

ASTRONOMICAL ALMANAC 2009



Pierpaolo Ricci

Questo Almanacco è il frutto di centinaia di ore di lavoro, la sua realizzazione ha richiesto infatti un anno intero.

Tutti i calcoli sono geocentrici e topocentrici: quest'anno quelli topocentrici sono per l'Italia, l'anno prossimo (2010) saranno estesi anche alle principali città mondiali.

Se il volume ti è piaciuto è gradita una donazione come contributo allo sviluppo di volumi futuri. Buona lettura.

Ricci Pier Paolo

IBAN IT17 D083 0534 4800 0000 0050 030

BIC CCRTIT2T77A

This Almanac is the result of hundreds hours of job, its creation has required in fact one whole year.

All the calculations are geocentric and topocentric: this year those topocentrics are for Italy, next year (2010) they will be also for the principal world cities.

If you like the volume it is pleasant a donation as contribution to the development of future volumes. Good reading.

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INTRODUCTION

After the success of 2008 the Almanac of this year is more rich and renewed; a lot of tables have been elaborated with the modern theories VSOP87, DE405 and ELP2000-85 that allow precision in the calculations over the second. Also the graphs are more numerous and detailed, all coloured for an immediate and easy consultation. Toward the end of the year will begin the PHEMUs, the particular and rare phenomena concerning the occultations of the satellites of Jupiter and Saturn: you will find the relative charts in the sections devoted to the giant planets. In complex they are present 70 new chapters in the edition 2009 and almost 30 have been completely renewed. The massive structure of the data contained in this Almanac is turned to satisfy all the necessities of whom observes the sky, the professionalist or the amateur. They are included the phenomena that they will be visible by naked eye and those notable for the spectacularity and the rarity too. Besides the classical ephemerides of Sun, planets and Moon, they are data about conjunctions of every type, between planets, with the Moon, with the comets, the positions of the satellites of Jupiter and Saturn, the mutual phenomena between the same, the solar and lunar eclipses, the planetary and stellar groupings, the prospecta of visibility of the objects, the lunar and asteroidal occultations and so much other, all with many explanatory graphics.

The maximum precision has been set in the calculations and, except where otherwise suitable, every time is in Universal Time. Generally the events topocentric are in U.T., while those geocentric in TDT. The difference TDT-UT in 2009 will be 66 seconds. Sometimes they have also been included events that begin or end under the horizon but that they are visible during the twilights.

The charts are been created with softwares developed by me or available in Internet and all the data are adjourned.

Pierpaolo Ricci is born in the '70 in Milan (Italy), he is graduated in mechanical engineering at Polytechnic and currently he lives in Rovereto (TN, Italy), where he works in a metalmeccanic industry.

He is amateur of astronomy since the young age and he devoted his free time to the celestial mechanic writing numerous softwares for the calculation of phenomena of every type.

In the years 90 he take care of a scientific page on a monthly local magazine, writing articles about astronomy and astronautics.

Currently he collaborates for a local Astronomic Association and he manage an astronomical site, www.pierpaoloricci.it

On the cover : partial penumbral lunar eclipse, in the 2009 they are 3 eclipses of this type.

CALENDAR

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	T	S	S	W	F	M	W	S	T	T	S	T
2	F	M	M	T	S	T	T	S	W	F	M	W
3	S	T	T	F	S	W	F	M	T	S	T	T
4	S	W	W	S	M	T	S	T	F	S	W	F
5	M	T	T	S	T	F	S	W	S	M	T	S
6	T	F	F	M	W	S	M	T	S	T	F	S
7	W	S	S	T	T	S	T	F	M	W	S	M
8	T	S	S	W	F	M	W	S	T	T	S	T
9	F	M	M	T	S	T	T	S	W	F	M	W
10	S	T	T	F	S	W	F	M	T	S	T	T
11	S	W	W	S	M	T	S	T	F	S	W	F
12	M	T	T	S	T	F	S	W	S	M	T	S
13	T	F	F	M	W	S	M	T	S	T	F	S
14	W	S	S	T	T	S	T	F	M	W	S	M
15	T	S	S	W	F	M	W	S	T	T	S	T
16	F	M	M	T	S	T	T	S	W	F	M	W
17	S	T	T	F	S	W	F	M	T	S	T	T
18	S	W	W	S	M	T	S	T	F	S	W	F
19	M	T	T	S	T	F	S	W	S	M	T	S
20	T	F	F	M	W	S	M	T	S	T	F	S
21	W	S	S	T	T	S	T	F	M	W	S	M
22	T	S	S	W	F	M	W	S	T	T	S	T
23	F	M	M	T	S	T	T	S	W	F	M	W
24	S	T	T	F	S	W	F	M	T	S	T	T
25	S	W	W	S	M	T	S	T	F	S	W	F
26	M	T	T	S	T	F	S	W	S	M	T	S
27	T	F	F	M	W	S	M	T	S	T	F	S
28	W	S	S	T	T	S	T	F	M	W	S	M
29	T		S	W	F	M	W	S	T	T	S	T
30	F		M	T	S	T	T	S	W	F	M	W
31	S		T		S		F	M		S		T

PERPETUAL CALENDAR

CENTURY						
0	100	200	300	400	500	600
700	800	900	1000	1100	1200	1300
1400	1500			1500	1600	
1700		1800		1900	2000	
2100		2200		2300	2400	
2500		2600		2700	2800	

SUNDAY CODE							YEARS			
DC	ED	FE	GF	AG	BA	CB	00			
B	C	D	E	F	G	A	01	29	57	85
A	B	C	D	E	F	G	02	30	58	86
G	A	B	C	D	E	F	03	31	59	87
FE	GF	AG	BA	CB	DC	ED	04	32	60	88
D	E	F	G	A	B	C	05	33	61	89
C	D	E	F	G	A	B	06	34	62	90
B	C	D	E	F	G	A	07	35	63	91
AG	BA	CB	DC	ED	FE	GF	08	36	64	92
F	G	A	B	C	D	E	09	37	65	93
E	F	G	A	B	C	D	10	38	66	94
D	E	F	G	A	B	C	11	39	67	95
CB	DC	ED	FE	GF	AG	BA	12	40	68	96
A	B	C	D	E	F	G	13	41	69	97
G	A	B	C	D	E	F	14	42	70	98
F	G	A	B	C	D	E	15	43	71	99
ED	FE	GF	AG	BA	CB	DC	16	44	72	
C	D	E	F	G	A	B	17	45	73	
B	C	D	E	F	G	A	18	46	74	
A	B	C	D	E	F	G	19	47	75	
GF	AG	BA	CB	DC	ED	FE	20	48	76	
E	F	G	A	B	C	D	21	49	77	
D	E	F	G	A	B	C	22	50	78	
C	D	E	F	G	A	B	23	51	79	
BA	CB	DC	ED	FE	GF	AG	24	52	80	
G	A	B	C	D	E	F	25	53	81	
F	G	A	B	C	D	E	26	54	82	
E	F	G	A	B	C	D	27	55	83	
DC	ED	FE	GF	AG	BA	CB	28	56	84	

MONTHS										
january, october		A	B	C	D	E	F	G		
february, march, november		D	E	F	G	A	B	C		
april, july		G	A	B	C	D	E	F		
may		B	C	D	E	F	G	A		
june		E	F	G	A	B	C	D		
august		C	D	E	F	G	A	B		
september, december		F	G	A	B	C	D	E		

DAYS									
1	8	15	22	29	S	S	F	T	W
2	9	16	23	30	M	S	S	F	T
3	10	17	24	31	T	M	S	S	F
4	11	18	25		W	T	M	S	S
5	12	19	26		T	W	T	M	S
6	13	20	27		F	T	W	T	M
7	14	21	28		S	F	T	W	T

How to use: set a date (for example 06-july-2009), find the Sunday code (in the leap years they are two, the first for january and february, and the second for the others months) in the cross of the column of the century (in this example 2000) and the row of the last two figures of the year (in this case 09): D. In the dates since 1500 to 4-10-1582 we use the second column, for the julian calendar, since 15-10-1582 al 1599 we use the fifth column, for the Gregorian Calendar.

The days from 5 october to 14 october 1582 don't exist.

We look then, in the sector of the months, in what column the letter appears on the same horizontal line of the considered month (July): in our case, in the fifth column. Finally, in the same vertical column (the fifth), in the sector of the days, we individualize the day of the week that appears to the intersection with the line in which it is the day (6) of the considered month: and we have that it is M Monday.

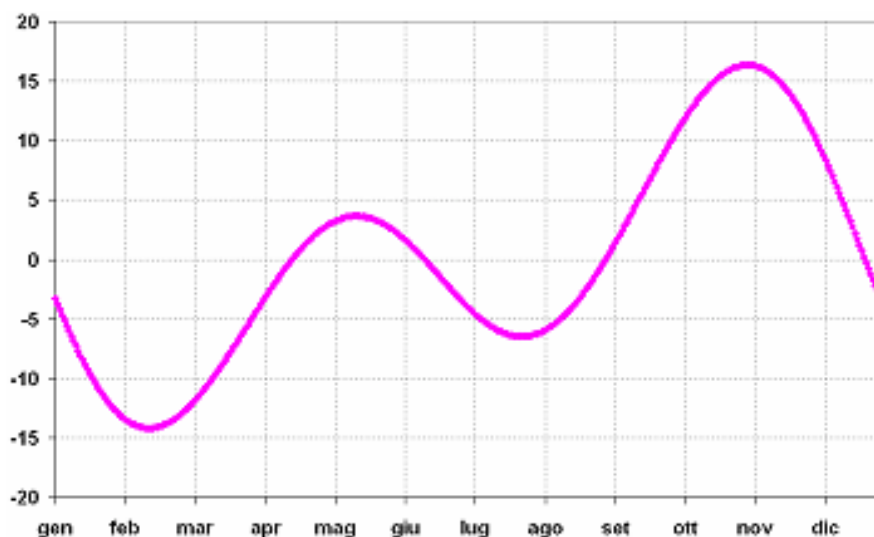
EASTER

07/04/1901	25/03/1951	15/04/2001	02/04/2051
30/03/1902	13/04/1952	31/03/2002	21/04/2052
12/04/1903	05/04/1953	20/04/2003	06/04/2053
03/04/1904	18/04/1954	11/04/2004	29/03/2054
23/04/1905	10/04/1955	27/03/2005	18/04/2055
15/04/1906	01/04/1956	16/04/2006	02/04/2056
31/03/1907	21/04/1957	08/04/2007	22/04/2057
19/04/1908	06/04/1958	23/03/2008	14/04/2058
11/04/1909	29/03/1959	12/04/2009	30/03/2059
27/03/1910	17/04/1960	04/04/2010	18/04/2060
16/04/1911	02/04/1961	24/04/2011	10/04/2061
07/04/1912	22/04/1962	08/04/2012	26/03/2062
23/03/1913	14/04/1963	31/03/2013	15/04/2063
12/04/1914	29/03/1964	20/04/2014	06/04/2064
04/04/1915	18/04/1965	05/04/2015	29/03/2065
23/04/1916	10/04/1966	27/03/2016	11/04/2066
08/04/1917	26/03/1967	16/04/2017	03/04/2067
31/03/1918	14/04/1968	01/04/2018	22/04/2068
20/04/1919	06/04/1969	21/04/2019	14/04/2069
04/04/1920	29/03/1970	12/04/2020	30/03/2070
27/03/1921	11/04/1971	04/04/2021	19/04/2071
16/04/1922	02/04/1972	17/04/2022	10/04/2072
01/04/1923	22/04/1973	09/04/2023	26/03/2073
20/04/1924	14/04/1974	31/03/2024	15/04/2074
12/04/1925	30/03/1975	20/04/2025	07/04/2075
04/04/1926	18/04/1976	05/04/2026	19/04/2076
17/04/1927	10/04/1977	28/03/2027	11/04/2077
08/04/1928	26/03/1978	16/04/2028	03/04/2078
31/03/1929	15/04/1979	01/04/2029	23/04/2079
20/04/1930	06/04/1980	21/04/2030	07/04/2080
05/04/1931	19/04/1981	13/04/2031	30/03/2081
27/03/1932	11/04/1982	28/03/2032	19/04/2082
16/04/1933	03/04/1983	17/04/2033	04/04/2083
01/04/1934	22/04/1984	09/04/2034	26/03/2084
21/04/1935	07/04/1985	25/03/2035	15/04/2085
12/04/1936	30/03/1986	13/04/2036	31/03/2086
28/03/1937	19/04/1987	05/04/2037	20/04/2087
17/04/1938	03/04/1988	25/04/2038	11/04/2088
09/04/1939	26/03/1989	10/04/2039	03/04/2089
24/03/1940	15/04/1990	01/04/2040	16/04/2090
13/04/1941	31/03/1991	21/04/2041	08/04/2091
05/04/1942	19/04/1992	06/04/2042	30/03/2092
25/04/1943	11/04/1993	29/03/2043	12/04/2093
09/04/1944	03/04/1994	17/04/2044	04/04/2094
01/04/1945	16/04/1995	09/04/2045	24/04/2095
21/04/1946	07/04/1996	25/03/2046	15/04/2096
06/04/1947	30/03/1997	14/04/2047	31/03/2097
28/03/1948	12/04/1998	05/04/2048	20/04/2098
17/04/1949	04/04/1999	18/04/2049	12/04/2099
09/04/1950	23/04/2000	10/04/2050	28/03/2100

EQUATION OF TIME

The equation of the time is the difference between the true solar time and the medium solar time. It is showed in minutes and seconds. Such difference depends on the fact that the medium solar time is based on the movement of a hypothetical Sun (the medium Sun) that moves with uniform motion along the celestial equator during the year, while the annual motion of the true Sun along the ecliptica is not uniform.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	-3m 40s	-13m 37s	-12m 19s	-3m 50s	2m 55s	2m 9s	-3m 54s	-6m 20s	0m 3s	10m 23s	16m 25s	10m 55s
2	-4m 8s	-13m 44s	-12m 7s	-3m 32s	3m 2s	2m 0s	-4m 5s	-6m 15s	0m 22s	10m 42s	16m 26s	10m 32s
3	-4m 36s	-13m 51s	-11m 54s	-3m 14s	3m 9s	1m 50s	-4m 16s	-6m 10s	0m 42s	11m 1s	16m 26s	10m 9s
4	-5m 3s	-13m 56s	-11m 41s	-2m 57s	3m 14s	1m 40s	-4m 27s	-6m 5s	1m 1s	11m 20s	16m 25s	9m 45s
5	-5m 30s	-14m 1s	-11m 28s	-2m 40s	3m 19s	1m 29s	-4m 37s	-5m 59s	1m 22s	11m 38s	16m 24s	9m 20s
6	-5m 56s	-14m 5s	-11m 14s	-2m 22s	3m 24s	1m 18s	-4m 47s	-5m 52s	1m 42s	11m 56s	16m 22s	8m 55s
7	-6m 22s	-14m 8s	-11m 0s	-2m 6s	3m 28s	1m 7s	-4m 57s	-5m 45s	2m 2s	12m 13s	16m 19s	8m 29s
8	-6m 47s	-14m 11s	-10m 45s	-1m 49s	3m 32s	0m 56s	-5m 6s	-5m 37s	2m 23s	12m 30s	16m 15s	8m 3s
9	-7m 12s	-14m 13s	-10m 30s	-1m 32s	3m 35s	0m 44s	-5m 15s	-5m 29s	2m 44s	12m 47s	16m 10s	7m 36s
10	-7m 36s	-14m 13s	-10m 14s	-1m 16s	3m 37s	0m 32s	-5m 23s	-5m 20s	3m 5s	13m 3s	16m 4s	7m 9s
11	-8m 0s	-14m 13s	-9m 59s	-1m 0s	3m 39s	0m 20s	-5m 31s	-5m 10s	3m 26s	13m 18s	15m 58s	6m 42s
12	-8m 23s	-14m 13s	-9m 42s	-0m 44s	3m 40s	0m 8s	-5m 39s	-5m 0s	3m 47s	13m 33s	15m 50s	6m 14s
13	-8m 46s	-14m 11s	-9m 26s	-0m 29s	3m 41s	-0m 4s	-5m 46s	-4m 49s	4m 8s	13m 48s	15m 42s	5m 46s
14	-9m 7s	-14m 9s	-9m 9s	-0m 14s	3m 41s	-0m 17s	-5m 53s	-4m 38s	4m 30s	14m 2s	15m 33s	5m 17s
15	-9m 29s	-14m 6s	-8m 53s	0m 1s	3m 40s	-0m 30s	-5m 59s	-4m 27s	4m 51s	14m 15s	15m 23s	4m 48s
16	-9m 49s	-14m 3s	-8m 36s	0m 15s	3m 39s	-0m 43s	-6m 5s	-4m 14s	5m 12s	14m 28s	15m 12s	4m 19s
17	-10m 9s	-13m 59s	-8m 18s	0m 29s	3m 37s	-0m 56s	-6m 10s	-4m 2s	5m 34s	14m 40s	15m 0s	3m 49s
18	-10m 28s	-13m 54s	-8m 1s	0m 42s	3m 35s	-1m 9s	-6m 14s	-3m 49s	5m 55s	14m 52s	14m 48s	3m 20s
19	-10m 47s	-13m 48s	-7m 43s	0m 55s	3m 32s	-1m 22s	-6m 19s	-3m 35s	6m 16s	15m 3s	14m 34s	2m 50s
20	-11m 4s	-13m 42s	-7m 26s	1m 8s	3m 29s	-1m 35s	-6m 22s	-3m 21s	6m 38s	15m 13s	14m 20s	2m 20s
21	-11m 21s	-13m 35s	-7m 8s	1m 20s	3m 25s	-1m 48s	-6m 25s	-3m 6s	6m 59s	15m 23s	14m 5s	1m 51s
22	-11m 38s	-13m 28s	-6m 50s	1m 32s	3m 21s	-2m 1s	-6m 28s	-2m 51s	7m 20s	15m 32s	13m 49s	1m 21s
23	-11m 53s	-13m 19s	-6m 32s	1m 43s	3m 16s	-2m 14s	-6m 30s	-2m 35s	7m 41s	15m 41s	13m 33s	0m 51s
24	-12m 8s	-13m 11s	-6m 14s	1m 54s	3m 10s	-2m 27s	-6m 31s	-2m 19s	8m 2s	15m 49s	13m 16s	0m 21s
25	-12m 22s	-13m 1s	-5m 56s	2m 4s	3m 4s	-2m 40s	-6m 32s	-2m 3s	8m 23s	15m 56s	12m 58s	-0m 9s
26	-12m 35s	-12m 52s	-5m 38s	2m 14s	2m 57s	-2m 53s	-6m 32s	-1m 46s	8m 43s	16m 2s	12m 39s	-0m 38s
27	-12m 47s	-12m 41s	-5m 20s	2m 23s	2m 50s	-3m 6s	-6m 31s	-1m 29s	9m 4s	16m 8s	12m 19s	-1m 8s
28	-12m 59s	-12m 30s	-5m 2s	2m 32s	2m 43s	-3m 18s	-6m 30s	-1m 11s	9m 24s	16m 13s	11m 59s	-1m 37s
29	-13m 10s		-4m 44s	2m 40s	2m 35s	-3m 30s	-6m 29s	-0m 53s	9m 44s	16m 17s	11m 38s	-2m 6s
30	-13m 19s		-4m 26s	2m 48s	2m 27s	-3m 42s	-6m 26s	-0m 35s	10m 4s	16m 20s	11m 17s	-2m 35s
31	-13m 28s		-4m 8s		2m 18s		-6m 23s	-0m 16s		16m 23s		-3m 4s



Example: on July 6 the Sun passes in meridian at 12.05 o'clock, 5 minutes late in comparison to the midday of our clock

TIME ZONES

UTC-12 : Isola Baker, Isola Howland

UTC-11 (BEST - Bering Standard Time) : Isole Midway ,Niue ,Samoa ,Samoa Americane

UTC-10 (HST - Hawaii-Aleutian Standard Time) : Atollo Johnston , Polinesia Francese (Tahiti, Arcipelago Tuamotu, Isole Tubuai) ,Stati Uniti (Hawaii) ,Stati Uniti (Isole Aleutine dell'Alaska)*

UTC-9:30 : Polinesia Francese (Isole Marchesi)

UTC-9 (AKST - Alaska Standard Time) : Polinesia Francese (Isole Gambier) ,Stati Uniti (Alaska*)

UTC-8 (PST - Pacific Standard Time) : Canada (Columbia Britannica*, Yukon*), Messico (Bassa California*), Stati Uniti (California*, Idaho (settentrionale)*, Nevada*, Oregon *, Stato di Washington*)

UTC-7 (MST - Mountain Standard Time) : Canada (Alberta*,Territori del Nord-Ovest*,Nunavut*), Messico,Stati Uniti (Arizona, Colorado*, Idaho (meridionale)*, Montana*, Nebraska (occidentale)*, Nuovo Messico*, Dakota del Nord*, Oregon*, Dakota del Sud*, Utah*, Wyoming*)

UTC-6 (CST - Central Standard Time) : Belize , Canada (Manitoba*, Nunavut (Isola Southampton), Nunavut (centrale)*, Ontario (occidentale)*, Saskatchewan) , Cile (Isola di Pasqua), Costa Rica , Ecuador (Isole Galapagos), El Salvador, Guatemala, Honduras, Messico* (Città del Messico e tutti gli stati non menzionati), Nicaragua, Stati Uniti (Alabama*, Arkansas*, Illinois*, Indiana*, Iowa*, Kansas*, Kentucky (occidentale)*, Louisiana*, Minnesota*, Mississippi*, Missouri*, Nebraska (orientale)*, Dakota del Nord*, Oklahoma*, Dakota del Sud (orientale)*, Tennessee centrale e occidentale)*, Texas*, Wisconsin*)

UTC-5 (EST - Eastern Standard Time) : Brasile (Acre) ,Canada (Nunavut (orientale)*, Ontario*, Quebec*), Colombia , Cuba*, Ecuador, Giamaica, Haiti, Isole Cayman, Isole Turks e Caicos* , Panamá, Perù, Stati Uniti (Connecticut*, Delaware*, Distretto di Columbia*, Florida*, Georgia*, Indiana (gran parte dello stato), Kentucky (orientale e centrale)*, Maine*, Maryland*, Massachusetts*, Michigan*, New Hampshire*, New Jersey*, New York*, Carolina del Nord*, Ohio*, Pennsylvania*, Rhode Island*, Carolina del Sud*, Tennessee (orientale)*, Vermont*, Virginia*, Virginia Occidentale*)

UTC-4 (AST - Atlantic Standard Time) : Anguilla , Antigua e Barbuda, Antille Olandesi, Aruba, Barbados, Bolivia, Brasile (Amazonas, Mato Grosso*, Mato Grosso do Sul*, Para (occidentale), Rondonia, Roraima), Canada (Labrador*, New Brunswick*, Nuova Scozia*, Isola del Principe Edoardo*) , Cile*, Dominica, Grenada, Guadalupa , Guyana, Isole Falkland*, Isole Vergini, Martinica, Montserrat, Paraguay*, Porto Rico, Repubblica Dominicana, Saint Kitts e Nevis, Saint Vincent e le Grenadine, Santa Lucia, Trinidad e Tobago, Venezuela

UTC-3:30 (NST - Newfoundland Standard Time) : Canada (Terranova*)

UTC-3 : Argentina ,Bahamas* ,Brasile (Alagoas, Amapa, Bahia*, Ceara, Distrito Federal*, Espirito Santo*, Goias*, Maranhao, Minas Gerais*, Para (orientale), Paraiba, Parana*, Pernambuco, Piaui, Rio de Janeiro*, Rio Grande do Norte, Rio Grande do Sul*, Santa Catarina*, Sao Paulo*, Sergipe, Tocantins*) ,Groenlandia, Guiana Francese* ,Saint Pierre e Miquelon* ,Suriname ,Uruguay

UTC-2 : Bermuda* , Brasile (Fernando de Noronha)

UTC-1 : Capo Verde , Portogallo (Azzorre*)

UTC (WET - West European Time) : Burkina Faso , Costa d'Avorio , Gambia ,Ghana ,Guinea ,Guinea-Bissau , Irlanda* , Islanda ,Isole Faroe* ,Liberia ,Mali ,Mauritania ,Marocco ,Portogallo* ,Regno Unito* , Sant'Elena ,São Tomé e Príncipe ,Senegal ,Sierra Leone ,Spagna* (Canarie) ,Togo

UTC+1 (CET - Central European Time) : Albania* ,Andorra* ,Angola ,Austria* ,Belgio* ,Benin ,Bosnia-Erzegovina* ,Camerun ,Ciad ,Croazia* ,Danimarca* ,Francia* ,Gabon ,Germania* ,Gibilterra* ,Guinea Equatoriale ,Italia* ,Isole Svalbard e Jan Mayen*,Liechtenstein* ,Lussemburgo* ,Macedonia* , Malta* Principato di Monaco* ,Montenegro* ,Namibia* ,Niger ,Nigeria ,Norvegia* ,Paesi Bassi* , Polonia* , Repubblica Ceca* ,Repubblica Centrafricana ,Repubblica del Congo ,Repubblica Democratica del Congo (Kinshasa, Bandundu, Bas-Congo, Équateur) ,San Marino* ,Serbia* ,Slovacchia* ,Slovenia* ,Spagna*, Svezia*, Svizzera* ,Tunisia* ,Ungheria*

UTC+2 (EET - East European Time) : Bielorussia* ,Botswana ,Bulgaria* ,Burundi ,Cipro* ,Cisgiordania* , Egitto* ,Estonia* ,Finlandia* ,Giordania ,Grecia* ,Israele* ,Lettonia* ,Lesotho ,Libano* ,Libia ,Lituania* ,Malawi ,Moldavia* ,Mozambico ,Repubblica Democratica del Congo (Kasai-Occidental, Kasai-Oriental, Alto Zaire, Katanga) ,Romania* ,Russia (Zona 1*, compresa Kaliningrad) ,Ruanda ,Striscia di Gaza* ,Sudafrica , Swaziland ,Siria* ,Turchia* ,Ucraina* ,Zambia ,Zimbabwe

UTC+3 (MSK - Moscow Time) : Arabia Saudita , Bahrain , Comore ,Eritrea ,Etiopia ,Gibuti ,Iraq* ,Kenya , Kuwait ,Madagascar ,Mayotte ,Qatar ,Russia (Zona 2*, include Mosca e San Pietroburgo; questo fuso orario si applica anche alle ferrovie di tutta la Russia) ,Somalia ,Sudan ,Tanzania ,Uganda ,Yemen

UTC+3:30 : Iran

UTC+4 : Emirati Arabi Uniti , Georgia , Mauritius , Oman ,Reunion ,Russia (Zona 3*) ,Seychelles

UTC+4:30 : Afghanistan

UTC+5 : Armenia , Azerbaidjan* ,Kazakistan (Occidentale)* ,Maldive ,Pakistan ,Russia (Zona 4*, comprende Ekaterinburg e Perm) ,Tagikistan ,Turkmenistan ,Uzbekistan

UTC+5:30 (IST - Indian Standard Time) : India ,Sri Lanka

UTC+5:45 : Nepal

UTC+6 : Bangladesh ,Bhutan ,Kazakistan (orientale) ,Kirghizistan ,Russia (Zona 5*, comprende Novosibirsk e Omsk) ,Sri Lanka

UTC+6:30 : Isole Cocos , Myanmar

UTC+7 : Cambogia ,Indonesia (occidentale) ,Isola Christmas (Australia) ,Laos ,Russia (Zona 6*) , Thailandia ,Vietnam

UTC+8 (AWST - Australian Western Standard Time) : Australia (Australia Occidentale) ,Brunei ,Cina (continentale),Filippine ,Hong Kong ,Indonesia (centrale),Macao ,Malesia ,Mongolia ,Russia (Zona 7*),Singapore, Taiwan

Si noti che l'intera Cina ha lo stesso orario, il che rende questo fuso orario eccezionalmente ampio. All'estremità occidentale della Cina il Sole raggiunge lo zenit alle 15:00, all'estremità orientale alle 11:00.

UTC+8:45 : Caiguna, Eucla (Australia Occidentale)

UTC+9 : Corea del Nord ,Corea del Sud (KST - tempo standard della Corea) ,Giappone (JST - Tempo standard del Giappone) ,Indonesia (orientale) ,Palau ,Russia (Zona 8*, comprende Yakutsk) ,Timor Est

UTC+9:30 (ACST - Australian Central Standard Time) : Australia (Broken Hill (Nuovo Galles del Sud); Territori del Nord; Australia Meridionale*)

UTC+10 (AEST - Australian Eastern Standard Time) : Australia (Australian Capital Territory*, Nuovo Galles del Sud* (eccetto Broken Hill), Queensland, Victoria*, Tasmania*) ,Guam ,Isole Cook ,Isole Marianne Settentrionali, Papua Nuova Guinea ,Russia (Zona 9*, comprende Vladivostok) ,Stati Federati di Micronesia

UTC+10:30 : Australia (Isola Lord Howe*) (DST solo 0:30)

UTC+11 : Isole Salomone ,Nuova Caledonia ,Russia (Zona 10*) ,Stati Federati di Micronesia (Kosrae e Pohnpei), Vanuatu

UTC+11:30 : Isole Norfolk

UTC+12 : Figi* ,Isola Wake ,Isole Marshall ,Kiribati (Isole Gilbert) ,Nauru ,Nuova Zelanda (Aotearoa)* , Russia (Zona 11*) ,Tuvalu ,Wallis e Futuna

UTC+12:45 : Nuova Zelanda (Aotearoa) (Isole Chatham*)

UTC+13 : Kiribati (Isole Phoenix) , Tonga

UTC+14 : Kiribati (Isole della Linea o Sporadi equatoriali)

* daylight saving time in the summer

DAYLIGHT SAVING

Year	Start		End	
1966	00:00	22 may	24:00	24 september
1967	"	28 may	01:00	24 september
1968	"	26 may	"	22 september
1969	"	1 june	"	28 september
1970	"	31 may	"	27 september
1971	"	23 may	"	26 september
1972	"	28 may	"	1 october
1973	"	3 june	"	30 september
1974	"	26 may	"	29 september
1975	"	1 june	"	28 september
1976	"	30 may	"	26 september
1977	"	22 may	"	25 september
1978	"	28 may	"	1 october
1979	"	27 may	"	30 september
1980	02:00	6 april	03:00	28 september
1981	"	29 march	"	27 september
1982	"	28 march	"	26 september
1983	"	27 march	"	25 september
1984	"	25 march	"	30 september
1985	"	31 march	"	29 september
1986	"	30 march	"	28 september
1987	"	29 march	"	27 september
1988	"	27 march	"	25 september
1989	"	26 march	"	24 september
1990	"	25 march	"	30 september
1991	"	31 march	"	29 september
1992	"	29 march	"	27 september
1993	"	28 march	"	26 september
1994	"	27 march	"	25 september
1995	"	26 march	"	24 september
1996	"	31 march	"	27 october
1997	"	30 march	"	26 october
1998	"	29 march	"	25 october
1999	"	28 march	"	31 october
2000	"	26 march	"	29 october
2001	"	25 march	"	28 october
2002	"	31 march	"	27 october
2003	"	30 march	"	26 october
2004	"	28 march	"	31 october
2005	"	27 march	"	30 october
2006	"	26 march	"	29 october
2007	"	25 march	"	28 october
2008	"	30 march	"	26 october
2009	"	29 march	"	25 october
2010	"	28 march	"	31 october
2011	"	27 march	"	30 october

SIDEREAL TIME

Sidereal time in Rome

Date	Time	Apparent sidereal time			Greenwich Medium			Local apparent sidereal time		
		h	m	s	h	m	s	h	m	s
2454832.50000	2009 Jan 1 0 00 00	6	43	07.1398	6	43	06.3212	7	31	07.1398
2454833.50000	2009 Jan 2 0 00 00	6	47	03.6932	6	47	02.8765	7	35	03.6932
2454834.50000	2009 Jan 3 0 00 00	6	51	00.2451	6	50	59.4319	7	39	00.2451
2454835.50000	2009 Jan 4 0 00 00	6	54	56.7968	6	54	55.9873	7	42	56.7968
2454836.50000	2009 Jan 5 0 00 00	6	58	53.3496	6	58	52.5426	7	46	53.3496
2454837.50000	2009 Jan 6 0 00 00	7	02	49.9051	7	02	49.0980	7	50	49.9051
2454838.50000	2009 Jan 7 0 00 00	7	06	46.4644	7	06	45.6534	7	54	46.4644
2454839.50000	2009 Jan 8 0 00 00	7	10	43.0280	7	10	42.2087	7	58	43.0280
2454840.50000	2009 Jan 9 0 00 00	7	14	39.5952	7	14	38.7641	8	02	39.5952
2454841.50000	2009 Jan 10 0 00 00	7	18	36.1641	7	18	35.3195	8	06	36.1641
2454842.50000	2009 Jan 11 0 00 00	7	22	32.7319	7	22	31.8748	8	10	32.7319
2454843.50000	2009 Jan 12 0 00 00	7	26	29.2963	7	26	28.4302	8	14	29.2963
2454844.50000	2009 Jan 13 0 00 00	7	30	25.8559	7	30	24.9856	8	18	25.8559
2454845.50000	2009 Jan 14 0 00 00	7	34	22.4111	7	34	21.5410	8	22	22.4111
2454846.50000	2009 Jan 15 0 00 00	7	38	18.9631	7	38	18.0983	8	26	18.9631
2454847.50000	2009 Jan 16 0 00 00	7	42	15.5139	7	42	14.6517	8	30	15.5139
2454848.50000	2009 Jan 17 0 00 00	7	46	12.0652	7	46	11.2071	8	34	12.0652
2454849.50000	2009 Jan 18 0 00 00	7	50	08.6181	7	50	07.7624	8	38	08.6181
2454850.50000	2009 Jan 19 0 00 00	7	54	05.1732	7	54	04.3178	8	42	05.1732
2454851.50000	2009 Jan 20 0 00 00	7	58	01.7309	7	58	00.8732	8	46	01.7309
2454852.50000	2009 Jan 21 0 00 00	8	01	58.2907	8	01	57.4285	8	49	58.2907
2454853.50000	2009 Jan 22 0 00 00	8	05	54.8521	8	05	53.9839	8	53	54.8521
2454854.50000	2009 Jan 23 0 00 00	8	09	51.4143	8	09	50.5393	8	57	51.4143
2454855.50000	2009 Jan 24 0 00 00	8	13	47.9765	8	13	47.0946	9	01	47.9765
2454856.50000	2009 Jan 25 0 00 00	8	17	44.5376	8	17	43.6500	9	05	44.5376
2454857.50000	2009 Jan 26 0 00 00	8	21	41.0969	8	21	40.2054	9	09	41.0969
2454858.50000	2009 Jan 27 0 00 00	8	25	37.6537	8	25	36.7607	9	13	37.6537
2454859.50000	2009 Jan 28 0 00 00	8	29	34.2079	8	29	33.3161	9	17	34.2079
2454860.50000	2009 Jan 29 0 00 00	8	33	30.7597	8	33	29.8715	9	21	30.7597
2454861.50000	2009 Jan 30 0 00 00	8	37	27.3097	8	37	26.4268	9	25	27.3097
2454862.50000	2009 Jan 31 0 00 00	8	41	23.8591	8	41	22.9822	9	29	23.8591
2454863.50000	2009 Feb 1 0 00 00	8	45	20.4093	8	45	19.5376	9	33	20.4093
2454864.50000	2009 Feb 2 0 00 00	8	49	16.9615	8	49	16.0930	9	37	16.9615
2454865.50000	2009 Feb 3 0 00 00	8	53	13.5171	8	53	12.6483	9	41	13.5171
2454866.50000	2009 Feb 4 0 00 00	8	57	10.0764	8	57	09.2037	9	45	10.0764
2454867.50000	2009 Feb 5 0 00 00	9	01	06.6393	9	01	05.7591	9	49	06.6393
2454868.50000	2009 Feb 6 0 00 00	9	05	03.2045	9	05	02.3144	9	53	03.2045
2454869.50000	2009 Feb 7 0 00 00	9	08	59.7698	9	08	58.8698	9	56	59.7698
2454870.50000	2009 Feb 8 0 00 00	9	12	56.3330	9	12	55.4252	10	00	56.3330
2454871.50000	2009 Feb 9 0 00 00	9	16	52.8921	9	16	51.9805	10	04	52.8921
2454872.50000	2009 Feb 10 0 00 00	9	20	49.4466	9	20	48.5359	10	08	49.4466
2454873.50000	2009 Feb 11 0 00 00	9	24	45.9972	9	24	45.0913	10	12	45.9972
2454874.50000	2009 Feb 12 0 00 00	9	28	42.5456	9	28	41.6466	10	16	42.5456
2454875.50000	2009 Feb 13 0 00 00	9	32	39.0937	9	32	38.2020	10	20	39.0937
2454876.50000	2009 Feb 14 0 00 00	9	36	35.6432	9	36	34.7574	10	24	35.6432
2454877.50000	2009 Feb 15 0 00 00	9	40	32.1949	9	40	31.3127	10	28	32.1949
2454878.50000	2009 Feb 16 0 00 00	9	44	28.7492	9	44	27.8681	10	32	28.7492
2454879.50000	2009 Feb 17 0 00 00	9	48	25.3059	9	48	24.4235	10	36	25.3059
2454880.50000	2009 Feb 18 0 00 00	9	52	21.8643	9	52	20.9788	10	40	21.8643
2454881.50000	2009 Feb 19 0 00 00	9	56	18.4238	9	56	17.5342	10	44	18.4238
2454882.50000	2009 Feb 20 0 00 00	10	00	14.9835	10	00	14.0896	10	48	14.9835
2454883.50000	2009 Feb 21 0 00 00	10	04	11.5423	10	04	10.6450	10	52	11.5423
2454884.50000	2009 Feb 22 0 00 00	10	08	08.0996	10	08	07.2003	10	56	08.0996
2454885.50000	2009 Feb 23 0 00 00	10	12	04.6546	10	12	03.7557	11	00	04.6546
2454886.50000	2009 Feb 24 0 00 00	10	16	01.2070	10	16	00.3111	11	04	01.2070
2454887.50000	2009 Feb 25 0 00 00	10	19	57.7568	10	19	56.8664	11	07	57.7568
2454888.50000	2009 Feb 26 0 00 00	10	23	54.3046	10	23	53.4218	11	11	54.3046
2454889.50000	2009 Feb 27 0 00 00	10	27	50.8515	10	27	49.9772	11	15	50.8515
2454890.50000	2009 Feb 28 0 00 00	10	31	47.3988	10	31	46.5325	11	19	47.3988
2454891.50000	2009 Mar 1 0 00 00	10	35	43.9480	10	35	43.0879	11	23	43.9480
2454892.50000	2009 Mar 2 0 00 00	10	39	40.5003	10	39	39.6433	11	27	40.5003
2454893.50000	2009 Mar 3 0 00 00	10	43	37.0562	10	43	36.1986	11	31	37.0562
2454894.50000	2009 Mar 4 0 00 00	10	47	33.6156	10	47	32.7540	11	35	33.6156
2454895.50000	2009 Mar 5 0 00 00	10	51	30.1774	10	51	29.3094	11	39	30.1774
2454896.50000	2009 Mar 6 0 00 00	10	55	26.7399	10	55	25.8647	11	43	26.7399
2454897.50000	2009 Mar 7 0 00 00	10	59	23.3010	10	59	22.4201	11	47	23.3010
2454898.50000	2009 Mar 8 0 00 00	11	03	19.8590	11	03	18.9755	11	51	19.8590
2454899.50000	2009 Mar 9 0 00 00	11	07	16.4129	11	07	15.5308	11	55	16.4129
2454900.50000	2009 Mar 10 0 00 00	11	11	12.9628	11	11	12.0862	11	59	12.9628
2454901.50000	2009 Mar 11 0 00 00	11	15	09.5100	11	15	08.6416	12	03	09.5100
2454902.50000	2009 Mar 12 0 00 00	11	19	06.0561	11	19	05.1970	12	07	06.0561
2454903.50000	2009 Mar 13 0 00 00	11	23	02.6030	11	23	01.7523	12	11	02.6030
2454904.50000	2009 Mar 14 0 00 00	11	26	59.1520	11	26	58.3077	12	14	59.1520

Date				Apparent sidereal time						Greenwich Medium			Local apparent sidereal time		
Julian day	YYYY	MM	DD	h	m	s	h	m	s	h	m	s	h	m	s
2454905.50000	2009	Mar	15	0	00	00	11	30	55.7037	11	30	54.8631	12	18	55.7037
2454906.50000	2009	Mar	16	0	00	00	11	34	52.2581	11	34	51.4184	12	22	52.2581
2454907.50000	2009	Mar	17	0	00	00	11	38	48.8146	11	38	47.9738	12	26	48.8146
2454908.50000	2009	Mar	18	0	00	00	11	42	45.3725	11	42	44.5292	12	30	45.3725
2454909.50000	2009	Mar	19	0	00	00	11	46	41.9309	11	46	41.0845	12	34	41.9309
2454910.50000	2009	Mar	20	0	00	00	11	50	38.4889	11	50	37.6399	12	38	38.4889
2454911.50000	2009	Mar	21	0	00	00	11	54	35.0455	11	54	34.1953	12	42	35.0455
2454912.50000	2009	Mar	22	0	00	00	11	58	31.6001	11	58	30.7506	12	46	31.6001
2454913.50000	2009	Mar	23	0	00	00	12	02	28.1524	12	02	27.3060	12	50	28.1524
2454914.50000	2009	Mar	24	0	00	00	12	06	24.7021	12	06	23.8614	12	54	24.7021
2454915.50000	2009	Mar	25	0	00	00	12	10	21.2496	12	10	20.4167	12	58	21.2496
2454916.50000	2009	Mar	26	0	00	00	12	14	17.7959	12	14	16.9721	13	02	17.7959
2454917.50000	2009	Mar	27	0	00	00	12	18	14.3422	12	18	13.5275	13	06	14.3422
2454918.50000	2009	Mar	28	0	00	00	12	22	10.8901	12	22	10.0828	13	10	10.8901
2454919.50000	2009	Mar	29	0	00	00	12	26	07.4410	12	26	06.6382	13	14	07.4410
2454920.50000	2009	Mar	30	0	00	00	12	30	03.9957	12	30	03.1936	13	18	03.9957
2454921.50000	2009	Mar	31	0	00	00	12	34	00.5542	12	33	59.7489	13	22	00.5542
2454922.50000	2009	Apr	1	0	00	00	12	37	57.1153	12	37	56.3043	13	25	57.1153
2454923.50000	2009	Apr	2	0	00	00	12	41	53.6775	12	41	52.8597	13	29	53.6775
2454924.50000	2009	Apr	3	0	00	00	12	45	50.2387	12	45	49.4151	13	33	50.2387
2454925.50000	2009	Apr	4	0	00	00	12	49	46.7972	12	49	45.9704	13	37	46.7972
2454926.50000	2009	Apr	5	0	00	00	12	53	43.3521	12	53	42.5258	13	41	43.3521
2454927.50000	2009	Apr	6	0	00	00	12	57	39.9031	12	57	39.0812	13	45	39.9031
2454928.50000	2009	Apr	7	0	00	00	13	01	36.4512	13	01	35.6365	13	49	36.4512
2454929.50000	2009	Apr	8	0	00	00	13	05	32.9979	13	05	32.1919	13	53	32.9979
2454930.50000	2009	Apr	9	0	00	00	13	09	29.5448	13	09	28.7473	13	57	29.5448
2454931.50000	2009	Apr	10	0	00	00	13	13	26.0934	13	13	25.3026	14	01	26.0934
2454932.50000	2009	Apr	11	0	00	00	13	17	22.6446	13	17	21.8580	14	05	22.6446
2454933.50000	2009	Apr	12	0	00	00	13	21	19.1987	13	21	18.4134	14	09	19.1987
2454934.50000	2009	Apr	13	0	00	00	13	25	15.7553	13	25	14.9687	14	13	15.7553
2454935.50000	2009	Apr	14	0	00	00	13	29	12.3138	13	29	11.5241	14	17	12.3138
2454936.50000	2009	Apr	15	0	00	00	13	33	08.8731	13	33	08.0795	14	21	08.8731
2454937.50000	2009	Apr	16	0	00	00	13	37	05.4323	13	37	04.6348	14	25	05.4323
2454938.50000	2009	Apr	17	0	00	00	13	41	01.9904	13	41	01.1902	14	29	01.9904
2454939.50000	2009	Apr	18	0	00	00	13	44	58.5469	13	44	57.7456	14	32	58.5469
2454940.50000	2009	Apr	19	0	00	00	13	48	55.1011	13	48	54.3009	14	36	55.1011
2454941.50000	2009	Apr	20	0	00	00	13	52	51.6529	13	52	50.8563	14	40	51.6529
2454942.50000	2009	Apr	21	0	00	00	13	56	48.2025	13	56	47.4117	14	44	48.2025
2454943.50000	2009	Apr	22	0	00	00	14	00	44.7506	14	00	43.9671	14	48	44.7506
2454944.50000	2009	Apr	23	0	00	00	14	04	41.2982	14	04	40.5224	14	52	41.2982
2454945.50000	2009	Apr	24	0	00	00	14	08	37.8469	14	08	37.0778	14	56	37.8469
2454946.50000	2009	Apr	25	0	00	00	14	12	34.3983	14	12	33.6332	15	00	34.3983
2454947.50000	2009	Apr	26	0	00	00	14	16	30.9535	14	16	30.1885	15	04	30.9535
2454948.50000	2009	Apr	27	0	00	00	14	20	27.5130	14	20	26.7439	15	08	27.5130
2454949.50000	2009	Apr	28	0	00	00	14	24	24.0758	14	24	23.2993	15	12	24.0758
2454950.50000	2009	Apr	29	0	00	00	14	28	20.6402	14	28	19.8546	15	16	20.6402
2454951.50000	2009	Apr	30	0	00	00	14	32	17.2040	14	32	16.4100	15	20	17.2040
2454952.50000	2009	May	1	0	00	00	14	36	13.7653	14	36	12.9654	15	24	13.7653
2454953.50000	2009	May	2	0	00	00	14	40	10.3229	14	40	09.5207	15	28	10.3229
2454954.50000	2009	May	3	0	00	00	14	44	06.8767	14	44	06.0761	15	32	06.8767
2454955.50000	2009	May	4	0	00	00	14	48	03.4274	14	48	02.6315	15	36	03.4274
2454956.50000	2009	May	5	0	00	00	14	51	59.9764	14	51	59.1868	15	39	59.9764
2454957.50000	2009	May	6	0	00	00	14	55	56.5252	14	55	55.7422	15	43	56.5252
2454958.50000	2009	May	7	0	00	00	14	59	53.0754	14	59	52.2976	15	47	53.0754
2454959.50000	2009	May	8	0	00	00	15	03	49.6279	15	03	48.8529	15	51	49.6279
2454960.50000	2009	May	9	0	00	00	15	07	46.1832	15	07	45.4083	15	55	46.1832
2454961.50000	2009	May	10	0	00	00	15	11	42.7413	15	11	41.9637	15	59	42.7413
2454962.50000	2009	May	11	0	00	00	15	15	39.3014	15	15	38.5191	16	03	39.3014
2454963.50000	2009	May	12	0	00	00	15	19	35.8628	15	19	35.0744	16	07	35.8628
2454964.50000	2009	May	13	0	00	00	15	23	32.4243	15	23	31.6298	16	11	32.4243
2454965.50000	2009	May	14	0	00	00	15	27	28.9851	15	27	28.1852	16	15	28.9851
2454966.50000	2009	May	15	0	00	00	15	31	25.5444	15	31	24.7405	16	19	25.5444
2454967.50000	2009	May	16	0	00	00	15	35	22.1015	15	35	21.2959	16	23	22.1015
2454968.50000	2009	May	17	0	00	00	15	39	18.6564	15	39	17.8513	16	27	18.6564
2454969.50000	2009	May	18	0	00	00	15	43	15.2089	15	43	14.4066	16	31	15.2089
2454970.50000	2009	May	19	0	00	00	15	47	11.7598	15	47	10.9620	16	35	11.7598
2454971.50000	2009	May	20	0	00	00	15	51	08.3098	15	51	07.5174	16	39	08.3098
2454972.50000	2009	May	21	0	00	00	15	55	04.8602	15	55	04.0727	16	43	04.8602
2454973.50000	2009	May	22	0	00	00	15	59	01.4127	15	59	00.6281	16	47	01.4127
2454974.50000	2009	May	23	0	00	00	16	02	57.9686	16	02	57.1835	16	50	57.9686
2454975.50000	2009	May	24	0	00	00	16	06	54.5288	16	06	53.7388	16	54	54.5288
2454976.50000	2009	May	25	0	00	00	16	10	51.0931	16	10	50.2942	16	58	51.0931
2454977.50000	2009	May	26	0	00	00	16	14	47.6600	16	14	46.8496	17	02	47.6600
2454978.50000	2009	May	27	0	00	00	16	18	44.2271	16	18	43.4049	17	06	44.2271
2454979.50000	2009	May	28	0	00	00	16	22	40.7921	16	22	39.9603	17	10	40.7921
2454980.50000	2009	May	29	0	00	00	16	26	37.3534	16	26	36.5157	17	14	37.3534
2454981.50000	2009	May	30	0	00	00	16	30	33.9104	16	30	33.0711	17	18	33.9104
2454982.50000	2009	May	31	0	00	00	16	34	30.4638	16	34	29.6264	17	22	30.4638
2454983.500															

Date				Time			Apparent sidereal time			Greenwich Medium			Local apparent sidereal time		
Julian day	YYYY	MM	DD	h	m	s	h	m	s	h	m	s	h	m	s
2454986.50000	2009	Jun	4	0	00	00	16	50	16.6715	16	50	15.8479	17	38	16.6715
2454987.50000	2009	Jun	5	0	00	00	16	54	13.2280	16	54	12.4033	17	42	13.2280
2454988.50000	2009	Jun	6	0	00	00	16	58	09.7872	16	58	08.9586	17	46	09.7872
2454989.50000	2009	Jun	7	0	00	00	17	02	06.3486	17	02	05.5140	17	50	06.3486
2454990.50000	2009	Jun	8	0	00	00	17	06	02.9114	17	06	02.0694	17	54	02.9114
2454991.50000	2009	Jun	9	0	00	00	17	09	59.4746	17	09	58.6247	17	57	59.4746
2454992.50000	2009	Jun	10	0	00	00	17	13	56.0374	17	13	55.1801	18	01	56.0374
2454993.50000	2009	Jun	11	0	00	00	17	17	52.5987	17	17	51.7355	18	05	52.5987
2454994.50000	2009	Jun	12	0	00	00	17	21	49.1579	17	21	48.2908	18	09	49.1579
2454995.50000	2009	Jun	13	0	00	00	17	25	45.7149	17	25	44.8462	18	13	45.7149
2454996.50000	2009	Jun	14	0	00	00	17	29	42.2694	17	29	41.4016	18	17	42.2694
2454997.50000	2009	Jun	15	0	00	00	17	33	38.8221	17	33	37.9569	18	21	38.8221
2454998.50000	2009	Jun	16	0	00	00	17	37	35.3736	17	37	34.5123	18	25	35.3736
2454999.50000	2009	Jun	17	0	00	00	17	41	31.9250	17	41	31.0677	18	29	31.9250
2455000.50000	2009	Jun	18	0	00	00	17	45	28.4778	17	45	27.6231	18	33	28.4778
2455001.50000	2009	Jun	19	0	00	00	17	49	25.0332	17	49	24.1784	18	37	25.0332
2455002.50000	2009	Jun	20	0	00	00	17	53	21.5926	17	53	20.7338	18	41	21.5926
2455003.50000	2009	Jun	21	0	00	00	17	57	18.1562	17	57	17.2892	18	45	18.1562
2455004.50000	2009	Jun	22	0	00	00	18	01	14.7232	18	01	13.8445	18	49	14.7232
2455005.50000	2009	Jun	23	0	00	00	18	05	11.2918	18	05	10.3999	18	53	11.2918
2455006.50000	2009	Jun	24	0	00	00	18	09	07.8592	18	09	06.9553	18	57	07.8592
2455007.50000	2009	Jun	25	0	00	00	18	13	04.4232	18	13	03.5106	19	01	04.4232
2455008.50000	2009	Jun	26	0	00	00	18	17	00.9826	18	17	00.0660	19	05	00.9826
2455009.50000	2009	Jun	27	0	00	00	18	20	57.5378	18	20	56.6214	19	08	57.5378
2455010.50000	2009	Jun	28	0	00	00	18	24	54.0901	18	24	53.1767	19	12	54.0901
2455011.50000	2009	Jun	29	0	00	00	18	28	50.6413	18	28	49.7321	19	16	50.6413
2455012.50000	2009	Jun	30	0	00	00	18	32	47.1931	18	32	46.2875	19	20	47.1931
2455013.50000	2009	Jul	1	0	00	00	18	36	43.7467	18	36	42.8428	19	24	43.7467
2455014.50000	2009	Jul	2	0	00	00	18	40	40.3028	18	40	39.3982	19	28	40.3028
2455015.50000	2009	Jul	3	0	00	00	18	44	36.8616	18	44	35.9536	19	32	36.8616
2455016.50000	2009	Jul	4	0	00	00	18	48	33.4226	18	48	32.5089	19	36	33.4226
2455017.50000	2009	Jul	5	0	00	00	18	52	29.9851	18	52	29.0643	19	40	29.9851
2455018.50000	2009	Jul	6	0	00	00	18	56	26.5482	18	56	25.6197	19	44	26.5482
2455019.50000	2009	Jul	7	0	00	00	19	00	23.1109	19	00	22.1751	19	48	23.1109
2455020.50000	2009	Jul	8	0	00	00	19	04	19.6724	19	04	18.7304	19	52	19.6724
2455021.50000	2009	Jul	9	0	00	00	19	08	16.2319	19	08	15.2858	19	56	16.2319
2455022.50000	2009	Jul	10	0	00	00	19	12	12.7890	19	12	11.8412	20	00	12.7890
2455023.50000	2009	Jul	11	0	00	00	19	16	09.3437	19	16	08.3965	20	04	09.3437
2455024.50000	2009	Jul	12	0	00	00	19	20	05.8962	19	20	04.9519	20	08	05.8962
2455025.50000	2009	Jul	13	0	00	00	19	24	02.4473	19	24	01.5073	20	12	02.4473
2455026.50000	2009	Jul	14	0	00	00	19	27	58.9980	19	27	58.0626	20	15	58.9980
2455027.50000	2009	Jul	15	0	00	00	19	31	55.5494	19	31	54.6180	20	19	55.5494
2455028.50000	2009	Jul	16	0	00	00	19	35	52.1030	19	35	51.1734	20	23	52.1030
2455029.50000	2009	Jul	17	0	00	00	19	39	48.6597	19	39	47.7287	20	27	48.6597
2455030.50000	2009	Jul	18	0	00	00	19	43	45.2204	19	43	44.2841	20	31	45.2204
2455031.50000	2009	Jul	19	0	00	00	19	47	41.7847	19	47	40.8395	20	35	41.7847
2455032.50000	2009	Jul	20	0	00	00	19	51	38.3515	19	51	37.3948	20	39	38.3515
2455033.50000	2009	Jul	21	0	00	00	19	55	34.9184	19	55	33.9502	20	43	34.9184
2455034.50000	2009	Jul	22	0	00	00	19	59	31.4831	19	59	30.5056	20	47	31.4831
2455035.50000	2009	Jul	23	0	00	00	20	03	28.0435	20	03	27.0609	20	51	28.0435
2455036.50000	2009	Jul	24	0	00	00	20	07	24.5991	20	07	23.6163	20	55	24.5991
2455037.50000	2009	Jul	25	0	00	00	20	11	21.1510	20	11	20.1717	20	59	21.1510
2455038.50000	2009	Jul	26	0	00	00	20	15	17.7008	20	15	16.7271	21	03	17.7008
2455039.50000	2009	Jul	27	0	00	00	20	19	14.2508	20	19	13.2824	21	07	14.2508
2455040.50000	2009	Jul	28	0	00	00	20	23	10.8023	20	23	09.8378	21	11	10.8023
2455041.50000	2009	Jul	29	0	00	00	20	27	07.3562	20	27	06.3932	21	15	07.3562
2455042.50000	2009	Jul	30	0	00	00	20	31	03.9128	20	31	02.9485	21	19	03.9128
2455043.50000	2009	Jul	31	0	00	00	20	35	00.4716	20	35	59.5039	21	23	00.4716
2455044.50000	2009	Aug	1	0	00	00	20	38	57.0322	20	38	56.0593	21	26	57.0322
2455045.50000	2009	Aug	2	0	00	00	20	42	53.5935	20	42	52.6146	21	30	53.5935
2455046.50000	2009	Aug	3	0	00	00	20	46	50.1545	20	46	49.1700	21	34	50.1545
2455047.50000	2009	Aug	4	0	00	00	20	50	46.7145	20	50	45.7254	21	38	46.7145
2455048.50000	2009	Aug	5	0	00	00	20	54	43.2726	20	54	42.2807	21	42	43.2726
2455049.50000	2009	Aug	6	0	00	00	20	58	39.8284	20	58	38.8361	21	46	39.8284
2455050.50000	2009	Aug	7	0	00	00	21	02	36.3816	21	02	35.3915	21	50	36.3816
2455051.50000	2009	Aug	8	0	00	00	21	06	32.9326	21	06	31.9468	21	54	32.9326
2455052.50000	2009	Aug	9	0	00	00	21	10	29.4819	21	10	28.5022	21	58	29.4819
2455053.50000	2009	Aug	10	0	00	00	21	14	26.0304	21	14	25.0576	22	02	26.0304
2455054.50000	2009	Aug	11	0	00	00	21	18	22.5794	21	18	21.6129	22	06	22.5794
2455055.50000	2009	Aug	12	0	00	00	21	22	19.1301	21	22	18.1683	22	10	19.1301
2455056.50000	2009	Aug	13	0	00	00	21	26	15.6835	21	26	14.7237	22	14	15.6835
2455057.50000	2009	Aug	14	0	00	00	21	30	12.2404	21	30	11.2791	22	18	12.2404
2455058.50000	2009	Aug	15	0	00	00	21	34	08.8008	21	34	07.8344	22	22	08.8008
2455059.50000	2009	Aug	16	0	00	00	21	38	05.3639	21	38	04.3898	22	26	05.3639
2455060.50000	2009	Aug	17	0	00	00	21	42	01.9281	21	42	00.9452	22	30	01.9281
2455061.50000	2009	Aug	18	0	00	00	21	45	58.4912	21	45	57.5005	22	33	58.4912
2455062.50000	2009	Aug	19	0	00	00	21	49	55.0511	21	49	54.0559	22	37	55.0511
2455063.50000	2009	Aug	20	0	00	00	21	53	51.6064	21	53	50.6113	22	41	51.6064
2455064.500															

Date				Time			Apparent sidereal time			Greenwich Medium			Local apparent sidereal time		
Julian day	YYYY	MM	DD	h	m	s	h	m	s	h	m	s	h	m	s
2455067.50000	2009	Aug	24	0	00	00	22	09	37.8014	22	09	36.8327	22	57	37.8014
2455068.50000	2009	Aug	25	0	00	00	22	13	34.3523	22	13	33.3881	23	01	34.3523
2455069.50000	2009	Aug	26	0	00	00	22	17	30.9059	22	17	29.9435	23	05	30.9059
2455070.50000	2009	Aug	27	0	00	00	22	21	27.4621	22	21	26.4988	23	09	27.4621
2455071.50000	2009	Aug	28	0	00	00	22	25	24.0201	22	25	23.0542	23	13	24.0201
2455072.50000	2009	Aug	29	0	00	00	22	29	20.5792	22	29	19.6096	23	17	20.5792
2455073.50000	2009	Aug	30	0	00	00	22	33	17.1383	22	33	16.1649	23	21	17.1383
2455074.50000	2009	Aug	31	0	00	00	22	37	13.6965	22	37	12.7203	23	25	13.6965
2455075.50000	2009	Sep	1	0	00	00	22	41	10.2531	22	41	09.2757	23	29	10.2531
2455076.50000	2009	Sep	2	0	00	00	22	45	06.8074	22	45	05.8311	23	33	06.8074
2455077.50000	2009	Sep	3	0	00	00	22	49	03.3592	22	49	02.3864	23	37	03.3592
2455078.50000	2009	Sep	4	0	00	00	22	52	59.9086	22	52	58.9418	23	40	59.9086
2455079.50000	2009	Sep	5	0	00	00	22	56	56.4562	22	56	55.4972	23	44	56.4562
2455080.50000	2009	Sep	6	0	00	00	23	00	53.0028	23	00	52.0525	23	48	53.0028
2455081.50000	2009	Sep	7	0	00	00	23	04	49.5496	23	04	48.6079	23	52	49.5496
2455082.50000	2009	Sep	8	0	00	00	23	08	46.0978	23	08	45.1633	23	56	46.0978
2455083.50000	2009	Sep	9	0	00	00	23	12	42.6486	23	12	41.7186	0	00	42.6486
2455084.50000	2009	Sep	10	0	00	00	23	16	39.2027	23	16	38.2740	0	04	39.2027
2455085.50000	2009	Sep	11	0	00	00	23	20	35.7601	23	20	34.8294	0	08	35.7601
2455086.50000	2009	Sep	12	0	00	00	23	24	32.3204	23	24	31.3847	0	12	32.3204
2455087.50000	2009	Sep	13	0	00	00	23	28	28.8821	23	28	27.9401	0	16	28.8821
2455088.50000	2009	Sep	14	0	00	00	23	32	25.4433	23	32	24.4955	0	20	25.4433
2455089.50000	2009	Sep	15	0	00	00	23	36	22.0023	23	36	21.0508	0	24	22.0023
2455090.50000	2009	Sep	16	0	00	00	23	40	18.5575	23	40	17.6062	0	28	18.5575
2455091.50000	2009	Sep	17	0	00	00	23	44	15.1085	23	44	14.1616	0	32	15.1085
2455092.50000	2009	Sep	18	0	00	00	23	48	11.6562	23	48	10.7169	0	36	11.6562
2455093.50000	2009	Sep	19	0	00	00	23	52	08.2023	23	52	07.2723	0	40	08.2023
2455094.50000	2009	Sep	20	0	00	00	23	56	04.7487	23	56	03.8277	0	44	04.7487
2455095.50000	2009	Sep	21	0	00	00	0	00	01.2972	0	00	00.3830	0	48	01.2972
2455096.50000	2009	Sep	22	0	00	00	0	03	57.8487	0	03	56.9384	0	51	57.8487
2455097.50000	2009	Sep	23	0	00	00	0	07	54.4031	0	07	53.4938	0	55	54.4031
2455098.50000	2009	Sep	24	0	00	00	0	11	50.9598	0	11	50.0492	0	59	50.9598
2455099.50000	2009	Sep	25	0	00	00	0	15	47.5179	0	15	46.6045	1	03	47.5179
2455100.50000	2009	Sep	26	0	00	00	0	19	44.0763	0	19	43.1599	1	07	44.0763
2455101.50000	2009	Sep	27	0	00	00	0	23	40.6342	0	23	39.7153	1	11	40.6342
2455102.50000	2009	Sep	28	0	00	00	0	27	37.1906	0	27	36.2706	1	15	37.1906
2455103.50000	2009	Sep	29	0	00	00	0	31	33.7450	0	31	32.8260	1	19	33.7450
2455104.50000	2009	Sep	30	0	00	00	0	35	30.2970	0	35	29.3814	1	23	30.2970
2455105.50000	2009	Oct	1	0	00	00	0	39	26.8467	0	39	25.9367	1	27	26.8467
2455106.50000	2009	Oct	2	0	00	00	0	43	23.3944	0	43	22.4921	1	31	23.3944
2455107.50000	2009	Oct	3	0	00	00	0	47	19.9408	0	47	19.0475	1	35	19.9408
2455108.50000	2009	Oct	4	0	00	00	0	51	16.4872	0	51	15.6028	1	39	16.4872
2455109.50000	2009	Oct	5	0	00	00	0	55	13.0347	0	55	12.1582	1	43	13.0347
2455110.50000	2009	Oct	6	0	00	00	0	59	09.5847	0	59	08.7136	1	47	09.5847
2455111.50000	2009	Oct	7	0	00	00	1	03	06.1381	1	03	05.2689	1	51	06.1381
2455112.50000	2009	Oct	8	0	00	00	1	07	02.6949	1	07	01.8243	1	55	02.6949
2455113.50000	2009	Oct	9	0	00	00	1	10	59.2548	1	10	58.3797	1	58	59.2548
2455114.50000	2009	Oct	10	0	00	00	1	14	55.8164	1	14	54.9350	2	02	55.8164
2455115.50000	2009	Oct	11	0	00	00	1	18	52.3779	1	18	51.4904	2	06	52.3779
2455116.50000	2009	Oct	12	0	00	00	1	22	48.9375	1	22	48.0458	2	10	48.9375
2455117.50000	2009	Oct	13	0	00	00	1	26	45.4939	1	26	44.6012	2	14	45.4939
2455118.50000	2009	Oct	14	0	00	00	1	30	42.0465	1	30	41.1565	2	18	42.0465
2455119.50000	2009	Oct	15	0	00	00	1	34	38.5957	1	34	37.7119	2	22	38.5957
2455120.50000	2009	Oct	16	0	00	00	1	38	35.1429	1	38	34.2673	2	26	35.1429
2455121.50000	2009	Oct	17	0	00	00	1	42	31.6898	1	42	30.8226	2	30	31.6898
2455122.50000	2009	Oct	18	0	00	00	1	46	28.2383	1	46	27.3780	2	34	28.2383
2455123.50000	2009	Oct	19	0	00	00	1	50	24.7895	1	50	23.9334	2	38	24.7895
2455124.50000	2009	Oct	20	0	00	00	1	54	21.3439	1	54	20.4887	2	42	21.3439
2455125.50000	2009	Oct	21	0	00	00	1	58	17.9010	1	58	17.0441	2	46	17.9010
2455126.50000	2009	Oct	22	0	00	00	2	02	14.4601	2	02	13.5995	2	50	14.4601
2455127.50000	2009	Oct	23	0	00	00	2	06	11.0200	2	06	10.1548	2	54	11.0200
2455128.50000	2009	Oct	24	0	00	00	2	10	07.5797	2	10	06.7102	2	58	07.5797
2455129.50000	2009	Oct	25	0	00	00	2	14	04.1381	2	14	03.2656	3	02	04.1381
2455130.50000	2009	Oct	26	0	00	00	2	18	00.6947	2	17	59.8209	3	06	00.6947
2455131.50000	2009	Oct	27	0	00	00	2	21	57.2491	2	21	56.3763	3	09	57.2491
2455132.50000	2009	Oct	28	0	00	00	2	25	53.8012	2	25	52.9317	3	13	53.8012
2455133.50000	2009	Oct	29	0	00	00	2	29	50.3513	2	29	49.4870	3	17	50.3513
2455134.50000	2009	Oct	30	0	00	00	2	33	46.8999	2	33	46.0424	3	21	46.8999
2455135.50000	2009	Oct	31	0	00	00	2	37	43.4480	2	37	42.5978	3	25	43.4480
2455136.50000	2009	Nov	1	0	00	00	2	41	39.9970	2	41	39.1532	3	29	39.9970
2455137.50000	2009	Nov	2	0	00	00	2	45	36.5481	2	45	35.7085	3	33	36.5481
2455138.50000	2009	Nov	3	0	00	00	2	49	33.1024	2	49	32.2639	3	37	33.1024
2455139.50000	2009	Nov	4	0	00	00	2	53	29.6606	2	53	28.8193	3	41	29.6606
2455140.50000	2009	Nov	5	0	00	00	2	57	26.2223	2	57	25.3746	3	45	26.2223
2455141.50000	2009	Nov	6	0	00	00	3	01	22.7862	3	01	21.9300	3	49	22.7862
2455142.50000	2009	Nov	7	0	00	00	3	05	19.3504	3	05	18.4854	3	53	19.3504
2455143.50000	2009	Nov	8	0	00	00	3	09	15.9130	3	09	15.0407	3	57	15.9130
2455144.50000	2009	Nov	9	0	00	00	3	13	12.4725	3	13	11.5961	4	01	12.4725
2455145.50000	2009	Nov	10	0	00	00	3	17	09.0282	3	17	08.1515	4	05	09.0282
2455146.50000	2009	Nov	11	0	00	00	3	21	05.5805	3	21	04.7068	4	09	05.5805
2455147.50000	2009	Nov	12	0	00	00	3	25							

Date						Time			Apparent sidereal time			Greenwich Medium			Local apparent sidereal time			
Julian day	YYYY	MM	DD	h	m	s	h	m	s	h	m	s	h	m	s	h	m	s
2455148.50000	2009	Nov	13	0	00	00	3	28	58.6799	3	28	57.8176	4	16	58.6799			
2455149.50000	2009	Nov	14	0	00	00	3	32	55.2303	3	32	54.3729	4	20	55.2303			
2455150.50000	2009	Nov	15	0	00	00	3	36	51.7831	3	36	50.9283	4	24	51.7831			
2455151.50000	2009	Nov	16	0	00	00	3	40	48.3388	3	40	47.4837	4	28	48.3388			
2455152.50000	2009	Nov	17	0	00	00	3	44	44.8976	3	44	44.0390	4	32	44.8976			
2455153.50000	2009	Nov	18	0	00	00	3	48	41.4587	3	48	40.5944	4	36	41.4587			
2455154.50000	2009	Nov	19	0	00	00	3	52	38.0210	3	52	37.1498	4	40	38.0210			
2455155.50000	2009	Nov	20	0	00	00	3	56	34.5835	3	56	33.7052	4	44	34.5835			
2455156.50000	2009	Nov	21	0	00	00	4	00	31.1451	4	00	30.2605	4	48	31.1451			
2455157.50000	2009	Nov	22	0	00	00	4	04	27.7050	4	04	26.8159	4	52	27.7050			
2455158.50000	2009	Nov	23	0	00	00	4	08	24.2628	4	08	23.3713	4	56	24.2628			
2455159.50000	2009	Nov	24	0	00	00	4	12	20.8182	4	12	19.9266	5	00	20.8182			
2455160.50000	2009	Nov	25	0	00	00	4	16	17.3715	4	16	16.4820	5	04	17.3715			
2455161.50000	2009	Nov	26	0	00	00	4	20	13.9232	4	20	13.0374	5	08	13.9232			
2455162.50000	2009	Nov	27	0	00	00	4	24	10.4740	4	24	09.5927	5	12	10.4740			
2455163.50000	2009	Nov	28	0	00	00	4	28	07.0252	4	28	06.1481	5	16	07.0252			
2455164.50000	2009	Nov	29	0	00	00	4	32	03.5779	4	32	02.7035	5	20	03.5779			
2455165.50000	2009	Nov	30	0	00	00	4	36	00.1334	4	35	59.2588	5	24	00.1334			
2455166.50000	2009	Dec	1	0	00	00	4	39	56.6927	4	39	55.8142	5	27	56.6927			
2455167.50000	2009	Dec	2	0	00	00	4	43	53.2559	4	43	52.3696	5	31	53.2559			
2455168.50000	2009	Dec	3	0	00	00	4	47	49.8221	4	47	48.9249	5	35	49.8221			
2455169.50000	2009	Dec	4	0	00	00	4	51	46.3895	4	51	45.4803	5	39	46.3895			
2455170.50000	2009	Dec	5	0	00	00	4	55	42.9559	4	55	42.0357	5	43	42.9559			
2455171.50000	2009	Dec	6	0	00	00	4	59	39.5192	4	59	38.5910	5	47	39.5192			
2455172.50000	2009	Dec	7	0	00	00	5	03	36.0784	5	03	35.1464	5	51	36.0784			
2455173.50000	2009	Dec	8	0	00	00	5	07	32.6337	5	07	31.7018	5	55	32.6337			
2455174.50000	2009	Dec	9	0	00	00	5	11	29.1863	5	11	28.2572	5	59	29.1863			
2455175.50000	2009	Dec	10	0	00	00	5	15	25.7379	5	15	24.8125	6	03	25.7379			
2455176.50000	2009	Dec	11	0	00	00	5	19	22.2900	5	19	21.3679	6	07	22.2900			
2455177.50000	2009	Dec	12	0	00	00	5	23	18.8442	5	23	17.9233	6	11	18.8442			
2455178.50000	2009	Dec	13	0	00	00	5	27	15.4011	5	27	14.4786	6	15	15.4011			
2455179.50000	2009	Dec	14	0	00	00	5	31	11.9608	5	31	11.0340	6	19	11.9608			
2455180.50000	2009	Dec	15	0	00	00	5	35	08.5230	5	35	07.5894	6	23	08.5230			
2455181.50000	2009	Dec	16	0	00	00	5	39	05.0867	5	39	04.1447	6	27	05.0867			
2455182.50000	2009	Dec	17	0	00	00	5	43	01.6509	5	43	00.7001	6	31	01.6509			
2455183.50000	2009	Dec	18	0	00	00	5	46	58.2145	5	46	57.2555	6	34	58.2145			
2455184.50000	2009	Dec	19	0	00	00	5	50	54.7765	5	50	53.8108	6	38	54.7765			
2455185.50000	2009	Dec	20	0	00	00	5	54	51.3363	5	54	50.3662	6	42	51.3363			
2455186.50000	2009	Dec	21	0	00	00	5	58	47.8938	5	58	46.9216	6	46	47.8938			
2455187.50000	2009	Dec	22	0	00	00	6	02	44.4490	6	02	43.4769	6	50	44.4490			
2455188.50000	2009	Dec	23	0	00	00	6	06	41.0023	6	06	40.0323	6	54	41.0023			
2455189.50000	2009	Dec	24	0	00	00	6	10	37.5545	6	10	36.5877	6	58	37.5545			
2455190.50000	2009	Dec	25	0	00	00	6	14	34.1065	6	14	33.1430	7	02	34.1065			
2455191.50000	2009	Dec	26	0	00	00	6	18	30.6594	6	18	29.6984	7	06	30.6594			
2455192.50000	2009	Dec	27	0	00	00	6	22	27.2145	6	22	26.2538	7	10	27.2145			
2455193.50000	2009	Dec	28	0	00	00	6	26	23.7728	6	26	22.8092	7	14	23.7728			
2455194.50000	2009	Dec	29	0	00	00	6	30	20.3349	6	30	19.3645	7	18	20.3349			
2455195.50000	2009	Dec	30	0	00	00	6	34	16.9005	6	34	15.9199	7	22	16.9005			
2455196.50000	2009	Dec	31	0	00	00	6	38	13.4683	6	38	12.4753	7	26	13.4683			

GENERAL CALENDAR OF EVENTS

January			
d	h		
1	19	Saturn stationary	
2	13	Uranus 4.1S of Moon	
4	6	Mercury greatest elong W(19)	
4	11	FIRST QUARTER	
4	12	Earth at perihelion	
9	5	Moon furthest North (27.0)	
10	10	Moon at perigee	
11	3	FULL MOON	
11	5	Mercury stationary	
11	7	Pollux 5.2N of Moon	
13	18	Regulus 2.2N of Moon	
14	20	Venus greatest elong W(47)	
15	7	Saturn 5.6N of Moon	
17	18	Spica 3.0N of Moon	
18	2	LAST QUARTER	
18	16	Mercury 3.2N of Jupiter	
20	15	Mercury inferior conjunction	
21	13	Antares 0.1S of Moon	Occn
22	13	Moon furthest South (-27.0)	
23	0	Moon at apogee	
23	1	Venus 1.2N of Uranus	
24	5	Jupiter at conjunction	
25	2	Mars 0.7N of Moon	Occn
25	9	Mercury 4.8N of Moon	
26	4	Jupiter 0.0N of Moon	Occn
26	7	NEW MOON	Eclipse
27	10	Mercury 4.3N of Mars	
27	17	Neptune 1.6S of Moon	
29	21	Uranus 4.2S of Moon	
30	9	Venus 2.5S of Moon	
February			
d	h		
1	5	Mercury stationary	
2	23	FIRST QUARTER	
5	14	Moon furthest North (27.0)	
7	17	Pollux 5.3N of Moon	
7	19	Moon at perigee	
9	14	FULL MOON	Eclipse
10	5	Regulus 2.3N of Moon	
11	15	Saturn 5.6N of Moon	
12	12	Neptune at conjunction	
14	1	Mercury greatest elong W(26)	
14	3	Spica 3.0N of Moon	
16	21	LAST QUARTER	
17	16	Mars 0.6S of Jupiter	
17	20	Antares 0.1S of Moon	Occn
18	20	Moon furthest South (-27.0)	
19	17	Moon at apogee	
22	21	Mercury 1.0S of Moon	Occn
23	0	Jupiter 0.7S of Moon	Occn
23	6	Mars 1.6S of Moon	
24	2	Neptune 1.7S of Moon	
24	5	Mercury 0.6S of Jupiter	
25	1	NEW MOON	
26	6	Uranus 4.2S of Moon	
27	23	Venus 1.2N of Moon	Occn
March			
d	h		
2	2	Mercury 0.6S of Mars	
4	7	FIRST QUARTER	
4	21	Moon furthest North (26.9)	
5	0	Venus stationary	
5	9	Mercury 1.6S of Neptune	
7	2	Pollux 5.4N of Moon	
7	14	Moon at perigee	
8	12	Mars 0.8S of Neptune	
8	19	Saturn at opposition	
9	15	Regulus 2.4N of Moon	
10	22	Saturn 5.6N of Moon	
11	2	FULL MOON	
13	1	Uranus at conjunction	
13	13	Spica 2.9N of Moon	
17	4	Antares 0.2S of Moon	Occn
18	5	Moon furthest South (-26.9)	
18	17	LAST QUARTER	
19	13	Moon at apogee	
20	11	Equinox	
22	4	Mercury 1.3S of Uranus	
22	20	Jupiter 1.4S of Moon	
23	12	Neptune 1.9S of Moon	
24	11	Mars 3.7S of Moon	
25	16	Uranus 4.4S of Moon	
26	6	Mercury 5.7S of Moon	
26	16	NEW MOON	
26	19	Venus 3.8N of Moon	
27	19	Venus inferior conjunction	
28	3	Venus greatest elong W(8)	
31	2	Mercury superior conjunction	
April			
d	h		
1	2	Moon furthest North (26.8)	
2	2	Moon at perigee	
2	14	FIRST QUARTER	
3	8	Pollux 5.5N of Moon	
4	16	Pluto stationary	
5	22	Regulus 2.5N of Moon	
7	3	Saturn 5.5N of Moon	
9	15	FULL MOON	
9	22	Spica 2.8N of Moon	
13	13	Antares 0.4S of Moon	Occn
14	13	Moon furthest South (-26.7)	
15	8	Venus stationary	
15	9	Mars 0.4S of Uranus	
16	9	Moon at apogee	
17	13	LAST QUARTER	
19	14	Jupiter 2.1S of Moon	
19	22	Neptune 2.2S of Moon	
22	1	Venus 4.4N of Mars	
22	4	Uranus 4.6S of Moon	
22	13	Venus 0.9S of Moon	Occn
22	14	Mars 5.3S of Moon	
25	3	NEW MOON	
26	6	Mercury greatest elong W(20)	
26	15	Mercury 1.9S of Moon	
28	6	Moon at perigee	
28	9	Moon furthest North (26.6)	
30	13	Pollux 5.7N of Moon	

May			
d	h		
1	20	FIRST QUARTER	
3	4	Regulus 2.7N of Moon	
4	7	Saturn 5.5N of Moon	
7	5	Spica 2.9N of Moon	
7	18	Mercury stationary	
9	4	FULL MOON	
10	21	Antares 0.6S of Moon	Occn
11	20	Moon furthest South (-26.5)	
14	2	Moon at apogee	
17	5	Jupiter 2.7S of Moon	
17	7	LAST QUARTER	
17	7	Neptune 2.4S of Moon	
17	18	Saturn stationary	
18	10	Mercury inferior conjunction	
19	15	Uranus 4.8S of Moon	
21	15	Mars 6.0S of Moon	
24	12	NEW MOON	
25	17	Moon furthest North (26.5)	
26	3	Moon at perigee	
27	20	Pollux 5.9N of Moon	
27	21	Jupiter 0.4S of Neptune	
29	11	Neptune stationary	
30	10	Regulus 2.8N of Moon	
30	15	Mercury stationary	
31	3	FIRST QUARTER	
31	12	Saturn 5.6N of Moon	

June			
d	h		
3	11	Spica 3.0N of Moon	
5	23	Venus greatest elong W(45)	
7	3	Antares 0.6S of Moon	Occn
7	18	FULL MOON	
8	2	Moon furthest South (-26.4)	
10	15	Moon at apogee	
13	13	Mercury greatest elong W(23)	
13	14	Neptune 2.6S of Moon	
13	15	Jupiter 3.1S of Moon	
15	19	Jupiter stationary	
15	22	LAST QUARTER	
16	1	Uranus 5.1S of Moon	
19	13	Mars 5.8S of Moon	
21	5	Solstice	
21	12	Venus 2.0S of Mars	
22	2	Moon furthest North (26.4)	
22	6	Mercury 3.2N of Aldebaran	
22	19	NEW MOON	
23	7	Pluto at opposition	
23	10	Moon at perigee	
24	6	Pollux 6.0N of Moon	
26	17	Regulus 3.0N of Moon	
27	21	Saturn 5.8N of Moon	
29	11	FIRST QUARTER	
30	17	Spica 3.2N of Moon	

July			
d	h		
1	15	Uranus stationary	
4	2	Earth at aphelion	
4	9	Antares 0.6S of Moon	Occn
5	7	Moon furthest South (-26.4)	
7	9	FULL MOON	Eclipse
7	21	Moon at apogee	
10	7	Jupiter 0.6S of Neptune	
10	19	Jupiter 3.2S of Moon	
10	19	Neptune 2.6S of Moon	
13	8	Uranus 5.1S of Moon	
14	2	Mercury superior conjunction	
14	8	Venus 3.1N of Aldebaran	
14	19	Mercury 5.2S of Pollux	
15	9	LAST QUARTER	
18	9	Mars 4.8S of Moon	
19	4	Venus 5.9S of Moon	
19	12	Moon furthest North (26.4)	
21	20	Moon at perigee	
22	2	NEW MOON	Eclipse
22	18	Mercury 2.6N of Moon	
24	3	Regulus 3.0N of Moon	
25	10	Saturn 5.9N of Moon	
26	9	Mars 5.1N of Aldebaran	
27	23	Spica 3.2N of Moon	
28	22	FIRST QUARTER	
31	15	Antares 0.5S of Moon	Occn

August			
d	h		
1	13	Moon furthest South (-26.4)	
2	23	Mercury 0.6N of Regulus	
4	1	Moon at apogee	
6	0	FULL MOON	Eclipse
6	19	Jupiter 3.1S of Moon	
7	0	Neptune 2.6S of Moon	
9	12	Uranus 5.1S of Moon	
13	18	LAST QUARTER	
14	17	Jupiter at opposition	
15	21	Moon furthest North (26.4)	
16	2	Mars 3.1S of Moon	
17	16	Mercury 3.0S of Saturn	
17	20	Neptune at opposition	
17	21	Venus 1.6S of Moon	
19	4	Moon at perigee	
20	10	NEW MOON	
20	14	Regulus 3.0N of Moon	
22	9	Mercury 2.5N of Moon	
24	8	Spica 3.1N of Moon	
24	12	Mercury greatest elong W(27)	
27	11	FIRST QUARTER	
27	22	Antares 0.6S of Moon	Occn
28	20	Moon furthest South (-26.4)	
31	10	Moon at apogee	

September			
d	h	d	h
2	19	Jupiter 2.9S of Moon	18 18 NEW MOON
3	5	Neptune 2.6S of Moon	18 23 Mercury 1.1N of Moon Occn
4	16	FULL MOON	20 10 Mercury inferior conjunction
5	16	Uranus 5.0S of Moon	20 12 Venus 0.5N of Regulus
6	17	Mercury stationary	20 18 Spica 3.0N of Moon
11	16	Pluto stationary	22 10 Mercury 4.4S of Saturn
12	2	LAST QUARTER	22 21 Equinox
12	4	Moon furthest North (26.3)	24 6 Antares 0.8S of Moon Occn
13	16	Mars 1.0S of Moon Occn	25 3 Moon furthest South (-26.2)
16	7	Moon at perigee	26 4 FIRST QUARTER
16	16	Venus 3.1N of Moon	28 3 Moon at apogee
16	23	Regulus 3.1N of Moon	28 18 Mercury stationary
17	9	Uranus at opposition	29 22 Jupiter 2.8S of Moon
17	18	Saturn at conjunction	30 11 Neptune 2.7S of Moon
October			
d	h	d	h
2	22	Uranus 5.0S of Moon	14 7 Regulus 3.3N of Moon
3	23	Mars 5.9S of Pollux	18 3 Spica 2.9N of Moon
4	6	FULL MOON	18 5 NEW MOON
6	3	Mercury greatest elong W(17)	21 15 Antares 1.0S of Moon Occn
8	5	Mercury 0.3S of Saturn	22 12 Moon furthest South (-26.0)
9	9	Moon furthest North (26.1)	24 20 Mercury 3.5N of Spica
11	8	LAST QUARTER	25 22 Moon at apogee
12	1	Mars 1.1N of Moon Occn	26 0 FIRST QUARTER
13	8	Jupiter stationary	27 6 Jupiter 3.0S of Moon
13	10	Venus 0.5S of Saturn	27 19 Neptune 2.9S of Moon
13	12	Moon at perigee	30 4 Uranus 5.1S of Moon
November			
d	h	d	h
2	19	FULL MOON	16 19 NEW MOON
3	4	Venus 3.5N of Spica	17 9 Mercury 2.8N of Moon
4	19	Neptune stationary	18 0 Antares 1.1S of Moon Occn
5	8	Mercury superior conjunction	18 20 Moon furthest South (-25.8)
5	15	Moon furthest North (25.9)	22 10 Mercury 3.0N of Antares
7	7	Moon at perigee	22 19 Moon at apogee
9	4	Mars 3.2N of Moon	23 19 Jupiter 3.3S of Moon
9	15	LAST QUARTER	24 3 Neptune 3.1S of Moon
10	13	Regulus 3.5N of Moon	24 21 FIRST QUARTER
14	11	Spica 3.0N of Moon	26 13 Uranus 5.2S of Moon
December			
d	h	d	h
2	4	Uranus stationary	18 9 Mercury greatest elong W(20)
2	7	FULL MOON	20 14 Moon at apogee
2	23	Moon furthest North (25.8)	21 8 Jupiter 0.5S of Neptune
4	14	Moon at perigee	21 12 Jupiter 3.8S of Moon
6	23	Mars 5.0N of Moon	21 12 Neptune 3.2S of Moon
7	19	Regulus 3.6N of Moon	21 15 Mars stationary
9	0	LAST QUARTER	21 17 Solstice
9	19	Venus 5.0N of Antares	23 21 Uranus 5.4S of Moon
11	17	Spica 3.1N of Moon	24 17 FIRST QUARTER
15	7	Antares 1.2S of Moon Occn	24 17 Pluto at conjunction
15	22	Venus 3.1N of Moon	26 6 Mercury stationary
16	2	Moon furthest South (-25.7)	28 6 Venus 5.4S of Pluto
16	12	NEW MOON	30 10 Moon furthest North (25.7)
18	7	Mercury 1.3S of Moon	31 19 FULL MOON Eclipse

© (8)

The values of this charts are approximate, for greater precisions to consult the following chapters

EPHEMERIDES OF THE SUN

Date	A.R. Geoc.	Dec. Geoc.	A.R. Topoc.	Dec. Topoc.	Distance A.U.	Light (m)	Parall. "	Diam. "
1-Jan	18h 46m 32.96s	-23° 00' 30.5"	18h 46m 33.06s	-23° 00' 33.4"	0.9833051	8.18	8.9	1951.9
2-Jan	18h 50m 57.77s	-22° 55' 22.2"	18h 50m 57.87s	-22° 55' 25.1"	0.9832902	8.18	8.9	1951.9
3-Jan	18h 55m 22.21s	-22° 49' 46.5"	18h 55m 22.31s	-22° 49' 49.4"	0.9832798	8.18	8.9	1951.9
4-Jan	18h 59m 46.26s	-22° 43' 43.5"	18h 59m 46.35s	-22° 43' 46.5"	0.9832741	8.18	8.9	1951.9
5-Jan	19h 04m 09.88s	-22° 37' 13.6"	19h 04m 09.97s	-22° 37' 16.6"	0.9832734	8.18	8.9	1951.9
6-Jan	19h 08m 33.05s	-22° 30' 16.8"	19h 08m 33.14s	-22° 30' 19.8"	0.9832779	8.18	8.9	1951.9
7-Jan	19h 12m 55.74s	-22° 22' 53.5"	19h 12m 55.83s	-22° 22' 56.5"	0.9832880	8.18	8.9	1951.9
8-Jan	19h 17m 17.93s	-22° 15' 03.7"	19h 17m 18.02s	-22° 15' 06.7"	0.9833040	8.18	8.9	1951.9
9-Jan	19h 21m 39.59s	-22° 06' 47.9"	19h 21m 39.68s	-22° 06' 50.9"	0.9833263	8.18	8.9	1951.8
10-Jan	19h 26m 00.70s	-21° 58' 06.1"	19h 26m 00.79s	-21° 58' 09.2"	0.9833550	8.18	8.9	1951.8
11-Jan	19h 30m 21.24s	-21° 48' 58.7"	19h 30m 21.33s	-21° 49' 01.8"	0.9833904	8.18	8.9	1951.7
12-Jan	19h 34m 41.19s	-21° 39' 25.9"	19h 34m 41.28s	-21° 39' 29.0"	0.9834325	8.18	8.9	1951.6
13-Jan	19h 39m 00.53s	-21° 29' 28.0"	19h 39m 00.62s	-21° 29' 31.1"	0.9834812	8.18	8.9	1951.5
14-Jan	19h 43m 19.25s	-21° 19' 05.1"	19h 43m 19.34s	-21° 19' 08.2"	0.9835363	8.18	8.9	1951.4
15-Jan	19h 47m 37.33s	-21° 08' 17.6"	19h 47m 37.41s	-21° 08' 20.7"	0.9835977	8.18	8.9	1951.3
16-Jan	19h 51m 54.75s	-20° 57' 05.7"	19h 51m 54.84s	-20° 57' 08.8"	0.9836649	8.18	8.9	1951.1
17-Jan	19h 56m 11.51s	-20° 45' 29.7"	19h 56m 11.60s	-20° 45' 32.9"	0.9837377	8.18	8.9	1951.0
18-Jan	20h 00m 27.59s	-20° 33' 29.9"	20h 00m 27.67s	-20° 33' 33.1"	0.9838158	8.18	8.9	1950.8
19-Jan	20h 04m 42.97s	-20° 21' 06.7"	20h 04m 43.05s	-20° 21' 10.0"	0.9838989	8.18	8.9	1950.7
20-Jan	20h 08m 57.64s	-20° 08' 20.4"	20h 08m 57.72s	-20° 08' 23.7"	0.9839866	8.18	8.9	1950.5
21-Jan	20h 13m 11.58s	-19° 55' 11.3"	20h 13m 11.66s	-19° 55' 14.7"	0.9840788	8.18	8.9	1950.3
22-Jan	20h 17m 24.77s	-19° 41' 39.9"	20h 17m 24.85s	-19° 41' 43.2"	0.9841752	8.19	8.9	1950.1
23-Jan	20h 21m 37.22s	-19° 27' 46.4"	20h 21m 37.30s	-19° 27' 49.8"	0.9842756	8.19	8.9	1949.9
24-Jan	20h 25m 48.89s	-19° 13' 31.3"	20h 25m 48.97s	-19° 13' 34.7"	0.9843798	8.19	8.9	1949.7
25-Jan	20h 29m 59.78s	-18° 58' 54.9"	20h 29m 59.86s	-18° 58' 58.4"	0.9844877	8.19	8.9	1949.5
26-Jan	20h 34m 09.88s	-18° 43' 57.6"	20h 34m 09.96s	-18° 44' 01.2"	0.9845991	8.19	8.9	1949.3
27-Jan	20h 38m 19.18s	-18° 28' 39.9"	20h 38m 19.25s	-18° 28' 43.5"	0.9847139	8.19	8.9	1949.1
28-Jan	20h 42m 27.66s	-18° 13' 02.2"	20h 42m 27.73s	-18° 13' 05.7"	0.9848322	8.19	8.9	1948.8
29-Jan	20h 46m 35.32s	-17° 57' 04.7"	20h 46m 35.39s	-17° 57' 08.3"	0.9849539	8.19	8.9	1948.6
30-Jan	20h 50m 42.16s	-17° 40' 48.0"	20h 50m 42.23s	-17° 40' 51.6"	0.9850790	8.19	8.9	1948.3
31-Jan	20h 54m 48.16s	-17° 24' 12.4"	20h 54m 48.24s	-17° 24' 16.1"	0.9852077	8.19	8.9	1948.1
1-Feb	20h 58m 53.33s	-17° 07' 18.5"	20h 58m 53.41s	-17° 07' 22.2"	0.9853401	8.19	8.9	1947.8
2-Feb	21h 02m 57.68s	-16° 50' 06.5"	21h 02m 57.75s	-16° 50' 10.2"	0.9854763	8.20	8.9	1947.6
3-Feb	21h 07m 01.18s	-16° 32' 36.9"	21h 07m 01.26s	-16° 32' 40.7"	0.9856166	8.20	8.9	1947.3
4-Feb	21h 11m 03.86s	-16° 14' 50.1"	21h 11m 03.93s	-16° 14' 54.0"	0.9857613	8.20	8.9	1947.0
5-Feb	21h 15m 05.71s	-15° 56' 46.6"	21h 15m 05.78s	-15° 56' 50.5"	0.9859107	8.20	8.9	1946.7
6-Feb	21h 19m 06.74s	-15° 38' 26.8"	21h 19m 06.81s	-15° 38' 30.7"	0.9860650	8.20	8.9	1946.4
7-Feb	21h 23m 06.95s	-15° 19' 51.0"	21h 23m 07.02s	-15° 19' 55.0"	0.9862245	8.20	8.9	1946.1
8-Feb	21h 27m 06.34s	-15° 00' 59.8"	21h 27m 06.42s	-15° 01' 03.8"	0.9863894	8.20	8.9	1945.7
9-Feb	21h 31m 04.94s	-14° 41' 53.4"	21h 31m 05.01s	-14° 41' 57.5"	0.9865600	8.20	8.9	1945.4
10-Feb	21h 35m 02.74s	-14° 22' 32.3"	21h 35m 02.81s	-14° 22' 36.4"	0.9867361	8.21	8.9	1945.1
11-Feb	21h 38m 59.77s	-14° 02' 56.8"	21h 38m 59.84s	-14° 03' 00.9"	0.9869178	8.21	8.9	1944.7
12-Feb	21h 42m 56.03s	-13° 43' 07.3"	21h 42m 56.10s	-13° 43' 11.5"	0.9871048	8.21	8.9	1944.3
13-Feb	21h 46m 51.54s	-13° 23' 04.2"	21h 46m 51.61s	-13° 23' 08.4"	0.9872969	8.21	8.9	1944.0
14-Feb	21h 50m 46.32s	-13° 02' 47.8"	21h 50m 46.39s	-13° 02' 52.1"	0.9874939	8.21	8.9	1943.6
15-Feb	21h 54m 40.39s	-12° 42' 18.6"	21h 54m 40.46s	-12° 42' 22.9"	0.9876954	8.21	8.9	1943.2
16-Feb	21h 58m 33.74s	-12° 21' 37.0"	21h 58m 33.81s	-12° 21' 41.4"	0.9879010	8.22	8.9	1942.8
17-Feb	22h 02m 26.41s	-12° 00' 43.4"	22h 02m 26.48s	-12° 00' 47.8"	0.9881105	8.22	8.9	1942.4
18-Feb	22h 06m 18.39s	-11° 39' 38.2"	22h 06m 18.46s	-11° 39' 42.6"	0.9883235	8.22	8.9	1941.9
19-Feb	22h 10m 09.70s	-11° 18' 21.8"	22h 10m 09.77s	-11° 18' 26.3"	0.9885397	8.22	8.9	1941.5
20-Feb	22h 14m 00.36s	-10° 56' 54.7"	22h 14m 00.43s	-10° 56' 59.3"	0.9887589	8.22	8.9	1941.1
21-Feb	22h 17m 50.37s	-10° 35' 17.3"	22h 17m 50.44s	-10° 35' 21.9"	0.9889808	8.23	8.8	1940.6
22-Feb	22h 21m 39.74s	-10° 13' 30.0"	22h 21m 39.81s	-10° 13' 34.7"	0.9892051	8.23	8.8	1940.2
23-Feb	22h 25m 28.50s	-09° 51' 33.3"	22h 25m 28.57s	-09° 51' 38.0"	0.9894316	8.23	8.8	1939.8
24-Feb	22h 29m 16.64s	-09° 29' 27.5"	22h 29m 16.71s	-09° 29' 32.3"	0.9896600	8.23	8.8	1939.3
25-Feb	22h 33m 04.19s	-09° 07' 13.2"	22h 33m 04.26s	-09° 07' 17.9"	0.9898903	8.23	8.8	1938.9
26-Feb	22h 36m 51.16s	-08° 44' 50.6"	22h 36m 51.23s	-08° 44' 55.4"	0.9901223	8.23	8.8	1938.4
27-Feb	22h 40m 37.56s	-08° 22' 20.3"	22h 40m 37.64s	-08° 22' 25.2"	0.9903559	8.24	8.8	1938.0
28-Feb	22h 44m 23.42s	-07° 59' 42.7"	22h 44m 23.49s	-07° 59' 47.6"	0.9905911	8.24	8.8	1937.5
1-Mar	22h 48m 08.73s	-07° 36' 58.1"	22h 48m 08.80s	-07° 37' 03.1"	0.9908279	8.24	8.8	1937.0
2-Mar	22h 51m 53.53s	-07° 14' 07.1"	22h 51m 53.60s	-07° 14' 12.1"	0.9910665	8.24	8.8	1936.6
3-Mar	22h 55m 37.82s	-06° 51' 09.9"	22h 55m 37.89s	-06° 51' 15.0"	0.9913070	8.24	8.8	1936.1
4-Mar	22h 59m 21.63s	-06° 28' 07.2"	22h 59m 21.70s	-06° 28' 12.3"	0.9915496	8.25	8.8	1935.6
5-Mar	23h 03m 04.97s	-06° 04' 59.1"	23h 03m 05.04s	-06° 05' 04.3"	0.9917946	8.25	8.8	1935.1
6-Mar	23h 06m 47.85s	-05° 41' 46.2"	23h 06m 47.93s	-05° 41' 51.4"	0.9920422	8.25	8.8	1934.7
7-Mar	23h 10m 30.30s	-05° 18' 28.8"	23h 10m 30.38s	-05° 18' 34.0"	0.9922927	8.25	8.8	1934.2
8-Mar	23h 14m 12.34s	-04° 55' 07.3"	23h 14m 12.41s	-04° 55' 12.6"	0.9925463	8.25	8.8	1933.7
9-Mar	23h 17m 53.98s	-04° 31' 42.0"	23h 17m 54.06s	-04° 31' 47.4"	0.9928033	8.26	8.8	1933.2
10-Mar	23h 21m 35.25s	-04° 08' 13.4"	23h 21m 35.33s	-04° 08' 18.8"	0.9930637	8.26	8.8	1932.7
11-Mar	23h 25m 16.18s	-03° 44' 41.7"	23h 25m 16.26s	-03° 44' 47.1"	0.9933275	8.26	8.8	1932.2
12-Mar	23h 28m 56.79s	-03° 21' 07.3"	23h 28m 56.87s	-03° 21' 12.8"	0.9935947	8.26	8.8	1931.6
13-Mar	23h 32m 37.11s	-02° 57' 30.5"	23h 32m 37.19s	-02° 57' 36.0"	0.9938652	8.27	8.8	1931.1
14-Mar	23h 36m 17.16s	-02° 33' 51.6"	23h 36m 17.24s	-02° 33' 57.2"	0.9941387	8.27	8.8	1930.6
15-Mar	23h 39m 56.97s	-02° 10' 11.1"	23h 39m 57.04s	-02° 10' 16.7"	0.9944150	8.27	8.8	1930.0
16-Mar	23h 43m 36.55s	-01° 46' 29.2"	23h 43m 36.63s	-01° 46' 34.9"	0.9946937	8.27	8.8	1929.5
17-Mar	23h 47m 15.94s	-01° 22' 46.3"	23h 47m 16.02s	-01° 22' 52.1"	0.9949746	8.27	8.8	1929.0
18-Mar	23h 50m 55.15s	-00° 59' 02.9"	23h 50m 55.23s	-00° 59' 08.6"	0.9952572	8.28	8.8	1928.4

Date	A.R. Geoc.	Dec. Geoc.	A.R. Topoc.	Dec. Topoc.	Distance A.U.	Light (m)	Parall. "	Diam. "
19-Mar	23h 54m 34.20s	-00° 35' 19.2"	23h 54m 34.28s	-00° 35' 25.0"	0.9955414	8.28	8.8	1927.9
20-Mar	23h 58m 13.11s	-00° 11' 35.6"	23h 58m 13.19s	-00° 11' 41.5"	0.9958268	8.28	8.8	1927.3
21-Mar	00h 01m 51.91s	+00° 12' 07.4"	00h 01m 51.99s	+00° 12' 01.5"	0.9961130	8.28	8.8	1926.8
22-Mar	00h 05m 30.60s	+00° 35' 49.5"	00h 05m 30.68s	+00° 35' 43.6"	0.9963998	8.29	8.8	1926.2
23-Mar	00h 09m 09.21s	+00° 59' 30.4"	00h 09m 09.30s	+00° 59' 24.4"	0.9966869	8.29	8.8	1925.6
24-Mar	00h 12m 47.76s	+01° 23' 09.6"	00h 12m 47.85s	+01° 23' 03.5"	0.9969739	8.29	8.8	1925.1
25-Mar	00h 16m 26.27s	+01° 46' 46.7"	00h 16m 26.35s	+01° 46' 40.7"	0.9972606	8.29	8.8	1924.5
26-Mar	00h 20m 04.75s	+02° 10' 21.5"	00h 20m 04.83s	+02° 10' 15.4"	0.9975468	8.30	8.8	1924.0
27-Mar	00h 23m 43.22s	+02° 33' 53.5"	00h 23m 43.30s	+02° 33' 47.3"	0.9978323	8.30	8.8	1923.4
28-Mar	00h 27m 21.70s	+02° 57' 22.3"	00h 27m 21.79s	+02° 57' 16.1"	0.9981169	8.30	8.8	1922.9
29-Mar	00h 31m 00.21s	+03° 20' 47.5"	00h 31m 00.29s	+03° 20' 41.3"	0.9984006	8.30	8.8	1922.3
30-Mar	00h 34m 38.76s	+03° 44' 08.9"	00h 34m 38.85s	+03° 44' 02.7"	0.9986834	8.31	8.8	1921.8
31-Mar	00h 38m 17.37s	+04° 07' 26.0"	00h 38m 17.46s	+04° 07' 19.7"	0.9989654	8.31	8.8	1921.3
1-Apr	00h 41m 56.06s	+04° 30' 38.4"	00h 41m 56.15s	+04° 30' 32.1"	0.9992468	8.31	8.8	1920.7
2-Apr	00h 45m 34.84s	+04° 53' 45.9"	00h 45m 34.92s	+04° 53' 39.5"	0.9995278	8.31	8.8	1920.2
3-Apr	00h 49m 13.72s	+05° 16' 47.9"	00h 49m 13.81s	+05° 16' 41.5"	0.9998086	8.32	8.8	1919.6
4-Apr	00h 52m 52.72s	+05° 39' 44.2"	00h 52m 52.81s	+05° 39' 37.8"	1.0000896	8.32	8.7	1919.1
5-Apr	00h 56m 31.87s	+06° 02' 34.4"	00h 56m 31.96s	+06° 02' 27.9"	1.0003708	8.32	8.7	1918.6
6-Apr	01h 00m 11.17s	+06° 25' 18.3"	01h 00m 11.26s	+06° 25' 11.8"	1.0006527	8.32	8.7	1918.0
7-Apr	01h 03m 50.66s	+06° 47' 55.4"	01h 03m 50.75s	+06° 47' 48.8"	1.0009353	8.32	8.7	1917.5
8-Apr	01h 07m 30.36s	+07° 10' 25.5"	01h 07m 30.45s	+07° 10' 18.9"	1.0012187	8.33	8.7	1916.9
9-Apr	01h 11m 10.28s	+07° 32' 48.3"	01h 11m 10.37s	+07° 32' 41.7"	1.0015030	8.33	8.7	1916.4
10-Apr	01h 14m 50.46s	+07° 55' 03.4"	01h 14m 50.55s	+07° 54' 56.8"	1.0017882	8.33	8.7	1915.8
11-Apr	01h 18m 30.91s	+08° 17' 10.7"	01h 18m 31.00s	+08° 17' 04.0"	1.0020741	8.33	8.7	1915.3
12-Apr	01h 22m 11.65s	+08° 39' 09.6"	01h 22m 11.74s	+08° 39' 02.9"	1.0023606	8.34	8.7	1914.7
13-Apr	01h 25m 52.71s	+09° 01' 00.0"	01h 25m 52.80s	+09° 00' 53.3"	1.0026474	8.34	8.7	1914.2
14-Apr	01h 29m 34.10s	+09° 22' 41.5"	01h 29m 34.19s	+09° 22' 34.7"	1.0029343	8.34	8.7	1913.6
15-Apr	01h 33m 15.83s	+09° 44' 13.8"	01h 33m 15.93s	+09° 44' 07.0"	1.0032211	8.34	8.7	1913.1
16-Apr	01h 36m 57.94s	+10° 05' 36.5"	01h 36m 58.03s	+10° 05' 29.6"	1.0035074	8.35	8.7	1912.6
17-Apr	01h 40m 40.42s	+10° 26' 49.3"	01h 40m 40.52s	+10° 26' 42.4"	1.0037930	8.35	8.7	1912.0
18-Apr	01h 44m 23.30s	+10° 47' 51.8"	01h 44m 23.39s	+10° 47' 44.9"	1.0040775	8.35	8.7	1911.5
19-Apr	01h 48m 06.59s	+11° 08' 43.8"	01h 48m 06.68s	+11° 08' 36.8"	1.0043606	8.35	8.7	1910.9
20-Apr	01h 51m 50.30s	+11° 29' 24.8"	01h 51m 50.40s	+11° 29' 17.8"	1.0046420	8.36	8.7	1910.4
21-Apr	01h 55m 34.45s	+11° 49' 54.4"	01h 55m 34.54s	+11° 49' 47.5"	1.0049214	8.36	8.7	1909.9
22-Apr	01h 59m 19.04s	+12° 10' 12.5"	01h 59m 19.14s	+12° 10' 05.5"	1.0051985	8.36	8.7	1909.3
23-Apr	02h 03m 04.10s	+12° 30' 18.6"	02h 03m 04.20s	+12° 30' 11.5"	1.0054729	8.36	8.7	1908.8
24-Apr	02h 06m 49.63s	+12° 50' 12.3"	02h 06m 49.73s	+12° 50' 05.2"	1.0057443	8.36	8.7	1908.3
25-Apr	02h 10m 35.64s	+13° 09' 53.4"	02h 10m 35.74s	+13° 09' 46.3"	1.0060126	8.37	8.7	1907.8
26-Apr	02h 14m 22.14s	+13° 29' 21.4"	02h 14m 22.24s	+13° 29' 14.3"	1.0062776	8.37	8.7	1907.3
27-Apr	02h 18m 09.13s	+13° 48' 36.1"	02h 18m 09.23s	+13° 48' 28.9"	1.0065392	8.37	8.7	1906.8
28-Apr	02h 21m 56.62s	+14° 07' 37.1"	02h 21m 56.72s	+14° 07' 29.9"	1.0067975	8.37	8.7	1906.3
29-Apr	02h 25m 44.61s	+14° 26' 24.0"	02h 25m 44.71s	+14° 26' 16.8"	1.0070524	8.38	8.7	1905.8
30-Apr	02h 29m 33.10s	+14° 44' 56.5"	02h 29m 33.21s	+14° 44' 49.3"	1.0073043	8.38	8.7	1905.3
1-May	02h 33m 22.11s	+15° 03' 14.4"	02h 33m 22.21s	+15° 03' 07.2"	1.0075533	8.38	8.7	1904.9
2-May	02h 37m 11.62s	+15° 21' 17.2"	02h 37m 11.72s	+15° 21' 09.9"	1.0077998	8.38	8.7	1904.4
3-May	02h 41m 01.65s	+15° 39' 04.6"	02h 41m 01.75s	+15° 38' 57.3"	1.0080440	8.38	8.7	1903.9
4-May	02h 44m 52.21s	+15° 56' 36.4"	02h 44m 52.31s	+15° 56' 29.1"	1.0082861	8.39	8.7	1903.5
5-May	02h 48m 43.30s	+16° 13' 52.2"	02h 48m 43.40s	+16° 13' 44.9"	1.0085264	8.39	8.7	1903.0
6-May	02h 52m 34.94s	+16° 30' 51.9"	02h 52m 35.04s	+16° 30' 44.5"	1.0087651	8.39	8.7	1902.6
7-May	02h 56m 27.12s	+16° 47' 34.9"	02h 56m 27.23s	+16° 47' 27.6"	1.0090023	8.39	8.7	1902.1
8-May	03h 00m 19.87s	+17° 04' 01.3"	03h 00m 19.98s	+17° 03' 53.9"	1.0092380	8.39	8.7	1901.7
9-May	03h 04m 13.19s	+17° 20' 10.5"	03h 04m 13.29s	+17° 20' 03.1"	1.0094723	8.40	8.7	1901.3
10-May	03h 08m 07.07s	+17° 36' 02.4"	03h 08m 07.18s	+17° 35' 55.0"	1.0097050	8.40	8.7	1900.8
11-May	03h 12m 01.54s	+17° 51' 36.7"	03h 12m 01.64s	+17° 51' 29.3"	1.0099362	8.40	8.7	1900.4
12-May	03h 15m 56.58s	+18° 06' 53.1"	03h 15m 56.69s	+18° 06' 45.6"	1.0101656	8.40	8.7	1900.0
13-May	03h 19m 52.21s	+18° 21' 51.3"	03h 19m 52.32s	+18° 21' 43.8"	1.0103930	8.40	8.7	1899.5
14-May	03h 23m 48.42s	+18° 36' 31.0"	03h 23m 48.52s	+18° 36' 23.5"	1.0106183	8.41	8.7	1899.1
15-May	03h 27m 45.21s	+18° 50' 52.0"	03h 27m 45.31s	+18° 50' 44.5"	1.0108412	8.41	8.7	1898.7
16-May	03h 31m 42.58s	+19° 04' 53.9"	03h 31m 42.68s	+19° 04' 46.4"	1.0110614	8.41	8.7	1898.3
17-May	03h 35m 40.53s	+19° 18' 36.5"	03h 35m 40.63s	+19° 18' 28.9"	1.0112787	8.41	8.7	1897.9
18-May	03h 39m 39.05s	+19° 31' 59.4"	03h 39m 39.16s	+19° 31' 51.9"	1.0114927	8.41	8.7	1897.5
19-May	03h 43m 38.15s	+19° 45' 02.5"	03h 43m 38.25s	+19° 44' 54.9"	1.0117033	8.41	8.6	1897.1
20-May	03h 47m 37.81s	+19° 57' 45.4"	03h 47m 37.91s	+19° 57' 37.8"	1.0119099	8.42	8.6	1896.7
21-May	03h 51m 38.03s	+20° 10' 07.8"	03h 51m 38.14s	+20° 10' 00.2"	1.0121124	8.42	8.6	1896.3
22-May	03h 55m 38.80s	+20° 22' 09.6"	03h 55m 38.91s	+20° 22' 02.0"	1.0123104	8.42	8.6	1895.9
23-May	03h 59m 40.12s	+20° 33' 50.4"	03h 59m 40.22s	+20° 33' 42.8"	1.0125035	8.42	8.6	1895.6
24-May	04h 03m 41.96s	+20° 45' 10.0"	04h 03m 42.07s	+20° 45' 02.4"	1.0126916	8.42	8.6	1895.2
25-May	04h 07m 44.32s	+20° 56' 08.2"	04h 07m 44.43s	+20° 56' 00.5"	1.0128745	8.42	8.6	1894.9
26-May	04h 11m 47.18s	+21° 06' 44.7"	04h 11m 47.29s	+21° 06' 37.0"	1.0130520	8.43	8.6	1894.5
27-May	04h 15m 50.51s	+21° 16' 59.3"	04h 15m 50.62s	+21° 16' 51.7"	1.0132242	8.43	8.6	1894.2
28-May	04h 19m 54.30s	+21° 26' 51.8"	04h 19m 54.41s	+21° 26' 44.2"	1.0133913	8.43	8.6	1893.9
29-May	04h 23m 58.53s	+21° 36' 22.0"	04h 23m 58.63s	+21° 36' 14.3"	1.0135535	8.43	8.6	1893.6
30-May	04h 28m 03.17s	+21° 45' 29.6"	04h 28m 03.28s	+21° 45' 22.0"	1.0137110	8.43	8.6	1893.3
31-May	04h 32m 08.22s	+21° 54' 14.5"	04h 32m 08.33s	+21° 54' 06.8"	1.0138641	8.43	8.6	1893.0
1-Jun	04h 36m 13.66s	+22° 02' 36.5"	04h 36m 13.77s	+22° 02' 28.8"	1.0140132	8.43	8.6	1892.7
2-Jun	04h 40m 19.48s	+22° 10' 35.4"	04h 40m 19.58s	+22° 10' 27.7"	1.0141585	8.43	8.6	1892.5
3-Jun	04h 44m 25.66s	+22° 18' 11.0"	04h 44m 25.76s	+22° 18' 03.3"	1.0143003	8.44	8.6	1892.2
4-Jun	04h 48m 32.19s	+22° 25' 23.3"	04h 48m 32.29s	+22° 25' 15.6"	1.0144387	8.44	8.6	1891.9
5-Jun	04h 52m 39.05s	+22° 32' 12.0"	04h 52m 39.16s	+22° 32' 04.3"	1.0145739	8.44	8.6	1891.7
6-Jun	04h 56m 46.24s	+22° 38' 37.1"	04h 56m 46.34s	+22° 38' 29.4"	1.0147061	8.44	8.6	1891.4
7-Jun	05h 00m 53.73s	+22° 44' 38.4"	05h 00m 53.84s	+22° 44' 30.7"	1.0148351	8.44	8.6	1891.2
8-Jun	05h 05m 01.51s	+22° 50' 15.9"	05h 05m 01.61s	+22° 50' 08.1"	1.0149612	8.44	8.6	1891.0

Date	A.R. Geoc.	Dec. Geoc.	A.R. Topoc.	Dec. Topoc.	Distance A.U.	Light (m)	Parall. "	Diam. "
9-Jun	05h 09m 09.56s	+22° 55' 29.2"	05h 09m 09.66s	+22° 55' 21.5"	1.0150842	8.44	8.6	1890.7
10-Jun	05h 13m 17.86s	+23° 00' 18.5"	05h 13m 17.96s	+23° 00' 10.7"	1.0152040	8.44	8.6	1890.5
11-Jun	05h 17m 26.39s	+23° 04' 43.5"	05h 17m 26.50s	+23° 04' 35.7"	1.0153206	8.44	8.6	1890.3
12-Jun	05h 21m 35.14s	+23° 08' 44.1"	05h 21m 35.24s	+23° 08' 36.3"	1.0154338	8.45	8.6	1890.1
13-Jun	05h 25m 44.08s	+23° 12' 20.3"	05h 25m 44.18s	+23° 12' 12.5"	1.0155434	8.45	8.6	1889.9
14-Jun	05h 29m 53.20s	+23° 15' 31.9"	05h 29m 53.30s	+23° 15' 24.2"	1.0156493	8.45	8.6	1889.7
15-Jun	05h 34m 02.46s	+23° 18' 19.0"	05h 34m 02.56s	+23° 18' 11.2"	1.0157511	8.45	8.6	1889.5
16-Jun	05h 38m 11.87s	+23° 20' 41.3"	05h 38m 11.97s	+23° 20' 33.5"	1.0158486	8.45	8.6	1889.3
17-Jun	05h 42m 21.38s	+23° 22' 38.9"	05h 42m 21.48s	+23° 22' 31.1"	1.0159416	8.45	8.6	1889.1
18-Jun	05h 46m 30.99s	+23° 24' 11.6"	05h 46m 31.08s	+23° 24' 03.9"	1.0160297	8.45	8.6	1889.0
19-Jun	05h 50m 40.66s	+23° 25' 19.6"	05h 50m 40.76s	+23° 25' 11.8"	1.0161126	8.45	8.6	1888.8
20-Jun	05h 54m 50.37s	+23° 26' 02.7"	05h 54m 50.47s	+23° 25' 54.9"	1.0161900	8.45	8.6	1888.7
21-Jun	05h 59m 00.11s	+23° 26' 20.9"	05h 59m 00.21s	+23° 26' 13.1"	1.0162616	8.45	8.6	1888.6
22-Jun	06h 03m 09.83s	+23° 26' 14.3"	06h 03m 09.93s	+23° 26' 06.5"	1.0163271	8.45	8.6	1888.4
23-Jun	06h 07m 19.51s	+23° 25' 42.9"	06h 07m 19.61s	+23° 25' 35.1"	1.0163863	8.45	8.6	1888.3
24-Jun	06h 11m 29.11s	+23° 24' 46.8"	06h 11m 29.21s	+23° 24' 39.0"	1.0164393	8.45	8.6	1888.2
25-Jun	06h 15m 38.61s	+23° 23' 25.8"	06h 15m 38.70s	+23° 23' 18.1"	1.0164859	8.45	8.6	1888.1
26-Jun	06h 19m 47.96s	+23° 21' 40.2"	06h 19m 48.06s	+23° 21' 32.4"	1.0165265	8.45	8.6	1888.1
27-Jun	06h 23m 57.15s	+23° 19' 29.9"	06h 23m 57.25s	+23° 19' 22.1"	1.0165613	8.45	8.6	1888.0
28-Jun	06h 28m 06.15s	+23° 16' 55.0"	06h 28m 06.25s	+23° 16' 47.3"	1.0165904	8.45	8.6	1887.9
29-Jun	06h 32m 14.94s	+23° 13' 55.7"	06h 32m 15.04s	+23° 13' 47.9"	1.0166144	8.45	8.6	1887.9
30-Jun	06h 36m 23.50s	+23° 10' 31.9"	06h 36m 23.59s	+23° 10' 24.1"	1.0166335	8.46	8.6	1887.9
1-Jul	06h 40m 31.80s	+23° 06' 43.8"	06h 40m 31.89s	+23° 06' 36.0"	1.0166480	8.46	8.6	1887.8
2-Jul	06h 44m 39.83s	+23° 02' 31.4"	06h 44m 39.93s	+23° 02' 23.7"	1.0166582	8.46	8.6	1887.8
3-Jul	06h 48m 47.57s	+22° 57' 55.0"	06h 48m 47.67s	+22° 57' 47.3"	1.0166642	8.46	8.6	1887.8
4-Jul	06h 52m 55.00s	+22° 52' 54.6"	06h 52m 55.10s	+22° 52' 46.9"	1.0166664	8.46	8.6	1887.8
5-Jul	06h 57m 02.11s	+22° 47' 30.4"	06h 57m 02.20s	+22° 47' 22.7"	1.0166648	8.46	8.6	1887.8
6-Jul	07h 01m 08.87s	+22° 41' 42.5"	07h 01m 08.96s	+22° 41' 34.8"	1.0166596	8.46	8.6	1887.8
7-Jul	07h 05m 15.26s	+22° 35' 31.0"	07h 05m 15.36s	+22° 35' 23.3"	1.0166508	8.46	8.6	1887.8
8-Jul	07h 09m 21.28s	+22° 28' 56.1"	07h 09m 21.37s	+22° 28' 48.4"	1.0166384	8.46	8.6	1887.9
9-Jul	07h 13m 26.91s	+22° 21' 57.9"	07h 13m 27.00s	+22° 21' 50.1"	1.0166226	8.45	8.6	1887.9
10-Jul	07h 17m 32.12s	+22° 14' 36.5"	07h 17m 32.21s	+22° 14' 28.8"	1.0166031	8.45	8.6	1887.9
11-Jul	07h 21m 36.92s	+22° 06' 52.2"	07h 21m 37.01s	+22° 06' 44.5"	1.0165801	8.45	8.6	1888.0
12-Jul	07h 25m 41.28s	+21° 58' 45.0"	07h 25m 41.36s	+21° 58' 37.3"	1.0165532	8.45	8.6	1888.0
13-Jul	07h 29m 45.19s	+21° 50' 15.2"	07h 29m 45.27s	+21° 50' 07.5"	1.0165224	8.45	8.6	1888.1
14-Jul	07h 33m 48.64s	+21° 41' 22.9"	07h 33m 48.73s	+21° 41' 15.2"	1.0164876	8.45	8.6	1888.1
15-Jul	07h 37m 51.62s	+21° 32' 08.3"	07h 37m 51.71s	+21° 32' 00.6"	1.0164484	8.45	8.6	1888.2
16-Jul	07h 41m 54.12s	+21° 22' 31.6"	07h 41m 54.21s	+21° 22' 23.9"	1.0164046	8.45	8.6	1888.3
17-Jul	07h 45m 56.13s	+21° 12' 33.0"	07h 45m 56.22s	+21° 12' 25.3"	1.0163560	8.45	8.6	1888.4
18-Jul	07h 49m 57.64s	+21° 02' 12.8"	07h 49m 57.73s	+21° 02' 05.1"	1.0163022	8.45	8.6	1888.5
19-Jul	07h 53m 58.63s	+20° 51' 31.1"	07h 53m 58.72s	+20° 51' 23.4"	1.0162430	8.45	8.6	1888.6
20-Jul	07h 57m 59.09s	+20° 40' 28.2"	07h 57m 59.18s	+20° 40' 20.6"	1.0161779	8.45	8.6	1888.7
21-Jul	08h 01m 59.01s	+20° 29' 04.5"	08h 01m 59.10s	+20° 28' 56.9"	1.0161069	8.45	8.6	1888.8
22-Jul	08h 05m 58.36s	+20° 17' 20.1"	08h 05m 58.45s	+20° 17' 12.5"	1.0160297	8.45	8.6	1889.0
23-Jul	08h 09m 57.14s	+20° 05' 15.4"	08h 09m 57.22s	+20° 05' 07.8"	1.0159462	8.45	8.6	1889.1
24-Jul	08h 13m 55.32s	+19° 52' 50.5"	08h 13m 55.41s	+19° 52' 42.9"	1.0158566	8.45	8.6	1889.3
25-Jul	08h 17m 52.90s	+19° 40' 05.8"	08h 17m 52.99s	+19° 39' 58.3"	1.0157611	8.45	8.6	1889.5
26-Jul	08h 21m 49.87s	+19° 27' 01.6"	08h 21m 49.96s	+19° 26' 54.1"	1.0156598	8.45	8.6	1889.7
27-Jul	08h 25m 46.23s	+19° 13' 38.1"	08h 25m 46.32s	+19° 13' 30.6"	1.0155532	8.45	8.6	1889.9
28-Jul	08h 29m 41.97s	+18° 59' 55.6"	08h 29m 42.06s	+18° 59' 48.1"	1.0154416	8.45	8.6	1890.1
29-Jul	08h 33m 37.09s	+18° 45' 54.4"	08h 33m 37.17s	+18° 45' 46.9"	1.0153252	8.44	8.6	1890.3
30-Jul	08h 37m 31.59s	+18° 31' 34.8"	08h 37m 31.67s	+18° 31' 27.3"	1.0152045	8.44	8.6	1890.5
31-Jul	08h 41m 25.46s	+18° 16' 57.0"	08h 41m 25.55s	+18° 16' 49.6"	1.0150798	8.44	8.6	1890.8
1-Aug	08h 45m 18.71s	+18° 02' 01.4"	08h 45m 18.80s	+18° 01' 54.0"	1.0149512	8.44	8.6	1891.0
2-Aug	08h 49m 11.35s	+17° 46' 48.3"	08h 49m 11.43s	+17° 46' 40.8"	1.0148191	8.44	8.6	1891.2
3-Aug	08h 53m 03.36s	+17° 31' 17.8"	08h 53m 03.45s	+17° 31' 10.4"	1.0146836	8.44	8.6	1891.5
4-Aug	08h 56m 54.76s	+17° 15' 30.4"	08h 56m 54.85s	+17° 15' 23.0"	1.0145449	8.44	8.6	1891.7
5-Aug	09h 00m 45.55s	+16° 59' 26.2"	09h 00m 45.64s	+16° 59' 18.9"	1.0144032	8.44	8.6	1892.0
6-Aug	09h 04m 35.73s	+16° 43' 05.7"	09h 04m 35.82s	+16° 42' 58.3"	1.0142585	8.44	8.6	1892.3
7-Aug	09h 08m 25.32s	+16° 26' 28.9"	09h 08m 25.40s	+16° 26' 21.6"	1.0141110	8.43	8.6	1892.6
8-Aug	09h 12m 14.31s	+16° 09' 36.3"	09h 12m 14.40s	+16° 09' 29.0"	1.0139606	8.43	8.6	1892.8
9-Aug	09h 16m 02.72s	+15° 52' 28.0"	09h 16m 02.81s	+15° 52' 20.7"	1.0138074	8.43	8.6	1893.1
10-Aug	09h 19m 50.56s	+15° 35' 04.4"	09h 19m 50.65s	+15° 34' 57.2"	1.0136513	8.43	8.6	1893.4
11-Aug	09h 23m 37.84s	+15° 17' 25.8"	09h 23m 37.92s	+15° 17' 18.6"	1.0134922	8.43	8.6	1893.7
12-Aug	09h 27m 24.56s	+14° 59' 32.4"	09h 27m 24.65s	+14° 59' 25.2"	1.0133299	8.43	8.6	1894.0
13-Aug	09h 31m 10.75s	+14° 41' 24.6"	09h 31m 10.84s	+14° 41' 17.4"	1.0131643	8.43	8.6	1894.3
14-Aug	09h 34m 56.41s	+14° 23' 02.5"	09h 34m 56.49s	+14° 22' 55.3"	1.0129951	8.42	8.6	1894.6
15-Aug	09h 38m 41.54s	+14° 04' 26.6"	09h 38m 41.63s	+14° 04' 19.5"	1.0128221	8.42	8.6	1895.0
16-Aug	09h 42m 26.17s	+13° 45' 37.2"	09h 42m 26.26s	+13° 45' 30.1"	1.0126450	8.42	8.6	1895.3
17-Aug	09h 46m 10.29s	+13° 26' 34.5"	09h 46m 10.38s	+13° 26' 27.4"	1.0124635	8.42	8.6	1895.6
18-Aug	09h 49m 53.92s	+13° 07' 19.0"	09h 49m 54.01s	+13° 07' 11.9"	1.0122773	8.42	8.6	1896.0
19-Aug	09h 53m 37.05s	+12° 47' 51.0"	09h 53m 37.14s	+12° 47' 44.0"	1.0120863	8.42	8.6	1896.3
20-Aug	09h 57m 19.69s	+12° 28' 10.8"	09h 57m 19.78s	+12° 28' 03.8"	1.0118902	8.42	8.6	1896.7
21-Aug	10h 01m 01.86s	+12° 08' 18.8"	10h 01m 01.95s	+12° 08' 11.8"	1.0116890	8.41	8.6	1897.1
22-Aug	10h 04m 43.55s	+11° 48' 15.3"	10h 04m 43.64s	+11° 48' 08.3"	1.0114829	8.41	8.6	1897.5
23-Aug	10h 08m 24.78s	+11° 28' 00.6"	10h 08m 24.87s	+11° 27' 53.7"	1.0112719	8.41	8.6	1897.9
24-Aug	10h 12m 05.56s	+11° 07' 35.1"	10h 12m 05.65s	+11° 07' 28.3"	1.0110565	8.41	8.7	1898.3
25-Aug	10h 15m 45.91s	+10° 46' 59.2"	10h 15m 46.00s	+10° 46' 52.3"	1.0108369	8.41	8.7	1898.7
26-Aug	10h 19m 25.83s	+10° 26' 13.1"	10h 19m 25.93s	+10° 26' 06.3"	1.0106135	8.41	8.7	1899.1
27-Aug	10h 23m 05.35s	+10° 05' 17.2"	10h 23m 05.44s	+10° 05' 10.4"	1.0103865	8.40	8.7	1899.5
28-Aug	10h 26m 44.47s	+09° 44' 11.8"	10h 26m 44.56s	+09° 44' 05.1"	1.0101564	8.40	8.7	1900.0
29-Aug	10h 30m 23.21s	+09° 22' 57.3"	10h 30m 23.30s	+09° 22' 50.5"	1.0099234	8.40	8.7	1900.4

Date	A.R. Geoc.	Dec. Geoc.	A.R. Topoc.	Dec. Topoc.	Distance A.U.	Light (m)	Parall. "	Diam. "
30-Aug	10h 34m 01.58s	+09° 01' 33.9"	10h 34m 01.68s	+09° 01' 27.2"	1.0096879	8.40	8.7	1900.8
31-Aug	10h 37m 39.61s	+08° 40' 02.0"	10h 37m 39.71s	+08° 39' 55.3"	1.0094501	8.40	8.7	1901.3
1-Sep	10h 41m 17.31s	+08° 18' 21.9"	10h 41m 17.40s	+08° 18' 15.2"	1.0092104	8.39	8.7	1901.7
2-Sep	10h 44m 54.69s	+07° 56' 33.8"	10h 44m 54.79s	+07° 56' 27.2"	1.0089688	8.39	8.7	1902.2
3-Sep	10h 48m 31.78s	+07° 34' 38.1"	10h 48m 31.88s	+07° 34' 31.6"	1.0087256	8.39	8.7	1902.7
4-Sep	10h 52m 08.60s	+07° 12' 35.2"	10h 52m 08.70s	+07° 12' 28.6"	1.0084811	8.39	8.7	1903.1
5-Sep	10h 55m 45.17s	+06° 50' 25.2"	10h 55m 45.26s	+06° 50' 18.7"	1.0082353	8.39	8.7	1903.6
6-Sep	10h 59m 21.50s	+06° 28' 08.5"	10h 59m 21.60s	+06° 28' 02.0"	1.0079883	8.38	8.7	1904.1
7-Sep	11h 02m 57.63s	+06° 05' 45.4"	11h 02m 57.73s	+06° 05' 39.0"	1.0077402	8.38	8.7	1904.5
8-Sep	11h 06m 33.57s	+05° 43' 16.1"	11h 06m 33.67s	+05° 43' 09.7"	1.0074910	8.38	8.7	1905.0
9-Sep	11h 10m 09.35s	+05° 20' 41.0"	11h 10m 09.45s	+05° 20' 34.7"	1.0072407	8.38	8.7	1905.5
10-Sep	11h 13m 44.99s	+04° 58' 00.4"	11h 13m 45.09s	+04° 57' 54.1"	1.0069890	8.37	8.7	1905.9
11-Sep	11h 17m 20.51s	+04° 35' 14.5"	11h 17m 20.61s	+04° 35' 08.2"	1.0067358	8.37	8.7	1906.4
12-Sep	11h 20m 55.94s	+04° 12' 23.8"	11h 20m 56.04s	+04° 12' 17.5"	1.0064810	8.37	8.7	1906.9
13-Sep	11h 24m 31.29s	+03° 49' 28.5"	11h 24m 31.39s	+03° 49' 22.3"	1.0062243	8.37	8.7	1907.4
14-Sep	11h 28m 06.57s	+03° 26' 28.9"	11h 28m 06.67s	+03° 26' 22.8"	1.0059654	8.37	8.7	1907.9
15-Sep	11h 31m 41.81s	+03° 03' 25.5"	11h 31m 41.92s	+03° 03' 19.4"	1.0057041	8.36	8.7	1908.4
16-Sep	11h 35m 17.03s	+02° 40' 18.6"	11h 35m 17.13s	+02° 40' 12.5"	1.0054400	8.36	8.7	1908.9
17-Sep	11h 38m 52.23s	+02° 17' 08.6"	11h 38m 52.34s	+02° 17' 02.5"	1.0051730	8.36	8.7	1909.4
18-Sep	11h 42m 27.44s	+01° 53' 55.8"	11h 42m 27.55s	+01° 53' 49.7"	1.0049031	8.36	8.7	1909.9
19-Sep	11h 46m 02.67s	+01° 30' 40.5"	11h 46m 02.78s	+01° 30' 34.5"	1.0046301	8.36	8.7	1910.4
20-Sep	11h 49m 37.94s	+01° 07' 23.2"	11h 49m 38.05s	+01° 07' 17.3"	1.0043542	8.35	8.7	1910.9
21-Sep	11h 53m 13.27s	+00° 44' 04.2"	11h 53m 13.38s	+00° 43' 58.3"	1.0040755	8.35	8.7	1911.5
22-Sep	11h 56m 48.68s	+00° 20' 43.8"	11h 56m 48.79s	+00° 20' 37.9"	1.0037943	8.35	8.7	1912.0
23-Sep	12h 00m 24.18s	-00° 02' 37.6"	12h 00m 24.29s	-00° 02' 43.4"	1.0035109	8.35	8.7	1912.6
24-Sep	12h 03m 59.79s	-00° 25' 59.6"	12h 03m 59.90s	-00° 26' 05.4"	1.0032256	8.34	8.7	1913.1
25-Sep	12h 07m 35.53s	-00° 49' 21.9"	12h 07m 35.64s	-00° 49' 27.6"	1.0029388	8.34	8.7	1913.6
26-Sep	12h 11m 11.42s	-01° 12' 44.1"	12h 11m 11.53s	-01° 12' 49.8"	1.0026507	8.34	8.7	1914.2
27-Sep	12h 14m 47.48s	-01° 36' 06.0"	12h 14m 47.59s	-01° 36' 11.6"	1.0023617	8.34	8.7	1914.7
28-Sep	12h 18m 23.72s	-01° 59' 27.0"	12h 18m 23.83s	-01° 59' 32.6"	1.0020721	8.33	8.7	1915.3
29-Sep	12h 22m 00.17s	-02° 22' 47.0"	12h 22m 00.28s	-02° 22' 52.6"	1.0017823	8.33	8.7	1915.9
30-Sep	12h 25m 36.84s	-02° 46' 05.6"	12h 25m 36.96s	-02° 46' 11.1"	1.0014925	8.33	8.7	1916.4
1-Oct	12h 29m 13.77s	-03° 09' 22.4"	12h 29m 13.89s	-03° 09' 27.8"	1.0012030	8.33	8.7	1917.0
2-Oct	12h 32m 50.98s	-03° 32' 37.0"	12h 32m 51.09s	-03° 32' 42.5"	1.0009140	8.32	8.7	1917.5
3-Oct	12h 36m 28.47s	-03° 55' 49.3"	12h 36m 28.59s	-03° 55' 54.7"	1.0006259	8.32	8.7	1918.1
4-Oct	12h 40m 06.29s	-04° 18' 58.8"	12h 40m 06.41s	-04° 19' 04.2"	1.0003387	8.32	8.7	1918.6
5-Oct	12h 43m 44.46s	-04° 42' 05.3"	12h 43m 44.57s	-04° 42' 10.6"	1.0000527	8.32	8.7	1919.2
6-Oct	12h 47m 22.99s	-05° 05' 08.3"	12h 47m 23.11s	-05° 05' 13.6"	0.9997680	8.31	8.7	1919.7
7-Oct	12h 51m 01.93s	-05° 28' 07.7"	12h 51m 02.04s	-05° 28' 12.9"	0.9994845	8.31	8.8	1920.3
8-Oct	12h 54m 41.28s	-05° 51' 02.9"	12h 54m 41.39s	-05° 51' 08.1"	0.9992023	8.31	8.8	1920.8
9-Oct	12h 58m 21.07s	-06° 13' 53.7"	12h 58m 21.19s	-06° 13' 58.9"	0.9989212	8.31	8.8	1921.3
10-Oct	13h 02m 01.32s	-06° 36' 39.8"	13h 02m 01.44s	-06° 36' 44.9"	0.9986412	8.31	8.8	1921.9
11-Oct	13h 05m 42.06s	-06° 59' 20.7"	13h 05m 42.18s	-06° 59' 25.7"	0.9983619	8.30	8.8	1922.4
12-Oct	13h 09m 23.29s	-07° 21' 56.1"	13h 09m 23.41s	-07° 22' 01.1"	0.9980831	8.30	8.8	1923.0
13-Oct	13h 13m 05.05s	-07° 44' 25.5"	13h 13m 05.17s	-07° 44' 30.5"	0.9978046	8.30	8.8	1923.5
14-Oct	13h 16m 47.34s	-08° 06' 48.6"	13h 16m 47.46s	-08° 06' 53.5"	0.9975261	8.30	8.8	1924.0
15-Oct	13h 20m 30.18s	-08° 29' 05.0"	13h 20m 30.30s	-08° 29' 09.9"	0.9972475	8.29	8.8	1924.6
16-Oct	13h 24m 13.59s	-08° 51' 14.3"	13h 24m 13.72s	-08° 51' 19.1"	0.9969684	8.29	8.8	1925.1
17-Oct	13h 27m 57.59s	-09° 13' 16.0"	13h 27m 57.71s	-09° 13' 20.8"	0.9966889	8.29	8.8	1925.6
18-Oct	13h 31m 42.19s	-09° 35' 09.8"	13h 31m 42.31s	-09° 35' 14.5"	0.9964088	8.29	8.8	1926.2
19-Oct	13h 35m 27.40s	-09° 56' 55.3"	13h 35m 27.52s	-09° 56' 60.0"	0.9961283	8.28	8.8	1926.7
20-Oct	13h 39m 13.23s	-10° 18' 32.0"	13h 39m 13.36s	-10° 18' 36.6"	0.9958475	8.28	8.8	1927.3
21-Oct	13h 42m 59.71s	-10° 39' 59.6"	13h 42m 59.84s	-10° 40' 04.2"	0.9955666	8.28	8.8	1927.8
22-Oct	13h 46m 46.83s	-11° 01' 17.6"	13h 46m 46.96s	-11° 01' 22.1"	0.9952859	8.28	8.8	1928.4
23-Oct	13h 50m 34.62s	-11° 22' 25.7"	13h 50m 34.75s	-11° 22' 30.2"	0.9950055	8.28	8.8	1928.9
24-Oct	13h 54m 23.08s	-11° 43' 23.4"	13h 54m 23.21s	-11° 43' 27.8"	0.9947259	8.27	8.8	1929.4
25-Oct	13h 58m 12.23s	-12° 04' 10.3"	13h 58m 12.35s	-12° 04' 14.7"	0.9944474	8.27	8.8	1930.0
26-Oct	14h 02m 02.07s	-12° 24' 46.0"	14h 02m 02.20s	-12° 24' 50.4"	0.9941701	8.27	8.8	1930.5
27-Oct	14h 05m 52.62s	-12° 45' 10.2"	14h 05m 52.75s	-12° 45' 14.6"	0.9938946	8.27	8.8	1931.1
28-Oct	14h 09m 43.90s	-13° 05' 22.5"	14h 09m 44.02s	-13° 05' 26.8"	0.9936210	8.26	8.8	1931.6
29-Oct	14h 13m 35.91s	-13° 25' 22.4"	14h 13m 36.04s	-13° 25' 26.6"	0.9933496	8.26	8.8	1932.1
30-Oct	14h 17m 28.67s	-13° 45' 09.5"	14h 17m 28.80s	-13° 45' 13.7"	0.9930809	8.26	8.8	1932.6
31-Oct	14h 21m 22.19s	-14° 04' 43.5"	14h 21m 22.32s	-14° 04' 47.7"	0.9928151	8.26	8.8	1933.2
1-Nov	14h 25m 16.49s	-14° 24' 04.1"	14h 25m 16.62s	-14° 24' 08.2"	0.9925525	8.25	8.8	1933.7
2-Nov	14h 29m 11.58s	-14° 43' 10.7"	14h 29m 11.71s	-14° 43' 14.8"	0.9922932	8.25	8.8	1934.2
3-Nov	14h 33m 07.47s	-15° 02' 03.1"	14h 33m 07.60s	-15° 02' 07.1"	0.9920376	8.25	8.8	1934.7
4-Nov	14h 37m 04.18s	-15° 20' 40.8"	14h 37m 04.32s	-15° 20' 44.8"	0.9917858	8.25	8.8	1935.2
5-Nov	14h 41m 01.73s	-15° 39' 03.6"	14h 41m 01.86s	-15° 39' 07.5"	0.9915377	8.25	8.8	1935.6
6-Nov	14h 45m 00.11s	-15° 57' 10.9"	14h 45m 00.24s	-15° 57' 14.8"	0.9912935	8.24	8.8	1936.1
7-Nov	14h 48m 59.33s	-16° 15' 02.4"	14h 48m 59.47s	-16° 15' 06.3"	0.9910529	8.24	8.8	1936.6
8-Nov	14h 52m 59.42s	-16° 32' 37.8"	14h 52m 59.55s	-16° 32' 41.6"	0.9908158	8.24	8.8	1937.1
9-Nov	14h 57m 00.36s	-16° 49' 56.4"	14h 57m 00.49s	-16° 50' 00.2"	0.9905820	8.24	8.8	1937.5
10-Nov	15h 01m 02.16s	-17° 06' 58.1"	15h 01m 02.29s	-17° 07' 01.8"	0.9903512	8.24	8.8	1938.0
11-Nov	15h 05m 04.83s	-17° 23' 42.2"	15h 05m 04.96s	-17° 23' 46.0"	0.9901231	8.23	8.8	1938.4
12-Nov	15h 09m 08.37s	-17° 40' 08.5"	15h 09m 08.50s	-17° 40' 12.2"	0.9898975	8.23	8.8	1938.9
13-Nov	15h 13m 12.77s	-17° 56' 16.5"	15h 13m 12.90s	-17° 56' 20.1"	0.9896742	8.23	8.8	1939.3
14-Nov	15h 17m 18.05s	-18° 12' 05.8"	15h 17m 18.18s	-18° 12' 09.4"	0.9894529	8.23	8.8	1939.7
15-Nov	15h 21m 24.18s	-18° 27' 35.9"	15h 21m 24.31s	-18° 27' 39.5"	0.9892336	8.23	8.8	1940.2
16-Nov	15h 25m 31.17s	-18° 42' 46.6"	15h 25m 31.30s	-18° 42' 50.1"	0.9890162	8.23	8.8	1940.6
17-Nov	15h 29m 39.01s	-18° 57' 37.4"	15h 29m 39.14s	-18° 57' 40.9"	0.9888007	8.22	8.8	1941.0
18-Nov	15h 33m 47.68s	-19° 12' 07.9"	15h 33m 47.81s	-19° 12' 11.4"	0.9885872	8.22	8.8	1941.4
19-Nov	15h 37m 57.19s	-19° 26' 17.7"	15h 37m 57.32s	-19° 26' 21.1"	0.9883759	8.22	8.9	1941.8

Date	A.R. Geoc.	Dec. Geoc.	A.R. Topoc.	Dec. Topoc.	Distance A.U.	Light (m)	Parall. "	Diam. "
20-Nov	15h 42m 07.50s	-19° 40' 06.5"	15h 42m 07.63s	-19° 40' 09.9"	0.9881669	8.22	8.9	1942.2
21-Nov	15h 46m 18.62s	-19° 53' 33.8"	15h 46m 18.75s	-19° 53' 37.2"	0.9879604	8.22	8.9	1942.7
22-Nov	15h 50m 30.53s	-20° 06' 39.3"	15h 50m 30.66s	-20° 06' 42.7"	0.9877567	8.21	8.9	1943.1
23-Nov	15h 54m 43.22s	-20° 19' 22.7"	15h 54m 43.35s	-20° 19' 26.1"	0.9875560	8.21	8.9	1943.4
24-Nov	15h 58m 56.66s	-20° 31' 43.6"	15h 58m 56.79s	-20° 31' 46.9"	0.9873587	8.21	8.9	1943.8
25-Nov	16h 03m 10.86s	-20° 43' 41.6"	16h 03m 10.99s	-20° 43' 44.9"	0.9871648	8.21	8.9	1944.2
26-Nov	16h 07m 25.79s	-20° 55' 16.5"	16h 07m 25.92s	-20° 55' 19.7"	0.9869749	8.21	8.9	1944.6
27-Nov	16h 11m 41.44s	-21° 06' 27.8"	16h 11m 41.57s	-21° 06' 31.0"	0.9867891	8.21	8.9	1945.0
28-Nov	16h 15m 57.80s	-21° 17' 15.3"	16h 15m 57.93s	-21° 17' 18.5"	0.9866079	8.21	8.9	1945.3
29-Nov	16h 20m 14.85s	-21° 27' 38.7"	16h 20m 14.98s	-21° 27' 41.9"	0.9864314	8.20	8.9	1945.7
30-Nov	16h 24m 32.57s	-21° 37' 37.7"	16h 24m 32.70s	-21° 37' 40.9"	0.9862600	8.20	8.9	1946.0
1-Dec	16h 28m 50.96s	-21° 47' 12.0"	16h 28m 51.09s	-21° 47' 15.2"	0.9860940	8.20	8.9	1946.3
2-Dec	16h 33m 10.00s	-21° 56' 21.4"	16h 33m 10.12s	-21° 56' 24.5"	0.9859335	8.20	8.9	1946.6
3-Dec	16h 37m 29.66s	-22° 05' 05.6"	16h 37m 29.78s	-22° 05' 08.6"	0.9857788	8.20	8.9	1947.0
4-Dec	16h 41m 49.93s	-22° 13' 24.3"	16h 41m 50.05s	-22° 13' 27.3"	0.9856300	8.20	8.9	1947.2
5-Dec	16h 46m 10.78s	-22° 21' 17.2"	16h 46m 10.91s	-22° 21' 20.3"	0.9854869	8.20	8.9	1947.5
6-Dec	16h 50m 32.21s	-22° 28' 44.2"	16h 50m 32.33s	-22° 28' 47.2"	0.9853495	8.19	8.9	1947.8
7-Dec	16h 54m 54.17s	-22° 35' 44.9"	16h 54m 54.29s	-22° 35' 47.9"	0.9852175	8.19	8.9	1948.1
8-Dec	16h 59m 16.66s	-22° 42' 19.1"	16h 59m 16.78s	-22° 42' 22.1"	0.9850906	8.19	8.9	1948.3
9-Dec	17h 03m 39.64s	-22° 48' 26.6"	17h 03m 39.76s	-22° 48' 29.6"	0.9849686	8.19	8.9	1948.6
10-Dec	17h 08m 03.09s	-22° 54' 07.2"	17h 08m 03.21s	-22° 54' 10.1"	0.9848512	8.19	8.9	1948.8
11-Dec	17h 12m 26.98s	-22° 59' 20.6"	17h 12m 27.10s	-22° 59' 23.6"	0.9847380	8.19	8.9	1949.0
12-Dec	17h 16m 51.28s	-23° 04' 06.7"	17h 16m 51.40s	-23° 04' 09.7"	0.9846289	8.19	8.9	1949.2
13-Dec	17h 21m 15.97s	-23° 08' 25.4"	17h 21m 16.08s	-23° 08' 28.3"	0.9845236	8.19	8.9	1949.4
14-Dec	17h 25m 40.99s	-23° 12' 16.4"	17h 25m 41.11s	-23° 12' 19.4"	0.9844220	8.19	8.9	1949.6
15-Dec	17h 30m 06.32s	-23° 15' 39.8"	17h 30m 06.44s	-23° 15' 42.7"	0.9843239	8.19	8.9	1949.8
16-Dec	17h 34m 31.93s	-23° 18' 35.2"	17h 34m 32.04s	-23° 18' 38.1"	0.9842294	8.19	8.9	1950.0
17-Dec	17h 38m 57.76s	-23° 21' 02.7"	17h 38m 57.87s	-23° 21' 05.6"	0.9841385	8.18	8.9	1950.2
18-Dec	17h 43m 23.79s	-23° 23' 02.2"	17h 43m 23.90s	-23° 23' 05.1"	0.9840511	8.18	8.9	1950.4
19-Dec	17h 47m 49.98s	-23° 24' 33.5"	17h 47m 50.09s	-23° 24' 36.4"	0.9839674	8.18	8.9	1950.5
20-Dec	17h 52m 16.28s	-23° 25' 36.7"	17h 52m 16.39s	-23° 25' 39.6"	0.9838875	8.18	8.9	1950.7
21-Dec	17h 56m 42.66s	-23° 26' 11.7"	17h 56m 42.77s	-23° 26' 14.6"	0.9838115	8.18	8.9	1950.8
22-Dec	18h 01m 09.09s	-23° 26' 18.4"	18h 01m 09.19s	-23° 26' 21.3"	0.9837397	8.18	8.9	1951.0
23-Dec	18h 05m 35.52s	-23° 25' 56.9"	18h 05m 35.63s	-23° 25' 59.8"	0.9836723	8.18	8.9	1951.1
24-Dec	18h 10m 01.93s	-23° 25' 07.1"	18h 10m 02.03s	-23° 25' 10.0"	0.9836094	8.18	8.9	1951.2
25-Dec	18h 14m 28.27s	-23° 23' 49.1"	18h 14m 28.38s	-23° 23' 52.0"	0.9835513	8.18	8.9	1951.4
26-Dec	18h 18m 54.52s	-23° 22' 03.0"	18h 18m 54.62s	-23° 22' 05.8"	0.9834983	8.18	8.9	1951.5
27-Dec	18h 23m 20.64s	-23° 19' 48.7"	18h 23m 20.75s	-23° 19' 51.5"	0.9834507	8.18	8.9	1951.6
28-Dec	18h 27m 46.60s	-23° 17' 06.3"	18h 27m 46.71s	-23° 17' 09.2"	0.9834087	8.18	8.9	1951.6
29-Dec	18h 32m 12.38s	-23° 13' 56.0"	18h 32m 12.48s	-23° 13' 58.9"	0.9833727	8.18	8.9	1951.7
30-Dec	18h 36m 37.93s	-23° 10' 17.8"	18h 36m 38.03s	-23° 10' 20.7"	0.9833429	8.18	8.9	1951.8
31-Dec	18h 41m 03.23s	-23° 06' 11.8"	18h 41m 03.33s	-23° 06' 14.7"	0.9833196	8.18	8.9	1951.8

Legenda :

A.R. e DEC. = geocentric and topocentric apparent coordinates for Rome (42°N, 12°E)

Light = Distance in minutes

Parall. = parallax in "

Diam. = diameter in "

TRANSITS OF THE SOLAR CENTRAL MERIDIAN

13/01/09	22.34
10/02/09	06.46
09/03/09	14.45
05/04/09	22.00
03/05/09	04.11
30/05/09	09.25
26/06/09	14.12
23/07/09	19.04
20/08/09	00.29
16/09/09	06.36
13/10/09	13.20
09/11/09	20.29
07/12/09	03.59

SOLSTICES AND EQUINOXES

Spring equinox	20/03	11.43
Summer solstice	21/06	05.45
Autumn equinox	22/09	21.18
Winter solstice	21/12	17.46

PERIGEE AND APOGEE

Perigee	04/01	16.24	0.98327 A.U.
Apogee	04/07	02.14	1.01667 A.U.

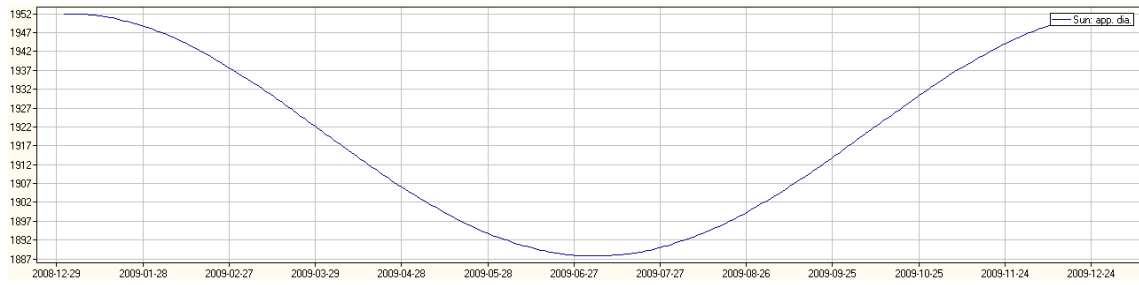
PHYSICAL EPHEMERIDES OF THE SUN

Date	Po °	Bo °	Lo °	Date	Po °	Bo °	Lo °	Date	Po °	Bo °	Lo °
Jan 1	1.9	-3.0	170.8	May 4	-23.4	-3.8	349.4	Sep 4	21.8	7.1	162.4
4	0.5	-3.3	131.2	7	-22.8	-3.5	309.8	7	22.5	7.1	122.8
7	-1.0	-3.6	91.7	10	-22.1	-3.2	270.1	10	23.1	7.1	83.2
10	-2.4	-4.0	52.2	13	-21.4	-2.9	230.4	13	23.7	7.1	43.6
13	-3.9	-4.3	12.7	16	-20.5	-2.5	190.7	16	24.2	7.1	4.0
16	-5.3	-4.6	333.2	19	-19.7	-2.2	151.1	19	24.6	7.0	324.4
19	-6.6	-4.8	293.7	22	-18.7	-1.9	111.4	22	25.0	7.0	284.8
22	-8.0	-5.1	254.2	25	-17.8	-1.5	71.7	25	25.4	6.9	245.2
25	-9.3	-5.4	214.7	28	-16.7	-1.2	32.0	28	25.7	6.8	205.6
28	-10.6	-5.6	175.2	31	-15.7	-0.8	352.3	Oct 1	25.9	6.6	166.0
31	-11.8	-5.8	135.7	Jun 3	-14.5	-0.5	312.6	4	26.1	6.5	126.4
Feb 3	-13.0	-6.1	96.2	6	-13.4	-0.1	272.9	7	26.2	6.3	86.8
6	-14.2	-6.3	56.7	9	-12.2	0.3	233.2	10	26.2	6.1	47.2
9	-15.3	-6.4	17.2	12	-10.9	0.6	193.5	13	26.2	5.9	7.7
12	-16.4	-6.6	337.7	15	-9.7	1.0	153.8	16	26.1	5.7	328.1
15	-17.4	-6.7	298.2	18	-8.4	1.3	114.1	19	25.9	5.5	288.5
18	-18.4	-6.8	258.7	21	-7.0	1.7	74.4	22	25.7	5.3	248.9
21	-19.3	-6.9	219.2	24	-5.7	2.0	34.6	25	25.3	5.0	209.4
24	-20.2	-7.0	179.7	27	-4.4	2.4	354.9	28	25.0	4.7	169.8
27	-21.0	-7.1	140.2	30	-3.0	2.7	315.2	31	24.5	4.4	130.3
Mar 2	-21.8	-7.1	100.7	Jul 3	-1.7	3.0	275.5	Nov 3	24.0	4.1	90.7
5	-22.5	-7.1	61.1	6	-0.3	3.3	235.8	6	23.4	3.8	51.1
8	-23.1	-7.1	21.6	9	1.0	3.6	196.1	9	22.8	3.5	11.6
11	-23.7	-7.1	342.1	12	2.4	3.9	156.4	12	22.1	3.2	332.0
14	-24.2	-7.1	302.5	15	3.7	4.2	116.7	15	21.3	2.8	292.5
17	-24.7	-7.0	263.0	18	5.0	4.5	77.0	18	20.4	2.5	252.9
20	-25.1	-7.0	223.4	21	6.3	4.8	37.3	21	19.5	2.1	213.4
23	-25.4	-6.9	183.9	24	7.6	5.0	357.6	24	18.5	1.8	173.9
26	-25.7	-6.7	144.3	27	8.9	5.3	317.9	27	17.4	1.4	134.3
29	-25.9	-6.6	104.8	30	10.1	5.5	278.3	30	16.3	1.0	94.8
Apr 1	-26.1	-6.5	65.2	Aug 2	11.3	5.7	238.6	Dec 3	15.2	0.7	55.2
4	-26.2	-6.3	25.6	5	12.4	6.0	198.9	6	14.0	0.3	15.7
7	-26.2	-6.1	346.0	8	13.6	6.1	159.2	9	12.7	-0.1	336.2
10	-26.1	-5.9	306.4	11	14.6	6.3	119.6	12	11.4	-0.5	296.7
13	-26.0	-5.7	266.8	14	15.7	6.5	79.9	15	10.1	-0.9	257.1
16	-25.9	-5.5	227.2	17	16.7	6.6	40.3	18	8.7	-1.2	217.6
19	-25.6	-5.2	187.6	20	17.7	6.7	0.6	21	7.3	-1.6	178.1
22	-25.3	-5.0	148.0	23	18.6	6.9	321.0	24	5.9	-2.0	138.6
25	-24.9	-4.7	108.3	26	19.4	6.9	281.3	27	4.4	-2.3	99.1
28	-24.5	-4.4	68.7	29	20.3	7.0	241.7	30	3.0	-2.7	59.5
May 1	-24.0	-4.1	29.1	Sep 1	21.1	7.1	202.1				

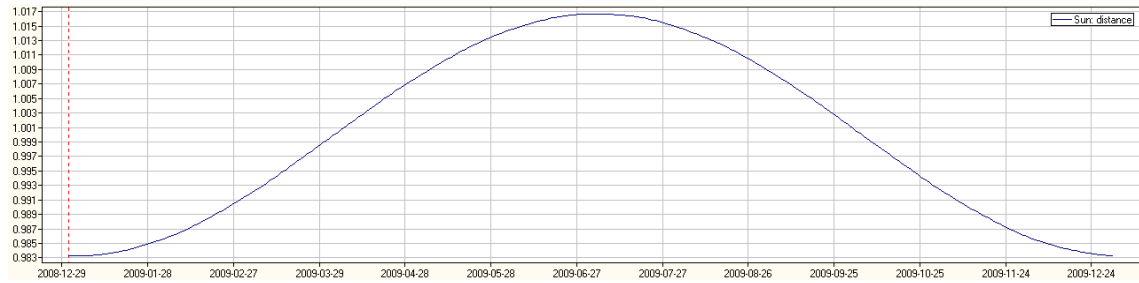
Motion of the central meridian

Days	0h	3h	6h	9h	12h	15h	18h	21h	24h
0	0.0	1.7	3.3	5.0	6.6	8.3	9.9	11.6	13.2
1	13.2	14.9	16.5	18.2	19.8	21.5	23.1	24.8	26.4
2	26.4	28.1	29.7	31.4	33.0	34.7	36.3	38.0	39.6

Po = Position angle of the north pole of the Sun, in °
Bo = Latitude of the Earth, referred to the solar equator, in °
Lo = Longitude of the central meridian of the Sun, in °

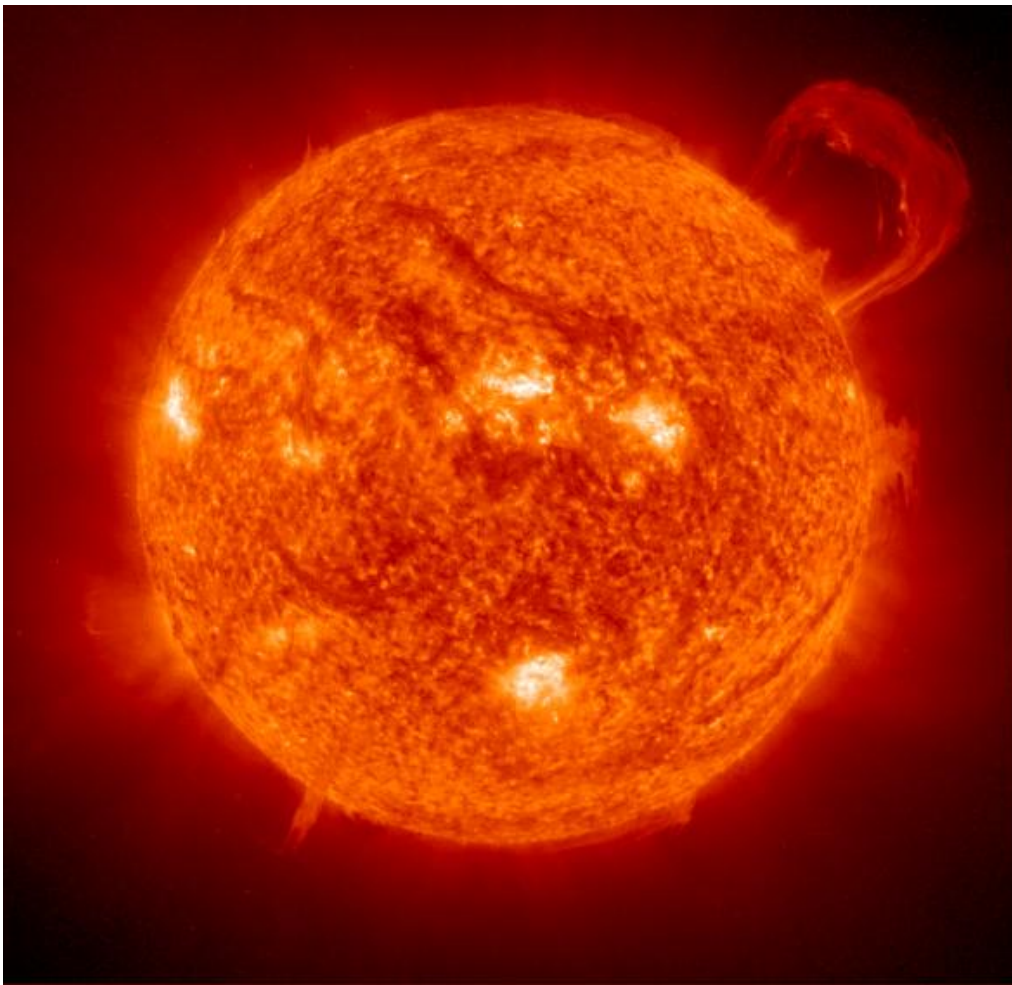


Diameter of the Sun in " during the year



Distance of the Sun in A.U. during the year

© (4)



RISING AND SETTING OF THE SUN

For Greenwich				For Rome Longitude E 12°				Latitude N 42°				Time zone UT +1			
Date	Transit			TDT			Rise (Azm)			Trans (Alt)			Set (Azm)		
	TDT	JD		h	m	s	h	m	°	h	m	°	h	m	°
2009 Jan 1	2454833.002544			12	03	39.8	7	40	(121)	12	16	(25)	16	51	(239)
2009 Jan 2	2454834.002869			12	04	07.9	7	40	(121)	12	16	(25)	16	52	(239)
2009 Jan 3	2454835.003190			12	04	35.6	7	40	(121)	12	17	(25)	16	53	(239)
2009 Jan 4	2454836.003506			12	05	02.9	7	40	(120)	12	17	(25)	16	54	(240)
2009 Jan 5	2454837.003817			12	05	29.8	7	40	(120)	12	17	(25)	16	55	(240)
2009 Jan 6	2454838.004122			12	05	56.1	7	40	(120)	12	18	(26)	16	56	(240)
2009 Jan 7	2454839.004422			12	06	22.0	7	40	(120)	12	18	(26)	16	57	(240)
2009 Jan 8	2454840.004715			12	06	47.4	7	40	(120)	12	19	(26)	16	58	(240)
2009 Jan 9	2454841.005003			12	07	12.2	7	40	(120)	12	19	(26)	16	59	(241)
2009 Jan 10	2454842.005283			12	07	36.5	7	39	(119)	12	20	(26)	17	00	(241)
2009 Jan 11	2454843.005558			12	08	00.2	7	39	(119)	12	20	(26)	17	01	(241)
2009 Jan 12	2454844.005825			12	08	23.3	7	39	(119)	12	20	(26)	17	02	(241)
2009 Jan 13	2454845.006085			12	08	45.7	7	38	(119)	12	21	(27)	17	03	(241)
2009 Jan 14	2454846.006338			12	09	07.6	7	38	(118)	12	21	(27)	17	05	(242)
2009 Jan 15	2454847.006583			12	09	28.8	7	38	(118)	12	21	(27)	17	06	(242)
2009 Jan 16	2454848.006821			12	09	49.3	7	37	(118)	12	22	(27)	17	07	(242)
2009 Jan 17	2454849.007051			12	10	09.2	7	37	(118)	12	22	(27)	17	08	(243)
2009 Jan 18	2454850.007273			12	10	28.4	7	36	(117)	12	22	(28)	17	09	(243)
2009 Jan 19	2454851.007487			12	10	46.9	7	35	(117)	12	23	(28)	17	10	(243)
2009 Jan 20	2454852.007692			12	11	04.6	7	35	(117)	12	23	(28)	17	12	(243)
2009 Jan 21	2454853.007889			12	11	21.6	7	34	(116)	12	23	(28)	17	13	(244)
2009 Jan 22	2454854.008077			12	11	37.9	7	33	(116)	12	24	(28)	17	14	(244)
2009 Jan 23	2454855.008256			12	11	53.4	7	33	(116)	12	24	(29)	17	15	(244)
2009 Jan 24	2454856.008427			12	12	08.1	7	32	(115)	12	24	(29)	17	17	(245)
2009 Jan 25	2454857.008588			12	12	22.0	7	31	(115)	12	24	(29)	17	18	(245)
2009 Jan 26	2454858.008740			12	12	35.1	7	30	(115)	12	25	(29)	17	19	(245)
2009 Jan 27	2454859.008883			12	12	47.5	7	30	(114)	12	25	(30)	17	20	(246)
2009 Jan 28	2454860.009016			12	12	59.0	7	29	(114)	12	25	(30)	17	22	(246)
2009 Jan 29	2454861.009140			12	13	09.7	7	28	(114)	12	25	(30)	17	23	(247)
2009 Jan 30	2454862.009254			12	13	19.5	7	27	(113)	12	25	(30)	17	24	(247)
2009 Jan 31	2454863.009359			12	13	28.6	7	26	(113)	12	25	(31)	17	26	(247)
2009 Feb 1	2454864.009454			12	13	36.8	7	25	(112)	12	26	(31)	17	27	(248)
2009 Feb 2	2454865.009539			12	13	44.1	7	24	(112)	12	26	(31)	17	28	(248)
2009 Feb 3	2454866.009614			12	13	50.7	7	23	(112)	12	26	(32)	17	29	(249)
2009 Feb 4	2454867.009680			12	13	56.4	7	22	(111)	12	26	(32)	17	31	(249)
2009 Feb 5	2454868.009737			12	14	01.2	7	20	(111)	12	26	(32)	17	32	(249)
2009 Feb 6	2454869.009783			12	14	05.3	7	19	(110)	12	26	(33)	17	33	(250)
2009 Feb 7	2454870.009821			12	14	08.5	7	18	(110)	12	26	(33)	17	35	(250)
2009 Feb 8	2454871.009849			12	14	10.9	7	17	(109)	12	26	(33)	17	36	(251)
2009 Feb 9	2454872.009868			12	14	12.6	7	16	(109)	12	26	(33)	17	37	(251)
2009 Feb 10	2454873.009878			12	14	13.4	7	15	(109)	12	26	(34)	17	38	(252)
2009 Feb 11	2454874.009879			12	14	13.5	7	13	(108)	12	26	(34)	17	40	(252)
2009 Feb 12	2454875.009871			12	14	12.8	7	12	(108)	12	26	(34)	17	41	(252)
2009 Feb 13	2454876.009855			12	14	11.4	7	11	(107)	12	26	(35)	17	42	(253)
2009 Feb 14	2454877.009830			12	14	09.3	7	09	(107)	12	26	(35)	17	44	(253)
2009 Feb 15	2454878.009797			12	14	06.4	7	08	(106)	12	26	(35)	17	45	(254)
2009 Feb 16	2454879.009756			12	14	02.9	7	07	(106)	12	26	(36)	17	46	(254)
2009 Feb 17	2454880.009707			12	13	58.6	7	05	(105)	12	26	(36)	17	47	(255)
2009 Feb 18	2454881.009650			12	13	53.7	7	04	(105)	12	26	(37)	17	49	(255)
2009 Feb 19	2454882.009585			12	13	48.1	7	02	(104)	12	26	(37)	17	50	(256)
2009 Feb 20	2454883.009513			12	13	41.9	7	01	(104)	12	26	(37)	17	51	(256)
2009 Feb 21	2454884.009433			12	13	35.0	6	59	(103)	12	26	(38)	17	52	(257)
2009 Feb 22	2454885.009346			12	13	27.5	6	58	(103)	12	25	(38)	17	54	(257)
2009 Feb 23	2454886.009253			12	13	19.4	6	56	(102)	12	25	(38)	17	55	(258)
2009 Feb 24	2454887.009152			12	13	10.7	6	55	(102)	12	25	(39)	17	56	(258)
2009 Feb 25	2454888.009044			12	13	01.4	6	53	(101)	12	25	(39)	17	57	(259)
2009 Feb 26	2454889.008930			12	12	51.6	6	52	(101)	12	25	(39)	17	59	(259)
2009 Feb 27	2454890.008809			12	12	41.1	6	50	(100)	12	25	(40)	18	00	(260)
2009 Feb 28	2454891.008683			12	12	30.2	6	49	(100)	12	25	(40)	18	01	(260)
2009 Mar 1	2454892.008549			12	12	18.7	6	47	(99)	12	24	(41)	18	02	(261)
2009 Mar 2	2454893.008410			12	12	06.7	6	46	(99)	12	24	(41)	18	03	(261)
2009 Mar 3	2454894.008266			12	11	54.1	6	44	(98)	12	24	(41)	18	05	(262)
2009 Mar 4	2454895.008115			12	11	41.1	6	42	(98)	12	24	(42)	18	06	(262)
2009 Mar 5	2454896.007959			12	11	27.7	6	41	(97)	12	23	(42)	18	07	(263)
2009 Mar 6	2454897.007798			12	11	13.8	6	39	(97)	12	23	(42)	18	08	(263)
2009 Mar 7	2454898.007633			12	10	59.5	6	37	(96)	12	23	(43)	18	09	(264)
2009 Mar 8	2454899.007462			12	10	44.8	6	36	(96)	12	23	(43)	18	10	(265)
2009 Mar 9	2454900.007288			12	10	29.7	6	34	(95)	12	23	(44)	18	12	(265)
2009 Mar 10	2454901.007109			12	10	14.2	6	32	(95)	12	22	(44)	18	13	(266)
2009 Mar 11	2454902.006926			12	09	58.4	6	31	(94)	12	22	(44)	18	14	(266)
2009 Mar 12	2454903.006740			12	09	42.4	6	29	(94)	12	22	(45)	18	15	(267)
2009 Mar 13	2454904.006551			12	09	26.0	6	27	(93)	12	21	(45)	18	16	(267)
2009 Mar 14	2454905.006358			12	09	09.4	6	26	(93)	12	21	(46)	18	17	(268)

Date	TDT JD	TDT			Rise		(Azm)	Trans		(Alt)	Set		(Azm)
		h	m	s	h	m	°	h	m	°	h	m	°
2009 Mar 15	2454906.006163	12	08	52.5	6	24	(92)	12	21	(46)	18	19	(268)
2009 Mar 16	2454907.005966	12	08	35.4	6	22	(92)	12	21	(46)	18	20	(269)
2009 Mar 17	2454908.005766	12	08	18.2	6	21	(91)	12	20	(47)	18	21	(269)
2009 Mar 18	2454909.005564	12	08	00.7	6	19	(90)	12	20	(47)	18	22	(270)
2009 Mar 19	2454910.005361	12	07	43.2	6	17	(90)	12	20	(48)	18	23	(270)
2009 Mar 20	2454911.005156	12	07	25.5	6	15	(89)	12	19	(48)	18	24	(271)
2009 Mar 21	2454912.004950	12	07	07.7	6	14	(89)	12	19	(48)	18	25	(271)
2009 Mar 22	2454913.004743	12	06	49.8	6	12	(88)	12	19	(49)	18	26	(272)
2009 Mar 23	2454914.004535	12	06	31.8	6	10	(88)	12	19	(49)	18	28	(272)
2009 Mar 24	2454915.004326	12	06	13.8	6	09	(87)	12	18	(50)	18	29	(273)
2009 Mar 25	2454916.004117	12	05	55.7	6	07	(87)	12	18	(50)	18	30	(274)
2009 Mar 26	2454917.003908	12	05	37.7	6	05	(86)	12	18	(50)	18	31	(274)
2009 Mar 27	2454918.003699	12	05	19.6	6	03	(86)	12	17	(51)	18	32	(275)
2009 Mar 28	2454919.003490	12	05	01.5	6	02	(85)	12	17	(51)	18	33	(275)
2009 Mar 29	2454920.003281	12	04	43.5	6	00	(85)	12	17	(52)	18	34	(276)
2009 Mar 30	2454921.003073	12	04	25.5	5	58	(84)	12	16	(52)	18	35	(276)
2009 Mar 31	2454922.002866	12	04	07.6	5	57	(84)	12	16	(52)	18	36	(277)
2009 Apr 1	2454923.002660	12	03	49.8	5	55	(83)	12	16	(53)	18	38	(277)
2009 Apr 2	2454924.002454	12	03	32.1	5	53	(83)	12	16	(53)	18	39	(278)
2009 Apr 3	2454925.002250	12	03	14.4	5	51	(82)	12	15	(53)	18	40	(278)
2009 Apr 4	2454926.002048	12	02	57.0	5	50	(82)	12	15	(54)	18	41	(279)
2009 Apr 5	2454927.001848	12	02	39.6	5	48	(81)	12	15	(54)	18	42	(279)
2009 Apr 6	2454928.001649	12	02	22.5	5	46	(80)	12	14	(55)	18	43	(280)
2009 Apr 7	2454929.001453	12	02	05.5	5	45	(80)	12	14	(55)	18	44	(280)
2009 Apr 8	2454930.001259	12	01	48.8	5	43	(79)	12	14	(55)	18	45	(281)
2009 Apr 9	2454931.001068	12	01	32.3	5	41	(79)	12	14	(56)	18	46	(281)
2009 Apr 10	2454932.000880	12	01	16.1	5	40	(78)	12	13	(56)	18	48	(282)
2009 Apr 11	2454933.000696	12	01	00.1	5	38	(78)	12	13	(56)	18	49	(282)
2009 Apr 12	2454934.000515	12	00	44.5	5	36	(77)	12	13	(57)	18	50	(283)
2009 Apr 13	2454935.000337	12	00	29.1	5	35	(77)	12	12	(57)	18	51	(283)
2009 Apr 14	2454936.000164	12	00	14.1	5	33	(76)	12	12	(58)	18	52	(284)
2009 Apr 15	2454936.999994	11	59	59.5	5	32	(76)	12	12	(58)	18	53	(284)
2009 Apr 16	2454937.999829	11	59	45.2	5	30	(75)	12	12	(58)	18	54	(285)
2009 Apr 17	2454938.999668	11	59	31.3	5	29	(75)	12	12	(59)	18	55	(285)
2009 Apr 18	2454939.999512	11	59	17.9	5	27	(75)	12	11	(59)	18	56	(286)
2009 Apr 19	2454940.999361	11	59	04.8	5	25	(74)	12	11	(59)	18	58	(286)
2009 Apr 20	2454941.999215	11	58	52.2	5	24	(74)	12	11	(60)	18	59	(287)
2009 Apr 21	2454942.999074	11	58	40.0	5	22	(73)	12	11	(60)	19	00	(287)
2009 Apr 22	2454943.998939	11	58	28.3	5	21	(73)	12	10	(60)	19	01	(288)
2009 Apr 23	2454944.998808	11	58	17.0	5	19	(72)	12	10	(61)	19	02	(288)
2009 Apr 24	2454945.998684	11	58	06.3	5	18	(72)	12	10	(61)	19	03	(289)
2009 Apr 25	2454946.998564	11	57	56.0	5	16	(71)	12	10	(61)	19	04	(289)
2009 Apr 26	2454947.998451	11	57	46.2	5	15	(71)	12	10	(62)	19	05	(289)
2009 Apr 27	2454948.998343	11	57	36.8	5	14	(70)	12	10	(62)	19	06	(290)
2009 Apr 28	2454949.998241	11	57	28.0	5	12	(70)	12	09	(62)	19	07	(290)
2009 Apr 29	2454950.998144	11	57	19.7	5	11	(70)	12	09	(63)	19	09	(291)
2009 Apr 30	2454951.998054	11	57	11.9	5	09	(69)	12	09	(63)	19	10	(291)
2009 May 1	2454952.997969	11	57	04.6	5	08	(69)	12	09	(63)	19	11	(292)
2009 May 2	2454953.997891	11	56	57.8	5	07	(68)	12	09	(63)	19	12	(292)
2009 May 3	2454954.997818	11	56	51.5	5	05	(68)	12	09	(64)	19	13	(292)
2009 May 4	2454955.997752	11	56	45.8	5	04	(67)	12	09	(64)	19	14	(293)
2009 May 5	2454956.997692	11	56	40.6	5	03	(67)	12	09	(64)	19	15	(293)
2009 May 6	2454957.997638	11	56	36.0	5	02	(67)	12	09	(65)	19	16	(294)
2009 May 7	2454958.997591	11	56	31.9	5	00	(66)	12	09	(65)	19	17	(294)
2009 May 8	2454959.997550	11	56	28.4	4	59	(66)	12	08	(65)	19	18	(294)
2009 May 9	2454960.997516	11	56	25.4	4	58	(65)	12	08	(65)	19	19	(295)
2009 May 10	2454961.997489	11	56	23.0	4	57	(65)	12	08	(66)	19	20	(295)
2009 May 11	2454962.997467	11	56	21.2	4	56	(65)	12	08	(66)	19	22	(295)
2009 May 12	2454963.997453	11	56	20.0	4	55	(64)	12	08	(66)	19	23	(296)
2009 May 13	2454964.997446	11	56	19.3	4	54	(64)	12	08	(66)	19	24	(296)
2009 May 14	2454965.997445	11	56	19.3	4	53	(64)	12	08	(67)	19	25	(297)
2009 May 15	2454966.997451	11	56	19.8	4	52	(63)	12	08	(67)	19	26	(297)
2009 May 16	2454967.997464	11	56	20.9	4	51	(63)	12	08	(67)	19	27	(297)
2009 May 17	2454968.997483	11	56	22.6	4	50	(63)	12	08	(67)	19	28	(298)
2009 May 18	2454969.997510	11	56	24.8	4	49	(62)	12	08	(68)	19	29	(298)
2009 May 19	2454970.997542	11	56	27.7	4	48	(62)	12	08	(68)	19	30	(298)
2009 May 20	2454971.997582	11	56	31.0	4	47	(62)	12	09	(68)	19	31	(298)
2009 May 21	2454972.997627	11	56	35.0	4	46	(61)	12	09	(68)	19	32	(299)
2009 May 22	2454973.997679	11	56	39.5	4	45	(61)	12	09	(68)	19	33	(299)
2009 May 23	2454974.997737	11	56	44.5	4	45	(61)	12	09	(69)	19	33	(299)
2009 May 24	2454975.997801	11	56	50.0	4	44	(61)	12	09	(69)	19	34	(300)
2009 May 25	2454976.997871	11	56	56.1	4	43	(60)	12	09	(69)	19	35	(300)
2009 May 26	2454977.997947	11	57	02.6	4	42	(60)	12	09	(69)	19	36	(300)
2009 May 27	2454978.998028	11	57	09.6	4	42	(60)	12	09	(69)	19	37	(300)
2009 May 28	2454979.998114	11	57	17.1	4	41	(60)	12	09	(70)	19	38	(301)
2009 May 29	2454980.998205	11	57	24.9	4	41	(59)	12	09	(70)	19	39	(301)
2009 May 30	2454981.998301	11	57	33.2	4	40	(59)	12	10	(70)	19	40	(301)
2009 May 31	2454982.998402	11	57	41.9	4	39	(59)	12	10	(70)	19	40	(301)
2009 Jun 1	2454983.998507	11	57	51.0	4	39	(59)	12	10	(70)	19	41	(301)
2009 Jun 2	2454984.998616	11	58	00.4	4	39	(59)	12	10	(70)	19	42	(302)
2009 Jun 3	2454985.998730	11	58	10.3	4	38	(58)	12	10	(70)	19	43	(302)
2009 Jun 4	2454986.998847	11	58	20.4	4	38	(58)	12	10	(70)	19	43	(302)

Date	TDT JD		TDT			Rise		(Azm) °	Trans		(Alt) °	Set		(Azm) °
			h	m	s	h	m		h	m		h	m	
2009 Jun 5	2454987.998968		11	58	30.9	4	37	(58)	12	11	(71)	19	44	(302)
2009 Jun 6	2454988.999093		11	58	41.7	4	37	(58)	12	11	(71)	19	45	(302)
2009 Jun 7	2454989.999221		11	58	52.7	4	37	(58)	12	11	(71)	19	45	(302)
2009 Jun 8	2454990.999353		11	59	04.1	4	37	(58)	12	11	(71)	19	46	(302)
2009 Jun 9	2454991.999487		11	59	15.7	4	36	(57)	12	11	(71)	19	46	(303)
2009 Jun 10	2454992.999624		11	59	27.6	4	36	(57)	12	11	(71)	19	47	(303)
2009 Jun 11	2454993.999764		11	59	39.6	4	36	(57)	12	12	(71)	19	47	(303)
2009 Jun 12	2454994.999907		11	59	51.9	4	36	(57)	12	12	(71)	19	48	(303)
2009 Jun 13	2454996.000051		12	00	04.4	4	36	(57)	12	12	(71)	19	48	(303)
2009 Jun 14	2454997.000197		12	00	17.0	4	36	(57)	12	12	(71)	19	49	(303)
2009 Jun 15	2454998.000345		12	00	29.8	4	36	(57)	12	12	(71)	19	49	(303)
2009 Jun 16	2454999.000495		12	00	42.7	4	36	(57)	12	13	(71)	19	50	(303)
2009 Jun 17	2455000.000645		12	00	55.8	4	36	(57)	12	13	(71)	19	50	(303)
2009 Jun 18	2455001.000797		12	01	08.9	4	36	(57)	12	13	(71)	19	50	(303)
2009 Jun 19	2455002.000949		12	01	22.0	4	36	(57)	12	13	(71)	19	51	(303)
2009 Jun 20	2455003.001101		12	01	35.2	4	36	(57)	12	14	(71)	19	51	(303)
2009 Jun 21	2455004.001254		12	01	48.3	4	37	(57)	12	14	(71)	19	51	(303)
2009 Jun 22	2455005.001406		12	02	01.5	4	37	(57)	12	14	(71)	19	51	(303)
2009 Jun 23	2455006.001557		12	02	14.5	4	37	(57)	12	14	(71)	19	51	(303)
2009 Jun 24	2455007.001708		12	02	27.5	4	37	(57)	12	14	(71)	19	52	(303)
2009 Jun 25	2455008.001857		12	02	40.4	4	38	(57)	12	15	(71)	19	52	(303)
2009 Jun 26	2455009.002004		12	02	53.1	4	38	(57)	12	15	(71)	19	52	(303)
2009 Jun 27	2455010.002149		12	03	05.7	4	38	(57)	12	15	(71)	19	52	(303)
2009 Jun 28	2455011.002292		12	03	18.0	4	39	(57)	12	15	(71)	19	52	(303)
2009 Jun 29	2455012.002432		12	03	30.1	4	39	(57)	12	15	(71)	19	52	(303)
2009 Jun 30	2455013.002570		12	03	42.0	4	40	(57)	12	16	(71)	19	51	(303)
2009 Jul 1	2455014.002704		12	03	53.6	4	40	(57)	12	16	(71)	19	51	(303)
2009 Jul 2	2455015.002835		12	04	05.0	4	41	(57)	12	16	(71)	19	51	(303)
2009 Jul 3	2455016.002963		12	04	16.0	4	41	(57)	12	16	(71)	19	51	(302)
2009 Jul 4	2455017.003087		12	04	26.7	4	42	(58)	12	16	(71)	19	51	(302)
2009 Jul 5	2455018.003207		12	04	37.1	4	42	(58)	12	17	(71)	19	50	(302)
2009 Jul 6	2455019.003323		12	04	47.1	4	43	(58)	12	17	(71)	19	50	(302)
2009 Jul 7	2455020.003435		12	04	56.7	4	44	(58)	12	17	(71)	19	50	(302)
2009 Jul 8	2455021.003542		12	05	06.0	4	44	(58)	12	17	(70)	19	49	(302)
2009 Jul 9	2455022.003644		12	05	14.9	4	45	(58)	12	17	(70)	19	49	(302)
2009 Jul 10	2455023.003742		12	05	23.3	4	46	(59)	12	17	(70)	19	49	(301)
2009 Jul 11	2455024.003835		12	05	31.3	4	47	(59)	12	18	(70)	19	48	(301)
2009 Jul 12	2455025.003923		12	05	38.9	4	47	(59)	12	18	(70)	19	48	(301)
2009 Jul 13	2455026.004005		12	05	46.1	4	48	(59)	12	18	(70)	19	47	(301)
2009 Jul 14	2455027.004082		12	05	52.7	4	49	(59)	12	18	(70)	19	46	(301)
2009 Jul 15	2455028.004154		12	05	58.9	4	50	(60)	12	18	(69)	19	46	(300)
2009 Jul 16	2455029.004220		12	06	04.6	4	50	(60)	12	18	(69)	19	45	(300)
2009 Jul 17	2455030.004280		12	06	09.8	4	51	(60)	12	18	(69)	19	45	(300)
2009 Jul 18	2455031.004335		12	06	14.5	4	52	(60)	12	18	(69)	19	44	(300)
2009 Jul 19	2455032.004383		12	06	18.7	4	53	(61)	12	18	(69)	19	43	(299)
2009 Jul 20	2455033.004425		12	06	22.3	4	54	(61)	12	18	(69)	19	42	(299)
2009 Jul 21	2455034.004460		12	06	25.4	4	55	(61)	12	18	(68)	19	41	(299)
2009 Jul 22	2455035.004489		12	06	27.9	4	56	(61)	12	18	(68)	19	41	(298)
2009 Jul 23	2455036.004511		12	06	29.8	4	57	(62)	12	18	(68)	19	40	(298)
2009 Jul 24	2455037.004527		12	06	31.1	4	58	(62)	12	19	(68)	19	39	(298)
2009 Jul 25	2455038.004535		12	06	31.8	4	59	(62)	12	19	(68)	19	38	(298)
2009 Jul 26	2455039.004536		12	06	31.9	5	00	(63)	12	19	(67)	19	37	(297)
2009 Jul 27	2455040.004531		12	06	31.4	5	00	(63)	12	19	(67)	19	36	(297)
2009 Jul 28	2455041.004518		12	06	30.3	5	01	(63)	12	19	(67)	19	35	(297)
2009 Jul 29	2455042.004497		12	06	28.6	5	02	(64)	12	18	(67)	19	34	(296)
2009 Jul 30	2455043.004470		12	06	26.2	5	03	(64)	12	18	(66)	19	33	(296)
2009 Jul 31	2455044.004435		12	06	23.2	5	04	(64)	12	18	(66)	19	32	(296)
2009 Aug 1	2455045.004393		12	06	19.6	5	05	(65)	12	18	(66)	19	31	(295)
2009 Aug 2	2455046.004344		12	06	15.3	5	06	(65)	12	18	(66)	19	29	(295)
2009 Aug 3	2455047.004288		12	06	10.5	5	07	(65)	12	18	(65)	19	28	(294)
2009 Aug 4	2455048.004224		12	06	05.0	5	08	(66)	12	18	(65)	19	27	(294)
2009 Aug 5	2455049.004154		12	05	58.9	5	09	(66)	12	18	(65)	19	26	(294)
2009 Aug 6	2455050.004077		12	05	52.3	5	11	(66)	12	18	(65)	19	25	(293)
2009 Aug 7	2455051.003993		12	05	45.0	5	12	(67)	12	18	(64)	19	23	(293)
2009 Aug 8	2455052.003902		12	05	37.1	5	13	(67)	12	18	(64)	19	22	(292)
2009 Aug 9	2455053.003805		12	05	28.7	5	14	(68)	12	17	(64)	19	21	(292)
2009 Aug 10	2455054.003701		12	05	19.7	5	15	(68)	12	17	(63)	19	19	(292)
2009 Aug 11	2455055.003590		12	05	10.2	5	16	(68)	12	17	(63)	19	18	(291)
2009 Aug 12	2455056.003473		12	05	00.1	5	17	(69)	12	17	(63)	19	17	(291)
2009 Aug 13	2455057.003350		12	04	49.4	5	18	(69)	12	17	(63)	19	15	(290)
2009 Aug 14	2455058.003221		12	04	38.3	5	19	(70)	12	17	(62)	19	14	(290)
2009 Aug 15	2455059.003086		12	04	26.6	5	20	(70)	12	16	(62)	19	12	(290)
2009 Aug 16	2455060.002944		12	04	14.4	5	21	(71)	12	16	(62)	19	11	(289)
2009 Aug 17	2455061.002798		12	04	01.7	5	22	(71)	12	16	(61)	19	09	(289)
2009 Aug 18	2455062.002645		12	03	48.5	5	23	(72)	12	16	(61)	19	08	(288)
2009 Aug 19	2455063.002487		12	03	34.9	5	24	(72)	12	16	(61)	19	06	(288)
2009 Aug 20	2455064.002323		12	03	20.7	5	25	(72)	12	15	(60)	19	05	(287)
2009 Aug 21	2455065.002154		12	03	06.1	5	26	(73)	12	15	(60)	19	03	(287)
2009 Aug 22	2455066.001979		12	02	51.0	5	27	(73)	12	15	(60)	19	02	(286)
2009 Aug 23	2455067.001800		12	02	35.5	5	28	(74)	12	15	(59)	19	00	(286)
2009 Aug 24	2455068.001614		12	02	19.5	5	29	(74)	12	14	(59)	18	59	(285)
2009 Aug 25	2455069.001425		12	02	03.1	5	30	(75)	12	14	(59)	18	57	(285)

Date	TDT JD		TDT			Rise		(Azm)	Trans		(Alt)	Set		(Azm)
			h	m	s	h	m	°	h	m	°	h	m	°
2009 Aug 26	2455070.001230		12	01	46.2	5	31	(75)	12	14	(58)	18	56	(285)
2009 Aug 27	2455071.001030		12	01	29.0	5	32	(76)	12	13	(58)	18	54	(284)
2009 Aug 28	2455072.000826		12	01	11.4	5	33	(76)	12	13	(58)	18	52	(284)
2009 Aug 29	2455073.000618		12	00	53.4	5	34	(77)	12	13	(57)	18	51	(283)
2009 Aug 30	2455074.000405		12	00	35.0	5	35	(77)	12	13	(57)	18	49	(283)
2009 Aug 31	2455075.000189		12	00	16.3	5	37	(78)	12	12	(56)	18	47	(282)
2009 Sep 1	2455075.999969		11	59	57.3	5	38	(78)	12	12	(56)	18	46	(282)
2009 Sep 2	2455076.999745		11	59	38.0	5	39	(79)	12	12	(56)	18	44	(281)
2009 Sep 3	2455077.999519		11	59	18.4	5	40	(79)	12	11	(55)	18	42	(281)
2009 Sep 4	2455078.999289		11	58	58.6	5	41	(80)	12	11	(55)	18	41	(280)
2009 Sep 5	2455079.999056		11	58	38.5	5	42	(80)	12	11	(55)	18	39	(280)
2009 Sep 6	2455080.998821		11	58	18.1	5	43	(81)	12	10	(54)	18	37	(279)
2009 Sep 7	2455081.998584		11	57	57.6	5	44	(81)	12	10	(54)	18	35	(279)
2009 Sep 8	2455082.998344		11	57	36.9	5	45	(82)	12	10	(54)	18	34	(278)
2009 Sep 9	2455083.998103		11	57	16.1	5	46	(82)	12	09	(53)	18	32	(278)
2009 Sep 10	2455084.997860		11	56	55.1	5	47	(83)	12	09	(53)	18	30	(277)
2009 Sep 11	2455085.997616		11	56	34.0	5	48	(83)	12	09	(52)	18	29	(277)
2009 Sep 12	2455086.997371		11	56	12.9	5	49	(84)	12	08	(52)	18	27	(276)
2009 Sep 13	2455087.997125		11	55	51.6	5	50	(84)	12	08	(52)	18	25	(276)
2009 Sep 14	2455088.996879		11	55	30.4	5	51	(85)	12	08	(51)	18	23	(275)
2009 Sep 15	2455089.996632		11	55	09.0	5	52	(85)	12	07	(51)	18	22	(274)
2009 Sep 16	2455090.996385		11	54	47.7	5	53	(86)	12	07	(50)	18	20	(274)
2009 Sep 17	2455091.996138		11	54	26.3	5	54	(86)	12	06	(50)	18	18	(273)
2009 Sep 18	2455092.995891		11	54	05.0	5	55	(87)	12	06	(50)	18	16	(273)
2009 Sep 19	2455093.995645		11	53	43.7	5	56	(87)	12	06	(49)	18	15	(272)
2009 Sep 20	2455094.995399		11	53	22.5	5	57	(88)	12	05	(49)	18	13	(272)
2009 Sep 21	2455095.995154		11	53	01.3	5	58	(88)	12	05	(49)	18	11	(271)
2009 Sep 22	2455096.994910		11	52	40.2	5	59	(89)	12	05	(48)	18	09	(271)
2009 Sep 23	2455097.994667		11	52	19.2	6	00	(89)	12	04	(48)	18	08	(270)
2009 Sep 24	2455098.994425		11	51	58.3	6	01	(90)	12	04	(47)	18	06	(270)
2009 Sep 25	2455099.994185		11	51	37.6	6	03	(90)	12	04	(47)	18	04	(269)
2009 Sep 26	2455100.993947		11	51	17.0	6	04	(91)	12	03	(47)	18	02	(269)
2009 Sep 27	2455101.993710		11	50	56.6	6	05	(92)	12	03	(46)	18	01	(268)
2009 Sep 28	2455102.993477		11	50	36.4	6	06	(92)	12	03	(46)	17	59	(268)
2009 Sep 29	2455103.993245		11	50	16.4	6	07	(93)	12	02	(45)	17	57	(267)
2009 Sep 30	2455104.993017		11	49	56.6	6	08	(93)	12	02	(45)	17	55	(267)
2009 Oct 1	2455105.992791		11	49	37.2	6	09	(94)	12	02	(45)	17	54	(266)
2009 Oct 2	2455106.992569		11	49	18.0	6	10	(94)	12	01	(44)	17	52	(266)
2009 Oct 3	2455107.992350		11	48	59.1	6	11	(95)	12	01	(44)	17	50	(265)
2009 Oct 4	2455108.992136		11	48	40.5	6	12	(95)	12	01	(44)	17	49	(265)
2009 Oct 5	2455109.991925		11	48	22.3	6	13	(96)	12	00	(43)	17	47	(264)
2009 Oct 6	2455110.991719		11	48	04.5	6	14	(96)	12	00	(43)	17	45	(264)
2009 Oct 7	2455111.991517		11	47	47.1	6	15	(97)	12	00	(42)	17	43	(263)
2009 Oct 8	2455112.991321		11	47	30.1	6	17	(97)	12	00	(42)	17	42	(263)
2009 Oct 9	2455113.991129		11	47	13.5	6	18	(98)	11	59	(42)	17	40	(262)
2009 Oct 10	2455114.990943		11	46	57.5	6	19	(98)	11	59	(41)	17	39	(261)
2009 Oct 11	2455115.990763		11	46	41.9	6	20	(99)	11	59	(41)	17	37	(261)
2009 Oct 12	2455116.990588		11	46	26.8	6	21	(99)	11	58	(40)	17	35	(260)
2009 Oct 13	2455117.990420		11	46	12.3	6	22	(100)	11	58	(40)	17	34	(260)
2009 Oct 14	2455118.990258		11	45	58.3	6	23	(100)	11	58	(40)	17	32	(259)
2009 Oct 15	2455119.990103		11	45	44.9	6	24	(101)	11	58	(39)	17	30	(259)
2009 Oct 16	2455120.989954		11	45	32.0	6	26	(101)	11	58	(39)	17	29	(258)
2009 Oct 17	2455121.989812		11	45	19.8	6	27	(102)	11	57	(39)	17	27	(258)
2009 Oct 18	2455122.989677		11	45	08.1	6	28	(102)	11	57	(38)	17	26	(257)
2009 Oct 19	2455123.989550		11	44	57.1	6	29	(103)	11	57	(38)	17	24	(257)
2009 Oct 20	2455124.989429		11	44	46.7	6	30	(103)	11	57	(38)	17	23	(257)
2009 Oct 21	2455125.989316		11	44	36.9	6	31	(104)	11	57	(37)	17	21	(256)
2009 Oct 22	2455126.989211		11	44	27.8	6	33	(104)	11	56	(37)	17	20	(256)
2009 Oct 23	2455127.989113		11	44	19.3	6	34	(105)	11	56	(36)	17	18	(255)
2009 Oct 24	2455128.989023		11	44	11.6	6	35	(105)	11	56	(36)	17	17	(255)
2009 Oct 25	2455129.988941		11	44	04.5	6	36	(106)	11	56	(36)	17	15	(254)
2009 Oct 26	2455130.988867		11	43	58.1	6	37	(106)	11	56	(35)	17	14	(254)
2009 Oct 27	2455131.988802		11	43	52.5	6	39	(107)	11	56	(35)	17	13	(253)
2009 Oct 28	2455132.988745		11	43	47.6	6	40	(107)	11	56	(35)	17	11	(253)
2009 Oct 29	2455133.988697		11	43	43.4	6	41	(108)	11	56	(34)	17	10	(252)
2009 Oct 30	2455134.988657		11	43	40.0	6	42	(108)	11	56	(34)	17	09	(252)
2009 Oct 31	2455135.988627		11	43	37.3	6	43	(108)	11	56	(34)	17	07	(251)
2009 Nov 1	2455136.988605		11	43	35.5	6	45	(109)	11	56	(33)	17	06	(251)
2009 Nov 2	2455137.988592		11	43	34.4	6	46	(109)	11	56	(33)	17	05	(251)
2009 Nov 3	2455138.988590		11	43	34.1	6	47	(110)	11	56	(33)	17	04	(250)
2009 Nov 4	2455139.988596		11	43	34.7	6	48	(110)	11	56	(33)	17	02	(250)
2009 Nov 5	2455140.988612		11	43	36.1	6	50	(111)	11	56	(32)	17	01	(249)
2009 Nov 6	2455141.988638		11	43	38.3	6	51	(111)	11	56	(32)	17	00	(249)
2009 Nov 7	2455142.988673		11	43	41.4	6	52	(111)	11	56	(32)	16	59	(248)
2009 Nov 8	2455143.988719		11	43	45.3	6	53	(112)	11	56	(31)	16	58	(248)
2009 Nov 9	2455144.988775		11	43	50.1	6	54	(112)	11	56	(31)	16	57	(248)
2009 Nov 10	2455145.988840		11	43	55.8	6	56	(113)	11	56	(31)	16	56	(247)
2009 Nov 11	2455146.988916		11	44	02.3	6	57	(113)	11	56	(30)	16	55	(247)
2009 Nov 12	2455147.989002		11	44	09.8	6	58	(113)	11	56	(30)	16	54	(246)
2009 Nov 13	2455148.989098		11	44	18.0	6	59	(114)	11	56	(30)	16	53	(246)
2009 Nov 14	2455149.989203		11	44	27.2	7	01	(114)	11	56	(30)	16	52	(246)
2009 Nov 15	2455150.989319		11	44	37.2	7	02	(114)	11	57	(29)	16	51	(245)

Date	TDT JD		TDT			Rise	(Azm)	Trans		(Alt)	Set		(Azm)
			h	m	s								
2009 Nov 16	2455151.989445		11	44	48.0	7 03	(115)	11 57	(29)		16 50	(245)	
2009 Nov 17	2455152.989580		11	44	59.7	7 04	(115)	11 57	(29)		16 49	(245)	
2009 Nov 18	2455153.989725		11	45	12.2	7 06	(116)	11 57	(29)		16 48	(244)	
2009 Nov 19	2455154.989879		11	45	25.6	7 07	(116)	11 57	(28)		16 48	(244)	
2009 Nov 20	2455155.990043		11	45	39.7	7 08	(116)	11 58	(28)		16 47	(244)	
2009 Nov 21	2455156.990216		11	45	54.7	7 09	(116)	11 58	(28)		16 46	(243)	
2009 Nov 22	2455157.990398		11	46	10.4	7 10	(117)	11 58	(28)		16 46	(243)	
2009 Nov 23	2455158.990589		11	46	26.9	7 11	(117)	11 58	(28)		16 45	(243)	
2009 Nov 24	2455159.990789		11	46	44.2	7 13	(117)	11 59	(27)		16 44	(243)	
2009 Nov 25	2455160.990998		11	47	02.2	7 14	(118)	11 59	(27)		16 44	(242)	
2009 Nov 26	2455161.991215		11	47	20.9	7 15	(118)	11 59	(27)		16 43	(242)	
2009 Nov 27	2455162.991440		11	47	40.4	7 16	(118)	12 00	(27)		16 43	(242)	
2009 Nov 28	2455163.991673		11	48	00.5	7 17	(118)	12 00	(27)		16 43	(241)	
2009 Nov 29	2455164.991914		11	48	21.4	7 18	(119)	12 00	(26)		16 42	(241)	
2009 Nov 30	2455165.992163		11	48	42.9	7 19	(119)	12 01	(26)		16 42	(241)	
2009 Dec 1	2455166.992419		11	49	05.0	7 20	(119)	12 01	(26)		16 41	(241)	
2009 Dec 2	2455167.992683		11	49	27.8	7 21	(119)	12 01	(26)		16 41	(241)	
2009 Dec 3	2455168.992954		11	49	51.2	7 22	(120)	12 02	(26)		16 41	(240)	
2009 Dec 4	2455169.993232		11	50	15.2	7 23	(120)	12 02	(26)		16 41	(240)	
2009 Dec 5	2455170.993516		11	50	39.8	7 24	(120)	12 03	(26)		16 41	(240)	
2009 Dec 6	2455171.993807		11	51	04.9	7 25	(120)	12 03	(26)		16 41	(240)	
2009 Dec 7	2455172.994104		11	51	30.6	7 26	(120)	12 03	(25)		16 40	(240)	
2009 Dec 8	2455173.994407		11	51	56.8	7 27	(120)	12 04	(25)		16 40	(239)	
2009 Dec 9	2455174.994716		11	52	23.5	7 28	(121)	12 04	(25)		16 40	(239)	
2009 Dec 10	2455175.995030		11	52	50.6	7 29	(121)	12 05	(25)		16 40	(239)	
2009 Dec 11	2455176.995349		11	53	18.2	7 30	(121)	12 05	(25)		16 41	(239)	
2009 Dec 12	2455177.995672		11	53	46.1	7 31	(121)	12 06	(25)		16 41	(239)	
2009 Dec 13	2455178.996000		11	54	14.4	7 31	(121)	12 06	(25)		16 41	(239)	
2009 Dec 14	2455179.996331		11	54	43.0	7 32	(121)	12 07	(25)		16 41	(239)	
2009 Dec 15	2455180.996666		11	55	12.0	7 33	(121)	12 07	(25)		16 41	(239)	
2009 Dec 16	2455181.997004		11	55	41.1	7 34	(121)	12 08	(25)		16 42	(239)	
2009 Dec 17	2455182.997344		11	56	10.5	7 34	(121)	12 08	(25)		16 42	(239)	
2009 Dec 18	2455183.997686		11	56	40.1	7 35	(121)	12 09	(25)		16 42	(239)	
2009 Dec 19	2455184.998030		11	57	09.8	7 36	(121)	12 09	(25)		16 43	(239)	
2009 Dec 20	2455185.998375		11	57	39.6	7 36	(121)	12 10	(25)		16 43	(239)	
2009 Dec 21	2455186.998720		11	58	09.4	7 37	(121)	12 10	(25)		16 44	(239)	
2009 Dec 22	2455187.999066		11	58	39.3	7 37	(121)	12 11	(25)		16 44	(239)	
2009 Dec 23	2455188.999412		11	59	09.2	7 38	(121)	12 11	(25)		16 45	(239)	
2009 Dec 24	2455189.999757		11	59	39.0	7 38	(121)	12 12	(25)		16 45	(239)	
2009 Dec 25	2455191.000102		12	00	08.8	7 38	(121)	12 12	(25)		16 46	(239)	
2009 Dec 26	2455192.000445		12	00	38.4	7 39	(121)	12 13	(25)		16 47	(239)	
2009 Dec 27	2455193.000786		12	01	07.9	7 39	(121)	12 13	(25)		16 47	(239)	
2009 Dec 28	2455194.001126		12	01	37.3	7 39	(121)	12 14	(25)		16 48	(239)	
2009 Dec 29	2455195.001463		12	02	06.4	7 40	(121)	12 14	(25)		16 49	(239)	
2009 Dec 30	2455196.001797		12	02	35.2	7 40	(121)	12 15	(25)		16 49	(239)	
2009 Dec 31	2455197.002128		12	03	03.9	7 40	(121)	12 15	(25)		16 50	(239)	

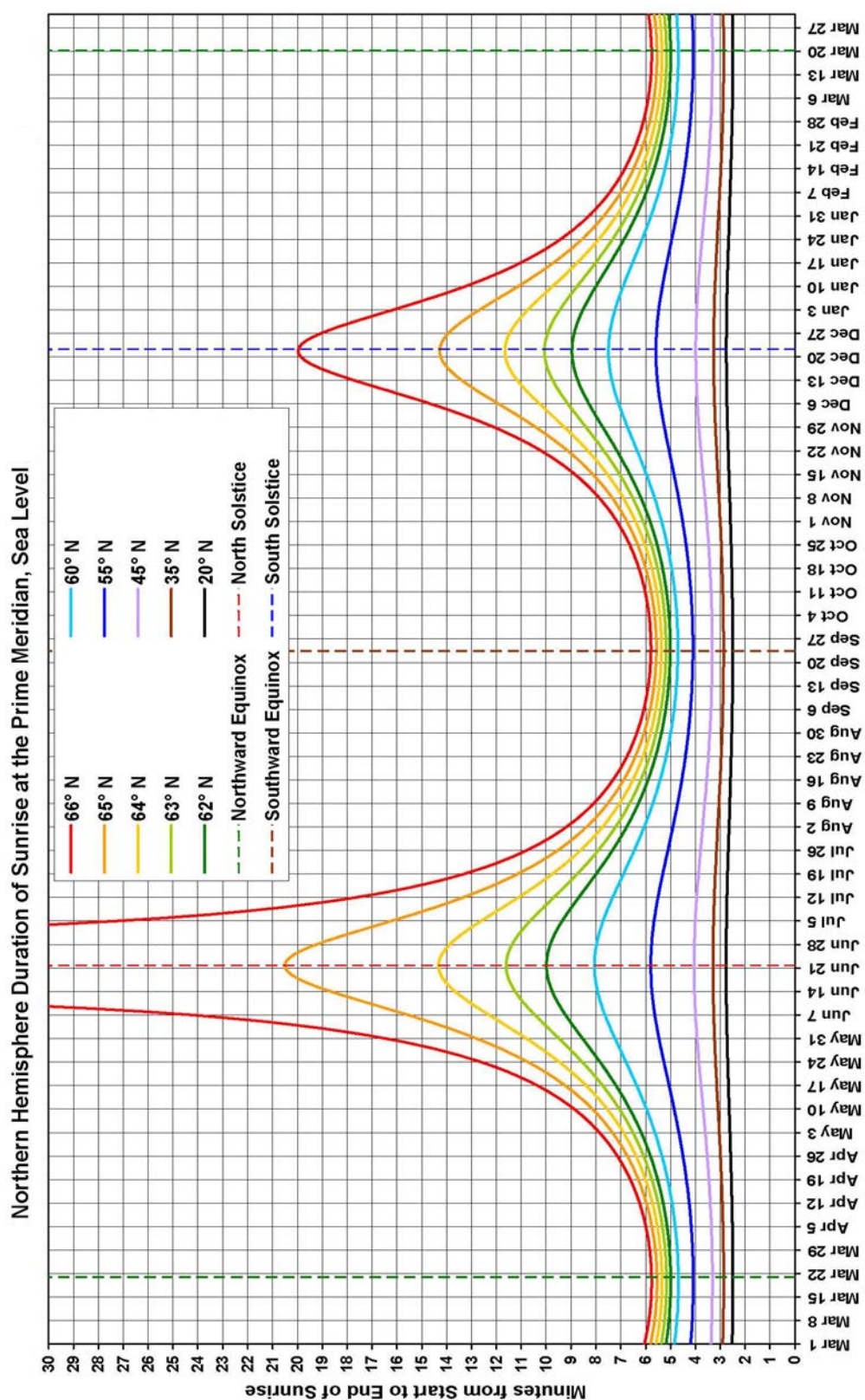
Times in U.T., to add an hour when it is in use daylight saving time

Legenda:

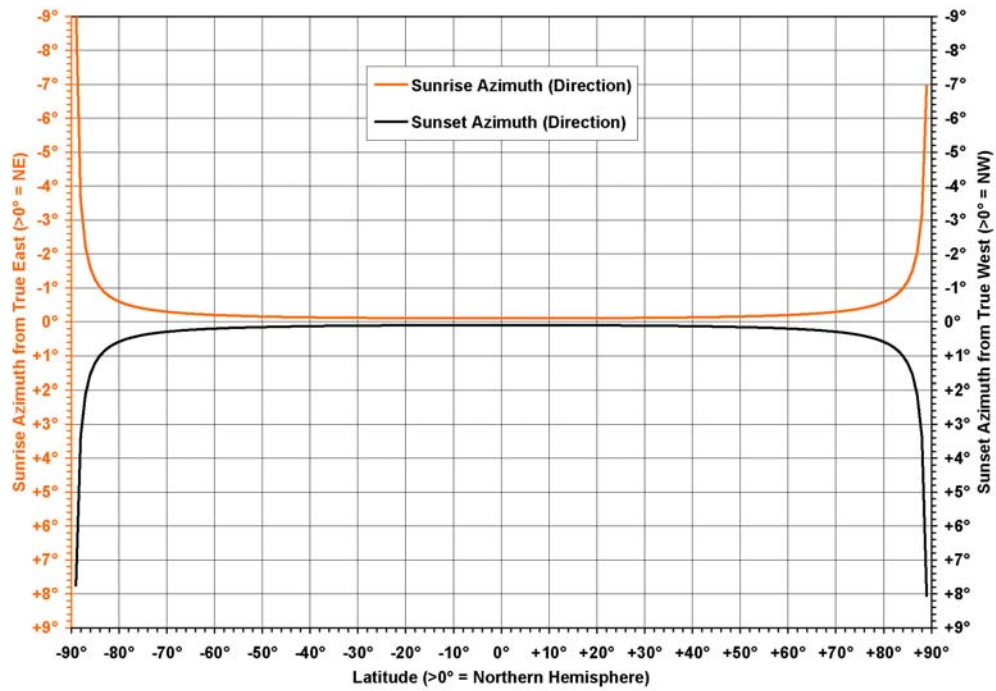
Rise, transits, set = times of rising, transit and setting, height in ° during the south transit.

For different places (42°N, 12°E) to refer to the corrective table in the last pages of the almanac.

DURATION OF THE RISING AND OF THE SETTING



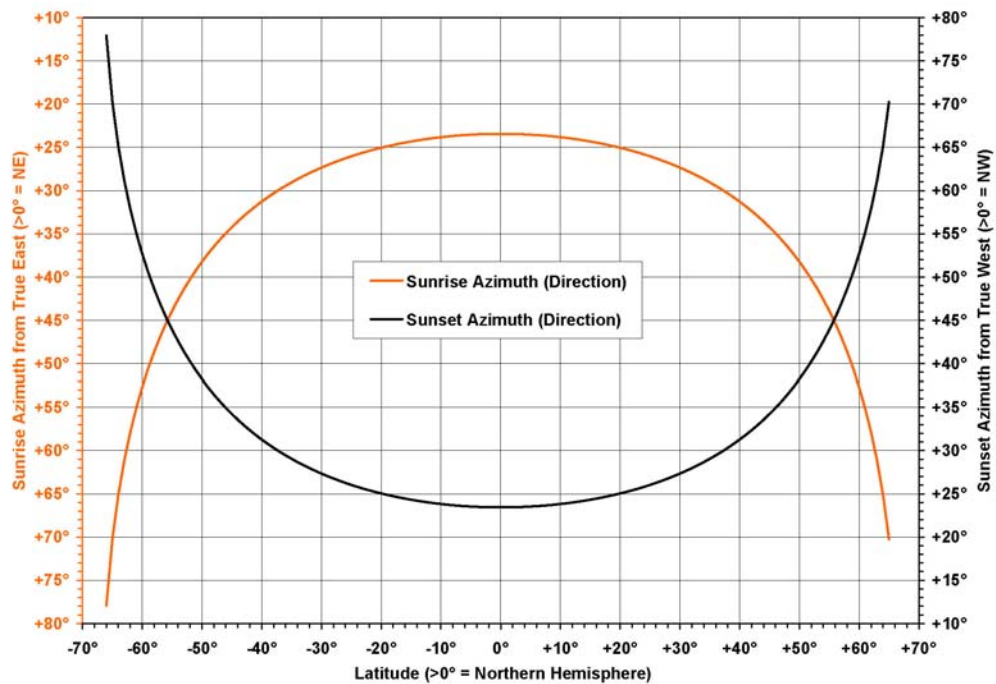
The graph shows how many minutes needs the Sun to rise or to set at the various latitudes © (2)



Analysis by Dr. Irv Bromberg, University of Toronto, Canada

<http://www.sym454.org/seasons/>

Position of the azimuth of the Sun at the rising and setting, at the spring equinox, at the various latitudes, in comparison to the true east and to the true west

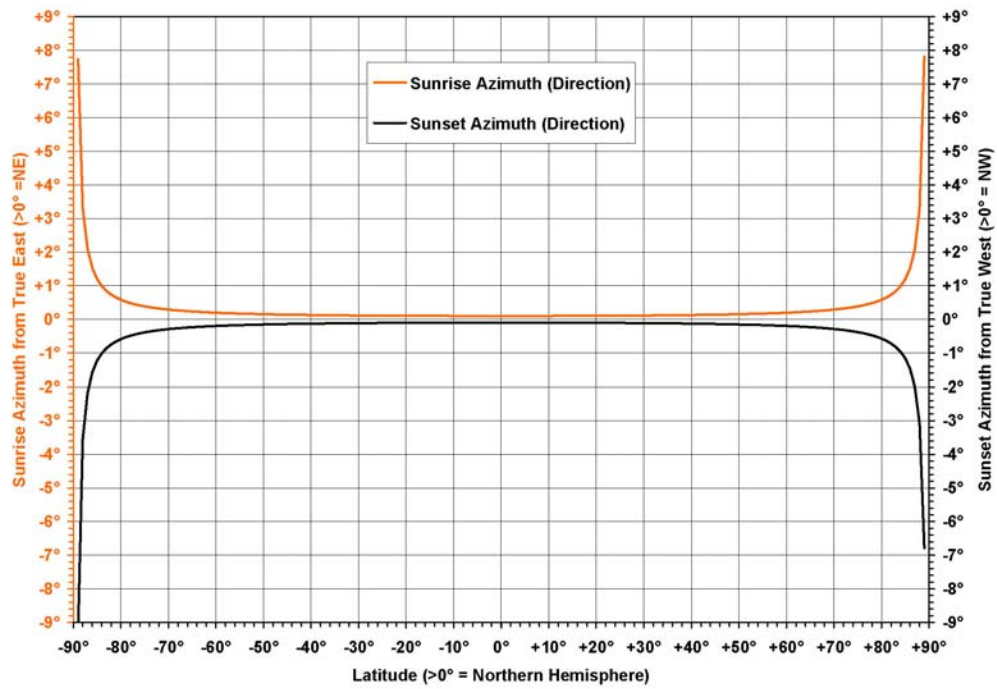


Analysis by Dr. Irv Bromberg, University of Toronto, Canada

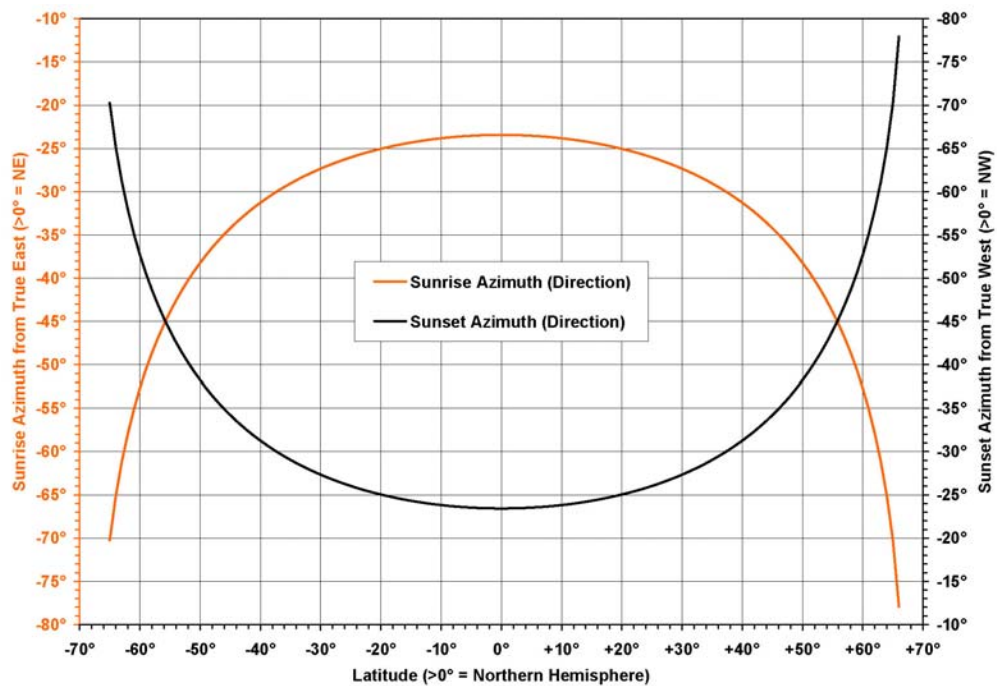
<http://www.sym454.org/seasons/>

Position of the azimuth of the Sun at the rising and setting, at the summer solstice, at the various latitudes, in comparison to the true east and to the true west

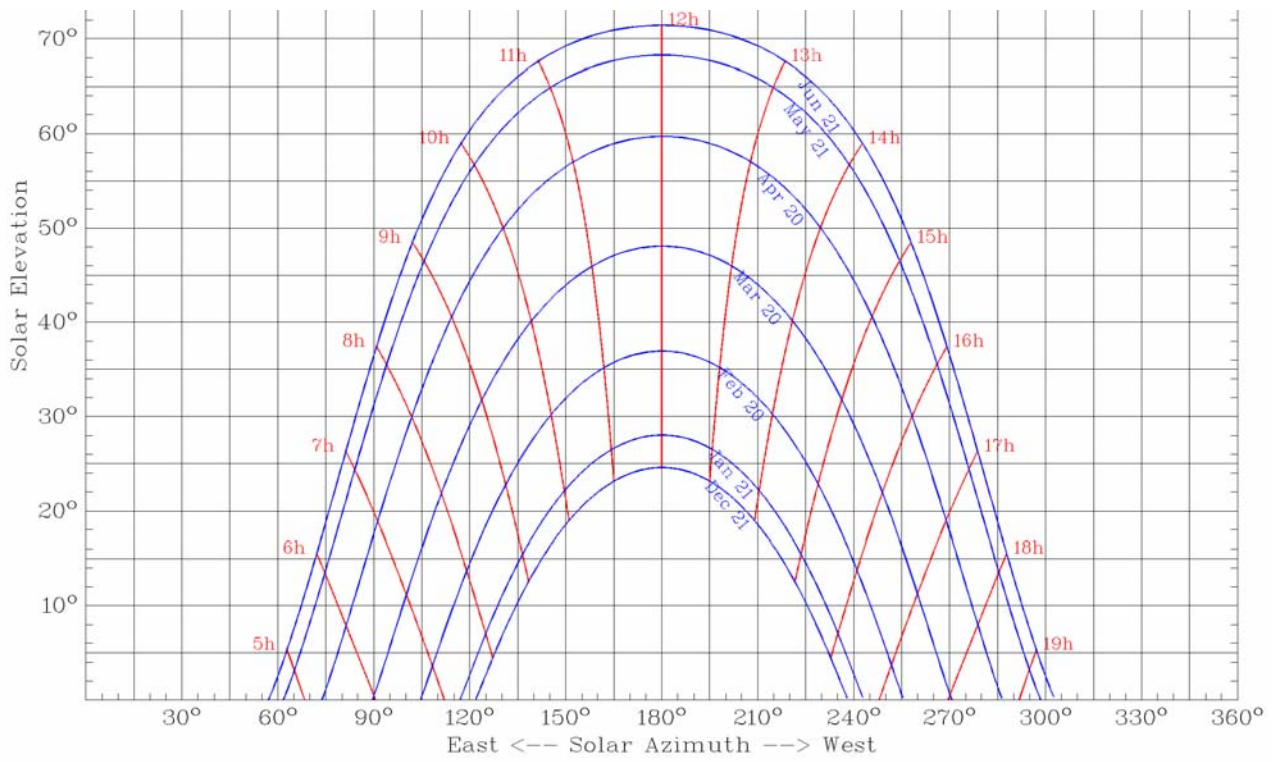
© (2)



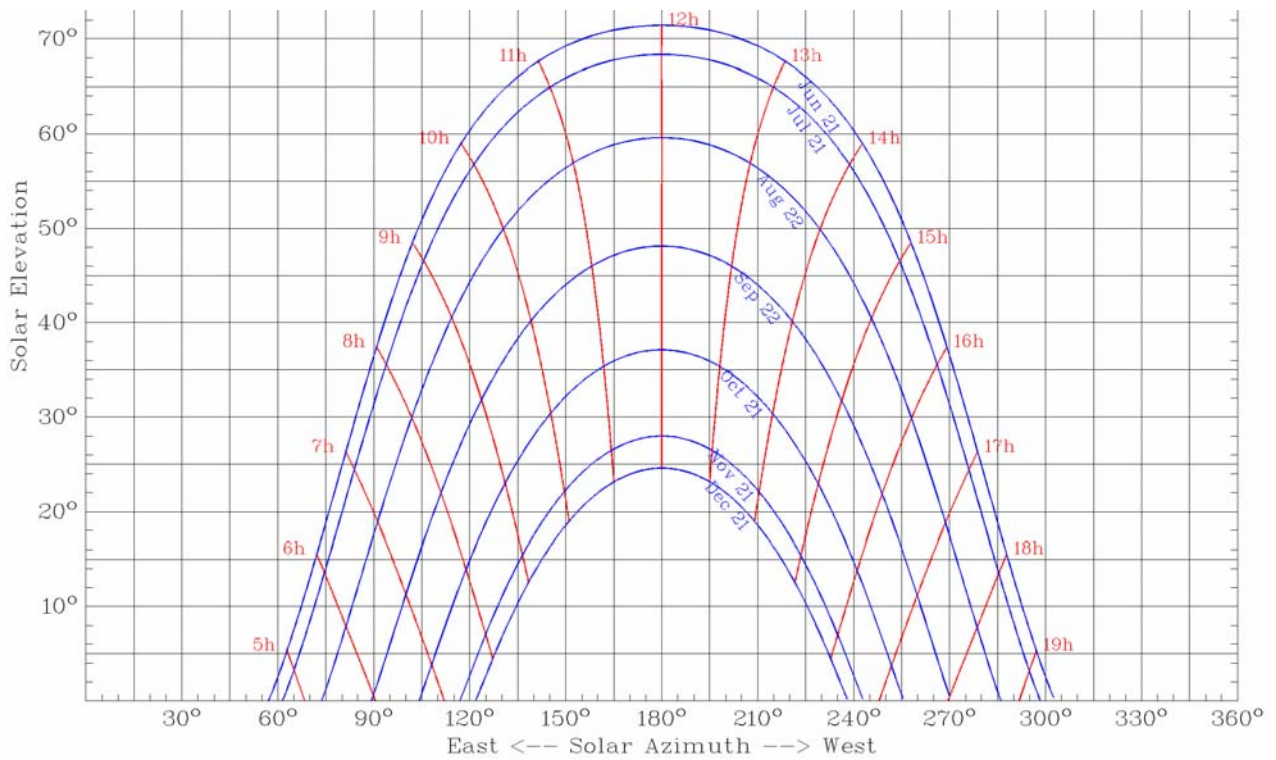
Position of the azimuth of the Sun at the rising and setting, at the autumn equinox, at the various latitudes, in comparison to the true east and to the true west



Position of the azimuth of the Sun at the rising and setting, at the winter solstice, at the various latitudes, in comparison to the true east and to the true west



Height and azimuth of the Sun on the horizon for each month and hour, january-june
For Rome



Height and azimuth of the Sun on the horizon for each month and hour, july-december
For Rome

TWILIGHTS

Longitude:E 12 Latitude:N 42 Time Zone: UT +1

Date	Civil		Nautical		Astronomical	
	Morning	Evening	Morning	Evening	Morning	Evening
	h m	h m	h m	h m	h m	h m
2009 Jan 1	7 09	17 23	6 33	17 58	6 00	18 32
2009 Jan 2	7 09	17 24	6 34	17 59	6 00	18 33
2009 Jan 3	7 09	17 25	6 34	18 00	6 00	18 33
2009 Jan 4	7 09	17 25	6 34	18 00	6 00	18 34
2009 Jan 5	7 09	17 26	6 34	18 01	6 00	18 35
2009 Jan 6	7 09	17 27	6 34	18 02	6 00	18 36
2009 Jan 7	7 09	17 28	6 34	18 03	6 00	18 37
2009 Jan 8	7 09	17 29	6 34	18 04	6 00	18 38
2009 Jan 9	7 08	17 30	6 34	18 05	6 00	18 39
2009 Jan 10	7 08	17 31	6 33	18 06	6 00	18 40
2009 Jan 11	7 08	17 32	6 33	18 07	6 00	18 41
2009 Jan 12	7 08	17 33	6 33	18 08	6 00	18 42
2009 Jan 13	7 07	17 34	6 33	18 09	5 59	18 42
2009 Jan 14	7 07	17 35	6 33	18 10	5 59	18 43
2009 Jan 15	7 07	17 37	6 32	18 11	5 59	18 44
2009 Jan 16	7 06	17 38	6 32	18 12	5 59	18 45
2009 Jan 17	7 06	17 39	6 32	18 13	5 58	18 46
2009 Jan 18	7 05	17 40	6 31	18 14	5 58	18 48
2009 Jan 19	7 05	17 41	6 31	18 15	5 57	18 49
2009 Jan 20	7 04	17 42	6 30	18 16	5 57	18 50
2009 Jan 21	7 04	17 43	6 30	18 17	5 56	18 51
2009 Jan 22	7 03	17 44	6 29	18 19	5 56	18 52
2009 Jan 23	7 03	17 46	6 29	18 20	5 55	18 53
2009 Jan 24	7 02	17 47	6 28	18 21	5 55	18 54
2009 Jan 25	7 01	17 48	6 27	18 22	5 54	18 55
2009 Jan 26	7 00	17 49	6 27	18 23	5 54	18 56
2009 Jan 27	7 00	17 50	6 26	18 24	5 53	18 57
2009 Jan 28	6 59	17 52	6 25	18 25	5 52	18 58
2009 Jan 29	6 58	17 53	6 24	18 26	5 51	18 59
2009 Jan 30	6 57	17 54	6 24	18 28	5 51	19 00
2009 Jan 31	6 56	17 55	6 23	18 29	5 50	19 02
2009 Feb 1	6 55	17 56	6 22	18 30	5 49	19 03
2009 Feb 2	6 54	17 58	6 21	18 31	5 48	19 04
2009 Feb 3	6 53	17 59	6 20	18 32	5 47	19 05
2009 Feb 4	6 52	18 00	6 19	18 33	5 46	19 06
2009 Feb 5	6 51	18 01	6 18	18 35	5 45	19 07
2009 Feb 6	6 50	18 03	6 17	18 36	5 44	19 08
2009 Feb 7	6 49	18 04	6 16	18 37	5 43	19 09
2009 Feb 8	6 48	18 05	6 15	18 38	5 42	19 11
2009 Feb 9	6 47	18 06	6 14	18 39	5 41	19 12
2009 Feb 10	6 46	18 07	6 13	18 40	5 40	19 13
2009 Feb 11	6 44	18 09	6 12	18 42	5 39	19 14
2009 Feb 12	6 43	18 10	6 10	18 43	5 38	19 15
2009 Feb 13	6 42	18 11	6 09	18 44	5 37	19 16
2009 Feb 14	6 41	18 12	6 08	18 45	5 36	19 17
2009 Feb 15	6 39	18 14	6 07	18 46	5 34	19 19
2009 Feb 16	6 38	18 15	6 05	18 47	5 33	19 20
2009 Feb 17	6 37	18 16	6 04	18 49	5 32	19 21
2009 Feb 18	6 35	18 17	6 03	18 50	5 30	19 22
2009 Feb 19	6 34	18 18	6 01	18 51	5 29	19 23
2009 Feb 20	6 33	18 20	6 00	18 52	5 28	19 24
2009 Feb 21	6 31	18 21	5 59	18 53	5 26	19 26
2009 Feb 22	6 30	18 22	5 57	18 54	5 25	19 27
2009 Feb 23	6 28	18 23	5 56	18 56	5 24	19 28
2009 Feb 24	6 27	18 24	5 54	18 57	5 22	19 29
2009 Feb 25	6 25	18 25	5 53	18 58	5 21	19 30
2009 Feb 26	6 24	18 27	5 51	18 59	5 19	19 31
2009 Feb 27	6 22	18 28	5 50	19 00	5 18	19 33
2009 Feb 28	6 21	18 29	5 48	19 01	5 16	19 34
2009 Mar 1	6 19	18 30	5 47	19 03	5 15	19 35
2009 Mar 2	6 18	18 31	5 45	19 04	5 13	19 36
2009 Mar 3	6 16	18 33	5 44	19 05	5 11	19 37
2009 Mar 4	6 14	18 34	5 42	19 06	5 10	19 38
2009 Mar 5	6 13	18 35	5 41	19 07	5 08	19 40
2009 Mar 6	6 11	18 36	5 39	19 08	5 06	19 41
2009 Mar 7	6 10	18 37	5 37	19 10	5 05	19 42
2009 Mar 8	6 08	18 38	5 36	19 11	5 03	19 43
2009 Mar 9	6 06	18 39	5 34	19 12	5 01	19 44
2009 Mar 10	6 05	18 41	5 32	19 13	5 00	19 46
2009 Mar 11	6 03	18 42	5 31	19 14	4 58	19 47
2009 Mar 12	6 01	18 43	5 29	19 15	4 56	19 48
2009 Mar 13	6 00	18 44	5 27	19 16	4 54	19 49
2009 Mar 14	5 58	18 45	5 25	19 18	4 53	19 51
2009 Mar 15	5 56	18 46	5 24	19 19	4 51	19 52

Date	Civil		Nautical		Astronomical	
	Morning	Evening	Morning	Evening	Morning	Evening
	h m	h m	h m	h m	h m	h m
2009 Mar 16	5 54	18 47	5 22	19 20	4 49	19 53
2009 Mar 17	5 53	18 49	5 20	19 21	4 47	19 54
2009 Mar 18	5 51	18 50	5 19	19 22	4 45	19 56
2009 Mar 19	5 49	18 51	5 17	19 24	4 44	19 57
2009 Mar 20	5 48	18 52	5 15	19 25	4 42	19 58
2009 Mar 21	5 46	18 53	5 13	19 26	4 40	19 59
2009 Mar 22	5 44	18 54	5 11	19 27	4 38	20 01
2009 Mar 23	5 42	18 55	5 10	19 28	4 36	20 02
2009 Mar 24	5 41	18 57	5 08	19 30	4 34	20 03
2009 Mar 25	5 39	18 58	5 06	19 31	4 32	20 05
2009 Mar 26	5 37	18 59	5 04	19 32	4 30	20 06
2009 Mar 27	5 35	19 00	5 02	19 33	4 29	20 07
2009 Mar 28	5 34	19 01	5 01	19 34	4 27	20 09
2009 Mar 29	5 32	19 02	4 59	19 36	4 25	20 10
2009 Mar 30	5 30	19 04	4 57	19 37	4 23	20 11
2009 Mar 31	5 28	19 05	4 55	19 38	4 21	20 13
2009 Apr 1	5 27	19 06	4 53	19 39	4 19	20 14
2009 Apr 2	5 25	19 07	4 51	19 41	4 17	20 15
2009 Apr 3	5 23	19 08	4 50	19 42	4 15	20 17
2009 Apr 4	5 21	19 09	4 48	19 43	4 13	20 18
2009 Apr 5	5 20	19 10	4 46	19 44	4 11	20 20
2009 Apr 6	5 18	19 12	4 44	19 46	4 09	20 21
2009 Apr 7	5 16	19 13	4 42	19 47	4 07	20 22
2009 Apr 8	5 15	19 14	4 41	19 48	4 05	20 24
2009 Apr 9	5 13	19 15	4 39	19 49	4 03	20 25
2009 Apr 10	5 11	19 16	4 37	19 51	4 01	20 27
2009 Apr 11	5 09	19 17	4 35	19 52	3 59	20 28
2009 Apr 12	5 08	19 19	4 33	19 53	3 57	20 30
2009 Apr 13	5 06	19 20	4 31	19 55	3 55	20 31
2009 Apr 14	5 04	19 21	4 30	19 56	3 53	20 33
2009 Apr 15	5 03	19 22	4 28	19 57	3 51	20 34
2009 Apr 16	5 01	19 23	4 26	19 58	3 49	20 36
2009 Apr 17	4 59	19 25	4 24	20 00	3 47	20 37
2009 Apr 18	4 58	19 26	4 23	20 01	3 45	20 39
2009 Apr 19	4 56	19 27	4 21	20 02	3 43	20 40
2009 Apr 20	4 54	19 28	4 19	20 04	3 41	20 42
2009 Apr 21	4 53	19 29	4 17	20 05	3 39	20 43
2009 Apr 22	4 51	19 31	4 15	20 06	3 37	20 45
2009 Apr 23	4 50	19 32	4 14	20 08	3 35	20 47
2009 Apr 24	4 48	19 33	4 12	20 09	3 33	20 48
2009 Apr 25	4 47	19 34	4 10	20 11	3 31	20 50
2009 Apr 26	4 45	19 35	4 09	20 12	3 29	20 51
2009 Apr 27	4 44	19 37	4 07	20 13	3 27	20 53
2009 Apr 28	4 42	19 38	4 05	20 15	3 26	20 55
2009 Apr 29	4 41	19 39	4 04	20 16	3 24	20 56
2009 Apr 30	4 39	19 40	4 02	20 17	3 22	20 58
2009 May 1	4 38	19 41	4 00	20 19	3 20	21 00
2009 May 2	4 36	19 43	3 59	20 20	3 18	21 01
2009 May 3	4 35	19 44	3 57	20 22	3 16	21 03
2009 May 4	4 33	19 45	3 56	20 23	3 14	21 05
2009 May 5	4 32	19 46	3 54	20 24	3 12	21 06
2009 May 6	4 31	19 47	3 53	20 26	3 11	21 08
2009 May 7	4 29	19 48	3 51	20 27	3 09	21 10
2009 May 8	4 28	19 50	3 50	20 28	3 07	21 11
2009 May 9	4 27	19 51	3 48	20 30	3 05	21 13
2009 May 10	4 26	19 52	3 47	20 31	3 03	21 15
2009 May 11	4 24	19 53	3 45	20 32	3 02	21 16
2009 May 12	4 23	19 54	3 44	20 34	3 00	21 18
2009 May 13	4 22	19 55	3 43	20 35	2 58	21 20
2009 May 14	4 21	19 57	3 41	20 36	2 57	21 21
2009 May 15	4 20	19 58	3 40	20 38	2 55	21 23
2009 May 16	4 19	19 59	3 39	20 39	2 53	21 25
2009 May 17	4 18	20 00	3 37	20 40	2 52	21 26
2009 May 18	4 16	20 01	3 36	20 42	2 50	21 28
2009 May 19	4 15	20 02	3 35	20 43	2 49	21 29
2009 May 20	4 14	20 03	3 34	20 44	2 47	21 31
2009 May 21	4 14	20 04	3 33	20 45	2 46	21 33
2009 May 22	4 13	20 05	3 32	20 47	2 44	21 34
2009 May 23	4 12	20 06	3 30	20 48	2 43	21 36
2009 May 24	4 11	20 07	3 29	20 49	2 42	21 37
2009 May 25	4 10	20 08	3 28	20 50	2 40	21 39
2009 May 26	4 09	20 09	3 27	20 51	2 39	21 40
2009 May 27	4 09	20 10	3 27	20 53	2 38	21 42
2009 May 28	4 08	20 11	3 26	20 54	2 36	21 43
2009 May 29	4 07	20 12	3 25	20 55	2 35	21 45
2009 May 30	4 07	20 13	3 24	20 56	2 34	21 46
2009 May 31	4 06	20 14	3 23	20 57	2 33	21 47
2009 Jun 1	4 05	20 15	3 23	20 58	2 32	21 49
2009 Jun 2	4 05	20 16	3 22	20 59	2 31	21 50
2009 Jun 3	4 04	20 16	3 21	21 00	2 30	21 51
2009 Jun 4	4 04	20 17	3 21	21 01	2 29	21 52

Date	Civil		Nautical		Astronomical	
	Morning	Evening	Morning	Evening	Morning	Evening
	h m	h m	h m	h m	h m	h m
2009 Jun 5	4 03	20 18	3 20	21 01	2 29	21 53
2009 Jun 6	4 03	20 19	3 20	21 02	2 28	21 54
2009 Jun 7	4 03	20 19	3 19	21 03	2 27	21 55
2009 Jun 8	4 02	20 20	3 19	21 04	2 26	21 56
2009 Jun 9	4 02	20 21	3 18	21 05	2 26	21 57
2009 Jun 10	4 02	20 21	3 18	21 05	2 25	21 58
2009 Jun 11	4 02	20 22	3 18	21 06	2 25	21 59
2009 Jun 12	4 02	20 22	3 17	21 07	2 24	22 00
2009 Jun 13	4 01	20 23	3 17	21 07	2 24	22 01
2009 Jun 14	4 01	20 23	3 17	21 08	2 24	22 01
2009 Jun 15	4 01	20 24	3 17	21 08	2 24	22 02
2009 Jun 16	4 01	20 24	3 17	21 09	2 23	22 02
2009 Jun 17	4 01	20 25	3 17	21 09	2 23	22 03
2009 Jun 18	4 02	20 25	3 17	21 09	2 23	22 03
2009 Jun 19	4 02	20 25	3 17	21 10	2 23	22 03
2009 Jun 20	4 02	20 25	3 17	21 10	2 23	22 04
2009 Jun 21	4 02	20 26	3 18	21 10	2 24	22 04
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2009 Jun 27	4 04	20 26	3 20	21 10	2 26	22 04
2009 Jun 28	4 04	20 26	3 20	21 10	2 27	22 04
2009 Jun 29	4 05	20 26	3 21	21 10	2 27	22 03
2009 Jun 30	4 05	20 26	3 21	21 10	2 28	22 03
2009 Jul 1	4 06	20 26	3 22	21 10	2 29	22 02
2009 Jul 2	4 06	20 25	3 22	21 09	2 30	22 02
2009 Jul 3	4 07	20 25	3 23	21 09	2 31	22 01
2009 Jul 4	4 08	20 25	3 24	21 09	2 31	22 01
2009 Jul 5	4 08	20 25	3 25	21 08	2 32	22 00
2009 Jul 6	4 09	20 24	3 25	21 08	2 33	21 59
2009 Jul 7	4 10	20 24	3 26	21 07	2 35	21 59
2009 Jul 8	4 10	20 23	3 27	21 06	2 36	21 58
2009 Jul 9	4 11	20 23	3 28	21 06	2 37	21 57
2009 Jul 10	4 12	20 22	3 29	21 05	2 38	21 56
2009 Jul 11	4 13	20 22	3 30	21 04	2 39	21 55
2009 Jul 12	4 14	20 21	3 31	21 04	2 41	21 54
2009 Jul 13	4 15	20 20	3 32	21 03	2 42	21 53
2009 Jul 14	4 15	20 20	3 33	21 02	2 43	21 52
2009 Jul 15	4 16	20 19	3 34	21 01	2 45	21 50
2009 Jul 16	4 17	20 18	3 35	21 00	2 46	21 49
2009 Jul 17	4 18	20 18	3 36	20 59	2 47	21 48
2009 Jul 18	4 19	20 17	3 37	20 58	2 49	21 46
2009 Jul 19	4 20	20 16	3 38	20 57	2 50	21 45
2009 Jul 20	4 21	20 15	3 40	20 56	2 52	21 44
2009 Jul 21	4 22	20 14	3 41	20 55	2 53	21 42
2009 Jul 22	4 23	20 13	3 42	20 54	2 55	21 41
2009 Jul 23	4 24	20 12	3 43	20 53	2 56	21 39
2009 Jul 24	4 25	20 11	3 44	20 52	2 58	21 38
2009 Jul 25	4 26	20 10	3 46	20 50	3 00	21 36
2009 Jul 26	4 27	20 09	3 47	20 49	3 01	21 35
2009 Jul 27	4 28	20 08	3 48	20 48	3 03	21 33
2009 Jul 28	4 29	20 07	3 49	20 47	3 04	21 31
2009 Jul 29	4 31	20 06	3 51	20 45	3 06	21 30
2009 Jul 30	4 32	20 05	3 52	20 44	3 08	21 28
2009 Jul 31	4 33	20 03	3 53	20 43	3 09	21 26
2009 Aug 1	4 34	20 02	3 55	20 41	3 11	21 25
2009 Aug 2	4 35	20 01	3 56	20 40	3 12	21 23
2009 Aug 3	4 36	20 00	3 57	20 38	3 14	21 21
2009 Aug 4	4 37	19 58	3 59	20 37	3 16	21 19
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2009 Aug 6	4 39	19 56	4 01	20 34	3 19	21 16
2009 Aug 7	4 41	19 54	4 02	20 32	3 20	21 14
2009 Aug 8	4 42	19 53	4 04	20 30	3 22	21 12
2009 Aug 9	4 43	19 51	4 05	20 29	3 24	21 10
2009 Aug 10	4 44	19 50	4 06	20 27	3 25	21 08
2009 Aug 11	4 45	19 48	4 08	20 26	3 27	21 06
2009 Aug 12	4 46	19 47	4 09	20 24	3 28	21 04
2009 Aug 13	4 47	19 45	4 10	20 22	3 30	21 02
2009 Aug 14	4 49	19 44	4 12	20 21	3 32	21 00
2009 Aug 15	4 50	19 42	4 13	20 19	3 33	20 58
2009 Aug 16	4 51	19 41	4 14	20 17	3 35	20 56
2009 Aug 17	4 52	19 39	4 16	20 16	3 36	20 54
2009 Aug 18	4 53	19 38	4 17	20 14	3 38	20 53
2009 Aug 19	4 54	19 36	4 18	20 12	3 39	20 51
2009 Aug 20	4 55	19 35	4 19	20 10	3 41	20 49
2009 Aug 21	4 57	19 33	4 21	20 09	3 42	20 47
2009 Aug 22	4 58	19 31	4 22	20 07	3 44	20 45
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2009 Aug 24	5 00	19 28	4 25	20 03	3 47	20 41

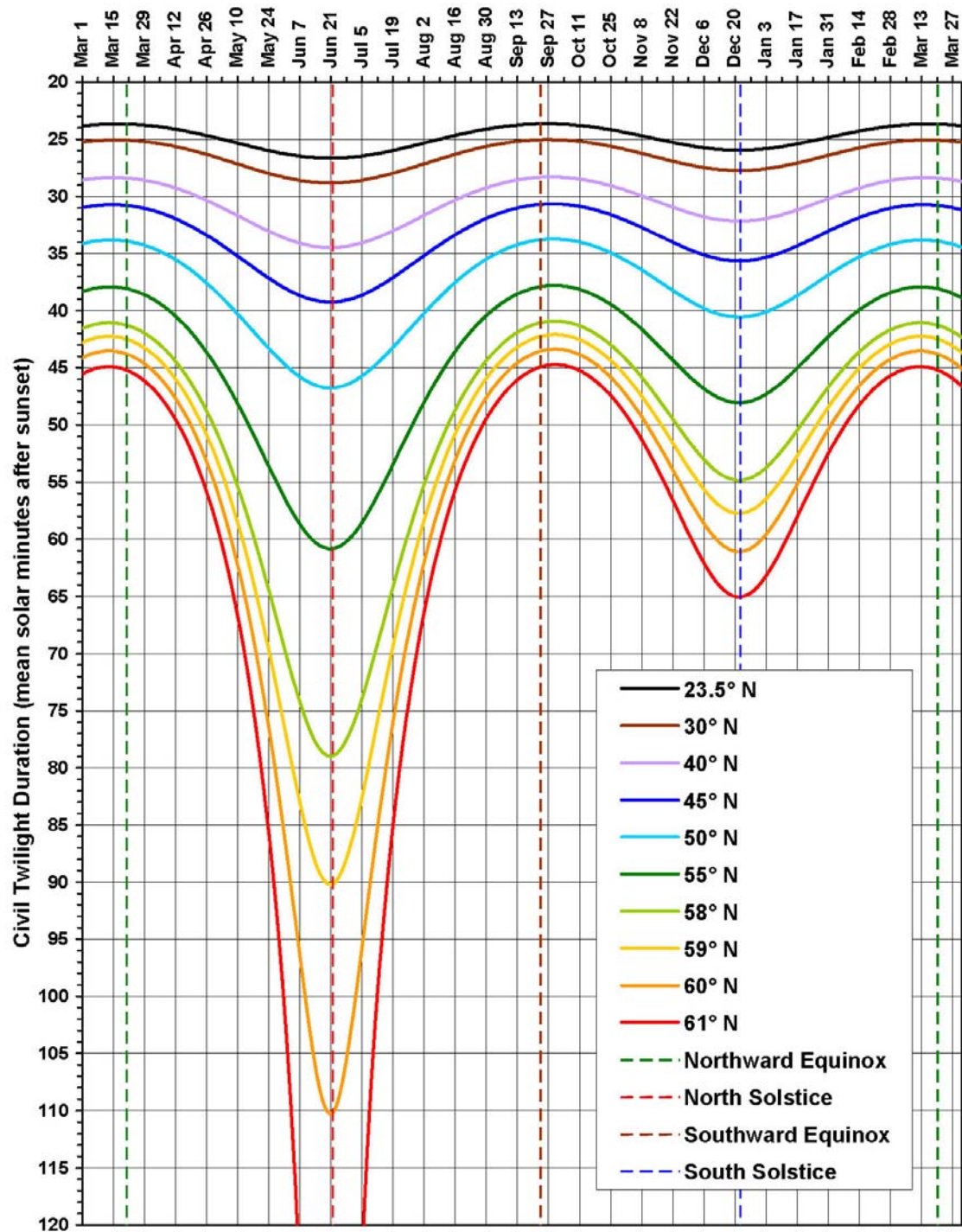
Date	Civil		Nautical		Astronomical	
	Morning	Evening	Morning	Evening	Morning	Evening
	h m	h m	h m	h m	h m	h m
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2009 Aug 26	5 02	19 25	4 27	20 00	3 50	20 37
2009 Aug 27	5 03	19 23	4 28	19 58	3 51	20 35
2009 Aug 28	5 04	19 21	4 30	19 56	3 53	20 32
2009 Aug 29	5 05	19 19	4 31	19 54	3 54	20 30
2009 Aug 30	5 07	19 18	4 32	19 52	3 56	20 28
2009 Aug 31	5 08	19 16	4 33	19 50	3 57	20 26
2009 Sep 1	5 09	19 14	4 34	19 49	3 58	20 24
2009 Sep 2	5 10	19 13	4 36	19 47	4 00	20 22
2009 Sep 3	5 11	19 11	4 37	19 45	4 01	20 20
2009 Sep 4	5 12	19 09	4 38	19 43	4 02	20 18
2009 Sep 5	5 13	19 07	4 39	19 41	4 04	20 16
2009 Sep 6	5 14	19 06	4 40	19 39	4 05	20 14
2009 Sep 7	5 15	19 04	4 42	19 37	4 06	20 12
2009 Sep 8	5 16	19 02	4 43	19 36	4 08	20 10
2009 Sep 9	5 18	19 00	4 44	19 34	4 09	20 08
2009 Sep 10	5 19	18 58	4 45	19 32	4 10	20 06
2009 Sep 11	5 20	18 57	4 46	19 30	4 12	20 04
2009 Sep 12	5 21	18 55	4 47	19 28	4 13	20 02
2009 Sep 13	5 22	18 53	4 49	19 26	4 14	20 00
2009 Sep 14	5 23	18 51	4 50	19 24	4 16	19 58
2009 Sep 15	5 24	18 50	4 51	19 23	4 17	19 56
2009 Sep 16	5 25	18 48	4 52	19 21	4 18	19 55
2009 Sep 17	5 26	18 46	4 53	19 19	4 19	19 53
2009 Sep 18	5 27	18 44	4 54	19 17	4 21	19 51
2009 Sep 19	5 28	18 42	4 55	19 15	4 22	19 49
2009 Sep 20	5 29	18 41	4 57	19 13	4 23	19 47
2009 Sep 21	5 30	18 39	4 58	19 12	4 24	19 45
2009 Sep 22	5 31	18 37	4 59	19 10	4 25	19 43
2009 Sep 23	5 33	18 35	5 00	19 08	4 27	19 41
2009 Sep 24	5 34	18 34	5 01	19 06	4 28	19 39
2009 Sep 25	5 35	18 32	5 02	19 04	4 29	19 37
2009 Sep 26	5 36	18 30	5 03	19 03	4 30	19 36
2009 Sep 27	5 37	18 28	5 04	19 01	4 31	19 34
2009 Sep 28	5 38	18 27	5 05	18 59	4 32	19 32
2009 Sep 29	5 39	18 25	5 06	18 57	4 34	19 30
2009 Sep 30	5 40	18 23	5 08	18 56	4 35	19 28
2009 Oct 1	5 41	18 21	5 09	18 54	4 36	19 26
2009 Oct 2	5 42	18 20	5 10	18 52	4 37	19 25
2009 Oct 3	5 43	18 18	5 11	18 50	4 38	19 23
2009 Oct 4	5 44	18 16	5 12	18 49	4 39	19 21
2009 Oct 5	5 45	18 15	5 13	18 47	4 40	19 19
2009 Oct 6	5 46	18 13	5 14	18 45	4 42	19 18
2009 Oct 7	5 48	18 11	5 15	18 44	4 43	19 16
2009 Oct 8	5 49	18 10	5 16	18 42	4 44	19 14
2009 Oct 9	5 50	18 08	5 17	18 40	4 45	19 13
2009 Oct 10	5 51	18 06	5 18	18 39	4 46	19 11
2009 Oct 11	5 52	18 05	5 20	18 37	4 47	19 09
2009 Oct 12	5 53	18 03	5 21	18 36	4 48	19 08
2009 Oct 13	5 54	18 02	5 22	18 34	4 49	19 06
2009 Oct 14	5 55	18 00	5 23	18 32	4 50	19 05
2009 Oct 15	5 56	17 59	5 24	18 31	4 52	19 03
2009 Oct 16	5 57	17 57	5 25	18 29	4 53	19 02
2009 Oct 17	5 59	17 56	5 26	18 28	4 54	19 00
2009 Oct 18	6 00	17 54	5 27	18 26	4 55	18 59
2009 Oct 19	6 01	17 53	5 28	18 25	4 56	18 57
2009 Oct 20	6 02	17 51	5 29	18 24	4 57	18 56
2009 Oct 21	6 03	17 50	5 30	18 22	4 58	18 54
2009 Oct 22	6 04	17 48	5 32	18 21	4 59	18 53
2009 Oct 23	6 05	17 47	5 33	18 19	5 00	18 52
2009 Oct 24	6 06	17 45	5 34	18 18	5 01	18 50
2009 Oct 25	6 08	17 44	5 35	18 17	5 02	18 49
2009 Oct 26	6 09	17 43	5 36	18 15	5 04	18 48
2009 Oct 27	6 10	17 41	5 37	18 14	5 05	18 46
2009 Oct 28	6 11	17 40	5 38	18 13	5 06	18 45
2009 Oct 29	6 12	17 39	5 39	18 12	5 07	18 44
2009 Oct 30	6 13	17 37	5 40	18 10	5 08	18 43
2009 Oct 31	6 14	17 36	5 41	18 09	5 09	18 42
2009 Nov 1	6 16	17 35	5 43	18 08	5 10	18 40
2009 Nov 2	6 17	17 34	5 44	18 07	5 11	18 39
2009 Nov 3	6 18	17 33	5 45	18 06	5 12	18 38
2009 Nov 4	6 19	17 32	5 46	18 05	5 13	18 37
2009 Nov 5	6 20	17 30	5 47	18 04	5 14	18 36
2009 Nov 6	6 21	17 29	5 48	18 03	5 15	18 35
2009 Nov 7	6 23	17 28	5 49	18 02	5 17	18 34
2009 Nov 8	6 24	17 27	5 50	18 01	5 18	18 33
2009 Nov 9	6 25	17 26	5 51	18 00	5 19	18 32
2009 Nov 10	6 26	17 25	5 53	17 59	5 20	18 32
2009 Nov 11	6 27	17 24	5 54	17 58	5 21	18 31
2009 Nov 12	6 28	17 23	5 55	17 57	5 22	18 30
2009 Nov 13	6 30	17 23	5 56	17 56	5 23	18 29

Date	Civil		Nautical		Astronomical	
	Morning	Evening	Morning	Evening	Morning	Evening
	h m	h m	h m	h m	h m	h m
2009 Nov 14	6 31	17 22	5 57	17 55	5 24	18 28
2009 Nov 15	6 32	17 21	5 58	17 55	5 25	18 28
2009 Nov 16	6 33	17 20	5 59	17 54	5 26	18 27
2009 Nov 17	6 34	17 19	6 00	17 53	5 27	18 26
2009 Nov 18	6 35	17 19	6 01	17 53	5 28	18 26
2009 Nov 19	6 36	17 18	6 02	17 52	5 29	18 25
2009 Nov 20	6 38	17 17	6 03	17 51	5 30	18 25
2009 Nov 21	6 39	17 17	6 04	17 51	5 31	18 24
2009 Nov 22	6 40	17 16	6 06	17 50	5 32	18 24
2009 Nov 23	6 41	17 16	6 07	17 50	5 33	18 23
2009 Nov 24	6 42	17 15	6 08	17 49	5 34	18 23
2009 Nov 25	6 43	17 15	6 09	17 49	5 35	18 22
2009 Nov 26	6 44	17 14	6 10	17 49	5 36	18 22
2009 Nov 27	6 45	17 14	6 11	17 48	5 37	18 22
2009 Nov 28	6 46	17 13	6 12	17 48	5 38	18 22
2009 Nov 29	6 47	17 13	6 13	17 48	5 39	18 21
2009 Nov 30	6 48	17 13	6 14	17 48	5 40	18 21
2009 Dec 1	6 49	17 13	6 15	17 47	5 41	18 21
2009 Dec 2	6 50	17 12	6 15	17 47	5 42	18 21
2009 Dec 3	6 51	17 12	6 16	17 47	5 43	18 21
2009 Dec 4	6 52	17 12	6 17	17 47	5 44	18 21
2009 Dec 5	6 53	17 12	6 18	17 47	5 44	18 21
2009 Dec 6	6 54	17 12	6 19	17 47	5 45	18 21
2009 Dec 7	6 55	17 12	6 20	17 47	5 46	18 21
2009 Dec 8	6 56	17 12	6 21	17 47	5 47	18 21
2009 Dec 9	6 57	17 12	6 22	17 47	5 48	18 21
2009 Dec 10	6 57	17 12	6 22	17 47	5 48	18 21
2009 Dec 11	6 58	17 12	6 23	17 47	5 49	18 21
2009 Dec 12	6 59	17 12	6 24	17 47	5 50	18 21
2009 Dec 13	7 00	17 13	6 25	17 48	5 51	18 22
2009 Dec 14	7 01	17 13	6 25	17 48	5 51	18 22
2009 Dec 15	7 01	17 13	6 26	17 48	5 52	18 22
2009 Dec 16	7 02	17 13	6 27	17 49	5 53	18 23
2009 Dec 17	7 03	17 14	6 27	17 49	5 53	18 23
2009 Dec 18	7 03	17 14	6 28	17 49	5 54	18 23
2009 Dec 19	7 04	17 14	6 29	17 50	5 55	18 24
2009 Dec 20	7 04	17 15	6 29	17 50	5 55	18 24
2009 Dec 21	7 05	17 15	6 30	17 51	5 56	18 25
2009 Dec 22	7 05	17 16	6 30	17 51	5 56	18 25
2009 Dec 23	7 06	17 16	6 31	17 52	5 57	18 26
2009 Dec 24	7 06	17 17	6 31	17 52	5 57	18 26
2009 Dec 25	7 07	17 18	6 31	17 53	5 57	18 27
2009 Dec 26	7 07	17 18	6 32	17 53	5 58	18 28
2009 Dec 27	7 07	17 19	6 32	17 54	5 58	18 28
2009 Dec 28	7 08	17 20	6 32	17 55	5 58	18 29
2009 Dec 29	7 08	17 20	6 33	17 56	5 59	18 30
2009 Dec 30	7 08	17 21	6 33	17 56	5 59	18 30
2009 Dec 31	7 08	17 22	6 33	17 57	5 59	18 31

Times in U.T., to add an hour when it is in use daylight saving time

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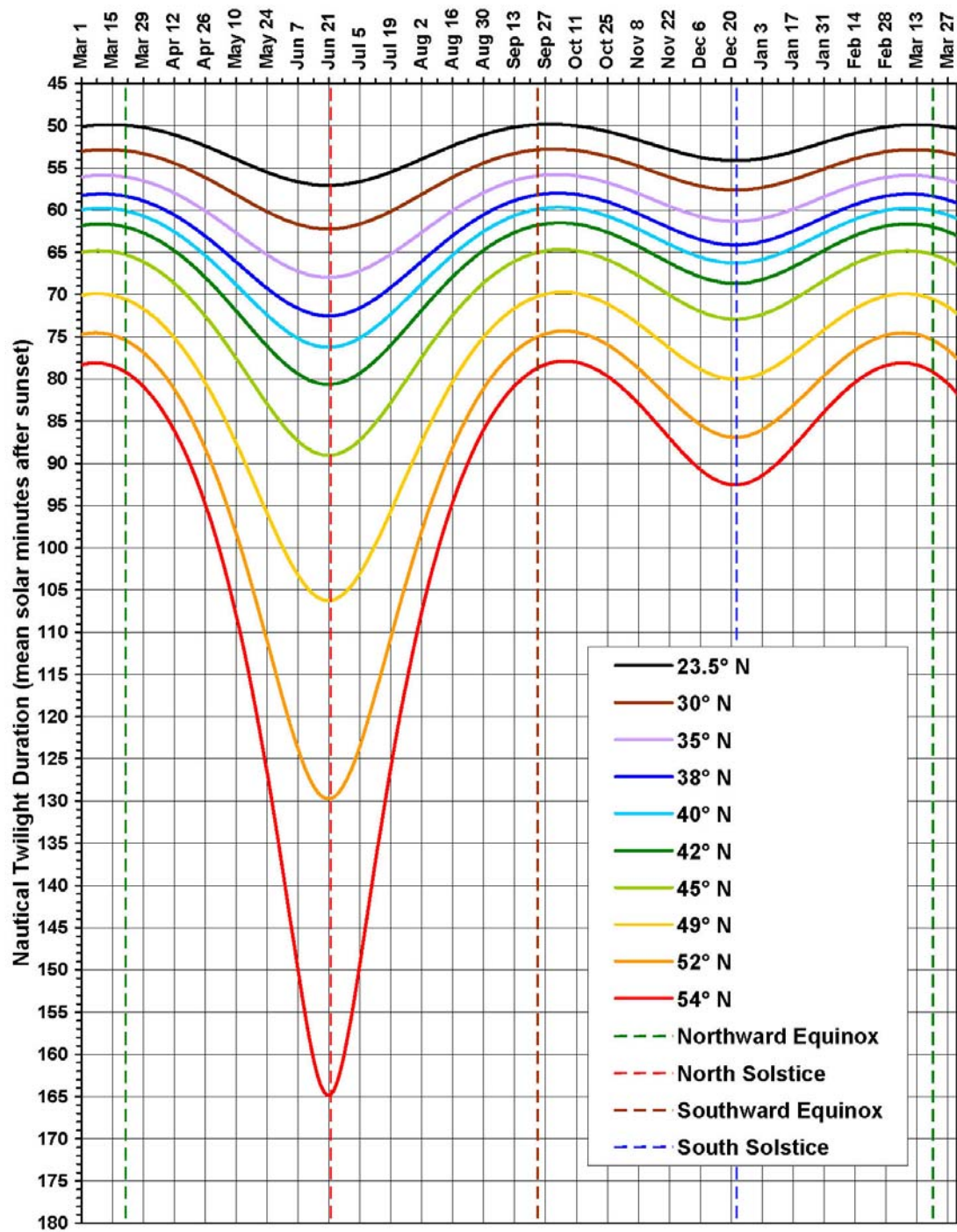
DURATION OF THE TWILIGHTS



Analysis by Dr. Irv Bromberg, University of Toronto, Canada

<http://www.sym454.org/twilight/>

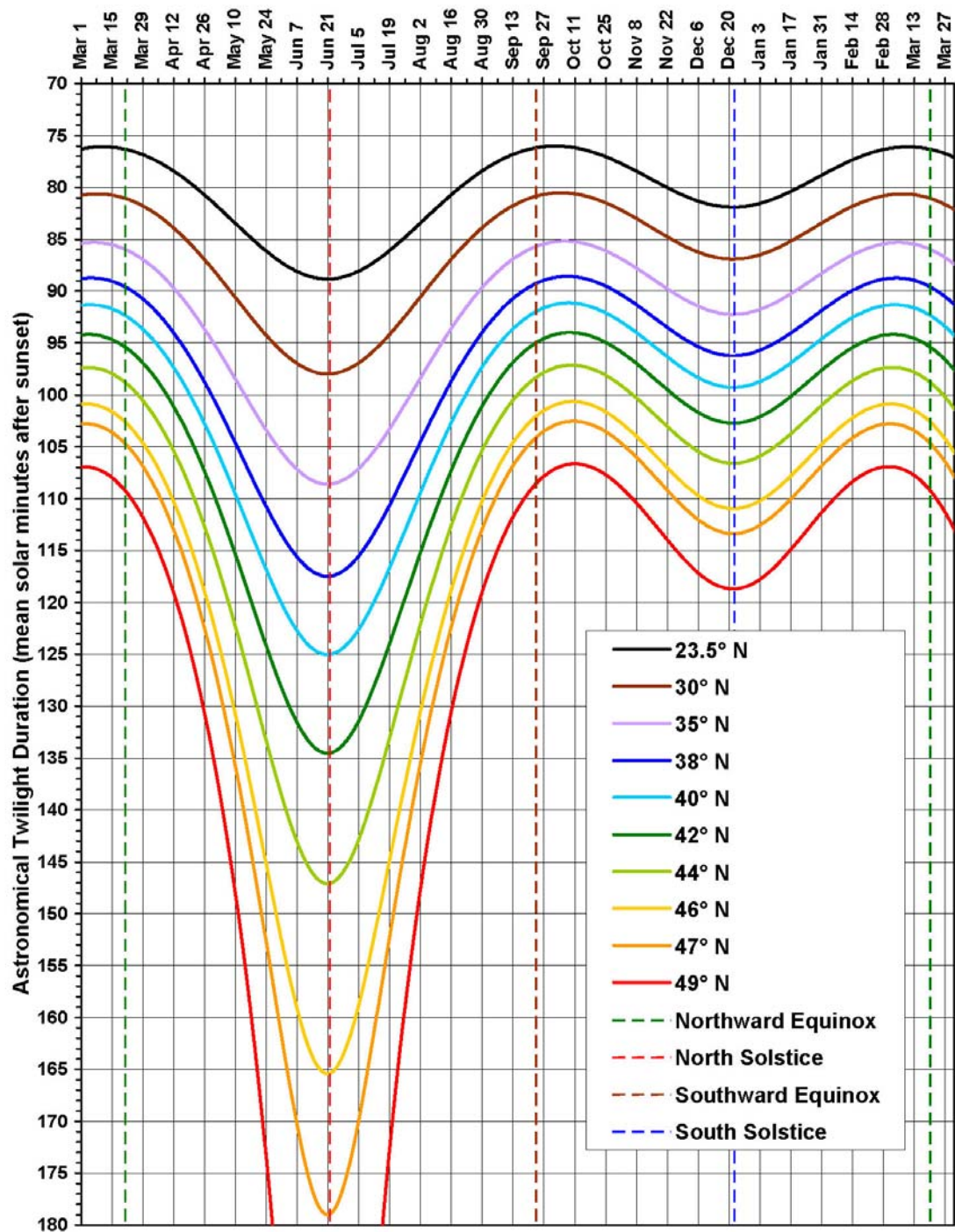
Duration of the civil twilight for every latitude, north hemisphere.
(The graphics for dawn and sunset, of for south hemisphere, are simmetrical or upside-down)



Analysis by Dr. Irv Bromberg, University of Toronto, Canada

<http://www.sym454.org/twilight/>

Duration of the nautical twilight for every latitude, north hemisphere.
 (The graphics for dawn and sunset, of for south hemisphere, are simmetrical or upside-down)



Analysis by Dr. Irv Bromberg, University of Toronto, Canada

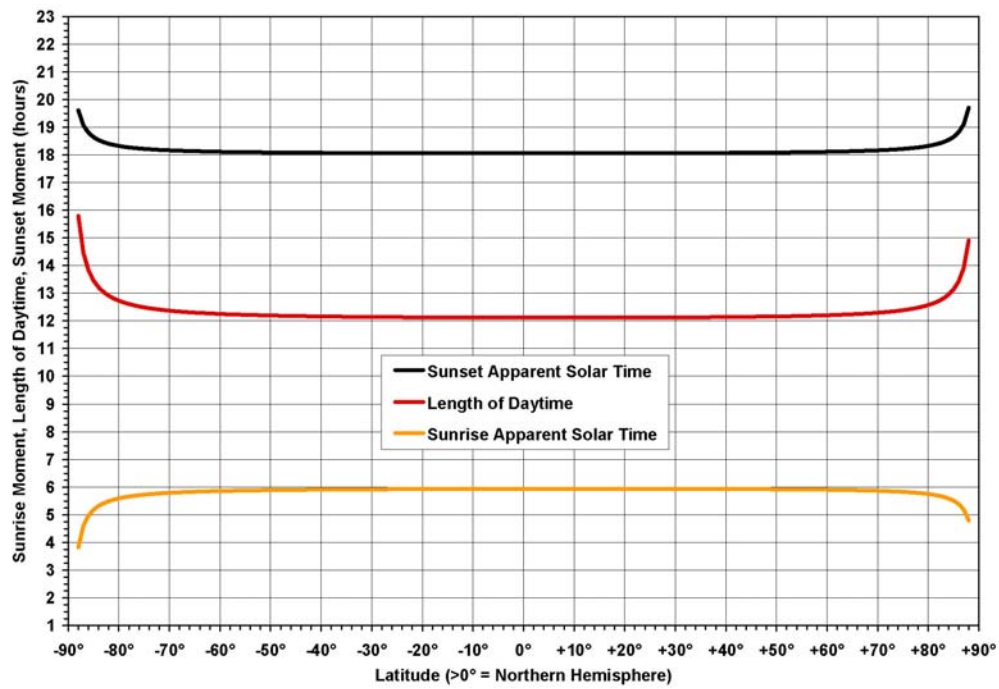
<http://www.sym454.org/twilight/>

Duration of the astronomical twilight for every latitude, north hemisphere.
(The graphics for dawn and sunset, of for south emisphère, are simmetrical or upside-down)

DURATION OF THE DAY

42°N – 12°E

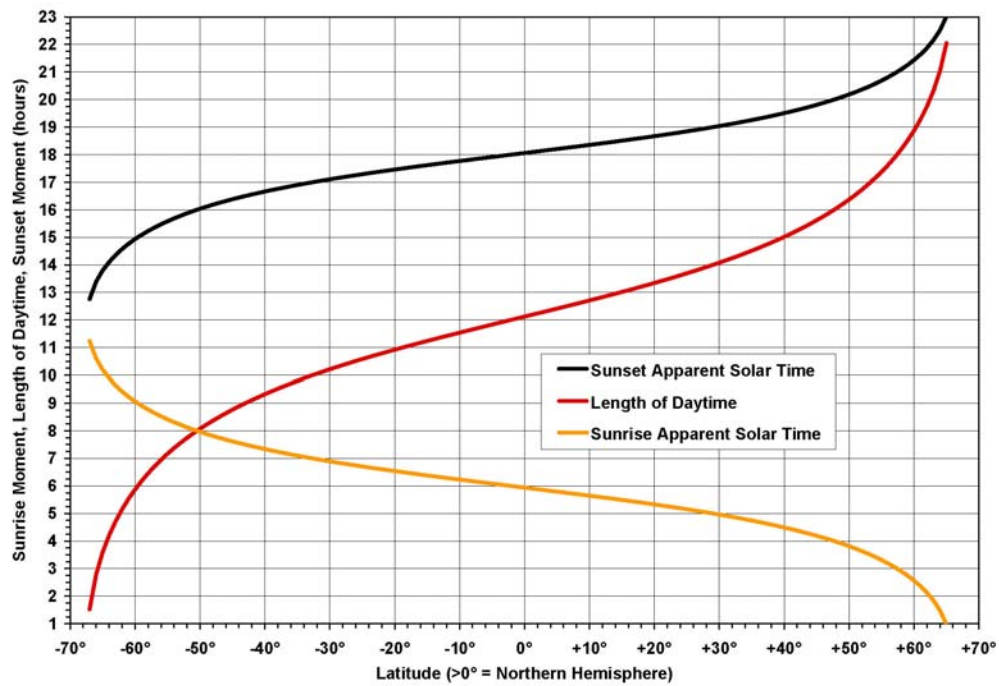
G	Jan. h m	Feb h m	Mar h m	Apr h m	May h m	Jun h m	Jul h m	Aug h m	Sep. h m	Oct h m	Nov h m	Dec h m
01	09:11	10:02	11:15	12:43	14:03	15:02	15:11	14:25	13:08	11:45	10:21	09:21
02	09:12	10:04	11:18	12:46	14:05	15:03	15:10	14:23	13:05	11:42	10:19	09:20
03	09:13	10:07	11:21	12:48	14:08	15:04	15:10	14:21	13:03	11:39	10:16	09:19
04	09:14	10:09	11:23	12:51	14:10	15:06	15:09	14:19	13:00	11:36	10:14	09:17
05	09:15	10:12	11:26	12:54	14:12	15:07	15:08	14:16	12:57	11:34	10:12	09:16
06	09:16	10:14	11:29	12:57	14:15	15:08	15:07	14:14	12:54	11:31	10:09	09:15
07	09:17	10:16	11:32	13:00	14:17	15:08	15:06	14:12	12:52	11:28	10:07	09:14
08	09:18	10:19	11:35	13:02	14:19	15:09	15:05	14:09	12:49	11:25	10:05	09:13
09	09:19	10:21	11:37	13:05	14:21	15:10	15:04	14:07	12:46	11:23	10:02	09:12
10	09:21	10:24	11:40	13:08	14:24	15:11	15:03	14:05	12:43	11:20	10:00	09:11
11	09:22	10:27	11:43	13:11	14:26	15:11	15:02	14:02	12:41	11:17	09:58	09:11
12	09:24	10:29	11:46	13:13	14:28	15:12	15:00	14:00	12:38	11:14	09:56	09:10
13	09:25	10:32	11:49	13:16	14:30	15:13	14:59	13:57	12:35	11:11	09:53	09:09
14	09:27	10:34	11:52	13:19	14:32	15:13	14:58	13:55	12:32	11:09	09:51	09:09
15	09:28	10:37	11:55	13:21	14:34	15:13	14:56	13:53	12:30	11:06	09:49	09:08
16	09:30	10:40	11:57	13:24	14:36	15:14	14:55	13:50	12:27	11:03	09:47	09:08
17	09:31	10:42	12:00	13:27	14:38	15:14	14:53	13:48	12:24	11:01	09:45	09:08
18	09:33	10:45	12:03	13:29	14:40	15:14	14:52	13:45	12:21	10:58	09:43	09:07
19	09:35	10:48	12:06	13:32	14:42	15:14	14:50	13:42	12:18	10:55	09:41	09:07
20	09:37	10:50	12:09	13:35	14:44	15:15	14:48	13:40	12:16	10:52	09:39	09:07
21	09:39	10:53	12:12	13:37	14:45	15:15	14:47	13:37	12:13	10:50	09:37	09:07
22	09:41	10:56	12:14	13:40	14:47	15:14	14:45	13:35	12:10	10:47	09:35	09:07
23	09:43	10:58	12:17	13:43	14:49	15:14	14:43	13:32	12:07	10:45	09:34	09:07
24	09:45	11:01	12:20	13:45	14:51	15:14	14:41	13:29	12:04	10:42	09:32	09:07
25	09:47	11:04	12:23	13:48	14:52	15:14	14:39	13:27	12:02	10:39	09:30	09:07
26	09:49	11:07	12:26	13:50	14:54	15:14	14:37	13:24	11:59	10:37	09:29	09:08
27	09:51	11:09	12:29	13:53	14:55	15:13	14:35	13:22	11:56	10:34	09:27	09:08
28	09:53	11:12	12:31	13:55	14:57	15:13	14:33	13:19	11:53	10:31	09:25	09:09
29	09:55		12:34	13:58	14:58	15:12	14:31	13:16	11:50	10:29	09:24	09:09
30	09:58		12:37	14:00	15:00	15:12	14:29	13:14	11:48	10:26	09:23	09:10
31	10:00		12:40		15:01		14:27	13:11		10:24		09:10



Analysis by Dr. Irv Bromberg, University of Toronto, Canada

<http://www.sym454.org/seasons/>

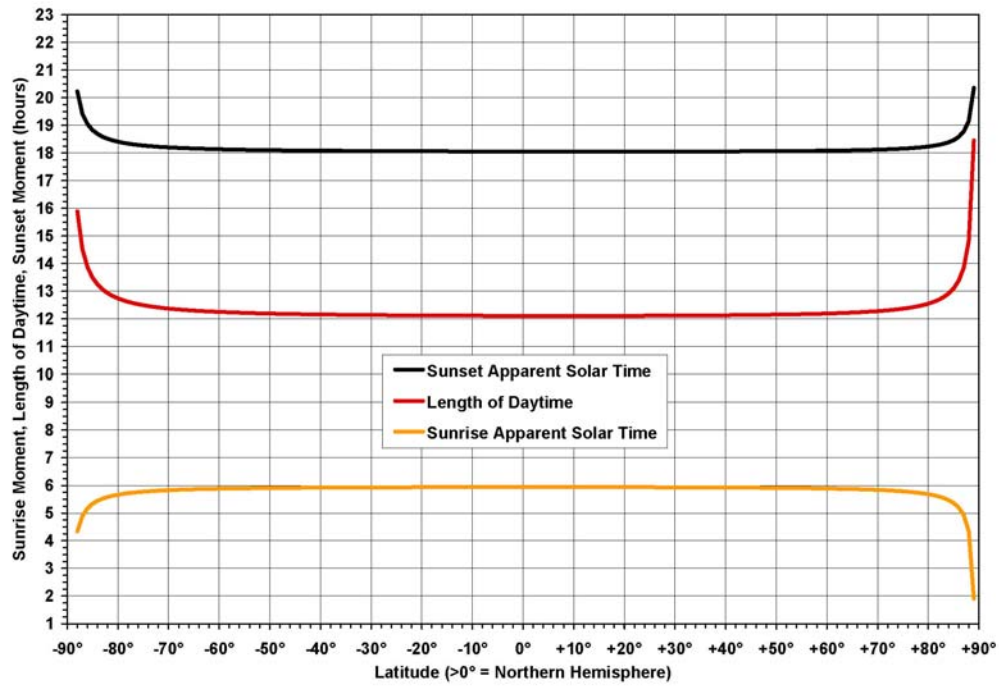
Spring equinox: times of rising and setting of the Sun and duration of the day at various latitudes



Analysis by Dr. Irv Bromberg, University of Toronto, Canada

<http://www.sym454.org/seasons/>

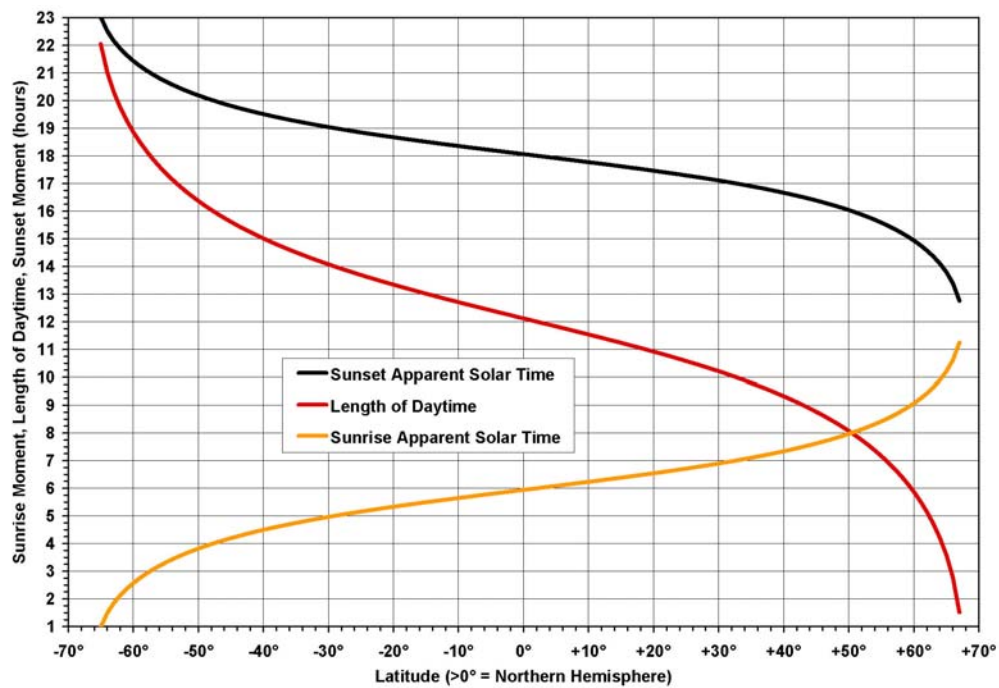
Summer solstice: times of rising and setting of the Sun and duration of the day at various latitudes



Analysis by Dr. Irv Bromberg, University of Toronto, Canada

<http://www.sym454.org/seasons/>

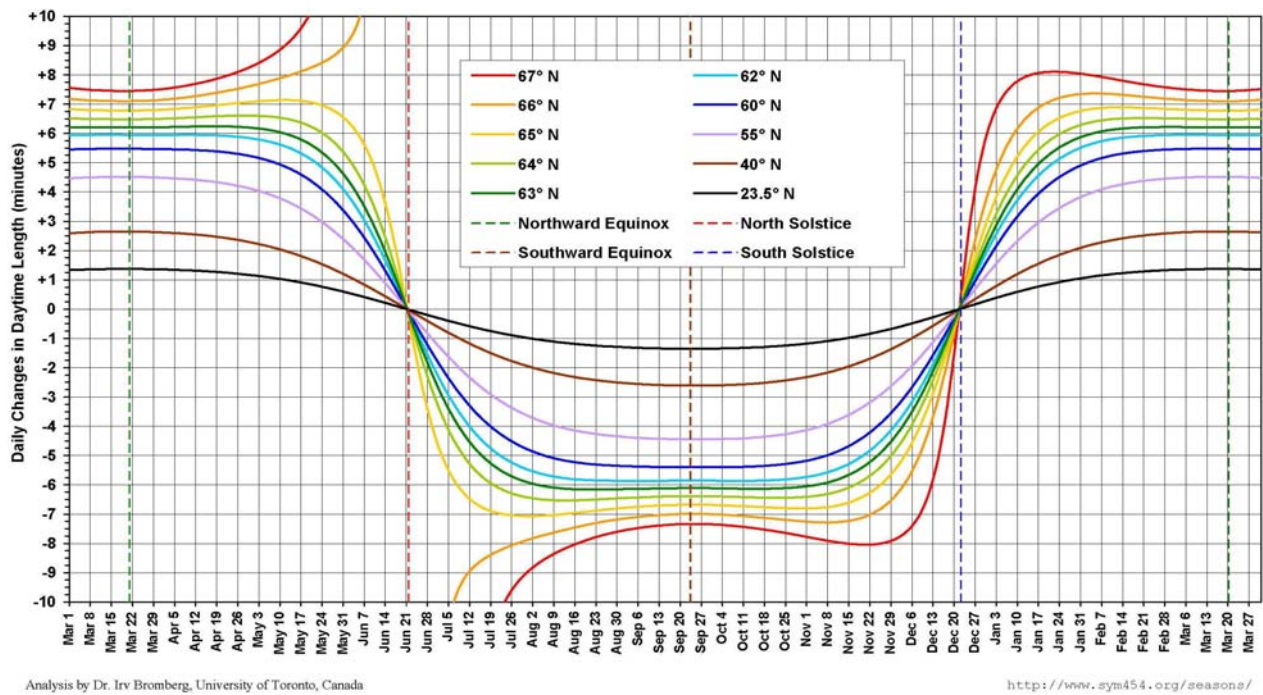
Autumn equinox: times of rising and setting of the Sun and duration of the day at various latitudes



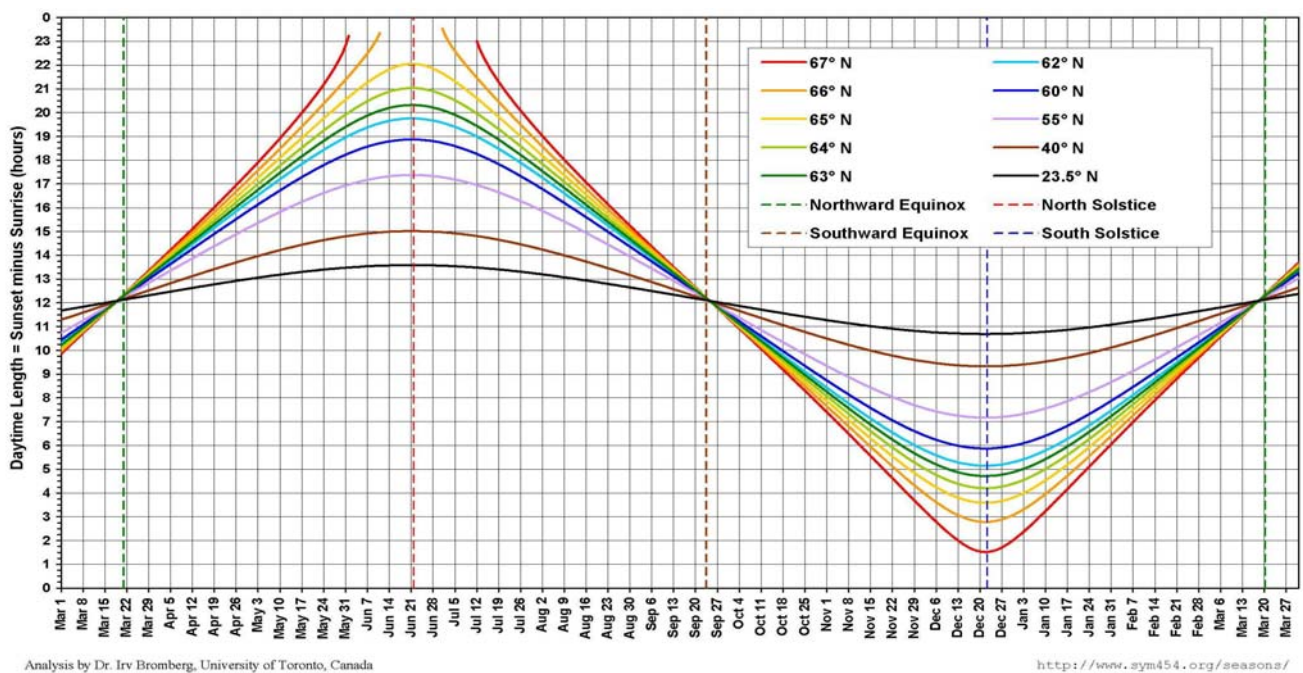
Analysis by Dr. Irv Bromberg, University of Toronto, Canada

<http://www.sym454.org/seasons/>

Winter solstice: times of rising and setting of the Sun and duration of the day at various latitudes



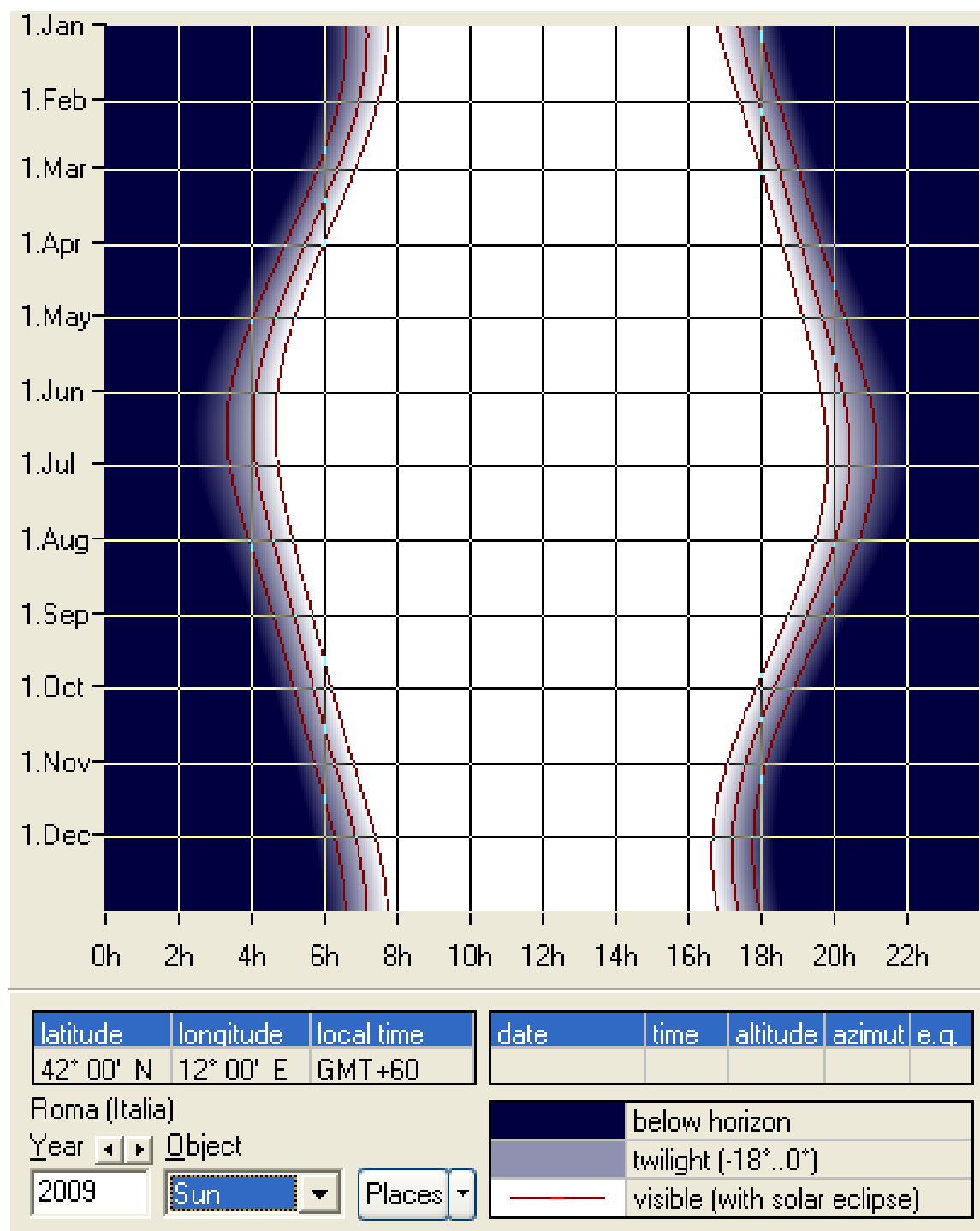
Incremental variation of the duration of the day during the year for various latitudes



Duration of the day during the year for various latitudes (north hemisphere)

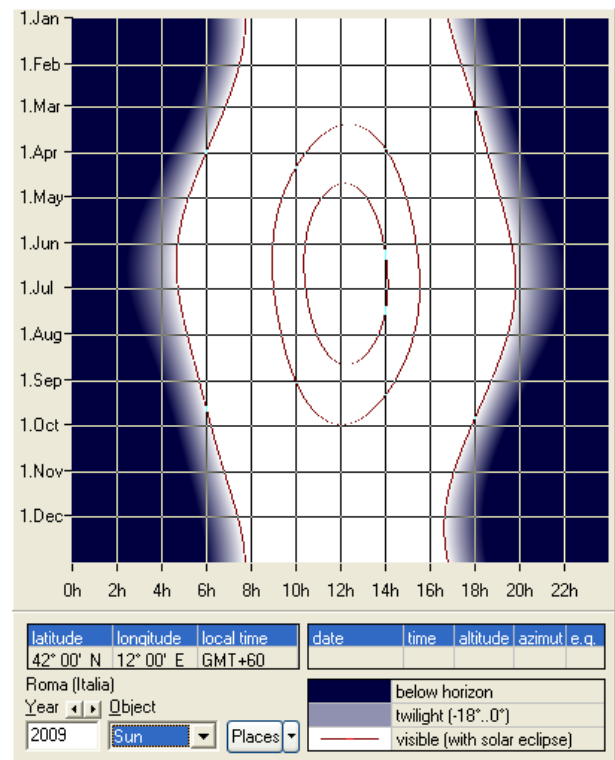
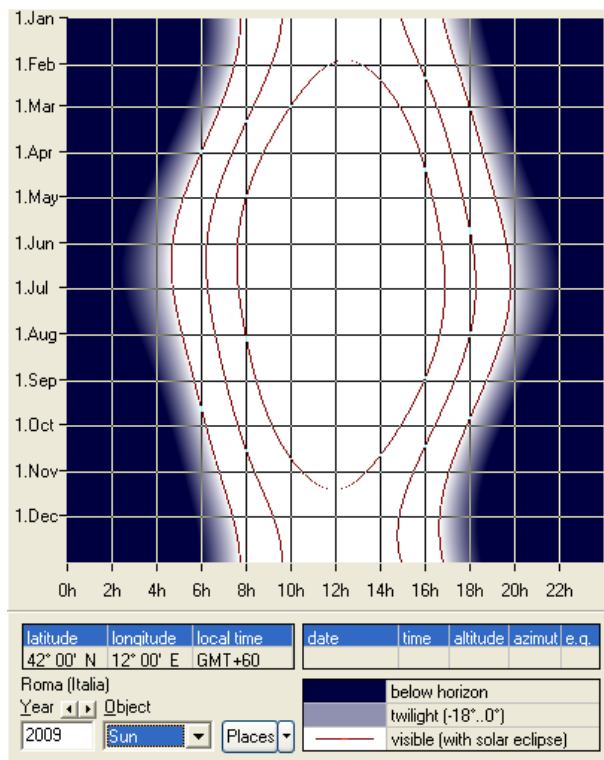
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VISIBILITY OF THE SUN



Visibilità del Sole nel corso dell'anno

Inner red lines : sunset or sunrise
 Medium red lines : Sun at -6° , civil twilights
 Exterior red lines: Sun at -12° , nautical twilights



Height of the Sun on the horizon during the year

Left:
 inner red line, the Sun is over 30°
 medium red line, the Sun is over 15°

Right:
 inner red line, the Sun is over 60°
 medium red line, the Sun is over 45°

EPHEMERIDES OF MERCURY

Date	A.R. Geoc.	Dec. Geoc.	R A.U.	Distance A.U.	Light (m)	El. °	Diam. "	Mag.	Phase	Phase ang°	Rise	Transit	Set
1-Jan	20h 07m 57.26s	-21° 48' 03.9"	0.3498026	1.0773302	8.96	18.8	6.2	-0.7	0.710	65.2	8.55	13.35	18.16
2-Jan	20h 13m 07.44s	-21° 23' 44.6"	0.3443241	1.0531909	8.76	19.1	6.4	-0.6	0.680	68.9	8.54	13.36	18.19
3-Jan	20h 17m 59.00s	-20° 58' 47.3"	0.3390371	1.0283569	8.55	19.2	6.5	-0.6	0.647	72.8	8.53	13.37	18.21
4-Jan	20h 22m 29.37s	-20° 33' 24.1"	0.3339909	1.0029059	8.34	19.3	6.7	-0.6	0.612	77.0	8.52	13.37	18.23
5-Jan	20h 26m 35.76s	-20° 07' 49.2"	0.3292366	0.9769379	8.13	19.3	6.9	-0.5	0.575	81.4	8.50	13.37	18.25
6-Jan	20h 30m 15.13s	-19° 42' 18.6"	0.3248263	0.9505775	7.91	19.2	7.1	-0.4	0.534	86.1	8.48	13.37	18.26
7-Jan	20h 33m 24.27s	-19° 17' 10.4"	0.3208123	0.9239769	7.69	19.0	7.3	-0.3	0.491	91.0	8.45	13.35	18.27
8-Jan	20h 35m 59.83s	-18° 52' 44.2"	0.3172453	0.8973174	7.46	18.7	7.5	-0.2	0.446	96.2	8.42	13.34	18.27
9-Jan	20h 37m 58.45s	-18° 29' 21.0"	0.3141737	0.8708105	7.24	18.2	7.7	-0.1	0.400	101.6	8.38	13.32	18.26
10-Jan	20h 39m 16.86s	-18° 07' 22.7"	0.3116412	0.8446972	7.03	17.6	8.0	0.1	0.351	107.3	8.34	13.29	18.24
11-Jan	20h 39m 52.10s	-17° 47' 11.5"	0.3096858	0.8192457	6.81	16.8	8.2	0.3	0.303	113.2	8.29	13.25	18.21
12-Jan	20h 39m 41.73s	-17° 29' 08.8"	0.3083378	0.7947465	6.61	15.9	8.5	0.6	0.255	119.4	8.23	13.20	18.18
13-Jan	20h 38m 44.11s	-17° 13' 34.1"	0.3076187	0.7715059	6.42	14.7	8.7	0.9	0.208	125.8	8.17	13.15	18.13
14-Jan	20h 36m 58.70s	-17° 00' 43.9"	0.3075404	0.7498363	6.24	13.4	9.0	1.3	0.163	132.3	8.10	13.09	18.08
15-Jan	20h 34m 26.33s	-16° 50' 50.5"	0.3081040	0.7300443	6.07	11.9	9.2	1.7	0.123	139.0	8.03	13.02	18.01
16-Jan	20h 31m 09.47s	-16° 44' 00.5"	0.3093003	0.7124176	5.93	10.2	9.4	2.2	0.087	145.8	7.55	12.55	17.54
17-Jan	20h 27m 12.35s	-16° 40' 14.7"	0.3111102	0.6972103	5.80	8.4	9.6	2.8	0.056	152.5	7.47	12.46	17.46
18-Jan	20h 22m 40.98s	-16° 39' 27.6"	0.3135053	0.6846296	5.69	6.5	9.8	3.4	0.033	159.0	7.39	12.38	17.37
19-Jan	20h 17m 42.97s	-16° 41' 27.5"	0.3164494	0.6748235	5.61	4.8	10.0	4.0	0.017	165.0	7.30	12.29	17.28
20-Jan	20h 12m 27.16s	-16° 45' 57.8"	0.3199000	0.6678733	5.55	3.5	10.1	4.5	0.009	169.3	7.21	12.20	17.18
21-Jan	20h 07m 03.13s	-16° 52' 38.5"	0.3238097	0.6637894	5.52	3.4	10.1	4.6	0.008	169.7	7.12	12.10	17.08
22-Jan	20h 01m 40.55s	-17° 01' 07.3"	0.3281282	0.6625137	5.51	4.6	10.1	4.2	0.015	166.1	7.04	12.01	16.58
23-Jan	19h 56m 28.60s	-17° 11' 02.0"	0.3328036	0.6639259	5.52	6.4	10.1	3.7	0.028	160.7	6.55	11.52	16.49
24-Jan	19h 51m 35.45s	-17° 22' 00.9"	0.3377834	0.6678546	5.55	8.3	10.1	3.1	0.047	155.0	6.47	11.43	16.39
25-Jan	19h 47m 07.89s	-17° 33' 44.7"	0.3430163	0.6740899	5.61	10.3	10.0	2.6	0.071	149.2	6.40	11.35	16.31
26-Jan	19h 43m 11.14s	-17° 45' 55.8"	0.3484527	0.6823976	5.67	12.2	9.9	2.2	0.098	143.5	6.33	11.28	16.22
27-Jan	19h 39m 48.82s	-17° 58' 19.4"	0.3540450	0.6925318	5.76	13.9	9.7	1.8	0.128	138.0	6.27	11.21	16.15
28-Jan	19h 37m 03.10s	-18° 10' 42.9"	0.3597489	0.7042463	5.86	15.5	9.5	1.5	0.160	132.8	6.21	11.14	16.07
29-Jan	19h 34m 54.84s	-18° 22' 55.5"	0.3655227	0.7173030	5.96	17.0	9.4	1.3	0.193	127.9	6.16	11.09	16.01
30-Jan	19h 33m 23.89s	-18° 34' 48.3"	0.3713284	0.7314782	6.08	18.4	9.2	1.0	0.226	123.2	6.11	11.03	15.55
31-Jan	19h 32m 29.32s	-18° 46' 13.5"	0.3771309	0.7465666	6.21	19.6	9.0	0.8	0.259	118.8	6.07	10.59	15.50
1-Feb	19h 32m 09.61s	-18° 57' 04.6"	0.3828983	0.7623832	6.34	20.7	8.8	0.7	0.292	114.6	6.04	10.55	15.45
2-Feb	19h 32m 22.90s	-19° 07' 16.0"	0.3886018	0.7787636	6.48	21.7	8.6	0.6	0.323	110.7	6.01	10.51	15.41
3-Feb	19h 33m 07.10s	-19° 16' 42.6"	0.3942154	0.7955640	6.62	22.5	8.5	0.5	0.354	107.0	5.59	10.48	15.38
4-Feb	19h 34m 20.04s	-19° 25' 20.1"	0.3997158	0.8126595	6.76	23.2	8.3	0.4	0.383	103.5	5.57	10.46	15.35
5-Feb	19h 35m 59.53s	-19° 33' 04.8"	0.4050820	0.8299429	6.90	23.9	8.1	0.3	0.411	100.2	5.55	10.44	15.32
6-Feb	19h 38m 03.44s	-19° 39' 53.3"	0.4102954	0.8473227	7.05	24.4	7.9	0.2	0.438	97.1	5.54	10.42	15.30
7-Feb	19h 40m 29.73s	-19° 45' 42.6"	0.4153394	0.8647213	7.19	24.8	7.8	0.2	0.464	94.2	5.53	10.40	15.28
8-Feb	19h 43m 16.49s	-19° 50' 30.1"	0.4201994	0.8820734	7.33	25.2	7.6	0.1	0.488	91.4	5.52	10.39	15.27
9-Feb	19h 46m 21.93s	-19° 54' 13.4"	0.4248622	0.8993244	7.48	25.5	7.5	0.1	0.510	88.8	5.51	10.39	15.26
10-Feb	19h 49m 44.40s	-19° 56' 50.6"	0.4293162	0.9164286	7.62	25.7	7.3	0.1	0.532	86.3	5.51	10.38	15.26
11-Feb	19h 53m 22.38s	-19° 58' 19.7"	0.4335511	0.9333482	7.76	25.9	7.2	0.1	0.553	84.0	5.51	10.38	15.25
12-Feb	19h 57m 14.51s	-19° 58' 39.3"	0.4375581	0.9500524	7.90	26.0	7.1	0.0	0.572	81.7	5.51	10.38	15.25
13-Feb	20h 01m 19.50s	-19° 57' 48.0"	0.4413291	0.9665157	8.04	26.1	7.0	0.0	0.590	79.6	5.51	10.38	15.26
14-Feb	20h 05m 36.22s	-19° 55' 44.7"	0.4448570	0.9827176	8.17	26.1	6.8	0.0	0.608	77.6	5.51	10.39	15.26
15-Feb	20h 10m 03.63s	-19° 52' 28.3"	0.4481359	0.9986417	8.30	26.1	6.7	0.0	0.624	75.6	5.51	10.39	15.27
16-Feb	20h 14m 40.77s	-19° 47' 58.1"	0.4511603	1.0142753	8.43	26.0	6.6	0.0	0.640	73.7	5.52	10.40	15.29
17-Feb	20h 19m 26.79s	-19° 42' 13.3"	0.4539256	1.0296082	8.56	25.9	6.5	0.0	0.655	71.9	5.52	10.41	15.30
18-Feb	20h 24m 20.91s	-19° 35' 13.4"	0.4564277	1.0446328	8.69	25.8	6.4	0.0	0.669	70.2	5.53	10.42	15.31
19-Feb	20h 29m 22.43s	-19° 26' 57.8"	0.4586632	1.0593436	8.81	25.6	6.3	0.0	0.683	68.5	5.53	10.43	15.33
20-Feb	20h 34m 30.71s	-19° 17' 26.3"	0.4606290	1.0737365	8.93	25.4	6.3	0.0	0.696	66.9	5.54	10.44	15.35
21-Feb	20h 39m 45.19s	-19° 06' 38.4"	0.4623226	1.0878088	9.05	25.1	6.2	0.0	0.708	65.4	5.54	10.46	15.37
22-Feb	20h 45m 05.33s	-18° 54' 34.0"	0.4637420	1.1015589	9.16	24.9	6.1	0.0	0.720	63.9	5.55	10.47	15.40
23-Feb	20h 50m 30.68s	-18° 41' 12.9"	0.4648854	1.1149858	9.27	24.6	6.0	-0.1	0.732	62.4	5.55	10.49	15.42
24-Feb	20h 56m 00.81s	-18° 26' 35.0"	0.4657516	1.1280892	9.38	24.3	6.0	-0.1	0.743	61.0	5.56	10.50	15.45
25-Feb	21h 01m 35.36s	-18° 10' 40.2"	0.4663394	1.1408693	9.49	24.0	5.9	-0.1	0.753	59.6	5.56	10.52	15.48
26-Feb	21h 07m 13.97s	-17° 53' 28.5"	0.4666483	1.1533263	9.59	23.6	5.8	-0.1	0.764	58.2	5.57	10.54	15.51
27-Feb	21h 12m 56.35s	-17° 34' 60.0"	0.4666780	1.1654608	9.69	23.2	5.8	-0.1	0.774	56.8	5.57	10.55	15.54
28-Feb	21h 18m 42.24s	-17° 15' 14.6"	0.4664282	1.1772731	9.79	22.8	5.7	-0.1	0.783	55.5	5.58	10.57	15.57
1-Mar	21h 24m 31.40s	-16° 54' 12.4"	0.4658995	1.1887635	9.89	22.4	5.7	-0.1	0.793	54.2	5.58	10.59	16.00
2-Mar	21h 30m 23.63s	-16° 31' 53.6"	0.4650923	1.1999319	9.98	22.0	5.6	-0.1	0.802	52.9	5.59	11.01	16.04
3-Mar	21h 36m 18.74s	-16° 08' 18.3"	0.4640075	1.2107780	10.07	21.5	5.6	-0.2	0.811	51.6	5.59	11.03	16.08
4-Mar	21h 42m 16.58s	-15° 43' 26.7"	0.4626465	1.2213007	10.16	21.0	5.5	-0.2	0.820	50.3	6.00	11.05	16.11
5-Mar	21h 48m 17.02s	-15° 17' 19.0"	0.4610109	1.2314984	10.24	20.5	5.5	-0.2	0.828	49.0	6.00	11.07	16.15
6-Mar	21h 54m 19.96s	-14° 49' 55.3"	0.4591026	1.2413687	10.32	20.0	5.4	-0.2	0.837	47.7	6.00	11.09	16.19
7-Mar	22h 00m 25.30s	-14° 21' 15.8"	0.4569241	1.2509083	10.40	19.5	5.4	-0.3	0.845	46.4	6.00	11.11	16.23
8-Mar	22h 06m 32.99s	-13° 51' 20.9"	0.4544783	1.2601129	10.48	18.9	5.3	-0.3	0.853	45.0	6.01	11.14	16.28
9-Mar	22h 12m 42.97s	-13° 20' 10.6"	0.4517685	1.2689770	10.55	18.3	5.3	-0.3	0.861	43.7	6.01	11.16	16.32
10-Mar	22h 18m 55.22s	-12° 47' 45.3"	0.4487987	1.2774936	10.62	17.7	5.3	-0.3	0.869	42.4	6.01	11.18	16.36
11-Mar	22h 25m 09.73s	-12° 14' 05.2"	0.4455734	1.2856546	10.69	17.1	5.2	-0.4	0.877	41.0	6.01	11.21	16.41
12-Mar	22h 31m 26.51s	-11° 39' 10.7"	0.4420978	1.2934501	10.76	16.5	5.2	-0.4	0.885	39.6	6.01	11.23	16.45
13-Mar	22h 37m 45.59s	-11° 03' 02.0"	0.4383779	1.3008684	10.82	15.8	5.2	-0.5	0.893	38.2	6.01	11.25	16.50

Date	A.R. Geoc.	Dec. Geoc.	R A.U.	Distance A.U.	Light (m)	El. °	Diam. "	Mag.	Phase	Phase ang°	Rise	Transit	Set
14-Mar	22h 44m 07.00s	-10° 25' 39.7"	0.4344204	1.3078963	10.88	15.1	5.1	-0.5	0.901	36.7	6.02	11.28	16.55
15-Mar	22h 50m 30.80s	-09° 47' 04.1"	0.4302332	1.3145181	10.93	14.4	5.1	-0.6	0.909	35.2	6.02	11.30	17.00
16-Mar	22h 56m 57.06s	-09° 07' 15.7"	0.4258249	1.3207165	10.98	13.7	5.1	-0.6	0.916	33.7	6.02	11.33	17.05
17-Mar	23h 03m 25.84s	-08° 26' 15.3"	0.4212056	1.3264713	11.03	13.0	5.1	-0.7	0.924	32.1	6.02	11.35	17.10
18-Mar	23h 09m 57.23s	-07° 44' 03.4"	0.4163866	1.3317603	11.08	12.2	5.1	-0.7	0.931	30.4	6.02	11.38	17.15
19-Mar	23h 16m 31.33s	-07° 00' 41.0"	0.4113805	1.3365583	11.12	11.4	5.0	-0.8	0.939	28.7	6.02	11.41	17.21
20-Mar	23h 23m 08.25s	-06° 16' 08.8"	0.4062018	1.3408372	11.15	10.6	5.0	-0.9	0.946	26.9	6.02	11.43	17.26
21-Mar	23h 29m 48.09s	-05° 30' 28.2"	0.4008667	1.3445661	11.18	9.8	5.0	-0.9	0.953	25.1	6.01	11.46	17.32
22-Mar	23h 36m 30.96s	-04° 43' 40.2"	0.3953933	1.3477104	11.21	9.0	5.0	-1.0	0.960	23.2	6.01	11.49	17.37
23-Mar	23h 43m 16.99s	-03° 55' 46.6"	0.3898020	1.3502326	11.23	8.1	5.0	-1.1	0.966	21.2	6.01	11.52	17.43
24-Mar	23h 50m 06.29s	-03° 06' 49.0"	0.3841157	1.3520915	11.24	7.2	5.0	-1.2	0.973	19.1	6.01	11.55	17.49
25-Mar	23h 56m 58.96s	-02° 16' 49.6"	0.3783597	1.3532422	11.25	6.3	5.0	-1.3	0.978	16.9	6.01	11.57	17.55
26-Mar	00h 03m 55.10s	-01° 25' 50.9"	0.3725623	1.3536365	11.26	5.4	5.0	-1.4	0.984	14.6	6.01	12.01	18.01
27-Mar	00h 10m 54.80s	-00° 33' 55.7"	0.3667546	1.3532229	11.25	4.5	5.0	-1.5	0.989	12.2	6.01	12.04	18.08
28-Mar	00h 17m 58.11s	+00° 18' 52.5"	0.3609711	1.3519468	11.24	3.5	5.0	-1.6	0.993	9.8	6.01	12.07	18.14
29-Mar	00h 25m 05.06s	+01° 12' 29.6"	0.3552492	1.3497509	11.23	2.6	5.0	-1.8	0.996	7.3	6.01	12.10	18.21
30-Mar	00h 32m 15.63s	+02° 06' 51.1"	0.3496298	1.3465760	11.20	1.7	5.0	-1.9	0.998	4.9	6.01	12.13	18.27
31-Mar	00h 39m 29.76s	+03° 01' 51.5"	0.3441567	1.3423619	11.16	1.1	5.0	-2.0	0.999	3.2	6.01	12.17	18.34
1-Apr	00h 46m 47.33s	+03° 57' 24.8"	0.3388767	1.3370485	11.12	1.3	5.0	-2.0	0.999	3.9	6.01	12.20	18.41
2-Apr	00h 54m 08.12s	+04° 53' 23.6"	0.3338391	1.3305775	11.07	2.1	5.1	-1.9	0.997	6.4	6.01	12.23	18.47
3-Apr	01h 01m 31.87s	+05° 49' 40.1"	0.3290949	1.3228937	11.00	3.1	5.1	-1.9	0.993	9.5	6.01	12.27	18.54
4-Apr	01h 08m 58.21s	+06° 46' 05.2"	0.3246964	1.3139478	10.93	4.2	5.1	-1.8	0.987	12.9	6.01	12.30	19.01
5-Apr	01h 16m 26.64s	+07° 42' 29.0"	0.3206958	1.3036982	10.84	5.2	5.2	-1.8	0.979	16.5	6.01	12.34	19.09
6-Apr	01h 23m 56.57s	+08° 38' 40.7"	0.3171438	1.2921137	10.75	6.3	5.2	-1.7	0.969	20.3	6.01	12.38	19.16
7-Apr	01h 31m 27.32s	+09° 34' 28.7"	0.3140885	1.2791762	10.64	7.4	5.3	-1.6	0.956	24.2	6.01	12.41	19.23
8-Apr	01h 38m 58.03s	+10° 29' 40.5"	0.3115736	1.2648826	10.52	8.5	5.3	-1.5	0.941	28.2	6.02	12.45	19.30
9-Apr	01h 46m 27.79s	+11° 24' 03.3"	0.3096369	1.2492473	10.39	9.5	5.4	-1.5	0.922	32.4	6.02	12.48	19.37
10-Apr	01h 53m 55.54s	+12° 17' 24.0"	0.3083083	1.2323031	10.25	10.6	5.5	-1.4	0.901	36.6	6.02	12.52	19.44
11-Apr	02h 01m 20.15s	+13° 09' 29.6"	0.3076093	1.2141023	10.10	11.6	5.5	-1.3	0.878	40.9	6.02	12.55	19.50
12-Apr	02h 08m 40.40s	+14° 00' 07.2"	0.3075510	1.1947159	9.94	12.6	5.6	-1.2	0.852	45.3	6.02	12.59	19.57
13-Apr	02h 15m 55.05s	+14° 49' 04.7"	0.3081345	1.1742326	9.77	13.5	5.7	-1.2	0.824	49.7	6.02	13.02	20.03
14-Apr	02h 23m 02.80s	+15° 36' 10.8"	0.3093503	1.1527569	9.59	14.5	5.8	-1.1	0.793	54.1	6.02	13.05	20.10
15-Apr	02h 30m 02.36s	+16° 21' 15.3"	0.3111789	1.1304059	9.40	15.3	5.9	-1.0	0.762	58.4	6.02	13.08	20.15
16-Apr	02h 36m 52.46s	+17° 04' 09.2"	0.3135916	1.1073060	9.21	16.1	6.1	-0.9	0.729	62.8	6.02	13.11	20.21
17-Apr	02h 43m 31.88s	+17° 44' 44.9"	0.3165520	1.0835897	9.01	16.9	6.2	-0.8	0.694	67.1	6.02	13.13	20.26
18-Apr	02h 49m 59.42s	+18° 22' 56.4"	0.3200175	1.0593918	8.81	17.6	6.3	-0.7	0.660	71.4	6.02	13.16	20.31
19-Apr	02h 56m 13.97s	+18° 58' 38.7"	0.3239406	1.0348463	8.61	18.2	6.5	-0.6	0.625	75.6	6.02	13.18	20.36
20-Apr	03h 02m 14.48s	+19° 31' 48.3"	0.3282708	1.0100838	8.40	18.8	6.7	-0.5	0.590	79.7	6.01	13.20	20.40
21-Apr	03h 07m 59.98s	+20° 02' 22.9"	0.3329562	0.9852292	8.20	19.2	6.8	-0.4	0.555	83.7	6.01	13.22	20.43
22-Apr	03h 13m 29.54s	+20° 30' 21.2"	0.3379445	0.9604003	7.99	19.6	7.0	-0.3	0.520	87.7	6.00	13.23	20.47
23-Apr	03h 18m 42.32s	+20° 55' 42.5"	0.3431843	0.9357070	7.78	19.9	7.2	-0.2	0.486	91.6	6.00	13.24	20.49
24-Apr	03h 23m 37.54s	+21° 18' 27.1"	0.3486260	0.9112504	7.58	20.2	7.4	0.0	0.453	95.4	5.59	13.25	20.52
25-Apr	03h 28m 14.48s	+21° 38' 35.6"	0.3542222	0.8871232	7.38	20.3	7.6	0.1	0.421	99.1	5.58	13.25	20.53
26-Apr	03h 32m 32.45s	+21° 56' 09.2"	0.3599287	0.8634098	7.18	20.4	7.8	0.2	0.389	102.8	5.57	13.26	20.55
27-Apr	03h 36m 30.85s	+22° 11' 09.3"	0.3657039	0.8401869	6.99	20.4	8.0	0.4	0.359	106.4	5.56	13.25	20.55
28-Apr	03h 40m 09.09s	+22° 23' 37.2"	0.3715098	0.8175244	6.80	20.3	8.2	0.5	0.329	109.9	5.55	13.25	20.56
29-Apr	03h 43m 26.68s	+22° 33' 34.7"	0.3773115	0.7954858	6.62	20.1	8.5	0.7	0.301	113.5	5.53	13.24	20.55
30-Apr	03h 46m 23.17s	+22° 41' 03.5"	0.3830771	0.7741293	6.44	19.8	8.7	0.8	0.274	116.9	5.52	13.23	20.54
1-May	03h 48m 58.18s	+22° 46' 05.3"	0.3887780	0.7535084	6.27	19.4	8.9	1.0	0.247	120.4	5.50	13.21	20.53
2-May	03h 51m 11.42s	+22° 48' 41.8"	0.3943882	0.7336725	6.10	19.0	9.2	1.2	0.222	123.8	5.48	13.19	20.51
3-May	03h 53m 02.73s	+22° 48' 54.9"	0.3998845	0.7146677	5.94	18.4	9.4	1.4	0.198	127.2	5.46	13.17	20.49
4-May	03h 54m 32.01s	+22° 46' 46.5"	0.4052461	0.6965372	5.79	17.8	9.7	1.6	0.175	130.6	5.43	13.15	20.45
5-May	03h 55m 39.35s	+22° 42' 19.1"	0.4104543	0.6793216	5.65	17.0	9.9	1.8	0.153	134.0	5.41	13.12	20.42
6-May	03h 56m 24.95s	+22° 35' 35.1"	0.4154927	0.6630593	5.52	16.2	10.1	2.0	0.132	137.4	5.38	13.08	20.38
7-May	03h 56m 49.21s	+22° 26' 37.8"	0.4203466	0.6477865	5.39	15.3	10.4	2.3	0.113	140.8	5.35	13.05	20.33
8-May	03h 56m 52.71s	+22° 15' 31.1"	0.4250029	0.6335376	5.27	14.3	10.6	2.5	0.095	144.2	5.32	13.00	20.28
9-May	03h 56m 36.22s	+22° 02' 19.5"	0.4294501	0.6203444	5.16	13.2	10.8	2.8	0.078	147.6	5.29	12.56	20.22
10-May	03h 56m 00.77s	+21° 47' 08.9"	0.4336781	0.6082368	5.06	12.0	11.1	3.1	0.063	151.0	5.26	12.51	20.16
11-May	03h 55m 07.57s	+21° 30' 06.2"	0.4376777	0.5972418	4.97	10.8	11.3	3.4	0.049	154.5	5.22	12.47	20.10
12-May	03h 53m 58.08s	+21° 11' 19.9"	0.4414411	0.5873835	4.89	9.4	11.4	3.7	0.037	157.9	5.18	12.41	20.03
13-May	03h 52m 33.97s	+20° 50' 59.7"	0.4449614	0.5786824	4.81	8.1	11.6	4.1	0.026	161.4	5.14	12.36	19.56
14-May	03h 50m 57.12s	+20° 29' 17.2"	0.4482324	0.5711553	4.75	6.7	11.8	4.4	0.017	164.9	5.11	12.30	19.49
15-May	03h 49m 09.59s	+20° 06' 25.2"	0.4512488	0.5648148	4.70	5.2	11.9	4.8	0.010	168.3	5.06	12.24	19.41
16-May	03h 47m 13.60s	+19° 42' 38.2"	0.4540059	0.5596684	4.65	3.7	12.0	5.2	0.005	171.7	5.02	12.19	19.34
17-May	03h 45m 11.45s	+19° 18' 11.9"	0.4564998	0.5557189	4.62	2.2	12.1	5.6	0.002	175.0	4.58	12.13	19.26
18-May	03h 43m 05.54s	+18° 53' 23.0"	0.4587269	0.5529639	4.60	1.0	12.2	6.0	0.000	177.7	4.54	12.07	19.18
19-May	03h 40m 58.25s	+18° 28' 29.1"	0.4606843	0.5513953	4.59	1.4	12.2	5.8	0.001	176.8	4.49	12.01	19.10
20-May	03h 38m 51.96s	+18° 03' 47.6"	0.4623694	0.5510003	4.58	2.8	12.2	5.5	0.003	173.8	4.45	11.55	19.03
21-May	03h 36m 48.95s	+17° 39' 36.4"	0.4637803	0.5517605	4.59	4.3	12.2	5.1	0.007	170.5	4.41	11.49	18.55
22-May	03h 34m 51.38s	+17° 16' 12.5"	0.4649152	0.5536532	4.60	5.8	12.1	4.7	0.012	167.2	4.37	11.43	18.48
23-May	03h 33m 01.25s	+16° 53' 51.9"	0.4657728	0.5566515	4.63	7.3	12.1	4.3	0.020	163.9	4.32	11.37	18.41
24-May	03h 31m 20.38s	+16° 32' 49.6"	0.4663520	0.5607247	4.66	8.8	12.0	4.0	0.028	160.7	4.28	11.32	18.34
25-May	03h 29m 50.38s	+16° 13' 18.9"	0.4666523	0.5658395	4.71	10.2	11.9	3.7	0.038	157.5	4.24	11.26	18.28
26-May	03h 28m 32.65s	+15° 55' 31.4"	0.4666734	0.5719603	4.76	11.5	11.8	3.4	0.049	154.4	4.20	11.21	18.21
27-May	03h 27m 28.37s	+15° 39' 36.6"	0.4664151	0.5790500	4.82	12.8	11.6	3.2	0.061	151.3	4.16	11.16	18.16
28-May	03h 26m 38.51s	+15° 25' 42.4"	0.4658778	0.5870706	4.88	14.0	11.5	2.9	0.075	148.3	4.12	11.12	18.10
29-May	03h 26m 03.85s	+15° 13' 54.5"	0.4650621	0.5959837	4.96	15.1	11.3	2.7	0.089	1			

Date	A.R. Geoc.	Dec. Geoc.	R A.U.	Distance A.U.	Light (m)	El. °	Diam. "	Mag.	Phase	Phase ang°	Rise	Transit	Set
30-May	03h 25m 45.00s	+15° 04' 17.0"	0.4639689	0.6057514	5.04	16.2	11.1	2.5	0.104	142.4	4.05	11.03	18.01
31-May	03h 25m 42.38s	+14° 56' 52.3"	0.4625995	0.6163359	5.13	17.2	10.9	2.3	0.119	139.6	4.02	10.59	17.56
1-Jun	03h 25m 56.31s	+14° 51' 41.1"	0.4609555	0.6277007	5.22	18.1	10.7	2.1	0.136	136.8	3.58	10.56	17.53
2-Jun	03h 26m 26.95s	+14° 48' 42.9"	0.4590390	0.6398103	5.32	19.0	10.5	1.9	0.152	134.1	3.55	10.52	17.49
3-Jun	03h 27m 14.39s	+14° 47' 55.9"	0.4568524	0.6526305	5.43	19.8	10.3	1.8	0.169	131.4	3.52	10.49	17.46
4-Jun	03h 28m 18.60s	+14° 49' 17.3"	0.4543985	0.6661287	5.54	20.4	10.1	1.6	0.187	128.8	3.49	10.46	17.44
5-Jun	03h 29m 39.53s	+14° 52' 43.5"	0.4516808	0.6802737	5.66	21.1	9.9	1.5	0.205	126.2	3.46	10.44	17.42
6-Jun	03h 31m 17.05s	+14° 58' 10.0"	0.4487033	0.6950357	5.78	21.6	9.7	1.4	0.223	123.6	3.44	10.42	17.40
7-Jun	03h 33m 11.00s	+15° 05' 31.9"	0.4454704	0.7103866	5.91	22.1	9.5	1.2	0.242	121.1	3.41	10.40	17.39
8-Jun	03h 35m 21.21s	+15° 14' 43.8"	0.4419874	0.7262990	6.04	22.5	9.3	1.1	0.261	118.6	3.39	10.38	17.38
9-Jun	03h 37m 47.50s	+15° 25' 39.8"	0.4382603	0.7427471	6.18	22.8	9.1	1.0	0.280	116.1	3.37	10.37	17.38
10-Jun	03h 40m 29.68s	+15° 38' 13.9"	0.4342959	0.7597058	6.32	23.1	8.9	0.9	0.299	113.7	3.34	10.36	17.37
11-Jun	03h 43m 27.59s	+15° 52' 19.6"	0.4301020	0.7771503	6.46	23.3	8.7	0.8	0.319	111.2	3.33	10.35	17.38
12-Jun	03h 46m 41.06s	+16° 07' 50.6"	0.4256874	0.7950565	6.61	23.4	8.5	0.7	0.339	108.8	3.31	10.34	17.38
13-Jun	03h 50m 09.96s	+16° 24' 40.0"	0.4210620	0.8134001	6.76	23.4	8.3	0.6	0.360	106.3	3.29	10.34	17.39
14-Jun	03h 53m 54.17s	+16° 42' 41.1"	0.4162374	0.8321561	6.92	23.4	8.1	0.5	0.380	103.8	3.28	10.34	17.40
15-Jun	03h 57m 53.61s	+17° 01' 47.0"	0.4112261	0.8512992	7.08	23.4	7.9	0.4	0.401	101.4	3.27	10.34	17.42
16-Jun	04h 02m 08.22s	+17° 21' 50.5"	0.4060427	0.8708022	7.24	23.3	7.7	0.3	0.423	98.8	3.25	10.34	17.44
17-Jun	04h 06m 37.97s	+17° 42' 44.3"	0.4007034	0.8906367	7.41	23.1	7.6	0.3	0.445	96.3	3.25	10.35	17.46
18-Jun	04h 11m 22.85s	+18° 04' 21.2"	0.3952264	0.9107715	7.57	22.8	7.4	0.2	0.468	93.7	3.24	10.36	17.49
19-Jun	04h 16m 22.88s	+18° 26' 33.4"	0.3896322	0.9311730	7.74	22.5	7.2	0.1	0.491	91.1	3.23	10.37	17.51
20-Jun	04h 21m 38.11s	+18° 49' 13.1"	0.3839437	0.9518038	7.91	22.2	7.1	0.0	0.514	88.4	3.23	10.38	17.55
21-Jun	04h 27m 08.59s	+19° 12' 12.3"	0.3781864	0.9726227	8.09	21.8	6.9	-0.1	0.538	85.6	3.23	10.40	17.58
22-Jun	04h 32m 54.37s	+19° 35' 22.4"	0.3723885	0.9935838	8.26	21.3	6.8	-0.2	0.563	82.8	3.23	10.42	18.02
23-Jun	04h 38m 55.53s	+19° 58' 34.6"	0.3665814	1.0146359	8.44	20.8	6.6	-0.3	0.588	79.9	3.24	10.44	18.06
24-Jun	04h 45m 12.11s	+20° 21' 39.8"	0.3607996	1.0357221	8.61	20.2	6.5	-0.3	0.614	76.9	3.24	10.47	18.10
25-Jun	04h 51m 44.14s	+20° 44' 28.4"	0.3550805	1.0567787	8.79	19.6	6.4	-0.4	0.640	73.8	3.25	10.49	18.14
26-Jun	04h 58m 31.63s	+21° 06' 50.1"	0.3494652	1.0777356	8.96	18.9	6.2	-0.5	0.666	70.6	3.27	10.52	18.19
27-Jun	05h 05m 34.52s	+21° 28' 34.7"	0.3439976	1.0985150	9.13	18.2	6.1	-0.6	0.693	67.3	3.28	10.55	18.24
28-Jun	05h 12m 52.70s	+21° 49' 30.9"	0.3387245	1.1190318	9.31	17.4	6.0	-0.7	0.720	63.9	3.30	10.59	18.29
29-Jun	05h 20m 25.96s	+22° 09' 27.6"	0.3336953	1.1391939	9.47	16.6	5.9	-0.8	0.747	60.4	3.32	11.03	18.34
30-Jun	05h 28m 13.98s	+22° 28' 13.0"	0.3289612	1.1589022	9.64	15.7	5.8	-0.9	0.774	56.8	3.35	11.07	18.40
1-Jul	05h 36m 16.32s	+22° 45' 35.1"	0.3245742	1.1780520	9.80	14.8	5.7	-1.0	0.800	53.1	3.37	11.11	18.45
2-Jul	05h 44m 32.38s	+23° 01' 22.2"	0.3205866	1.1965340	9.95	13.8	5.6	-1.1	0.826	49.2	3.41	11.15	18.51
3-Jul	05h 53m 01.39s	+23° 15' 22.2"	0.3170491	1.2142370	10.10	12.8	5.5	-1.1	0.851	45.3	3.44	11.20	18.56
4-Jul	06h 01m 42.41s	+23° 27' 23.8"	0.3140096	1.2310495	10.24	11.8	5.5	-1.2	0.875	41.3	3.48	11.25	19.02
5-Jul	06h 10m 34.34s	+23° 37' 16.0"	0.3115118	1.2468632	10.37	10.7	5.4	-1.3	0.898	37.3	3.52	11.30	19.08
6-Jul	06h 19m 35.86s	+23° 44' 49.0"	0.3095931	1.2615761	10.49	9.6	5.3	-1.4	0.918	33.2	3.57	11.35	19.14
7-Jul	06h 28m 45.54s	+23° 49' 54.1"	0.3082832	1.2750954	10.60	8.5	5.3	-1.5	0.937	29.1	4.02	11.40	19.19
8-Jul	06h 38m 01.77s	+23° 52' 24.1"	0.3076033	1.2873412	10.71	7.3	5.2	-1.6	0.953	24.9	4.07	11.46	19.25
9-Jul	06h 47m 22.89s	+23° 52' 13.3"	0.3075643	1.2982486	10.80	6.2	5.2	-1.7	0.967	20.8	4.12	11.51	19.30
10-Jul	06h 56m 47.13s	+23° 49' 18.2"	0.3081669	1.3077703	10.88	5.0	5.1	-1.8	0.979	16.8	4.18	11.57	19.35
11-Jul	07h 06m 12.74s	+23° 43' 36.9"	0.3094013	1.3158775	10.94	3.9	5.1	-1.9	0.987	12.9	4.24	12.02	19.40
12-Jul	07h 15m 37.98s	+23° 35' 09.7"	0.3112476	1.3225603	11.00	2.8	5.1	-2.0	0.994	9.2	4.30	12.08	19.44
13-Jul	07h 25m 01.21s	+23° 23' 58.6"	0.3136771	1.3278271	11.04	1.9	5.1	-2.1	0.997	6.2	4.37	12.13	19.49
14-Jul	07h 34m 20.86s	+23° 10' 07.4"	0.3166531	1.3317033	11.08	1.5	5.1	-2.1	0.998	4.8	4.43	12.18	19.53
15-Jul	07h 43m 35.54s	+22° 53' 41.2"	0.3201327	1.3342289	11.10	1.9	5.0	-2.0	0.997	6.1	4.50	12.24	19.57
16-Jul	07h 52m 43.99s	+22° 34' 46.5"	0.3240684	1.3354561	11.11	2.8	5.0	-1.9	0.994	8.8	4.56	12.29	20.00
17-Jul	08h 01m 45.13s	+22° 13' 30.9"	0.3284097	1.3354467	11.11	3.8	5.0	-1.8	0.989	11.9	5.03	12.34	20.04
18-Jul	08h 10m 38.06s	+21° 50' 02.4"	0.3331046	1.3342693	11.10	4.9	5.0	-1.7	0.983	15.1	5.10	12.39	20.06
19-Jul	08h 19m 22.04s	+21° 24' 29.6"	0.3381008	1.3319967	11.08	6.0	5.1	-1.5	0.975	18.2	5.17	12.43	20.09
20-Jul	08h 27m 56.49s	+20° 57' 01.4"	0.3433470	1.3287038	11.05	7.0	5.1	-1.4	0.966	21.2	5.23	12.48	20.11
21-Jul	08h 36m 20.99s	+20° 27' 46.8"	0.3487936	1.3244657	11.02	8.1	5.1	-1.3	0.956	24.1	5.30	12.52	20.14
22-Jul	08h 44m 35.21s	+19° 56' 54.6"	0.3543935	1.3193557	10.97	9.1	5.1	-1.2	0.946	26.9	5.36	12.57	20.15
23-Jul	08h 52m 38.99s	+19° 24' 33.5"	0.3601022	1.3134448	10.92	10.1	5.1	-1.1	0.935	29.6	5.43	13.01	20.17
24-Jul	09h 00m 32.22s	+18° 50' 51.8"	0.3658786	1.3068005	10.87	11.0	5.1	-1.0	0.923	32.1	5.49	13.05	20.18
25-Jul	09h 08m 14.89s	+18° 15' 57.5"	0.3716845	1.2994863	10.81	12.0	5.2	-0.9	0.912	34.6	5.55	13.08	20.20
26-Jul	09h 15m 47.07s	+17° 39' 58.2"	0.3774852	1.2915611	10.74	12.9	5.2	-0.8	0.899	37.0	6.02	13.12	20.20
27-Jul	09h 23m 08.87s	+17° 03' 01.2"	0.3832491	1.2830794	10.67	13.8	5.2	-0.8	0.887	39.2	6.08	13.15	20.21
28-Jul	09h 30m 20.44s	+16° 25' 13.2"	0.3889473	1.2740910	10.60	14.7	5.3	-0.7	0.875	41.4	6.13	13.18	20.22
29-Jul	09h 37m 21.96s	+15° 46' 40.6"	0.3945542	1.2646411	10.52	15.5	5.3	-0.6	0.863	43.5	6.19	13.21	20.22
30-Jul	09h 44m 13.65s	+15° 07' 29.6"	0.4000465	1.2547708	10.44	16.3	5.4	-0.6	0.851	45.5	6.25	13.24	20.22
31-Jul	09h 50m 55.72s	+14° 27' 45.6"	0.4054035	1.2445166	10.35	17.1	5.4	-0.5	0.838	47.4	6.30	13.27	20.22
1-Aug	09h 57m 28.38s	+13° 47' 34.1"	0.4106067	1.2339117	10.26	17.9	5.5	-0.4	0.826	49.3	6.35	13.29	20.22
2-Aug	10h 03m 51.87s	+13° 06' 59.9"	0.4156396	1.2229851	10.17	18.6	5.5	-0.4	0.814	51.1	6.40	13.32	20.22
3-Aug	10h 10m 06.41s	+12° 26' 07.8"	0.4204876	1.2117631	10.08	19.3	5.6	-0.3	0.802	52.8	6.45	13.34	20.21
4-Aug	10h 16m 12.20s	+11° 45' 02.3"	0.4251377	1.2002685	9.98	20.0	5.6	-0.3	0.790	54.5	6.50	13.36	20.21
5-Aug	10h 22m 09.47s	+11° 03' 47.4"	0.4295783	1.1885217	9.89	20.6	5.7	-0.3	0.778	56.2	6.55	13.38	20.20
6-Aug	10h 27m 58.38s	+10° 22' 27.1"	0.4337994	1.1765405	9.79	21.2	5.7	-0.2	0.766	57.8	6.59	13.40	20.19
7-Aug	10h 33m 39.13s	+09° 41' 05.3"	0.4377920	1.1643405	9.68	21.8	5.8	-0.2	0.754	59.4	7.03	13.41	20.18
8-Aug	10h 39m 11.87s	+08° 59' 45.5"	0.4415481	1.1519354	9.58	22.4	5.8	-0.1	0.743	61.0	7.07	13.43	20.17
9-Aug	10h 44m 36.73s	+08° 18' 31.3"	0.4450609	1.1393370	9.48	22.9	5.9	-0.1	0.731	62.5	7.11	13.44	20.16
10-Aug	10h 49m 53.85s	+07° 37' 25.9"	0.4483243	1.1265559	9.37	23.4	6.0	-0.1	0.719	64.0	7.15	13.46	20.15
11-Aug	10h 55m 03.31s	+06° 56' 32.8"	0.4513329	1.1136011	9.26	23.9	6.0	0.0	0.707	65.5	7.19	13.47	20.13
12-Aug	11h 00m 05.20s	+06° 15' 55.0"	0.4540821	1.1004806	9.15	24.4	6.1	0.0	0.695	67.0	7.23	13.48	20.12
13-Aug	11h 04m 59.55s	+05° 35' 36.0"	0.4565680	1.0872014	9.04	24.8	6.2	0.0	0.683	68.5	7.26	13.49	20.10
14-Aug	11h 09m 46.38s	+04° 55' 38.7"	0.4587870	1.0737699	8.93	25.2	6.3	0.1	0.671	70.0	7.29	13.49	

Date	A.R. Geoc.	Dec. Geoc.	R A.U.	Distance A.U.	Light (m)	El. °	Diam. "	Mag.	Phase	Phase ang°	Rise	Transit	Set
15-Aug	11h 14m 25.69s	+04° 16' 06.5"	0.4607362	1.0601917	8.82	25.6	6.3	0.1	0.659	71.5	7.32	13.50	20.07
16-Aug	11h 18m 57.44s	+03° 37' 02.6"	0.4624131	1.0464722	8.70	25.9	6.4	0.1	0.646	73.0	7.35	13.51	20.05
17-Aug	11h 23m 21.54s	+02° 58' 30.3"	0.4638157	1.0326165	8.59	26.2	6.5	0.1	0.634	74.5	7.38	13.51	20.03
18-Aug	11h 27m 37.90s	+02° 20' 33.2"	0.4649423	1.0186295	8.47	26.5	6.6	0.1	0.621	76.0	7.40	13.51	20.01
19-Aug	11h 31m 46.35s	+01° 43' 14.6"	0.4657915	1.0045167	8.36	26.7	6.7	0.2	0.608	77.5	7.43	13.51	19.59
20-Aug	11h 35m 46.72s	+01° 06' 38.5"	0.4663624	0.9902836	8.24	26.9	6.8	0.2	0.594	79.1	7.45	13.51	19.57
21-Aug	11h 39m 38.77s	+00° 30' 48.6"	0.4666543	0.9759366	8.12	27.1	6.9	0.2	0.581	80.7	7.47	13.51	19.54
22-Aug	11h 43m 22.23s	-00° 04' 11.0"	0.4666669	0.9614829	8.00	27.2	7.0	0.2	0.566	82.4	7.49	13.51	19.52
23-Aug	11h 46m 56.79s	-00° 38' 15.8"	0.4664003	0.9469309	7.88	27.3	7.1	0.3	0.552	84.0	7.50	13.51	19.50
24-Aug	11h 50m 22.09s	-01° 11' 21.2"	0.4658546	0.9322902	7.75	27.4	7.2	0.3	0.537	85.8	7.52	13.50	19.47
25-Aug	11h 53m 37.70s	-01° 43' 22.3"	0.4650305	0.9175722	7.63	27.4	7.3	0.3	0.521	87.6	7.53	13.49	19.44
26-Aug	11h 56m 43.15s	-02° 14' 13.6"	0.4639290	0.9027903	7.51	27.3	7.4	0.3	0.505	89.4	7.54	13.48	19.42
27-Aug	11h 59m 37.92s	-02° 43' 49.4"	0.4625513	0.8879599	7.39	27.2	7.6	0.4	0.489	91.3	7.55	13.47	19.39
28-Aug	12h 02m 21.41s	-03° 12' 03.5"	0.4608991	0.8730991	7.26	27.1	7.7	0.4	0.472	93.3	7.55	13.46	19.36
29-Aug	12h 04m 52.99s	-03° 38' 49.0"	0.4589744	0.8582292	7.14	26.9	7.8	0.4	0.454	95.3	7.55	13.44	19.33
30-Aug	12h 07m 11.93s	-04° 03' 58.7"	0.4567797	0.8433746	7.02	26.7	8.0	0.5	0.435	97.4	7.55	13.42	19.29
31-Aug	12h 09m 17.48s	-04° 27' 24.4"	0.4543179	0.8285642	6.89	26.3	8.1	0.5	0.416	99.6	7.54	13.40	19.26
1-Sep	12h 11m 08.81s	-04° 48' 57.7"	0.4515923	0.8138309	6.77	26.0	8.3	0.6	0.396	102.0	7.53	13.38	19.23
2-Sep	12h 12m 45.04s	-05° 08' 29.2"	0.4486070	0.7992133	6.65	25.5	8.4	0.6	0.376	104.4	7.52	13.36	19.19
3-Sep	12h 14m 05.25s	-05° 25' 48.8"	0.4453665	0.7847555	6.53	25.0	8.6	0.7	0.355	106.9	7.51	13.33	19.15
4-Sep	12h 15m 08.48s	-05° 40' 45.7"	0.4418761	0.7705083	6.41	24.4	8.7	0.8	0.332	109.6	7.48	13.30	19.11
5-Sep	12h 15m 53.77s	-05° 53' 08.6"	0.4381417	0.7565298	6.29	23.7	8.9	0.8	0.310	112.4	7.46	13.27	19.07
6-Sep	12h 16m 20.15s	-06° 02' 45.3"	0.4341702	0.7428864	6.18	22.9	9.1	0.9	0.286	115.3	7.43	13.23	19.03
7-Sep	12h 16m 26.71s	-06° 09' 23.4"	0.4299695	0.7296531	6.07	22.0	9.2	1.1	0.262	118.4	7.39	13.19	18.59
8-Sep	12h 16m 12.61s	-06° 12' 50.1"	0.4255483	0.7169147	5.96	21.1	9.4	1.2	0.238	121.6	7.35	13.15	18.54
9-Sep	12h 15m 37.12s	-06° 12' 52.8"	0.4209168	0.7047661	5.86	20.0	9.5	1.3	0.213	125.0	7.30	13.10	18.50
10-Sep	12h 14m 39.72s	-06° 09' 19.6"	0.4160863	0.6933129	5.77	18.8	9.7	1.5	0.188	128.6	7.25	13.05	18.45
11-Sep	12h 13m 20.14s	-06° 01' 59.4"	0.4110696	0.6826715	5.68	17.5	9.8	1.7	0.163	132.4	7.19	12.59	18.40
12-Sep	12h 11m 38.46s	-05° 50' 43.4"	0.4058812	0.6729688	5.60	16.2	10.0	1.9	0.138	136.4	7.13	12.54	18.35
13-Sep	12h 09m 35.16s	-05° 35' 25.2"	0.4005374	0.6643416	5.53	14.7	10.1	2.2	0.114	140.5	7.06	12.48	18.30
14-Sep	12h 07m 11.24s	-05° 16' 02.7"	0.3950566	0.6569351	5.46	13.1	10.2	2.5	0.091	144.8	6.58	12.41	18.25
15-Sep	12h 04m 28.27s	-04° 52' 38.5"	0.3894592	0.6509007	5.41	11.4	10.3	2.8	0.070	149.3	6.50	12.34	18.19
16-Sep	12h 01m 28.49s	-04° 25' 21.3"	0.3837683	0.6463930	5.38	9.6	10.4	3.2	0.051	154.0	6.41	12.27	18.14
17-Sep	11h 58m 14.82s	-03° 54' 27.0"	0.3780093	0.6435663	5.35	7.9	10.4	3.6	0.034	158.7	6.32	12.20	18.09
18-Sep	11h 54m 50.86s	-03° 20' 18.8"	0.3722107	0.6425691	5.34	6.1	10.5	4.1	0.021	163.4	6.23	12.13	18.03
19-Sep	11h 51m 20.85s	-02° 43' 28.1"	0.3664039	0.6435394	5.35	4.4	10.4	4.6	0.011	167.7	6.13	12.05	17.58
20-Sep	11h 47m 49.56s	-02° 04' 33.7"	0.3606234	0.6465983	5.38	3.2	10.4	4.9	0.006	170.9	6.04	11.58	17.53
21-Sep	11h 44m 22.16s	-01° 24' 20.8"	0.3549070	0.6518446	5.42	3.1	10.3	4.9	0.006	171.2	5.54	11.51	17.48
22-Sep	11h 41m 04.02s	-00° 43' 39.5"	0.3492956	0.6593495	5.48	4.1	10.2	4.6	0.011	168.2	5.44	11.43	17.44
23-Sep	11h 38m 00.49s	-00° 03' 22.5"	0.3438333	0.6691514	5.56	5.6	10.0	4.0	0.021	163.4	5.35	11.37	17.39
24-Sep	11h 35m 16.67s	+00° 35' 37.2"	0.3385669	0.6812533	5.67	7.3	9.9	3.5	0.036	158.0	5.26	11.30	17.35
25-Sep	11h 32m 57.22s	+01° 12' 28.7"	0.3335460	0.6956206	5.78	8.9	9.7	2.9	0.057	152.3	5.18	11.24	17.31
26-Sep	11h 31m 06.14s	+01° 46' 25.3"	0.3288218	0.7121807	5.92	10.5	9.4	2.4	0.084	146.4	5.10	11.19	17.28
27-Sep	11h 29m 46.71s	+02° 16' 46.3"	0.3244463	0.7308247	6.08	11.9	9.2	1.9	0.115	140.4	5.03	11.14	17.25
28-Sep	11h 29m 01.32s	+02° 42' 58.1"	0.3204718	0.7514090	6.25	13.2	8.9	1.5	0.150	134.4	4.57	11.09	17.22
29-Sep	11h 28m 51.52s	+03° 04' 34.7"	0.3169488	0.7737596	6.43	14.4	8.7	1.1	0.190	128.4	4.52	11.05	17.19
30-Sep	11h 29m 17.97s	+03° 21' 18.1"	0.3139254	0.7976764	6.63	15.4	8.4	0.8	0.232	122.4	4.48	11.02	17.17
1-Oct	11h 30m 20.56s	+03° 32' 57.5"	0.3114448	0.8229385	6.84	16.2	8.2	0.5	0.277	116.4	4.44	10.59	17.15
2-Oct	11h 31m 58.46s	+03° 39' 29.2"	0.3095443	0.8493096	7.06	16.8	7.9	0.2	0.324	110.6	4.42	10.57	17.13
3-Oct	11h 34m 10.24s	+03° 40' 55.7"	0.3082535	0.8765447	7.29	17.3	7.7	0.0	0.372	104.8	4.40	10.56	17.12
4-Oct	11h 36m 53.98s	+03° 37' 24.6"	0.3075931	0.9043958	7.52	17.7	7.4	-0.2	0.421	99.1	4.39	10.55	17.10
5-Oct	11h 40m 07.40s	+03° 29' 07.9"	0.3075738	0.9326185	7.75	17.9	7.2	-0.3	0.469	93.6	4.39	10.54	17.09
6-Oct	11h 43m 47.97s	+03° 16' 21.1"	0.3081959	0.9609779	7.99	17.9	7.0	-0.5	0.516	88.2	4.39	10.54	17.08
7-Oct	11h 47m 53.03s	+02° 59' 22.4"	0.3094493	0.9892531	8.23	17.9	6.8	-0.6	0.562	82.9	4.41	10.54	17.08
8-Oct	11h 52m 19.88s	+02° 38' 31.6"	0.3113140	1.0172423	8.46	17.7	6.6	-0.7	0.605	77.9	4.43	10.55	17.07
9-Oct	11h 57m 05.84s	+02° 14' 09.7"	0.3137607	1.0447656	8.69	17.5	6.4	-0.7	0.647	73.0	4.45	10.56	17.06
10-Oct	12h 02m 08.37s	+01° 46' 38.3"	0.3167527	1.0716669	8.91	17.1	6.3	-0.8	0.685	68.3	4.48	10.57	17.06
11-Oct	12h 07m 25.06s	+01° 16' 18.6"	0.3202470	1.0978149	9.13	16.7	6.1	-0.8	0.721	63.7	4.51	10.59	17.05
12-Oct	12h 12m 53.73s	+00° 43' 31.5"	0.3241958	1.1231027	9.34	16.2	6.0	-0.9	0.754	59.4	4.55	11.00	17.05
13-Oct	12h 18m 32.39s	+00° 08' 36.8"	0.3285487	1.1474469	9.54	15.7	5.9	-0.9	0.784	55.3	4.58	11.02	17.05
14-Oct	12h 24m 19.28s	-00° 28' 06.8"	0.3332536	1.1707855	9.74	15.1	5.7	-1.0	0.812	51.4	5.02	11.04	17.04
15-Oct	12h 30m 12.86s	-01° 06' 21.9"	0.3382581	1.1930755	9.92	14.5	5.6	-1.0	0.837	47.7	5.07	11.06	17.04
16-Oct	12h 36m 11.80s	-01° 45' 52.6"	0.3435112	1.2142910	10.10	13.9	5.5	-1.0	0.859	44.1	5.11	11.08	17.04
17-Oct	12h 42m 14.97s	-02° 26' 24.3"	0.3489631	1.2344200	10.26	13.2	5.4	-1.0	0.879	40.8	5.16	11.10	17.03
18-Oct	12h 48m 21.44s	-03° 07' 44.0"	0.3545669	1.2534622	10.42	12.5	5.4	-1.0	0.896	37.6	5.20	11.12	17.03
19-Oct	12h 54m 30.42s	-03° 49' 39.7"	0.3602783	1.2714266	10.57	11.9	5.3	-1.0	0.912	34.6	5.25	11.15	17.03
20-Oct	13h 00m 41.25s	-04° 32' 01.1"	0.3660561	1.2883297	10.71	11.2	5.2	-1.1	0.925	31.7	5.30	11.17	17.02
21-Oct	13h 06m 53.44s	-05° 14' 38.8"	0.3718624	1.3041933	10.85	10.4	5.2	-1.1	0.937	29.0	5.35	11.19	17.02
22-Oct	13h 13m 06.57s	-05° 57' 24.4"	0.3776624	1.3190430	10.97	9.7	5.1	-1.1	0.948	26.5	5.40	11.21	17.02
23-Oct	13h 19m 20.31s	-06° 40' 10.7"	0.3834247	1.3329072	11.08	9.0	5.0	-1.1	0.957	24.0	5.45	11.24	17.01
24-Oct	13h 25m 34.44s	-07° 22' 51.2"	0.3891205	1.3458158	11.19	8.3	5.0	-1.1	0.965	21.7	5.50	11.26	17.01
25-Oct	13h 31m 48.78s	-08° 05' 20.1"	0.3947242	1.3577994	11.29	7.6	5.0	-1.1	0.971	19.5	5.54	11.28	17.01
26-Oct	13h 38m 03.21s	-08° 47' 32.5"	0.4002127	1.3688888	11.38	6.9	4.9	-1.1	0.977	17.4	5.59	11.31	17.01
27-Oct	13h 44m 17.67s	-09° 29' 23.8"	0.4055653	1.3791140	11.47	6.2	4.9	-1.1	0.982	15.4	6.04	11.33	17.00
28-Oct	13h 50m 32.11s	-10° 10' 50.0"	0.4107635	1.3885044	11.55	5.5	4.8	-1.2	0.986	13.5	6.09	11.35	17.00
29-Oct	13h 56m 46.53s	-10° 51' 47.7"	0.4157910	1.3970883	11.62	4.8	4.8	-1.2	0.990	11.6	6.14	11.37	17.00
30-Oct	14h 03m 00.97s	-11° 32' 13.6"	0.4206331	1.4048925	11.68	4.2	4.8	-1.2	0.993	9.9			

Date	A.R. Geoc.	Dec. Geoc.	R A.U.	Distance A.U.	Light (m)	El. °	Diam. "	Mag.	Phase	Phase ang°	Rise	Transit	Set
31-Oct	14h 09m 15.45s	-12° 12' 05.0"	0.4252769	1.4119424	11.74	3.5	4.8	-1.2	0.995	8.2	6.24	11.42	16.59
1-Nov	14h 15m 30.04s	-12° 51' 19.3"	0.4297110	1.4182619	11.79	2.8	4.7	-1.3	0.997	6.6	6.28	11.44	16.59
2-Nov	14h 21m 44.80s	-13° 29' 54.1"	0.4339253	1.4238731	11.84	2.2	4.7	-1.3	0.998	5.0	6.33	11.47	16.59
3-Nov	14h 27m 59.83s	-14° 07' 47.5"	0.4379107	1.4287967	11.88	1.5	4.7	-1.3	0.999	3.5	6.38	11.49	16.59
4-Nov	14h 34m 15.19s	-14° 44' 57.3"	0.4416595	1.4330514	11.92	0.9	4.7	-1.3	1.000	2.1	6.43	11.51	16.59
5-Nov	14h 40m 30.98s	-15° 21' 21.6"	0.4451648	1.4366545	11.95	0.4	4.7	-1.4	1.000	0.9	6.47	11.54	16.59
6-Nov	14h 46m 47.33s	-15° 56' 59.7"	0.4484204	1.4396216	11.97	0.5	4.7	-1.3	1.000	1.1	6.52	11.56	16.59
7-Nov	14h 53m 04.23s	-16° 31' 48.9"	0.4514212	1.4419666	11.99	1.0	4.7	-1.3	1.000	2.3	6.57	11.58	16.59
8-Nov	14h 59m 21.84s	-17° 05' 47.9"	0.4541624	1.4437020	12.01	1.6	4.7	-1.2	0.999	3.6	7.01	12.01	16.59
9-Nov	15h 05m 40.22s	-17° 38' 55.3"	0.4566401	1.4448389	12.02	2.2	4.7	-1.1	0.998	4.9	7.06	12.03	16.59
10-Nov	15h 11m 59.47s	-18° 11' 09.6"	0.4588509	1.4453867	12.02	2.8	4.7	-1.1	0.997	6.1	7.11	12.05	16.59
11-Nov	15h 18m 19.64s	-18° 42' 29.6"	0.4607918	1.4453537	12.02	3.4	4.7	-1.0	0.996	7.4	7.15	12.08	17.00
12-Nov	15h 24m 40.83s	-19° 12' 53.7"	0.4624604	1.4447469	12.02	4.0	4.7	-1.0	0.994	8.6	7.20	12.10	17.00
13-Nov	15h 31m 03.08s	-19° 42' 20.7"	0.4638545	1.4435720	12.01	4.6	4.7	-0.9	0.993	9.8	7.24	12.13	17.00
14-Nov	15h 37m 26.45s	-20° 10' 49.2"	0.4649726	1.4418335	11.99	5.2	4.7	-0.9	0.991	11.0	7.29	12.15	17.01
15-Nov	15h 43m 51.00s	-20° 38' 18.0"	0.4658133	1.4395348	11.97	5.7	4.7	-0.9	0.989	12.2	7.33	12.18	17.01
16-Nov	15h 50m 16.75s	-21° 04' 45.6"	0.4663756	1.4366785	11.95	6.3	4.7	-0.8	0.986	13.4	7.38	12.20	17.02
17-Nov	15h 56m 43.74s	-21° 30' 10.8"	0.4666589	1.4332656	11.92	6.8	4.7	-0.8	0.984	14.6	7.42	12.23	17.03
18-Nov	16h 03m 11.98s	-21° 54' 32.3"	0.4666630	1.4292967	11.89	7.4	4.7	-0.8	0.981	15.8	7.46	12.25	17.04
19-Nov	16h 09m 41.46s	-22° 17' 48.6"	0.4663877	1.4247708	11.85	7.9	4.7	-0.7	0.978	17.0	7.51	12.28	17.04
20-Nov	16h 16m 12.17s	-22° 39' 58.6"	0.4658334	1.4196865	11.81	8.5	4.7	-0.7	0.975	18.3	7.55	12.30	17.05
21-Nov	16h 22m 44.09s	-23° 01' 00.7"	0.4650008	1.4140409	11.76	9.0	4.8	-0.7	0.971	19.5	7.59	12.33	17.06
22-Nov	16h 29m 17.18s	-23° 20' 53.7"	0.4638907	1.4078304	11.71	9.6	4.8	-0.7	0.968	20.7	8.03	12.36	17.08
23-Nov	16h 35m 51.37s	-23° 39' 36.2"	0.4625045	1.4010506	11.65	10.1	4.8	-0.6	0.964	22.0	8.07	12.38	17.09
24-Nov	16h 42m 26.59s	-23° 57' 06.8"	0.4608439	1.3936958	11.59	10.6	4.8	-0.6	0.959	23.3	8.11	12.41	17.10
25-Nov	16h 49m 02.75s	-24° 13' 24.1"	0.4589108	1.3857597	11.53	11.2	4.9	-0.6	0.955	24.6	8.15	12.44	17.12
26-Nov	16h 55m 39.71s	-24° 28' 26.8"	0.4567078	1.3772350	11.45	11.7	4.9	-0.6	0.950	25.9	8.19	12.46	17.13
27-Nov	17h 02m 17.35s	-24° 42' 13.5"	0.4542377	1.3681137	11.38	12.2	4.9	-0.6	0.944	27.3	8.23	12.49	17.15
28-Nov	17h 08m 55.50s	-24° 54' 42.9"	0.4515040	1.3583866	11.30	12.7	5.0	-0.6	0.938	28.7	8.26	12.52	17.17
29-Nov	17h 15m 33.95s	-25° 05' 53.6"	0.4485107	1.3480442	11.21	13.2	5.0	-0.6	0.932	30.2	8.30	12.54	17.19
30-Nov	17h 22m 12.48s	-25° 15' 44.5"	0.4452624	1.3370759	11.12	13.7	5.0	-0.6	0.925	31.7	8.33	12.57	17.21
1-Dec	17h 28m 50.83s	-25° 24' 14.2"	0.4417643	1.3254707	11.02	14.2	5.1	-0.5	0.918	33.2	8.37	13.00	17.23
2-Dec	17h 35m 28.69s	-25° 31' 21.6"	0.4380224	1.3132168	10.92	14.7	5.1	-0.5	0.910	34.8	8.40	13.02	17.25
3-Dec	17h 42m 05.71s	-25° 37' 05.7"	0.4340437	1.3003022	10.82	15.2	5.2	-0.5	0.902	36.5	8.43	13.05	17.27
4-Dec	17h 48m 41.50s	-25° 41' 25.4"	0.4298359	1.2867141	10.70	15.7	5.2	-0.5	0.893	38.2	8.46	13.08	17.30
5-Dec	17h 55m 15.60s	-25° 44' 19.8"	0.4254080	1.2724398	10.58	16.1	5.3	-0.5	0.883	40.0	8.49	13.10	17.32
6-Dec	18h 01m 47.50s	-25° 45' 48.3"	0.4207701	1.2574666	10.46	16.6	5.3	-0.5	0.872	41.9	8.51	13.13	17.35
7-Dec	18h 08m 16.62s	-25° 45' 50.2"	0.4159335	1.2417820	10.33	17.0	5.4	-0.5	0.860	43.9	8.54	13.15	17.37
8-Dec	18h 14m 42.29s	-25° 44' 25.2"	0.4109111	1.2253743	10.19	17.5	5.5	-0.5	0.848	46.0	8.56	13.18	17.40
9-Dec	18h 21m 03.78s	-25° 41' 33.2"	0.4057176	1.2082329	10.05	17.9	5.6	-0.5	0.834	48.1	8.58	13.20	17.42
10-Dec	18h 27m 20.22s	-25° 37' 14.4"	0.4003692	1.1903490	9.90	18.3	5.7	-0.6	0.819	50.4	9.00	13.23	17.45
11-Dec	18h 33m 30.65s	-25° 31' 29.6"	0.3948843	1.1717163	9.75	18.6	5.7	-0.6	0.802	52.8	9.02	13.25	17.48
12-Dec	18h 39m 34.00s	-25° 24' 19.6"	0.3892836	1.1523317	9.59	19.0	5.8	-0.6	0.784	55.4	9.03	13.27	17.51
13-Dec	18h 45m 29.01s	-25° 15' 46.1"	0.3835900	1.1321966	9.42	19.3	5.9	-0.6	0.765	58.0	9.05	13.29	17.53
14-Dec	18h 51m 14.29s	-25° 05' 51.2"	0.3778292	1.1113177	9.24	19.6	6.1	-0.6	0.743	60.9	9.05	13.30	17.56
15-Dec	18h 56m 48.25s	-24° 54' 37.9"	0.3720297	1.0897089	9.06	19.8	6.2	-0.5	0.720	63.9	9.06	13.32	17.58
16-Dec	19h 02m 09.11s	-24° 42' 09.8"	0.3662230	1.0673929	8.88	20.0	6.3	-0.5	0.695	67.1	9.06	13.33	18.00
17-Dec	19h 07m 14.86s	-24° 28' 31.4"	0.3604438	1.0444030	8.69	20.2	6.4	-0.5	0.668	70.4	9.06	13.34	18.02
18-Dec	19h 12m 03.25s	-24° 13' 48.3"	0.3547298	1.0207855	8.49	20.3	6.6	-0.5	0.638	74.0	9.06	13.35	18.04
19-Dec	19h 16m 31.76s	-23° 58' 07.3"	0.3491222	0.9966024	8.29	20.3	6.7	-0.5	0.606	77.8	9.05	13.35	18.06
20-Dec	19h 20m 37.63s	-23° 41' 36.1"	0.3436650	0.9719341	8.08	20.2	6.9	-0.4	0.571	81.8	9.04	13.35	18.07
21-Dec	19h 24m 17.80s	-23° 24' 24.0"	0.3384054	0.9468825	7.88	20.1	7.1	-0.4	0.534	86.1	9.02	13.35	18.08
22-Dec	19h 27m 29.01s	-23° 06' 41.3"	0.3333928	0.9215740	7.67	19.8	7.3	-0.3	0.494	90.7	9.00	13.34	18.08
23-Dec	19h 30m 07.74s	-22° 48' 39.8"	0.3286784	0.8961626	7.45	19.4	7.5	-0.2	0.452	95.5	8.57	13.32	18.08
24-Dec	19h 32m 10.38s	-22° 30' 32.1"	0.3243144	0.8708322	7.24	18.9	7.7	-0.1	0.408	100.6	8.54	13.30	18.07
25-Dec	19h 33m 33.28s	-22° 12' 31.9"	0.3203530	0.8457981	7.04	18.2	8.0	0.1	0.362	106.0	8.49	13.27	18.05
26-Dec	19h 34m 12.97s	-21° 54' 53.3"	0.3168448	0.8213078	6.83	17.4	8.2	0.3	0.315	111.7	8.45	13.23	18.02
27-Dec	19h 34m 06.34s	-21° 37' 50.4"	0.3138375	0.7976391	6.63	16.4	8.4	0.5	0.268	117.7	8.39	13.19	17.59
28-Dec	19h 33m 10.97s	-21° 21' 36.5"	0.3113743	0.7750960	6.45	15.2	8.7	0.8	0.221	123.9	8.33	13.13	17.55
29-Dec	19h 31m 25.47s	-21° 06' 23.9"	0.3094923	0.7540017	6.27	13.9	8.9	1.2	0.176	130.4	8.26	13.07	17.49
30-Dec	19h 28m 49.85s	-20° 52' 22.8"	0.3082208	0.7346878	6.11	12.3	9.2	1.6	0.133	137.2	8.18	13.00	17.43
31-Dec	19h 25m 25.89s	-20° 39' 41.0"	0.3075802	0.7174810	5.97	10.6	9.4	2.1	0.095	144.1	8.10	12.53	17.36

Legenda :

A.R., Dec. = apparent coordinates

R. = distance from the Sun in A.U.

Distance = distance from the Earth in A.U.

Light = Distance in minutes

El. = elongation from the Sun in °

Diam. = diameter in "

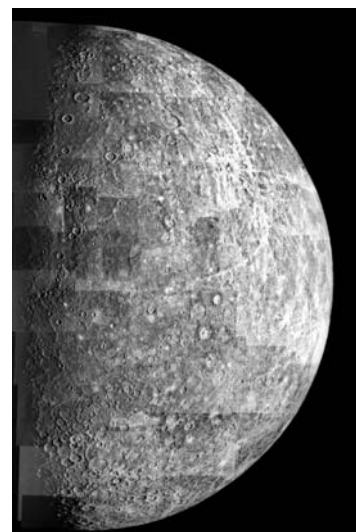
Mag. = magnitude

Times of rising and setting of the planet for Rome (42°N, 12°E), in U.T.+1

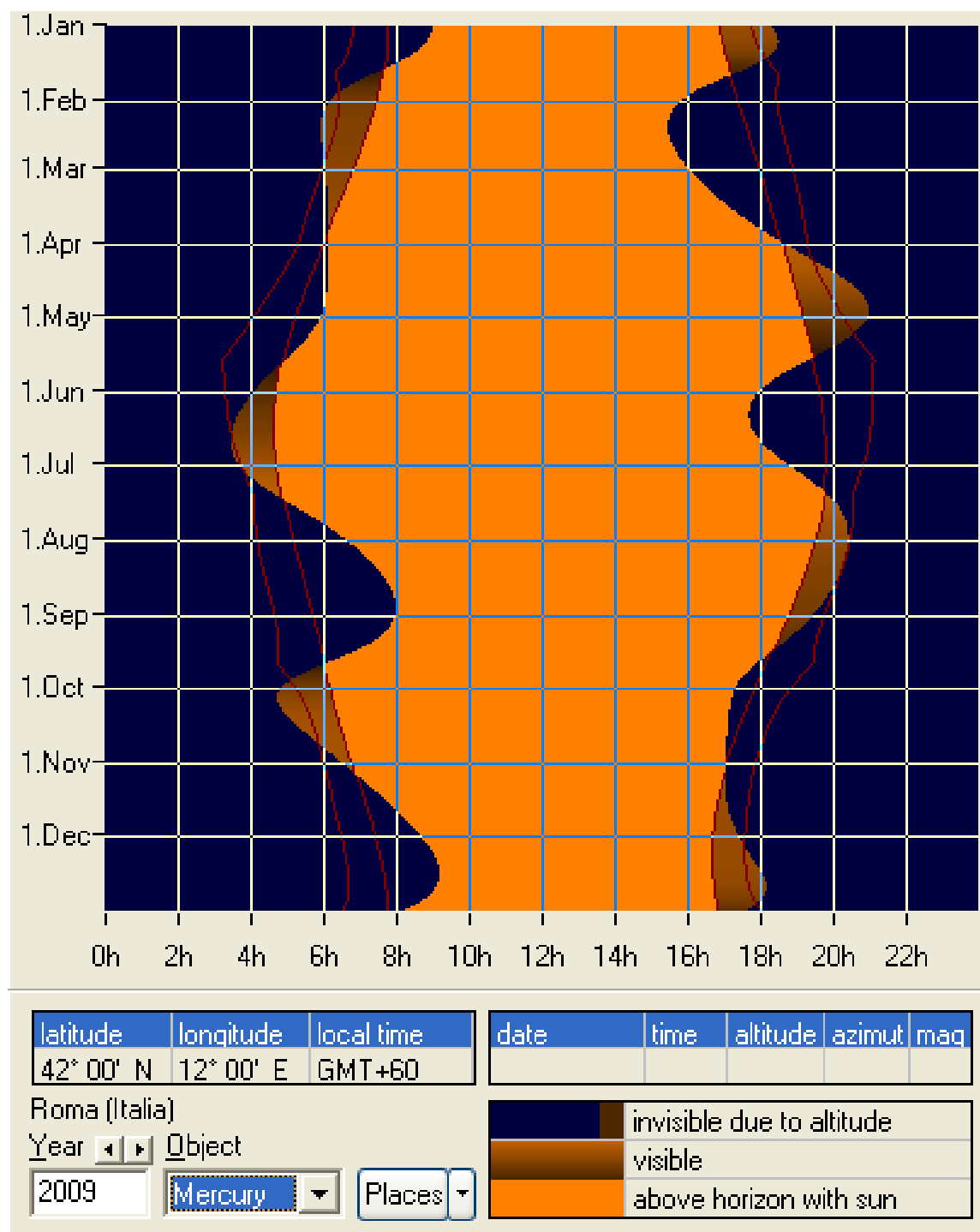
PHENOMENA OF MERCURY

Perihelion	13/01/2009	14.56	0.30749	A.U.
Perihelion	11/04/2009	14.11	0.30750	A.U.
Perihelion	08/07/2009	13.28	0.30750	A.U.
Perihelion	04/10/2009	12.43	0.30750	A.U.
Perihelion	31/12/2009	11.59	0.30750	A.U.
Aphelion	26/02/2009	14.33	0.46670	A.U.
Aphelion	25/05/2009	13.49	0.46670	A.U.
Aphelion	21/08/2009	13.05	0.46670	A.U.
Aphelion	17/11/2009	12.21	0.46670	A.U.
Perigee	21/01/2009	23.11	0.66251	A.U.
Perigee	19/05/2009	20.09	0.55099	A.U.
Perigee	18/09/2009	00.25	0.64257	A.U.
Apogee	25/03/2009	22.56	1.35364	A.U.
Apogee	16/07/2009	12.26	1.33562	A.U.
Apogee	10/11/2009	10.37	1.44544	A.U.
Maxima magnitude	31/03/2009	16.05	-2.0	Mag
Maxima magnitude	13/07/2009	17.42	-2.1	Mag
Maxima magnitude	04/11/2009	22.45	-1.4	Mag
Minima magnitude	20/01/2009	14.27	4.6	Mag
Minima magnitude	18/05/2009	08.42	6.0	Mag
Minima magnitude	20/09/2009	12.12	5.0	Mag
Minima magnitude	04/12/2009	10.39	-0.5	Mag
Maxima est elongation	04/01/2009	13.31	19.3	°
Maxima est elongation	26/04/2009	07.48	20.4	°
Maxima est elongation	24/08/2009	16.02	27.4	°
Maxima est elongation	18/12/2009	17.06	20.3	°
Maxima west elongation	13/02/2009	20.53	26.1	°
Maxima west elongation	13/06/2009	11.52	23.5	°
Maxima west elongation	06/10/2009	01.43	17.9	°
Inferior conjunction	20/01/2009	15.59		
Inferior conjunction	18/05/2009	10.02		
Inferior conjunction	20/09/2009	10.05		
Superior conjunction	31/03/2009	03.29		
Superior conjunction	14/07/2009	02.16		
Superior conjunction	05/11/2009	08.02		
Retrograde motion	11/01/2009	06.41		
Retrograde motion	07/05/2009	16.15		
Retrograde motion	06/09/2009	19.46		
Retrograde motion	26/12/2009	08.42		
Direct motion	01/02/2009	02.06		
Direct motion	30/05/2009	15.50		
Direct motion	28/09/2009	18.32		
Maxima phase angle	20/01/2009	13.49	170.1	°
Maxima phase angle	18/05/2009	07.42	178.0	°
Maxima phase angle	20/09/2009	13.20	171.5	°
Minima phase angle	31/03/2009	06.04	3.2	°
Minima phase angle	14/07/2009	00.27	4.9	°
Minima phase angle	05/11/2009	10.41	0.5	°

© (5)



VISIBILITY OF MERCURY



Visibility of Mercury during the year

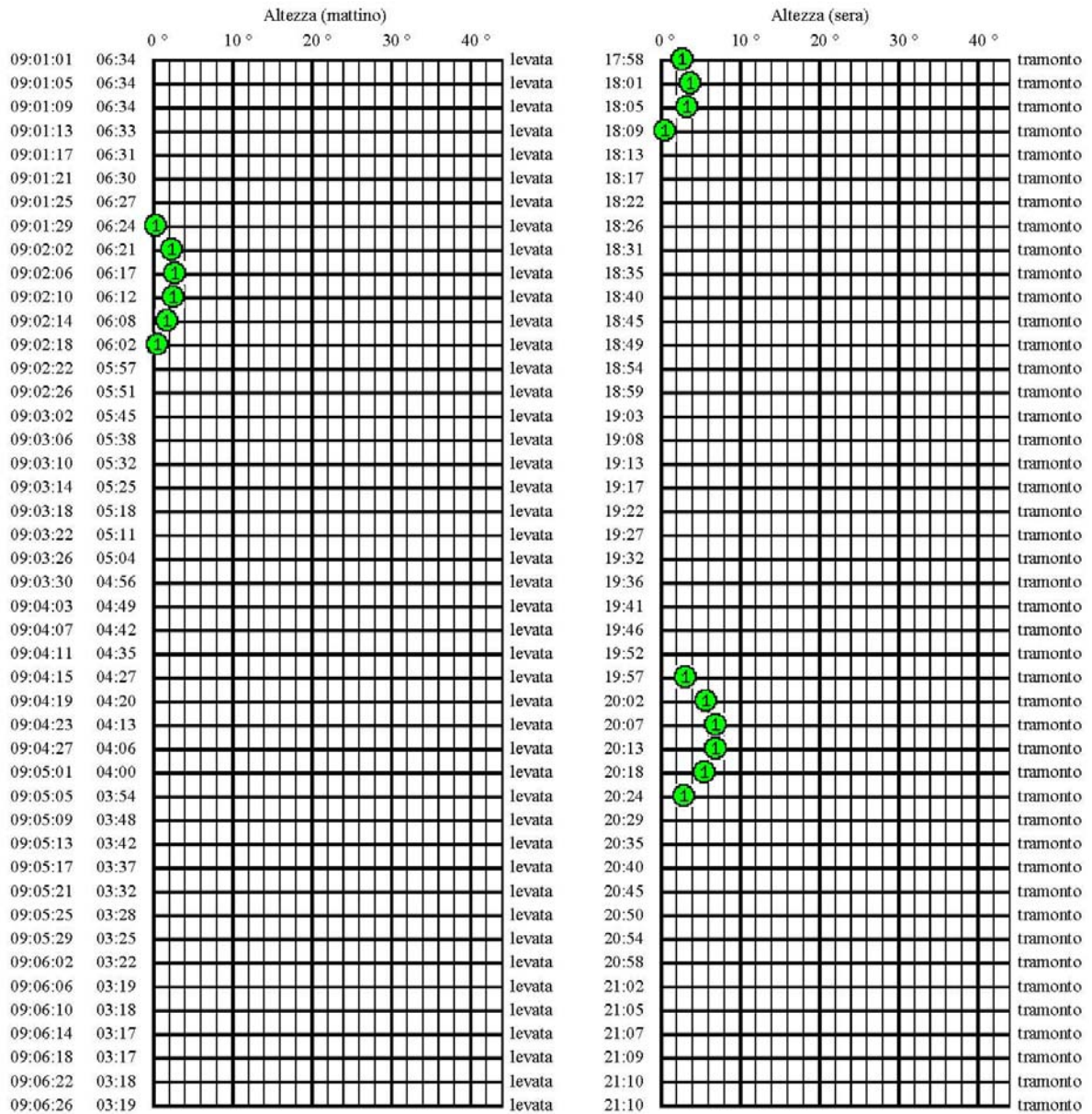
The external red lines show in what periods of the year the planet is sufficiently distant from the Sun to be able to be observed easily. The exact dates are in the following tables.

Altezza ai crepuscoli

di Mercurio

nel momento il cui il Sole è 12 ° sotto l'orizzonte

Postazione: IT:Roma 42:00 N, 12:00 E (UT +01:00)

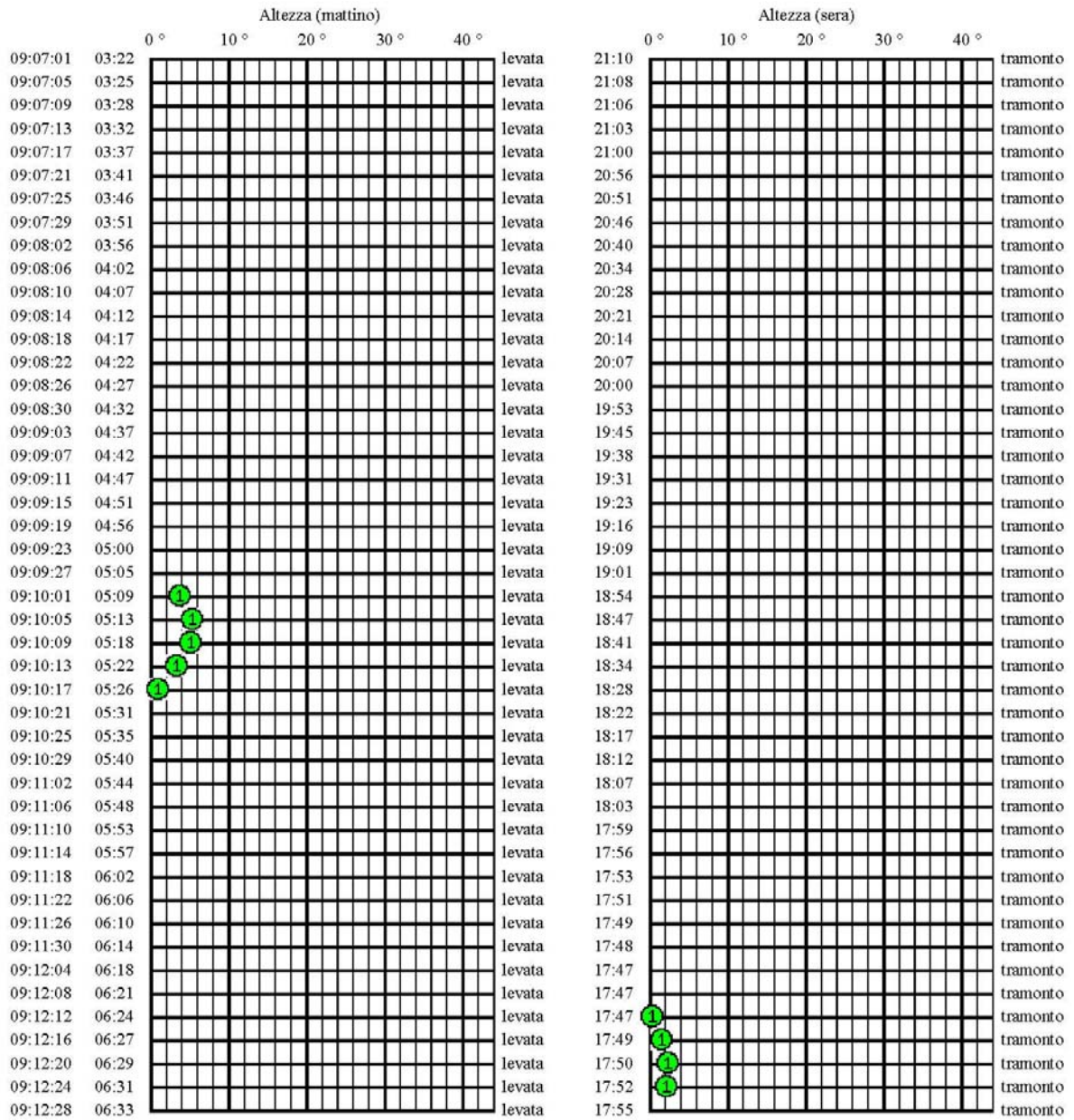


Altezza ai crepuscoli

di Mercurio

nel momento il cui il Sole è 12 ° sotto l'orizzonte

Postazione: IT:Roma 42:00 N, 12:00 E (UT +01:00)



Height in the twilights. The Sun is 12° under the horizon

Date	Morning twilight				Evening twilight			
	Times	Alt	Az	Elong	Times	Alt	Az	Elong
2009:01:01	06:34	-25.9	96.7	18.9	17:58	2.7	237.6	19.0
2009:01:05	06:34	-25.3	94.8	19.3	18:01	3.7	239.0	19.3
2009:01:09	06:34	-23.4	94.2	18.1	18:05	3.3	241.8	17.8
2009:01:13	06:33	-19.9	95.6	14.4	18:09	0.6	246.2	13.8
2009:01:17	06:31	-14.6	99.4	8.0	18:13	-4.9	252.0	7.1
2009:01:21	06:30	-8.6	105.1	3.6	18:17	-12.5	258.3	4.2
2009:01:25	06:27	-3.2	110.9	10.7	18:22	-20.2	263.9	11.6
2009:01:29	06:24	0.4	115.5	17.3	18:26	-26.4	268.2	18.0
2009:02:02	06:21	2.2	118.5	21.8	18:31	-30.8	271.2	22.3
2009:02:06	06:17	2.8	119.8	24.5	18:35	-33.6	273.0	24.7
2009:02:10	06:12	2.5	119.9	25.8	18:40	-35.2	274.2	25.9
2009:02:14	06:08	1.7	119.0	26.1	18:45	-35.9	274.9	26.1
2009:02:18	06:02	0.6	117.4	25.7	18:49	-35.8	275.6	25.6
2009:02:22	05:57	-0.7	115.1	24.8	18:54	-35.3	276.2	24.7
2009:02:26	05:51	-2.0	112.3	23.5	18:59	-34.2	276.8	23.3
2009:03:02	05:45	-3.5	109.1	21.9	19:03	-32.8	277.6	21.6
2009:03:06	05:38	-4.9	105.5	19.9	19:08	-31.0	278.5	19.6
2009:03:10	05:32	-6.3	101.4	17.6	19:13	-28.8	279.6	17.3
2009:03:14	05:25	-7.7	96.9	15.0	19:17	-26.3	280.7	14.6
2009:03:18	05:18	-9.1	92.1	12.1	19:22	-23.4	281.9	11.6
2009:03:22	05:11	-10.4	86.8	8.8	19:27	-20.2	283.2	8.3
2009:03:26	05:04	-11.7	81.1	5.2	19:32	-16.6	284.5	4.7
2009:03:30	04:56	-12.8	74.9	1.6	19:36	-12.7	285.7	1.2
2009:04:03	04:49	-13.9	68.5	3.3	19:41	-8.5	286.9	3.9
2009:04:07	04:42	-14.8	61.8	7.5	19:46	-4.3	288.0	8.2
2009:04:11	04:35	-15.4	55.3	11.7	19:52	-0.3	289.0	12.4
2009:04:15	04:27	-15.9	49.3	15.4	19:57	3.1	290.1	16.0
2009:04:19	04:20	-16.1	44.2	18.3	20:02	5.6	291.2	18.6
2009:04:23	04:13	-16.1	40.3	20.0	20:07	6.9	292.4	20.1
2009:04:27	04:06	-16.1	37.9	20.4	20:13	6.9	294.0	20.3
2009:05:01	04:00	-15.9	37.0	19.4	20:18	5.6	295.9	19.1
2009:05:05	03:54	-15.7	37.6	16.9	20:24	2.8	298.3	16.4
2009:05:09	03:48	-15.2	39.9	13.1	20:29	-1.2	301.3	12.2
2009:05:13	03:42	-14.5	43.4	7.9	20:35	-6.2	305.0	6.9
2009:05:17	03:37	-13.4	47.9	2.1	20:40	-11.7	309.3	1.2
2009:05:21	03:32	-11.9	52.7	4.5	20:45	-17.1	314.1	5.6
2009:05:25	03:28	-10.2	57.1	10.3	20:50	-21.7	319.2	11.3
2009:05:29	03:25	-8.4	60.7	15.2	20:54	-25.1	324.1	16.0
2009:06:02	03:22	-6.6	63.2	19.1	20:58	-27.3	328.4	19.6
2009:06:06	03:19	-5.1	64.6	21.7	21:02	-28.3	332.0	22.0
2009:06:10	03:18	-3.8	65.0	23.1	21:05	-28.3	334.5	23.2
2009:06:14	03:17	-2.7	64.5	23.4	21:07	-27.6	335.9	23.4
2009:06:18	03:17	-2.1	63.2	22.8	21:09	-26.2	336.2	22.6
2009:06:22	03:18	-1.8	61.3	21.3	21:10	-24.3	335.4	20.9
2009:06:26	03:19	-2.1	58.8	18.9	21:10	-22.0	333.5	18.3
2009:06:30	03:21	-2.9	55.8	15.6	21:10	-19.5	330.5	14.9

Date	Morning twilight				Evening twilight			
	Times	Alt	Az	Elong	Times	Alt	Az	Elong
2009:07:01	03:22	-3.3	55.0	14.7	21:10	-18.8	329.6	14.0
2009:07:05	03:25	-5.0	51.7	10.6	21:08	-16.1	325.5	9.8
2009:07:09	03:28	-7.3	48.4	6.1	21:06	-13.4	320.6	5.2
2009:07:13	03:32	-10.1	45.3	1.8	21:03	-10.8	315.4	1.5
2009:07:17	03:37	-13.3	42.8	3.9	21:00	-8.6	310.1	4.7
2009:07:21	03:41	-16.5	40.8	8.2	20:56	-6.8	304.8	8.9
2009:07:25	03:46	-19.8	39.6	12.1	20:51	-5.3	299.7	12.8
2009:07:29	03:51	-22.9	39.1	15.6	20:46	-4.2	294.8	16.2
2009:08:02	03:56	-25.9	39.3	18.7	20:40	-3.3	290.2	19.2
2009:08:06	04:02	-28.6	40.0	21.3	20:34	-2.8	285.9	21.7
2009:08:10	04:07	-31.1	41.4	23.5	20:28	-2.5	281.8	23.8
2009:08:14	04:12	-33.3	43.3	25.2	20:21	-2.4	278.1	25.5
2009:08:18	04:17	-35.1	45.7	26.5	20:14	-2.6	274.8	26.7
2009:08:22	04:22	-36.4	48.7	27.2	20:07	-2.9	272.0	27.3
2009:08:26	04:27	-37.1	52.2	27.3	20:00	-3.6	269.7	27.3
2009:08:30	04:32	-37.0	56.1	26.6	19:53	-4.5	268.1	26.4
2009:09:03	04:37	-35.8	60.5	24.9	19:45	-5.7	267.6	24.5
2009:09:07	04:42	-33.3	65.2	21.9	19:38	-7.4	268.3	21.3
2009:09:11	04:47	-29.1	70.1	17.3	19:31	-9.5	270.6	16.5
2009:09:15	04:51	-23.1	74.9	11.1	19:23	-12.0	274.7	10.1
2009:09:19	04:56	-15.5	79.3	4.2	19:16	-14.5	280.3	3.4
2009:09:23	05:00	-7.5	83.1	5.9	19:09	-16.5	286.1	6.9
2009:09:27	05:05	-0.8	86.1	12.1	19:01	-17.6	290.5	12.9
2009:10:01	05:09	3.6	88.4	16.3	18:54	-18.0	292.5	16.7
2009:10:05	05:13	5.4	90.2	17.9	18:47	-17.8	291.8	17.9
2009:10:09	05:18	5.0	91.6	17.4	18:41	-17.3	289.1	17.2
2009:10:13	05:22	3.3	93.0	15.6	18:34	-16.6	285.1	15.3
2009:10:17	05:26	0.9	94.3	13.1	18:28	-15.8	280.6	12.7
2009:10:21	05:31	-1.8	95.6	10.3	18:22	-15.0	275.8	9.9
2009:10:25	05:35	-4.6	97.0	7.5	18:17	-14.2	271.2	7.1
2009:10:29	05:40	-7.3	98.2	4.7	18:12	-13.3	266.6	4.3
2009:11:02	05:44	-9.9	99.5	2.0	18:07	-12.5	262.3	1.7
2009:11:06	05:48	-12.4	100.6	0.5	18:03	-11.6	258.3	0.9
2009:11:10	05:53	-14.8	101.5	2.9	17:59	-10.6	254.5	3.2
2009:11:14	05:57	-17.0	102.3	5.3	17:56	-9.5	250.9	5.6
2009:11:18	06:02	-19.1	102.8	7.5	17:53	-8.4	247.6	7.8
2009:11:22	06:06	-21.1	103.1	9.7	17:51	-7.2	244.6	9.9
2009:11:26	06:10	-22.9	103.0	11.8	17:49	-5.9	241.9	12.0
2009:11:30	06:14	-24.6	102.7	13.8	17:48	-4.5	239.5	14.1
2009:12:04	06:18	-26.2	102.0	15.8	17:47	-2.9	237.4	16.0
2009:12:08	06:21	-27.4	101.0	17.5	17:47	-1.3	235.7	17.7
2009:12:12	06:24	-28.3	99.8	19.1	17:47	0.2	234.6	19.2
2009:12:16	06:27	-28.6	98.6	20.1	17:49	1.6	234.3	20.1
2009:12:20	06:29	-28.0	97.6	20.2	17:50	2.4	235.0	20.1
2009:12:24	06:31	-26.0	97.6	18.8	17:52	2.1	237.1	18.5
2009:12:28	06:33	-22.2	99.2	14.9	17:55	-0.2	241.2	14.3

Altezza ai crepuscoli

di Mercurio

nel momento il cui il Sole è 18 ° sotto l'orizzonte

Postazione: Roma 42:00 N, 12:00 E (UT +01:00)

Altezza (mattino)							Altezza (sera)								
		0 °	10 °	20 °	30 °	40 °			0 °	10 °	20 °	30 °	40 °		
09:01:01	06:00						levata	18:32							tramonto
09:01:05	06:00						levata	18:35							tramonto
09:01:09	06:00						levata	18:38							tramonto
09:01:13	05:59						levata	18:42							tramonto
09:01:17	05:58						levata	18:46							tramonto
09:01:21	05:56						levata	18:50							tramonto
09:01:25	05:54						levata	18:55							tramonto
09:01:29	05:51						levata	18:59							tramonto
09:02:02	05:48						levata	19:03							tramonto
09:02:06	05:44						levata	19:08							tramonto
09:02:10	05:40						levata	19:13							tramonto
09:02:14	05:35						levata	19:17							tramonto
09:02:18	05:30						levata	19:22							tramonto
09:02:22	05:25						levata	19:26							tramonto
09:02:26	05:19						levata	19:31							tramonto
09:03:02	05:13						levata	19:36							tramonto
09:03:06	05:06						levata	19:41							tramonto
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09:03:14	04:52						levata	19:50							tramonto
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09:03:22	04:37						levata	20:00							tramonto
09:03:26	04:30						levata	20:05							tramonto
09:03:30	04:22						levata	20:11							tramonto
09:04:03	04:14						levata	20:16							tramonto
09:04:07	04:06						levata	20:22							tramonto
09:04:11	03:58						levata	20:28							tramonto
09:04:15	03:50						levata	20:34							tramonto
09:04:19	03:42						levata	20:40							tramonto
09:04:23	03:35						levata	20:46							tramonto
09:04:27	03:27						levata	20:52							tramonto
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09:05:21	02:45						levata	21:32							tramonto
09:05:25	02:40						levata	21:38							tramonto
09:05:29	02:35						levata	21:44							tramonto
09:06:02	02:31						levata	21:49							tramonto
09:06:06	02:27						levata	21:54							tramonto
09:06:10	02:25						levata	21:58							tramonto
09:06:14	02:24						levata	22:01							tramonto
09:06:18	02:23						levata	22:03							tramonto
09:06:22	02:24						levata	22:04							tramonto
09:06:26	02:26						levata	22:04							tramonto

Altezza ai crepuscoli

di Mercurio

nel momento il cui il Sole è 18 ° sotto l'orizzonte

Postazione: Roma 42:00 N, 12:00 E (UT +01:00)

		Altezza (mattino)					Altezza (sera)				
		0 °	10 °	20 °	30 °	40 °	0 °	10 °	20 °	30 °	40 °
09:07:01	02:29						22:03				
09:07:05	02:33						22:00				
09:07:09	02:37						21:57				
09:07:13	02:42						21:53				
09:07:17	02:48						21:48				
09:07:21	02:54						21:43				
09:07:25	03:00						21:37				
09:07:29	03:07						21:30				
09:08:02	03:13						21:24				
09:08:06	03:19						21:16				
09:08:10	03:26						21:09				
09:08:14	03:32						21:01				
09:08:18	03:38						20:53				
09:08:22	03:44						20:45				
09:08:26	03:50						20:37				
09:08:30	03:56						20:29				
09:09:03	04:02						20:21				
09:09:07	04:07						20:13				
09:09:11	04:12						20:05				
09:09:15	04:17						19:57				
09:09:19	04:22						19:49				
09:09:23	04:27						19:42				
09:09:27	04:32						19:34				
09:10:01	04:36						19:27				
09:10:05	04:41						19:20				
09:10:09	04:45						19:13				
09:10:13	04:50						19:07				
09:10:17	04:54						19:01				
09:10:21	04:58						18:55				
09:10:25	05:03						18:49				
09:10:29	05:07						18:44				
09:11:02	05:11						18:40				
09:11:06	05:16						18:36				
09:11:10	05:20						18:32				
09:11:14	05:24						18:29				
09:11:18	05:28						18:26				
09:11:22	05:33						18:24				
09:11:26	05:36						18:22				
09:11:30	05:40						18:21				
09:12:04	05:44						18:21				
09:12:08	05:47						18:21				
09:12:12	05:50						18:21				
09:12:16	05:53						18:23				
09:12:20	05:55						18:24				
09:12:24	05:57						18:26				
09:12:28	05:59						18:29				

Height in the twilights. The Sun is 18° under the horizon

Date	Morning twilight				Evening twilight			
	Times	Alt	Az	Elong	Times	Alt	Az	Elong
2009:01:01	06:00	-32.2	91.2	18.9	18:32	-2.8	243.3	19.0
2009:01:05	06:00	-31.6	89.3	19.3	18:35	-1.9	244.7	19.3
2009:01:09	06:00	-29.7	88.6	18.1	18:38	-2.4	247.4	17.8
2009:01:13	05:59	-26.1	90.1	14.4	18:42	-5.3	251.7	13.7
2009:01:17	05:58	-20.8	94.0	8.0	18:46	-11.0	257.4	7.0
2009:01:21	05:56	-14.6	99.7	3.5	18:50	-18.6	263.6	4.2
2009:01:25	05:54	-9.1	105.5	10.7	18:55	-26.3	269.4	11.7
2009:01:29	05:51	-5.3	110.1	17.3	18:59	-32.5	273.8	18.1
2009:02:02	05:48	-3.3	113.0	21.8	19:03	-36.8	276.9	22.3
2009:02:06	05:44	-2.6	114.4	24.5	19:08	-39.6	278.9	24.7
2009:02:10	05:40	-2.9	114.5	25.8	19:13	-41.2	280.2	25.9
2009:02:14	05:35	-3.7	113.6	26.1	19:17	-41.8	281.0	26.1
2009:02:18	05:30	-4.9	112.1	25.7	19:22	-41.8	281.7	25.6
2009:02:22	05:25	-6.2	109.9	24.8	19:26	-41.2	282.3	24.7
2009:02:26	05:19	-7.7	107.1	23.5	19:31	-40.1	283.0	23.3
2009:03:02	05:13	-9.2	103.9	21.9	19:36	-38.7	283.8	21.6
2009:03:06	05:06	-10.8	100.2	19.9	19:41	-36.9	284.8	19.6
2009:03:10	04:59	-12.3	96.1	17.6	19:45	-34.7	285.9	17.3
2009:03:14	04:52	-13.8	91.5	15.0	19:50	-32.2	287.0	14.6
2009:03:18	04:45	-15.2	86.5	12.1	19:55	-29.3	288.3	11.6
2009:03:22	04:37	-16.6	81.0	8.9	20:00	-26.1	289.6	8.3
2009:03:26	04:30	-17.8	75.1	5.3	20:05	-22.6	290.8	4.7
2009:03:30	04:22	-18.9	68.6	1.6	20:11	-18.7	292.1	1.2
2009:04:03	04:14	-19.8	61.8	3.3	20:16	-14.6	293.2	3.9
2009:04:07	04:06	-20.4	54.8	7.5	20:22	-10.4	294.2	8.3
2009:04:11	03:58	-20.7	47.9	11.7	20:28	-6.5	295.2	12.4
2009:04:15	03:50	-20.8	41.5	15.4	20:34	-3.1	296.2	16.0
2009:04:19	03:42	-20.6	36.1	18.3	20:40	-0.8	297.4	18.7
2009:04:23	03:35	-20.4	32.0	20.0	20:46	0.5	298.7	20.2
2009:04:27	03:27	-20.2	29.2	20.4	20:52	0.4	300.4	20.3
2009:05:01	03:19	-20.0	28.1	19.4	20:59	-1.1	302.6	19.1
2009:05:05	03:12	-19.9	28.5	17.0	21:06	-3.8	305.3	16.3
2009:05:09	03:05	-19.9	30.5	13.1	21:12	-7.8	308.9	12.2
2009:05:13	02:58	-19.6	34.0	8.0	21:19	-12.6	313.3	6.9
2009:05:17	02:51	-19.2	38.4	2.1	21:26	-17.9	318.5	1.2
2009:05:21	02:45	-18.4	43.2	4.4	21:32	-22.8	324.4	5.6
2009:05:25	02:40	-17.3	47.6	10.2	21:38	-26.9	330.6	11.3
2009:05:29	02:35	-16.0	51.2	15.2	21:44	-29.7	336.6	16.1
2009:06:02	02:31	-14.7	53.7	19.0	21:49	-31.3	341.8	19.7
2009:06:06	02:27	-13.4	55.1	21.6	21:54	-31.8	345.9	22.0
2009:06:10	02:25	-12.3	55.4	23.1	21:58	-31.4	348.7	23.2
2009:06:14	02:24	-11.3	54.9	23.4	22:01	-30.4	350.2	23.4
2009:06:18	02:23	-10.6	53.6	22.8	22:03	-29.0	350.3	22.6
2009:06:22	02:24	-10.2	51.7	21.3	22:04	-27.3	349.0	20.9
2009:06:26	02:26	-10.1	49.2	18.9	22:04	-25.4	346.6	18.3
2009:06:30	02:28	-10.6	46.2	15.7	22:03	-23.4	342.9	14.9

Date	Morning twilight				Evening twilight			
	Times	Alt	Az	Elong	Times	Alt	Az	Elong
2009:07:01	02:29	-10.8	45.4	14.7	22:03	-22.9	341.8	13.9
2009:07:05	02:33	-12.0	42.0	10.6	22:00	-20.8	337.0	9.7
2009:07:09	02:37	-13.8	38.6	6.1	21:57	-18.7	331.4	5.2
2009:07:13	02:42	-16.1	35.3	1.8	21:53	-16.7	325.5	1.5
2009:07:17	02:48	-18.8	32.6	3.9	21:48	-15.0	319.5	4.7
2009:07:21	02:54	-21.6	30.5	8.1	21:43	-13.6	313.7	8.9
2009:07:25	03:00	-24.6	29.1	12.1	21:37	-12.4	308.1	12.8
2009:07:29	03:07	-27.5	28.4	15.6	21:30	-11.4	302.8	16.2
2009:08:02	03:13	-30.3	28.4	18.6	21:24	-10.7	297.9	19.2
2009:08:06	03:19	-33.1	29.1	21.3	21:16	-10.2	293.2	21.7
2009:08:10	03:26	-35.6	30.5	23.5	21:09	-9.8	288.9	23.8
2009:08:14	03:32	-37.9	32.4	25.2	21:01	-9.7	285.0	25.5
2009:08:18	03:38	-39.8	35.0	26.5	20:53	-9.7	281.4	26.7
2009:08:22	03:44	-41.3	38.2	27.2	20:45	-10.0	278.4	27.3
2009:08:26	03:50	-42.2	42.1	27.3	20:37	-10.5	275.9	27.3
2009:08:30	03:56	-42.3	46.5	26.6	20:29	-11.2	274.2	26.4
2009:09:03	04:02	-41.3	51.6	24.9	20:21	-12.4	273.6	24.5
2009:09:07	04:07	-39.0	57.0	21.9	20:13	-13.9	274.2	21.3
2009:09:11	04:12	-35.0	62.7	17.4	20:05	-15.9	276.5	16.5
2009:09:15	04:17	-29.1	68.2	11.2	19:57	-18.3	280.7	10.0
2009:09:19	04:22	-21.6	73.2	4.2	19:49	-20.6	286.4	3.4
2009:09:23	04:27	-13.6	77.3	5.8	19:42	-22.3	292.4	6.9
2009:09:27	04:32	-6.9	80.5	12.1	19:34	-23.3	297.0	12.9
2009:10:01	04:36	-2.5	82.9	16.3	19:27	-23.5	299.0	16.7
2009:10:05	04:41	-0.7	84.7	17.9	19:20	-23.3	298.2	17.9
2009:10:09	04:45	-1.0	86.2	17.4	19:13	-22.9	295.3	17.2
2009:10:13	04:50	-2.6	87.6	15.6	19:07	-22.3	291.2	15.3
2009:10:17	04:54	-5.1	88.9	13.1	19:01	-21.7	286.4	12.7
2009:10:21	04:58	-7.8	90.2	10.3	18:55	-21.0	281.5	9.9
2009:10:25	05:03	-10.6	91.6	7.5	18:49	-20.2	276.7	7.1
2009:10:29	05:07	-13.3	92.9	4.7	18:44	-19.4	272.0	4.3
2009:11:02	05:11	-15.9	94.2	2.1	18:40	-18.5	267.6	1.7
2009:11:06	05:16	-18.4	95.3	0.5	18:36	-17.5	263.5	0.9
2009:11:10	05:20	-20.8	96.3	2.9	18:32	-16.5	259.6	3.3
2009:11:14	05:24	-23.0	97.1	5.3	18:29	-15.4	256.1	5.6
2009:11:18	05:28	-25.1	97.7	7.5	18:26	-14.2	252.8	7.8
2009:11:22	05:33	-27.1	98.0	9.7	18:24	-12.9	249.8	10.0
2009:11:26	05:36	-29.0	98.0	11.8	18:22	-11.5	247.1	12.1
2009:11:30	05:40	-30.8	97.6	13.8	18:21	-10.0	244.7	14.1
2009:12:04	05:44	-32.3	96.9	15.7	18:21	-8.3	242.7	16.0
2009:12:08	05:47	-33.6	95.9	17.5	18:21	-6.7	241.2	17.8
2009:12:12	05:50	-34.5	94.6	19.0	18:21	-5.1	240.2	19.2
2009:12:16	05:53	-34.8	93.3	20.1	18:23	-3.7	239.9	20.2
2009:12:20	05:55	-34.3	92.3	20.2	18:24	-3.0	240.6	20.1
2009:12:24	05:57	-32.3	92.2	18.8	18:26	-3.4	242.8	18.4
2009:12:28	05:59	-28.5	93.9	15.0	18:29	-5.9	246.7	14.3

Eliacal date for Mercury
Location : Rome
Latitude : 42° 00' 00'' N
Longitude : 12° 00' 00'' E
Visibility [°] = 10.5 + 1.4 * magnitudine
Critical height : 0.00°

	Date	obj s/t	Sun s/t	d s/t	age	Mag
last evening visibility	2009-01-13	18:14	17:03	1:11h	-6d 23h	0.9
first morning visibility	2009-01-28	06:23	07:28	-1:05h	7d 13h	1.2
last morning visibility	2009-02-25	05:59	06:53	-0:53h	-33d 22h	0.1
first evening vsibility	2009-04-08	19:32	18:45	0:47h	8d 15h	-1.4
last evening visibility	2009-05-07	20:35	19:17	1:17h	-10d 14h	1.8
first morning visibility	2009-06-20	03:26	04:36	-1:09h	32d 16h	0.2
last morning visibility	2009-07-02	03:43	04:40	-0:57h	-11d 23h	-1.0
first morning visibility	2009-09-28	05:00	06:05	-1:05h	7d 18h	1.1
last morning visibility	2009-10-23	05:47	06:33	-0:45h	-13d 03h	-1.0
first evening vsibility	2009-12-06	17:36	16:40	0:56h	31d 09h	-0.4
last evening visibility	2009-12-28	17:56	16:47	1:08h	-7d 02h	0.8

Legenda:

Obj s/t : rising and setting of the planet

Sun s/t : sunrise and sunset

D s/t : difference in hours and minutes between the instants of the rising or the setting of the two objects

Age : days from the conjunction with the Sun

Mag : magnitude

	Date	obj s/t	Sun s/t	Sun alt	Sun lon	obj lon	obj lat	Mag	d az	d lon
LE	01-13	18:14	17:03	-13° 01'	293° 40'	307° 22'	1° 25'	0.9	-5° 40'	13° 42'
FM	01-28	06:23	07:28	-12° 13'	308° 25'	292° 53'	3° 19'	1.2	10° 49'	-15° 32'
LM	02-25	05:59	06:53	-10° 44'	336° 44'	312° 52'	-1° 13'	0.1	21° 43'	-23° 52'
FE	04-08	19:32	18:45	-9° 15'	19° 03'	28° 19'	0° 20'	-1.4	-3° 14'	9° 16'
LE	05-07	20:35	19:17	-13° 13'	47° 22'	61° 44'	1° 50'	1.8	-6° 52'	14° 21'
FM	06-20	03:26	04:36	-10° 53'	88° 55'	66° 55'	-2° 38'	0.2	19° 40'	-22° 00'
LM	07-02	03:43	04:40	-9° 14'	100° 22'	86° 40'	-0° 21'	-1.0	10° 34'	-13° 43'
FM	09-28	05:00	06:05	-12° 59'	185° 10'	171° 46'	-0° 31'	1.1	4° 55'	-13° 24'
LM	10-23	05:47	06:33	-9° 11'	209° 55'	201° 10'	1° 34'	-1.0	1° 37'	-8° 45'
FE	12-06	17:36	16:40	-10° 10'	254° 42'	271° 25'	-2° 20'	-0.4	-13° 56'	16° 43'
LE	12-28	17:56	16:47	-12° 14'	277° 06'	291° 22'	0° 34'	0.8	-8° 13'	14° 17'

Legenda:

Date : date in the format month/day

Obj s/t : rising and setting of the planet

Sun s/t : sunrise and sunset

Sun alt : height of the Sun in the instant of visibility of the planet

Sun lon : celestial longitude of the Sun

Obj lon : celestial longitude of the planet

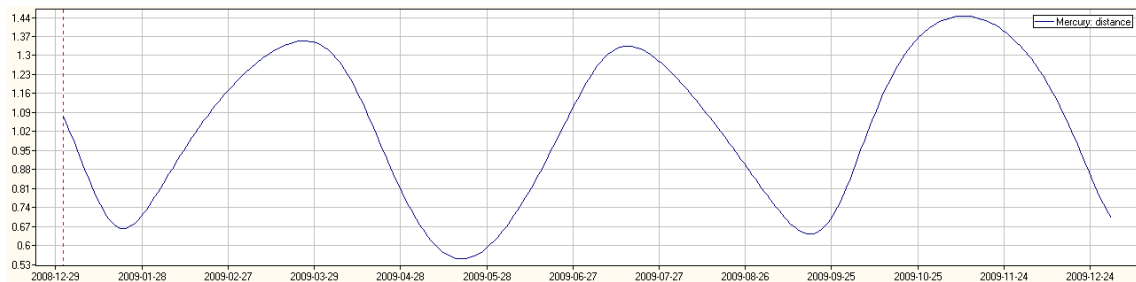
Obj lat : Celestial latitude of the planet

Mag : magnitude

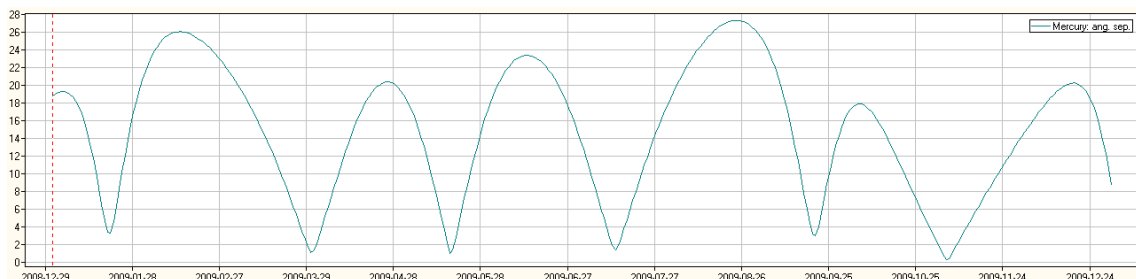
D az : difference in azimuth between the centers of the Sun and the planet in the instant of its visibility

D lon : difference in longitude between the centers of the Sun and the planet in the instant of its visibility

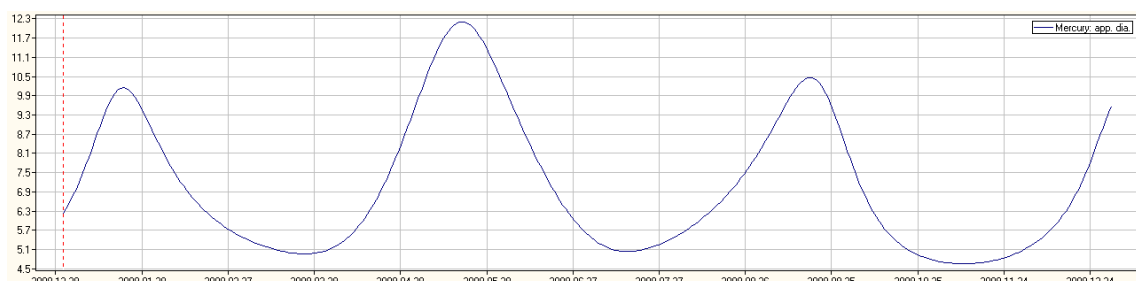
© (3)



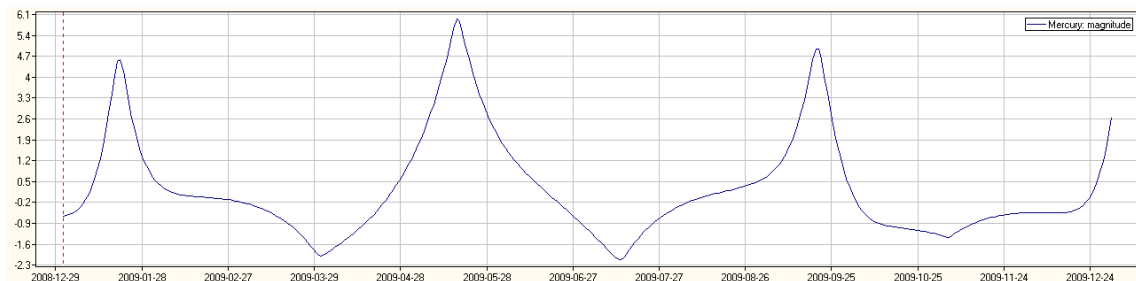
Distance of Mercury in A.U. during the year



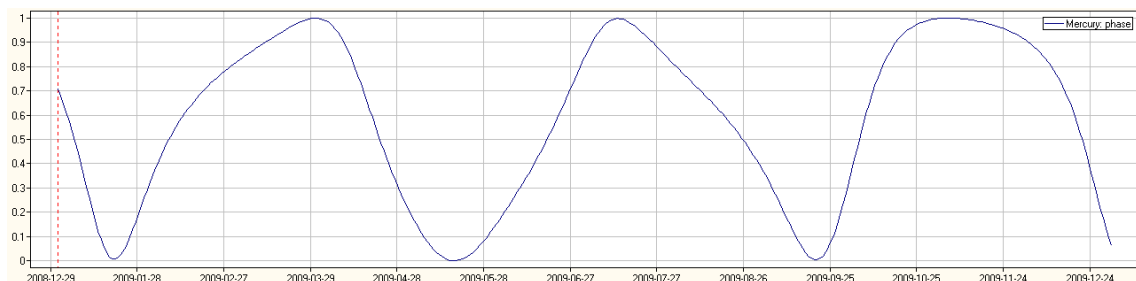
Elongation of Mercury in $^{\circ}$ during the year



Diameter of Mercury in $''$ during the year



Magnitude of Mercury during the year

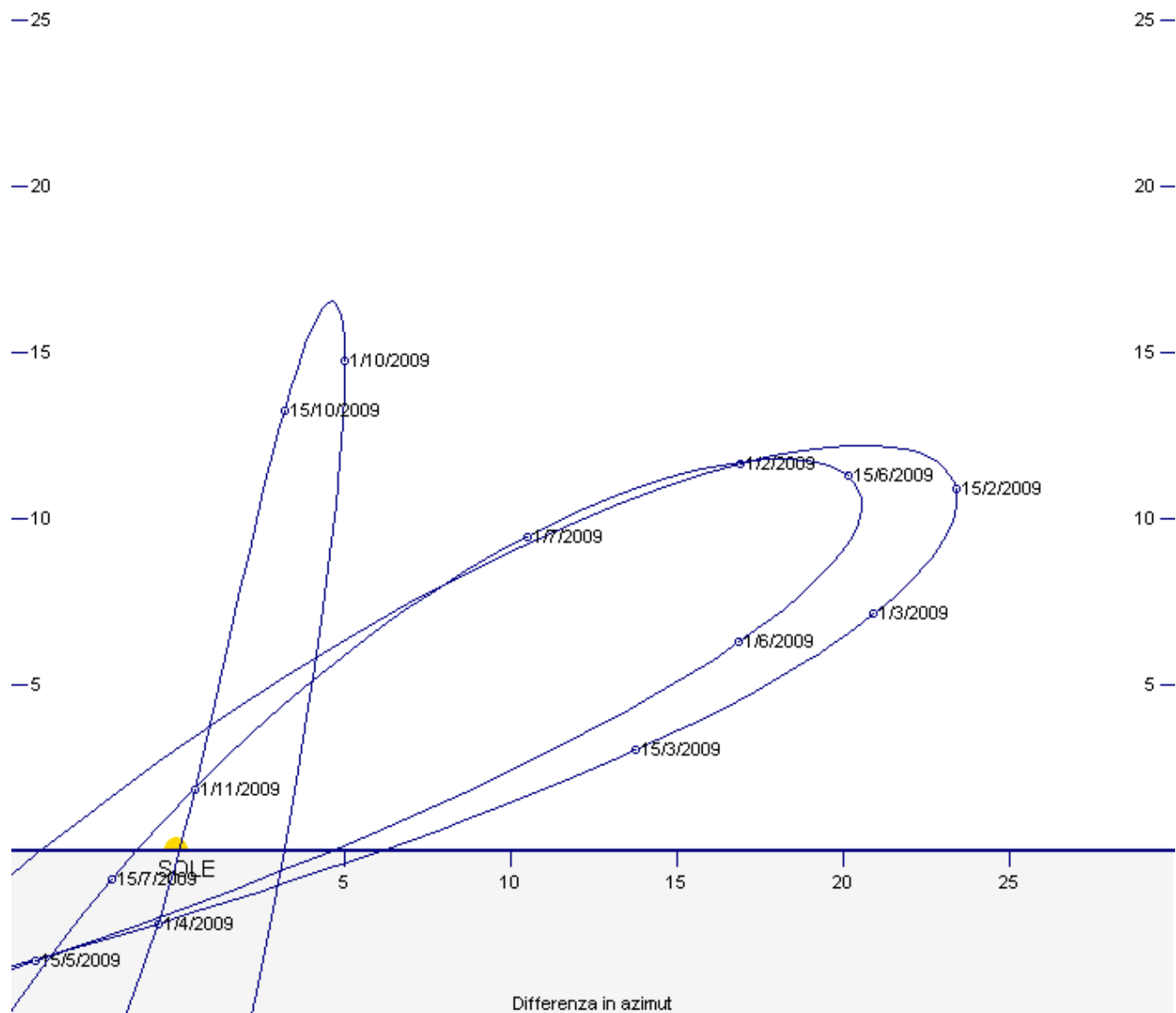


Phase of Mercury during the year

© (4)

Posizione di Mercurio al mattino rispetto al sorgere del Sole

Luogo : Roma
 Latitudine: 42° 00' 00" N
 Longitudine: 12° 00' 00" E

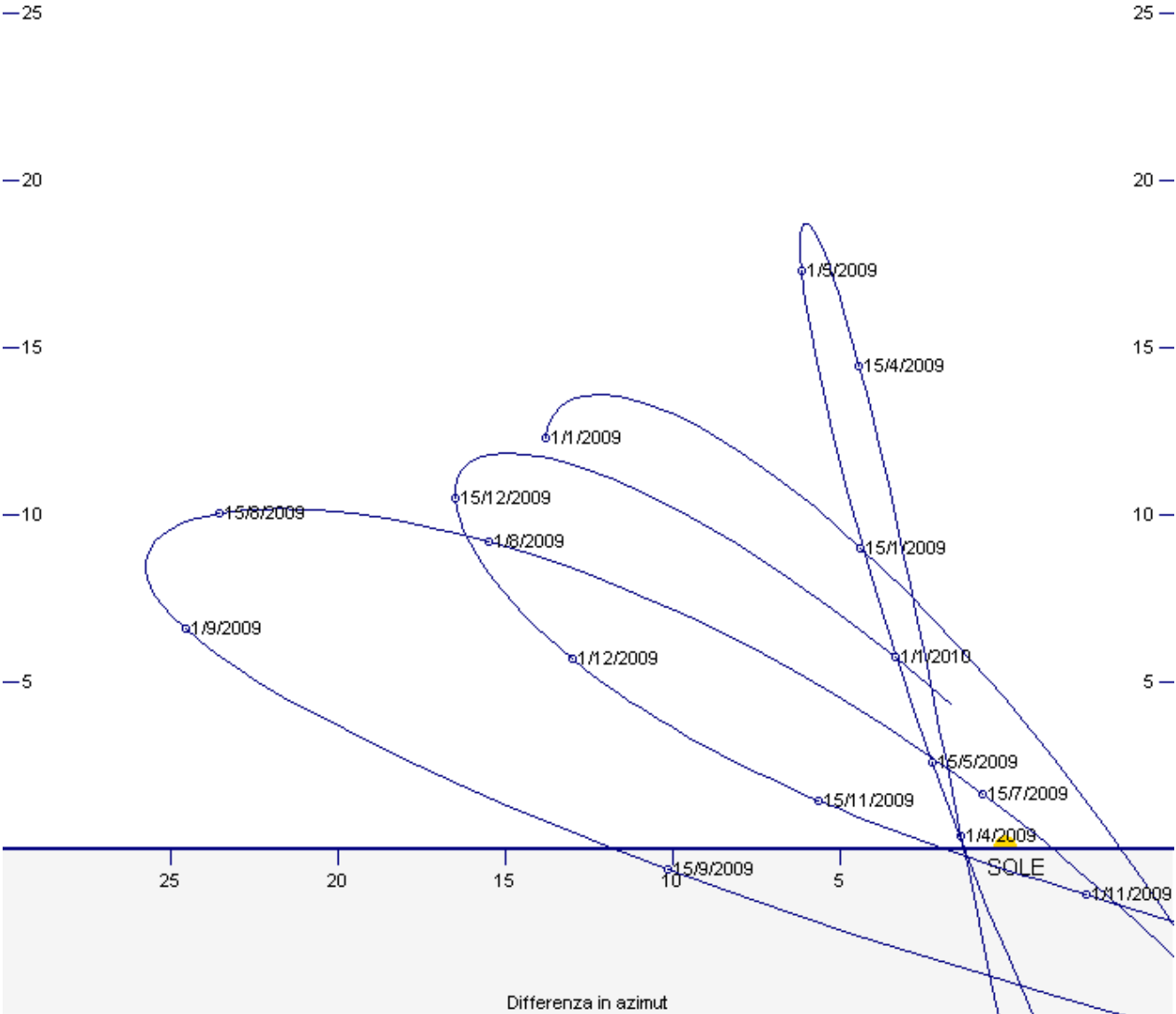


Relative position of Mercury respect to the sunrising

© (3)

Posizione di Mercurio alla sera rispetto al tramonto del Sole

Luogo : Roma
Latitudine: 42° 00' 00" N
Longitudine: 12° 00' 00" E



Relative position of Mercury respect to the sunsetting

© (3)

EPHEMERIDES OF VENUS

Date	A.R. Geoc.	Dec. Geoc.	R A.U.	Distance A.U.	Light (m)	El. °	Diam. "	Mag.	Phase	Phase angle°	Rise	Transit	Set
1-Jan	21h 59m 53.94s	-13° 49' 07.1"	0.7227414	0.7878392	6.55	46.6	21.2	-4.3	0.577	81.1	10.13	15.26	20.40
2-Jan	22h 04m 01.59s	-13° 22' 47.3"	0.7226057	0.7805091	6.49	46.6	21.4	-4.3	0.573	81.6	10.12	15.27	20.42
3-Jan	22h 08m 07.18s	-12° 56' 11.9"	0.7224706	0.7731686	6.43	46.7	21.6	-4.3	0.568	82.1	10.10	15.27	20.44
4-Jan	22h 12m 10.69s	-12° 29' 21.8"	0.7223361	0.7658180	6.37	46.8	21.8	-4.3	0.564	82.7	10.09	15.27	20.46
5-Jan	22h 16m 12.12s	-12° 02' 17.8"	0.7222023	0.7584581	6.31	46.8	22.0	-4.3	0.559	83.2	10.07	15.27	20.47
6-Jan	22h 20m 11.46s	-11° 35' 00.8"	0.7220694	0.7510893	6.25	46.9	22.2	-4.3	0.555	83.7	10.05	15.27	20.49
7-Jan	22h 24m 08.69s	-11° 07' 31.7"	0.7219374	0.7437125	6.19	46.9	22.4	-4.4	0.550	84.3	10.04	15.27	20.51
8-Jan	22h 28m 03.81s	-10° 39' 51.3"	0.7218066	0.7363285	6.12	47.0	22.7	-4.4	0.545	84.8	10.02	15.27	20.53
9-Jan	22h 31m 56.81s	-10° 12' 00.4"	0.7216768	0.7289381	6.06	47.0	22.9	-4.4	0.540	85.4	10.00	15.27	20.54
10-Jan	22h 35m 47.66s	-09° 44' 00.0"	0.7215484	0.7215423	6.00	47.0	23.1	-4.4	0.536	85.9	9.58	15.27	20.56
11-Jan	22h 39m 36.36s	-09° 15' 50.9"	0.7214213	0.7141422	5.94	47.1	23.4	-4.4	0.531	86.5	9.56	15.26	20.57
12-Jan	22h 43m 22.89s	-08° 47' 33.8"	0.7212957	0.7067385	5.88	47.1	23.6	-4.4	0.526	87.0	9.54	15.26	20.59
13-Jan	22h 47m 07.25s	-08° 19' 09.7"	0.7211717	0.6993322	5.82	47.1	23.9	-4.4	0.521	87.6	9.53	15.26	21.00
14-Jan	22h 50m 49.42s	-07° 50' 39.1"	0.7210493	0.6919242	5.76	47.1	24.1	-4.4	0.516	88.2	9.51	15.26	21.02
15-Jan	22h 54m 29.40s	-07° 22' 03.0"	0.7209287	0.6845151	5.69	47.1	24.4	-4.4	0.511	88.8	9.48	15.25	21.03
16-Jan	22h 58m 07.16s	-06° 53' 22.2"	0.7208100	0.6771056	5.63	47.1	24.6	-4.4	0.505	89.4	9.46	15.25	21.05
17-Jan	23h 01m 42.70s	-06° 24' 37.3"	0.7206933	0.6696964	5.57	47.1	24.9	-4.4	0.500	90.0	9.44	15.25	21.06
18-Jan	23h 05m 15.99s	-05° 55' 49.2"	0.7205786	0.6622881	5.51	47.1	25.2	-4.4	0.495	90.6	9.42	15.24	21.07
19-Jan	23h 08m 47.02s	-05° 26' 58.8"	0.7204660	0.6548813	5.45	47.1	25.5	-4.5	0.489	91.2	9.40	15.24	21.09
20-Jan	23h 12m 15.75s	-04° 58' 06.8"	0.7203557	0.6474766	5.39	47.0	25.8	-4.5	0.484	91.8	9.38	15.23	21.10
21-Jan	23h 15m 42.16s	-04° 29' 14.1"	0.7202477	0.6400747	5.32	47.0	26.1	-4.5	0.478	92.5	9.36	15.23	21.11
22-Jan	23h 19m 06.21s	-04° 00' 21.5"	0.7201421	0.6326763	5.26	46.9	26.4	-4.5	0.473	93.1	9.33	15.22	21.12
23-Jan	23h 22m 27.87s	-03° 31' 30.0"	0.7200390	0.6252821	5.20	46.9	26.7	-4.5	0.467	93.8	9.31	15.22	21.13
24-Jan	23h 25m 47.08s	-03° 02' 40.3"	0.7199385	0.6178929	5.14	46.8	27.0	-4.5	0.461	94.4	9.29	15.21	21.15
25-Jan	23h 29m 03.81s	-02° 33' 53.3"	0.7198407	0.6105096	5.08	46.7	27.3	-4.5	0.455	95.1	9.26	15.20	21.16
26-Jan	23h 32m 18.00s	-02° 05' 10.0"	0.7197456	0.6031330	5.02	46.7	27.7	-4.5	0.450	95.8	9.24	15.20	21.17
27-Jan	23h 35m 29.60s	-01° 36' 31.2"	0.7196533	0.5957641	4.96	46.6	28.0	-4.5	0.444	96.5	9.21	15.19	21.17
28-Jan	23h 38m 38.53s	-01° 07' 58.0"	0.7195640	0.5884039	4.89	46.5	28.4	-4.5	0.438	97.2	9.19	15.18	21.18
29-Jan	23h 41m 44.74s	-00° 39' 31.1"	0.7194775	0.5810536	4.83	46.3	28.7	-4.5	0.431	97.9	9.16	15.17	21.19
30-Jan	23h 44m 48.16s	-00° 11' 11.6"	0.7193942	0.5737142	4.77	46.2	29.1	-4.5	0.425	98.6	9.14	15.16	21.20
31-Jan	23h 47m 48.71s	+00° 16' 59.5"	0.7193139	0.5663872	4.71	46.1	29.5	-4.5	0.419	99.4	9.11	15.15	21.21
1-Feb	23h 50m 46.30s	+00° 45' 01.3"	0.7192368	0.5590741	4.65	45.9	29.8	-4.5	0.412	100.1	9.08	15.14	21.21
2-Feb	23h 53m 40.84s	+01° 12' 52.7"	0.7191629	0.5517763	4.59	45.8	30.2	-4.5	0.406	100.9	9.06	15.13	21.22
3-Feb	23h 56m 32.25s	+01° 40' 32.8"	0.7190923	0.5444956	4.53	45.6	30.6	-4.5	0.399	101.6	9.03	15.12	21.22
4-Feb	23h 59m 20.42s	+02° 08' 00.4"	0.7190251	0.5372339	4.47	45.4	31.1	-4.6	0.392	102.4	9.00	15.11	21.23
5-Feb	00h 02m 05.23s	+02° 35' 14.5"	0.7189613	0.5299933	4.41	45.2	31.5	-4.6	0.386	103.2	8.57	15.10	21.23
6-Feb	00h 04m 46.59s	+03° 02' 14.0"	0.7189009	0.5227759	4.35	45.0	31.9	-4.6	0.379	104.0	8.54	15.08	21.23
7-Feb	00h 07m 24.36s	+03° 28' 57.7"	0.7188440	0.5155841	4.29	44.8	32.4	-4.6	0.372	104.9	8.51	15.07	21.24
8-Feb	00h 09m 58.42s	+03° 55' 24.6"	0.7187907	0.5084203	4.23	44.5	32.8	-4.6	0.365	105.7	8.48	15.06	21.24
9-Feb	00h 12m 28.64s	+04° 21' 33.5"	0.7187410	0.5012873	4.17	44.3	33.3	-4.6	0.357	106.6	8.45	15.04	21.24
10-Feb	00h 14m 54.89s	+04° 47' 23.3"	0.7186949	0.4941877	4.11	44.0	33.8	-4.6	0.350	107.4	8.42	15.03	21.24
11-Feb	00h 17m 17.04s	+05° 12' 52.7"	0.7186525	0.4871241	4.05	43.7	34.2	-4.6	0.343	108.3	8.39	15.01	21.24
12-Feb	00h 19m 34.94s	+05° 38' 00.7"	0.7186138	0.4800993	3.99	43.4	34.7	-4.6	0.335	109.3	8.36	14.59	21.24
13-Feb	00h 21m 48.45s	+06° 02' 45.9"	0.7185788	0.4731162	3.94	43.1	35.3	-4.6	0.327	110.2	8.33	14.58	21.23
14-Feb	00h 23m 57.42s	+06° 27' 07.1"	0.7185476	0.4661775	3.88	42.7	35.8	-4.6	0.320	111.1	8.29	14.56	21.23
15-Feb	00h 26m 01.68s	+06° 51' 03.0"	0.7185202	0.4592861	3.82	42.4	36.3	-4.6	0.312	112.1	8.26	14.54	21.22
16-Feb	00h 28m 01.06s	+07° 14' 32.2"	0.7184966	0.4524452	3.76	42.0	36.9	-4.6	0.304	113.1	8.23	14.52	21.22
17-Feb	00h 29m 55.38s	+07° 37' 33.1"	0.7184769	0.4456578	3.71	41.6	37.4	-4.6	0.296	114.1	8.19	14.50	21.21
18-Feb	00h 31m 44.46s	+08° 00' 04.3"	0.7184610	0.4389273	3.65	41.2	38.0	-4.6	0.288	115.1	8.16	14.48	21.20
19-Feb	00h 33m 28.09s	+08° 22' 04.1"	0.7184489	0.4322571	3.60	40.7	38.6	-4.6	0.279	116.2	8.12	14.45	21.19
20-Feb	00h 35m 06.09s	+08° 43' 30.8"	0.7184408	0.4256508	3.54	40.2	39.2	-4.6	0.271	117.3	8.09	14.43	21.18
21-Feb	00h 36m 38.23s	+09° 04' 22.7"	0.7184365	0.4191124	3.49	39.7	39.8	-4.6	0.262	118.4	8.05	14.41	21.17
22-Feb	00h 38m 04.30s	+09° 24' 37.8"	0.7184361	0.4126459	3.43	39.2	40.4	-4.6	0.254	119.5	8.01	14.38	21.16
23-Feb	00h 39m 24.08s	+09° 44' 14.3"	0.7184397	0.4062556	3.38	38.7	41.1	-4.6	0.245	120.7	7.57	14.35	21.14
24-Feb	00h 40m 37.35s	+10° 03' 09.9"	0.7184470	0.3999459	3.33	38.1	41.7	-4.6	0.236	121.8	7.53	14.33	21.12
25-Feb	00h 41m 43.87s	+10° 21' 22.6"	0.7184583	0.3937216	3.27	37.5	42.4	-4.6	0.227	123.1	7.49	14.30	21.11
26-Feb	00h 42m 43.41s	+10° 38' 50.1"	0.7184735	0.3875878	3.22	36.8	43.0	-4.6	0.218	124.3	7.45	14.27	21.09
27-Feb	00h 43m 35.75s	+10° 55' 30.0"	0.7184925	0.3815498	3.17	36.2	43.7	-4.6	0.209	125.6	7.41	14.23	21.06
28-Feb	00h 44m 20.65s	+11° 11' 19.8"	0.7185153	0.3756133	3.12	35.5	44.4	-4.6	0.200	126.9	7.37	14.20	21.04
1-Mar	00h 44m 57.89s	+11° 26' 17.0"	0.7185420	0.3697842	3.08	34.7	45.1	-4.6	0.191	128.2	7.33	14.17	21.02
2-Mar	00h 45m 27.25s	+11° 40' 18.8"	0.7185725	0.3640690	3.03	34.0	45.8	-4.6	0.182	129.6	7.28	14.13	20.59
3-Mar	00h 45m 48.52s	+11° 53' 22.4"	0.7186068	0.3584744	2.98	33.2	46.5	-4.6	0.172	131.0	7.24	14.10	20.56
4-Mar	00h 46m 01.49s	+12° 05' 25.1"	0.7186448	0.3530075	2.94	32.4	47.3	-4.6	0.163	132.4	7.19	14.06	20.53
5-Mar	00h 46m 06.01s	+12° 16' 23.9"	0.7186865	0.3476757	2.89	31.5	48.0	-4.6	0.154	133.9	7.15	14.02	20.50
6-Mar	00h 46m 01.91s	+12° 26' 15.9"	0.7187319	0.3424870	2.85	30.6	48.7	-4.5	0.144	135.4	7.10	13.58	20.46
7-Mar	00h 45m 49.07s	+12° 34' 58.0"	0.7187810	0.3374494	2.81	29.7	49.4	-4.5	0.135	136.9	7.05	13.54	20.42
8-Mar	00h 45m 27.40s	+12° 42' 27.3"	0.7188337	0.3325713	2.77	28.7	50.2	-4.5	0.126	138.5	7.01	13.49	20.38
9-Mar	00h 44m 56.87s	+12° 48' 41.0"	0.7188900	0.3278615	2.73	27.7	50.9	-4.5	0.117	140.1	6.56	13.45	20.34
10-Mar	00h 44m 17.47s	+12° 53' 36.3"	0.7189498	0.3233288	2.69	26.7	51.6	-4.5	0.108	141.7	6.51	13.40	20.30
11-Mar	00h 43m 29.26s	+12° 57' 10.7"	0.7190130	0.3189821	2.65	25.6	52.3	-4.5	0.099	143.4	6.46	13.35	20.25
12-Mar	00h 42m 32.35s	+12° 59' 21.6"	0.7190797	0.3148303	2.62	24.5	53.0	-4.5	0.090	145.0	6.41	13.30	20.20
13-Mar	00h 41m 26.91s	+13° 00' 06.9"	0.7191498	0.3108823	2.59	23.4	53.7	-4.4	0.082	146.8	6.36	13.25	20.15

Date	A.R. Geoc.	Dec. Geoc.	R A.U.	Distance A.U.	Light (m)	El. °	Diam. "	Mag.	Phase	Phase angle°	Rise	Transit	Set
14-Mar	00h 40m 13.18s	+12° 59' 24.9"	0.7192232	0.3071471	2.55	22.2	54.3	-4.4	0.074	148.5	6.31	13.20	20.09
15-Mar	00h 38m 51.45s	+12° 57' 13.8"	0.7192998	0.3036333	2.53	21.0	54.9	-4.4	0.066	150.3	6.25	13.15	20.04
16-Mar	00h 37m 22.07s	+12° 53' 32.7"	0.7193797	0.3003496	2.50	19.8	55.5	-4.3	0.058	152.1	6.20	13.09	19.58
17-Mar	00h 35m 45.48s	+12° 48' 20.8"	0.7194627	0.2973043	2.47	18.6	56.1	-4.3	0.051	153.8	6.15	13.04	19.52
18-Mar	00h 34m 02.16s	+12° 41' 38.0"	0.7195487	0.2945056	2.45	17.4	56.6	-4.3	0.045	155.6	6.10	12.58	19.46
19-Mar	00h 32m 12.68s	+12° 33' 24.7"	0.7196377	0.2919610	2.43	16.1	57.1	-4.3	0.038	157.4	6.05	12.52	19.39
20-Mar	00h 30m 17.67s	+12° 23' 42.1"	0.7197297	0.2896780	2.41	14.9	57.6	-4.2	0.033	159.2	5.59	12.46	19.33
21-Mar	00h 28m 17.79s	+12° 12' 32.0"	0.7198245	0.2876633	2.39	13.7	58.0	-4.2	0.028	160.9	5.54	12.40	19.26
22-Mar	00h 26m 13.81s	+11° 59' 56.8"	0.7199221	0.2859232	2.38	12.5	58.3	-4.2	0.023	162.5	5.49	12.34	19.19
23-Mar	00h 24m 06.50s	+11° 45' 59.8"	0.7200224	0.2844632	2.37	11.4	58.6	-4.1	0.019	164.1	5.44	12.28	19.12
24-Mar	00h 21m 56.69s	+11° 30' 45.0"	0.7201253	0.2832883	2.36	10.4	58.9	-4.1	0.016	165.5	5.39	12.22	19.05
25-Mar	00h 19m 45.25s	+11° 14' 17.0"	0.7202307	0.2824024	2.35	9.5	59.1	-4.1	0.013	166.8	5.34	12.16	18.58
26-Mar	00h 17m 33.05s	+10° 56' 41.3"	0.7203386	0.2818088	2.34	8.8	59.2	-4.0	0.011	167.7	5.29	12.10	18.50
27-Mar	00h 15m 20.98s	+10° 38' 03.9"	0.7204489	0.2815100	2.34	8.4	59.3	-4.0	0.010	168.4	5.24	12.04	18.43
28-Mar	00h 13m 09.94s	+10° 18' 31.3"	0.7205614	0.2815075	2.34	8.2	59.3	-4.0	0.010	168.6	5.19	11.58	18.36
29-Mar	00h 11m 00.80s	+09° 58' 10.7"	0.7206761	0.2818020	2.34	8.3	59.2	-4.0	0.010	168.5	5.14	11.52	18.28
30-Mar	00h 08m 54.41s	+09° 37' 09.3"	0.7207929	0.2823933	2.35	8.7	59.1	-4.0	0.011	167.9	5.09	11.46	18.21
31-Mar	00h 06m 51.60s	+09° 15' 35.1"	0.7209117	0.2832805	2.36	9.4	58.9	-4.1	0.013	167.0	5.05	11.40	18.14
1-Apr	00h 04m 53.16s	+08° 53' 36.0"	0.7210324	0.2844615	2.37	10.2	58.6	-4.1	0.015	165.8	5.00	11.34	18.07
2-Apr	00h 02m 59.82s	+08° 31' 19.8"	0.7211549	0.2859337	2.38	11.2	58.3	-4.1	0.018	164.4	4.56	11.28	18.00
3-Apr	00h 01m 12.28s	+08° 08' 54.8"	0.7212791	0.2876935	2.39	12.3	58.0	-4.1	0.022	162.9	4.52	11.22	17.53
4-Apr	23h 59m 31.15s	+07° 46' 28.8"	0.7214049	0.2897365	2.41	13.4	57.6	-4.2	0.027	161.2	4.47	11.17	17.46
5-Apr	23h 57m 57.01s	+07° 24' 09.3"	0.7215323	0.2920575	2.43	14.6	57.1	-4.2	0.032	159.5	4.43	11.11	17.39
6-Apr	23h 56m 30.37s	+07° 02' 03.9"	0.7216610	0.2946506	2.45	15.8	56.6	-4.2	0.037	157.8	4.39	11.06	17.32
7-Apr	23h 55m 11.65s	+06° 40' 19.5"	0.7217910	0.2975094	2.47	17.0	56.1	-4.3	0.043	156.0	4.35	11.01	17.26
8-Apr	23h 54m 01.22s	+06° 19' 02.6"	0.7219223	0.3006266	2.50	18.3	55.5	-4.3	0.050	154.2	4.32	10.56	17.20
9-Apr	23h 52m 59.40s	+05° 58' 19.2"	0.7220546	0.3039946	2.53	19.5	54.9	-4.3	0.057	152.5	4.28	10.51	17.14
10-Apr	23h 52m 06.39s	+05° 38' 14.8"	0.7221879	0.3076052	2.56	20.7	54.2	-4.3	0.064	150.7	4.24	10.46	17.08
11-Apr	23h 51m 22.38s	+05° 18' 54.1"	0.7223222	0.3114500	2.59	21.8	53.6	-4.3	0.072	148.9	4.21	10.42	17.02
12-Apr	23h 50m 47.47s	+05° 00' 21.5"	0.7224572	0.3155204	2.62	23.0	52.9	-4.4	0.080	147.2	4.17	10.37	16.56
13-Apr	23h 50m 21.70s	+04° 42' 40.6"	0.7225928	0.3198074	2.66	24.1	52.2	-4.4	0.088	145.5	4.14	10.33	16.51
14-Apr	23h 50m 05.08s	+04° 25' 54.4"	0.7227290	0.3243022	2.70	25.2	51.4	-4.4	0.096	143.8	4.11	10.29	16.46
15-Apr	23h 49m 57.54s	+04° 10' 05.5"	0.7228657	0.3289960	2.74	26.2	50.7	-4.4	0.105	142.2	4.08	10.25	16.41
16-Apr	23h 49m 58.99s	+03° 55' 15.9"	0.7230027	0.3338800	2.78	27.2	50.0	-4.4	0.114	140.6	4.05	10.21	16.37
17-Apr	23h 50m 09.32s	+03° 41' 27.1"	0.7231400	0.3389454	2.82	28.2	49.2	-4.5	0.123	139.0	4.02	10.17	16.32
18-Apr	23h 50m 28.35s	+03° 28' 40.3"	0.7232774	0.3441839	2.86	29.2	48.5	-4.5	0.132	137.4	3.59	10.14	16.28
19-Apr	23h 50m 55.92s	+03° 16' 56.2"	0.7234148	0.3495870	2.91	30.1	47.7	-4.5	0.141	135.9	3.56	10.10	16.24
20-Apr	23h 51m 31.81s	+03° 06' 15.2"	0.7235522	0.3551469	2.95	31.0	47.0	-4.5	0.150	134.4	3.54	10.07	16.20
21-Apr	23h 52m 15.81s	+02° 56' 37.2"	0.7236893	0.3608557	3.00	31.8	46.2	-4.5	0.159	133.0	3.51	10.04	16.16
22-Apr	23h 53m 07.69s	+02° 48' 02.2"	0.7238261	0.3667060	3.05	32.6	45.5	-4.5	0.168	131.5	3.48	10.01	16.13
23-Apr	23h 54m 07.19s	+02° 40' 29.5"	0.7239626	0.3726905	3.10	33.4	44.8	-4.5	0.178	130.1	3.46	9.58	16.10
24-Apr	23h 55m 14.08s	+02° 33' 58.7"	0.7240985	0.3788025	3.15	34.1	44.0	-4.5	0.187	128.8	3.44	9.55	16.06
25-Apr	23h 56m 28.11s	+02° 28' 28.8"	0.7242338	0.3850354	3.20	34.9	43.3	-4.5	0.196	127.5	3.41	9.52	16.04
26-Apr	23h 57m 49.01s	+02° 23' 58.8"	0.7243684	0.3913831	3.25	35.5	42.6	-4.5	0.205	126.2	3.39	9.50	16.01
27-Apr	23h 59m 16.53s	+02° 20' 27.7"	0.7245021	0.3978399	3.31	36.2	41.9	-4.5	0.214	124.9	3.37	9.47	15.58
28-Apr	00h 00m 50.44s	+02° 17' 54.2"	0.7246349	0.4044003	3.36	36.8	41.3	-4.5	0.223	123.7	3.34	9.45	15.56
29-Apr	00h 02m 30.47s	+02° 16' 17.1"	0.7247667	0.4110592	3.42	37.4	40.6	-4.5	0.232	122.5	3.32	9.43	15.53
30-Apr	00h 04m 16.40s	+02° 15' 35.2"	0.7248973	0.4178118	3.47	38.0	39.9	-4.5	0.240	121.3	3.30	9.41	15.51
1-May	00h 06m 08.00s	+02° 15' 47.1"	0.7250267	0.4246535	3.53	38.5	39.3	-4.5	0.249	120.1	3.28	9.39	15.49
2-May	00h 08m 05.04s	+02° 16' 51.4"	0.7251547	0.4315798	3.59	39.0	38.7	-4.5	0.258	119.0	3.26	9.37	15.48
3-May	00h 10m 07.32s	+02° 18' 46.8"	0.7252813	0.4385864	3.65	39.5	38.0	-4.5	0.266	117.9	3.24	9.35	15.46
4-May	00h 12m 14.64s	+02° 21' 31.9"	0.7254064	0.4456693	3.71	39.9	37.4	-4.5	0.274	116.8	3.22	9.33	15.44
5-May	00h 14m 26.80s	+02° 25' 05.3"	0.7255298	0.4528244	3.77	40.4	36.8	-4.5	0.283	115.8	3.20	9.31	15.43
6-May	00h 16m 43.61s	+02° 29' 25.6"	0.7256515	0.4600478	3.83	40.8	36.3	-4.5	0.291	114.7	3.18	9.30	15.41
7-May	00h 19m 04.91s	+02° 34' 31.6"	0.7257714	0.4673358	3.89	41.2	35.7	-4.5	0.299	113.7	3.16	9.28	15.40
8-May	00h 21m 30.50s	+02° 40' 21.6"	0.7258894	0.4746845	3.95	41.6	35.1	-4.5	0.307	112.7	3.14	9.27	15.39
9-May	00h 24m 00.24s	+02° 46' 54.3"	0.7260053	0.4820905	4.01	41.9	34.6	-4.5	0.315	111.8	3.13	9.25	15.38
10-May	00h 26m 33.96s	+02° 54' 08.3"	0.7261192	0.4895503	4.07	42.2	34.1	-4.5	0.322	110.8	3.11	9.24	15.37
11-May	00h 29m 11.50s	+03° 02' 02.0"	0.7262309	0.4970604	4.13	42.5	33.6	-4.5	0.330	109.9	3.09	9.23	15.37
12-May	00h 31m 52.71s	+03° 10' 34.2"	0.7263403	0.5046178	4.20	42.8	33.1	-4.5	0.337	109.0	3.07	9.21	15.36
13-May	00h 34m 37.45s	+03° 19' 43.3"	0.7264474	0.5122192	4.26	43.1	32.6	-4.5	0.345	108.1	3.05	9.20	15.35
14-May	00h 37m 25.59s	+03° 29' 28.0"	0.7265520	0.5198618	4.32	43.4	32.1	-4.5	0.352	107.2	3.04	9.19	15.35
15-May	00h 40m 16.98s	+03° 39' 46.8"	0.7266541	0.5275427	4.39	43.6	31.6	-4.5	0.359	106.3	3.02	9.18	15.34
16-May	00h 43m 11.51s	+03° 50' 38.3"	0.7267537	0.5352590	4.45	43.8	31.2	-4.5	0.367	105.5	3.00	9.17	15.34
17-May	00h 46m 09.05s	+04° 02' 01.1"	0.7268505	0.5430083	4.52	44.1	30.7	-4.5	0.374	104.6	2.59	9.16	15.34
18-May	00h 49m 09.50s	+04° 13' 53.9"	0.7269447	0.5507881	4.58	44.3	30.3	-4.4	0.381	103.8	2.57	9.15	15.34
19-May	00h 52m 12.75s	+04° 26' 15.4"	0.7270360	0.5585960	4.65	44.4	29.9	-4.4	0.387	103.0	2.55	9.14	15.33
20-May	00h 55m 18.69s	+04° 39' 04.2"	0.7271244	0.5664296	4.71	44.6	29.5	-4.4	0.394	102.2	2.54	9.13	15.33
21-May	00h 58m 27.24s	+04° 52' 19.0"	0.7272099	0.5742870	4.78	44.8	29.0	-4.4	0.401	101.4	2.52	9.13	15.34
22-May	01h 01m 38.29s	+05° 05' 58.5"	0.7272924	0.5821661	4.84	44.9	28.7	-4.4	0.407	100.7	2.51	9.12	15.34
23-May	01h 04m 51.76s	+05° 20' 01.6"	0.7273719	0.5900651	4.91	45.0	28.3	-4.4	0.414	99.9	2.49	9.11	15.34
24-May	01h 08m 07.58s	+05° 34' 26.8"	0.7274481	0.5979822	4.97	45.2	27.9	-4.4	0.420	99.2	2.47	9.11	15.34
25-May	01h 11m 25.66s	+05° 49' 13.2"	0.7275212	0.6059159	5.04	45.3	27.5	-4.4	0.427	98.4	2.46	9.10	15.34
26-May	01h 14m 45.93s	+06° 04' 19.4"	0.7275911	0.6138650	5.10	45.4	27.2	-4.4	0.433	97.7	2.44	9.09	15.35
27-May	01h 18m 08.32s	+06° 19' 44.3"	0.7276577	0.6218280	5.17	45.5	26.8	-4.4	0.439	97.0	2.43	9.09	15.35
28-May	01h 21m 32.78s	+06° 35' 26.8"	0.7277209	0.6298040	5.24	45.5	26.5	-4.4	0.445	96.3	2.41	9.08	15.36
29-May	01h 24m 59.24s	+06° 51' 25.7"	0.7277807	0.									

Date	A.R. Geoc.	Dec. Geoc.	R A.U.	Distance A.U.	Light (m)	El. °	Diam. "	Mag.	Phase	Phase angle°	Rise	Transit	Set
30-May	01h 28m 27.66s	+07° 07' 40.1"	0.7278370	0.6457906	5.37	45.7	25.8	-4.3	0.457	94.9	2.38	9.07	15.37
31-May	01h 31m 57.99s	+07° 24' 08.9"	0.7278899	0.6537990	5.44	45.7	25.5	-4.3	0.463	94.3	2.37	9.07	15.37
1-Jun	01h 35m 30.21s	+07° 40' 51.0"	0.7279393	0.6618162	5.50	45.8	25.2	-4.3	0.469	93.6	2.36	9.06	15.38
2-Jun	01h 39m 04.29s	+07° 57' 45.6"	0.7279851	0.6698410	5.57	45.8	24.9	-4.3	0.474	92.9	2.34	9.06	15.39
3-Jun	01h 42m 40.18s	+08° 14' 51.6"	0.7280273	0.6778722	5.64	45.8	24.6	-4.3	0.480	92.3	2.33	9.06	15.39
4-Jun	01h 46m 17.87s	+08° 32' 08.0"	0.7280659	0.6859089	5.70	45.8	24.3	-4.3	0.486	91.6	2.31	9.05	15.40
5-Jun	01h 49m 57.33s	+08° 49' 33.9"	0.7281009	0.6939497	5.77	45.8	24.0	-4.3	0.491	91.0	2.30	9.05	15.41
6-Jun	01h 53m 38.53s	+09° 07' 08.2"	0.7281321	0.7019935	5.84	45.9	23.8	-4.3	0.497	90.4	2.29	9.05	15.42
7-Jun	01h 57m 21.46s	+09° 24' 50.2"	0.7281597	0.7100391	5.90	45.8	23.5	-4.3	0.502	89.8	2.27	9.05	15.43
8-Jun	02h 01m 06.10s	+09° 42' 38.7"	0.7281835	0.7180853	5.97	45.8	23.2	-4.3	0.507	89.1	2.26	9.05	15.44
9-Jun	02h 04m 52.42s	+10° 00' 32.8"	0.7282036	0.7261309	6.04	45.8	23.0	-4.3	0.513	88.5	2.25	9.04	15.45
10-Jun	02h 08m 40.41s	+10° 18' 31.6"	0.7282200	0.7341748	6.11	45.8	22.7	-4.3	0.518	87.9	2.23	9.04	15.46
11-Jun	02h 12m 30.04s	+10° 36' 34.0"	0.7282325	0.7422157	6.17	45.8	22.5	-4.3	0.523	87.3	2.22	9.04	15.47
12-Jun	02h 16m 21.31s	+10° 54' 39.2"	0.7282413	0.7502525	6.24	45.7	22.2	-4.3	0.528	86.7	2.21	9.04	15.48
13-Jun	02h 20m 14.20s	+11° 12' 46.3"	0.7282463	0.7582840	6.31	45.7	22.0	-4.3	0.533	86.2	2.20	9.04	15.49
14-Jun	02h 24m 08.69s	+11° 30' 54.2"	0.7282475	0.7663092	6.37	45.6	21.8	-4.2	0.539	85.6	2.19	9.04	15.50
15-Jun	02h 28m 04.77s	+11° 49' 02.0"	0.7282450	0.7743270	6.44	45.6	21.5	-4.2	0.544	85.0	2.17	9.04	15.51
16-Jun	02h 32m 02.44s	+12° 07' 08.9"	0.7282386	0.7823363	6.51	45.5	21.3	-4.2	0.548	84.4	2.16	9.04	15.52
17-Jun	02h 36m 01.67s	+12° 25' 13.9"	0.7282285	0.7903360	6.57	45.5	21.1	-4.2	0.553	83.9	2.15	9.04	15.54
18-Jun	02h 40m 02.46s	+12° 43' 16.0"	0.7282146	0.7983252	6.64	45.4	20.9	-4.2	0.558	83.3	2.14	9.04	15.55
19-Jun	02h 44m 04.80s	+13° 01' 14.5"	0.7281969	0.8063028	6.71	45.3	20.7	-4.2	0.563	82.8	2.13	9.04	15.56
20-Jun	02h 48m 08.68s	+13° 19' 08.4"	0.7281755	0.8142682	6.77	45.2	20.5	-4.2	0.568	82.2	2.12	9.04	15.57
21-Jun	02h 52m 14.08s	+13° 36' 56.9"	0.7281503	0.8222203	6.84	45.1	20.3	-4.2	0.572	81.7	2.11	9.04	15.59
22-Jun	02h 56m 20.99s	+13° 54' 39.0"	0.7281214	0.8301586	6.90	45.1	20.1	-4.2	0.577	81.1	2.10	9.05	16.00
23-Jun	03h 00m 29.39s	+14° 12' 13.9"	0.7280888	0.8380826	6.97	45.0	19.9	-4.2	0.582	80.6	2.09	9.05	16.01
24-Jun	03h 04m 39.28s	+14° 29' 40.8"	0.7280526	0.8459916	7.04	44.9	19.7	-4.2	0.586	80.1	2.08	9.05	16.03
25-Jun	03h 08m 50.64s	+14° 46' 58.8"	0.7280127	0.8538855	7.10	44.8	19.5	-4.2	0.591	79.5	2.07	9.05	16.04
26-Jun	03h 13m 03.46s	+15° 04' 07.0"	0.7279692	0.8617638	7.17	44.7	19.4	-4.2	0.595	79.0	2.06	9.06	16.06
27-Jun	03h 17m 17.74s	+15° 21' 04.8"	0.7279221	0.8696264	7.23	44.6	19.2	-4.2	0.600	78.5	2.06	9.06	16.07
28-Jun	03h 21m 33.48s	+15° 37' 51.1"	0.7278715	0.8774729	7.30	44.4	19.0	-4.2	0.604	78.0	2.05	9.06	16.08
29-Jun	03h 25m 50.67s	+15° 54' 25.4"	0.7278174	0.8853030	7.36	44.3	18.8	-4.2	0.609	77.5	2.04	9.07	16.10
30-Jun	03h 30m 09.31s	+16° 10' 46.8"	0.7277598	0.8931164	7.43	44.2	18.7	-4.1	0.613	76.9	2.03	9.07	16.11
1-Jul	03h 34m 29.40s	+16° 26' 54.5"	0.7276987	0.9009126	7.49	44.1	18.5	-4.1	0.617	76.4	2.03	9.07	16.13
2-Jul	03h 38m 50.94s	+16° 42' 47.8"	0.7276343	0.9086912	7.56	44.0	18.4	-4.1	0.622	75.9	2.02	9.08	16.14
3-Jul	03h 43m 13.92s	+16° 58' 25.9"	0.7275666	0.9164516	7.62	43.8	18.2	-4.1	0.626	75.4	2.01	9.08	16.16
4-Jul	03h 47m 38.35s	+17° 13' 48.0"	0.7274956	0.9241932	7.69	43.7	18.1	-4.1	0.630	74.9	2.01	9.09	16.17
5-Jul	03h 52m 04.21s	+17° 28' 53.5"	0.7274213	0.9319156	7.75	43.6	17.9	-4.1	0.634	74.4	2.00	9.09	16.19
6-Jul	03h 56m 31.50s	+17° 43' 41.5"	0.7273439	0.9396181	7.81	43.4	17.8	-4.1	0.638	73.9	2.00	9.10	16.21
7-Jul	04h 01m 00.20s	+17° 58' 11.2"	0.7272634	0.9473000	7.88	43.3	17.6	-4.1	0.642	73.4	1.59	9.10	16.22
8-Jul	04h 05m 30.31s	+18° 12' 21.9"	0.7271799	0.9549606	7.94	43.1	17.5	-4.1	0.647	73.0	1.59	9.11	16.24
9-Jul	04h 10m 01.82s	+18° 26' 12.9"	0.7270933	0.9625994	8.00	43.0	17.3	-4.1	0.651	72.5	1.58	9.11	16.25
10-Jul	04h 14m 34.72s	+18° 39' 43.5"	0.7270038	0.9702156	8.07	42.8	17.2	-4.1	0.655	72.0	1.58	9.12	16.27
11-Jul	04h 19m 08.98s	+18° 52' 52.8"	0.7269115	0.9778085	8.13	42.7	17.1	-4.1	0.659	71.5	1.58	9.13	16.28
12-Jul	04h 23m 44.60s	+19° 05' 40.2"	0.7268164	0.9853773	8.19	42.5	16.9	-4.1	0.663	71.0	1.57	9.13	16.30
13-Jul	04h 28m 21.55s	+19° 18' 04.9"	0.7267185	0.9929214	8.26	42.4	16.8	-4.1	0.667	70.5	1.57	9.14	16.31
14-Jul	04h 32m 59.83s	+19° 30' 06.3"	0.7266181	1.0004401	8.32	42.2	16.7	-4.1	0.670	70.1	1.57	9.15	16.33
15-Jul	04h 37m 39.41s	+19° 41' 43.6"	0.7265150	1.0079325	8.38	42.1	16.6	-4.1	0.674	69.6	1.57	9.15	16.35
16-Jul	04h 42m 20.27s	+19° 52' 56.3"	0.7264095	1.0153981	8.44	41.9	16.4	-4.1	0.678	69.1	1.57	9.16	16.36
17-Jul	04h 47m 02.38s	+20° 03' 43.6"	0.7263016	1.0228361	8.51	41.7	16.3	-4.1	0.682	68.7	1.57	9.17	16.38
18-Jul	04h 51m 45.72s	+20° 14' 04.8"	0.7261913	1.0302458	8.57	41.6	16.2	-4.1	0.686	68.2	1.57	9.18	16.39
19-Jul	04h 56m 30.26s	+20° 23' 59.5"	0.7260789	1.0376267	8.63	41.4	16.1	-4.0	0.690	67.7	1.57	9.19	16.41
20-Jul	05h 01m 15.96s	+20° 33' 26.9"	0.7259642	1.0449782	8.69	41.2	16.0	-4.0	0.693	67.3	1.57	9.19	16.42
21-Jul	05h 06m 02.79s	+20° 42' 26.5"	0.7258475	1.0522998	8.75	41.0	15.9	-4.0	0.697	66.8	1.57	9.20	16.44
22-Jul	05h 10m 50.71s	+20° 50' 57.8"	0.7257288	1.0595912	8.81	40.9	15.7	-4.0	0.701	66.3	1.57	9.21	16.45
23-Jul	05h 15m 39.68s	+20° 59' 00.0"	0.7256083	1.0668523	8.87	40.7	15.6	-4.0	0.704	65.9	1.58	9.22	16.47
24-Jul	05h 20m 29.67s	+21° 06' 32.8"	0.7254859	1.0740829	8.93	40.5	15.5	-4.0	0.708	65.4	1.58	9.23	16.48
25-Jul	05h 25m 20.63s	+21° 13' 35.6"	0.7253618	1.0812830	8.99	40.3	15.4	-4.0	0.712	65.0	1.59	9.24	16.49
26-Jul	05h 30m 12.55s	+21° 20' 07.8"	0.7252362	1.0884525	9.05	40.1	15.3	-4.0	0.715	64.5	1.59	9.25	16.51
27-Jul	05h 35m 05.37s	+21° 26' 09.1"	0.7251090	1.0955914	9.11	40.0	15.2	-4.0	0.719	64.1	1.59	9.26	16.52
28-Jul	05h 39m 59.07s	+21° 31' 39.0"	0.7249804	1.1026996	9.17	39.8	15.1	-4.0	0.722	63.6	2.00	9.27	16.54
29-Jul	05h 44m 53.62s	+21° 36' 37.0"	0.7248505	1.1097769	9.23	39.6	15.0	-4.0	0.726	63.2	2.01	9.28	16.55
30-Jul	05h 49m 48.97s	+21° 41' 02.7"	0.7247194	1.1168233	9.29	39.4	14.9	-4.0	0.729	62.7	2.01	9.29	16.56
31-Jul	05h 54m 45.08s	+21° 44' 55.8"	0.7245872	1.1238384	9.35	39.2	14.8	-4.0	0.733	62.3	2.02	9.30	16.57
1-Aug	05h 59m 41.92s	+21° 48' 15.8"	0.7244539	1.1308221	9.40	39.0	14.8	-4.0	0.736	61.8	2.03	9.31	16.59
2-Aug	06h 04m 39.44s	+21° 51' 02.5"	0.7243198	1.1377740	9.46	38.8	14.7	-4.0	0.739	61.4	2.03	9.32	17.00
3-Aug	06h 09m 37.61s	+21° 53' 15.5"	0.7241848	1.1446938	9.52	38.6	14.6	-4.0	0.743	60.9	2.04	9.33	17.01
4-Aug	06h 14m 36.38s	+21° 54' 54.5"	0.7240492	1.1515812	9.58	38.4	14.5	-4.0	0.746	60.5	2.05	9.34	17.02
5-Aug	06h 19m 35.70s	+21° 55' 59.1"	0.7239130	1.1584357	9.63	38.2	14.4	-4.0	0.750	60.1	2.06	9.35	17.03
6-Aug	06h 24m 35.53s	+21° 56' 29.1"	0.7237763	1.1652570	9.69	38.0	14.3	-4.0	0.753	59.6	2.07	9.36	17.04
7-Aug	06h 29m 35.83s	+21° 56' 24.3"	0.7236391	1.1720445	9.75	37.8	14.2	-4.0	0.756	59.2	2.08	9.37	17.05
8-Aug	06h 34m 36.54s	+21° 55' 44.4"	0.7235018	1.1787979	9.80	37.6	14.2	-4.0	0.759	58.8	2.09	9.38	17.06
9-Aug	06h 39m 37.64s	+21° 54' 29.2"	0.7233642	1.1855166	9.86	37.4	14.1	-4.0	0.763	58.3	2.11	9.39	17.07
10-Aug	06h 44m 39.06s	+21° 52' 38.6"	0.7232266	1.1922002	9.91	37.2	14.0	-4.0	0.766	57.9	2.12	9.40	17.08
11-Aug	06h 49m 40.76s	+21° 50' 12.4"	0.7230891	1.1988479	9.97	37.0	13.9	-4.0	0.769	57.4	2.13	9.41	17.09
12-Aug	06h 54m 42.71s	+21° 47' 10.5"	0.7229517	1.2054594	10.02	36.8	13.8	-4.0	0.772	57.0	2.14	9.42	17.10
13-Aug	06h 59m 44.84s	+21° 43' 32.9"	0.7228145	1.2120340	10.08	36.5	13.8	-4.0	0.775	56.6	2.16	9.43	17.11
14-Aug	07h 04m 47.12s	+21° 39' 19.4"	0.7226778	1.2185711	10.13	36.3	13.7	-4.0	0.778	56.2	2.17	9.44	17.12

Date	A.R. Geoc.	Dec. Geoc.	R A.U.	Distance A.U.	Light (m)	El. °	Diam. "	Mag.	Phase	Phase angle°	Rise	Transit	Set
15-Aug	07h 09m 49.49s	+21° 34' 30.0"	0.7225415	1.2250702	10.19	36.1	13.6	-4.0	0.782	55.7	2.19	9.46	17.12
16-Aug	07h 14m 51.91s	+21° 29' 04.9"	0.7224058	1.2315308	10.24	35.9	13.5	-4.0	0.785	55.3	2.20	9.47	17.13
17-Aug	07h 19m 54.32s	+21° 23' 03.9"	0.7222708	1.2379523	10.29	35.7	13.5	-4.0	0.788	54.9	2.22	9.48	17.14
18-Aug	07h 24m 56.67s	+21° 16' 27.3"	0.7221366	1.2443343	10.35	35.5	13.4	-4.0	0.791	54.4	2.23	9.49	17.14
19-Aug	07h 29m 58.91s	+21° 09' 15.0"	0.7220033	1.2506765	10.40	35.3	13.3	-4.0	0.794	54.0	2.25	9.50	17.15
20-Aug	07h 35m 01.00s	+21° 01' 27.2"	0.7218710	1.2569788	10.45	35.0	13.3	-4.0	0.797	53.6	2.27	9.51	17.15
21-Aug	07h 40m 02.87s	+20° 53' 04.1"	0.7217398	1.2632408	10.51	34.8	13.2	-4.0	0.800	53.2	2.28	9.52	17.16
22-Aug	07h 45m 04.50s	+20° 44' 05.8"	0.7216099	1.2694628	10.56	34.6	13.1	-4.0	0.803	52.7	2.30	9.53	17.16
23-Aug	07h 50m 05.85s	+20° 34' 32.4"	0.7214812	1.2756446	10.61	34.4	13.1	-4.0	0.806	52.3	2.32	9.54	17.16
24-Aug	07h 55m 06.87s	+20° 24' 24.3"	0.7213540	1.2817865	10.66	34.2	13.0	-4.0	0.809	51.9	2.34	9.55	17.17
25-Aug	08h 00m 07.52s	+20° 13' 41.6"	0.7212283	1.2878884	10.71	33.9	13.0	-4.0	0.811	51.5	2.36	9.56	17.17
26-Aug	08h 05m 07.79s	+20° 02' 24.6"	0.7211043	1.2939504	10.76	33.7	12.9	-4.0	0.814	51.1	2.37	9.58	17.17
27-Aug	08h 10m 07.62s	+19° 50' 33.6"	0.7209819	1.2999726	10.81	33.5	12.8	-4.0	0.817	50.6	2.39	9.59	17.17
28-Aug	08h 15m 06.99s	+19° 38' 08.8"	0.7208614	1.3059550	10.86	33.3	12.8	-4.0	0.820	50.2	2.41	10.00	17.17
29-Aug	08h 20m 05.88s	+19° 25' 10.7"	0.7207428	1.3118975	10.91	33.0	12.7	-4.0	0.823	49.8	2.43	10.01	17.17
30-Aug	08h 25m 04.24s	+19° 11' 39.5"	0.7206263	1.3178000	10.96	32.8	12.7	-4.0	0.825	49.4	2.45	10.02	17.17
31-Aug	08h 30m 02.06s	+18° 57' 35.6"	0.7205118	1.3236625	11.01	32.6	12.6	-4.0	0.828	49.0	2.47	10.03	17.17
1-Sep	08h 34m 59.32s	+18° 42' 59.4"	0.7203995	1.3294848	11.06	32.3	12.6	-4.0	0.831	48.6	2.49	10.04	17.17
2-Sep	08h 39m 55.98s	+18° 27' 51.1"	0.7202895	1.3352668	11.10	32.1	12.5	-4.0	0.834	48.1	2.51	10.05	17.17
3-Sep	08h 44m 52.03s	+18° 12' 11.3"	0.7201819	1.3410082	11.15	31.9	12.4	-4.0	0.836	47.7	2.54	10.06	17.17
4-Sep	08h 49m 47.44s	+17° 56' 00.4"	0.7200768	1.3467089	11.20	31.7	12.4	-4.0	0.839	47.3	2.56	10.07	17.17
5-Sep	08h 54m 42.22s	+17° 39' 18.8"	0.7199742	1.3523686	11.25	31.4	12.3	-4.0	0.842	46.9	2.58	10.08	17.17
6-Sep	08h 59m 36.34s	+17° 22' 06.8"	0.7198742	1.3579870	11.29	31.2	12.3	-4.0	0.844	46.5	3.00	10.09	17.17
7-Sep	09h 04m 29.78s	+17° 04' 25.1"	0.7197770	1.3635638	11.34	31.0	12.2	-4.0	0.847	46.1	3.02	10.10	17.16
8-Sep	09h 09m 22.55s	+16° 46' 14.0"	0.7196825	1.3690986	11.39	30.7	12.2	-4.0	0.849	45.7	3.04	10.10	17.16
9-Sep	09h 14m 14.63s	+16° 27' 34.0"	0.7195909	1.3745910	11.43	30.5	12.1	-4.0	0.852	45.3	3.06	10.11	17.16
10-Sep	09h 19m 06.02s	+16° 08' 25.8"	0.7195022	1.3800406	11.48	30.3	12.1	-4.0	0.855	44.8	3.09	10.12	17.15
11-Sep	09h 23m 56.71s	+15° 48' 49.8"	0.7194166	1.3854469	11.52	30.0	12.0	-4.0	0.857	44.4	3.11	10.13	17.15
12-Sep	09h 28m 46.69s	+15° 28' 46.5"	0.7193340	1.3908096	11.57	29.8	12.0	-4.0	0.860	44.0	3.13	10.14	17.14
13-Sep	09h 33m 35.96s	+15° 08' 16.7"	0.7192546	1.3961280	11.61	29.5	12.0	-4.0	0.862	43.6	3.15	10.15	17.14
14-Sep	09h 38m 24.52s	+14° 47' 20.7"	0.7191784	1.4014019	11.65	29.3	11.9	-4.0	0.864	43.2	3.18	10.16	17.13
15-Sep	09h 43m 12.35s	+14° 25' 59.4"	0.7191055	1.4066308	11.70	29.1	11.9	-3.9	0.867	42.8	3.20	10.17	17.13
16-Sep	09h 47m 59.47s	+14° 04' 13.2"	0.7190359	1.4118144	11.74	28.8	11.8	-3.9	0.869	42.4	3.22	10.18	17.12
17-Sep	09h 52m 45.87s	+13° 42' 02.7"	0.7189697	1.4169524	11.78	28.6	11.8	-3.9	0.872	42.0	3.25	10.18	17.11
18-Sep	09h 57m 31.55s	+13° 19' 28.7"	0.7189070	1.4220447	11.83	28.4	11.7	-3.9	0.874	41.6	3.27	10.19	17.11
19-Sep	10h 02m 16.52s	+12° 56' 31.7"	0.7188477	1.4270914	11.87	28.1	11.7	-3.9	0.876	41.2	3.29	10.20	17.10
20-Sep	10h 07m 00.80s	+12° 33' 12.4"	0.7187920	1.4320924	11.91	27.9	11.7	-3.9	0.879	40.8	3.31	10.21	17.09
21-Sep	10h 11m 44.38s	+12° 09' 31.4"	0.7187399	1.4370478	11.95	27.6	11.6	-3.9	0.881	40.4	3.34	10.22	17.08
22-Sep	10h 16m 27.29s	+11° 45' 29.3"	0.7186914	1.4419579	11.99	27.4	11.6	-3.9	0.883	40.0	3.36	10.22	17.08
23-Sep	10h 21m 09.54s	+11° 21' 06.9"	0.7186466	1.4468227	12.03	27.1	11.5	-3.9	0.885	39.6	3.38	10.23	17.07
24-Sep	10h 25m 51.14s	+10° 56' 24.7"	0.7186054	1.4516426	12.07	26.9	11.5	-3.9	0.888	39.2	3.41	10.24	17.06
25-Sep	10h 30m 32.10s	+10° 31' 23.5"	0.7185681	1.4564176	12.11	26.7	11.5	-3.9	0.890	38.8	3.43	10.25	17.05
26-Sep	10h 35m 12.46s	+10° 06' 03.8"	0.7185345	1.4611479	12.15	26.4	11.4	-3.9	0.892	38.4	3.45	10.25	17.04
27-Sep	10h 39m 52.22s	+09° 40' 26.4"	0.7185047	1.4658336	12.19	26.2	11.4	-3.9	0.894	38.0	3.48	10.26	17.03
28-Sep	10h 44m 31.42s	+09° 14' 31.9"	0.7184787	1.4704748	12.23	25.9	11.3	-3.9	0.896	37.6	3.50	10.27	17.02
29-Sep	10h 49m 10.06s	+08° 48' 21.0"	0.7184566	1.4750716	12.27	25.7	11.3	-3.9	0.898	37.2	3.52	10.27	17.02
30-Sep	10h 53m 48.18s	+08° 21' 54.4"	0.7184383	1.4796241	12.30	25.4	11.3	-3.9	0.900	36.8	3.55	10.28	17.01
1-Oct	10h 58m 25.81s	+07° 55' 12.6"	0.7184240	1.4841323	12.34	25.2	11.2	-3.9	0.902	36.4	3.57	10.29	17.00
2-Oct	11h 03m 02.96s	+07° 28' 16.5"	0.7184135	1.4885962	12.38	25.0	11.2	-3.9	0.904	36.0	3.59	10.29	16.59
3-Oct	11h 07m 39.68s	+07° 01' 06.6"	0.7184069	1.4930159	12.42	24.7	11.2	-3.9	0.906	35.6	4.02	10.30	16.58
4-Oct	11h 12m 15.99s	+06° 33' 43.6"	0.7184042	1.4973912	12.45	24.5	11.1	-3.9	0.908	35.2	4.04	10.31	16.57
5-Oct	11h 16m 51.92s	+06° 06' 08.2"	0.7184054	1.5017221	12.49	24.2	11.1	-3.9	0.910	34.8	4.06	10.31	16.56
6-Oct	11h 21m 27.51s	+05° 38' 21.1"	0.7184105	1.5060084	12.52	24.0	11.1	-3.9	0.912	34.4	4.09	10.32	16.55
7-Oct	11h 26m 02.80s	+05° 10' 22.9"	0.7184196	1.5102500	12.56	23.7	11.0	-3.9	0.914	34.0	4.11	10.33	16.53
8-Oct	11h 30m 37.80s	+04° 42' 14.4"	0.7184325	1.5144465	12.59	23.5	11.0	-3.9	0.916	33.7	4.13	10.33	16.52
9-Oct	11h 35m 12.57s	+04° 13' 56.2"	0.7184493	1.5185978	12.63	23.2	11.0	-3.9	0.918	33.3	4.16	10.34	16.51
10-Oct	11h 39m 47.12s	+03° 45' 29.1"	0.7184700	1.5227034	12.66	23.0	11.0	-3.9	0.920	32.9	4.18	10.35	16.50
11-Oct	11h 44m 21.50s	+03° 16' 53.8"	0.7184946	1.5267631	12.70	22.7	10.9	-3.9	0.922	32.5	4.20	10.35	16.49
12-Oct	11h 48m 55.73s	+02° 48' 11.0"	0.7185229	1.5307765	12.73	22.5	10.9	-3.9	0.924	32.1	4.23	10.36	16.48
13-Oct	11h 53m 29.84s	+02° 19' 21.5"	0.7185551	1.5347433	12.76	22.2	10.9	-3.9	0.925	31.7	4.25	10.36	16.47
14-Oct	11h 58m 03.88s	+01° 50' 26.0"	0.7185911	1.5386633	12.80	22.0	10.8	-3.9	0.927	31.3	4.28	10.37	16.46
15-Oct	12h 02m 37.87s	+01° 21' 25.2"	0.7186308	1.5425362	12.83	21.8	10.8	-3.9	0.929	30.9	4.30	10.38	16.45
16-Oct	12h 07m 11.85s	+00° 52' 19.9"	0.7186743	1.5463618	12.86	21.5	10.8	-3.9	0.931	30.6	4.32	10.38	16.44
17-Oct	12h 11m 45.85s	+00° 23' 10.8"	0.7187214	1.5501402	12.89	21.3	10.8	-3.9	0.932	30.2	4.35	10.39	16.42
18-Oct	12h 16m 19.92s	-00° 06' 01.3"	0.7187722	1.5538713	12.92	21.0	10.7	-3.9	0.934	29.8	4.37	10.40	16.41
19-Oct	12h 20m 54.08s	-00° 35' 15.7"	0.7188266	1.5575553	12.95	20.8	10.7	-3.9	0.936	29.4	4.39	10.40	16.40
20-Oct	12h 25m 28.37s	-01° 04' 31.7"	0.7188846	1.5611924	12.98	20.5	10.7	-3.9	0.937	29.0	4.42	10.41	16.39
21-Oct	12h 30m 02.83s	-01° 33' 48.5"	0.7189461	1.5647827	13.01	20.3	10.7	-3.9	0.939	28.7	4.44	10.42	16.38
22-Oct	12h 34m 37.50s	-02° 03' 05.4"	0.7190110	1.5683266	13.04	20.0	10.6	-3.9	0.940	28.3	4.47	10.42	16.37
23-Oct	12h 39m 12.40s	-02° 32' 21.6"	0.7190794	1.5718242	13.07	19.8	10.6	-3.9	0.942	27.9	4.49	10.43	16.36
24-Oct	12h 43m 47.58s	-03° 01' 36.4"	0.7191511	1.5752758	13.10	19.5	10.6	-3.9	0.943	27.5	4.51	10.43	16.35
25-Oct	12h 48m 23.08s	-03° 30' 49.0"	0.7192262	1.5786818	13.13	19.3	10.6	-3.9	0.945	27.2	4.54	10.44	16.34
26-Oct	12h 52m 58.92s	-03° 59' 58.6"	0.7193045	1.5820424	13.16	19.0	10.5	-3.9	0.946	26.8	4.56	10.45	16.32
27-Oct	12h 57m 35.15s	-04° 29' 04.6"	0.7193859	1.5853577	13.18	18.8	10.5	-3.9	0.948	26.4	4.59	10.45	16.31
28-Oct	13h 02m 11.81s	-04° 58' 06.2"	0.7194705	1.5886282	13.21	18.5	10.5	-3.9	0.949	26.0	5.01	10.46	16.30
29-Oct	13h 06m 48.94s	-05° 27' 02.5"	0.7195581	1.5918540	13.24	18.3	10.5	-3.9	0.951	25.7	5.03	10.47	16.29
30-Oct	13h 11m 26.57s												

Date	A.R. Geoc.	Dec. Geoc.	R A.U.	Distance A.U.	Light (m)	El. °	Diam. "	Mag.	Phase	Phase angle°	Rise	Transit	Set
31-Oct	13h 16m 04.74s	-06° 24' 36.8"	0.7197422	1.5981723	13.29	17.8	10.4	-3.9	0.953	24.9	5.08	10.48	16.27
1-Nov	13h 20m 43.50s	-06° 53' 13.1"	0.7198385	1.6012653	13.32	17.5	10.4	-3.9	0.955	24.5	5.11	10.49	16.26
2-Nov	13h 25m 22.88s	-07° 21' 41.3"	0.7199375	1.6043144	13.34	17.3	10.4	-3.9	0.956	24.2	5.13	10.50	16.25
3-Nov	13h 30m 02.93s	-07° 50' 00.6"	0.7200392	1.6073197	13.37	17.0	10.4	-3.9	0.957	23.8	5.16	10.50	16.24
4-Nov	13h 34m 43.67s	-08° 18' 10.1"	0.7201436	1.6102812	13.39	16.8	10.4	-3.9	0.959	23.4	5.18	10.51	16.23
5-Nov	13h 39m 25.16s	-08° 46' 09.3"	0.7202504	1.6131989	13.42	16.5	10.3	-3.9	0.960	23.1	5.21	10.52	16.22
6-Nov	13h 44m 07.41s	-09° 13' 57.2"	0.7203596	1.6160727	13.44	16.3	10.3	-3.9	0.961	22.7	5.23	10.53	16.21
7-Nov	13h 48m 50.48s	-09° 41' 33.0"	0.7204711	1.6189025	13.46	16.0	10.3	-3.9	0.962	22.3	5.26	10.53	16.20
8-Nov	13h 53m 34.38s	-10° 08' 56.1"	0.7205849	1.6216879	13.49	15.8	10.3	-3.9	0.964	22.0	5.28	10.54	16.19
9-Nov	13h 58m 19.15s	-10° 36' 05.5"	0.7207009	1.6244288	13.51	15.5	10.3	-3.9	0.965	21.6	5.31	10.55	16.19
10-Nov	14h 03m 04.83s	-11° 03' 00.5"	0.7208189	1.6271249	13.53	15.3	10.3	-3.9	0.966	21.2	5.33	10.56	16.18
11-Nov	14h 07m 51.43s	-11° 29' 40.3"	0.7209388	1.6297761	13.55	15.0	10.2	-3.9	0.967	20.9	5.36	10.57	16.17
12-Nov	14h 12m 38.99s	-11° 56' 03.9"	0.7210606	1.6323821	13.58	14.8	10.2	-3.9	0.968	20.5	5.38	10.57	16.16
13-Nov	14h 17m 27.54s	-12° 22' 10.7"	0.7211842	1.6349427	13.60	14.5	10.2	-3.9	0.969	20.2	5.41	10.58	16.15
14-Nov	14h 22m 17.11s	-12° 47' 59.9"	0.7213095	1.6374580	13.62	14.3	10.2	-3.9	0.970	19.8	5.43	10.59	16.15
15-Nov	14h 27m 07.71s	-13° 13' 30.5"	0.7214363	1.6399279	13.64	14.0	10.2	-3.9	0.971	19.4	5.46	11.00	16.14
16-Nov	14h 31m 59.37s	-13° 38' 41.8"	0.7215646	1.6423525	13.66	13.8	10.2	-3.9	0.973	19.1	5.48	11.01	16.13
17-Nov	14h 36m 52.12s	-14° 03' 33.1"	0.7216942	1.6447318	13.68	13.6	10.1	-3.9	0.974	18.7	5.51	11.02	16.13
18-Nov	14h 41m 45.96s	-14° 28' 03.4"	0.7218251	1.6470661	13.70	13.3	10.1	-3.9	0.975	18.4	5.53	11.03	16.12
19-Nov	14h 46m 40.91s	-14° 52' 12.0"	0.7219572	1.6493556	13.72	13.1	10.1	-3.9	0.975	18.0	5.56	11.04	16.11
20-Nov	14h 51m 37.00s	-15° 15' 58.1"	0.7220904	1.6516006	13.74	12.8	10.1	-3.9	0.976	17.7	5.58	11.05	16.11
21-Nov	14h 56m 34.22s	-15° 39' 20.8"	0.7222244	1.6538013	13.75	12.6	10.1	-3.9	0.977	17.3	6.01	11.06	16.10
22-Nov	15h 01m 32.60s	-16° 02' 19.4"	0.7223593	1.6559580	13.77	12.3	10.1	-3.9	0.978	17.0	6.04	11.07	16.10
23-Nov	15h 06m 32.15s	-16° 24' 53.0"	0.7224950	1.6580711	13.79	12.1	10.1	-3.9	0.979	16.6	6.06	11.08	16.09
24-Nov	15h 11m 32.87s	-16° 47' 00.9"	0.7226313	1.6601409	13.81	11.8	10.1	-3.9	0.980	16.3	6.09	11.09	16.09
25-Nov	15h 16m 34.77s	-17° 08' 42.3"	0.7227681	1.6621677	13.82	11.6	10.0	-3.9	0.981	15.9	6.11	11.10	16.09
26-Nov	15h 21m 37.87s	-17° 29' 56.4"	0.7229053	1.6641518	13.84	11.3	10.0	-3.9	0.982	15.6	6.14	11.11	16.08
27-Nov	15h 26m 42.15s	-17° 50' 42.4"	0.7230428	1.6660936	13.86	11.1	10.0	-3.9	0.982	15.2	6.16	11.13	16.08
28-Nov	15h 31m 47.64s	-18° 10' 59.6"	0.7231806	1.6679934	13.87	10.8	10.0	-3.9	0.983	14.9	6.19	11.14	16.08
29-Nov	15h 36m 54.32s	-18° 30' 47.1"	0.7233184	1.6698515	13.89	10.6	10.0	-3.9	0.984	14.5	6.21	11.15	16.08
30-Nov	15h 42m 02.21s	-18° 50' 04.4"	0.7234562	1.6716683	13.90	10.3	10.0	-3.9	0.985	14.2	6.24	11.16	16.08
1-Dec	15h 47m 11.28s	-19° 08' 50.6"	0.7235938	1.6734440	13.92	10.1	10.0	-3.9	0.986	13.8	6.26	11.17	16.08
2-Dec	15h 52m 21.55s	-19° 27' 05.0"	0.7237313	1.6751788	13.93	9.9	10.0	-3.9	0.986	13.5	6.29	11.19	16.08
3-Dec	15h 57m 33.00s	-19° 44' 47.0"	0.7238684	1.6768731	13.95	9.6	10.0	-3.9	0.987	13.1	6.31	11.20	16.08
4-Dec	16h 02m 45.62s	-20° 01' 55.7"	0.7240050	1.6785267	13.96	9.4	9.9	-3.9	0.988	12.8	6.34	11.21	16.08
5-Dec	16h 07m 59.39s	-20° 18' 30.5"	0.7241411	1.6801396	13.97	9.1	9.9	-3.9	0.988	12.5	6.36	11.22	16.08
6-Dec	16h 13m 14.29s	-20° 34' 30.7"	0.7242765	1.6817119	13.99	8.9	9.9	-3.9	0.989	12.1	6.39	11.24	16.08
7-Dec	16h 18m 30.31s	-20° 49' 55.6"	0.7244112	1.6832432	14.00	8.6	9.9	-3.9	0.989	11.8	6.41	11.25	16.08
8-Dec	16h 23m 47.41s	-21° 04' 44.5"	0.7245450	1.6847334	14.01	8.4	9.9	-3.9	0.990	11.4	6.44	11.26	16.09
9-Dec	16h 29m 05.59s	-21° 18' 56.8"	0.7246778	1.6861823	14.02	8.1	9.9	-3.9	0.991	11.1	6.46	11.28	16.09
10-Dec	16h 34m 24.80s	-21° 32' 31.9"	0.7248095	1.6875896	14.03	7.9	9.9	-3.9	0.991	10.8	6.48	11.29	16.09
11-Dec	16h 39m 45.01s	-21° 45' 29.0"	0.7249401	1.6889552	14.05	7.6	9.9	-3.9	0.992	10.4	6.51	11.31	16.10
12-Dec	16h 45m 06.20s	-21° 57' 47.8"	0.7250694	1.6902790	14.06	7.4	9.9	-3.9	0.992	10.1	6.53	11.32	16.10
13-Dec	16h 50m 28.33s	-22° 09' 27.5"	0.7251973	1.6915607	14.07	7.2	9.9	-3.9	0.993	9.7	6.55	11.33	16.11
14-Dec	16h 55m 51.34s	-22° 20' 27.7"	0.7253237	1.6928005	14.08	6.9	9.9	-3.9	0.993	9.4	6.58	11.35	16.12
15-Dec	17h 01m 15.21s	-22° 30' 47.9"	0.7254486	1.6939982	14.09	6.7	9.9	-3.9	0.994	9.1	7.00	11.36	16.12
16-Dec	17h 06m 39.87s	-22° 40' 27.6"	0.7255718	1.6951540	14.10	6.4	9.8	-3.9	0.994	8.7	7.02	11.38	16.13
17-Dec	17h 12m 05.28s	-22° 49' 26.3"	0.7256932	1.6962680	14.11	6.2	9.8	-3.9	0.995	8.4	7.04	11.39	16.14
18-Dec	17h 17m 31.38s	-22° 57' 43.6"	0.7258128	1.6973402	14.12	5.9	9.8	-3.9	0.995	8.1	7.06	11.41	16.15
19-Dec	17h 22m 58.13s	-23° 05' 19.1"	0.7259304	1.6983709	14.12	5.7	9.8	-3.9	0.995	7.7	7.08	11.42	16.16
20-Dec	17h 28m 25.46s	-23° 12' 12.4"	0.7260459	1.6993603	14.13	5.5	9.8	-3.9	0.996	7.4	7.10	11.44	16.17
21-Dec	17h 33m 53.33s	-23° 18' 23.2"	0.7261594	1.7003086	14.14	5.2	9.8	-3.9	0.996	7.1	7.12	11.45	16.18
22-Dec	17h 39m 21.66s	-23° 23' 51.2"	0.7262706	1.7012160	14.15	5.0	9.8	-3.9	0.997	6.8	7.14	11.47	16.19
23-Dec	17h 44m 50.41s	-23° 28' 36.1"	0.7263795	1.7020828	14.16	4.7	9.8	-3.9	0.997	6.4	7.16	11.48	16.20
24-Dec	17h 50m 19.52s	-23° 32' 37.6"	0.7264861	1.7029093	14.16	4.5	9.8	-3.9	0.997	6.1	7.18	11.50	16.22
25-Dec	17h 55m 48.92s	-23° 35' 55.5"	0.7265902	1.7036959	14.17	4.3	9.8	-3.9	0.997	5.8	7.20	11.51	16.23
26-Dec	18h 01m 18.55s	-23° 38' 29.8"	0.7266917	1.7044427	14.18	4.0	9.8	-3.9	0.998	5.5	7.22	11.53	16.24
27-Dec	18h 06m 48.36s	-23° 40' 20.1"	0.7267906	1.7051501	14.18	3.8	9.8	-3.9	0.998	5.2	7.23	11.55	16.26
28-Dec	18h 12m 18.27s	-23° 41' 26.4"	0.7268869	1.7058185	14.19	3.6	9.8	-3.9	0.998	4.8	7.25	11.56	16.27
29-Dec	18h 17m 48.24s	-23° 41' 48.7"	0.7269803	1.7064482	14.19	3.3	9.8	-3.9	0.998	4.5	7.26	11.58	16.29
30-Dec	18h 23m 18.20s	-23° 41' 27.0"	0.7270709	1.7070394	14.20	3.1	9.8	-3.9	0.999	4.2	7.28	11.59	16.31
31-Dec	18h 28m 48.08s	-23° 40' 21.1"	0.7271587	1.7075925	14.20	2.9	9.8	-3.9	0.999	3.9	7.29	12.01	16.32

Legenda :

A.R., Dec. = apparent coordinates

R. = distance from the Sun in A.U.

Distance = distance from the Earth in A.U.

Light = Distance in minutes

El. = elongation from the Sun in °

Diam. = diameter in "

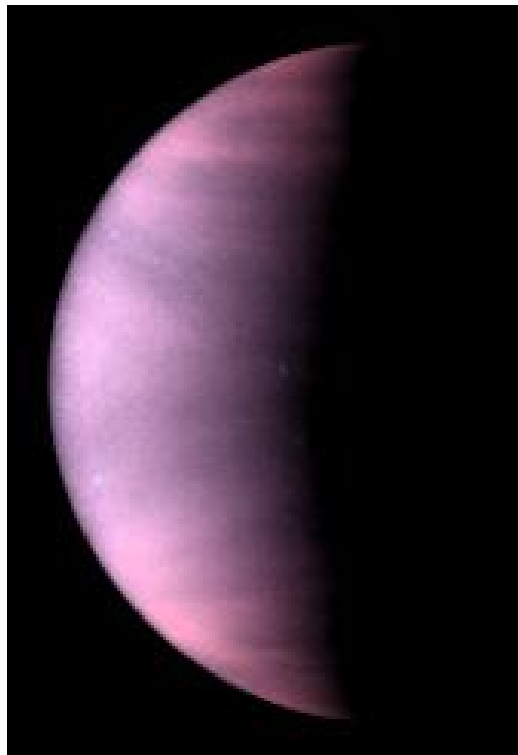
Mag. = magnitude

Times of rising and setting of the planet for Rome (42°N, 12°E), in U.T.+1

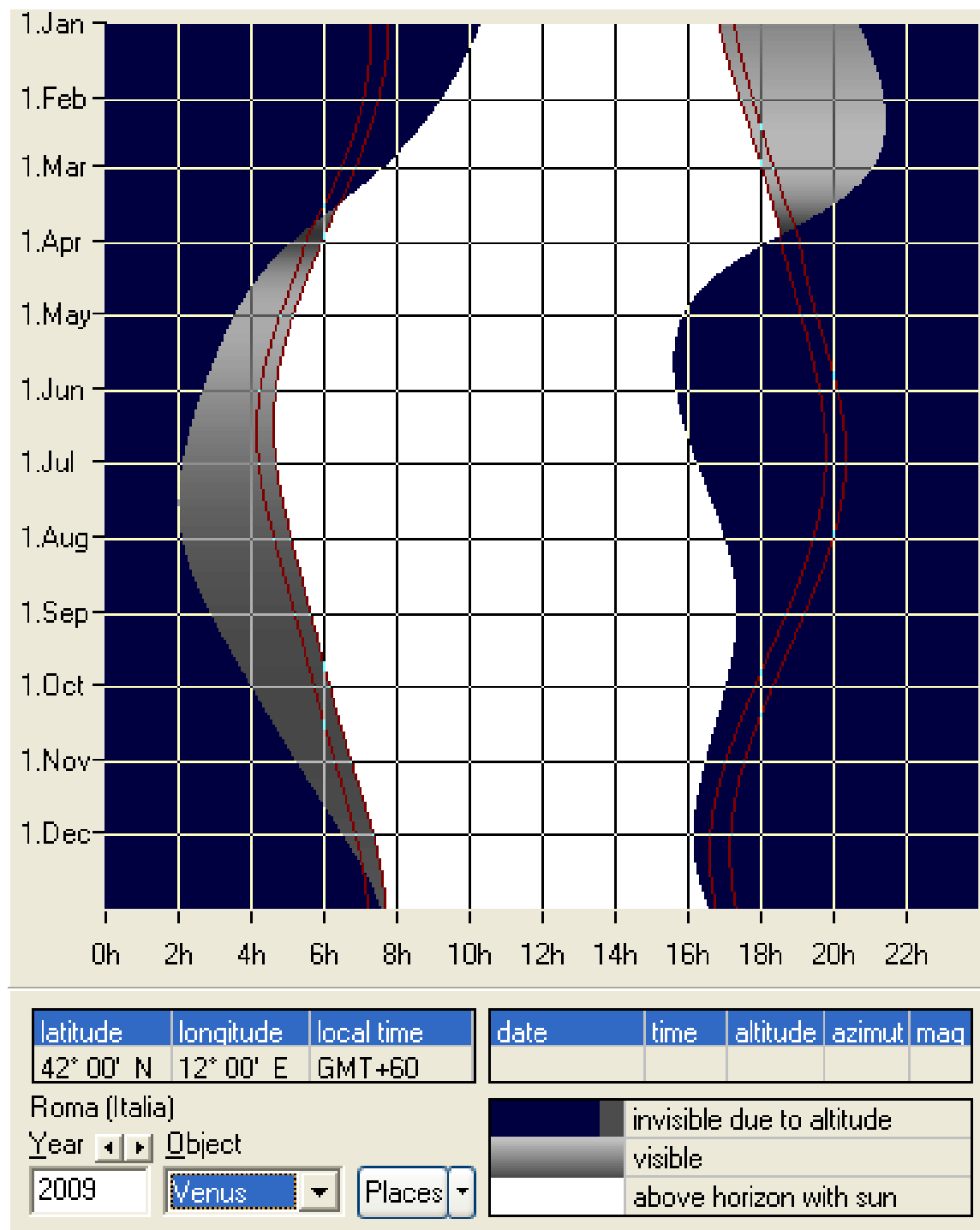
PHENOMENA OF VENUS

Perihelion	21/02/2009	14.20	0.71844 A.U.	
Perihelion	04/10/2009	04.29	0.71840 A.U.	
Aphelion	13/06/2009	19.43	0.72825 A.U.	
Perigee	27/03/2009	12.12	0.28147 A.U.	
Apogee	-----			
Maxima magnitude	20/02/2009	22.51	-4.6	Mag
Maxima magnitude	29/04/2009	07.21	-4.5	Mag
Minima magnitude	28/03/2009	06.45	-4.0	Mag
Maxima est elongation	14/01/2009	21.24	47.1	°
Maxima west elongation	05/06/2009	21.09	45.9	°
Inferior conjunction	27/03/2009	19.24		
Superior conjunction	-----			
Retrograde motion	05/03/2009	00.38		
Direct motion	15/04/2009	08.05		
Maxima phase angle	28/03/2009	02.10	168.7	°
Minima phase angle	-----			

© (5)



VISIBILITY OF VENUS



Visibility of Venus during the year

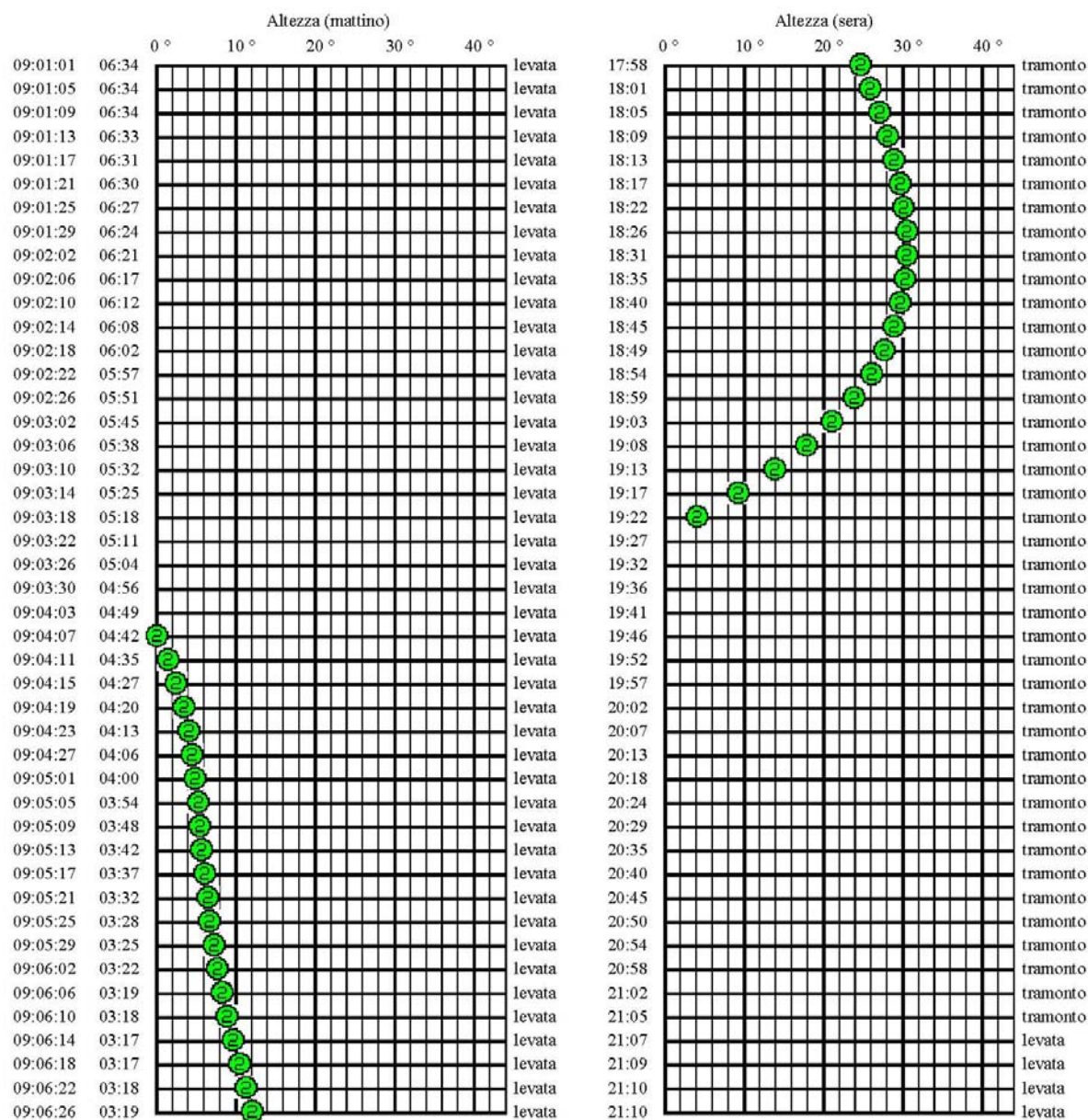
The external red lines show in what periods of the year the planet is sufficiently distant from the Sun to be able to be observed easily. The exact dates are in the following tables.

Altezza ai crepuscoli

di Venere

nel momento il cui il Sole è 12 ° sotto l'orizzonte

Postazione: IT:Roma 42:00 N, 12:00 E (UT +01:00)

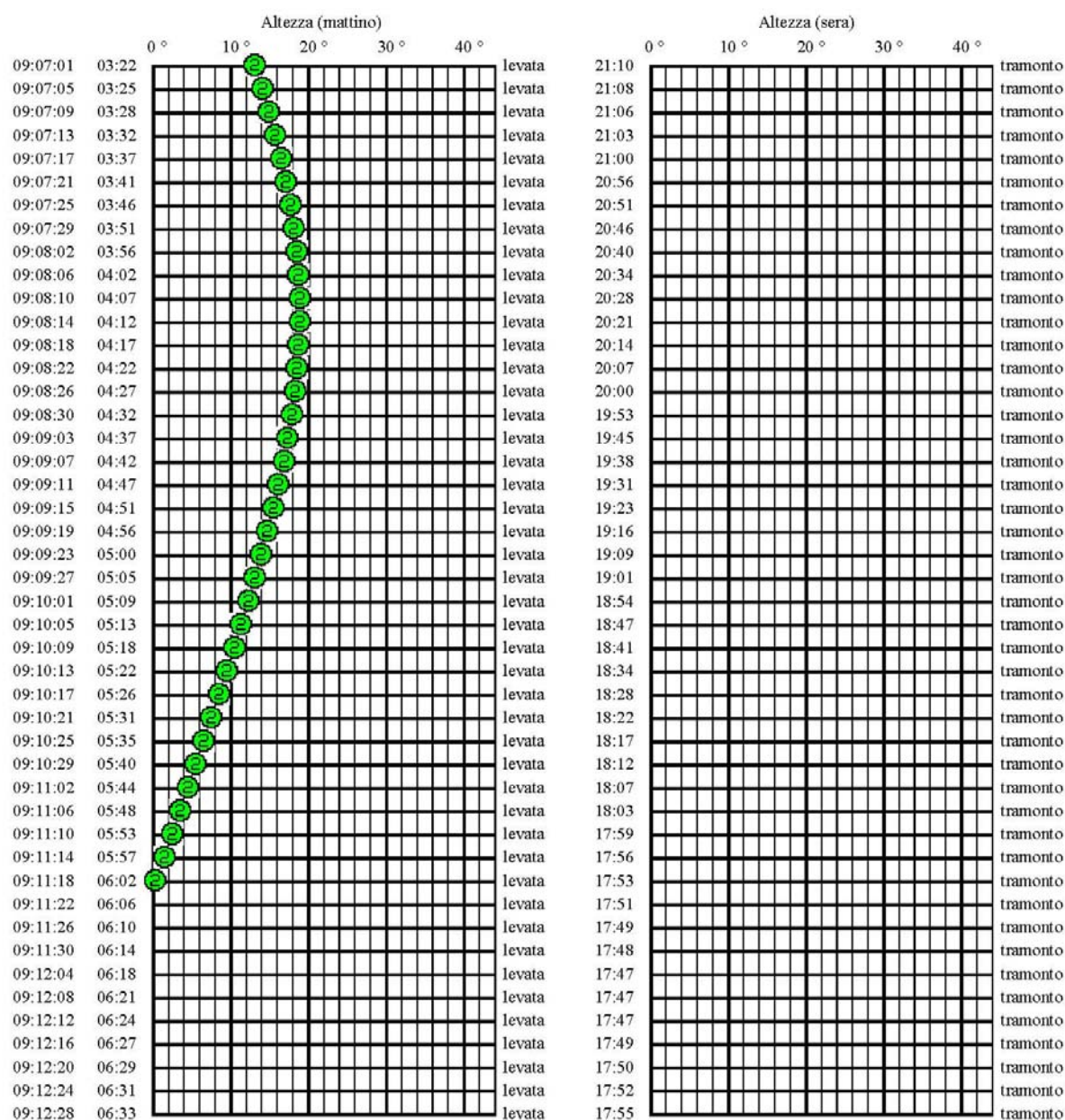


Altezza ai crepuscoli

di Venere

nel momento il cui il Sole è 12 ° sotto l'orizzonte

Postazione: IT:Roma 42:00 N, 12:00 E (UT +01:00)



Height in the twilights. The Sun is 12° under the horizon

Date	Morning twilight			Elong	Evening twilight			
	Times	Alt	Az		Times	Alt	Az	Elong
2009:01:01	06:34	-41.2	68.6	46.6	17:58	24.8	220.4	46.6
2009:01:05	06:34	-40.0	67.0	46.8	18:01	26.0	222.1	46.9
2009:01:09	06:34	-38.7	65.3	47.0	18:05	27.1	224.0	47.0
2009:01:13	06:33	-37.3	63.6	47.1	18:09	28.1	226.2	47.1
2009:01:17	06:31	-35.9	62.0	47.1	18:13	28.9	228.7	47.1
2009:01:21	06:30	-34.5	60.4	47.0	18:17	29.6	231.4	47.0
2009:01:25	06:27	-33.0	58.9	46.7	18:22	30.1	234.4	46.7
2009:01:29	06:24	-31.5	57.6	46.3	18:26	30.4	237.5	46.3
2009:02:02	06:21	-30.0	56.3	45.7	18:31	30.5	240.8	45.7
2009:02:06	06:17	-28.4	55.2	45.0	18:35	30.3	244.2	44.8
2009:02:10	06:12	-26.8	54.3	44.0	18:40	29.8	247.8	43.8
2009:02:14	06:08	-25.2	53.6	42.7	18:45	28.9	251.5	42.5
2009:02:18	06:02	-23.5	53.2	41.1	18:49	27.7	255.3	40.8
2009:02:22	05:57	-21.8	53.2	39.1	18:54	26.0	259.1	38.8
2009:02:26	05:51	-20.1	53.5	36.7	18:59	23.9	263.0	36.3
2009:03:02	05:45	-18.2	54.3	33.8	19:03	21.2	267.0	33.4
2009:03:06	05:38	-16.3	55.6	30.4	19:08	17.9	271.0	29.9
2009:03:10	05:32	-14.2	57.4	26.5	19:13	13.9	275.0	25.9
2009:03:14	05:25	-12.1	59.8	22.0	19:17	9.3	279.1	21.3
2009:03:18	05:18	-9.9	62.8	17.1	19:22	4.2	283.2	16.4
2009:03:22	05:11	-7.6	66.3	12.3	19:27	-1.5	287.4	11.7
2009:03:26	05:04	-5.4	70.1	8.7	19:32	-7.4	291.6	8.4
2009:03:30	04:56	-3.3	74.0	8.8	19:36	-13.3	296.0	9.2
2009:04:03	04:49	-1.4	77.8	12.4	19:41	-19.1	300.4	13.2
2009:04:07	04:42	0.2	81.2	17.2	19:46	-24.3	304.9	18.0
2009:04:11	04:35	1.5	84.3	22.0	19:52	-29.0	309.4	22.7
2009:04:15	04:27	2.6	86.8	26.4	19:57	-32.9	314.0	27.0
2009:04:19	04:20	3.4	88.7	30.2	20:02	-36.2	318.6	30.8
2009:04:23	04:13	4.0	90.1	33.5	20:07	-38.7	323.1	34.0
2009:04:27	04:06	4.5	90.9	36.3	20:13	-40.6	327.6	36.7
2009:05:01	04:00	4.9	91.4	38.5	20:18	-42.0	331.9	38.9
2009:05:05	03:54	5.2	91.4	40.4	20:24	-42.8	336.1	40.7
2009:05:09	03:48	5.5	91.2	41.9	20:29	-43.2	340.0	42.2
2009:05:13	03:42	5.8	90.7	43.1	20:35	-43.3	343.6	43.3
2009:05:17	03:37	6.1	90.0	44.1	20:40	-43.0	346.9	44.2
2009:05:21	03:32	6.4	89.2	44.8	20:45	-42.5	349.9	44.9
2009:05:25	03:28	6.8	88.2	45.3	20:50	-41.7	352.6	45.4
2009:05:29	03:25	7.2	87.2	45.6	20:54	-40.8	354.9	45.7
2009:06:02	03:22	7.7	86.2	45.8	20:58	-39.7	356.8	45.8
2009:06:06	03:19	8.3	85.1	45.8	21:02	-38.6	358.3	45.8
2009:06:10	03:18	9.0	84.1	45.8	21:05	-37.4	359.5	45.8
2009:06:14	03:17	9.7	83.1	45.6	21:07	-36.2	0.3	45.6
2009:06:18	03:17	10.4	82.2	45.4	21:09	-35.0	0.7	45.3
2009:06:22	03:18	11.2	81.3	45.1	21:10	-33.8	0.9	45.0
2009:06:26	03:19	12.1	80.5	44.7	21:10	-32.7	0.6	44.6
2009:06:30	03:21	13.0	79.7	44.2	21:10	-31.6	0.1	44.1

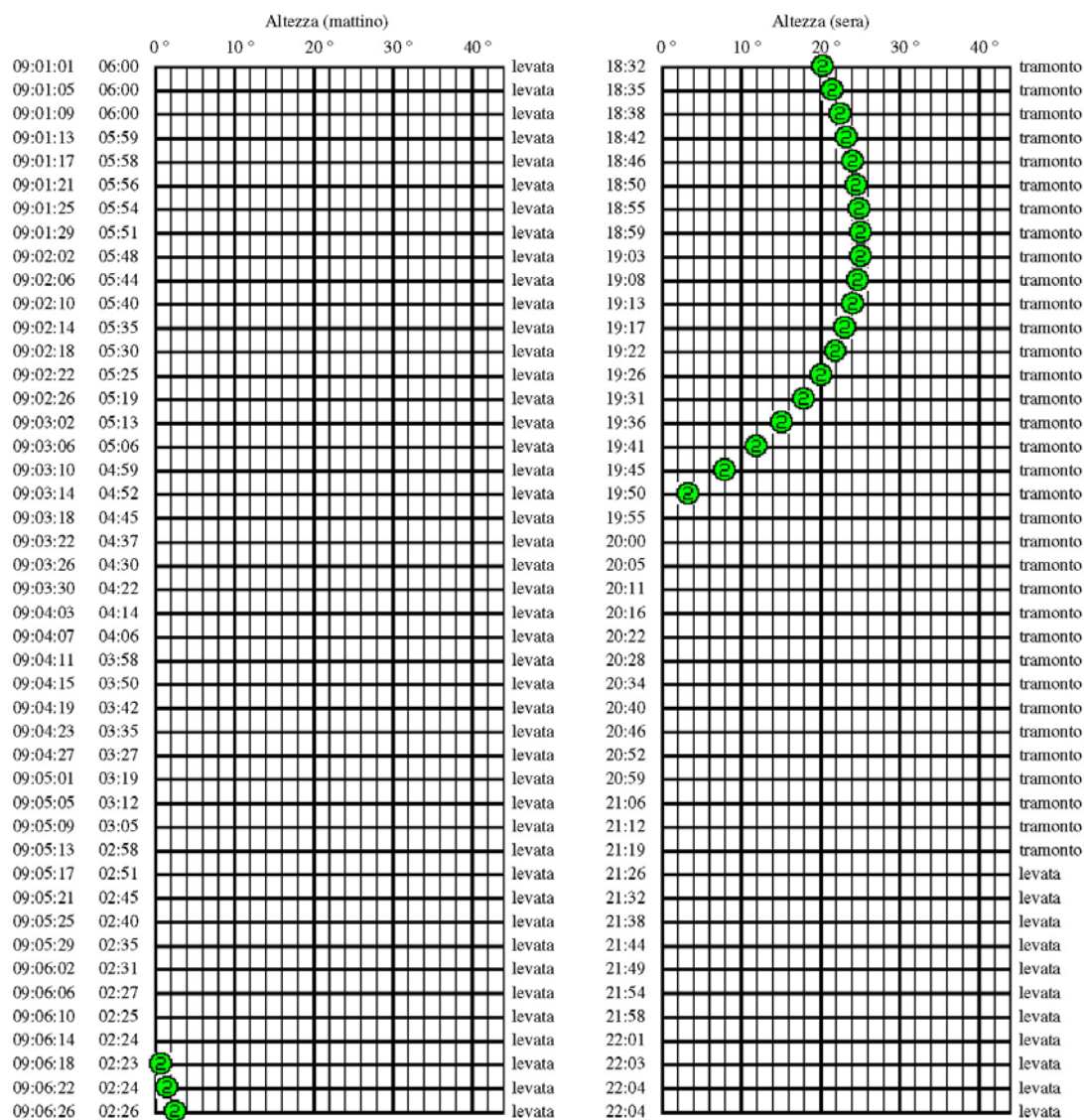
Date	Morning twilight				Evening twilight			
	Times	Alt	Az	Elong	Times	Alt	Az	Elong
2009:07:01	03:22	13.2	79.6	44.1	21:10	-31.3	359.9	44.0
2009:07:05	03:25	14.0	78.9	43.6	21:08	-30.3	359.0	43.5
2009:07:09	03:28	14.9	78.4	43.0	21:06	-29.3	357.8	42.9
2009:07:13	03:32	15.7	77.9	42.4	21:03	-28.4	356.3	42.2
2009:07:17	03:37	16.4	77.5	41.7	21:00	-27.6	354.7	41.6
2009:07:21	03:41	17.1	77.2	41.0	20:56	-26.9	352.8	40.9
2009:07:25	03:46	17.6	77.0	40.3	20:51	-26.1	350.7	40.2
2009:07:29	03:51	18.1	76.9	39.5	20:46	-25.5	348.5	39.4
2009:08:02	03:56	18.5	76.8	38.8	20:40	-24.9	346.1	38.6
2009:08:06	04:02	18.7	76.9	38.0	20:34	-24.3	343.5	37.8
2009:08:10	04:07	18.8	77.1	37.1	20:28	-23.8	340.9	37.0
2009:08:14	04:12	18.8	77.5	36.3	20:21	-23.4	338.1	36.2
2009:08:18	04:17	18.7	77.9	35.4	20:14	-22.9	335.3	35.3
2009:08:22	04:22	18.5	78.5	34.6	20:07	-22.5	332.4	34.4
2009:08:26	04:27	18.2	79.2	33.7	20:00	-22.2	329.4	33.5
2009:08:30	04:32	17.8	80.0	32.8	19:53	-21.8	326.4	32.6
2009:09:03	04:37	17.4	80.9	31.9	19:45	-21.5	323.3	31.7
2009:09:07	04:42	16.8	82.0	30.9	19:38	-21.2	320.2	30.8
2009:09:11	04:47	16.2	83.1	30.0	19:31	-21.0	317.0	29.8
2009:09:15	04:51	15.5	84.4	29.0	19:23	-20.7	313.8	28.9
2009:09:19	04:56	14.7	85.8	28.1	19:16	-20.5	310.6	27.9
2009:09:23	05:00	14.0	87.3	27.1	19:09	-20.3	307.5	27.0
2009:09:27	05:05	13.1	88.8	26.1	19:01	-20.1	304.3	26.0
2009:10:01	05:09	12.3	90.4	25.2	18:54	-20.0	301.1	25.0
2009:10:05	05:13	11.4	92.1	24.2	18:47	-19.8	297.9	24.0
2009:10:09	05:18	10.4	93.8	23.2	18:41	-19.7	294.8	23.1
2009:10:13	05:22	9.5	95.6	22.2	18:34	-19.6	291.7	22.1
2009:10:17	05:26	8.5	97.4	21.2	18:28	-19.4	288.6	21.1
2009:10:21	05:31	7.6	99.1	20.2	18:22	-19.3	285.6	20.1
2009:10:25	05:35	6.6	100.9	19.2	18:17	-19.2	282.6	19.1
2009:10:29	05:40	5.6	102.6	18.2	18:12	-19.1	279.7	18.1
2009:11:02	05:44	4.5	104.3	17.2	18:07	-19.0	276.9	17.1
2009:11:06	05:48	3.5	105.9	16.2	18:03	-18.9	274.1	16.1
2009:11:10	05:53	2.5	107.4	15.2	17:59	-18.8	271.5	15.1
2009:11:14	05:57	1.4	108.8	14.3	17:56	-18.6	269.0	14.1
2009:11:18	06:02	0.4	110.1	13.3	17:53	-18.5	266.5	13.1
2009:11:22	06:06	-0.7	111.3	12.3	17:51	-18.3	264.2	12.1
2009:11:26	06:10	-1.7	112.3	11.3	17:49	-18.1	262.1	11.2
2009:11:30	06:14	-2.8	113.1	10.3	17:48	-17.8	260.1	10.2
2009:12:04	06:18	-3.8	113.8	9.3	17:47	-17.5	258.3	9.2
2009:12:08	06:21	-4.8	114.3	8.3	17:47	-17.2	256.6	8.2
2009:12:12	06:24	-5.8	114.5	7.4	17:47	-16.8	255.1	7.2
2009:12:16	06:27	-6.8	114.5	6.4	17:49	-16.4	253.9	6.3
2009:12:20	06:29	-7.8	114.4	5.4	17:50	-15.9	252.8	5.3
2009:12:24	06:31	-8.7	113.9	4.5	17:52	-15.4	251.9	4.3
2009:12:28	06:33	-9.6	113.3	3.5	17:55	-14.8	251.3	3.4

Altezza ai crepuscoli

di Venere

nel momento il cui il Sole è 18 ° sotto l'orizzonte

Postazione: Roma 42:00 N, 12:00 E (UT +01:00)

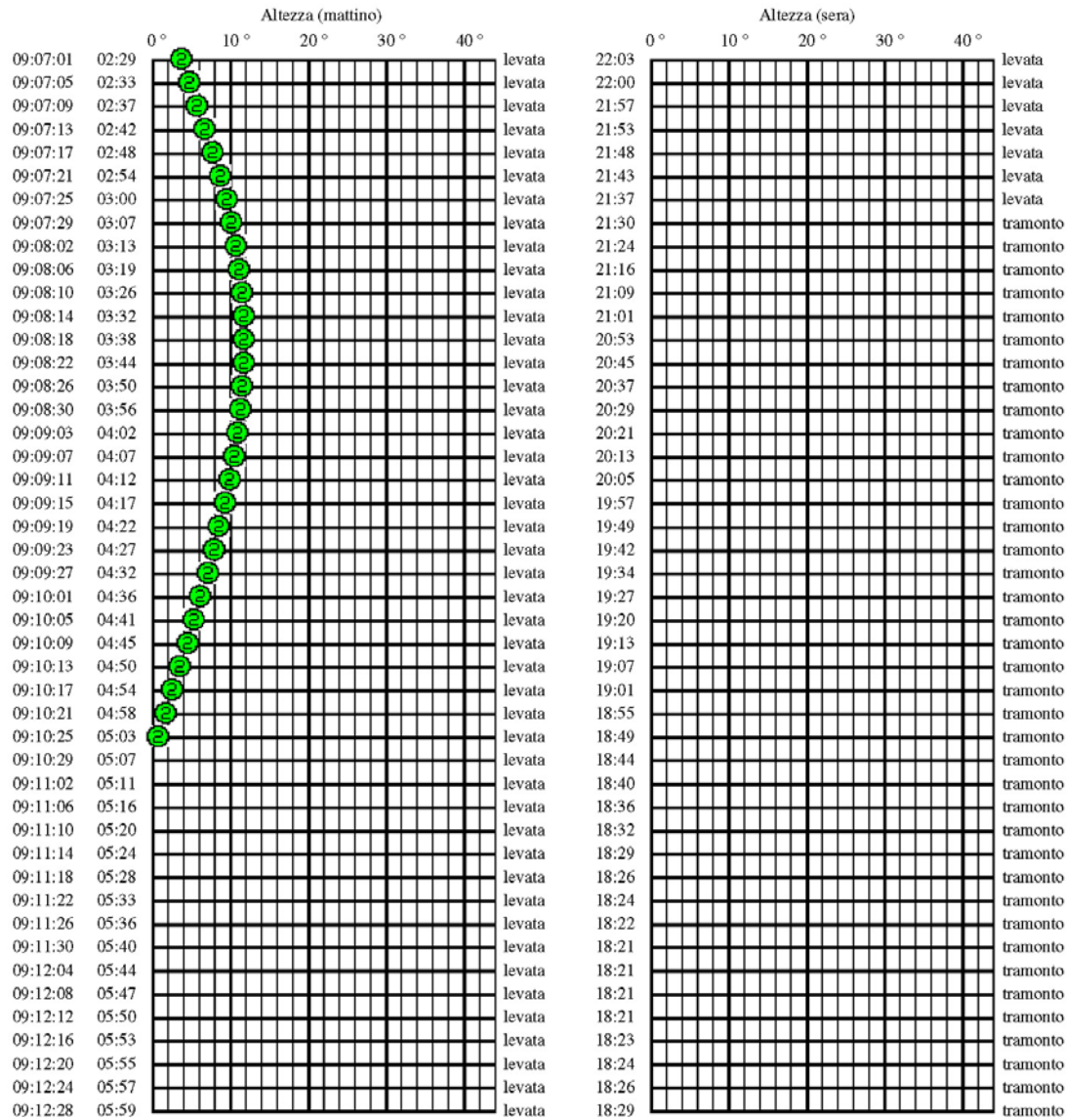


Altezza ai crepuscoli

di Venere

nel momento il cui il Sole è 18 ° sotto l'orizzonte

Postazione: Roma 42:00 N, 12:00 E (UT +01:00)



Height in the twilights. The Sun is 18° under the horizon

Date	Morning twilight				Evening twilight			
	Times	Alt	Az	Elong	Times	Alt	Az	Elong
2009:01:01	06:00	-46.9	60.4	46.6	18:32	20.4	227.9	46.6
2009:01:05	06:00	-45.6	58.6	46.8	18:35	21.5	229.6	46.9
2009:01:09	06:00	-44.1	57.0	47.0	18:38	22.4	231.6	47.0
2009:01:13	05:59	-42.7	55.3	47.1	18:42	23.3	233.8	47.1
2009:01:17	05:58	-41.2	53.8	47.1	18:46	24.0	236.2	47.1
2009:01:21	05:56	-39.6	52.3	47.0	18:50	24.6	238.8	47.0
2009:01:25	05:54	-38.0	50.9	46.7	18:55	24.9	241.6	46.7
2009:01:29	05:51	-36.4	49.6	46.3	18:59	25.1	244.6	46.3
2009:02:02	05:48	-34.8	48.5	45.7	19:03	25.0	247.7	45.7
2009:02:06	05:44	-33.1	47.5	45.0	19:08	24.7	250.9	44.8
2009:02:10	05:40	-31.5	46.7	44.0	19:13	24.1	254.3	43.8
2009:02:14	05:35	-29.8	46.2	42.7	19:17	23.1	257.7	42.5
2009:02:18	05:30	-28.1	45.9	41.1	19:22	21.8	261.3	40.8
2009:02:22	05:25	-26.4	46.0	39.1	19:26	20.1	264.9	38.8
2009:02:26	05:19	-24.7	46.5	36.7	19:31	17.9	268.6	36.3
2009:03:02	05:13	-22.9	47.4	33.8	19:36	15.1	272.4	33.4
2009:03:06	05:06	-21.1	48.9	30.4	19:41	11.8	276.3	29.9
2009:03:10	04:59	-19.2	50.9	26.5	19:45	7.9	280.3	25.8
2009:03:14	04:52	-17.2	53.4	22.0	19:50	3.4	284.5	21.3
2009:03:18	04:45	-15.2	56.6	17.2	19:55	-1.8	288.7	16.4
2009:03:22	04:37	-13.2	60.1	12.3	20:00	-7.3	293.2	11.6
2009:03:26	04:30	-11.2	64.0	8.7	20:05	-13.1	297.8	8.4
2009:03:30	04:22	-9.4	67.9	8.8	20:11	-18.9	302.6	9.2
2009:04:03	04:14	-7.7	71.8	12.4	20:16	-24.5	307.7	13.2
2009:04:07	04:06	-6.3	75.2	17.2	20:22	-29.5	312.9	18.0
2009:04:11	03:58	-5.1	78.2	22.0	20:28	-33.8	318.3	22.8
2009:04:15	03:50	-4.2	80.6	26.3	20:34	-37.5	323.8	27.0
2009:04:19	03:42	-3.6	82.3	30.2	20:40	-40.3	329.4	30.8
2009:04:23	03:35	-3.1	83.6	33.5	20:46	-42.4	334.9	34.0
2009:04:27	03:27	-2.8	84.3	36.2	20:52	-43.9	340.3	36.7
2009:05:01	03:19	-2.7	84.5	38.5	20:59	-44.7	345.4	38.9
2009:05:05	03:12	-2.6	84.4	40.4	21:06	-45.1	350.3	40.7
2009:05:09	03:05	-2.5	84.0	41.9	21:12	-45.0	354.8	42.2
2009:05:13	02:58	-2.5	83.3	43.1	21:19	-44.5	358.9	43.3
2009:05:17	02:51	-2.4	82.4	44.1	21:26	-43.8	2.6	44.2
2009:05:21	02:45	-2.3	81.3	44.8	21:32	-42.8	5.9	44.9
2009:05:25	02:40	-2.2	80.2	45.3	21:38	-41.6	8.7	45.4
2009:05:29	02:35	-1.9	79.0	45.6	21:44	-40.3	11.1	45.7
2009:06:02	02:31	-1.6	77.7	45.8	21:49	-38.9	13.0	45.8
2009:06:06	02:27	-1.2	76.5	45.9	21:54	-37.5	14.6	45.8
2009:06:10	02:25	-0.7	75.4	45.8	21:58	-36.1	15.6	45.8
2009:06:14	02:24	-0.1	74.3	45.6	22:01	-34.8	16.3	45.6
2009:06:18	02:23	0.7	73.4	45.4	22:03	-33.5	16.5	45.3
2009:06:22	02:24	1.5	72.5	45.1	22:04	-32.3	16.3	45.0
2009:06:26	02:26	2.4	71.8	44.7	22:04	-31.3	15.8	44.6
2009:06:30	02:28	3.4	71.2	44.2	22:03	-30.3	14.8	44.1

Date	Morning twilight				Evening twilight			
	Times	Alt	Az	Elong	Times	Alt	Az	Elong
2009:07:01	02:29	3.7	71.1	44.1	22:03	-30.1	14.6	44.0
2009:07:05	02:33	4.7	70.6	43.6	22:00	-29.3	13.2	43.4
2009:07:09	02:37	5.7	70.3	43.0	21:57	-28.6	11.6	42.9
2009:07:13	02:42	6.8	70.0	42.4	21:53	-28.0	9.7	42.2
2009:07:17	02:48	7.7	69.9	41.7	21:48	-27.4	7.5	41.6
2009:07:21	02:54	8.6	69.8	41.0	21:43	-27.0	5.2	40.9
2009:07:25	03:00	9.5	69.9	40.3	21:37	-26.6	2.6	40.2
2009:07:29	03:07	10.2	70.0	39.6	21:30	-26.3	359.9	39.4
2009:08:02	03:13	10.7	70.2	38.8	21:24	-26.1	357.1	38.6
2009:08:06	03:19	11.2	70.5	38.0	21:16	-25.8	354.2	37.8
2009:08:10	03:26	11.5	70.9	37.2	21:09	-25.7	351.2	37.0
2009:08:14	03:32	11.7	71.3	36.3	21:01	-25.5	348.0	36.2
2009:08:18	03:38	11.8	71.9	35.5	20:53	-25.4	344.9	35.3
2009:08:22	03:44	11.7	72.6	34.6	20:45	-25.3	341.6	34.4
2009:08:26	03:50	11.6	73.4	33.7	20:37	-25.2	338.3	33.5
2009:08:30	03:56	11.3	74.3	32.8	20:29	-25.1	335.0	32.6
2009:09:03	04:02	10.9	75.3	31.9	20:21	-25.1	331.6	31.7
2009:09:07	04:07	10.4	76.4	30.9	20:13	-25.0	328.3	30.8
2009:09:11	04:12	9.9	77.6	30.0	20:05	-25.0	324.9	29.8
2009:09:15	04:17	9.2	78.9	29.0	19:57	-25.0	321.5	28.9
2009:09:19	04:22	8.6	80.3	28.1	19:49	-25.0	318.1	27.9
2009:09:23	04:27	7.8	81.8	27.1	19:42	-25.0	314.7	27.0
2009:09:27	04:32	7.0	83.4	26.1	19:34	-25.0	311.3	26.0
2009:10:01	04:36	6.2	85.0	25.2	19:27	-25.0	308.0	25.0
2009:10:05	04:41	5.3	86.7	24.2	19:20	-25.0	304.6	24.0
2009:10:09	04:45	4.4	88.4	23.2	19:13	-25.0	301.4	23.1
2009:10:13	04:50	3.5	90.1	22.2	19:07	-25.0	298.1	22.1
2009:10:17	04:54	2.6	91.9	21.2	19:01	-25.0	294.9	21.1
2009:10:21	04:58	1.6	93.7	20.2	18:55	-25.0	291.7	20.1
2009:10:25	05:03	0.6	95.4	19.2	18:49	-25.0	288.7	19.1
2009:10:29	05:07	-0.4	97.1	18.2	18:44	-25.0	285.7	18.1
2009:11:02	05:11	-1.4	98.8	17.2	18:40	-25.0	282.7	17.1
2009:11:06	05:16	-2.4	100.4	16.2	18:36	-24.9	279.9	16.1
2009:11:10	05:20	-3.4	101.9	15.3	18:32	-24.9	277.2	15.1
2009:11:14	05:24	-4.4	103.4	14.3	18:29	-24.8	274.5	14.1
2009:11:18	05:28	-5.5	104.7	13.3	18:26	-24.6	272.0	13.1
2009:11:22	05:33	-6.5	105.8	12.3	18:24	-24.5	269.7	12.1
2009:11:26	05:36	-7.6	106.9	11.3	18:22	-24.3	267.5	11.2
2009:11:30	05:40	-8.6	107.7	10.3	18:21	-24.0	265.4	10.2
2009:12:04	05:44	-9.6	108.4	9.3	18:21	-23.7	263.5	9.2
2009:12:08	05:47	-10.7	108.9	8.3	18:21	-23.4	261.8	8.2
2009:12:12	05:50	-11.7	109.2	7.4	18:21	-23.0	260.3	7.2
2009:12:16	05:53	-12.7	109.3	6.4	18:23	-22.5	259.0	6.3
2009:12:20	05:55	-13.7	109.1	5.4	18:24	-22.0	257.9	5.3
2009:12:24	05:57	-14.6	108.7	4.5	18:26	-21.5	257.1	4.3
2009:12:28	05:59	-15.5	108.1	3.5	18:29	-20.9	256.4	3.4

Eliacal date for Venus
 Location : Rome
 Latitude : 42° 00' 00'' N
 Longitude : 12° 00' 00'' E
 Visibility [°] = 10.5 + 1.4 * magnitude
 Critical height : 0.00°

	Date	obj s/t	Sun s/t	d s/t	age	Mag
first morning visibility	2009-03-25	05:36	06:06	-0:29h	-2d 15h	-3.3
last evening visibility	2009-03-25	18:59	18:29	0:30h	-2d 02h	-3.3
last morning visibility	2009-12-14	07:01	07:32	-0:31h	-28d 15h	-3.4

Legenda:

Obj s/t : rising and setting of the planet

Sun s/t : sunrise and sunset

D s/t : difference in hours and minutes between the instants of the rising or the setting of the two objects

Age : days from the conjunction with the Sun

Mag : magnitude

	Date	obj s/t	Sun s/t	Sun alt	Sun lon	obj lon	obj lat	Mag	d az	d lon
FM	03-25	05:36	06:06	-6° 24'	4° 40'	8° 54'	8° 20'	-3.3	-7° 13'	4° 14'
LE	03-25	18:59	18:29	-6° 23'	5° 13'	8° 33'	8° 19'	-3.3	6° 45'	3° 20'
LM	12-14	07:01	07:32	-5° 54'	262° 22'	255° 31'	0° 16'	-3.4	4° 13'	-6° 52'

Legenda:

Date : date in the format month/day

Obj s/t : rising and setting of the planet

Sun s/t : sunrise and sunset

Sun alt : height of the Sun in the instant of visibility of the planet

Sun lon : celestial longitude of the Sun

Obj lon : celestial longitude of the planet

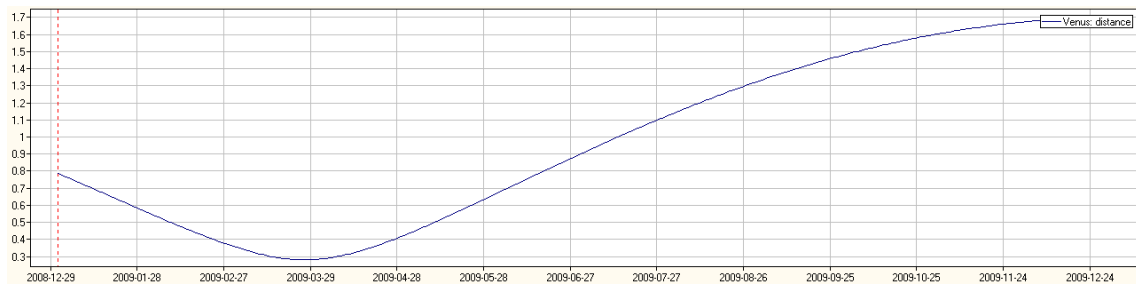
Obj lat : Celestial latitude of the planet

Mag : magnitude

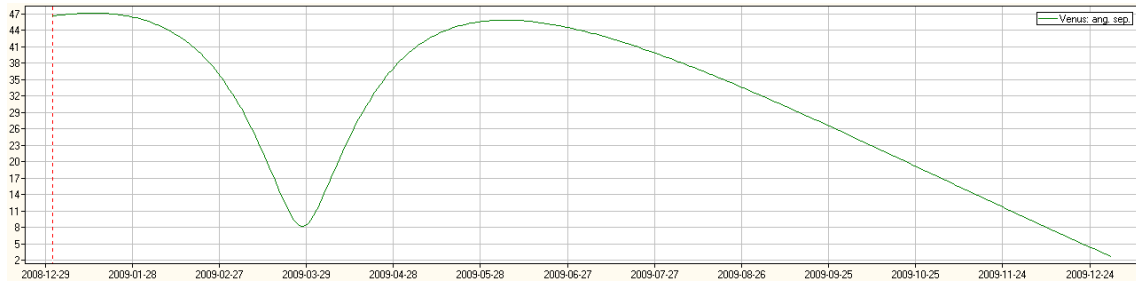
D az : difference in azimuth between the centers of the Sun and the planet in the instant of its visibility

D lon : difference in longitude between the centers of the Sun and the planet in the instant of its visibility

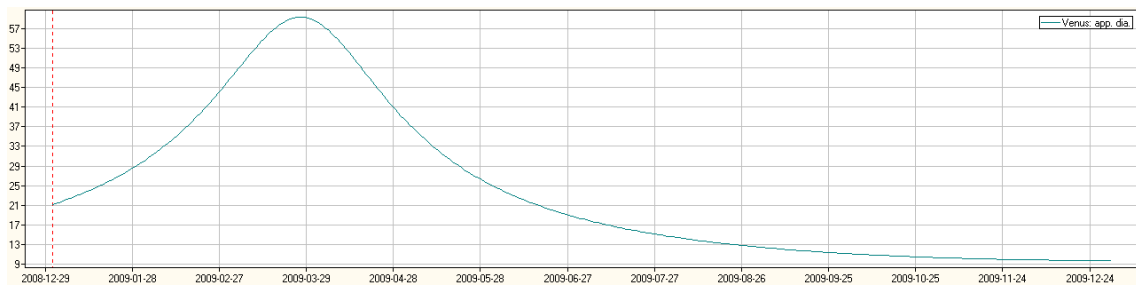
© (3)



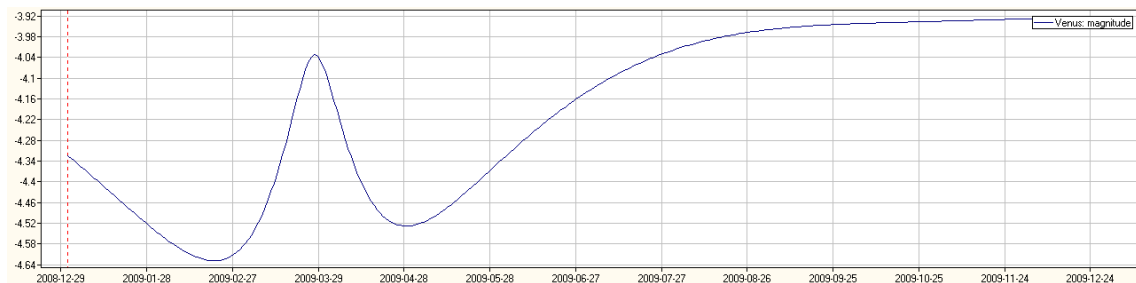
Distance of Venus in A.U. during the year



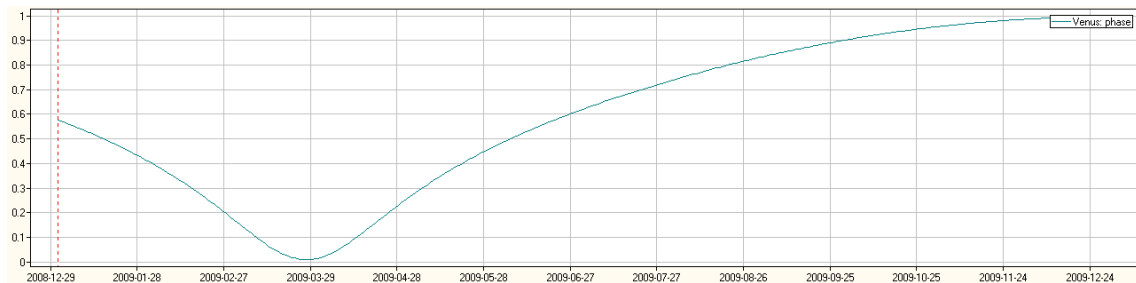
Elongation of Venus in $^{\circ}$ during the year



Diameter of Venus in $''$ during the year



Magnitude of Venus during the year

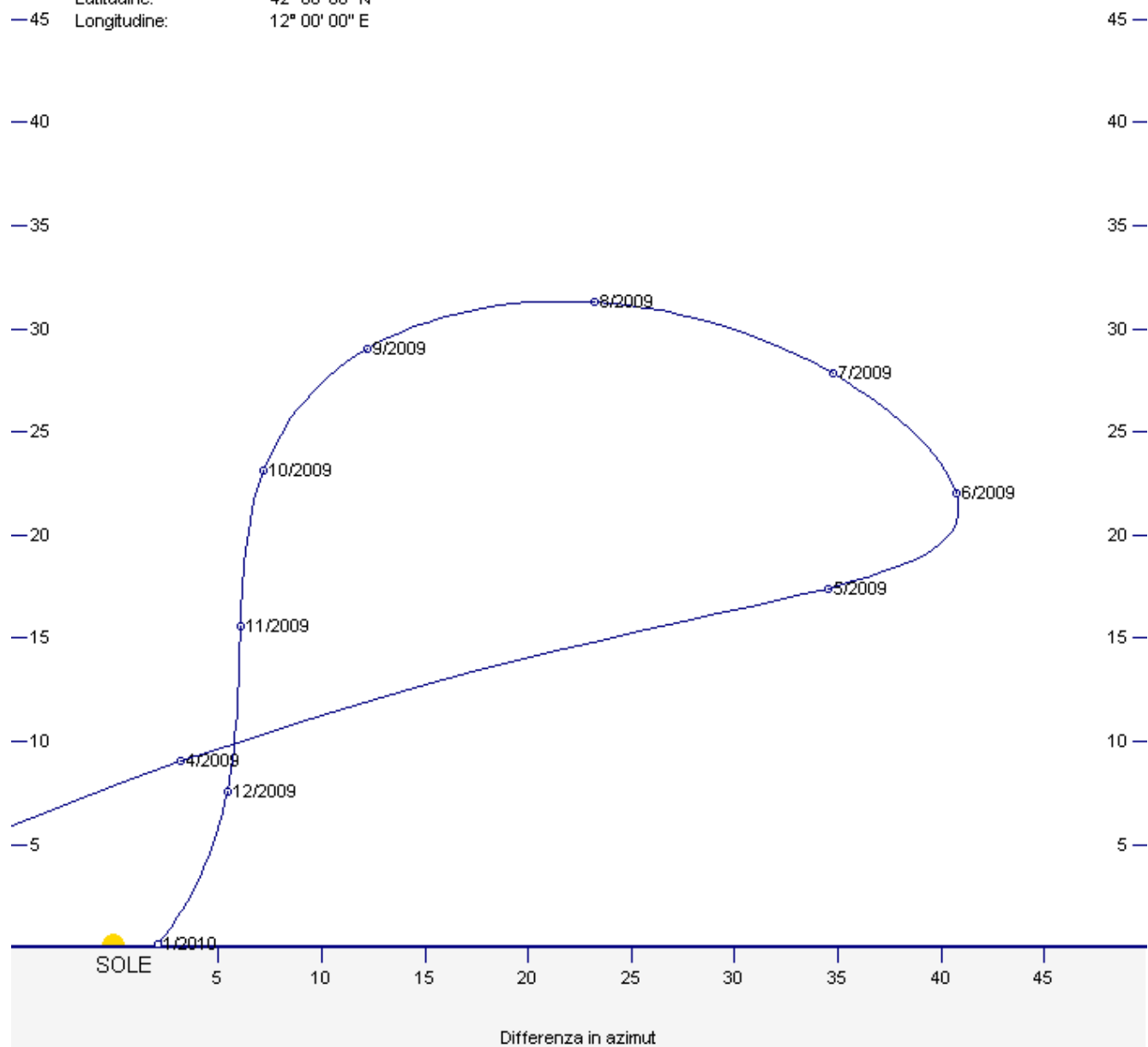


Phase of Venus during the year

© (4)

Posizione di Venere al mattino rispetto al sorgere del Sole

Luogo : Roma
 Latitudine: 42° 00' 00" N
 Longitudine: 12° 00' 00" E

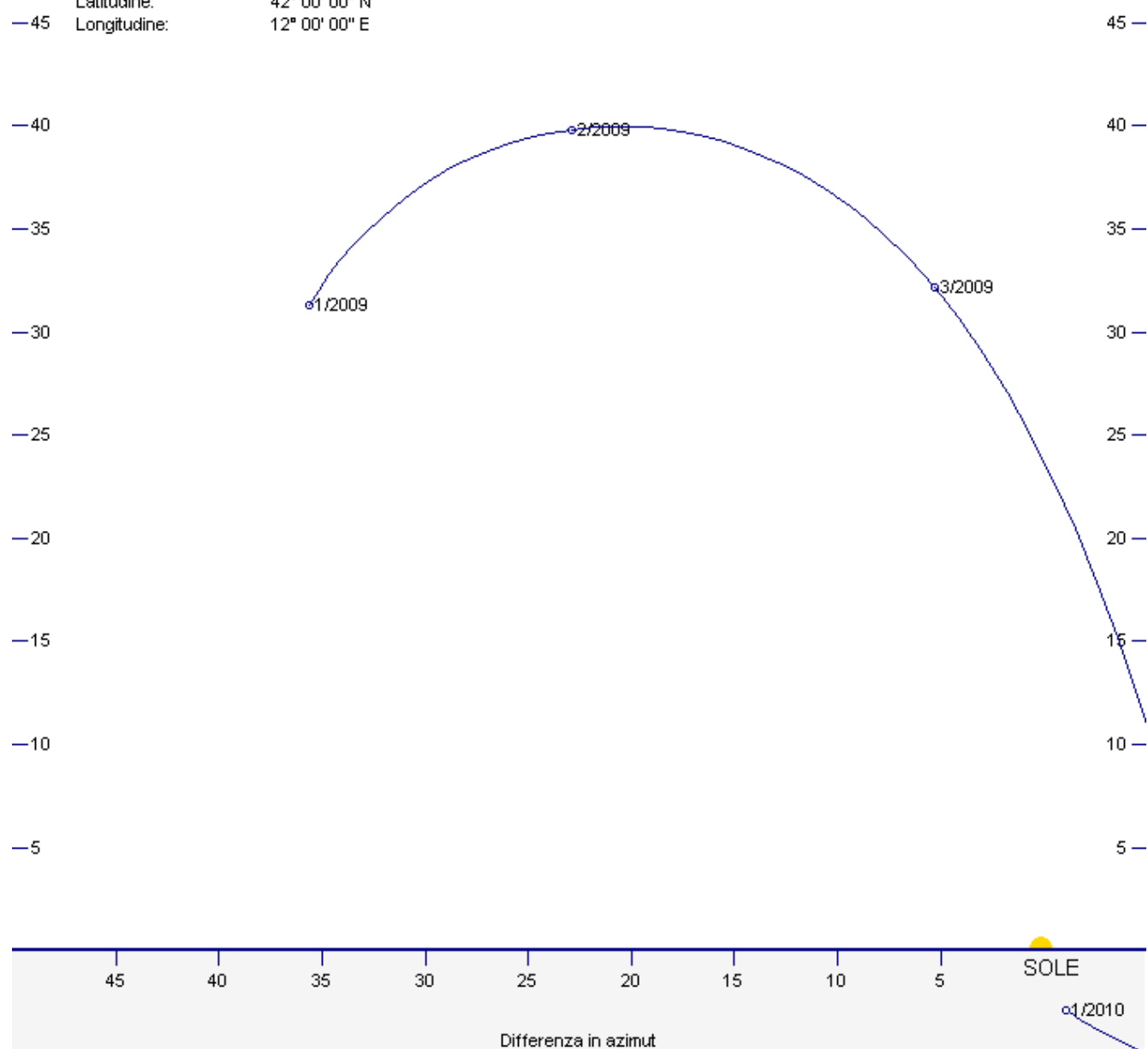


Relative position of Venus respect to the sunrising

© (4)

Posizione di Venere alla sera rispetto al tramonto del Sole

Luogo : Roma
 Latitudine: 42° 00' 00" N
 Longitudine: 12° 00' 00" E



Relative position of Venus respect to the sunsetting

© (4)

EPHEMERIDES OF MARS

Date	A.R. Geoc.	Dec. Geoc.	R A.U.	Distance A.U.	Light (m)	El. °	Diam. "	Mag.	Phase	Phase angle°	Rise	Transit	Set
1-Jan	18h 15m 25.58s	-24° 05' 33.1"	1.4582625	2.4285651	20.20	7.2	3.9	1.3	0.998	4.8	7.13	11.42	16.11
2-Jan	18h 18m 43.51s	-24° 04' 43.7"	1.4570562	2.4263645	20.18	7.5	3.9	1.3	0.998	5.0	7.12	11.41	16.10
3-Jan	18h 22m 01.58s	-24° 03' 38.6"	1.4558550	2.4241404	20.16	7.7	3.9	1.3	0.998	5.2	7.11	11.40	16.09
4-Jan	18h 25m 19.76s	-24° 02' 17.8"	1.4546590	2.4218937	20.14	8.0	3.9	1.3	0.998	5.4	7.10	11.40	16.09
5-Jan	18h 28m 38.05s	-24° 00' 41.2"	1.4534684	2.4196250	20.12	8.3	3.9	1.3	0.998	5.6	7.10	11.39	16.08
6-Jan	18h 31m 56.43s	-23° 58' 48.7"	1.4522833	2.4173350	20.10	8.5	3.9	1.3	0.997	5.8	7.09	11.38	16.08
7-Jan	18h 35m 14.88s	-23° 56' 40.5"	1.4511038	2.4150245	20.09	8.8	3.9	1.3	0.997	5.9	7.08	11.38	16.07
8-Jan	18h 38m 33.40s	-23° 54' 16.5"	1.4499300	2.4126942	20.07	9.1	3.9	1.3	0.997	6.1	7.07	11.37	16.07
9-Jan	18h 41m 51.96s	-23° 51' 36.8"	1.4487621	2.4103448	20.05	9.3	3.9	1.3	0.997	6.3	7.06	11.36	16.07
10-Jan	18h 45m 10.56s	-23° 48' 41.2"	1.4476003	2.4079770	20.03	9.6	3.9	1.3	0.997	6.5	7.05	11.36	16.06
11-Jan	18h 48m 29.18s	-23° 45' 30.0"	1.4464445	2.4055914	20.01	9.8	3.9	1.3	0.997	6.7	7.05	11.35	16.06
12-Jan	18h 51m 47.80s	-23° 42' 03.0"	1.4452950	2.4031881	19.99	10.1	3.9	1.3	0.996	6.9	7.04	11.35	16.05
13-Jan	18h 55m 06.42s	-23° 38' 20.3"	1.4441519	2.4007677	19.97	10.4	3.9	1.3	0.996	7.0	7.03	11.34	16.05
14-Jan	18h 58m 25.00s	-23° 34' 21.8"	1.4430153	2.3983302	19.95	10.6	3.9	1.3	0.996	7.2	7.02	11.33	16.05
15-Jan	19h 01m 43.56s	-23° 30' 07.6"	1.4418853	2.3958757	19.93	10.9	3.9	1.3	0.996	7.4	7.01	11.33	16.05
16-Jan	19h 05m 02.07s	-23° 25' 37.7"	1.4407621	2.3934043	19.91	11.1	3.9	1.3	0.996	7.6	7.00	11.32	16.04
17-Jan	19h 08m 20.52s	-23° 20' 52.1"	1.4396458	2.3909161	19.88	11.4	3.9	1.3	0.995	7.7	6.59	11.31	16.04
18-Jan	19h 11m 38.90s	-23° 15' 51.0"	1.4385366	2.3884112	19.86	11.6	3.9	1.3	0.995	7.9	6.58	11.31	16.04
19-Jan	19h 14m 57.20s	-23° 10' 34.2"	1.4374344	2.3858896	19.84	11.9	3.9	1.3	0.995	8.1	6.57	11.30	16.04
20-Jan	19h 18m 15.40s	-23° 05' 02.0"	1.4363396	2.3833514	19.82	12.1	3.9	1.3	0.995	8.3	6.56	11.29	16.03
21-Jan	19h 21m 33.49s	-22° 59' 14.3"	1.4352521	2.3807970	19.80	12.4	3.9	1.3	0.995	8.5	6.55	11.29	16.03
22-Jan	19h 24m 51.45s	-22° 53' 11.3"	1.4341722	2.3782264	19.78	12.6	3.9	1.3	0.994	8.6	6.54	11.28	16.03
23-Jan	19h 28m 09.26s	-22° 46' 53.0"	1.4331000	2.3756399	19.76	12.9	3.9	1.3	0.994	8.8	6.52	11.28	16.03
24-Jan	19h 31m 26.92s	-22° 40' 19.4"	1.4320355	2.3730378	19.74	13.1	3.9	1.3	0.994	9.0	6.51	11.27	16.03
25-Jan	19h 34m 44.41s	-22° 33' 30.8"	1.4309789	2.3704203	19.71	13.4	4.0	1.3	0.994	9.2	6.50	11.26	16.02
26-Jan	19h 38m 01.71s	-22° 26' 27.1"	1.4299303	2.3677878	19.69	13.6	4.0	1.3	0.993	9.3	6.49	11.26	16.02
27-Jan	19h 41m 18.81s	-22° 19' 08.4"	1.4288899	2.3651408	19.67	13.9	4.0	1.3	0.993	9.5	6.48	11.25	16.02
28-Jan	19h 44m 35.69s	-22° 11' 34.9"	1.4278578	2.3624795	19.65	14.1	4.0	1.3	0.993	9.7	6.47	11.24	16.02
29-Jan	19h 47m 52.35s	-22° 03' 46.7"	1.4268341	2.3598045	19.63	14.4	4.0	1.3	0.993	9.9	6.45	11.24	16.02
30-Jan	19h 51m 08.77s	-21° 55' 43.8"	1.4258188	2.3571163	19.60	14.6	4.0	1.3	0.992	10.0	6.44	11.23	16.02
31-Jan	19h 54m 24.93s	-21° 47' 26.3"	1.4248123	2.3544154	19.58	14.9	4.0	1.3	0.992	10.2	6.43	11.22	16.02
1-Feb	19h 57m 40.84s	-21° 38' 54.4"	1.4238145	2.3517025	19.56	15.1	4.0	1.3	0.992	10.4	6.41	11.22	16.02
2-Feb	20h 00m 56.47s	-21° 30' 08.1"	1.4228255	2.3489782	19.54	15.4	4.0	1.3	0.992	10.6	6.40	11.21	16.02
3-Feb	20h 04m 11.83s	-21° 21' 07.7"	1.4218456	2.3462432	19.51	15.6	4.0	1.3	0.991	10.7	6.39	11.20	16.02
4-Feb	20h 07m 26.90s	-21° 11' 53.1"	1.4208748	2.3434981	19.49	15.8	4.0	1.3	0.991	10.9	6.37	11.19	16.02
5-Feb	20h 10m 41.68s	-21° 02' 24.6"	1.4199133	2.3407436	19.47	16.1	4.0	1.3	0.991	11.1	6.36	11.19	16.02
6-Feb	20h 13m 56.15s	-20° 52' 42.4"	1.4189611	2.3379804	19.44	16.3	4.0	1.3	0.990	11.3	6.35	11.18	16.02
7-Feb	20h 17m 10.31s	-20° 42' 46.4"	1.4180184	2.3352091	19.42	16.6	4.0	1.3	0.990	11.4	6.33	11.17	16.02
8-Feb	20h 20m 24.15s	-20° 32' 36.9"	1.4170853	2.3324302	19.40	16.8	4.0	1.3	0.990	11.6	6.32	11.17	16.02
9-Feb	20h 23m 37.66s	-20° 22' 13.9"	1.4161619	2.3296441	19.37	17.0	4.0	1.3	0.989	11.8	6.30	11.16	16.02
10-Feb	20h 26m 50.84s	-20° 11' 37.7"	1.4152483	2.3268511	19.35	17.3	4.0	1.3	0.989	11.9	6.29	11.15	16.02
11-Feb	20h 30m 03.68s	-20° 00' 48.3"	1.4143447	2.3240514	19.33	17.5	4.0	1.3	0.989	12.1	6.27	11.14	16.02
12-Feb	20h 33m 16.18s	-19° 49' 45.8"	1.4134511	2.3212451	19.30	17.7	4.0	1.3	0.989	12.3	6.26	11.14	16.02
13-Feb	20h 36m 28.33s	-19° 38' 30.3"	1.4125677	2.3184321	19.28	18.0	4.0	1.3	0.988	12.5	6.24	11.13	16.02
14-Feb	20h 39m 40.14s	-19° 27' 02.1"	1.4116946	2.3156125	19.26	18.2	4.0	1.3	0.988	12.6	6.23	11.12	16.02
15-Feb	20h 42m 51.59s	-19° 15' 21.3"	1.4108319	2.3127863	19.23	18.4	4.1	1.3	0.988	12.8	6.21	11.12	16.02
16-Feb	20h 46m 02.69s	-19° 03' 28.0"	1.4099797	2.3099535	19.21	18.7	4.1	1.3	0.987	13.0	6.20	11.11	16.02
17-Feb	20h 49m 13.43s	-18° 51' 22.4"	1.4091381	2.3071140	19.19	18.9	4.1	1.3	0.987	13.1	6.18	11.10	16.02
18-Feb	20h 52m 23.81s	-18° 39' 04.6"	1.4083072	2.3042678	19.16	19.1	4.1	1.2	0.987	13.3	6.16	11.09	16.02
19-Feb	20h 55m 33.81s	-18° 26' 34.9"	1.4074871	2.3014151	19.14	19.4	4.1	1.2	0.986	13.5	6.15	11.08	16.03
20-Feb	20h 58m 43.44s	-18° 13' 53.5"	1.4066780	2.2985559	19.12	19.6	4.1	1.2	0.986	13.6	6.13	11.08	16.03
21-Feb	21h 01m 52.69s	-18° 01' 00.4"	1.4058799	2.2956904	19.09	19.8	4.1	1.2	0.986	13.8	6.11	11.07	16.03
22-Feb	21h 05m 01.55s	-17° 47' 55.9"	1.4050930	2.2928185	19.07	20.0	4.1	1.2	0.985	14.0	6.10	11.06	16.03
23-Feb	21h 08m 10.01s	-17° 34' 40.2"	1.4043173	2.2899405	19.04	20.3	4.1	1.2	0.985	14.1	6.08	11.05	16.03
24-Feb	21h 11m 18.09s	-17° 21' 13.4"	1.4035530	2.2870566	19.02	20.5	4.1	1.2	0.985	14.3	6.06	11.04	16.03
25-Feb	21h 14m 25.76s	-17° 07' 35.7"	1.4028000	2.2841670	19.00	20.7	4.1	1.2	0.984	14.5	6.04	11.04	16.03
26-Feb	21h 17m 33.03s	-16° 53' 47.4"	1.4020587	2.2812720	18.97	20.9	4.1	1.2	0.984	14.6	6.03	11.03	16.03
27-Feb	21h 20m 39.90s	-16° 39' 48.5"	1.4013290	2.2783718	18.95	21.2	4.1	1.2	0.983	14.8	6.01	11.02	16.03
28-Feb	21h 23m 46.36s	-16° 25' 39.4"	1.4006110	2.2754669	18.92	21.4	4.1	1.2	0.983	15.0	5.59	11.01	16.04
1-Mar	21h 26m 52.43s	-16° 11' 20.1"	1.3999049	2.2725578	18.90	21.6	4.1	1.2	0.983	15.1	5.57	11.00	16.04
2-Mar	21h 29m 58.08s	-15° 56' 50.8"	1.3992107	2.2696448	18.88	21.8	4.1	1.2	0.982	15.3	5.56	10.59	16.04
3-Mar	21h 33m 03.34s	-15° 42' 11.8"	1.3985285	2.2667286	18.85	22.1	4.1	1.2	0.982	15.4	5.54	10.59	16.04
4-Mar	21h 36m 08.19s	-15° 27' 23.3"	1.3978584	2.2638096	18.83	22.3	4.1	1.2	0.982	15.6	5.52	10.58	16.04
5-Mar	21h 39m 12.63s	-15° 12' 25.4"	1.3972006	2.2608884	18.80	22.5	4.1	1.2	0.981	15.8	5.50	10.57	16.04
6-Mar	21h 42m 16.68s	-14° 57' 18.4"	1.3965550	2.2579654	18.78	22.7	4.2	1.2	0.981	15.9	5.48	10.56	16.04
7-Mar	21h 45m 20.32s	-14° 42' 02.4"	1.3959218	2.2550413	18.75	22.9	4.2	1.2	0.980	16.1	5.46	10.55	16.04
8-Mar	21h 48m 23.56s	-14° 26' 37.6"	1.3953011	2.2521163	18.73	23.2	4.2	1.2	0.980	16.2	5.44	10.54	16.04
9-Mar	21h 51m 26.40s	-14° 11' 04.3"	1.3946929	2.2491908	18.71	23.4	4.2	1.2	0.980	16.4	5.42	10.53	16.05
10-Mar	21h 54m 28.85s	-13° 55' 22.5"	1.3940974	2.2462650	18.68	23.6	4.2	1.2	0.979	16.6	5.41	10.52	16.05
11-Mar	21h 57m 30.91s	-13° 39' 32.5"	1.3935146	2.2433390	18.66	23.8	4.2	1.2	0.979	16.7	5.39	10.51	16.05
12-Mar	22h 00m 32.59s	-13° 23' 34.4"	1.3929445	2.2404129	18.63	24.0	4.2	1.2	0.978	16.9	5.37	10.51	16.05
13-Mar	22h 03m 33.89s	-13° 07' 28.4"	1.3923874	2.2374865	18.61	24.2	4.2	1.2	0.978	17.0	5.35	10.50	16.05

Date	A.R. Geoc.	Dec. Geoc.	R A.U.	Distance A.U.	Light (m)	El. °	Diam. "	Mag.	Phase	Phase angle°	Rise	Transit	Set
14-Mar	22h 06m 34.82s	-12° 51' 14.7"	1.3918432	2.2345597	18.58	24.5	4.2	1.2	0.978	17.2	5.33	10.49	16.05
15-Mar	22h 09m 35.39s	-12° 34' 53.4"	1.3913120	2.2316323	18.56	24.7	4.2	1.2	0.977	17.4	5.31	10.48	16.05
16-Mar	22h 12m 35.59s	-12° 18' 24.9"	1.3907939	2.2287043	18.54	24.9	4.2	1.2	0.977	17.5	5.29	10.47	16.05
17-Mar	22h 15m 35.45s	-12° 01' 49.2"	1.3902890	2.2257753	18.51	25.1	4.2	1.2	0.976	17.7	5.27	10.46	16.05
18-Mar	22h 18m 34.94s	-11° 45' 06.5"	1.3897973	2.2228453	18.49	25.3	4.2	1.2	0.976	17.8	5.25	10.45	16.06
19-Mar	22h 21m 34.09s	-11° 28' 17.2"	1.3893190	2.2199140	18.46	25.5	4.2	1.2	0.976	18.0	5.23	10.44	16.06
20-Mar	22h 24m 32.89s	-11° 11' 21.4"	1.3888540	2.2169814	18.44	25.7	4.2	1.2	0.975	18.1	5.21	10.43	16.06
21-Mar	22h 27m 31.35s	-10° 54' 19.3"	1.3884024	2.2140473	18.41	25.9	4.2	1.2	0.975	18.3	5.19	10.42	16.06
22-Mar	22h 30m 29.46s	-10° 37' 11.1"	1.3879644	2.2111116	18.39	26.1	4.2	1.2	0.974	18.4	5.17	10.41	16.06
23-Mar	22h 33m 27.24s	-10° 19' 57.1"	1.3875399	2.2081742	18.36	26.4	4.2	1.2	0.974	18.6	5.15	10.40	16.06
24-Mar	22h 36m 24.68s	-10° 02' 37.4"	1.3871290	2.2052350	18.34	26.6	4.2	1.2	0.973	18.7	5.13	10.39	16.06
25-Mar	22h 39m 21.79s	-09° 45' 12.2"	1.3867318	2.2022940	18.32	26.8	4.3	1.2	0.973	18.9	5.10	10.38	16.06
26-Mar	22h 42m 18.58s	-09° 27' 41.8"	1.3863483	2.1993513	18.29	27.0	4.3	1.2	0.973	19.1	5.08	10.37	16.06
27-Mar	22h 45m 15.05s	-09° 10' 06.3"	1.3859787	2.1964068	18.27	27.2	4.3	1.2	0.972	19.2	5.06	10.36	16.06
28-Mar	22h 48m 11.21s	-08° 52' 26.1"	1.3856228	2.1934607	18.24	27.4	4.3	1.2	0.972	19.4	5.04	10.35	16.06
29-Mar	22h 51m 07.05s	-08° 34' 41.1"	1.3852809	2.1905133	18.22	27.6	4.3	1.2	0.971	19.5	5.02	10.34	16.07
30-Mar	22h 54m 02.60s	-08° 16' 51.8"	1.3849529	2.1875648	18.19	27.8	4.3	1.2	0.971	19.7	5.00	10.33	16.07
31-Mar	22h 56m 57.84s	-07° 58' 58.2"	1.3846389	2.1846154	18.17	28.0	4.3	1.2	0.970	19.8	4.58	10.32	16.07
1-Apr	22h 59m 52.80s	-07° 41' 00.6"	1.3843389	2.1816656	18.14	28.2	4.3	1.2	0.970	20.0	4.56	10.31	16.07
2-Apr	23h 02m 47.46s	-07° 22' 59.3"	1.3840530	2.1787157	18.12	28.4	4.3	1.2	0.970	20.1	4.54	10.30	16.07
3-Apr	23h 05m 41.85s	-07° 04' 54.3"	1.3837812	2.1757660	18.09	28.6	4.3	1.2	0.969	20.3	4.52	10.29	16.07
4-Apr	23h 08m 35.96s	-06° 46' 46.0"	1.3835235	2.1728168	18.07	28.8	4.3	1.2	0.969	20.4	4.49	10.28	16.07
5-Apr	23h 11m 29.79s	-06° 28' 34.4"	1.3832801	2.1698684	18.05	29.0	4.3	1.2	0.968	20.6	4.47	10.27	16.07
6-Apr	23h 14m 23.37s	-06° 10' 19.8"	1.3830508	2.1669209	18.02	29.2	4.3	1.2	0.968	20.7	4.45	10.26	16.07
7-Apr	23h 17m 16.69s	-05° 52' 02.4"	1.3828358	2.1639745	18.00	29.4	4.3	1.2	0.967	20.8	4.43	10.25	16.07
8-Apr	23h 20m 09.77s	-05° 33' 42.3"	1.3826351	2.1610290	17.97	29.6	4.3	1.2	0.967	21.0	4.41	10.24	16.07
9-Apr	23h 23m 02.61s	-05° 15' 19.7"	1.3824487	2.1580844	17.95	29.9	4.3	1.2	0.966	21.1	4.39	10.23	16.07
10-Apr	23h 25m 55.24s	-04° 56' 54.7"	1.3822767	2.1551406	17.92	30.1	4.3	1.2	0.966	21.3	4.36	10.22	16.07
11-Apr	23h 28m 47.66s	-04° 38' 27.6"	1.3821190	2.1521971	17.90	30.3	4.4	1.2	0.965	21.4	4.34	10.21	16.07
12-Apr	23h 31m 39.87s	-04° 19' 58.6"	1.3819757	2.1492538	17.87	30.5	4.4	1.2	0.965	21.6	4.32	10.19	16.07
13-Apr	23h 34m 31.89s	-04° 01' 27.7"	1.3818468	2.1463103	17.85	30.7	4.4	1.2	0.965	21.7	4.30	10.18	16.07
14-Apr	23h 37m 23.72s	-03° 42' 55.3"	1.3817323	2.1433663	17.83	30.9	4.4	1.2	0.964	21.9	4.28	10.17	16.07
15-Apr	23h 40m 15.37s	-03° 24' 21.5"	1.3816323	2.1404213	17.80	31.1	4.4	1.2	0.964	22.0	4.25	10.16	16.07
16-Apr	23h 43m 06.84s	-03° 05' 46.6"	1.3815468	2.1374751	17.78	31.3	4.4	1.2	0.963	22.1	4.23	10.15	16.07
17-Apr	23h 45m 58.15s	-02° 47' 10.6"	1.3814757	2.1345272	17.75	31.5	4.4	1.2	0.963	22.3	4.21	10.14	16.08
18-Apr	23h 48m 49.30s	-02° 28' 33.9"	1.3814190	2.1315773	17.73	31.7	4.4	1.2	0.962	22.4	4.19	10.13	16.08
19-Apr	23h 51m 40.29s	-02° 09' 56.6"	1.3813769	2.1286252	17.70	31.9	4.4	1.2	0.962	22.6	4.17	10.12	16.08
20-Apr	23h 54m 31.13s	-01° 51' 18.9"	1.3813493	2.1256703	17.68	32.1	4.4	1.2	0.961	22.7	4.14	10.11	16.08
21-Apr	23h 57m 21.83s	-01° 32' 41.0"	1.3813361	2.1227125	17.65	32.3	4.4	1.2	0.961	22.8	4.12	10.10	16.08
22-Apr	00h 00m 12.39s	-01° 14' 03.2"	1.3813375	2.1197514	17.63	32.5	4.4	1.2	0.960	23.0	4.10	10.09	16.08
23-Apr	00h 03m 02.82s	-00° 55' 25.6"	1.3813533	2.1167867	17.60	32.7	4.4	1.2	0.960	23.1	4.08	10.07	16.08
24-Apr	00h 05m 53.14s	-00° 36' 48.4"	1.3813836	2.1138183	17.58	32.9	4.4	1.2	0.959	23.3	4.06	10.06	16.08
25-Apr	00h 08m 43.33s	-00° 18' 11.7"	1.3814285	2.1108461	17.55	33.1	4.4	1.2	0.959	23.4	4.03	10.05	16.08
26-Apr	00h 11m 33.42s	+00° 00' 24.1"	1.3814878	2.1078700	17.53	33.3	4.4	1.2	0.958	23.5	4.01	10.04	16.08
27-Apr	00h 14m 23.40s	+00° 18' 59.0"	1.3815616	2.1048899	17.51	33.5	4.5	1.2	0.958	23.7	3.59	10.03	16.08
28-Apr	00h 17m 13.29s	+00° 37' 32.7"	1.3816498	2.1019061	17.48	33.7	4.5	1.2	0.957	23.8	3.57	10.02	16.08
29-Apr	00h 20m 03.08s	+00° 56' 05.0"	1.3817525	2.0989186	17.46	33.9	4.5	1.2	0.957	24.0	3.55	10.01	16.08
30-Apr	00h 22m 52.79s	+01° 14' 35.7"	1.3818696	2.0959277	17.43	34.1	4.5	1.2	0.956	24.1	3.52	10.00	16.08
1-May	00h 25m 42.41s	+01° 33' 04.7"	1.3820012	2.0929335	17.41	34.3	4.5	1.2	0.956	24.2	3.50	9.59	16.08
2-May	00h 28m 31.95s	+01° 51' 31.7"	1.3821472	2.0899362	17.38	34.5	4.5	1.2	0.955	24.4	3.48	9.57	16.08
3-May	00h 31m 21.42s	+02° 09' 56.6"	1.3823075	2.0869359	17.36	34.7	4.5	1.2	0.955	24.5	3.46	9.56	16.08
4-May	00h 34m 10.83s	+02° 28' 19.3"	1.3824822	2.0839326	17.33	34.9	4.5	1.2	0.954	24.6	3.43	9.55	16.08
5-May	00h 37m 00.19s	+02° 46' 39.5"	1.3826712	2.0809262	17.31	35.1	4.5	1.2	0.954	24.8	3.41	9.54	16.08
6-May	00h 39m 49.51s	+03° 04' 57.1"	1.3828745	2.0779166	17.28	35.3	4.5	1.2	0.953	24.9	3.39	9.53	16.08
7-May	00h 42m 38.80s	+03° 23' 12.0"	1.3830921	2.0749037	17.26	35.5	4.5	1.2	0.953	25.0	3.37	9.52	16.07
8-May	00h 45m 28.06s	+03° 41' 24.0"	1.3833239	2.0718870	17.23	35.7	4.5	1.2	0.953	25.2	3.35	9.51	16.07
9-May	00h 48m 17.32s	+03° 59' 33.0"	1.3835699	2.0688663	17.21	35.9	4.5	1.2	0.952	25.3	3.32	9.50	16.07
10-May	00h 51m 06.57s	+04° 17' 38.7"	1.3838302	2.0658411	17.18	36.1	4.5	1.2	0.952	25.4	3.30	9.48	16.07
11-May	00h 53m 55.82s	+04° 35' 41.1"	1.3841045	2.0628110	17.16	36.3	4.5	1.2	0.951	25.6	3.28	9.47	16.07
12-May	00h 56m 45.08s	+04° 53' 39.9"	1.3843929	2.0597756	17.13	36.5	4.5	1.2	0.951	25.7	3.26	9.46	16.07
13-May	00h 59m 34.36s	+05° 11' 34.9"	1.3846954	2.0567343	17.10	36.7	4.6	1.2	0.950	25.8	3.24	9.45	16.07
14-May	01h 02m 23.65s	+05° 29' 26.1"	1.3850119	2.0536865	17.08	36.9	4.6	1.2	0.950	26.0	3.21	9.44	16.07
15-May	01h 05m 12.97s	+05° 47' 13.2"	1.3853424	2.0506319	17.05	37.1	4.6	1.2	0.949	26.1	3.19	9.43	16.07
16-May	01h 08m 02.33s	+06° 04' 56.0"	1.3856868	2.0475698	17.03	37.3	4.6	1.2	0.949	26.2	3.17	9.42	16.07
17-May	01h 10m 51.72s	+06° 22' 34.4"	1.3860451	2.0444998	17.00	37.5	4.6	1.2	0.948	26.4	3.15	9.41	16.07
18-May	01h 13m 41.15s	+06° 40' 08.1"	1.3864171	2.0414213	16.98	37.7	4.6	1.2	0.948	26.5	3.13	9.40	16.07
19-May	01h 16m 30.63s	+06° 57' 37.1"	1.3868030	2.0383339	16.95	37.9	4.6	1.2	0.947	26.6	3.10	9.38	16.07
20-May	01h 19m 20.16s	+07° 15' 01.2"	1.3872025	2.0352369	16.93	38.1	4.6	1.2	0.947	26.7	3.08	9.37	16.07
21-May	01h 22m 09.74s	+07° 32' 20.1"	1.3876158	2.0321300	16.90	38.3	4.6	1.2	0.946	26.9	3.06	9.36	16.07
22-May	01h 24m 59.39s	+07° 49' 33.7"	1.3880426	2.0290128	16.87	38.5	4.6	1.2	0.946	27.0	3.04	9.35	16.07
23-May	01h 27m 49.10s	+08° 06' 41.9"	1.3884829	2.0258849	16.85	38.7	4.6	1.1	0.945	27.1	3.02	9.34	16.07
24-May	01h 30m 38.89s	+08° 23' 44.4"	1.3889367	2.0227459	16.82	38.9	4.6	1.1	0.944	27.3	3.00	9.33	16.07
25-May	01h 33m 28.74s	+08° 40' 41.2"	1.3894040	2.0195958	16.80	39.1	4.6	1.1	0.944	27.4	2.57	9.32	16.07
26-May	01h 36m 18.67s	+08° 57' 32.0"	1.3898846	2.0164345	16.77	39.3	4.6	1.1	0.943	27.5	2.55	9.31	16.07
27-May	01h 39m 08.67s	+09° 14' 16.7"	1.3903784	2.0132619	16.74	39.5	4.7	1.1	0.943	27.6	2.53	9.30	16.07
28-May	01h 41m 58.74s	+09° 30' 55.1"	1.3908855	2.0100781	16.72	39.7	4.7	1.1	0.942	27.8	2.51	9.28	16.06
29-May	01h 44m 48.88s	+09° 47' 27.1"	1.3914057	2.0068832	16.69	39.9	4.7	1.1	0.942				

Date	A.R. Geoc.	Dec. Geoc.	R A.U.	Distance A.U.	Light (m)	El. °	Diam. "	Mag.	Phase	Phase angle°	Rise	Transit	Set
30-May	01h 47m 39.10s	+10° 03' 52.4"	1.3919390	2.0036772	16.66	40.2	4.7	1.1	0.941	28.0	2.47	9.26	16.06
31-May	01h 50m 29.40s	+10° 20' 11.0"	1.3924853	2.0004603	16.64	40.4	4.7	1.1	0.941	28.1	2.45	9.25	16.06
1-Jun	01h 53m 19.79s	+10° 36' 22.7"	1.3930445	1.9972322	16.61	40.6	4.7	1.1	0.940	28.3	2.42	9.24	16.06
2-Jun	01h 56m 10.28s	+10° 52' 27.4"	1.3936165	1.9939930	16.58	40.8	4.7	1.1	0.940	28.4	2.40	9.23	16.06
3-Jun	01h 59m 00.87s	+11° 08' 24.9"	1.3942013	1.9907424	16.56	41.0	4.7	1.1	0.939	28.5	2.38	9.22	16.06
4-Jun	02h 01m 51.56s	+11° 24' 15.2"	1.3947988	1.9874800	16.53	41.2	4.7	1.1	0.939	28.6	2.36	9.21	16.06
5-Jun	02h 04m 42.37s	+11° 39' 58.1"	1.3954089	1.9842057	16.50	41.4	4.7	1.1	0.938	28.8	2.34	9.20	16.06
6-Jun	02h 07m 33.30s	+11° 55' 33.5"	1.3960315	1.9809190	16.47	41.6	4.7	1.1	0.938	28.9	2.32	9.19	16.06
7-Jun	02h 10m 24.34s	+12° 11' 01.2"	1.3966665	1.9776195	16.45	41.8	4.7	1.1	0.937	29.0	2.30	9.17	16.06
8-Jun	02h 13m 15.51s	+12° 26' 21.2"	1.3973139	1.9743066	16.42	42.1	4.7	1.1	0.937	29.1	2.28	9.16	16.05
9-Jun	02h 16m 06.80s	+12° 41' 33.3"	1.3979736	1.9709799	16.39	42.3	4.8	1.1	0.936	29.2	2.26	9.15	16.05
10-Jun	02h 18m 58.22s	+12° 56' 37.3"	1.3986454	1.9676388	16.36	42.5	4.8	1.1	0.936	29.4	2.24	9.14	16.05
11-Jun	02h 21m 49.76s	+13° 11' 33.1"	1.3993293	1.9642828	16.34	42.7	4.8	1.1	0.935	29.5	2.22	9.13	16.05
12-Jun	02h 24m 41.44s	+13° 26' 20.6"	1.4000252	1.9609111	16.31	42.9	4.8	1.1	0.935	29.6	2.20	9.12	16.05
13-Jun	02h 27m 33.25s	+13° 40' 59.6"	1.4007330	1.9575233	16.28	43.1	4.8	1.1	0.934	29.7	2.18	9.11	16.05
14-Jun	02h 30m 25.19s	+13° 55' 30.0"	1.4014525	1.9541187	16.25	43.4	4.8	1.1	0.934	29.8	2.16	9.10	16.05
15-Jun	02h 33m 17.26s	+14° 09' 51.7"	1.4021838	1.9506967	16.22	43.6	4.8	1.1	0.933	30.0	2.14	9.09	16.05
16-Jun	02h 36m 09.46s	+14° 24' 04.5"	1.4029267	1.9472567	16.19	43.8	4.8	1.1	0.933	30.1	2.11	9.08	16.04
17-Jun	02h 39m 01.79s	+14° 38' 08.3"	1.4036811	1.9437982	16.17	44.0	4.8	1.1	0.932	30.2	2.10	9.07	16.04
18-Jun	02h 41m 54.26s	+14° 52' 03.0"	1.4044470	1.9403205	16.14	44.2	4.8	1.1	0.932	30.3	2.08	9.06	16.04
19-Jun	02h 44m 46.86s	+15° 05' 48.4"	1.4052241	1.9368230	16.11	44.5	4.8	1.1	0.931	30.4	2.06	9.05	16.04
20-Jun	02h 47m 39.59s	+15° 19' 24.5"	1.4060124	1.9333053	16.08	44.7	4.8	1.1	0.931	30.5	2.04	9.03	16.04
21-Jun	02h 50m 32.45s	+15° 32' 51.1"	1.4068119	1.9297671	16.05	44.9	4.9	1.1	0.930	30.7	2.02	9.02	16.04
22-Jun	02h 53m 25.43s	+15° 46' 08.1"	1.4076223	1.9262078	16.02	45.1	4.9	1.1	0.930	30.8	2.00	9.01	16.04
23-Jun	02h 56m 18.53s	+15° 59' 15.4"	1.4084437	1.9226274	15.99	45.4	4.9	1.1	0.929	30.9	1.58	9.00	16.03
24-Jun	02h 59m 11.73s	+16° 12' 12.8"	1.4092758	1.9190258	15.96	45.6	4.9	1.1	0.929	31.0	1.56	8.59	16.03
25-Jun	03h 02m 05.04s	+16° 25' 00.2"	1.4101186	1.9154029	15.93	45.8	4.9	1.1	0.928	31.1	1.54	8.58	16.03
26-Jun	03h 04m 58.44s	+16° 37' 37.6"	1.4109720	1.9117588	15.90	46.1	4.9	1.1	0.927	31.2	1.52	8.57	16.03
27-Jun	03h 07m 51.94s	+16° 50' 04.8"	1.4118358	1.9080935	15.87	46.3	4.9	1.1	0.927	31.4	1.50	8.56	16.03
28-Jun	03h 10m 45.53s	+17° 02' 21.7"	1.4127101	1.9044070	15.84	46.5	4.9	1.1	0.926	31.5	1.48	8.55	16.02
29-Jun	03h 13m 39.21s	+17° 14' 28.2"	1.4135945	1.9006994	15.81	46.8	4.9	1.1	0.926	31.6	1.46	8.54	16.02
30-Jun	03h 16m 32.99s	+17° 26' 24.3"	1.4144891	1.8969705	15.78	47.0	4.9	1.1	0.925	31.7	1.44	8.53	16.02
1-Jul	03h 19m 26.87s	+17° 38' 09.9"	1.4153937	1.8932202	15.74	47.2	4.9	1.1	0.925	31.8	1.43	8.52	16.02
2-Jul	03h 22m 20.83s	+17° 49' 44.8"	1.4163082	1.8894481	15.71	47.5	5.0	1.1	0.924	31.9	1.41	8.51	16.01
3-Jul	03h 25m 14.89s	+18° 01' 09.2"	1.4172325	1.8856541	15.68	47.7	5.0	1.1	0.924	32.0	1.39	8.50	16.01
4-Jul	03h 28m 09.03s	+18° 12' 22.7"	1.4181665	1.8818376	15.65	47.9	5.0	1.1	0.923	32.2	1.37	8.49	16.01
5-Jul	03h 31m 03.26s	+18° 23' 25.5"	1.4191100	1.8779985	15.62	48.2	5.0	1.1	0.923	32.3	1.35	8.48	16.01
6-Jul	03h 33m 57.57s	+18° 34' 17.4"	1.4200630	1.8741361	15.59	48.4	5.0	1.1	0.922	32.4	1.33	8.47	16.00
7-Jul	03h 36m 51.96s	+18° 44' 58.3"	1.4210253	1.8702501	15.55	48.7	5.0	1.1	0.922	32.5	1.32	8.46	16.00
8-Jul	03h 39m 46.41s	+18° 55' 28.2"	1.4219968	1.8663398	15.52	48.9	5.0	1.1	0.921	32.6	1.30	8.45	16.00
9-Jul	03h 42m 40.94s	+19° 05' 47.0"	1.4229774	1.8624048	15.49	49.1	5.0	1.1	0.921	32.7	1.28	8.44	15.59
10-Jul	03h 45m 35.52s	+19° 15' 54.5"	1.4239669	1.8584445	15.46	49.4	5.0	1.1	0.920	32.8	1.26	8.43	15.59
11-Jul	03h 48m 30.17s	+19° 25' 50.8"	1.4249653	1.8544583	15.42	49.6	5.1	1.1	0.920	32.9	1.25	8.42	15.59
12-Jul	03h 51m 24.86s	+19° 35' 35.7"	1.4259725	1.8504456	15.39	49.9	5.1	1.1	0.919	33.0	1.23	8.40	15.58
13-Jul	03h 54m 19.60s	+19° 45' 09.3"	1.4269882	1.8464059	15.36	50.1	5.1	1.1	0.919	33.1	1.21	8.39	15.58
14-Jul	03h 57m 14.37s	+19° 54' 31.3"	1.4280124	1.8423384	15.32	50.4	5.1	1.1	0.918	33.3	1.20	8.38	15.58
15-Jul	04h 00m 09.18s	+20° 03' 41.9"	1.4290450	1.8382425	15.29	50.6	5.1	1.1	0.918	33.4	1.18	8.37	15.57
16-Jul	04h 03m 04.02s	+20° 12' 40.8"	1.4300858	1.8341178	15.25	50.9	5.1	1.1	0.917	33.5	1.16	8.36	15.57
17-Jul	04h 05m 58.87s	+20° 21' 28.1"	1.4311348	1.8299636	15.22	51.1	5.1	1.1	0.917	33.6	1.14	8.35	15.57
18-Jul	04h 08m 53.73s	+20° 30' 03.8"	1.4321917	1.8257795	15.18	51.4	5.1	1.1	0.916	33.7	1.13	8.34	15.56
19-Jul	04h 11m 48.59s	+20° 38' 27.8"	1.4332565	1.8215648	15.15	51.7	5.1	1.1	0.916	33.8	1.11	8.33	15.56
20-Jul	04h 14m 43.44s	+20° 46' 40.0"	1.4343290	1.8173194	15.11	51.9	5.2	1.1	0.915	33.9	1.10	8.32	15.55
21-Jul	04h 17m 38.26s	+20° 54' 40.4"	1.4354092	1.8130429	15.08	52.2	5.2	1.1	0.915	34.0	1.08	8.31	15.55
22-Jul	04h 20m 33.03s	+21° 02' 29.0"	1.4364968	1.8087352	15.04	52.4	5.2	1.1	0.914	34.1	1.06	8.30	15.54
23-Jul	04h 23m 27.74s	+21° 10' 05.7"	1.4375918	1.8043963	15.01	52.7	5.2	1.1	0.913	34.2	1.05	8.29	15.54
24-Jul	04h 26m 22.38s	+21° 17' 30.5"	1.4386941	1.8000263	14.97	53.0	5.2	1.1	0.913	34.3	1.03	8.28	15.53
25-Jul	04h 29m 16.95s	+21° 24' 43.4"	1.4398034	1.7956252	14.93	53.2	5.2	1.1	0.912	34.4	1.02	8.27	15.53
26-Jul	04h 32m 11.43s	+21° 31' 44.3"	1.4409198	1.7911932	14.90	53.5	5.2	1.1	0.912	34.5	1.00	8.26	15.52
27-Jul	04h 35m 05.81s	+21° 38' 33.2"	1.4420430	1.7867303	14.86	53.8	5.2	1.1	0.911	34.6	0.58	8.25	15.52
28-Jul	04h 38m 00.10s	+21° 45' 10.3"	1.4431729	1.7822366	14.82	54.1	5.3	1.1	0.911	34.7	0.57	8.24	15.51
29-Jul	04h 40m 54.28s	+21° 51' 35.3"	1.4443095	1.7777119	14.78	54.3	5.3	1.1	0.910	34.8	0.55	8.23	15.51
30-Jul	04h 43m 48.35s	+21° 57' 48.5"	1.4454525	1.7731561	14.75	54.6	5.3	1.1	0.910	34.9	0.54	8.22	15.50
31-Jul	04h 46m 42.29s	+22° 03' 49.7"	1.4466019	1.7685692	14.71	54.9	5.3	1.1	0.909	35.0	0.52	8.21	15.50
1-Aug	04h 49m 36.10s	+22° 09' 39.0"	1.4477575	1.7639507	14.67	55.2	5.3	1.1	0.909	35.1	0.51	8.20	15.49
2-Aug	04h 52m 29.77s	+22° 15' 16.4"	1.4489192	1.7593006	14.63	55.4	5.3	1.1	0.908	35.2	0.49	8.19	15.48
3-Aug	04h 55m 23.29s	+22° 20' 41.9"	1.4500869	1.7546184	14.59	55.7	5.3	1.1	0.908	35.3	0.48	8.18	15.48
4-Aug	04h 58m 16.64s	+22° 25' 55.5"	1.4512604	1.7499038	14.55	56.0	5.4	1.1	0.907	35.4	0.47	8.17	15.47
5-Aug	05h 01m 09.83s	+22° 30' 57.2"	1.4524396	1.7451564	14.51	56.3	5.4	1.1	0.907	35.5	0.45	8.16	15.46
6-Aug	05h 04m 02.83s	+22° 35' 47.1"	1.4536244	1.7403757	14.47	56.6	5.4	1.1	0.906	35.6	0.44	8.15	15.46
7-Aug	05h 06m 55.64s	+22° 40' 25.1"	1.4548147	1.7355615	14.43	56.9	5.4	1.1	0.906	35.7	0.42	8.14	15.45
8-Aug	05h 09m 48.26s	+22° 44' 51.3"	1.4560103	1.7307131	14.39	57.2	5.4	1.1	0.905	35.8	0.41	8.12	15.44
9-Aug	05h 12m 40.66s	+22° 49' 05.7"	1.4572111	1.7258300	14.35	57.4	5.4	1.1	0.905	35.9	0.39	8.11	15.43
10-Aug	05h 15m 32.84s	+22° 53' 08.3"	1.4584170	1.7209119	14.31	57.7	5.4	1.1	0.905	36.0	0.38	8.10	15.43
11-Aug	05h 18m 24.79s	+22° 56' 59.1"	1.4596278	1.7159580	14.27	58.0	5.5	1.1	0.904	36.1	0.37	8.09	15.42
12-Aug	05h 21m 16.49s	+23° 00' 38.2"	1.4608435	1.7109680	14.23	58.3	5.5	1.0	0.904	36.2	0.35	8.08	15.41
13-Aug	05h 24m 07.95s	+23° 04' 05.7"	1.4620638	1.7059414	14.19	58.6	5.5	1.0	0.903	36.3	0.34	8.07	15.40
14-Aug	05h 26m 59.14s	+23° 07' 21.5"	1.4632887	1.7008776	14.14	58.9	5.5	1.0	0.903	36.4	0.33	8.06	15.39

Date	A.R. Geoc.	Dec. Geoc.	R A.U.	Distance A.U.	Light (m)	El. °	Diam. "	Mag.	Phase	Phase angle°	Rise	Transit	Set
15-Aug	05h 29m 50.04s	+23° 10' 25.8"	1.4645181	1.6957762	14.10	59.2	5.5	1.0	0.902	36.5	0.31	8.05	15.39
16-Aug	05h 32m 40.65s	+23° 13' 18.6"	1.4657517	1.6906368	14.06	59.5	5.5	1.0	0.902	36.6	0.30	8.04	15.38
17-Aug	05h 35m 30.95s	+23° 15' 59.9"	1.4669895	1.6854592	14.02	59.9	5.6	1.0	0.901	36.6	0.29	8.03	15.37
18-Aug	05h 38m 20.91s	+23° 18' 29.9"	1.4682314	1.6802431	13.97	60.2	5.6	1.0	0.901	36.7	0.27	8.02	15.36
19-Aug	05h 41m 10.53s	+23° 20' 48.6"	1.4694773	1.6749885	13.93	60.5	5.6	1.0	0.900	36.8	0.26	8.00	15.35
20-Aug	05h 43m 59.78s	+23° 22' 56.1"	1.4707269	1.6696954	13.89	60.8	5.6	1.0	0.900	36.9	0.25	7.59	15.34
21-Aug	05h 46m 48.64s	+23° 24' 52.4"	1.4719802	1.6643641	13.84	61.1	5.6	1.0	0.899	37.0	0.24	7.58	15.33
22-Aug	05h 49m 37.11s	+23° 26' 37.5"	1.4732371	1.6589946	13.80	61.4	5.6	1.0	0.899	37.1	0.22	7.57	15.32
23-Aug	05h 52m 25.17s	+23° 28' 11.7"	1.4744973	1.6535873	13.75	61.8	5.7	1.0	0.898	37.2	0.21	7.56	15.31
24-Aug	05h 55m 12.82s	+23° 29' 34.9"	1.4757609	1.6481425	13.71	62.1	5.7	1.0	0.898	37.3	0.20	7.55	15.30
25-Aug	05h 58m 00.05s	+23° 30' 47.3"	1.4770277	1.6426602	13.66	62.4	5.7	1.0	0.898	37.3	0.19	7.54	15.29
26-Aug	06h 00m 46.83s	+23° 31' 49.0"	1.4782975	1.6371407	13.61	62.7	5.7	1.0	0.897	37.4	0.17	7.52	15.28
27-Aug	06h 03m 33.18s	+23° 32' 40.0"	1.4795703	1.6315840	13.57	63.1	5.7	1.0	0.897	37.5	0.16	7.51	15.27
28-Aug	06h 06m 19.06s	+23° 33' 20.5"	1.4808458	1.6259902	13.52	63.4	5.8	1.0	0.896	37.6	0.15	7.50	15.25
29-Aug	06h 09m 04.48s	+23° 33' 50.6"	1.4821241	1.6203593	13.48	63.7	5.8	1.0	0.896	37.7	0.14	7.49	15.24
30-Aug	06h 11m 49.41s	+23° 34' 10.4"	1.4834049	1.6146913	13.43	64.1	5.8	1.0	0.895	37.7	0.12	7.48	15.23
31-Aug	06h 14m 33.86s	+23° 34' 20.0"	1.4846881	1.6089859	13.38	64.4	5.8	1.0	0.895	37.8	0.11	7.47	15.22
1-Sep	06h 17m 17.81s	+23° 34' 19.4"	1.4859737	1.6032432	13.33	64.7	5.8	1.0	0.895	37.9	0.10	7.45	15.21
2-Sep	06h 20m 01.24s	+23° 34' 08.8"	1.4872614	1.5974629	13.28	65.1	5.9	1.0	0.894	38.0	0.09	7.44	15.19
3-Sep	06h 22m 44.15s	+23° 33' 48.4"	1.4885512	1.5916448	13.24	65.4	5.9	1.0	0.894	38.0	0.08	7.43	15.18
4-Sep	06h 25m 26.53s	+23° 33' 18.1"	1.4898430	1.5857888	13.19	65.8	5.9	0.9	0.893	38.1	0.06	7.42	15.17
5-Sep	06h 28m 08.36s	+23° 32' 38.1"	1.4911366	1.5798946	13.14	66.1	5.9	0.9	0.893	38.2	0.05	7.40	15.16
6-Sep	06h 30m 49.64s	+23° 31' 48.5"	1.4924319	1.5739618	13.09	66.5	6.0	0.9	0.893	38.3	0.04	7.39	15.14
7-Sep	06h 33m 30.36s	+23° 30' 49.5"	1.4937288	1.5679902	13.04	66.8	6.0	0.9	0.892	38.3	0.03	7.38	15.13
8-Sep	06h 36m 10.51s	+23° 29' 41.1"	1.4950272	1.5619795	12.99	67.2	6.0	0.9	0.892	38.4	0.02	7.37	15.11
9-Sep	06h 38m 50.08s	+23° 28' 23.5"	1.4963269	1.5559293	12.94	67.6	6.0	0.9	0.891	38.5	0.00	7.35	15.10
10-Sep	06h 41m 29.04s	+23° 26' 56.9"	1.4976279	1.5498394	12.89	67.9	6.0	0.9	0.891	38.5	23.58	7.34	15.09
11-Sep	06h 44m 07.40s	+23° 25' 21.3"	1.4989299	1.5437094	12.84	68.3	6.1	0.9	0.891	38.6	23.57	7.33	15.07
12-Sep	06h 46m 45.14s	+23° 23' 37.0"	1.5002330	1.5375391	12.79	68.7	6.1	0.9	0.890	38.7	23.56	7.31	15.06
13-Sep	06h 49m 22.23s	+23° 21' 44.1"	1.5015369	1.5313283	12.73	69.0	6.1	0.9	0.890	38.7	23.55	7.30	15.04
14-Sep	06h 51m 58.67s	+23° 19' 42.7"	1.5028417	1.5250770	12.68	69.4	6.1	0.9	0.890	38.8	23.53	7.29	15.03
15-Sep	06h 54m 34.43s	+23° 17' 33.0"	1.5041470	1.5187852	12.63	69.8	6.2	0.9	0.889	38.9	23.52	7.27	15.01
16-Sep	06h 57m 09.50s	+23° 15' 15.3"	1.5054529	1.5124529	12.58	70.2	6.2	0.9	0.889	38.9	23.51	7.26	15.00
17-Sep	06h 59m 43.86s	+23° 12' 49.5"	1.5067592	1.5060805	12.52	70.5	6.2	0.9	0.889	39.0	23.50	7.25	14.58
18-Sep	07h 02m 17.49s	+23° 10' 15.9"	1.5080659	1.4996683	12.47	70.9	6.2	0.9	0.888	39.0	23.49	7.23	14.57
19-Sep	07h 04m 50.39s	+23° 07' 34.7"	1.5093727	1.4932167	12.42	71.3	6.3	0.9	0.888	39.1	23.47	7.22	14.55
20-Sep	07h 07m 22.54s	+23° 04' 46.0"	1.5106796	1.4867262	12.36	71.7	6.3	0.9	0.888	39.1	23.46	7.20	14.53
21-Sep	07h 09m 53.94s	+23° 01' 49.9"	1.5119864	1.4801974	12.31	72.1	6.3	0.8	0.888	39.2	23.45	7.19	14.52
22-Sep	07h 12m 24.56s	+22° 58' 46.8"	1.5132932	1.4736307	12.26	72.5	6.4	0.8	0.887	39.2	23.44	7.18	14.50
23-Sep	07h 14m 54.41s	+22° 55' 36.6"	1.5145996	1.4670267	12.20	72.9	6.4	0.8	0.887	39.3	23.43	7.16	14.48
24-Sep	07h 17m 23.47s	+22° 52' 19.7"	1.5159057	1.4603856	12.14	73.3	6.4	0.8	0.887	39.3	23.41	7.15	14.47
25-Sep	07h 19m 51.73s	+22° 48' 56.2"	1.5172114	1.4537080	12.09	73.7	6.4	0.8	0.886	39.4	23.40	7.13	14.45
26-Sep	07h 22m 19.17s	+22° 45' 26.3"	1.5185164	1.4469941	12.03	74.1	6.5	0.8	0.886	39.4	23.39	7.12	14.43
27-Sep	07h 24m 45.80s	+22° 41' 50.1"	1.5198207	1.4402443	11.98	74.5	6.5	0.8	0.886	39.5	23.38	7.10	14.41
28-Sep	07h 27m 11.59s	+22° 38' 07.8"	1.5211243	1.4334588	11.92	75.0	6.5	0.8	0.886	39.5	23.37	7.09	14.39
29-Sep	07h 29m 36.55s	+22° 34' 19.6"	1.5224269	1.4266378	11.86	75.4	6.6	0.8	0.886	39.5	23.35	7.07	14.38
30-Sep	07h 32m 00.65s	+22° 30' 25.7"	1.5237286	1.4197816	11.81	75.8	6.6	0.8	0.885	39.6	23.34	7.06	14.36
1-Oct	07h 34m 23.89s	+22° 26' 26.3"	1.5250290	1.4128903	11.75	76.2	6.6	0.8	0.885	39.6	23.33	7.04	14.34
2-Oct	07h 36m 46.26s	+22° 22' 21.4"	1.5263283	1.4059641	11.69	76.7	6.7	0.8	0.885	39.7	23.32	7.02	14.32
3-Oct	07h 39m 07.75s	+22° 18' 11.4"	1.5276263	1.3990030	11.63	77.1	6.7	0.8	0.885	39.7	23.30	7.01	14.30
4-Oct	07h 41m 28.35s	+22° 13' 56.4"	1.5289228	1.3920072	11.58	77.5	6.7	0.8	0.885	39.7	23.29	6.59	14.28
5-Oct	07h 43m 48.05s	+22° 09' 36.5"	1.5302177	1.3849767	11.52	78.0	6.8	0.7	0.885	39.7	23.28	6.58	14.26
6-Oct	07h 46m 06.84s	+22° 05' 11.9"	1.5315110	1.3779116	11.46	78.4	6.8	0.7	0.884	39.8	23.26	6.56	14.24
7-Oct	07h 48m 24.71s	+22° 00' 43.0"	1.5328026	1.3708118	11.40	78.9	6.8	0.7	0.884	39.8	23.25	6.54	14.22
8-Oct	07h 50m 41.65s	+21° 56' 09.8"	1.5340923	1.3636774	11.34	79.3	6.9	0.7	0.884	39.8	23.24	6.53	14.20
9-Oct	07h 52m 57.64s	+21° 51' 32.6"	1.5353801	1.3565084	11.28	79.8	6.9	0.7	0.884	39.8	23.22	6.51	14.18
10-Oct	07h 55m 12.67s	+21° 46' 51.7"	1.5366658	1.3493051	11.22	80.2	6.9	0.7	0.884	39.8	23.21	6.49	14.16
11-Oct	07h 57m 26.72s	+21° 42' 07.3"	1.5379494	1.3420676	11.16	80.7	7.0	0.7	0.884	39.8	23.20	6.48	14.14
12-Oct	07h 59m 39.76s	+21° 37' 19.5"	1.5392307	1.3347962	11.10	81.2	7.0	0.7	0.884	39.8	23.18	6.46	14.12
13-Oct	08h 01m 51.78s	+21° 32' 28.7"	1.5405097	1.3274913	11.04	81.7	7.1	0.7	0.884	39.9	23.17	6.44	14.10
14-Oct	08h 04m 02.76s	+21° 27' 35.1"	1.5417863	1.3201534	10.98	82.1	7.1	0.7	0.884	39.9	23.15	6.42	14.08
15-Oct	08h 06m 12.69s	+21° 22' 38.8"	1.5430603	1.3127833	10.92	82.6	7.1	0.7	0.884	39.9	23.14	6.41	14.06
16-Oct	08h 08m 21.54s	+21° 17' 40.2"	1.5443317	1.3053817	10.86	83.1	7.2	0.6	0.884	39.9	23.13	6.39	14.03
17-Oct	08h 10m 29.30s	+21° 12' 39.4"	1.5456003	1.2979494	10.79	83.6	7.2	0.6	0.884	39.9	23.11	6.37	14.01
18-Oct	08h 12m 35.95s	+21° 07' 36.8"	1.5468661	1.2904873	10.73	84.1	7.3	0.6	0.884	39.8	23.10	6.35	13.59
19-Oct	08h 14m 41.49s	+21° 02' 32.4"	1.5481290	1.2829965	10.67	84.6	7.3	0.6	0.884	39.8	23.08	6.33	13.57
20-Oct	08h 16m 45.90s	+20° 57' 26.7"	1.5493889	1.2754779	10.61	85.1	7.3	0.6	0.884	39.8	23.07	6.31	13.55
21-Oct	08h 18m 49.15s	+20° 52' 19.8"	1.5506457	1.2679324	10.54	85.6	7.4	0.6	0.884	39.8	23.05	6.30	13.52
22-Oct	08h 20m 51.24s	+20° 47' 11.9"	1.5518992	1.2603612	10.48	86.1	7.4	0.6	0.884	39.8	23.04	6.28	13.50
23-Oct	08h 22m 52.16s	+20° 42' 03.4"	1.5531495	1.2527650	10.42	86.6	7.5	0.6	0.884	39.8	23.02	6.26	13.48
24-Oct	08h 24m 51.88s	+20° 36' 54.4"	1.5543964	1.2451448	10.35	87.1	7.5	0.5	0.885	39.7	23.00	6.24	13.45
25-Oct	08h 26m 50.38s	+20° 31' 45.1"	1.5556398	1.2375014	10.29	87.7	7.6	0.5	0.885	39.7	22.59	6.22	13.43
26-Oct	08h 28m 47.67s	+20° 26' 35.9"	1.5568797	1.2298358	10.23	88.2	7.6	0.5	0.885	39.7	22.57	6.20	13.41
27-Oct	08h 30m 43.71s	+20° 21' 26.9"	1.5581159	1.2221487	10.16	88.7	7.7	0.5	0.885	39.6	22.56	6.18	13.38
28-Oct	08h 32m 38.50s	+20° 16' 18.4"	1.5593484	1.2144409	10.10	89.3	7.7	0.5	0.885	39.6	22.54	6.16	13.36
29-Oct	08h 34m 32.01s	+20° 11' 10.7"	1.5605771	1.2067134	10.04	89.8	7.8	0.5	0.886	39.5	22.52	6.14	13.33
30-Oct	08h 36m 24.24s	+20° 06' 03.8"	1.5618019	1.1989667	9.97	90.4	7.8	0.5	0.886				

Date	A.R. Geoc.	Dec. Geoc.	R A.U.	Distance A.U.	Light (m)	El. °	Diam. "	Mag.	Phase	Phase angle°	Rise	Transit	Set
31-Oct	08h 38m 15.17s	+20° 00' 58.2"	1.5630226	1.1912018	9.91	90.9	7.9	0.5	0.886	39.4	22.49	6.10	13.28
1-Nov	08h 40m 04.79s	+19° 55' 54.0"	1.5642393	1.1834192	9.84	91.5	7.9	0.4	0.887	39.4	22.47	6.07	13.26
2-Nov	08h 41m 53.06s	+19° 50' 51.5"	1.5654518	1.1756198	9.78	92.1	8.0	0.4	0.887	39.3	22.45	6.05	13.23
3-Nov	08h 43m 39.99s	+19° 45' 50.9"	1.5666601	1.1678041	9.71	92.6	8.0	0.4	0.887	39.2	22.43	6.03	13.21
4-Nov	08h 45m 25.55s	+19° 40' 52.5"	1.5678640	1.1599729	9.65	93.2	8.1	0.4	0.888	39.2	22.42	6.01	13.18
5-Nov	08h 47m 09.71s	+19° 35' 56.7"	1.5690635	1.1521269	9.58	93.8	8.1	0.4	0.888	39.1	22.40	5.59	13.16
6-Nov	08h 48m 52.45s	+19° 31' 03.6"	1.5702585	1.1442668	9.52	94.4	8.2	0.4	0.889	39.0	22.38	5.57	13.13
7-Nov	08h 50m 33.75s	+19° 26' 13.7"	1.5714490	1.1363934	9.45	95.0	8.2	0.4	0.889	38.9	22.36	5.54	13.11
8-Nov	08h 52m 13.57s	+19° 21' 27.2"	1.5726348	1.1285077	9.39	95.6	8.3	0.3	0.889	38.8	22.34	5.52	13.08
9-Nov	08h 53m 51.88s	+19° 16' 44.4"	1.5738158	1.1206107	9.32	96.2	8.4	0.3	0.890	38.7	22.32	5.50	13.05
10-Nov	08h 55m 28.66s	+19° 12' 05.7"	1.5749920	1.1127036	9.25	96.8	8.4	0.3	0.891	38.6	22.30	5.47	13.03
11-Nov	08h 57m 03.87s	+19° 07' 31.3"	1.5761634	1.1047878	9.19	97.4	8.5	0.3	0.891	38.5	22.28	5.45	13.00
12-Nov	08h 58m 37.49s	+19° 03' 01.6"	1.5773298	1.0968647	9.12	98.1	8.5	0.3	0.892	38.4	22.26	5.43	12.57
13-Nov	09h 00m 09.48s	+18° 58' 36.9"	1.5784911	1.0889360	9.06	98.7	8.6	0.3	0.892	38.3	22.24	5.40	12.55
14-Nov	09h 01m 39.81s	+18° 54' 17.4"	1.5796473	1.0810033	8.99	99.4	8.7	0.3	0.893	38.2	22.21	5.38	12.52
15-Nov	09h 03m 08.46s	+18° 50' 03.5"	1.5807983	1.0730684	8.92	100.0	8.7	0.2	0.894	38.0	22.19	5.35	12.49
16-Nov	09h 04m 35.39s	+18° 45' 55.6"	1.5819440	1.0651333	8.86	100.7	8.8	0.2	0.895	37.9	22.17	5.33	12.46
17-Nov	09h 06m 00.58s	+18° 41' 53.8"	1.5830844	1.0571997	8.79	101.3	8.9	0.2	0.895	37.8	22.15	5.30	12.43
18-Nov	09h 07m 24.00s	+18° 37' 58.6"	1.5842193	1.0492698	8.73	102.0	8.9	0.2	0.896	37.6	22.12	5.28	12.41
19-Nov	09h 08m 45.60s	+18° 34' 10.2"	1.5853488	1.0413453	8.66	102.7	9.0	0.2	0.897	37.5	22.10	5.25	12.38
20-Nov	09h 10m 05.37s	+18° 30' 28.9"	1.5864726	1.0334282	8.59	103.4	9.1	0.1	0.898	37.3	22.08	5.23	12.35
21-Nov	09h 11m 23.27s	+18° 26' 55.1"	1.5875909	1.0255206	8.53	104.1	9.1	0.1	0.899	37.1	22.05	5.20	12.32
22-Nov	09h 12m 39.27s	+18° 23' 29.0"	1.5887034	1.0176244	8.46	104.8	9.2	0.1	0.900	37.0	22.03	5.17	12.29
23-Nov	09h 13m 53.34s	+18° 20' 10.9"	1.5898102	1.0097416	8.40	105.5	9.3	0.1	0.901	36.8	22.00	5.15	12.26
24-Nov	09h 15m 05.44s	+18° 17' 01.1"	1.5909111	1.0018740	8.33	106.2	9.3	0.1	0.902	36.6	21.58	5.12	12.23
25-Nov	09h 16m 15.54s	+18° 13' 59.9"	1.5920061	0.9940237	8.27	106.9	9.4	0.1	0.903	36.4	21.55	5.09	12.20
26-Nov	09h 17m 23.62s	+18° 11' 07.6"	1.5930951	0.9861928	8.20	107.7	9.5	0.0	0.904	36.2	21.52	5.06	12.17
27-Nov	09h 18m 29.63s	+18° 08' 24.4"	1.5941781	0.9783831	8.14	108.4	9.6	0.0	0.905	36.0	21.50	5.03	12.14
28-Nov	09h 19m 33.54s	+18° 05' 50.7"	1.5952549	0.9705966	8.07	109.2	9.6	0.0	0.906	35.7	21.47	5.00	12.11
29-Nov	09h 20m 35.33s	+18° 03' 26.8"	1.5963256	0.9628355	8.01	109.9	9.7	0.0	0.907	35.5	21.44	4.58	12.08
30-Nov	09h 21m 34.95s	+18° 01' 12.9"	1.5973900	0.9551016	7.94	110.7	9.8	0.0	0.908	35.3	21.41	4.55	12.05
1-Dec	09h 22m 32.37s	+17° 59' 09.3"	1.5984481	0.9473970	7.88	111.5	9.9	-0.1	0.909	35.0	21.39	4.52	12.02
2-Dec	09h 23m 27.54s	+17° 57' 16.4"	1.5994998	0.9397237	7.82	112.3	10.0	-0.1	0.911	34.8	21.36	4.49	11.59
3-Dec	09h 24m 20.44s	+17° 55' 34.5"	1.6005450	0.9320837	7.75	113.1	10.0	-0.1	0.912	34.5	21.33	4.46	11.55
4-Dec	09h 25m 11.00s	+17° 54' 04.0"	1.6015838	0.9244792	7.69	113.9	10.1	-0.1	0.913	34.2	21.30	4.42	11.52
5-Dec	09h 25m 59.19s	+17° 52' 45.0"	1.6026160	0.9169124	7.63	114.7	10.2	-0.1	0.915	34.0	21.27	4.39	11.49
6-Dec	09h 26m 44.95s	+17° 51' 38.1"	1.6036416	0.9093858	7.56	115.6	10.3	-0.2	0.916	33.7	21.23	4.36	11.46
7-Dec	09h 27m 28.23s	+17° 50' 43.5"	1.6046604	0.9019019	7.50	116.4	10.4	-0.2	0.918	33.4	21.20	4.33	11.42
8-Dec	09h 28m 08.97s	+17° 50' 01.5"	1.6056726	0.8944636	7.44	117.3	10.5	-0.2	0.919	33.0	21.17	4.30	11.39
9-Dec	09h 28m 47.14s	+17° 49' 32.5"	1.6066779	0.8870738	7.38	118.1	10.6	-0.2	0.921	32.7	21.14	4.26	11.36
10-Dec	09h 29m 22.68s	+17° 49' 16.7"	1.6076763	0.8797357	7.32	119.0	10.6	-0.2	0.922	32.4	21.10	4.23	11.32
11-Dec	09h 29m 55.54s	+17° 49' 14.5"	1.6086678	0.8724527	7.26	119.9	10.7	-0.3	0.924	32.0	21.07	4.20	11.29
12-Dec	09h 30m 25.67s	+17° 49' 26.0"	1.6096524	0.8652281	7.20	120.8	10.8	-0.3	0.925	31.7	21.03	4.16	11.25
13-Dec	09h 30m 53.03s	+17° 49' 51.6"	1.6106299	0.8580656	7.14	121.7	10.9	-0.3	0.927	31.3	21.00	4.13	11.22
14-Dec	09h 31m 17.57s	+17° 50' 31.4"	1.6116003	0.8509687	7.08	122.7	11.0	-0.3	0.929	30.9	20.56	4.09	11.19
15-Dec	09h 31m 39.25s	+17° 51' 25.7"	1.6125635	0.8439412	7.02	123.6	11.1	-0.4	0.931	30.6	20.52	4.06	11.15
16-Dec	09h 31m 58.02s	+17° 52' 34.7"	1.6135196	0.8369868	6.96	124.5	11.2	-0.4	0.932	30.2	20.49	4.02	11.11
17-Dec	09h 32m 13.83s	+17° 53' 58.5"	1.6144684	0.8301095	6.90	125.5	11.3	-0.4	0.934	29.7	20.45	3.58	11.08
18-Dec	09h 32m 26.65s	+17° 55' 37.4"	1.6154098	0.8233130	6.85	126.5	11.4	-0.4	0.936	29.3	20.41	3.55	11.04
19-Dec	09h 32m 36.44s	+17° 57' 31.3"	1.6163439	0.8166013	6.79	127.5	11.5	-0.5	0.938	28.9	20.37	3.51	11.01
20-Dec	09h 32m 43.16s	+17° 59' 40.4"	1.6172706	0.8099782	6.74	128.5	11.6	-0.5	0.940	28.4	20.33	3.47	10.57
21-Dec	09h 32m 46.77s	+18° 02' 04.8"	1.6181898	0.8034478	6.68	129.5	11.7	-0.5	0.942	28.0	20.29	3.43	10.53
22-Dec	09h 32m 47.25s	+18° 04' 44.4"	1.6191015	0.7970138	6.63	130.5	11.7	-0.5	0.943	27.5	20.25	3.39	10.49
23-Dec	09h 32m 44.56s	+18° 07' 39.4"	1.6200056	0.7906803	6.58	131.5	11.8	-0.5	0.945	27.0	20.20	3.35	10.46
24-Dec	09h 32m 38.67s	+18° 10' 49.6"	1.6209020	0.7844513	6.52	132.6	11.9	-0.6	0.947	26.5	20.16	3.31	10.42
25-Dec	09h 32m 29.57s	+18° 14' 15.0"	1.6217908	0.7783307	6.47	133.7	12.0	-0.6	0.949	26.0	20.12	3.27	10.38
26-Dec	09h 32m 17.22s	+18° 17' 55.5"	1.6226719	0.7723225	6.42	134.7	12.1	-0.6	0.951	25.5	20.07	3.23	10.34
27-Dec	09h 32m 01.62s	+18° 21' 51.1"	1.6235452	0.7664307	6.37	135.8	12.2	-0.6	0.953	25.0	20.03	3.19	10.30
28-Dec	09h 31m 42.74s	+18° 26' 01.5"	1.6244107	0.7606592	6.33	136.9	12.3	-0.7	0.955	24.4	19.58	3.14	10.26
29-Dec	09h 31m 20.57s	+18° 30' 26.6"	1.6252683	0.7550119	6.28	138.0	12.4	-0.7	0.957	23.9	19.54	3.10	10.22
30-Dec	09h 30m 55.11s	+18° 35' 06.3"	1.6261180	0.7494929	6.23	139.2	12.5	-0.7	0.959	23.3	19.49	3.06	10.18
31-Dec	09h 30m 26.33s	+18° 40' 00.3"	1.6269597	0.7441060	6.19	140.3	12.6	-0.7	0.961	22.7	19.44	3.01	10.14

Legenda :

A.R., Dec. = apparent coordinates

R. = distance from the Sun in A.U.

Distance = distance from the Earth in A.U.

Light = Distance in minutes

El. = elongation from the Sun in °

Diam. = diameter in "

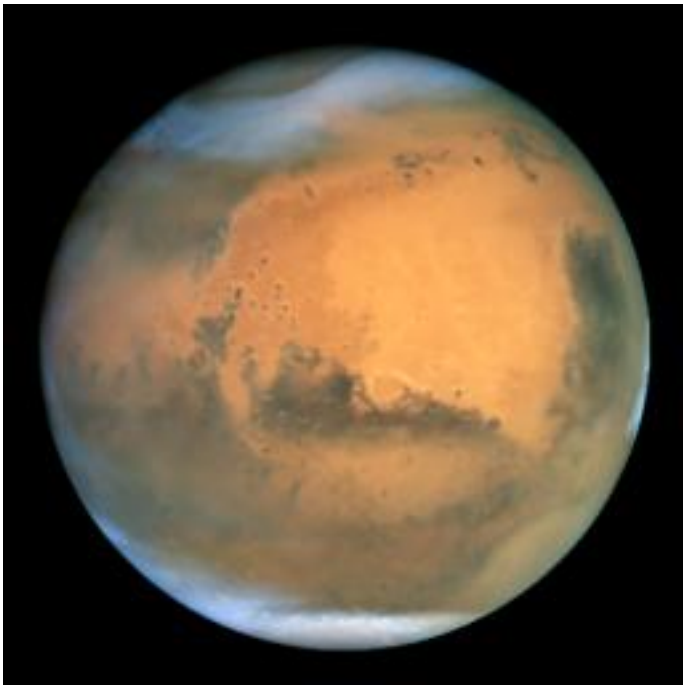
Mag. = magnitude

Times of rising and setting of the planet for Rome (42°N, 12°E), in U.T.+1

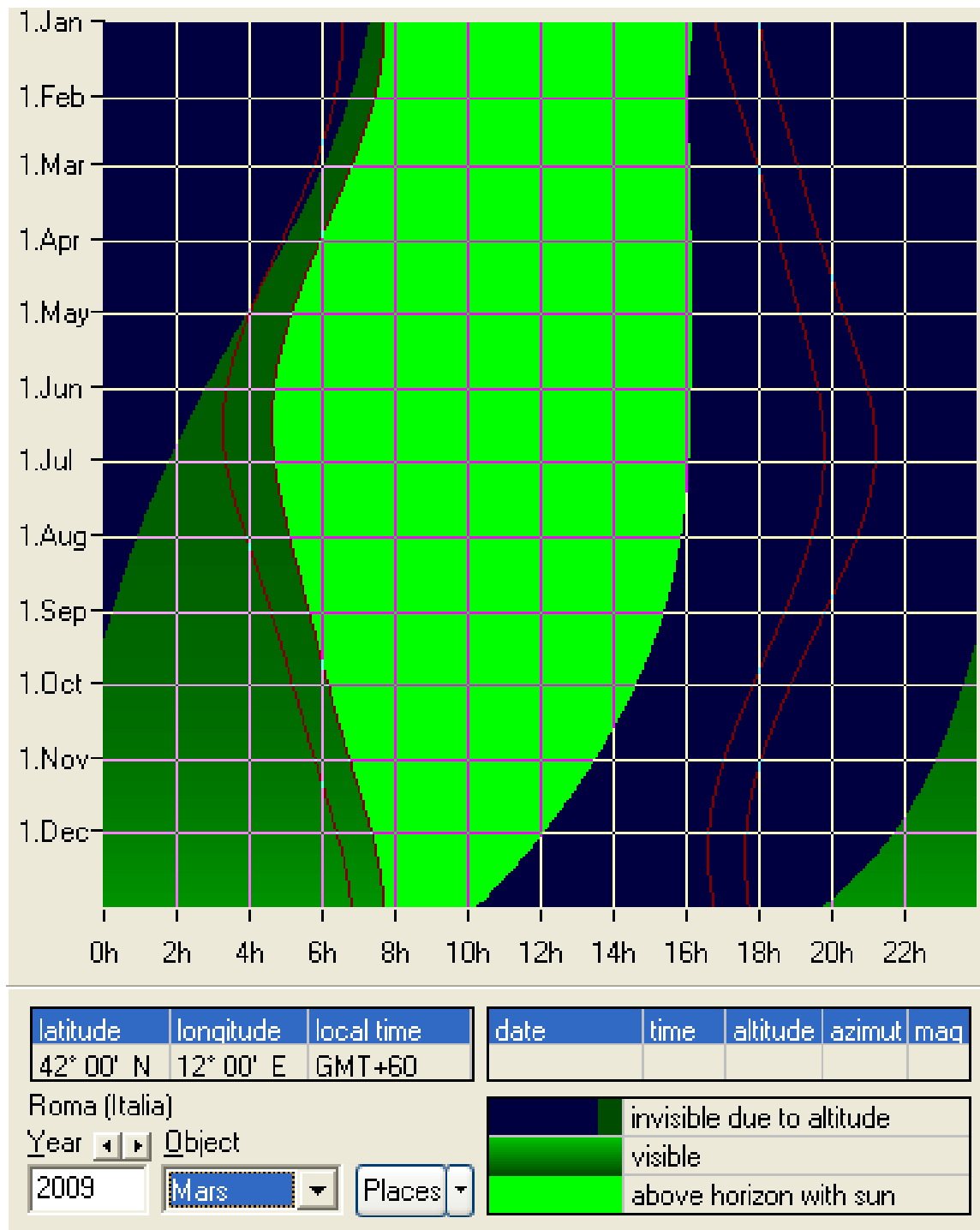
PHENOMENA OF MARS

Perihelion	21/04/2009	09.46	1.38133 A.U.
Aphelion	-----		
Perigee	-----		
Apogee	-----		
Maxima magnitude	-----		
Minima magnitude	-----		
Opposition	-----		
Conjunction	-----		
Retrograde motion	21/12/2009	15.38	
Direct motion	-----		
Maxima phase angle	14/10/2009	19.50	39.9 °
Minima phase angle	-----		
Extrema lat. of the Earth	13/04/2009	19.18	-25.55 °
Extrema lat. of the Earth	08/12/2009	16.44	19.15 °
Earth lat. null	14/08/2009	15.41	
Extrema lat. of the Sun	21/05/2009	09.37	-25.19 °
Sun lat. null	26/10/2009	15.04	

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VISIBILITY OF MARS



Visibility of Mars during the year

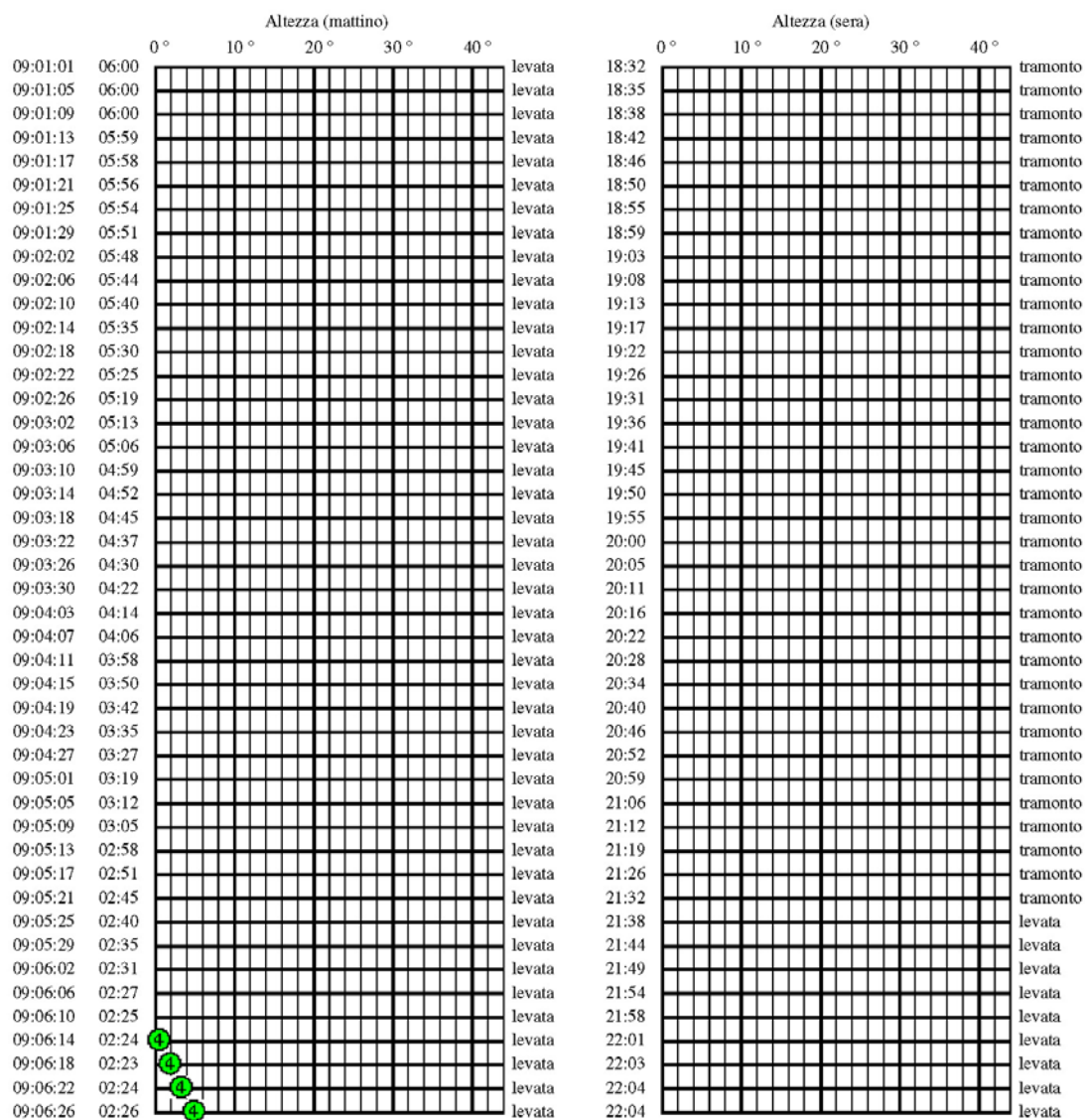
The external red lines show in what periods of the year the planet is sufficiently distant from the Sun to be able to be observed easily. The exact dates are in the following tables.

Altezza ai crepuscoli

di Marte

nel momento il cui il Sole è 18 ° sotto l'orizzonte

Postazione: Roma 42:00 N, 12:00 E (UT +01:00)

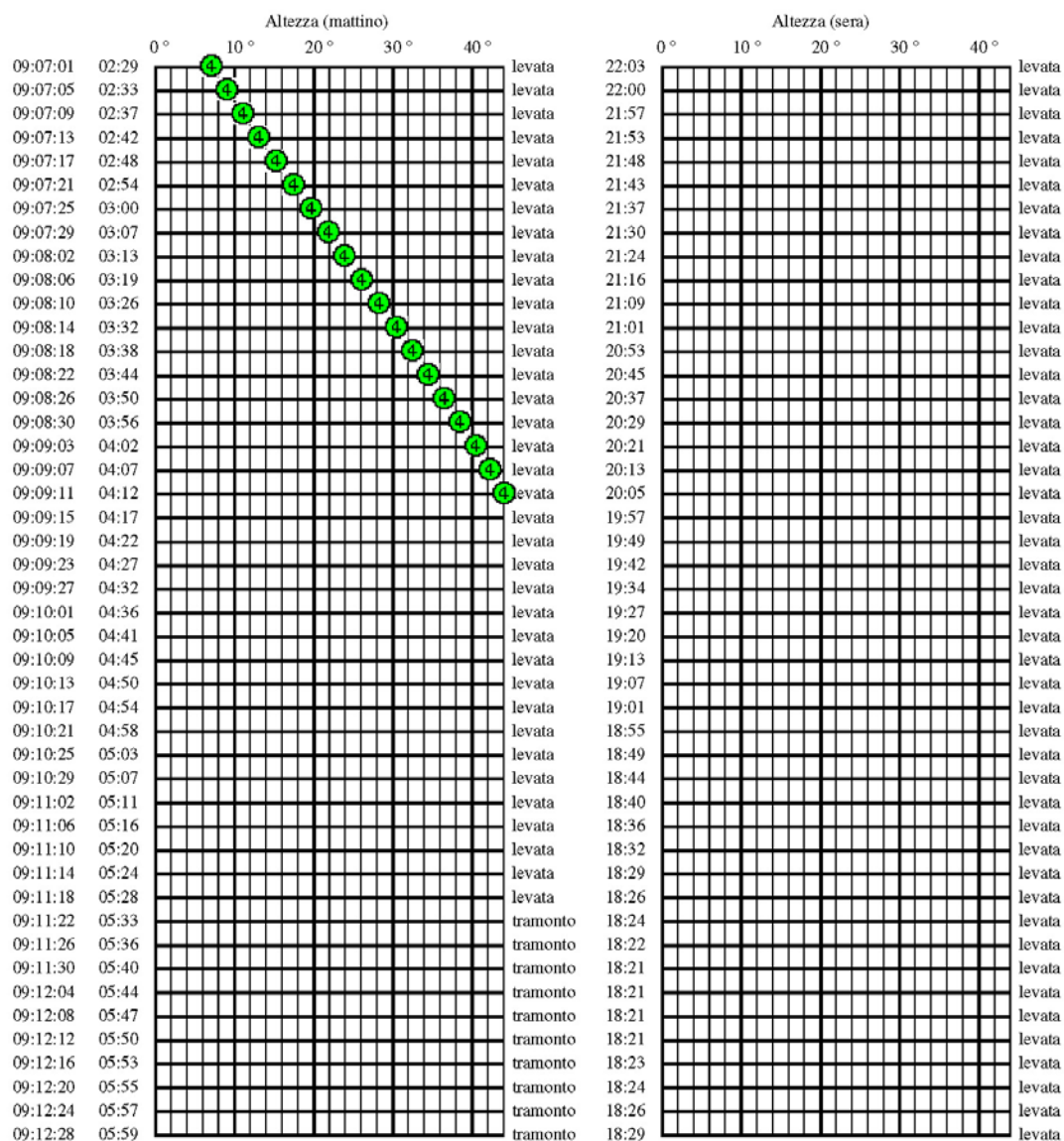


Altezza ai crepuscoli

di Marte

nel momento il cui il Sole è 18 ° sotto l'orizzonte

Postazione: Roma 42:00 N, 12:00 E (UT +01:00)



Height in the twilights. The Sun is 18° under the horizon

Date	Morning twilight				Evening twilight			
	Times	Alt	Az	Elong	Times	Alt	Az	Elong
2009:01:01	06:00	-13.2	110.7	7.3	18:32	-24.4	258.8	7.4
2009:01:05	06:00	-12.6	111.1	8.3	18:35	-25.4	259.8	8.5
2009:01:09	06:00	-12.1	111.3	9.4	18:38	-26.4	260.8	9.5
2009:01:13	05:59	-11.6	111.5	10.4	18:42	-27.5	262.0	10.5
2009:01:17	05:58	-11.2	111.4	11.4	18:46	-28.5	263.3	11.6
2009:01:21	05:56	-10.8	111.3	12.4	18:50	-29.5	264.7	12.6
2009:01:25	05:54	-10.4	111.0	13.4	18:55	-30.5	266.2	13.6
2009:01:29	05:51	-10.1	110.6	14.4	18:59	-31.5	267.8	14.6
2009:02:02	05:48	-9.9	110.1	15.4	19:03	-32.5	269.5	15.5
2009:02:06	05:44	-9.6	109.4	16.4	19:08	-33.5	271.4	16.5
2009:02:10	05:40	-9.4	108.7	17.3	19:13	-34.4	273.3	17.4
2009:02:14	05:35	-9.2	107.9	18.3	19:17	-35.4	275.4	18.4
2009:02:18	05:30	-9.1	106.9	19.2	19:22	-36.3	277.6	19.3
2009:02:22	05:25	-8.9	105.9	20.1	19:26	-37.2	279.9	20.2
2009:02:26	05:19	-8.8	104.8	21.0	19:31	-38.0	282.3	21.1
2009:03:02	05:13	-8.7	103.6	21.9	19:36	-38.8	284.8	22.0
2009:03:06	05:06	-8.6	102.4	22.8	19:41	-39.6	287.5	22.9
2009:03:10	04:59	-8.5	101.1	23.6	19:45	-40.4	290.3	23.8
2009:03:14	04:52	-8.4	99.7	24.5	19:50	-41.1	293.3	24.6
2009:03:18	04:45	-8.3	98.3	25.3	19:55	-41.8	296.4	25.5
2009:03:22	04:37	-8.2	96.9	26.2	20:00	-42.4	299.6	26.3
2009:03:26	04:30	-8.1	95.4	27.0	20:05	-43.0	303.0	27.1
2009:03:30	04:22	-8.0	93.9	27.8	20:11	-43.5	306.5	28.0
2009:04:03	04:14	-7.9	92.3	28.7	20:16	-43.9	310.1	28.8
2009:04:07	04:06	-7.8	90.8	29.5	20:22	-44.3	313.9	29.6
2009:04:11	03:58	-7.7	89.3	30.3	20:28	-44.5	317.8	30.4
2009:04:15	03:50	-7.6	87.7	31.1	20:34	-44.7	321.8	31.2
2009:04:19	03:42	-7.4	86.2	31.9	20:40	-44.7	325.9	32.0
2009:04:23	03:35	-7.2	84.7	32.7	20:46	-44.6	330.0	32.8
2009:04:27	03:27	-7.0	83.2	33.5	20:52	-44.4	334.2	33.6
2009:05:01	03:19	-6.8	81.7	34.3	20:59	-44.0	338.4	34.4
2009:05:05	03:12	-6.5	80.3	35.1	21:06	-43.5	342.5	35.2
2009:05:09	03:05	-6.1	78.9	35.9	21:12	-42.9	346.6	36.0
2009:05:13	02:58	-5.8	77.7	36.7	21:19	-42.1	350.6	36.8
2009:05:17	02:51	-5.3	76.5	37.5	21:26	-41.2	354.4	37.7
2009:05:21	02:45	-4.8	75.3	38.3	21:32	-40.2	358.0	38.5
2009:05:25	02:40	-4.2	74.3	39.1	21:38	-39.1	1.4	39.3
2009:05:29	02:35	-3.5	73.5	40.0	21:44	-37.9	4.6	40.1
2009:06:02	02:31	-2.7	72.7	40.8	21:49	-36.6	7.5	41.0
2009:06:06	02:27	-1.8	72.2	41.6	21:54	-35.3	10.0	41.8
2009:06:10	02:25	-0.7	71.8	42.5	21:58	-34.0	12.3	42.7
2009:06:14	02:24	0.5	71.5	43.4	22:01	-32.7	14.2	43.6
2009:06:18	02:23	1.8	71.5	44.3	22:03	-31.5	15.8	44.4
2009:06:22	02:24	3.3	71.7	45.2	22:04	-30.4	17.0	45.3
2009:06:26	02:26	4.9	72.0	46.1	22:04	-29.3	17.9	46.3
2009:06:30	02:28	6.7	72.5	47.0	22:03	-28.3	18.5	47.2

Date	Morning twilight				Evening twilight			
	Times	Alt	Az	Elong	Times	Alt	Az	Elong
2009:07:01	02:29	7.1	72.6	47.2	22:03	-28.1	18.6	47.4
2009:07:05	02:33	9.0	73.3	48.2	22:00	-27.3	18.9	48.4
2009:07:09	02:37	11.0	74.1	49.2	21:57	-26.6	18.9	49.4
2009:07:13	02:42	13.1	75.1	50.2	21:53	-25.9	18.8	50.4
2009:07:17	02:48	15.2	76.1	51.2	21:48	-25.4	18.4	51.4
2009:07:21	02:54	17.4	77.2	52.2	21:43	-24.9	18.0	52.4
2009:07:25	03:00	19.6	78.4	53.3	21:37	-24.6	17.4	53.5
2009:07:29	03:07	21.8	79.7	54.3	21:30	-24.3	16.7	54.6
2009:08:02	03:13	24.0	81.0	55.5	21:24	-24.1	15.9	55.7
2009:08:06	03:19	26.2	82.3	56.6	21:16	-23.9	15.1	56.8
2009:08:10	03:26	28.3	83.7	57.8	21:09	-23.8	14.2	58.0
2009:08:14	03:32	30.4	85.2	59.0	21:01	-23.7	13.4	59.2
2009:08:18	03:38	32.5	86.7	60.2	20:53	-23.7	12.5	60.4
2009:08:22	03:44	34.5	88.3	61.5	20:45	-23.7	11.6	61.7
2009:08:26	03:50	36.5	89.9	62.8	20:37	-23.7	10.7	63.0
2009:08:30	03:56	38.5	91.6	64.1	20:29	-23.8	9.9	64.3
2009:09:03	04:02	40.4	93.5	65.5	20:21	-23.9	9.1	65.7
2009:09:07	04:07	42.3	95.4	66.9	20:13	-24.1	8.4	67.1
2009:09:11	04:12	44.2	97.4	68.3	20:05	-24.2	7.7	68.6
2009:09:15	04:17	46.0	99.6	69.8	19:57	-24.4	7.1	70.1
2009:09:19	04:22	47.8	101.9	71.4	19:49	-24.6	6.5	71.6
2009:09:23	04:27	49.6	104.4	73.0	19:42	-24.9	6.1	73.2
2009:09:27	04:32	51.3	107.1	74.6	19:34	-25.1	5.7	74.9
2009:10:01	04:36	53.1	110.1	76.3	19:27	-25.4	5.4	76.6
2009:10:05	04:41	54.8	113.3	78.0	19:20	-25.7	5.3	78.3
2009:10:09	04:45	56.4	116.8	79.9	19:13	-26.0	5.3	80.1
2009:10:13	04:50	58.0	120.7	81.7	19:07	-26.3	5.4	82.0
2009:10:17	04:54	59.6	125.0	83.7	19:01	-26.6	5.7	83.9
2009:10:21	04:58	61.1	129.7	85.7	18:55	-27.0	6.2	86.0
2009:10:25	05:03	62.5	135.0	87.7	18:49	-27.2	6.9	88.1
2009:10:29	05:07	63.7	140.9	89.9	18:44	-27.5	7.7	90.2
2009:11:02	05:11	64.8	147.4	92.2	18:40	-27.7	8.8	92.5
2009:11:06	05:16	65.7	154.5	94.5	18:36	-27.9	10.1	94.8
2009:11:10	05:20	66.3	162.2	96.9	18:32	-28.0	11.6	97.3
2009:11:14	05:24	66.6	170.4	99.5	18:29	-28.1	13.3	99.8
2009:11:18	05:28	66.6	178.9	102.1	18:26	-28.0	15.4	102.5
2009:11:22	05:33	66.2	187.6	104.9	18:24	-27.8	17.6	105.3
2009:11:26	05:36	65.4	196.1	107.8	18:22	-27.4	20.2	108.2
2009:11:30	05:40	64.3	204.3	110.9	18:21	-26.8	22.9	111.3
2009:12:04	05:44	62.8	212.0	114.1	18:21	-26.0	25.9	114.5
2009:12:08	05:47	61.0	219.2	117.5	18:21	-25.0	29.1	117.9
2009:12:12	05:50	58.9	225.9	121.0	18:21	-23.6	32.6	121.5
2009:12:16	05:53	56.6	232.1	124.7	18:23	-21.9	36.1	125.2
2009:12:20	05:55	54.0	237.8	128.7	18:24	-19.9	39.8	129.2
2009:12:24	05:57	51.3	243.2	132.8	18:26	-17.5	43.6	133.4
2009:12:28	05:59	48.4	248.1	137.2	18:29	-14.7	47.4	137.7

Eliacal date for Mars
 Location : Rome
 Latitude : 42° 00' 00'' N
 Longitude : 12° 00' 00'' E
 Visibility [°] = 10.5 + 1.4 * magnitude
 Critical height : 0.00°

	Date	obj s/t	Sun s/t	d s/t	age	Mag
first morning visibility	2009-04-22	04:10	05:18	-1:08h	137d 05h	1.4

Legenda:

Obj s/t : rising and setting of the planet

Sun s/t : sunrise and sunset

D s/t : difference in hours and minutes between the instants of the rising or the setting of the two objects

Age : days from the conjunction with the Sun

Mag : magnitude

	Date	obj s/t	Sun s/t	Sun alt	Sun lon	obj lon	obj lat	Mag	d az	d lon
FM	04-22	04:10	05:18	-12° 30'	32° 08'	359° 40'	-1° 09'	1.4	30° 27'	-32° 28'

Legenda:

Date : date in the format month/day

Obj s/t : rising and setting of the planet

Sun s/t : sunrise and sunset

Sun alt : height of the Sun in the instant of visibility of the planet

Sun lon : celestial longitude of the Sun

Obj lon : celestial longitude of the planet

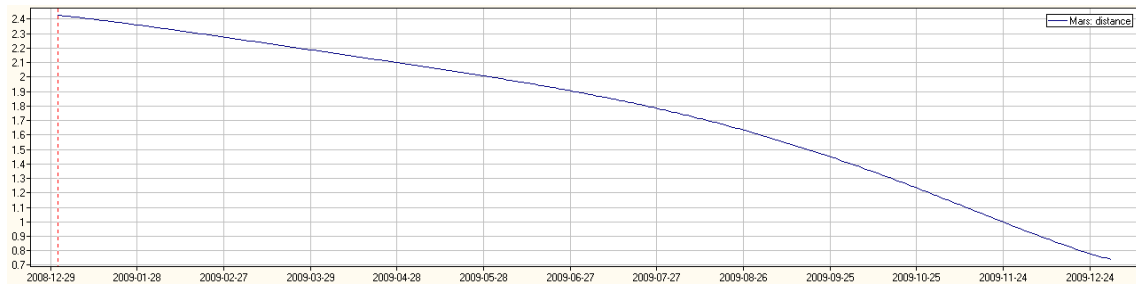
Obj lat : Celestial latitude of the planet

Mag : magnitude

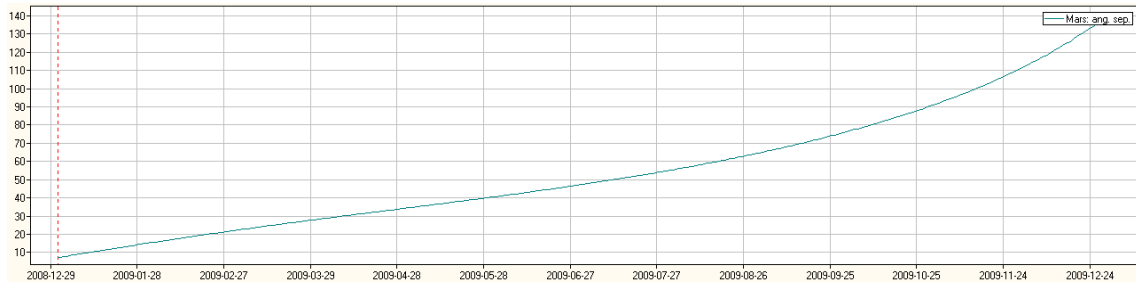
D az : difference in azimuth between the centers of the Sun and the planet in the instant of its visibility

D lon : difference in longitude between the centers of the Sun and the planet in the instant of its visibility

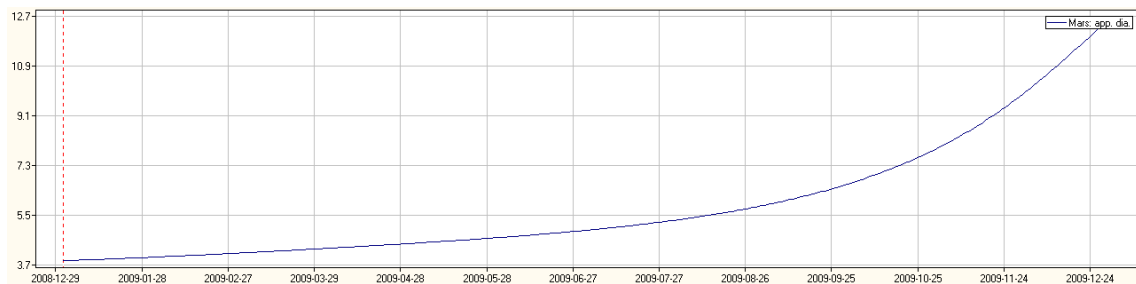
© (3)



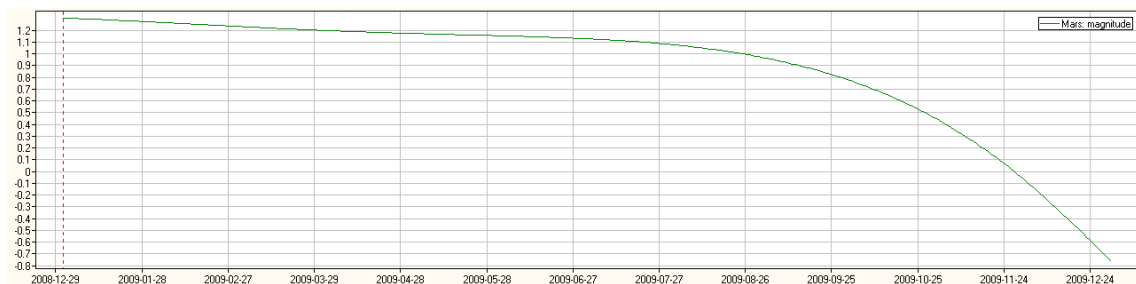
Distance of Mars in A.U. during the year



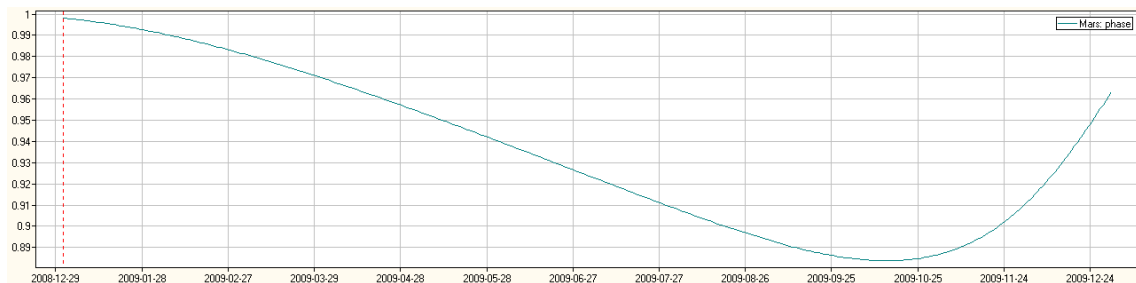
Elongation of Mars in $^{\circ}$ during the year



Diameter of Mars in $''$ during the year



Magnitude of Mars during the year



Phase di Mars during the year
© (4)

CENTRAL MERIDIAN OF MARS – TRANSITS

01/01/2009	03.38.3	02/04/2009	15.53.2	03/07/2009	04.14.7	02/10/2009	15.19.7
02/01/2009	04.18.5	03/04/2009	16.34.1	04/07/2009	04.55.0	03/10/2009	15.59.2
03/01/2009	04.58.8	04/04/2009	17.15.1	05/07/2009	05.35.1	04/10/2009	16.38.7
04/01/2009	05.38.9	05/04/2009	17.56.0	06/07/2009	06.15.3	05/10/2009	17.18.2
05/01/2009	06.19.2	06/04/2009	18.37.1	07/07/2009	06.55.4	06/10/2009	17.57.7
06/01/2009	06.59.4	07/04/2009	19.18.2	08/07/2009	07.35.6	07/10/2009	18.37.2
07/01/2009	07.39.7	08/04/2009	19.59.1	09/07/2009	08.15.6	08/10/2009	19.16.7
08/01/2009	08.19.9	09/04/2009	20.40.1	10/07/2009	08.55.8	09/10/2009	19.56.1
09/01/2009	09.00.3	10/04/2009	21.21.0	11/07/2009	09.35.8	10/10/2009	20.35.6
10/01/2009	09.40.6	11/04/2009	22.02.1	12/07/2009	10.16.0	11/10/2009	21.15.0
11/01/2009	10.20.8	12/04/2009	22.43.0	13/07/2009	10.56.2	12/10/2009	21.54.5
12/01/2009	11.01.2	13/04/2009	23.24.1	14/07/2009	11.36.2	13/10/2009	22.33.9
13/01/2009	11.41.4	15/04/2009	00.05.1	15/07/2009	12.16.3	14/10/2009	23.13.3
14/01/2009	12.21.8	16/04/2009	00.46.0	16/07/2009	12.56.3	15/10/2009	23.52.7
15/01/2009	13.02.0	17/04/2009	01.27.1	17/07/2009	13.36.4	17/10/2009	00.32.1
16/01/2009	13.42.4	18/04/2009	02.08.0	18/07/2009	14.16.4	18/10/2009	01.11.4
17/01/2009	14.22.6	19/04/2009	02.49.0	19/07/2009	14.56.5	19/10/2009	01.50.8
18/01/2009	15.03.0	20/04/2009	03.29.9	20/07/2009	15.36.5	20/10/2009	02.30.2
19/01/2009	15.43.4	21/04/2009	04.11.0	21/07/2009	16.16.5	21/10/2009	03.09.5
20/01/2009	16.23.7	22/04/2009	04.52.0	22/07/2009	16.56.6	22/10/2009	03.48.9
21/01/2009	17.04.1	23/04/2009	05.32.9	23/07/2009	17.36.5	23/10/2009	04.28.1
22/01/2009	17.44.4	24/04/2009	06.13.9	24/07/2009	18.16.5	24/10/2009	05.07.5
23/01/2009	18.24.9	25/04/2009	06.54.8	25/07/2009	18.56.4	25/10/2009	05.46.7
24/01/2009	19.05.2	26/04/2009	07.35.8	26/07/2009	19.36.5	26/10/2009	06.26.0
25/01/2009	19.45.7	27/04/2009	08.16.6	27/07/2009	20.16.4	27/10/2009	07.05.2
26/01/2009	20.26.1	28/04/2009	08.57.6	28/07/2009	20.56.4	28/10/2009	07.44.4
27/01/2009	21.06.5	29/04/2009	09.38.6	29/07/2009	21.36.4	29/10/2009	08.23.6
28/01/2009	21.47.0	30/04/2009	10.19.5	30/07/2009	22.16.2	30/10/2009	09.02.8
29/01/2009	22.27.3	01/05/2009	11.00.4	31/07/2009	22.56.2	31/10/2009	09.42.0
30/01/2009	23.07.8	02/05/2009	11.41.2	01/08/2009	23.36.1	01/11/2009	10.21.1
31/01/2009	23.48.2	03/05/2009	12.22.2	03/08/2009	00.16.1	02/11/2009	11.00.3
02/02/2009	00.28.7	04/05/2009	13.03.0	04/08/2009	00.55.9	03/11/2009	11.39.4
03/02/2009	01.09.1	05/05/2009	13.44.0	05/08/2009	01.35.9	04/11/2009	12.18.5
04/02/2009	01.49.7	06/05/2009	14.24.9	06/08/2009	02.15.7	05/11/2009	12.57.5
05/02/2009	02.30.2	07/05/2009	15.05.7	07/08/2009	02.55.6	06/11/2009	13.36.6
06/02/2009	03.10.7	08/05/2009	15.46.6	08/08/2009	03.35.4	07/11/2009	14.15.6
07/02/2009	03.51.2	09/05/2009	16.27.3	09/08/2009	04.15.4	08/11/2009	14.54.7
08/02/2009	04.31.7	10/05/2009	17.08.2	10/08/2009	04.55.3	09/11/2009	15.33.6
09/02/2009	05.12.3	11/05/2009	17.49.0	11/08/2009	05.35.1	10/11/2009	16.12.6
10/02/2009	05.52.8	12/05/2009	18.29.8	12/08/2009	06.15.0	11/11/2009	16.51.6
11/02/2009	06.33.4	13/05/2009	19.10.6	13/08/2009	06.54.8	12/11/2009	17.30.5
12/02/2009	07.14.0	14/05/2009	19.51.4	14/08/2009	07.34.7	13/11/2009	18.09.4
13/02/2009	07.54.5	15/05/2009	20.32.3	15/08/2009	08.14.4	14/11/2009	18.48.2
14/02/2009	08.35.2	16/05/2009	21.12.9	16/08/2009	08.54.3	15/11/2009	19.27.1
15/02/2009	09.15.7	17/05/2009	21.53.8	17/08/2009	09.34.1	16/11/2009	20.05.8
16/02/2009	09.56.4	18/05/2009	22.34.4	18/08/2009	10.13.9	17/11/2009	20.44.6
17/02/2009	10.36.9	19/05/2009	23.15.2	19/08/2009	10.53.8	18/11/2009	21.23.3
18/02/2009	11.17.6	20/05/2009	23.55.8	20/08/2009	11.33.5	19/11/2009	22.02.1
19/02/2009	11.58.2	22/05/2009	00.36.6	21/08/2009	12.13.4	20/11/2009	22.40.7
20/02/2009	12.38.9	23/05/2009	01.17.4	22/08/2009	12.53.1	21/11/2009	23.19.4
21/02/2009	13.19.7	24/05/2009	01.58.0	23/08/2009	13.33.0	22/11/2009	23.58.0
22/02/2009	14.00.2	25/05/2009	02.38.7	24/08/2009	14.12.7	24/11/2009	00.36.6
23/02/2009	14.41.0	26/05/2009	03.19.3	25/08/2009	14.52.5	25/11/2009	01.15.2
24/02/2009	15.21.6	27/05/2009	04.00.0	26/08/2009	15.32.2	26/11/2009	01.53.7
25/02/2009	16.02.4	28/05/2009	04.40.6	27/08/2009	16.12.0	27/11/2009	02.32.2
26/02/2009	16.43.0	29/05/2009	05.21.2	28/08/2009	16.51.8	28/11/2009	03.10.6
27/02/2009	17.23.9	30/05/2009	06.01.9	29/08/2009	17.31.5	29/11/2009	03.49.0
28/02/2009	18.04.7	31/05/2009	06.42.4	30/08/2009	18.11.3	30/11/2009	04.27.3
01/03/2009	18.45.3	01/06/2009	07.23.1	31/08/2009	18.51.0	01/12/2009	05.05.7
02/03/2009	19.26.2	02/06/2009	08.03.6	01/09/2009	19.30.7	02/12/2009	05.43.9
03/03/2009	20.06.9	03/06/2009	08.44.2	02/09/2009	20.10.4	03/12/2009	06.22.2
04/03/2009	20.47.7	04/06/2009	09.24.6	03/09/2009	20.50.2	04/12/2009	07.00.4
05/03/2009	21.28.4	05/06/2009	10.05.2	04/09/2009	21.29.8	05/12/2009	07.38.6
06/03/2009	22.09.3	06/06/2009	10.45.7	05/09/2009	22.09.6	06/12/2009	08.16.6
07/03/2009	22.50.2	07/06/2009	11.26.2	06/09/2009	22.49.3	07/12/2009	08.54.7
08/03/2009	23.30.9	08/06/2009	12.06.8	07/09/2009	23.29.0	08/12/2009	09.32.7
09/03/2009	00.11.8	09/06/2009	12.47.2	09/09/2009	00.08.7	09/12/2009	10.10.7
10/03/2009	00.52.6	10/06/2009	13.27.7	10/09/2009	00.48.3	10/12/2009	10.48.7
11/03/2009	01.33.5	11/06/2009	14.08.1	11/09/2009	01.28.0	11/12/2009	11.26.5
12/03/2009	02.14.3	12/06/2009	14.48.6	12/09/2009	02.07.7	12/12/2009	12.04.3
13/03/2009	02.55.2	13/06/2009	15.28.9	13/09/2009	02.47.4	13/12/2009	12.42.1
14/03/2009	03.36.2	14/06/2009	16.09.4	14/09/2009	03.27.0	14/12/2009	13.19.8
15/03/2009	04.17.0	15/06/2009	16.49.9	15/09/2009	04.06.7	15/12/2009	13.57.5
16/03/2009	04.58.0	16/06/2009	17.30.2	16/09/2009	04.46.3	16/12/2009	14.35.1
17/03/2009	05.38.8	17/06/2009	18.10.6	17/09/2009	05.26.0	17/12/2009	15.12.7
18/03/2009	06.19.8	18/06/2009	18.50.9	18/09/2009	06.05.6	18/12/2009	15.50.2
19/03/2009	07.00.6	19/06/2009	19.31.3	19/09/2009	06.45.2	19/12/2009	16.27.6
20/03/2009	07.41.6	20/06/2009	20.11.6	20/09/2009	07.24.9	20/12/2009	17.05.0
21/03/2009	08.22.4	21/06/2009	20.52.0	21/09/2009	08.04.4	21/12/2009	17.42.4
22/03/2009	09.03.4	22/06/2009	21.32.2	22/09/2009	08.44.1	22/12/2009	18.19.6
23/03/2009	09.44.5	23/06/2009	22.12.5	23/09/2009	09.23.6	23/12/2009	18.56.9
24/03/2009	10.25.3	24/06/2009	22.52.9	24/09/2009	10.03.3	24/12/2009	19.34.0
25/03/2009	11.06.3	25/06/2009	23.33.1	25/09/2009	10.42.8	25/12/2009	20.11.1
26/03/2009	11.47.2	26/06/2009	00.13.4	26/09/2009	11.22.4	26/12/2009	20.48.2
27/03/2009	12.28.3	27/06/2009	00.53.6	27/09/2009	12.02.0	27/12/2009	21.25.2
28/03/2009	13.09.1	28/06/2009	01.33.9	28/09/2009	12.41.5	28/12/2009	22.02.1
29/03/2009	13.50.2	29/06/2009	02.14.1	29/09/2009	13.21.1	29/12/2009	22.39.0
30/03/2009	14.31.2	30/06/2009	02.54.3	30/09/2009	14.00.6	30/12/2009	23.15.8
01/04/2009	15.12.1	02/07/2009	03.34.5	01/10/2009	14.40.2	31/12/2009	23.52.5

Times in U.T. (hh.mm,m) of the transits of the Syrtis major

CENTRAL MERIDIAN OF MARS

Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	°	°	°	°	°	°	°	°	°	°	°	°
01	238.8	294.7	018.3	070.1	131.3	184.2	249.5	307.4	007.1	077.7	140.7	217.5
02	229.0	284.9	008.4	060.2	121.4	174.3	239.7	297.7	357.4	068.1	131.2	208.1
03	219.2	275.1	358.5	050.2	111.5	164.4	229.9	288.0	347.7	058.5	121.7	198.8
04	209.4	265.2	348.5	040.3	101.5	154.6	220.2	278.3	338.1	048.9	112.1	189.5
05	199.7	255.4	338.6	030.3	091.6	144.7	210.4	268.6	328.4	039.3	102.6	180.2
06	189.9	245.5	328.7	020.3	081.6	134.9	200.6	258.9	318.7	029.6	093.1	170.9
07	180.1	235.7	318.8	010.4	071.7	125.0	190.8	249.2	309.1	020.0	083.6	161.7
08	170.3	225.8	308.9	000.4	061.8	115.2	181.1	239.5	299.4	010.4	074.1	152.4
09	160.5	215.9	298.9	350.4	051.8	105.3	171.3	229.8	289.8	000.8	064.6	143.1
10	150.7	206.1	289.0	340.5	041.9	095.5	161.6	220.1	280.1	351.2	055.1	133.9
11	140.9	196.2	279.1	330.5	032.0	085.6	151.8	210.4	270.5	341.6	045.7	124.7
12	131.1	186.4	269.1	320.5	022.1	075.8	142.0	200.7	260.8	332.0	036.2	115.4
13	121.3	176.5	259.2	310.6	012.1	066.0	132.3	191.0	251.2	322.4	026.7	106.2
14	111.5	166.6	249.3	300.6	002.2	056.1	122.5	181.3	241.5	312.8	017.2	097.0
15	101.7	156.8	239.3	290.6	352.3	046.3	112.8	171.6	231.9	303.2	007.8	087.9
16	091.9	146.9	229.4	280.7	342.4	036.5	103.1	161.9	222.2	293.7	358.3	078.7
17	082.1	137.0	219.5	270.7	332.5	026.7	093.3	152.2	212.6	284.1	348.9	069.5
18	072.3	127.1	209.5	260.8	322.6	016.9	083.6	142.5	202.9	274.5	339.5	060.4
19	062.5	117.2	199.6	250.8	312.7	007.0	073.8	132.8	193.3	264.9	330.0	051.2
20	052.6	107.4	189.6	240.8	302.8	357.2	064.1	123.2	183.7	255.3	320.6	042.1
21	042.8	097.5	179.7	230.9	292.9	347.4	054.4	113.5	174.0	245.8	311.2	033.0
22	033.0	087.6	169.7	220.9	283.0	337.6	044.6	103.8	164.4	236.2	301.8	023.9
23	023.2	077.7	159.8	211.0	273.1	327.8	034.9	094.1	154.7	226.6	292.4	014.8
24	013.4	067.8	149.8	201.0	263.2	318.0	025.2	084.4	145.1	217.1	283.0	005.8
25	003.6	057.9	139.9	191.0	253.3	308.2	015.4	074.8	135.5	207.5	273.6	356.7
26	353.7	048.0	129.9	181.1	243.4	298.4	005.7	065.1	125.8	198.0	264.2	347.7
27	343.9	038.1	119.9	171.1	233.5	288.6	356.0	055.4	116.2	188.4	254.8	338.7
28	334.1	028.2	110.0	161.2	223.6	278.8	346.3	045.7	106.6	178.9	245.5	329.6
29	324.2		100.0	151.2	213.8	269.0	336.5	036.1	097.0	169.3	236.1	320.6
30	314.4		090.1	141.3	203.9	259.3	326.8	026.4	087.3	159.8	226.8	311.7
31	304.6		080.1		194.0		317.1	016.7		150.2		302.7

Motion of the central meridian

	0h	1h	2h	3h	4h	5h	6h	7h	8h	9h	10h	11h
m	°	°	°	°	°	°	°	°	°	°	°	°
0	0.0	14.6	29.2	43.9	58.5	73.1	87.7	102.3	117.0	131.6	146.2	160.8
10	2.4	17.1	31.7	46.3	60.9	75.5	90.2	104.8	119.4	134.0	148.6	163.3
20	4.9	19.5	34.1	48.7	63.4	78.0	92.6	107.2	121.8	136.5	151.1	165.7
30	7.3	21.9	36.6	51.2	65.8	80.4	95.0	109.7	124.3	138.9	153.5	168.1
40	9.7	24.4	39.0	53.6	68.2	82.8	97.5	112.1	126.7	141.3	156.0	170.6
50	12.2	26.8	41.4	56.0	70.7	85.3	99.9	114.5	129.1	143.8	158.4	173.0
60	14.6	29.2	43.9	58.5	73.1	87.7	102.3	117.0	131.6	146.2	160.8	175.4

Longitude of the central meridian at 0 U.T. of the day and medium motion in °

EPHEMERIDES OF JUPITER

Date	A.R. Geoc.	Dec. Geoc.	R A.U.	Distance A.U.	Light (m)	El. °	Diam. Eq."	Diam. Pol."	Mag.	Phase angle°	Rise	Transit	Set
1-Jan	20h 04m 35.81s	-20° 46' 34.4"	5.114175	6.0388651	50.22	18.2	32.6	30.5	-1.9	3.4	8.46	13.29	18.13
2-Jan	20h 05m 33.73s	-20° 43' 47.3"	5.113823	6.0434054	50.26	17.4	32.6	30.5	-1.9	3.3	8.43	13.26	18.10
3-Jan	20h 06m 31.74s	-20° 40' 58.8"	5.113471	6.0477393	50.30	16.7	32.6	30.4	-1.9	3.2	8.40	13.23	18.07
4-Jan	20h 07m 29.84s	-20° 38' 08.7"	5.113119	6.0518661	50.33	15.9	32.5	30.4	-1.9	3.0	8.37	13.21	18.05
5-Jan	20h 08m 28.02s	-20° 35' 17.1"	5.112768	6.0557855	50.36	15.1	32.5	30.4	-1.9	2.9	8.33	13.18	18.02
6-Jan	20h 09m 26.28s	-20° 32' 23.9"	5.112417	6.0594972	50.40	14.3	32.5	30.4	-1.9	2.7	8.30	13.15	17.59
7-Jan	20h 10m 24.61s	-20° 29' 29.3"	5.112066	6.0630009	50.42	13.5	32.5	30.4	-1.9	2.6	8.27	13.12	17.56
8-Jan	20h 11m 23.01s	-20° 26' 33.2"	5.111715	6.0662965	50.45	12.7	32.5	30.4	-1.9	2.4	8.24	13.09	17.54
9-Jan	20h 12m 21.48s	-20° 23' 35.7"	5.111364	6.0693837	50.48	11.9	32.4	30.3	-1.9	2.3	8.21	13.06	17.51
10-Jan	20h 13m 19.99s	-20° 20' 36.8"	5.111013	6.0722626	50.50	11.2	32.4	30.3	-1.9	2.1	8.18	13.03	17.48
11-Jan	20h 14m 18.55s	-20° 17' 36.5"	5.110663	6.0749329	50.52	10.4	32.4	30.3	-1.9	2.0	8.14	13.00	17.45
12-Jan	20h 15m 17.15s	-20° 14' 34.9"	5.110313	6.0773943	50.54	9.6	32.4	30.3	-1.9	1.8	8.11	12.57	17.43
13-Jan	20h 16m 15.78s	-20° 11' 31.9"	5.109963	6.0796464	50.56	8.8	32.4	30.3	-1.9	1.7	8.08	12.54	17.40
14-Jan	20h 17m 14.44s	-20° 08' 27.5"	5.109613	6.0816889	50.58	8.0	32.4	30.3	-1.9	1.5	8.05	12.51	17.37
15-Jan	20h 18m 13.12s	-20° 05' 21.8"	5.109263	6.0835211	50.60	7.2	32.4	30.3	-1.9	1.4	8.02	12.48	17.34
16-Jan	20h 19m 11.82s	-20° 02' 14.7"	5.108914	6.0851424	50.61	6.5	32.4	30.3	-1.9	1.2	7.58	12.45	17.32
17-Jan	20h 20m 10.54s	-19° 59' 06.3"	5.108564	6.0865524	50.62	5.7	32.4	30.3	-1.9	1.1	7.55	12.42	17.29
18-Jan	20h 21m 09.27s	-19° 55' 56.5"	5.108215	6.0877503	50.63	4.9	32.3	30.2	-1.9	0.9	7.52	12.39	17.26
19-Jan	20h 22m 08.00s	-19° 52' 45.5"	5.107866	6.0887359	50.64	4.1	32.3	30.2	-1.9	0.8	7.49	12.36	17.23
20-Jan	20h 23m 06.74s	-19° 49' 33.2"	5.107517	6.0895085	50.65	3.3	32.3	30.2	-1.9	0.6	7.46	12.33	17.21
21-Jan	20h 24m 05.48s	-19° 46' 19.6"	5.107169	6.0900678	50.65	2.6	32.3	30.2	-1.9	0.5	7.43	12.30	17.18
22-Jan	20h 25m 04.21s	-19° 43' 04.9"	5.106821	6.0904134	50.65	1.8	32.3	30.2	-1.9	0.3	7.39	12.27	17.15
23-Jan	20h 26m 02.93s	-19° 39' 49.0"	5.106472	6.0905453	50.65	1.0	32.3	30.2	-1.9	0.2	7.36	12.24	17.13
24-Jan	20h 27m 01.62s	-19° 36' 32.5"	5.106124	6.0904630	50.65	0.3	32.3	30.2	-1.9	0.0	7.33	12.21	17.10
25-Jan	20h 28m 00.21s	-19° 33' 14.1"	5.105776	6.0901666	50.65	0.6	32.3	30.2	-1.9	0.1	7.30	12.18	17.07
26-Jan	20h 28m 58.83s	-19° 29' 54.5"	5.105429	6.0896561	50.65	1.4	32.3	30.2	-1.9	0.3	7.27	12.15	17.04
27-Jan	20h 29m 57.40s	-19° 26' 34.0"	5.105081	6.0889314	50.64	2.2	32.3	30.2	-1.9	0.4	7.23	12.12	17.02
28-Jan	20h 30m 55.91s	-19° 23' 12.6"	5.104734	6.0879928	50.63	2.9	32.3	30.2	-1.9	0.6	7.20	12.09	16.59
29-Jan	20h 31m 54.36s	-19° 19' 50.1"	5.104387	6.0868405	50.62	3.7	32.4	30.3	-1.9	0.7	7.17	12.07	16.56
30-Jan	20h 32m 52.76s	-19° 16' 26.7"	5.104040	6.0854749	50.61	4.5	32.4	30.3	-1.9	0.9	7.14	12.04	16.53
31-Jan	20h 33m 51.08s	-19° 13' 02.2"	5.103694	6.0838964	50.60	5.3	32.4	30.3	-1.9	1.0	7.11	12.01	16.51
1-Feb	20h 34m 49.32s	-19° 09' 36.8"	5.103347	6.0821056	50.58	6.1	32.4	30.3	-1.9	1.2	7.07	11.58	16.48
2-Feb	20h 35m 47.49s	-19° 06' 10.5"	5.103001	6.0801031	50.57	6.8	32.4	30.3	-1.9	1.3	7.04	11.55	16.45
3-Feb	20h 36m 45.58s	-19° 02' 43.3"	5.102655	6.0778896	50.55	7.6	32.4	30.3	-1.9	1.5	7.01	11.52	16.43
4-Feb	20h 37m 43.58s	-18° 59' 15.2"	5.102309	6.0754660	50.53	8.4	32.4	30.3	-1.9	1.6	6.58	11.49	16.40
5-Feb	20h 38m 41.49s	-18° 55' 46.3"	5.101963	6.0728330	50.51	9.2	32.4	30.3	-1.9	1.8	6.55	11.46	16.37
6-Feb	20h 39m 39.30s	-18° 52' 16.5"	5.101618	6.0699915	50.48	10.0	32.4	30.3	-1.9	1.9	6.51	11.43	16.34
7-Feb	20h 40m 37.00s	-18° 48' 46.1"	5.101272	6.0669425	50.46	10.7	32.5	30.4	-1.9	2.1	6.48	11.40	16.32
8-Feb	20h 41m 34.59s	-18° 45' 14.9"	5.100927	6.0636866	50.43	11.5	32.5	30.4	-1.9	2.2	6.45	11.37	16.29
9-Feb	20h 42m 32.07s	-18° 41' 43.0"	5.100582	6.0602247	50.40	12.3	32.5	30.4	-1.9	2.4	6.42	11.34	16.26
10-Feb	20h 43m 29.42s	-18° 38' 10.4"	5.100238	6.0565573	50.37	13.1	32.5	30.4	-1.9	2.5	6.38	11.31	16.23
11-Feb	20h 44m 26.64s	-18° 34' 37.2"	5.099893	6.0526850	50.34	13.8	32.5	30.4	-1.9	2.7	6.35	11.28	16.21
12-Feb	20h 45m 23.73s	-18° 31' 03.3"	5.099549	6.0486083	50.30	14.6	32.6	30.4	-1.9	2.8	6.32	11.25	16.18
13-Feb	20h 46m 20.68s	-18° 27' 28.8"	5.099205	6.0443275	50.27	15.4	32.6	30.5	-1.9	2.9	6.29	11.22	16.15
14-Feb	20h 47m 17.51s	-18° 23' 53.6"	5.098861	6.0398432	50.23	16.2	32.6	30.5	-1.9	3.1	6.26	11.19	16.12
15-Feb	20h 48m 14.19s	-18° 20' 17.9"	5.098517	6.0351557	50.19	17.0	32.6	30.5	-1.9	3.2	6.22	11.16	16.10
16-Feb	20h 49m 10.73s	-18° 16' 41.7"	5.098174	6.0302656	50.15	17.7	32.7	30.5	-1.9	3.4	6.19	11.13	16.07
17-Feb	20h 50m 07.11s	-18° 13' 04.9"	5.097831	6.0251734	50.11	18.5	32.7	30.6	-1.9	3.5	6.16	11.10	16.04
18-Feb	20h 51m 03.35s	-18° 09' 27.7"	5.097488	6.0198796	50.07	19.3	32.7	30.6	-1.9	3.7	6.13	11.07	16.01
19-Feb	20h 51m 59.42s	-18° 05' 50.0"	5.097145	6.0143850	50.02	20.1	32.7	30.6	-1.9	3.8	6.09	11.04	15.59
20-Feb	20h 52m 55.32s	-18° 02' 12.0"	5.096802	6.0086903	49.97	20.8	32.8	30.6	-1.9	4.0	6.06	11.01	15.56
21-Feb	20h 53m 51.04s	-17° 58' 33.7"	5.096460	6.0027964	49.92	21.6	32.8	30.7	-2	4.1	6.03	10.58	15.53
22-Feb	20h 54m 46.59s	-17° 54' 55.0"	5.096118	5.9967040	49.87	22.4	32.8	30.7	-2	4.2	6.00	10.55	15.50
23-Feb	20h 55m 41.94s	-17° 51' 16.1"	5.095776	5.9904141	49.82	23.2	32.9	30.7	-2	4.4	5.56	10.52	15.48
24-Feb	20h 56m 37.10s	-17° 47' 36.9"	5.095434	5.9839279	49.77	24.0	32.9	30.8	-2	4.5	5.53	10.49	15.45
25-Feb	20h 57m 32.06s	-17° 43' 57.6"	5.095092	5.9772464	49.71	24.7	32.9	30.8	-2	4.7	5.50	10.46	15.42
26-Feb	20h 58m 26.82s	-17° 40' 18.1"	5.094751	5.9703708	49.65	25.5	33.0	30.8	-2	4.8	5.46	10.43	15.39
27-Feb	20h 59m 21.36s	-17° 36' 38.5"	5.094410	5.9633026	49.60	26.3	33.0	30.9	-2	4.9	5.43	10.40	15.37
28-Feb	21h 00m 15.69s	-17° 32' 58.7"	5.094069	5.9560431	49.53	27.1	33.1	30.9	-2	5.1	5.40	10.37	15.34
1-Mar	21h 01m 09.80s	-17° 29' 18.9"	5.093728	5.9485938	49.47	27.9	33.1	31.0	-2	5.2	5.37	10.34	15.31
2-Mar	21h 02m 03.69s	-17° 25' 39.1"	5.093388	5.9409565	49.41	28.6	33.1	31.0	-2	5.4	5.33	10.31	15.28
3-Mar	21h 02m 57.35s	-17° 21' 59.3"	5.093048	5.9331328	49.34	29.4	33.2	31.0	-2	5.5	5.30	10.28	15.25
4-Mar	21h 03m 50.77s	-17° 18' 19.6"	5.092708	5.9251244	49.28	30.2	33.2	31.1	-2	5.6	5.27	10.25	15.23
5-Mar	21h 04m 43.96s	-17° 14' 40.0"	5.092368	5.9169331	49.21	31.0	33.3	31.1	-2	5.8	5.23	10.22	15.20
6-Mar	21h 05m 36.91s	-17° 11' 00.5"	5.092028	5.9085607	49.14	31.8	33.3	31.2	-2	5.9	5.20	10.18	15.17
7-Mar	21h 06m 29.60s	-17° 07' 21.3"	5.091689	5.9000089	49.07	32.6	33.4	31.2	-2	6.0	5.17	10.15	15.14
8-Mar	21h 07m 22.03s	-17° 03' 42.2"	5.091350	5.8912794	49.00	33.3	33.4	31.3	-2	6.2	5.14	10.12	15.11
9-Mar	21h 08m 14.20s	-17° 00' 03.5"	5.091011	5.8823739	48.92	34.1	33.5	31.3	-2	6.3	5.10	10.09	15.08
10-Mar	21h 09m 06.10s	-16° 56' 25.1"	5.090672	5.8732938	48.85	34.9	33.5	31.4	-2	6.4	5.07	10.06	15.06
11-Mar	21h 09m 57.73s	-16° 52' 46.9"	5.090334	5.8640407	48.77	35.7	33.6	31.4	-2	6.5	5.04	10.03	15.03
12-Mar	21h 10m 49.09s	-16° 49' 09.2"	5.089995	5.8546159	48.69	36.5	33.6	31.5	-2	6.7	5.00	10.00	15.00
13-Mar	21h 11m 40.17s	-16° 45' 31.7"	5.089657	5.8450207	48.61	37.3	33.7	31.5	-2	6.8	4.57	9.57	14.57

Date	A.R. Geoc.	Dec. Geoc.	R A.U.	Distance A.U.	Light (m)	El. °	Diam. Eq."	Diam. Pol."	Mag.	Phase angle°	Rise	Transit	Set
14-Mar	21h 12m 30.97s	-16° 41' 54.7"	5.089320	5.8352566	48.53	38.0	33.7	31.6	-2	6.9	4.54	9.54	14.54
15-Mar	21h 13m 21.49s	-16° 38' 18.2"	5.088982	5.8253248	48.45	38.8	33.8	31.6	-2	7.0	4.50	9.51	14.51
16-Mar	21h 14m 11.72s	-16° 34' 42.1"	5.088645	5.8152268	48.36	39.6	33.9	31.7	-2	7.2	4.47	9.48	14.49
17-Mar	21h 15m 01.66s	-16° 31' 06.6"	5.088308	5.8049639	48.28	40.4	33.9	31.7	-2	7.3	4.44	9.45	14.46
18-Mar	21h 15m 51.30s	-16° 27' 31.7"	5.087971	5.7945377	48.19	41.2	34.0	31.8	-2	7.4	4.40	9.41	14.43
19-Mar	21h 16m 40.63s	-16° 23' 57.4"	5.087634	5.7839497	48.10	42.0	34.0	31.8	-2	7.5	4.37	9.38	14.40
20-Mar	21h 17m 29.65s	-16° 20' 23.8"	5.087298	5.7732016	48.01	42.8	34.1	31.9	-2	7.6	4.34	9.35	14.37
21-Mar	21h 18m 18.35s	-16° 16' 51.0"	5.086962	5.7622951	47.92	43.6	34.2	32.0	-2	7.8	4.30	9.32	14.34
22-Mar	21h 19m 06.72s	-16° 13' 18.9"	5.086626	5.7512319	47.83	44.3	34.2	32.0	-2	7.9	4.27	9.29	14.31
23-Mar	21h 19m 54.76s	-16° 09' 47.7"	5.086290	5.7400139	47.74	45.1	34.3	32.1	-2	8.0	4.23	9.26	14.28
24-Mar	21h 20m 42.46s	-16° 06' 17.4"	5.085954	5.7286430	47.64	45.9	34.4	32.1	-2	8.1	4.20	9.23	14.25
25-Mar	21h 21m 29.81s	-16° 02' 47.9"	5.085619	5.7171213	47.55	46.7	34.4	32.2	-2	8.2	4.17	9.20	14.23
26-Mar	21h 22m 16.82s	-15° 59' 19.5"	5.085284	5.7054508	47.45	47.5	34.5	32.3	-2	8.3	4.13	9.16	14.20
27-Mar	21h 23m 03.47s	-15° 55' 52.0"	5.084950	5.6936338	47.35	48.3	34.6	32.3	-2	8.4	4.10	9.13	14.17
28-Mar	21h 23m 49.76s	-15° 52' 25.6"	5.084615	5.6816726	47.25	49.1	34.7	32.4	-2	8.5	4.07	9.10	14.14
29-Mar	21h 24m 35.69s	-15° 49' 00.2"	5.084281	5.6695697	47.15	49.9	34.7	32.5	-2	8.6	4.03	9.07	14.11
30-Mar	21h 25m 21.25s	-15° 45' 36.0"	5.083947	5.6573276	47.05	50.7	34.8	32.6	-2.1	8.7	4.00	9.04	14.08
31-Mar	21h 26m 06.44s	-15° 42' 12.9"	5.083613	5.6449489	46.95	51.5	34.9	32.6	-2.1	8.8	3.56	9.01	14.05
1-Apr	21h 26m 51.24s	-15° 38' 51.1"	5.083279	5.6324362	46.84	52.3	35.0	32.7	-2.1	8.9	3.53	8.57	14.02
2-Apr	21h 27m 35.67s	-15° 35' 30.6"	5.082946	5.6197921	46.74	53.1	35.0	32.8	-2.1	9.0	3.50	8.54	13.59
3-Apr	21h 28m 19.69s	-15° 32' 11.4"	5.082613	5.6070192	46.63	53.9	35.1	32.8	-2.1	9.1	3.46	8.51	13.56
4-Apr	21h 29m 03.32s	-15° 28' 53.7"	5.082280	5.5941201	46.52	54.7	35.2	32.9	-2.1	9.2	3.43	8.48	13.53
5-Apr	21h 29m 46.55s	-15° 25' 37.3"	5.081947	5.5810973	46.42	55.5	35.3	33.0	-2.1	9.3	3.39	8.45	13.50
6-Apr	21h 30m 29.36s	-15° 22' 22.4"	5.081615	5.5679532	46.31	56.3	35.4	33.1	-2.1	9.4	3.36	8.41	13.47
7-Apr	21h 31m 11.76s	-15° 19' 09.0"	5.081283	5.5546902	46.20	57.1	35.4	33.2	-2.1	9.5	3.32	8.38	13.44
8-Apr	21h 31m 53.74s	-15° 15' 57.2"	5.080951	5.5413106	46.09	57.9	35.5	33.2	-2.1	9.6	3.29	8.35	13.41
9-Apr	21h 32m 35.30s	-15° 12' 46.8"	5.080620	5.5278165	45.97	58.7	35.6	33.3	-2.1	9.7	3.25	8.32	13.38
10-Apr	21h 33m 16.44s	-15° 09' 38.1"	5.080288	5.5142101	45.86	59.5	35.7	33.4	-2.1	9.8	3.22	8.28	13.35
11-Apr	21h 33m 57.15s	-15° 06' 30.9"	5.079957	5.5004938	45.75	60.3	35.8	33.5	-2.1	9.9	3.19	8.25	13.32
12-Apr	21h 34m 37.42s	-15° 03' 25.5"	5.079626	5.4866695	45.63	61.2	35.9	33.6	-2.1	10.0	3.15	8.22	13.29
13-Apr	21h 35m 17.26s	-15° 00' 21.8"	5.079296	5.4727397	45.52	62.0	36.0	33.6	-2.1	10.0	3.12	8.19	13.26
14-Apr	21h 35m 56.66s	-14° 57' 19.9"	5.078965	5.4587066	45.40	62.8	36.1	33.7	-2.1	10.1	3.08	8.15	13.22
15-Apr	21h 36m 35.60s	-14° 54' 19.8"	5.078635	5.4445724	45.28	63.6	36.2	33.8	-2.1	10.2	3.05	8.12	13.19
16-Apr	21h 37m 14.09s	-14° 51' 21.6"	5.078305	5.4303397	45.16	64.4	36.3	33.9	-2.1	10.3	3.01	8.09	13.16
17-Apr	21h 37m 52.10s	-14° 48' 25.4"	5.077976	5.4160109	45.04	65.2	36.4	34.0	-2.1	10.3	2.58	8.05	13.13
18-Apr	21h 38m 29.65s	-14° 45' 31.2"	5.077647	5.4015886	44.92	66.1	36.5	34.1	-2.1	10.4	2.54	8.02	13.10
19-Apr	21h 39m 06.72s	-14° 42' 39.0"	5.077317	5.3870753	44.80	66.9	36.6	34.2	-2.2	10.5	2.51	7.59	13.07
20-Apr	21h 39m 43.30s	-14° 39' 48.9"	5.076989	5.3724738	44.68	67.7	36.7	34.3	-2.2	10.5	2.47	7.55	13.04
21-Apr	21h 40m 19.39s	-14° 37' 01.0"	5.076660	5.3577869	44.56	68.5	36.8	34.4	-2.2	10.6	2.44	7.52	13.01
22-Apr	21h 40m 54.98s	-14° 34' 15.2"	5.076332	5.3430174	44.44	69.3	36.9	34.5	-2.2	10.7	2.40	7.49	12.57
23-Apr	21h 41m 30.07s	-14° 31' 31.7"	5.076004	5.3281683	44.31	70.2	37.0	34.6	-2.2	10.7	2.37	7.45	12.54
24-Apr	21h 42m 04.64s	-14° 28' 50.5"	5.075676	5.3132426	44.19	71.0	37.1	34.7	-2.2	10.8	2.33	7.42	12.51
25-Apr	21h 42m 38.71s	-14° 26' 11.6"	5.075348	5.2982437	44.06	71.8	37.2	34.8	-2.2	10.9	2.30	7.39	12.48
26-Apr	21h 43m 12.25s	-14° 23' 35.0"	5.075021	5.2831748	43.94	72.7	37.3	34.9	-2.2	10.9	2.26	7.35	12.45
27-Apr	21h 43m 45.28s	-14° 21' 00.9"	5.074694	5.2680394	43.81	73.5	37.4	35.0	-2.2	11.0	2.22	7.32	12.41
28-Apr	21h 44m 17.77s	-14° 18' 29.2"	5.074367	5.2528408	43.69	74.3	37.5	35.1	-2.2	11.0	2.19	7.28	12.38
29-Apr	21h 44m 49.72s	-14° 16' 00.1"	5.074041	5.2375826	43.56	75.2	37.6	35.2	-2.2	11.1	2.15	7.25	12.35
30-Apr	21h 45m 21.13s	-14° 13' 33.6"	5.073715	5.2222682	43.43	76.0	37.7	35.3	-2.2	11.1	2.12	7.22	12.32
1-May	21h 45m 51.99s	-14° 11' 09.7"	5.073389	5.2069011	43.30	76.8	37.8	35.4	-2.2	11.2	2.08	7.18	12.28
2-May	21h 46m 22.29s	-14° 08' 48.5"	5.073063	5.1914846	43.18	77.7	37.9	35.5	-2.2	11.2	2.05	7.15	12.25
3-May	21h 46m 52.02s	-14° 06' 30.0"	5.072738	5.1760221	43.05	78.5	38.0	35.6	-2.2	11.2	2.01	7.11	12.21
4-May	21h 47m 21.19s	-14° 04' 14.3"	5.072412	5.1605166	42.92	79.4	38.2	35.7	-2.3	11.3	1.57	7.08	12.19
5-May	21h 47m 49.78s	-14° 02' 01.3"	5.072088	5.1449714	42.79	80.2	38.3	35.8	-2.3	11.3	1.54	7.04	12.15
6-May	21h 48m 17.80s	-13° 59' 51.1"	5.071763	5.1293896	42.66	81.1	38.4	35.9	-2.3	11.3	1.50	7.01	12.12
7-May	21h 48m 45.24s	-13° 57' 43.7"	5.071439	5.1137742	42.53	81.9	38.5	36.0	-2.3	11.4	1.47	6.58	12.09
8-May	21h 49m 12.10s	-13° 55' 39.3"	5.071114	5.0981282	42.40	82.8	38.6	36.1	-2.3	11.4	1.43	6.54	12.05
9-May	21h 49m 38.38s	-13° 53' 37.7"	5.070791	5.0824546	42.27	83.6	38.7	36.2	-2.3	11.4	1.39	6.51	12.02
10-May	21h 50m 04.06s	-13° 51' 39.0"	5.070467	5.0667566	42.14	84.5	38.9	36.3	-2.3	11.4	1.36	6.47	11.58
11-May	21h 50m 29.15s	-13° 49' 43.4"	5.070144	5.0510372	42.01	85.4	39.0	36.5	-2.3	11.5	1.32	6.43	11.55
12-May	21h 50m 53.63s	-13° 47' 50.9"	5.069821	5.0352996	41.88	86.2	39.1	36.6	-2.3	11.5	1.28	6.40	11.52
13-May	21h 51m 17.49s	-13° 46' 01.5"	5.069498	5.0195469	41.75	87.1	39.2	36.7	-2.3	11.5	1.25	6.36	11.48
14-May	21h 51m 40.74s	-13° 44' 15.2"	5.069176	5.0037823	41.61	87.9	39.4	36.8	-2.3	11.5	1.21	6.33	11.45
15-May	21h 52m 03.37s	-13° 42' 32.1"	5.068854	4.9880094	41.48	88.8	39.5	36.9	-2.3	11.5	1.17	6.29	11.41
16-May	21h 52m 25.36s	-13° 40' 52.3"	5.068532	4.9722313	41.35	89.7	39.6	37.0	-2.3	11.5	1.14	6.26	11.38
17-May	21h 52m 46.72s	-13° 39' 15.8"	5.068210	4.9564517	41.22	90.6	39.7	37.2	-2.3	11.5	1.10	6.22	11.34
18-May	21h 53m 07.43s	-13° 37' 42.6"	5.067889	4.9406740	41.09	91.4	39.9	37.3	-2.3	11.5	1.06	6.19	11.31
19-May	21h 53m 27.49s	-13° 36' 12.7"	5.067568	4.9249019	40.96	92.3	40.0	37.4	-2.4	11.5	1.03	6.15	11.27
20-May	21h 53m 46.89s	-13° 34' 46.3"	5.067247	4.9091392	40.83	93.2	40.1	37.5	-2.4	11.5	0.59	6.11	11.24
21-May	21h 54m 05.64s	-13° 33' 23.3"	5.066926	4.8933896	40.70	94.1	40.2	37.6	-2.4	11.5	0.55	6.08	11.20
22-May	21h 54m 23.72s	-13° 32' 03.8"	5.066606	4.8776572	40.57	95.0	40.4	37.8	-2.4	11.5	0.52	6.04	11.17
23-May	21h 54m 41.13s	-13° 30' 47.8"	5.066286	4.8619460	40.44	95.9	40.5	37.9	-2.4	11.5	0.48	6.00	11.13
24-May	21h 54m 57.87s	-13° 29' 35.4"	5.065966	4.8462601	40.30	96.7	40.6	38.0	-2.4	11.5	0.44	5.57	11.10
25-May	21h 55m 13.94s	-13° 28' 26.5"	5.065647	4.8306038	40.17	97.6	40.8	38.1	-2.4	11.4	0.40	5.53	11.06
26-May	21h 55m 29.32s	-13° 27' 21.3"	5.065328	4.8149815	40.04	98.5	40.9	38.2	-2.4	11.4	0.37	5.49	11.02
27-May	21h 55m 44.01s	-13° 26' 19.8"	5.065009	4.7993974	39.92	99.4	41.0	38.4	-2.4	11.4	0.33	5.46	10.59
28-May	21h 55m 58.00s	-13° 25' 21.9"	5.064691	4.7838558	39.79	100.3	41.2	38.5	-2.4	11.4	0.29	5.42	10.55
29-May	21h 56m 11.29s	-13° 24' 27.9"	5.064372	4.7683609	39.66	101.2	41.3	38.6	-2.4	11.3	0.25	5.38	10.51

Date	A.R. Geoc.	Dec. Geoc.	R A.U.	Distance A.U.	Light (m)	El. °	Diam. Eq."	Diam. Pol."	Mag.	Phase angle°	Rise	Transit	Set
30-May	21h 56m 23.87s	-13° 23' 37.5"	5.064054	4.7529168	39.53	102.1	41.4	38.7	-2.4	11.3	0.22	5.35	10.48
31-May	21h 56m 35.75s	-13° 22' 51.0"	5.063737	4.7375275	39.40	103.1	41.6	38.9	-2.4	11.2	0.18	5.31	10.44
1-Jun	21h 56m 46.92s	-13° 22' 08.2"	5.063419	4.7221970	39.27	104.0	41.7	39.0	-2.5	11.2	0.14	5.27	10.40
2-Jun	21h 56m 57.38s	-13° 21' 29.1"	5.063102	4.7069290	39.15	104.9	41.8	39.1	-2.5	11.2	0.10	5.23	10.37
3-Jun	21h 57m 07.12s	-13° 20' 53.9"	5.062785	4.6917274	39.02	105.8	42.0	39.2	-2.5	11.1	0.06	5.20	10.33
4-Jun	21h 57m 16.15s	-13° 20' 22.5"	5.062469	4.6765960	38.89	106.7	42.1	39.4	-2.5	11.1	0.03	5.16	10.29
5-Jun	21h 57m 24.47s	-13° 19' 54.9"	5.062153	4.6615384	38.77	107.6	42.2	39.5	-2.5	11.0	23.55	5.12	10.25
6-Jun	21h 57m 32.07s	-13° 19' 31.1"	5.061837	4.6465585	38.64	108.6	42.4	39.6	-2.5	11.0	23.51	5.08	10.22
7-Jun	21h 57m 38.95s	-13° 19' 11.2"	5.061521	4.6316600	38.52	109.5	42.5	39.8	-2.5	10.9	23.47	5.04	10.18
8-Jun	21h 57m 45.10s	-13° 18' 55.2"	5.061206	4.6168468	38.40	110.4	42.6	39.9	-2.5	10.8	23.43	5.01	10.14
9-Jun	21h 57m 50.53s	-13° 18' 43.1"	5.060891	4.6021227	38.27	111.4	42.8	40.0	-2.5	10.8	23.39	4.97	10.10
10-Jun	21h 57m 55.22s	-13° 18' 35.0"	5.060576	4.5874915	38.15	112.3	42.9	40.1	-2.5	10.7	23.36	4.93	10.06
11-Jun	21h 57m 59.18s	-13° 18' 30.7"	5.060261	4.5729572	38.03	113.2	43.1	40.3	-2.5	10.6	23.32	4.89	10.02
12-Jun	21h 58m 02.40s	-13° 18' 30.5"	5.059947	4.5585239	37.91	114.2	43.2	40.4	-2.5	10.5	23.28	4.85	9.98
13-Jun	21h 58m 04.88s	-13° 18' 34.2"	5.059633	4.5441954	37.79	115.1	43.3	40.5	-2.5	10.5	23.24	4.81	9.95
14-Jun	21h 58m 06.62s	-13° 18' 41.9"	5.059320	4.5299761	37.67	116.1	43.5	40.6	-2.5	10.4	23.20	4.77	9.91
15-Jun	21h 58m 07.61s	-13° 18' 53.6"	5.059007	4.5158699	37.56	117.0	43.6	40.8	-2.5	10.3	23.16	4.73	9.87
16-Jun	21h 58m 07.85s	-13° 19' 09.3"	5.058694	4.5018813	37.44	118.0	43.7	40.9	-2.6	10.2	23.12	4.69	9.83
17-Jun	21h 58m 07.35s	-13° 19' 28.9"	5.058381	4.4880145	37.33	118.9	43.9	41.0	-2.6	10.1	23.08	4.65	9.79
18-Jun	21h 58m 06.10s	-13° 19' 52.5"	5.058068	4.4742738	37.21	119.9	44.0	41.2	-2.6	10.0	23.04	4.61	9.75
19-Jun	21h 58m 04.11s	-13° 20' 20.1"	5.057756	4.4606638	37.10	120.9	44.1	41.3	-2.6	9.9	23.00	4.57	9.71
20-Jun	21h 58m 01.38s	-13° 20' 51.6"	5.057445	4.4471891	36.99	121.8	44.3	41.4	-2.6	9.8	22.96	4.53	9.67
21-Jun	21h 57m 57.90s	-13° 21' 27.1"	5.057133	4.4338542	36.88	122.8	44.4	41.5	-2.6	9.7	22.92	4.49	9.63
22-Jun	21h 57m 53.67s	-13° 22' 06.6"	5.056822	4.4206638	36.77	123.8	44.5	41.7	-2.6	9.6	22.88	4.45	9.59
23-Jun	21h 57m 48.71s	-13° 22' 50.0"	5.056511	4.4076227	36.66	124.8	44.7	41.8	-2.6	9.5	22.84	4.41	9.55
24-Jun	21h 57m 43.00s	-13° 23' 37.3"	5.056200	4.3947355	36.55	125.7	44.8	41.9	-2.6	9.4	22.80	4.37	9.51
25-Jun	21h 57m 36.55s	-13° 24' 28.6"	5.055890	4.3820067	36.44	126.7	44.9	42.0	-2.6	9.3	22.76	4.33	9.47
26-Jun	21h 57m 29.35s	-13° 25' 23.7"	5.055580	4.3694408	36.34	127.7	45.1	42.1	-2.6	9.2	22.72	4.29	9.43
27-Jun	21h 57m 21.42s	-13° 26' 22.7"	5.055271	4.3570420	36.24	128.7	45.2	42.3	-2.6	9.0	22.68	4.25	9.39
28-Jun	21h 57m 12.76s	-13° 27' 25.5"	5.054961	4.3448144	36.13	129.7	45.3	42.4	-2.6	8.9	22.64	4.21	9.35
29-Jun	21h 57m 03.38s	-13° 28' 32.0"	5.054652	4.3327621	36.03	130.7	45.4	42.5	-2.6	8.8	22.60	4.17	9.31
30-Jun	21h 56m 53.28s	-13° 29' 42.2"	5.054343	4.3208890	35.94	131.7	45.6	42.6	-2.7	8.6	22.56	4.13	9.27
1-Jul	21h 56m 42.47s	-13° 30' 56.1"	5.054035	4.3091987	35.84	132.7	45.7	42.7	-2.7	8.5	22.52	4.09	9.23
2-Jul	21h 56m 30.96s	-13° 32' 13.6"	5.053727	4.2976951	35.74	133.7	45.8	42.8	-2.7	8.4	22.48	4.05	9.19
3-Jul	21h 56m 18.75s	-13° 33' 34.6"	5.053419	4.2863820	35.65	134.7	45.9	43.0	-2.7	8.2	22.44	4.01	9.15
4-Jul	21h 56m 05.86s	-13° 34' 59.1"	5.053112	4.2752629	35.56	135.7	46.1	43.1	-2.7	8.1	22.40	3.97	9.11
5-Jul	21h 55m 52.27s	-13° 36' 27.1"	5.052805	4.2643415	35.47	136.7	46.2	43.2	-2.7	7.9	21.36	3.93	9.07
6-Jul	21h 55m 38.01s	-13° 37' 58.6"	5.052498	4.2536215	35.38	137.7	46.3	43.3	-2.7	7.8	21.32	3.89	9.03
7-Jul	21h 55m 23.07s	-13° 39' 33.5"	5.052191	4.2431065	35.29	138.8	46.4	43.4	-2.7	7.6	21.28	3.85	8.99
8-Jul	21h 55m 07.46s	-13° 41' 11.7"	5.051885	4.2328001	35.20	139.8	46.5	43.5	-2.7	7.5	21.24	3.81	8.95
9-Jul	21h 54m 51.19s	-13° 42' 53.2"	5.051579	4.2227059	35.12	140.8	46.6	43.6	-2.7	7.3	21.20	3.77	8.91
10-Jul	21h 54m 34.27s	-13° 44' 38.0"	5.051273	4.2128276	35.04	141.8	46.7	43.7	-2.7	7.1	21.16	3.73	8.87
11-Jul	21h 54m 16.71s	-13° 46' 25.9"	5.050968	4.2031688	34.96	142.9	46.8	43.8	-2.7	7.0	21.12	3.69	8.83
12-Jul	21h 53m 58.51s	-13° 48' 16.9"	5.050663	4.1937332	34.88	143.9	47.0	43.9	-2.7	6.8	21.08	3.65	8.79
13-Jul	21h 53m 39.68s	-13° 50' 11.0"	5.050359	4.1845243	34.80	144.9	47.1	44.0	-2.7	6.6	21.04	3.61	8.75
14-Jul	21h 53m 20.23s	-13° 52' 08.0"	5.050054	4.1755458	34.73	146.0	47.2	44.1	-2.7	6.5	21.00	3.57	8.71
15-Jul	21h 53m 00.19s	-13° 54' 07.9"	5.049750	4.1668014	34.65	147.0	47.3	44.2	-2.8	6.3	21.15	2.30	7.41
16-Jul	21h 52m 39.55s	-13° 56' 10.7"	5.049447	4.1582947	34.58	148.0	47.4	44.3	-2.8	6.1	21.11	2.26	7.37
17-Jul	21h 52m 18.33s	-13° 58' 16.1"	5.049143	4.1500295	34.51	149.1	47.4	44.4	-2.8	5.9	21.07	2.22	7.33
18-Jul	21h 51m 56.54s	-14° 00' 24.2"	5.048840	4.1420093	34.45	150.1	47.5	44.5	-2.8	5.8	21.03	2.17	7.28
19-Jul	21h 51m 34.20s	-14° 02' 34.9"	5.048538	4.1342377	34.38	151.2	47.6	44.5	-2.8	5.6	20.59	2.13	7.24
20-Jul	21h 51m 11.32s	-14° 04' 48.0"	5.048235	4.1267185	34.32	152.3	47.7	44.6	-2.8	5.4	20.54	2.09	7.19
21-Jul	21h 50m 47.92s	-14° 07' 03.6"	5.047933	4.1194551	34.26	153.3	47.8	44.7	-2.8	5.2	20.50	2.05	7.15
22-Jul	21h 50m 23.99s	-14° 09' 21.5"	5.047631	4.1124509	34.20	154.4	47.9	44.8	-2.8	5.0	20.46	2.00	7.10
23-Jul	21h 49m 59.57s	-14° 11' 41.6"	5.047330	4.1057090	34.15	155.4	48.0	44.8	-2.8	4.8	20.42	1.96	7.06
24-Jul	21h 49m 34.66s	-14° 14' 03.8"	5.047029	4.0992325	34.09	156.5	48.0	44.9	-2.8	4.6	20.38	1.92	7.01
25-Jul	21h 49m 09.28s	-14° 16' 28.0"	5.046728	4.0930241	34.04	157.6	48.1	45.0	-2.8	4.4	20.33	1.87	6.97
26-Jul	21h 48m 43.46s	-14° 18' 54.0"	5.046428	4.0870861	33.99	158.6	48.2	45.1	-2.8	4.2	20.29	1.83	6.92
27-Jul	21h 48m 17.21s	-14° 21' 21.8"	5.046128	4.0814211	33.94	159.7	48.2	45.1	-2.8	4.0	20.25	1.79	6.88
28-Jul	21h 47m 50.56s	-14° 23' 51.1"	5.045828	4.0760309	33.90	160.8	48.3	45.2	-2.8	3.8	20.21	1.75	6.83
29-Jul	21h 47m 23.52s	-14° 26' 22.0"	5.045529	4.0709176	33.86	161.8	48.4	45.2	-2.8	3.6	20.17	1.71	6.79
30-Jul	21h 46m 56.11s	-14° 28' 54.2"	5.045230	4.0660831	33.82	162.9	48.4	45.3	-2.8	3.4	20.12	1.67	6.74
31-Jul	21h 46m 28.36s	-14° 31' 27.8"	5.044931	4.0615291	33.78	164.0	48.5	45.3	-2.8	3.2	20.08	1.63	6.70
1-Aug	21h 46m 00.27s	-14° 34' 02.5"	5.044633	4.0572573	33.74	165.0	48.5	45.4	-2.8	3.0	20.04	1.59	6.65
2-Aug	21h 45m 31.88s	-14° 36' 38.3"	5.044334	4.0532692	33.71	166.1	48.6	45.4	-2.8	2.8	20.00	1.55	6.60
3-Aug	21h 45m 03.19s	-14° 39' 15.1"	5.044037	4.0495663	33.68	167.2	48.6	45.5	-2.8	2.6	19.55	1.51	6.56
4-Aug	21h 44m 34.22s	-14° 41' 52.8"	5.043739	4.0461500	33.65	168.3	48.7	45.5	-2.8	2.3	19.51	1.47	6.51
5-Aug	21h 44m 05.00s	-14° 44' 31.2"	5.043442	4.0430217	33.62	169.3	48.7	45.5	-2.8	2.1	19.47	1.43	6.47
6-Aug	21h 43m 35.55s	-14° 47' 10.2"	5.043146	4.0401826	33.60	170.4	48.7	45.6	-2.8	1.9	19.43	1.39	6.42
7-Aug	21h 43m 05.88s	-14° 49' 49.8"	5.042849	4.0376339	33.58	171.5	48.8	45.6	-2.8	1.7	19.38	1.35	6.38
8-Aug	21h 42m 36.01s	-14° 52' 29.8"	5.042553	4.0353768	33.56	172.6	48.8	45.6	-2.8	1.5	19.34	1.31	6.33
9-Aug	21h 42m 05.96s	-14° 55' 10.1"	5.042257	4.0334123	33.54	173.6	48.8	45.7	-2.9	1.3	19.30	1.27	6.29
10-Aug	21h 41m 35.77s	-14° 57' 50.6"	5.041962	4.0317414	33.53	174.7	48.8	45.7	-2.9	1.1	19.26	1.23	6.24
11-Aug	21h 41m 05.44s	-15° 00' 31.1"	5.041667	4.0303651	33.52	175.8	48.9	45.7	-2.9	0.8	19.21	1.19	6.20
12-Aug	21h 40m 35.00s	-15° 03' 11.6"	5.041372	4.0292843	33.51	176.8	48.9	45.7	-2.9	0.6	19.17	1.15	6.15
13-Aug	21h 40m 04.48s	-15° 05' 51.9"	5.041078	4.0284998	33.50	177.8	48.9	45.7	-2.9	0.4	19.13	1.11	6.11
14-Aug	21h 39m 33.90s	-15° 08' 31.9"	5.040784	4.0280123	33.50	178.7	48.9	45.7	-2.9	0.3	19.09	1.07	6.07

Date	A.R. Geoc.	Dec. Geoc.	R A.U.	Distance A.U.	Light (m)	El. °	Diam. Eq."	Diam. Pol."	Mag.	Phase angle°	Rise	Transit	Set
15-Aug	21h 39m 03.28s	-15° 11' 11.5"	5.040491	4.0278225	33.50	178.9	48.9	45.7	-2.9	0.2	19.04	0.15	5.20
16-Aug	21h 38m 32.64s	-15° 13' 50.6"	5.040197	4.0279310	33.50	178.3	48.9	45.7	-2.9	0.3	19.00	0.10	5.16
17-Aug	21h 38m 02.00s	-15° 16' 29.1"	5.039904	4.0283382	33.50	177.3	48.9	45.7	-2.9	0.5	18.56	0.06	5.11
18-Aug	21h 37m 31.39s	-15° 19' 06.9"	5.039612	4.0290443	33.51	176.3	48.9	45.7	-2.9	0.7	18.51	0.01	5.07
19-Aug	21h 37m 00.83s	-15° 21' 43.8"	5.039319	4.0300495	33.52	175.2	48.9	45.7	-2.9	1.0	18.47	23.52	5.02
20-Aug	21h 36m 30.33s	-15° 24' 19.8"	5.039028	4.0313535	33.53	174.2	48.8	45.7	-2.9	1.2	18.43	23.48	4.57
21-Aug	21h 35m 59.93s	-15° 26' 54.7"	5.038736	4.0329558	33.54	173.1	48.8	45.7	-2.9	1.4	18.39	23.43	4.53
22-Aug	21h 35m 29.65s	-15° 29' 28.3"	5.038445	4.0348558	33.56	172.0	48.8	45.6	-2.9	1.6	18.34	23.39	4.48
23-Aug	21h 34m 59.51s	-15° 32' 00.6"	5.038154	4.0370523	33.58	170.9	48.8	45.6	-2.8	1.8	18.30	23.35	4.44
24-Aug	21h 34m 29.55s	-15° 34' 31.4"	5.037863	4.0395442	33.60	169.8	48.7	45.6	-2.8	2.0	18.26	23.30	4.39
25-Aug	21h 33m 59.78s	-15° 37' 00.6"	5.037573	4.0423301	33.62	168.7	48.7	45.6	-2.8	2.2	18.22	23.26	4.34
26-Aug	21h 33m 30.23s	-15° 39' 28.2"	5.037284	4.0454084	33.64	167.7	48.7	45.5	-2.8	2.5	18.17	23.21	4.30
27-Aug	21h 33m 00.93s	-15° 41' 54.0"	5.036994	4.0487774	33.67	166.6	48.6	45.5	-2.8	2.7	18.13	23.17	4.25
28-Aug	21h 32m 31.88s	-15° 44' 17.9"	5.036705	4.0524354	33.70	165.5	48.6	45.4	-2.8	2.9	18.09	23.13	4.21
29-Aug	21h 32m 03.12s	-15° 46' 39.8"	5.036416	4.0563804	33.74	164.4	48.5	45.4	-2.8	3.1	18.05	23.08	4.16
30-Aug	21h 31m 34.66s	-15° 48' 59.7"	5.036128	4.0606105	33.77	163.3	48.5	45.3	-2.8	3.3	18.00	23.04	4.12
31-Aug	21h 31m 06.52s	-15° 51' 17.5"	5.035840	4.0651237	33.81	162.2	48.4	45.3	-2.8	3.5	17.56	22.59	4.07
1-Sep	21h 30m 38.73s	-15° 53' 33.1"	5.035552	4.0699179	33.85	161.1	48.4	45.2	-2.8	3.7	17.52	22.55	4.03
2-Sep	21h 30m 11.29s	-15° 55' 46.5"	5.035265	4.0749910	33.89	160.1	48.3	45.2	-2.8	3.9	17.48	22.51	3.58
3-Sep	21h 29m 44.23s	-15° 57' 57.5"	5.034978	4.0803406	33.94	159.0	48.3	45.1	-2.8	4.1	17.43	22.46	3.53
4-Sep	21h 29m 17.57s	-16° 00' 06.0"	5.034692	4.0859645	33.98	157.9	48.2	45.1	-2.8	4.3	17.39	22.42	3.49
5-Sep	21h 28m 51.33s	-16° 02' 12.0"	5.034405	4.0918603	34.03	156.8	48.1	45.0	-2.8	4.5	17.35	22.37	3.44
6-Sep	21h 28m 25.52s	-16° 04' 15.4"	5.034120	4.0980258	34.08	155.7	48.0	44.9	-2.8	4.7	17.31	22.33	3.40
7-Sep	21h 28m 00.17s	-16° 06' 16.2"	5.033834	4.1044585	34.14	154.7	48.0	44.9	-2.8	4.9	17.27	22.29	3.35
8-Sep	21h 27m 35.28s	-16° 08' 14.2"	5.033549	4.1111560	34.19	153.6	47.9	44.8	-2.8	5.1	17.22	22.24	3.31
9-Sep	21h 27m 10.89s	-16° 10' 09.4"	5.033264	4.1181157	34.25	152.5	47.8	44.7	-2.8	5.3	17.18	22.20	3.27
10-Sep	21h 26m 47.01s	-16° 12' 01.8"	5.032980	4.1253352	34.31	151.5	47.7	44.6	-2.8	5.5	17.14	22.16	3.22
11-Sep	21h 26m 23.65s	-16° 13' 51.2"	5.032696	4.1328118	34.37	150.4	47.6	44.6	-2.8	5.7	17.10	22.11	3.18
12-Sep	21h 26m 00.83s	-16° 15' 37.6"	5.032412	4.1405430	34.44	149.3	47.6	44.5	-2.8	5.9	17.06	22.07	3.13
13-Sep	21h 25m 38.57s	-16° 17' 21.0"	5.032129	4.1485260	34.50	148.3	47.5	44.4	-2.8	6.0	17.01	22.03	3.09
14-Sep	21h 25m 16.88s	-16° 19' 01.3"	5.031846	4.1567578	34.57	147.2	47.4	44.3	-2.8	6.2	16.57	21.59	3.04
15-Sep	21h 24m 55.77s	-16° 20' 38.5"	5.031563	4.1652355	34.64	146.1	47.3	44.2	-2.8	6.4	16.53	21.54	3.00
16-Sep	21h 24m 35.26s	-16° 22' 12.5"	5.031281	4.1739559	34.71	145.1	47.2	44.1	-2.8	6.6	16.49	21.50	2.56
17-Sep	21h 24m 15.37s	-16° 23' 43.3"	5.030999	4.1829156	34.79	144.0	47.1	44.0	-2.8	6.7	16.45	21.46	2.51
18-Sep	21h 23m 56.10s	-16° 25' 10.7"	5.030718	4.1921111	34.86	143.0	47.0	43.9	-2.7	6.9	16.41	21.42	2.47
19-Sep	21h 23m 37.47s	-16° 26' 34.8"	5.030437	4.2015384	34.94	141.9	46.9	43.8	-2.7	7.1	16.36	21.37	2.43
20-Sep	21h 23m 19.51s	-16° 27' 55.4"	5.030156	4.2111936	35.02	140.8	46.8	43.7	-2.7	7.2	16.32	21.33	2.38
21-Sep	21h 23m 02.22s	-16° 29' 12.5"	5.029876	4.2210727	35.11	139.8	46.6	43.6	-2.7	7.4	16.28	21.29	2.34
22-Sep	21h 22m 45.62s	-16° 30' 26.1"	5.029596	4.2311713	35.19	138.8	46.5	43.5	-2.7	7.6	16.24	21.25	2.30
23-Sep	21h 22m 29.71s	-16° 31' 36.1"	5.029316	4.2414853	35.28	137.7	46.4	43.4	-2.7	7.7	16.20	21.21	2.25
24-Sep	21h 22m 14.51s	-16° 32' 42.6"	5.029037	4.2520103	35.36	136.7	46.3	43.3	-2.7	7.9	16.16	21.16	2.21
25-Sep	21h 22m 00.03s	-16° 33' 45.5"	5.028758	4.2627421	35.45	135.6	46.2	43.2	-2.7	8.0	16.12	21.12	2.17
26-Sep	21h 21m 46.27s	-16° 34' 44.9"	5.028480	4.2736761	35.54	134.6	46.1	43.1	-2.7	8.2	16.08	21.08	2.13
27-Sep	21h 21m 33.24s	-16° 35' 40.5"	5.028202	4.2848083	35.64	133.6	46.0	43.0	-2.7	8.3	16.04	21.04	2.08
28-Sep	21h 21m 20.95s	-16° 36' 32.6"	5.027924	4.2961341	35.73	132.5	45.8	42.9	-2.7	8.4	15.59	21.00	2.04
29-Sep	21h 21m 09.40s	-16° 37' 21.1"	5.027647	4.3076494	35.83	131.5	45.7	42.7	-2.7	8.6	15.55	20.56	2.00
30-Sep	21h 20m 58.60s	-16° 38' 05.8"	5.027370	4.3193498	35.92	130.5	45.6	42.6	-2.7	8.7	15.51	20.52	1.56
1-Oct	21h 20m 48.55s	-16° 38' 47.0"	5.027093	4.3312310	36.02	129.4	45.5	42.5	-2.7	8.8	15.47	20.47	1.52
2-Oct	21h 20m 39.26s	-16° 39' 24.4"	5.026817	4.3432888	36.12	128.4	45.3	42.4	-2.6	9.0	15.43	20.43	1.48
3-Oct	21h 20m 30.74s	-16° 39' 58.1"	5.026541	4.3555190	36.22	127.4	45.2	42.3	-2.6	9.1	15.39	20.39	1.44
4-Oct	21h 20m 22.98s	-16° 40' 28.2"	5.026266	4.3679173	36.33	126.4	45.1	42.2	-2.6	9.2	15.35	20.35	1.39
5-Oct	21h 20m 16.00s	-16° 40' 54.5"	5.025991	4.3804797	36.43	125.4	44.9	42.0	-2.6	9.3	15.31	20.31	1.35
6-Oct	21h 20m 09.79s	-16° 41' 17.0"	5.025716	4.3932021	36.54	124.4	44.8	41.9	-2.6	9.5	15.27	20.27	1.31
7-Oct	21h 20m 04.37s	-16° 41' 35.9"	5.025442	4.4060804	36.64	123.4	44.7	41.8	-2.6	9.6	15.23	20.23	1.27
8-Oct	21h 19m 59.74s	-16° 41' 51.0"	5.025168	4.4191106	36.75	122.3	44.6	41.7	-2.6	9.7	15.19	20.19	1.23
9-Oct	21h 19m 55.90s	-16° 42' 02.4"	5.024895	4.4322886	36.86	121.3	44.4	41.5	-2.6	9.8	15.15	20.15	1.19
10-Oct	21h 19m 52.84s	-16° 42' 10.1"	5.024622	4.4456104	36.97	120.3	44.3	41.4	-2.6	9.9	15.11	20.11	1.15
11-Oct	21h 19m 50.58s	-16° 42' 14.0"	5.024349	4.4590718	37.09	119.4	44.2	41.3	-2.6	10.0	15.07	20.07	1.11
12-Oct	21h 19m 49.10s	-16° 42' 14.3"	5.024077	4.4726688	37.20	118.4	44.0	41.2	-2.6	10.1	15.03	20.03	1.07
13-Oct	21h 19m 48.42s	-16° 42' 10.8"	5.023805	4.4863970	37.31	117.4	43.9	41.0	-2.6	10.2	14.59	19.59	1.03
14-Oct	21h 19m 48.53s	-16° 42' 03.6"	5.023533	4.5002520	37.43	116.4	43.8	40.9	-2.6	10.2	14.55	19.56	0.59
15-Oct	21h 19m 49.44s	-16° 41' 52.7"	5.023262	4.5142294	37.54	115.4	43.6	40.8	-2.6	10.3	14.52	19.52	0.56
16-Oct	21h 19m 51.14s	-16° 41' 38.0"	5.022991	4.5283245	37.66	114.4	43.5	40.7	-2.6	10.4	14.48	19.48	0.52
17-Oct	21h 19m 53.64s	-16° 41' 19.6"	5.022721	4.5425326	37.78	113.4	43.3	40.5	-2.5	10.5	14.44	19.44	0.48
18-Oct	21h 19m 56.94s	-16° 40' 57.3"	5.022451	4.5568489	37.90	112.4	43.2	40.4	-2.5	10.6	14.40	19.40	0.44
19-Oct	21h 20m 01.05s	-16° 40' 31.4"	5.022181	4.5712685	38.02	111.5	43.1	40.3	-2.5	10.6	14.36	19.36	0.40
20-Oct	21h 20m 05.95s	-16° 40' 01.6"	5.021912	4.5857866	38.14	110.5	42.9	40.2	-2.5	10.7	14.32	19.32	0.36
21-Oct	21h 20m 11.65s	-16° 39' 28.2"	5.021643	4.6003984	38.26	109.5	42.8	40.0	-2.5	10.8	14.28	19.28	0.33
22-Oct	21h 20m 18.15s	-16° 38' 51.0"	5.021375	4.6150990	38.38	108.6	42.7	39.9	-2.5	10.8	14.24	19.25	0.29
23-Oct	21h 20m 25.44s	-16° 38' 10.2"	5.021107	4.6298837	38.51	107.6	42.5	39.8	-2.5	10.9	14.20	19.21	0.25
24-Oct	21h 20m 33.51s	-16° 37' 25.7"	5.020839	4.6447478	38.63	106.6	42.4	39.6	-2.5	10.9	14.17	19.17	0.21
25-Oct	21h 20m 42.37s	-16° 36' 37.5"	5.020572	4.6596867	38.75	105.7	42.3	39.5	-2.5	11.0	14.13	19.13	0.17
26-Oct	21h 20m 52.00s	-16° 35' 45.8"	5.020306	4.6746957	38.88	104.7	42.1	39.4	-2.5	11.0	14.09	19.10	0.14
27-Oct	21h 21m 02.40s	-16° 34' 50.4"	5.020039	4.6897705	39.00	103.8	42.0	39.3	-2.5	11.1	14.05	19.06	0.10
28-Oct	21h 21m 13.57s	-16° 33' 51.4"	5.019773	4.7049066	39.13	102.8	41.9	39.1	-2.5	11.1	14.01	19.02	0.06
29-Oct	21h 21m 25.50s	-16° 32' 48.9"	5.019508	4.7200996	39.26	101.9	41.7	39.0	-2.5	11.2	13.58	18.58	0.03
30-Oct	21h 21m 38.18s	-16° 31' 42.8"	5.019242	4.7353453	39.38	100.9	41.6	38.9	-2.5	11.2	13.54	18.55	

Date	A.R. Geoc.	Dec. Geoc.	R A.U.	Distance A.U.	Light (m)	El. °	Diam. Eq."	Diam. Pol."	Mag.	Phase angle°	Rise	Transit	Set
31-Oct	21h 21m 51.62s	-16° 30' 33.1"	5.018978	4.7506395	39.51	100.0	41.4	38.8	-2.5	11.2	13.50	18.51	23.52
1-Nov	21h 22m 05.80s	-16° 29' 19.9"	5.018713	4.7659781	39.64	99.0	41.3	38.6	-2.4	11.3	13.46	18.47	23.48
2-Nov	21h 22m 20.73s	-16° 28' 03.2"	5.018449	4.7813571	39.77	98.1	41.2	38.5	-2.4	11.3	13.42	18.44	23.45
3-Nov	21h 22m 36.40s	-16° 26' 42.9"	5.018186	4.7967726	39.89	97.2	41.0	38.4	-2.4	11.3	13.39	18.40	23.41
4-Nov	21h 22m 52.80s	-16° 25' 19.2"	5.017923	4.8122207	40.02	96.2	40.9	38.3	-2.4	11.3	13.35	18.36	23.38
5-Nov	21h 23m 09.93s	-16° 23' 52.0"	5.017660	4.8276978	40.15	95.3	40.8	38.1	-2.4	11.3	13.31	18.33	23.34
6-Nov	21h 23m 27.78s	-16° 22' 21.4"	5.017397	4.8432000	40.28	94.4	40.7	38.0	-2.4	11.4	13.27	18.29	23.30
7-Nov	21h 23m 46.34s	-16° 20' 47.5"	5.017135	4.8587236	40.41	93.5	40.5	37.9	-2.4	11.4	13.24	18.25	23.27
8-Nov	21h 24m 05.61s	-16° 19' 10.1"	5.016874	4.8742648	40.54	92.5	40.4	37.8	-2.4	11.4	13.20	18.22	23.23
9-Nov	21h 24m 25.58s	-16° 17' 29.3"	5.016613	4.8898197	40.67	91.6	40.3	37.7	-2.4	11.4	13.16	18.18	23.20
10-Nov	21h 24m 46.24s	-16° 15' 45.2"	5.016352	4.9053845	40.80	90.7	40.1	37.5	-2.4	11.4	13.13	18.15	23.17
11-Nov	21h 25m 07.59s	-16° 13' 57.7"	5.016092	4.9209550	40.93	89.8	40.0	37.4	-2.4	11.4	13.09	18.11	23.13
12-Nov	21h 25m 29.62s	-16° 12' 06.9"	5.015832	4.9365273	41.06	88.9	39.9	37.3	-2.4	11.4	13.05	18.07	23.10
13-Nov	21h 25m 52.33s	-16° 10' 12.7"	5.015572	4.9520972	41.19	88.0	39.8	37.2	-2.4	11.4	13.02	18.04	23.06
14-Nov	21h 26m 15.72s	-16° 08' 15.2"	5.015313	4.9676605	41.32	87.1	39.6	37.1	-2.4	11.4	12.58	18.00	23.03
15-Nov	21h 26m 39.77s	-16° 06' 14.4"	5.015055	4.9832129	41.44	86.2	39.5	37.0	-2.4	11.4	12.54	17.57	22.59
16-Nov	21h 27m 04.49s	-16° 04' 10.2"	5.014796	4.9987503	41.57	85.3	39.4	36.8	-2.3	11.3	12.51	17.53	22.56
17-Nov	21h 27m 29.87s	-16° 02' 02.8"	5.014538	5.0142685	41.70	84.4	39.3	36.7	-2.3	11.3	12.47	17.50	22.53
18-Nov	21h 27m 55.89s	-15° 59' 52.1"	5.014281	5.0297633	41.83	83.5	39.1	36.6	-2.3	11.3	12.43	17.46	22.49
19-Nov	21h 28m 22.56s	-15° 57' 38.2"	5.014024	5.0452307	41.96	82.6	39.0	36.5	-2.3	11.3	12.40	17.43	22.46
20-Nov	21h 28m 49.86s	-15° 55' 21.1"	5.013767	5.0606666	42.09	81.7	38.9	36.4	-2.3	11.2	12.36	17.39	22.43
21-Nov	21h 29m 17.78s	-15° 53' 00.8"	5.013511	5.0760671	42.22	80.8	38.8	36.3	-2.3	11.2	12.32	17.36	22.39
22-Nov	21h 29m 46.31s	-15° 50' 37.5"	5.013255	5.0914285	42.34	79.9	38.7	36.2	-2.3	11.2	12.29	17.32	22.36
23-Nov	21h 30m 15.45s	-15° 48' 11.0"	5.013000	5.1067469	42.47	79.0	38.6	36.1	-2.3	11.2	12.25	17.29	22.33
24-Nov	21h 30m 45.18s	-15° 45' 41.4"	5.012745	5.1220187	42.60	78.1	38.4	36.0	-2.3	11.1	12.22	17.26	22.30
25-Nov	21h 31m 15.50s	-15° 43' 08.8"	5.012491	5.1372403	42.73	77.2	38.3	35.8	-2.3	11.1	12.18	17.22	22.26
26-Nov	21h 31m 46.40s	-15° 40' 33.1"	5.012237	5.1524084	42.85	76.4	38.2	35.7	-2.3	11.0	12.14	17.19	22.23
27-Nov	21h 32m 17.88s	-15° 37' 54.4"	5.011983	5.1675194	42.98	75.5	38.1	35.6	-2.3	11.0	12.11	17.15	22.20
28-Nov	21h 32m 49.91s	-15° 35' 12.7"	5.011730	5.1825701	43.10	74.6	38.0	35.5	-2.3	10.9	12.07	17.12	22.17
29-Nov	21h 33m 22.50s	-15° 32' 28.0"	5.011477	5.1975574	43.23	73.7	37.9	35.4	-2.3	10.9	12.04	17.09	22.13
30-Nov	21h 33m 55.65s	-15° 29' 40.4"	5.011224	5.2124781	43.35	72.9	37.8	35.3	-2.3	10.8	12.00	17.05	22.10
1-Dec	21h 34m 29.34s	-15° 26' 49.8"	5.010972	5.2273293	43.47	72.0	37.7	35.2	-2.3	10.8	11.57	17.02	22.07
2-Dec	21h 35m 03.56s	-15° 23' 56.3"	5.010721	5.2421081	43.60	71.1	37.6	35.1	-2.2	10.7	11.53	16.58	22.04
3-Dec	21h 35m 38.31s	-15° 20' 60.0"	5.010470	5.2568117	43.72	70.3	37.5	35.0	-2.2	10.7	11.49	16.55	22.01
4-Dec	21h 36m 13.58s	-15° 18' 00.8"	5.010219	5.2714373	43.84	69.4	37.4	34.9	-2.2	10.6	11.46	16.52	21.58
5-Dec	21h 36m 49.36s	-15° 14' 58.7"	5.009969	5.2859821	43.96	68.5	37.3	34.8	-2.2	10.5	11.42	16.48	21.55
6-Dec	21h 37m 25.63s	-15° 11' 53.9"	5.009719	5.3004434	44.08	67.7	37.1	34.7	-2.2	10.5	11.39	16.45	21.51
7-Dec	21h 38m 02.40s	-15° 08' 46.4"	5.009469	5.3148182	44.20	66.8	37.0	34.6	-2.2	10.4	11.35	16.42	21.48
8-Dec	21h 38m 39.65s	-15° 05' 36.0"	5.009220	5.3291035	44.32	66.0	36.9	34.6	-2.2	10.3	11.32	16.38	21.45
9-Dec	21h 39m 17.38s	-15° 02' 22.9"	5.008972	5.3432962	44.44	65.1	36.9	34.5	-2.2	10.3	11.28	16.35	21.42
10-Dec	21h 39m 55.59s	-14° 59' 07.0"	5.008724	5.3573933	44.56	64.3	36.8	34.4	-2.2	10.2	11.25	16.32	21.39
11-Dec	21h 40m 34.26s	-14° 55' 48.4"	5.008476	5.3713915	44.67	63.4	36.7	34.3	-2.2	10.1	11.21	16.29	21.36
12-Dec	21h 41m 13.40s	-14° 52' 27.1"	5.008229	5.3852878	44.79	62.6	36.6	34.2	-2.2	10.0	11.18	16.25	21.33
13-Dec	21h 41m 52.99s	-14° 49' 03.1"	5.007982	5.3990789	44.90	61.7	36.5	34.1	-2.2	10.0	11.14	16.22	21.30
14-Dec	21h 42m 33.03s	-14° 45' 36.4"	5.007735	5.4127616	45.02	60.9	36.4	34.0	-2.2	9.9	11.11	16.19	21.27
15-Dec	21h 43m 13.51s	-14° 42' 07.0"	5.007489	5.4263329	45.13	60.0	36.3	33.9	-2.2	9.8	11.07	16.16	21.24
16-Dec	21h 43m 54.43s	-14° 38' 35.0"	5.007244	5.4397898	45.24	59.2	36.2	33.9	-2.2	9.7	11.04	16.12	21.21
17-Dec	21h 44m 35.77s	-14° 35' 00.5"	5.006999	5.4531291	45.35	58.3	36.1	33.8	-2.2	9.6	11.00	16.09	21.18
18-Dec	21h 45m 17.52s	-14° 31' 23.4"	5.006754	5.4663481	45.46	57.5	36.0	33.7	-2.2	9.5	10.57	16.06	21.15
19-Dec	21h 45m 59.69s	-14° 27' 43.8"	5.006510	5.4794439	45.57	56.7	35.9	33.6	-2.2	9.4	10.53	16.03	21.12
20-Dec	21h 46m 42.24s	-14° 24' 01.7"	5.006266	5.4924138	45.68	55.8	35.9	33.5	-2.1	9.4	10.50	15.59	21.09
21-Dec	21h 47m 25.19s	-14° 20' 17.2"	5.006022	5.5052551	45.79	55.0	35.8	33.4	-2.1	9.3	10.46	15.56	21.06
22-Dec	21h 48m 08.51s	-14° 16' 30.2"	5.005779	5.5179654	45.89	54.2	35.7	33.4	-2.1	9.2	10.43	15.53	21.03
23-Dec	21h 48m 52.21s	-14° 12' 40.9"	5.005537	5.5305421	46.00	53.3	35.6	33.3	-2.1	9.1	10.40	15.50	21.00
24-Dec	21h 49m 36.28s	-14° 08' 49.1"	5.005295	5.5429829	46.10	52.5	35.5	33.2	-2.1	9.0	10.36	15.47	20.57
25-Dec	21h 50m 20.70s	-14° 04' 55.0"	5.005053	5.5552855	46.20	51.7	35.4	33.1	-2.1	8.9	10.33	15.43	20.54
26-Dec	21h 51m 05.47s	-14° 00' 58.6"	5.004812	5.5674478	46.30	50.8	35.4	33.1	-2.1	8.8	10.29	15.40	20.51
27-Dec	21h 51m 50.59s	-13° 56' 59.9"	5.004571	5.5794676	46.40	50.0	35.3	33.0	-2.1	8.7	10.26	15.37	20.48
28-Dec	21h 52m 36.05s	-13° 52' 58.8"	5.004331	5.5913431	46.50	49.2	35.2	32.9	-2.1	8.6	10.22	15.34	20.45
29-Dec	21h 53m 21.84s	-13° 48' 55.5"	5.004091	5.6030724	46.60	48.4	35.1	32.9	-2.1	8.4	10.19	15.31	20.42
30-Dec	21h 54m 07.95s	-13° 44' 50.0"	5.003851	5.6146536	46.70	47.6	35.1	32.8	-2.1	8.3	10.16	15.27	20.40
31-Dec	21h 54m 54.38s	-13° 40' 42.4"	5.003612	5.6260852	46.79	46.7	35.0	32.7	-2.1	8.2	10.12	15.24	20.37

Legenda :

A.R., Dec. = apparent coordinates

R. = distance from the Sun in A.U.

Distance = distance from the Earth in A.U.

Light = Distance in minutes

El. = elongation from the Sun in °

Diam. = equatorial and polar diameter in "

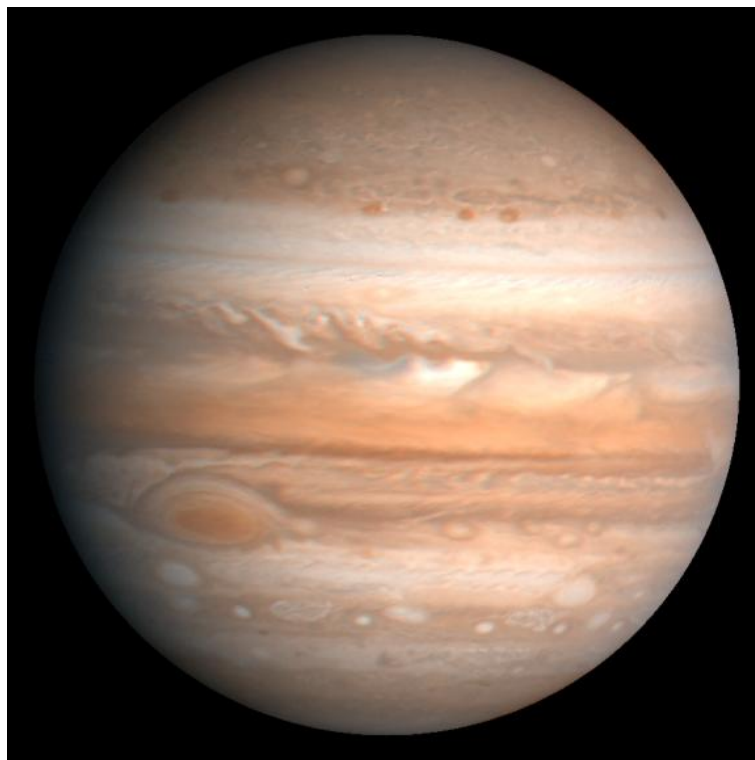
Mag. = magnitude

Times of rising and setting of the planet for Rome (42°N, 12°E), in U.T.+1

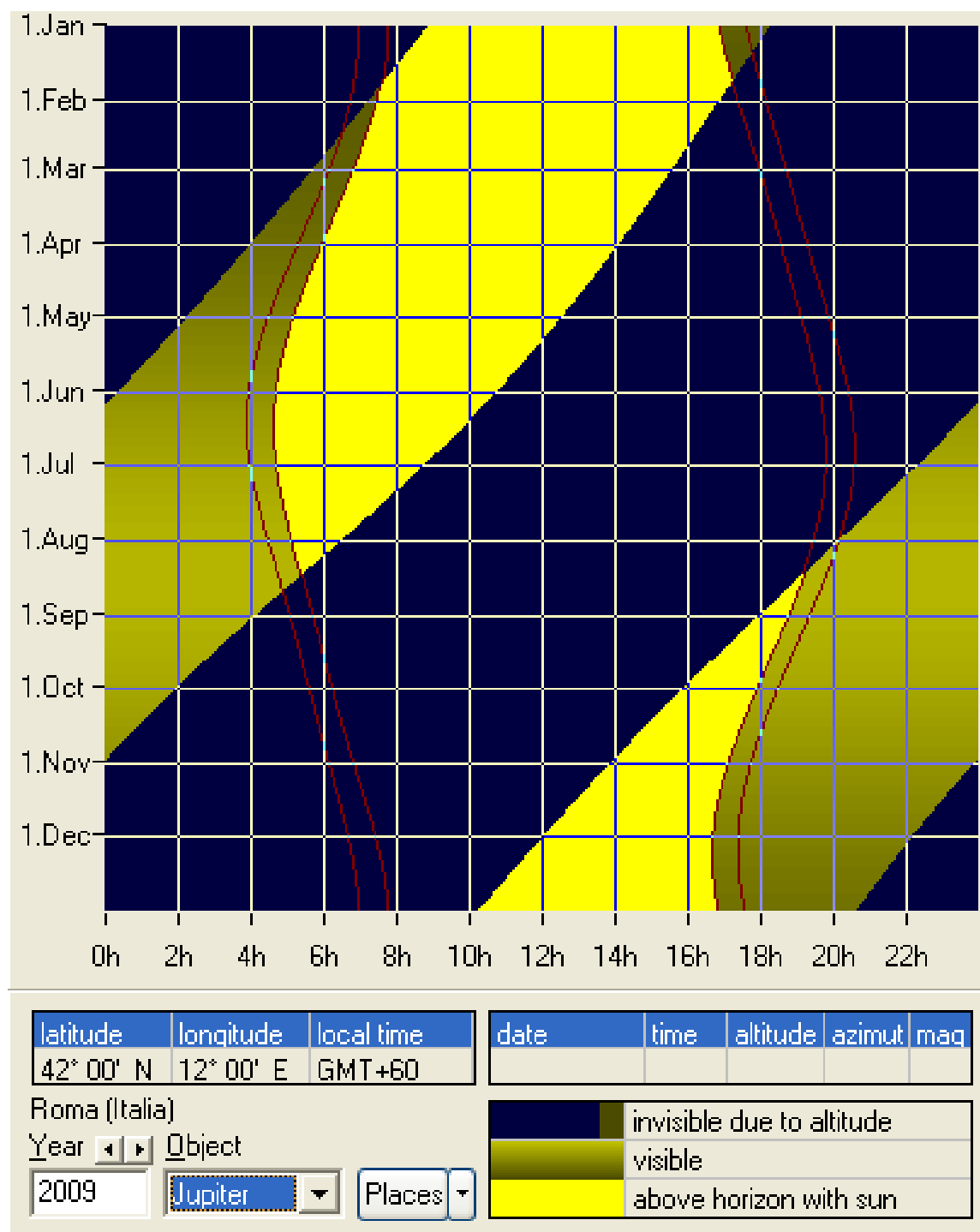
PHENOMENA OF JUPITER

Perihelion	-----				
Aphelion	-----				
Perigee	15/08/2009	03.17	4.02782	A.U.	
Apogee	23/01/2009	02.47	6.09055	A.U.	
Maxima magnitude	15/08/2009	00.52	-2.9	Mag	
Minima magnitude	11/01/2009	08.34	-1.9	Mag	
Opposition	14/08/2009	17.53			
Congiunzione	24/01/2009	05.44			
Retrograde motion	15/06/2009	19.53			
Direct motion	13/10/2009	08.38			
Maxima phase angle	17/05/2009	13.35	11.5	°	
Maxima phase angle	10/11/2009	02.32	11.4	°	
Minima phase angle	24/01/2009	04.18	0.1	°	
Minima phase angle	14/08/2009	18.57	0.2	°	
Extrema lat. of the Earth	18/07/2009	18.47	0.52	°	
Earth Lat. null	15/04/2009	11.01			
Extrema lat. of the Sun	-----				
Solar lat null	22/06/2009	11.05			

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VISIBILITY OF JUPITER



Visibility of Jupiter during the year

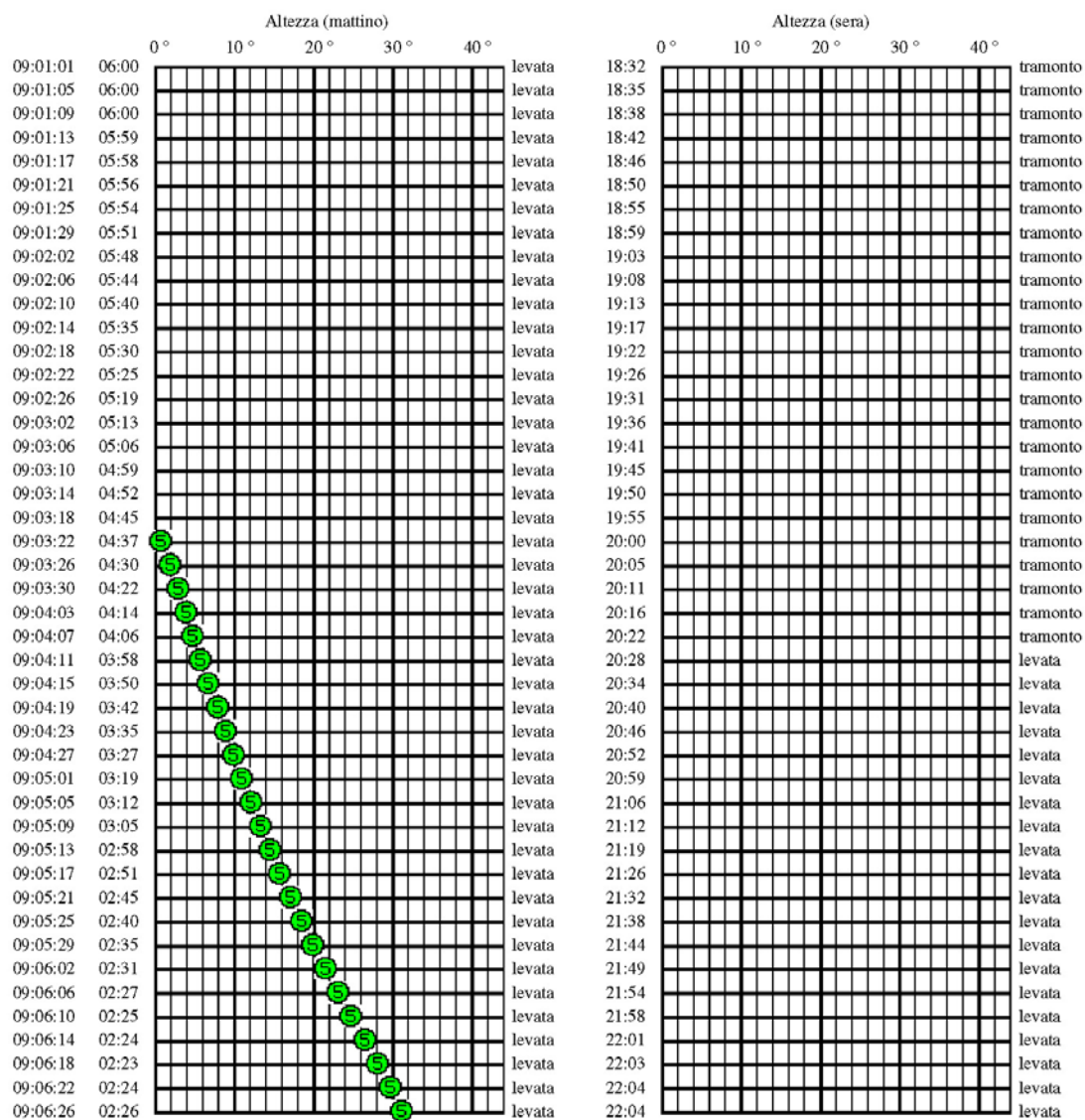
The external red lines show in what periods of the year the planet is sufficiently distant from the Sun to be able to be observed easily. The exact dates are in the following tables.

Altezza ai crepuscoli

di Giove

nel momento il cui il Sole è 18 ° sotto l'orizzonte

Postazione: Roma 42:00 N, 12:00 E (UT +01:00)

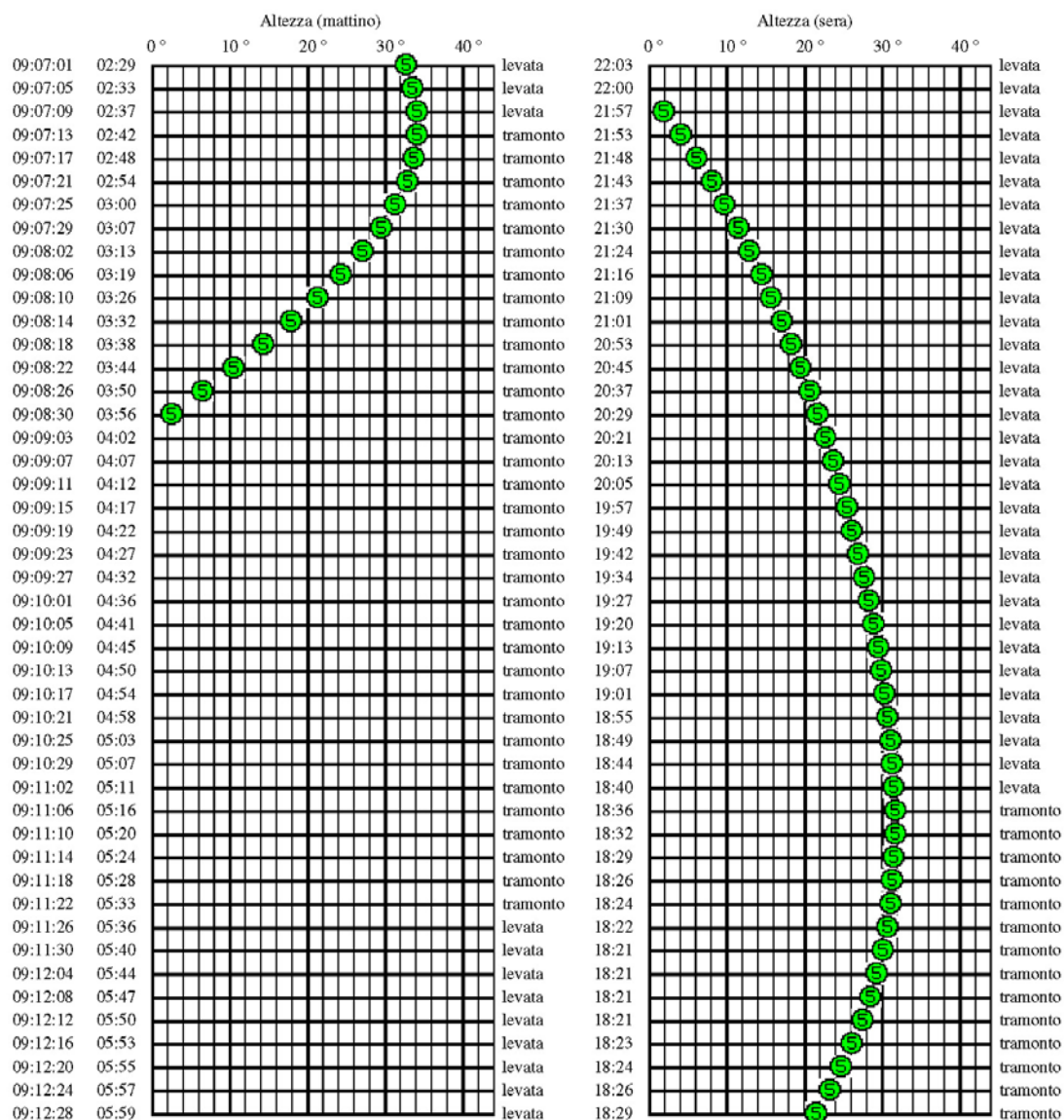


Altezza ai crepuscoli

di Giove

nel momento il cui il Sole è 18 ° sotto l'orizzonte

Postazione: Roma 42:00 N, 12:00 E (UT +01:00)



Height in the twilights. The Sun is 18° under the horizon

Date	Morning twilight				Evening twilight			
	Times	Alt	Az	Elong	Times	Alt	Az	Elong
2009:01:01	06:00	-30.8	91.1	18.1	18:32	-3.3	244.9	17.6
2009:01:05	06:00	-28.4	92.9	14.9	18:35	-5.8	247.4	14.5
2009:01:09	06:00	-26.1	94.6	11.8	18:38	-8.3	250.0	11.4
2009:01:13	05:59	-23.9	96.2	8.6	18:42	-10.9	252.7	8.2
2009:01:17	05:58	-21.8	97.7	5.5	18:46	-13.6	255.3	5.1
2009:01:21	05:56	-19.8	99.2	2.4	18:50	-16.4	258.0	2.0
2009:01:25	05:54	-17.9	100.5	0.9	18:55	-19.2	260.7	1.3
2009:01:29	05:51	-16.1	101.7	3.9	18:59	-22.1	263.4	4.3
2009:02:02	05:48	-14.4	102.9	7.0	19:03	-24.9	266.2	7.4
2009:02:06	05:44	-12.8	104.0	10.1	19:08	-27.8	269.1	10.5
2009:02:10	05:40	-11.3	105.0	13.2	19:13	-30.8	272.1	13.7
2009:02:14	05:35	-9.8	105.9	16.3	19:17	-33.7	275.2	16.8
2009:02:18	05:30	-8.5	106.9	19.4	19:22	-36.6	278.5	19.9
2009:02:22	05:25	-7.1	107.7	22.6	19:26	-39.5	282.0	23.0
2009:02:26	05:19	-5.9	108.5	25.7	19:31	-42.4	285.7	26.1
2009:03:02	05:13	-4.7	109.3	28.8	19:36	-45.2	289.6	29.3
2009:03:06	05:06	-3.5	110.1	31.9	19:41	-48.0	294.0	32.4
2009:03:10	04:59	-2.4	110.8	35.0	19:45	-50.6	298.7	35.5
2009:03:14	04:52	-1.3	111.5	38.2	19:50	-53.2	304.0	38.7
2009:03:18	04:45	-0.2	112.2	41.3	19:55	-55.6	309.9	41.8
2009:03:22	04:37	0.8	112.9	44.5	20:00	-57.8	316.5	45.0
2009:03:26	04:30	1.8	113.5	47.6	20:05	-59.7	323.9	48.2
2009:03:30	04:22	2.8	114.2	50.8	20:11	-61.3	332.2	51.3
2009:04:03	04:14	3.8	114.9	54.0	20:16	-62.4	341.2	54.6
2009:04:07	04:06	4.8	115.6	57.2	20:22	-63.0	350.9	57.8
2009:04:11	03:58	5.8	116.3	60.5	20:28	-63.1	0.9	61.0
2009:04:15	03:50	6.8	117.1	63.7	20:34	-62.5	11.0	64.3
2009:04:19	03:42	7.8	117.9	67.0	20:40	-61.3	20.7	67.6
2009:04:23	03:35	8.8	118.8	70.3	20:46	-59.6	29.7	70.9
2009:04:27	03:27	9.9	119.7	73.6	20:52	-57.4	37.9	74.2
2009:05:01	03:19	11.0	120.7	76.9	20:59	-54.7	45.3	77.6
2009:05:05	03:12	12.1	121.8	80.3	21:06	-51.7	52.0	80.9
2009:05:09	03:05	13.3	123.0	83.7	21:12	-48.5	58.0	84.4
2009:05:13	02:58	14.5	124.3	87.2	21:19	-45.0	63.4	87.8
2009:05:17	02:51	15.8	125.7	90.6	21:26	-41.4	68.2	91.3
2009:05:21	02:45	17.1	127.4	94.2	21:32	-37.7	72.7	94.8
2009:05:25	02:40	18.5	129.2	97.7	21:38	-33.9	76.9	98.4
2009:05:29	02:35	20.0	131.2	101.3	21:44	-30.1	80.7	102.0
2009:06:02	02:31	21.5	133.5	104.9	21:49	-26.3	84.4	105.7
2009:06:06	02:27	23.1	136.2	108.6	21:54	-22.6	87.8	109.4
2009:06:10	02:25	24.7	139.1	112.4	21:58	-19.0	91.0	113.1
2009:06:14	02:24	26.4	142.5	116.1	22:01	-15.5	94.1	116.9
2009:06:18	02:23	28.1	146.3	120.0	22:03	-12.2	97.1	120.8
2009:06:22	02:24	29.6	150.5	123.8	22:04	-9.1	99.9	124.6
2009:06:26	02:26	31.1	155.3	127.8	22:04	-6.2	102.5	128.6
2009:06:30	02:28	32.4	160.5	131.8	22:03	-3.4	105.1	132.6

Date	Morning twilight				Evening twilight			
	Times	Alt	Az	Elong	Times	Alt	Az	Elong
2009:07:01	02:29	32.6	161.9	132.8	22:03	-2.8	105.7	133.6
2009:07:05	02:33	33.5	167.7	136.8	22:00	-0.3	108.2	137.6
2009:07:09	02:37	34.1	173.9	140.9	21:57	2.0	110.6	141.7
2009:07:13	02:42	34.2	180.3	145.0	21:53	4.1	112.9	145.8
2009:07:17	02:48	33.8	187.0	149.2	21:48	6.1	115.1	150.0
2009:07:21	02:54	32.8	193.6	153.4	21:43	8.0	117.3	154.2
2009:07:25	03:00	31.4	200.2	157.6	21:37	9.8	119.5	158.5
2009:07:29	03:07	29.5	206.5	161.9	21:30	11.4	121.7	162.7
2009:08:02	03:13	27.1	212.6	166.2	21:24	12.9	123.8	167.0
2009:08:06	03:19	24.3	218.3	170.5	21:16	14.4	125.9	171.3
2009:08:10	03:26	21.2	223.7	174.8	21:09	15.8	128.1	175.6
2009:08:14	03:32	17.8	228.7	178.7	21:01	17.1	130.2	178.9
2009:08:18	03:38	14.2	233.5	176.2	20:53	18.3	132.4	175.4
2009:08:22	03:44	10.4	237.9	171.9	20:45	19.5	134.6	171.1
2009:08:26	03:50	6.5	242.1	167.5	20:37	20.6	136.7	166.8
2009:08:30	03:56	2.5	246.0	163.2	20:29	21.7	138.9	162.4
2009:09:03	04:02	-1.6	249.8	158.8	20:21	22.7	141.2	158.1
2009:09:07	04:07	-5.7	253.4	154.5	20:13	23.7	143.4	153.8
2009:09:11	04:12	-9.9	257.0	150.2	20:05	24.6	145.6	149.5
2009:09:15	04:17	-14.0	260.5	146.0	19:57	25.4	147.9	145.3
2009:09:19	04:22	-18.1	263.9	141.7	19:49	26.2	150.2	141.1
2009:09:23	04:27	-22.2	267.4	137.6	19:42	26.9	152.6	136.9
2009:09:27	04:32	-26.2	270.8	133.4	19:34	27.6	154.9	132.8
2009:10:01	04:36	-30.2	274.4	129.3	19:27	28.3	157.3	128.7
2009:10:05	04:41	-34.0	278.2	125.2	19:20	28.9	159.7	124.6
2009:10:09	04:45	-37.8	282.1	121.2	19:13	29.4	162.2	120.6
2009:10:13	04:50	-41.5	286.2	117.2	19:07	29.9	164.7	116.6
2009:10:17	04:54	-45.0	290.7	113.3	19:01	30.4	167.3	112.7
2009:10:21	04:58	-48.4	295.6	109.4	18:55	30.8	169.9	108.8
2009:10:25	05:03	-51.5	301.0	105.5	18:49	31.1	172.6	105.0
2009:10:29	05:07	-54.5	307.0	101.7	18:44	31.3	175.4	101.2
2009:11:02	05:11	-57.1	313.7	97.9	18:40	31.5	178.2	97.4
2009:11:06	05:16	-59.4	321.2	94.2	18:36	31.6	181.2	93.7
2009:11:10	05:20	-61.3	329.4	90.5	18:32	31.7	184.2	90.0
2009:11:14	05:24	-62.7	338.5	86.9	18:29	31.6	187.3	86.4
2009:11:18	05:28	-63.6	348.0	83.3	18:26	31.4	190.5	82.8
2009:11:22	05:33	-63.8	357.8	79.7	18:24	31.1	193.8	79.2
2009:11:26	05:36	-63.5	7.4	76.2	18:22	30.7	197.2	75.7
2009:11:30	05:40	-62.7	16.4	72.7	18:21	30.1	200.6	72.2
2009:12:04	05:44	-61.4	24.7	69.2	18:21	29.3	204.1	68.8
2009:12:08	05:47	-59.7	32.2	65.8	18:21	28.5	207.7	65.3
2009:12:12	05:50	-57.7	38.8	62.4	18:21	27.4	211.3	61.9
2009:12:16	05:53	-55.6	44.5	59.0	18:23	26.2	214.9	58.6
2009:12:20	05:55	-53.3	49.6	55.6	18:24	24.8	218.5	55.2
2009:12:24	05:57	-50.9	54.0	52.3	18:26	23.2	222.0	51.9
2009:12:28	05:59	-48.5	57.8	49.0	18:29	21.5	225.6	48.6

Eliacal date for Jupiter
Location : Rome
Latitude : 42° 00' 00'' N
Longitude : 12° 00' 00'' E
Visibility [°] = 10.5 + 1.4 * magnitude
Critical height : 0.00°

	Date	obj s/t	Sun s/t	d s/t	age	Mag
last evening visibility	2009-01-11	17:47	17:01	0:46h	-12d 14h	-1.5
first morning visibility	2009-02-15	06:25	07:08	-0:42h	21d 22h	-1.5

Legenda:

Obj s/t : rising and setting of the planet

Sun s/t : sunrise and sunset

D s/t : difference in hours and minutes between the instants of the rising or the setting of the two objects

Age : days from the conjunction with the Sun

Mag : magnitude

	Date	obj s/t	Sun s/t	Sun alt	Sun lon	obj lon	obj lat	Mag	d az	d lon
LE	01-11	17:47	17:01	-8° 33'	291° 36'	301° 25'	-0° 25'	-1.5	-5° 40'	9° 48'
FM	02-15	06:25	07:08	-8° 34'	326° 40'	309° 32'	-0° 29'	-1.5	15° 11'	-17° 07'

Legenda:

Date : date in the format month/day

Obj s/t : rising and setting of the planet

Sun s/t : sunrise and sunset

Sun alt : height of the Sun in the instant of visibility of the planet

Sun lon : celestial longitude of the Sun

Obj lon : celestial longitude of the planet

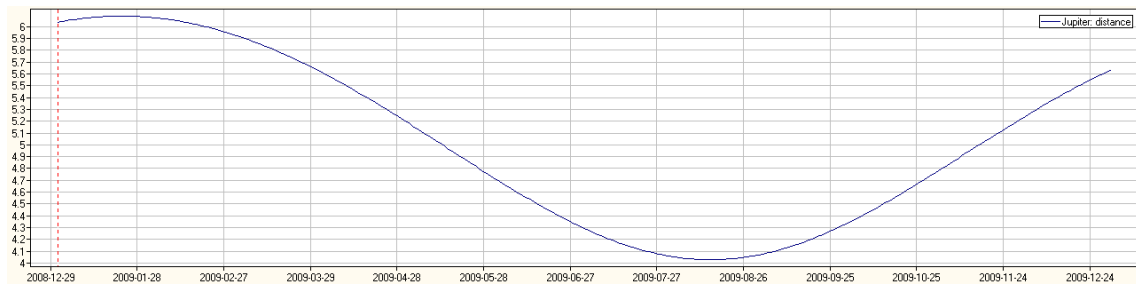
Obj lat : Celestial latitude of the planet

Mag : magnitude

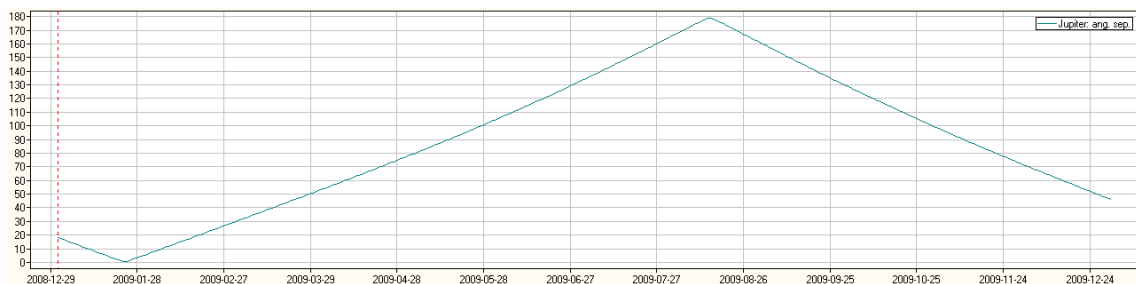
D az : difference in azimuth between the centers of the Sun and the planet in the instant of its visibility

D lon : difference in longitude between the centers of the Sun and the planet in the instant of its visibility

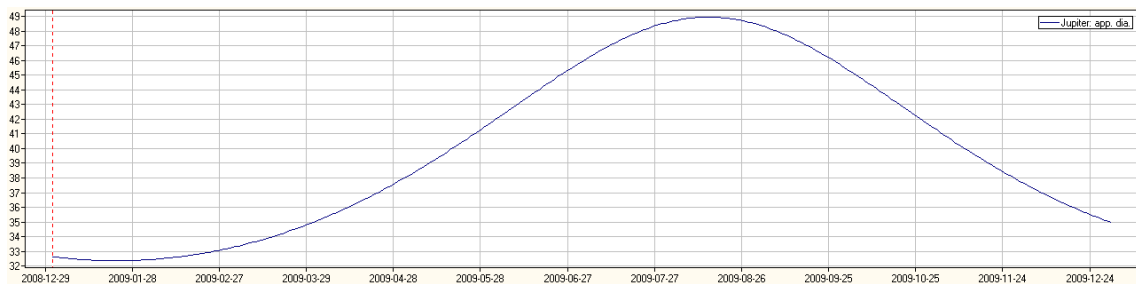
© (3)



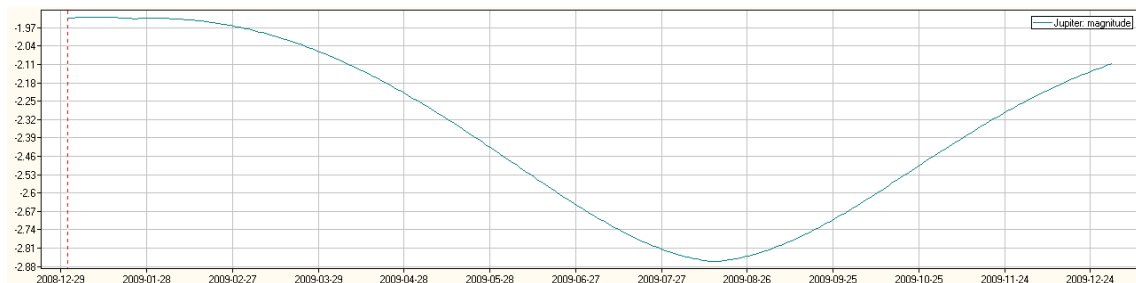
Distance of Jupiter in A.U. during the year



Elongation of Jupiter in ° during the year



Diameter of Jupiter in " during the year



Magnitude of Jupiter during the year

COORDINATES OF THE MOONS OF JUPITER

	I:x	I:y	I:z	II:x	II:y	II:z	III:x	III:y	III:z	IV:x	IV:y	IV:z
01/01/2009	-1.8112	0.0931	-5.6015	0.0310	0.2204	-9.4850	-14.8251	0.0297	-2.2793	-18.5083	0.2226	-18.7431
02/01/2009	-0.5887	-0.0983	5.9008	9.2654	0.0188	1.6176	-7.7876	0.2436	-12.8281	-10.4324	0.3218	-24.2519
03/01/2009	2.8517	0.0862	-5.1464	-3.5284	-0.2189	8.6082	4.8323	0.2815	-14.2058	-0.9209	0.3762	-26.4447
04/01/2009	-4.6586	-0.0620	3.6610	-7.7869	0.0749	-5.3210	13.9861	0.1188	-5.4268	8.7169	0.3795	-25.0474
05/01/2009	5.7161	0.0262	-1.4474	6.5730	0.1947	-6.8298	13.1154	-0.1256	7.2344	17.1737	0.3325	-20.2716
06/01/2009	-5.8497	0.0107	-0.8383	5.3843	-0.1403	7.6238	2.8461	-0.2766	14.7020	23.3109	0.2426	-12.7720
07/01/2009	4.9978	-0.0479	3.1627	-8.6418	-0.1311	3.5536	-9.4614	-0.2281	11.6052	26.3113	0.1226	-3.5598
08/01/2009	-3.3969	0.0743	-4.8126	-1.9298	0.1966	-9.2846	-14.9903	-0.0176	0.1715	25.7718	-0.0111	6.1289
09/01/2009	1.1767	-0.0902	5.8111	9.4090	0.0629	-0.3453	-9.7737	0.2027	-11.3880	21.7582	-0.1406	14.9903
10/01/2009	1.1898	0.0898	-5.7609	-1.6410	-0.2121	9.1576	2.4496	0.2758	-14.8044	14.7970	-0.2488	21.8121
11/01/2009	-3.3720	-0.0764	4.8749	-8.7144	0.0283	-3.5843	12.9165	0.1519	-7.6394	5.8190	-0.3216	25.6456
12/01/2009	5.0257	0.0492	-3.0777	5.0203	0.2052	-8.0441	14.1277	-0.0776	4.9888	-3.9565	-0.3496	25.9369
13/01/2009	-5.8391	-0.0169	0.9314	6.8673	-0.0983	6.3307	5.2164	-0.2478	14.0362	-13.1860	-0.3297	22.6223
14/01/2009	5.7063	-0.0201	1.5408	-7.6983	-0.1582	5.2815	-7.4314	-0.2386	12.9975	-20.5810	-0.2653	16.1457
15/01/2009	-4.6767	0.0505	-3.5883	-3.8086	0.1652	-8.6821	-14.7549	-0.0594	2.6190	-25.1042	-0.1660	7.4074
16/01/2009	2.8375	-0.0744	5.2035	9.1406	0.1008	-2.2972	-11.5029	0.1595	-9.6406	-26.1191	-0.0459	-2.3668
17/01/2009	-0.5804	0.0842	-5.8539	0.3206	-0.1957	9.2988	-0.0083	0.2617	-15.0085	-23.4917	0.0781	-11.8126
18/01/2009	-1.7844	-0.0816	5.6546	-9.2600	-0.0160	-1.6914	11.4921	0.1766	-9.6551	-17.6005	0.1890	-19.6220
19/01/2009	3.8816	0.0646	-4.4298	3.2476	0.2053	-8.9113	14.7588	-0.0321	2.5995	-9.2776	0.2723	-24.7349
20/01/2009	-5.3051	-0.0393	2.6189	8.0482	-0.0547	4.7544	7.4487	-0.2139	12.9868	0.3172	0.3176	-26.4736
21/01/2009	5.9030	0.0061	-0.2184	-6.4140	-0.1757	6.7746	-5.1997	-0.2399	14.0391	9.8701	0.3200	-24.6289
22/01/2009	-5.5348	0.0250	-2.0395	-5.5216	0.1286	-7.7033	-14.1221	-0.0946	4.9986	18.0866	0.2804	-19.4685
23/01/2009	4.2449	-0.0536	4.1323	8.4714	0.1311	-4.1508	-12.9226	0.1157	-7.6313	23.8668	0.2053	-11.6942
24/01/2009	-2.2978	0.0712	-5.4168	2.2691	-0.1711	9.0247	-2.4644	0.2403	-14.8059	26.4353	0.1052	-2.3511
25/01/2009	-0.0382	-0.0783	5.9306	-9.3989	-0.0561	0.2744	9.7591	0.1923	-11.4050	25.4460	-0.0060	7.3088
26/01/2009	2.3873	0.0715	-5.3808	1.3334	0.1957	-9.3925	14.9901	0.0090	0.1460	21.0215	-0.1136	15.9787
27/01/2009	-4.2966	-0.0548	4.0724	8.8734	-0.0120	2.9662	9.4776	-0.1767	11.5892	13.7438	-0.2035	22.4725
28/01/2009	5.5699	0.0279	-1.9561	-4.8461	-0.1831	7.9656	-2.8282	-0.2328	14.7032	4.5893	-0.2641	25.8786
29/01/2009	-5.8942	0.0007	-0.3069	-6.9938	0.0890	-6.3906	-13.1085	-0.1222	7.2483	-5.1965	-0.2879	25.7027
30/01/2009	5.2728	-0.0306	2.6935	7.4310	0.1525	-5.8242	-13.9971	0.0733	-5.4102	-14.2603	-0.2724	21.9469
31/01/2009	-3.8065	0.0530	-4.4901	4.1155	-0.1403	8.3480	-4.8599	0.2132	-14.2016	-21.3396	-0.2206	15.1217
01/02/2009	1.7104	-0.0677	5.6788	-9.1251	-0.0898	2.2251	7.7590	0.1992	-12.8468	-25.4396	-0.1403	6.1797
02/02/2009	0.6789	0.0702	-5.8450	-0.6385	0.1776	-9.4671	14.8154	0.0445	-2.3096	-25.9878	-0.0431	-3.6275
03/02/2009	-2.9053	-0.0624	5.1621	9.3066	0.0275	1.0460	11.2493	-0.1381	9.8800	-22.9164	0.0573	-12.9294
04/02/2009	4.7373	0.0435	-3.5159	-3.0658	-0.1810	8.8009	-0.3816	-0.2183	14.9691	-16.6673	0.1475	-20.4463
05/02/2009	-5.7242	-0.0198	1.4528	-8.1598	0.0487	-4.8031	-11.7407	-0.1416	9.2984	-8.1210	0.2158	-25.1603
06/02/2009	5.8298	-0.0082	1.0170	6.0663	0.1646	-7.2438	-14.6884	0.0341	-3.0490	1.5402	0.2539	-26.4516
07/02/2009	-4.9703	0.0323	-3.1590	5.7780	-0.1054	7.2996	-7.1146	0.1821	-13.2173	10.9925	0.2579	-24.1678
08/02/2009	3.3052	-0.0521	4.9232	-8.4519	-0.1159	4.0740	5.5577	0.1978	-13.9399	18.9597	0.2286	-18.6330
09/02/2009	-1.0885	0.0618	-5.7816	-2.5803	0.1527	-9.1328	14.2450	0.0733	-4.6982	24.3719	0.1708	-10.5986
10/02/2009	-1.2571	-0.0623	5.7919	9.3296	0.0619	-0.9193	12.7192	-0.0999	7.9066	26.5035	0.0929	-1.1396
11/02/2009	3.4813	0.0518	-4.7575	-1.1529	-0.1700	9.2444	2.0774	-0.1978	14.8319	25.0620	0.0056	8.4714
12/02/2009	-5.0426	-0.0346	3.0812	-8.9698	0.0101	-3.0109	-10.0540	-0.1529	11.0994	20.2292	-0.0796	16.9327
13/02/2009	5.8673	0.0110	-0.7468	4.4391	0.1674	-8.3477	-14.9818	-0.0004	-0.6047	12.6463	-0.1516	23.0792
14/02/2009	-5.6858	0.0121	-1.5455	7.1818	-0.0689	5.9289	-9.1735	0.1488	-11.8785	3.3311	-0.2015	26.0472
15/02/2009	4.6051	-0.0339	3.7330	-7.4107	-0.1335	5.7397	3.2128	0.1891	-14.6575	-6.4420	-0.2232	25.4007
16/02/2009	-2.7549	0.0485	-5.1985	-4.4078	0.1229	-8.4061	13.2943	0.0947	-6.9568	-15.3210	-0.2148	21.2081
17/02/2009	0.5002	-0.0556	5.9080	8.9435	0.0895	-2.8424	13.8447	-0.0640	5.7233	-22.0641	-0.1782	14.0467
18/02/2009	1.9162	0.0530	-5.5707	0.8057	-0.1517	9.2779	4.4728	-0.1728	14.2932	-25.7272	-0.1192	4.9157
19/02/2009	-3.9133	-0.0428	4.4337	-9.3900	-0.0247	-1.0939	-8.1046	-0.1561	12.5922	-25.8003	-0.0465	-9.4036
20/02/2009	5.3839	0.0251	-2.4401	2.6216	0.1616	-0.9898	-14.8733	-0.0291	1.8431	-22.2818	0.0298	-14.0440
21/02/2009	-5.8913	-0.0053	0.2042	8.2666	-0.0328	4.2986	-10.9796	0.1152	-10.2311	-15.6785	0.0996	-21.2468
22/02/2009	5.4962	-0.0158	2.2160	-6.0500	-0.1425	7.1492	0.7893	0.1742	-14.9859	-6.9163	0.1541	-25.5419
23/02/2009	-4.1710	0.0326	-4.1507	-6.0414	0.0904	-7.3212	11.9916	0.1085	-9.0283	2.7919	0.1870	-26.3678
24/02/2009	2.2102	-0.0443	5.5031	8.1680	0.1095	-4.6390	14.6003	-0.0317	3.3871	12.1229	0.1950	-23.6325
25/02/2009	0.1840	0.0480	-5.8849	2.7234	-0.1277	8.9026	6.7472	-0.1450	13.3694	19.8141	0.1783	-17.7202
26/02/2009	-2.4400	-0.0444	5.3917	-9.4050	-0.0542	0.8634	-5.9410	-0.1521	13.7432	24.8334	0.1400	-9.4285
27/02/2009	4.4251	0.0332	-3.9127	0.6956	0.1483	-9.4404	-14.3684	-0.0512	4.2334	26.5062	0.0858	0.1297
28/02/2009	-5.5724	-0.0181	1.9326	8.9863	0.0006	2.4835	-12.4885	0.0830	-8.3190	24.5974	0.0232	9.6709
01/03/2009	5.9021	-0.0002	0.5084	-4.4318	-0.1430	8.2426	-1.6482	0.1545	-14.9175	19.3516	-0.0397	17.8957
02/03/2009	-5.2115	0.0167	-2.7353	-7.4123	0.0573	-5.9279	10.3741	0.1148	-10.8522	11.4636	-0.0949	23.6665
03/03/2009	3.7226	-0.0305	4.6167	7.0408	0.1215	-6.2309	14.9622	-0.0044	0.9733	2.0013	-0.1359	26.1676
04/03/2009	-1.5596	0.0385	-5.6752	4.5149	-0.1001	8.1389	8.8271	-0.1162	12.0962	-7.7391	-0.1578	25.0259
05/03/2009	-0.7556	-0.0402	5.8738	-9.0178	-0.0772	2.7757	-3.6357	-0.1419	14.5236	-16.4029	-0.1588	20.3829
06/03/2009	3.0789	0.0352	-5.0355	-1.2552	0.1292	-9.3880	-13.4901	-0.0663	6.4998	-22.7761	-0.1396	12.8794
07/03/2009	-4.7619	-0.0254	3.4865	9.3128	0.0297	0.5656	-13.6652	0.0537	-6.1967	-25.9664	-0.1035	3.5710
08/03/2009	5.7906	0.0114	-1.2382	-2.6301	-0.1360	8.9745	-4.0374	0.1317	-14.4591	-25.5320	-0.0561	-6.2381
09/03/2009	-5.7871	0.0030	-1.0811	-8.4638	0.0256	-4.2897	8.4850	0.1142	-12.3877	-21.5473	-0.0037	-15.1826
10/03/2009	4.9066	-0.0167	3.3306	5.6144	0.1255	-7.5514	14.9267	0.0172	-1.4610	-14.5801	0.0468	-22.0348
11/03/2009	-3.1595	0.0266	-4.9643	6.1033	-0.0710	7.0245	10.6653	-0.0880	10.5077	-5.6092	0.0893	-25.8749
12/03/2009	0.9903	-0.0320	5.8421	-8.2497	-0.0930	4.5605	-1.2473	-0.1268	14.9183	4.1292	0.1191	-26.2025
13/03/2009	1.4671	0.0319	-5.7121	-3.1456	0.1060	-8.9398	-12.2646	-0.0745	8.5855	13.3083	0.1334	-22.9943
14/03/2009	-3.5363	-0.0270	4.7308	9.2363	0.0532	-1.3700	-14.4791	0.0284	-3.9231	20.6878	0.1314	-16.6904
15/03/2009	5.1755	0.0178	-2.8706	-0.7246	-0.1227	9.3175	-6.3056	0.1073	-13.6257	25.2747	0.1141	-8.1418
16/03/2009	-5.8515	-0.0070	0.6634	-9.1551	-0.0029	-2.4791	6.3892	0.1075	-13.5877	26.4462	0.0845	1.5052
17/03/2009	5.6622	-0.0047	1.7606	3.9547	0.1222	-8.5468	14.5040	0.0324	-3.8367	24.0357	0.0465	10.9482
18/03/2009	-4.4757	0.0146	-3.8196	7.4216	-0.0422	5.6126	12.2147	-0.0620	8.6596	18.3510	0.0050	18.8959
19/03/2009	2.6452	-0.0216	5.3047	-7.1382	-0.1014	6.1435	1.1592	-0.1084	14.9261	10.1524	-0.0352	24.2424
20/03/2009	-0.2664	0.0247	-5.8875	-4.8967	0.0805	-8.1198	-10.7289	-0.0762	10.4417	0.5537	-0.0693	26.2235
21/03/2009	-2.0071	-0.0238	5.5601	8.7658	0.0703	-3.2391	-1					

	I:x	I:y	I:z	II:x	II:y	II:z	III:x	III:y	III:z	IV:x	IV:y	IV:z
02/04/2009	5.1382	-0.0027	2.9605	-4.1069	-0.0982	8.4582	5.7815	-0.0672	13.8115	26.2950	0.0895	3.0266
03/04/2009	-3.4940	0.0067	-4.7394	-7.7039	0.0301	-5.5402	-6.9125	-0.0630	13.2803	23.3268	0.0752	12.3292
04/04/2009	1.4054	-0.0090	5.7504	6.7632	0.0846	-6.4706	-14.6420	-0.0151	3.1840	17.1706	0.0531	19.9406
05/04/2009	1.0723	0.0098	-5.8065	4.7845	-0.0616	8.0064	-11.8565	0.0401	-9.2058	8.6520	0.0256	24.7928
06/04/2009	-3.2003	-0.0090	4.9557	-8.9135	-0.0579	3.1883	-0.5554	0.0634	-15.0003	-1.0648	-0.0045	26.1902
07/04/2009	4.9684	0.0072	-3.2277	-1.6613	0.0811	-9.2929	11.1458	0.0410	-10.0576	-10.6321	-0.0343	23.9141
08/04/2009	-5.7909	-0.0049	1.0448	9.3067	0.0259	0.2867	14.8411	-0.0081	2.0912	-18.7131	-0.0605	18.2733
09/04/2009	5.7718	0.0025	1.3644	-2.3235	-0.0886	9.1034	7.8771	-0.0474	12.7327	-24.1713	-0.0806	10.0579
10/04/2009	-4.7125	-0.0004	-3.5273	-8.6529	0.0083	-3.8983	-4.7466	-0.0505	14.1989	-26.2437	-0.0921	0.4264
11/04/2009	2.9955	-0.0010	5.1093	5.3283	0.0826	-7.7039	-13.9586	-0.0181	5.4302	-24.6464	-0.0937	-9.2665
12/04/2009	-0.6425	0.0021	-5.8652	6.2967	-0.0398	6.8735	-13.1401	0.0239	-7.2508	-19.6193	-0.0850	-17.6756
13/04/2009	-1.6434	-0.0026	5.6707	-8.0960	-0.0646	4.8936	-2.8783	0.0454	-14.7339	-11.8763	-0.0668	-23.6508
14/04/2009	3.8363	0.0030	-4.5104	-3.4797	0.0619	-8.7840	9.4523	0.0335	-11.6690	-2.4972	-0.0406	-26.3948
15/04/2009	-5.2464	-0.0033	2.6682	9.1783	0.0392	-1.5920	14.9940	-0.0001	-0.2463	7.2246	-0.0090	-25.5518
16/04/2009	5.9218	0.0038	-0.3368	-0.4614	-0.0753	9.3763	9.7658	-0.0299	11.3480	15.9637	0.0246	-21.2520
17/04/2009	-5.5257	-0.0044	-2.0239	-9.2518	-0.0098	-2.1145	-2.4821	-0.0356	14.7614	22.5336	0.0566	-14.0817
18/04/2009	4.3286	0.0050	4.0461	3.6884	0.0758	-8.6179	-12.9434	-0.0160	7.5224	26.0451	0.0834	-5.0059
19/04/2009	-2.2931	-0.0052	-5.4324	7.5415	-0.0198	5.4714	-14.0950	0.0120	-5.1419	26.0115	0.1017	4.7498
20/04/2009	0.0429	0.0049	5.9085	-6.9659	-0.0657	6.3913	-5.1102	0.0280	-14.1183	22.4239	0.1088	13.8559
21/04/2009	2.3928	-0.0037	-5.4115	-5.1474	0.0427	-7.9319	7.5484	0.0225	-12.9840	15.7556	0.1033	21.0498
22/04/2009	-4.2657	0.0018	4.0595	8.6811	0.0471	-3.3915	14.7843	0.0026	-2.5497	6.9082	0.0851	25.3187
23/04/2009	5.5835	0.0011	-2.0002	1.4014	-0.0597	9.2744	11.3955	-0.0157	9.7100	-2.9009	0.0556	26.0407
24/04/2009	-5.8722	-0.0044	-0.3605	-9.4852	-0.0233	-0.2629	-0.1899	-0.0197	14.9660	-12.3056	0.0179	23.0949
25/04/2009	5.2989	0.0077	2.6565	1.9143	0.0653	-9.1838	-11.6374	-0.0095	9.4119	-19.9816	-0.0237	16.8869
26/04/2009	-3.7427	-0.0104	-4.5523	8.4749	-0.0028	3.8641	-14.7104	0.0050	-2.9355	-24.8501	-0.0643	8.2934
27/04/2009	1.7161	0.0118	5.6582	-5.5768	-0.0621	7.6261	-7.2026	0.0124	-13.1792	-26.2289	-0.0985	-1.4686
28/04/2009	0.7626	-0.0114	-5.8628	-6.6016	0.0247	-6.7795	5.4827	0.0091	-13.9840	-23.9354	-0.1218	-11.0284
29/04/2009	-2.9387	0.0092	5.1072	7.8444	0.0500	-5.0417	14.2279	0.0004	-4.7723	-18.3060	-0.1306	-19.0564
30/04/2009	4.7936	-0.0050	-3.4901	3.1908	-0.0434	8.8115	12.7400	-0.0053	7.8615	-10.1392	-0.1232	-24.4594
01/05/2009	-5.7320	-0.0005	1.3218	-9.3538	-0.0322	1.5808	2.0785	-0.0042	14.8196	-0.5750	-0.0999	-26.5159
02/05/2009	5.8342	0.0067	1.0603	0.0812	0.0525	-9.3886	-10.0796	0.0005	11.0614	9.0715	-0.0630	-24.9643
03/05/2009	-4.8753	-0.0124	-3.3058	9.0678	0.0106	2.1212	-14.9797	0.0027	-0.6883	17.4799	-0.0165	-20.0257
04/05/2009	3.2400	0.0165	4.9503	-3.9898	-0.0548	8.5572	-9.1003	-0.0004	-11.9499	23.5073	0.0339	-12.3709
05/05/2009	-0.9175	-0.0184	-5.8362	-7.7912	0.0090	-5.3805	3.3229	-0.0054	-14.6482	26.3294	0.0820	-3.0351
06/05/2009	-1.3812	0.0173	5.7326	6.7115	0.0484	-6.4805	13.3567	-0.0059	-6.8507	25.5520	0.1215	6.7171
07/05/2009	3.6246	-0.0132	-4.6893	4.8386	-0.0277	8.0159	13.7769	0.0007	5.8635	21.2646	0.1466	15.5441
08/05/2009	-5.1266	0.0066	2.8852	-8.8734	-0.0366	3.3468	4.2696	0.0098	14.3419	14.0384	0.1534	22.2143
09/05/2009	5.9002	0.0017	-0.6095	-1.7380	0.0386	-9.2351	-8.3149	0.0129	12.4439	4.8618	0.1401	25.7762
10/05/2009	-5.6051	-0.0105	-1.8013	9.3068	0.0199	0.3159	-14.9111	0.0049	1.5509	-4.9955	0.1076	25.7081
11/05/2009	4.4953	0.0179	3.8516	-2.2723	-0.0449	9.1577	-10.7740	-0.0098	-10.4661	-14.1501	0.0592	22.0021
12/05/2009	-2.5112	-0.0231	-5.3432	-8.6795	-0.0036	-3.7955	1.1146	-0.0198	-14.9769	-21.3112	0.0010	15.1755
13/05/2009	0.2762	0.0246	5.8945	5.3350	0.0433	-7.6593	12.2007	-0.0155	-8.7477	-25.4664	-0.0595	6.2001
14/05/2009	2.1776	-0.0221	-5.5083	6.2858	-0.0135	6.9288	14.4956	0.0024	3.7654	-26.0367	-0.1141	-3.6524
15/05/2009	-4.1152	0.0157	4.2060	-8.0735	-0.0368	4.9699	6.3364	0.0215	13.5554	-22.9542	-0.1553	-12.9951
16/05/2009	5.5020	-0.0064	-2.2189	-3.4742	0.0249	-8.7408	-6.3933	0.0264	13.5322	-16.6643	-0.1769	-20.5339
17/05/2009	-5.8824	-0.0047	-0.1652	9.1941	0.0252	-1.4813	-14.5166	0.0110	3.7191	-8.0589	-0.1756	-25.2396
18/05/2009	5.3888	0.0153	2.4583	-0.4927	-0.0336	9.4156	-12.1836	-0.0152	-8.7821	1.6631	-0.1508	-26.4854
19/05/2009	-3.8936	-0.0243	-4.4331	-9.2427	-0.0127	-2.0907	-1.0786	-0.0330	-14.9795	11.1581	-0.1052	-24.1181
20/05/2009	1.8998	0.0293	5.5911	3.7761	0.0355	-8.5416	10.8039	-0.0274	-10.4276	19.1265	-0.0442	-18.4661
21/05/2009	0.5727	-0.0299	-5.8912	7.4847	-0.0016	5.6004	14.8965	-0.0001	1.6180	24.4764	0.0244	-10.2989
22/05/2009	-2.7875	0.0254	5.1853	-6.9945	-0.0337	6.3956	8.2419	0.0300	12.4905	26.4711	0.0917	-0.7233
23/05/2009	4.6815	-0.0165	-3.6437	-5.0652	0.0123	-7.9362	-4.3599	0.0400	14.3184	24.8269	0.1484	8.9499
24/05/2009	-5.6958	0.0043	1.4704	8.7459	0.0268	-3.2018	-13.8184	0.0203	5.7792	19.7524	0.1866	17.3833
25/05/2009	5.8599	0.0089	0.8862	1.2811	-0.0220	9.3334	-13.3138	-0.0166	-6.9391	11.9339	0.2004	23.3877
26/05/2009	-4.9611	-0.0216	-3.1869	-9.4723	-0.0184	-0.3319	-3.2123	-0.0441	-14.6703	2.4458	0.1869	26.0987
27/05/2009	3.3640	0.0306	4.8577	2.0989	0.0263	-9.1056	9.2063	-0.0405	-11.8644	-7.3849	0.1471	25.1124
28/05/2009	-1.0620	-0.0354	-5.8189	8.3994	0.0074	4.0892	14.9822	-0.0062	-0.5287	-16.1743	0.0858	20.5535
29/05/2009	-1.2552	0.0340	5.7553	-5.6862	-0.0280	7.5790	9.9431	0.0350	11.1837	-22.6761	0.0108	13.0677
30/05/2009	3.5119	-0.0271	-4.7791	-6.4588	0.0016	-6.8618	-2.2759	0.0526	14.7926	-25.9688	-0.0677	3.7211
31/05/2009	-5.0715	0.0153	2.9783	7.9909	0.0253	-4.7861	-12.8530	0.0317	7.6796	-25.5936	-0.1388	-6.1540
01/06/2009	5.8833	-0.0008	-0.7397	2.9853	-0.0110	8.9267	-14.1540	-0.0143	-4.9932	-21.6153	-0.1924	-15.1680
02/06/2009	-5.6394	-0.0149	-1.7086	-9.3730	-0.0208	1.4151	-5.2433	-0.0524	-14.0753	-14.6096	-0.2209	-22.0702
03/06/2009	4.5614	0.0278	3.7621	0.3690	0.0165	-9.3433	7.4511	-0.0537	-13.0425	-5.5653	-0.2198	-25.9200
04/06/2009	-2.6011	-0.0372	-5.3081	9.0084	0.0134	2.4558	14.7676	-0.0153	-2.6331	4.2518	-0.1887	-26.2062
05/06/2009	0.3593	0.0401	5.8832	-4.2030	-0.0208	8.4882	11.4204	0.0363	9.6710	13.4837	-0.1314	-22.9030
06/06/2009	2.0905	-0.0367	-5.5472	-7.6131	-0.0067	-5.5667	-0.1799	0.0632	14.9623	20.8602	-0.0552	-16.4697
07/06/2009	-4.0689	0.0268	4.2471	6.9685	0.0213	-6.1824	-11.6509	0.0443	9.3938	25.3669	0.0299	-7.7801
08/06/2009	5.4695	-0.0125	-2.2963	4.5637	-0.0014	8.2224	-14.7028	-0.0085	-2.9862	26.3776	0.1125	1.9790
09/06/2009	-5.8875	-0.0048	-0.1159	-8.9616	-0.0204	3.0916	-7.1367	-0.0574	-13.2192	23.7383	0.1811	11.4638
10/06/2009	5.4099	0.0210	2.3962	-1.3509	0.0072	-9.2596	5.5829	-0.0660	-13.9464	17.7999	0.2258	19.3489
11/06/2009	-3.9322	-0.0349	-4.4085	9.3021	0.0166	0.7630	14.2705	-0.0264	-4.6438	9.3705	0.2399	24.5122
12/06/2009	1.9331	0.0425	5.5720	-2.6029	-0.0128	9.1034	12.6456	0.0340	8.0046	-0.3780	0.2206	26.2016
13/06/2009	0.5290	-0.0438	-5.9012	-8.4992	-0.0125	-4.1037	1.8733	0.0713	14.8433	-10.0739	0.1698	24.1536
14/06/2009	-2.7731	0.0373	5.1886	5.7246	0.0159	-7.3506	-10.2556	0.0570	10.8961	-18.3400	0.0941	18.6521
15/06/2009	4.6607	-0.0249	-3.6713	5.9674	0.0063	7.2570	-14.9677	0.0001	-0.9614	-23.9988	0.0037	10.4811
16/06/2009	-5.6986	0.0075	1.4701	-8.2654	-0.0178	4.6435	-8.8655	-0.0589	-12.1327	-26.2481	-0.0888	0.8134
17/06/2009	5.8573	0.0107	0.8680	-3.0031	-0.0011	-8.8709	3.6398	-0.0766	-14.5767	-24.7742	-0.1704	-8.9729
18/06/2009	-4.9631	-0.0285	-3.1964	9.2839	0.0174	-0.9302	13.5142	-0.0387	-6.5348	-19.8020	-0.2295	-17.4976
19/06/2009	3.3520	0.0407	4.8571	-0.9436	-0.0051	9.4167	13.6131	0.0286	6.2193	-12.0459	-0.2575	-23.5787
20/06/2009	-1.0554	-0.0473	-5.8268</									

	I:x	I:y	I:z	II:x	II:y	II:z	III:x	III:y	III:z	IV:x	IV:y	IV:z
08/07/2009	4.7382	-0.0283	-3.5681	-7.0794	-0.0165	-6.1696	-2.1922	-0.0919	-14.8631	10.4500	-0.2067	-24.4325
09/07/2009	-5.7412	0.0077	1.3136	7.5378	0.0108	-5.4864	10.0255	-0.0728	-11.1815	18.6343	-0.1226	-18.9685
10/07/2009	5.8268	0.0130	1.0163	3.8596	0.0124	8.6206	14.9717	-0.0006	0.5784	24.2302	-0.0213	-10.8840
11/07/2009	-4.8787	-0.0330	-3.3374	-9.1645	-0.0157	2.3309	9.0477	0.0722	11.9103	26.4557	0.0833	-1.2921
12/07/2009	3.2022	0.0462	4.9484	-0.4271	-0.0068	-9.3169	-3.4451	0.0925	14.5623	24.9945	0.1764	8.4793
13/07/2009	-0.8907	-0.0529	-5.8595	9.2145	0.0185	1.6859	-13.4418	0.0453	6.6031	20.0341	0.2450	17.0583
14/07/2009	-1.4782	0.0498	5.6940	-3.3984	-0.0005	8.8518	-13.6983	-0.0353	-6.1571	12.2546	0.2792	23.2223
15/07/2009	3.6656	-0.0392	-4.6645	-8.0309	-0.0186	-4.8816	-4.0308	-0.0908	-14.4728	2.7414	0.2737	26.0711
16/07/2009	-5.2025	0.0210	2.7526	6.4875	0.0077	-6.6921	8.5569	-0.0807	-12.3436	-7.1619	0.2290	25.1771
17/07/2009	5.8975	-0.0006	-0.5139	5.2519	0.0155	7.8413	14.9347	-0.0121	-1.2940	-16.0412	0.1513	20.6528
18/07/2009	-5.5679	-0.0215	-1.9705	-8.6465	-0.0139	3.8376	10.4645	0.0651	10.6876	-22.6232	0.0515	13.1459
19/07/2009	4.3706	0.0384	3.9600	-2.0064	-0.0103	-9.1134	-1.6072	0.0947	14.8768	-25.9600	-0.0560	3.7427
20/07/2009	-2.3576	-0.0503	-5.4351	9.3618	0.0183	0.1039	-12.5148	0.0552	8.2159	-25.5795	-0.1559	-6.2007
21/07/2009	0.0378	0.0526	5.8843	-1.8774	0.0029	9.2931	-14.3460	-0.0246	-4.4251	-21.5468	-0.2339	-15.2630
22/07/2009	2.3572	-0.0471	-5.4439	-8.7421	-0.0196	-3.4688	-5.7764	-0.0867	-13.8713	-14.4504	-0.2789	-22.1716
23/07/2009	-4.3180	0.0327	3.9961	5.2615	0.0050	-7.6906	6.9804	-0.0859	-13.3026	-5.3089	-0.2847	-25.9699
24/07/2009	5.5765	-0.0140	-2.0003	6.4804	0.0175	6.8505	14.6712	-0.0231	-3.1233	4.5819	-0.2506	-26.1486
25/07/2009	-5.8814	-0.0083	-0.4820	-7.8928	-0.0122	5.2214	11.7048	0.0561	9.3148	13.8310	-0.1817	-22.6982
26/07/2009	5.2413	0.0277	2.7135	-3.5120	-0.0128	-8.6519	0.2322	0.0939	14.9583	21.1511	-0.0877	-16.1038
27/07/2009	-3.6595	-0.0439	-4.6555	9.2425	0.0177	-1.4636	-11.4113	0.0631	9.6808	25.5211	0.0181	-7.2764
28/07/2009	1.5427	0.0513	5.6805	-0.3199	0.0053	9.4736	-14.7701	-0.0136	-2.6522	26.3290	0.1210	2.5640
29/07/2009	0.9017	-0.0512	-5.8626	-9.2026	-0.0200	-1.9712	-7.4133	-0.0801	-13.0725	23.4511	0.2064	12.0425
30/07/2009	-3.1514	0.0415	4.9667	3.8976	0.0030	-8.4617	5.3198	-0.0884	-14.0511	17.2765	0.2623	19.8207
31/07/2009	4.8916	-0.0260	-3.3484	7.5182	0.0187	5.6801	14.1913	-0.0328	-4.8792	8.6598	0.2807	24.7764
01/08/2009	-5.8052	0.0050	1.0303	-6.9293	-0.0109	6.4512	12.7512	0.0457	7.8247	-1.1895	0.2588	26.1788
02/08/2009	5.7638	0.0153	1.2937	-4.9081	-0.0144	-7.9512	2.0400	0.0902	14.8179	-10.8673	0.1996	23.8045
03/08/2009	-4.7158	-0.0344	-3.5757	8.8665	0.0172	-2.9771	-10.1571	0.0685	10.9856	-18.9860	0.1118	17.9861
04/08/2009	2.9400	0.0462	5.1020	1.2340	0.0069	9.3954	-14.9767	-0.0027	-0.8596	-24.3742	0.0081	9.5652
05/08/2009	-0.6068	-0.0513	-5.8992	-9.4072	-0.0202	-0.4288	-8.9307	-0.0714	-12.0915	-26.2582	-0.0966	-0.2388
06/08/2009	-1.7813	0.0469	5.6057	2.4329	0.0017	-8.9916	3.5906	-0.0879	-14.5915	-24.3734	-0.1871	-10.0093
07/08/2009	3.8909	-0.0356	-4.4752	8.3442	0.0195	4.3624	13.5047	-0.0410	-6.5541	-19.0040	-0.2505	-18.3562
08/08/2009	-5.3486	0.0173	2.4699	-5.7843	-0.0102	7.5000	13.6030	0.0348	6.2290	-10.9320	-0.2781	-24.1098
09/08/2009	5.9090	0.0024	-0.2074	-6.1613	-0.0154	-7.0339	3.8038	0.0840	14.4623	-1.3110	-0.2663	-26.4831
10/08/2009	-5.4622	-0.0229	-2.2666	8.2476	0.0171	-4.4006	-8.7659	0.0715	12.1225	8.4955	-0.2172	-25.1635
11/08/2009	4.1420	0.0379	4.1894	2.7480	0.0078	9.0647	-14.9663	0.0073	0.9346	17.1131	-0.1382	-20.3476
12/08/2009	-2.0729	-0.0477	-5.5548	-9.3553	-0.0206	1.1206	-10.3079	-0.0614	-10.9423	23.3393	-0.0406	-12.7092
13/08/2009	-0.2964	0.0484	5.8748	0.9060	0.0011	-9.2705	1.8240	-0.0848	-14.9162	26.3077	0.0618	-3.3031
14/08/2009	2.6395	-0.0419	-5.3116	8.9412	0.0203	2.9314	12.6299	-0.0470	-8.1200	25.5978	0.1545	6.5629
15/08/2009	-4.5425	0.0274	3.7458	-4.4866	-0.0101	8.3456	14.2549	0.0239	4.5559	21.2962	0.2244	15.5051
16/08/2009	5.6700	-0.0098	-1.6947	-7.2432	-0.0162	-5.9244	5.5061	0.0759	13.9023	13.9949	0.2618	22.2470
17/08/2009	-5.8527	-0.0106	-0.8113	7.4031	0.0175	-5.6998	-7.2522	0.0719	13.0860	4.7104	0.2614	25.8104
18/08/2009	5.0734	0.0276	3.0021	4.1860	0.0084	8.4915	-14.7427	0.0159	2.7183	-5.2434	0.2234	25.6615
19/08/2009	-3.4049	-0.0410	-4.8516	-9.0503	-0.0215	2.6401	-11.5403	-0.0506	-9.6330	-14.4455	0.1534	21.8032
20/08/2009	1.2087	0.0462	5.7575	-0.6465	0.0009	-9.2931	0.0277	-0.0795	-15.0261	-21.5690	0.0617	14.7889
21/08/2009	1.2161	-0.0446	-5.8057	9.2955	0.0214	1.4214	11.5721	-0.0508	-9.5688	-25.5880	-0.0382	5.6350
22/08/2009	-3.4378	0.0347	4.7768	-3.0679	-0.0105	8.9682	14.7025	0.0137	2.8176	-25.9277	-0.1319	-4.3308
23/08/2009	5.0617	-0.0201	-3.0745	-8.1277	-0.0173	-4.6499	7.1320	0.0665	13.1416	-22.5481	-0.2058	-13.6796
24/08/2009	-5.8616	0.0012	0.6989	6.3526	0.0185	-6.8439	-5.6307	0.0699	13.8616	-15.9490	-0.2497	-21.0857
25/08/2009	5.6745	0.0162	1.6148	5.5148	0.0091	7.6886	-14.3047	0.0228	4.4639	-7.0829	-0.2577	-25.5210
26/08/2009	-4.5184	-0.0320	-3.8320	-8.4986	-0.0230	4.0932	-12.6054	-0.0397	-8.1852	2.7839	-0.2293	-26.3864
27/08/2009	2.6385	0.0410	5.2595	-2.1860	0.0007	-9.0576	-1.7700	-0.0723	-14.9218	12.2623	-0.1690	-23.5790
28/08/2009	-0.2909	-0.0440	-5.9246	9.3970	0.0230	-0.1325	10.3461	-0.0523	-10.8857	20.0253	-0.0859	-17.5006
29/08/2009	-2.1027	0.0387	5.4952	-1.5594	-0.0112	9.3517	14.9426	0.0046	1.0286	24.9933	0.0082	-8.9945
30/08/2009	4.1198	-0.0280	-4.2592	-8.7920	-0.0189	-3.2395	8.6700	0.0564	12.1843	26.4749	0.0998	0.7593
31/08/2009	-5.4847	0.0117	2.1685	5.1200	0.0198	-7.8026	-3.9097	0.0660	14.4432	24.2567	0.1760	10.4051
01/09/2009	5.9041	0.0050	0.1141	6.7011	0.0101	6.6721	-13.6517	0.0278	6.1631	18.6383	0.2264	18.5930
02/09/2009	-5.3403	-0.0218	-2.5569	-7.7101	-0.0249	5.4448	-13.4946	-0.0294	-6.6031	10.3934	0.2438	24.1216
03/09/2009	3.9001	0.0335	4.4084	-3.6749	0.0003	-8.5657	-3.5567	-0.0640	-14.5988	0.6788	0.2260	26.2108
04/09/2009	-1.7867	-0.0404	-5.6560	9.2385	0.0253	-1.6924	8.9574	-0.0518	-12.0562	-9.1311	0.1758	24.5296
05/09/2009	-0.6203	0.0396	5.8502	0.0031	-0.0117	9.4822	14.9648	-0.0031	-0.7949	-17.6322	0.1008	19.3078
06/09/2009	2.9001	-0.0330	-5.1702	-9.2152	-0.0212	-1.7255	10.0941	0.0461	11.0342	-23.6009	0.0119	11.2939
07/09/2009	-4.7403	0.0201	3.5016	3.7318	0.0212	-8.5484	-2.1154	0.0605	14.8122	-26.1786	-0.0777	1.6511
08/09/2009	5.7415	-0.0052	-1.4042	7.7123	0.0120	5.4623	-12.7904	0.0309	7.7840	-24.9998	-0.1552	-8.2303
09/09/2009	-5.8121	-0.0114	-1.1042	-6.6994	-0.0272	6.6579	-14.1929	-0.0200	-4.9089	-20.2481	-0.2096	-16.9399
10/09/2009	4.9080	0.0246	3.2542	-5.0728	-0.0009	-7.8240	-5.3119	-0.0551	-14.0576	-12.6146	-0.2334	-23.2551
11/09/2009	-3.1739	-0.0345	-5.0100	8.8170	0.0280	-3.2193	7.4150	-0.0497	-13.0653	-3.1974	-0.2239	-26.3087
12/09/2009	0.9145	0.0376	5.8110	1.5824	-0.0116	9.3495	14.7618	-0.0092	-2.6374	6.6696	-0.1830	-25.6963
13/09/2009	1.4769	-0.0351	-5.7428	-9.3795	-0.0242	-0.1450	11.3895	0.0364	9.6938	15.6033	-0.1170	-21.5238
14/09/2009	-3.6697	0.0261	4.6071	2.2211	0.0222	-9.0547	-0.2571	0.0541	14.9574	22.3630	-0.0357	-14.3753
15/09/2009	5.1893	-0.0138	-2.8401	8.5167	0.0147	4.0846	-11.7183	0.0324	9.3099	26.0137	0.0494	-5.2404
16/09/2009	-5.8948	-0.0016	0.4340	-5.4855	-0.0293	7.6968	-14.6844	-0.0119	-3.1136	26.0456	0.1263	4.6195
17/09/2009	5.5891	0.0153	1.8675	-6.3392	-0.0030	-6.8441	-7.0148	-0.0462	-13.2923	22.4489	0.1842	13.8311
18/09/2009	-4.3579	-0.0271	-4.0204	8.1347	0.0311	-4.6700	5.7306	-0.0464	-13.8885	15.7106	0.2152	21.0951
19/09/2009	2.3995	0.0334	5.3708	3.1366	-0.0107	8.9478	14.3222	-0.0137	-4.4664	6.7631	0.2152	25.3687
20/09/2009	-0.0595	-0.0347	-5.9306	-9.2715	-0.0278	1.4618	12.5224	0.0275	8.1814	-3.1409	0.1843	26.0188
21/09/2009	-2.3368	0.0295	5.4037	0.6246	0.0225	-9.2988	1.6307	0.0473	14.8683	-12.5956	0.1271	22.9351
22/09/2009	4.2752	-0.0203	-4.0949	9.0839	0.0183	2.5704	-10.4461	0.0325	10.7135	-20.2485	0.0523	16.5498
23/09/2009	-5.5720	0.0071	1.9559	-4.0946	-0.0310	8.5256	-14.9544	-0.0051	-1.2363	-25.0025	-0.0293	7.7832
24/09/2009	5.8882	0.0061	0.3371	-7.4328	-0.0062	-5.6445	-8.6424	-0.0378	-12.3008	-26.1758	-0.1058	-2.1010
25/09/2009	-5.2525	-0.0190	-2.7447									

	I:x	I:y	I:z	II:x	II:y	II:z	III:x	III:y	III:z	IV:x	IV:y	IV:z
13/10/2009	0.0096	-0.0279	-5.9282	9.1199	0.0322	-2.3804	-5.5018	0.0289	13.9151	-15.1195	-0.1924	-21.6773
14/10/2009	-2.4148	0.0233	5.3754	0.7789	-0.0291	9.4407	-14.2544	0.0081	4.6352	-6.1474	-0.1872	-25.7564
15/10/2009	4.3114	-0.0156	-4.0466	-9.2877	-0.0213	-1.0340	-12.7237	-0.0181	-8.0023	3.6832	-0.1559	-26.2741
16/10/2009	-5.5970	0.0047	1.9050	3.0935	0.0379	-8.8237	-2.0250	-0.0307	-14.8893	13.0031	-0.1032	-23.1776
17/10/2009	5.8787	0.0061	0.3931	8.1829	0.0055	4.7723	10.1312	-0.0212	-11.0804	20.5282	-0.0367	-16.9049
18/10/2009	-5.2428	-0.0164	-2.7720	-6.0716	-0.0406	7.1933	14.9588	0.0031	0.7086	25.2251	0.0343	-8.3186
19/10/2009	3.6935	0.0234	4.5771	-5.6699	0.0105	-7.3931	8.9556	0.0246	11.9757	26.4515	0.1000	1.4072
20/10/2009	-1.5960	-0.0269	-5.7116	8.5293	0.0363	-3.9967	-3.5325	0.0280	14.5420	24.0313	0.1514	10.9354
21/10/2009	-0.8547	0.0255	5.8276	2.4784	-0.0253	9.1459	-13.4716	0.0112	6.5575	18.2868	0.1814	18.9427
22/10/2009	3.0489	-0.0205	-5.0708	-9.3233	-0.0268	0.6950	-13.6984	-0.0134	-6.1715	10.0007	0.1858	24.2951
23/10/2009	-4.8606	0.0114	3.3575	1.4096	0.0361	-9.2366	-4.0596	-0.0281	-14.4669	0.3179	0.1639	26.2218
24/10/2009	5.7658	-0.0013	-1.2351	8.9150	0.0119	3.1958	8.5025	-0.0226	-12.3758	-9.4066	0.1189	24.4283
25/10/2009	-5.7968	-0.0097	-1.2375	-4.6477	-0.0410	8.1952	14.9196	-0.0011	-1.3814	-17.8007	0.0571	19.1562
26/10/2009	4.8129	0.0184	3.3812	-6.9490	0.0041	-6.2075	10.5461	0.0210	10.6033	-23.6690	-0.0128	11.1530
27/10/2009	-3.0974	-0.0246	-5.0593	7.6378	0.0392	-5.5005	-1.4572	0.0277	14.8931	-26.1804	-0.0808	1.5624
28/10/2009	0.7868	0.0263	5.8342	4.1208	-0.0199	8.5350	-12.4112	0.0145	8.3841	-24.9853	-0.1373	-8.2490
29/10/2009	1.5385	-0.0241	-5.7169	-9.0334	-0.0316	2.4270	-14.4226	-0.0092	-4.1880	-20.2675	-0.1745	-16.9023
30/10/2009	-3.7425	0.0174	4.5651	-0.3485	0.0325	-9.3311	-6.0537	-0.0263	-13.7542	-12.7077	-0.1873	-23.1970
31/10/2009	5.2032	-0.0085	-2.7846	9.3509	0.0182	1.4852	6.6713	-0.0246	-13.4549	-3.3767	-0.1741	-26.2824
01/11/2009	-5.9094	-0.0025	0.4073	-3.0388	-0.0395	8.9264	14.5807	-0.0053	-3.4911	6.4200	-0.1370	-25.7569
02/11/2009	5.5659	0.0124	1.9076	-7.9979	-0.0029	-4.7823	11.9591	0.0178	8.9832	15.3331	-0.0810	-21.7126
03/11/2009	-4.3737	-0.0208	-4.0089	6.4640	0.0404	-6.8309	0.6936	0.0282	14.9452	22.1414	-0.0141	-14.7106
04/11/2009	2.3818	0.0255	5.3808	5.6442	-0.0132	7.6156	-11.0750	0.0183	10.0745	25.9181	0.0547	-5.7045
05/11/2009	-0.1078	-0.0263	-5.9226	-8.4142	-0.0352	4.0984	-14.8659	-0.0050	-2.0813	26.1442	0.1160	4.0777
06/11/2009	-2.3199	0.0224	5.4239	-2.1177	0.0271	-9.0894	-7.9626	-0.0251	-12.7466	22.7807	0.1614	13.2972
07/11/2009	4.2226	-0.0154	-4.1290	9.4607	0.0240	-0.3013	4.6656	-0.0275	-14.2766	16.2761	0.1846	20.6723
08/11/2009	-5.5582	0.0051	2.0349	-1.2968	-0.0359	9.3476	13.9289	-0.0101	-5.5646	7.5132	0.1823	25.1612
09/11/2009	5.8807	0.0054	0.2673	-8.7671	-0.0099	-3.1607	13.1414	0.0149	7.1481	-2.2962	0.1544	26.1109
10/11/2009	-5.3165	-0.0157	-2.6326	5.0395	0.0396	-7.9302	2.8617	0.0295	14.6826	-11.7824	0.1047	23.3683
11/11/2009	3.7996	0.0231	4.4906	6.9857	-0.0057	6.4089	-9.4858	0.0230	11.5797	-19.6059	0.0400	17.3121
12/11/2009	-1.7611	-0.0270	-5.6592	-7.4757	-0.0368	-5.6021	-15.0049	-0.0004	0.1062	-24.6611	-0.0307	8.7991
13/11/2009	-0.6991	0.0263	5.8539	-3.8309	0.0202	8.5461	-9.7403	-0.0243	-11.4500	-26.2345	-0.0977	-0.9577
14/11/2009	2.8924	-0.0217	-5.1537	9.2262	0.0283	-2.1000	2.5177	-0.0313	-14.8100	-24.1151	-0.1514	-10.5802
15/11/2009	-4.7584	0.0129	3.5128	0.5173	-0.0305	9.4299	12.9600	-0.0159	-7.5598	-18.6191	-0.1846	-18.7239
16/11/2009	5.7196	-0.0025	-1.4095	-9.2146	-0.0162	-1.3987	14.0575	0.0115	5.1212	-10.5304	-0.1925	-24.2753
17/11/2009	-5.8401	-0.0090	-1.0331	3.4092	0.0365	-8.7465	5.0038	0.0313	14.0929	-0.9859	-0.1741	-26.4911
18/11/2009	4.9184	0.0188	3.2251	8.0869	0.0018	4.9491	-7.6635	0.0289	12.8566	8.6946	-0.1319	-25.0906
19/11/2009	-3.2863	-0.0259	-4.9359	-6.2417	-0.0363	6.9930	-14.8175	0.0053	2.3288	17.1837	-0.0716	-20.2820
20/11/2009	0.9916	0.0287	5.8077	-5.4174	0.0124	-7.5909	-11.3307	-0.0232	-9.8794	23.3298	-0.0012	-12.7228
21/11/2009	1.3137	-0.0271	-5.7660	8.6429	0.0308	-3.8409	0.2836	-0.0359	-15.0210	26.2967	0.0699	-3.4374
22/11/2009	-3.5642	0.0206	4.7149	2.3360	-0.0234	9.1569	11.6887	-0.0231	-9.4115	25.6745	0.1321	6.3164
23/11/2009	5.0839	-0.0112	-2.9837	-9.3109	-0.0211	0.4396	14.6714	0.0071	2.9536	21.5372	0.1768	15.1999
24/11/2009	-5.8906	-0.0009	0.6632	1.6302	0.0313	-9.2363	7.0652	0.0332	13.1789	14.4359	0.1976	21.9806
25/11/2009	5.6366	0.0125	1.6813	8.8951	0.0087	3.2848	-5.6398	0.0360	13.8654	5.3380	0.1915	25.6978
26/11/2009	-4.5536	-0.0226	-3.8017	-4.7510	-0.0334	8.0899	-14.2925	0.0125	4.5387	-4.5034	0.1587	25.8085
27/11/2009	2.6117	0.0290	5.2771	-6.8090	0.0045	-6.3681	-12.6917	-0.0212	-8.0549	-13.7110	0.1033	22.2806
28/11/2009	-0.3868	-0.0310	-5.9051	7.7211	0.0308	-5.4529	-1.9956	-0.0411	-14.8903	-20.9906	0.0329	15.6043
29/11/2009	-2.0660	0.0277	5.5334	4.0860	-0.0154	8.5270	10.1275	-0.0319	-11.0738	-25.3174	-0.0431	6.7269
30/11/2009	4.0166	-0.0202	-4.3199	-9.0398	-0.0238	2.2809	14.9548	0.0010	0.6879	-26.0880	-0.1142	-3.0979
01/12/2009	-5.4529	0.0086	2.3160	-0.2308	0.0244	-9.3685	8.9924	0.0346	11.9464	-23.2076	-0.1705	-12.4892
02/12/2009	5.8839	0.0040	-0.0155	9.3678	0.0140	1.4753	-3.4563	0.0442	14.5642	-17.0953	-0.2041	-20.1483
03/12/2009	-5.4505	-0.0167	-2.3429	-3.0560	-0.0281	8.8792	-13.4256	0.0217	6.6694	-8.6188	-0.2103	-25.0359
04/12/2009	4.0214	0.0268	4.2965	-7.9409	-0.0027	-4.8787	-13.7690	-0.0178	-6.0219	1.0446	-0.1881	-26.5053
05/12/2009	-2.0670	-0.0328	-5.5494	6.4871	0.0283	-6.8659	-4.2515	-0.0462	-14.4103	10.5655	-0.1403	-24.3773
06/12/2009	-0.3848	0.0334	5.8899	5.6947	-0.0073	7.5543	8.3112	-0.0422	-12.4958	18.6478	-0.0729	-18.9511
07/12/2009	2.6005	-0.0289	-5.2987	-8.4012	-0.0240	4.0491	14.8899	-0.0072	-1.6232	24.1964	0.0051	-10.9660
08/12/2009	-4.5539	0.0190	3.7839	-2.0984	0.0162	-9.1262	10.7347	0.0347	10.4124	26.4584	0.0835	-1.4966
09/12/2009	5.6292	-0.0063	-1.7217	9.4750	0.0172	-0.4093	-1.1566	0.0529	14.9250	25.1194	0.1517	8.1740
10/12/2009	-5.8933	-0.0082	-0.6776	-1.2204	-0.0209	9.3193	-12.2227	0.0331	8.6716	20.3459	0.2003	16.7222
11/12/2009	5.0945	0.0215	2.9416	-8.7586	-0.0084	-3.1766	-14.5280	-0.0120	-3.8162	12.7782	0.2223	22.9585
12/12/2009	-3.5824	-0.0317	-4.7204	4.9827	0.0232	-8.0157	-6.4310	-0.0506	-13.5781	3.4447	0.2140	25.9987
13/12/2009	1.3381	0.0369	5.7442	7.0906	0.0002	6.2697	6.2734	-0.0540	-13.6338	-6.3661	0.1760	25.3984
14/12/2009	0.9521	-0.0364	-5.8291	-7.4119	-0.0214	5.6674	14.4627	-0.0181	-3.9231	-15.2866	0.1129	21.2242
15/12/2009	-3.2624	0.0296	4.9368	-3.8950	0.0078	-8.5089	12.2339	0.0327	8.6050	-22.0647	0.0329	14.0611
16/12/2009	4.8856	-0.0182	-3.2890	9.2022	0.0175	-2.2934	1.1933	0.0617	14.9206	-25.7498	-0.0532	4.9196
17/12/2009	-5.8360	0.0030	1.0546	0.6819	-0.0125	9.3822	-10.7104	0.0466	10.4769	-25.8354	-0.1335	-4.9110
18/12/2009	5.7311	0.0128	1.3244	-9.2185	-0.0117	-1.3292	-14.9390	-0.0035	-1.4993	-22.3220	-0.1970	-14.0601
19/12/2009	-4.7989	-0.0270	-3.4817	3.2636	0.0158	-8.8473	-8.4746	-0.0534	-12.4078	-15.7178	-0.2347	-21.2701
20/12/2009	2.9533	0.0372	5.1002	8.2106	0.0060	4.7184	4.0587	-0.0667	-14.4516	-6.9499	-0.2412	-25.5685
21/12/2009	-0.7883	-0.0416	-5.8579	-6.1054	-0.0159	7.0628	13.6719	-0.0318	-6.1552	2.7676	-0.2153	-26.3943
22/12/2009	-1.6838	0.0391	5.6689	-5.5412	-0.0001	-7.5337	13.4469	0.0279	6.5580	12.1085	-0.1601	-23.6526
23/12/2009	3.7109	-0.0305	-4.5771	8.5512	0.0148	-4.0976	3.5421	0.0696	14.5392	19.8074	-0.0824	-17.7247
24/12/2009	-5.2757	0.0162	2.7041	2.5724	-0.0037	9.0561	-8.9133	0.0620	12.0369	24.8228	0.0076	-9.4084
25/12/2009	5.8679	0.0008	-0.4166	-9.2927	-0.0119	0.5876	-14.9806	0.0084	0.8767	26.4748	0.0981	0.1772
26/12/2009	-5.6060	-0.0183	-1.9358	1.3986	0.0070	-9.3175	-10.3263	-0.0538	-10.9168	24.5276	0.1770	9.7367
27/12/2009	4.3166	0.0334	4.0068	9.0002	0.0092	2.9609	1.7196	-0.0796	-14.9141	19.2314	0.2333	17.9621
28/12/2009	-2.4686	-0.0432	-5.3757	-4.5311	-0.0081	8.1702	12.5260	-0.0483	-8.2494	11.2920	0.2587	23.7063
29/12/2009	0.0472	0.0463	5.9093	-6.9630	-0.0062	-6.2345	14.3244	0.0196	4.3306	1.7924	0.2490	26.1533
30/12/2009	2.2037	-0.0420	-5.4682	7.5416	0.0089	-5.7432	5.8138	0.0758	13.7854	-7.9553	0.2046	24.9399
31/12/2009	-4.2547	0.0305	4.1248</									

MUTUAL PHENOMENA OF THE MOONS OF JUPITER

Ec.D. : beginning of the eclipse
 Ec.R. : ending of the eclipse
 Oc.D. : beginning of the occultation
 Oc.R. : ending of the occultation
 Tr.I. : beginning of the transit
 Tr.E. : ending of the transit
 Sh.I. : beginning of the umbra transit
 Sh.E. : ending of the umbra transit

I : Io
 II : Europa
 III: Ganymede
 IV : Callisto

TIMES IN T.U.

Date	Times	Moon	Phenomena	Phase	h	h Sun							
01/01/09	0.57.34	I	Tr.	I.	-68.2	-61.5	13/01/09	9.38.35	II	Occ.	D.	20.2	22.4
01/01/09	1.21.35	I	Sh.	I.	-66.5	-57.6	13/01/09	10.30.28	I	Tr.	I.	24.8	25.6
01/01/09	1.22.24	II	Tr.	E.	-66.4	-57.5	13/01/09	10.41.44	I	Sh.	I.	25.5	26.0
01/01/09	2.12.47	II	Sh.	E.	-60.2	-48.7	13/01/09	12.18.02	III	Ec.	R.	27.7	25.3
01/01/09	3.14.19	I	Tr.	E.	-50.1	-37.4	13/01/09	12.47.20	I	Tr.	E.	26.8	23.6
01/01/09	3.38.29	I	Sh.	E.	-45.8	-32.9	13/01/09	12.49.38	II	Ec.	R.	26.7	23.4
01/01/09	22.10.19	I	Occ.	D.	-53.7	-66.5	13/01/09	12.58.40	I	Sh.	E.	26.2	22.7
02/01/09	0.51.55	I	Ec.	R.	-68.3	-62.4	14/01/09	7.44.32	I	Occ.	D.	5.5	9.5
02/01/09	13.15.07	III	Tr.	I.	26.4	19.6	14/01/09	10.13.14	I	Ec.	R.	23.7	24.9
02/01/09	14.45.59	III	Sh.	I.	19.8	9.2	15/01/09	4.17.38	II	Tr.	I.	-30.5	-25.6
02/01/09	16.43.54	III	Tr.	E.	4.2	-9.5	15/01/09	4.36.56	II	Sh.	I.	-26.9	-22.0
02/01/09	17.24.39	II	Occ.	D.	-2.0	-16.6	15/01/09	5.00.53	I	Tr.	I.	-22.5	-17.7
02/01/09	18.17.21	III	Sh.	E.	-11.8	-26.1	15/01/09	5.10.18	I	Sh.	I.	-20.8	-16.0
02/01/09	19.27.58	I	Tr.	I.	-24.6	-39.2	15/01/09	7.08.57	II	Tr.	E.	0.6	4.4
02/01/09	19.50.12	I	Sh.	I.	-28.7	-43.3	15/01/09	7.17.47	I	Tr.	E.	1.9	5.7
02/01/09	20.57.20	II	Ec.	R.	-41.2	-55.3	15/01/09	7.27.16	I	Sh.	E.	3.4	7.1
02/01/09	21.44.44	I	Tr.	E.	-49.7	-63.0	15/01/09	7.28.46	II	Sh.	E.	3.6	7.3
02/01/09	22.07.05	I	Sh.	E.	-53.6	-66.0	16/01/09	2.15.12	I	Occ.	D.	-52.2	-48.1
03/01/09	0.00.50	IV	Tr.	I.	-68.0	-68.7	16/01/09	4.42.02	I	Ec.	R.	-25.4	-21.1
03/01/09	3.29.12	IV	Sh.	I.	-46.4	-34.7	16/01/09	22.15.19	III	Tr.	I.	-60.8	-64.6
03/01/09	4.29.23	IV	Tr.	E.	-35.3	-23.6	16/01/09	22.45.49	III	Sh.	I.	-64.6	-67.4
03/01/09	8.05.19	IV	Sh.	E.	3.3	11.7	16/01/09	23.03.14	II	Occ.	D.	-66.2	-68.4
03/01/09	16.40.53	I	Occ.	D.	4.2	-8.8	16/01/09	23.31.18	I	Tr.	I.	-67.8	-68.7
03/01/09	19.20.40	I	Ec.	R.	-23.8	-37.7	16/01/09	23.38.52	I	Sh.	I.	-67.9	-68.5
04/01/09	11.57.47	II	Tr.	I.	27.1	24.7	17/01/09	1.46.27	III	Tr.	E.	-56.4	-53.0
04/01/09	12.39.49	II	Sh.	I.	27.3	22.6	17/01/09	1.48.13	I	Tr.	E.	-56.1	-52.7
04/01/09	13.58.22	I	Tr.	I.	23.6	15.4	17/01/09	1.55.49	I	Sh.	E.	-54.9	-51.4
04/01/09	14.18.47	I	Sh.	I.	21.9	13.0	17/01/09	2.07.01	II	Ec.	R.	-53.0	-49.4
04/01/09	14.48.30	II	Tr.	E.	19.0	9.1	17/01/09	2.18.17	III	Sh.	E.	-51.1	-47.4
04/01/09	15.31.21	II	Sh.	E.	13.8	3.0	17/01/09	20.45.47	I	Occ.	D.	-46.7	-50.8
04/01/09	16.15.08	I	Tr.	E.	7.7	-4.1	17/01/09	23.10.44	I	Ec.	R.	-66.9	-68.4
04/01/09	16.35.41	I	Sh.	E.	4.6	-7.8	18/01/09	17.43.43	II	Tr.	I.	-13.7	-17.4
05/01/09	11.11.32	I	Occ.	D.	25.5	25.5	18/01/09	17.55.20	II	Sh.	I.	-15.8	-19.5
05/01/09	13.49.29	I	Ec.	R.	24.1	16.6	18/01/09	18.01.42	I	Tr.	I.	-17.0	-20.6
06/01/09	3.29.54	III	Occ.	D.	-44.5	-34.6	18/01/09	18.07.25	I	Sh.	I.	-18.0	-21.7
06/01/09	6.49.18	II	Occ.	D.	-8.1	1.0	18/01/09	20.18.38	I	Tr.	E.	-42.3	-45.8
06/01/09	8.17.23	III	Ec.	R.	6.6	13.3	18/01/09	20.24.23	I	Sh.	E.	-43.3	-46.9
06/01/09	8.28.48	I	Tr.	I.	8.3	14.7	18/01/09	20.35.12	II	Tr.	E.	-45.3	-48.8
06/01/09	8.47.24	I	Sh.	I.	11.0	16.8	18/01/09	20.47.15	II	Sh.	E.	-47.4	-50.9
06/01/09	10.14.49	II	Ec.	R.	21.4	24.0	19/01/09	15.16.27	I	Occ.	D.	10.3	7.8
06/01/09	10.45.35	I	Tr.	E.	24.0	25.2	19/01/09	17.39.31	I	Ec.	R.	-13.5	-16.4
06/01/09	11.04.18	I	Sh.	E.	25.3	25.5	19/01/09	20.54.56	IV	Tr.	I.	-49.3	-52.0
07/01/09	5.42.04	I	Occ.	D.	-19.5	-10.6	19/01/09	21.36.41	IV	Sh.	I.	-56.2	-58.7
07/01/09	8.18.12	I	Ec.	R.	7.2	13.5	20/01/09	1.31.31	IV	Tr.	E.	-57.2	-55.2
08/01/09	1.24.37	II	Tr.	I.	-63.6	-57.1	20/01/09	2.16.14	IV	Sh.	E.	-49.8	-47.6
08/01/09	1.59.09	II	Sh.	I.	-58.9	-51.2	20/01/09	12.27.57	II	Occ.	D.	27.1	26.2
08/01/09	2.59.13	I	Tr.	I.	-48.9	-40.3	20/01/09	12.30.38	III	Occ.	D.	26.9	26.1
08/01/09	3.16.00	I	Sh.	I.	-45.9	-37.2	20/01/09	12.32.08	I	Tr.	I.	26.9	26.0
08/01/09	4.15.33	II	Tr.	E.	-35.0	-26.2	20/01/09	12.35.58	I	Sh.	I.	26.7	25.8
08/01/09	4.50.47	II	Sh.	E.	-28.4	-19.7	20/01/09	14.49.05	I	Tr.	E.	13.8	12.0
08/01/09	5.16.02	I	Tr.	E.	-23.7	-15.2	20/01/09	14.52.57	I	Sh.	E.	13.3	11.4
08/01/09	5.32.55	I	Sh.	E.	-20.6	-12.2	20/01/09	15.24.24	II	Ec.	R.	8.8	6.8
09/01/09	0.12.44	I	Occ.	D.	-68.4	-67.2	20/01/09	16.18.30	III	Ec.	R.	0.6	-1.2
09/01/09	2.47.01	I	Ec.	R.	-50.5	-42.5	21/01/09	9.47.00	I	Occ.	D.	23.6	24.3
09/01/09	17.44.40	III	Tr.	I.	-9.5	-19.1	21/01/09	12.08.11	I	Ec.	R.	27.7	27.4
09/01/09	18.45.36	III	Sh.	I.	-20.4	-30.3	22/01/09	7.02.33	I	Tr.	I.	3.0	4.1
09/01/09	20.13.54	II	Occ.	D.	-36.8	-46.6	22/01/09	7.04.32	I	Sh.	I.	3.3	4.4
09/01/09	21.14.38	III	Tr.	E.	-47.9	-57.1	22/01/09	7.10.43	II	Tr.	I.	4.3	5.4
09/01/09	21.29.37	I	Tr.	I.	-50.5	-59.6	22/01/09	7.14.38	II	Sh.	I.	4.9	6.0
09/01/09	21.44.34	I	Sh.	I.	-53.1	-61.8	22/01/09	9.19.32	I	Tr.	E.	21.4	22.1
09/01/09	22.17.30	III	Sh.	E.	-58.4	-66.2	22/01/09	9.21.31	I	Sh.	E.	21.6	22.3
09/01/09	23.32.14	II	Ec.	R.	-67.2	-69.8	22/01/09	10.02.23	II	Tr.	E.	25.1	25.6
09/01/09	23.46.27	I	Tr.	E.	-67.9	-69.2	22/01/09	10.06.37	II	Sh.	E.	25.4	25.9
10/01/09	0.01.30	I	Sh.	E.	-68.3	-68.1	23/01/09	4.17.40	I	Occ.	D.	-25.9	-25.0
10/01/09	18.43.19	I	Occ.	D.	-20.5	-29.7	23/01/09	6.36.57	I	Ec.	R.	-0.3	0.4
10/01/09	21.15.44	I	Ec.	R.	-48.5	-57.2	24/01/09	1.32.57	I	Tr.	I.	-54.9	-54.5
11/01/09	12.02.29	IV	Occ.	D.	27.8	25.5	24/01/09	1.33.04	I	Sh.	I.	-54.9	-54.5
11/01/09	14.50.40	II	Tr.	I.	16.6	10.0	24/01/09	1.52.38	II	Occ.	D.	-51.7	-51.2
11/01/09	15.17.36	II	Sh.	I.	13.1	6.1	24/01/09	2.45.41	III	Sh.	I.	-42.3	-41.9
11/01/09	16.00.02	I	Tr.	I.	7.1	-0.1	24/01/09	2.45.54	III	Tr.	I.	-42.2	-41.8
11/01/09	16.13.08	I	Sh.	I.	5.1	-2.2	24/01/09	3.49.57	I	Tr.	E.	-30.4	-30.0
11/01/09	17.41.47	II	Tr.	E.	-10.0	-18.3	24/01/09	3.50.04	I	Sh.	E.	-30.4	-30.0
11/01/09	18.09.20	II	Sh.	E.	-14.9	-23.3	24/01/09	4.41.46	II	Ec.	R.	-20.8	-20.5
11/01/09	18.16.53	I	Tr.	E.	-16.2	-24.7	24/01/09	6.18.10	III	Tr.	E.	-3.2	-2.7
11/01/09	18.30.05	I	Sh.	E.	-18.6	-27.1	24/01/09	6.18.39	III	Sh.	E.	-3.1	-2.6
11/01/09	18.42.51	IV	Ec.	R.	-21.0	-29.4	24/01/09	22.47.24	I	Ec.	D.	-66.4	-65.7
12/01/09	13.13.59	I	Occ.	D.	25.5	21.3	25/01/09	1.06.29	I	Occ.	R.	-58.5	-58.4
12/01/09	15.44.33	I	Ec.	R.	9.0	2.3	25/01/09	20.01.36	I	Sh.	I.	-42.7	-41.4
13/01/09	8.00.09	III	Occ.	D.	7.4	11.5	25/01/09	20.03.21	I	Tr.	I.	-43.0	-41.7

Date	Times	Moon	Phenomena	Phase	h	h Sun								
25/01/09	20.32.59	II	Sh.	I.	-48.3	-47.0	09/02/09	23.41.46	I	Occ.	R.	-62.6	-62.2	
25/01/09	20.36.47	II	Tr.	I.	-49.0	-47.6	10/02/09	18.18.13	I	Sh.	I.	-31.8	-19.0	
25/01/09	22.18.36	I	Sh.	E.	-64.1	-62.9	10/02/09	18.36.37	I	Tr.	I.	-35.2	-22.4	
25/01/09	22.20.22	I	Tr.	E.	-64.3	-63.1	10/02/09	20.18.45	II	Ec.	D.	-53.3	-41.0	
25/01/09	23.25.03	II	Sh.	E.	-67.5	-66.7	10/02/09	20.35.19	I	Sh.	E.	-55.9	-43.8	
25/01/09	23.28.38	II	Tr.	E.	-67.4	-66.7	10/02/09	20.53.50	I	Tr.	E.	-58.7	-46.9	
26/01/09	17.16.10	I	Ec.	D.	-12.8	-10.8	10/02/09	23.45.19	II	Occ.	R.	-61.8	-61.8	
26/01/09	19.37.09	I	Occ.	R.	-38.7	-36.7	11/02/09	0.45.19	III	Ec.	D.	-53.2	-57.2	
27/01/09	14.30.08	I	Sh.	I.	13.9	16.1	11/02/09	5.36.27	III	Occ.	R.	-0.2	-7.5	
27/01/09	14.33.45	I	Tr.	I.	13.4	15.7	11/02/09	15.34.12	I	Ec.	D.	-1.8	10.4	
27/01/09	15.09.55	II	Ec.	D.	8.2	10.5	11/02/09	18.12.13	I	Occ.	R.	-31.2	-17.7	
27/01/09	16.45.23	III	Ec.	D.	-7.8	-5.1	12/02/09	12.46.43	I	Sh.	I.	21.5	31.5	
27/01/09	16.47.09	I	Sh.	E.	-8.1	-5.4	12/02/09	13.06.57	I	Tr.	I.	19.2	29.8	
27/01/09	16.50.47	I	Tr.	E.	-8.7	-6.1	12/02/09	15.03.51	I	Sh.	E.	2.4	15.4	
27/01/09	18.06.16	II	Occ.	R.	-22.4	-19.7	12/02/09	15.07.08	II	Sh.	I.	1.9	14.9	
27/01/09	20.33.45	III	Occ.	R.	-49.4	-46.7	12/02/09	15.24.11	I	Tr.	E.	-0.6	12.2	
28/01/09	8.12.12	IV	Ec.	D.	15.9	15.3	12/02/09	15.49.07	II	Tr.	I.	-5.6	8.2	
28/01/09	11.44.48	I	Ec.	D.	28.2	29.8	12/02/09	17.59.30	II	Sh.	E.	-29.4	-15.1	
28/01/09	13.34.15	IV	Occ.	R.	20.4	23.0	12/02/09	18.41.40	II	Tr.	E.	-37.2	-23.0	
28/01/09	14.07.42	I	Occ.	R.	16.5	19.2	13/02/09	10.02.54	I	Ec.	D.	29.4	31.5	
29/01/09	8.58.41	I	Sh.	I.	21.7	21.3	13/02/09	12.42.46	I	Occ.	R.	21.7	32.1	
29/01/09	9.04.09	I	Tr.	I.	22.3	21.9	14/02/09	2.18.14	IV	Ec.	D.	-35.1	-42.9	
29/01/09	9.52.15	II	Sh.	I.	26.2	26.5	14/02/09	7.15.12	I	Sh.	I.	15.9	10.6	
29/01/09	10.03.47	II	Tr.	I.	26.9	27.3	14/02/09	7.37.14	I	Tr.	I.	18.7	14.1	
29/01/09	11.15.42	I	Sh.	E.	28.7	30.2	14/02/09	9.32.19	I	Sh.	E.	28.6	29.2	
29/01/09	11.21.13	I	Tr.	E.	28.7	30.2	14/02/09	9.35.57	II	Ec.	D.	28.7	29.5	
29/01/09	12.44.23	II	Sh.	E.	24.9	27.5	14/02/09	9.54.29	I	Tr.	E.	29.3	31.2	
29/01/09	12.55.46	II	Tr.	E.	23.9	26.7	14/02/09	10.30.44	IV	Occ.	R.	29.6	33.7	
30/01/09	6.13.32	I	Ec.	D.	-0.4	-2.6	14/02/09	13.09.56	II	Occ.	R.	18.2	30.2	
30/01/09	8.38.21	I	Occ.	R.	19.9	19.1	14/02/09	14.45.10	III	Sh.	I.	4.5	18.7	
31/01/09	3.27.11	I	Sh.	I.	-30.6	-33.4	14/02/09	16.16.44	III	Tr.	I.	-11.5	4.1	
31/01/09	3.34.31	I	Tr.	I.	-29.2	-32.0	14/02/09	18.19.27	III	Sh.	E.	-34.1	-18.4	
31/01/09	4.27.09	II	Ec.	D.	-19.5	-22.3	14/02/09	19.51.52	III	Tr.	E.	-50.7	-35.3	
31/01/09	5.44.13	I	Sh.	E.	-5.6	-8.2	15/02/09	4.31.31	I	Ec.	D.	-10.0	-18.6	
31/01/09	5.51.36	I	Tr.	E.	-4.2	-6.9	15/02/09	7.13.13	I	Occ.	R.	16.1	10.5	
31/01/09	6.46.11	III	Sh.	I.	5.0	2.9	16/02/09	1.43.40	I	Sh.	I.	-40.3	-47.9	
31/01/09	7.17.10	III	Tr.	I.	9.7	7.8	16/02/09	2.07.31	I	Tr.	I.	-35.9	-44.1	
31/01/09	7.31.07	II	Occ.	R.	11.7	9.9	16/02/09	4.00.49	I	Sh.	E.	-15.0	-24.0	
31/01/09	10.19.36	III	Sh.	E.	28.0	28.8	16/02/09	4.24.48	I	Tr.	E.	-10.6	-19.6	
31/01/09	10.50.26	III	Tr.	E.	28.8	30.2	16/02/09	4.25.23	II	Sh.	I.	-10.5	-19.5	
01/02/09	0.42.12	I	Ec.	D.	-58.7	-60.2	16/02/09	5.14.48	II	Tr.	I.	-1.0	-10.3	
01/02/09	3.08.55	I	Occ.	R.	-33.4	-36.6	16/02/09	7.17.49	II	Sh.	E.	17.1	11.5	
01/02/09	21.55.42	I	Sh.	I.	-63.5	-58.3	16/02/09	8.07.30	II	Tr.	E.	22.9	19.2	
01/02/09	22.04.53	I	Tr.	I.	-64.4	-59.5	16/02/09	23.00.12	I	Ec.	D.	-64.3	-59.5	
01/02/09	23.10.34	II	Sh.	I.	-67.0	-64.6	17/02/09	1.43.45	I	Occ.	R.	-39.7	-47.6	
01/02/09	23.29.47	II	Tr.	I.	-66.2	-64.8	17/02/09	20.12.09	I	Sh.	I.	-55.3	-38.2	
02/02/09	0.12.45	I	Sh.	E.	-62.2	-62.9	17/02/09	20.37.47	I	Tr.	I.	-59.0	-42.6	
02/02/09	0.22.00	I	Tr.	E.	-61.1	-62.1	17/02/09	22.29.18	I	Sh.	E.	-65.9	-57.3	
02/02/09	2.02.47	II	Sh.	E.	-44.9	-48.1	17/02/09	22.53.06	II	Ec.	D.	-64.5	-58.8	
02/02/09	2.21.57	II	Tr.	E.	-41.4	-44.8	17/02/09	22.55.05	I	Tr.	E.	-64.4	-58.9	
02/02/09	19.10.56	I	Ec.	D.	-37.5	-30.5	18/02/09	2.34.27	II	Occ.	R.	-29.7	-39.1	
02/02/09	21.39.33	I	Occ.	R.	-61.9	-55.9	18/02/09	4.45.18	III	Ec.	D.	-5.8	-15.3	
03/02/09	16.24.13	I	Sh.	I.	-7.5	0.6	18/02/09	10.06.58	III	Occ.	R.	29.9	33.5	
03/02/09	16.35.16	I	Tr.	I.	-9.4	-1.1	18/02/09	17.28.47	I	Ec.	D.	-26.8	-8.2	
03/02/09	17.44.21	II	Ec.	D.	-21.9	-14.3	18/02/09	20.14.08	I	Occ.	R.	-56.0	-38.3	
03/02/09	18.41.16	I	Sh.	E.	-32.5	-24.8	19/02/09	14.40.38	I	Sh.	I.	3.1	20.7	
03/02/09	18.52.23	I	Tr.	E.	-34.6	-26.8	19/02/09	15.08.04	I	Tr.	I.	-1.1	16.5	
03/02/09	20.45.02	III	Ec.	D.	-54.5	-47.1	19/02/09	16.57.49	I	Sh.	E.	-21.6	-1.5	
03/02/09	20.55.52	II	Occ.	R.	-56.2	-48.9	19/02/09	17.25.23	I	Tr.	E.	-26.7	-7.4	
04/02/09	1.04.58	III	Occ.	R.	-53.7	-56.6	19/02/09	17.44.25	II	Sh.	I.	-30.2	-10.9	
04/02/09	13.39.32	I	Ec.	D.	17.7	24.3	19/02/09	18.41.10	II	Tr.	I.	-40.7	-21.4	
04/02/09	16.10.03	I	Occ.	R.	-5.4	3.0	19/02/09	20.36.52	II	Sh.	E.	-59.6	-41.9	
05/02/09	10.52.44	I	Sh.	I.	29.1	31.7	19/02/09	21.33.58	II	Tr.	E.	-65.2	-56.0	
05/02/09	11.05.38	I	Tr.	I.	29.0	32.0	20/02/09	11.57.27	I	Ec.	D.	24.5	36.8	
05/02/09	12.29.45	II	Sh.	I.	24.8	30.4	20/02/09	14.44.36	I	Occ.	R.	2.0	20.4	
05/02/09	12.56.37	II	Tr.	I.	22.3	28.6	21/02/09	9.09.05	I	Sh.	I.	28.9	28.9	
05/02/09	13.09.48	I	Sh.	E.	20.9	27.5	21/02/09	9.38.17	I	Tr.	I.	29.9	32.1	
05/02/09	13.22.47	I	Tr.	E.	19.4	26.3	21/02/09	11.26.16	I	Sh.	E.	26.9	37.6	
05/02/09	15.22.01	II	Sh.	E.	2.6	10.9	21/02/09	11.55.38	I	Tr.	E.	24.4	37.2	
05/02/09	15.44.13	IV	Sh.	I.	-0.7	7.4	21/02/09	12.10.18	II	Ec.	D.	23.0	36.6	
05/02/09	15.48.55	II	Tr.	E.	-1.5	6.6	21/02/09	15.58.55	II	Occ.	R.	-11.8	8.7	
05/02/09	17.51.41	IV	Tr.	I.	-24.3	-15.2	21/02/09	18.44.15	III	Sh.	I.	-42.2	-21.5	
05/02/09	20.26.41	IV	Sh.	E.	-52.4	-43.5	21/02/09	20.45.15	III	Tr.	I.	-61.3	-42.8	
05/02/09	22.35.00	IV	Tr.	E.	-66.7	-61.5	21/02/09	22.18.58	III	Sh.	E.	-65.5	-55.1	
06/02/09	8.08.16	I	Ec.	D.	19.2	16.7	22/02/09	0.21.15	III	Tr.	E.	-51.3	-56.0	
06/02/09	10.40.40	I	Occ.	R.	29.2	31.6	22/02/09	6.26.02	I	Ec.	D.	12.8	4.4	
07/02/09	5.21.13	I	Sh.	I.	-5.7	-11.1	22/02/09	9.14.59	I	Occ.	R.	29.3	30.0	
07/02/09	5.35.58	I	Tr.	I.	-2.6	-8.4	22/02/09	9.52.18	IV	Sh.	I.	30.1	33.7	
07/02/09	7.01.35	II	Ec.	D.	10.7	6.7	22/02/09	14.37.23	IV	Sh.	E.	2.3	22.0	
07/02/09	7.38.18	I	Sh.	E.	15.9	12.5	22/02/09	14.44.27	IV	Tr.	I.	1.2	20.9	
07/02/09	7.53.08	I	Tr.	E.	17.8	14.7	22/02/09	19.33.01	IV	Tr.	E.	-51.2	-30.2	
07/02/09	10.20.39	II	Occ.	R.	29.0	30.9	23/02/09	3.37.33	I	Sh.	I.	-15.1	-26.5	
07/02/09	10.45.47	III	Sh.	I.	29.2	32.1	23/02/09	4.08.30	I	Tr.	I.	-9.5	-20.8	
07/02/09	11.47.17	III	Tr.	I.	27.4	32.6	23/02/09	5.54.45	I	Sh.	E.	8.6	-0.5	
07/02/09	14.19.39	III	Sh.	E.	11.2	20.3	23/02/09	6.25.52	I	Tr.	E.	13.3	4.6	
07/02/09	15.21.32	III	Tr.	E.	1.8	11.4	23/02/09	7.02.34	II	Sh.	I.	18.2	10.9	
08/02/09	2.36.54	I	Ec.	D.	-35.2	-41.0	23/02/09	8.06.34	II	Tr.	I.	25.2	21.2	
08/02/09	5.11.10	I	Occ.	R.	-6.9	-12.8	23/02/09	9.55.05	II	Sh.	E.	30.2	34.3	
08/02/09	23.49.43	I	Sh.	I.	-62.1	-62.2	23/02/09	10.59.29	II	Tr.	E.	28.3	38.0	
09/02/09	0.06.18	I	Tr.	I.	-60.1	-61.4	24/02/09	0.54.43	I	Ec.	D.	-44.4	-52.0	
09/02/09	1.48.01	II	Sh.	I.	-43.5	-49.1	24/02/09	3.45.26	I	Occ.	R.	-13.1	-24.8	
09/02/09	2.06.49	I	Sh.	E.	-40.1	-46.0	24/02/09	22.06.00	I	Sh.	I.	-65.5	-52.8	
09/02/09	2.22.29	II	Tr.	I.	-37.3	-43.3	24/02/09	22.38.42	I	Tr.	I.	-63.6	-55.6	
09/02/09	2.23.29	I	Tr.	E.	-37.1	-43.2	25/02/09	0.23.13	I	Sh.	E.	-49.3	-54.7	
09/02/09	4.40.21	II	Sh.	E.	-11.9	-18.2	25/02/09	0.56.05	I	Tr.	E.	-43.6	-51.5	
09/02/09	5.14.56	II	Tr.	E.	-5.7	-11.9	25/02/09	1.27.29	II	Ec.	D.	-37.9	-47.5	
09/02/09	21.05.37	I	Ec.	D.	-59.9	-49.0	25/02/09	5.23.17	II	Occ.	R.	4.7	-6.4	
							25/02/09	8.45.52	III	Ec.	D.	28.6	27.4	

Date	Times	Moon	Phenomena	Phase	h	h Sun								
25/02/09	14.37.09	III	Occ.	R.	1.0	22.8	12/03/09	22.39.23	I	Sh.	E.	-57.1	-49.9	
25/02/09	19.23.16	I	Ec.	D.	-50.9	-27.7	12/03/09	23.27.13	I	Tr.	E.	-49.8	-51.0	
25/02/09	22.15.44	I	Occ.	R.	-64.9	-53.5	13/03/09	1.35.17	II	Sh.	I.	-26.9	-40.8	
26/02/09	16.34.29	I	Sh.	I.	-20.9	3.7	13/03/09	3.13.06	II	Tr.	I.	-8.9	-25.4	
26/02/09	17.08.55	I	Tr.	I.	-27.3	-2.1	13/03/09	4.27.53	II	Sh.	E.	4.4	-12.0	
26/02/09	18.51.43	I	Sh.	E.	-46.0	-21.8	13/03/09	6.06.21	II	Tr.	E.	19.0	6.5	
26/02/09	19.26.20	I	Tr.	E.	-51.9	-28.1	13/03/09	17.40.33	I	Ec.	D.	-41.0	-5.4	
26/02/09	20.21.31	II	Sh.	I.	-59.9	-37.6	13/03/09	20.47.56	I	Occ.	R.	-64.6	-37.8	
26/02/09	21.32.36	II	Tr.	I.	-65.5	-48.3	14/03/09	14.50.26	I	Sh.	I.	-10.2	25.3	
26/02/09	23.14.02	II	Sh.	E.	-58.9	-56.3	14/03/09	15.39.36	I	Tr.	I.	-19.2	17.0	
27/02/09	0.25.35	II	Tr.	E.	-47.8	-53.8	14/03/09	17.07.48	I	Sh.	E.	-35.5	1.3	
27/02/09	13.51.54	I	Ec.	D.	7.3	29.6	14/03/09	17.57.12	I	Tr.	E.	-44.4	-8.3	
27/02/09	16.46.07	I	Occ.	R.	-23.6	2.0	14/03/09	19.53.23	II	Ec.	D.	-61.4	-29.0	
28/02/09	11.02.56	I	Sh.	I.	27.4	40.0	15/03/09	0.23.06	II	Occ.	R.	-38.9	-47.8	
28/02/09	11.39.04	I	Tr.	I.	24.4	40.1	15/03/09	6.42.52	III	Sh.	I.	24.1	13.7	
28/02/09	13.20.10	I	Sh.	E.	11.7	33.7	15/03/09	10.05.52	III	Tr.	I.	29.1	42.8	
28/02/09	13.56.30	I	Tr.	E.	6.1	29.4	15/03/09	10.18.52	III	Sh.	E.	28.2	43.8	
28/02/09	14.44.39	II	Ec.	D.	-1.3	22.5	15/03/09	12.09.05	I	Ec.	D.	16.0	44.7	
28/02/09	18.47.32	II	Occ.	R.	-46.3	-20.6	15/03/09	13.43.58	III	Tr.	E.	1.4	35.5	
28/02/09	22.43.28	III	Sh.	I.	-61.8	-54.5	15/03/09	15.18.00	I	Occ.	R.	-15.7	21.0	
01/03/09	1.13.01	III	Tr.	I.	-38.2	-48.1	16/03/09	9.18.52	I	Sh.	I.	31.1	38.4	
01/03/09	2.18.38	III	Sh.	E.	-26.1	-38.5	16/03/09	10.09.34	I	Tr.	I.	28.7	43.5	
01/03/09	4.49.49	III	Tr.	E.	1.5	-11.5	16/03/09	11.36.15	I	Sh.	E.	20.0	46.3	
01/03/09	8.20.28	I	Ec.	D.	28.0	25.2	16/03/09	12.27.11	I	Tr.	E.	13.0	43.9	
01/03/09	11.16.25	I	Occ.	R.	26.2	40.6	16/03/09	14.53.14	II	Sh.	I.	-11.8	25.3	
02/03/09	5.31.23	I	Sh.	I.	8.6	-3.1	16/03/09	16.37.17	II	Tr.	I.	-31.0	7.1	
02/03/09	6.09.13	I	Tr.	I.	14.2	3.7	16/03/09	17.45.52	II	Sh.	E.	-43.4	-5.7	
02/03/09	7.48.38	I	Sh.	E.	25.9	20.6	16/03/09	19.30.37	II	Tr.	E.	-59.5	-24.6	
02/03/09	8.26.40	I	Tr.	E.	28.7	26.4	17/03/09	6.37.41	I	Ec.	D.	24.3	13.4	
02/03/09	9.39.37	II	Sh.	I.	30.6	35.4	17/03/09	9.48.07	I	Occ.	R.	29.9	42.0	
02/03/09	10.57.40	II	Tr.	I.	27.5	40.6	18/03/09	3.47.17	I	Sh.	I.	0.6	-17.7	
02/03/09	12.32.11	II	Sh.	E.	17.7	38.6	18/03/09	4.39.29	I	Tr.	I.	8.9	-8.2	
02/03/09	13.50.45	II	Tr.	E.	6.2	30.7	18/03/09	6.04.40	I	Sh.	E.	21.0	7.8	
02/03/09	20.24.08	IV	Ec.	D.	-61.5	-37.1	18/03/09	6.57.07	I	Tr.	E.	26.6	17.2	
03/03/09	1.09.04	IV	Ec.	R.	-37.8	-47.9	18/03/09	9.10.35	II	Ec.	D.	31.3	38.2	
03/03/09	2.28.08	IV	Occ.	D.	-23.1	-36.3	18/03/09	13.46.36	II	Occ.	R.	-0.2	36.0	
03/03/09	2.49.07	I	Ec.	D.	-19.2	-32.8	18/03/09	20.44.08	III	Ec.	D.	-64.4	-35.9	
03/03/09	5.46.46	I	Occ.	R.	11.5	0.2	19/03/09	1.06.10	I	Ec.	D.	-28.6	-42.2	
03/03/09	7.16.56	IV	Occ.	R.	23.2	15.8	19/03/09	3.56.29	III	Occ.	R.	2.6	-15.8	
03/03/09	23.59.49	I	Sh.	I.	-49.4	-53.6	19/03/09	4.18.06	I	Occ.	R.	6.1	-11.8	
04/03/09	0.39.19	I	Tr.	I.	-42.5	-50.7	19/03/09	14.30.15	IV	Ec.	D.	-9.2	29.8	
04/03/09	2.17.05	I	Sh.	E.	-24.6	-37.8	19/03/09	19.17.05	IV	Ec.	R.	-58.9	-21.6	
04/03/09	2.56.48	I	Tr.	E.	-17.2	-31.1	19/03/09	22.15.44	I	Sh.	I.	-57.0	-45.8	
04/03/09	4.01.48	II	Ec.	D.	-5.4	-19.5	19/03/09	22.55.13	IV	Occ.	D.	-51.2	-47.9	
04/03/09	8.11.38	II	Occ.	R.	28.2	24.9	19/03/09	23.09.25	I	Tr.	I.	-48.9	-48.2	
04/03/09	12.45.30	III	Ec.	D.	15.1	38.3	20/03/09	0.33.09	I	Sh.	E.	-34.1	-45.0	
04/03/09	19.05.15	III	Occ.	R.	-51.2	-22.9	20/03/09	1.27.05	I	Tr.	E.	-24.1	-39.3	
04/03/09	21.17.39	I	Ec.	D.	-65.2	-44.6	20/03/09	3.46.19	IV	Occ.	R.	1.5	-17.2	
05/03/09	0.16.58	I	Occ.	R.	-45.9	-52.2	20/03/09	4.11.54	II	Sh.	I.	5.6	-12.6	
05/03/09	18.28.17	I	Sh.	I.	-45.4	-16.0	20/03/09	6.01.54	II	Tr.	I.	21.5	7.9	
05/03/09	19.09.28	I	Tr.	I.	-52.3	-23.4	20/03/09	7.04.31	II	Sh.	E.	27.9	19.2	
05/03/09	20.45.34	I	Sh.	E.	-64.0	-39.7	20/03/09	8.55.14	II	Tr.	E.	31.6	36.9	
05/03/09	21.26.57	I	Tr.	E.	-65.2	-45.5	20/03/09	19.34.45	I	Ec.	D.	-61.1	-24.4	
05/03/09	22.58.30	II	Sh.	I.	-57.8	-53.3	20/03/09	22.48.07	I	Occ.	R.	-51.8	-47.2	
06/03/09	0.23.18	II	Tr.	I.	-44.2	-51.3	21/03/09	16.44.08	I	Sh.	I.	-34.9	6.9	
06/03/09	1.51.04	II	Sh.	E.	-28.2	-41.1	21/03/09	17.39.17	I	Tr.	I.	-44.8	-3.1	
06/03/09	3.16.27	II	Tr.	E.	-12.4	-27.1	21/03/09	19.01.34	I	Sh.	E.	-57.6	-18.4	
06/03/09	15.46.17	I	Ec.	D.	-16.2	14.0	21/03/09	19.56.57	I	Tr.	E.	-63.1	-27.8	
06/03/09	18.47.15	I	Occ.	R.	-49.1	-19.2	21/03/09	22.27.48	II	Ec.	D.	-54.4	-45.9	
07/03/09	12.56.42	I	Sh.	I.	12.4	38.3	22/03/09	3.09.52	II	Occ.	R.	-3.8	-22.9	
07/03/09	13.39.31	I	Tr.	I.	5.7	33.6	22/03/09	10.43.02	III	Sh.	I.	24.4	48.0	
07/03/09	15.14.00	I	Sh.	E.	-10.8	19.7	22/03/09	14.03.15	I	Ec.	D.	-5.8	34.7	
07/03/09	15.57.02	I	Tr.	E.	-18.7	12.3	22/03/09	14.19.21	III	Sh.	E.	-8.8	32.3	
07/03/09	17.18.59	II	Ec.	D.	-33.9	-2.0	22/03/09	14.30.20	III	Tr.	I.	-10.8	30.6	
07/03/09	21.35.36	II	Occ.	R.	-64.7	-45.9	22/03/09	17.18.03	I	Occ.	R.	-41.6	1.1	
08/03/09	2.43.21	III	Sh.	I.	-17.3	-32.1	22/03/09	18.08.53	III	Tr.	E.	-50.3	-8.7	
08/03/09	5.40.20	III	Tr.	I.	13.0	0.5	23/03/09	11.12.33	I	Sh.	I.	20.6	49.2	
08/03/09	6.18.57	III	Sh.	E.	18.4	7.2	23/03/09	12.09.08	I	Tr.	I.	12.8	47.7	
08/03/09	9.17.52	III	Tr.	E.	31.0	35.3	23/03/09	13.30.00	I	Sh.	E.	0.1	39.7	
08/03/09	10.14.49	I	Ec.	D.	29.4	40.8	23/03/09	14.26.50	I	Tr.	E.	-10.7	31.4	
08/03/09	13.17.26	I	Occ.	R.	8.8	36.5	23/03/09	17.29.49	II	Sh.	I.	-44.2	-0.6	
09/03/09	7.25.09	I	Sh.	I.	26.1	19.1	23/03/09	19.25.36	II	Tr.	I.	-61.0	-22.1	
09/03/09	8.09.35	I	Tr.	I.	29.3	26.3	23/03/09	20.22.28	II	Sh.	E.	-64.1	-31.3	
09/03/09	9.42.28	I	Sh.	E.	30.6	38.4	23/03/09	22.18.59	II	Tr.	E.	-54.6	-44.6	
09/03/09	10.27.07	I	Tr.	E.	28.5	42.0	24/03/09	8.31.50	I	Ec.	D.	31.9	35.0	
09/03/09	12.16.31	II	Sh.	I.	17.3	42.1	24/03/09	11.48.02	I	Occ.	R.	15.5	49.0	
09/03/09	13.47.57	II	Tr.	I.	3.5	33.2	25/03/09	5.40.57	I	Sh.	I.	21.1	5.7	
09/03/09	15.09.08	II	Sh.	E.	-11.0	21.0	25/03/09	6.38.55	I	Tr.	I.	27.3	16.2	
09/03/09	16.41.11	II	Tr.	E.	-27.9	4.9	25/03/09	7.58.25	I	Sh.	E.	31.7	30.1	
10/03/09	4.43.27	I	Ec.	D.	5.3	-10.0	25/03/09	8.56.38	I	Tr.	E.	31.5	39.0	
10/03/09	7.47.40	I	Occ.	R.	28.2	23.2	25/03/09	11.45.01	II	Ec.	D.	15.5	49.5	
11/03/09	1.53.34	I	Sh.	I.	-24.7	-39.0	25/03/09	16.33.00	II	Occ.	R.	-35.0	9.8	
11/03/09	2.39.36	I	Tr.	I.	-16.2	-31.8	26/03/09	0.43.19	III	Ec.	D.	-28.5	-41.8	
11/03/09	3.59.37	IV	Sh.	I.	-1.0	-17.8	26/03/09	3.00.18	I	Ec.	D.	-2.9	-23.2	
11/03/09	4.10.54	I	Sh.	E.	0.7	-15.7	26/03/09	4.19.44	III	Ec.	R.	10.1	-9.3	
11/03/09	4.57.09	I	Tr.	E.	8.0	-7.2	26/03/09	4.40.45	III	Occ.	D.	13.3	-5.4	
11/03/09	6.36.10	II	Ec.	D.	21.8	11.2	26/03/09	6.17.53	I	Occ.	R.	25.7	12.7	
11/03/09	8.46.52	IV	Sh.	E.	31.0	32.4	26/03/09	8.19.25	III	Occ.	R.	32.1	33.8	
11/03/09	10.59.26	II	Occ.	R.	25.6	44.2	27/03/09	0.09.24	I	Sh.	I.	-34.1	-43.9	
11/03/09	11.24.33	IV	Tr.	I.	23.0	44.5	27/03/09	1.08.45	I	Tr.	I.	-23.1	-38.8	
11/03/09	16.16.34	IV	Tr.	E.	-24.4	9.8	27/03/09	2.26.53	I	Sh.	E.	-8.8	-28.2	
11/03/09	16.44.58	III	Ec.	D.	-29.7	4.7	27/03/09	3.26.29	I	Tr.	E.	2.1	-18.4	
11/03/09	23.11.57	I	Ec.	D.	-52.8	-51.3	27/03/09	6.48.20	II	Sh.	I.	28.7	18.6	
11/03/09	23.31.45	III	Occ.	R.	-49.6	-51.3	27/03/09	8.49.34	II	Tr.	I.	31.6	38.7	
12/03/09	2.17.46	I	Occ.	R.	-19.6	-34.9	27/03/09	9.40.57	II	Sh.	E.	28.9	45.2	
12/03/09	20.22.02	I	Sh.	I.	-63.4	-34.1	27/03/09	11.42.56	II	Tr.	E.	15.0	50.4	
12/03/09	21.09.39	I	Tr.	I.	-64.7	-41.1	27/03/09	21.28.52	I	Ec.	D.	-59.3	-38.8	
							27/03/09	22.07.10	IV	Sh.	I.	-54.3	-42.4	

Date	Times	Moon	Phenomena	Phase	h	h Sun	11/04/09	23.35.13	I	Tr.	I.	-30.4	-39.1
28/03/09	0.47.46	I	Occ.	R.	-26.4	-40.6	12/04/09	0.42.41	I	Sh.	E.	-17.9	-35.3
28/03/09	2.56.12	IV	Sh.	E.	-2.3	-23.2	12/04/09	1.53.05	I	Tr.	E.	-4.9	-27.5
28/03/09	7.45.44	IV	Tr.	I.	31.8	29.0	12/04/09	6.11.28	II	Ec.	D.	30.6	16.8
28/03/09	12.39.15	IV	Tr.	E.	5.8	47.0	12/04/09	11.24.49	II	Occ.	R.	10.6	56.7
28/03/09	18.37.47	I	Sh.	I.	-57.0	-12.7	12/04/09	19.45.17	I	Ec.	D.	-62.6	-20.5
28/03/09	19.38.28	I	Tr.	I.	-62.9	-23.1	12/04/09	22.40.24	III	Sh.	I.	-39.7	-38.5
28/03/09	20.55.17	I	Sh.	E.	-62.1	-34.5	12/04/09	23.14.34	I	Occ.	R.	-33.6	-39.0
28/03/09	21.56.13	I	Tr.	E.	-55.4	-41.1	13/04/09	2.17.37	III	Sh.	E.	0.5	-23.8
29/03/09	1.02.17	II	Ec.	D.	-23.1	-38.7	13/04/09	3.28.09	III	Tr.	I.	11.8	-12.6
29/03/09	5.55.51	II	Occ.	R.	24.5	9.6	13/04/09	7.07.31	III	Tr.	E.	32.9	27.3
29/03/09	14.42.21	III	Sh.	I.	-16.7	30.3	13/04/09	16.15.23	IV	Sh.	I.	-42.1	16.8
29/03/09	15.57.20	I	Ec.	D.	-30.6	17.1	13/04/09	16.53.28	II	Sh.	I.	-48.6	9.8
29/03/09	18.18.59	III	Sh.	E.	-54.9	-9.1	13/04/09	18.04.40	I	Tr.	I.	-58.5	-2.9
29/03/09	18.52.04	III	Tr.	I.	-59.1	-15.0	13/04/09	19.11.07	I	Sh.	E.	-62.9	-14.8
29/03/09	19.17.33	I	Occ.	R.	-61.6	-19.3	13/04/09	20.22.33	I	Tr.	E.	-59.7	-25.7
29/03/09	22.30.58	III	Tr.	E.	-49.6	-43.1	13/04/09	21.05.44	IV	Sh.	E.	-54.5	-31.7
30/03/09	13.06.12	I	Sh.	I.	0.6	44.8	14/04/09	1.18.21	II	Sh.	I.	-10.1	-31.1
30/03/09	14.08.12	I	Tr.	I.	-11.0	36.1	14/04/09	3.40.10	IV	Tr.	I.	14.2	-10.3
30/03/09	15.23.43	I	Sh.	E.	-25.0	23.4	14/04/09	3.42.42	II	Tr.	I.	14.6	-9.9
30/03/09	16.25.58	I	Tr.	E.	-36.5	12.1	14/04/09	4.10.57	II	Sh.	E.	18.6	-4.8
30/03/09	20.06.10	II	Sh.	I.	-63.7	-27.0	14/04/09	6.36.05	II	Tr.	E.	32.3	21.9
30/03/09	22.12.40	II	Tr.	I.	-52.0	-41.7	14/04/09	8.33.22	IV	Tr.	E.	30.5	42.4
30/03/09	22.58.49	II	Sh.	E.	-44.4	-43.7	14/04/09	14.13.49	I	Ec.	D.	-20.5	38.8
31/03/09	1.06.05	II	Tr.	E.	-21.1	-37.6	14/04/09	17.44.03	I	Occ.	R.	-56.4	1.0
31/03/09	10.25.54	I	Ec.	D.	23.6	50.7	15/04/09	11.21.50	I	Sh.	I.	9.6	57.8
31/03/09	13.47.22	I	Occ.	R.	-7.8	39.5	15/04/09	12.34.01	I	Tr.	I.	-2.1	53.2
01/04/09	7.34.36	I	Sh.	I.	32.1	28.4	15/04/09	13.39.30	I	Sh.	E.	-14.7	44.5
01/04/09	8.37.52	I	Tr.	I.	31.7	38.8	15/04/09	14.51.54	I	Tr.	E.	-28.1	32.4
01/04/09	9.52.07	I	Sh.	E.	26.8	48.3	15/04/09	19.28.54	II	Ec.	D.	-62.7	-17.2
01/04/09	10.55.38	I	Tr.	E.	19.6	52.4	16/04/09	0.46.32	II	Occ.	R.	-14.6	-33.6
01/04/09	14.19.34	II	Ec.	D.	-14.2	34.8	16/04/09	8.42.14	I	Ec.	D.	29.4	44.4
01/04/09	19.18.33	II	Occ.	R.	-62.3	-18.8	16/04/09	12.13.23	I	Occ.	R.	0.8	55.5
02/04/09	4.43.10	III	Ec.	D.	17.2	-2.0	16/04/09	12.42.51	III	Ec.	D.	-4.9	52.5
02/04/09	4.54.21	I	Ec.	D.	18.7	0.0	16/04/09	16.20.10	III	Ec.	R.	-44.6	16.5
02/04/09	8.17.03	I	Occ.	R.	32.3	35.9	16/04/09	17.36.48	III	Occ.	D.	-56.2	2.6
02/04/09	8.19.56	III	Ec.	R.	32.2	36.3	16/04/09	21.16.10	III	Occ.	R.	-51.5	-31.3
02/04/09	9.01.55	III	Occ.	D.	30.5	42.6	17/04/09	5.50.17	I	Sh.	I.	30.5	14.2
02/04/09	12.40.57	III	Occ.	R.	3.1	48.5	17/04/09	7.03.24	I	Tr.	I.	33.2	27.7
03/04/09	2.03.03	I	Sh.	I.	-8.8	-29.3	17/04/09	8.07.58	I	Sh.	E.	31.6	39.1
03/04/09	3.07.33	I	Tr.	I.	2.9	-19.3	17/04/09	9.21.18	I	Tr.	E.	25.4	50.4
03/04/09	4.20.35	I	Sh.	E.	14.4	-6.5	17/04/09	14.36.30	II	Sh.	I.	-26.4	35.5
03/04/09	5.25.21	I	Tr.	E.	23.1	5.6	17/04/09	17.04.26	II	Tr.	I.	-52.2	8.5
03/04/09	9.24.34	II	Sh.	I.	28.8	45.9	17/04/09	17.29.03	II	Sh.	E.	-55.6	4.1
03/04/09	11.35.56	II	Tr.	I.	13.0	53.2	17/04/09	19.57.46	II	Tr.	E.	-60.6	-21.1
03/04/09	12.17.10	II	Sh.	E.	6.5	51.0	18/04/09	3.10.43	I	Ec.	D.	11.9	-14.0
03/04/09	14.29.20	II	Tr.	E.	-17.1	33.7	18/04/09	6.42.45	I	Occ.	R.	33.1	24.2
03/04/09	23.22.53	I	Ec.	D.	-37.7	-42.3	19/04/09	0.18.39	I	Sh.	I.	-17.8	-34.7
04/04/09	2.46.47	I	Occ.	R.	0.2	-22.3	19/04/09	1.32.40	I	Tr.	I.	-4.1	-27.7
04/04/09	20.31.25	I	Sh.	I.	-61.9	-29.3	19/04/09	2.36.21	I	Sh.	E.	6.9	-19.1
04/04/09	21.37.08	I	Tr.	I.	-54.6	-37.1	19/04/09	3.50.35	I	Tr.	E.	18.3	-7.0
04/04/09	22.48.59	I	Sh.	E.	-43.1	-41.6	19/04/09	8.46.13	II	Ec.	D.	28.4	46.0
04/04/09	23.54.57	I	Tr.	E.	-31.2	-41.1	19/04/09	14.07.38	II	Occ.	R.	-22.2	40.9
05/04/09	3.36.50	II	Ec.	D.	8.8	-13.7	19/04/09	21.39.09	I	Ec.	D.	-46.1	-32.6
05/04/09	8.36.13	IV	Ec.	D.	31.5	39.9	20/04/09	1.12.00	I	Occ.	R.	-7.4	-29.7
05/04/09	8.40.52	II	Occ.	R.	31.3	40.6	20/04/09	2.39.29	III	Sh.	I.	8.0	-18.3
05/04/09	13.24.32	IV	Ec.	R.	-6.4	44.1	20/04/09	6.17.01	III	Sh.	E.	32.6	20.0
05/04/09	17.51.21	I	Ec.	D.	-53.8	-1.9	20/04/09	7.42.25	III	Tr.	I.	32.4	35.6
05/04/09	18.41.29	III	Sh.	I.	-60.0	-11.6	20/04/09	11.21.55	III	Tr.	E.	7.1	59.6
05/04/09	18.59.01	IV	Occ.	D.	-61.6	-14.6	20/04/09	18.47.04	I	Sh.	I.	-62.6	-9.3
05/04/09	21.16.24	I	Occ.	R.	-56.9	-34.6	20/04/09	20.01.56	I	Tr.	I.	-59.2	-21.0
05/04/09	22.18.24	III	Sh.	E.	-47.7	-40.0	20/04/09	21.04.48	I	Sh.	E.	-51.0	-28.9
05/04/09	23.11.23	III	Tr.	I.	-38.5	-41.6	20/04/09	22.19.52	I	Tr.	E.	-38.4	-35.0
05/04/09	23.50.32	IV	Occ.	R.	-31.4	-40.9	21/04/09	3.54.09	II	Sh.	I.	19.8	-5.8
06/04/09	2.50.33	III	Tr.	E.	1.8	-21.1	21/04/09	6.25.24	II	Tr.	I.	33.0	21.8
06/04/09	14.59.50	I	Sh.	I.	-24.5	29.1	21/04/09	6.46.42	II	Sh.	E.	33.4	25.8
06/04/09	16.06.44	I	Tr.	I.	-36.8	17.1	21/04/09	9.18.43	II	Tr.	E.	24.4	51.3
06/04/09	17.17.25	I	Sh.	E.	-49.0	4.1	21/04/09	16.07.40	I	Ec.	D.	-45.1	19.7
06/04/09	18.24.34	I	Tr.	E.	-58.5	-8.4	21/04/09	19.41.17	I	Occ.	R.	-60.7	-17.7
06/04/09	22.42.22	II	Sh.	I.	-43.0	-40.7	22/04/09	2.42.03	IV	Ec.	D.	9.6	-17.3
07/04/09	0.58.25	II	Tr.	I.	-18.1	-35.7	22/04/09	7.31.27	IV	Ec.	R.	32.7	34.2
07/04/09	1.34.59	II	Sh.	E.	-11.4	-31.6	22/04/09	13.15.27	I	Sh.	I.	-14.3	49.8
07/04/09	3.51.50	II	Tr.	E.	12.2	-10.4	22/04/09	14.31.07	I	Tr.	I.	-28.4	37.5
07/04/09	12.19.54	I	Ec.	D.	4.1	52.1	22/04/09	14.31.55	IV	Occ.	D.	-28.5	37.4
07/04/09	15.46.04	I	Occ.	R.	-33.6	21.0	22/04/09	15.33.11	I	Sh.	E.	-39.7	26.3
08/04/09	9.28.13	I	Sh.	I.	27.3	48.2	22/04/09	16.49.03	I	Tr.	E.	-52.2	12.3
08/04/09	10.36.14	I	Tr.	I.	19.5	54.4	22/04/09	19.22.17	IV	Occ.	R.	-61.6	-14.6
08/04/09	11.45.49	I	Sh.	E.	9.2	54.7	22/04/09	22.03.43	II	Ec.	D.	-40.0	-33.4
08/04/09	12.54.05	I	Tr.	E.	-1.8	48.9	23/04/09	3.28.42	II	Occ.	R.	17.2	-9.6
08/04/09	16.54.10	II	Ec.	D.	-46.2	8.7	23/04/09	10.36.04	I	Ec.	D.	12.9	59.7
08/04/09	22.03.05	II	Occ.	R.	-48.5	-37.9	23/04/09	14.10.26	I	Occ.	R.	-25.1	41.3
09/04/09	6.48.20	I	Ec.	D.	31.9	22.7	23/04/09	16.42.05	III	Ec.	D.	-51.6	13.7
09/04/09	8.42.43	III	Ec.	D.	30.7	42.2	23/04/09	20.19.38	III	Ec.	R.	-55.9	-22.7
09/04/09	10.15.35	I	Occ.	R.	21.8	53.4	23/04/09	21.49.29	III	Occ.	D.	-41.9	-32.2
09/04/09	12.19.47	III	Ec.	R.	3.2	52.8	24/04/09	1.28.52	III	Occ.	R.	-1.0	-26.6
09/04/09	13.20.24	III	Occ.	D.	-7.8	45.8	24/04/09	7.43.54	I	Sh.	I.	31.9	36.9
09/04/09	16.59.38	III	Occ.	R.	-47.6	7.9	24/04/09	9.00.19	I	Tr.	I.	25.5	49.6
10/04/09	3.56.40	I	Sh.	I.	14.5	-8.6	24/04/09	10.01.39	I	Sh.	E.	17.6	57.4
10/04/09	5.05.47	I	Tr.	I.	23.8	4.1	24/04/09	11.18.16	I	Tr.	E.	5.6	60.9
10/04/09	6.14.17	I	Sh.	E.	30.2	16.7	24/04/09	17.12.13	II	Sh.	I.	-56.2	8.4
10/04/09	7.23.39	I	Tr.	E.	32.9	29.3	24/04/09	19.46.19	II	Tr.	I.	-59.2	-17.8
10/04/09	12.00.39	II	Sh.	I.	5.8	54.5	24/04/09	20.04.43	II	Sh.	E.	-57.2	-20.4
10/04/09	14.20.58	II	Tr.	I.	-19.5	36.7	24/04/09	22.39.34	II	Tr.	E.	-32.3	-34.4
10/04/09	14.53.13	II	Sh.	E.	-25.5	31.2	25/04/09	5.04.32	I	Ec.	D.	29.4	7.9
10/04/09	17.14.20	II	Tr.	E.	-50.4	5.4	25/04/09	8.39.35	I	Occ.	R.	27.3	46.6
11/04/09	1.16.50	I	Ec.	D.	-12.2	-32.3	26/04/09	2.12.16	I	Sh.	I.	7.0	-20.5
11/04/09	4.45.07	I	Occ.	R.	21.7	0.9	26/04/09	3.29.24	I	Tr.	I.	18.9	-8.7
11/04/09	22.25.03	I	Sh.	I.	-43.0	-38.2	26/04/09	4.30.03	I	Sh.	E.	26.4	2.1

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Date	Times	Moon	Phenomena	Phase	h	h Sun								
25/05/09	22.37.35	III	Sh.	I.	-11.8	-26.5	09/06/09	10.15.03	III	Sh.	E.	-12.0	67.6	
26/05/09	2.16.10	III	Sh.	E.	24.0	-13.6	09/06/09	10.21.15	I	Sh.	E.	-13.2	68.3	
26/05/09	3.32.51	IV	Occ.	D.	31.6	-1.7	09/06/09	11.37.29	I	Tr.	E.	-27.3	70.2	
26/05/09	4.05.03	III	Tr.	I.	33.5	3.1	09/06/09	11.44.44	III	Tr.	I.	-28.6	69.7	
26/05/09	4.15.25	I	Sh.	I.	33.9	4.8	09/06/09	15.23.10	III	Tr.	E.	-60.4	34.9	
26/05/09	5.36.19	I	Tr.	I.	33.6	18.9	10/06/09	22.00.10	II	Sh.	I.	-8.2	-23.0	
26/05/09	6.33.29	I	Sh.	E.	29.8	29.4	10/06/09	0.30.26	II	Tr.	I.	17.4	-22.5	
26/05/09	7.43.56	III	Tr.	E.	21.9	42.5	10/06/09	0.52.17	II	Sh.	E.	20.5	-21.0	
26/05/09	7.54.23	I	Tr.	E.	20.5	44.4	10/06/09	3.22.51	II	Tr.	E.	34.2	-2.3	
26/05/09	8.17.26	IV	Occ.	R.	17.2	48.5	10/06/09	5.23.25	I	Ec.	D.	31.1	17.4	
26/05/09	16.50.37	II	Sh.	I.	-61.5	17.4	10/06/09	8.56.12	I	Occ.	R.	1.9	56.1	
26/05/09	19.31.07	II	Tr.	I.	-45.0	-9.3	11/06/09	2.31.30	I	Sh.	I.	31.7	-10.3	
26/05/09	19.42.52	II	Sh.	E.	-43.0	-10.9	11/06/09	3.46.57	I	Tr.	I.	34.7	1.3	
26/05/09	22.23.50	II	Tr.	E.	-13.7	-25.9	11/06/09	4.49.41	I	Sh.	E.	33.1	11.4	
27/05/09	1.36.10	I	Ec.	D.	19.1	-18.2	11/06/09	6.05.01	I	Tr.	E.	26.7	24.9	
27/05/09	5.14.09	I	Occ.	R.	34.3	15.0	11/06/09	9.01.57	IV	Ec.	D.	0.4	57.1	
27/05/09	22.43.49	I	Sh.	I.	-9.3	-26.3	11/06/09	13.52.24	IV	Ec.	R.	-51.7	51.7	
28/05/09	0.04.22	I	Tr.	I.	5.3	-25.3	11/06/09	16.11.40	II	Ec.	D.	-60.9	26.1	
28/05/09	1.01.53	I	Sh.	E.	14.6	-21.5	11/06/09	20.45.00	IV	Occ.	D.	-20.7	-16.6	
28/05/09	2.22.26	I	Tr.	E.	25.6	-12.5	11/06/09	21.37.27	II	Occ.	R.	-11.0	-21.3	
28/05/09	10.59.58	II	Ec.	D.	-12.0	69.4	11/06/09	23.51.48	I	Ec.	D.	12.6	-24.2	
28/05/09	16.35.58	II	Occ.	R.	-61.4	20.3	12/06/09	1.25.56	IV	Occ.	R.	25.8	-17.9	
28/05/09	20.04.32	I	Ec.	D.	-37.9	-13.5	12/06/09	3.23.38	I	Occ.	R.	34.4	-2.1	
28/05/09	23.42.08	I	Occ.	R.	2.2	-26.0	12/06/09	20.37.38	III	Ec.	D.	-21.3	-15.7	
29/05/09	12.38.16	III	Ec.	D.	-30.9	62.5	12/06/09	21.00.03	I	Sh.	I.	-17.2	-18.1	
29/05/09	16.16.53	III	Ec.	R.	-61.0	23.9	12/06/09	22.14.32	I	Tr.	I.	-3.1	-23.5	
29/05/09	17.12.19	I	Sh.	I.	-60.5	13.9	12/06/09	23.18.14	I	Sh.	E.	7.8	-24.8	
29/05/09	18.00.32	III	Occ.	D.	-56.4	5.6	13/06/09	0.16.29	III	Ec.	R.	17.0	-23.1	
29/05/09	18.32.28	I	Tr.	I.	-52.3	0.6	13/06/09	0.32.36	I	Tr.	E.	19.4	-22.2	
29/05/09	19.30.24	I	Sh.	E.	-43.2	-8.7	13/06/09	1.36.15	III	Occ.	D.	27.4	-16.8	
29/05/09	20.50.32	I	Tr.	E.	-28.9	-18.7	13/06/09	5.14.25	III	Occ.	R.	30.9	15.8	
29/05/09	21.39.16	III	Occ.	R.	-19.9	-23.0	13/06/09	11.17.33	II	Sh.	I.	-26.5	71.2	
30/05/09	6.08.07	II	Sh.	I.	30.8	25.1	13/06/09	13.43.52	II	Tr.	I.	-51.6	53.4	
30/05/09	8.46.50	II	Tr.	I.	10.3	54.0	13/06/09	14.09.37	II	Sh.	E.	-55.0	48.8	
30/05/09	9.00.19	II	Sh.	E.	8.1	56.3	13/06/09	16.36.11	II	Tr.	E.	-59.0	21.8	
30/05/09	11.39.28	II	Tr.	E.	-20.7	68.9	13/06/09	18.20.13	I	Ec.	D.	-45.3	3.9	
30/05/09	14.32.58	I	Ec.	D.	-51.0	43.2	13/06/09	21.51.01	I	Occ.	R.	-7.1	-22.1	
30/05/09	18.10.03	I	Occ.	R.	-54.8	4.2	14/06/09	15.28.30	I	Sh.	I.	-61.3	34.3	
31/05/09	11.40.44	I	Sh.	I.	-21.6	69.0	14/06/09	16.41.57	I	Tr.	I.	-58.1	20.8	
31/05/09	13.00.26	I	Tr.	I.	-36.2	59.4	14/06/09	17.46.42	I	Sh.	E.	-50.0	9.5	
31/05/09	13.58.50	I	Sh.	E.	-46.3	49.5	14/06/09	19.00.01	I	Tr.	E.	-37.8	-1.9	
31/05/09	15.18.30	I	Tr.	E.	-57.3	34.9	15/06/09	5.29.25	II	Ec.	D.	28.8	18.4	
01/06/09	0.17.35	II	Ec.	D.	10.0	-24.1	15/06/09	10.51.07	II	Occ.	R.	-23.0	70.8	
01/06/09	5.51.48	II	Occ.	R.	31.5	22.2	15/06/09	12.48.36	I	Ec.	D.	-44.1	62.7	
01/06/09	9.01.20	I	Ec.	D.	6.7	56.6	15/06/09	16.18.18	I	Occ.	R.	-59.7	25.2	
01/06/09	12.37.53	I	Occ.	R.	-32.8	62.9	16/06/09	9.57.01	I	Sh.	I.	-13.7	65.6	
02/06/09	2.36.43	III	Sh.	I.	29.2	-10.1	16/06/09	10.36.22	III	Sh.	I.	-21.0	69.9	
02/06/09	6.09.13	I	Sh.	I.	29.8	25.4	16/06/09	11.09.23	I	Tr.	I.	-27.2	71.4	
02/06/09	6.15.28	III	Sh.	E.	29.2	26.6	16/06/09	12.15.15	I	Sh.	E.	-39.1	67.3	
02/06/09	7.28.23	I	Tr.	I.	20.5	40.1	16/06/09	13.27.27	I	Tr.	E.	-50.9	56.4	
02/06/09	7.57.01	III	Tr.	I.	16.4	45.3	16/06/09	14.15.27	III	Sh.	E.	-57.1	47.9	
02/06/09	8.27.20	I	Sh.	E.	11.7	50.8	16/06/09	15.28.39	III	Tr.	I.	-61.3	34.4	
02/06/09	9.46.27	I	Tr.	E.	-1.2	63.6	16/06/09	19.06.52	III	Tr.	E.	-35.2	-3.1	
02/06/09	11.35.41	III	Tr.	E.	-22.1	69.5	17/06/09	0.34.49	II	Sh.	I.	21.8	-22.0	
02/06/09	19.25.27	II	Sh.	I.	-41.4	-7.5	17/06/09	2.56.40	II	Tr.	I.	34.2	-6.8	
02/06/09	22.01.55	II	Tr.	I.	-12.8	-23.8	17/06/09	3.26.52	II	Sh.	E.	34.7	-1.5	
02/06/09	22.17.38	II	Sh.	E.	-10.0	-24.6	17/06/09	5.48.56	II	Tr.	E.	25.9	21.9	
02/06/09	22.40.26	IV	Sh.	I.	-5.8	-25.4	17/06/09	7.17.03	I	Ec.	D.	13.7	38.1	
03/06/09	0.54.29	II	Tr.	E.	16.9	-21.4	17/06/09	10.45.35	I	Occ.	R.	-23.5	70.5	
03/06/09	3.29.47	I	Ec.	D.	33.4	-1.4	18/06/09	12.48.36	I	Sh.	I.	32.9	7.3	
03/06/09	3.32.31	IV	Sh.	E.	33.5	-1.0	18/06/09	16.18.18	I	Tr.	I.	26.8	19.7	
03/06/09	7.05.43	I	Occ.	R.	23.1	35.9	18/06/09	6.43.42	I	Sh.	E.	18.1	31.9	
03/06/09	11.15.22	IV	Tr.	I.	-19.0	70.3	18/06/09	7.54.43	I	Tr.	E.	6.9	45.1	
03/06/09	15.59.50	IV	Tr.	E.	-61.0	27.6	18/06/09	18.47.48	II	Ec.	D.	-37.2	0.1	
04/06/09	0.37.38	I	Sh.	I.	15.0	-22.5	19/06/09	0.04.56	II	Occ.	R.	18.8	-23.5	
04/06/09	1.56.11	I	Tr.	I.	25.7	-15.1	19/06/09	1.45.27	I	Ec.	D.	30.5	-15.8	
04/06/09	2.55.45	I	Sh.	E.	31.5	-7.3	19/06/09	5.12.45	I	Occ.	R.	28.9	15.4	
04/06/09	4.14.15	I	Tr.	E.	34.7	5.3	19/06/09	16.49.39	IV	Sh.	I.	-55.1	19.7	
04/06/09	13.35.45	II	Ec.	D.	-44.9	54.0	19/06/09	21.41.28	IV	Sh.	E.	-4.4	-21.2	
04/06/09	19.07.47	II	Occ.	R.	-43.1	-4.5	19/06/09	22.54.01	I	Sh.	I.	8.3	-24.4	
04/06/09	21.58.10	I	Ec.	D.	-12.1	-23.4	20/06/09	0.03.57	I	Tr.	I.	19.2	-23.6	
05/06/09	1.33.25	I	Occ.	R.	23.4	-17.5	20/06/09	0.36.50	III	Ec.	D.	23.6	-21.8	
05/06/09	16.38.21	III	Ec.	D.	-60.8	20.7	20/06/09	1.12.16	I	Sh.	E.	27.7	-19.1	
05/06/09	19.06.09	I	Sh.	I.	-42.8	-4.1	20/06/09	2.22.02	I	Tr.	E.	33.3	-11.5	
05/06/09	20.17.06	III	Ec.	R.	-30.1	-14.0	20/06/09	3.59.00	IV	Tr.	I.	33.8	3.0	
05/06/09	20.24.01	I	Tr.	I.	-28.9	-14.8	20/06/09	4.15.45	III	Ec.	R.	33.0	5.7	
05/06/09	21.24.17	I	Sh.	E.	-17.7	-20.9	20/06/09	5.16.40	III	Occ.	D.	28.1	16.0	
05/06/09	21.51.05	III	Occ.	D.	-12.7	-22.8	20/06/09	8.39.52	IV	Tr.	E.	-1.8	53.2	
05/06/09	22.42.06	I	Tr.	E.	-2.9	-25.1	20/06/09	8.54.33	III	Occ.	R.	-5.2	55.7	
06/06/09	1.29.32	III	Occ.	R.	23.4	-17.9	20/06/09	13.52.06	II	Sh.	I.	-56.3	52.3	
06/06/09	8.42.52	II	Sh.	I.	6.7	53.7	20/06/09	16.08.53	II	Tr.	I.	-59.0	27.2	
06/06/09	11.16.29	II	Tr.	I.	-21.3	70.7	20/06/09	16.44.08	II	Sh.	E.	-55.3	20.8	
06/06/09	11.35.00	II	Sh.	E.	-24.7	70.0	20/06/09	19.01.05	II	Tr.	E.	-33.4	-1.7	
06/06/09	14.08.58	II	Tr.	E.	-51.3	48.3	20/06/09	20.13.52	I	Ec.	D.	-19.9	-12.6	
06/06/09	16.26.35	I	Ec.	D.	-61.1	23.0	20/06/09	23.39.51	I	Occ.	R.	16.2	-24.3	
06/06/09	20.01.05	I	Occ.	R.	-32.4	-11.9	21/06/09	17.22.30	I	Sh.	I.	-49.5	14.0	
07/06/09	13.34.35	I	Sh.	I.	-46.6	54.5	21/06/09	18.31.07	I	Tr.	I.	-38.0	2.6	
07/06/09	14.51.43	I	Tr.	I.	-57.2	40.6	21/06/09	19.40.45	I	Sh.	E.	-25.3	-8.2	
07/06/09	15.52.44	I	Sh.	E.	-61.2	29.3	21/06/09	20.49.11	I	Tr.	E.	-12.6	-16.6	
07/06/09	17.09.47	I	Tr.	E.	-58.0	15.3	22/06/09	8.05.39	II	Ec.	D.	2.4	46.9	
08/06/09	2.53.26	II	Ec.	D.	32.4	-7.4	22/06/09	13.17.31	II	Occ.	R.	-52.9	58.4	
08/06/09	8.22.33	II	Occ.	R.	8.8	50.2	22/06/09	14.42.16	I	Ec.	D.	-60.9	43.3	
08/06/09	10.54.58	I	Ec.	D.	-18.7	70.6	22/06/09	18.06.52	I	Occ.	R.	-41.6	6.5	
08/06/09	14.28.39	I	Occ.	R.	-55.0	44.9	23/06/09	11.51.03	I	Sh.	I.	-39.8	69.9	
09/06/09	6.36.07	III	Sh.	I.	23.9	30.6	23/06/09	12.58.16	I	Tr.	I.	-50.8	61.5	
09/06/09	8.03.05	I	Sh.	I.	11.3	46.7	23/06/09	14.09.19	I	Sh.	E.	-59.2	49.3	
09/06/09	9.19.24	I	Tr.	I.	-1.1	59.9	23/06/09	14.36.18	III	Sh.	I.	-60.9	44.4	
							23/06/09	15.16.21	I	Tr.	E.	-61.2	37.0	

Date	Times	Moon	Phenomena	Phase	h	h Sun								
23/06/09	18.15.29	III	Sh.	E.	-39.4	5.1	08/07/09	2.16.11	III	Sh.	E.	34.2	-13.5	
23/06/09	19.07.22	III	Tr.	I.	-30.0	-2.8	08/07/09	5.49.05	III	Tr.	E.	13.8	20.6	
23/06/09	22.45.21	III	Tr.	E.	9.5	-24.3	08/07/09	8.18.20	II	Sh.	I.	-12.3	48.1	
24/06/09	3.09.21	II	Sh.	I.	34.6	-5.9	08/07/09	10.01.43	II	Tr.	I.	-31.4	64.9	
24/06/09	5.20.33	II	Tr.	I.	25.9	16.6	08/07/09	11.10.14	II	Sh.	E.	-43.6	70.4	
24/06/09	6.01.21	II	Sh.	E.	20.7	23.9	08/07/09	12.53.37	II	Tr.	E.	-58.2	61.9	
24/06/09	8.12.41	II	Tr.	E.	0.0	48.1	08/07/09	16.07.21	I	Occ.	R.	-58.7	61.2	
24/06/09	9.10.43	I	Ec.	D.	-11.1	58.3	09/07/09	10.07.56	I	Sh.	I.	-50.5	27.5	
24/06/09	12.33.52	I	Occ.	R.	-47.6	65.1	09/07/09	10.59.29	I	Tr.	I.	-33.4	65.6	
25/06/09	6.19.31	I	Sh.	I.	17.5	27.2	09/07/09	12.26.17	I	Sh.	E.	-42.5	70.0	
25/06/09	7.25.16	I	Tr.	I.	7.1	39.3	09/07/09	13.17.33	I	Tr.	E.	-55.7	65.6	
25/06/09	8.37.47	I	Sh.	E.	-5.8	52.6	10/07/09	2.37.25	II	Ec.	D.	-60.5	58.1	
25/06/09	9.43.20	I	Tr.	E.	-17.9	63.4	10/07/09	7.14.34	II	Occ.	R.	33.4	-11.0	
25/06/09	21.24.08	II	Ec.	D.	-2.9	-19.9	10/07/09	7.26.38	I	Ec.	D.	-1.5	36.1	
26/06/09	2.30.15	II	Occ.	R.	34.4	-10.7	10/07/09	10.33.46	I	Occ.	R.	-4.3	38.4	
26/06/09	3.39.07	I	Ec.	D.	33.5	-0.1	11/07/09	4.36.34	I	Sh.	I.	-38.8	68.2	
26/06/09	7.00.46	I	Occ.	R.	10.4	34.7	11/07/09	5.26.03	I	Tr.	I.	22.3	7.5	
27/06/09	0.48.06	I	Sh.	I.	28.1	-21.3	11/07/09	6.54.56	I	Sh.	E.	15.3	16.2	
27/06/09	1.52.19	I	Tr.	I.	33.1	-15.3	11/07/09	7.44.08	I	Tr.	E.	0.9	32.4	
27/06/09	3.06.23	I	Sh.	E.	34.4	-5.7	11/07/09	12.35.30	III	Ec.	D.	-8.4	41.5	
27/06/09	4.10.23	I	Tr.	E.	31.4	4.5	11/07/09	19.29.12	III	Occ.	R.	-57.7	64.2	
27/06/09	4.35.59	III	Ec.	D.	29.2	8.7	11/07/09	21.35.32	II	Sh.	I.	-12.5	-7.2	
27/06/09	8.15.00	III	Ec.	R.	-2.7	48.4	11/07/09	23.10.42	II	Tr.	I.	10.0	-21.8	
27/06/09	8.52.25	III	Occ.	D.	-10.0	55.0	12/07/09	0.27.25	II	Sh.	E.	23.8	-26.0	
27/06/09	12.30.06	III	Occ.	R.	-49.0	65.7	12/07/09	1.55.06	I	Ec.	D.	31.4	-24.1	
27/06/09	16.26.37	II	Sh.	I.	-54.0	24.1	12/07/09	2.02.33	II	Tr.	E.	34.2	-16.5	
27/06/09	18.31.38	II	Tr.	I.	-33.6	2.6	12/07/09	5.00.08	I	Occ.	R.	34.1	-15.6	
27/06/09	19.18.35	II	Sh.	E.	-25.0	-4.9	12/07/09	23.05.08	I	Sh.	I.	18.5	11.5	
27/06/09	21.23.41	II	Tr.	E.	-1.2	-19.9	12/07/09	23.52.29	I	Tr.	I.	23.6	-26.1	
27/06/09	22.07.33	I	Ec.	D.	5.9	-22.9	13/07/09	1.23.29	I	Sh.	E.	28.8	-25.7	
28/06/09	1.27.36	I	Occ.	R.	31.8	-18.0	13/07/09	2.10.33	I	Tr.	E.	34.0	-19.9	
28/06/09	3.09.55	IV	Ec.	D.	34.2	-5.2	13/07/09	15.55.28	II	Ec.	D.	33.8	-14.8	
28/06/09	7.59.56	IV	Ec.	R.	-0.5	45.5	13/07/09	20.23.33	I	Ec.	D.	-49.2	29.4	
28/06/09	12.59.26	IV	Occ.	D.	-53.8	61.4	13/07/09	20.24.00	II	Occ.	R.	-0.4	-14.7	
28/06/09	17.37.25	IV	Occ.	R.	-42.5	11.5	13/07/09	23.26.25	I	Occ.	R.	-0.3	-14.8	
28/06/09	19.16.36	I	Sh.	I.	-24.6	-4.6	14/07/09	17.33.46	I	Sh.	I.	26.5	-26.3	
28/06/09	20.19.13	I	Tr.	I.	-13.0	-13.2	14/07/09	18.18.56	I	Tr.	I.	-31.5	11.5	
28/06/09	21.34.54	I	Sh.	E.	1.2	-20.8	14/07/09	19.52.08	I	Sh.	E.	-23.2	3.9	
28/06/09	22.37.17	I	Tr.	E.	11.4	-24.2	14/07/09	20.37.00	I	Tr.	E.	-6.0	-10.7	
29/06/09	10.42.02	II	Ec.	D.	-31.8	70.0	14/07/09	21.18.14	IV	Ec.	D.	2.3	-16.4	
29/06/09	15.41.42	II	Occ.	R.	-58.3	32.4	15/07/09	2.07.29	IV	Ec.	R.	9.2	-20.7	
29/06/09	16.35.58	I	Ec.	D.	-51.7	22.4	15/07/09	2.36.48	III	Sh.	I.	33.5	-15.4	
29/06/09	19.54.22	I	Occ.	R.	-16.9	-10.0	15/07/09	4.17.34	IV	Occ.	D.	32.2	-11.7	
30/06/09	13.45.11	I	Sh.	I.	-59.6	53.7	15/07/09	5.36.52	III	Tr.	I.	22.4	3.9	
30/06/09	14.46.07	I	Tr.	I.	-61.4	42.7	15/07/09	6.16.06	III	Sh.	E.	10.8	17.6	
30/06/09	16.03.29	I	Sh.	E.	-55.5	28.4	15/07/09	8.53.48	IV	Occ.	R.	4.4	24.8	
30/06/09	17.04.11	I	Tr.	E.	-46.7	17.4	15/07/09	9.14.17	III	Tr.	E.	-24.5	53.5	
30/06/09	18.36.56	III	Sh.	I.	-30.5	1.8	15/07/09	10.52.48	II	Tr.	E.	-28.3	57.0	
30/06/09	22.16.11	III	Sh.	E.	9.3	-23.5	15/07/09	12.19.19	II	Sh.	I.	-45.8	68.8	
30/06/09	22.42.01	III	Tr.	I.	13.4	-24.5	15/07/09	13.44.40	II	Tr.	E.	-57.9	65.8	
01/07/09	2.19.45	III	Tr.	E.	34.4	-12.3	15/07/09	14.52.02	I	Sh.	E.	-61.8	53.1	
01/07/09	5.43.53	II	Sh.	I.	19.0	20.3	15/07/09	15.11.07	II	Ec.	D.	-56.8	41.0	
01/07/09	7.42.13	II	Tr.	I.	0.2	42.1	15/07/09	17.52.42	I	Tr.	E.	-54.5	37.5	
01/07/09	8.35.50	II	Sh.	E.	-10.1	51.8	16/07/09	12.02.19	I	Occ.	R.	-27.3	8.2	
01/07/09	10.34.13	II	Tr.	E.	-31.9	69.2	16/07/09	12.45.14	I	Sh.	I.	-56.6	67.3	
01/07/09	11.04.26	I	Ec.	D.	-37.4	70.9	16/07/09	14.20.41	I	Tr.	I.	-60.6	62.4	
01/07/09	14.21.06	I	Occ.	R.	-61.5	47.3	16/07/09	15.03.18	I	Sh.	E.	-59.6	46.6	
02/07/09	8.13.40	I	Sh.	I.	-6.8	47.8	17/07/09	5.14.20	II	Tr.	E.	-55.0	38.9	
02/07/09	9.12.52	I	Tr.	E.	-17.7	58.1	17/07/09	9.20.30	I	Ec.	D.	13.0	13.4	
02/07/09	10.31.59	I	Sh.	E.	-32.3	68.9	17/07/09	9.33.52	II	Ec.	D.	-31.1	57.7	
02/07/09	11.30.56	I	Tr.	E.	-42.8	70.8	17/07/09	12.18.55	I	Occ.	R.	-33.5	59.8	
03/07/09	0.00.39	II	Ec.	D.	25.5	-24.3	18/07/09	6.30.59	I	Occ.	R.	-58.8	65.5	
03/07/09	4.53.24	II	Occ.	R.	24.6	11.2	18/07/09	7.11.36	I	Sh.	I.	-0.1	27.2	
03/07/09	5.32.51	I	Ec.	D.	19.4	18.1	18/07/09	8.49.22	I	Tr.	I.	-8.1	34.7	
03/07/09	8.47.45	I	Occ.	R.	-13.8	53.8	18/07/09	9.29.41	I	Sh.	E.	-26.2	52.4	
04/07/09	2.42.17	I	Sh.	I.	34.2	-9.7	18/07/09	16.35.28	III	Tr.	E.	-33.6	59.0	
04/07/09	3.39.40	I	Tr.	I.	31.4	-0.5	18/07/09	22.52.54	III	Ec.	D.	-39.1	21.6	
04/07/09	5.00.36	I	Sh.	E.	23.1	12.4	19/07/09	0.10.01	II	Occ.	R.	25.0	-26.9	
04/07/09	5.57.44	I	Tr.	E.	15.1	22.5	19/07/09	1.27.27	II	Sh.	I.	32.0	-26.1	
04/07/09	8.35.18	III	Ec.	D.	-12.3	51.5	19/07/09	3.01.53	II	Tr.	E.	33.9	-20.5	
04/07/09	12.14.25	III	Ec.	R.	-51.1	67.3	19/07/09	3.48.59	I	Sh.	E.	28.8	-8.8	
04/07/09	12.23.49	III	Occ.	D.	-52.5	66.2	19/07/09	4.19.13	II	Ec.	D.	23.8	-0.8	
04/07/09	16.01.20	III	Occ.	R.	-53.7	28.7	19/07/09	6.45.05	I	Tr.	E.	19.8	3.7	
04/07/09	19.01.05	II	Sh.	I.	-23.0	-1.7	20/07/09	0.59.34	I	Occ.	R.	-3.8	29.7	
04/07/09	20.52.12	II	Tr.	I.	-1.8	-17.2	20/07/09	1.37.50	I	Sh.	I.	33.9	-23.1	
04/07/09	21.53.01	II	Sh.	E.	8.2	-22.4	20/07/09	3.17.58	I	Tr.	E.	33.6	-19.6	
04/07/09	23.44.09	II	Tr.	E.	24.4	-24.9	20/07/09	3.55.55	I	Sh.	E.	26.8	-6.5	
05/07/09	0.01.18	I	Ec.	D.	26.4	-24.4	20/07/09	18.32.28	II	Tr.	E.	22.3	0.0	
05/07/09	3.14.20	I	Occ.	R.	32.8	-5.1	20/07/09	22.17.27	I	Ec.	D.	-16.0	1.2	
05/07/09	21.10.48	I	Sh.	I.	1.8	-19.1	20/07/09	22.42.27	II	Ec.	D.	21.6	-26.0	
05/07/09	22.06.19	I	Tr.	I.	11.0	-23.3	21/07/09	1.11.11	I	Occ.	R.	24.7	-27.0	
05/07/09	23.29.08	I	Sh.	E.	23.1	-25.3	21/07/09	19.28.15	I	Occ.	R.	33.9	-22.3	
06/07/09	0.24.23	I	Tr.	E.	29.2	-23.5	21/07/09	20.04.06	I	Sh.	I.	-5.0	-8.2	
06/07/09	10.59.34	IV	Sh.	I.	-40.3	70.3	21/07/09	21.46.39	I	Tr.	I.	1.7	-13.3	
06/07/09	13.18.39	II	Ec.	D.	-59.6	58.1	21/07/09	22.22.11	I	Sh.	E.	18.0	-24.2	
06/07/09	15.50.45	IV	Sh.	E.	-54.0	30.6	22/07/09	6.36.43	III	Tr.	E.	22.8	-26.4	
06/07/09	18.03.48	II	Occ.	R.	-32.1	6.9	22/07/09	8.58.36	III	Sh.	I.	-4.9	27.7	
06/07/09	18.29.43	I	Ec.	D.	-27.3	2.7	22/07/09	10.16.03	III	Tr.	E.	-31.1	53.4	
06/07/09	19.43.11	IV	Tr.	I.	-13.7	-8.8	22/07/09	12.35.58	III	Sh.	E.	-44.9	64.5	
06/07/09	21.40.51	I	Occ.	R.	7.5	-21.7	22/07/09	13.27.16	II	Tr.	E.	-61.7	62.7	
07/07/09	0.21.25	IV	Tr.	E.	29.3	-23.7	22/07/09	14.35.13	II	Sh.	I.	-61.6	55.2	
07/07/09	15.39.25	I	Sh.	I.	-55.0	32.7	22/07/09	16.19.06	II	Tr.	E.	-55.4	43.4	
07/07/09	16.32.59	I	Tr.	I.	-47.2	22.8	22/07/09	16.45.58	I	Sh.	E.	-39.0	24.2	
07/07/09	17.57.45	I	Sh.	E.	-32.4	7.9	22/07/09	17.26.56	II	Ec.	D.	-34.2	19.3	
07/07/09	18.51.03	I	Tr.	E.	-22.6	-0.4	22/07/09	19.37.18	I	Tr.	E.	-26.6	11.9	
07/07/09	22.36.54	III	Sh.	I.	17.0	-24.9	23/07/09	5.11.03	IV	Occ.	R.	-1.9	-9.7	
08/07/09	2.11.33	III	Tr.	I.	34.3	-14.0	23/07/09	10.01.09	IV	Sh.	I.	9.2	12.0	
										Sh.	E.	-43.1	62.6	

Date	Times	Moon	Phenomena	Phase	h	h Sun								
23/07/09	10.35.14	IV	Tr.	I.	-48.8	66.2	08/08/09	12.24.44	I	Tr.	I.	-61.6	60.3	
23/07/09	13.56.49	I	Sh.	I.	-59.3	50.1	08/08/09	14.33.26	I	Sh.	E.	-44.9	40.8	
23/07/09	14.30.14	I	Tr.	I.	-55.6	44.2	08/08/09	14.42.51	I	Tr.	E.	-43.3	39.1	
23/07/09	15.12.15	IV	Tr.	E.	-49.5	36.5	08/08/09	23.22.49	IV	Sh.	I.	32.9	-32.1	
23/07/09	16.15.13	I	Sh.	E.	-38.9	24.8	09/08/09	0.50.57	IV	Tr.	I.	31.0	-28.3	
23/07/09	16.48.19	I	Tr.	E.	-33.0	18.7	09/08/09	4.11.30	IV	Sh.	E.	6.2	-0.5	
24/07/09	7.51.29	II	Ec.	D.	-20.4	41.3	09/08/09	4.36.00	III	Ec.	D.	2.2	3.3	
24/07/09	11.14.27	I	Ec.	D.	-55.2	67.8	09/08/09	5.28.34	IV	Tr.	E.	-7.5	12.6	
24/07/09	11.51.36	II	Occ.	R.	-59.3	66.7	09/08/09	7.53.40	II	Sh.	I.	-34.2	39.2	
24/07/09	14.03.20	I	Occ.	R.	-58.2	48.8	09/08/09	8.09.58	II	Tr.	I.	-37.2	42.1	
25/07/09	8.25.32	I	Sh.	I.	-27.5	47.3	09/08/09	8.47.54	III	Occ.	R.	-43.9	48.6	
25/07/09	8.56.26	I	Tr.	I.	-33.2	52.6	09/08/09	9.31.13	I	Ec.	D.	-51.0	55.2	
25/07/09	10.43.56	I	Sh.	E.	-51.5	66.4	09/08/09	10.45.29	II	Sh.	E.	-60.4	62.9	
25/07/09	11.14.31	I	Tr.	E.	-55.8	67.6	09/08/09	11.01.34	II	Tr.	E.	-61.6	63.5	
25/07/09	20.36.08	III	Ec.	D.	9.7	-18.0	09/08/09	11.56.37	I	Occ.	R.	-62.8	62.4	
26/07/09	2.13.56	III	Occ.	R.	30.1	-16.5	10/08/09	6.43.43	I	Sh.	I.	-22.1	26.3	
26/07/09	2.44.30	II	Sh.	I.	27.3	-12.4	10/08/09	6.50.41	I	Tr.	I.	-23.4	27.6	
26/07/09	3.42.37	II	Tr.	I.	20.4	-3.3	10/08/09	9.02.08	I	Sh.	E.	-47.1	50.7	
26/07/09	5.36.20	II	Sh.	E.	2.8	16.1	10/08/09	9.08.48	I	Tr.	E.	-48.2	51.7	
26/07/09	5.42.57	I	Ec.	D.	1.8	17.3	11/08/09	2.24.44	II	Ec.	D.	20.8	-18.4	
26/07/09	6.34.18	II	Tr.	E.	-7.8	26.8	11/08/09	3.59.46	I	Ec.	D.	6.6	-3.2	
26/07/09	8.29.21	I	Occ.	R.	-29.1	47.8	11/08/09	5.31.02	II	Occ.	R.	-9.6	12.7	
27/07/09	2.54.09	I	Sh.	I.	25.8	-11.2	11/08/09	6.22.27	I	Occ.	R.	-19.0	22.2	
27/07/09	3.22.31	I	Tr.	I.	22.5	-7.0	12/08/09	1.12.30	I	Sh.	I.	28.3	-27.2	
27/07/09	5.12.33	I	Sh.	E.	6.0	11.7	12/08/09	1.16.42	I	Tr.	I.	27.9	-26.7	
27/07/09	5.40.36	I	Tr.	E.	1.4	16.7	12/08/09	3.30.55	I	Sh.	E.	10.5	-8.6	
27/07/09	21.09.42	II	Ec.	D.	16.2	-22.1	12/08/09	3.34.50	I	Tr.	E.	9.9	-8.0	
28/07/09	0.11.27	I	Ec.	D.	33.3	-27.8	12/08/09	18.39.07	III	Sh.	I.	3.0	-4.6	
28/07/09	0.59.32	II	Occ.	R.	33.4	-24.7	12/08/09	18.51.36	III	Tr.	I.	5.1	-6.8	
28/07/09	2.55.19	I	Occ.	R.	25.2	-11.2	12/08/09	21.11.00	II	Sh.	I.	25.0	-26.3	
28/07/09	21.22.51	I	Sh.	I.	18.7	-23.6	12/08/09	21.16.30	II	Tr.	I.	25.6	-26.9	
28/07/09	21.48.39	I	Tr.	I.	22.1	-25.8	12/08/09	22.18.28	III	Sh.	E.	30.8	-31.7	
28/07/09	23.41.16	I	Sh.	E.	32.4	-29.0	12/08/09	22.28.21	I	Ec.	D.	31.4	-32.2	
29/07/09	0.06.45	I	Tr.	E.	33.3	-28.3	12/08/09	22.29.10	III	Tr.	E.	31.4	-32.3	
29/07/09	10.36.59	III	Sh.	I.	-53.2	65.1	13/08/09	0.02.50	II	Sh.	E.	32.3	-32.4	
29/07/09	12.17.40	III	Tr.	I.	-62.3	63.5	13/08/09	0.08.05	II	Tr.	E.	32.1	-32.1	
29/07/09	14.16.22	III	Sh.	E.	-54.1	45.8	13/08/09	0.48.19	I	Occ.	R.	29.8	-29.6	
29/07/09	15.55.03	III	Tr.	E.	-38.0	27.7	13/08/09	19.41.10	I	Sh.	I.	13.6	-15.0	
29/07/09	16.01.46	II	Sh.	I.	-36.8	26.5	13/08/09	19.42.37	I	Tr.	I.	13.8	-15.2	
29/07/09	16.49.45	II	Tr.	I.	-28.0	17.6	13/08/09	21.59.35	I	Sh.	E.	29.8	-30.9	
29/07/09	18.39.59	I	Ec.	D.	-7.7	-1.1	13/08/09	22.00.45	I	Tr.	E.	29.9	-31.0	
29/07/09	18.53.35	II	Sh.	E.	-5.4	-3.9	14/08/09	15.44.01	II	Ec.	D.	-27.6	26.6	
29/07/09	19.41.25	II	Tr.	E.	3.5	-11.5	14/08/09	16.56.56	I	Ec.	D.	-14.0	13.1	
29/07/09	21.21.17	I	Occ.	R.	19.0	-23.7	14/08/09	18.39.18	II	Ec.	R.	4.4	-5.2	
30/07/09	15.51.28	I	Sh.	I.	-37.9	28.2	14/08/09	19.14.24	I	Ec.	R.	10.1	-11.1	
30/07/09	16.14.39	I	Tr.	I.	-33.7	23.9	15/08/09	19.42.37	I	Tr.	I.	-44.0	43.5	
30/07/09	18.09.53	I	Sh.	E.	-12.4	3.3	15/08/09	14.09.58	I	Sh.	I.	-43.8	43.2	
30/07/09	18.32.45	I	Tr.	E.	-8.2	-0.2	15/08/09	16.26.47	I	Tr.	E.	-18.8	18.4	
31/07/09	10.28.49	II	Ec.	D.	-53.3	63.9	15/08/09	16.28.24	I	Sh.	E.	-18.5	18.1	
31/07/09	13.08.30	I	Ec.	D.	-60.7	56.6	16/08/09	16.28.24	I	Occ.	D.	-45.7	43.6	
31/07/09	14.08.05	II	Occ.	R.	-54.1	46.9	16/08/09	8.26.01	III	Tr.	I.	-61.4	59.4	
31/07/09	15.27.21	IV	Ec.	D.	-41.4	32.5	16/08/09	10.23.00	II	Sh.	I.	-61.8	59.8	
31/07/09	15.47.13	I	Occ.	R.	-37.9	28.8	16/08/09	10.28.22	II	Sh.	I.	-61.8	59.8	
31/07/09	23.27.02	IV	Occ.	R.	32.2	-30.0	16/08/09	11.22.50	I	Occ.	D.	-63.1	61.6	
01/08/09	10.20.12	I	Sh.	I.	-52.8	62.9	16/08/09	12.15.02	III	Ec.	R.	-59.8	58.9	
01/08/09	10.40.45	I	Tr.	I.	-55.6	64.6	16/08/09	13.14.35	II	Tr.	E.	-52.2	51.8	
01/08/09	12.38.37	I	Sh.	E.	-62.2	60.5	16/08/09	13.20.12	II	Sh.	E.	-51.3	50.9	
01/08/09	12.58.50	I	Tr.	E.	-61.1	57.8	16/08/09	13.42.59	I	Ec.	R.	-47.7	47.4	
02/08/09	0.36.04	III	Ec.	D.	33.2	-27.6	17/08/09	8.34.36	I	Tr.	I.	-47.9	44.9	
02/08/09	5.19.03	II	Sh.	I.	0.5	12.0	17/08/09	8.38.42	I	Sh.	I.	-48.6	45.5	
02/08/09	5.31.45	III	Occ.	R.	-1.5	14.3	17/08/09	9.02.28	IV	Occ.	D.	-52.3	49.3	
02/08/09	5.56.40	II	Tr.	I.	-6.7	18.8	17/08/09	10.52.45	I	Tr.	E.	-63.1	60.9	
02/08/09	7.37.02	I	Ec.	D.	-25.2	37.3	17/08/09	10.57.07	I	Sh.	E.	-63.2	61.0	
02/08/09	8.10.53	II	Sh.	E.	-31.5	43.5	17/08/09	14.24.32	IV	Sh.	R.	-39.8	40.2	
02/08/09	8.48.18	II	Tr.	E.	-38.3	49.9	18/08/09	4.51.19	II	Occ.	D.	-8.2	4.4	
02/08/09	10.13.07	I	Occ.	R.	-52.4	62.0	18/08/09	5.48.42	I	Occ.	D.	-18.7	14.8	
03/08/09	4.48.52	I	Sh.	I.	4.6	6.5	18/08/09	7.57.47	II	Ec.	R.	-42.4	38.4	
03/08/09	5.06.44	I	Tr.	I.	1.7	9.6	18/08/09	8.11.34	I	Ec.	R.	-44.8	40.8	
03/08/09	7.07.17	I	Sh.	E.	-20.6	31.7	19/08/09	3.00.39	I	Tr.	I.	10.2	-14.8	
03/08/09	7.24.50	I	Tr.	E.	-23.8	35.0	19/08/09	3.07.31	I	Sh.	I.	9.1	-13.8	
03/08/09	23.47.06	II	Ec.	D.	33.2	-30.4	19/08/09	5.18.48	I	Tr.	E.	-14.1	9.1	
04/08/09	2.05.33	I	Ec.	D.	26.9	-19.3	19/08/09	5.25.56	I	Sh.	E.	-15.4	10.4	
04/08/09	3.15.34	II	Occ.	R.	18.4	-9.5	19/08/09	22.08.08	III	Tr.	I.	31.6	-33.4	
04/08/09	4.39.00	I	Occ.	R.	5.5	4.6	19/08/09	22.40.45	III	Sh.	I.	32.5	-35.0	
04/08/09	23.17.36	I	Sh.	I.	32.4	-31.0	19/08/09	23.29.36	II	Tr.	I.	32.1	-35.5	
04/08/09	23.32.47	I	Tr.	I.	32.9	-30.9	19/08/09	23.45.47	II	Sh.	I.	31.4	-35.1	
05/08/09	1.36.02	I	Sh.	E.	29.2	-23.0	20/08/09	0.14.36	I	Occ.	D.	29.7	-33.9	
05/08/09	1.50.53	I	Tr.	E.	27.9	-21.3	20/08/09	1.45.48	III	Tr.	E.	20.4	-25.6	
05/08/09	14.38.12	III	Sh.	I.	-46.2	40.6	20/08/09	2.20.01	III	Sh.	E.	15.6	-21.1	
05/08/09	15.35.27	III	Tr.	I.	-36.2	30.1	20/08/09	2.21.11	II	Tr.	E.	15.5	-20.9	
05/08/09	18.17.36	III	Sh.	E.	-6.3	1.0	20/08/09	2.37.38	II	Sh.	E.	13.0	-18.5	
05/08/09	18.36.22	II	Sh.	I.	-2.4	-2.0	20/08/09	2.40.10	I	Ec.	R.	12.6	-18.2	
05/08/09	19.03.23	II	Tr.	I.	2.1	-7.1	20/08/09	2.12.36	I	Tr.	I.	29.4	-30.4	
05/08/09	19.12.55	III	Tr.	E.	3.7	-8.7	20/08/09	21.36.13	I	Sh.	I.	30.1	-31.3	
05/08/09	20.34.07	I	Ec.	D.	16.5	-20.2	20/08/09	23.44.46	I	Tr.	E.	31.2	-35.5	
05/08/09	21.28.11	II	Sh.	E.	23.7	-26.1	20/08/09	23.54.38	I	Sh.	E.	30.7	-35.1	
05/08/09	21.55.00	II	Tr.	E.	26.6	-28.2	21/08/09	17.59.31	II	Occ.	D.	2.8	0.4	
05/08/09	23.04.53	I	Occ.	R.	32.0	-31.2	21/08/09	18.40.31	I	Occ.	D.	9.4	-7.4	
06/08/09	17.46.15	I	Sh.	I.	-11.3	6.0	21/08/09	21.08.47	I	Ec.	R.	28.3	-28.9	
06/08/09	17.58.42	I	Tr.	I.	-9.0	3.9	21/08/09	21.17.12	II	Ec.	R.	29.0	-29.8	
06/08/09	20.04.40	I	Sh.	E.	12.7	-16.6	22/08/09	15.52.42	I	Tr.	I.	-19.6	23.0	
06/08/09	20.16.49	I	Tr.	E.	14.6	-18.2	22/08/09	16.05.04	I	Sh.	I.	-17.3	20.7	
07/08/09	13.06.19	II	Ec.	D.	-58.3	55.3	22/08/09	18.10.52	I	Tr.	E.	5.4	-1.7	
07/08/09	15.02.40	I	Ec.	D.	-40.6	35.8	22/08/09	18.23.28	I	Sh.	E.	7.4	-4.6	
07/08/09	16.23.46	II	Occ.	R.	-25.8	20.8	23/08/09	11.41.47	III	Occ.	D.	-60.3	58.7	
07/08/09	17.30.46	I	Occ.	R.	-13.3	8.5	23/08/09	12.36.16	II	Tr.	I.	-53.5	54.5	
08/08/09	12.15.01	I	Sh.	I.	-62.2	61.2	23/08/09	13.03.11	II	Sh.	I.	-49.3	51.2	
							23/08/09	13.06.26	I	Occ.	D.	-48.8	50.8	
							23/08/09	15.27.51	II	Tr.	E.	-23.4	27.3	

Date	Times	Moon	Phenomena	Phase	h	h Sun	08/09/09	11.01.22	I	Occ.	D.	-57.4	53.5
23/08/09	15.37.23	I	Ec.	R.	-21.6	25.5	08/09/09	11.41.23	II	Occ.	D.	-51.6	52.9
23/08/09	15.55.03	II	Sh.	E.	-18.3	22.3	08/09/09	13.55.16	I	Ec.	R.	-27.9	38.3
23/08/09	16.15.15	III	Ec.	R.	-14.6	18.5	08/09/09	15.51.59	II	Ec.	R.	-6.5	18.1
24/08/09	10.18.44	I	Tr.	I.	-63.4	56.7	09/09/09	8.15.04	I	Tr.	I.	-60.1	36.7
24/08/09	10.33.49	I	Sh.	I.	-63.6	57.7	09/09/09	8.53.21	I	Sh.	I.	-63.3	42.4
24/08/09	12.36.54	I	Tr.	E.	-52.8	54.1	09/09/09	10.33.18	I	Tr.	E.	-60.3	52.3
24/08/09	12.52.13	I	Sh.	E.	-50.4	52.3	09/09/09	11.11.43	I	Sh.	E.	-55.4	53.2
25/08/09	7.07.00	II	Occ.	D.	-39.1	28.0	10/09/09	5.27.43	I	Occ.	D.	-34.2	6.9
25/08/09	7.32.23	I	Occ.	D.	-43.6	32.6	10/09/09	6.13.28	II	Tr.	I.	-42.4	15.3
25/08/09	10.06.00	I	Ec.	R.	-63.1	55.3	10/09/09	7.30.47	II	Sh.	I.	-55.1	29.1
25/08/09	10.35.45	II	Ec.	R.	-63.6	57.5	10/09/09	8.03.52	III	Tr.	I.	-59.4	34.6
25/08/09	14.57.13	IV	Tr.	I.	-27.5	32.3	10/09/09	8.23.57	I	Ec.	R.	-61.5	37.8
25/08/09	17.36.00	IV	Sh.	I.	1.8	3.2	10/09/09	9.05.06	II	Tr.	E.	-64.0	43.7
25/08/09	19.36.39	IV	Tr.	E.	20.1	-17.8	10/09/09	10.22.45	II	Sh.	E.	-60.9	51.4
25/08/09	22.22.48	IV	Sh.	E.	32.4	-36.3	10/09/09	10.43.41	III	Sh.	I.	-58.6	52.4
26/08/09	4.44.52	I	Tr.	I.	-13.7	1.9	10/09/09	11.42.01	III	Tr.	E.	-50.2	52.1
26/08/09	5.02.40	I	Sh.	I.	-17.0	5.0	10/09/09	14.22.36	III	Sh.	E.	-21.3	33.2
26/08/09	7.03.03	I	Tr.	E.	-39.2	27.1	11/09/09	2.41.30	I	Tr.	I.	-4.3	-23.0
26/08/09	7.21.04	I	Sh.	E.	-42.4	30.4	11/09/09	3.22.09	I	Sh.	I.	-11.8	-16.3
27/08/09	1.24.44	III	Tr.	I.	18.8	-29.9	11/09/09	4.59.45	I	Tr.	E.	-29.8	1.7
27/08/09	1.43.08	II	Tr.	I.	16.3	-27.7	11/09/09	5.23.07	IV	Tr.	I.	-34.1	5.8
27/08/09	1.58.22	I	Occ.	D.	14.0	-25.7	11/09/09	5.40.30	I	Sh.	E.	-37.3	9.0
27/08/09	2.20.39	II	Sh.	I.	10.7	-22.7	11/09/09	10.04.58	IV	Tr.	E.	-62.2	49.8
27/08/09	2.41.44	III	Sh.	I.	7.3	-19.5	11/09/09	11.50.33	IV	Sh.	I.	-48.1	51.3
27/08/09	4.34.38	I	Ec.	R.	-12.7	0.1	11/09/09	16.35.05	IV	Sh.	E.	3.5	9.2
27/08/09	4.34.43	II	Tr.	E.	-12.7	0.1	11/09/09	23.54.07	I	Occ.	D.	21.0	-42.7
27/08/09	5.02.33	III	Tr.	E.	-17.8	4.8	12/09/09	0.51.23	II	Occ.	D.	13.2	-38.2
27/08/09	5.12.31	II	Sh.	E.	-19.7	6.6	12/09/09	2.52.41	I	Ec.	R.	-7.2	-21.5
27/08/09	6.20.53	III	Sh.	E.	-32.4	19.2	12/09/09	5.11.33	II	Ec.	R.	-32.8	3.6
27/08/09	23.10.56	I	Tr.	I.	31.1	-38.3	12/09/09	21.08.06	I	Tr.	I.	31.7	-36.7
27/08/09	23.31.25	I	Sh.	I.	29.9	-38.1	12/09/09	21.51.05	I	Sh.	I.	31.0	-40.9
28/08/09	1.29.07	I	Tr.	E.	17.6	-29.7	12/09/09	23.26.21	I	Tr.	E.	23.7	-44.0
28/08/09	1.49.49	I	Sh.	E.	14.6	-27.1	13/09/09	0.09.25	I	Sh.	E.	18.5	-42.1
28/08/09	20.15.36	II	Occ.	D.	26.0	-24.5	13/09/09	18.20.34	I	Occ.	D.	20.4	-11.0
28/08/09	20.24.24	I	Occ.	D.	26.8	-25.7	13/09/09	19.22.00	II	Tr.	I.	27.0	-21.7
28/08/09	23.03.17	I	Ec.	R.	31.2	-38.6	13/09/09	20.48.25	II	Sh.	I.	31.6	-34.6
28/08/09	23.55.15	II	Ec.	R.	27.8	-37.7	13/09/09	21.21.22	I	Ec.	R.	31.6	-38.5
29/08/09	17.37.09	I	Tr.	I.	4.7	1.9	13/09/09	21.42.54	III	Occ.	D.	31.1	-40.6
29/08/09	18.00.17	I	Sh.	I.	8.4	-1.9	13/09/09	22.13.41	II	Tr.	E.	29.6	-42.9
29/08/09	19.55.21	I	Tr.	E.	24.3	-21.9	13/09/09	23.40.26	II	Sh.	E.	21.6	-44.0
29/08/09	20.18.40	I	Sh.	E.	26.7	-25.3	14/09/09	4.18.43	III	Ec.	R.	-24.6	-6.8
30/08/09	14.50.13	II	Tr.	I.	-24.8	32.0	14/09/09	15.34.41	I	Tr.	I.	-5.0	19.3
30/08/09	14.50.27	I	Occ.	D.	-24.8	32.0	14/09/09	16.19.55	I	Sh.	I.	3.1	11.0
30/08/09	14.59.40	III	Occ.	D.	-23.1	30.3	14/09/09	17.52.56	I	Tr.	E.	17.3	-6.4
30/08/09	15.38.06	II	Sh.	I.	-15.9	23.4	14/09/09	18.38.15	I	Sh.	E.	23.0	-14.5
30/08/09	17.31.55	I	Ec.	R.	4.5	2.6	15/09/09	12.47.04	I	Occ.	D.	-35.1	44.9
30/08/09	17.41.49	II	Tr.	E.	6.1	0.9	15/09/09	14.00.55	II	Occ.	D.	-21.4	34.9
30/08/09	18.30.01	II	Sh.	E.	13.7	-8.2	15/09/09	15.50.05	I	Ec.	R.	-0.8	16.2
30/08/09	20.16.22	III	Ec.	R.	26.8	-25.3	15/09/09	18.30.15	II	Ec.	R.	22.5	-13.4
31/08/09	12.03.19	I	Tr.	I.	-53.4	54.7	16/09/09	10.01.25	I	Tr.	I.	-60.6	47.9
31/08/09	12.29.04	I	Sh.	I.	-49.4	52.5	16/09/09	10.48.52	I	Sh.	I.	-54.6	50.3
31/08/09	14.21.31	I	Tr.	E.	-29.4	36.7	16/09/09	12.19.41	I	Tr.	E.	-39.3	47.2
31/08/09	14.47.27	I	Sh.	E.	-24.5	32.2	16/09/09	13.07.11	I	Sh.	E.	-30.6	42.2
01/09/09	9.16.32	I	Occ.	D.	-62.3	47.7	17/09/09	7.13.39	I	Occ.	D.	-57.0	24.6
01/09/09	9.23.33	II	Occ.	D.	-62.8	48.6	17/09/09	8.31.00	II	Tr.	I.	-64.1	37.1
01/09/09	12.00.34	I	Ec.	R.	-53.2	54.5	17/09/09	10.06.03	II	Sh.	I.	-59.7	47.9
01/09/09	13.13.50	II	Ec.	R.	-41.0	46.8	17/09/09	10.18.48	I	Ec.	R.	-58.1	48.7
02/09/09	6.29.37	I	Tr.	I.	-38.9	19.7	17/09/09	11.22.40	II	Tr.	E.	-48.6	49.9
02/09/09	6.57.57	I	Sh.	I.	-43.9	24.9	17/09/09	11.28.21	III	Tr.	I.	-47.6	49.8
02/09/09	8.47.49	I	Tr.	E.	-60.2	43.4	17/09/09	12.58.06	II	Sh.	E.	-31.5	42.9
02/09/09	9.16.20	I	Sh.	E.	-62.6	47.4	17/09/09	14.45.02	III	Sh.	I.	-11.8	27.0
02/09/09	23.18.03	IV	Occ.	D.	28.8	-40.4	17/09/09	15.06.43	III	Tr.	E.	-7.8	23.3
03/09/09	3.42.41	I	Occ.	D.	-9.0	-11.1	17/09/09	18.23.49	III	Sh.	E.	22.7	-13.0
03/09/09	3.57.37	II	Tr.	I.	-11.7	-8.5	18/09/09	4.28.06	I	Tr.	I.	-29.6	-5.9
03/09/09	4.43.01	III	Tr.	I.	-20.1	0.3	18/09/09	5.17.41	I	Sh.	I.	-38.7	3.6
03/09/09	4.55.39	II	Sh.	I.	-22.4	2.4	18/09/09	6.46.22	I	Tr.	E.	-53.7	19.6
03/09/09	6.29.14	I	Ec.	R.	-39.7	19.5	18/09/09	7.36.00	I	Sh.	E.	-60.3	28.2
03/09/09	6.42.41	III	Sh.	I.	-42.1	21.9	19/09/09	1.40.19	I	Occ.	D.	0.7	-34.3
03/09/09	6.49.13	II	Tr.	E.	-43.2	23.1	19/09/09	3.11.50	II	Occ.	D.	-16.3	-19.8
03/09/09	7.47.34	II	Sh.	E.	-52.9	33.5	19/09/09	4.47.33	I	Ec.	R.	-34.0	-1.8
03/09/09	8.20.58	III	Tr.	E.	-57.6	39.0	19/09/09	7.49.48	II	Ec.	R.	-62.1	30.3
03/09/09	8.33.49	IV	Ec.	R.	-59.1	41.0	19/09/09	14.05.11	IV	Occ.	D.	-17.5	32.8
03/09/09	10.21.42	III	Sh.	E.	-63.2	53.7	19/09/09	18.47.07	IV	Occ.	R.	26.0	-17.8
04/09/09	0.55.50	I	Tr.	I.	17.7	-35.3	19/09/09	22.01.42	IV	Ec.	D.	28.6	-44.5
04/09/09	1.26.44	I	Sh.	I.	13.3	-31.9	19/09/09	22.54.58	I	Tr.	I.	23.7	-46.8
04/09/09	3.14.03	I	Tr.	E.	-4.5	-16.1	19/09/09	23.46.38	I	Tr.	I.	17.4	-45.9
04/09/09	3.45.06	I	Sh.	E.	-10.3	-10.9	20/09/09	1.13.14	I	Tr.	E.	4.3	-38.2
04/09/09	22.08.52	I	Occ.	D.	31.7	-39.1	20/09/09	2.04.56	I	Sh.	E.	-4.8	-31.0
04/09/09	22.32.44	II	Occ.	D.	30.9	-40.4	20/09/09	2.43.30	IV	Ec.	R.	-11.9	-24.8
05/09/09	0.57.55	I	Ec.	R.	16.8	-35.4	20/09/09	20.07.01	I	Occ.	D.	31.2	-31.4
05/09/09	2.33.21	II	Ec.	R.	2.0	-22.9	20/09/09	21.40.33	II	Tr.	I.	29.6	-43.2
05/09/09	19.22.13	I	Tr.	I.	23.8	-19.0	20/09/09	23.16.16	I	Ec.	R.	20.8	-47.2
05/09/09	19.55.37	I	Sh.	I.	27.1	-24.3	20/09/09	23.23.47	II	Sh.	I.	19.8	-47.1
05/09/09	21.40.27	I	Tr.	E.	32.0	-37.3	21/09/09	0.32.16	II	Tr.	E.	10.1	-43.0
05/09/09	22.14.00	I	Sh.	E.	31.4	-39.8	21/09/09	1.09.15	III	Occ.	D.	4.2	-39.0
06/09/09	16.35.06	I	Occ.	D.	0.2	10.8	21/09/09	2.15.53	II	Sh.	E.	-7.6	-29.5
06/09/09	17.05.22	II	Tr.	I.	5.0	5.2	21/09/09	8.19.28	III	Ec.	R.	-64.3	34.4
06/09/09	18.13.13	II	Sh.	I.	15.5	-7.5	21/09/09	17.21.49	I	Tr.	I.	17.0	-2.2
06/09/09	18.19.28	III	Occ.	D.	16.4	-8.6	21/09/09	18.15.30	I	Sh.	I.	23.6	-12.8
06/09/09	19.26.35	I	Ec.	R.	24.7	-20.1	21/09/09	19.40.05	I	Tr.	E.	30.3	-27.5
06/09/09	19.57.00	II	Tr.	E.	27.6	-24.9	21/09/09	20.33.47	I	Sh.	E.	31.5	-35.7
06/09/09	21.05.10	II	Sh.	E.	31.5	-34.1	22/09/09	14.33.47	I	Occ.	D.	-10.0	27.2
07/09/09	0.17.14	III	Ec.	R.	21.0	-39.6	22/09/09	16.22.23	II	Occ.	D.	8.8	8.0
07/09/09	13.48.35	I	Tr.	I.	-30.0	39.6	22/09/09	17.45.01	I	Ec.	R.	20.5	-7.5
07/09/09	14.24.27	I	Sh.	I.	-23.3	33.9	22/09/09	21.08.31	II	Ec.	R.	30.7	-40.6
07/09/09	16.06.48	I	Tr.	E.	-4.4	15.7	23/09/09	11.48.49	I	Tr.	I.	-39.7	46.6
07/09/09	16.42.48	I	Sh.	E.	2.1	9.0	23/09/09	12.44.28	I	Sh.	I.	-29.5	42.1

Date	Times	Moon	Phenomena	Phase	h	h Sun							
23/09/09	14.07.05	I	Tr.	E.	-14.1	31.1	07/10/09	18.54.03	I	Sh.	E.	30.9	-24.9
23/09/09	15.02.44	I	Sh.	E.	-3.9	21.9	08/10/09	12.38.09	I	Occ.	D.	-19.3	37.0
24/09/09	9.00.39	I	Occ.	D.	-63.2	39.2	08/10/09	15.36.35	II	Tr.	I.	11.7	11.1
24/09/09	10.50.35	II	Tr.	I.	-49.1	47.3	08/10/09	16.03.59	I	Ec.	R.	15.7	6.2
24/09/09	12.13.46	I	Ec.	R.	-34.4	44.6	08/10/09	17.52.53	II	Sh.	I.	27.8	-14.1
24/09/09	12.41.31	II	Sh.	I.	-29.2	42.0	08/10/09	18.28.30	II	Tr.	E.	30.1	-20.6
24/09/09	13.42.20	II	Tr.	E.	-17.9	34.4	08/10/09	20.45.11	II	Sh.	E.	28.2	-43.5
24/09/09	14.57.39	III	Tr.	I.	-4.1	22.4	08/10/09	22.09.54	III	Tr.	I.	19.6	-52.6
24/09/09	15.33.38	II	Sh.	E.	2.3	16.2	09/10/09	1.48.45	III	Tr.	E.	-16.3	-38.3
24/09/09	18.36.14	III	Tr.	E.	26.8	-17.5	09/10/09	2.51.36	III	Sh.	I.	-27.9	-27.7
24/09/09	18.47.17	III	Sh.	I.	27.8	-19.5	09/10/09	6.29.49	III	Sh.	E.	-62.5	12.2
24/09/09	22.25.56	III	Sh.	E.	24.5	-47.9	09/10/09	9.54.41	I	Tr.	I.	-48.3	39.4
25/09/09	6.15.47	I	Tr.	I.	-53.7	12.7	09/10/09	11.04.46	I	Sh.	I.	-35.9	41.6
25/09/09	7.13.19	I	Sh.	I.	-61.1	22.8	09/10/09	12.12.59	I	Tr.	E.	-23.3	38.8
25/09/09	8.34.03	I	Tr.	E.	-64.3	35.4	09/10/09	13.22.55	I	Sh.	E.	-10.4	31.6
25/09/09	9.31.35	I	Sh.	E.	-59.9	42.3	10/10/09	7.05.42	I	Occ.	D.	-64.6	18.1
26/09/09	3.27.35	I	Occ.	D.	-24.7	-18.5	10/10/09	10.26.30	II	Occ.	D.	-42.1	40.7
26/09/09	5.34.23	II	Occ.	D.	-47.7	5.0	10/10/09	10.32.49	I	Ec.	R.	-41.0	40.9
26/09/09	6.42.33	I	Ec.	R.	-58.1	17.3	10/10/09	15.44.36	II	Ec.	R.	14.0	9.0
26/09/09	10.28.03	II	Ec.	R.	-51.4	45.9	11/10/09	4.22.26	I	Tr.	I.	-45.9	-11.5
27/09/09	0.42.55	I	Tr.	I.	4.3	-43.8	11/10/09	5.33.45	I	Sh.	I.	-57.1	2.0
27/09/09	1.42.16	I	Sh.	I.	-6.2	-36.2	11/10/09	6.40.44	I	Tr.	E.	-63.8	13.6
27/09/09	3.01.12	I	Tr.	E.	-20.6	-23.4	11/10/09	7.51.53	I	Sh.	E.	-63.3	25.0
27/09/09	4.00.32	I	Sh.	E.	-31.6	-12.8	12/10/09	1.33.18	I	Occ.	D.	-15.6	-41.4
27/09/09	20.32.01	IV	Tr.	I.	31.1	-37.6	12/10/09	4.49.35	II	Tr.	I.	-51.1	-6.7
27/09/09	21.54.34	I	Occ.	D.	26.3	-47.1	12/10/09	5.01.37	I	Ec.	R.	-53.0	-4.3
28/09/09	0.01.12	II	Tr.	I.	10.3	-47.9	12/10/09	7.10.49	II	Sh.	I.	-64.7	18.4
28/09/09	1.11.17	I	Ec.	R.	-0.7	-40.7	12/10/09	7.41.33	II	Tr.	E.	-63.7	23.2
28/09/09	1.16.18	IV	Tr.	E.	-1.5	-40.1	12/10/09	10.03.11	II	Sh.	E.	-44.8	38.9
28/09/09	1.59.18	II	Sh.	I.	-10.0	-33.9	12/10/09	11.54.50	III	Occ.	D.	-24.4	38.8
28/09/09	2.52.59	II	Tr.	E.	-19.8	-25.0	12/10/09	15.33.30	III	Occ.	R.	13.6	10.4
28/09/09	4.39.48	III	Occ.	D.	-39.6	-5.7	12/10/09	16.44.04	III	Ec.	D.	22.8	-1.8
28/09/09	4.51.28	II	Sh.	E.	-41.7	-3.1	12/10/09	20.22.01	III	Ec.	R.	28.7	-41.4
28/09/09	6.05.37	IV	Sh.	I.	-54.1	10.3	12/10/09	22.50.11	I	Tr.	I.	11.8	-55.7
28/09/09	8.18.08	III	Occ.	R.	-64.4	32.3	13/10/09	0.02.40	I	Sh.	I.	0.4	-52.9
28/09/09	8.41.53	III	Ec.	D.	-63.4	35.6	13/10/09	1.08.29	I	Tr.	E.	-11.8	-45.3
28/09/09	10.47.29	IV	Sh.	E.	-46.9	45.7	13/10/09	2.20.47	I	Sh.	E.	-25.1	-33.9
28/09/09	12.20.11	III	Ec.	R.	-30.2	42.5	13/10/09	20.00.59	I	Occ.	D.	29.8	-38.4
28/09/09	19.10.04	I	Tr.	I.	30.2	-24.8	13/10/09	23.30.26	I	Ec.	R.	4.9	-55.4
28/09/09	20.11.10	I	Sh.	I.	31.4	-34.9	13/10/09	23.40.38	II	Occ.	D.	3.2	-54.8
28/09/09	21.28.21	I	Tr.	E.	28.1	-45.1	14/10/09	5.03.21	II	Ec.	R.	-54.4	-4.4
28/09/09	22.29.24	I	Sh.	E.	22.3	-49.7	14/10/09	12.39.34	IV	Tr.	I.	-14.7	34.6
29/09/09	16.21.39	I	Occ.	D.	13.0	5.9	14/10/09	17.18.06	I	Tr.	I.	26.9	-9.4
29/09/09	18.46.07	II	Occ.	D.	29.1	-20.9	14/10/09	17.25.39	IV	Tr.	E.	27.6	-10.8
29/09/09	19.40.03	I	Ec.	R.	31.2	-30.3	14/10/09	18.31.40	I	Sh.	I.	31.0	-23.0
29/09/09	23.46.50	II	Ec.	R.	11.2	-49.5	14/10/09	19.36.24	I	Tr.	E.	30.7	-34.5
30/09/09	13.37.22	I	Tr.	I.	-14.3	32.9	14/10/09	20.49.47	I	Sh.	E.	25.9	-46.2
30/09/09	14.40.09	I	Sh.	I.	-2.5	23.3	15/10/09	0.21.42	IV	Sh.	I.	-4.7	-51.8
30/09/09	15.55.39	I	Tr.	E.	9.7	10.2	15/10/09	5.00.23	IV	Sh.	E.	-54.6	-5.3
30/09/09	16.58.22	I	Sh.	E.	18.7	-0.7	15/10/09	14.28.44	I	Occ.	D.	5.4	20.1
01/10/09	10.48.48	I	Occ.	D.	-44.5	44.6	15/10/09	17.59.14	I	Ec.	R.	30.0	-17.3
01/10/09	13.12.23	II	Tr.	I.	-18.2	35.8	15/10/09	18.03.12	II	Tr.	I.	30.2	-18.0
01/10/09	14.08.49	I	Ec.	R.	-7.9	28.0	15/10/09	20.28.47	II	Sh.	I.	27.4	-43.4
01/10/09	15.17.06	II	Sh.	I.	4.2	16.7	15/10/09	20.55.13	II	Tr.	E.	25.0	-47.3
01/10/09	16.04.12	II	Tr.	E.	11.6	8.4	15/10/09	23.21.12	II	Sh.	E.	5.1	-56.5
01/10/09	18.09.19	II	Sh.	E.	26.9	-14.9	16/10/09	1.52.51	III	Tr.	I.	-22.1	-39.3
01/10/09	18.31.04	III	Tr.	I.	28.6	-18.9	16/10/09	5.31.48	III	Tr.	E.	-59.4	0.7
01/10/09	22.09.49	III	Tr.	E.	23.1	-49.8	16/10/09	6.53.21	III	Sh.	I.	-64.7	14.6
01/10/09	22.49.08	III	Sh.	I.	18.3	-51.4	16/10/09	10.31.17	III	Sh.	E.	-37.0	38.6
02/10/09	2.27.36	III	Sh.	E.	-18.2	-30.2	16/10/09	11.45.59	I	Tr.	I.	-23.1	37.8
02/10/09	8.04.37	I	Tr.	I.	-64.4	29.3	16/10/09	13.00.34	I	Sh.	I.	-9.5	31.7
02/10/09	9.09.01	I	Sh.	I.	-59.3	37.7	16/10/09	14.04.16	I	Tr.	E.	2.1	23.5
02/10/09	10.22.55	I	Tr.	E.	-48.3	43.5	16/10/09	15.18.39	I	Sh.	E.	13.7	11.7
02/10/09	11.27.13	I	Sh.	E.	-36.9	43.9	17/10/09	8.56.36	I	Occ.	D.	-52.6	31.7
03/10/09	5.16.02	I	Occ.	D.	-49.5	0.6	17/10/09	12.28.05	I	Ec.	R.	-14.6	34.6
03/10/09	7.59.16	II	Occ.	D.	-64.5	28.2	17/10/09	12.56.12	II	Occ.	D.	-9.5	31.8
03/10/09	8.37.38	I	Ec.	R.	-62.2	33.6	17/10/09	18.22.49	II	Ec.	R.	31.1	-22.2
03/10/09	13.06.21	II	Ec.	R.	-17.8	35.8	18/10/09	6.14.02	I	Tr.	I.	-63.9	7.5
04/10/09	2.32.04	I	Tr.	I.	-20.5	-29.9	18/10/09	7.29.34	I	Sh.	I.	-62.9	19.9
04/10/09	3.37.59	I	Sh.	I.	-32.8	-18.3	18/10/09	8.32.19	I	Tr.	E.	-55.7	28.6
04/10/09	4.50.21	I	Tr.	E.	-45.8	-4.9	18/10/09	9.47.38	I	Sh.	E.	-43.4	35.9
04/10/09	5.56.11	I	Sh.	E.	-56.3	7.4	19/10/09	3.24.30	I	Occ.	D.	-41.1	-23.9
04/10/09	23.43.19	I	Occ.	D.	8.6	-51.5	19/10/09	6.56.54	I	Ec.	R.	-64.4	14.5
05/10/09	2.24.11	II	Tr.	I.	-19.8	-31.5	19/10/09	7.17.26	II	Tr.	I.	-63.5	17.7
05/10/09	3.06.24	I	Ec.	R.	-27.7	-24.2	19/10/09	9.46.48	II	Sh.	I.	-42.9	35.5
05/10/09	4.34.58	II	Sh.	I.	-43.8	-8.0	19/10/09	10.09.31	II	Tr.	E.	-38.8	36.8
05/10/09	5.16.03	II	Tr.	E.	-50.8	0.2	19/10/09	12.39.16	II	Sh.	E.	-11.2	32.9
05/10/09	7.27.13	II	Sh.	E.	-64.6	22.8	19/10/09	15.40.30	III	Occ.	D.	18.4	7.1
05/10/09	8.14.51	III	Occ.	D.	-63.3	30.0	19/10/09	19.19.20	III	Occ.	R.	30.6	-33.0
05/10/09	11.53.21	III	Occ.	R.	-29.9	41.6	19/10/09	20.46.10	III	Ec.	D.	24.4	-47.3
05/10/09	12.42.52	III	Ec.	D.	-20.7	37.6	20/10/09	0.23.55	III	Tr.	I.	-8.7	-53.0
05/10/09	16.21.00	III	Ec.	R.	16.4	4.1	20/10/09	0.42.06	I	Tr.	I.	-11.9	-50.8
05/10/09	20.59.31	I	Tr.	I.	28.1	-44.3	20/10/09	1.58.29	I	Sh.	I.	-26.0	-39.3
05/10/09	22.06.53	I	Sh.	I.	21.5	-51.2	20/10/09	3.00.23	I	Tr.	E.	-37.5	-28.5
05/10/09	23.17.48	I	Tr.	E.	11.9	-52.9	20/10/09	4.16.32	I	Sh.	E.	-50.7	-14.4
06/10/09	0.25.04	I	Sh.	E.	1.3	-48.6	20/10/09	21.52.30	I	Occ.	D.	15.7	-55.6
06/10/09	5.44.26	IV	Occ.	D.	-55.8	4.9	21/10/09	1.25.44	I	Ec.	R.	-20.7	-44.9
06/10/09	10.28.24	IV	Occ.	R.	-44.6	42.2	21/10/09	2.11.32	II	Occ.	D.	-29.2	-37.3
06/10/09	16.15.35	IV	Ec.	D.	16.2	4.8	21/10/09	7.41.33	II	Ec.	R.	-60.7	20.9
06/10/09	18.10.42	I	Occ.	D.	28.6	-16.7	21/10/09	19.10.19	I	Tr.	I.	30.7	-32.0
06/10/09	20.54.24	IV	Ec.	R.	28.2	-44.0	21/10/09	20.27.30	I	Sh.	I.	25.5	-45.1
06/10/09	21.12.10	II	Occ.	D.	26.7	-46.3	21/10/09	21.28.36	I	Tr.	E.	18.5	-53.5
06/10/09	21.35.12	I	Ec.	R.	24.6	-48.9	21/10/09	22.45.32	I	Sh.	E.	7.2	-58.9
07/10/09	2.25.06	II	Ec.	R.	-21.5	-31.8	22/10/09	16.20.34	I	Occ.	D.	24.5	-0.3
07/10/09	15.27.07	I	Tr.	I.	9.6	13.0	22/10/09	19.54.33	I	Ec.	R.	28.0	-40.0
07/10/09	16.35.53	I	Sh.	I.	19.4	1.0	22/10/09	20.32.18	II	Tr.	I.	24.6	-46.1
07/10/09	17.45.25	I	Tr.	E.	26.9	-12.4	22/10/09	22.23.27	IV	Occ.	D.	10.0	-58.5
							22/10/09	23.04.52	II	Sh.	I.	3.5	-59.3

Date	Times	Moon	Phenomena	Phase	h	h Sun								
22/10/09	23.24.26	II	Tr.	E.	0.4	-58.8	06/11/09	13.30.22	III	Tr.	I.	9.5	21.9	
23/10/09	1.57.23	II	Sh.	E.	-27.9	-40.2	06/11/09	17.09.38	III	Tr.	E.	31.5	-13.3	
23/10/09	3.08.51	IV	Occ.	R.	-41.1	-27.5	06/11/09	17.27.02	I	Tr.	I.	31.7	-16.5	
23/10/09	5.40.35	III	Tr.	I.	-62.9	0.8	06/11/09	18.48.04	I	Sh.	I.	29.0	-31.5	
23/10/09	9.19.37	III	Tr.	E.	-44.9	32.1	06/11/09	18.58.25	III	Sh.	I.	28.3	-33.4	
23/10/09	10.29.34	IV	Ec.	D.	-32.3	36.1	06/11/09	19.45.17	I	Tr.	E.	24.0	-41.9	
23/10/09	10.54.57	III	Sh.	I.	-27.6	36.5	06/11/09	21.05.55	I	Sh.	E.	13.6	-55.1	
23/10/09	13.38.30	I	Tr.	I.	2.3	24.8	06/11/09	22.35.33	III	Sh.	E.	-0.4	-63.9	
23/10/09	14.32.36	III	Sh.	E.	10.9	17.1	07/11/09	14.36.34	I	Occ.	D.	19.6	12.6	
23/10/09	14.56.23	I	Sh.	I.	14.4	13.3	07/11/09	18.14.17	I	Ec.	R.	30.7	-25.5	
23/10/09	15.05.09	IV	Ec.	R.	15.7	11.9	07/11/09	20.39.13	II	Occ.	D.	16.9	-51.3	
23/10/09	15.56.47	I	Tr.	E.	22.3	3.2	08/11/09	2.16.52	II	Ec.	R.	-42.1	-40.3	
23/10/09	17.14.25	I	Sh.	E.	29.3	-11.2	08/11/09	11.55.57	I	Tr.	I.	-5.3	29.7	
24/10/09	10.48.45	I	Occ.	D.	-28.0	36.1	08/11/09	13.17.03	I	Sh.	I.	8.6	22.9	
24/10/09	14.23.26	I	Ec.	R.	10.1	18.2	08/11/09	14.14.11	I	Tr.	E.	17.1	15.7	
24/10/09	15.28.15	II	Occ.	D.	19.3	7.8	08/11/09	15.34.53	I	Sh.	E.	26.5	3.3	
24/10/09	21.00.56	II	Ec.	R.	20.6	-50.9	08/11/09	16.03.16	IV	Occ.	D.	28.8	-1.0	
25/10/09	8.06.51	I	Tr.	I.	-55.5	23.4	08/11/09	20.49.16	IV	Occ.	R.	15.0	-53.1	
25/10/09	9.25.23	I	Sh.	I.	-42.6	31.9	09/11/09	4.43.59	IV	Ec.	D.	-63.0	-13.4	
25/10/09	10.25.08	I	Tr.	E.	-31.7	35.3	09/11/09	9.05.20	I	Occ.	D.	-36.0	25.8	
25/10/09	11.43.23	I	Sh.	E.	-17.2	34.7	09/11/09	9.15.43	IV	Ec.	R.	-34.1	26.7	
26/10/09	5.16.57	I	Occ.	D.	-61.8	-4.4	09/11/09	12.43.08	I	Ec.	R.	3.7	26.1	
26/10/09	8.52.15	I	Ec.	R.	-47.7	28.5	09/11/09	14.55.33	II	Tr.	I.	22.8	9.3	
26/10/09	9.47.47	II	Tr.	I.	-37.9	33.3	09/11/09	17.35.45	II	Sh.	I.	31.7	-18.7	
26/10/09	12.22.59	II	Sh.	I.	-9.3	31.9	09/11/09	17.48.04	II	Tr.	E.	31.4	-20.9	
26/10/09	12.40.00	II	Tr.	E.	-6.2	30.4	09/11/09	20.28.33	II	Sh.	E.	17.4	-49.9	
26/10/09	15.15.33	II	Sh.	E.	18.7	9.4	10/11/09	3.25.47	III	Occ.	D.	-54.6	-28.0	
26/10/09	19.30.47	III	Occ.	D.	28.7	-36.9	10/11/09	6.24.52	I	Tr.	I.	-60.6	4.2	
26/10/09	23.09.44	III	Occ.	R.	0.4	-60.6	10/11/09	7.04.52	III	Occ.	R.	-55.6	10.5	
27/10/09	0.47.57	III	Ec.	D.	-17.8	-52.0	10/11/09	7.45.58	I	Sh.	I.	-49.3	16.4	
27/10/09	2.35.13	I	Tr.	I.	-37.7	-34.5	10/11/09	8.43.05	I	Tr.	E.	-39.4	23.4	
27/10/09	3.54.19	I	Sh.	I.	-51.4	-20.0	10/11/09	8.51.51	III	Ec.	D.	-37.8	24.3	
27/10/09	4.25.27	III	Ec.	R.	-56.1	-14.2	10/11/09	10.03.47	I	Sh.	E.	-24.5	29.6	
27/10/09	4.53.29	I	Tr.	E.	-59.7	-9.1	10/11/09	12.28.43	III	Ec.	R.	2.0	27.0	
27/10/09	6.12.18	I	Sh.	E.	-64.6	5.2	11/11/09	3.34.12	I	Occ.	D.	-56.3	-26.7	
27/10/09	23.45.15	I	Occ.	D.	-7.1	-59.2	11/11/09	7.12.01	I	Ec.	R.	-54.1	11.3	
28/10/09	3.21.06	I	Ec.	R.	-46.5	-26.3	11/11/09	9.57.57	II	Occ.	D.	-24.9	29.0	
28/10/09	4.44.47	II	Occ.	D.	-59.1	-10.9	11/11/09	15.35.32	II	Ec.	R.	27.6	2.7	
28/10/09	10.19.39	II	Ec.	R.	-30.6	34.2	12/11/09	0.53.55	I	Tr.	I.	-29.6	-55.1	
28/10/09	21.03.44	I	Tr.	I.	18.3	-52.5	12/11/09	2.14.59	I	Sh.	I.	-44.2	-41.4	
28/10/09	22.23.20	I	Sh.	I.	6.6	-60.6	12/11/09	3.12.08	I	Tr.	E.	-53.6	-31.0	
28/10/09	23.22.00	I	Tr.	E.	-3.2	-60.9	12/11/09	4.32.46	I	Sh.	E.	-62.9	-16.1	
29/10/09	0.41.17	I	Sh.	E.	-18.0	-53.4	12/11/09	22.03.06	I	Occ.	D.	1.3	-63.4	
29/10/09	18.13.36	I	Occ.	D.	31.4	-23.5	13/11/09	1.40.52	I	Ec.	R.	-38.8	-47.6	
29/10/09	21.49.56	I	Ec.	R.	11.2	-58.3	13/11/09	4.13.54	II	Tr.	I.	-61.7	-19.7	
29/10/09	23.03.50	II	Tr.	I.	-0.4	-61.7	13/11/09	6.54.04	II	Sh.	I.	-55.6	8.2	
30/10/09	1.41.06	II	Sh.	I.	-29.7	-44.5	13/11/09	7.06.32	II	Tr.	E.	-53.8	10.1	
30/10/09	1.56.07	II	Tr.	E.	-32.5	-42.0	13/11/09	9.46.57	II	Sh.	E.	-25.6	27.9	
30/10/09	4.33.45	II	Sh.	E.	-58.6	-13.3	13/11/09	17.32.53	III	Tr.	I.	31.6	-18.7	
30/10/09	9.33.02	III	Tr.	I.	-37.8	31.0	13/11/09	19.22.56	I	Tr.	I.	23.9	-39.1	
30/10/09	13.12.11	III	Tr.	E.	2.4	25.9	13/11/09	20.43.53	I	Sh.	I.	13.3	-53.1	
30/10/09	14.56.33	III	Sh.	I.	18.2	11.4	13/11/09	21.12.15	III	Tr.	E.	8.9	-57.5	
30/10/09	15.32.12	I	Tr.	I.	22.6	5.6	13/11/09	21.41.08	I	Tr.	E.	4.3	-61.3	
30/10/09	16.52.14	I	Sh.	I.	29.6	-8.8	13/11/09	23.01.06	III	Sh.	I.	-10.0	-66.2	
30/10/09	17.50.28	I	Tr.	E.	31.5	-19.5	13/11/09	23.01.39	I	Sh.	E.	-10.1	-66.2	
30/10/09	18.33.58	III	Sh.	E.	30.9	-27.5	14/11/09	2.37.56	III	Sh.	E.	-49.3	-37.6	
30/10/09	19.10.10	I	Sh.	E.	29.1	-34.2	14/11/09	16.32.08	I	Occ.	D.	31.5	-7.9	
31/10/09	5.50.21	IV	Tr.	I.	-64.5	0.8	14/11/09	20.09.47	I	Ec.	R.	17.7	-47.6	
31/10/09	10.37.39	IV	Tr.	E.	-25.2	33.6	14/11/09	23.17.50	II	Occ.	D.	-13.7	-66.0	
31/10/09	12.42.05	I	Occ.	D.	-1.7	28.7	15/11/09	4.54.38	II	Ec.	R.	-64.1	-12.7	
31/10/09	16.18.50	I	Ec.	R.	27.6	-2.3	15/11/09	13.52.05	I	Tr.	I.	17.7	17.2	
31/10/09	18.02.39	II	Occ.	D.	31.5	-21.9	15/11/09	15.12.51	I	Sh.	I.	27.0	5.6	
31/10/09	18.38.59	IV	Sh.	I.	30.6	-28.7	15/11/09	16.10.17	I	Tr.	E.	30.9	-4.0	
31/10/09	23.14.07	IV	Sh.	E.	-3.9	-62.1	15/11/09	17.30.36	I	Sh.	E.	31.5	-18.6	
31/10/09	23.38.57	II	Ec.	R.	-8.6	-60.9	16/11/09	11.01.10	I	Occ.	D.	-9.9	29.2	
01/11/09	10.00.51	I	Tr.	I.	-31.3	32.1	16/11/09	14.38.38	I	Ec.	R.	23.9	10.6	
01/11/09	11.21.13	I	Sh.	I.	-16.4	33.2	16/11/09	17.32.46	II	Tr.	I.	31.4	-19.1	
01/11/09	12.19.06	I	Tr.	E.	-5.9	30.3	16/11/09	20.12.21	II	Sh.	I.	16.4	-48.3	
01/11/09	13.39.09	I	Sh.	E.	7.9	22.1	16/11/09	20.25.29	II	Tr.	E.	14.5	-50.6	
02/11/09	7.10.35	I	Occ.	D.	-58.9	13.2	16/11/09	23.05.16	II	Sh.	E.	-12.6	-66.9	
02/11/09	10.47.40	I	Ec.	R.	-21.9	33.1	17/11/09	0.00.30	IV	Tr.	I.	-22.8	-63.3	
02/11/09	12.20.30	II	Tr.	I.	-4.9	29.9	17/11/09	4.48.07	IV	Tr.	E.	-64.0	-14.2	
02/11/09	14.59.16	II	Sh.	I.	20.0	10.3	17/11/09	7.29.19	III	Occ.	D.	-47.8	12.5	
02/11/09	15.12.51	II	Tr.	E.	21.7	8.1	17/11/09	8.21.15	I	Tr.	I.	-38.7	19.2	
02/11/09	17.51.58	II	Sh.	E.	31.6	-20.4	17/11/09	9.41.46	I	Sh.	I.	-23.9	26.5	
02/11/09	23.26.26	III	Occ.	D.	-7.6	-62.2	17/11/09	10.39.25	I	Tr.	E.	-13.2	28.8	
03/11/09	3.05.28	III	Occ.	R.	-47.5	-30.4	17/11/09	11.08.26	III	Occ.	R.	-8.0	28.9	
03/11/09	4.29.30	I	Tr.	I.	-59.8	-14.9	17/11/09	11.59.30	I	Sh.	E.	1.5	27.3	
03/11/09	4.50.17	III	Ec.	D.	-61.9	-11.1	17/11/09	12.53.18	III	Ec.	D.	10.1	23.3	
03/11/09	5.50.09	I	Sh.	I.	-64.4	0.2	17/11/09	12.55.59	IV	Sh.	I.	10.5	23.1	
03/11/09	6.47.45	I	Tr.	E.	-61.0	9.5	17/11/09	16.29.50	III	Ec.	R.	31.8	-7.9	
03/11/09	8.08.03	I	Sh.	E.	-50.0	21.1	17/11/09	17.27.04	IV	Sh.	E.	31.5	-18.2	
03/11/09	8.27.29	III	Ec.	R.	-46.7	23.5	18/11/09	5.30.17	I	Occ.	D.	-62.6	-7.0	
04/11/09	1.39.10	I	Occ.	D.	-32.7	-46.0	18/11/09	9.07.31	I	Ec.	R.	-29.6	23.7	
04/11/09	5.16.32	I	Ec.	R.	-63.9	-6.5	18/11/09	12.37.35	II	Occ.	D.	8.2	24.5	
04/11/09	7.20.20	II	Occ.	D.	-56.6	14.2	18/11/09	18.13.17	II	Ec.	R.	28.9	-26.8	
04/11/09	12.57.41	II	Ec.	R.	3.1	26.0	19/11/09	2.50.33	I	Tr.	I.	-53.9	-36.3	
04/11/09	22.58.17	I	Tr.	I.	-3.6	-63.6	19/11/09	4.10.46	I	Sh.	I.	-62.8	-21.4	
05/11/09	0.19.10	I	Sh.	I.	-18.5	-58.1	19/11/09	5.08.43	I	Tr.	E.	-63.5	-11.0	
05/11/09	1.16.32	I	Tr.	E.	-29.2	-49.9	19/11/09	6.28.28	I	Sh.	E.	-56.0	3.0	
05/11/09	2.37.02	I	Sh.	E.	-43.8	-36.0	19/11/09	23.59.26	I	Occ.	D.	-24.5	-64.1	
05/11/09	20.07.48	I	Occ.	D.	21.8	-45.6	20/11/09	3.36.22	I	Ec.	R.	-60.2	-28.0	
05/11/09	23.45.23	I	Ec.	R.	-13.0	-61.9	20/11/09	6.52.12	II	Tr.	I.	-52.0	6.4	
06/11/09	1.37.43	II	Tr.	I.	-33.8	-46.7	20/11/09	9.30.46	II	Sh.	I.	-23.9	25.1	
06/11/09	4.17.29	II	Sh.	I.	-59.6	-17.7	20/11/09	9.45.01	II	Tr.	E.	-21.3	26.0	
06/11/09	4.30.10	II	Tr.	E.	-61.0	-15.4	20/11/09	12.23.46	II	Sh.	E.	7.2	25.1	
06/11/09	7.10.15	II	Sh.	E.	-57.0	12.2	20/11/09	21.19.48	I	Tr.	I.	3.9	-59.7	
							20/11/09	21.39.10	III	Tr.	I.	0.9	-62.3	

Date	Times	Moon	Phenomena	Phase	h	h Sun							
20/11/09	22.39.39	I	Sh.	I.	-10.4	-67.6	05/12/09	4.48.34	I	Sh.	E.	-60.6	-17.3
20/11/09	23.37.57	I	Tr.	E.	-21.1	-66.3	05/12/09	6.03.22	III	Tr.	I.	-51.2	-4.2
21/11/09	0.57.21	I	Sh.	E.	-35.8	-56.5	05/12/09	9.42.43	III	Tr.	E.	-11.8	23.0
21/11/09	1.18.35	III	Tr.	E.	-39.6	-53.0	05/12/09	11.07.40	III	Sh.	I.	3.5	25.6
21/11/09	3.03.15	III	Sh.	I.	-56.6	-34.3	05/12/09	14.43.22	III	Sh.	E.	30.7	8.0
21/11/09	6.39.45	III	Sh.	E.	-53.3	4.3	06/12/09	22.24.36	I	Occ.	D.	-16.5	-68.9
21/11/09	18.28.43	I	Occ.	D.	26.8	-29.9	06/12/09	1.56.24	I	Ec.	R.	-53.8	-49.1
21/11/09	22.05.18	I	Ec.	R.	-4.7	-65.4	06/12/09	7.24.21	II	Occ.	D.	-36.7	8.2
22/11/09	1.58.22	II	Occ.	D.	-47.2	-46.3	06/12/09	12.47.02	II	Ec.	R.	19.3	21.2
22/11/09	7.32.17	II	Ec.	R.	-44.2	11.8	06/12/09	19.45.53	I	Tr.	I.	10.9	-44.8
22/11/09	15.49.11	I	Tr.	I.	31.3	-0.7	06/12/09	21.00.00	I	Sh.	I.	-0.9	-57.8
22/11/09	17.08.37	I	Sh.	I.	31.7	-15.3	06/12/09	22.03.55	I	Tr.	E.	-13.3	-67.0
22/11/09	18.07.20	I	Tr.	E.	28.4	-26.1	06/12/09	23.17.28	I	Sh.	E.	-26.9	-70.4
22/11/09	19.26.17	I	Sh.	E.	20.0	-40.7	07/12/09	16.54.18	I	Occ.	D.	30.7	-13.4
23/11/09	12.57.59	I	Occ.	D.	14.2	21.8	07/12/09	20.25.15	I	Ec.	R.	4.0	-51.9
23/11/09	16.34.09	I	Ec.	R.	32.2	-9.3	08/12/09	1.36.26	II	Tr.	I.	-51.8	-52.9
23/11/09	20.12.06	II	Tr.	I.	13.1	-49.0	08/12/09	4.03.03	II	Sh.	I.	-62.7	-26.0
23/11/09	22.49.06	II	Sh.	I.	-13.9	-68.4	08/12/09	4.29.46	II	Tr.	E.	-61.2	-21.1
23/11/09	23.05.00	II	Tr.	E.	-16.8	-68.5	08/12/09	6.56.19	II	Sh.	E.	-40.5	3.9
24/11/09	1.42.08	II	Sh.	E.	-45.5	-49.6	08/12/09	14.15.39	I	Tr.	I.	29.7	11.6
24/11/09	10.18.34	I	Tr.	I.	-12.4	26.7	08/12/09	15.28.53	I	Sh.	I.	32.9	1.4
24/11/09	11.36.44	III	Occ.	D.	1.9	26.8	08/12/09	16.33.40	I	Tr.	E.	31.7	-9.8
24/11/09	11.37.32	I	Sh.	I.	2.0	26.8	08/12/09	17.46.19	I	Sh.	E.	26.1	-22.7
24/11/09	12.36.42	I	Tr.	E.	11.5	23.4	08/12/09	20.03.22	III	Occ.	D.	7.1	-47.9
24/11/09	13.55.10	I	Sh.	E.	22.4	15.3	08/12/09	23.42.35	III	Occ.	R.	-32.7	-69.2
24/11/09	15.15.55	III	Occ.	R.	29.9	4.0	09/12/09	0.58.50	III	Ec.	D.	-46.2	-59.4
24/11/09	16.54.47	III	Ec.	D.	32.0	-13.0	09/12/09	4.34.22	III	Ec.	R.	-60.5	-20.5
24/11/09	20.31.00	III	Ec.	R.	9.7	-52.4	09/12/09	11.24.04	I	Occ.	D.	8.5	25.0
25/11/09	7.27.21	I	Occ.	D.	-43.2	10.5	09/12/09	14.54.10	I	Ec.	R.	32.1	6.4
25/11/09	10.39.00	IV	Occ.	D.	-8.1	27.0	09/12/09	20.46.31	II	Occ.	D.	-0.3	-55.5
25/11/09	11.03.04	I	Ec.	R.	-3.4	27.2	10/12/09	2.05.28	II	Ec.	R.	-56.7	-48.0
25/11/09	15.19.00	II	Occ.	D.	30.4	3.4	10/12/09	8.45.33	I	Tr.	I.	-19.2	17.6
25/11/09	15.24.41	IV	Occ.	R.	30.7	2.6	10/12/09	9.57.50	I	Sh.	I.	-5.9	23.3
25/11/09	20.50.50	II	Ec.	R.	6.0	-55.8	10/12/09	11.03.32	I	Tr.	E.	5.8	25.1
25/11/09	22.59.24	IV	Ec.	D.	-17.0	-68.9	10/12/09	12.15.15	I	Sh.	E.	16.9	23.1
26/11/09	3.26.56	IV	Ec.	R.	-61.0	-30.8	11/12/09	5.53.51	I	Occ.	D.	-49.3	-6.8
26/11/09	4.48.05	I	Tr.	I.	-63.1	-15.9	11/12/09	9.23.00	I	Ec.	R.	-11.6	20.9
26/11/09	6.06.31	I	Sh.	I.	-55.5	-1.5	11/12/09	14.58.41	II	Tr.	I.	32.6	5.7
26/11/09	7.06.12	I	Tr.	E.	-46.2	7.3	11/12/09	17.21.45	II	Sh.	I.	27.7	-18.1
26/11/09	8.24.07	I	Sh.	E.	-32.3	17.6	11/12/09	17.52.09	II	Tr.	E.	24.5	-23.6
27/11/09	1.56.44	I	Occ.	D.	-49.6	-47.5	11/12/09	20.15.06	II	Sh.	E.	3.6	-50.0
27/11/09	5.31.55	I	Ec.	R.	-59.4	-8.4	12/12/09	3.15.23	I	Tr.	I.	-62.7	-35.4
27/11/09	9.32.34	II	Tr.	I.	-18.9	23.7	12/12/09	4.26.41	I	Sh.	I.	-60.2	-22.3
27/11/09	12.07.39	II	Sh.	I.	8.6	24.9	12/12/09	5.33.21	I	Tr.	E.	-51.9	-10.4
27/11/09	12.25.35	II	Tr.	E.	11.5	23.8	12/12/09	6.01.13	IV	Occ.	D.	-47.5	-5.7
27/11/09	15.00.46	II	Sh.	E.	29.7	6.0	12/12/09	6.44.05	I	Sh.	E.	-40.2	1.6
27/11/09	23.17.33	I	Tr.	I.	-21.6	-69.0	12/12/09	10.19.50	III	Tr.	I.	-0.1	24.1
28/11/09	0.35.23	I	Sh.	I.	-36.0	-61.2	12/12/09	10.45.38	IV	Occ.	R.	4.0	24.8
28/11/09	1.35.40	I	Tr.	E.	-46.6	-51.4	12/12/09	13.59.06	III	Tr.	E.	29.6	13.6
28/11/09	1.49.55	III	Tr.	I.	-49.0	-48.9	12/12/09	15.09.15	III	Sh.	I.	33.0	4.2
28/11/09	2.52.59	I	Sh.	E.	-58.1	-37.4	12/12/09	17.14.47	IV	Ec.	D.	28.1	-16.9
28/11/09	5.29.19	III	Tr.	E.	-59.2	-9.0	12/12/09	18.44.32	III	Sh.	E.	17.3	-33.2
28/11/09	7.05.51	III	Sh.	I.	-45.0	6.9	12/12/09	21.37.40	IV	Ec.	R.	-11.9	-63.7
28/11/09	10.41.58	III	Sh.	E.	-5.5	26.5	13/12/09	0.23.45	I	Occ.	D.	-42.3	-65.2
28/11/09	20.26.14	I	Occ.	D.	8.4	-51.8	13/12/09	3.51.56	I	Ec.	R.	-62.3	-28.7
29/11/09	0.00.51	I	Ec.	R.	-30.2	-65.8	13/12/09	10.09.26	II	Occ.	D.	-1.2	23.6
29/11/09	4.40.35	II	Occ.	D.	-62.9	-17.8	13/12/09	15.24.06	II	Ec.	R.	33.2	2.1
29/11/09	10.09.44	II	Ec.	R.	-10.8	25.4	13/12/09	21.45.19	I	Tr.	I.	-13.9	-64.7
29/11/09	17.47.09	I	Tr.	I.	28.4	-22.7	13/12/09	22.55.36	I	Sh.	I.	-26.9	-71.1
29/11/09	19.04.21	I	Sh.	I.	20.0	-37.0	14/12/09	9.33.37	II	Sh.	E.	-39.2	-67.8
29/11/09	20.05.15	I	Tr.	E.	11.2	-48.2	14/12/09	16.15.15	I	Tr.	I.	-50.9	-57.7
29/11/09	21.21.54	I	Sh.	E.	-0.9	-61.0	14/12/09	17.24.27	I	Sh.	I.	26.3	-18.4
30/11/09	14.55.44	I	Occ.	D.	30.2	6.5	15/12/09	18.33.11	I	Tr.	E.	17.7	-31.0
30/11/09	18.29.42	I	Ec.	R.	23.9	-30.6	15/12/09	19.41.48	I	Sh.	E.	7.1	-43.7
30/11/09	22.53.23	II	Tr.	I.	-18.9	-69.7	16/12/09	0.21.31	III	Occ.	D.	-43.5	-65.8
01/12/09	1.26.02	II	Sh.	I.	-46.6	-53.6	16/12/09	4.00.40	III	Occ.	R.	-61.0	-27.5
01/12/09	1.46.30	II	Tr.	E.	-49.9	-50.0	16/12/09	4.00.40	III	Occ.	R.	-61.0	-27.5
01/12/09	4.19.11	II	Sh.	E.	-63.3	-22.0	16/12/09	5.00.50	III	Ec.	D.	-54.5	-16.6
01/12/09	12.16.44	I	Tr.	I.	12.3	23.8	16/12/09	8.35.57	III	Ec.	R.	-17.1	15.9
01/12/09	13.33.14	I	Sh.	I.	22.9	17.1	16/12/09	13.23.35	I	Occ.	D.	27.9	17.6
01/12/09	14.34.49	I	Tr.	E.	29.0	9.4	16/12/09	16.49.42	I	Ec.	R.	29.3	-12.3
01/12/09	15.47.58	III	Occ.	D.	32.5	-1.1	16/12/09	23.32.15	II	Occ.	D.	-35.3	-70.7
01/12/09	15.50.46	I	Sh.	E.	32.5	-1.6	17/12/09	4.42.28	II	Ec.	R.	-56.5	-20.0
01/12/09	19.27.11	III	Occ.	R.	16.0	-41.3	17/12/09	10.45.17	I	Tr.	I.	6.8	24.5
01/12/09	20.56.24	III	Ec.	D.	2.0	-57.1	17/12/09	11.53.23	I	Sh.	I.	17.4	23.8
02/12/09	0.32.17	III	Ec.	R.	-37.7	-62.4	17/12/09	13.03.12	I	Tr.	E.	26.2	19.5
02/12/09	9.25.18	I	Occ.	D.	-17.0	22.3	17/12/09	14.10.42	I	Sh.	E.	31.8	12.3
02/12/09	12.58.37	I	Ec.	R.	18.9	20.5	18/12/09	7.53.31	I	Occ.	D.	-23.7	10.7
02/12/09	18.02.02	II	Occ.	D.	26.2	-25.5	18/12/09	11.18.33	I	Ec.	R.	12.7	24.6
02/12/09	23.28.14	II	Ec.	R.	-26.6	-69.3	18/12/09	17.44.13	II	Tr.	I.	23.1	-21.8
03/12/09	6.46.27	I	Tr.	I.	-45.3	3.2	18/12/09	19.59.02	II	Sh.	I.	2.8	-46.6
03/12/09	8.02.12	I	Sh.	I.	-31.7	13.7	18/12/09	20.37.55	II	Tr.	E.	-4.1	-53.6
03/12/09	9.04.31	I	Tr.	E.	-20.2	20.4	18/12/09	22.52.29	II	Sh.	E.	-29.1	-71.1
03/12/09	10.19.43	I	Sh.	E.	-6.4	25.2	19/12/09	5.15.16	I	Tr.	I.	-50.9	-14.4
03/12/09	19.03.27	IV	Tr.	I.	18.5	-36.9	19/12/09	6.22.13	I	Sh.	I.	-39.7	-2.5
03/12/09	23.50.26	IV	Tr.	E.	-31.3	-67.8	19/12/09	7.33.10	I	Tr.	E.	-26.8	7.9
04/12/09	3.54.54	I	Occ.	D.	-63.3	-26.9	19/12/09	8.39.31	I	Sh.	E.	-14.5	16.1
04/12/09	7.13.46	IV	Sh.	I.	-39.9	7.0	19/12/09	14.39.07	III	Tr.	I.	33.3	8.7
04/12/09	7.27.27	I	Ec.	R.	-37.4	8.9	19/12/09	18.18.17	III	Tr.	E.	18.2	-27.9
04/12/09	11.40.19	IV	Sh.	E.	8.3	25.1	19/12/09	19.10.49	III	Sh.	I.	10.2	-37.7
04/12/09	12.14.45	II	Tr.	I.	13.7	23.6	19/12/09	22.45.42	III	Sh.	E.	-28.4	-70.8
04/12/09	14.44.38	II	Sh.	I.	30.5	7.9	20/12/09	2.23.36	I	Occ.	D.	-61.1	-45.9
04/12/09	15.08.00	II	Tr.	E.	31.8	4.5							
04/12/09	17.37.52	II	Sh.	E.	28.0	-21.2							
05/12/09	1.16.07	I	Tr.	I.	-47.0	-55.9							
05/12/09	2.31.04	I	Sh.	I.	-58.0	-42.6							
05/12/09	3.34.10	I	Tr.	E.	-63.0	-30.9							

Date	Times	Moon	Phenomena	Phase	h	h Sun							
20/12/09	5.47.29	I	Ec.	R.	-45.1	-8.9	26/12/09	8.17.40	I	Sh.	I.	-14.1	13.2
20/12/09	12.55.44	II	Occ.	D.	26.6	20.2	26/12/09	9.33.32	I	Tr.	E.	0.2	20.8
20/12/09	14.50.26	IV	Tr.	I.	33.6	7.2	26/12/09	10.34.52	I	Sh.	E.	10.2	24.1
20/12/09	18.01.00	II	Ec.	R.	20.2	-24.7	26/12/09	19.01.11	III	Tr.	I.	8.5	-35.2
20/12/09	19.35.29	IV	Tr.	E.	5.7	-42.1	26/12/09	22.40.13	III	Tr.	E.	-31.2	-70.1
20/12/09	23.45.21	I	Tr.	I.	-39.8	-70.0	26/12/09	23.12.33	III	Sh.	I.	-37.1	-71.3
21/12/09	0.51.06	I	Sh.	I.	-50.7	-62.0	27/12/09	2.47.01	III	Sh.	E.	-61.9	-42.1
21/12/09	1.32.13	IV	Sh.	I.	-56.4	-55.2	27/12/09	4.24.03	I	Occ.	D.	-54.2	-24.2
21/12/09	2.03.14	I	Tr.	E.	-59.7	-49.7	27/12/09	7.43.00	I	Ec.	R.	-19.9	8.8
21/12/09	3.08.22	I	Sh.	E.	-62.3	-37.7	27/12/09	15.43.02	II	Occ.	D.	32.2	0.3
21/12/09	5.53.43	IV	Sh.	E.	-43.5	-8.0	27/12/09	20.37.42	II	Ec.	R.	-9.2	-52.7
21/12/09	20.53.37	I	Occ.	D.	-8.8	-56.1	28/12/09	1.45.55	I	Tr.	I.	-59.7	-53.3
22/12/09	0.16.20	I	Ec.	R.	-45.6	-66.9	28/12/09	2.46.32	I	Sh.	I.	-61.8	-42.3
22/12/09	7.07.25	II	Tr.	I.	-29.7	4.0	28/12/09	4.03.42	I	Tr.	E.	-56.3	-28.0
22/12/09	9.17.32	II	Sh.	I.	-5.6	19.6	28/12/09	5.03.42	I	Sh.	E.	-47.8	-17.1
22/12/09	10.01.11	II	Tr.	E.	2.4	22.7	28/12/09	22.54.13	I	Occ.	D.	-34.9	-70.8
22/12/09	12.11.00	II	Sh.	E.	22.2	23.1	29/12/09	2.00.52	IV	Occ.	D.	-60.9	-50.7
22/12/09	18.15.25	I	Tr.	I.	17.4	-27.1	29/12/09	2.11.51	I	Ec.	R.	-61.4	-48.7
22/12/09	19.19.57	I	Sh.	I.	7.3	-39.1	29/12/09	6.42.28	IV	Occ.	R.	-29.9	0.2
22/12/09	20.33.17	I	Tr.	E.	-5.6	-52.5	29/12/09	9.55.02	II	Tr.	I.	5.4	22.3
22/12/09	21.37.11	I	Sh.	E.	-17.4	-63.1	29/12/09	11.29.51	IV	Ec.	D.	20.1	24.7
23/12/09	4.42.59	III	Occ.	D.	-53.5	-20.5	29/12/09	11.54.57	II	Sh.	I.	23.4	24.2
23/12/09	8.21.59	III	Occ.	R.	-15.2	13.9	29/12/09	12.49.01	II	Tr.	E.	29.3	21.3
23/12/09	9.03.16	III	Ec.	D.	-7.6	18.3	29/12/09	14.48.30	II	Sh.	E.	34.1	8.3
23/12/09	12.37.57	III	Ec.	R.	25.9	21.6	29/12/09	15.47.38	IV	Ec.	R.	31.7	-0.1
23/12/09	15.23.44	I	Occ.	D.	33.4	2.7	29/12/09	20.16.05	I	Tr.	I.	-6.3	-48.6
23/12/09	18.45.15	I	Ec.	R.	12.4	-32.6	29/12/09	21.15.21	I	Sh.	I.	-17.2	-58.9
24/12/09	2.19.08	II	Occ.	D.	-61.3	-47.1	29/12/09	22.33.52	I	Tr.	E.	-31.7	-69.4
24/12/09	7.19.19	II	Ec.	R.	-26.2	5.6	29/12/09	23.32.29	I	Sh.	E.	-42.1	-70.8
24/12/09	12.45.36	I	Tr.	I.	27.1	21.1	30/12/09	9.06.02	III	Occ.	D.	-2.1	18.4
24/12/09	13.48.51	I	Sh.	I.	32.2	15.3	30/12/09	12.44.49	III	Occ.	R.	29.3	21.6
24/12/09	15.03.26	I	Tr.	E.	33.8	5.7	30/12/09	13.04.53	III	Ec.	D.	31.0	20.1
24/12/09	16.06.04	I	Sh.	E.	31.2	-4.0	30/12/09	16.39.05	III	Ec.	R.	26.9	-9.1
25/12/09	9.53.50	I	Occ.	D.	2.9	22.2	30/12/09	17.24.28	I	Occ.	D.	21.3	-17.0
25/12/09	13.14.04	I	Ec.	R.	30.1	18.9	30/12/09	20.40.45	I	Ec.	R.	-11.3	-52.9
25/12/09	20.31.11	II	Tr.	I.	-6.9	-51.8	31/12/09	5.06.53	II	Occ.	D.	-45.5	-16.7
25/12/09	22.36.24	II	Sh.	I.	-30.0	-69.9	31/12/09	9.55.55	II	Ec.	R.	6.7	22.4
25/12/09	23.25.06	II	Tr.	E.	-38.8	-71.2	31/12/09	14.46.22	I	Tr.	I.	34.2	8.8
26/12/09	1.29.57	II	Sh.	E.	-57.7	-56.0	31/12/09	15.44.14	I	Sh.	I.	31.6	0.6
26/12/09	7.15.42	I	Tr.	I.	-25.6	5.0	31/12/09	17.04.07	I	Tr.	E.	23.6	-13.3
							31/12/09	18.01.21	I	Sh.	E.	15.7	-23.5

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DOUBLE MUTUAL PHENOMENA OF THE SATELLITES OF JUPITER

DOUBLE TRANSITS OF THE SATELLITES

YYYY	MM	DD	hh	mm	ss	AAAA	MM	GG	hh	mm	ss	IEGC	YYYY	MM	DD	hh	mm	ss	AAAA	MM	GG	hh	mm	ss	IEGC	
2009	1	1		0	58	36	2009	1	1	1	23	25	1100	2009	4	14	3	43	44	2009	4	14	6	37	5	0101
2009	1	4	13	59	24	2009	1	4	14	49	30	1100	2009	5	19	3	44	16	2009	5	19	3	48	51	1010	
2009	1	8	3	0	14	2009	1	8	4	16	33	1100	2009	5	26	5	37	21	2009	5	26	7	44	58	1010	
2009	1	11	16	1	4	2009	1	11	17	42	47	1100	2009	6	2	7	58	3	2009	6	2	9	47	28	1010	
2009	1	15	5	1	56	2009	1	15	7	9	57	1100	2009	7	23	14	31	16	2009	7	23	15	13	18	1001	
2009	1	16	23	32	20	2009	1	17	1	47	27	1010	2009	8	5	19	4	26	2009	8	5	19	13	56	0110	
2009	1	18	18	2	44	2009	1	18	20	19	39	1100	2009	8	12	21	17	32	2009	8	12	22	30	12	0110	
2009	1	22	7	11	45	2009	1	22	9	20	33	1100	2009	8	19	23	30	38	2009	8	20	1	46	50	0110	
2009	1	24	2	46	57	2009	1	24	3	50	58	1010	2009	8	27	1	44	10	2009	8	27	4	35	44	0110	
2009	1	25	20	37	50	2009	1	25	22	21	23	1100	2009	9	3	4	44	3	2009	9	3	6	50	14	0110	
2009	1	29	10	4	49	2009	1	29	11	22	13	1100	2009	9	10	8	4	54	2009	9	10	9	6	7	0110	
2009	2	1	23	30	50	2009	2	2	0	23	0	1100	2009	9	28	0	2	14	2009	9	28	1	17	21	0101	
2009	2	5	12	57	39	2009	2	5	13	23	48	1100	2009	10	14	17	19	8	2009	10	14	17	26	43	1001	
2009	2	9	2	23	31	2009	2	9	2	24	30	1100	2009	11	13	19	23	57	2009	11	13	21	13	16	1010	
													2009	11	20	21	40	12	2009	11	20	23	38	59	1010	

DOUBLE TRANSITS OF THE UMBRA

YYYY	MM	DD	hh	mm	ss	AAAA	MM	GG	hh	mm	ss	IEGC	YYYY	MM	DD	hh	mm	ss	AAAA	MM	GG	hh	mm	ss	IEGC
2009	1	1	1	22	38	2009	1	1	2	13	47	1100	2009	2	9	1	49	3	2009	2	9	2	7	49	1100
2009	1	4	14	19	49	2009	1	4	15	32	21	1100	2009	3	11	4	0	40	2009	3	11	4	11	55	1001
2009	1	8	3	17	2	2009	1	8	4	51	48	1100	2009	4	13	16	54	30	2009	4	13	19	12	8	1001
2009	1	9	21	45	37	2009	1	9	22	18	31	1010	2009	5	17	7	54	16	2009	5	17	9	24	13	1001
2009	1	11	16	14	11	2009	1	11	18	10	20	1100	2009	6	2	6	10	15	2009	6	2	6	16	29	1010
2009	1	15	5	11	21	2009	1	15	7	28	16	1100	2009	6	9	8	4	7	2009	6	9	10	16	3	1010
2009	1	16	23	39	54	2009	1	17	1	56	50	1010	2009	6	16	10	37	24	2009	6	16	12	16	15	1010
2009	1	18	18	8	27	2009	1	18	20	25	23	1100	2009	8	12	21	12	2	2009	8	12	22	19	29	0110
2009	1	22	7	15	40	2009	1	22	9	22	32	1100	2009	8	19	23	46	50	2009	8	20	2	21	2	0110
2009	1	24	2	46	44	2009	1	24	3	51	5	1010	2009	8	27	2	42	46	2009	8	27	5	13	32	0110
2009	1	25	20	34	1	2009	1	25	22	19	36	1100	2009	9	3	6	43	43	2009	9	3	7	48	35	0110
2009	1	29	9	53	17	2009	1	29	11	16	43	1100	2009	10	30	16	53	16	2009	10	30	18	34	59	1010
2009	2	1	23	11	36	2009	2	2	0	13	45	1100	2009	11	6	18	59	26	2009	11	6	21	6	56	1010
2009	2	5	12	30	47	2009	2	5	13	10	49	1100	2009	11	13	23	2	7	2009	11	13	23	2	40	1010
													2009	12	21	1	33	11	2009	12	21	3	9	24	1001

DOUBLE ECLIPSES

YYYY	MM	DD	hh	mm	ss	AAAA	MM	GG	hh	mm	ss	IEGC	YYYY	MM	DD	hh	mm	ss	AAAA	MM	GG	hh	mm	ss	IEGC
2009	1	6	7	27	11	2009	1	6	8	18	24	0110	2009	8	16	11	26	33	2009	8	16	12	16	3	1010
2009	1	13	10	1	52	2009	1	13	12	19	2	0110	2009	8	18	5	55	8	2009	8	18	7	58	48	1100
2009	1	20	12	46	47	2009	1	20	15	25	24	0110	2009	8	21	18	52	22	2009	8	21	21	9	48	1100
2009	1	27	16	46	26	2009	1	27	18	0	5	0110	2009	8	23	13	20	58	2009	8	23	15	38	24	1010
2009	1	28	11	45	50	2009	1	28	12	53	15	1001	2009	8	25	7	49	35	2009	8	25	10	7	1	1100
2009	3	26	3	1	21	2009	3	26	4	20	45	1010	2009	8	28	21	0	56	2009	8	28	23	4	18	1100
2009	4	2	4	55	24	2009	4	2	7	13	34	1010	2009	8	30	16	38	27	2009	8	30	17	32	57	1010
2009	4	9	8	43	46	2009	4	9	9	7	31	1010	2009	9	1	10	19	30	2009	9	1	12	1	35	1100
2009	7	31	13	9	32	2009	7	31	13	24	56	1100	2009	9	3	4	12	51	2009	9	3	6	30	15	1001
2009	8	4	2	6	35	2009	8	4	2	43	16	1100	2009	9	4	23	39	1	2009	9	5	0	58	56	1100
2009	8	7	15	3	42	2009	8	7	16	2	32	1100	2009	9	8	12	57	40	2009	9	8	13	56	17	1100
2009	8	11	4	0	48	2009	8	11	5	21	0	1100	2009	9	12	2	17	15	2009	9	12	2	53	42	1100
2009	8	14	16	57	58	2009	8	14	18	40	19	1100	2009	9	15	15	35	57	2009	9	15	15	51	6	1100
													2009	10	6	19	18	48	2009	10	6	20	55	27	1001

Io, Europa, Ganimede, Callisto (1 = the satellite is involved, 0 = it isn't)

Times in T.D.T.

DOUBLE OCCULTATIONS

YYYY MM DD hh mm ss	AAAA MM GG hh mm ss	IEGC	YYYY MM DD hh mm ss	AAAA MM GG hh mm ss	IEGC
2009 1 6 6 50 20	2009 1 6 7 0 27	0110	2009 8 14 16 58 1	2009 8 14 18 40 8	1100
2009 1 13 9 39 37	2009 1 13 11 31 50	0110	2009 8 16 11 23 52	2009 8 16 12 4 24	1010
2009 1 20 12 31 41	2009 1 20 15 17 35	0110	2009 8 18 5 49 44	2009 8 18 7 47 22	1100
2009 1 27 17 1 58	2009 1 27 18 7 17	0110	2009 8 21 18 41 33	2009 8 21 20 55 34	1100
2009 1 28 11 50 27	2009 1 28 13 35 14	1001	2009 8 23 13 7 28	2009 8 23 15 20 21	1010
2009 2 14 10 21 2	2009 2 14 10 31 43	0101	2009 8 25 7 33 24	2009 8 25 9 50 37	1100
2009 3 3 3 29 22	2009 3 3 5 47 47	1001	2009 8 28 20 25 26	2009 8 28 22 42 39	1100
2009 3 19 2 0 44	2009 3 19 3 57 29	1010	2009 8 30 15 0 42	2009 8 30 17 8 43	1010
2009 3 26 4 41 47	2009 3 26 6 18 53	1010	2009 9 1 9 24 35	2009 9 1 11 34 48	1100
2009 4 5 19 0 3	2009 4 5 21 17 25	1001	2009 9 3 3 43 43	2009 9 3 3 58 40	1001
2009 5 9 10 13 48	2009 5 9 12 31 41	1001	2009 9 4 22 33 46	2009 9 5 0 27 10	1100
2009 6 11 20 46 1	2009 6 11 21 38 28	0101	2009 9 6 18 20 30	2009 9 6 18 53 23	1010
2009 6 12 1 7 10	2009 6 12 1 26 59	1001	2009 9 8 11 42 25	2009 9 8 13 19 40	1100
2009 7 24 11 47 10	2009 7 24 11 52 37	1100	2009 9 12 0 52 25	2009 9 12 2 12 26	1100
2009 7 28 0 39 9	2009 7 28 1 0 33	1100	2009 9 15 14 1 57	2009 9 15 15 5 24	1100
2009 7 31 13 31 4	2009 7 31 14 9 7	1100	2009 9 19 3 12 52	2009 9 19 3 58 40	1100
2009 8 4 2 22 51	2009 8 4 3 16 35	1100	2009 9 22 16 23 25	2009 9 22 16 52 10	1100
2009 8 7 15 14 36	2009 8 7 16 24 47	1100	2009 9 26 5 35 25	2009 9 26 5 45 59	1100
2009 8 11 4 6 17	2009 8 11 5 32 3	1100	2009 11 25 15 20 2	2009 11 25 15 25 43	0101

2 TRANSITS OF SATELLITES + 2 TRANSITS OF UMBRA

YYYY MM DD hh mm ss	AAAA MM GG hh mm ss	IEGC	IEGC
2009 1 1 1 22 38	2009 1 1 1 23 25	1100	1100
2009 1 4 14 19 49	2009 1 4 14 49 30	1100	1100
2009 1 8 3 17 2	2009 1 8 4 16 33	1100	1100
2009 1 11 16 14 11	2009 1 11 17 42 47	1100	1100
2009 1 15 5 11 21	2009 1 15 7 9 57	1100	1100
2009 1 16 23 39 54	2009 1 17 1 47 27	1010	1010
2009 1 18 18 8 27	2009 1 18 20 19 39	1100	1100
2009 1 22 7 15 40	2009 1 22 9 20 33	1100	1100
2009 1 24 2 46 57	2009 1 24 3 50 58	1010	1010
2009 1 25 20 37 50	2009 1 25 22 19 36	1100	1100
2009 1 29 10 4 49	2009 1 29 11 16 43	1100	1100
2009 2 1 23 30 50	2009 2 2 0 13 45	1100	1100
2009 2 5 12 57 39	2009 2 5 13 10 49	1100	1100
2009 8 12 21 17 32	2009 8 12 22 19 29	0110	0110
2009 8 19 23 46 50	2009 8 20 1 46 50	0110	0110
2009 8 27 2 42 46	2009 8 27 4 35 44	0110	0110
2009 9 3 6 43 43	2009 9 3 6 50 14	0110	0110

Io, Europa, Ganymede, Callisto (1 = the satellite is involved, 0 = it isn't)

JUPITER WITHOUT SATELLITES

YYYY MM DD hh mm ss	YYYY MM DD hh mm ss
2009 9 3 4 44 3	2009 9 3 6 30 15

OCCULTATION OF AN UMBRA OF A SATELLITE

YYYY MM DD hh mm ss	YYYY MM DD hh mm ss	
2009 5 26 4 33 53	2009 5 26 4 35 11	3 → 1
2009 8 20 2 15 48	in egress	2 → 3
2009 11 21 0 14 14	2009 11 21 0 30 51	3 → 1

X → Y the satellite X occults the umbra of the satellite Y

Times in T.D.T.

TRIPLE CONJUNCTIONS BETWEEN THE MOON OF JUPITER

DATE	TIMES			BODIES		D12	D13	D23	GROUP	MAG1	MAG2	MAG3	MAGT	
2009	8	25	11 30	IO	EUROPA	CALLISTO	0.41	0.29	0.48	0.484	5.0	5.3	5.7	4.1
2009	8	25	11 32	IO	EUROPA	CALLISTO	0.41	0.29	0.45	0.461	5.0	5.3	5.7	4.1
2009	8	25	11 34	IO	EUROPA	CALLISTO	0.42	0.29	0.42	0.447	5.0	5.3	5.7	4.1
2009	8	25	11 36	IO	EUROPA	CALLISTO	0.42	0.30	0.39	0.440	5.0	5.3	5.7	4.1
2009	8	25	11 38	IO	EUROPA	CALLISTO	0.42	0.32	0.36	0.437	5.0	5.3	5.7	4.1
2009	8	25	11 40	IO	EUROPA	CALLISTO	0.43	0.34	0.34	0.438	5.0	5.3	5.7	4.1
2009	8	25	11 42	IO	EUROPA	CALLISTO	0.43	0.36	0.31	0.441	5.0	5.3	5.7	4.1
2009	8	25	11 44	IO	EUROPA	CALLISTO	0.44	0.39	0.29	0.446	5.0	5.3	5.7	4.1
2009	8	25	11 46	IO	EUROPA	CALLISTO	0.44	0.42	0.27	0.454	5.0	5.3	5.7	4.1
2009	8	25	11 48	IO	EUROPA	CALLISTO	0.44	0.45	0.25	0.466	5.0	5.3	5.7	4.1
2009	8	25	11 50	IO	EUROPA	CALLISTO	0.45	0.48	0.24	0.485	5.0	5.3	5.7	4.1
2009	9	11	18 42	IO	EUROPA	CALLISTO	0.19	0.35	0.50	0.498	5.0	5.3	5.7	4.1
2009	9	11	18 44	IO	EUROPA	CALLISTO	0.19	0.32	0.47	0.468	5.0	5.3	5.7	4.1
2009	9	11	18 46	IO	EUROPA	CALLISTO	0.19	0.30	0.44	0.438	5.0	5.3	5.7	4.1
2009	9	11	18 48	IO	EUROPA	CALLISTO	0.19	0.28	0.41	0.408	5.0	5.3	5.7	4.1
2009	9	11	18 50	IO	EUROPA	CALLISTO	0.18	0.26	0.38	0.379	5.0	5.3	5.7	4.1
2009	9	11	18 52	IO	EUROPA	CALLISTO	0.18	0.25	0.35	0.351	5.0	5.3	5.7	4.1
2009	9	11	18 54	IO	EUROPA	CALLISTO	0.18	0.23	0.32	0.324	5.0	5.3	5.7	4.1
2009	9	11	18 56	IO	EUROPA	CALLISTO	0.18	0.23	0.30	0.298	5.0	5.3	5.7	4.1
2009	9	11	18 58	IO	EUROPA	CALLISTO	0.18	0.22	0.27	0.274	5.0	5.3	5.7	4.1
2009	9	11	19 0	IO	EUROPA	CALLISTO	0.17	0.22	0.25	0.256	5.0	5.3	5.7	4.1
2009	9	11	19 2	IO	EUROPA	CALLISTO	0.17	0.22	0.23	0.246	5.0	5.3	5.7	4.1
2009	9	11	19 4	IO	EUROPA	CALLISTO	0.17	0.23	0.21	0.242	5.0	5.3	5.7	4.1
2009	9	11	19 6	IO	EUROPA	CALLISTO	0.17	0.24	0.20	0.247	5.0	5.3	5.7	4.1
2009	9	11	19 8	IO	EUROPA	CALLISTO	0.17	0.26	0.19	0.260	5.0	5.3	5.7	4.1
2009	9	11	19 10	IO	EUROPA	CALLISTO	0.17	0.28	0.19	0.279	5.0	5.3	5.7	4.1
2009	9	11	19 12	IO	EUROPA	CALLISTO	0.17	0.30	0.19	0.300	5.0	5.3	5.7	4.1
2009	9	11	19 14	IO	EUROPA	CALLISTO	0.17	0.32	0.20	0.323	5.0	5.3	5.7	4.1
2009	9	11	19 16	IO	EUROPA	CALLISTO	0.17	0.35	0.22	0.347	5.0	5.3	5.7	4.1
2009	9	11	19 18	IO	EUROPA	CALLISTO	0.16	0.37	0.24	0.373	5.0	5.3	5.7	4.1
2009	9	11	19 20	IO	EUROPA	CALLISTO	0.16	0.40	0.26	0.400	5.0	5.3	5.7	4.1
2009	9	11	19 22	IO	EUROPA	CALLISTO	0.16	0.43	0.28	0.428	5.0	5.3	5.7	4.1
2009	9	11	19 24	IO	EUROPA	CALLISTO	0.16	0.46	0.31	0.457	5.0	5.3	5.7	4.1
2009	9	11	19 26	IO	EUROPA	CALLISTO	0.16	0.49	0.33	0.486	5.0	5.3	5.7	4.1
2009	9	28	3 36	EUROPA	GANIMEDE	CALLISTO	0.11	0.50	0.41	0.496	5.3	4.6	5.7	3.9
2009	9	28	3 38	EUROPA	GANIMEDE	CALLISTO	0.07	0.49	0.44	0.487	5.3	4.6	5.7	3.9
2009	9	28	3 40	EUROPA	GANIMEDE	CALLISTO	0.03	0.48	0.46	0.479	5.3	4.6	5.7	3.9
2009	9	28	3 42	EUROPA	GANIMEDE	CALLISTO	0.02	0.47	0.49	0.492	5.3	4.6	5.7	3.9

D12 = distance between the first and the second satellite, in jovian radii

D13 = distance between the first and the third satellite, in jovian radii

D23 = distance between the second and the third satellite, in jovian radii

R_j is almost 40"

GROUP = least grouping, in jovian radii

MAG1 = magnitude of the first satellite

MAG2 = magnitude of the second satellite

MAG3 = magnitude of the third satellite

MAGT = total magnitude of the group

Times in TDT Are listed only the events under 0.5 R_j

CONJUNCT. BETWEEN THE MOONS OF JUPITER

Date	Times	Moons	Dit.	h	h Sun								
02/01/09	5.54.21	I/III	-5''	-20.1	-8.5		05/03/09	10.04.28	II/III	2''	30.1	38.8	
02/01/09	17.07.57	II/III	-8''	-0.6	-13.7		06/03/09	10.03.19	I/II	-2''	30.1	39.1	
02/01/09	21.34.19	II/IV	-10''	-47.9	-61.4		07/03/09	17.11.44	I/II	3''	-32.6	-0.6	
03/01/09	12.30.21	I/IV	-7''	27.4	23.1		08/03/09	1.11.06	II/III	-4''	-34.4	-45.8	
04/01/09	4.04.46	I/II	-2''	-39.3	-28.1		09/03/09	23.17.59	I/II	-2''	-52.9	-52.1	
04/01/09	16.11.24	III/IV	-7''	8.2	-3.4		11/03/09	6.22.31	I/II	2''	20.1	8.8	
05/01/09	10.35.51	II/III	4''	23.0	24.8		11/03/09	11.08.56	II/IV	-4''	24.6	44.4	
07/01/09	17.30.30	I/II	-2''	-6.0	-16.9		11/03/09	11.35.30	I/III	2''	21.8	44.4	
09/01/09	9.18.08	I/III	-5''	16.3	20.1		11/03/09	21.24.58	I/IV	-2''	-64.4	-43.4	
10/01/09	14.27.51	III/IV	8''	19.5	12.8		12/03/09	13.52.00	II/III	2''	1.5	33.5	
11/01/09	6.58.09	I/II	-2''	-3.5	2.5		13/03/09	12.32.26	I/II	-2''	13.5	42.5	
11/01/09	20.43.55	I/II	-2''	-43.3	-51.6		14/03/09	19.33.14	I/II	2''	-59.2	-25.6	
12/01/09	0.02.37	I/II	-3''	-68.2	-67.8		15/03/09	4.43.08	II/III	-4''	7.9	-8.5	
12/01/09	15.15.35	II/III	4''	13.1	6.6		17/03/09	1.46.07	I/II	-2''	-22.4	-37.9	
13/01/09	16.00.40	II/III	1''	6.2	0.2		18/03/09	8.43.50	I/II	2''	31.6	34.6	
14/01/09	2.19.11	II/III	2''	-52.6	-47.5		18/03/09	15.10.51	I/III	2''	-16.0	22.9	
14/01/09	20.30.35	I/II	-2''	-42.4	-48.7		19/03/09	4.55.20	I/III	1''	11.9	-4.9	
15/01/09	7.44.13	I/II	-2''	6.0	9.5		19/03/09	13.08.41	I/III	2''	5.3	41.0	
15/01/09	14.22.50	I/II	-3''	18.7	14.4		19/03/09	17.35.37	II/III	2''	-43.1	-2.7	
16/01/09	13.01.47	I/III	-4''	25.7	23.1		20/03/09	5.10.44	II/IV	3''	14.7	-1.0	
17/01/09	1.44.27	I/III	-3''	-56.7	-53.3		20/03/09	14.59.33	I/II	-2''	-15.0	25.3	
17/01/09	11.07.56	I/III	-4''	27.5	27.3		21/03/09	10.53.45	III/IV	3''	23.5	48.0	
18/01/09	10.07.42	I/II	-2''	24.4	25.2		21/03/09	21.54.20	I/II	2''	-58.9	-43.4	
18/01/09	19.12.20	I/II	-2''	-30.0	-33.7		22/03/09	8.14.44	II/III	-4''	31.7	31.7	
19/01/09	4.10.44	I/II	-3''	-29.5	-26.6		24/03/09	4.12.21	I/II	-2''	7.9	-11.3	
19/01/09	18.37.21	I/IV	-6''	-24.0	-27.0		25/03/09	11.04.43	I/II	2''	20.9	49.9	
19/01/09	20.35.25	II/III	3''	-45.8	-48.6		25/03/09	19.29.07	I/III	1''	-61.8	-22.2	
20/01/09	7.48.46	III/IV	-9''	9.1	10.7		26/03/09	17.15.54	I/III	1''	-43.3	2.2	
20/01/09	8.22.48	II/IV	-8''	13.8	15.3		26/03/09	21.15.41	II/III	2''	-61.1	-37.6	
20/01/09	12.24.49	II/III	1''	27.2	26.4		27/03/09	5.46.14	III/IV	-1''	22.6	7.3	
21/01/09	8.28.18	II/III	2''	15.0	16.2		27/03/09	17.24.52	I/II	-2''	-45.3	0.9	
21/01/09	23.56.52	I/II	-2''	-67.1	-66.6		28/03/09	3.06.47	I/IV	-1''	-0.4	-21.4	
22/01/09	6.37.24	I/II	-2''	-0.7	0.3		28/03/09	21.32.56	II/IV	-2''	-58.4	-38.9	
22/01/09	17.49.23	I/II	-3''	-16.8	-17.6		29/03/09	0.15.00	I/II	2''	-31.9	-42.8	
23/01/09	17.46.36	I/III	-3''	-16.8	-16.9		29/03/09	11.45.08	II/III	-3''	13.8	51.0	
23/01/09	23.20.22	II/III	-3''	-67.6	-67.2		31/03/09	6.36.48	I/II	-2''	29.0	17.8	
24/01/09	15.11.54	I/III	-4''	9.1	9.6		01/04/09	13.25.08	I/II	2''	-4.1	42.9	
25/01/09	14.12.19	I/II	-2''	16.9	17.9		02/04/09	20.45.14	I/III	1''	-61.4	-31.7	
25/01/09	17.43.31	I/II	-2''	-17.2	-16.0		03/04/09	0.52.45	II/III	2''	-21.7	-37.8	
26/01/09	7.20.54	I/II	-3''	7.8	7.5		03/04/09	19.48.27	I/II	-2''	-63.5	-23.2	
27/01/09	22.43.43	I/IV	5''	-66.5	-64.7		05/04/09	2.35.09	I/II	1''	-1.0	-23.8	
28/01/09	13.24.22	II/III	2''	21.5	23.9		05/04/09	7.29.07	I/IV	-0''	32.5	28.8	
28/01/09	14.32.47	I/IV	3''	13.1	16.0		05/04/09	15.14.28	II/III	-3''	-26.6	26.3	
29/01/09	1.18.26	I/IV	5''	-54.7	-55.9		05/04/09	22.01.13	I/III	-1''	-50.5	-38.8	
29/01/09	2.00.22	II/IV	6''	-47.6	-49.2		06/04/09	10.02.59	I/IV	0''	24.3	51.2	
29/01/09	20.49.33	I/II	-3''	-53.0	-49.0		06/04/09	14.49.38	II/IV	1''	-22.6	30.9	
29/01/09	23.30.33	III/IV	6''	-66.8	-65.7		07/04/09	8.59.35	I/II	-2''	29.9	44.0	
31/01/09	18.44.40	I/III	-4''	-31.6	-26.0		08/04/09	15.45.01	I/II	1''	-33.9	21.4	
02/02/09	10.14.36	I/II	-3''	28.2	29.1		09/04/09	23.58.01	I/III	1''	-27.5	-39.1	
03/02/09	19.53.13	I/III	5''	-45.7	-38.0		10/04/09	4.26.15	II/III	1''	18.8	-2.9	
04/02/09	17.53.45	II/III	2''	-24.2	-15.8		10/04/09	22.10.24	I/II	-2''	-46.1	-37.7	
04/02/09	19.13.35	III/IV	-6''	-39.0	-30.5		12/04/09	4.54.44	I/II	1''	23.4	2.7	
04/02/09	23.20.00	II/IV	-3''	-66.1	-63.9		12/04/09	18.42.35	II/III	-2''	-61.7	-10.3	
05/02/09	2.55.16	II/IV	-2''	-33.6	-38.4		13/04/09	0.54.35	I/III	-1''	-15.0	-33.9	
05/02/09	23.38.17	I/II	-3''	-64.4	-63.5		13/04/09	6.28.09	II/IV	0''	31.7	20.1	
06/02/09	5.04.23	I/IV	-5''	-9.3	-14.4		14/04/09	3.45.54	II/IV	2''	15.1	-9.3	
06/02/09	17.31.09	II/IV	-5''	-21.0	-11.2		14/04/09	11.20.43	I/II	-1''	10.3	57.5	
07/02/09	10.58.26	II/III	-6''	29.1	32.5		14/04/09	13.08.46	I/IV	0''	-8.5	48.7	
07/02/09	22.03.08	I/III	-4''	-65.4	-57.7		15/04/09	4.53.54	II/IV	0''	24.5	3.4	
09/02/09	12.59.40	I/II	-3''	20.9	29.5		15/04/09	15.02.55	III/IV	-1''	-30.2	30.5	
10/02/09	22.54.29	I/III	4''	-66.1	-61.2		15/04/09	18.04.19	I/II	1''	-59.1	-2.3	
11/02/09	22.08.55	II/III	2''	-66.1	-57.2		17/04/09	3.01.33	I/III	1''	9.8	-15.8	
13/02/09	2.20.18	I/II	-3''	-35.3	-42.8		17/04/09	7.56.42	II/III	1''	32.1	37.2	
13/02/09	10.08.21	II/IV	4''	29.5	31.9		18/04/09	0.30.44	I/II	-1''	-16.3	-34.2	
14/02/09	13.48.17	III/IV	7''	13.1	26.2		19/04/09	7.13.42	I/II	1''	33.3	30.2	
14/02/09	14.32.06	II/III	-6''	6.5	20.5		19/04/09	22.09.36	II/III	-2''	-40.9	-34.7	
14/02/09	17.14.40	II/IV	1''	-22.1	-6.5		20/04/09	3.48.14	I/III	-0''	18.5	-7.2	
15/02/09	1.13.35	I/III	-4''	-46.2	-52.6		21/04/09	10.50.54	III/IV	-2''	11.6	59.7	
15/02/09	7.29.24	II/IV	3''	18.2	13.1		21/04/09	13.40.15	I/II	-1''	-18.3	45.8	
16/02/09	15.39.17	I/II	-3''	-5.8	10.8		21/04/09	21.29.15	II/IV	-1''	-46.6	-31.1	
18/02/09	1.57.44	I/III	4''	-36.5	-45.2		22/04/09	20.22.58	I/II	1''	-55.9	-23.4	
19/02/09	2.13.58	II/III	2''	-32.9	-42.3		24/04/09	5.58.15	I/III	0''	32.6	17.5	
20/02/09	4.57.48	I/II	-3''	-1.8	-12.5		24/04/09	11.23.32	II/III	1''	4.8	60.9	
21/02/09	18.05.22	II/III	-5''	-35.1	-14.3		25/04/09	2.49.27	I/II	-1''	12.4	-15.3	
22/02/09	0.56.59	II/IV	-5''	-45.2	-52.4		26/04/09	9.32.00	I/II	1''	20.8	54.6	
22/02/09	4.18.51	I/III	-3''	-8.2	-19.2		27/04/09	1.35.34	II/III	-1''	1.6	-24.9	
22/02/09	11.02.46	I/IV	-4''	28.3	37.7		27/04/09	6.43.04	I/III	-0''	33.6	26.6	
23/02/09	18.15.01	I/II	-3''	-38.0	-15.7		28/04/09	15.58.11	I/II	-1''	-47.2	22.7	
24/02/09	4.43.02	III/IV	-4''	-2.2	-14.2		29/04/09	22.40.55	I/II	1''	-28.8	-32.9	
25/02/09	5.04.28	I/III	3''	1.8	-9.9		30/04/09	12.39.28	II/IV	1''	-12.5	56.7	
26/02/09	6.12.16	II/III	2''	12.8	3.1		30/04/09	18.23.20	I/IV	2''	-62.2	-2.7	
27/02/09	7.31.54	I/II	-3''	23.2	17.0		01/05/09	8.50.05	I/III	-0''	24.1	49.9	
28/02/09	21.38.20	II/III	-5''	-65.5	-48.4		01/05/09	14.47.00	II/III	1''	-36.6	36.4	
01/03/09	7.20.36	I/III	-3''	22.8	15.8		02/05/09	5.06.33	I/II	-1''	31.6	9.9	
02/03/09	1.26.27	III/IV	3''	-35.2	-46.0		03/05/09	11.49.34	I/II	0''	-5.0	62.4	
02/03/09	15.22.23	I/IV	2''	-9.8	17.0		04/05/09	4.59.51	II/III	-1''	31.6	9.1	
02/03/09	18.41.24	II/IV	4''	-46.2	-19.0		04/05/09	9.39.29	I/III	0''	16.2	57.8	
02/03/09	20.47.44	I/II	-3''	-63.6	-40.8		05/05/09	18.14.28	I/II	-1''	-61.9	-0.1	
03/03/09	18.03.50	I/IV	3''	-40.0	-11.9		07/05/09	0.58.05	I/II	0''	1.3	-26.0	
04/03/09	4.00.51	I/II	3''	-5.6	-19.7		08/05/09	11.38.04	I/III	-1''	-6.1	64.4	
04/03/09	8.15.50	I/III	3''	28.5	25.5		08/05/09	18.07.12	II/III	0''	-61.8	1.4	

Date	Times	Moons	Dist.	h	h Sun								
28/09/09	5.14.51	II/IV	5''	-45.8	1.2	20/11/09	4.21.23	I/II	0''	-63.5	-19.7		
28/09/09	14.37.10	I/III	-1''	-4.9	24.5	20/11/09	12.22.44	I/III	1''	7.0	25.2		
28/09/09	22.11.54	II/IV	4''	24.2	-48.8	20/11/09	20.45.31	I/III	0''	9.5	-54.4		
30/09/09	5.21.32	I/II	1''	-48.3	2.0	21/11/09	10.19.59	I/III	1''	-14.1	27.4		
01/10/09	15.15.08	I/III	1''	3.9	17.1	21/11/09	14.18.57	II/III	1''	23.8	12.6		
02/10/09	14.32.18	II/III	1''	-2.4	23.9	22/11/09	10.39.18	I/II	0''	-10.0	27.7		
03/10/09	18.30.13	I/II	1''	29.1	-19.4	23/11/09	17.29.48	I/II	0''	30.7	-19.2		
05/10/09	6.35.02	II/III	-0''	-61.5	14.0	24/11/09	4.42.55	II/III	-0''	-63.6	-16.5		
05/10/09	15.05.20	II/IV	-4''	4.9	17.4	24/11/09	14.45.51	II/IV	-3''	27.6	8.5		
05/10/09	17.15.21	I/III	-1''	23.2	-6.2	24/11/09	22.43.02	I/IV	-4''	-13.4	-68.5		
06/10/09	1.26.29	I/IV	-5''	-10.0	-40.9	25/11/09	4.01.45	I/IV	-3''	-63.2	-24.2		
07/10/09	7.38.19	I/II	1''	-64.6	24.0	25/11/09	22.46.25	II/IV	-4''	-14.6	-68.7		
07/10/09	17.53.45	III/IV	-3''	27.6	-13.9	25/11/09	23.49.40	I/II	0''	-26.3	-66.4		
08/10/09	17.50.12	I/III	1''	27.6	-13.6	26/11/09	11.49.30	II/IV	-3''	5.1	26.0		
09/10/09	17.53.06	II/III	1''	28.1	-14.4	26/11/09	22.23.20	III/IV	-2''	-11.0	-67.8		
10/10/09	20.47.00	I/II	1''	27.5	-44.4	27/11/09	6.38.37	I/II	0''	-50.1	3.0		
12/10/09	9.33.37	II/III	0''	-49.8	36.8	28/11/09	13.45.55	I/III	1''	23.0	16.0		
13/10/09	11.53.00	III/IV	5''	-24.0	38.5	28/11/09	17.48.37	II/III	1''	28.5	-23.0		
14/10/09	3.27.31	I/IV	4''	-38.2	-22.3	29/11/09	13.00.21	I/II	0''	17.6	20.7		
14/10/09	6.25.26	II/IV	3''	-63.6	10.3	30/11/09	19.47.48	I/II	0''	13.4	-45.0		
14/10/09	9.55.17	I/II	1''	-44.8	37.7	01/12/09	8.06.17	II/III	-0''	-32.3	14.5		
14/10/09	21.45.14	I/IV	3''	19.8	-52.8	01/12/09	15.03.18	I/III	-1''	30.9	5.3		
15/10/09	5.25.43	I/IV	3''	-58.1	0.0	02/12/09	16.57.49	III/IV	5''	31.2	-13.9		
15/10/09	20.29.40	I/III	1''	27.3	-43.6	03/12/09	2.11.01	I/II	0''	-54.6	-45.9		
16/10/09	21.13.56	II/III	1''	22.6	-50.1	03/12/09	5.40.58	II/IV	3''	-55.5	-7.8		
17/10/09	23.04.08	I/II	1''	6.6	-57.5	04/12/09	2.35.57	I/IV	4''	-58.2	-41.5		
19/10/09	12.36.12	II/III	0''	-11.8	33.1	04/12/09	8.57.21	I/II	0''	-20.9	19.6		
21/10/09	12.12.42	I/II	1''	-14.6	34.4	05/12/09	16.58.37	I/III	1''	30.7	-14.1		
22/10/09	23.14.49	I/III	1''	1.9	-59.1	05/12/09	21.19.10	II/III	1''	-4.4	-60.9		
23/10/09	4.36.04	III/IV	-4''	-55.5	-11.5	06/12/09	15.21.59	I/II	0''	32.6	2.4		
23/10/09	10.01.43	I/IV	-4''	-37.4	35.0	07/12/09	22.07.16	I/II	0''	-14.5	-67.4		
24/10/09	0.35.47	II/III	1''	-13.5	-52.8	08/12/09	11.33.04	II/III	-0''	9.4	24.9		
25/10/09	1.21.48	I/II	1''	-22.7	-46.5	08/12/09	17.56.03	I/III	-2''	25.0	-24.4		
26/10/09	15.42.25	II/III	0''	22.0	4.9	10/12/09	4.32.57	I/II	-0''	-60.3	-20.9		
28/10/09	14.30.42	I/II	1''	13.5	16.0	11/12/09	11.17.34	I/II	0''	8.6	24.9		
30/10/09	2.07.10	I/III	1''	-34.6	-40.1	11/12/09	22.29.05	II/IV	-4''	-20.8	-69.6		
31/10/09	3.59.05	II/III	1''	-54.4	-19.9	12/12/09	5.41.14	I/IV	-4''	-50.7	-9.1		
31/10/09	12.02.22	I/IV	4''	-9.6	31.7	12/12/09	20.04.42	I/III	2''	4.9	-48.0		
31/10/09	15.14.45	II/IV	3''	21.0	8.3	13/12/09	0.50.45	II/III	1''	-46.9	-61.2		
01/11/09	3.40.07	I/II	1''	-52.0	-23.6	13/12/09	17.44.07	I/II	-0''	24.8	-22.1		
01/11/09	18.38.39	III/IV	2''	30.5	-28.8	15/12/09	0.28.11	I/II	0''	-44.1	-64.8		
02/11/09	18.52.36	II/III	0''	29.6	-31.6	15/12/09	15.02.43	II/III	-1''	33.3	5.2		
03/11/09	3.56.41	I/III	-1''	-55.6	-20.9	15/12/09	20.51.48	I/III	-2''	-5.2	-56.2		
04/11/09	16.49.25	I/II	0''	30.5	-9.3	17/12/09	6.55.20	I/II	-0''	-35.0	2.7		
05/11/09	23.51.50	I/II	-0''	-14.2	-61.3	18/12/09	13.39.11	I/II	0''	29.9	16.0		
06/11/09	5.09.39	I/III	1''	-63.9	-8.2	19/12/09	23.07.04	I/III	2''	-32.3	-71.4		
07/11/09	7.23.59	II/III	1''	-54.5	14.0	20/12/09	4.23.25	II/III	1''	-57.4	-23.8		
07/11/09	14.26.39	III/IV	-4''	18.3	14.1	20/12/09	8.07.25	I/IV	5''	-19.8	12.3		
08/11/09	5.59.09	I/II	0''	-63.3	0.6	20/12/09	20.06.43	I/II	-0''	0.7	-47.9		
08/11/09	14.49.02	I/IV	-4''	21.6	10.5	22/12/09	2.09.33	III/IV	3''	-60.4	-48.6		
09/11/09	12.58.37	I/II	-0''	6.2	24.6	22/12/09	2.50.29	I/II	0''	-62.2	-41.1		
09/11/09	22.05.59	II/III	0''	2.5	-62.9	22/12/09	18.35.34	II/III	-1''	14.4	-30.9		
11/11/09	19.08.48	I/II	0''	26.0	-36.2	22/12/09	23.51.39	I/III	-2''	-41.9	-69.6		
13/11/09	2.05.47	I/II	-0''	-43.2	-43.3	24/12/09	9.18.09	I/II	-0''	-4.1	19.6		
13/11/09	8.28.42	I/III	1''	-40.0	21.0	25/12/09	16.02.10	I/II	1''	31.3	-3.1		
13/11/09	22.33.01	I/III	0''	-4.9	-65.7	27/12/09	2.07.20	I/III	2''	-61.0	-49.4		
14/11/09	6.21.32	I/III	1''	-59.3	2.9	27/12/09	7.57.02	II/III	1''	-17.3	10.6		
14/11/09	10.50.54	II/III	1''	-13.1	29.7	27/12/09	22.11.42	III/IV	-5''	-26.5	-67.3		
15/11/09	8.18.52	I/II	0''	-40.4	19.4	27/12/09	22.29.41	I/II	-1''	-29.8	-69.2		
16/11/09	15.13.23	I/II	-0''	27.3	5.3	28/12/09	13.59.01	I/IV	-4''	33.5	14.5		
16/11/09	16.58.07	I/IV	4''	32.0	-12.8	28/12/09	19.39.40	I/IV	-4''	1.2	-42.1		
17/11/09	1.22.49	II/III	0''	-38.0	-51.5	29/12/09	5.14.08	I/II	1''	-45.5	-15.3		
17/11/09	6.21.09	III/IV	4''	-58.0	2.2	29/12/09	8.44.32	II/IV	-4''	-7.3	16.3		
17/11/09	23.09.57	II/IV	3''	-14.1	-67.0	29/12/09	22.10.47	II/III	-1''	-27.4	-67.0		
18/11/09	21.28.54	I/II	0''	3.5	-60.7	30/12/09	2.56.13	I/III	-2''	-61.2	-40.6		
						31/12/09	11.41.17	I/II	-1''	22.6	24.7		

I = Io
 II = Europa
 III = Ganimede
 IV = Callisto

TIMES IN U.T.

Negative values of the distances show that the 2nd satellite transits to north of the other

OCCULTATIONS BETWEEN THE MOONS OF JUPITER

M	D	h	m	s	Event	Type	Ph	Dur	dMag	%Ill	Sep	PA	MinD	h	m	s	h	m	s	h	m	s	h	m	s	h	m	s			
1	13	16	2	14	(II)	occ	(III)	P	937	0.0	99.6	55.1	80	0.915			15	54	26			16	2	14			16	10	2		
1	13	14	46	1	(II)	ecl	(III)	P	2329	0.1	90.9	44.2	81	0.847	14	26	37			14	33	18			14	46	1		14	58	45
1	20	12	4	4	(II)	ecl	(III)	E	1462	0.0	98.7	20.0	243	1.075	11	51	53					12	4	4							
2	14	17	14	53	(II)	occ	(IV)	P	225	0.0	99.9	60.8	76	0.898			17	13	1			17	14	53			17	16	46		
3	27	5	45	45	(IV)	occ	(III)	P	371	0.0	96.0	194.4	70	1.017			5	42	39			5	45	45			5	48	50		
3	28	3	6	36	(IV)	occ	(I)	P	228	0.1	93.6	49.9	70	0.784			3	4	42			3	6	36			3	8	30		
4	5	7	28	53	(I)	occ	(IV)	P	628	0.5	63.8	100.5	250	0.159			7	23	39			7	28	53			7	34	7		
4	5	18	57	28	(I)	occ	(IV)	P	910	0.5	63.8	17.9	250	0.159			18	49	53			18	57	28			19	5	3		
4	5	23	27	37	(III)	occ	(IV)	P	127	0.0	99.7	14.8	70	1.208			23	26	34			23	27	37			23	28	41		
4	6	10	2	43	(I)	occ	(IV)	P	478	0.4	70.7	91.4	70	0.316			9	58	44			10	2	43			10	6	42		
4	9	23	57	39	(I)	occ	(III)	P	250	0.1	95.2	249.6	69	0.894			23	55	34			23	57	39			23	59	44		
4	13	0	54	22	(III)	occ	(I)	P	200	0.1	94.7	42.7	69	0.887			0	52	42			0	54	22			0	56	2		
4	13	6	28	5	(IV)	occ	(II)	P	790	0.2	80.5	170.2	69	0.464			6	21	31			6	28	5			6	34	40		
4	13	17	28	29	(IV)	ecl	(I)	E	613	0.0	98.1	27.6	69	1.285	17	23	23					17	28	29							
4	14	13	8	44	(IV)	occ	(I)	P	320	0.3	77.1	52.1	249	0.451			13	6	4			13	8	44			13	11	24		
4	15	4	53	51	(IV)	occ	(II)	P	723	0.4	70.9	165.2	249	0.246			4	47	50			4	53	51			4	59	53		
4	15	15	2	36	(IV)	occ	(III)	P	680	0.3	79.4	233.7	249	0.611			14	56	56			15	2	36			15	8	16		
4	17	3	1	14	(I)	occ	(III)	P	331	0.2	80.9	74.3	70	0.547			2	58	29			3	1	14			3	4	0		
4	20	3	48	2	(III)	occ	(I)	P	308	0.3	78.5	56.8	69	0.497			3	45	29			3	48	2			3	50	36		
4	21	21	29	0	(II)	occ	(IV)	P	429	0.2	84.3	145.7	249	0.556			21	25	25			21	29	0			21	32	34		
4	22	20	22	46	(I)	occ	(II)	P	58	0.0	99.7	70.3	248	0.852			20	22	16			20	22	46			20	23	15		
4	24	5	57	59	(I)	occ	(III)	A	348	0.4	67.7	63.4	69	0.168			5	55	5	5	57	40	5	57	59	5	58	18	6	0	53
4	24	11	23	5	(II)	occ	(III)	P	238	0.0	95.6	115.4	69	0.882			11	21	6			11	23	5			11	25	4		
4	26	9	31	47	(I)	occ	(II)	P	145	0.0	95.9	73.2	248	0.733			9	30	35			9	31	47			9	33	0		
4	27	6	42	54	(III)	occ	(I)	T	363	0.4	67.7	70.8	69	0.132			6	39	52	6	42	28	6	42	54	6	43	20	6	45	55
4	29	22	40	43	(I)	occ	(II)	P	190	0.1	90.2	76.2	248	0.616			22	39	8			22	40	43			22	42	18		
4	30	12	39	20	(IV)	occ	(II)	P	119	0.0	99.5	97.8	69	1.001			12	38	21			12	39	20			12	40	20		
5	1	8	49	51	(I)	occ	(III)	P	327	0.4	67.9	51.7	69	0.232			8	47	7			8	49	51			8	52	34		
5	1	14	46	36	(II)	occ	(III)	P	342	0.2	82.8	110.6	69	0.551			14	43	45			14	46	36			14	49	26		
5	2	5	6	21	(II)	occ	(I)	P	112	0.0	97.9	67.3	249	0.803			5	5	25			5	6	21			5	7	17		
5	3	11	49	23	(I)	occ	(II)	P	222	0.2	83.7	79.1	248	0.504			11	47	32			11	49	23			11	51	14		
5	4	9	39	21	(III)	occ	(I)	T	393	0.4	67.7	84.4	68	0.197			9	36	5	9	39	6	9	39	21	9	39	37	9	42	38
5	4	4	59	31	(III)	occ	(II)	P	217	0.0	97.2	129.4	69	0.966			4	57	43			4	59	31			5	1	19		
5	5	18	14	17	(II)	occ	(I)	P	164	0.1	92.5	65.7	249	0.675			18	12	55			18	14	17			18	15	39		
5	7	0	57	55	(I)	occ	(II)	P	245	0.3	76.9	82.1	248	0.395			0	55	52			0	57	55			0	59	58		
5	8	11	37	52	(I)	occ	(III)	P	272	0.2	83.4	39.2	68	0.642			11	35	36			11	37	52			11	40	9		
5	8	16	9	10	(I)	ecl	(IV)	E	385	0.1	92.8	155.0	249	1.139	16	5	58					16	9	10							
5	8	18	6	51	(II)	occ	(III)	A	377	0.3	73.9	105.6	68	0.203			18	3	42	18	6	16	18	6	51	18	7	25	18	9	59
5	9	7	21	50	(II)	occ	(I)	P	195	0.2	85.6	64.1	249	0.546			7	20	13			7	21	50			7	23	27		
5	10	14	6	9	(I)	occ	(II)	P	263	0.4	70.2	85.1	248	0.290			14	3	57			14	6	9			14	8	20		
5	11	12	39	25	(III)	occ	(I)	P	411	0.3	76.4	97.3	68	0.479			12	35	59			12	39	25			12	42	50		
5	11	8	22	31	(III)	occ	(II)	P	381	0.2	83.2	139.0	69	0.577			8	19	20			8	22	31			8	25	41		
5	12	20	28	58	(II)	occ	(I)	P	214	0.3	77.8	62.5	249	0.416			20	27	11			20	28	58			20	30	45		
5	14	3	14	17	(I)	occ	(II)	P	276	0.5	63.7	88.1	248	0.190			3	11	59			3	14	17			3	16	35		
5	15	14	22	43	(I)	occ	(III)	P	164	0.0	96.9	26.2	67	1.052			14	21	21			14	22	43			14	24	5		
5	15	21	23	46	(II)	occ	(III)	A	372	0.3	73.9	100.4	68	0.156			21	20	40	21	23	5	21	23	46	21	24	26	21	26	51
5	16	4	10	24	(IV)	ecl	(III)	E	764	0.2	84.5	165.9	68	1.134	4	4	2					4	10	24							
5	16	9	35	40	(I)	occ	(I)	P	226	0.4	69.6	60.8	249	0.286			9	33	47			9	35	40			9	37	32		
5	16	18	43	41	(IV)	ecl	(I)	P	648	0.6	59.4	84.6	68	0.535	18	38	17	18	42	33			18	43	41			18	44	49	
5	17	10	55	50	(IV)	ecl	(I)	P	1221	0.7	52.2	9.0	245	0.362	10	45	40	10	51	5			10	55	50			11	0	35	
5	17	16	22	5	(I)	occ	(II)	P	286	0.6	58.2	91.1	248	0.094			16	19	42			16	22	5			16	24	28		
5	17	21	10	5	(IV)	ecl	(I)	E	815	0.3	78.1	118.1	248	0.927	21	3	17					21	10	5							
5	18	15	45	1	(III)	occ	(I)	P	434	0.2	84.9	109.0	68	0.702			15	41	24			15	45	1			15	48	38		
5	18	11	43	18	(III)	occ	(II)	T	451	0.3	73.9	148.6	68	0.213			11	39	33	11	42	37	11	43	18	11	43	59	11	47	4
5	19	22	41	57	(II)	occ	(I)	P	231	0.5	61.5	59.1	249	0.156			22	40	1			22	41	57			22	43	52		
5	21	5	29	48	(I)	occ	(II)	T	293	0.6	57.5	94.1	248	0.004			5	27	21	5	29	37	5	29	48	5	29	59	5	32	14
5	23	11	47	47	(II)	occ	(I)	A	232	0.6	57.5	57.4	249	0.028			11	45	51	11	47	39	11	47	47	11	47	55	11	49	43
5	23	0	37	34	(II)	occ	(III)	P	331	0.2	80.2	94.8	68	0.519			0	34	48			0	37	34			0	40	19		
5	24	18	37	6	(I)	occ	(II)	P	298	0.6	57.7	97.1	248	0.082			18	34	37			18	37	6			18	39	35		
5	25	15	2	7	(III)	occ	(II)	T	475	0.3	73.9	158.1	68	0.122			14	58	9	15	1	11	15	2	7	15	3	3	15	6	5
5	25	19	2	10	(III)	occ	(I)	P	501	0.1	89.6	118.5	68	0.848																	

M	D	h	m	s	Event Type	Ph	Dur	dMag	%I11	Sep	PA	MinD	h	m	s	h	m	s	h	m	s	h	m	s	h	m	s	h	m	s
6	10	7	29	22	(III) ecl (IV)	A	941	0.6	59.1	330.7	249	0.307	7	21	31	7	26	32	7	27	34	7	29	22	7	31	9	7	32	11
6	10	14	37	52	(II) ecl (IV)	E	812	0.5	62.7	277.3	249	0.328	14	31	6	14	35	52	14	34	59	14	37	52	14	40	45	14	39	52
6	11	12	10	46	(I) occ (II)	P	306	0.3	75.7	112.1	248	0.419				12	8	13				12	10	46				12	13	19
6	11	6	12	43	(I) ecl (IV)	E	485	0.6	56.7	149.3	250	0.416	6	8	41	6	11	43	6	11	17	6	12	43	6	14	9	6	13	43
6	12	22	15	46	(I) ecl (III)	E	288	0.1	93.8	61.1	249	1.095	22	13	22							22	15	46						
6	13	18	13	46	(II) occ (I)	P	166	0.1	89.2	46.3	249	0.688				18	12	24				18	13	46				18	15	9
6	14	23	21	12	(I) ecl (II)	E	66	0.0	100.0	137.6	248	1.107	23	20	38							23	21	12						
6	15	1	16	38	(I) occ (II)	P	306	0.3	78.0	114.9	248	0.467				1	14	5				1	16	38				1	19	11
6	16	0	46	56	(III) occ (II)	P	388	0.1	91.9	186.1	68	0.910							0	43	42	0	46	56				0	50	10
6	16	1	29	41	(III) ecl (I)	P	1041	0.3	79.1	128.7	68	0.929	1	21	0	1	27	12				1	29	41				1	32	9
6	16	8	46	1	(III) ecl (I)	P	1336	0.3	77.3	64.9	69	0.903	8	34	53	8	40	22				8	46	1				8	51	40
6	16	23	16	29	(III) ecl (I)	P	644	0.5	64.4	129.8	248	0.790	23	11	7	23	14	17				23	16	29				23	18	40
6	17	7	16	36	(II) occ (I)	P	144	0.1	93.3	44.4	249	0.792				7	15	24				7	16	36				7	17	48
6	18	14	22	36	(I) occ (II)	P	308	0.2	79.9	117.8	248	0.508				14	20	2				14	22	36				14	25	10
6	18	12	29	59	(I) ecl (II)	E	144	0.0	99.7	140.0	248	1.039	12	28	47							12	29	59						
6	19	5	11	25	(IV) ecl (II)	P	604	0.5	64.6	95.8	68	0.482	5	6	23	5	11	17				5	11	25				5	11	32
6	19	8	32	46	(IV) ecl (I)	E	507	0.3	76.9	80.2	67	0.933	8	28	33							8	32	46						
6	19	23	21	17	(IV) ecl (III)	E	786	0.2	83.2	92.9	249	0.189	23	14	44	23	19	24	23	18	51	23	21	17	23	23	42	23	23	9
6	20	0	58	12	(I) ecl (III)	E	336	0.2	84.8	74.0	249	0.864	0	55	24							0	58	12						
6	20	5	10	45	(IV) ecl (I)	P	2236	0.9	45.6	72.0	247	0.557	4	52	7	5	4	3				5	10	45				5	17	26
6	20	9	36	38	(IV) ecl (I)	P	2112	0.7	51.5	123.9	248	0.453	9	19	2	9	30	25				9	36	38				9	42	51
6	20	20	18	57	(II) occ (I)	P	118	0.0	96.5	42.4	249	0.889				20	17	59				20	18	57				20	19	56
6	22	3	28	3	(I) occ (II)	P	311	0.2	81.3	120.6	248	0.541				3	25	27				3	28	3				3	30	38
6	22	1	38	47	(I) ecl (II)	E	193	0.0	98.6	142.2	248	0.974	1	37	10							1	38	47						
6	23	3	58	9	(III) occ (II)	P	325	0.0	96.2	194.8	68	1.088				3	55	27				3	58	9				4	0	52
6	24	9	20	56	(II) occ (I)	P	86	0.0	98.7	40.4	249	0.979				9	20	13				9	20	56				9	21	39
6	24	2	32	9	(III) ecl (I)	P	565	0.9	44.9	128.4	248	0.619	2	27	27	2	29	50				2	32	9				2	34	29
6	25	16	33	37	(I) occ (II)	P	316	0.2	82.3	123.3	248	0.567				16	30	59				16	33	37				16	36	15
6	25	14	48	6	(I) ecl (II)	E	232	0.0	96.8	144.3	248	0.911	14	46	9							14	48	6						
6	27	3	41	6	(I) ecl (III)	P	373	0.3	72.5	86.2	249	0.634	3	38	0	3	39	54				3	41	6				3	42	18
6	27	22	22	27	(II) occ (I)	P	34	0.0	99.9	38.4	250	1.061				22	22	10				22	22	27				22	22	44
6	27	22	16	22	(IV) ecl (IV)	E	564	0.3	76.0	158.8	250	0.224	22	11	40	22	15	15	22	14	4	22	16	22	22	18	39	22	17	28
6	28	15	21	4	(I) ecl (IV)	E	486	0.2	84.3	5.7	340	0.912	15	17	1							15	21	4						
6	29	3	57	25	(I) ecl (II)	E	266	0.1	94.1	146.1	248	0.851	3	55	12							3	57	25						
6	29	5	38	40	(I) occ (II)	P	322	0.2	83.0	125.9	248	0.585				5	35	59				5	38	40				5	41	21
6	29	14	59	56	(III) ecl (IV)	A	1095	0.4	67.6	218.9	67	0.183	14	50	49	14	56	0	14	57	51	14	59	56	15	2	1	15	3	53
6	30	7	8	10	(III) occ (II)	P	257	0.0	98.5	203.1	68	1.218				7	6	1				7	8	10				7	10	19
7	1	5	35	29	(III) ecl (I)	P	521	1.0	39.5	122.4	248	0.426	5	31	9	5	33	8				5	35	29				5	37	50
7	2	18	43	58	(I) occ (II)	P	331	0.2	83.2	128.4	248	0.596				18	41	12				18	43	58				18	46	43
7	2	17	7	22	(I) ecl (II)	E	296	0.1	90.6	147.8	248	0.794	17	4	53							17	7	22						
7	4	6	24	57	(I) ecl (III)	A	402	0.5	62.8	97.5	249	0.409	6	21	36	6	23	19	6	24	2	6	24	57	6	25	53	6	26	36
7	4	15	59	59	(II) ecl (III)	E	124	0.0	100.0	22.6	63	1.511	15	58	57							15	59	59						
7	5	9	22	16	(IV) ecl (III)	E	511	0.0	98.6	223.7	68	1.678	9	18	1							9	22	16						
7	6	6	17	21	(I) ecl (II)	P	325	0.2	86.2	149.3	248	0.740	6	14	38	6	17	4				6	17	21				6	17	38
7	6	7	48	45	(I) occ (II)	P	342	0.2	83.1	130.8	248	0.599				7	45	54				7	48	45				7	51	36
7	6	14	15	32	(IV) ecl (II)	A	559	0.2	79.7	37.5	248	0.162	14	10	53	14	14	26	14	14	30	14	15	32	14	16	35	14	16	39
7	6	17	38	14	(IV) ecl (I)	E	258	0.0	98.4	57.5	249	1.475	17	36	5							17	38	14						
7	7	10	16	24	(III) occ (II)	P	202	0.0	99.4	210.5	68	1.299				10	14	43				10	16	24				10	18	6
7	7	7	14	23	(III) ecl (II)	E	292	0.0	99.4	191.8	68	1.309	7	11	57							7	14	23						
7	8	12	9	48	(II) ecl (I)	E	90	0.0	99.9	56.2	249	1.126	12	9	3							12	9	48						
7	8	8	31	10	(III) ecl (I)	P	489	0.5	64.9	112.8	248	0.215	8	27	5	8	28	53				8	31	10				8	33	28
7	9	20	53	53	(I) occ (II)	P	356	0.2	82.6	133.1	248	0.593				20	50	55				20	53	53				20	56	51
7	9	19	28	5	(I) ecl (II)	P	352	0.2	81.3	150.6	248	0.689	19	25	9	19	27	5				19	28	5				19	29	6
7	11	9	10	30	(I) ecl (III)	A	428	0.5	64.6	107.9	249	0.194	9	6	56	9	8	35	9	9	15	9	10	30	9	11	44	9	12	24
7	11	19	12	54	(II) ecl (III)	E	264	0.0	98.6	19.8	62	1.293	19	10	42							19	12	54						
7	12	1	15	48	(II) ecl (I)	E	135	0.0	99.1	52.5	249	1.040	1	14	41							1	15	48						
7	13	9	58	30	(I) occ (II)	P	373	0.2	81.8	135.2	248	0.581				9	55	24				9	58	30				10	1	37
7	13	8	38	51	(I) ecl (II)	P	379	0.3	76.2	151.5	248	0.641	8	35	42	8	37	27				8	38	51				8	40	16
7	14	13	23	52	(III) occ (II)	P	197	0.0	99.6	217.1	68	1.332				13	22	14				13	23	52				13	25	31
7	14	10	46	27	(III) ecl (II)	E	525	0.1	89.9																					

M	D	h	m	s	Event Type	Ph	Dur	dMag	%I11	Sep	PA	MinD	h	m	s	h	m	s	h	m	s	h	m	s	h	m	s	h	m	s
8	5	20	58	4	(II) ecl (I)	P	255	0.5	60.9	21.1	252	0.425	20	55	57	20	57	8				20	58	4				20	59	1
8	5	19	40	45	(III) ecl (I)	P	365	0.6	56.7	47.8	250	0.731	19	37	43	19	39	49				19	40	45				19	41	41
8	7	5	38	9	(I) occ (II)	P	580	0.4	66.6	144.4	249	0.293				5	33	19				5	38	9				5	42	59
8	7	5	15	4	(I) ecl (II)	P	606	0.8	48.3	149.3	249	0.420	5	10	0	5	11	37				5	15	4				5	18	30
8	8	20	42	59	(I) ecl (III)	A	557	0.5	64.7	134.9	250	0.480	20	38	21	20	40	29	20	42	18	20	42	59	20	43	40	20	45	29
8	9	10	4	9	(II) ecl (I)	A	262	0.7	52.8	16.0	253	0.337	10	1	58	10	3	5	10	4	1	10	4	9	10	4	16	10	5	12
8	9	8	2	42	(II) ecl (III)	E	445	0.4	67.9	14.2	60	0.340	7	59	0	8	1	12	8	1	9	8	2	42	8	4	15	8	4	12
8	10	18	45	30	(I) occ (II)	P	625	0.5	63.3	144.6	249	0.228				18	40	17				18	45	30				18	50	43
8	10	18	32	51	(I) ecl (II)	P	656	0.8	46.7	147.3	249	0.409	18	27	23	18	29	2				18	32	51				18	36	39
8	12	1	53	18	(III) ecl (II)	T	1209	9.9	0.0	229.9	69	0.071	1	43	13	1	46	18	1	52	56	1	53	18	1	53	39	2	0	17
8	12	2	11	15	(III) occ (II)	P	676	0.1	94.0	229.7	69	1.094				2	5	38				2	11	15				2	16	53
8	12	22	24	26	(III) ecl (I)	E	320	0.2	79.6	27.1	251	0.974	22	21	46							22	24	26						
8	12	23	10	16	(II) ecl (I)	A	267	0.8	46.6	11.0	255	0.248	23	8	2	23	9	7	23	9	49	23	10	16	23	10	43	23	11	24
8	14	7	53	24	(I) ecl (II)	P	720	0.8	46.3	144.7	249	0.406	7	47	24				7	49	10	7	53	24				7	57	39
8	14	7	54	45	(I) occ (II)	P	679	0.6	59.8	144.4	249	0.155				7	49	6				7	54	45				8	0	25
8	14	21	59	29	(I) occ (II)	P	1097	0.0	99.4	78.7	69	1.108				21	50	20				21	59	29				22	8	37
8	15	0	44	52	(I) occ (II)	P	2209	0.1	91.5	120.3	69	0.833				0	26	27				0	44	52				1	3	16
8	15	23	53	6	(I) ecl (III)	P	642	0.4	69.6	175.7	68	0.571	23	47	45	23	50	15				23	53	6				23	55	58
8	16	11	14	56	(II) ecl (III)	E	455	0.2	81.4	13.5	60	0.087	11	11	9	11	13	15	11	13	13	11	14	56	11	16	40	11	16	38
8	16	12	12	30	(II) occ (I)	P	48	0.0	99.8	7.2	258	1.129				12	12	6				12	12	30				12	12	54
8	16	12	16	23	(II) ecl (I)	A	270	0.7	52.2	5.9	260	0.160	12	14	8	12	15	11	12	15	49	12	16	23	12	16	58	12	17	35
8	16	16	46	58	(I) ecl (III)	A	2791	0.4	70.7	86.9	68	0.192	16	23	42	16	29	43	16	41	4	16	46	58	16	52	51	17	4	12
8	16	17	14	9	(II) occ (III)	P	2103	0.1	92.9	92.8	68	1.133				16	56	38				17	14	9				17	31	41
8	16	20	14	8	(I) occ (III)	P	420	0.0	99.9	131.2	68	1.508				20	10	38				20	14	8				20	17	38
8	16	20	45	45	(I) ecl (III)	P	2370	0.5	62.9	137.8	68	0.449	20	25	59	20	32	42				20	45	45				20	58	48
8	17	21	4	31	(I) occ (II)	T	741	0.6	57.5	143.8	249	0.079				20	58	21	21	4	19	21	4	31	21	4	43	21	10	41
8	17	21	15	41	(I) ecl (II)	P	799	0.8	47.0	141.4	249	0.410	21	9	2	21	10	54				21	15	41				21	20	28
8	18	14	36	10	(I) occ (II)	P	1312	0.1	87.2	130.6	69	0.725				14	25	14				14	36	10				14	47	6
8	18	14	58	51	(I) ecl (II)	E	806	0.0	97.9	135.8	69	0.891	14	52	8							14	58	51						
8	19	5	40	25	(III) occ (II)	P	889	0.1	91.3	227.5	69	0.993				5	33	0				5	40	25				5	47	50
8	19	6	13	16	(III) ecl (II)	P	1498	0.2	85.5	226.0	69	0.173	6	0	47	6	4	21				6	13	16				6	22	11
8	20	1	10	51	(II) occ (I)	P	84	0.0	98.6	4.9	262	1.061				1	10	9				1	10	51				1	11	33
8	20	1	7	52	(III) ecl (I)	E	261	0.1	93.5	6.0	260	1.212	1	5	42							1	7	52						
8	20	1	22	34	(II) ecl (I)	A	272	0.3	74.1	1.3	311	0.071	1	20	18	1	21	20	1	21	56	1	22	34	1	23	12	1	23	47
8	20	17	52	52	(III) ecl (II)	E	1083	0.0	97.4	218.4	249	1.142	17	43	51							17	52	52						
8	21	10	17	11	(I) occ (II)	T	818	0.6	57.5	142.7	249	0.005				10	10	22	10	16	40	10	17	11	10	17	42	10	24	0
8	21	10	42	44	(I) ecl (II)	P	911	0.8	49.4	137.0	249	0.427	10	35	8	10	37	12				10	42	44				10	48	15
8	22	4	7	54	(I) occ (II)	P	1021	0.2	84.4	135.8	69	0.660				3	59	24				4	7	54				4	16	24
8	22	4	42	32	(I) ecl (II)	P	781	0.1	91.4	143.5	69	0.788	4	36	2	4	40	23				4	42	32				4	44	42
8	23	3	22	35	(I) ecl (III)	P	843	0.4	72.0	133.0	250	0.607	3	15	33	3	18	41				3	22	35				3	26	29
8	23	14	34	4	(I) ecl (III)	A	1496	0.2	82.0	14.1	62	0.154	14	21	36	14	24	36	14	30	52	14	34	4	14	37	17	14	43	32
8	23	14	9	17	(II) occ (I)	P	109	0.0	96.7	2.7	274	0.986				14	8	22				14	9	17				14	10	11
8	23	14	28	45	(II) ecl (I)	A	273	0.1	90.6	4.6	56	0.017	14	26	28	14	27	31	14	28	6	14	28	45	14	29	24	14	29	59
8	23	14	27	20	(II) ecl (III)	E	453	0.4	71.0	12.6	61	0.170	14	23	34	14	25	41	14	25	38	14	27	20	14	29	2	14	28	59
8	23	15	30	58	(I) occ (III)	P	1187	0.2	82.6	26.8	65	0.786				15	21	4				15	30	58				15	40	51
8	24	23	31	19	(I) occ (II)	P	915	0.6	57.6	140.9	249	0.093				23	23	41				23	31	19				23	38	56
8	24	1	28	44	(I) ecl (III)	P	781	0.2	84.6	155.2	69	0.834	1	22	14	1	26	9				1	28	44				1	31	20
8	25	0	14	17	(I) ecl (II)	P	1080	0.7	53.5	131.3	249	0.458	0	5	17	0	7	41				0	14	17				0	20	52
8	25	17	29	20	(I) occ (II)	P	870	0.2	82.7	138.6	69	0.622				17	22	5				17	29	20				17	36	35
8	25	18	14	8	(I) ecl (II)	P	745	0.2	82.6	148.3	69	0.696	18	7	55	18	10	47				18	14	8				18	17	29
8	26	9	26	57	(III) occ (II)	P	1204	0.1	89.1	221.4	69	0.912				9	16	55				9	26	57				9	36	59
8	26	11	12	24	(III) ecl (II)	P	2111	1.6	22.2	212.0	69	0.441	10	54	48	10	59	52				11	12	24				11	24	55
8	27	1	1	34	(III) ecl (II)	E	361	0.0	100.0	36.3	69	1.246	0	58	34							1	1	34						
8	27	3	7	51	(II) occ (I)	P	129	0.1	94.3	1.1	336	0.907				3	6	46				3	7	51				3	8	55
8	27	3	34	58	(II) ecl (I)	A	272	0.5	65.2	9.6	63	0.104	3	32	42	3	33	45	3	34	21	3	34	58	3	35	35	3	36	11
8	27	3	50	57	(III) ecl (I)	E	173	0.0	99.3	15.3	65	1.441	3	49	31							3	50	57						
8	27	22	49	2	(III) ecl (II)	E	762	0.0	97.2	226.9	250	1.150	22	42	41							22	49	2						
8	28	12	50	29	(I) occ (II)	P	1053	0.5	61.7	138.2	249	0.193				12	41	43				12	50	29				12	59	15
8	28																													

M	D	h	m	s	Event	Type	Ph	Dur	dMag	%I11	Sep	PA	MinD	h	m	s	h	m	s	h	m	s	h	m	s	h	m	s	h	m	s			
9	13	20	4	6	(II)	occ	(I)	P	189	0.3	77.0	11.7	66	0.487				20	2	32				20	4	6				20	5	41		
9	13	21	6	38	(II)	ecl	(I)	P	246	0.4	71.1	33.1	68	0.534				21	5	54				21	6	38				21	7	21		
9	13	21	59	57	(II)	occ	(III)	P	262	0.1	87.5	20.2	254	0.837				21	57	46				21	59	57				22	2	8		
9	14	0	6	22	(II)	ecl	(III)	E	367	0.1	90.6	7.4	60	0.954		0	3	18						0	6	22								
9	16	0	46	16	(I)	occ	(II)	P	500	0.2	81.2	139.1	70	0.569				0	42	6				0	46	16				0	50	26		
9	16	2	15	20	(I)	ecl	(II)	P	578	1.3	30.0	157.0	70	0.171		2	10	31		2	11	53		2	15	20				2	18	46		
9	17	9	4	16	(II)	occ	(I)	P	195	0.3	73.1	14.1	67	0.407				9	2	39				9	4	16				9	5	54		
9	17	10	13	4	(II)	ecl	(I)	P	236	0.3	78.4	37.3	69	0.618		10	11	5		10	12	38		10	13	4				10	13	29		
9	19	13	55	48	(I)	occ	(II)	P	468	0.2	81.6	137.7	70	0.574				13	51	53				13	55	48				13	59	42		
9	19	15	30	22	(I)	ecl	(II)	A	554	0.6	55.9	156.5	70	0.082		15	25	45		15	27	4	15	30	18	15	30	22	15	30	26	15	33	40
9	20	22	4	51	(II)	occ	(I)	P	200	0.4	69.2	16.4	67	0.330				22	3	10				22	4	51				22	6	31		
9	20	23	19	34	(II)	ecl	(I)	E	225	0.2	84.9	41.3	69	0.700		23	17	42						23	19	34								
9	21	0	48	25	(II)	occ	(III)	P	301	0.3	78.7	27.9	252	0.549				0	45	55				0	48	25				0	50	56		
9	21	3	19	33	(II)	ecl	(III)	E	296	0.0	97.4	4.5	56	1.216		3	17	5						3	19	33				3	19	33		
9	23	3	4	16	(I)	occ	(II)	P	440	0.2	82.2	136.1	70	0.582				3	0	36				3	4	16				3	7	57		
9	23	4	44	2	(I)	ecl	(II)	A	531	0.0	100.0	155.8	70	0.006		4	39	36		4	40	54	4	43	40	4	44	2	4	44	23	4	47	9
9	24	11	5	47	(II)	occ	(I)	P	204	0.5	65.5	18.7	68	0.258				11	4	5				11	5	47				11	7	29		
9	24	12	26	6	(II)	ecl	(I)	E	210	0.1	90.1	45.0	69	0.782		12	24	20						12	26	6								
9	25	11	11	42	(III)	occ	(II)	P	234	0.0	99.5	215.9	250	1.296				11	9	45				11	11	42				11	13	39		
9	26	16	13	10	(I)	occ	(II)	P	415	0.2	82.8	134.3	70	0.588				16	9	42				16	13	10				16	16	37		
9	26	17	57	30	(I)	ecl	(II)	P	507	0.7	54.3	154.7	70	0.097		17	53	17		17	54	34		17	57	30				18	0	27		
9	28	0	7	9	(II)	occ	(I)	P	207	0.5	62.1	21.0	68	0.191				0	5	25				0	7	9				0	8	52		
9	28	1	32	41	(II)	ecl	(I)	E	193	0.1	94.1	48.6	69	0.863		1	31	4					1	32	41									
9	28	3	39	58	(II)	occ	(III)	A	322	0.3	73.9	35.6	252	0.294				3	37	18	3	39	37	3	39	58	3	40	20	3	42	39		
9	28	6	32	56	(II)	ecl	(III)	E	168	0.0	99.9	1.2	15	1.477		6	31	32						6	32	56								
9	30	5	21	21	(I)	occ	(II)	P	393	0.2	83.4	132.3	71	0.595				5	18	4				5	21	21				5	24	37		
9	30	7	9	56	(I)	ecl	(II)	P	483	1.2	32.6	153.3	70	0.188		7	5	55		7	7	11		7	9	56				7	12	40		
10	1	13	8	55	(II)	occ	(I)	P	209	0.6	59.2	23.2	69	0.130				13	7	11				13	8	55				13	10	40		
10	1	14	39	18	(II)	ecl	(I)	E	173	0.0	96.9	51.9	70	0.942		14	37	51						14	39	18								
10	2	14	32	20	(III)	occ	(II)	P	392	0.0	96.6	209.6	250	1.118				14	29	4				14	32	20				14	35	36		
10	3	18	30	0	(I)	occ	(II)	P	373	0.2	83.9	130.1	71	0.599				18	26	54				18	30	0				18	33	7		
10	3	20	22	17	(I)	ecl	(II)	P	457	1.3	29.1	151.7	71	0.281		20	18	28		20	19	46		20	22	17				20	24	47		
10	5	2	11	10	(II)	occ	(I)	A	211	0.6	57.5	25.5	69	0.076				2	9	25	2	11	7	2	11	10	2	11	13	2	12	56		
10	5	3	45	59	(II)	ecl	(I)	E	147	0.0	98.7	55.1	70	1.021		3	44	45						3	45	59								
10	5	6	34	53	(II)	occ	(III)	A	331	0.3	73.9	43.1	251	0.081				6	32	7	6	34	12	6	34	53	6	35	34	6	37	38		
10	5	7	15	15	(I)	occ	(III)	P	102	0.0	99.5	87.3	70	1.344				17	14	24				17	15	15				17	16	6		
10	7	17	38	8	(I)	occ	(II)	P	356	0.2	84.3	127.8	71	0.602				7	35	10				7	38	8				7	41	6		
10	7	9	33	44	(I)	ecl	(II)	P	431	0.9	41.8	149.8	71	0.375		9	30	9		9	31	29		9	33	44				9	35	59		
10	8	15	13	51	(II)	occ	(I)	A	212	0.6	57.5	27.7	69	0.028				15	12	5	15	13	43	15	13	51	15	13	58	15	15	37		
10	8	16	52	42	(II)	ecl	(I)	E	113	0.0	99.7	58.0	70	1.098		16	51	45						16	52	42								
10	8	17	50	12	(III)	occ	(I)	P	162	0.0	97.7	74.1	70	1.222				17	48	51				17	50	12				17	51	34		
10	9	17	53	5	(III)	occ	(II)	P	454	0.1	92.9	202.3	250	0.954				17	49	18				17	53	5				17	56	52		
10	10	20	46	48	(I)	occ	(II)	P	340	0.2	84.6	125.3	71	0.602				20	43	58				20	46	48				20	49	38		
10	10	22	45	12	(I)	ecl	(II)	P	402	0.7	54.6	147.8	71	0.470		22	41	51		22	43	15		22	45	12				22	47	8		
10	12	4	17	0	(II)	occ	(I)	A	213	0.6	57.5	29.9	69	0.012				4	15	13	4	16	52	4	17	0	4	17	8	4	18	46		
10	12	5	59	28	(II)	ecl	(I)	E	56	0.0	100.0	60.7	70	1.173		5	59	0						5	59	28								
10	12	9	33	27	(II)	occ	(III)	A	333	0.3	73.9	50.4	251	0.082				9	30	40	9	32	46	9	33	27	9	34	8	9	36	13		
10	12	19	53	47	(I)	occ	(III)	P	144	0.0	98.5	73.5	70	1.245				19	52	35				19	53	47				19	54	59		
10	14	9	55	5	(I)	occ	(II)	P	327	0.2	84.9	122.8	71	0.600				9	52	22				9	55	5				9	57	49		
10	14	11	55	55	(I)	ecl	(II)	P	372	0.4	66.8	145.6	71	0.566		11	52	50		11	54	22		11	55	55				11	57	29		
10	15	17	20	35	(II)	occ	(I)	A	213	0.6	57.5	32.1	69	0.045				17	18	48	17	20	28	17	20	35	17	20	41	17	22	22		
10	15	20	29	40	(III)	occ	(I)	P	235	0.1	93.8	84.7	70	1.038				20	27	43				20	29	40				20	31	37		
10	16	21	13	54	(III)	occ	(II)	P	478	0.1	89.0	194.4	250	0.812				21	9	55				21	13	54				21	17	53		
10	17	23	3	57	(I)	occ	(II)	P	315	0.2	84.9	120.1	71	0.593				23	1	20				23	3	57				23	6	35		
10	18	1	6	42	(I)	ecl	(II)	P	338	0.3	77.9	143.1	71	0.663		1	3	53		1	5	40		1	6	42				1	7	43		
10	19	6	24	39	(II)	occ	(I)	A	214	0.6	57.5	34.3	69	0.071				6	22	52	6	24	36	6	24	39	6	24	42	6	26	26		
10	19	12	36	1	(II)	occ	(III)	A	333	0.3	73.9	57.6	251	0.193				12	33	15	12	35	27	12	36	1	12	36	35	12	38	48		
10	19	22																																

M	D	h	m	s	Event Type	Ph	Dur	dMag	%Ill	Sep	PA	MinD	h	m	s	h	m	s	h	m	s	h	m	s	h	m	s	h	m	s
11	17	1	22	35	(II) occ (III) A	A	355	0.3	73.9	84.3	250	0.113				1	19	38	1	21	53	1	22	35	1	23	17	1	25	33
11	18	21	28	44	(I) occ (II) P	P	282	0.3	73.0	94.5	70	0.335				21	26	23				21	28	44				21	31	5
11	20	4	21	19	(II) occ (I) A	A	229	0.6	57.5	52.4	69	0.005				4	19	25	4	21	11	4	21	19	4	21	28	4	23	13
11	20	12	22	40	(III) occ (I) P	P	923	0.3	77.4	114.8	70	0.499				12	14	58				12	22	40				12	30	21
11	20	20	45	41	(III) occ (I) T	T	1436	0.4	67.7	29.1	71	0.133				20	33	43	20	43	56	20	45	41	20	47	26	20	57	39
11	21	10	19	53	(III) occ (I) P	P	466	0.1	91.0	112.0	250	0.841				10	16	0				10	19	53				10	23	46
11	21	14	18	49	(III) occ (II) P	P	401	0.2	84.1	149.6	250	0.598				14	15	28				14	18	49				14	22	10
11	22	10	39	8	(I) occ (II) P	P	282	0.4	69.7	91.5	70	0.281				10	36	47				10	39	8				10	41	28
11	23	17	29	44	(II) occ (I) A	A	231	0.6	57.5	54.3	69	0.042				17	27	49	17	29	37	17	29	44	17	29	51	17	31	39
11	24	4	42	41	(II) occ (III) A	A	365	0.3	73.9	90.3	250	0.021				4	39	38	4	41	54	4	42	41	4	43	27	4	45	43
11	25	23	49	30	(I) occ (II) P	P	281	0.4	66.1	88.6	70	0.222				23	47	9				23	49	30				23	51	50
11	27	6	38	33	(II) occ (I) P	P	232	0.6	57.9	56.2	69	0.083				6	36	37				6	38	33				6	40	29
11	28	13	45	49	(III) occ (I) P	P	225	0.0	98.1	102.6	250	1.060				13	43	57				13	45	49				13	47	42
11	28	17	48	28	(III) occ (II) P	P	360	0.1	87.6	140.4	249	0.673				17	45	28				17	48	28				17	51	28
11	29	13	0	11	(I) occ (II) P	P	280	0.5	62.1	85.7	70	0.157				12	57	51				13	0	11				13	2	31
11	30	19	47	44	(II) occ (I) P	P	234	0.5	60.3	58.0	69	0.128				19	45	47				19	47	44				19	49	40
12	1	8	6	3	(II) occ (III) A	A	368	0.3	73.9	96.2	250	0.191				8	2	59	8	5	28	8	6	3	8	6	38	8	9	7
12	3	2	10	52	(I) occ (II) P	P	277	0.6	58.2	82.8	70	0.087				2	8	33				2	10	52				2	13	10
12	4	8	57	17	(II) occ (I) P	P	234	0.5	63.5	59.8	69	0.177				8	55	20				8	57	17				8	59	14
12	5	21	19	1	(III) occ (II) P	P	301	0.1	92.5	131.2	249	0.790				21	16	31				21	19	1				21	21	31
12	6	15	21	50	(I) occ (II) T	T	274	0.6	57.5	79.9	69	0.012				15	19	33	15	21	40	15	21	50	15	22	0	15	24	7
12	7	22	7	12	(II) occ (I) P	P	234	0.4	67.0	61.5	69	0.228				22	5	15				22	7	12				22	9	9
12	8	11	32	50	(II) occ (III) P	P	357	0.3	77.1	101.9	249	0.392				11	29	51				11	32	50				11	35	48
12	10	4	32	47	(I) occ (II) P	P	268	0.6	57.6	77.1	69	0.068				4	30	33				4	32	47				4	35	2
12	11	11	17	30	(II) occ (I) P	P	232	0.4	70.8	63.3	68	0.282				11	15	34				11	17	30				11	19	26
12	13	17	43	59	(I) occ (II) P	P	260	0.5	62.2	74.2	69	0.153				17	41	49				17	43	59				17	46	9
12	13	0	50	37	(III) occ (II) P	P	195	0.0	97.9	122.1	249	0.949				0	48	59				0	50	37				0	52	15
12	15	0	28	8	(II) occ (I) P	P	229	0.3	74.7	65.0	68	0.338				0	26	14				0	28	8				0	30	2
12	15	15	2	30	(II) occ (III) P	P	322	0.2	86.6	107.4	249	0.618				14	59	49				15	2	30				15	5	10
12	17	6	55	11	(I) occ (II) P	P	250	0.4	68.4	71.4	69	0.244				6	53	6				6	55	11				6	57	16
12	18	13	39	8	(II) occ (I) P	P	224	0.3	78.7	66.7	68	0.396				13	37	16				13	39	8				13	40	59
12	20	20	6	35	(I) occ (II) P	P	235	0.3	75.1	68.6	69	0.339				20	4	37				20	6	35				20	8	32
12	22	2	50	26	(II) occ (I) P	P	216	0.2	82.7	68.4	68	0.455				2	48	38				2	50	26				2	52	14
12	22	18	35	20	(II) occ (III) P	P	231	0.0	96.1	112.8	249	0.864				18	33	24				18	35	20				18	37	15
12	24	9	18	0	(I) occ (II) P	P	216	0.2	81.8	65.9	68	0.438				9	16	12				9	18	0				9	19	48
12	25	16	2	7	(II) occ (I) P	P	206	0.2	86.6	70.1	68	0.515				16	0	24				16	2	7				16	3	50
12	27	22	29	33	(I) occ (II) P	P	190	0.1	88.4	63.1	68	0.543				22	27	58				22	29	33				22	31	8
12	29	5	14	5	(II) occ (I) P	P	192	0.1	90.3	71.7	68	0.576				5	12	29				5	14	5				5	15	41

Times in U.T.

Legenda :

date in the format month/day, an asterisk shows that the moons are near but they don't occult

Event type : eclipse or occultation

Ph : phenomenon, M=missed, E=penumbral eclipse, P=partial eclipse/occultation, T=total eclipse/occultation, A=annular eclipse/occultation

Durn : duration in seconds

dMag : difference magnitude

%ill : defect of illumination, respect to integer

Sep : distance in " between the satellite and the center of the planet

Pa : position angle between the satellite and the center of the planet

MinD : least distance between the satellites

T1-T7 : penumbral phase begins/ends

T2-T6 : umbra phase begins/ends

T3-T5 : totalità phase begins/ends

Tmax : middle time of the event

CONJUNCTIONS AND ELONGATIONS OF THE SATELLITES OF JUPITER

I Superior conjunction

Date	Times	h	h Sun										
01/01/09	23.19.18	-64.0	-70.9	04/05/09	3.55.25	25.9	-1.6	03/09/09	4.51.18	-21.6	1.6		
03/01/09	17.49.52	-7.5	-21.0	05/05/09	22.24.17	-27.9	-30.6	04/09/09	23.17.30	28.1	-41.1		
05/01/09	12.20.32	27.5	23.9	07/05/09	16.53.00	-58.6	14.2	06/09/09	17.43.44	11.1	-1.3		
07/01/09	6.51.05	-7.2	1.3	09/05/09	11.21.43	-3.4	65.3	08/09/09	12.10.01	-46.9	51.1		
09/01/09	1.21.46	-63.6	-57.6	11/05/09	5.50.20	34.2	19.6	10/09/09	6.36.21	-46.4	19.4		
10/01/09	19.52.21	-33.3	-42.5	13/05/09	0.18.57	-1.3	-27.5	12/09/09	1.02.46	11.5	-37.0		
12/01/09	14.23.02	19.5	13.8	14/05/09	18.47.26	-57.5	-4.5	13/09/09	19.29.13	27.6	-22.9		
14/01/09	8.53.35	15.3	18.2	16/05/09	13.15.54	-29.3	54.7	15/09/09	13.55.44	-22.4	35.7		
16/01/09	3.24.16	-39.8	-35.4	18/05/09	7.44.16	25.3	41.7	17/09/09	8.22.19	-63.7	35.8		
17/01/09	21.54.52	-58.2	-61.8	20/05/09	2.12.39	20.5	-14.9	19/09/09	2.48.59	-12.1	-23.7		
19/01/09	16.25.33	0.0	-3.0	21/05/09	20.40.53	-36.1	-19.0	20/09/09	21.15.41	30.8	-40.6		
21/01/09	10.56.06	27.7	27.9	23/05/09	15.09.06	-52.6	35.7	22/09/09	15.42.28	2.4	15.2		
23/01/09	5.26.47	-13.2	-12.4	25/05/09	9.37.12	5.0	61.5	24/09/09	10.09.20	-55.5	45.7		
24/01/09	23.57.22	-66.4	-65.9	27/05/09	4.05.19	33.7	3.3	26/09/09	4.36.17	-37.4	-6.0		
26/01/09	18.28.01	-25.9	-23.9	28/05/09	22.33.18	-10.6	-25.9	27/09/09	23.03.16	18.6	-50.0		
28/01/09	12.58.34	23.9	26.2	30/05/09	17.01.14	-60.8	16.0	29/09/09	17.30.21	22.2	-7.1		
30/01/09	7.29.12	10.9	9.4	01/06/09	11.29.05	-20.1	69.7	01/10/09	11.57.30	-32.1	42.9		
01/02/09	1.59.45	-46.0	-48.8	03/06/09	5.56.55	30.5	23.2	03/10/09	6.24.45	-59.5	12.6		
02/02/09	20.30.23	-51.6	-44.8	05/06/09	0.24.38	13.5	-23.3	05/10/09	0.52.02	-2.6	-45.2		
04/02/09	15.00.53	6.3	13.8	06/06/09	18.52.18	-44.5	-1.3	06/10/09	19.19.25	31.3	-29.1		
06/02/09	9.31.29	26.8	26.7	08/06/09	13.19.52	-44.8	57.1	08/10/09	13.46.52	-6.8	28.7		
08/02/09	4.02.00	-19.4	-25.5	10/06/09	7.47.26	13.2	43.8	10/10/09	8.14.26	-61.7	28.5		
09/02/09	22.32.35	-66.6	-60.1	12/06/09	2.14.53	30.7	-12.4	12/10/09	2.42.02	-28.4	-30.0		
11/02/09	17.03.02	-18.4	-5.0	13/06/09	20.42.16	-19.8	-16.2	13/10/09	21.09.43	24.3	-48.5		
13/02/09	11.33.34	27.5	34.8	15/06/09	15.09.34	-60.8	37.9	15/10/09	15.37.29	15.8	8.8		
15/02/09	6.04.01	6.0	-0.8	17/06/09	9.36.52	-10.8	62.7	17/10/09	10.05.22	-41.0	37.3		
17/02/09	0.34.32	-51.8	-56.5	19/06/09	4.04.02	33.8	3.8	19/10/09	4.33.16	-52.8	-11.2		
18/02/09	19.04.56	-44.4	-26.0	20/06/09	22.31.09	5.2	-23.9	20/10/09	23.01.16	5.2	-58.6		
20/02/09	13.35.24	12.6	29.5	22/06/09	16.58.10	-52.4	18.3	22/10/09	17.29.20	29.9	-13.7		
22/02/09	8.05.46	24.8	20.8	24/06/09	11.25.11	-35.9	71.3	24/10/09	11.57.32	-15.3	34.3		
24/02/09	2.36.13	-25.8	-37.1	26/06/09	5.52.05	20.8	22.1	26/10/09	6.25.44	-64.5	7.7		
25/02/09	21.06.31	-64.2	-45.0	28/06/09	0.18.56	25.3	-23.1	28/10/09	0.54.03	-19.6	-51.4		
27/02/09	15.36.55	-10.9	13.9	29/06/09	18.45.42	-29.6	0.6	29/10/09	19.22.24	28.5	-36.1		
01/03/09	10.07.12	30.1	37.5	01/07/09	13.12.27	-57.0	59.3	31/10/09	13.50.53	9.2	20.8		
03/03/09	4.37.33	0.7	-13.2	03/07/09	7.39.06	-0.5	41.3	02/11/09	8.19.23	-48.7	22.8		
04/03/09	23.07.45	-57.0	-53.9	05/07/09	2.05.41	34.4	-14.4	04/11/09	2.47.59	-45.1	-33.8		
06/03/09	17.38.02	-36.9	-6.4	06/07/09	20.32.12	-4.6	-15.1	05/11/09	21.16.38	12.5	-56.4		
08/03/09	12.08.13	18.7	42.2	08/07/09	14.58.43	-59.0	40.2	07/11/09	15.45.24	27.1	1.8		
10/03/09	6.38.28	21.6	11.3	10/07/09	9.25.08	-26.3	59.3	09/11/09	10.14.11	-23.3	30.3		
12/03/09	1.08.34	-32.4	-44.6	12/07/09	3.51.30	27.1	0.3	11/11/09	4.43.03	-63.3	-14.0		
13/03/09	19.38.44	-59.5	-26.7	13/07/09	22.17.48	17.7	-24.8	12/11/09	23.11.58	-11.3	-65.7		
15/03/09	14.08.48	-2.8	32.0	15/07/09	16.44.05	-39.7	20.3	14/11/09	17.41.00	31.2	-20.4		
17/03/09	8.38.55	31.5	33.5	17/07/09	11.10.18	-50.0	69.1	16/11/09	12.10.02	2.6	26.9		
19/03/09	3.08.54	-6.0	-24.1	19/07/09	5.36.28	8.0	17.1	18/11/09	6.39.10	-55.1	4.8		
20/03/09	21.38.56	-61.0	-42.2	21/07/09	0.02.35	32.0	-26.7	20/11/09	1.08.19	-37.2	-54.5		
22/03/09	16.08.52	-28.9	13.6	22/07/09	18.28.41	-15.2	1.5	21/11/09	19.37.36	18.9	-42.7		
24/03/09	10.38.52	24.3	48.6	24/07/09	12.54.44	-62.3	59.9	23/11/09	14.06.53	23.3	14.0		
26/03/09	5.08.42	17.3	0.3	26/07/09	7.20.45	-16.3	35.4	25/11/09	8.36.15	-30.7	19.1		
27/03/09	23.38.36	-39.1	-44.8	28/07/09	1.46.43	31.3	-20.1	27/11/09	3.05.38	-59.2	-34.9		
29/03/09	18.08.23	-53.3	-7.2	29/07/09	20.12.41	8.6	-15.9	28/11/09	21.35.09	-3.1	-62.8		
31/03/09	12.38.13	4.5	48.1	31/07/09	14.38.37	-49.6	41.4	30/11/09	16.04.39	32.6	-4.5		
02/04/09	7.07.54	31.4	24.0	02/08/09	9.04.31	-41.2	52.6	02/12/09	10.34.14	-4.3	25.7		
04/04/09	1.37.38	-12.8	-32.3	04/08/09	3.30.24	16.3	-7.2	04/12/09	5.03.50	-59.5	-14.4		
05/04/09	20.07.16	-63.0	-25.6	05/08/09	21.56.18	26.8	-28.3	05/12/09	23.33.33	-29.3	-69.5		
07/04/09	14.36.56	-20.8	33.3	07/08/09	16.22.10	-26.1	21.1	07/12/09	18.03.15	24.5	-25.8		
09/04/09	9.06.28	29.0	45.7	09/08/09	10.48.01	-60.6	63.0	09/12/09	12.33.02	18.9	22.0		
11/04/09	3.36.01	11.9	-11.9	11/08/09	5.13.51	-6.4	9.6	11/12/09	7.02.49	-37.5	4.4		
12/04/09	22.05.28	-45.8	-36.8	12/08/09	23.39.43	32.8	-33.1	13/12/09	1.32.43	-53.4	-54.2		
14/04/09	16.34.57	-46.0	13.4	14/08/09	18.05.35	-0.8	1.0	14/12/09	20.02.36	4.2	-47.6		
16/04/09	11.04.18	11.9	58.2	16/08/09	12.31.26	-58.0	57.3	16/12/09	14.32.34	32.6	9.4		
18/04/09	5.33.40	29.5	11.5	18/08/09	6.57.18	-31.5	27.5	18/12/09	9.02.31	-10.9	18.5		
20/04/09	0.02.56	-20.1	-35.2	20/08/09	1.23.12	23.2	-28.2	20/12/09	3.32.35	-61.7	-33.1		
21/04/09	18.32.14	-62.2	-6.6	21/08/09	19.49.07	19.5	-18.4	21/12/09	22.02.37	-21.5	-66.7		
23/04/09	13.01.23	-12.4	52.1	23/08/09	14.15.02	-36.8	40.2	23/12/09	16.32.45	29.3	-8.8		
25/04/09	7.30.33	32.5	34.8	25/08/09	8.40.59	-54.6	44.2	25/12/09	11.02.51	14.1	24.6		
27/04/09	1.59.37	5.5	-21.9	27/08/09	3.06.59	3.2	-15.6	27/12/09	5.33.04	-43.5	-11.9		
28/04/09	20.28.42	-52.1	-22.6	28/08/09	21.33.01	31.4	-33.7	29/12/09	0.03.14	-46.8	-68.6		
30/04/09	14.57.38	-37.9	34.3	30/08/09	15.59.04	-12.1	19.5	30/12/09	18.33.30	11.1	-29.6		
02/05/09	9.26.35	19.0	55.5	01/09/09	10.25.09	-63.3	54.6						

I Inferior conjunction

[illegible]

28/02/09	12.47.47	16.3	36.7	11/06/09	4.55.59	32.7	12.5	21/09/09	18.30.57	25.2	-15.6
02/03/09	7.17.56	22.9	15.6	12/06/09	23.23.33	8.7	-24.8	23/09/09	12.57.57	-26.9	40.6
04/03/09	1.48.04	-30.0	-42.2	14/06/09	17.50.59	-49.3	8.7	25/09/09	7.24.55	-62.2	24.8
05/03/09	20.18.13	-61.6	-35.3	16/06/09	12.18.25	-39.6	66.9	27/09/09	1.52.04	-7.9	-34.7
07/03/09	14.48.17	-6.2	23.8	18/06/09	6.45.41	17.8	32.3	28/09/09	20.19.12	31.3	-36.1
09/03/09	9.18.21	31.0	35.7	20/06/09	1.12.59	27.8	-19.0	30/09/09	14.46.30	-1.1	22.3
11/03/09	3.48.23	-3.4	-19.8	21/06/09	19.40.09	-25.4	-8.1	02/10/09	9.13.46	-58.7	38.2
12/03/09	22.18.26	-59.8	-48.5	23/06/09	14.07.18	-59.0	49.7	04/10/09	3.41.13	-33.4	-17.7
14/03/09	16.48.24	-32.0	4.7	25/06/09	8.34.18	-5.1	52.0	05/10/09	22.08.39	21.3	-51.3
16/03/09	11.18.23	22.2	46.4	27/06/09	3.01.21	34.5	-6.4	07/10/09	16.36.16	19.5	0.9
18/03/09	5.48.18	18.9	4.8	28/06/09	21.28.15	0.1	-20.3	09/10/09	11.03.50	-36.1	41.6
20/03/09	0.18.15	-36.8	-46.2	30/06/09	15.55.09	-56.5	29.9	11/10/09	5.31.35	-56.8	1.6
21/03/09	18.48.07	-55.8	-16.0	02/07/09	10.21.54	-30.5	67.9	12/10/09	23.59.20	0.9	-53.2
23/03/09	13.17.59	1.9	41.2	04/07/09	4.48.42	24.6	10.3	14/10/09	18.27.15	30.9	-22.2
25/03/09	7.47.47	31.5	28.3	05/07/09	23.15.21	21.3	-25.3	16/10/09	12.55.07	-10.4	32.3
27/03/09	2.17.37	-10.5	-29.6	07/07/09	17.42.01	-35.3	10.5	18/10/09	7.23.11	-63.4	18.9
28/03/09	20.47.21	-62.7	-33.5	09/07/09	12.08.31	-53.3	67.6	20/10/09	1.51.14	-24.7	-40.5
30/03/09	15.17.05	-23.7	24.6	11/07/09	6.35.05	4.2	28.7	21/10/09	20.19.27	26.2	-43.8
01/04/09	9.46.45	27.3	47.7	13/07/09	1.01.31	33.4	-21.9	23/10/09	14.47.38	13.2	14.7
03/04/09	4.16.27	13.8	-7.3	14/07/09	19.27.58	-10.4	-7.3	25/10/09	9.16.00	-44.2	31.1
04/04/09	22.46.03	-43.6	-41.5	16/07/09	13.54.16	-61.3	51.3	27/10/09	3.44.21	-49.8	-21.8
06/04/09	17.15.39	-48.7	4.4	18/07/09	8.20.38	-20.8	47.3	28/10/09	22.12.52	8.2	-59.9
08/04/09	11.45.10	9.3	54.7	20/07/09	2.46.52	29.8	-11.1	30/10/09	16.41.20	28.9	-6.8
10/04/09	6.14.43	30.2	16.8	21/07/09	21.13.09	13.0	-21.3	01/11/09	11.09.59	-18.5	33.4
12/04/09	0.44.09	-17.6	-35.2	23/07/09	15.39.16	-45.2	31.5	03/11/09	5.38.37	-64.4	-1.6
13/04/09	19.13.36	-62.9	-15.2	25/07/09	10.05.28	-45.4	62.8	05/11/09	0.07.25	-16.4	-59.5
15/04/09	13.42.57	-15.3	44.0	27/07/09	4.31.33	12.6	4.6	06/11/09	18.36.09	29.8	-29.3
17/04/09	8.12.21	31.3	39.9	28/07/09	22.57.42	29.5	-29.1	08/11/09	13.05.04	6.7	24.2
19/04/09	2.41.38	7.8	-18.3	30/07/09	17.23.42	-21.0	11.3	10/11/09	7.33.58	-51.2	14.8
20/04/09	21.10.54	-50.1	-29.6	01/08/09	11.49.47	-62.0	65.0	12/11/09	2.03.01	-42.1	-43.5
22/04/09	15.40.05	-40.9	25.0	03/08/09	6.15.47	-11.1	22.2	13/11/09	20.32.02	15.0	-51.2
24/04/09	10.09.18	16.5	58.1	05/08/09	0.41.50	32.5	-28.0	15/11/09	15.01.11	25.9	7.4
26/04/09	4.38.23	27.3	3.5	06/08/09	19.07.45	3.5	-8.1	17/11/09	9.30.20	-26.0	25.8
27/04/09	23.07.29	-25.2	-33.9	08/08/09	13.33.48	-54.3	50.9	19/11/09	3.59.38	-62.0	-23.5
29/04/09	17.36.28	-60.3	5.0	10/08/09	7.59.44	-36.2	40.2	20/11/09	22.28.52	-8.4	-67.1
01/05/09	12.05.29	-6.9	60.6	12/08/09	2.25.46	20.1	-18.4	22/11/09	16.58.15	32.0	-13.5
03/05/09	6.34.22	33.7	26.3	13/08/09	20.51.40	23.2	-24.5	24/11/09	11.27.38	0.5	27.1
05/05/09	1.03.16	1.0	-26.1	15/08/09	15.17.43	-31.6	31.2	26/11/09	5.57.09	-56.8	-3.6
06/05/09	19.32.02	-55.8	-13.0	17/08/09	9.43.40	-57.9	55.0	28/11/09	0.26.36	-34.4	-62.4
08/05/09	14.00.51	-32.5	45.8	19/08/09	4.09.43	-0.8	-2.9	29/11/09	18.56.12	21.0	-35.5
10/05/09	8.29.32	23.1	48.4	20/08/09	22.35.41	32.5	-35.1	01/12/09	13.25.46	21.9	18.0
12/05/09	2.58.13	22.6	-10.0	22/08/09	17.01.47	-6.9	10.2	03/12/09	7.55.29	-33.0	12.8
13/05/09	21.26.46	-33.1	-25.1	24/08/09	11.27.49	-61.2	58.8	05/12/09	2.25.08	-57.3	-43.7
15/05/09	15.55.21	-55.0	26.0	26/08/09	5.53.58	-26.5	14.4	06/12/09	20.54.54	-0.2	-57.0
17/05/09	10.23.48	2.0	65.5	28/08/09	0.20.02	25.9	-36.1	08/12/09	15.24.40	32.8	2.0
19/05/09	4.52.16	34.1	10.3	29/08/09	18.46.15	15.4	-10.7	10/12/09	9.54.32	-6.5	23.1
20/05/09	23.20.34	-7.4	-27.8	31/08/09	13.12.25	-42.0	47.3	12/12/09	4.24.22	-60.4	-22.7
22/05/09	17.48.56	-60.0	6.6	02/09/09	7.38.43	-50.8	32.1	13/12/09	22.54.18	-26.6	-71.0
24/05/09	12.17.08	-23.6	64.4	04/09/09	2.04.56	7.3	-26.9	15/12/09	17.24.13	26.3	-18.4
26/05/09	6.45.21	28.7	31.6	05/09/09	20.31.20	29.8	-29.5	17/12/09	11.54.15	17.5	23.8
28/05/09	1.13.24	16.3	-20.4	07/09/09	14.57.41	-17.1	28.2	19/12/09	6.24.13	-39.4	-2.0
29/05/09	19.41.30	-41.3	-10.3	09/09/09	9.24.11	-64.2	46.4	21/12/09	0.54.18	-51.2	-61.5
31/05/09	14.09.28	-48.0	47.6	11/09/09	3.50.37	-17.0	-11.3	22/12/09	19.24.21	6.6	-39.9
02/06/09	8.37.25	10.1	52.6	12/09/09	22.17.14	29.7	-42.3	24/12/09	13.54.31	32.5	14.6
04/06/09	3.05.13	32.2	-5.9	14/09/09	16.43.49	6.9	6.6	26/12/09	8.24.37	-12.8	14.1
05/06/09	21.33.04	-16.1	-21.6	16/09/09	11.10.33	-51.2	50.5	28/12/09	2.54.48	-61.6	-40.8
07/06/09	16.00.45	-61.3	27.8	18/09/09	5.37.14	-42.2	7.1	29/12/09	21.24.58	-18.9	-60.5
09/06/09	10.28.27	-14.5	69.0	20/09/09	0.04.06	14.9	-44.9	31/12/09	15.55.15	30.8	-0.9

I Maxima est elongation

Date	Times	h	h Sun								
02/01/09	10.01.02	18.6	22.9	07/03/09	4.15.28	-0.6	-16.1	09/05/09	21.54.48	-30.7	-28.1
04/01/09	4.31.32	-34.3	-23.2	08/03/09	22.45.31	-58.2	-51.7	11/05/09	16.23.21	-56.8	20.2
05/01/09	23.02.08	-63.2	-70.2	10/03/09	17.15.36	-34.8	-0.6	13/05/09	10.51.51	-0.2	66.2
07/01/09	17.32.38	-6.4	-17.3	12/03/09	11.45.36	20.2	44.5	15/05/09	5.20.19	34.3	14.7
09/01/09	12.03.12	27.7	25.2	14/03/09	6.15.35	20.6	8.5	16/05/09	23.48.42	-4.9	-28.0
11/01/09	6.33.42	-8.1	-1.0	16/03/09	0.45.31	-34.2	-45.5	18/05/09	18.17.01	-59.0	1.5
13/01/09	1.04.18	-64.1	-60.1	17/03/09	19.15.28	-58.0	-21.8	20/05/09	12.45.17	-26.2	60.1
14/01/09	19.34.47	-32.1	-38.6	19/03/09	13.45.21	-0.5	36.5	22/05/09	7.13.31	27.3	36.5
16/01/09	14.05.21	20.3	16.7	21/03/09	8.15.13	31.6	31.4	24/05/09	1.41.38	18.3	-18.0
18/01/09	8.35.51	14.7	16.7	23/03/09	2.45.01	-7.9	-26.7	25/05/09	20.09.43	-39.0	-14.6
20/01/09	3.06.25	-40.8	-38.5	24/03/09	21.14.50	-61.8	-38.2	27/05/09	14.37.44	-50.1	42.0
21/01/09	21.36.54	-57.1	-58.3	26/03/09	15.44.36	-26.6	18.8	29/05/09	9.05.43	7.8	57.1
23/01/09	16.07.26	1.0	0.9	28/03/09	10.14.19	25.7	48.7	31/05/09	3.33.35	33.0	-1.0
25/01/09	10.37.55	27.7	28.2	30/03/09	4.43.59	15.8	-3.1	01/06/09	22.01.24	-13.6	-23.9
27/01/09	5.08.27	-14.2	-15.2	31/03/09	23.13.39	-41.2	-43.5	03/06/09	16.29.10	-61.3	22.2
28/01/09	23.38.55	-66.6	-65.8	02/04/09	17.43.16	-51.2	-0.9	05/06/09	10.56.53	-16.9	70.4
30/01/09	18.09.24	-24.5	-19.7	04/04/09	12.12.49	6.8	51.7	07/06/09	5.24.30	31.9	17.5
01/02/09	12.39.50	24.7	28.6	06/04/09	6.42.20	30.9	20.7	08/06/09	23.52.04	10.8	-24.4
03/02/09	7.10.20	10.1	7.3	08/04/09	1.11.51	-15.0	-33.9	10/06/09	18.19.33	-47.3	3.8
05/02/09	1.40.45	-47.1	-51.1	09/04/09	19.41.18	-63.1	-20.6	12/06/09	12.47.01	-41.9	62.7
06/02/09	20.11.11	-50.2	-40.6	11/04/09	14.10.42	-18.2	38.6	14/06/09	7.14.21	15.9	37.7
08/02/09	14.41.34	7.6	17.6	13/04/09	8.40.03	30.2	43.1	16/06/09	1.41.40	29.1	-16.2
10/02/09	9.12.00	26.6	25.9	15/04/09	3.09.23	10.0	-15.1	17/06/09	20.08.53	-23.0	-12.1
12/02/09	3.42.21	-20.7	-28.3	16/04/09	21.38.40	-47.9	-33.4	19/06/09	14.36.05	-59.9	44.3
13/02/09	22.12.44	-66.3	-57.0	18/04/09	16.07.54	-43.5	19.2	21/06/09	9.03.09	-7.5	57.2
15/02/09	16.43.03	-16.8	0.1	20/04/09	10.37.04	14.2	58.8	23/06/09	3.30.12	34.3	-1.1
17/02/09	11.13.25	28.2	36.1	22/04/09	5.06.13	28.5	7.5	24/06/09	21.57.09	2.2	-22.2
19/02/09	5.43.42	4.9	-4.1	23/04/09	23.35.19	-22.6	-34.9	26/06/09	16.24.06	-54.9	24.6
21/02/09	0.14.00	-53.0	-56.9	25/04/09	18.04.21	-61.4	-0.2	28/06/09	10.50.55	-32.7	70.6
22/02/09	18.44.14	-42.7	-21.3	27/04/09	12.33.20	-9.6	56.7	30/06/09	5.17.42	23.1	15.7
24/02/09	13.14.31	14.1	33.0	29/04/09	7.02.16	33.2	30.6	01/07/09	23.44.24	23.0	-24.7
26/02/09	7.44.43	24.2	18.7	01/05/09	1.31.10	3.2	-24.2	03/07/09	18.11.06	-33.0	5.8
28/02/09	2.14.56	-27.4	-39.4	02/05/09	20.00.00	-54.1	-17.9	05/07/09	12.37.40	-54.9	64.4
01/03/09	20.45.05	-63.2	-40.7	04/05/09	14.28.46	-35.1	40.2	07/07/09	7.04.14	2.2	34.5
03/03/09	15.15.16	-9.0	18.5	06/05/09	8.57.30	21.2	52.2	09/07/09	1.30.42	33.9	-18.7
05/03/09	9.45.22	30.6	37.1	08/05/09	3.26.11	24.2	-6.4	10/07/09	19.57.10	-8.1	-11.0

12/07/09	14.23.31	-60.5	46.4	08/09/09	22.43.44	29.2	-42.3	06/11/09	7.54.12	-50.4	18.5
14/07/09	8.49.52	-23.0	53.0	10/09/09	17.10.07	8.5	3.1	08/11/09	2.23.07	-43.2	-39.1
16/07/09	3.16.07	28.8	-6.2	12/09/09	11.36.40	-49.7	51.5	09/11/09	20.52.01	14.1	-53.7
17/07/09	21.42.24	14.9	-23.2	14/09/09	6.03.11	-43.7	12.6	11/11/09	15.21.04	26.3	5.0
19/07/09	16.08.34	-43.0	26.5	16/09/09	0.29.50	13.7	-41.6	13/11/09	9.50.04	-25.0	28.1
21/07/09	10.34.44	-47.2	66.5	17/09/09	18.56.28	26.1	-18.7	15/11/09	4.19.15	-62.6	-19.1
23/07/09	5.00.49	10.9	10.2	19/09/09	13.23.16	-25.3	38.9	16/11/09	22.48.25	-9.6	-66.9
24/07/09	23.26.56	30.6	-28.3	21/09/09	7.50.03	-62.8	29.8	18/11/09	17.17.43	31.7	-16.6
26/07/09	17.52.57	-18.7	6.8	23/09/09	2.16.58	-9.4	-29.8	20/11/09	11.46.59	1.2	27.2
28/07/09	12.18.59	-62.2	63.6	24/09/09	20.43.53	31.2	-38.2	22/11/09	6.16.25	-56.2	0.6
30/07/09	6.44.57	-13.1	28.2	26/09/09	15.10.59	0.1	19.5	24/11/09	0.45.49	-35.5	-58.9
01/08/09	1.10.57	32.2	-24.6	28/09/09	9.38.03	-57.6	41.9	25/11/09	19.15.21	20.2	-38.9
02/08/09	19.36.52	5.5	-11.7	30/09/09	4.05.17	-34.8	-12.5	27/11/09	13.44.50	22.5	16.2
04/08/09	14.02.49	-52.5	47.0	01/10/09	22.32.30	20.4	-51.0	29/11/09	8.14.29	-32.1	15.9
06/08/09	8.28.43	-38.1	45.9	03/10/09	16.59.54	20.4	-2.0	01/12/09	2.44.06	-58.1	-39.6
08/08/09	2.54.40	18.7	-13.4	05/10/09	11.27.17	-34.7	42.7	02/12/09	21.13.51	-1.2	-59.9
09/08/09	21.20.33	24.7	-26.4	07/10/09	5.54.49	-57.8	6.5	04/12/09	15.43.33	32.7	-0.6
11/08/09	15.46.28	-29.5	26.8	09/10/09	0.22.21	-0.1	-49.8	06/12/09	10.13.24	-5.6	24.5
13/08/09	10.12.20	-59.0	59.2	10/10/09	18.50.03	31.1	-25.1	08/12/09	4.43.12	-60.1	-18.7
15/08/09	4.38.18	-2.9	2.7	12/10/09	13.17.46	-9.2	31.1	09/12/09	23.13.09	-27.8	-70.8
16/08/09	23.04.11	32.7	-34.5	14/10/09	7.45.37	-62.9	23.3	11/12/09	17.43.01	25.5	-22.0
18/08/09	17.30.08	-4.8	6.1	16/10/09	2.13.27	-26.0	-35.9	13/12/09	12.13.03	18.1	23.1
20/08/09	11.56.03	-60.1	59.0	17/10/09	20.41.29	25.6	-46.0	15/12/09	6.43.02	-38.5	1.1
22/08/09	6.22.04	-28.3	20.3	19/10/09	15.09.30	14.1	12.3	17/12/09	1.13.09	-52.3	-58.0
24/08/09	0.48.02	25.0	-32.7	21/10/09	9.37.40	-43.1	34.2	18/12/09	19.43.11	5.4	-43.7
25/08/09	19.14.05	17.0	-14.2	23/10/09	4.05.49	-50.8	-17.0	20/12/09	14.13.22	32.6	12.1
27/08/09	13.40.06	-40.1	44.6	24/10/09	22.34.10	7.2	-59.7	22/12/09	8.43.30	-11.9	16.3
29/08/09	8.06.15	-52.2	37.7	26/10/09	17.02.30	29.3	-9.7	24/12/09	3.13.45	-61.7	-37.0
31/08/09	2.32.21	5.9	-21.9	28/10/09	11.30.58	-17.4	34.2	25/12/09	21.43.56	-20.3	-63.8
01/09/09	20.58.33	30.5	-31.5	30/10/09	5.59.25	-64.5	2.4	27/12/09	16.14.15	30.0	-5.2
03/09/09	15.24.44	-15.3	24.6	01/11/09	0.28.04	-17.5	-56.0	29/12/09	10.44.30	13.4	24.5
05/09/09	9.51.03	-64.0	50.5	02/11/09	18.56.41	29.3	-32.4	31/12/09	5.14.53	-44.2	-15.3
07/09/09	4.17.20	-18.6	-5.7	04/11/09	13.25.27	7.6	23.0				

I Maxima west elongation

Date	Times	h	h Sun								
01/01/09	12.39.26	27.3	22.3	19/04/09	13.22.05	-13.8	48.1	05/08/09	11.22.23	-61.6	64.9
03/01/09	7.09.53	-6.1	4.0	21/04/09	7.51.29	31.9	37.4	07/08/09	5.48.17	-9.4	16.5
05/01/09	1.40.24	-62.9	-54.5	23/04/09	2.20.43	6.7	-20.2	09/08/09	0.14.14	32.7	-30.7
06/01/09	20.10.51	-34.7	-46.5	24/04/09	20.50.00	-51.1	-26.2	10/08/09	18.40.08	1.8	-4.3
08/01/09	14.41.25	18.6	10.7	26/04/09	15.19.10	-39.4	29.6	12/08/09	13.06.06	-55.8	54.1
10/01/09	9.11.53	15.9	19.6	28/04/09	9.48.22	17.7	57.2	14/08/09	7.31.59	-34.5	34.5
12/01/09	3.42.25	-38.8	-32.2	30/04/09	4.17.24	26.7	1.0	16/08/09	1.57.57	21.2	-23.1
13/01/09	22.12.54	-59.3	-64.9	01/05/09	22.46.29	-26.4	-32.4	17/08/09	20.23.51	21.9	-22.2
15/01/09	16.43.29	-1.0	-7.3	03/05/09	17.15.26	-59.5	9.4	19/08/09	14.49.51	-33.6	35.2
17/01/09	11.13.58	27.7	27.3	05/05/09	11.44.25	-5.4	63.3	21/08/09	9.15.47	-56.8	50.3
19/01/09	5.44.31	-12.3	-9.6	07/05/09	6.13.13	34.0	23.1	23/08/09	3.41.48	0.6	-9.0
21/01/09	0.15.00	-66.2	-65.4	09/05/09	0.42.05	0.0	-26.9	24/08/09	22.07.47	32.1	-35.1
22/01/09	18.45.35	-27.1	-28.0	10/05/09	19.10.49	-56.6	-9.0	26/08/09	16.33.53	-8.9	14.2
24/01/09	13.16.05	23.2	23.7	12/05/09	13.39.34	-31.1	50.1	28/08/09	10.59.55	-62.2	57.5
26/01/09	7.46.37	11.6	11.3	14/05/09	8.08.09	24.1	45.4	30/08/09	5.26.03	-24.7	8.5
28/01/09	2.17.06	-45.2	-46.5	16/05/09	2.36.46	21.8	-12.3	31/08/09	23.52.10	26.8	-38.9
29/01/09	20.47.40	-52.7	-48.7	17/05/09	21.05.15	-34.4	-22.3	02/09/09	18.18.24	13.8	-7.1
31/01/09	15.18.09	5.3	10.2	19/05/09	15.33.46	-54.0	30.6	04/09/09	12.44.36	-43.9	49.4
02/02/09	9.48.41	26.9	27.2	21/05/09	10.02.06	3.2	64.1	06/09/09	7.10.54	-49.2	26.4
04/02/09	4.19.08	-18.6	-23.1	23/05/09	4.30.28	34.0	7.0	08/09/09	1.37.12	8.9	-31.7
05/02/09	22.49.40	-66.9	-62.5	24/05/09	22.58.42	-8.7	-27.1	09/09/09	20.03.38	29.0	-26.9
07/02/09	17.20.07	-19.5	-9.0	26/05/09	17.26.57	-60.4	10.9	11/09/09	14.30.02	-19.1	31.6
09/02/09	11.50.37	27.0	33.2	28/05/09	11.55.01	-22.2	67.4	13/09/09	8.56.33	-64.2	41.8
11/02/09	6.21.02	6.6	0.9	30/05/09	6.23.07	29.5	27.8	15/09/09	3.23.05	-15.1	-17.0
13/02/09	0.51.32	-51.1	-55.9	01/06/09	0.51.05	15.3	-21.8	16/09/09	21.49.45	30.2	-42.4
14/02/09	19.21.57	-45.5	-29.9	02/06/09	19.19.04	-42.5	-6.6	18/09/09	16.16.23	5.2	10.4
16/02/09	13.52.24	11.7	26.3	04/06/09	13.46.52	-46.7	52.1	20/09/09	10.43.09	-52.9	48.7
18/02/09	8.22.46	25.0	22.0	06/06/09	8.14.42	11.3	48.7	22/09/09	5.09.57	-40.4	1.5
20/02/09	2.53.13	-25.1	-35.3	08/06/09	2.42.23	31.7	-8.9	23/09/09	23.36.52	16.3	-47.8
21/02/09	21.23.34	-64.8	-48.5	09/06/09	21.10.06	-17.5	-19.3	25/09/09	18.30.51	24.1	-12.0
23/02/09	15.53.58	-11.9	10.0	11/06/09	15.37.37	-61.2	32.4	27/09/09	12.30.48	-28.9	41.9
25/02/09	10.24.16	29.7	37.2	13/06/09	10.05.11	-13.1	66.6	29/09/09	6.57.55	-61.3	19.3
27/02/09	4.54.39	1.3	-11.2	15/06/09	4.32.36	33.2	8.5	01/10/09	1.25.08	-6.1	-39.7
28/02/09	23.24.56	-56.5	-55.6	16/06/09	23.00.02	7.4	-24.6	02/10/09	19.52.21	31.3	-33.3
02/03/09	17.55.15	-37.9	-10.5	18/06/09	17.27.16	-50.5	13.0	04/10/09	14.19.41	-3.5	25.2
04/03/09	12.25.28	17.9	39.7	20/06/09	11.54.33	-38.3	69.6	06/10/09	8.47.04	-60.0	33.9
06/03/09	6.55.46	22.0	13.1	22/06/09	6.21.41	19.0	27.7	08/10/09	3.14.35	-31.5	-23.4
08/03/09	1.25.58	-31.6	-43.9	24/06/09	0.48.50	26.9	-21.1	09/10/09	21.42.06	22.5	-50.7
09/03/09	19.56.12	-60.4	-30.7	25/06/09	19.15.49	-27.0	-4.4	11/10/09	16.09.44	18.1	4.3
11/03/09	14.26.19	-4.2	28.3	27/06/09	13.42.49	-58.3	54.1	13/10/09	10.37.24	-38.0	39.9
13/03/09	8.56.32	31.3	34.5	29/06/09	8.09.41	-3.4	47.3	15/10/09	5.05.13	-55.3	-4.3
15/03/09	3.26.37	-5.2	-22.4	01/07/09	2.36.34	34.5	-10.2	16/10/09	23.33.03	2.6	-56.3
16/03/09	21.56.45	-60.6	-45.3	02/07/09	21.03.17	-1.2	-18.2	18/10/09	18.00.59	30.6	-18.5
18/03/09	16.26.46	-30.1	9.5	04/07/09	15.30.02	-57.5	34.5	20/10/09	12.28.57	-12.4	33.4
20/03/09	10.56.52	23.4	47.7	06/07/09	9.56.39	-28.9	64.4	22/10/09	6.57.04	-63.9	13.8
22/03/09	5.26.50	17.9	2.2	08/07/09	4.23.18	25.6	5.7	24/10/09	1.25.12	-22.7	-45.7
23/03/09	23.56.52	-38.3	-45.8	09/07/09	22.49.46	20.0	-25.5	25/10/09	19.53.25	27.2	-40.6
25/03/09	18.26.45	-54.3	-11.3	11/07/09	17.16.17	-37.0	14.8	27/10/09	14.21.42	11.6	17.6
27/03/09	12.56.43	3.5	44.9	13/07/09	11.42.40	-52.2	69.1	29/10/09	8.50.05	-46.1	27.4
29/03/09	7.26.34	31.4	26.0	15/07/09	6.09.05	5.6	23.5	31/10/09	3.18.31	-47.9	-27.4
31/03/09	1.56.27	-11.9	-31.3	17/07/09	0.35.21	32.9	-24.4	01/11/09	21.47.01	10.0	-58.9
01/04/09	20.26.12	-62.9	-29.4	18/07/09	19.01.39	-12.2	-3.4	03/11/09	16.15.34	28.2	-2.4
03/04/09	14.56.01	-22.1	29.1	20/07/09	13.27.51	-61.8	55.4	05/11/09	10.44.14	-20.5	32.2
05/04/09	9.25.43	28.3	46.8	22/07/09	7.54.05	-19.2	42.0	07/11/09	5.12.55	-64.1	-7.8
07/04/09	3.55.27	12.8	-9.8	24/07/09	2.20.10	30.4	-15.3	08/11/09	23.41.42	-14.2	-63.0
08/04/09	22.25.02	-44.8	-39.3	25/07/09	20.46.19	11.4	-19.2	10/11/09	18.10.30	30.5	-25.2
10/04/09	16.54.42	-47.3	9.0	27/07/09	15.12.21	-46.9	35.9	12/11/09	12.39.26	4.9	25.6
12/04/09	11.24.14	10.7	56.7	29/07/09	9.38.27	-43.9	58.5	14/11/09	7.08.23	-52.9	10.1
14/04/09	5.53.49	29.9	14.1	31/07/09	4.04.25	14.0	-0.2	16/11/09	1.37.24	-40.0	-48.8
16/04/09	0.23.14	-18.9	-35.4	01/08/09	22.30.26	28.5	-29.2	17/11/09	20.06.27	16.8	-47.4
17/04/09	18.52.44	-62.6	-10.9	03/08/09	16.56.22	-22.9	15.5	19/11/09	14.35.37	24.8	10.6

21/11/09	9.04.48	-28.1	22.8	05/12/09	13.00.13	20.6	20.1	19/12/09	16.58.32	27.8	-13.6
23/11/09	3.34.03	-60.9	-28.9	07/12/09	7.29.52	-35.1	8.8	21/12/09	11.28.30	15.8	24.5
24/11/09	22.03.20	-6.2	-65.7	09/12/09	1.59.32	-55.5	-48.9	23/12/09	5.58.29	-41.5	-7.3
26/11/09	16.32.42	32.3	-9.3	10/12/09	20.29.17	1.8	-52.5	25/12/09	0.28.31	-49.0	-65.5
28/11/09	11.02.07	-1.2	26.7	12/12/09	14.59.04	32.8	5.7	26/12/09	18.58.36	8.9	-34.7
30/11/09	5.31.34	-58.1	-9.0	14/12/09	9.28.52	-8.6	21.0	28/12/09	13.28.40	32.0	17.7
02/12/09	0.01.03	-32.0	-66.4	16/12/09	3.58.42	-61.1	-27.9	30/12/09	7.58.47	-15.1	10.8
03/12/09	18.30.37	22.7	-30.8	17/12/09	22.28.36	-24.1	-69.6				

II Superior conjunction

Date	Times	h	h Sun								
02/01/09	18.48.42	-17.4	-31.9	07/05/09	7.21.48	31.0	35.8	08/09/09	13.08.54	-36.5	44.9
06/01/09	8.13.24	6.0	12.8	10/05/09	20.40.32	-43.3	-21.2	12/09/09	2.18.54	-0.5	-26.8
09/01/09	21.38.05	-52.0	-60.9	14/05/09	9.59.16	7.8	62.5	15/09/09	15.28.26	-5.4	20.1
13/01/09	11.02.50	26.6	26.5	17/05/09	23.17.07	-10.0	-28.5	19/09/09	4.39.21	-32.5	-3.8
17/01/09	0.27.34	-66.3	-64.7	21/05/09	12.35.00	-24.9	61.7	22/09/09	17.49.55	21.1	-8.4
20/01/09	13.52.22	20.6	19.1	25/05/09	1.51.50	20.3	-16.7	26/09/09	7.01.54	-60.4	20.6
24/01/09	3.17.08	-36.5	-36.1	28/05/09	15.08.45	-54.9	36.4	29/09/09	20.13.38	31.3	-35.6
27/01/09	16.41.52	-7.2	-4.4	01/06/09	4.24.34	34.6	6.8	03/10/09	9.26.46	-56.4	39.2
31/01/09	6.06.36	-1.0	-4.0	04/06/09	17.40.30	-56.0	9.7	06/10/09	22.39.40	16.8	-53.2
03/02/09	19.31.16	-41.7	-34.0	08/06/09	6.55.15	22.0	34.1	10/10/09	11.53.59	-26.1	39.6
07/02/09	8.55.57	24.4	23.2	11/06/09	20.10.07	-27.2	-12.6	14/10/09	1.08.06	-12.5	-45.7
10/02/09	22.20.31	-66.5	-58.7	15/06/09	9.23.46	-6.9	60.7	17/10/09	14.23.39	5.8	20.3
14/02/09	11.45.03	26.6	35.0	18/06/09	22.37.34	4.9	-24.1	21/10/09	3.38.58	-45.0	-21.6
18/02/09	1.09.27	-45.3	-52.2	22/06/09	11.50.08	-38.9	70.0	24/10/09	16.55.40	28.3	-8.0
21/02/09	14.33.49	3.3	22.2	26/06/09	1.02.51	29.1	-20.1	28/10/09	6.12.11	-64.5	5.0
25/02/09	3.58.05	-10.2	-22.2	29/06/09	14.14.17	-61.0	48.5	31/10/09	19.30.01	27.4	-38.0
28/02/09	17.22.13	-30.8	-4.7	03/07/09	3.25.58	32.6	-2.8	04/11/09	8.47.41	-42.6	25.5
04/03/09	6.46.13	20.1	10.8	06/07/09	16.36.23	-47.3	22.2	07/11/09	22.06.33	3.5	-62.4
07/03/09	20.10.05	-61.3	-33.5	10/07/09	5.47.07	12.7	20.0	11/11/09	11.25.16	-8.9	30.1
11/03/09	9.33.49	30.8	38.2	13/07/09	18.56.33	-17.0	-1.6	15/11/09	0.45.06	-29.8	-57.1
14/03/09	22.57.23	-53.5	-49.8	17/07/09	8.06.24	-17.3	44.9	18/11/09	14.04.51	20.8	15.0
18/03/09	12.20.46	13.2	45.1	20/07/09	21.14.59	12.6	-21.3	22/11/09	3.25.35	-59.7	-30.3
22/03/09	1.43.58	-19.7	-36.3	24/07/09	10.24.07	-47.7	65.0	25/11/09	16.46.12	32.1	-11.6
25/03/09	15.06.59	-19.1	25.2	27/07/09	23.32.03	31.7	-28.9	29/11/09	6.07.44	-53.8	-1.9
29/03/09	4.29.45	13.2	-6.5	31/07/09	12.40.36	-62.2	60.4	02/12/09	19.29.11	15.3	-41.7
01/04/09	17.52.21	-52.2	-3.2	04/08/09	1.48.04	28.6	-21.4	06/12/09	8.51.27	-20.7	18.7
05/04/09	7.14.35	32.1	26.2	07/08/09	14.56.16	-41.7	36.9	09/12/09	22.13.36	-16.8	-68.1
08/04/09	20.36.42	-60.2	-28.9	11/08/09	4.03.32	6.0	-2.4	13/12/09	11.36.28	12.7	24.5
12/04/09	9.58.23	22.8	53.0	14/08/09	17.11.37	-11.4	10.4	17/12/09	0.59.16	-50.2	-60.3
15/04/09	23.19.59	-30.7	-37.9	18/08/09	6.18.50	-24.3	20.4	20/12/09	14.22.41	32.9	10.9
19/04/09	12.41.02	-6.3	53.6	21/08/09	19.27.02	16.5	-15.0	24/12/09	3.46.04	-59.7	-31.0
23/04/09	2.02.01	3.6	-22.8	25/08/09	8.34.31	-53.7	43.2	27/12/09	17.09.54	24.2	-14.8
26/04/09	15.22.21	-40.0	29.0	28/08/09	21.43.08	31.8	-34.6	31/12/09	6.33.44	-30.2	-1.1
30/04/09	4.42.39	29.1	5.2	01/09/09	10.51.05	-61.7	55.8				
03/05/09	18.02.16	-62.0	1.4	05/09/09	0.00.16	24.0	-39.9				

II Inferior conjunction

Date	Times	h	h Sun								
04/01/09	13.23.16	25.9	19.1	05/05/09	13.12.10	-21.6	53.2	03/09/09	5.23.26	-27.6	7.3
08/01/09	2.50.12	-50.5	-42.0	09/05/09	2.31.06	17.3	-14.5	06/09/09	18.31.11	18.0	-10.7
11/01/09	16.16.20	4.6	-2.9	12/05/09	15.49.23	-52.9	26.7	10/09/09	7.39.17	-56.3	30.6
15/01/09	5.43.24	-14.7	-10.1	16/05/09	5.07.15	34.1	12.5	13/09/09	20.47.51	31.6	-34.6
18/01/09	19.09.34	-29.5	-33.2	19/05/09	18.24.30	-57.9	0.5	17/09/09	9.56.50	-60.7	47.2
22/01/09	8.36.39	16.5	17.4	23/05/09	7.41.17	23.6	41.7	20/09/09	23.06.25	22.0	-47.3
25/01/09	22.02.48	-62.3	-61.0	26/05/09	20.57.29	-29.7	-19.8	24/09/09	12.16.28	-33.9	44.4
29/01/09	11.29.52	28.5	30.2	30/05/09	10.13.09	-4.7	66.6	28/09/09	1.27.06	-4.0	-38.6
02/02/09	0.55.57	-56.2	-58.3	02/06/09	23.28.12	3.0	-25.6	01/10/09	14.38.18	-2.0	23.3
05/02/09	14.22.51	11.6	19.4	06/06/09	12.42.43	-37.1	62.8	05/10/09	3.50.07	-35.8	-16.3
09/02/09	3.48.47	-21.3	-27.8	10/06/09	1.56.38	28.3	-14.7	08/10/09	17.02.33	23.1	-4.6
12/02/09	17.15.28	-21.2	-7.1	13/06/09	15.10.02	-60.5	37.7	12/10/09	6.15.35	-62.3	9.1
16/02/09	6.41.14	12.1	5.4	17/06/09	4.22.48	33.3	6.9	15/10/09	19.29.13	30.8	-33.6
19/02/09	20.07.38	-55.4	-37.0	20/06/09	17.34.59	-48.1	11.8	19/10/09	8.43.29	-53.5	29.6
23/02/09	9.33.05	30.0	32.3	24/06/09	6.46.37	14.0	32.2	22/10/09	21.58.22	13.8	-56.8
26/02/09	22.59.09	-60.8	-55.9	27/06/09	19.57.40	-17.7	-10.4	26/10/09	11.13.54	-21.9	35.3
02/03/09	12.24.16	18.7	39.1	01/07/09	9.08.13	-16.0	57.4	30/10/09	0.29.59	-16.6	-55.2
06/03/09	1.49.56	-28.4	-41.3	04/07/09	22.18.10	12.2	-23.8	02/11/09	13.46.41	9.7	20.8
09/03/09	15.14.37	-12.0	20.1	08/07/09	11.27.40	-46.5	70.3	06/11/09	3.03.57	-49.0	-31.3
13/03/09	4.39.46	6.3	-9.8	12/07/09	0.36.38	32.0	-23.5	09/11/09	16.21.49	30.2	-5.2
16/03/09	18.03.59	-46.6	-9.1	15/07/09	13.45.13	-61.8	53.0	13/11/09	5.40.13	-63.3	-4.0
20/03/09	7.28.36	29.6	23.4	19/07/09	2.53.20	29.6	-10.0	16/11/09	18.59.08	25.4	-35.1
23/03/09	20.52.19	-63.5	-35.6	22/07/09	16.01.04	-42.2	27.5	20/11/09	8.18.37	-37.2	18.2
27/03/09	10.16.17	25.8	48.4	26/07/09	5.08.27	7.4	11.1	23/11/09	21.38.33	-0.5	-62.7
30/03/09	23.39.24	-37.1	-43.6	29/07/09	18.15.35	-12.1	2.5	27/11/09	10.59.05	-2.6	26.8
03/04/09	13.02.40	-0.7	46.4	02/08/09	7.22.29	-22.5	34.7	01/12/09	0.19.57	-34.9	-63.9
07/04/09	2.25.09	-1.6	-24.7	05/08/09	20.29.12	15.8	-19.6	04/12/09	13.41.23	25.1	16.0
10/04/09	15.47.40	-35.5	21.4	09/08/09	9.35.46	-51.7	55.9	08/12/09	3.03.06	-61.8	-37.1
14/04/09	5.09.24	25.8	5.9	12/08/09	22.42.17	32.0	-32.8	11/12/09	16.25.25	31.8	-8.3
17/04/09	18.31.07	-61.7	-7.2	16/08/09	11.48.48	-62.0	60.7	15/12/09	5.47.58	-48.0	-32.8
21/04/09	7.52.05	31.9	37.5	20/08/09	0.55.24	26.2	-30.9	18/12/09	19.11.04	10.7	-37.8
24/04/09	21.12.57	-47.5	-28.7	23/08/09	14.02.04	-39.2	42.4	22/12/09	8.34.18	-13.6	15.3
28/04/09	10.33.04	10.9	61.2	27/08/09	3.08.56	2.9	-15.3	25/12/09	21.58.09	-22.9	-65.8
01/05/09	23.52.58	-14.1	-31.8	30/08/09	16.16.01	-9.0	16.4	29/12/09	11.22.01	19.0	24.8

II Maxima est elongation

Date	Times	h	h Sun								
03/01/09	15.50.23	11.6	0.1	25/01/09	0.23.50	-64.0	-63.7	15/02/09	8.58.26	26.9	25.8
07/01/09	5.15.51	-24.4	-15.2	28/01/09	13.49.48	18.7	21.3	18/02/09	22.24.22	-65.9	-56.5
10/01/09	18.41.14	-20.1	-29.3	01/02/09	3.15.23	-32.2	-35.4	22/02/09	11.49.39	24.8	37.7
14/01/09	8.06.53	8.9	12.5	04/02/09	16.41.24	-11.0	-2.1	26/02/09	1.15.28	-39.5	-48.8
17/01/09	21.32.24	-54.7	-58.5	08/02/09	6.06.57	2.9	-2.0	01/03/09	14.40.33	-1.1	23.4
21/01/09	10.58.13	27.8	27.9	11/02/09	19.32.59	-46.0	-32.6	05/03/09	4.06.09	-3.9	-18.4

08/03/09	17.30.55	-36.6	-4.6	16/06/09	7.03.12	16.4	35.6	23/09/09	15.16.58	-0.8	19.4
12/03/09	6.56.14	24.4	15.1	19/06/09	20.16.52	-20.1	-13.0	27/09/09	4.27.54	-36.6	-7.7
15/03/09	20.20.40	-63.7	-33.1	23/06/09	9.29.14	-13.8	61.4	30/09/09	17.39.16	23.6	-9.1
19/03/09	9.45.40	29.8	42.6	26/06/09	22.41.44	10.9	-24.3	04/10/09	6.51.20	-62.6	17.0
22/03/09	23.09.39	-47.1	-47.0	30/06/09	11.52.57	-45.1	69.6	07/10/09	20.03.51	30.7	-36.9
26/03/09	12.34.13	7.6	46.8	04/07/09	1.04.16	31.8	-20.5	11/10/09	9.17.01	-53.1	35.7
30/03/09	1.57.42	-12.2	-31.5	07/07/09	14.14.25	-61.6	48.4	14/10/09	22.30.42	13.5	-55.9
02/04/09	15.21.47	-26.3	24.4	11/07/09	3.24.41	30.1	-4.1	18/10/09	11.45.01	-21.9	37.1
06/04/09	4.44.42	19.3	-0.5	14/07/09	16.33.54	-42.2	22.3	22/10/09	0.59.55	-16.6	-49.0
09/04/09	18.08.11	-57.6	-4.7	18/07/09	5.43.11	7.7	18.4	25/10/09	14.15.21	9.4	19.1
13/04/09	7.30.28	33.0	31.5	21/07/09	18.51.32	-11.7	-1.8	29/10/09	3.31.21	-48.8	-24.6
16/04/09	20.53.17	-54.8	-28.8	25/07/09	8.00.00	-22.8	42.7	01/11/09	16.47.53	29.8	-8.4
20/04/09	10.14.54	17.5	57.3	28/07/09	21.07.43	16.5	-22.2	05/11/09	6.04.59	-63.7	2.1
23/04/09	23.36.58	-22.3	-34.8	01/08/09	10.15.35	-52.1	62.5	08/11/09	19.22.34	25.6	-38.2
27/04/09	12.57.45	-14.1	53.5	04/08/09	23.22.49	32.6	-31.0	12/11/09	8.40.40	-38.5	22.6
01/05/09	2.19.00	11.0	-18.2	08/08/09	12.30.18	-61.3	59.7	15/11/09	21.59.14	0.4	-63.7
04/05/09	15.38.56	-47.3	27.3	12/08/09	1.37.17	25.9	-24.6	19/11/09	11.18.18	-4.8	28.3
08/05/09	4.59.19	32.6	9.8	15/08/09	14.44.38	-37.7	37.2	23/11/09	0.37.48	-33.4	-59.9
11/05/09	18.18.18	-60.9	0.2	19/08/09	3.51.37	1.9	-6.5	26/11/09	13.57.45	23.5	14.8
15/05/09	7.37.41	27.2	40.1	22/08/09	16.59.01	-7.4	10.7	30/11/09	3.18.04	-61.3	-33.1
18/05/09	20.55.40	-35.4	-21.1	26/08/09	6.06.15	-28.8	16.7	03/12/09	16.38.49	31.9	-10.6
22/05/09	10.14.02	0.7	65.6	29/08/09	19.14.00	19.3	-15.4	07/12/09	5.59.55	-50.6	-5.6
25/05/09	23.30.59	-1.3	-26.7	02/09/09	8.21.46	-57.1	39.4	10/12/09	19.21.25	12.8	-40.2
29/05/09	12.48.12	-32.7	61.0	05/09/09	21.30.02	31.9	-36.4	14/12/09	8.43.13	-17.0	16.9
02/06/09	2.04.02	25.7	-14.3	09/09/09	10.38.28	-59.7	52.6	17/12/09	22.05.21	-19.8	-67.2
05/06/09	15.20.05	-59.1	35.1	12/09/09	23.47.28	21.3	-43.3	21/12/09	11.27.47	15.7	24.5
09/06/09	4.34.48	34.1	8.9	16/09/09	12.56.46	-32.5	43.4	25/12/09	0.50.32	-52.3	-62.3
12/06/09	17.49.40	-50.7	8.8	20/09/09	2.06.41	-5.2	-30.7	28/12/09	14.13.34	33.9	12.7

II Maxima west elongation

Date	Times	h	h Sun	06/05/09	10.14.45	9.7	62.1	07/09/09	15.35.38	-10.2	21.4
01/01/09	21.38.30	-48.1	-62.2	09/05/09	23.32.51	-12.5	-30.2	11/09/09	4.44.43	-27.0	-0.7
05/01/09	11.04.02	25.0	25.4	13/05/09	12.50.31	-22.6	58.0	14/09/09	17.53.53	17.4	-6.5
09/01/09	0.30.01	-68.0	-65.2	17/05/09	2.07.46	18.3	-16.1	18/09/09	7.03.58	-56.3	22.7
12/01/09	13.55.36	22.2	17.1	20/05/09	15.24.28	-53.2	32.4	21/09/09	20.14.09	31.4	-32.8
16/01/09	3.21.31	-40.3	-35.9	24/05/09	4.40.44	34.4	8.9	25/09/09	9.25.24	-60.6	41.7
19/01/09	16.47.05	-4.1	-7.1	27/05/09	17.56.27	-57.6	6.0	28/09/09	22.36.45	21.4	-50.0
23/01/09	6.12.51	-5.0	-4.1	31/05/09	7.11.44	23.7	36.9	02/10/09	11.49.13	-32.9	43.0
26/01/09	19.38.18	-38.9	-36.9	03/06/09	20.26.27	-29.8	-15.4	06/10/09	1.01.47	-5.5	-44.3
30/01/09	9.03.53	22.6	22.1	07/06/09	9.40.40	-4.1	63.1	09/10/09	14.15.32	-0.3	24.1
02/02/09	22.29.13	-66.4	-61.8	10/06/09	22.54.19	2.5	-24.8	13/10/09	3.29.23	-37.8	-21.7
06/02/09	11.54.33	27.1	32.2	14/06/09	12.07.29	-36.3	68.0	16/10/09	16.44.25	24.5	-3.4
10/02/09	1.19.38	-48.0	-53.1	18/06/09	1.20.07	27.7	-18.4	20/10/09	5.59.31	-63.4	4.6
13/02/09	14.44.41	5.0	18.5	21/06/09	14.32.11	-60.2	45.1	23/10/09	19.15.53	30.2	-33.5
17/02/09	4.09.31	-12.8	-22.2	25/06/09	3.43.44	33.5	0.6	27/10/09	8.32.14	-50.4	26.0
20/02/09	17.34.17	-28.9	-8.8	28/06/09	16.54.45	-49.5	19.0	30/10/09	21.49.54	10.7	-58.6
24/02/09	6.58.47	18.2	10.6	02/07/09	6.05.17	15.2	24.1	03/11/09	11.07.26	-17.5	32.8
27/02/09	20.23.08	-60.5	-37.7	05/07/09	19.15.20	-19.6	-4.6	07/11/09	0.26.18	-21.2	-57.8
03/03/09	9.47.16	30.6	36.6	09/07/09	8.24.54	-14.3	49.1	10/11/09	13.44.58	14.0	19.1
06/03/09	23.11.13	-55.5	-53.2	12/07/09	21.34.01	10.4	-21.8	14/11/09	3.05.01	-53.6	-32.7
10/03/09	12.34.57	14.3	41.2	16/07/09	10.42.44	-44.9	68.0	17/11/09	16.24.46	31.7	-7.0
14/03/09	1.58.25	-21.9	-37.2	19/07/09	23.51.03	31.0	-26.9	21/11/09	5.45.51	-60.3	-4.7
17/03/09	15.21.40	-17.5	20.8	23/07/09	12.59.05	-62.2	59.4	24/11/09	19.06.37	21.7	-37.2
21/03/09	4.44.38	11.3	-6.3	27/07/09	2.06.41	30.3	-17.6	28/11/09	8.28.41	-30.1	17.7
24/03/09	18.07.24	-50.9	-8.0	30/07/09	15.14.11	-44.4	35.1	01/12/09	21.50.23	-7.9	-65.0
28/03/09	7.29.50	31.3	26.3	03/08/09	4.21.21	9.1	1.8	05/12/09	11.13.20	4.5	25.6
31/03/09	20.51.59	-61.5	-33.2	06/08/09	17.28.33	-14.5	9.1	09/12/09	0.35.50	-42.3	-62.9
04/04/09	10.13.49	23.7	51.4	10/08/09	6.35.28	-20.6	24.8	12/12/09	13.59.35	29.6	13.6
07/04/09	23.35.21	-32.9	-40.6	13/08/09	19.42.33	13.8	-15.2	16/12/09	3.22.49	-62.6	-34.5
11/04/09	12.56.34	-4.5	49.5	17/08/09	8.49.27	-50.3	47.3	19/12/09	16.47.19	28.9	-11.6
15/04/09	2.17.26	1.5	-23.1	20/08/09	21.56.41	31.3	-32.9	23/12/09	6.11.10	-39.3	-5.1
18/04/09	15.37.57	-38.3	24.7	24/08/09	11.03.51	-62.9	58.9	26/12/09	19.36.15	2.7	-41.7
22/04/09	4.58.05	27.7	6.0	28/08/09	0.11.27	26.7	-36.6	30/12/09	9.00.40	-3.4	17.9
25/04/09	18.17.51	-62.0	-2.8	31/08/09	13.19.04	-40.8	46.4				
29/04/09	7.37.15	31.5	36.9	04/09/09	2.27.19	3.7	-23.6				
02/05/09	20.56.13	-45.5	-24.8								

III Superior conjunction

Date	Times	h	h Sun	08/05/09	7.54.19	27.9	41.9	06/09/09	20.08.25	28.5	-26.6
06/01/09	5.14.42	-25.1	-15.4	15/05/09	11.56.32	-13.9	64.8	13/09/09	23.31.56	22.6	-44.2
13/01/09	9.45.31	20.9	22.9	22/05/09	15.55.33	-57.8	27.0	21/09/09	2.58.21	-15.4	-22.5
20/01/09	14.16.32	17.9	16.2	29/05/09	19.49.54	-39.8	-11.4	28/09/09	6.28.58	-57.4	14.4
27/01/09	18.47.21	-30.0	-27.3	05/06/09	23.40.18	7.0	-25.0	05/10/09	10.04.06	-49.4	41.4
03/02/09	23.18.03	-66.4	-64.2	13/06/09	3.25.21	34.6	-1.8	12/10/09	13.44.10	-4.3	27.7
11/02/09	3.49.03	-20.0	-27.3	20/06/09	7.05.37	13.6	35.9	19/10/09	17.29.55	29.2	-13.0
18/02/09	8.19.07	24.7	21.5	27/06/09	10.41.16	-30.2	70.0	26/10/09	21.20.15	17.1	-54.1
25/02/09	12.48.55	17.2	35.6	04/07/09	14.12.35	-61.6	48.8	03/11/09	1.15.57	-27.8	-49.6
04/03/09	17.16.41	-31.9	-2.3	11/07/09	17.40.31	-32.6	10.6	10/11/09	5.15.20	-64.3	-8.0
11/03/09	21.42.54	-63.5	-45.5	18/07/09	21.04.16	9.6	-19.9	17/11/09	9.18.52	-28.1	24.9
19/03/09	2.07.22	-17.2	-34.1	26/07/09	0.25.20	33.5	-26.7	24/11/09	13.26.19	18.7	18.7
26/03/09	6.30.05	26.8	15.0	02/08/09	3.43.09	15.8	-4.6	01/12/09	17.37.35	28.7	-21.1
02/04/09	10.51.26	19.8	52.7	09/08/09	6.59.16	-24.2	29.3	08/12/09	21.52.59	-12.4	-65.7
09/04/09	15.10.01	-28.0	28.0	16/08/09	10.14.42	-60.7	58.7	16/12/09	2.11.05	-59.2	-47.7
16/04/09	19.26.29	-62.6	-16.6	23/08/09	13.30.33	-44.7	47.3	23/12/09	6.32.29	-35.4	-0.9
23/04/09	23.39.10	-21.9	-34.8	30/08/09	16.48.32	-2.6	10.4			15.6	24.7
01/05/09	3.48.30	23.8	-4.0								

III Inferior conjunction

Date	Times	h	h Sun	31/01/09	9.03.49	22.9	22.3	01/03/09	3.01.25	-18.2	-31.3
02/01/09	14.59.32	18.3	7.3	07/02/09	13.34.25	17.4	25.7	08/03/09	7.29.06	26.1	19.4
09/01/09	19.29.40	-28.6	-38.5	14/02/09	18.04.18	-31.3	-15.6	15/03/09	11.54.55	18.0	45.4
17/01/09	0.00.54	-67.8	-67.2	21/02/09	22.33.15	-64.8	-56.2	22/03/09	16.19.37	-30.9	11.6
24/01/09	4.32.03	-22.6	-22.2								

29/03/09	20.41.31	-62.8	-32.4	01/07/09	0.30.53	27.9	-22.7	01/10/09	20.20.26	31.0	-37.4
06/04/09	1.00.58	-18.3	-35.8	08/07/09	4.00.19	28.0	2.0	08/10/09	23.59.20	3.4	-51.9
13/04/09	5.17.50	26.3	7.2	15/07/09	7.25.35	-8.2	37.6	16/10/09	3.42.19	-42.3	-20.0
20/04/09	9.32.10	23.1	52.8	22/07/09	10.47.17	-49.9	67.2	23/10/09	7.30.06	-61.1	18.7
27/04/09	13.44.16	-22.7	46.5	29/07/09	14.06.21	-55.5	47.5	30/10/09	11.22.37	-17.5	33.8
04/05/09	17.52.32	-61.8	3.1	05/08/09	17.24.11	-16.1	10.1	06/11/09	15.20.00	24.2	6.1
11/05/09	21.57.43	-28.8	-27.8	12/08/09	20.40.23	21.3	-22.8	13/11/09	19.22.34	23.9	-39.0
19/05/09	1.58.16	18.0	-16.9	19/08/09	23.56.58	30.9	-34.7	20/11/09	23.28.52	-19.4	-66.9
26/05/09	5.54.29	32.7	22.3	27/08/09	3.13.38	2.1	-14.5	28/11/09	3.39.37	-62.4	-28.8
02/06/09	9.46.21	-1.2	63.6	03/09/09	6.31.59	-40.2	20.0	05/12/09	7.53.03	-32.1	12.2
09/06/09	13.33.57	-47.7	54.8	10/09/09	9.52.57	-63.3	49.1	12/12/09	12.09.28	17.1	23.3
16/06/09	17.17.45	-53.0	14.6	17/09/09	13.17.32	-27.9	40.5	19/12/09	16.28.42	30.4	-8.5
23/06/09	20.56.22	-9.9	-17.3	24/09/09	16.46.56	13.8	2.9	26/12/09	20.50.42	-11.0	-55.1

III Maxima est elongation

Date	Times	h	h Sun								
08/01/09	0.18.50	-68.4	-66.6	10/05/09	2.50.18	20.6	-11.5	08/09/09	14.53.54	-17.1	28.5
15/01/09	4.49.16	-24.6	-19.8	17/05/09	6.51.51	30.9	31.9	15/09/09	18.17.26	21.0	-11.1
22/01/09	9.20.03	21.4	22.1	24/05/09	10.49.49	-7.5	68.5	22/09/09	21.44.44	28.8	-44.3
29/01/09	13.51.33	18.1	21.4	31/05/09	14.42.42	-52.9	41.5	30/09/09	1.16.37	-3.5	-40.6
05/02/09	18.22.29	-30.0	-20.9	07/06/09	18.31.01	-47.3	1.8	07/10/09	4.54.01	-48.5	-4.8
12/02/09	22.53.31	-65.7	-60.5	14/06/09	22.14.45	-1.3	-23.4	14/10/09	8.35.54	-57.4	30.2
20/02/09	3.23.01	-19.5	-30.0	22/06/09	1.53.58	32.1	-14.9	21/10/09	12.23.21	-12.7	33.5
27/02/09	7.51.25	25.2	20.1	29/06/09	5.29.26	22.2	17.8	28/10/09	16.14.55	26.2	-0.8
06/03/09	12.18.24	18.1	40.9	06/07/09	9.00.00	-18.4	55.6	04/11/09	20.11.07	21.8	-46.0
13/03/09	16.44.05	-30.6	5.3	13/07/09	12.26.58	-57.8	65.1	12/11/09	0.11.39	-21.7	-60.8
20/03/09	21.08.53	-63.4	-38.6	20/07/09	15.49.32	-45.5	29.9	19/11/09	4.16.35	-63.1	-20.4
28/03/09	1.31.22	-18.3	-35.7	27/07/09	19.08.59	-3.7	-6.2	26/11/09	8.26.18	-31.9	17.8
04/04/09	5.52.10	26.4	10.8	03/08/09	22.26.07	28.8	-29.5	03/12/09	12.39.14	16.7	22.0
11/04/09	10.09.41	21.8	53.7	11/08/09	1.42.04	25.9	-23.8	10/12/09	16.55.59	30.0	-13.6
18/04/09	14.24.23	-24.8	37.9	18/08/09	4.58.24	-9.5	5.7	17/12/09	21.14.56	-10.5	-60.0
25/04/09	18.36.00	-62.4	-6.4	25/08/09	8.14.53	-50.7	40.0	25/12/09	1.36.25	-58.1	-54.8
02/05/09	22.44.30	-26.2	-32.1	01/09/09	11.33.31	-57.0	55.8	28/12/08	5.40.03		

III Maxima west elongation

Date	Times	h	h Sun								
04/01/09	10.10.18	20.3	23.5	06/05/09	12.59.45	-19.9	55.3	05/09/09	1.26.44	12.6	-32.2
11/01/09	14.41.02	17.8	11.3	13/05/09	17.03.04	-60.8	13.3	12/09/09	4.49.18	-28.7	-0.2
18/01/09	19.12.52	-30.1	-33.8	20/05/09	21.02.29	-32.9	-21.4	19/09/09	8.15.04	-63.8	34.2
25/01/09	23.43.57	-66.9	-66.4	28/05/09	0.57.52	14.0	-21.8	26/09/09	11.45.37	-38.0	45.6
02/02/09	4.14.45	-20.6	-24.2	04/06/09	4.49.38	34.2	11.2	03/10/09	15.19.54	6.0	15.6
09/02/09	8.44.59	24.1	22.4	11/06/09	8.36.24	4.6	52.7	10/10/09	18.58.48	31.2	-26.7
16/02/09	13.14.49	16.9	30.4	18/06/09	12.19.03	-41.1	66.9	17/10/09	22.42.30	10.0	-57.4
23/02/09	17.44.34	-32.3	-10.0	25/06/09	15.56.13	-58.4	29.7	25/10/09	2.31.18	-35.6	-34.7
02/03/09	22.12.59	-63.8	-51.5	02/07/09	19.28.39	-19.4	-6.5	01/11/09	6.25.37	-63.5	6.3
10/03/09	2.40.43	-16.6	-31.9	09/07/09	22.56.51	20.9	-25.6	08/11/09	10.24.10	-22.1	30.9
17/03/09	7.06.03	27.0	18.5	17/07/09	2.21.21	32.5	-14.0	15/11/09	14.27.40	22.2	12.4
24/03/09	11.29.24	18.1	49.5	24/07/09	5.43.13	3.2	17.6	22/11/09	18.34.22	26.0	-31.1
31/03/09	15.50.37	-30.5	18.8	31/07/09	9.01.59	-39.1	52.5	29/11/09	22.44.37	-16.7	-69.4
07/04/09	20.09.43	-62.5	-25.4	07/08/09	12.19.31	-62.1	61.1	07/12/09	2.58.13	-61.2	-37.9
15/04/09	0.27.02	-18.9	-35.5	14/08/09	15.35.19	-29.2	28.2	14/12/09	7.15.06	-33.3	5.8
22/04/09	4.41.05	26.0	3.0	21/08/09	18.51.00	11.1	-9.2	21/12/09	11.35.34	16.9	24.3
29/04/09	8.52.34	24.6	49.7	28/08/09	22.07.45	32.2	-36.5	28/12/09	15.58.06	31.1	-1.8

IV Superior conjunction

Date	Times	h	h Sun								
11/01/09	14.18.43	20.2	14.2	26/05/09	5.55.02	32.7	22.4	06/10/09	8.06.19	-63.6	28.5
28/01/09	11.14.48	28.7	29.9	11/06/09	23.05.20	5.0	-24.9	23/10/09	0.46.03	-14.7	-51.2
14/02/09	8.08.24	22.3	18.8	28/06/09	15.18.16	-60.4	36.7	08/11/09	18.26.11	30.0	-27.8
03/03/09	4.52.36	3.0	-10.4	15/07/09	6.35.31	1.2	28.4	25/11/09	13.01.44	15.8	21.1
20/03/09	1.20.48	-25.2	-40.1	31/07/09	21.08.53	18.5	-22.9	12/12/09	8.23.18	-22.0	14.9
05/04/09	21.24.46	-55.8	-35.5	17/08/09	11.20.59	-63.1	61.3	29/12/09	4.21.31	-53.5	-24.8
22/04/09	16.57.04	-53.3	10.8	03/09/09	1.37.42	12.3	-30.3				
09/05/09	11.50.07	-8.9	63.9	19/09/09	16.26.02	7.4	8.3				

IV Inferior conjunction

Date	Times	h	h Sun								
03/01/09	2.15.16	-58.9	-48.3	17/05/09	19.56.47	-46.3	-14.3	27/09/09	22.54.03	19.8	-49.9
19/01/09	23.13.22	-67.3	-68.1	03/06/09	13.37.30	-44.6	53.6	14/10/09	15.02.31	10.1	15.0
05/02/09	20.13.27	-50.1	-41.2	20/06/09	6.19.17	20.4	27.4	31/10/09	8.13.54	-50.9	22.6
22/02/09	17.08.49	-25.2	-3.3	06/07/09	22.02.08	11.0	-23.2	17/11/09	2.24.13	-48.7	-40.7
11/03/09	13.50.37	2.2	33.4	23/07/09	12.53.35	-62.2	60.2	03/12/09	21.26.50	-4.7	-61.9
28/03/09	10.12.31	25.9	48.5	09/08/09	3.09.36	15.9	-11.4	20/12/09	17.12.50	26.1	-16.0
14/04/09	6.06.45	30.8	16.5	25/08/09	17.16.47	-1.1	6.6				
01/05/09	1.24.12	2.1	-25.0	11/09/09	7.43.55	-57.5	31.1				

IV Maxima est elongation

Date	Times	h	h Sun								
15/01/09	18.14.31	-17.8	-23.5	13/05/09	15.08.16	-47.2	34.4	07/09/09	3.57.21	-14.9	-9.3
01/02/09	15.09.25	6.2	11.8	30/05/09	9.00.39	8.1	56.3	23/09/09	18.57.14	28.2	-20.9
18/02/09	12.00.56	24.6	35.9	16/06/09	1.57.29	30.6	-14.4	10/10/09	10.51.16	-37.6	41.2
07/03/09	8.42.03	30.3	30.3	02/07/09	17.55.26	-36.5	8.4	27/10/09	3.46.08	-50.1	-21.5
24/03/09	5.04.46	15.8	-0.8	19/07/09	9.00.02	-28.9	54.1	12/11/09	21.41.04	4.8	-61.1
10/04/09	1.02.02	-15.6	-34.3	04/08/09	23.25.43	32.7	-31.0	29/11/09	16.28.39	32.4	-8.7
26/04/09	20.26.26	-53.5	-22.8	21/08/09	13.35.23	-45.4	47.2	16/12/09	12.00.41	17.9	23.6

IV Maxima west elongation

Date	Times	h	h Sun								
07/01/09	8.47.00	11.4	16.8	22/05/09	1.45.42	17.8	-17.9	02/10/09	4.09.52	-37.1	-12.1
24/01/09	5.47.23	-9.0	-8.6	07/06/09	19.11.16	-40.6	-4.8	18/10/09	20.34.35	25.9	-45.3
10/02/09	2.48.07	-31.9	-38.6	24/06/09	11.37.58	-38.2	70.8	04/11/09	14.01.02	13.0	18.4
26/02/09	23.40.53	-55.1	-56.2	11/07/09	3.07.33	31.4	-6.9	21/11/09	8.25.11	-35.4	18.7
15/03/09	20.18.17	-63.6	-32.8	27/07/09	17.47.57	-18.8	7.5	08/12/09	3.39.51	-63.1	-30.3
01/04/09	16.34.11	-39.0	11.0	13/08/09	7.59.35	-38.6	39.6	24/12/09	23.33.57	-39.9	-70.8
18/04/09	12.19.06	-1.0	55.6	29/08/09	22.09.57	32.2	-37.0				
05/05/09	7.25.28	31.1	36.1	15/09/09	12.45.46	-35.3	45.1				

I = Io
 II = Europa
 III = Ganimede
 IV = Callisto

TIMES IN U.T.

CENTRAL MERIDIAN OF JUPITER - TRANSITS

[illegible]

TIMES IN U.T.

CENTRAL MERIDIAN OF JUPITER I

(For equatorial zones)

Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	°	°	°	°	°	°	°	°	°	°	°	°
1	252.8	100.0	195.5	45.5	100.0	314.5	13.8	232.8	91.5	149.5	2.0	53.5
2	50.3	257.8	353.3	203.3	257.8	112.5	171.8	30.8	249.5	307.5	159.8	211.0
3	208.0	55.5	151.0	1.0	55.5	270.3	329.8	188.8	47.5	105.3	317.5	8.8
4	5.5	213.0	308.8	159.0	213.5	68.3	127.8	346.8	205.3	263.3	115.3	166.5
5	163.3	10.8	106.3	316.8	11.3	226.3	285.8	144.8	3.3	61.0	273.0	324.3
6	321.0	168.5	264.0	114.5	169.3	24.3	83.8	302.8	161.3	219.0	70.8	121.8
7	118.5	326.3	61.8	272.3	327.0	182.3	241.8	101.0	319.3	16.8	228.5	279.5
8	276.3	123.8	219.5	70.0	125.0	340.0	39.8	259.0	117.3	174.5	26.3	77.3
9	73.8	281.5	17.3	227.8	282.8	138.0	197.8	57.0	275.3	332.5	184.0	234.8
10	231.5	79.3	175.0	25.8	80.8	296.0	355.8	215.0	73.3	130.3	341.8	32.5
11	29.3	236.8	332.8	183.5	238.5	94.0	153.8	13.0	231.3	288.3	139.3	190.3
12	186.8	34.5	130.5	341.3	36.5	252.0	311.8	171.0	29.0	86.0	297.0	347.8
13	344.5	192.3	288.3	139.0	194.3	50.0	110.0	329.0	187.0	243.8	94.8	145.5
14	142.0	350.0	86.0	296.8	352.3	207.8	268.0	127.3	345.0	41.8	252.5	303.0
15	299.8	147.5	243.8	94.8	150.0	5.8	66.0	285.3	143.0	199.5	50.3	100.8
16	97.5	305.3	41.5	252.5	308.0	163.8	224.0	83.3	301.0	357.3	208.0	258.5
17	255.0	103.0	199.3	50.3	105.8	321.8	22.0	241.3	98.8	155.0	5.8	56.0
18	52.8	260.8	357.0	208.0	263.8	119.8	180.0	39.3	256.8	313.0	163.5	213.8
19	210.5	58.5	154.8	6.0	61.5	277.8	338.0	197.3	54.8	110.8	321.0	11.5
20	8.0	216.0	312.5	163.8	219.5	75.8	136.3	355.3	212.8	268.5	118.8	169.0
21	165.8	13.8	110.3	321.5	17.5	233.8	294.3	153.3	10.5	66.3	276.5	326.8
22	323.5	171.5	268.0	119.3	175.3	31.8	92.3	311.3	168.5	224.3	74.3	124.3
23	121.0	329.3	65.8	277.3	333.3	189.8	250.3	109.3	326.5	22.0	232.0	282.0
24	278.8	127.0	223.5	75.0	131.0	347.8	48.3	267.5	124.3	179.8	29.5	79.8
25	76.5	284.8	21.3	232.8	289.0	145.8	206.3	65.5	282.3	337.5	187.3	237.3
26	234.0	82.3	179.0	30.8	87.0	303.8	4.5	223.5	80.0	135.3	345.0	35.0
27	31.8	240.0	336.8	188.5	244.8	101.8	162.5	21.5	238.0	293.0	142.8	192.5
28	189.5	37.8	134.5	346.3	42.8	259.8	320.5	179.5	36.0	90.8	300.3	350.3
29	347.0		292.3	144.3	200.8	57.8	118.5	337.5	193.8	248.5	98.0	147.8
30	144.8		90.0	302.0	358.8	215.8	276.5	135.5	351.8	46.5	255.8	305.5
31	302.5		247.8		156.5		74.5	293.5		204.3		103.3

Motion of the central meridian

	0h	1h	2h	3h	4h	5h	6h	7h	8h	9h	10h	11h
m	°	°	°	°	°	°	°	°	°	°	°	°
00	0.0	36.6	73.2	109.7	146.3	182.9	219.5	256.1	292.6	329.2	5.8	42.4
10	6.1	42.7	79.3	115.8	152.4	189.0	225.6	262.2	298.7	335.3	11.9	48.5
20	12.2	48.8	85.4	121.9	158.5	195.1	231.7	268.2	304.8	341.4	18.0	54.6
30	18.3	54.9	91.4	128.0	164.6	201.2	237.8	274.3	310.9	347.5	24.1	60.7
40	24.4	61.0	97.5	134.1	170.7	207.3	243.9	280.4	317.0	353.6	30.2	66.8
50	30.5	67.1	103.6	140.2	176.8	213.4	250.0	286.5	323.1	359.7	36.3	72.9
60	36.6	73.2	109.7	146.3	182.9	219.5	256.1	292.6	329.2	5.8	42.4	79.0

Longitude of the meridian that transits at 0 U.T. and motion in °

CENTRAL MERIDIAN OF JUPITER II

(For middle latitude zones)

Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	°	°	°	°	°	°	°	°	°	°	°	°
1	345.5	316.3	198.3	171.8	357.0	335.3	165.5	147.8	130.0	319.3	295.3	117.8
2	135.5	106.5	348.3	321.8	147.3	125.5	315.8	298.3	280.5	109.5	85.3	267.8
3	285.5	256.5	138.3	112.0	297.5	275.8	106.3	88.8	70.8	259.8	235.5	58.0
4	75.5	46.5	288.5	262.0	87.8	66.0	256.5	239.0	221.3	50.0	25.5	208.0
5	225.5	196.5	78.5	52.3	238.0	216.3	47.0	29.5	11.5	200.3	175.8	358.0
6	15.5	346.5	228.5	202.5	28.3	6.8	197.3	180.0	161.8	350.5	325.8	148.0
7	165.5	136.8	18.8	352.5	178.5	157.0	347.8	330.3	312.3	140.8	116.0	298.0
8	315.8	286.8	168.8	142.8	328.8	307.3	138.0	120.8	102.5	291.0	266.0	88.0
9	105.8	76.8	318.8	293.0	119.0	97.8	288.5	271.0	252.8	81.3	56.0	238.3
10	255.8	226.8	109.0	83.0	269.3	248.0	78.8	61.5	43.3	231.5	206.3	28.3
11	45.8	16.8	259.0	233.3	59.5	38.3	229.3	212.0	193.5	21.8	356.3	178.3
12	195.8	167.0	49.3	23.5	209.8	188.5	19.8	2.3	343.8	171.8	146.5	328.3
13	345.8	317.0	199.3	173.5	0.0	339.0	170.0	152.8	134.3	322.0	296.5	118.3
14	135.8	107.0	349.5	323.8	150.3	129.3	320.5	303.3	284.5	112.3	86.5	268.3
15	285.8	257.0	139.5	114.0	300.5	279.8	110.8	93.5	74.8	262.5	236.8	58.3
16	75.8	47.3	289.5	264.0	90.8	70.0	261.3	244.0	225.0	52.5	26.8	208.3
17	225.8	197.3	79.8	54.3	241.0	220.3	51.8	34.3	15.5	202.8	176.8	358.5
18	15.8	347.3	229.8	204.5	31.3	10.8	202.0	184.8	165.8	353.0	327.0	148.5
19	166.0	137.3	20.0	354.8	181.5	161.0	352.5	335.3	316.0	143.3	117.0	298.5
20	316.0	287.5	170.0	144.8	331.8	311.3	143.0	125.5	106.3	293.3	267.0	88.5
21	106.0	77.5	320.3	295.0	122.0	101.8	293.3	276.0	256.8	83.5	57.3	238.5
22	256.0	227.5	110.3	85.3	272.3	252.0	83.8	66.3	47.0	233.8	207.3	28.5
23	46.0	17.8	260.5	235.5	62.5	42.5	234.0	216.8	197.3	23.8	357.3	178.5
24	196.0	167.8	50.5	25.8	212.8	192.8	24.5	7.0	347.5	174.0	147.5	328.5
25	346.0	317.8	200.8	175.8	3.0	343.3	175.0	157.5	137.8	324.3	297.5	118.5
26	136.3	108.0	350.8	326.0	153.5	133.5	325.3	307.8	288.0	114.3	87.5	268.5
27	286.3	258.0	141.0	116.3	303.8	284.0	115.8	98.3	78.3	264.5	237.5	58.5
28	76.3	48.0	291.0	266.5	94.0	74.3	266.3	248.5	228.5	54.5	27.8	208.5
29	226.3		81.3	56.8	244.3	224.8	56.5	39.0	18.8	204.8	177.8	358.5
30	16.3		231.5	207.0	34.5	15.0	207.0	189.3	169.0	355.0	327.8	148.8
31	166.3		21.5		184.8		357.5	339.8		145.0		298.8

Motion of the central meridian

	0h	1h	2h	3h	4h	5h	6h	7h	8h	9h	10h	11h
m	°	°	°	°	°	°	°	°	°	°	°	°
0	0.0	36.3	72.5	108.8	145.0	181.3	217.6	253.8	290.1	326.4	2.6	38.9
10	6.0	42.3	78.6	114.8	151.1	187.3	223.6	259.9	296.1	332.4	8.7	44.9
20	12.1	48.3	84.6	120.9	157.1	193.4	229.7	265.9	302.2	338.4	14.7	51.0
30	18.1	54.4	90.7	126.9	163.2	199.4	235.7	272.0	308.2	344.5	20.7	57.0
40	24.2	60.4	96.7	133.0	169.2	205.5	241.7	278.0	314.3	350.5	26.8	63.0
50	30.2	66.5	102.7	139.0	175.3	211.5	247.8	284.0	320.3	356.6	32.8	69.1
60	36.3	72.5	108.8	145.0	181.3	217.6	253.8	290.1	326.4	2.6	38.9	75.1

Longitude of the meridian that transits at 0 U.T. and motion in °

TRANSITS OF THE RED SPOT OF JUPITER

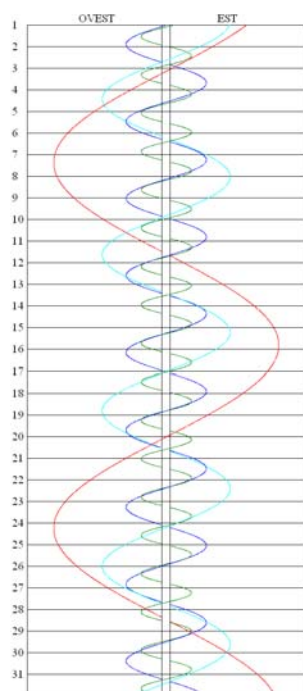
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Date	Times												
25/09/2009	09.24.4	19.20.1			28/10/2009	01.46.3	11.42.1	21.37.9		30/11/2009	04.10.1	14.05.9	
26/09/2009	05.15.8	15.11.5			29/10/2009	07.33.6	17.29.4			01/12/2009	00.01.8	09.57.6	19.53.4
27/09/2009	01.07.1	11.02.8	20.58.5		30/10/2009	03.25.1	13.20.9	23.16.7		02/12/2009	05.49.2	15.45.1	
28/09/2009	06.54.2	16.49.9			31/10/2009	09.12.5	19.08.2			03/12/2009	01.40.9	11.36.7	21.32.6
29/09/2009	02.45.5	12.41.2	22.36.9		01/11/2009	05.04.0	14.59.8			04/12/2009	07.28.4	17.24.2	
30/09/2009	08.32.6	18.28.3			02/11/2009	00.55.5	10.51.3	20.47.1		05/12/2009	03.20.1	13.15.9	23.11.7
01/10/2009	04.24.0	14.19.7			03/11/2009	06.42.9	16.38.7			06/12/2009	09.07.6	19.03.4	
02/10/2009	00.15.4	10.11.1	20.06.8		04/11/2009	02.34.4	12.30.2	22.26.0		07/12/2009	04.59.2	14.55.1	
03/10/2009	06.02.5	15.58.2			05/11/2009	08.21.8	18.17.6			08/12/2009	00.50.9	10.46.7	20.42.6
04/10/2009	01.53.9	11.49.6	21.45.3		06/11/2009	04.13.3	14.09.1			09/12/2009	06.38.4	16.34.2	
05/10/2009	07.41.0	17.36.7			07/11/2009	00.04.9	10.00.7	19.56.5		10/12/2009	02.30.1	12.25.9	22.21.8
06/10/2009	03.32.4	13.28.1	23.23.8		08/11/2009	05.52.3	15.48.1			11/12/2009	08.17.6	18.13.5	
07/10/2009	09.19.5	19.15.2			09/11/2009	01.43.9	11.39.6	21.35.4		12/12/2009	04.09.3	14.05.1	
08/10/2009	05.10.9	15.06.6			10/11/2009	07.31.2	17.27.0			13/12/2009	00.01.0	09.56.8	19.52.6
09/10/2009	01.02.3	10.58.1	20.53.8		11/11/2009	03.22.8	13.18.6	23.14.4		14/12/2009	05.48.5	15.44.3	
10/10/2009	06.49.5	16.45.2			12/11/2009	09.10.2	19.06.0			15/12/2009	01.40.2	11.36.0	21.31.9
11/10/2009	02.40.9	12.36.6	22.32.4		13/11/2009	05.01.8	14.57.6			16/12/2009	07.27.7	17.23.6	
12/10/2009	08.28.1	18.23.8			14/11/2009	00.53.4	10.49.2	20.45.0		17/12/2009	03.19.4	13.15.3	23.11.1
13/10/2009	04.19.5	14.15.3			15/11/2009	06.40.8	16.36.6			18/12/2009	09.06.9	19.02.8	
14/10/2009	00.11.0	10.06.7	20.02.4		16/11/2009	02.32.4	12.28.2	22.24.0		19/12/2009	04.58.6	14.54.5	
15/10/2009	05.58.2	15.53.9			17/11/2009	08.19.8	18.15.6			20/12/2009	00.50.3	10.46.2	20.42.0
16/10/2009	01.49.6	11.45.4	21.41.1		18/11/2009	04.11.4	14.07.2			21/12/2009	06.37.9	16.33.7	
17/10/2009	07.36.8	17.32.6			19/11/2009	00.03.0	09.58.9	19.54.7		22/12/2009	02.29.6	12.25.4	22.21.3
18/10/2009	03.28.3	13.24.0	23.19.8		20/11/2009	05.50.5	15.46.3			23/12/2009	08.17.1	18.13.0	
19/10/2009	09.15.5	19.11.3			21/11/2009	01.42.1	11.37.9	21.33.7		24/12/2009	04.08.8	14.04.7	
20/10/2009	05.07.0	15.02.8			22/11/2009	07.29.5	17.25.3			25/12/2009	00.00.5	09.56.4	19.52.2
21/10/2009	00.58.5	10.54.2	20.50.0		23/11/2009	03.21.2	13.17.0	23.12.8		26/12/2009	05.48.1	15.43.9	
22/10/2009	06.45.7	16.41.5			24/11/2009	09.08.6	19.04.4			27/12/2009	01.39.8	11.35.6	21.31.5
23/10/2009	02.37.2	12.33.0	22.28.7		25/11/2009	05.00.3	14.56.1			28/12/2009	07.27.3	17.23.2	
24/10/2009	08.24.5	18.20.3			26/11/2009	00.51.9	10.47.7	20.43.5		29/12/2009	03.19.0	13.14.9	23.10.7
25/10/2009	04.16.0	14.11.8			27/11/2009	06.39.4	16.35.2			30/12/2009	09.06.6	19.02.4	
26/10/2009	00.07.5	10.03.3	19.59.0		28/11/2009	02.31.0	12.26.8	22.22.6		31/12/2009	04.58.3	14.54.1	
27/10/2009	05.54.8	15.50.6			29/11/2009	08.18.5	18.14.3						

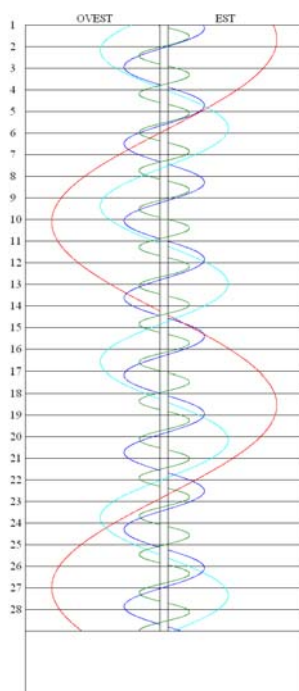
TIMES IN U.T.

POSITION OF THE SATELLITES OF JUPITER

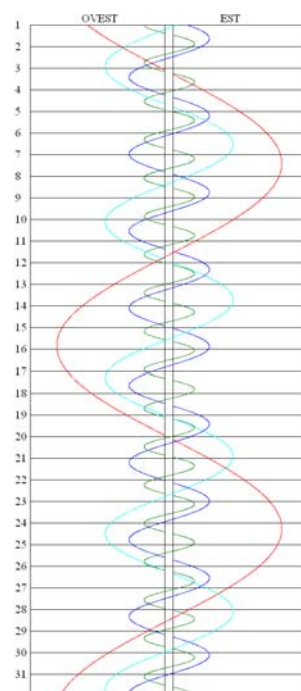
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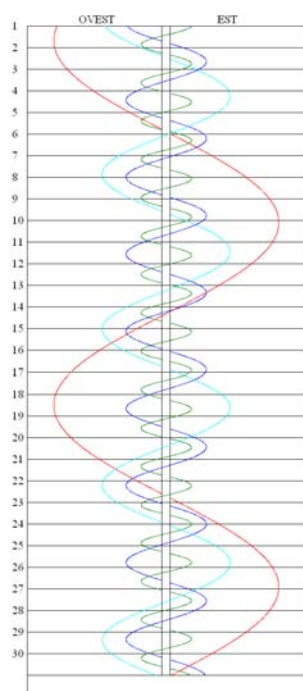
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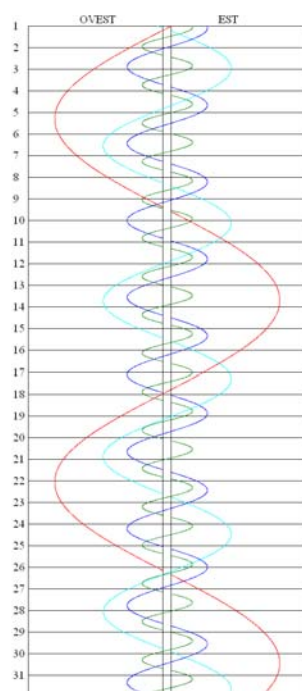
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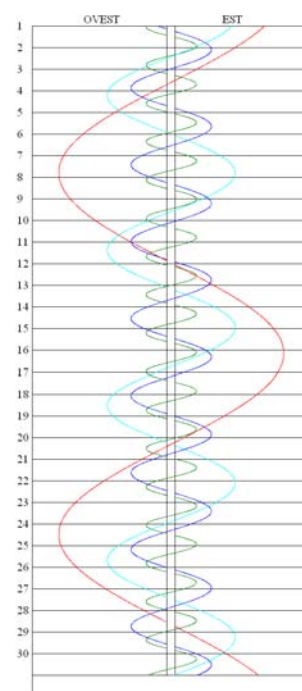
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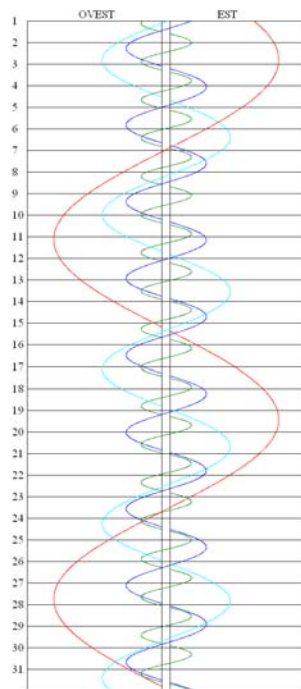


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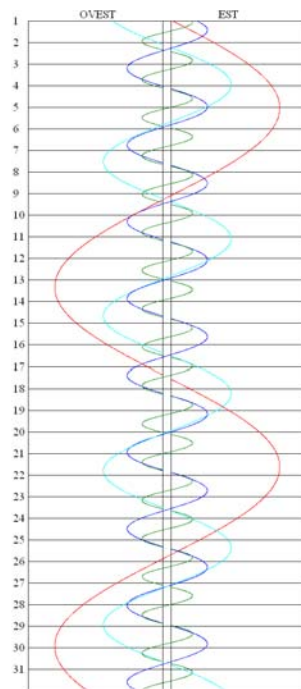


In green Io, in blue Europa, in blue light Ganymede, in red Callisto

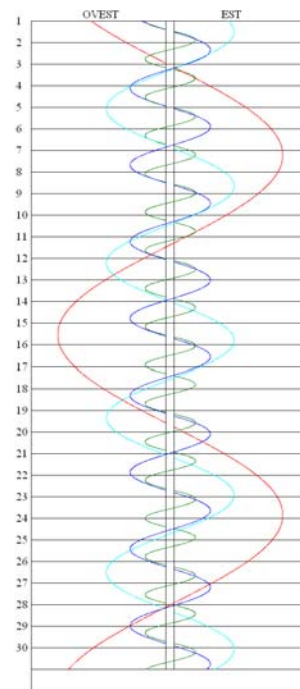
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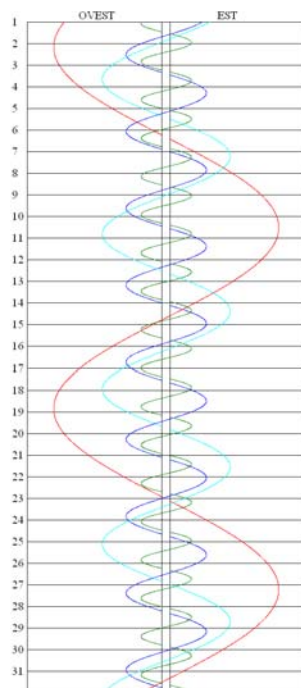
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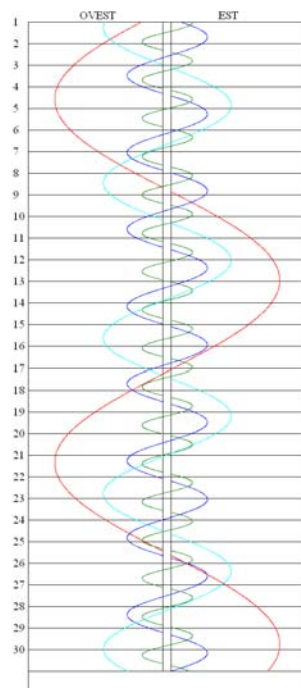
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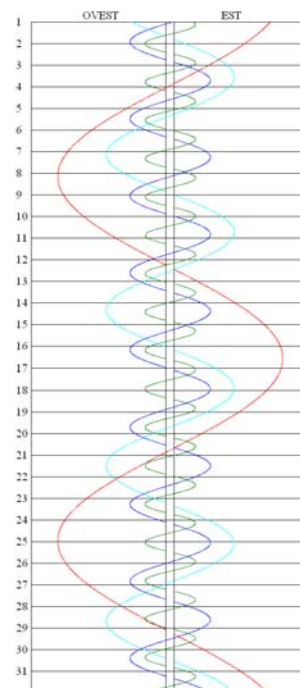
Oct



Nov



Dec



In green Io, in blue Europa, in blue light Ganymede, in red Callisto

EPHEMERIDES OF SATURN

Date	A.R. Geoc.	Dec. Geoc.	R A.U.	Distance A.U.	Light (m)	El. °	Diam. Eq."	Diam. Pol."	Mag.	Phase angle°	Max "	Min "	B °	Rise	Trans.	Set.
1-Jan	11h 32m 59.78s	+05° 08' 52.2"	9.367137	9.001902	74.87	108.9	18.4	16.4	0.9	5.7	41.7	0.6	-0.8	22.34	4.59	11.19
2-Jan	11h 32m 59.91s	+05° 09' 09.3"	9.367426	8.986268	74.74	109.9	18.4	16.4	0.9	5.7	41.8	0.6	-0.8	22.30	4.55	11.15
3-Jan	11h 32m 59.63s	+05° 09' 29.1"	9.367714	8.970736	74.61	111.0	18.4	16.5	0.9	5.6	41.8	0.6	-0.8	22.26	4.51	11.11
4-Jan	11h 32m 58.94s	+05° 09' 51.4"	9.368003	8.955312	74.48	112.0	18.5	16.5	0.9	5.6	41.9	0.6	-0.8	22.22	4.47	11.08
5-Jan	11h 32m 57.85s	+05° 10' 16.3"	9.368291	8.940001	74.35	113.0	18.5	16.5	0.9	5.5	42.0	0.6	-0.8	22.18	4.43	11.04
6-Jan	11h 32m 56.35s	+05° 10' 43.7"	9.368580	8.924808	74.23	114.0	18.5	16.5	0.9	5.5	42.1	0.6	-0.8	22.14	4.39	11.00
7-Jan	11h 32m 54.46s	+05° 11' 13.7"	9.368869	8.909738	74.10	115.1	18.6	16.6	0.9	5.5	42.1	0.6	-0.8	22.10	4.35	10.56
8-Jan	11h 32m 52.17s	+05° 11' 46.1"	9.369158	8.894795	73.98	116.1	18.6	16.6	0.9	5.4	42.2	0.6	-0.9	22.06	4.31	10.52
9-Jan	11h 32m 49.48s	+05° 12' 21.0"	9.369446	8.879985	73.85	117.1	18.6	16.6	0.9	5.4	42.3	0.6	-0.9	22.02	4.27	10.48
10-Jan	11h 32m 46.39s	+05° 12' 58.4"	9.369735	8.865312	73.73	118.2	18.7	16.7	0.9	5.3	42.3	0.6	-0.9	21.58	4.23	10.44
11-Jan	11h 32m 42.90s	+05° 13' 38.3"	9.370024	8.850781	73.61	119.2	18.7	16.7	0.9	5.3	42.4	0.7	-0.9	21.54	4.19	10.40
12-Jan	11h 32m 39.02s	+05° 14' 20.7"	9.370313	8.836396	73.49	120.2	18.7	16.7	0.9	5.2	42.5	0.7	-0.9	21.50	4.15	10.36
13-Jan	11h 32m 34.73s	+05° 15' 05.5"	9.370602	8.822161	73.37	121.3	18.8	16.7	0.9	5.1	42.5	0.7	-0.9	21.46	4.11	10.32
14-Jan	11h 32m 30.05s	+05° 15' 52.8"	9.370891	8.808082	73.25	122.3	18.8	16.8	0.9	5.1	42.6	0.7	-0.9	21.42	4.07	10.28
15-Jan	11h 32m 24.98s	+05° 16' 42.5"	9.371180	8.794163	73.14	123.4	18.8	16.8	0.8	5.0	42.7	0.7	-0.9	21.38	4.03	10.24
16-Jan	11h 32m 19.52s	+05° 17' 34.7"	9.371469	8.780408	73.02	124.4	18.8	16.8	0.8	5.0	42.7	0.7	-1.0	21.34	3.59	10.20
17-Jan	11h 32m 13.67s	+05° 18' 29.2"	9.371759	8.766824	72.91	125.5	18.9	16.8	0.8	4.9	42.8	0.7	-1.0	21.30	3.55	10.16
18-Jan	11h 32m 07.43s	+05° 19' 26.0"	9.372048	8.753415	72.80	126.5	18.9	16.9	0.8	4.8	42.9	0.7	-1.0	21.26	3.51	10.12
19-Jan	11h 32m 00.82s	+05° 20' 25.1"	9.372337	8.740185	72.69	127.5	18.9	16.9	0.8	4.8	42.9	0.8	-1.0	21.22	3.47	10.08
20-Jan	11h 31m 53.83s	+05° 21' 26.6"	9.372627	8.727140	72.58	128.6	19.0	16.9	0.8	4.7	43.0	0.8	-1.0	21.18	3.43	10.04
21-Jan	11h 31m 46.47s	+05° 22' 30.2"	9.372916	8.714285	72.47	129.7	19.0	16.9	0.8	4.6	43.1	0.8	-1.1	21.13	3.39	10.00
22-Jan	11h 31m 38.75s	+05° 23' 36.1"	9.373206	8.701625	72.37	130.7	19.0	17.0	0.8	4.6	43.1	0.8	-1.1	21.09	3.35	9.56
23-Jan	11h 31m 30.65s	+05° 24' 44.3"	9.373495	8.689164	72.27	131.8	19.0	17.0	0.8	4.5	43.2	0.8	-1.1	21.05	3.31	9.52
24-Jan	11h 31m 22.19s	+05° 25' 54.6"	9.373785	8.676907	72.16	132.8	19.1	17.0	0.8	4.4	43.3	0.8	-1.1	21.01	3.27	9.48
25-Jan	11h 31m 13.37s	+05° 27' 07.0"	9.374074	8.664860	72.06	133.9	19.1	17.0	0.8	4.3	43.3	0.9	-1.1	20.57	3.23	9.44
26-Jan	11h 31m 04.19s	+05° 28' 21.6"	9.374364	8.653026	71.96	134.9	19.1	17.1	0.8	4.3	43.4	0.9	-1.2	20.53	3.18	9.40
27-Jan	11h 30m 54.67s	+05° 29' 38.2"	9.374654	8.641411	71.87	136.0	19.2	17.1	0.8	4.2	43.4	0.9	-1.2	20.48	3.14	9.36
28-Jan	11h 30m 44.79s	+05° 30' 56.9"	9.374944	8.630018	71.77	137.1	19.2	17.1	0.8	4.1	43.5	0.9	-1.2	20.44	3.10	9.32
29-Jan	11h 30m 34.58s	+05° 32' 17.5"	9.375233	8.618853	71.68	138.1	19.2	17.1	0.8	4.0	43.5	0.9	-1.2	20.40	3.06	9.28
30-Jan	11h 30m 24.03s	+05° 33' 40.1"	9.375523	8.607919	71.59	139.2	19.2	17.2	0.8	3.9	43.6	1.0	-1.3	20.36	3.02	9.24
31-Jan	11h 30m 13.15s	+05° 35' 04.6"	9.375813	8.597221	71.50	140.2	19.3	17.2	0.7	3.9	43.7	1.0	-1.3	20.32	2.58	9.20
1-Feb	11h 30m 01.95s	+05° 36' 30.9"	9.376103	8.586763	71.41	141.3	19.3	17.2	0.7	3.8	43.7	1.0	-1.3	20.27	2.54	9.16
2-Feb	11h 29m 50.44s	+05° 37' 59.0"	9.376393	8.576547	71.33	142.4	19.3	17.2	0.7	3.7	43.8	1.0	-1.4	20.23	2.50	9.12
3-Feb	11h 29m 38.62s	+05° 39' 28.9"	9.376683	8.566579	71.25	143.4	19.3	17.2	0.7	3.6	43.8	1.1	-1.4	20.19	2.46	9.08
4-Feb	11h 29m 26.51s	+05° 41' 00.3"	9.376973	8.556861	71.16	144.5	19.3	17.3	0.7	3.5	43.9	1.1	-1.4	20.15	2.41	9.04
5-Feb	11h 29m 14.10s	+05° 42' 33.4"	9.377264	8.547397	71.09	145.6	19.4	17.3	0.7	3.4	43.9	1.1	-1.4	20.11	2.37	9.00
6-Feb	11h 29m 01.41s	+05° 44' 08.1"	9.377554	8.538190	71.01	146.6	19.4	17.3	0.7	3.3	44.0	1.1	-1.5	20.06	2.33	8.56
7-Feb	11h 28m 48.44s	+05° 45' 44.4"	9.377844	8.529243	70.94	147.7	19.4	17.3	0.7	3.2	44.0	1.2	-1.5	20.02	2.29	8.52
8-Feb	11h 28m 35.20s	+05° 47' 22.1"	9.378134	8.520558	70.86	148.8	19.4	17.3	0.7	3.1	44.1	1.2	-1.5	19.58	2.25	8.48
9-Feb	11h 28m 21.68s	+05° 49' 01.3"	9.378425	8.512139	70.79	149.9	19.4	17.3	0.7	3.0	44.1	1.2	-1.6	19.54	2.21	8.44
10-Feb	11h 28m 07.90s	+05° 50' 41.9"	9.378715	8.503989	70.73	150.9	19.5	17.4	0.7	2.9	44.1	1.2	-1.6	19.49	2.17	8.40
11-Feb	11h 27m 53.86s	+05° 52' 23.9"	9.379006	8.496110	70.66	152.0	19.5	17.4	0.7	2.8	44.2	1.3	-1.6	19.45	2.12	8.36
12-Feb	11h 27m 39.58s	+05° 54' 07.2"	9.379296	8.488505	70.60	153.1	19.5	17.4	0.7	2.7	44.2	1.3	-1.7	19.41	2.08	8.32
13-Feb	11h 27m 25.05s	+05° 55' 51.8"	9.379587	8.481177	70.54	154.1	19.5	17.4	0.7	2.6	44.3	1.3	-1.7	19.36	2.04	8.27
14-Feb	11h 27m 10.29s	+05° 57' 37.5"	9.379877	8.474129	70.48	155.2	19.5	17.4	0.6	2.5	44.3	1.3	-1.7	19.32	2.00	8.23
15-Feb	11h 26m 55.32s	+05° 59' 24.4"	9.380168	8.467364	70.42	156.3	19.5	17.4	0.6	2.4	44.3	1.4	-1.8	19.28	1.56	8.19
16-Feb	11h 26m 40.12s	+06° 01' 12.3"	9.380459	8.460885	70.37	157.4	19.6	17.5	0.6	2.3	44.4	1.4	-1.8	19.24	1.52	8.15
17-Feb	11h 26m 24.73s	+06° 03' 01.2"	9.380750	8.454694	70.32	158.4	19.6	17.5	0.6	2.2	44.4	1.4	-1.8	19.19	1.47	8.11
18-Feb	11h 26m 09.13s	+06° 04' 51.1"	9.381040	8.448794	70.27	159.5	19.6	17.5	0.6	2.1	44.4	1.5	-1.9	19.15	1.43	8.07
19-Feb	11h 25m 53.34s	+06° 06' 41.9"	9.381331	8.443187	70.22	160.6	19.6	17.5	0.6	2.0	44.5	1.5	-1.9	19.11	1.39	8.03
20-Feb	11h 25m 37.38s	+06° 08' 33.5"	9.381622	8.437877	70.18	161.7	19.6	17.5	0.6	1.9	44.5	1.5	-2.0	19.06	1.35	7.59
21-Feb	11h 25m 21.23s	+06° 10' 25.9"	9.381913	8.432865	70.13	162.7	19.6	17.5	0.6	1.8	44.5	1.5	-2.0	19.02	1.31	7.55
22-Feb	11h 25m 04.93s	+06° 12' 19.1"	9.382204	8.428153	70.09	163.8	19.6	17.5	0.6	1.7	44.5	1.6	-2.0	18.58	1.26	7.51
23-Feb	11h 24m 48.46s	+06° 14' 12.9"	9.382495	8.423744	70.06	164.9	19.6	17.5	0.6	1.6	44.6	1.6	-2.1	18.53	1.22	7.47
24-Feb	11h 24m 31.85s	+06° 16' 07.3"	9.382786	8.419639	70.02	166.0	19.7	17.5	0.6	1.5	44.6	1.6	-2.1	18.49	1.18	7.43
25-Feb	11h 24m 15.09s	+06° 18' 02.3"	9.383077	8.415840	69.99	167.0	19.7	17.5	0.6	1.4	44.6	1.7	-2.1	18.45	1.14	7.38
26-Feb	11h 23m 58.21s	+06° 19' 57.7"	9.383368	8.412348	69.96	168.1	19.7	17.6	0.6	1.2	44.6	1.7	-2.2	18.40	1.10	7.34
27-Feb	11h 23m 41.22s	+06° 21' 53.5"	9.383660	8.409166	69.94	169.2	19.7	17.6	0.6	1.1	44.6	1.7	-2.2	18.36	1.05	7.30
28-Feb	11h 23m 24.11s	+06° 23' 49.7"	9.383951	8.406293	69.91	170.2	19.7	17.6	0.5	1.0	44.7	1.8	-2.3	18.32	1.01	7.26
1-Mar	11h 23m 06.92s	+06° 25' 46.0"	9.384242	8.403731	69.89	171.3	19.7	17.6	0.5	0.9	44.7	1.8	-2.3	18.27	0.57	7.22
2-Mar	11h 22m 49.64s	+06° 27' 42.5"	9.384534	8.401481	69.87	172.3	19.7	17.6	0.5	0.8	44.7	1.8	-2.3	18.23	0.53	7.18
3-Mar	11h 22m 32.28s	+06° 29' 39.1"	9.384825	8.399543	69.86	173.3	19.7	17.6	0.5	0.7	44.7	1.8	-2.4	18.19	0.48	7.14
4-Mar	11h 22m 14.87s	+06° 31' 35.8"	9.385116	8.397917	69.84	174.3	19.7	17.6	0.5	0.6	44.7	1.9	-2.4	18.14	0.44	7.10
5-Mar	11h 21m 57.40s	+06° 33' 32.4"	9.385408	8.396604	69.83	175.3	19.7	17.6	0.5	0.5	44.7	1.9	-2.4	18.10	0.40	7.06
6-Mar	11h 21m 39.89s	+06° 35' 28.9"	9.385699	8.395603	69.82	176.2	19.7	17.6	0.5	0.4	44.7	1.9	-2.5	18.06	0.36	7.02
7-Mar	11h 21m 22.34s	+06° 37' 25.3"	9.385991	8.394914	69.82	177.0	19.7	17.6	0.5	0.3	44.7	2.0	-2.5	18.01	0.32	6.57
8-Mar	11h 21m 04.77s	+06° 39' 21.5"	9.386283	8.394537	69.82	177.5	19.7	17.6	0.5	0.3	44.7	2.0	-2.6			

Date	A.R. Geoc.	Dec. Geoc.	R A.U.	Distance A.U.	Light (m)	El. °	Diam. Eq."	Diam. Pol."	Mag.	Phase angle°	Max "	Min "	B °	Rise	Trans.	Set.
14-Mar	11h 19m 19.23s	+06° 50' 51.5"	9.388033	8.398808	69.85	174.0	19.7	17.6	0.5	0.6	44.7	2.2	-2.8	17.31	0.02	6.29
15-Mar	11h 19m 01.72s	+06° 52' 44.6"	9.388325	8.400605	69.87	173.0	19.7	17.6	0.5	0.7	44.7	2.2	-2.8	17.27	23.54	6.25
16-Mar	11h 18m 44.27s	+06° 54' 37.1"	9.388617	8.402710	69.88	171.9	19.7	17.6	0.5	0.9	44.7	2.2	-2.9	17.22	23.49	6.20
17-Mar	11h 18m 26.87s	+06° 56' 28.9"	9.388909	8.405123	69.90	170.9	19.7	17.6	0.5	1.0	44.7	2.3	-2.9	17.18	23.45	6.16
18-Mar	11h 18m 09.55s	+06° 58' 19.8"	9.389201	8.407843	69.93	169.9	19.7	17.6	0.5	1.1	44.6	2.3	-2.9	17.14	23.41	6.12
19-Mar	11h 17m 52.30s	+07° 00' 09.9"	9.389494	8.410870	69.95	168.8	19.7	17.6	0.5	1.2	44.6	2.3	-3.0	17.09	23.37	6.08
20-Mar	11h 17m 35.14s	+07° 01' 59.0"	9.389786	8.414202	69.98	167.8	19.7	17.6	0.5	1.3	44.6	2.3	-3.0	17.05	23.32	6.04
21-Mar	11h 17m 18.08s	+07° 03' 47.3"	9.390078	8.417838	70.01	166.7	19.7	17.5	0.5	1.4	44.6	2.4	-3.1	17.01	23.28	6.00
22-Mar	11h 17m 01.11s	+07° 05' 34.5"	9.390370	8.421777	70.04	165.7	19.7	17.5	0.5	1.5	44.6	2.4	-3.1	16.56	23.24	5.56
23-Mar	11h 16m 44.27s	+07° 07' 20.6"	9.390663	8.426017	70.08	164.6	19.6	17.5	0.5	1.6	44.5	2.4	-3.1	16.52	23.20	5.52
24-Mar	11h 16m 27.54s	+07° 09' 05.6"	9.390955	8.430557	70.11	163.6	19.6	17.5	0.5	1.7	44.5	2.5	-3.2	16.48	23.16	5.48
25-Mar	11h 16m 10.94s	+07° 10' 49.4"	9.391247	8.435395	70.15	162.5	19.6	17.5	0.5	1.8	44.5	2.5	-3.2	16.43	23.11	5.44
26-Mar	11h 15m 54.49s	+07° 12' 32.0"	9.391540	8.440529	70.20	161.4	19.6	17.5	0.5	1.9	44.5	2.5	-3.2	16.39	23.07	5.39
27-Mar	11h 15m 38.19s	+07° 14' 13.2"	9.391832	8.445957	70.24	160.4	19.6	17.5	0.5	2.0	44.4	2.5	-3.3	16.35	23.03	5.35
28-Mar	11h 15m 22.05s	+07° 15' 53.1"	9.392125	8.451676	70.29	159.3	19.6	17.5	0.6	2.1	44.4	2.6	-3.3	16.31	22.59	5.31
29-Mar	11h 15m 06.09s	+07° 17' 31.5"	9.392417	8.457685	70.34	158.3	19.6	17.5	0.6	2.3	44.4	2.6	-3.3	16.26	22.55	5.27
30-Mar	11h 14m 50.32s	+07° 19' 08.4"	9.392710	8.463981	70.39	157.2	19.6	17.4	0.6	2.4	44.3	2.6	-3.4	16.22	22.50	5.23
31-Mar	11h 14m 34.73s	+07° 20' 43.7"	9.393003	8.470560	70.45	156.2	19.5	17.4	0.6	2.5	44.3	2.6	-3.4	16.18	22.46	5.19
1-Apr	11h 14m 19.35s	+07° 22' 17.5"	9.393295	8.477419	70.50	155.1	19.5	17.4	0.6	2.6	44.3	2.6	-3.4	16.13	22.42	5.15
2-Apr	11h 14m 04.17s	+07° 23' 49.6"	9.393588	8.484556	70.56	154.1	19.5	17.4	0.6	2.7	44.2	2.7	-3.5	16.09	22.38	5.11
3-Apr	11h 13m 49.21s	+07° 25' 20.1"	9.393881	8.491967	70.63	153.0	19.5	17.4	0.6	2.8	44.2	2.7	-3.5	16.05	22.34	5.07
4-Apr	11h 13m 34.46s	+07° 26' 48.9"	9.394174	8.499649	70.69	152.0	19.5	17.4	0.6	2.9	44.2	2.7	-3.5	16.01	22.30	5.03
5-Apr	11h 13m 19.94s	+07° 28' 16.0"	9.394466	8.507599	70.76	150.9	19.5	17.4	0.6	3.0	44.1	2.7	-3.5	15.56	22.25	4.59
6-Apr	11h 13m 05.65s	+07° 29' 41.4"	9.394759	8.515812	70.82	149.9	19.4	17.3	0.6	3.1	44.1	2.7	-3.6	15.52	22.21	4.54
7-Apr	11h 12m 51.60s	+07° 31' 04.9"	9.395052	8.524287	70.89	148.8	19.4	17.3	0.6	3.2	44.0	2.8	-3.6	15.48	22.17	4.50
8-Apr	11h 12m 37.80s	+07° 32' 26.6"	9.395345	8.533019	70.97	147.8	19.4	17.3	0.6	3.3	44.0	2.8	-3.6	15.44	22.13	4.46
9-Apr	11h 12m 24.25s	+07° 33' 46.4"	9.395638	8.542006	71.04	146.8	19.4	17.3	0.6	3.4	43.9	2.8	-3.7	15.39	22.09	4.42
10-Apr	11h 12m 10.96s	+07° 35' 04.3"	9.395931	8.551243	71.12	145.7	19.4	17.3	0.6	3.4	43.9	2.8	-3.7	15.35	22.05	4.38
11-Apr	11h 11m 57.94s	+07° 36' 20.2"	9.396224	8.560729	71.20	144.7	19.3	17.3	0.6	3.5	43.8	2.8	-3.7	15.31	22.00	4.34
12-Apr	11h 11m 45.20s	+07° 37' 34.1"	9.396518	8.570459	71.28	143.6	19.3	17.2	0.6	3.6	43.8	2.9	-3.7	15.27	21.56	4.30
13-Apr	11h 11m 32.74s	+07° 38' 46.0"	9.396811	8.580431	71.36	142.6	19.3	17.2	0.6	3.7	43.7	2.9	-3.8	15.23	21.52	4.26
14-Apr	11h 11m 20.57s	+07° 39' 55.8"	9.397104	8.590640	71.45	141.6	19.3	17.2	0.6	3.8	43.7	2.9	-3.8	15.18	21.48	4.22
15-Apr	11h 11m 08.69s	+07° 41' 03.6"	9.397397	8.601085	71.53	140.5	19.2	17.2	0.6	3.9	43.6	2.9	-3.8	15.14	21.44	4.18
16-Apr	11h 10m 57.11s	+07° 42' 09.3"	9.397691	8.611760	71.62	139.5	19.2	17.1	0.6	4.0	43.6	2.9	-3.8	15.10	21.40	4.14
17-Apr	11h 10m 45.83s	+07° 43' 12.8"	9.397984	8.622662	71.71	138.5	19.2	17.1	0.6	4.1	43.5	2.9	-3.8	15.06	21.36	4.10
18-Apr	11h 10m 34.85s	+07° 44' 14.2"	9.398277	8.633789	71.81	137.5	19.2	17.1	0.7	4.1	43.5	2.9	-3.9	15.02	21.32	4.06
19-Apr	11h 10m 24.19s	+07° 45' 13.4"	9.398571	8.645135	71.90	136.4	19.1	17.1	0.7	4.2	43.4	2.9	-3.9	14.57	21.27	4.02
20-Apr	11h 10m 13.84s	+07° 46' 10.5"	9.398864	8.656698	72.00	135.4	19.1	17.1	0.7	4.3	43.4	3.0	-3.9	14.53	21.23	3.58
21-Apr	11h 10m 03.81s	+07° 47' 05.3"	9.399158	8.668473	72.09	134.4	19.1	17.0	0.7	4.4	43.3	3.0	-3.9	14.49	21.19	3.54
22-Apr	11h 09m 54.11s	+07° 47' 57.8"	9.399451	8.680456	72.19	133.4	19.1	17.0	0.7	4.5	43.2	3.0	-3.9	14.45	21.15	3.50
23-Apr	11h 09m 44.75s	+07° 48' 48.0"	9.399745	8.692643	72.29	132.4	19.0	17.0	0.7	4.5	43.2	3.0	-4.0	14.41	21.11	3.45
24-Apr	11h 09m 35.72s	+07° 49' 35.9"	9.400039	8.705030	72.40	131.4	19.0	17.0	0.7	4.6	43.1	3.0	-4.0	14.37	21.07	3.41
25-Apr	11h 09m 27.04s	+07° 50' 21.5"	9.400332	8.717613	72.50	130.4	19.0	16.9	0.7	4.7	43.1	3.0	-4.0	14.33	21.03	3.37
26-Apr	11h 09m 18.71s	+07° 51' 04.6"	9.400626	8.730386	72.61	129.3	19.0	16.9	0.7	4.7	43.0	3.0	-4.0	14.28	20.59	3.33
27-Apr	11h 09m 10.73s	+07° 51' 45.4"	9.400920	8.743345	72.72	128.3	18.9	16.9	0.7	4.8	42.9	3.0	-4.0	14.24	20.55	3.29
28-Apr	11h 09m 03.12s	+07° 52' 23.7"	9.401214	8.756486	72.83	127.3	18.9	16.9	0.7	4.9	42.9	3.0	-4.0	14.20	20.51	3.25
29-Apr	11h 08m 55.86s	+07° 52' 59.7"	9.401507	8.769804	72.94	126.3	18.9	16.8	0.7	5.0	42.8	3.0	-4.1	14.16	20.47	3.21
30-Apr	11h 08m 48.97s	+07° 53' 33.2"	9.401801	8.783292	73.05	125.3	18.8	16.8	0.7	5.0	42.7	3.0	-4.1	14.12	20.43	3.17
1-May	11h 08m 42.44s	+07° 54' 04.3"	9.402095	8.796948	73.16	124.3	18.8	16.8	0.7	5.1	42.7	3.0	-4.1	14.08	20.39	3.13
2-May	11h 08m 36.27s	+07° 54' 33.0"	9.402389	8.810765	73.28	123.3	18.8	16.8	0.7	5.1	42.6	3.0	-4.1	14.04	20.35	3.09
3-May	11h 08m 30.47s	+07° 54' 59.3"	9.402683	8.824740	73.39	122.3	18.8	16.7	0.7	5.2	42.5	3.0	-4.1	14.00	20.31	3.05
4-May	11h 08m 25.03s	+07° 55' 23.2"	9.402977	8.838867	73.51	121.4	18.7	16.7	0.7	5.3	42.5	3.0	-4.1	13.56	20.27	3.01
5-May	11h 08m 19.97s	+07° 55' 44.6"	9.403271	8.853141	73.63	120.4	18.7	16.7	0.7	5.3	42.4	3.0	-4.1	13.52	20.23	2.57
6-May	11h 08m 15.28s	+07° 56' 03.6"	9.403566	8.867559	73.75	119.4	18.7	16.7	0.8	5.4	42.3	3.0	-4.1	13.48	20.19	2.53
7-May	11h 08m 10.96s	+07° 56' 20.1"	9.403860	8.882116	73.87	118.4	18.6	16.6	0.8	5.4	42.3	3.0	-4.1	13.44	20.15	2.49
8-May	11h 08m 07.03s	+07° 56' 34.1"	9.404154	8.896807	73.99	117.4	18.6	16.6	0.8	5.5	42.2	3.0	-4.1	13.40	20.11	2.45
9-May	11h 08m 03.47s	+07° 56' 45.7"	9.404448	8.911628	74.12	116.4	18.6	16.6	0.8	5.5	42.1	3.0	-4.1	13.36	20.07	2.41
10-May	11h 08m 00.30s	+07° 56' 54.8"	9.404742	8.926575	74.24	115.4	18.5	16.5	0.8	5.6	42.0	3.0	-4.1	13.32	20.03	2.37
11-May	11h 07m 57.51s	+07° 57' 01.4"	9.405037	8.941643	74.37	114.5	18.5	16.5	0.8	5.6	42.0	3.0	-4.1	13.28	19.59	2.33
12-May	11h 07m 55.10s	+07° 57' 05.6"	9.405331	8.956829	74.49	113.5	18.5	16.5	0.8	5.7	41.9	3.0	-4.1	13.24	19.55	2.29
13-May	11h 07m 53.08s	+07° 57' 07.3"	9.405626	8.972127	74.62	112.5	18.4	16.5	0.8	5.7	41.8	3.0	-4.1	13.20	19.51	2.25
14-May	11h 07m 51.44s	+07° 57' 06.5"	9.405920	8.987533	74.75	111.6	18.4	16.4	0.8	5.7	41.8	3.0	-4.1	13.16	19.47	2.22
15-May	11h 07m 50.18s	+07° 57' 03.3"	9.406214	9.003044	74.88	110.6	18.4	16.4	0.8	5.8	41.7	3.0	-4.1	13.12	19.43	2.18
16-May	11h 07m 49.30s	+07° 56' 57.7"	9.406509	9.018654	75.01	109.6	18.4	16.4	0.8	5.8	41.6	3.0	-4.1	13.08	19.39	2.14
17-May	11h 07m 48.80s	+07° 56' 49.6"	9.406804	9.034360	75.14	108.7	18.3	16.3	0.8	5.8	41.5	3.0	-4.1	13.04	19.35	2.10
18-May	11h 07m 48.69s	+07° 56' 39.0"	9.407098	9.050156	75.27	107.7	18.3	16.3	0.8	5.9	41.5	3.0	-4.1	13.00	19.31	2.06
19-May	11h 07m 48.96s	+07° 56' 26.1"	9.407393	9.066038	75.40	106.7	18.3	16.3	0.8	5.9	41.4	3.0	-4			

Date	A.R. Geoc.	Dec. Geoc.	R A.U.	Distance A.U.	Light (m)	El. °	Diam. Eq."	Diam. Pol."	Mag.	Phase angle°	Max "	Min "	B °	Rise	Trans.	Set.
30-May	11h 08m 17.55s	+07° 51' 21.3"	9.410636	9.245068	76.89	96.3	17.9	16.0	0.9	6.1	40.6	2.9	-4.0	12.14	18.44	1.19
31-May	11h 08m 22.45s	+07° 50' 39.2"	9.410931	9.261609	77.03	95.4	17.9	15.9	0.9	6.2	40.5	2.8	-4.0	12.10	18.41	1.15
1-Jun	11h 08m 27.71s	+07° 49' 54.8"	9.411227	9.278174	77.16	94.4	17.8	15.9	0.9	6.2	40.5	2.8	-4.0	12.06	18.37	1.11
2-Jun	11h 08m 33.36s	+07° 49' 08.0"	9.411522	9.294758	77.30	93.5	17.8	15.9	0.9	6.2	40.4	2.8	-4.0	12.03	18.33	1.07
3-Jun	11h 08m 39.37s	+07° 48' 19.0"	9.411817	9.311357	77.44	92.6	17.8	15.9	0.9	6.2	40.3	2.8	-4.0	11.59	18.29	1.03
4-Jun	11h 08m 45.76s	+07° 47' 27.6"	9.412112	9.327967	77.58	91.7	17.7	15.8	0.9	6.2	40.2	2.8	-4.0	11.55	18.25	0.99
5-Jun	11h 08m 52.52s	+07° 46' 34.0"	9.412408	9.344584	77.72	90.7	17.7	15.8	0.9	6.2	40.2	2.8	-3.9	11.51	18.21	0.95
6-Jun	11h 08m 59.64s	+07° 45' 38.0"	9.412703	9.361203	77.85	89.8	17.7	15.8	0.9	6.2	40.1	2.7	-3.9	11.47	18.18	0.92
7-Jun	11h 09m 07.14s	+07° 44' 39.8"	9.412998	9.377820	77.99	88.9	17.6	15.7	0.9	6.2	40.0	2.7	-3.9	11.44	18.14	0.88
8-Jun	11h 09m 14.99s	+07° 43' 39.4"	9.413294	9.394432	78.13	88.0	17.6	15.7	0.9	6.2	40.0	2.7	-3.9	11.40	18.10	0.84
9-Jun	11h 09m 23.21s	+07° 42' 36.7"	9.413589	9.411035	78.27	87.1	17.6	15.7	0.9	6.2	39.9	2.7	-3.9	11.36	18.06	0.80
10-Jun	11h 09m 31.78s	+07° 41' 31.9"	9.413885	9.427625	78.41	86.1	17.6	15.7	0.9	6.2	39.8	2.7	-3.9	11.33	18.02	0.76
11-Jun	11h 09m 40.71s	+07° 40' 24.9"	9.414180	9.444197	78.55	85.2	17.5	15.6	0.9	6.2	39.7	2.7	-3.8	11.29	17.99	0.72
12-Jun	11h 09m 49.99s	+07° 39' 15.7"	9.414476	9.460748	78.68	84.3	17.5	15.6	0.9	6.2	39.7	2.6	-3.8	11.25	17.95	0.68
13-Jun	11h 09m 59.62s	+07° 38' 04.4"	9.414771	9.477274	78.82	83.4	17.5	15.6	0.9	6.2	39.6	2.6	-3.8	11.21	17.91	0.64
14-Jun	11h 10m 09.59s	+07° 36' 51.0"	9.415067	9.493771	78.96	82.5	17.4	15.6	0.9	6.1	39.5	2.6	-3.8	11.18	17.87	0.60
15-Jun	11h 10m 19.91s	+07° 35' 35.4"	9.415363	9.510235	79.09	81.6	17.4	15.5	0.9	6.1	39.5	2.6	-3.7	11.14	17.83	0.56
16-Jun	11h 10m 30.57s	+07° 34' 17.8"	9.415658	9.526662	79.23	80.7	17.4	15.5	0.9	6.1	39.4	2.5	-3.7	11.10	17.79	0.52
17-Jun	11h 10m 41.57s	+07° 32' 58.0"	9.415954	9.543048	79.37	79.8	17.3	15.5	1.0	6.1	39.3	2.5	-3.7	11.07	17.76	0.48
18-Jun	11h 10m 52.91s	+07° 31' 36.2"	9.416250	9.559389	79.50	78.9	17.3	15.4	1.0	6.1	39.3	2.5	-3.7	11.03	17.72	0.44
19-Jun	11h 11m 04.59s	+07° 30' 12.2"	9.416546	9.575681	79.64	78.0	17.3	15.4	1.0	6.1	39.2	2.5	-3.6	10.99	17.68	0.40
20-Jun	11h 11m 16.61s	+07° 28' 46.2"	9.416842	9.591920	79.77	77.1	17.3	15.4	1.0	6.0	39.1	2.5	-3.6	10.96	17.64	0.36
21-Jun	11h 11m 28.97s	+07° 27' 18.1"	9.417137	9.608101	79.91	76.2	17.2	15.4	1.0	6.0	39.1	2.4	-3.6	10.92	17.60	0.32
22-Jun	11h 11m 41.66s	+07° 25' 48.0"	9.417433	9.624221	80.04	75.3	17.2	15.3	1.0	6.0	39.0	2.4	-3.5	10.89	17.56	0.28
23-Jun	11h 11m 54.68s	+07° 24' 15.9"	9.417729	9.640274	80.18	74.4	17.2	15.3	1.0	6.0	38.9	2.4	-3.5	10.85	17.52	0.24
24-Jun	11h 12m 08.03s	+07° 22' 41.9"	9.418025	9.656257	80.31	73.5	17.1	15.3	1.0	5.9	38.9	2.4	-3.5	10.81	17.48	0.20
25-Jun	11h 12m 21.69s	+07° 21' 05.9"	9.418321	9.672165	80.44	72.6	17.1	15.3	1.0	5.9	38.8	2.3	-3.4	10.78	17.44	0.16
26-Jun	11h 12m 35.66s	+07° 19' 28.0"	9.418618	9.687995	80.57	71.7	17.1	15.2	1.0	5.9	38.7	2.3	-3.4	10.74	17.40	0.12
27-Jun	11h 12m 49.43s	+07° 17' 48.3"	9.418914	9.703743	80.70	70.8	17.1	15.2	1.0	5.9	38.7	2.3	-3.4	10.70	17.36	0.08
28-Jun	11h 13m 04.53s	+07° 16' 06.7"	9.419210	9.719404	80.83	69.9	17.0	15.2	1.0	5.8	38.6	2.3	-3.3	10.67	17.32	0.04
29-Jun	11h 13m 19.42s	+07° 14' 23.2"	9.419506	9.734975	80.96	69.1	17.0	15.2	1.0	5.8	38.6	2.2	-3.3	10.63	17.28	0.00
30-Jun	11h 13m 34.62s	+07° 12' 37.9"	9.419802	9.750453	81.09	68.2	17.0	15.1	1.0	5.7	38.5	2.2	-3.3	10.60	17.24	0.00
1-Jul	11h 13m 50.11s	+07° 10' 50.8"	9.420099	9.765835	81.22	67.3	16.9	15.1	1.0	5.7	38.4	2.2	-3.2	10.56	17.20	0.00
2-Jul	11h 14m 05.90s	+07° 09' 01.9"	9.420395	9.781116	81.35	66.4	16.9	15.1	1.0	5.7	38.4	2.1	-3.2	10.53	17.16	0.00
3-Jul	11h 14m 21.99s	+07° 07' 11.2"	9.420691	9.796295	81.47	65.5	16.9	15.1	1.0	5.6	38.3	2.1	-3.2	10.49	17.12	0.00
4-Jul	11h 14m 38.36s	+07° 05' 18.8"	9.420988	9.811367	81.60	64.7	16.9	15.1	1.0	5.6	38.3	2.1	-3.1	10.46	17.08	0.00
5-Jul	11h 14m 55.02s	+07° 03' 24.6"	9.421284	9.826330	81.72	63.8	16.8	15.0	1.0	5.6	38.2	2.1	-3.1	10.42	17.04	0.00
6-Jul	11h 15m 11.96s	+07° 01' 28.8"	9.421580	9.841180	81.85	62.9	16.8	15.0	1.0	5.5	38.1	2.0	-3.1	10.39	17.00	0.00
7-Jul	11h 15m 29.18s	+06° 59' 31.3"	9.421877	9.855915	81.97	62.0	16.8	15.0	1.0	5.5	38.1	2.0	-3.0	10.35	16.96	0.00
8-Jul	11h 15m 46.67s	+06° 57' 32.2"	9.422173	9.870532	82.09	61.2	16.8	15.0	1.0	5.4	38.0	2.0	-3.0	10.32	16.92	0.00
9-Jul	11h 16m 04.43s	+06° 55' 31.4"	9.422470	9.885028	82.21	60.3	16.7	14.9	1.0	5.4	38.0	1.9	-2.9	10.28	16.88	0.00
10-Jul	11h 16m 22.45s	+06° 53' 29.1"	9.422767	9.899400	82.33	59.4	16.7	14.9	1.0	5.3	37.9	1.9	-2.9	10.24	16.84	0.00
11-Jul	11h 16m 40.74s	+06° 51' 25.2"	9.423063	9.913644	82.45	58.5	16.7	14.9	1.1	5.3	37.9	1.9	-2.9	10.21	16.80	0.00
12-Jul	11h 16m 59.28s	+06° 49' 19.7"	9.423360	9.927758	82.57	57.7	16.7	14.9	1.1	5.2	37.8	1.9	-2.8	10.17	16.76	0.00
13-Jul	11h 17m 18.08s	+06° 47' 12.7"	9.423657	9.941739	82.68	56.8	16.6	14.9	1.1	5.2	37.8	1.8	-2.8	10.14	16.72	0.00
14-Jul	11h 17m 37.13s	+06° 45' 04.2"	9.423953	9.955584	82.80	55.9	16.6	14.8	1.1	5.1	37.7	1.8	-2.7	10.10	16.68	0.00
15-Jul	11h 17m 56.43s	+06° 42' 54.1"	9.424250	9.969290	82.91	55.1	16.6	14.8	1.1	5.1	37.7	1.8	-2.7	10.07	16.64	0.00
16-Jul	11h 18m 15.99s	+06° 40' 42.5"	9.424547	9.982853	83.02	54.2	16.6	14.8	1.1	5.0	37.6	1.7	-2.6	10.03	16.60	0.00
17-Jul	11h 18m 35.79s	+06° 38' 29.5"	9.424844	9.996271	83.14	53.3	16.6	14.8	1.1	5.0	37.5	1.7	-2.6	10.00	16.56	0.00
18-Jul	11h 18m 55.83s	+06° 36' 14.9"	9.425141	10.009541	83.25	52.5	16.5	14.8	1.1	4.9	37.5	1.7	-2.6	9.96	16.52	0.00
19-Jul	11h 19m 16.12s	+06° 33' 59.0"	9.425438	10.022659	83.36	51.6	16.5	14.7	1.1	4.8	37.4	1.6	-2.5	9.93	16.48	0.00
20-Jul	11h 19m 36.65s	+06° 31' 41.6"	9.425735	10.035622	83.46	50.8	16.5	14.7	1.1	4.8	37.4	1.6	-2.5	9.89	16.44	0.00
21-Jul	11h 19m 57.40s	+06° 29' 22.8"	9.426032	10.048427	83.57	49.9	16.5	14.7	1.1	4.7	37.4	1.6	-2.4	9.86	16.40	0.00
22-Jul	11h 20m 18.39s	+06° 27' 02.7"	9.426329	10.061071	83.68	49.0	16.5	14.7	1.1	4.7	37.3	1.5	-2.4	9.82	16.36	0.00
23-Jul	11h 20m 39.59s	+06° 24' 41.3"	9.426626	10.073550	83.78	48.2	16.4	14.7	1.1	4.6	37.3	1.5	-2.3	9.79	16.32	0.00
24-Jul	11h 21m 01.00s	+06° 22' 18.6"	9.426923	10.085863	83.88	47.3	16.4	14.6	1.1	4.5	37.2	1.5	-2.3	9.75	16.28	0.00
25-Jul	11h 21m 22.63s	+06° 19' 54.7"	9.427220	10.098005	83.98	46.5	16.4	14.6	1.1	4.5	37.2	1.4	-2.2	9.72	16.24	0.00
26-Jul	11h 21m 44.46s	+06° 17' 29.5"	9.427517	10.109974	84.08	45.6	16.4	14.6	1.1	4.4	37.1	1.4	-2.2	9.68	16.20	0.00
27-Jul	11h 22m 06.50s	+06° 15' 03.1"	9.427814	10.121768	84.18	44.8	16.4	14.6	1.1	4.3	37.1	1.4	-2.1	9.65	16.16	0.00
28-Jul	11h 22m 28.75s	+06° 12' 35.5"	9.428111	10.133385	84.28	43.9	16.3	14.6	1.1	4.3	37.0	1.4	-2.1	9.61	16.12	0.00
29-Jul	11h 22m 51.19s	+06° 10' 06.8"	9.428409	10.144821	84.37	43.1	16.3	14.6	1.1	4.2	37.0	1.3	-2.0	9.58	16.08	0.00
30-Jul	11h 23m 13.83s	+06° 07' 36.8"	9.428706	10.156077	84.47	42.2	16.3	14.5	1.1	4.1	37.0	1.3	-2.0	9.54	16.04	0.00
31-Jul	11h 23m 36.67s	+06° 05' 05.8"	9.429003	10.167148	84.56	41.3	16.3	14.5	1.1	4.1	36.9	1.3	-1.9	9.51	16.00	0.00
1-Aug	11h 23m 59.69s	+06° 02' 33.6"	9.429301	10.178033	84.65	40.5	16.3	14.5	1.1	4.0	36.9	1.2	-1.9	9.47	15.96	0.00
2-Aug	11h 24m 22.89s	+06° 00' 00.4"	9.429598	10.188730	84.74	39.6	16.2	14.5	1.1	3.9	36.8	1.2	-1.8	9.44	15.92	0.00
3-Aug	11h 24m 46.27s	+05° 57' 26.1"	9.429895	10.199238	84.82	38.8	16.2	14.5	1.1	3.9	36.8	1.1	-1.8	9.40	15.88	0.00
4-Aug	11h 25m 09.83s	+05° 54' 50.8"	9.430193	10.209554	84.91	38.0	16.2	14.5	1.1	3.8	36.8	1.1	-1.7	9.37	15.84	0.00
5-Aug	11h 25m 33.56s	+05°														

Date	A.R. Geoc.	Dec. Geoc.	R A.U.	Distance A.U.	Light (m)	El. °	Diam. Eq."	Diam. Pol."	Mag.	Phase angle°	Max "	Min "	B °	Rise	Trans.	Set.
15-Aug	11h 29m 39.43s	+05° 25' 22.1"	9.433467	10.309839	85.74	28.6	16.1	14.3	1.1	2.9	36.4	0.7	-1.2	7.41	14.03	20.25
16-Aug	11h 30m 04.82s	+05° 22' 36.3"	9.433765	10.317706	85.81	27.8	16.0	14.3	1.1	2.9	36.4	0.7	-1.1	7.38	14.00	20.21
17-Aug	11h 30m 30.34s	+05° 19' 49.7"	9.434062	10.325357	85.87	27.0	16.0	14.3	1.1	2.8	36.4	0.7	-1.0	7.35	13.56	20.17
18-Aug	11h 30m 55.99s	+05° 17' 02.4"	9.434360	10.332789	85.94	26.1	16.0	14.3	1.1	2.7	36.3	0.6	-1.0	7.31	13.53	20.14
19-Aug	11h 31m 21.75s	+05° 14' 14.5"	9.434658	10.340000	86.00	25.3	16.0	14.3	1.1	2.6	36.3	0.6	-0.9	7.28	13.49	20.10
20-Aug	11h 31m 47.63s	+05° 11' 26.0"	9.434956	10.346988	86.05	24.4	16.0	14.3	1.1	2.5	36.3	0.6	-0.9	7.25	13.46	20.06
21-Aug	11h 32m 13.61s	+05° 08' 36.8"	9.435254	10.353752	86.11	23.6	16.0	14.3	1.1	2.5	36.3	0.5	-0.8	7.21	13.42	20.03
22-Aug	11h 32m 39.71s	+05° 05' 47.1"	9.435552	10.360289	86.16	22.7	16.0	14.3	1.1	2.4	36.2	0.5	-0.8	7.18	13.39	19.59
23-Aug	11h 33m 05.91s	+05° 02' 56.8"	9.435850	10.366598	86.22	21.9	16.0	14.2	1.1	2.3	36.2	0.4	-0.7	7.15	13.35	19.55
24-Aug	11h 33m 32.20s	+05° 00' 06.0"	9.436148	10.372679	86.27	21.1	16.0	14.2	1.1	2.2	36.2	0.4	-0.7	7.11	13.32	19.52
25-Aug	11h 33m 58.60s	+04° 57' 14.7"	9.436446	10.378530	86.32	20.2	15.9	14.2	1.1	2.1	36.2	0.4	-0.6	7.08	13.28	19.48
26-Aug	11h 34m 25.10s	+04° 54' 22.9"	9.436744	10.384150	86.36	19.4	15.9	14.2	1.1	2.0	36.1	0.3	-0.5	7.05	13.25	19.44
27-Aug	11h 34m 51.68s	+04° 51' 30.6"	9.437043	10.389537	86.41	18.5	15.9	14.2	1.1	2.0	36.1	0.3	-0.5	7.02	13.21	19.41
28-Aug	11h 35m 18.35s	+04° 48' 37.8"	9.437341	10.394692	86.45	17.7	15.9	14.2	1.1	1.9	36.1	0.3	-0.4	6.58	13.18	19.37
29-Aug	11h 35m 45.11s	+04° 45' 44.7"	9.437639	10.399614	86.49	16.9	15.9	14.2	1.1	1.8	36.1	0.2	-0.4	6.55	13.14	19.33
30-Aug	11h 36m 11.94s	+04° 42' 51.1"	9.437937	10.404300	86.53	16.0	15.9	14.2	1.1	1.7	36.1	0.2	-0.3	6.52	13.11	19.30
31-Aug	11h 36m 38.84s	+04° 39' 57.3"	9.438236	10.408752	86.57	15.2	15.9	14.2	1.1	1.6	36.1	0.2	-0.3	6.48	13.07	19.26
1-Sep	11h 37m 05.81s	+04° 37' 03.1"	9.438534	10.412968	86.60	14.3	15.9	14.2	1.1	1.5	36.0	0.1	-0.2	6.45	13.04	19.22
2-Sep	11h 37m 32.84s	+04° 34' 08.7"	9.438832	10.416947	86.64	13.5	15.9	14.2	1.1	1.4	36.0	0.1	-0.1	6.42	13.00	19.19
3-Sep	11h 37m 59.93s	+04° 31' 13.9"	9.439131	10.420689	86.67	12.7	15.9	14.2	1.1	1.3	36.0	0.1	-0.1	6.38	12.57	19.15
4-Sep	11h 38m 27.08s	+04° 28' 19.0"	9.439429	10.424193	86.70	11.8	15.9	14.2	1.1	1.3	36.0	0.0	0.0	6.35	12.53	19.11
5-Sep	11h 38m 54.28s	+04° 25' 23.8"	9.439727	10.427458	86.72	11.0	15.9	14.2	1.1	1.2	36.0	0.0	0.0	6.32	12.50	19.08
6-Sep	11h 39m 21.53s	+04° 22' 28.4"	9.440026	10.430484	86.75	10.2	15.9	14.2	1.1	1.1	36.0	0.1	0.1	6.28	12.46	19.04
7-Sep	11h 39m 48.83s	+04° 19' 32.8"	9.440324	10.433270	86.77	9.4	15.9	14.2	1.1	1.0	36.0	0.1	0.1	6.25	12.43	19.00
8-Sep	11h 40m 16.18s	+04° 16' 37.0"	9.440623	10.435815	86.79	8.5	15.9	14.2	1.1	0.9	36.0	0.1	0.2	6.22	12.39	18.57
9-Sep	11h 40m 43.57s	+04° 13' 41.1"	9.440921	10.438118	86.81	7.7	15.9	14.1	1.1	0.8	36.0	0.2	0.3	6.19	12.36	18.53
10-Sep	11h 41m 11.00s	+04° 10' 45.1"	9.441220	10.440179	86.83	6.9	15.9	14.1	1.1	0.7	36.0	0.2	0.3	6.15	12.32	18.49
11-Sep	11h 41m 38.47s	+04° 07' 48.9"	9.441519	10.441997	86.84	6.1	15.9	14.1	1.1	0.6	35.9	0.2	0.4	6.12	12.29	18.46
12-Sep	11h 42m 05.97s	+04° 04' 52.7"	9.441817	10.443571	86.86	5.3	15.8	14.1	1.1	0.6	35.9	0.3	0.4	6.09	12.25	18.42
13-Sep	11h 42m 33.50s	+04° 01' 56.4"	9.442116	10.444901	86.87	4.5	15.8	14.1	1.1	0.5	35.9	0.3	0.5	6.05	12.22	18.38
14-Sep	11h 43m 01.05s	+03° 59' 00.1"	9.442414	10.445984	86.88	3.8	15.8	14.1	1.1	0.4	35.9	0.3	0.6	6.02	12.18	18.35
15-Sep	11h 43m 28.62s	+03° 56' 03.8"	9.442713	10.446821	86.88	3.1	15.8	14.1	1.1	0.3	35.9	0.4	0.6	5.59	12.15	18.31
16-Sep	11h 43m 56.20s	+03° 53' 07.7"	9.443012	10.447411	86.89	2.5	15.8	14.1	1.1	0.3	35.9	0.4	0.7	5.55	12.12	18.27
17-Sep	11h 44m 23.78s	+03° 50' 11.6"	9.443311	10.447754	86.89	2.0	15.8	14.1	1.1	0.2	35.9	0.5	0.7	5.52	12.08	18.24
18-Sep	11h 44m 51.37s	+03° 47' 15.7"	9.443609	10.447848	86.89	1.9	15.8	14.1	1.1	0.2	35.9	0.5	0.8	5.49	12.05	18.20
19-Sep	11h 45m 18.95s	+03° 44' 19.8"	9.443908	10.447694	86.89	2.2	15.8	14.1	1.1	0.2	35.9	0.5	0.8	5.46	12.01	18.17
20-Sep	11h 45m 46.53s	+03° 41' 24.1"	9.444207	10.447291	86.89	2.7	15.8	14.1	1.1	0.3	35.9	0.6	0.9	5.42	11.58	18.13
21-Sep	11h 46m 14.11s	+03° 38' 28.5"	9.444506	10.446639	86.88	3.4	15.8	14.1	1.1	0.4	35.9	0.6	1.0	5.39	11.54	18.09
22-Sep	11h 46m 41.69s	+03° 35' 33.2"	9.444805	10.445740	86.87	4.1	15.8	14.1	1.1	0.4	35.9	0.6	1.0	5.36	11.51	18.06
23-Sep	11h 47m 09.25s	+03° 32' 38.1"	9.445104	10.444592	86.86	4.9	15.8	14.1	1.1	0.5	35.9	0.7	1.1	5.32	11.47	18.02
24-Sep	11h 47m 36.79s	+03° 29' 43.3"	9.445403	10.443196	86.85	5.7	15.8	14.1	1.1	0.6	35.9	0.7	1.1	5.29	11.44	17.58
25-Sep	11h 48m 04.31s	+03° 26' 48.8"	9.445702	10.441553	86.84	6.5	15.9	14.1	1.1	0.7	35.9	0.7	1.2	5.26	11.40	17.55
26-Sep	11h 48m 31.80s	+03° 23' 54.6"	9.446001	10.439664	86.82	7.3	15.9	14.1	1.1	0.8	36.0	0.8	1.2	5.22	11.37	17.51
27-Sep	11h 48m 59.26s	+03° 21' 00.8"	9.446300	10.437528	86.81	8.1	15.9	14.2	1.1	0.9	36.0	0.8	1.3	5.19	11.33	17.47
28-Sep	11h 49m 26.69s	+03° 18' 07.4"	9.446599	10.435147	86.79	9.0	15.9	14.2	1.1	0.9	36.0	0.9	1.4	5.16	11.30	17.44
29-Sep	11h 49m 54.07s	+03° 15' 14.4"	9.446898	10.432520	86.76	9.8	15.9	14.2	1.1	1.0	36.0	0.9	1.4	5.13	11.26	17.40
30-Sep	11h 50m 21.40s	+03° 12' 21.8"	9.447197	10.429649	86.74	10.6	15.9	14.2	1.1	1.1	36.0	0.9	1.5	5.09	11.23	17.36
1-Oct	11h 50m 48.69s	+03° 09' 29.8"	9.447496	10.426535	86.71	11.5	15.9	14.2	1.1	1.2	36.0	1.0	1.5	5.06	11.19	17.33
2-Oct	11h 51m 15.92s	+03° 06' 38.2"	9.447795	10.423177	86.69	12.3	15.9	14.2	1.1	1.3	36.0	1.0	1.6	5.03	11.16	17.29
3-Oct	11h 51m 43.10s	+03° 03' 47.2"	9.448094	10.419576	86.66	13.2	15.9	14.2	1.1	1.4	36.0	1.0	1.6	4.59	11.12	17.25
4-Oct	11h 52m 10.22s	+03° 00' 56.7"	9.448394	10.415734	86.62	14.0	15.9	14.2	1.1	1.5	36.0	1.1	1.7	4.56	11.09	17.22
5-Oct	11h 52m 37.27s	+02° 58' 06.7"	9.448693	10.411651	86.59	14.9	15.9	14.2	1.1	1.6	36.1	1.1	1.8	4.53	11.05	17.18
6-Oct	11h 53m 04.27s	+02° 55' 17.3"	9.448992	10.407327	86.55	15.8	15.9	14.2	1.1	1.6	36.1	1.1	1.8	4.49	11.02	17.14
7-Oct	11h 53m 31.20s	+02° 52' 28.6"	9.449291	10.402762	86.52	16.6	15.9	14.2	1.1	1.7	36.1	1.2	1.9	4.46	10.58	17.11
8-Oct	11h 53m 58.05s	+02° 49' 40.4"	9.449591	10.397959	86.48	17.5	15.9	14.2	1.1	1.8	36.1	1.2	1.9	4.43	10.55	17.07
9-Oct	11h 54m 24.84s	+02° 46' 52.8"	9.449890	10.392916	86.44	18.3	15.9	14.2	1.1	1.9	36.1	1.2	2.0	4.39	10.51	17.04
10-Oct	11h 54m 51.54s	+02° 44' 06.0"	9.450189	10.387635	86.39	19.2	15.9	14.2	1.1	2.0	36.1	1.3	2.0	4.36	10.48	17.00
11-Oct	11h 55m 18.16s	+02° 41' 19.9"	9.450489	10.382116	86.35	20.1	15.9	14.2	1.1	2.1	36.2	1.3	2.1	4.33	10.45	16.56
12-Oct	11h 55m 44.69s	+02° 38' 34.5"	9.450788	10.376360	86.30	20.9	16.0	14.2	1.1	2.2	36.2	1.3	2.1	4.29	10.41	16.53
13-Oct	11h 56m 11.13s	+02° 35' 49.9"	9.451087	10.370367	86.25	21.8	16.0	14.2	1.1	2.2	36.2	1.4	2.2	4.26	10.38	16.49
14-Oct	11h 56m 37.46s	+02° 33' 06.1"	9.451387	10.364138	86.20	22.7	16.0	14.3	1.1	2.3	36.2	1.4	2.2	4.23	10.34	16.45
15-Oct	11h 57m 03.69s	+02° 30' 23.2"	9.451686	10.357674	86.14	23.5	16.0	14.3	1.1	2.4	36.2	1.5	2.3	4.19	10.31	16.42
16-Oct	11h 57m 29.80s	+02° 27' 41.2"	9.451986	10.350976	86.09	24.4	16.0	14.3	1.1	2.5	36.3	1.5	2.4	4.16	10.27	16.38
17-Oct	11h 57m 55.81s	+02° 25' 00.1"	9.452285	10.344046	86.03	25.3	16.0	14.3	1.1	2.6	36.3	1.5	2.4	4.13	10.24	16.34
18-Oct	11h 58m 21.70s	+02° 22' 19.9"	9.452585	10.336884	85.97	26.1	16.0	14.3	1.1	2.7	36.3	1.6	2.5	4.09	10.20	16.31
19-Oct	11h 58m 47.48s	+02° 19' 40.7"	9.452884	10.329492	85.91	27.0	16.0	14.3	1.1	2.7	36.3	1.6	2.5	4.06	10.17	16.27
20-Oct	11h 59m 13.13s	+02° 17' 02.4"	9.453184	10.321872	85.84	27.9	16.0	14.3	1.1	2.8	36.4	1.6	2.6	4.03	10.13</	

Date	A.R. Geoc.	Dec. Geoc.	R A.U.	Distance A.U.	Light (m)	El. °	Diam. Eq."	Diam. Pol."	Mag.	Phase angle°	Max "	Min "	B °	Rise	Trans.	Set.
31-Oct	12h 03m 45.83s	+01° 49' 15.1"	9.456481	10.223546	85.03	37.6	16.2	14.4	1.0	3.7	36.7	2.0	3.1	3.26	9.34	15.43
1-Nov	12h 04m 09.64s	+01° 46' 50.9"	9.456780	10.213342	84.94	38.5	16.2	14.5	1.0	3.7	36.8	2.0	3.2	3.22	9.31	15.39
2-Nov	12h 04m 33.28s	+01° 44' 28.1"	9.457080	10.202937	84.85	39.4	16.2	14.5	1.0	3.8	36.8	2.1	3.2	3.19	9.27	15.36
3-Nov	12h 04m 56.74s	+01° 42' 06.5"	9.457380	10.192333	84.77	40.3	16.2	14.5	1.0	3.9	36.8	2.1	3.2	3.15	9.24	15.32
4-Nov	12h 05m 20.02s	+01° 39' 46.4"	9.457680	10.181531	84.68	41.2	16.3	14.5	1.0	4.0	36.9	2.1	3.3	3.12	9.20	15.28
5-Nov	12h 05m 43.11s	+01° 37' 27.7"	9.457980	10.170534	84.59	42.1	16.3	14.5	1.0	4.0	36.9	2.1	3.3	3.09	9.17	15.24
6-Nov	12h 06m 06.00s	+01° 35' 10.3"	9.458280	10.159344	84.49	43.0	16.3	14.5	1.0	4.1	36.9	2.2	3.4	3.05	9.13	15.21
7-Nov	12h 06m 28.71s	+01° 32' 54.5"	9.458580	10.147962	84.40	43.9	16.3	14.6	1.0	4.2	37.0	2.2	3.4	3.02	9.09	15.17
8-Nov	12h 06m 51.20s	+01° 30' 40.1"	9.458880	10.136392	84.30	44.8	16.3	14.6	1.0	4.2	37.0	2.2	3.5	2.58	9.06	15.13
9-Nov	12h 07m 13.49s	+01° 28' 27.3"	9.459180	10.124634	84.20	45.7	16.3	14.6	1.0	4.3	37.1	2.3	3.5	2.55	9.02	15.10
10-Nov	12h 07m 35.56s	+01° 26' 16.1"	9.459480	10.112692	84.10	46.6	16.4	14.6	1.0	4.4	37.1	2.3	3.6	2.51	8.59	15.06
11-Nov	12h 07m 57.41s	+01° 24' 06.5"	9.459780	10.100568	84.00	47.5	16.4	14.6	1.0	4.4	37.2	2.3	3.6	2.48	8.55	15.02
12-Nov	12h 08m 19.04s	+01° 21' 58.5"	9.460080	10.088264	83.90	48.4	16.4	14.6	1.0	4.5	37.2	2.4	3.6	2.45	8.52	14.59
13-Nov	12h 08m 40.45s	+01° 19' 52.1"	9.460380	10.075783	83.80	49.3	16.4	14.7	1.0	4.5	37.3	2.4	3.7	2.41	8.48	14.55
14-Nov	12h 09m 01.63s	+01° 17' 47.5"	9.460680	10.063128	83.69	50.2	16.4	14.7	1.0	4.6	37.3	2.4	3.7	2.38	8.44	14.51
15-Nov	12h 09m 22.57s	+01° 15' 44.5"	9.460980	10.050301	83.59	51.1	16.5	14.7	1.0	4.7	37.3	2.4	3.8	2.34	8.41	14.47
16-Nov	12h 09m 43.28s	+01° 13' 43.2"	9.461280	10.037307	83.48	52.0	16.5	14.7	1.0	4.7	37.4	2.5	3.8	2.31	8.37	14.44
17-Nov	12h 10m 03.74s	+01° 11' 43.7"	9.461580	10.024148	83.37	53.0	16.5	14.7	1.0	4.8	37.4	2.5	3.8	2.27	8.34	14.40
18-Nov	12h 10m 23.96s	+01° 09' 45.9"	9.461881	10.010828	83.26	53.9	16.5	14.8	1.0	4.8	37.5	2.5	3.9	2.24	8.30	14.36
19-Nov	12h 10m 43.93s	+01° 07' 50.0"	9.462181	9.997350	83.15	54.8	16.6	14.8	1.0	4.9	37.5	2.6	3.9	2.20	8.26	14.33
20-Nov	12h 11m 03.65s	+01° 05' 55.9"	9.462481	9.983718	83.03	55.7	16.6	14.8	1.0	5.0	37.6	2.6	4.0	2.17	8.23	14.29
21-Nov	12h 11m 23.10s	+01° 04' 03.7"	9.462781	9.969935	82.92	56.6	16.6	14.8	1.0	5.0	37.6	2.6	4.0	2.13	8.19	14.25
22-Nov	12h 11m 42.28s	+01° 02' 13.3"	9.463081	9.956005	82.80	57.6	16.6	14.8	1.0	5.1	37.7	2.6	4.0	2.10	8.16	14.21
23-Nov	12h 12m 01.19s	+01° 00' 24.9"	9.463382	9.941931	82.68	58.5	16.6	14.9	1.0	5.1	37.8	2.7	4.1	2.06	8.12	14.18
24-Nov	12h 12m 19.83s	+00° 58' 38.5"	9.463682	9.927718	82.57	59.4	16.7	14.9	1.0	5.2	37.8	2.7	4.1	2.03	8.08	14.14
25-Nov	12h 12m 38.19s	+00° 56' 54.0"	9.463982	9.913369	82.45	60.3	16.7	14.9	1.0	5.2	37.9	2.7	4.1	1.59	8.05	14.10
26-Nov	12h 12m 56.27s	+00° 55' 11.5"	9.464282	9.898887	82.33	61.3	16.7	14.9	1.0	5.2	37.9	2.8	4.2	1.56	8.01	14.07
27-Nov	12h 13m 14.06s	+00° 53' 31.0"	9.464583	9.884277	82.20	62.2	16.7	14.9	1.0	5.3	38.0	2.8	4.2	1.52	7.58	14.03
28-Nov	12h 13m 31.56s	+00° 51' 52.6"	9.464883	9.869541	82.08	63.1	16.8	15.0	1.0	5.3	38.0	2.8	4.2	1.49	7.54	13.59
29-Nov	12h 13m 48.77s	+00° 50' 16.2"	9.465184	9.854685	81.96	64.1	16.8	15.0	1.0	5.4	38.1	2.8	4.3	1.45	7.50	13.55
30-Nov	12h 14m 05.69s	+00° 48' 41.8"	9.465484	9.839711	81.83	65.0	16.8	15.0	1.0	5.4	38.1	2.9	4.3	1.42	7.47	13.52
1-Dec	12h 14m 22.32s	+00° 47' 09.5"	9.465784	9.824624	81.71	66.0	16.8	15.0	1.0	5.5	38.2	2.9	4.3	1.38	7.43	13.48
2-Dec	12h 14m 38.65s	+00° 45' 39.3"	9.466085	9.809426	81.58	66.9	16.9	15.1	1.0	5.5	38.3	2.9	4.4	1.34	7.39	13.44
3-Dec	12h 14m 54.68s	+00° 44' 11.2"	9.466385	9.794122	81.45	67.8	16.9	15.1	1.0	5.5	38.3	2.9	4.4	1.31	7.36	13.40
4-Dec	12h 15m 10.40s	+00° 42' 45.2"	9.466686	9.778715	81.33	68.8	16.9	15.1	1.0	5.6	38.4	3.0	4.4	1.27	7.32	13.37
5-Dec	12h 15m 25.80s	+00° 41' 21.3"	9.466986	9.763208	81.20	69.7	17.0	15.1	1.0	5.6	38.4	3.0	4.4	1.24	7.28	13.33
6-Dec	12h 15m 40.89s	+00° 39' 59.7"	9.467287	9.747605	81.07	70.7	17.0	15.2	1.0	5.6	38.5	3.0	4.5	1.20	7.25	13.29
7-Dec	12h 15m 55.65s	+00° 38' 40.4"	9.467587	9.731910	80.94	71.6	17.0	15.2	1.0	5.7	38.6	3.0	4.5	1.16	7.21	13.25
8-Dec	12h 16m 10.09s	+00° 37' 23.3"	9.467888	9.716127	80.81	72.6	17.0	15.2	1.0	5.7	38.6	3.0	4.5	1.13	7.17	13.21
9-Dec	12h 16m 24.19s	+00° 36' 08.5"	9.468188	9.700260	80.67	73.5	17.1	15.2	0.9	5.7	38.7	3.1	4.5	1.09	7.13	13.18
10-Dec	12h 16m 37.97s	+00° 34' 55.9"	9.468489	9.684312	80.54	74.5	17.1	15.3	0.9	5.8	38.8	3.1	4.6	1.06	7.10	13.14
11-Dec	12h 16m 51.40s	+00° 33' 45.7"	9.468789	9.668288	80.41	75.4	17.1	15.3	0.9	5.8	38.8	3.1	4.6	1.02	7.06	13.10
12-Dec	12h 17m 04.50s	+00° 32' 37.8"	9.469090	9.652193	80.27	76.4	17.1	15.3	0.9	5.8	38.9	3.1	4.6	0.58	7.02	13.06
13-Dec	12h 17m 17.26s	+00° 31' 32.3"	9.469390	9.636030	80.14	77.4	17.2	15.3	0.9	5.8	39.0	3.1	4.6	0.55	6.59	13.03
14-Dec	12h 17m 29.67s	+00° 30' 29.1"	9.469691	9.619805	80.01	78.3	17.2	15.4	0.9	5.8	39.0	3.2	4.7	0.51	6.55	12.59
15-Dec	12h 17m 41.74s	+00° 29' 28.2"	9.469992	9.603523	79.87	79.3	17.2	15.4	0.9	5.9	39.1	3.2	4.7	0.47	6.51	12.55
16-Dec	12h 17m 53.45s	+00° 28' 29.8"	9.470292	9.587187	79.73	80.2	17.3	15.4	0.9	5.9	39.2	3.2	4.7	0.44	6.47	12.51
17-Dec	12h 18m 04.81s	+00° 27' 33.8"	9.470593	9.570804	79.60	81.2	17.3	15.4	0.9	5.9	39.2	3.2	4.7	0.40	6.44	12.47
18-Dec	12h 18m 15.80s	+00° 26' 40.2"	9.470894	9.554378	79.46	82.2	17.3	15.5	0.9	5.9	39.3	3.2	4.7	0.36	6.40	12.44
19-Dec	12h 18m 26.43s	+00° 25' 49.1"	9.471194	9.537913	79.32	83.2	17.4	15.5	0.9	5.9	39.4	3.3	4.7	0.33	6.36	12.40
20-Dec	12h 18m 36.70s	+00° 25' 00.5"	9.471495	9.521415	79.19	84.1	17.4	15.5	0.9	5.9	39.4	3.3	4.8	0.29	6.32	12.36
21-Dec	12h 18m 46.59s	+00° 24' 14.3"	9.471796	9.504889	79.05	85.1	17.4	15.5	0.9	5.9	39.5	3.3	4.8	0.25	6.29	12.32
22-Dec	12h 18m 56.10s	+00° 23' 30.7"	9.472097	9.488340	78.91	86.1	17.4	15.6	0.9	5.9	39.6	3.3	4.8	0.21	6.25	12.28
23-Dec	12h 19m 05.25s	+00° 22' 49.6"	9.472397	9.471773	78.77	87.1	17.5	15.6	0.9	6.0	39.6	3.3	4.8	0.18	6.21	12.24
24-Dec	12h 19m 14.01s	+00° 22' 11.0"	9.472698	9.455193	78.64	88.0	17.5	15.6	0.9	6.0	39.7	3.3	4.8	0.14	6.17	12.21
25-Dec	12h 19m 22.40s	+00° 21' 34.9"	9.472999	9.438604	78.50	89.0	17.5	15.6	0.9	6.0	39.8	3.3	4.8	0.10	6.13	12.17
26-Dec	12h 19m 30.40s	+00° 21' 01.4"	9.473300	9.422012	78.36	90.0	17.6	15.7	0.9	6.0	39.8	3.4	4.8	0.06	6.10	12.13
27-Dec	12h 19m 38.03s	+00° 20' 30.3"	9.473601	9.405421	78.22	91.0	17.6	15.7	0.9	6.0	39.9	3.4	4.9	0.03	6.06	12.09
28-Dec	12h 19m 45.28s	+00° 20' 01.8"	9.473902	9.388837	78.08	92.0	17.6	15.7	0.9	6.0	40.0	3.4	4.9	23.55	6.02	12.05
29-Dec	12h 19m 52.15s	+00° 19' 35.8"	9.474202	9.372264	77.95	93.0	17.7	15.8	0.9	5.9	40.0	3.4	4.9	23.51	5.58	12.01
30-Dec	12h 19m 58.63s	+00° 19' 12.4"	9.474503	9.355707	77.81	94.0	17.7	15.8	0.9	5.9	40.1	3.4	4.9	23.47	5.54	11.58
31-Dec	12h 20m 04.73s	+00° 18' 51.4"	9.474804	9.339170	77.67	94.9	17.7	15.8	0.9	5.9	40.2	3.4	4.9	23.44	5.51	11.54

Legenda :

A.R., Dec. = apparent coordinates

R. = distance from the Sun in A.U.

Distance = distance from the Earth in A.U.

Light = Distance in minutes

El. = elongation from the Sun in °

Diam. = equatorial and polar diameter in "

Mag. = magnitude

Max = diameter of the major axis of the rings in " Min = diameter of the minor axis of the rings in "

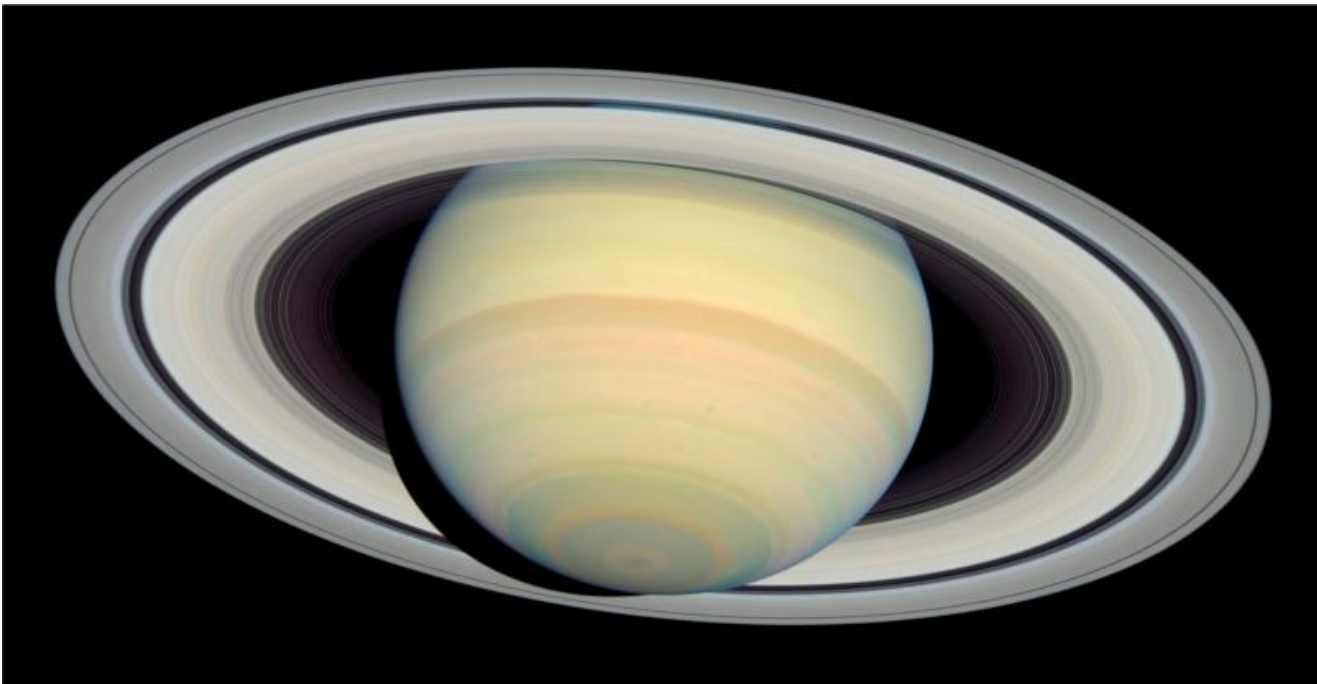
B = Saturnocentric latitude of the Earth, in °

Times of rising and setting of the planet for Rome (42°N, 12°E), in U.T.+1

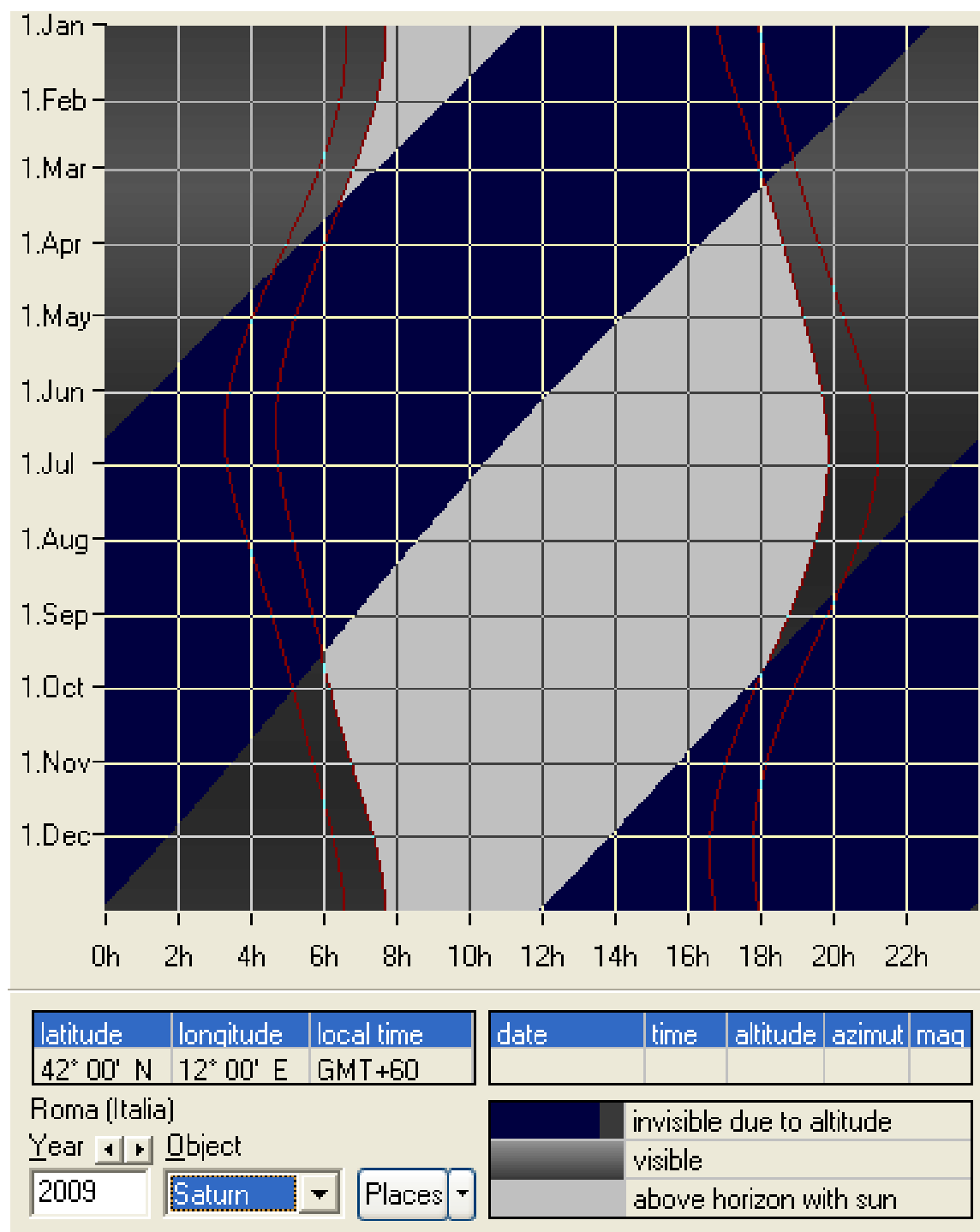
PHENOMENA OF SATURN

Perihelion	-----				
Aphelion	-----				
Perigee	08/03/2009	17.01	8.39446	A.U.	
Apogee	17/09/2009	21.06	10.44785	A.U.	
Maxima magnitude	10/03/2009	07.39	0.5	Mag	
Maxima magnitude	20/09/2009	04.30	1.1	Mag	
Minima magnitude	03/09/2009	01.33	1.1	Mag	
Opposition	08/03/2009	19.53			
Conjunction	17/09/2009	18.22			
Retrograde motion	01/01/2009	19.41			
Direct motion	17/05/2009	18.59			
Maxima phase angle	06/06/2009	05.02	6.2	°	
Maxima phase angle	25/12/2009	18.13	6.0	°	
Minima phase angle	08/03/2009	20.39	0.2	°	
Minima phase angle	17/09/2009	19.17	0.2	°	

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VISIBILITY OF SATURN



Visibility of Saturn during the year

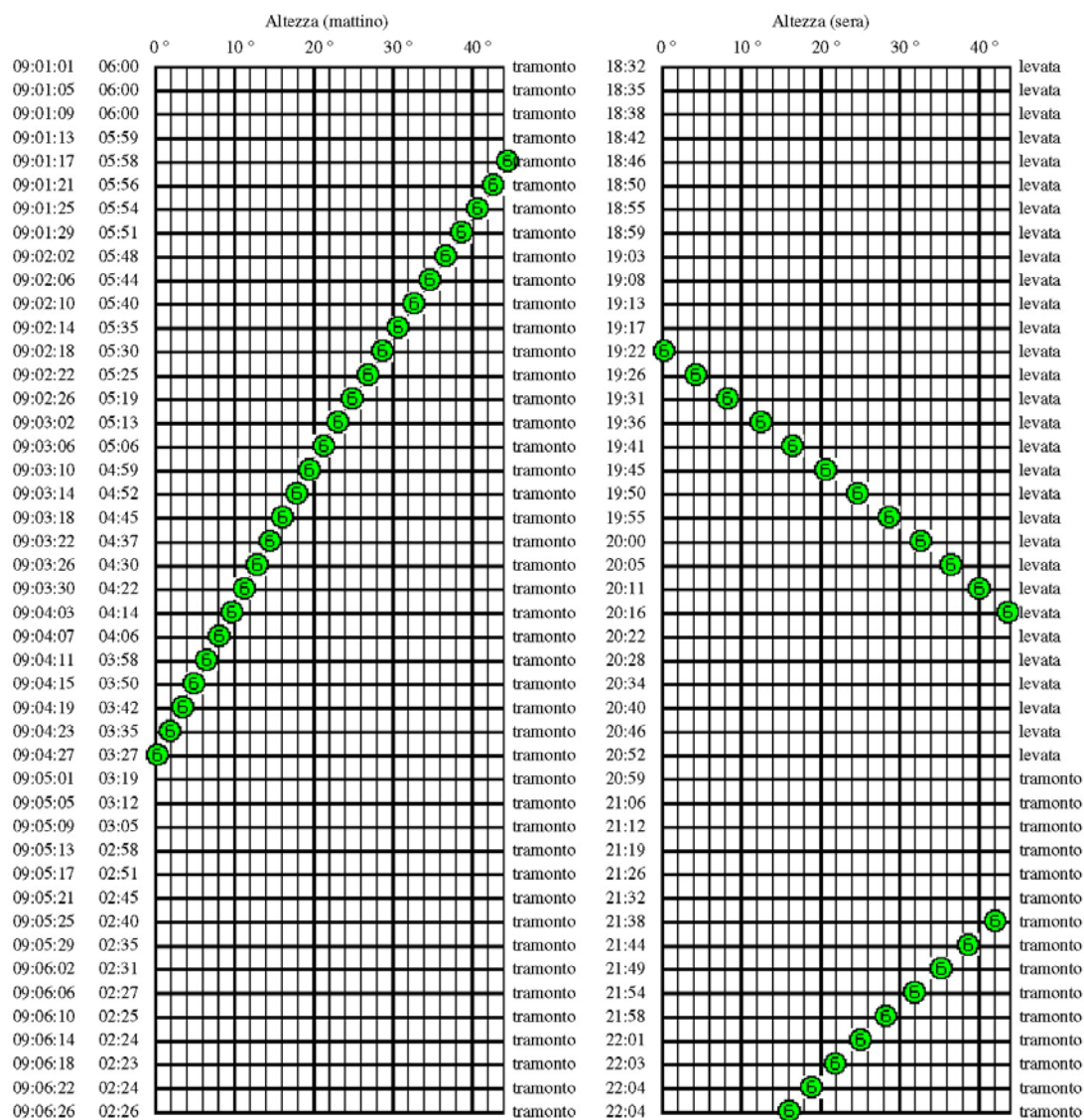
The external red lines show in what periods of the year the planet is sufficiently distant from the Sun to be able to be observed easily. The exact dates are in the following tables.

Altezza ai crepuscoli

di Saturno

nel momento il cui il Sole è 18 ° sotto l'orizzonte

Postazione: Roma 42:00 N, 12:00 E (UT +01:00)

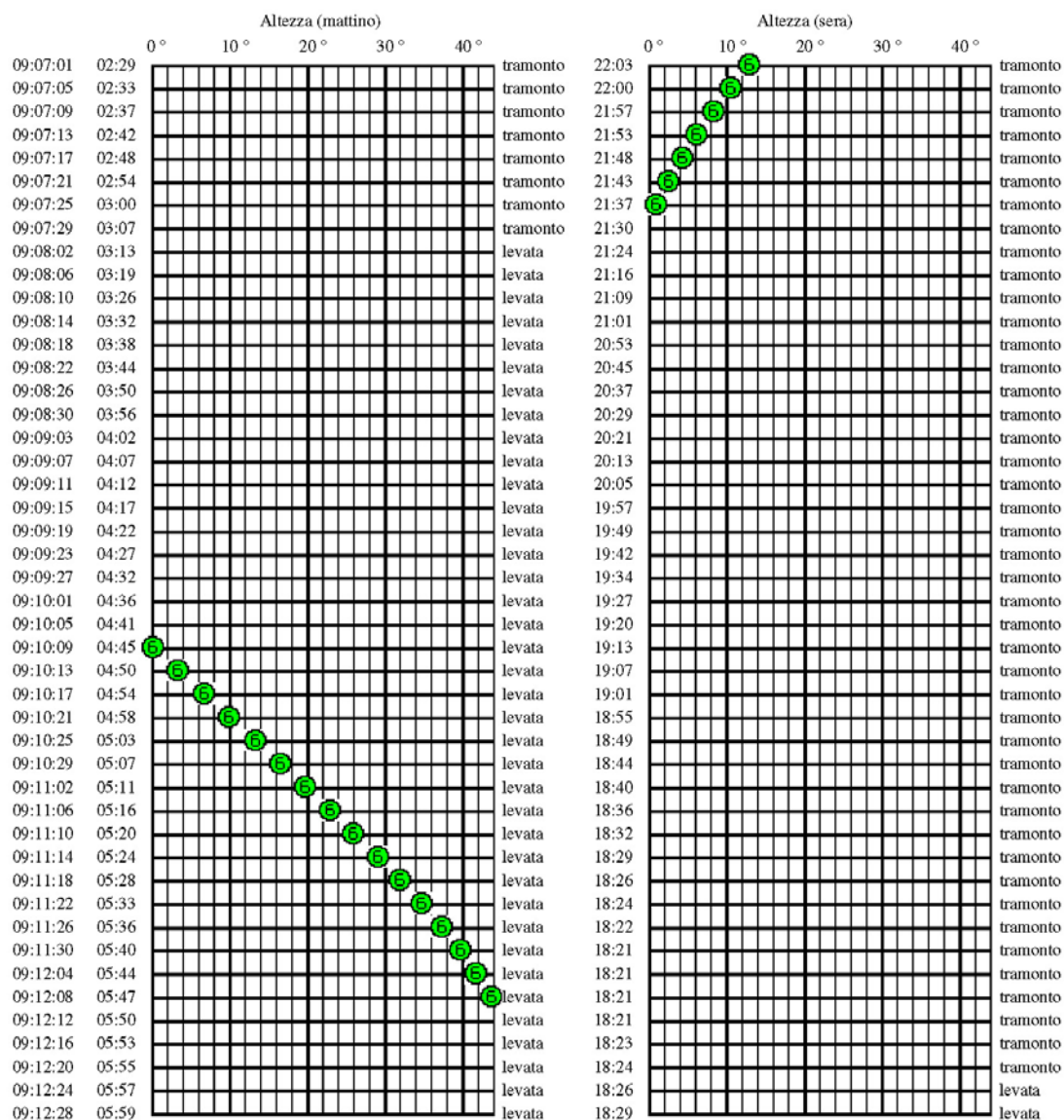


Altezza ai crepuscoli

di Saturno

nel momento il cui il Sole è 18 ° sotto l'orizzonte

Postazione: Roma 42:00 N, 12:00 E (UT +01:00)



Height in the twilights. The Sun is 18° under the horizon

Date	Morning twilight				Evening twilight			
	Times	Alt	Az	Elong	Times	Alt	Az	Elong
2009:01:01	06:00	50.9	203.5	109.1	18:32	-38.3	30.0	109.7
2009:01:05	06:00	49.6	209.5	113.2	18:35	-36.4	35.4	113.8
2009:01:09	06:00	48.1	215.0	117.4	18:38	-34.1	40.7	117.9
2009:01:13	05:59	46.4	220.1	121.5	18:42	-31.6	45.7	122.1
2009:01:17	05:58	44.5	224.7	125.7	18:46	-28.7	50.5	126.2
2009:01:21	05:56	42.6	228.9	129.9	18:50	-25.7	55.0	130.4
2009:01:25	05:54	40.7	232.8	134.1	18:55	-22.4	59.4	134.7
2009:01:29	05:51	38.7	236.4	138.3	18:59	-18.9	63.5	138.9
2009:02:02	05:48	36.7	239.6	142.6	19:03	-15.3	67.4	143.2
2009:02:06	05:44	34.7	242.7	146.9	19:08	-11.5	71.2	147.5
2009:02:10	05:40	32.7	245.5	151.1	19:13	-7.7	74.9	151.8
2009:02:14	05:35	30.7	248.2	155.4	19:17	-3.8	78.5	156.1
2009:02:18	05:30	28.8	250.6	159.7	19:22	0.2	82.0	160.3
2009:02:22	05:25	26.9	253.0	164.0	19:26	4.3	85.5	164.6
2009:02:26	05:19	25.0	255.2	168.3	19:31	8.4	89.0	168.9
2009:03:02	05:13	23.1	257.3	172.5	19:36	12.5	92.5	173.1
2009:03:06	05:06	21.3	259.3	176.4	19:41	16.6	96.1	176.8
2009:03:10	04:59	19.6	261.2	177.3	19:45	20.7	99.8	176.9
2009:03:14	04:52	17.8	263.1	173.8	19:50	24.7	103.7	173.2
2009:03:18	04:45	16.1	264.8	169.7	19:55	28.7	107.9	169.0
2009:03:22	04:37	14.5	266.5	165.5	20:00	32.7	112.3	164.8
2009:03:26	04:30	12.8	268.2	161.3	20:05	36.5	117.1	160.6
2009:03:30	04:22	11.2	269.8	157.1	20:11	40.1	122.3	156.4
2009:04:03	04:14	9.6	271.4	152.9	20:16	43.6	128.1	152.2
2009:04:07	04:06	8.1	272.9	148.7	20:22	46.8	134.5	148.0
2009:04:11	03:58	6.5	274.4	144.6	20:28	49.7	141.7	143.8
2009:04:15	03:50	5.0	275.9	140.4	20:34	52.1	149.7	139.7
2009:04:19	03:42	3.4	277.3	136.3	20:40	54.0	158.4	135.6
2009:04:23	03:35	1.9	278.8	132.3	20:46	55.3	167.9	131.5
2009:04:27	03:27	0.4	280.3	128.2	20:52	55.9	177.9	127.5
2009:05:01	03:19	-1.2	281.7	124.2	20:59	55.7	187.9	123.5
2009:05:05	03:12	-2.7	283.2	120.3	21:06	54.8	197.7	119.5
2009:05:09	03:05	-4.3	284.7	116.3	21:12	53.2	206.8	115.6
2009:05:13	02:58	-5.9	286.3	112.4	21:19	51.0	215.3	111.7
2009:05:17	02:51	-7.6	287.9	108.6	21:26	48.4	222.8	107.8
2009:05:21	02:45	-9.3	289.6	104.8	21:32	45.4	229.6	104.0
2009:05:25	02:40	-11.1	291.4	101.0	21:38	42.2	235.5	100.2
2009:05:29	02:35	-12.9	293.3	97.2	21:44	38.8	240.9	96.4
2009:06:02	02:31	-14.9	295.4	93.5	21:49	35.3	245.6	92.7
2009:06:06	02:27	-16.9	297.7	89.8	21:54	31.8	249.8	89.0
2009:06:10	02:25	-19.1	300.1	86.1	21:58	28.4	253.6	85.3
2009:06:14	02:24	-21.3	302.9	82.4	22:01	25.1	257.0	81.7
2009:06:18	02:23	-23.6	305.9	78.8	22:03	21.9	260.1	78.1
2009:06:22	02:24	-26.0	309.3	75.2	22:04	18.9	262.8	74.5
2009:06:26	02:26	-28.4	313.0	71.7	22:04	16.1	265.3	70.9
2009:06:30	02:28	-30.8	317.2	68.1	22:03	13.4	267.6	67.4

Date	Morning twilight				Evening twilight			
	Times	Alt	Az	Elong	Times	Alt	Az	Elong
2009:07:01	02:29	-31.4	318.3	67.2	22:03	12.8	268.1	66.5
2009:07:05	02:33	-33.7	323.0	63.7	22:00	10.4	270.1	63.0
2009:07:09	02:37	-35.8	328.1	60.2	21:57	8.2	271.9	59.5
2009:07:13	02:42	-37.7	333.7	56.7	21:53	6.2	273.5	56.0
2009:07:17	02:48	-39.3	339.8	53.3	21:48	4.3	275.0	52.6
2009:07:21	02:54	-40.6	346.2	49.8	21:43	2.5	276.4	49.2
2009:07:25	03:00	-41.4	352.9	46.4	21:37	0.9	277.7	45.7
2009:07:29	03:07	-41.8	359.7	43.0	21:30	-0.6	278.8	42.3
2009:08:02	03:13	-41.8	6.6	39.6	21:24	-2.1	280.0	38.9
2009:08:06	03:19	-41.3	13.5	36.2	21:16	-3.5	281.0	35.5
2009:08:10	03:26	-40.4	20.1	32.8	21:09	-4.8	282.0	32.2
2009:08:14	03:32	-39.0	26.5	29.4	21:01	-6.1	283.0	28.8
2009:08:18	03:38	-37.3	32.6	26.0	20:53	-7.3	283.9	25.4
2009:08:22	03:44	-35.3	38.3	22.6	20:45	-8.6	284.8	22.1
2009:08:26	03:50	-33.1	43.6	19.3	20:37	-9.8	285.7	18.7
2009:08:30	03:56	-30.6	48.6	15.9	20:29	-10.9	286.6	15.3
2009:09:03	04:02	-28.0	53.3	12.6	20:21	-12.1	287.5	12.0
2009:09:07	04:07	-25.1	57.7	9.2	20:13	-13.3	288.4	8.7
2009:09:11	04:12	-22.2	61.8	6.0	20:05	-14.5	289.4	5.4
2009:09:15	04:17	-19.2	65.7	3.0	19:57	-15.7	290.3	2.6
2009:09:19	04:22	-16.1	69.4	2.3	19:49	-16.9	291.3	2.6
2009:09:23	04:27	-12.9	73.0	5.0	19:42	-18.1	292.4	5.5
2009:09:27	04:32	-9.7	76.5	8.3	19:34	-19.4	293.5	8.8
2009:10:01	04:36	-6.5	79.8	11.6	19:27	-20.6	294.7	12.1
2009:10:05	04:41	-3.2	83.1	15.0	19:20	-21.9	295.9	15.5
2009:10:09	04:45	0.1	86.3	18.5	19:13	-23.3	297.2	19.0
2009:10:13	04:50	3.4	89.5	21.9	19:07	-24.6	298.6	22.4
2009:10:17	04:54	6.7	92.8	25.4	19:01	-26.0	300.2	25.9
2009:10:21	04:58	10.0	96.0	28.9	18:55	-27.5	301.8	29.4
2009:10:25	05:03	13.3	99.3	32.4	18:49	-29.0	303.6	32.9
2009:10:29	05:07	16.5	102.7	36.0	18:44	-30.5	305.5	36.5
2009:11:02	05:11	19.7	106.2	39.6	18:40	-32.0	307.7	40.1
2009:11:06	05:16	22.9	109.9	43.1	18:36	-33.6	310.0	43.6
2009:11:10	05:20	26.0	113.7	46.8	18:32	-35.2	312.6	47.3
2009:11:14	05:24	29.0	117.7	50.4	18:29	-36.8	315.4	50.9
2009:11:18	05:28	31.9	121.9	54.1	18:26	-38.4	318.5	54.6
2009:11:22	05:33	34.6	126.4	57.7	18:24	-40.0	321.9	58.2
2009:11:26	05:36	37.2	131.1	61.5	18:22	-41.5	325.7	62.0
2009:11:30	05:40	39.6	136.1	65.2	18:21	-43.0	329.9	65.7
2009:12:04	05:44	41.8	141.4	69.0	18:21	-44.3	334.4	69.5
2009:12:08	05:47	43.7	147.0	72.8	18:21	-45.5	339.4	73.3
2009:12:12	05:50	45.3	152.9	76.6	18:21	-46.4	344.8	77.1
2009:12:16	05:53	46.5	159.0	80.5	18:23	-47.1	350.6	81.0
2009:12:20	05:55	47.5	165.2	84.3	18:24	-47.5	356.7	84.8
2009:12:24	05:57	48.1	171.5	88.3	18:26	-47.6	3.1	88.8
2009:12:28	05:59	48.3	177.8	92.2	18:29	-47.3	9.6	92.7

Eliacal date for Saturn
 Location : Rome
 Latitude : 42° 00' 00'' N
 Longitude : 12° 00' 00'' E
 Visibility [°] = 10.5 + 1.4 * magnitude
 Critical height : 0.00°

	Date	obj s/t	Sun s/t	d s/t	age	Mag
Last evening visibility	2009-08-17	20:19	19:09	1:09h	-30d 23h	1.4
first morning visibility	2009-10-02	05:05	06:09	-1:04h	14d 10h	1.3

Legenda:

Obj s/t : rising and setting of the planet

Sun s/t : sunrise and sunset

D s/t : difference in hours and minutes between the instants of the rising or the setting of the two objects

Age : days from the conjunction with the Sun

Mag : magnitude

	Date	obj s/t	Sun s/t	Sun alt	Sun lon	obj lon	obj lat	Mag	d az	d lon
LE	08-17	20:19	19:09	-12° 35'	145° 01'	171° 13'	1° 58'	1.4	-23° 30'	26° 12'
FM	10-02	05:05	06:09	-12° 46'	189° 06'	176° 47'	1° 59'	1.3	2° 08'	-12° 20'

Legenda:

Date : date in the format month/day

Obj s/t : rising and setting of the planet

Sun s/t : sunrise and sunset

Sun alt : height of the Sun in the instant of visibility of the planet

Sun lon : celestial longitude of the Sun

Obj lon : celestial longitude of the planet

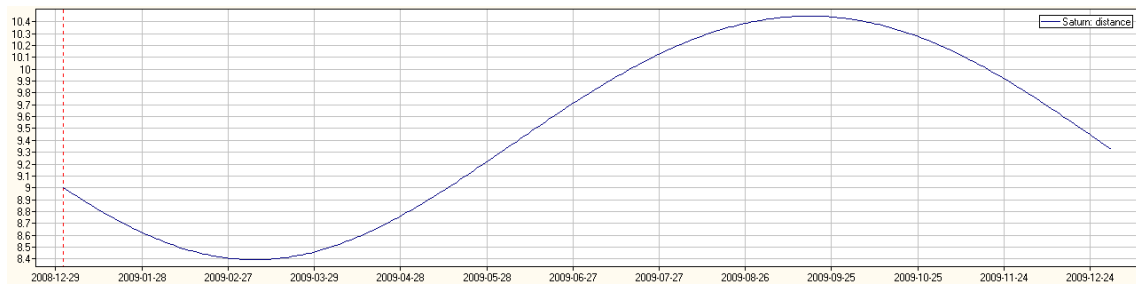
Obj lat : Celestial latitude of the planet

Mag : magnitude

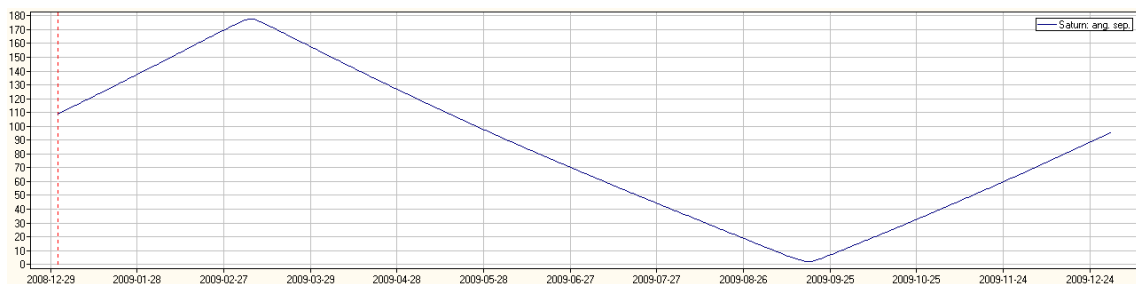
D az : difference in azimuth between the centers of the Sun and the planet in the instant of its visibility

D lon : difference in longitude between the centers of the Sun and the planet in the instant of its visibility

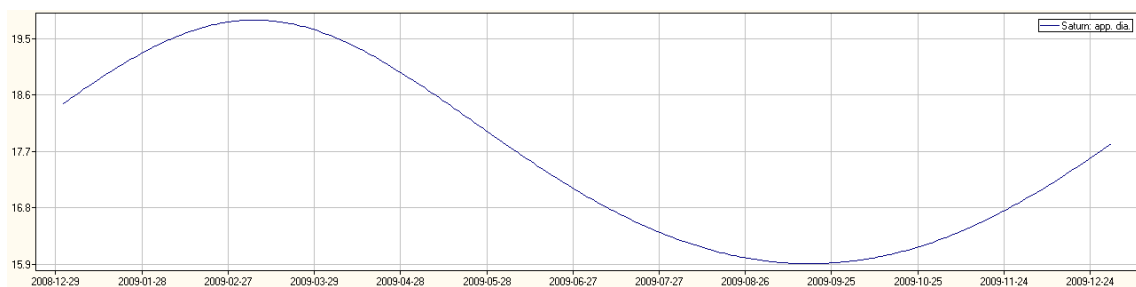
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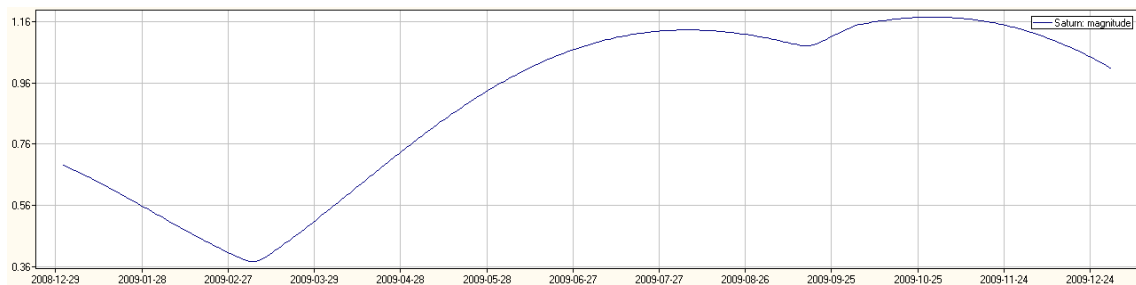
Distance of Saturn in A.U. during the year



Elongation of Saturn in $^{\circ}$ during the year



Diameter of Saturn in $''$ during the year



Magnitude of Saturn during the year

COORDINATES OF THE SATELLITES OF SATURN

Tethys: x	y	z	Dione: x	y	z	Rhea: x	y	z	Titan: x	y	z
01/01/09	4.4067	-0.0179	2.0980	0.9462	-6.1772	8.7087	0.0084	-0.5439	-8.1896	-0.2673	18.9874
02/01/09	-3.9407	0.0118	-2.8807	4.0364	-0.0692	4.7813	-0.1193	8.4747	-14.5128	-0.2060	14.4792
03/01/09	3.3354	-0.0055	3.5632	-6.2331	0.0036	-0.1675	-7.9501	-0.0519	3.6011	-18.7027	-0.1136
04/01/09	-2.6154	-0.0007	-4.1214	4.2917	0.0653	-4.5540	-4.9571	0.1023	-7.1739	-20.0549	-0.0025
05/01/09	1.8026	0.0066	4.5358	0.6093	-0.0912	6.2206	0.0894	-6.1450	-18.2585	0.1108	-7.7875
06/01/09	-0.9276	-0.0121	-4.7920	-5.0254	0.0557	-3.6951	7.1581	-0.0722	4.9952	-13.5047	0.2082
07/01/09	0.0201	0.0169	4.8809	6.1212	0.0185	-1.3202	-3.6183	-0.1175	7.9463	-6.5125	0.2729
08/01/09	0.8891	-0.0210	-4.7994	-3.0341	-0.0819	5.4552	-8.4605	0.0310	-2.1311	1.5721	0.2930
09/01/09	-1.7658	0.0242	4.5501	-2.0233	0.0908	-5.9058	0.6011	0.1315	-8.6968	9.3970	0.2643
10/01/09	2.5830	-0.0265	-4.1419	5.7906	-0.0381	2.3808	8.6736	0.0153	-0.9498	15.6842	0.1911
11/01/09	-3.3076	0.0279	3.5888	-5.5984	-0.0421	2.7477	2.4957	-0.1296	8.3677	19.4724	0.0850
12/01/09	3.9191	-0.0285	-2.9101	1.7016	0.0957	-6.0146	-7.7755	-0.0631	3.9643	20.2580	-0.0375
13/01/09	-4.3914	0.0282	2.1296	3.4150	-0.0856	5.2418	-5.2822	0.1105	-6.9383	18.0216	-0.1580
14/01/09	4.7119	-0.0273	-1.2745	-6.1640	0.0167	-0.9418	5.9011	0.1049	-6.4214	13.1721	-0.2592
15/01/09	-4.8664	0.0259	0.3747	4.8240	0.0658	-3.9876	7.3774	-0.0764	4.6644	6.4502	-0.3263
16/01/09	4.8510	-0.0240	0.5384	-0.1697	-0.1062	6.2464	-3.2558	-0.1364	8.1015	-1.1802	-0.3490
17/01/09	-4.6662	0.0217	-1.4327	-4.5238	0.0753	-4.2954	-8.5481	0.0291	-1.7481	-8.6427	-0.3223
18/01/09	4.3169	-0.0193	2.2769	6.2382	0.0084	-0.5470	0.2102	0.1519	-8.7146	-14.8617	-0.2474
19/01/09	-3.8179	0.0168	-3.0415	-3.6944	-0.0895	5.0296	8.6225	0.0245	-1.3352	-18.8879	-0.1326
20/01/09	3.1833	-0.0142	3.6997	-1.2641	0.1121	-6.1144	2.8632	-0.1489	8.2486	-20.0365	0.0071
21/01/09	-2.4388	0.0117	-4.2282	5.4454	-0.0587	3.0883	-7.5935	-0.0800	4.3029	-18.0269	0.1511
22/01/09	1.6074	-0.0092	4.6087	-5.9008	-0.0371	2.0165	-5.5821	0.1255	-6.6995	-13.0870	0.2758
23/01/09	-0.7202	0.0067	-4.8276	2.4488	0.1111	-5.7525	5.6147	0.1286	-6.6725	-5.9711	0.3587
24/01/09	-0.1923	-0.0043	4.8772	2.7242	-0.1119	5.6302	7.5726	-0.0843	4.3397	2.1486	0.3834
25/01/09	1.0990	0.0019	-4.7558	-5.9941	0.0359	-1.7193	-2.9036	-0.1648	8.2340	9.9119	0.3437
26/01/09	-1.9656	0.0007	4.4675	5.2918	0.0678	-3.3437	-8.6156	0.0273	-1.3792	16.0518	0.2446
27/01/09	2.7655	-0.0033	-4.0224	-0.9643	-0.1296	6.1719	-0.1635	0.1816	-8.7151	19.6332	0.1014
28/01/09	-3.4660	0.0062	3.4361	-3.9369	0.1047	-4.8396	8.5577	0.0370	-1.7006	20.1866	-0.0641
29/01/09	4.0473	-0.0093	-2.7291	6.2570	-0.0068	0.2529	3.2091	-0.1760	8.1195	17.7276	-0.2268
30/01/09	-4.4844	0.0126	1.9262	-4.3092	-0.1001	4.5120	-7.4058	-0.1031	4.6184	12.6964	-0.3628
31/01/09	4.7657	-0.0163	-1.0556	-0.4672	0.1425	-6.2269	-5.8587	0.1459	-6.4591	5.8582	-0.4518
01/02/09	-4.8787	0.0201	0.1479	5.0035	-0.0888	3.7666	5.3308	0.1603	-6.9004	-1.8066	-0.4793
02/02/09	4.8204	-0.0242	0.7651	-6.1118	-0.0282	1.2362	7.7459	-0.0944	4.0213	-9.2140	-0.4382
03/02/09	-4.5934	0.0283	-1.6514	3.1713	0.1306	-5.3893	-2.5615	-0.2018	8.3461	-15.2916	-0.3306
04/02/09	4.2037	-0.0322	2.4796	1.9739	-0.1479	5.9330	-8.6653	0.0245	-1.0234	-19.1049	-0.1682
05/02/09	-3.6678	0.0360	-3.2208	-5.7201	0.0642	-2.4837	-0.5213	0.2193	-8.7001	-19.9968	0.0275
06/02/09	3.0012	-0.0393	3.8487	5.6807	0.0671	-2.6310	8.4810	0.0535	-2.0481	-17.7252	0.2272
07/02/09	-2.2306	0.0419	-4.3414	-1.7582	-0.1583	5.9919	3.5355	-0.2094	7.9817	-12.5631	0.3974
08/02/09	1.3803	-0.0435	4.6815	-3.2720	0.1443	-5.3119	-7.2133	-0.1325	4.9134	-5.3068	0.5070
09/02/09	-0.4820	0.0441	-4.8569	6.1709	-0.0306	1.0634	-6.1148	0.1698	-6.2170	2.8434	0.5339
10/02/09	-0.4331	-0.0433	4.8615	-4.8619	-0.1091	3.9080	5.0490	0.1993	-7.1079	10.5206	0.4705
11/02/09	1.3341	0.0411	-4.6951	0.3519	0.1792	-6.2350	7.9001	-0.1051	3.7082	16.4737	0.3252
12/02/09	-2.1865	-0.0372	4.3634	4.4690	-0.1294	4.3803	-2.2279	-0.2460	8.4403	19.8012	0.1206
13/02/09	2.9642	0.0317	-3.8782	-6.2212	-0.0114	0.4217	-8.6993	0.0194	-0.6789	20.0756	-0.1115
14/02/09	-3.6351	-0.0245	3.2565	3.8513	0.1497	-4.9276	-0.8657	0.2631	-8.6715	17.3546	-0.3361
15/02/09	4.1806	0.0157	-2.5201	1.1779	-0.1914	6.1384	8.3935	0.0744	-2.3801	12.1149	-0.5199
16/02/09	-4.5768	-0.0054	1.6950	-5.3426	0.1033	-3.2163	3.8454	-0.2469	7.8358	5.1499	-0.6353
17/02/09	4.8135	-0.0060	-0.8102	5.9776	0.0591	-1.8624	-7.0159	-0.1677	5.1908	-2.5426	-0.6633
18/02/09	-4.8799	0.0184	-0.1032	-2.5330	-0.1878	5.7052	-6.3532	0.1954	-5.9729	-9.8725	-0.5958
19/02/09	4.7744	-0.0312	1.0129	-2.5408	0.1923	-5.6976	4.7681	0.2446	-7.2976	-15.7739	-0.4375
20/02/09	-4.5017	0.0441	-1.8870	5.9768	-0.0652	1.8660	8.0376	-0.1151	3.3988	-19.3326	-0.2067
21/02/09	4.0689	-0.0565	2.6946	-5.3365	-0.1116	3.2280	-1.9007	-0.2959	8.5185	-19.9258	0.0653
22/02/09	-3.4946	0.0679	-3.4074	1.1749	0.2180	-6.1336	-8.7192	0.0113	-0.3432	-17.3574	0.3369
23/02/09	2.7954	-0.0779	4.0002	3.8504	-0.1794	4.9304	-1.1994	0.3110	-8.6301	-11.9511	0.5624
24/02/09	-1.9993	0.0859	-4.4520	-6.2220	0.0164	-0.4090	8.2957	0.0998	-2.6997	-4.5488	0.7003
25/02/09	1.1317	-0.0914	4.7471	4.4711	0.1634	-4.3744	4.1419	-0.2864	7.6815	3.6205	0.7227
26/02/09	-0.2246	0.0941	-4.8749	0.3533	-0.2383	6.2374	-6.8129	-0.2079	5.4536	11.1865	0.6225
27/02/09	-0.6900	-0.0936	4.8310	-4.8668	0.1526	-3.8984	-6.5768	0.2209	-5.7252	16.9194	0.4144
28/02/09	1.5815	0.0898	-4.6170	6.1721	0.0404	-1.0543	4.4862	0.2945	-7.4721	19.9577	0.1314
01/03/09	-2.4154	-0.0824	4.2403	-3.2694	-0.2130	5.3148	8.1607	-0.1229	3.0906	19.9216	-0.1820
02/03/09	3.1667	0.0717	-3.7142	-1.7586	0.2451	-5.9847	-1.5768	-0.3492	8.5825	16.9156	-0.4785
03/03/09	-3.8038	-0.0577	3.0574	5.6759	-0.1109	2.6410	-8.7262	-0.0003	-0.0129	11.4558	-0.7141
04/03/09	4.3093	0.0407	-2.2928	-5.7192	-0.1038	2.4862	-1.5262	0.3605	-8.5766	4.3646	-0.8537
05/03/09	-4.6610	-0.0213	1.4476	1.9822	0.2538	-5.9224	8.1874	0.1293	-3.0105	-3.3433	-0.8746
06/03/09	4.8499	0.0000	-0.5513	3.1604	-0.2358	5.3956	4.4286	-0.3256	7.5180	-10.5741	-0.7693
07/03/09	-4.8674	0.0225	-0.3643	-6.1116	0.0560	-1.2359	-6.6025	-0.2519	5.7051	-16.2720	-0.5472
08/03/09	4.7132	-0.0454	1.2670	5.0142	0.1671	-3.7413	-6.7888	0.2442	-5.4718	-19.5480	-0.2353
09/03/09	-4.3940	0.0679	-2.1250	-0.4805	-0.2837	6.2256	4.2003	0.3471	-7.6340	-19.8185	0.1228
10/03/09	3.9186	-0.0891	2.9082	-4.3024	0.2097	-4.5121	8.2712	-0.1273	2.7803	-16.9376	0.4717
11/03/09	-3.3069	0.1083	-3.5888	6.2577	0.0093	-0.2260	-1.2527	-0.4035	8.6334	-11.2827	0.7522
12/03/09	2.5771	-0.1244	4.1431	-3.9487	-0.2291	4.8290	-8.7207	-0.0158	0.3157	-3.7416	0.9129
13/03/09	-1.7580	0.1369	-4.5514	-0.9442	0.2979	-6.1647	-1.8497	0.4092	-8.5106	4.4307	0.9219
14/03/09	0.8762	-0.1450	4.7995	5.2745	-0.1659	3.3690	8.0675	0.1624	-3.3162	11.8641	0.7743
15/03/09	0.0364	0.1484	-4.8786	-5.9996	-0.0831	1.7004	4.7089	-0.3622	7.3436	17.3555	0.4937
16/03/09	-0.9468	-0.1465	4.7860	2.7536	0.2812	-5.6059	-6.3825	-0.2982	5.9485	20.0871	0.1257
17/03/09	1.8254	0.1394	-4.5249	2.4154	-0.2938	5.7640	-6.9916	0.2636	-5.2098	19.7298	-0.2718
18/03/09	-2.6376	-0.1268	4.1046	-5.8923	0.1063	-2.0385	3.9072	0.4003	-7.7853	16.4361	-0.6385
19/03/09	3.3594	0.1094	-3.5399	5.4671	0.1578	-3.0438	8.3705	-0.1274	2.4643	10.7614	-0.9207
20/03/09	-3.9605	-0.0872	2.8507	-1.3031	-0.3221	6.1032	-0.9245	-0.4563	8.6722	3.5555	-1.0767
21/03/09	4.4244	0.0612	-2.0613	-3.6635	0.2704	-5.0426	-8.7026	-0.0352	0.6465	-4.1523	-1.0820
22/03/09	-4.7309	-0.0319	1.1995	6.2328	-0.0338	0.6020	-2.1737	0.4544	-8.4315	-11.2676	-0.9311
23/03/09	4.8721	0.0005	-0.2956	-4.5546	-0.2321	4.2602	7.9346	0.1981	-3.6203	-16.7479	-0.6398
24/03/09	-4.8417	0.0321	-0.6186	-0.1174	0.3451	-6.2344	4.9859	-0.3939	7.1563	-19.7322	-0.2453
25/03/09	4.6405	-0.0646	1.5109	4.7830	-0.2265	4.0327	-6.1501	-0.3453	6.1864	-19.6783	0.1962
26/03/09	-4.2774	0.0959	-2.3500	-6.1720	-0.0491	0.8903	-7.1872	0.2775	-4.9362	-16.4912	0.6156
27/03/09	3.7623	-0.1248	3.1064	3.4711	0.2961	-5.1933	3.6034	0.4518	-7.9274	-10.6010	0.9416
28/03/09	-3.1169	0.1502	-3.7535	1.6342	-0.3482	6.0282	8.4593	-0.1223	2.1392	-2.9383	1.1151
29/03/09	2.3604	-0.1709	4.2687	-5.5709	0.164						

Tethys: x	y	z	Dione: x	y	z	Rhea: x	y	z	Titan: x	y	z	
02/04/09	-1.1875	-0.1932	4.7303	6.1003	-0.0866	1.4102	5.2623	-0.4189	6.9538	19.5140	-0.3699	6.1644
03/04/09	2.0507	0.1818	-4.4259	-5.0744	-0.2202	3.6242	-5.9024	-0.3912	6.4209	15.9501	-0.7950	13.0913
04/04/09	-2.8396	-0.1635	3.9662	0.7016	0.3816	-6.1952	-7.3770	0.2848	-4.6479	10.0806	-1.1113	18.1276
05/04/09	3.5313	0.1391	-3.3674	4.2156	-0.2877	4.6185	3.2855	0.4996	-8.0613	2.7792	-1.2733	20.5863
06/04/09	-4.0966	-0.1090	2.6506	-6.2354	-0.0035	0.0760	8.5375	-0.1117	1.8014	-4.9139	-1.2562	20.1324
07/04/09	4.5203	0.0745	-1.8410	4.1193	0.2957	-4.6977	-0.2414	-0.5479	8.7127	-11.9061	-1.0583	16.8111
08/04/09	-4.7839	-0.0365	0.9669	0.8361	-0.3935	6.1857	-8.6250	-0.0850	1.3282	-17.1706	-0.7023	11.0540
09/04/09	4.8807	-0.0036	-0.0591	-5.1586	0.2252	-3.4975	-2.8361	0.5255	-8.2285	-19.8747	-0.2355	3.6548
10/04/09	-4.8063	0.0444	-0.8506	6.0703	0.0974	-1.5291	7.6211	0.2732	-4.2354	-19.5167	0.2748	-4.2993
11/04/09	4.5629	-0.0844	1.7304	-2.8388	-0.3601	5.5520	5.5397	-0.4356	6.7334	-16.0498	0.7480	-11.5608
12/04/09	-4.1609	0.1223	-2.5494	-2.2312	0.3811	-5.8155	-5.6363	-0.4344	6.6535	-9.9520	1.1040	-16.9222
13/04/09	3.6117	-0.1565	3.2790	5.8679	-0.1448	2.1807	-7.5616	0.2845	-4.3418	-2.1914	1.2787	-19.4557
14/04/09	-2.9379	0.1859	-3.8937	-5.4998	-0.1936	2.9385	2.9502	0.5414	-8.1871	5.9382	1.2391	-18.7219
15/04/09	2.1597	-0.2091	4.3721	1.4946	0.4034	-6.0531	8.6045	-0.0955	1.4480	13.0798	0.9909	-14.8703
16/04/09	-1.3072	0.2256	-4.6973	3.5885	-0.3439	5.1167	0.1197	-0.5824	8.7130	18.0900	0.5768	-8.5919
17/04/09	0.4086	-0.2341	4.8582	-6.1934	0.0501	-0.7240	-8.5623	-0.1141	1.6849	20.2395	0.0659	-0.9489
18/04/09	0.5044	0.2348	-4.8492	4.6873	0.2795	-4.1342	-3.1792	0.5478	-8.1009	19.2949	-0.4610	6.8456
19/04/09	-1.3986	-0.2270	4.6707	0.0398	-0.4252	6.2384	7.4357	0.3101	-4.5503	15.4947	-0.9248	13.6317
20/04/09	2.2456	0.2114	-4.3289	-4.6690	-0.2837	-4.1255	5.8191	-0.4430	6.4925	9.4609	-1.2592	18.4542
21/04/09	-3.0117	-0.1879	3.8359	6.2159	0.0503	-0.7492	-5.3490	-0.4730	6.8844	2.0863	-1.4171	20.6584
22/04/09	3.6750	0.1577	-3.2091	-3.5211	-0.3551	5.1449	-7.7405	0.2763	-4.0153	-5.5816	-1.3753	19.9443
23/04/09	-4.2075	-0.1215	2.4702	-1.4742	0.4208	-6.0503	2.5952	0.5758	-8.3040	-12.4542	-1.1363	16.3927
24/04/09	4.5950	0.0806	-1.6453	5.5459	-0.2034	2.8995	8.6588	-0.0741	1.0768	-17.5204	-0.7298	10.4671
25/04/09	-4.8207	-0.0365	0.7631	-5.8271	-0.1543	2.2207	0.4965	-0.6073	8.6979	-19.9744	-0.2107	2.9872
26/04/09	4.8788	-0.0094	0.1456	2.2463	0.4087	-5.8174	-8.4810	-0.1448	2.0543	-19.3507	0.3449	-4.9450
27/04/09	-4.7668	0.0554	-1.0491	2.9183	-0.3902	5.5225	-3.5318	0.5595	-7.9530	-15.6448	0.8492	-12.0821
28/04/09	4.4878	-0.0998	1.9158	-6.0531	0.1070	-1.4941	7.2277	0.3446	-4.8711	-9.3756	1.2171	-17.2351
29/04/09	-4.0538	0.1412	-2.7156	5.1681	0.2489	-3.5190	6.1003	-0.4405	6.2288	-1.5419	1.3832	-19.5114
30/04/09	3.4769	-0.1780	3.4206	-0.7386	-0.4408	6.1922	-5.0381	-0.5055	7.1132	6.5509	1.3173	-18.5172
01/05/09	-2.7807	0.2089	-4.0063	-4.1172	0.3347	-4.6736	-7.9127	0.2604	-3.6661	13.5565	1.0313	-14.4474
02/05/09	1.9862	-0.2327	4.4524	6.2614	-0.0030	0.0231	2.2184	0.6010	-8.4106	18.3601	0.5753	-8.0271
03/05/09	-1.1237	0.2486	-4.7434	-4.1320	-0.3341	4.6682	8.6984	-0.0483	0.6861	20.2707	0.0261	-0.3361
04/05/09	0.2219	-0.2559	4.8692	-0.7128	0.4451	-6.1858	0.8903	-0.6211	8.6654	19.0938	-0.5296	7.4124
05/05/09	0.6880	0.2544	-4.8256	5.1470	-0.2572	3.5559	-8.3787	-0.1759	2.4372	15.1012	-1.0092	14.0724
06/05/09	-1.5725	-0.2439	4.6141	-6.0564	-0.1061	1.4871	-3.8940	0.5606	-7.7824	8.9386	-1.3451	18.7114
07/05/09	2.4041	0.2251	-4.2422	2.9446	0.3970	-5.4996	6.9947	0.3754	-5.1974	1.5126	-1.4911	20.7024
08/05/09	-3.1497	-0.1983	3.7229	2.2212	-0.4226	5.8347	6.3822	-0.4281	5.9400	-6.1253	-1.4270	19.7748
09/05/09	3.7882	0.1646	-3.0743	-5.8244	0.1622	-2.2215	-4.7015	-0.5305	7.3385	-12.8919	-1.1595	16.0376
10/05/09	-4.2926	-0.1251	2.3190	5.5589	0.2068	-2.8676	-8.0762	0.2375	-3.2927	-17.7901	-0.7234	9.9798
11/05/09	4.6498	0.0812	-1.4832	-1.4855	-0.4390	6.0552	1.8187	0.6159	-8.5048	-20.0370	-0.1787	2.4408
12/05/09	-4.8442	-0.0344	0.5961	-3.5181	0.3738	-5.1377	8.7210	-0.0192	0.2752	-19.1975	0.3941	-5.4666
13/05/09	4.8710	-0.0136	0.3116	6.2133	-0.0575	0.7745	1.3011	-0.6235	8.6130	-15.3014	0.9043	-12.4965
14/05/09	-4.7289	0.0612	-1.2083	-4.6654	-0.2994	4.1358	-8.2527	-0.2059	2.8331	-8.9004	1.2664	-17.4766
15/05/09	4.4219	-0.1066	2.0630	0.0388	0.4524	-6.2274	-4.2646	0.5493	-7.5867	-1.0164	1.4170	-19.5443
16/05/09	-3.9630	0.1484	-2.8460	4.6841	-0.3017	4.1432	6.7348	0.4010	-5.5279	7.0383	1.3303	-18.3430
17/05/09	3.3652	-0.1850	3.5302	-6.1909	-0.0533	0.7519	6.6629	-0.4064	5.6244	13.9281	1.0230	-14.1038
18/05/09	-2.6524	0.2152	-4.0920	3.5814	0.3700	-5.1117	-4.3382	-0.5468	7.5581	18.5633	0.5502	-7.5776
19/05/09	1.8465	-0.2378	4.5119	1.5113	-0.4389	6.0553	-8.2284	0.2084	-2.8944	20.2846	-0.0084	0.1440
20/05/09	-0.9775	0.2523	-4.7755	-5.5180	0.2109	-2.8973	1.3960	0.6199	-8.5839	18.9285	-0.5646	7.8501
21/05/09	0.0748	-0.2579	4.8736	5.8601	0.1573	-2.1938	8.7238	0.0120	-0.1554	14.7912	-1.0366	14.4073
22/05/09	0.8311	0.2549	-4.8030	-2.1907	-0.4207	5.8370	1.7278	-0.6141	8.5382	8.5355	-1.3587	18.9020
23/05/09	-1.7067	-0.2429	4.5662	-2.8857	0.3982	-5.5169	-8.1009	-0.2335	3.2407	1.0766	-1.4882	20.7290
24/05/09	2.5251	0.2228	-4.1715	6.0798	-0.1087	1.4942	-4.6417	0.5278	-7.3640	-6.5325	-1.4081	19.6396
25/05/09	-3.2537	-0.1951	3.6325	-5.1188	-0.2544	3.5608	6.4461	0.4200	-5.8602	-13.2137	-1.1288	15.7639
26/05/09	3.8721	0.1610	-2.9681	0.7689	0.4425	-6.1819	6.9398	-0.3763	5.2807	-17.9817	-0.6877	9.6093
27/05/09	-4.3544	-0.1215	2.2011	4.1698	-0.3334	4.6576	-3.9474	-0.5534	7.7692	-20.0713	-0.1465	2.0291
28/05/09	4.6879	0.0781	-1.3581	-6.2362	-0.0006	0.0269	-8.3664	0.1747	-2.4708	-19.0703	0.4142	-5.8563
29/05/09	-4.8583	-0.0325	0.4683	4.1515	0.3304	-4.6654	0.9507	0.6125	-8.6450	-15.0346	0.9058	-12.8032
30/05/09	4.8612	-0.0139	0.4375	0.8010	-0.4380	6.1884	8.7039	0.0435	-0.6048	-8.5398	1.2464	-17.6525
31/05/09	-4.6967	0.0595	-1.3281	-5.1450	0.2491	-3.5152	2.1690	-0.5932	8.4382	-0.6242	1.3778	-19.5647
01/06/09	4.3691	-0.1025	2.1728	6.0743	0.1048	-1.5096	-7.9207	-0.2571	3.6580	7.3962	1.2786	-18.2120
02/06/09	-3.8922	0.1417	-2.9424	-2.8469	-0.3877	5.5473	-5.0228	0.4964	-7.1122	14.1960	0.9695	-13.8518
03/06/09	3.2795	-0.1756	3.6104	-2.2322	0.4060	-5.8125	6.1274	0.4313	-6.1914	18.7061	0.5066	-7.2531
04/06/09	-2.5554	0.2032	-4.1539	5.8701	-0.1522	2.1743	7.2095	-0.3392	4.9082	20.2911	-0.0316	0.4858
05/06/09	1.7420	-0.2235	4.5540	-5.4917	-0.2031	2.9550	-3.5291	-0.5496	7.9684	18.8095	-0.5606	8.1577
06/06/09	-0.8693	0.2361	-4.7972	1.4687	0.4167	-6.0573	-8.4868	0.1381	-2.0226	14.5744	-1.0030	14.6398
07/06/09	-0.0331	-0.2404	4.8750	3.6158	-0.3499	5.0979	0.4842	0.5935	-8.6849	8.2586	-1.2985	19.0328
08/06/09	0.9351	0.2366	-4.7848	-6.1988	0.0476	-0.6786	8.6585	0.0736	-1.0713	0.7817	-1.4090	20.7466
09/06/09	-1.8033	-0.2247	4.5299	4.6523	0.2818	-4.1717	2.6220	-0.5614	8.3106	-6.8037	-1.3214	19.5474
10/06/09	2.6113	0.2056	-4.1190	0.0999	-0.4206	6.2392	-7.7105	-0.2751	4.0819	-13.4242	-1.0483	15.5787
11/06/09	-3.3270	-0.1796	3.5664	-4.7160	0.2740	-4.0716	-5.4043	0.4562	-6.8300	-18.1025	-0.6274	9.3596
12/06/09	3.9304	0.1481	-2.8911	6.2057	0.0536	-0.8250	5.7781	0.4338	-6.5180	-20.0856	-0.1185	1.7523
13/06/09	-4.3965	-0.1121	2.1164	-3.4491	-0.3433	5.1958	7.4685	-0.2969	4.5068	-18.9768	0.4023	-6.1178
14/06/09	4.7129	0.0729	-1.2689	1.5682	0.3971	-6.0272	-3.0840	-0.5351	8.1522	-14.8492	0.8529	-13.0088
15/06/09	-4.8662	-0.0320	0.3779	5.5929	-0.1848	2.8095	-8.5862	0.1003	-1.5511	-8.2949	1.1588	-17.7706
16/06/09	4.8525	-0.0093	0.5260	-5.7859	-0.1499	2.3284	-0.0013	0.5635	-8.7004	-0.3623	1.2690	-19.5801
17/06/09	-4.6724	0.0494	-1.4118	2.1315	0.3775	-5.8612	8.5848	0.1006	-1.5522	7.6312	1.1673	-18.1291
18/06/09	4.3308	-0.0871	2.2490	3.0321	-0.3503	5.4645	3.0837	-0.5198	8.1531	14.3691	0.8759	-13.6927
19/06/09	-3.8418	0.1212	-3.0088	-6.0856	0.0875	-1.3576	-7.4686	-0.2862	4.5091	18.7972	0.4487	-7.0508
20/06/09	3.2194	-0.1503	3.6653	5.0832	0.2283	-3.6401	-5.7827	0.4090	-6.5164	20.2968	-0.0417	0.6957
21/06/09	-2.4880	0.1739	-4.1958	-0.5840	-0.3881	6.2134	5.3981	0.4267	-6.8361	18.7403	-0.5181	8.3439
22/06												

	Tethys: x	y	z	Dione: x	y	z	Rhea: x	y	z	Titan: x	y	z
08/07/09	-2.4464	0.1296	-4.2218	-6.1487	-0.0532	1.0457	-6.5135	0.3008	-5.7935	14.4093	-0.7699	14.8366
09/07/09	1.6263	-0.1429	4.5998	3.3290	0.2713	-5.2840	4.5483	0.3818	-7.4304	8.0547	-0.9810	19.1456
10/07/09	-0.7511	0.1512	-4.8205	1.8092	-0.3040	5.9825	8.1426	-0.1579	3.1364	0.5727	-1.0504	20.7716
11/07/09	-0.1495	-0.1542	4.8763	-5.6592	0.1322	-2.6155	-1.6049	-0.4277	8.5736	-6.9882	-0.9724	19.4904
12/07/09	1.0458	0.1521	-4.7653	5.7379	0.1218	-2.4959	-8.7263	0.0001	-0.0186	-13.5600	-0.7607	15.4528
13/07/09	-1.9047	-0.1451	4.4915	-1.8774	-0.2888	5.9544	-1.5435	0.4150	-8.5711	-18.1716	-0.4465	9.1846
14/07/09	2.7005	0.1339	-4.0641	-3.1830	0.2571	-5.3587	8.1729	0.1461	-3.0481	-20.0779	-0.0762	1.5541
15/07/09	-3.4016	-0.1188	3.4979	6.1530	-0.0560	1.1597	4.4837	-0.3507	7.4840	-18.8929	0.2943	-6.3094
16/07/09	3.9888	0.1007	-2.8121	-4.9086	-0.1773	3.8514	-6.5455	-0.2669	5.7701	-14.7028	0.6067	-13.1640
17/07/09	-4.4376	-0.0803	2.0303	0.4091	0.2835	-6.2242	-6.8577	0.2439	-5.3852	-8.1120	0.8110	-17.8667
18/07/09	4.7363	0.0584	-1.1792	4.4361	-0.1986	4.4136	4.0814	0.3439	-7.6982	-0.1761	0.8757	-19.6078
19/07/09	-4.8723	-0.0359	0.2878	-6.2237	-0.0163	0.4025	8.3205	-0.1145	2.6299	7.7901	0.7947	-18.0960
20/07/09	4.8422	0.0135	0.6133	3.8582	0.2115	-4.9157	-1.0723	-0.3726	8.6590	14.4812	0.5881	-13.6189
21/07/09	-4.6471	0.0080	-1.4935	1.1835	-0.2604	6.1379	-8.7108	-0.0228	0.5214	18.8588	0.2961	-6.9615
22/07/09	4.2925	-0.0279	2.3227	-5.3582	0.1337	-3.1871	-2.0741	0.3504	-8.4615	20.3177	-0.0302	0.7795
23/07/09	-3.7927	0.0457	-3.0725	5.9645	0.0760	-1.8966	7.9669	0.1450	-3.5513	18.7373	-0.3395	8.4100
24/07/09	3.1620	-0.0609	3.7175	-2.4785	-0.2282	5.7314	4.9414	-0.2855	7.1925	14.4397	-0.5881	14.8251
25/07/09	-2.4248	0.0732	-4.2356	-2.6147	0.2219	-5.6600	-6.1723	-0.2408	6.1692	8.0970	-0.7443	19.1413
26/07/09	1.6039	-0.0823	4.6092	6.0028	-0.0695	1.7807	-7.1822	0.1879	-4.9471	0.6230	-0.7914	20.7798
27/07/09	-0.7288	0.0884	-4.8255	-5.2767	-0.1233	3.3295	3.5890	0.2963	-7.9414	-6.9368	-0.7274	19.5129
28/07/09	-0.1709	-0.0913	4.8771	1.0438	0.2248	-6.1535	8.4693	-0.0757	2.1027	-13.5151	-0.5651	15.4878
29/07/09	1.0656	0.0913	-4.7625	3.9645	-0.1737	4.8420	-0.5251	-0.3096	8.7119	-18.1396	-0.3298	9.2268
30/07/09	-1.9225	-0.0886	4.4854	-6.2318	0.0096	-0.2348	-8.6607	-0.0379	1.0699	-20.0624	-0.0575	1.5965
31/07/09	2.7156	0.0837	-4.0553	4.3385	0.1519	-4.5018	-2.6064	0.2810	-8.3158	-18.8945	0.2103	-6.2737
01/08/09	-3.4140	-0.0768	3.4870	0.5555	-0.2060	6.2271	7.7254	0.1341	-4.0497	-14.7201	0.4315	-13.1403
02/08/09	3.9981	0.0684	-2.7998	-5.0060	0.1208	-3.7168	5.3877	-0.2194	6.8666	-8.1422	0.5720	-17.8590
03/08/09	-4.4439	-0.0591	2.0172	6.1263	0.0389	-1.2864	-5.7679	-0.2046	6.5505	-0.2149	0.6119	-19.6197
04/08/09	4.7397	0.0492	-1.1658	-3.0450	-0.1650	5.4522	-7.4832	0.1349	-4.4811	7.7493	0.5499	-18.1301
05/08/09	-4.8730	-0.0392	0.2747	-2.0277	0.1745	-5.8984	3.0740	0.2398	-8.1561	14.4480	0.4033	-13.6759
06/08/09	4.8405	0.0293	0.6257	5.7935	-0.0692	2.3749	8.5863	-0.0435	1.5581	18.8445	0.2023	-7.0380
07/08/09	-4.6435	-0.0201	-1.5048	-5.5854	-0.0756	2.7802	0.0329	-0.2402	8.7298	20.3330	-0.0169	0.6920
08/08/09	4.2872	0.0116	2.3325	1.6592	0.1607	-6.0204	-8.5745	-0.0440	1.6228	18.7882	-0.2196	8.3248
09/08/09	-3.7862	-0.0040	-3.0808	3.4591	-0.1355	5.2155	-3.1358	0.2087	-8.1334	14.5256	-0.3775	14.7573
10/08/09	3.1548	-0.0026	3.7241	-6.1761	0.0229	-0.8618	7.4486	0.1131	-4.5388	8.2098	-0.4720	19.1045
11/08/09	-2.4173	0.0082	-4.2405	4.7687	0.0959	-4.0470	5.8181	-0.1544	6.5074	0.7485	-0.4949	20.7827
12/08/09	1.5964	-0.0128	4.6125	-0.0704	-0.1439	6.2520	-5.3341	-0.1586	6.9099	-6.8160	-0.4482	19.5571
13/08/09	-0.7217	0.0165	-4.8273	-4.6070	0.0939	-4.2024	-7.7573	0.0868	-3.9899	-13.4162	-0.3430	15.5672
14/08/09	-0.1775	-0.0197	4.8777	6.2246	0.0127	-0.6700	2.5395	0.1754	-8.3394	-18.0759	-0.1978	9.3289
15/08/09	1.0714	0.0223	-4.7620	-3.5744	-0.1025	5.1206	8.6690	-0.0192	0.9997	-20.0411	-0.0363	1.7050
16/08/09	-1.9273	-0.0247	4.4841	-1.4267	0.1171	-6.0742	0.5977	-0.1662	8.7111	-18.9163	0.1160	-6.1756
17/08/09	2.7195	0.0270	-4.0535	5.5287	-0.0549	2.9391	-8.4513	-0.0403	2.1757	-14.7793	0.2356	-13.0677
18/08/09	-3.4168	-0.0295	3.4849	-5.8346	-0.0368	2.2081	-3.6583	0.1355	-7.9140	-8.2283	0.3055	-17.8232
19/08/09	4.0000	0.0322	-2.7977	2.2517	0.0946	-5.8278	7.1374	0.0819	-5.0142	-0.3141	0.3184	-19.6279
20/08/09	-4.4451	-0.0352	2.0152	2.9244	-0.0856	5.5332	6.2288	-0.0925	6.1162	7.6536	0.2781	-18.1846
21/08/09	4.7402	0.0386	-1.1641	-6.0589	0.0226	-1.4745	-4.8732	-0.1037	7.2437	14.3740	0.1981	-13.7734
22/08/09	-4.8731	-0.0424	0.2734	5.1476	0.0465	-3.5557	-8.0013	0.0454	-3.4761	18.8094	0.0972	-7.1681
23/08/09	4.8403	0.0464	0.6266	-0.6899	-0.0770	6.2140	1.9888	0.1046	-8.4886	20.3495	-0.0046	0.5465
24/08/09	-4.6431	-0.0505	-1.5052	-4.1654	0.0541	-4.6417	8.7156	-0.0040	0.4314	18.8614	-0.0907	8.1854
25/08/09	4.2869	0.0543	2.3326	6.2608	-0.0009	-0.0518	1.1652	-0.0892	8.6546	14.6506	-0.1498	14.6465
26/08/09	-3.7860	-0.0578	-3.0805	-4.0642	-0.0439	4.7403	-8.2910	-0.0263	2.7243	8.3723	-0.1770	19.0412
27/08/09	3.1549	0.0605	3.7236	-0.8162	0.0526	-6.1879	-4.1696	0.0635	-7.6582	0.9271	-0.1734	20.7783
28/08/09	-2.4177	-0.0621	-4.2399	5.2117	-0.0271	3.4703	6.7929	0.0409	-5.4718	-6.6463	-0.1450	19.6131
29/08/09	1.5972	0.0623	4.6118	-6.0244	-0.0091	1.6177	6.6161	-0.0355	5.6952	-13.2789	-0.1011	15.6749
30/08/09	-0.7228	-0.0608	-4.8268	2.8180	0.0299	-5.5784	-4.3879	-0.0409	7.5486	-17.9893	-0.0527	9.4708
31/08/09	-0.1761	0.0573	4.8775	2.3644	-0.0265	5.7943	-8.2126	0.0120	-2.9433	-20.0151	-0.0102	1.8585
01/09/09	1.0697	-0.0517	-4.7621	-5.8825	0.0086	-2.0689	1.4258	0.0290	-8.6015	-18.9509	0.0183	-6.0346
02/09/09	-1.9255	0.0438	4.4847	5.4740	0.0062	-3.0319	8.7249	0.0012	-0.1426	-14.8659	0.0291	-12.9604
03/09/09	2.7177	-0.0336	-4.0546	-1.2994	-0.0086	6.1147	1.7312	-0.0114	8.5597	-8.3513	0.0233	-17.7660
04/09/09	-3.4152	0.0211	3.4866	-3.6849	0.0032	-5.0327	-8.0940	-0.0019	3.2642	-0.4530	0.0069	-19.6305
05/09/09	3.9986	-0.0067	6.2359	-0.0012	-0.0012	0.5641	-4.6655	-0.0054	-7.3672	7.5220	-0.0111	-18.2496
06/09/09	-4.4440	-0.0095	2.0179	-4.5121	0.0078	4.3144	6.4172	-0.0092	-5.9076	14.2732	-0.0215	-13.8946
07/09/09	4.7395	0.0270	-1.1672	-0.2000	-0.0160	-6.2398	9.9766	0.0148	5.2470	18.7602	-0.0176	-7.3309
08/09/09	-4.8729	-0.0452	0.2769	4.8453	0.0131	3.9656	-3.8815	0.0284	7.8214	20.3657	0.0035	0.3645
09/09/09	4.8406	0.0637	0.6229	-6.1543	0.0061	1.0129	-8.3891	-0.0121	-2.3953	18.9470	0.0396	8.0112
10/09/09	-4.6439	-0.0816	-1.5014	3.3552	-0.0304	-5.2745	0.8545	-0.0495	-8.6767	14.7981	0.0842	14.5070
11/09/09	4.2881	0.0983	2.3288	1.7828	0.0392	5.9978	8.6964	-0.0039	-0.7179	8.5635	0.1280	18.9585
12/09/09	-3.7877	-0.1132	-3.0769	-5.6486	-0.0188	-2.6416	2.2914	0.0654	8.4266	1.1359	0.1603	20.7653
13/09/09	3.1569	0.1253	3.7202	5.7466	-0.0228	-2.4791	-7.8612	0.0323	3.7911	-6.4488	0.1709	19.6716
14/09/09	-2.4199	-0.1343	-4.2369	-1.8954	0.0579	5.9552	-5.1423	-0.0692	-7.0427	-13.1200	0.1524	15.7945
15/09/09	1.5996	0.1393	4.6093	-3.1687	-0.0566	-5.3731	6.0128	-0.0674	-6.3180	-17.8897	0.1016	9.6316
16/09/09	-0.7252	-0.1401	-4.8248	6.1506	0.0122	1.1740	7.3073	0.0570	4.7748	-19.9854	0.0218	2.0345
17/09/09	-0.1737	0.1361	4.8760	-4.9156	0.0500	3.8460	-3.3574	0.1027	8.0600	-18.9910	-0.0770	-5.8709
18/09/09	1.0676	-0.1273	-4.7612	0.4181	-0.0854	-6.2297	-8.5291	-0.0262	-1.8360	-14.9652	-0.1786	-12.8338
19/09/09	-1.9236	0.1136	4.4843	4.4317	0.0640	4.4219	0.2789	-0.1290	-8.7133	-8.4913	-0.2628	-17.6953
20/09/09	2.7161	-0.0953	-4.0547	-6.2239	0.0077	0.3979	8.6299	-0.0195	-1.2902	-0.6101	-0.3104	-19.6270
21/09/09	-3.4140	0.0726	3.4871	3.8601	-0.0832	-4.9184	2.8417	0.1391	8.2562	7.3740	-0.3072	-18.3155
22/09/09	3.9977	-0.0462	-2.8007	1.1833	0.1086	6.1423	-7.5941	0.0758	4.3010	14.1602	-0.2483	-14.0232
23/09/09	-4.4434	0.0168	2.0190	-5.3587	-0.0584	-3.1886	-5.5964	-0.1265	-6.6871	18.7040	-0.1392	-7.5056
24/09/09	4.7393	0.0149	-1.1686	5.9636	-0.0389	-1.9011	5.5824	-0.1323	-6.6999	20.3804	0.0055	0.1681
25/09/09	-4.8728	-0.0477	0.2783	-2.4741	0.1195	5.7364	7.6059	0.0899	4.2821	19.0358	0.1648	7.8222
26/09/09	4.8405	0.0805	0.6213	-2.6201	-0.1224	-5.6608	-2.8195	0.1799	8.2625	14.9519	0.3145	14.3540
27/09/09	-4.6438	-0.1123	-1.4998	6.0051	0.0389	1.7738	-8.6317	-0.0299				

Tethys: x y z			Dione: x y z			Rhea: x y z			Titan: x y z			
13/10/09	4.8393	0.0968	0.6286	4.7591	-0.1563	-4.0569	8.0993	0.1254	3.2513	8.9479	0.7195	18.7701
14/10/09	-4.6407	-0.1417	-1.5068	-0.0557	0.2448	6.2487	-1.7191	0.3355	8.5552	1.5538	0.8126	20.7168
15/10/09	4.2827	0.1831	2.3336	-4.6160	-0.1670	-4.1904	-8.7240	-0.0063	-0.1341	-6.0560	0.7929	19.7657
16/10/09	-3.7799	-0.2196	-3.0808	6.2233	-0.0295	-0.6832	-1.4303	-0.3536	-8.5934	-12.8054	0.6563	16.0109
17/10/09	3.1466	0.2496	3.7227	-3.5642	0.2159	5.1239	8.2118	-0.1230	-2.9463	-17.6922	0.4152	9.9307
18/10/09	-2.4071	-0.2720	-4.2376	-1.4376	-0.2599	-6.0675	4.3944	0.3242	7.5387	-19.9235	0.0994	2.3656
19/10/09	1.5844	0.2856	4.6078	5.5339	0.1268	2.9270	-6.6121	0.2489	5.6929	-19.0611	-0.2460	-5.5602
20/10/09	-0.7080	-0.2900	-4.8207	-5.8313	0.1004	2.2144	-6.7924	-0.2454	-5.4655	-15.1446	-0.5654	-12.5896
21/10/09	-0.1925	0.2843	4.8689	2.2442	-0.2663	-5.8257	4.1714	-0.3490	-7.6505	-8.7439	-0.8028	-17.5520
22/10/09	1.0873	-0.2689	-4.7508	2.9307	0.2561	5.5244	8.2920	0.1276	2.7218	-0.8915	-0.9133	-19.6046
23/10/09	-1.9436	0.2437	4.4705	-6.0600	-0.0681	-1.4685	-1.1650	0.4099	8.6450	7.1108	-0.8735	-18.4186
24/10/09	2.7354	-0.2096	-4.0374	5.1455	-0.1729	-3.5554	-8.7147	0.0197	0.4266	13.9603	-0.6868	-14.2396
25/10/09	-3.4316	0.1672	3.4664	-0.6876	0.3051	6.2069	-1.9805	-0.4176	-8.4807	18.6047	-0.3820	-7.8066
26/10/09	4.0128	-0.1181	-2.7770	-4.1653	-0.2309	-4.6366	8.0056	-0.1726	-3.4650	20.4046	-0.0065	-0.1748
27/10/09	-4.4549	0.0637	1.9926	6.2610	-0.0041	-0.0508	4.8677	0.3691	7.2396	19.1872	0.3832	7.4880
28/10/09	4.7462	-0.0058	-1.1402	-4.0668	0.2456	4.7314	-6.2348	0.3151	6.1011	15.2134	0.7300	14.0781
29/10/09	-4.8743	-0.0538	0.2488	-0.8103	-0.3248	-6.1807	-7.1281	-0.2649	-5.0194	9.0983	0.9834	18.6868
30/10/09	4.8359	0.1128	0.6512	5.2077	0.1841	3.4715	3.6744	-0.4219	-7.8973	1.7152	1.1050	20.6870
31/10/09	-4.6326	-0.1694	-1.5288	-6.0269	0.0885	1.6049	8.4483	0.1197	2.1888	-5.9064	1.0727	19.7898
01/11/09	4.2697	0.2213	2.3541	2.8294	-0.3072	-5.5646	-0.6142	0.4792	8.6981	-12.6872	0.8841	16.0799
02/11/09	-3.7620	-0.2669	-3.0989	2.3507	0.3229	5.7907	-8.6703	0.0537	0.9770	-17.6180	0.5587	10.0292
03/11/09	3.1241	0.3041	3.7376	-5.8763	-0.1167	-2.0831	-2.5143	-0.4734	-8.3352	-19.8975	0.1382	2.4747
04/11/09	-2.3805	-0.3318	-4.2484	5.4840	-0.1744	-3.0093	7.7705	-0.2271	-3.9611	-19.0789	-0.3162	-5.4583
05/11/09	1.5543	0.3484	4.6137	-1.3221	0.3557	6.0991	5.3140	0.4039	6.9164	-15.1960	-0.7316	-12.5092
06/11/09	-0.6753	-0.3536	-4.8211	-3.6632	-0.2969	-5.0400	-5.8389	0.3822	6.4779	-8.8156	-1.0363	-17.5025
07/11/09	-0.2267	0.3465	4.8634	6.2334	0.0339	0.5918	-7.4298	-0.2740	-4.5608	-0.9699	-1.1743	-19.5910
08/11/09	1.1219	-0.3275	-4.7391	-4.5345	0.2607	4.2824	3.1713	-0.4917	-8.1082	7.0392	-1.1186	-18.4420
09/11/09	-1.9773	0.2966	4.4525	-0.1638	-0.3824	-6.2295	8.5685	0.1027	1.6569	13.9075	-0.8770	-14.2971
10/11/09	2.7669	-0.2552	-4.0133	4.8206	0.2465	3.9877	-0.0707	0.5417	8.7159	18.5808	-0.4886	-7.8905
11/11/09	-3.4596	0.2040	3.4365	-6.1610	0.0624	0.9681	-8.5927	0.0943	1.5131	20.4156	-0.0149	-0.2731
12/11/09	4.0359	-0.1451	-2.7420	3.3945	-0.3341	-5.2393	-3.0285	-0.5198	-8.1597	19.2334	0.4723	7.3897
13/11/09	-4.4720	0.0800	1.9534	1.7350	0.3854	5.9992	7.5096	-0.2845	-4.4321	15.2887	0.9019	13.9943
14/11/09	4.7561	-0.0111	-1.0979	-5.6252	-0.1733	-2.6855	5.7313	0.4283	6.5728	9.1915	1.2124	18.6287
15/11/09	-4.8763	-0.0594	0.2047	5.7693	-0.1606	-2.4211	-5.4283	0.4481	6.8220	1.8119	1.3581	20.6599
16/11/09	4.8293	0.1289	0.6955	-1.9542	0.3939	5.9229	-7.6971	-0.2731	-4.0943	-5.8200	1.3140	19.7925
17/11/09	-4.6171	-0.1951	-1.5719	-3.1112	-0.3615	-5.3951	2.6663	-0.5563	-8.2836	-12.6214	1.0795	16.1055
18/11/09	4.2453	0.2555	2.3944	6.1372	0.0826	1.2398	8.6539	0.0776	1.1302	-17.5772	0.6807	10.0763
19/11/09	-3.7291	-0.3081	-3.1346	-4.9612	0.2598	3.7778	0.4614	0.5959	8.7005	-19.8796	0.1700	2.5150
20/11/09	3.0833	0.3506	3.7673	0.4974	-0.4295	-6.2100	-8.4847	0.1396	2.0314	-19.0773	-0.3772	-5.4234
21/11/09	-2.3328	-0.3819	-4.2705	4.3724	0.3107	4.4700	-3.5200	-0.5560	-7.9578	-15.2025	-0.8733	-12.4829
22/11/09	1.5011	0.4001	4.6271	-6.2288	0.0232	0.3081	7.2267	-0.3427	-4.8756	-8.8234	-1.2332	-17.4848
23/11/09	-0.6182	-0.4051	-4.8247	3.9332	-0.3454	-4.8490	6.1178	0.4420	6.2133	-0.9753	-1.3924	-19.5808
24/11/09	-0.2859	0.3958	4.8565	1.0869	0.4398	6.1450	-5.0075	0.5105	7.1328	7.0374	-1.3215	-18.4388
25/11/09	1.1811	-0.3730	-4.7213	-5.3049	-0.2349	-3.2696	-7.9298	-0.2628	-3.6244	13.9099	-1.0324	-14.3011
26/11/09	-2.0343	0.3367	4.4238	5.9958	-0.1321	-1.7935	2.1640	-0.6137	-8.4246	18.5877	-0.5737	-7.9016
27/11/09	2.8196	-0.2886	-3.9741	-2.5779	0.4172	5.6759	8.7059	0.0460	0.6130	20.4273	-0.0190	-0.2900
28/11/09	-3.5058	0.2297	3.3877	-2.5113	-0.4208	-5.6960	0.9785	0.6403	8.6544	19.2488	0.5473	7.3698
29/11/09	4.0736	-0.1623	-2.6847	5.9688	0.1392	1.8876	-8.3492	0.1876	2.5288	15.3051	1.0428	13.9743
30/11/09	-4.4993	0.0885	1.8893	-5.3403	0.2429	3.2187	-3.9861	-0.5814	-7.7333	9.2050	1.3973	18.6098
01/12/09	4.7715	-0.0108	-1.0288	1.1679	-0.4630	-6.1185	6.9258	-0.3994	-5.2898	1.8188	1.5597	20.6410
02/12/09	-4.8787	0.0681	0.1328	3.8633	0.3729	4.9116	6.4726	0.4455	5.8422	-5.8212	1.5034	19.7700
03/12/09	4.8179	0.1454	0.7678	-6.2250	-0.0269	-0.3702	-4.5809	0.5673	7.4103	-12.6282	1.2298	16.0749
04/12/09	-4.5916	-0.2185	-1.6420	4.4387	-0.3400	-4.3935	-8.1286	-0.2444	-3.1555	-17.5825	0.7711	10.0253
05/12/09	4.2059	0.2846	2.4597	0.4106	0.4827	6.2224	1.6684	-0.6625	-8.5327	-19.8735	0.1889	2.4628
06/12/09	-3.6767	-0.3416	-3.1926	-4.9138	-0.2978	-3.8286	8.7267	0.0095	0.1089	-19.0500	-0.4301	-5.4791
07/12/09	3.0190	0.3871	3.8155	6.1568	-0.0903	-1.1302	1.4771	0.6740	8.5808	-15.1489	-0.9865	-12.5305
08/12/09	-2.2585	-0.4197	-4.3068	-3.1861	0.4237	5.3559	-8.1896	0.2363	3.0028	-8.7459	-1.3854	-17.5116
09/12/09	1.4189	0.4378	4.6496	-1.8664	-0.4711	-5.9359	-4.4250	-0.5957	-7.4899	-0.8839	-1.5564	-19.5774
10/12/09	-0.5307	-0.4412	-4.8320	5.7249	0.2005	2.5286	6.6111	-0.4525	-5.6739	7.1280	-1.4698	-18.4026
11/12/09	-0.3757	0.4289	4.8476	-5.6640	0.2106	2.6075	6.7951	0.4392	5.4637	13.9847	-1.1417	-14.2366
12/12/09	1.2702	-0.4020	-4.6958	1.8411	-0.4805	-5.9509	-4.1526	0.6168	7.6550	18.6350	-0.6287	-7.8188
13/12/09	-2.1193	0.3605	4.3818	3.2945	0.4289	5.3049	-8.2947	-0.2191	-2.6915	20.4402	-0.0140	-0.2012
14/12/09	2.8974	-0.3066	-3.9165	-6.1444	-0.0848	-1.0607	1.1832	-0.7011	-8.6101	19.2249	0.6086	7.4519
15/12/09	-3.5732	0.2414	3.3157	4.9027	-0.3179	-3.8729	8.7190	-0.0300	-0.3788	15.2464	1.1487	14.0374
16/12/09	4.1278	-0.1675	-2.6003	-0.2883	0.5110	6.2257	1.9547	0.6964	8.4828	9.1172	1.5303	18.6429
17/12/09	-4.5378	0.0873	1.7950	-4.4509	-0.3578	-4.3541	-8.0096	0.2836	3.4515	1.7120	1.6995	20.6348
18/12/09	4.7923	-0.0037	-0.9274	6.2456	-0.0376	-0.4359	-4.8351	-0.5991	-7.2319	-5.9325	1.6294	19.7180
19/12/09	-4.8802	-0.0806	0.0278	-3.7704	0.4128	4.9610	6.2865	-0.5000	-6.0273	-12.7254	1.3242	15.9756
20/12/09	4.7994	0.1624	0.8730	-1.1806	-0.5087	-6.1075	7.0856	0.4242	5.0822	-17.6447	0.8213	9.8849
21/12/09	-4.5530	-0.2390	-1.7436	5.4024	0.2624	3.1547	-3.7268	0.6572	7.8682	-19.8810	0.1897	2.2967
22/12/09	4.1477	0.3076	2.5540	-5.9241	0.1647	1.9472	-8.4298	-0.1885	-2.2363	-18.9901	-0.4757	-5.6462
23/12/09	-3.6002	-0.3658	-3.2759	2.5090	-0.4803	-5.7032	0.7120	-0.7285	-8.6595	-15.0206	-1.0677	-12.6689
24/12/09	2.9263	0.4113	3.8845	2.6679	0.4750	5.6415	8.6856	-0.0705	-0.8474	-8.5634	-1.4856	-17.5929
25/12/09	-2.1523	-0.4429	-4.3585	-5.9816	-0.1470	-1.7559	2.4089	0.7072	8.3642	-0.6744	-1.6570	-19.5824
26/12/09	1.3026	0.4588	4.6815	5.3159	-0.2800	-3.2887	-7.8129	0.3273	3.8733	7.3301	-1.5534	-18.3263
27/12/09	-0.4080	-0.4591	-4.8422	-1.0028	0.5223	6.1487	-5.2158	-0.5922	-6.9633	14.1461	-1.1957	-14.0893
28/12/09	-0.5006	0.4429	4.8350	-3.9165	-0.4108	-4.8369	5.9562	-0.5400	-6.3501	18.7295	-0.6468	-7.6227
29/12/09	1.3930	-0.4117	-4.6600	6.2548	0.0226	0.2830	7.3447	0.4016	4.7014	20.4527	0.0035	0.0146
30/12/09	-2.2355	0.3656	4.3233	-4.3209	0.3845	4.4901	-3.3070	0.6871	8.0515	19.1524	0.6558	7.6558
31/12/09	3.0026	-0.3070	-3.8364	-0.4598	-0.5306	-6.2029	-8.5359	-0.1543	-1.7930	15.0969	1.2155	14.1995
01/01/10	-3.6632	0.2373	3.2163	4.9988	0.3205	3.7567	0.2574	-0.744				

MUTUAL PHENOM. OF THE SATELLITES OF SATURN

Ec.D. : beginning of the eclipse
 Ec.R. : ending of the eclipse
 Oc.D. : beginning of the occultation
 Oc.R. : ending of the occultation
 Tr.I. : beginning of the transit
 Tr.E. : ending of the transit
 Sh.I. : beginning of the umbra transit
 Sh.E. : ending of the umbra transit

TIMES IN U.T.

Date	Times	Moon	Phenomen	Phase	h Sat	h Sun							
01/01/09	0.04.58	Dione	Tr.	E.	26.1	-68.4	13/01/09	3.39.30	Dione	Ec.	D.	52.8	-32.7
01/01/09	6.02.18	Tethys	Ec.	D.	44.3	-7.1	13/01/09	7.42.55	Dione	Occ.	R.	20.2	9.2
01/01/09	9.36.36	Tethys	Occ.	R.	8.0	21.2	13/01/09	8.09.44	Rhea	Sh.	I.	15.3	12.8
02/01/09	1.03.43	Rhea	Ec.	D.	36.7	-60.6	13/01/09	9.14.53	Rhea	Tr.	I.	3.3	20.3
02/01/09	4.41.35	Tethys	Sh.	I.	51.9	-21.3	13/01/09	11.29.26	Rhea	Sh.	E.	-20.9	26.6
02/01/09	4.53.24	Dione	Ec.	D.	51.1	-19.2	13/01/09	12.33.02	Tethys	Sh.	I.	-30.5	24.5
02/01/09	5.17.11	Tethys	Tr.	I.	49.1	-14.9	13/01/09	13.05.32	Tethys	Tr.	I.	-34.7	22.2
02/01/09	6.10.29	Rhea	Occ.	R.	42.7	-5.7	13/01/09	13.09.28	Rhea	Tr.	E.	-35.2	21.9
02/01/09	7.35.38	Tethys	Sh.	E.	29.2	7.7	13/01/09	15.27.46	Tethys	Sh.	E.	-42.6	5.0
02/01/09	8.15.38	Tethys	Tr.	E.	22.1	12.9	13/01/09	16.04.00	Tethys	Tr.	E.	-41.3	-0.3
02/01/09	9.00.54	Dione	Occ.	R.	13.8	18.0	14/01/09	11.12.19	Tethys	Ec.	D.	-18.7	26.8
03/01/09	3.20.52	Tethys	Ec.	D.	52.5	-36.2	14/01/09	12.25.00	Dione	Sh.	I.	-30.0	25.1
03/01/09	6.54.47	Tethys	Occ.	R.	35.4	1.8	14/01/09	13.07.20	Dione	Tr.	I.	-35.4	22.2
03/01/09	13.38.52	Dione	Sh.	I.	-34.0	17.4	14/01/09	14.43.02	Tethys	Occ.	R.	-42.4	11.6
03/01/09	14.25.13	Dione	Tr.	I.	-38.9	12.0	14/01/09	15.30.55	Dione	Sh.	E.	-42.4	4.7
03/01/09	16.43.01	Dione	Sh.	E.	-41.4	-9.2	14/01/09	16.27.30	Dione	Tr.	E.	-39.3	-4.6
03/01/09	17.45.44	Dione	Tr.	E.	-36.1	-20.2	15/01/09	9.51.37	Tethys	Sh.	I.	-5.1	23.6
04/01/09	2.00.09	Tethys	Sh.	I.	45.9	-51.0	15/01/09	10.23.28	Tethys	Tr.	I.	-11.0	25.6
04/01/09	2.35.21	Tethys	Tr.	I.	49.6	-44.7	15/01/09	12.46.28	Tethys	Sh.	E.	-33.3	24.0
04/01/09	4.54.19	Tethys	Sh.	E.	50.4	-19.1	15/01/09	13.21.55	Tethys	Tr.	E.	-37.3	21.1
04/01/09	5.33.47	Tethys	Tr.	E.	46.4	-12.1	15/01/09	14.22.29	Rhea	Ec.	D.	-41.8	14.4
04/01/09	7.17.15	Rhea	Sh.	I.	31.0	5.1	15/01/09	17.28.41	Titan	Occ.	D.	-32.3	-15.2
04/01/09	8.27.05	Rhea	Tr.	I.	18.6	14.4	15/01/09	19.21.13	Rhea	Occ.	R.	-14.9	-35.9
04/01/09	10.33.13	Rhea	Sh.	E.	-4.8	24.6	15/01/09	21.21.03	Dione	Ec.	D.	7.1	-57.1
04/01/09	12.22.18	Rhea	Tr.	E.	-23.7	23.6	15/01/09	23.11.55	Titan	Occ.	R.	27.3	-68.9
04/01/09	22.34.54	Dione	Ec.	D.	12.6	-68.7	16/01/09	1.23.06	Dione	Occ.	R.	47.2	-57.0
05/01/09	0.39.26	Tethys	Ec.	D.	34.7	-64.1	16/01/09	8.30.55	Tethys	Ec.	D.	9.2	15.8
05/01/09	2.41.36	Dione	Occ.	R.	50.5	-43.5	16/01/09	12.00.57	Tethys	Occ.	R.	-27.6	26.5
05/01/09	4.12.55	Tethys	Occ.	R.	52.7	-26.6	17/01/09	6.06.34	Dione	Sh.	I.	34.3	-5.9
05/01/09	23.18.43	Tethys	Sh.	I.	21.3	-70.5	17/01/09	6.47.35	Dione	Tr.	I.	27.3	1.3
05/01/09	23.53.28	Tethys	Tr.	I.	27.5	-69.1	17/01/09	7.10.13	Tethys	Sh.	I.	23.2	4.7
06/01/09	2.13.00	Tethys	Sh.	E.	48.2	-48.7	17/01/09	7.41.21	Tethys	Tr.	I.	17.6	9.3
06/01/09	2.51.54	Tethys	Tr.	E.	51.6	-41.6	17/01/09	9.12.55	Dione	Sh.	E.	0.9	20.6
06/01/09	7.20.23	Dione	Sh.	I.	29.1	5.6	17/01/09	10.05.11	Tethys	Sh.	E.	-9.1	24.9
06/01/09	8.05.55	Dione	Tr.	I.	21.0	11.8	17/01/09	10.07.37	Dione	Tr.	E.	-9.5	25.0
06/01/09	10.24.59	Dione	Sh.	E.	-4.7	24.4	17/01/09	10.39.49	Tethys	Tr.	E.	-15.2	26.6
06/01/09	11.26.23	Dione	Tr.	E.	-15.7	25.6	17/01/09	20.36.04	Rhea	Sh.	I.	0.6	-49.1
06/01/09	13.29.56	Rhea	Ec.	D.	-34.3	18.8	17/01/09	21.38.03	Rhea	Tr.	I.	11.7	-59.3
06/01/09	18.34.41	Rhea	Occ.	R.	-28.2	-28.7	17/01/09	23.57.32	Rhea	Sh.	E.	36.4	-67.3
06/01/09	21.58.00	Tethys	Ec.	D.	7.2	-64.2	18/01/09	1.32.07	Rhea	Tr.	E.	49.1	-55.3
07/01/09	1.31.01	Tethys	Occ.	R.	43.7	-56.1	18/01/09	5.49.31	Tethys	Ec.	D.	36.4	-8.8
07/01/09	16.16.26	Dione	Ec.	D.	-41.9	-3.8	18/01/09	9.18.49	Tethys	Occ.	R.	-0.6	21.3
07/01/09	16.37.53	Titan	Tr.	I.	-40.7	-7.7	18/01/09	15.02.37	Dione	Ec.	D.	-42.6	9.6
07/01/09	20.22.10	Dione	Occ.	R.	-9.9	-48.4	18/01/09	19.03.09	Dione	Occ.	R.	-15.9	-32.0
07/01/09	20.37.17	Tethys	Sh.	I.	-7.1	-51.1	19/01/09	4.28.49	Tethys	Sh.	I.	47.2	-23.3
07/01/09	21.11.32	Tethys	Tr.	I.	-0.2	-57.0	19/01/09	4.59.12	Tethys	Tr.	I.	43.3	-17.7
07/01/09	22.09.53	Titan	Tr.	E.	10.1	-65.6	19/01/09	7.23.53	Tethys	Sh.	E.	19.3	7.0
07/01/09	23.31.41	Tethys	Sh.	E.	25.1	-70.1	19/01/09	7.57.40	Tethys	Tr.	E.	13.1	11.9
08/01/09	0.09.59	Tethys	Tr.	E.	31.8	-67.5	19/01/09	23.48.09	Dione	Sh.	I.	36.2	-67.5
08/01/09	19.16.34	Tethys	Ec.	D.	-20.5	-36.2	20/01/09	0.27.44	Dione	Tr.	I.	42.3	-64.2
08/01/09	19.43.28	Rhea	Sh.	I.	-15.9	-41.2	20/01/09	2.48.50	Rhea	Ec.	D.	53.4	-41.7
08/01/09	20.51.14	Rhea	Tr.	I.	-3.5	-53.4	20/01/09	2.54.55	Dione	Sh.	E.	53.3	-40.6
08/01/09	22.49.05	Tethys	Occ.	R.	18.1	-69.2	20/01/09	3.08.07	Tethys	Ec.	D.	53.0	-38.2
08/01/09	23.01.20	Rhea	Sh.	E.	20.3	-69.8	20/01/09	3.47.36	Dione	Tr.	E.	50.8	-30.8
09/01/09	0.46.11	Rhea	Tr.	E.	38.3	-63.0	20/01/09	6.36.39	Tethys	Occ.	R.	27.1	0.0
09/01/09	1.01.55	Dione	Sh.	I.	40.7	-60.7	20/01/09	7.43.34	Rhea	Occ.	R.	15.0	10.0
09/01/09	1.46.30	Dione	Tr.	I.	46.6	-53.4	21/01/09	1.47.26	Tethys	Sh.	I.	51.5	-52.5
09/01/09	4.06.57	Dione	Sh.	E.	52.3	-27.7	21/01/09	2.17.01	Tethys	Tr.	I.	53.0	-47.3
09/01/09	5.06.53	Dione	Tr.	E.	47.3	-16.8	21/01/09	4.42.36	Tethys	Sh.	E.	44.5	-20.6
09/01/09	17.55.52	Tethys	Sh.	I.	-32.0	-21.1	21/01/09	5.15.29	Tethys	Tr.	E.	39.9	-14.6
09/01/09	18.29.34	Tethys	Tr.	I.	-27.2	-27.3	21/01/09	8.44.12	Dione	Ec.	D.	3.1	18.1
09/01/09	20.50.23	Tethys	Sh.	E.	-2.8	-53.1	21/01/09	12.43.05	Dione	Occ.	R.	-35.7	25.5
09/01/09	21.28.02	Tethys	Tr.	E.	3.9	-59.3	22/01/09	0.26.44	Tethys	Ec.	D.	43.3	-64.0
10/01/09	9.57.57	Dione	Ec.	D.	-2.1	23.4	22/01/09	3.54.27	Tethys	Occ.	R.	49.6	-29.4
10/01/09	14.02.37	Dione	Occ.	R.	-39.3	15.9	22/01/09	9.02.27	Rhea	Sh.	I.	-0.6	20.3
10/01/09	16.35.09	Tethys	Ec.	D.	-40.0	-6.7	22/01/09	10.00.45	Rhea	Tr.	I.	-11.9	25.5
10/01/09	20.07.06	Tethys	Occ.	R.	-10.4	-45.2	22/01/09	12.25.39	Rhea	Sh.	E.	-34.1	26.8
11/01/09	1.56.11	Rhea	Ec.	D.	48.6	-51.7	22/01/09	13.54.10	Rhea	Tr.	E.	-41.7	19.4
11/01/09	6.58.16	Rhea	Occ.	R.	29.5	2.5	22/01/09	17.29.45	Dione	Sh.	I.	-28.2	-14.1
11/01/09	15.14.26	Tethys	Sh.	I.	-42.8	6.6	22/01/09	18.07.47	Dione	Tr.	I.	-22.3	-21.0
11/01/09	15.47.34	Tethys	Tr.	I.	-42.4	1.7	22/01/09	20.36.55	Dione	Sh.	E.	4.3	-48.3
11/01/09	18.09.04	Tethys	Sh.	E.	-29.0	-23.2	22/01/09	21.27.28	Dione	Tr.	E.	13.6	-56.7
11/01/09	18.43.27	Dione	Sh.	I.	-23.8	-29.6	22/01/09	23.06.03	Tethys	Sh.	I.	31.3	-67.2
11/01/09	18.46.02	Tethys	Tr.	E.	-23.4	-30.0	22/01/09	23.34.48	Tethys	Tr.	I.	36.1	-67.4
11/01/09	19.26.58	Dione	Tr.	I.	-16.7	-37.6	23/01/09	2.01.19	Tethys	Sh.	E.	52.7	-49.9
11/01/09	21.48.56	Dione	Sh.	E.	9.2	-62.1	23/01/09	2.33.16	Tethys	Tr.	E.	53.4	-44.2
11/01/09	22.47.15	Dione	Tr.	E.	20.0	-68.5	23/01/09	15.03.56	Titan	Tr.	I.	-42.0	10.5
12/01/09	13.53.44	Tethys	Ec.	D.	-39.2	17.3	23/01/09	20.21.24	Titan	Tr.	E.	2.3	-45.3
12/01/09	17.25.05	Tethys	Occ.	R.	-34.3	-15.1	23/01/09	21.45.21	Tethys	Ec.	D.	17.6	-59.1

Date	Times	Moon	Phenomen	Phase	h Sat	h Sun	07/02/09	4.31.17	Tethys	Sh.	E.	36.1	-20.3
24/01/09	1.12.13	Tethys	Occ.	R.	49.6	-57.7	07/02/09	4.34.53	Rhea	Ec.	D.	35.6	-19.6
24/01/09	2.25.48	Dione	Ec.	D.	53.4	-45.5	07/02/09	4.54.23	Tethys	Tr.	E.	32.3	-16.0
24/01/09	6.22.53	Dione	Occ.	R.	26.7	-1.7	07/02/09	9.07.10	Rhea	Occ.	R.	-13.7	24.5
24/01/09	15.15.15	Rhea	Ec.	D.	-41.3	9.1	08/02/09	0.14.35	Tethys	Ec.	D.	50.3	-61.1
24/01/09	20.05.19	Rhea	Occ.	R.	0.3	-42.3	08/02/09	3.33.13	Tethys	Occ.	R.	44.3	-30.9
24/01/09	20.24.40	Tethys	Sh.	I.	3.6	-45.7	08/02/09	3.39.40	Dione	Sh.	I.	43.4	-29.7
24/01/09	20.52.34	Tethys	Tr.	I.	8.7	-50.6	08/02/09	4.06.25	Dione	Tr.	I.	39.4	-24.7
24/01/09	23.20.03	Tethys	Sh.	E.	35.0	-67.0	08/02/09	6.49.11	Dione	Sh.	E.	10.9	4.9
24/01/09	23.51.01	Tethys	Tr.	E.	39.9	-66.3	08/02/09	7.24.17	Dione	Tr.	E.	4.4	10.5
25/01/09	11.11.21	Dione	Sh.	I.	-25.6	29.1	08/02/09	13.19.12	Titan	Tr.	I.	-42.2	27.5
25/01/09	11.47.45	Dione	Tr.	I.	-30.8	28.9	08/02/09	18.01.23	Titan	Tr.	E.	-11.3	-16.3
25/01/09	14.18.56	Dione	Sh.	E.	-42.5	17.1	08/02/09	22.53.56	Tethys	Sh.	I.	40.9	-61.8
25/01/09	15.07.13	Dione	Tr.	E.	-41.5	10.5	08/02/09	23.13.39	Tethys	Tr.	I.	43.8	-62.6
25/01/09	19.03.58	Tethys	Ec.	D.	-10.7	-30.8	09/02/09	1.50.04	Tethys	Sh.	E.	53.3	-48.7
25/01/09	22.29.57	Tethys	Occ.	R.	27.2	-64.0	09/02/09	2.11.54	Tethys	Tr.	E.	52.2	-45.1
26/01/09	17.43.18	Tethys	Sh.	I.	-23.6	-15.7	09/02/09	10.48.36	Rhea	Sh.	I.	-30.9	32.8
26/01/09	18.10.17	Tethys	Tr.	I.	-19.2	-20.7	09/02/09	11.27.59	Rhea	Tr.	I.	-35.6	33.5
26/01/09	20.07.25	Dione	Ec.	D.	2.0	-42.2	09/02/09	12.35.45	Dione	Ec.	D.	-41.1	31.3
26/01/09	20.38.47	Tethys	Sh.	E.	7.7	-47.8	09/02/09	14.18.10	Rhea	Sh.	E.	-40.4	21.1
26/01/09	21.08.44	Tethys	Tr.	E.	13.2	-52.8	09/02/09	15.16.44	Rhea	Tr.	E.	-35.4	12.7
26/01/09	21.28.53	Rhea	Sh.	I.	16.9	-56.0	09/02/09	16.19.23	Dione	Occ.	R.	-27.3	2.5
26/01/09	22.23.03	Rhea	Tr.	I.	26.7	-63.1	09/02/09	21.33.16	Tethys	Ec.	D.	28.4	-53.2
27/01/09	0.02.34	Dione	Occ.	R.	42.8	-65.1	10/02/09	0.50.43	Tethys	Occ.	R.	53.3	-56.9
27/01/09	0.53.45	Rhea	Sh.	E.	49.1	-59.8	10/02/09	20.12.38	Tethys	Sh.	I.	14.5	-39.9
27/01/09	2.15.38	Rhea	Tr.	E.	53.5	-46.9	10/02/09	20.31.12	Tethys	Tr.	I.	18.0	-43.1
27/01/09	16.22.36	Tethys	Ec.	D.	-34.3	-0.5	10/02/09	21.21.23	Dione	Sh.	I.	27.0	-51.2
27/01/09	19.47.39	Tethys	Occ.	R.	-0.5	-38.4	10/02/09	21.45.58	Dione	Tr.	I.	31.3	-54.7
28/01/09	4.52.59	Dione	Sh.	I.	39.0	-17.9	10/02/09	23.08.51	Tethys	Sh.	E.	44.3	-61.8
28/01/09	5.27.38	Dione	Tr.	I.	33.5	-11.6	10/02/09	23.29.24	Tethys	Tr.	E.	46.9	-62.1
28/01/09	8.00.58	Dione	Sh.	E.	5.9	13.7	11/02/09	0.31.16	Dione	Sh.	E.	52.6	-58.7
28/01/09	8.46.51	Dione	Tr.	E.	-2.2	19.7	11/02/09	1.03.25	Dione	Tr.	E.	53.8	-55.0
28/01/09	15.01.56	Tethys	Sh.	I.	-41.1	12.0	11/02/09	17.01.34	Rhea	Ec.	D.	-19.3	-4.7
28/01/09	15.27.59	Tethys	Tr.	I.	-39.3	8.1	11/02/09	18.51.58	Tethys	Ec.	D.	0.7	-25.1
28/01/09	17.57.31	Tethys	Sh.	E.	-19.9	-17.9	11/02/09	21.26.46	Rhea	Occ.	R.	28.7	-51.7
28/01/09	18.26.25	Tethys	Tr.	E.	-15.0	-23.2	11/02/09	22.08.12	Tethys	Occ.	R.	35.8	-57.1
29/01/09	3.41.44	Rhea	Ec.	D.	48.1	-31.0	12/02/09	6.17.29	Dione	Ec.	D.	13.7	0.6
29/01/09	8.26.28	Rhea	Occ.	R.	0.7	17.4	12/02/09	9.58.27	Dione	Occ.	R.	-25.4	30.9
29/01/09	13.41.15	Tethys	Ec.	D.	-42.1	22.5	12/02/09	17.31.20	Tethys	Sh.	I.	-13.6	-10.0
29/01/09	13.49.03	Dione	Ec.	D.	-42.3	21.6	12/02/09	17.48.43	Tethys	Tr.	I.	-10.5	-13.2
29/01/09	17.05.19	Tethys	Occ.	R.	-27.4	-8.3	12/02/09	20.27.38	Tethys	Sh.	E.	18.9	-42.1
29/01/09	17.42.08	Dione	Occ.	R.	-21.7	-14.9	12/02/09	20.46.52	Tethys	Tr.	E.	22.4	-45.3
30/01/09	12.20.35	Tethys	Sh.	I.	-37.1	29.1	13/02/09	15.03.07	Dione	Sh.	I.	-34.9	15.8
30/01/09	12.45.39	Tethys	Tr.	I.	-39.3	27.7	13/02/09	15.25.28	Dione	Tr.	I.	-32.3	12.3
30/01/09	15.16.15	Tethys	Sh.	E.	-39.5	10.3	13/02/09	16.10.41	Tethys	Ec.	D.	-26.0	4.9
30/01/09	15.44.04	Tethys	Tr.	E.	-37.1	6.0	13/02/09	18.13.22	Dione	Sh.	E.	-5.2	-17.5
30/01/09	22.34.37	Dione	Sh.	I.	31.7	-63.1	13/02/09	18.42.27	Dione	Sh.	E.	0.6	-22.9
30/01/09	23.07.25	Dione	Tr.	I.	37.1	-65.1	13/02/09	19.25.40	Tethys	Occ.	R.	8.2	-30.8
31/01/09	1.43.00	Dione	Sh.	E.	53.4	-51.7	13/02/09	23.15.18	Rhea	Sh.	I.	46.8	-61.0
31/01/09	2.26.22	Dione	Tr.	E.	53.1	-44.4	13/02/09	23.49.10	Rhea	Tr.	I.	50.5	-60.6
31/01/09	9.55.23	Rhea	Sh.	I.	-17.2	27.2	14/02/09	2.46.21	Rhea	Sh.	E.	47.2	-38.0
31/01/09	10.45.00	Rhea	Tr.	I.	-25.2	30.0	14/02/09	3.36.08	Rhea	Tr.	E.	40.4	-29.0
31/01/09	10.59.54	Tethys	Ec.	D.	-27.4	30.5	14/02/09	14.50.03	Tethys	Sh.	I.	-35.9	18.0
31/01/09	13.21.53	Rhea	Sh.	E.	-41.7	25.0	14/02/09	15.06.14	Tethys	Tr.	I.	-34.1	15.5
31/01/09	14.22.57	Tethys	Occ.	R.	-42.1	18.1	14/02/09	17.46.26	Tethys	Sh.	E.	-9.4	-12.3
31/01/09	14.36.31	Rhea	Tr.	E.	-41.6	16.3	14/02/09	18.04.19	Tethys	Tr.	E.	-6.2	-15.6
31/01/09	15.46.11	Titan	Occ.	D.	-36.4	5.9	14/02/09	23.59.14	Dione	Ec.	D.	51.7	-59.8
31/01/09	21.01.18	Titan	Occ.	R.	15.7	-50.5	15/02/09	3.37.27	Dione	Occ.	R.	39.6	-28.6
01/02/09	7.30.42	Dione	Ec.	D.	8.4	10.0	15/02/09	13.29.24	Tethys	Ec.	D.	-41.4	28.6
01/02/09	9.39.14	Tethys	Sh.	I.	-15.1	26.1	15/02/09	16.43.06	Tethys	Occ.	R.	-19.5	0.0
01/02/09	10.03.18	Tethys	Tr.	I.	-19.2	28.0	16/02/09	5.28.18	Rhea	Ec.	D.	19.8	-7.9
01/02/09	11.21.36	Dione	Occ.	R.	-31.0	31.0	16/02/09	8.44.53	Dione	Sh.	I.	-16.2	24.4
01/02/09	12.35.00	Tethys	Sh.	E.	-39.1	28.9	16/02/09	9.04.57	Dione	Tr.	I.	-19.5	26.9
01/02/09	13.01.41	Tethys	Tr.	E.	-40.9	27.0	16/02/09	9.45.56	Rhea	Occ.	R.	-26.0	31.1
02/02/09	8.18.33	Tethys	Ec.	D.	-0.6	17.2	16/02/09	11.55.29	Dione	Sh.	E.	-40.3	35.4
02/02/09	11.40.34	Tethys	Occ.	R.	-33.9	31.2	16/02/09	12.08.46	Tethys	Sh.	I.	-41.0	35.0
02/02/09	16.08.17	Rhea	Ec.	D.	-32.9	2.8	16/02/09	12.21.25	Dione	Tr.	E.	-41.5	34.4
02/02/09	16.16.17	Dione	Sh.	I.	-31.9	1.6	16/02/09	12.23.45	Tethys	Tr.	I.	-41.6	34.2
02/02/09	16.47.09	Dione	Tr.	I.	-27.6	-4.0	16/02/09	14.00.42	Titan	Occ.	D.	-39.5	25.3
02/02/09	19.25.03	Dione	Sh.	E.	-0.1	-33.1	16/02/09	15.05.14	Tethys	Sh.	E.	-33.1	16.2
02/02/09	20.05.46	Dione	Tr.	E.	7.0	-40.5	16/02/09	15.21.45	Tethys	Tr.	E.	-31.1	13.6
02/02/09	20.47.05	Rhea	Occ.	R.	14.6	-47.7	16/02/09	18.12.05	Titan	Occ.	R.	-2.7	-16.6
03/02/09	6.57.54	Tethys	Sh.	I.	13.0	5.3	17/02/09	10.48.08	Tethys	Ec.	D.	-34.7	35.5
03/02/09	7.20.55	Tethys	Tr.	E.	8.8	8.9	17/02/09	14.00.32	Tethys	Occ.	R.	-39.2	25.6
03/02/09	9.53.46	Tethys	Sh.	I.	-18.9	27.9	17/02/09	17.41.00	Dione	Ec.	D.	-8.1	-10.7
03/02/09	10.19.17	Tethys	Tr.	E.	-23.0	29.6	17/02/09	21.16.22	Dione	Occ.	R.	31.4	-48.6
04/02/09	1.12.22	Dione	Ec.	D.	53.0	-55.6	18/02/09	9.27.30	Tethys	Sh.	I.	-24.4	30.0
04/02/09	5.00.57	Dione	Occ.	R.	33.2	-15.4	18/02/09	9.41.14	Tethys	Tr.	I.	-26.5	31.4
04/02/09	5.37.13	Tethys	Ec.	D.	27.0	-8.8	18/02/09	11.42.05	Rhea	Sh.	I.	-39.9	36.4
04/02/09	8.58.08	Tethys	Occ.	R.	-10.0	22.7	18/02/09	12.10.12	Rhea	Tr.	I.	-41.3	35.6
04/02/09	22.21.58	Rhea	Sh.	I.	33.1	-60.6	18/02/09	12.24.03	Tethys	Sh.	E.	-41.7	34.9
04/02/09	23.06.37	Rhea	Tr.	I.	40.3	-63.6	18/02/09	12.39.10	Tethys	Tr.	E.	-41.9	34.0
05/02/09	1.50.01	Rhea	Sh.	E.	53.7	-49.6	18/02/09	15.14.33	Rhea	Sh.	E.	-30.8	15.3
05/02/09	2.56.53	Rhea	Tr.	E.	49.9	-38.1	18/02/09	15.55.06	Rhea	Tr.	E.	-25.1	8.7
05/02/09	4.16.34	Tethys	Sh.	I.	39.7	-23.4	19/02/09	2.26.40	Dione	Sh.	I.	47.2	-40.1
05/02/09	4.38.31	Tethys	Tr.	I.	36.3	-19.3	19/02/09	2.44.24	Dione	Tr.	I.	44.9	-37.1
05/02/09	7.12.31	Tethys	Sh.	E.	8.8	8.0	19/02/09	5.37.37	Dione	Sh.	E.	15.8	-5.3
05/02/09	7.36.51	Tethys	Tr.	E.	4.4	11.8	19/02/09	6.00.18	Dione	Tr.	E.	11.6	-0.5
05/02/09	9.57.58	Dione	Sh.	I.	-20.9	28.7	19/02/09	8.06.52	Tethys	Ec.	D.	-11.7	20.0
05/02/09	10.26.49	Dione	Tr.	I.	-25.5	30.6	19/02/09	11.17.56	Tethys	Occ.	R.	-38.4	36.9
05/02/09	13.07.07	Dione	Sh.	E.	-41.8	27.7	20/02/09	6.46.15	Tethys	Sh.	I.	2.5	7.3
05/02/09	13.45.05	Dione	Tr.	E.	-42.3	24.0	20/02/09	6.58.44	Tethys	Tr.	I.	0.4	9.4
06/02/09	2.55.54	Tethys	Ec.	D.	49.6	-38.1	20/02/09	9.42.52	Tethys	Sh.	E.	-27.9	32.2
06/02/09	6.15.42	Tethys	Occ.	R.	18.6	-0.8	20/02/09	9.56.33	Tethys	Tr.	E.	-29.8	33.4
06/02/09	18.54.03	Dione	Ec.	D.	-2.8	-26.5	20/02/09	11.22.47	Dione	Ec.	D.	-39.1	37.2
06/02/09	22.40.13	Dione	Occ.	R.	37.5	-61.6	20/02/09	14.55.14	Dione	Occ.	R.	-32.2	18.8
07/02/09	1.35.15	Tethys	Sh.	I.	53.8	-51.5	20/02/09	17.55.07	Rhea	Ec.	D.	-2.6	-12.6
07/02/09	1.56.05	Tethys	Tr.	I.	53.4	-48.2	20/02/09	22.04.41	Rhea	Occ.	R.	41.3	-54.0

Date	Times	Moon	Phenomen	Phase	h Sat	h Sun	06/03/09	13.36.49	Tethys	Occ.	R.	-34.1	33.7
21/02/09	5.25.37	Tethys	Ec.	D.	16.5	-7.1	07/03/09	9.16.32	Tethys	Sh.	I.	-32.4	34.8
21/02/09	8.35.19	Tethys	Occ.	R.	-18.0	24.7	07/03/09	9.18.38	Tethys	Tr.	I.	-32.6	35.0
21/02/09	20.08.28	Dione	Sh.	I.	22.4	-36.6	07/03/09	12.13.43	Tethys	Sh.	E.	-40.4	41.5
21/02/09	20.23.50	Dione	Tr.	I.	25.2	-39.3	07/03/09	12.15.25	Tethys	Tr.	E.	-40.4	41.4
21/02/09	23.19.46	Dione	Sh.	E.	51.1	-58.2	07/03/09	12.37.48	Dione	Sh.	I.	-39.1	39.9
21/02/09	23.39.08	Dione	Tr.	E.	52.5	-58.1	07/03/09	12.41.00	Dione	Tr.	I.	-38.9	39.7
22/02/09	4.05.00	Tethys	Sh.	I.	30.3	-21.7	07/03/09	15.50.43	Dione	Sh.	E.	-13.7	13.4
22/02/09	4.16.13	Tethys	Tr.	I.	28.4	-19.7	07/03/09	15.52.40	Dione	Tr.	E.	-13.4	13.1
22/02/09	7.01.41	Tethys	Sh.	E.	-1.4	10.5	08/03/09	7.55.57	Tethys	Ec.	D.	-21.5	23.8
22/02/09	7.13.56	Tethys	Tr.	E.	-4.2	12.5	08/03/09	10.54.10	Tethys	Occ.	R.	-40.7	42.8
23/02/09	0.08.55	Rhea	Sh.	I.	54.1	-56.5	08/03/09	13.29.54	Rhea	Sh.	I.	-33.9	35.1
23/02/09	0.31.10	Rhea	Tr.	I.	54.2	-54.8	08/03/09	13.34.14	Rhea	Tr.	I.	-33.4	34.6
23/02/09	2.44.22	Tethys	Ec.	D.	42.7	-36.0	08/03/09	17.07.37	Rhea	Sh.	E.	1.3	0.2
23/02/09	3.42.46	Rhea	Sh.	E.	33.4	-25.6	08/03/09	17.07.57	Rhea	Tr.	E.	1.4	0.2
23/02/09	4.13.42	Rhea	Tr.	E.	28.1	-19.9	08/03/09	21.33.57	Dione	Ec.	D.	46.9	-45.4
23/02/09	5.04.35	Dione	Ec.	D.	18.9	-10.5	09/03/09	0.47.28	Dione	Occ.	R.	50.3	-48.8
23/02/09	5.52.42	Tethys	Occ.	R.	10.0	-0.8	09/03/09	6.35.22	Tethys	Sh.	I.	-8.5	10.4
23/02/09	8.34.02	Dione	Occ.	R.	-19.1	25.1	09/03/09	6.36.09	Tethys	Tr.	I.	-8.7	10.6
24/02/09	1.23.45	Tethys	Sh.	I.	51.6	-48.4	09/03/09	9.32.37	Tethys	Sh.	E.	-35.1	37.3
24/02/09	1.33.42	Tethys	Tr.	I.	50.7	-47.0	09/03/09	9.32.46	Tethys	Tr.	E.	-35.1	37.4
24/02/09	4.20.32	Tethys	Sh.	E.	26.2	-18.3	10/03/09	5.14.47	Tethys	Ec.	D.	5.7	-4.0
24/02/09	4.31.19	Tethys	Tr.	E.	24.2	-16.3	10/03/09	6.19.44	Dione	Sh.	I.	-6.5	8.0
24/02/09	11.25.41	Titan	Sh.	I.	-40.3	38.7	10/03/09	6.20.29	Dione	Tr.	I.	-6.6	8.1
24/02/09	11.39.17	Titan	Tr.	I.	-40.9	38.6	10/03/09	8.12.08	Tethys	Ec.	R.	-25.2	27.0
24/02/09	12.39.45	Titan	Sh.	E.	-41.5	36.0	10/03/09	9.31.19	Dione	Tr.	E.	-35.4	37.6
24/02/09	13.50.17	Dione	Sh.	I.	-37.4	28.9	10/03/09	9.32.58	Dione	Sh.	E.	-35.6	37.8
24/02/09	14.03.15	Dione	Tr.	I.	-36.1	27.3	10/03/09	19.43.08	Rhea	Ec.	D.	31.1	-28.2
24/02/09	15.06.06	Titan	Tr.	E.	-28.4	18.2	10/03/09	23.21.57	Rhea	Ec.	R.	54.7	-51.8
24/02/09	17.01.55	Dione	Sh.	E.	-9.6	-1.1	11/03/09	3.53.40	Tethys	Tr.	I.	19.9	-18.8
24/02/09	17.17.55	Dione	Tr.	E.	-6.8	-4.8	11/03/09	3.54.13	Tethys	Sh.	I.	19.8	-18.7
25/02/09	0.03.08	Tethys	Ec.	D.	54.2	-56.1	11/03/09	6.50.07	Tethys	Tr.	E.	-12.6	13.7
25/02/09	3.10.04	Rhea	Occ.	R.	37.5	-30.9	11/03/09	6.51.31	Tethys	Sh.	E.	-12.8	13.9
25/02/09	6.22.01	Rhea	Ec.	D.	3.2	4.5	11/03/09	15.15.26	Dione	Occ.	D.	-16.7	20.4
25/02/09	10.23.06	Rhea	Occ.	R.	-35.4	37.1	11/03/09	18.29.33	Dione	Ec.	R.	18.6	-14.9
25/02/09	22.42.32	Tethys	Sh.	I.	49.2	-55.5	12/03/09	2.32.26	Tethys	Occ.	D.	33.6	-32.6
25/02/09	22.46.25	Dione	Ec.	D.	49.6	-55.7	12/03/09	5.31.02	Tethys	Ec.	R.	1.4	0.1
25/02/09	22.51.10	Tethys	Tr.	I.	50.1	-55.9	12/03/09	9.51.28	Titan	Sh.	I.	-37.9	40.4
26/02/09	1.39.22	Tethys	Sh.	E.	49.4	-45.5	12/03/09	12.36.00	Titan	Sh.	E.	-37.5	41.8
26/02/09	1.48.40	Tethys	Tr.	E.	48.4	-44.1	13/03/09	0.00.01	Dione	Tr.	I.	53.0	-50.0
26/02/09	2.12.46	Dione	Occ.	R.	45.4	-40.4	13/03/09	0.01.41	Dione	Sh.	I.	52.9	-50.9
26/02/09	21.21.55	Tethys	Ec.	D.	38.8	-46.9	13/03/09	1.11.13	Tethys	Tr.	I.	45.6	-43.0
27/02/09	0.27.26	Tethys	Occ.	R.	54.1	-53.7	13/03/09	1.13.04	Tethys	Sh.	I.	45.3	-43.7
27/02/09	7.32.08	Dione	Sh.	I.	-11.3	17.0	13/03/09	1.55.30	Rhea	Tr.	I.	39.0	-38.0
27/02/09	7.42.40	Dione	Tr.	I.	-13.2	18.7	13/03/09	1.57.03	Rhea	Sh.	I.	38.8	-37.8
27/02/09	10.44.06	Dione	Sh.	E.	-38.2	39.0	13/03/09	3.09.59	Dione	Tr.	E.	26.3	-25.9
27/02/09	10.56.38	Dione	Tr.	E.	-39.1	39.4	13/03/09	3.15.13	Dione	Sh.	E.	25.4	-25.0
27/02/09	12.35.51	Rhea	Sh.	I.	-41.1	37.3	13/03/09	4.07.28	Tethys	Tr.	E.	15.8	-15.7
27/02/09	12.52.07	Rhea	Tr.	I.	-40.5	36.0	13/03/09	4.10.26	Tethys	Sh.	E.	15.3	-15.2
27/02/09	16.11.02	Rhea	Sh.	E.	-16.2	8.0	13/03/09	5.25.46	Rhea	Tr.	E.	1.6	-0.5
27/02/09	16.32.00	Rhea	Tr.	E.	-12.6	4.4	13/03/09	5.35.58	Rhea	Sh.	E.	-0.1	1.1
27/02/09	20.01.19	Tethys	Sh.	I.	25.8	-34.0	13/03/09	23.49.59	Tethys	Occ.	D.	53.4	-50.1
27/02/09	20.08.39	Tethys	Tr.	I.	27.2	-35.2	14/03/09	2.49.57	Tethys	Ec.	R.	29.2	-29.0
27/02/09	22.58.13	Tethys	Sh.	E.	51.6	-55.5	14/03/09	8.54.58	Dione	Occ.	D.	-33.1	34.6
27/02/09	23.06.02	Tethys	Tr.	E.	52.2	-55.8	14/03/09	12.11.49	Dione	Ec.	R.	-38.6	44.2
28/02/09	16.28.16	Dione	Ec.	D.	-12.5	5.3	14/03/09	22.28.46	Tethys	Tr.	I.	54.2	-48.5
28/02/09	18.40.42	Tethys	Ec.	D.	11.9	-19.3	14/03/09	22.31.56	Tethys	Sh.	I.	54.3	-48.7
28/02/09	19.51.29	Dione	Occ.	R.	24.9	-32.0	15/03/09	1.24.51	Tethys	Tr.	E.	42.5	-41.5
28/02/09	21.44.47	Tethys	Occ.	R.	43.6	-49.2	15/03/09	1.29.21	Tethys	Sh.	E.	41.8	-40.9
01/03/09	17.20.06	Tethys	Sh.	I.	-1.6	-4.0	15/03/09	8.05.51	Rhea	Occ.	D.	-27.3	27.8
01/03/09	17.26.08	Tethys	Tr.	I.	-0.6	-5.2	15/03/09	11.50.19	Rhea	Ec.	R.	-39.7	45.5
01/03/09	18.48.59	Rhea	Ec.	D.	14.2	-20.6	15/03/09	17.39.35	Dione	Tr.	I.	12.6	-4.7
01/03/09	20.17.05	Tethys	Sh.	E.	30.2	-36.1	15/03/09	17.43.40	Dione	Sh.	I.	13.3	-5.5
01/03/09	20.23.23	Tethys	Tr.	E.	31.3	-37.2	15/03/09	20.48.39	Dione	Tr.	E.	45.0	-37.3
01/03/09	22.41.15	Rhea	Occ.	R.	50.9	-54.0	15/03/09	20.57.30	Dione	Sh.	E.	46.2	-38.6
02/03/09	1.14.00	Dione	Sh.	I.	50.4	-47.6	15/03/09	21.07.33	Tethys	Occ.	D.	47.5	-40.0
02/03/09	1.22.06	Dione	Tr.	I.	49.6	-46.6	16/03/09	0.08.53	Tethys	Ec.	R.	51.4	-48.4
02/03/09	4.26.17	Dione	Sh.	E.	20.7	-15.6	16/03/09	19.46.21	Tethys	Tr.	I.	36.1	-27.3
02/03/09	4.35.20	Dione	Tr.	E.	19.0	-13.9	16/03/09	19.50.48	Tethys	Sh.	I.	36.8	-28.1
02/03/09	15.59.30	Tethys	Ec.	D.	-15.9	10.7	16/03/09	22.42.13	Tethys	Tr.	E.	54.9	-48.5
02/03/09	19.02.08	Tethys	Occ.	R.	17.4	-22.8	16/03/09	22.48.16	Tethys	Sh.	E.	54.9	-48.8
03/03/09	10.10.09	Dione	Ec.	D.	-36.5	38.5	17/03/09	2.34.33	Dione	Occ.	D.	29.7	-30.5
03/03/09	13.30.10	Dione	Occ.	R.	-36.3	33.5	17/03/09	5.54.06	Dione	Ec.	R.	-7.0	5.5
03/03/09	14.38.54	Tethys	Sh.	I.	-27.9	24.2	17/03/09	14.16.59	Rhea	Tr.	I.	-22.0	31.3
03/03/09	14.43.38	Tethys	Tr.	I.	-27.2	23.5	17/03/09	14.24.16	Rhea	Sh.	I.	-20.8	30.2
03/03/09	17.35.57	Tethys	Sh.	E.	2.4	-6.7	17/03/09	17.43.34	Rhea	Tr.	E.	14.9	-5.9
03/03/09	17.40.43	Tethys	Tr.	E.	3.3	-7.6	17/03/09	18.04.21	Rhea	Sh.	E.	18.8	-9.0
04/03/09	1.02.50	Rhea	Sh.	I.	50.7	-48.2	17/03/09	18.25.08	Tethys	Occ.	D.	22.6	-12.8
04/03/09	1.13.07	Rhea	Tr.	I.	49.7	-47.0	17/03/09	21.27.49	Tethys	Ec.	R.	50.8	-41.9
04/03/09	4.39.19	Rhea	Sh.	E.	16.8	-12.6	18/03/09	11.19.13	Dione	Tr.	I.	-40.4	47.2
04/03/09	4.50.03	Rhea	Tr.	E.	14.8	-10.6	18/03/09	11.25.40	Dione	Sh.	I.	-40.2	47.2
04/03/09	12.27.03	Titan	Ec.	D.	-40.5	39.6	18/03/09	14.27.22	Dione	Tr.	E.	-19.6	30.0
04/03/09	13.18.18	Tethys	Ec.	D.	-37.0	35.2	18/03/09	14.39.47	Dione	Sh.	E.	-17.6	28.0
04/03/09	14.16.04	Titan	Occ.	R.	-30.4	27.9	18/03/09	17.03.56	Tethys	Tr.	I.	8.4	2.8
04/03/09	16.19.28	Tethys	Occ.	R.	-11.0	7.7	18/03/09	17.09.41	Tethys	Sh.	I.	9.5	1.8
04/03/09	18.55.53	Dione	Sh.	I.	17.9	-21.2	18/03/09	19.59.37	Tethys	Tr.	E.	39.6	-29.0
04/03/09	19.01.32	Dione	Tr.	I.	18.9	-22.2	18/03/09	20.07.13	Tethys	Sh.	E.	40.8	-30.2
04/03/09	22.08.30	Dione	Sh.	E.	48.9	-50.4	19/03/09	15.42.44	Tethys	Occ.	D.	-5.9	17.6
04/03/09	22.14.01	Dione	Tr.	E.	49.5	-50.9	19/03/09	18.46.45	Tethys	Ec.	R.	28.0	-16.2
05/03/09	11.57.43	Tethys	Sh.	I.	-41.3	41.5	19/03/09	20.14.11	Dione	Occ.	D.	42.5	-31.1
05/03/09	12.01.07	Tethys	Tr.	I.	-41.2	41.4	19/03/09	20.27.26	Rhea	Occ.	D.	44.5	-33.1
05/03/09	14.54.50	Tethys	Sh.	E.	-24.2	22.3	19/03/09	23.36.24	Dione	Ec.	R.	52.8	-48.0
05/03/09	14.58.04	Tethys	Tr.	E.	-23.8	21.8	20/03/09	0.18.43	Rhea	Ec.	R.	48.7	-46.1
06/03/09	3.52.02	Dione	Ec.	D.	23.9	-20.7	20/03/09	10.47.56	Titan	Ec.	D.	-40.9	47.4
06/03/09	7.08.49	Dione	Occ.	R.	-12.3	15.3	20/03/09	13.41.51	Titan	Ec.	R.	-25.3	37.2
06/03/09	7.16.01	Rhea	Ec.	D.	-13.5	16.6	20/03/09	14.21.33	Tethys	Tr.	I.	-19.1	31.4
06/03/09	10.37.07	Tethys	Ec.	D.	-39.6	41.3	20/03/09	14.28.34	Tethys	Sh.	I.	-18.0	30.3
06/03/09	10.59.11	Rhea	Occ.	R.	-40.7	42.2	20/03/09	17.17.02	Tethys	Tr.	E.	12.4	0.9

Date	Times	Moon	Phenomen	Phase	h Sat	h Sun								
20/03/09	17.26.09	Tethys	Sh.	E.	14.1	-0.5	04/04/09	0.20.45	Dione	Tr.	E.	39.9	-40.1	
21/03/09	4.58.53	Dione	Tr.	I.	0.6	-3.3	04/04/09	0.53.50	Dione	Sh.	E.	34.4	-37.3	
21/03/09	5.07.41	Dione	Sh.	I.	-0.8	-1.2	04/04/09	15.45.36	Rhea	Tr.	I.	7.4	20.5	
21/03/09	8.06.06	Dione	Tr.	E.	-30.6	29.9	04/04/09	16.13.50	Rhea	Sh.	I.	12.6	15.4	
21/03/09	8.22.05	Dione	Sh.	E.	-32.5	32.4	04/04/09	16.43.21	Tethys	Tr.	I.	18.1	9.9	
21/03/09	13.00.21	Tethys	Occ.	D.	-30.5	42.6	04/04/09	17.00.03	Tethys	Sh.	I.	21.2	6.9	
21/03/09	16.05.42	Tethys	Ec.	R.	0.4	13.9	04/04/09	18.56.28	Rhea	Tr.	E.	41.3	-14.4	
22/03/09	2.38.42	Rhea	Tr.	I.	25.3	-28.1	04/04/09	19.37.07	Tethys	Tr.	E.	47.1	-21.2	
22/03/09	2.51.33	Rhea	Sh.	I.	23.0	-26.0	04/04/09	19.58.00	Tethys	Sh.	E.	49.7	-24.4	
22/03/09	6.01.27	Rhea	Tr.	E.	-11.9	8.5	04/04/09	19.58.08	Rhea	Sh.	E.	49.7	-24.5	
22/03/09	6.32.45	Rhea	Sh.	E.	-17.2	14.2	05/04/09	6.13.22	Dione	Occ.	D.	-23.2	15.0	
22/03/09	11.39.11	Tethys	Tr.	I.	-38.3	48.6	05/04/09	9.34.46	Titan	Ec.	D.	-40.5	47.9	
22/03/09	11.47.28	Tethys	Sh.	I.	-37.7	48.3	05/04/09	9.50.29	Dione	Ec.	R.	-40.3	49.6	
22/03/09	13.53.53	Dione	Occ.	D.	-22.2	36.1	05/04/09	13.25.43	Titan	Ec.	R.	-17.0	44.0	
22/03/09	14.34.27	Tethys	Tr.	E.	-15.6	29.9	05/04/09	15.22.16	Tethys	Occ.	D.	4.0	24.9	
22/03/09	14.45.07	Tethys	Sh.	E.	-13.8	28.2	05/04/09	18.37.35	Tethys	Ec.	R.	39.0	-10.9	
22/03/09	17.18.42	Dione	Ec.	R.	14.3	1.0	06/04/09	14.01.13	Tethys	Tr.	I.	-10.2	39.0	
23/03/09	10.18.00	Tethys	Occ.	D.	-40.9	47.0	06/04/09	14.19.01	Tethys	Sh.	I.	-7.1	36.1	
23/03/09	13.24.40	Tethys	Ec.	R.	-25.9	40.4	06/04/09	14.58.20	Dione	Tr.	I.	0.6	29.4	
23/03/09	22.38.37	Dione	Tr.	I.	55.0	-45.7	06/04/09	15.20.16	Dione	Sh.	I.	4.4	25.5	
23/03/09	22.49.44	Dione	Sh.	I.	54.6	-46.2	06/04/09	16.54.46	Tethys	Tr.	E.	21.8	8.2	
24/03/09	1.44.53	Dione	Tr.	E.	33.4	-35.5	06/04/09	17.17.01	Tethys	Sh.	E.	25.8	4.2	
24/03/09	2.04.24	Dione	Sh.	E.	30.0	-32.7	06/04/09	17.59.57	Dione	Tr.	E.	33.4	-3.7	
24/03/09	8.49.17	Rhea	Occ.	D.	-36.6	37.6	06/04/09	18.36.14	Dione	Sh.	E.	39.4	-10.4	
24/03/09	8.56.51	Tethys	Tr.	I.	-37.3	38.6	06/04/09	21.56.38	Rhea	Occ.	D.	54.8	-38.1	
24/03/09	9.06.23	Tethys	Sh.	I.	-38.0	39.9	07/04/09	2.12.37	Rhea	Ec.	R.	18.1	-26.5	
24/03/09	11.51.54	Tethys	Tr.	E.	-36.6	48.9	07/04/09	12.40.08	Tethys	Occ.	D.	-22.9	50.2	
24/03/09	12.04.04	Tethys	Sh.	E.	-35.4	48.3	07/04/09	15.56.36	Tethys	Ec.	R.	11.8	19.1	
24/03/09	12.47.09	Rhea	Ec.	R.	-30.5	45.0	07/04/09	23.53.30	Dione	Occ.	D.	41.6	-40.0	
25/03/09	7.33.38	Dione	Occ.	D.	-28.4	25.9	08/04/09	3.32.53	Dione	Ec.	R.	2.6	-13.4	
25/03/09	7.35.40	Tethys	Occ.	D.	-28.7	26.3	08/04/09	11.19.06	Tethys	Tr.	I.	-33.2	55.3	
25/03/09	10.43.37	Tethys	Ec.	R.	-40.4	49.2	08/04/09	11.38.00	Tethys	Sh.	I.	-30.9	55.0	
25/03/09	11.01.02	Dione	Ec.	R.	-39.8	49.8	08/04/09	14.12.27	Tethys	Tr.	E.	-6.7	37.6	
26/03/09	6.14.32	Tethys	Tr.	I.	-16.9	12.1	08/04/09	14.36.02	Tethys	Sh.	E.	-1.7	33.7	
26/03/09	6.25.18	Tethys	Sh.	I.	-18.7	14.1	09/04/09	4.08.32	Rhea	Tr.	I.	-4.8	-6.8	
26/03/09	9.09.22	Tethys	Tr.	E.	-38.8	41.0	09/04/09	4.41.23	Rhea	Sh.	I.	-10.8	-0.2	
26/03/09	9.23.02	Tethys	Sh.	E.	-39.5	42.8	09/04/09	7.15.35	Rhea	Tr.	E.	-33.6	27.6	
26/03/09	15.00.41	Rhea	Tr.	I.	-8.0	26.5	09/04/09	8.26.39	Rhea	Sh.	E.	-39.3	39.7	
26/03/09	15.18.54	Rhea	Sh.	I.	-4.6	23.4	09/04/09	8.38.31	Dione	Tr.	I.	-39.8	41.6	
26/03/09	16.18.25	Dione	Tr.	I.	6.4	12.7	09/04/09	9.02.26	Dione	Sh.	I.	-40.4	45.1	
26/03/09	16.31.48	Dione	Sh.	I.	8.8	10.2	09/04/09	9.58.03	Tethys	Occ.	D.	-39.4	51.9	
26/03/09	18.19.30	Rhea	Tr.	E.	28.6	-9.8	09/04/09	11.39.15	Dione	Tr.	E.	-30.2	55.3	
26/03/09	19.01.11	Rhea	Sh.	E.	35.8	-17.2	09/04/09	12.18.38	Dione	Sh.	E.	-24.8	52.9	
26/03/09	19.23.44	Dione	Tr.	E.	39.5	-21.1	09/04/09	13.15.37	Tethys	Ec.	R.	-15.8	46.5	
26/03/09	19.46.45	Dione	Sh.	E.	43.0	-24.9	10/04/09	8.37.01	Tethys	Tr.	I.	-39.9	41.7	
27/03/09	4.53.22	Tethys	Occ.	D.	-3.0	-2.1	10/04/09	8.57.00	Tethys	Sh.	I.	-40.3	44.7	
27/03/09	8.02.36	Tethys	Ec.	R.	-33.1	31.5	10/04/09	11.30.10	Tethys	Tr.	E.	-30.9	55.9	
28/03/09	1.13.28	Dione	Occ.	D.	35.9	-37.9	10/04/09	11.55.04	Tethys	Sh.	E.	-27.6	54.9	
28/03/09	3.32.14	Tethys	Tr.	I.	10.9	-17.1	10/04/09	17.33.43	Dione	Occ.	D.	31.8	2.0	
28/03/09	3.44.14	Tethys	Sh.	I.	8.7	-15.0	10/04/09	21.15.18	Dione	Ec.	R.	55.6	-33.0	
28/03/09	4.43.22	Dione	Ec.	R.	-1.6	-4.1	11/04/09	7.15.59	Tethys	Occ.	D.	-34.5	28.3	
28/03/09	6.26.52	Tethys	Tr.	E.	-20.3	15.0	11/04/09	10.19.44	Rhea	Occ.	D.	-37.5	54.5	
28/03/09	6.42.01	Tethys	Sh.	E.	-22.6	17.8	11/04/09	10.34.39	Tethys	Ec.	R.	-36.3	55.4	
28/03/09	8.37.34	Titan	Sh.	I.	-37.0	37.3	11/04/09	14.41.09	Rhea	Ec.	R.	1.2	33.5	
28/03/09	12.13.10	Titan	Sh.	E.	-32.5	49.2	12/04/09	2.18.47	Dione	Tr.	I.	13.2	-23.9	
28/03/09	21.11.25	Rhea	Occ.	D.	53.6	-36.5	12/04/09	2.44.36	Dione	Sh.	I.	8.4	-20.0	
29/03/09	1.15.37	Rhea	Ec.	R.	34.9	-37.3	12/04/09	5.18.40	Dione	Tr.	E.	-19.1	7.0	
29/03/09	2.11.05	Tethys	Occ.	D.	25.1	-29.9	12/04/09	5.54.58	Tethys	Tr.	I.	-24.7	13.7	
29/03/09	5.21.35	Tethys	Ec.	R.	-10.0	3.4	12/04/09	6.01.04	Dione	Sh.	E.	-25.6	14.8	
29/03/09	9.58.17	Dione	Tr.	I.	-40.7	47.7	12/04/09	6.16.00	Tethys	Sh.	I.	-27.7	17.6	
29/03/09	10.13.53	Dione	Sh.	I.	-40.6	49.0	12/04/09	8.47.55	Tethys	Tr.	E.	-40.3	44.0	
29/03/09	13.02.39	Dione	Tr.	E.	-25.3	44.9	12/04/09	9.14.06	Tethys	Sh.	E.	-40.3	47.8	
29/03/09	13.29.06	Dione	Sh.	E.	-21.3	41.6	13/04/09	4.33.57	Tethys	Occ.	D.	-12.3	-0.4	
30/03/09	0.49.58	Tethys	Tr.	I.	38.4	-39.6	13/04/09	7.31.21	Titan	Sh.	I.	-36.6	31.6	
30/03/09	1.03.10	Tethys	Sh.	I.	36.3	-38.3	13/04/09	7.53.42	Tethys	Ec.	R.	-38.3	35.5	
30/03/09	3.44.23	Tethys	Tr.	E.	7.2	-14.3	13/04/09	11.14.00	Dione	Occ.	D.	-31.3	57.2	
30/03/09	4.01.00	Tethys	Sh.	E.	4.2	-11.4	13/04/09	11.43.46	Titan	Sh.	E.	-27.4	56.5	
30/03/09	18.53.21	Dione	Occ.	D.	37.4	-15.0	13/04/09	14.57.43	Dione	Ec.	R.	5.6	31.0	
30/03/09	22.25.44	Dione	Ec.	R.	54.6	-42.5	13/04/09	16.31.48	Rhea	Tr.	I.	23.0	13.8	
30/03/09	23.28.50	Tethys	Occ.	D.	49.4	-43.8	13/04/09	17.09.00	Rhea	Sh.	I.	29.7	7.0	
31/03/09	2.40.34	Tethys	Ec.	R.	18.2	-24.7	13/04/09	19.35.13	Rhea	Tr.	E.	51.4	-18.7	
31/03/09	3.22.59	Rhea	Tr.	I.	10.4	-17.7	13/04/09	20.55.11	Rhea	Sh.	E.	55.7	-29.8	
31/03/09	3.46.20	Rhea	Sh.	I.	6.1	-13.6	14/04/09	3.12.57	Tethys	Tr.	I.	1.9	-14.8	
31/03/09	6.37.48	Rhea	Tr.	E.	-23.8	18.0	14/04/09	3.35.00	Tethys	Sh.	I.	-1.8	-11.2	
31/03/09	7.29.39	Rhea	Sh.	E.	-31.0	27.2	14/04/09	6.05.43	Tethys	Tr.	E.	-27.4	16.3	
31/03/09	22.07.44	Tethys	Tr.	I.	55.1	-41.0	14/04/09	6.33.09	Tethys	Sh.	E.	-31.0	21.3	
31/03/09	22.22.07	Tethys	Sh.	I.	54.6	-41.9	14/04/09	19.59.08	Dione	Tr.	I.	53.9	-22.1	
01/04/09	1.01.56	Tethys	Tr.	E.	35.1	-37.6	14/04/09	20.26.48	Dione	Sh.	I.	55.3	-26.0	
01/04/09	1.20.00	Tethys	Sh.	E.	32.0	-35.6	14/04/09	22.58.13	Dione	Tr.	E.	45.6	-38.2	
01/04/09	3.38.14	Dione	Tr.	I.	6.8	-14.7	14/04/09	23.43.29	Dione	Sh.	E.	38.7	-37.8	
01/04/09	3.55.59	Dione	Sh.	I.	3.6	-11.6	15/04/09	1.51.57	Tethys	Occ.	D.	15.9	-26.6	
01/04/09	6.41.39	Dione	Tr.	E.	-25.0	19.0	15/04/09	5.12.44	Tethys	Ec.	R.	-20.1	6.8	
01/04/09	7.11.28	Dione	Sh.	E.	-29.2	24.4	15/04/09	22.43.09	Rhea	Occ.	D.	47.1	-37.5	
01/04/09	20.46.37	Tethys	Occ.	D.	53.1	-32.2	16/04/09	0.30.59	Tethys	Tr.	I.	29.9	-34.9	
01/04/09	23.59.34	Tethys	Ec.	R.	44.3	-42.1	16/04/09	0.54.01	Tethys	Sh.	I.	25.8	-32.9	
02/04/09	9.33.52	Rhea	Occ.	D.	-40.6	46.7	16/04/09	3.09.42	Rhea	Ec.	R.	1.1	-14.8	
02/04/09	12.33.19	Dione	Occ.	D.	-27.0	49.3	16/04/09	3.23.33	Tethys	Tr.	E.	-1.1	-12.5	
02/04/09	13.44.06	Rhea	Ec.	R.	-16.1	40.5	16/04/09	3.52.12	Tethys	Sh.	E.	-7.1	-7.6	
02/04/09	16.08.06	Dione	Ec.	R.	10.0	16.0	16/04/09	4.54.23	Dione	Occ.	D.	-17.8	3.8	
02/04/09	19.25.32	Tethys	Tr.	I.	44.3	-19.7	16/04/09	8.40.09	Dione	Ec.	R.	-40.3	44.1	
02/04/09	19.41.05	Tethys	Sh.	I.	46.5	-22.3	16/04/09	23.09.59	Tethys	Occ.	D.	42.7	-37.6	
02/04/09	22.19.31	Tethys	Tr.	E.	54.4	-41.1	17/04/09	2.31.47	Tethys	Ec.	R.	7.0	-20.4	
02/04/09	22.39.00	Tethys	Sh.	E.	53.1	-42.0	17/04/09	13.39.34	Dione	Tr.	I.	-5.8	45.0	
03/04/09	18.04.26	Tethys	Occ.	D.	32.0	-5.3	17/04/09	14.09.01	Dione	Sh.	I.	0.1	40.2	
03/04/09	21.18.15	Dione	Tr.	I.	55.2	-35.5	17/04/09	16.37.54	Dione	Tr.	E.	27.1	13.4	
03/04/09	21.18.34	Tethys	Ec.	R.	55.2	-35.5	17/04/09	17.25.56	Dione	Sh.	E.	35.5	4.7	
03/04/09	21.38.07	Dione	Sh.	I.	55.5	-37.5	17/04/09	21.49.02	Tethys	Tr.	I.	52.3	-34.0	

Date	Times	Moon	Phenomen	Phase	h Sat	h Sun								
18/04/09	0.41.26	Tethys	Tr.	E.	26.6	-33.3	01/05/09	19.00.01	Rhea	Sh.	I.	54.7	-9.1	
18/04/09	1.11.15	Tethys	Sh.	E.	21.2	-30.5	01/05/09	21.00.32	Rhea	Tr.	E.	51.7	-25.5	
18/04/09	4.55.23	Rhea	Tr.	I.	-19.2	4.5	01/05/09	22.49.30	Rhea	Sh.	E.	36.3	-32.5	
18/04/09	5.36.40	Rhea	Sh.	I.	-25.5	12.0	02/05/09	1.35.36	Tethys	Occ.	D.	6.3	-23.5	
18/04/09	7.55.27	Rhea	Tr.	E.	-39.4	37.3	02/05/09	5.04.23	Tethys	Ec.	R.	-28.8	9.5	
18/04/09	9.23.45	Rhea	Sh.	E.	-39.1	51.1	02/05/09	14.58.32	Dione	Occ.	D.	20.3	34.4	
18/04/09	20.28.04	Tethys	Occ.	D.	55.7	-25.1	03/05/09	18.54.58	Dione	Ec.	R.	54.7	-8.1	
18/04/09	22.34.51	Dione	Occ.	D.	46.6	-36.2	03/05/09	0.14.47	Tethys	Tr.	I.	20.5	-30.4	
18/04/09	23.50.51	Tethys	Ec.	R.	34.8	-36.1	03/05/09	0.45.28	Tethys	Sh.	I.	14.8	-28.2	
19/04/09	2.22.36	Dione	Ec.	R.	7.2	-21.1	03/05/09	3.06.09	Tethys	Tr.	E.	-11.0	-10.7	
19/04/09	19.07.07	Tethys	Tr.	I.	51.2	-12.8	03/05/09	3.43.52	Tethys	Sh.	E.	-17.4	-4.4	
19/04/09	19.32.04	Tethys	Sh.	I.	53.5	-16.8	03/05/09	22.53.58	Tethys	Occ.	D.	34.2	-32.0	
19/04/09	21.59.22	Tethys	Tr.	E.	50.5	-34.1	03/05/09	23.44.02	Dione	Tr.	I.	25.3	-31.5	
19/04/09	22.30.18	Tethys	Sh.	E.	46.7	-35.7	04/05/09	0.19.50	Rhea	Occ.	D.	18.8	-29.8	
20/04/09	7.20.05	Dione	Tr.	I.	-37.9	31.6	04/05/09	0.22.39	Dione	Sh.	I.	18.3	-29.6	
20/04/09	7.51.15	Dione	Sh.	I.	-39.5	37.1	04/05/09	2.23.29	Tethys	Ec.	R.	-4.0	-16.8	
20/04/09	10.17.44	Dione	Tr.	E.	-34.2	57.5	04/05/09	2.39.12	Dione	Tr.	E.	-7.0	-14.5	
20/04/09	11.06.53	Rhea	Occ.	D.	-28.4	59.6	04/05/09	3.40.47	Dione	Sh.	E.	-17.5	-4.8	
20/04/09	11.08.23	Dione	Sh.	E.	-28.2	59.7	04/05/09	5.04.06	Rhea	Ec.	R.	-29.8	9.9	
20/04/09	15.38.17	Rhea	Ec.	R.	18.5	25.0	04/05/09	21.33.10	Tethys	Tr.	I.	46.3	-27.8	
20/04/09	17.46.10	Tethys	Occ.	D.	40.9	1.7	04/05/09	22.04.33	Tethys	Sh.	I.	41.7	-30.0	
20/04/09	21.09.54	Tethys	Ec.	R.	54.4	-29.5	05/05/09	0.24.28	Tethys	Tr.	E.	17.2	-29.2	
21/04/09	8.30.24	Titan	Ec.	D.	-40.2	44.0	05/05/09	1.02.58	Tethys	Sh.	E.	10.1	-26.1	
21/04/09	13.01.49	Titan	Ec.	R.	-9.6	51.5	05/05/09	8.39.32	Dione	Occ.	D.	-37.4	49.1	
21/04/09	16.15.25	Dione	Occ.	D.	26.1	18.3	05/05/09	12.37.28	Dione	Ec.	R.	-3.3	58.1	
21/04/09	16.25.15	Tethys	Tr.	I.	27.8	16.5	05/05/09	20.12.22	Tethys	Occ.	D.	54.4	-18.8	
21/04/09	16.51.07	Tethys	Sh.	I.	32.4	11.7	05/05/09	23.42.35	Tethys	Ec.	R.	24.2	-31.0	
21/04/09	19.17.20	Tethys	Tr.	E.	52.9	-14.0	06/05/09	6.32.39	Rhea	Tr.	I.	-38.8	26.5	
21/04/09	19.49.22	Tethys	Sh.	E.	55.1	-18.9	06/05/09	7.27.53	Rhea	Sh.	I.	-40.1	36.7	
21/04/09	20.05.03	Dione	Ec.	R.	55.6	-21.2	06/05/09	9.23.53	Rhea	Tr.	E.	-32.9	56.2	
22/04/09	15.04.19	Tethys	Occ.	D.	13.8	31.6	06/05/09	11.18.07	Rhea	Sh.	E.	-16.8	64.6	
22/04/09	17.19.16	Rhea	Tr.	I.	37.9	6.8	06/05/09	17.25.05	Dione	Tr.	I.	47.4	8.2	
22/04/09	18.04.24	Rhea	Sh.	I.	44.9	-0.7	06/05/09	18.04.58	Dione	Sh.	I.	52.0	1.5	
22/04/09	18.28.58	Tethys	Ec.	R.	48.2	-5.8	06/05/09	18.51.35	Tethys	Tr.	I.	55.3	-6.8	
22/04/09	20.16.22	Rhea	Tr.	E.	55.8	-22.5	06/05/09	19.23.38	Tethys	Sh.	I.	55.9	-11.8	
22/04/09	21.52.19	Rhea	Sh.	E.	49.9	-32.7	06/05/09	20.20.00	Dione	Tr.	E.	53.5	-19.6	
23/04/09	1.00.42	Dione	Tr.	I.	19.4	-29.9	06/05/09	21.23.17	Dione	Sh.	E.	46.5	-26.4	
23/04/09	1.33.30	Dione	Sh.	I.	13.3	-26.4	06/05/09	21.42.50	Tethys	Tr.	E.	43.8	-28.0	
23/04/09	3.57.42	Dione	Tr.	E.	-13.0	-4.6	06/05/09	22.22.04	Tethys	Sh.	E.	37.6	-30.3	
23/04/09	4.50.51	Dione	Sh.	E.	-21.7	5.0	07/05/09	7.31.19	Titan	Ec.	D.	-40.0	37.5	
23/04/09	13.43.25	Tethys	Tr.	I.	0.0	45.8	07/05/09	12.33.23	Titan	Ec.	R.	-2.3	59.1	
23/04/09	14.10.09	Tethys	Sh.	I.	4.6	41.3	07/05/09	17.30.48	Tethys	Occ.	D.	48.6	7.4	
23/04/09	16.35.21	Tethys	Tr.	E.	31.1	15.0	07/05/09	21.01.41	Tethys	Ec.	R.	48.8	-24.1	
23/04/09	17.08.26	Tethys	Sh.	E.	36.8	8.9	08/05/09	2.20.37	Dione	Occ.	D.	-6.5	-16.2	
24/04/09	9.56.03	Dione	Occ.	D.	-34.7	56.8	08/05/09	6.19.58	Dione	Ec.	R.	-38.5	24.6	
24/04/09	12.22.30	Tethys	Occ.	D.	-14.2	57.0	08/05/09	12.44.42	Rhea	Occ.	D.	0.4	57.8	
24/04/09	13.47.31	Dione	Ec.	R.	1.3	45.3	08/05/09	16.10.03	Tethys	Tr.	I.	37.2	22.2	
24/04/09	15.48.03	Tethys	Ec.	R.	23.4	23.9	08/05/09	16.42.43	Tethys	Sh.	I.	42.5	16.2	
24/04/09	23.30.55	Rhea	Occ.	D.	34.1	-34.7	08/05/09	17.32.43	Rhea	Ec.	R.	49.4	7.2	
25/04/09	4.06.53	Rhea	Ec.	R.	-15.9	-1.8	08/05/09	19.01.15	Tethys	Tr.	E.	55.9	-7.9	
25/04/09	11.01.37	Tethys	Tr.	I.	-26.2	61.3	08/05/09	19.41.10	Tethys	Sh.	E.	55.4	-13.9	
25/04/09	11.29.12	Tethys	Sh.	I.	-22.1	61.0	09/05/09	11.06.14	Dione	Tr.	I.	-16.7	65.5	
25/04/09	13.53.25	Tethys	Tr.	E.	3.1	44.6	09/05/09	11.47.17	Dione	Sh.	I.	-9.8	64.1	
25/04/09	14.27.31	Tethys	Sh.	E.	9.2	38.7	09/05/09	14.00.58	Dione	Tr.	E.	14.8	45.9	
25/04/09	18.41.24	Dione	Tr.	I.	51.1	-7.3	09/05/09	14.49.17	Tethys	Occ.	D.	23.7	37.3	
25/04/09	19.15.46	Dione	Sh.	I.	54.1	-12.9	09/05/09	15.05.48	Dione	Sh.	E.	26.7	34.3	
25/04/09	21.37.50	Dione	Tr.	E.	50.2	-30.7	09/05/09	18.20.48	Tethys	Ec.	R.	54.3	-0.4	
25/04/09	22.33.19	Dione	Sh.	E.	42.8	-33.9	10/05/09	13.28.33	Tethys	Tr.	I.	9.6	51.6	
26/04/09	9.40.43	Tethys	Occ.	D.	-35.4	55.7	10/05/09	14.01.49	Tethys	Sh.	I.	15.7	46.0	
26/04/09	13.07.08	Tethys	Ec.	R.	-4.8	52.0	10/05/09	16.19.43	Tethys	Tr.	E.	40.1	20.7	
27/04/09	3.36.47	Dione	Occ.	D.	-12.2	-7.2	10/05/09	17.00.17	Tethys	Sh.	E.	46.2	13.3	
27/04/09	5.43.27	Rhea	Tr.	I.	-31.2	15.5	10/05/09	18.57.38	Rhea	Tr.	I.	55.9	-7.0	
27/04/09	6.32.11	Rhea	Sh.	I.	-36.3	24.5	10/05/09	19.55.48	Rhea	Sh.	I.	54.2	-15.6	
27/04/09	7.29.59	Dione	Ec.	R.	-39.7	35.2	10/05/09	20.01.48	Dione	Occ.	D.	53.7	-16.4	
27/04/09	8.19.51	Tethys	Tr.	I.	-39.9	43.9	10/05/09	21.48.06	Rhea	Tr.	E.	40.5	-27.4	
27/04/09	8.38.03	Rhea	Tr.	E.	-39.4	46.9	10/05/09	23.46.43	Rhea	Sh.	E.	19.7	-29.5	
27/04/09	8.48.16	Tethys	Sh.	I.	-38.9	48.6	11/05/09	0.02.28	Dione	Ec.	R.	16.8	-28.9	
27/04/09	10.20.54	Rhea	Sh.	E.	-30.5	60.0	11/05/09	12.07.48	Tethys	Occ.	D.	-4.6	62.9	
27/04/09	11.11.31	Tethys	Tr.	E.	-23.6	62.0	11/05/09	15.39.54	Tethys	Ec.	R.	34.2	28.3	
27/04/09	11.46.36	Tethys	Sh.	E.	-18.1	60.9	12/05/09	4.47.28	Dione	Tr.	I.	-31.7	8.4	
28/04/09	6.58.58	Tethys	Occ.	D.	-38.5	29.7	12/05/09	5.29.37	Dione	Sh.	I.	-36.0	16.0	
28/04/09	10.26.13	Tethys	Ec.	R.	-29.4	60.7	12/05/09	7.42.07	Dione	Tr.	E.	-39.1	40.4	
28/04/09	12.22.11	Dione	Tr.	I.	-11.4	58.2	12/05/09	8.48.19	Dione	Sh.	E.	-34.2	51.9	
28/04/09	12.58.03	Dione	Sh.	I.	-5.0	53.7	12/05/09	10.47.05	Tethys	Tr.	I.	-17.9	65.8	
28/04/09	15.18.07	Dione	Tr.	E.	20.9	30.2	12/05/09	11.20.54	Tethys	Sh.	I.	-12.3	66.1	
28/04/09	16.15.48	Dione	Sh.	E.	31.3	19.5	12/05/09	13.38.14	Tethys	Tr.	E.	12.8	50.3	
29/04/09	5.38.07	Tethys	Tr.	I.	-31.6	15.0	12/05/09	14.19.23	Tethys	Sh.	E.	20.4	43.2	
29/04/09	6.07.19	Tethys	Sh.	I.	-34.7	20.4	13/05/09	1.09.49	Rhea	Occ.	D.	3.0	-23.5	
29/04/09	6.29.53	Titan	Sh.	I.	-36.8	24.6	13/05/09	6.01.20	Rhea	Ec.	R.	-38.6	21.9	
29/04/09	8.29.41	Tethys	Tr.	E.	-39.4	46.1	13/05/09	9.26.21	Tethys	Occ.	D.	-29.3	58.0	
29/04/09	9.05.41	Tethys	Sh.	E.	-37.3	51.8	13/05/09	12.59.01	Tethys	Ec.	R.	6.3	56.8	
29/04/09	11.10.32	Titan	Sh.	E.	-22.5	62.6	13/05/09	13.43.04	Dione	Occ.	D.	14.5	49.7	
29/04/09	11.55.14	Rhea	Occ.	D.	-15.3	60.9	13/05/09	17.44.59	Dione	Ec.	R.	52.8	5.9	
29/04/09	16.35.29	Rhea	Ec.	R.	35.4	16.0	14/05/09	8.05.39	Tethys	Tr.	I.	-37.2	45.0	
29/04/09	21.17.37	Dione	Occ.	D.	50.7	-27.7	14/05/09	8.40.00	Tethys	Sh.	I.	-34.2	50.9	
30/04/09	1.12.28	Dione	Ec.	R.	12.0	-26.6	14/05/09	10.56.48	Tethys	Tr.	E.	-15.0	66.6	
30/04/09	4.17.16	Tethys	Occ.	D.	-20.8	0.9	14/05/09	11.38.30	Tethys	Sh.	E.	-7.8	65.9	
30/04/09	7.45.18	Tethys	Ec.	R.	-40.1	38.6	14/05/09	22.28.47	Dione	Tr.	I.	31.0	-28.5	
01/05/09	2.56.26	Tethys	Tr.	I.	-7.9	-12.7	14/05/09	23.11.58	Dione	Sh.	I.	23.2	-29.2	
01/05/09	3.26.23	Tethys	Sh.	I.	-13.1	-7.9	15/05/09	1.23.26	Dione	Tr.	E.	-0.5	-21.7	
01/05/09	5.47.54	Tethys	Tr.	E.	-33.6	17.2	15/05/09	2.30.50	Dione	Sh.	E.	-13.2	-13.3	
01/05/09	6.03.04	Dione	Tr.	I.	-35.1	20.0	15/05/09	5.31.50	Titan	Sh.	I.	-37.2	16.8	
01/05/09	6.24.46	Tethys	Sh.	E.	-37.0	24.1	15/05/09	6.44.56	Tethys	Occ.	D.	-40.1	30.3	
01/05/09	6.40.20	Dione	Sh.	I.	-38.1	27.0	15/05/09	7.22.53	Rhea	Tr.	I.	-39.4	37.3	
01/05/09	8.58.35	Dione	Tr.	E.	-37.2	51.2	15/05/09	8.23.45	Rhea	Sh.	I.	-35.4	48.3	
01/05/09	9.58.17	Dione	Sh.	E.	-31.3	59.2	15/05/09	10.13.14	Rhea	Tr.	E.	-21.4	64.2	
01/05/09	18.07.55	Rhea	Tr.	I.	50.2	0.2	15/05/09	10.18.08	Tethys	Ec.	R.	-20.6	64.6	

Date	Times	Moon	Phenomen	Phase	h Sat	h Sun								
15/05/09	12.15.20	Rhea	Sh.	E.	0.1	62.9	29/05/09	23.52.31	Dione	Occ.	D.	4.9	-25.5	
16/05/09	5.24.15	Tethys	Tr.	I.	-36.9	15.6	30/05/09	4.00.06	Dione	Ec.	R.	-34.3	2.7	
16/05/09	5.59.07	Tethys	Sh.	I.	-39.1	22.0	30/05/09	9.14.57	Tethys	Occ.	D.	-21.5	58.7	
16/05/09	7.24.25	Dione	Occ.	D.	-39.2	37.8	30/05/09	12.51.06	Tethys	Ec.	R.	17.1	60.7	
16/05/09	8.15.25	Tethys	Tr.	E.	-35.8	47.0	31/05/09	2.52.50	Rhea	Occ.	D.	-26.5	-8.0	
16/05/09	8.57.37	Tethys	Sh.	E.	-31.4	54.2	31/05/09	4.36.24	Titan	Sh.	I.	-37.8	8.7	
16/05/09	11.27.30	Dione	Ec.	R.	-8.4	66.8	31/05/09	7.54.25	Tethys	Tr.	I.	-32.0	44.8	
17/05/09	4.03.34	Tethys	Occ.	D.	-28.6	1.8	31/05/09	7.55.47	Rhea	Ec.	R.	-31.9	45.0	
17/05/09	7.37.15	Tethys	Ec.	R.	-38.3	40.3	31/05/09	8.32.03	Tethys	Sh.	I.	-27.2	51.5	
17/05/09	13.35.11	Rhea	Occ.	D.	15.9	51.7	31/05/09	8.38.33	Dione	Tr.	I.	-26.3	52.7	
17/05/09	16.10.12	Dione	Tr.	I.	42.9	23.6	31/05/09	9.26.12	Dione	Sh.	I.	-19.1	60.5	
17/05/09	16.54.19	Dione	Sh.	I.	49.0	15.5	31/05/09	9.56.19	Titan	Sh.	E.	-14.1	64.8	
17/05/09	18.29.58	Rhea	Ec.	R.	55.9	-0.5	31/05/09	10.46.11	Tethys	Tr.	E.	-5.3	69.4	
17/05/09	19.04.55	Dione	Tr.	E.	55.4	-6.8	31/05/09	11.30.36	Tethys	Sh.	E.	3.0	69.5	
17/05/09	20.13.21	Dione	Sh.	E.	49.9	-16.5	31/05/09	11.34.56	Dione	Tr.	E.	3.8	69.3	
18/05/09	2.42.54	Tethys	Tr.	I.	-17.2	-11.1	31/05/09	12.45.58	Dione	Sh.	E.	16.8	61.6	
18/05/09	3.18.13	Tethys	Sh.	I.	-22.7	-5.8	01/06/09	6.33.52	Tethys	Occ.	D.	-38.7	29.9	
18/05/09	5.34.05	Tethys	Tr.	E.	-38.1	17.7	01/06/09	10.10.14	Tethys	Ec.	R.	-11.1	66.5	
18/05/09	6.16.44	Tethys	Sh.	E.	-39.9	25.5	01/06/09	17.34.24	Dione	Occ.	D.	55.8	10.4	
19/05/09	1.05.52	Dione	Occ.	D.	-0.2	-22.6	01/06/09	21.42.37	Dione	Ec.	R.	26.6	-22.8	
19/05/09	1.22.13	Tethys	Occ.	D.	-3.6	-21.0	02/06/09	5.13.21	Tethys	Tr.	I.	-39.9	15.3	
19/05/09	4.56.22	Tethys	Ec.	R.	-35.5	11.0	02/06/09	5.51.10	Tethys	Sh.	I.	-40.1	22.1	
19/05/09	5.10.01	Dione	Ec.	R.	-36.7	13.4	02/06/09	8.05.14	Tethys	Tr.	E.	-29.8	46.8	
19/05/09	19.48.22	Rhea	Tr.	I.	51.7	-12.8	02/06/09	8.49.44	Tethys	Sh.	E.	-23.6	54.7	
19/05/09	20.51.45	Rhea	Sh.	I.	43.7	-20.5	02/06/09	9.06.26	Rhea	Tr.	I.	-21.0	57.5	
19/05/09	22.39.16	Rhea	Tr.	E.	25.6	-27.7	02/06/09	10.15.52	Rhea	Sh.	I.	-9.5	67.2	
20/05/09	0.01.35	Tethys	Tr.	I.	10.4	-26.9	02/06/09	12.02.40	Rhea	Tr.	E.	10.2	67.4	
20/05/09	0.37.20	Tethys	Sh.	I.	3.9	-24.8	02/06/09	14.09.44	Rhea	Sh.	E.	33.3	47.8	
20/05/09	0.43.57	Rhea	Sh.	E.	2.7	-24.3	03/06/09	2.20.30	Dione	Tr.	I.	-23.5	-12.2	
20/05/09	2.52.48	Tethys	Tr.	E.	-20.0	-9.4	03/06/09	3.08.36	Dione	Sh.	I.	-30.2	-5.4	
20/05/09	3.35.51	Tethys	Sh.	E.	-26.5	-2.0	03/06/09	3.52.49	Tethys	Occ.	D.	-35.1	1.8	
20/05/09	9.51.42	Dione	Tr.	I.	-21.7	62.7	03/06/09	5.17.26	Dione	Tr.	E.	-40.1	16.1	
20/05/09	10.36.41	Dione	Sh.	I.	-14.4	67.1	03/06/09	6.28.29	Dione	Sh.	E.	-38.6	29.0	
20/05/09	12.46.35	Dione	Tr.	E.	9.1	59.9	03/06/09	7.29.22	Tethys	Ec.	R.	-33.6	40.3	
20/05/09	13.55.52	Dione	Sh.	E.	21.9	48.6	04/06/09	2.32.19	Tethys	Tr.	I.	-25.8	-10.5	
20/05/09	22.40.55	Tethys	Occ.	D.	24.6	-27.5	04/06/09	3.10.18	Tethys	Sh.	I.	-30.9	-5.2	
21/05/09	2.15.29	Tethys	Ec.	R.	-14.6	-14.4	04/06/09	5.24.21	Tethys	Tr.	E.	-40.2	17.4	
21/05/09	18.47.24	Dione	Occ.	D.	55.5	-3.0	04/06/09	6.08.51	Tethys	Sh.	E.	-39.4	25.4	
21/05/09	21.20.18	Tethys	Tr.	I.	38.0	-22.8	04/06/09	11.16.23	Dione	Occ.	D.	3.2	70.4	
21/05/09	21.56.27	Tethys	Sh.	I.	31.8	-25.5	04/06/09	15.19.17	Rhea	Occ.	D.	45.6	35.2	
21/05/09	22.52.32	Dione	Ec.	R.	21.7	-27.6	04/06/09	15.25.08	Dione	Ec.	R.	46.4	34.1	
22/05/09	0.11.35	Tethys	Tr.	E.	7.1	-26.0	04/06/09	20.24.23	Rhea	Ec.	R.	38.2	-15.0	
22/05/09	0.54.59	Tethys	Sh.	E.	-0.4	-23.0	05/06/09	1.11.48	Tethys	Occ.	D.	-13.7	-19.7	
22/05/09	2.00.48	Rhea	Occ.	D.	-12.8	-16.1	05/06/09	4.48.29	Tethys	Ec.	R.	-39.5	11.1	
22/05/09	6.58.35	Rhea	Ec.	R.	-39.3	33.7	05/06/09	20.02.31	Dione	Tr.	I.	41.0	-10.2	
22/05/09	19.59.39	Tethys	Occ.	D.	49.2	-13.8	05/06/09	20.50.59	Dione	Sh.	I.	33.0	-17.8	
22/05/09	23.34.37	Tethys	Ec.	R.	13.2	-27.2	05/06/09	23.00.05	Dione	Tr.	E.	9.5	-25.3	
23/05/09	3.33.17	Dione	Tr.	I.	-27.8	-2.0	05/06/09	23.51.19	Tethys	Tr.	I.	0.4	-24.7	
23/05/09	4.19.03	Dione	Sh.	I.	-33.4	5.1	06/06/09	0.11.00	Dione	Sh.	E.	-3.3	-23.9	
23/05/09	6.28.25	Dione	Tr.	E.	-40.0	28.2	06/06/09	0.29.26	Tethys	Sh.	I.	-7.0	-22.9	
23/05/09	6.36.00	Titan	Ec.	D.	-39.9	29.6	06/06/09	0.29.26	Tethys	Sh.	I.	-7.0	-22.9	
23/05/09	7.38.23	Dione	Sh.	E.	-36.6	41.2	06/06/09	2.43.30	Tethys	Tr.	E.	-28.5	-8.9	
23/05/09	12.01.41	Titan	Ec.	R.	3.1	65.9	06/06/09	3.27.59	Tethys	Sh.	E.	-33.8	-1.5	
23/05/09	18.39.03	Tethys	Tr.	I.	55.5	-1.0	06/06/09	21.33.02	Rhea	Tr.	I.	24.9	-21.5	
23/05/09	19.15.34	Tethys	Sh.	I.	53.3	-7.5	06/06/09	22.30.49	Tethys	Occ.	D.	14.2	-24.6	
23/05/09	21.30.24	Tethys	Tr.	E.	35.0	-23.3	06/06/09	22.43.57	Rhea	Sh.	I.	11.8	-25.0	
23/05/09	22.14.06	Tethys	Sh.	E.	27.3	-26.0	07/06/09	0.32.06	Rhea	Tr.	E.	-8.2	-22.6	
24/05/09	8.14.07	Rhea	Tr.	I.	-32.8	47.8	07/06/09	2.07.37	Tethys	Ec.	R.	-23.9	-13.5	
24/05/09	9.19.45	Rhea	Sh.	I.	-24.2	58.8	07/06/09	2.38.18	Rhea	Sh.	E.	-28.3	-9.5	
24/05/09	11.06.12	Rhea	Tr.	E.	-6.6	68.8	07/06/09	4.58.26	Dione	Occ.	D.	-40.1	12.9	
24/05/09	12.29.01	Dione	Occ.	D.	8.7	63.0	07/06/09	4.58.26	Dione	Occ.	D.	-40.1	12.9	
24/05/09	13.12.33	Rhea	Sh.	E.	16.8	56.5	07/06/09	9.07.39	Dione	Ec.	R.	-17.8	58.0	
24/05/09	16.35.03	Dione	Ec.	R.	50.0	20.0	07/06/09	21.10.21	Tethys	Tr.	I.	28.3	-19.5	
24/05/09	17.18.26	Tethys	Occ.	D.	54.1	12.2	07/06/09	21.48.33	Tethys	Sh.	I.	21.3	-22.5	
24/05/09	20.53.44	Tethys	Ec.	R.	40.4	-19.8	08/06/09	0.02.42	Tethys	Tr.	E.	-3.2	-24.1	
25/05/09	15.57.50	Tethys	Tr.	I.	45.7	26.9	08/06/09	0.47.06	Tethys	Sh.	E.	-11.5	-21.5	
25/05/09	16.34.41	Tethys	Sh.	I.	50.4	20.2	08/06/09	5.43.34	Titan	Ec.	D.	-39.8	20.9	
25/05/09	18.49.16	Tethys	Tr.	E.	54.6	-2.5	08/06/09	11.27.16	Titan	Ec.	R.	7.8	70.6	
25/05/09	19.33.14	Tethys	Sh.	E.	50.8	-9.7	08/06/09	13.44.38	Dione	Tr.	I.	32.9	52.9	
25/05/09	21.14.57	Dione	Tr.	I.	36.2	-21.7	08/06/09	14.33.23	Dione	Sh.	I.	40.9	44.1	
25/05/09	22.01.26	Dione	Sh.	I.	28.2	-25.0	08/06/09	16.42.53	Dione	Tr.	E.	55.1	20.2	
26/05/09	0.10.25	Dione	Tr.	E.	4.5	-25.3	08/06/09	17.53.32	Dione	Sh.	E.	54.5	7.8	
26/05/09	1.20.55	Dione	Sh.	E.	-8.6	-19.9	08/06/09	19.49.52	Tethys	Occ.	D.	41.2	-10.2	
26/05/09	14.26.41	Rhea	Occ.	D.	31.6	43.9	08/06/09	23.26.44	Tethys	Ec.	R.	2.6	-25.0	
26/05/09	14.37.14	Tethys	Occ.	D.	33.5	42.0	09/06/09	3.46.03	Rhea	Occ.	D.	-36.7	1.1	
26/05/09	18.12.51	Tethys	Ec.	R.	55.8	3.2	09/06/09	8.52.57	Rhea	Ec.	R.	-19.0	55.5	
26/05/09	19.27.11	Rhea	Ec.	R.	51.1	-8.7	09/06/09	18.29.25	Tethys	Tr.	I.	51.3	2.2	
27/05/09	6.10.44	Dione	Occ.	D.	-40.1	25.3	09/06/09	19.07.41	Tethys	Sh.	I.	46.8	-3.9	
27/05/09	10.17.35	Dione	Ec.	R.	-13.1	66.7	09/06/09	21.21.56	Tethys	Tr.	E.	24.8	-20.3	
27/05/09	13.16.40	Tethys	Tr.	I.	19.7	56.3	09/06/09	22.06.14	Tethys	Sh.	E.	16.6	-23.3	
27/05/09	13.53.48	Tethys	Sh.	I.	26.5	49.9	09/06/09	22.40.35	Dione	Occ.	D.	10.3	-24.6	
27/05/09	16.08.11	Tethys	Tr.	E.	48.1	25.3	10/06/09	2.50.10	Dione	Ec.	R.	-31.3	-7.8	
27/05/09	16.52.21	Tethys	Sh.	E.	52.9	17.2	10/06/09	17.08.57	Tethys	Occ.	D.	55.7	15.7	
28/05/09	11.56.05	Tethys	Occ.	D.	5.5	67.3	10/06/09	20.45.51	Tethys	Ec.	R.	30.5	-16.8	
28/05/09	14.56.43	Dione	Tr.	I.	38.0	38.6	11/06/09	7.26.49	Dione	Tr.	I.	-30.4	40.0	
28/05/09	15.31.59	Tethys	Ec.	R.	43.6	32.1	11/06/09	8.15.47	Dione	Sh.	I.	-23.6	49.0	
28/05/09	15.43.49	Dione	Sh.	I.	45.3	29.9	11/06/09	9.59.57	Rhea	Tr.	I.	-6.3	65.9	
28/05/09	17.52.36	Dione	Tr.	E.	55.9	6.8	11/06/09	10.25.50	Dione	Tr.	E.	-0.8	68.8	
28/05/09	19.03.26	Dione	Sh.	E.	52.6	-4.8	11/06/09	11.12.02	Rhea	Sh.	I.	7.1	71.1	
28/05/09	20.40.08	Rhea	Tr.	I.	40.0	-17.7	11/06/09	11.36.02	Dione	Sh.	E.	11.5	70.4	
28/05/09	21.47.48	Rhea	Sh.	I.	28.5	-23.7	11/06/09	13.02.16	Rhea	Tr.	E.	27.4	60.3	
28/05/09	23.34.01	Rhea	Tr.	E.	9.0	-26.2	11/06/09	15.06.51	Rhea	Sh.	E.	47.4	38.1	
29/05/09	1.41.09	Rhea	Sh.	E.	-14.1	-17.4	11/06/09	15.48.31	Tethys	Tr.	I.	52.1	30.4	
29/05/09	10.35.31	Tethys	Tr.	I.	-8.7	68.5	11/06/09	16.26.49	Tethys	Sh.	I.	54.8	23.4	
29/05/09	11.12.55	Tethys	Sh.	I.	-1.1	69.7	11/06/09	18.41.13	Tethys	Tr.	E.	49.1	0.6	
29/05/09	13.27.10	Tethys	Tr.	E.	23.0	54.8	11/06/09	19.25.21	Tethys	Sh.	E.	43.2	-6.6	
29/05/09	14.11.29	Tethys	Sh.	E.	31.0	47.0	12/06/09	14.28.04	Tethys	Occ.	D.	42.4	45.4	

Date	Times	Moon	Phenomen	Phase	h Sat	h Sun								
13/06/09	13.07.39	Tethys	Tr.	I.	29.6	59.5	26/06/09	21.58.16	Tethys	Sh.	E.	6.1	-22.3	
13/06/09	13.45.57	Tethys	Sh.	I.	36.2	53.0	27/06/09	5.36.36	Rhea	Occ.	D.	-36.3	19.2	
13/06/09	16.00.33	Tethys	Tr.	E.	53.7	28.3	27/06/09	10.46.59	Rhea	Ec.	R.	13.2	70.4	
13/06/09	16.13.08	Rhea	Occ.	D.	54.5	26.0	27/06/09	17.02.10	Tethys	Occ.	D.	52.8	17.7	
13/06/09	16.44.28	Tethys	Sh.	E.	55.6	20.3	27/06/09	17.41.50	Dione	Tr.	I.	48.8	10.8	
13/06/09	21.21.30	Rhea	Ec.	R.	22.0	-20.0	27/06/09	18.30.10	Dione	Sh.	I.	42.2	2.8	
14/06/09	1.09.06	Dione	Tr.	I.	-19.0	-19.4	27/06/09	20.37.53	Tethys	Ec.	R.	20.2	-15.3	
14/06/09	1.58.11	Dione	Sh.	I.	-26.5	-14.4	27/06/09	20.46.15	Dione	Tr.	E.	18.7	-16.2	
14/06/09	4.08.55	Dione	Tr.	E.	-39.4	4.7	27/06/09	21.51.00	Dione	Sh.	E.	6.7	-21.9	
14/06/09	5.18.33	Dione	Sh.	E.	-40.0	16.5	28/06/09	15.41.52	Tethys	Tr.	I.	55.1	32.4	
14/06/09	11.47.13	Tethys	Occ.	D.	15.6	69.9	28/06/09	16.18.56	Tethys	Sh.	I.	54.9	25.5	
14/06/09	15.24.06	Tethys	Ec.	R.	50.7	35.1	28/06/09	18.36.29	Tethys	Tr.	E.	40.6	1.9	
15/06/09	10.05.08	Dione	Occ.	D.	-2.0	66.7	28/06/09	19.17.22	Tethys	Sh.	E.	33.9	-4.7	
15/06/09	10.26.49	Tethys	Tr.	I.	1.7	69.0	29/06/09	2.38.02	Dione	Occ.	D.	-37.7	-9.8	
15/06/09	11.05.04	Tethys	Sh.	I.	8.5	71.3	29/06/09	6.47.36	Dione	Ec.	R.	-27.1	32.1	
15/06/09	13.19.54	Tethys	Tr.	E.	33.1	57.6	29/06/09	11.51.13	Rhea	Tr.	I.	26.3	69.8	
15/06/09	14.03.35	Tethys	Sh.	E.	40.3	50.0	29/06/09	13.04.31	Rhea	Sh.	I.	38.9	60.6	
15/06/09	14.15.11	Dione	Ec.	R.	42.1	47.9	29/06/09	14.21.34	Tethys	Occ.	D.	49.6	47.2	
15/06/09	22.27.12	Rhea	Tr.	I.	8.5	-23.9	29/06/09	15.09.13	Rhea	Tr.	E.	53.8	38.4	
15/06/09	23.40.09	Rhea	Sh.	I.	-5.0	-24.4	29/06/09	17.00.48	Rhea	Sh.	E.	52.2	18.0	
16/06/09	1.33.08	Rhea	Tr.	E.	-24.0	-17.1	29/06/09	17.56.59	Tethys	Ec.	R.	45.8	8.2	
16/06/09	3.35.22	Rhea	Sh.	E.	-38.0	-0.3	30/06/09	11.24.38	Dione	Tr.	I.	22.2	71.1	
16/06/09	3.43.03	Titan	Sh.	I.	-38.5	0.7	30/06/09	12.12.33	Dione	Sh.	I.	30.8	67.7	
16/06/09	9.06.24	Tethys	Occ.	D.	-12.5	57.8	30/06/09	13.01.17	Tethys	Tr.	I.	39.0	61.1	
16/06/09	9.16.01	Titan	Sh.	E.	-10.8	59.4	30/06/09	13.38.03	Tethys	Sh.	I.	44.5	55.0	
16/06/09	12.43.13	Tethys	Ec.	R.	27.2	63.5	30/06/09	14.30.03	Dione	Tr.	E.	50.9	45.7	
16/06/09	18.51.28	Dione	Tr.	I.	45.3	-0.4	30/06/09	15.33.29	Dione	Sh.	E.	55.0	33.9	
16/06/09	19.40.35	Dione	Sh.	I.	37.7	-8.4	30/06/09	15.56.07	Tethys	Tr.	E.	55.2	29.7	
16/06/09	21.52.08	Dione	Tr.	E.	14.3	-22.1	30/06/09	16.36.28	Tethys	Sh.	E.	53.7	22.3	
16/06/09	23.01.03	Dione	Sh.	E.	1.7	-24.6	01/07/09	11.41.00	Tethys	Occ.	D.	25.8	70.4	
17/06/09	7.46.01	Tethys	Tr.	I.	-24.8	43.5	01/07/09	15.16.05	Tethys	Ec.	R.	54.5	37.2	
17/06/09	8.24.12	Tethys	Sh.	I.	-18.9	50.5	01/07/09	18.05.12	Rhea	Occ.	D.	43.6	6.8	
17/06/09	10.39.19	Tethys	Tr.	E.	5.2	70.1	01/07/09	20.20.53	Dione	Occ.	D.	20.6	-13.5	
17/06/09	11.22.43	Tethys	Sh.	E.	13.1	71.3	01/07/09	23.15.25	Rhea	Ec.	R.	-11.5	-25.0	
18/06/09	3.47.32	Dione	Occ.	D.	-39.2	1.3	02/07/09	0.30.04	Dione	Ec.	R.	-23.8	-22.8	
18/06/09	4.40.35	Rhea	Occ.	D.	-40.5	9.8	02/07/09	2.51.23	Titan	Sh.	I.	-39.4	-8.2	
18/06/09	6.25.37	Tethys	Occ.	D.	-34.6	28.6	02/07/09	8.33.47	Titan	Sh.	E.	-8.1	51.4	
18/06/09	7.57.41	Dione	Ec.	R.	-22.5	45.6	02/07/09	10.20.44	Tethys	Tr.	I.	11.7	67.8	
18/06/09	9.50.01	Rhea	Ec.	R.	-3.0	64.6	02/07/09	10.57.10	Tethys	Sh.	I.	18.4	70.6	
18/06/09	10.02.20	Tethys	Ec.	R.	-0.5	66.3	02/07/09	13.15.48	Tethys	Tr.	E.	42.3	58.7	
19/06/09	5.05.15	Tethys	Tr.	I.	-40.0	14.1	02/07/09	13.55.34	Tethys	Sh.	E.	47.8	51.9	
19/06/09	5.43.19	Tethys	Sh.	I.	-38.0	20.8	03/07/09	5.07.31	Dione	Tr.	I.	-37.1	13.6	
19/06/09	7.58.45	Tethys	Tr.	E.	-21.8	45.8	03/07/09	5.54.57	Dione	Sh.	I.	-32.2	22.1	
19/06/09	8.41.50	Tethys	Sh.	E.	-14.8	53.5	03/07/09	8.13.57	Dione	Tr.	E.	-11.0	47.7	
19/06/09	12.33.56	Dione	Tr.	I.	27.5	65.0	03/07/09	9.00.28	Tethys	Occ.	D.	-1.9	56.0	
19/06/09	13.22.59	Dione	Sh.	I.	36.1	57.3	03/07/09	9.15.56	Dione	Sh.	E.	0.7	58.5	
19/06/09	15.35.29	Dione	Tr.	E.	53.4	33.3	03/07/09	12.35.11	Tethys	Ec.	R.	36.4	64.8	
19/06/09	16.43.33	Dione	Sh.	E.	55.4	20.8	04/07/09	0.20.01	Rhea	Tr.	I.	-23.4	-23.5	
20/06/09	3.44.52	Tethys	Occ.	D.	-39.5	0.9	04/07/09	1.32.39	Rhea	Sh.	I.	-33.2	-17.9	
20/06/09	7.21.27	Tethys	Ec.	R.	-26.8	38.9	04/07/09	3.42.14	Rhea	Tr.	E.	-40.9	-0.2	
20/06/09	10.54.50	Rhea	Tr.	I.	10.0	71.0	04/07/09	5.29.12	Rhea	Sh.	E.	-34.7	17.4	
20/06/09	12.08.16	Rhea	Sh.	I.	23.6	68.2	04/07/09	7.40.13	Tethys	Tr.	I.	-16.1	41.5	
20/06/09	14.04.37	Rhea	Tr.	E.	43.2	50.1	04/07/09	8.16.17	Tethys	Sh.	I.	-10.0	48.1	
20/06/09	16.03.52	Rhea	Sh.	E.	55.1	28.1	04/07/09	10.35.30	Tethys	Tr.	E.	15.7	69.0	
20/06/09	21.30.02	Dione	Occ.	D.	15.5	-20.4	04/07/09	11.14.40	Tethys	Sh.	E.	22.9	70.8	
21/06/09	1.40.10	Dione	Ec.	R.	-27.8	-16.4	04/07/09	14.03.49	Dione	Occ.	D.	49.6	50.4	
21/06/09	2.24.31	Tethys	Tr.	I.	-33.3	-11.2	04/07/09	18.12.31	Dione	Ec.	R.	40.8	5.5	
21/06/09	3.02.27	Tethys	Sh.	I.	-37.0	-6.0	05/07/09	6.19.57	Tethys	Occ.	D.	-28.0	26.5	
21/06/09	5.18.14	Tethys	Tr.	E.	-39.1	16.3	05/07/09	9.54.16	Tethys	Ec.	R.	8.8	64.2	
21/06/09	6.00.56	Tethys	Sh.	E.	-36.0	24.0	05/07/09	12.50.30	Dione	Tr.	I.	-9.8	-25.1	
22/06/09	1.04.09	Tethys	Occ.	D.	-23.1	-19.8	05/07/09	23.37.20	Dione	Sh.	I.	-17.8	-25.2	
22/06/09	4.40.34	Tethys	Ec.	R.	-40.4	9.7	06/07/09	1.57.56	Dione	Tr.	E.	-36.6	-15.4	
22/06/09	6.16.29	Dione	Tr.	I.	-34.1	26.8	06/07/09	2.58.23	Dione	Sh.	E.	-40.5	-7.6	
22/06/09	7.05.23	Dione	Sh.	I.	-28.0	35.8	06/07/09	4.59.43	Tethys	Tr.	I.	-36.9	12.0	
22/06/09	9.18.57	Dione	Tr.	E.	-6.4	59.8	06/07/09	5.35.23	Tethys	Sh.	I.	-33.3	18.3	
22/06/09	10.26.03	Dione	Sh.	E.	6.1	68.9	06/07/09	6.34.12	Rhea	Occ.	D.	-25.5	29.1	
22/06/09	17.08.23	Rhea	Occ.	D.	53.8	16.5	06/07/09	7.55.13	Tethys	Tr.	E.	-12.4	44.0	
22/06/09	22.18.31	Rhea	Ec.	R.	5.2	-23.4	06/07/09	8.33.45	Tethys	Sh.	E.	-5.5	51.0	
22/06/09	23.43.48	Tethys	Tr.	I.	-10.5	-24.2	06/07/09	11.43.49	Rhea	Ec.	R.	29.4	69.8	
23/06/09	0.21.34	Tethys	Sh.	I.	-16.9	-22.8	07/07/09	3.39.28	Tethys	Occ.	D.	-40.9	-0.8	
23/06/09	2.37.44	Tethys	Tr.	E.	-35.5	-9.5	07/07/09	7.13.22	Tethys	Ec.	R.	-18.8	36.2	
23/06/09	3.20.03	Tethys	Sh.	E.	-38.9	-3.1	07/07/09	7.46.49	Dione	Occ.	D.	-13.2	42.4	
23/06/09	15.12.37	Dione	Occ.	D.	52.6	37.7	07/07/09	11.54.58	Dione	Ec.	R.	32.0	69.0	
23/06/09	19.22.40	Dione	Ec.	R.	36.3	-5.6	08/07/09	2.19.14	Tethys	Tr.	I.	-38.9	-13.1	
23/06/09	22.23.28	Tethys	Occ.	D.	3.6	-23.6	08/07/09	2.54.30	Tethys	Sh.	I.	-40.6	-8.4	
24/06/09	1.59.41	Tethys	Ec.	R.	-31.8	-14.3	08/07/09	5.14.58	Tethys	Tr.	E.	-34.8	14.5	
24/06/09	4.53.25	Titan	Ec.	D.	-39.8	11.8	08/07/09	5.52.50	Tethys	Sh.	E.	-30.3	21.3	
24/06/09	10.50.26	Titan	Ec.	R.	11.9	70.7	08/07/09	12.49.13	Rhea	Tr.	I.	41.4	62.6	
24/06/09	21.03.08	Tethys	Tr.	I.	17.7	-17.9	08/07/09	14.00.46	Rhea	Sh.	I.	50.7	50.8	
24/06/09	21.40.42	Tethys	Sh.	I.	10.7	-21.1	08/07/09	16.15.37	Rhea	Tr.	E.	52.9	26.0	
24/06/09	23.22.49	Rhea	Tr.	I.	-8.2	-24.6	08/07/09	16.33.33	Dione	Tr.	I.	51.4	22.7	
24/06/09	23.57.17	Tethys	Tr.	E.	-14.1	-23.9	08/07/09	17.19.42	Dione	Sh.	I.	46.2	14.4	
24/06/09	23.59.07	Dione	Tr.	I.	-14.4	-23.8	08/07/09	17.57.35	Rhea	Sh.	E.	40.7	7.8	
25/06/09	0.36.24	Rhea	Sh.	I.	-20.6	-22.0	08/07/09	19.42.00	Dione	Tr.	E.	22.9	-8.8	
25/06/09	0.39.10	Tethys	Sh.	E.	-21.0	-21.8	08/07/09	20.40.50	Dione	Sh.	E.	12.0	-16.2	
25/06/09	0.47.46	Dione	Sh.	I.	-22.4	-21.2	09/07/09	0.59.01	Tethys	Occ.	D.	-31.5	-21.5	
25/06/09	2.36.40	Rhea	Tr.	E.	-36.2	-9.8	09/07/09	4.32.27	Tethys	Ec.	R.	-38.3	7.1	
25/06/09	3.02.33	Dione	Tr.	E.	-38.3	-6.1	09/07/09	23.38.48	Tethys	Tr.	I.	-20.5	-25.6	
25/06/09	4.08.32	Dione	Sh.	E.	-40.7	4.3	10/07/09	0.13.36	Tethys	Sh.	I.	-25.9	-24.5	
25/06/09	4.32.21	Rhea	Sh.	E.	-40.4	8.2	10/07/09	1.29.55	Dione	Occ.	D.	-35.5	-18.9	
25/06/09	19.42.48	Tethys	Occ.	D.	31.5	-8.4	10/07/09	2.34.45	Tethys	Tr.	E.	-40.2	-11.3	
25/06/09	23.18.47	Tethys	Ec.	R.	-8.1	-24.7	10/07/09	3.11.55	Tethys	Sh.	E.	-41.1	-6.1	
26/06/09	8.55.17	Dione	Occ.	D.	-8.1	55.6	10/07/09	4.05.10	Titan	Ec.	D.	-39.8	2.5	
26/06/09	13.05.08	Dione	Ec.	R.	37.3	60.5	10/07/09	5.37.24	Dione	Ec.	R.	-31.4	18.3	
26/06/09	18.22.29	Tethys	Tr.	I.	43.9	4.0	10/07/09	10.11.19	Titan	Ec.	R.	15.2	65.8	
26/06/09	18.59.49	Tethys	Sh.	I.	38.1	-1.3	10/07/09	19.03.38	Rhea	Occ.	D.	28.4	-2.7	
26/06/09	21.16.52	Tethys	Tr.	E.	13.7	-19.2	10/07/09	22.18.35	Tethys	Occ.	D.	-7.5	-24.5	

Date	Times	Moon	Phenomen	Phase	h Sat	h Sun								
11/07/09	1.51.31	Tethys	Ec.	R.	-37.8	-16.7	25/07/09	2.53.37	Dione	Tr.	I.	-41.1	-11.0	
11/07/09	10.16.42	Dione	Tr.	I.	16.8	66.3	25/07/09	3.33.51	Dione	Sh.	I.	-39.0	-4.8	
11/07/09	11.02.05	Dione	Sh.	I.	25.1	69.8	25/07/09	5.13.41	Tethys	Tr.	E.	-27.8	12.2	
11/07/09	13.26.09	Dione	Tr.	E.	47.9	56.6	25/07/09	5.44.24	Tethys	Sh.	E.	-23.2	17.7	
11/07/09	14.23.16	Dione	Sh.	E.	53.3	46.6	25/07/09	6.07.50	Dione	Tr.	E.	-19.4	22.0	
11/07/09	20.58.23	Tethys	Tr.	I.	6.7	-18.4	26/07/09	0.26.42	Titan	Occ.	D.	-35.4	-26.6	
11/07/09	21.32.42	Tethys	Sh.	I.	0.7	-21.6	26/07/09	0.56.04	Tethys	Occ.	D.	-38.2	-24.6	
11/07/09	23.54.33	Tethys	Tr.	E.	-24.2	-25.5	26/07/09	4.23.59	Tethys	Ec.	R.	-33.8	3.5	
12/07/09	0.30.59	Tethys	Sh.	E.	-29.4	-23.9	26/07/09	9.29.57	Titan	Ec.	R.	17.8	57.8	
12/07/09	19.13.06	Dione	Occ.	D.	25.4	-4.8	26/07/09	11.50.12	Dione	Occ.	D.	41.8	66.4	
12/07/09	19.38.11	Tethys	Occ.	D.	20.8	-8.6	26/07/09	14.50.15	Rhea	Tr.	I.	53.5	40.1	
12/07/09	23.10.36	Tethys	Ec.	R.	-17.8	-26.2	26/07/09	15.51.45	Dione	Ec.	R.	48.5	28.8	
12/07/09	23.19.49	Dione	Ec.	R.	-19.3	-26.2	26/07/09	15.53.11	Rhea	Sh.	I.	48.3	28.5	
13/07/09	1.18.51	Rhea	Tr.	I.	-35.5	-20.3	26/07/09	18.32.01	Rhea	Tr.	E.	23.4	0.5	
13/07/09	2.28.53	Rhea	Sh.	I.	-40.5	-12.5	26/07/09	19.50.40	Rhea	Sh.	E.	8.9	-12.3	
13/07/09	4.49.21	Rhea	Tr.	E.	-35.7	9.5	26/07/09	23.35.58	Tethys	Tr.	I.	-29.7	-28.7	
13/07/09	6.25.55	Rhea	Sh.	E.	-23.1	26.8	27/07/09	0.05.22	Tethys	Sh.	I.	-33.5	-27.9	
13/07/09	18.18.00	Tethys	Tr.	I.	34.4	4.1	27/07/09	2.33.37	Tethys	Tr.	E.	-41.6	-14.1	
13/07/09	18.51.48	Tethys	Sh.	I.	28.5	-0.9	27/07/09	3.03.26	Tethys	Sh.	E.	-40.5	-9.9	
13/07/09	21.14.22	Tethys	Tr.	E.	2.5	-20.2	27/07/09	20.37.14	Dione	Tr.	I.	0.0	-18.6	
13/07/09	21.50.04	Tethys	Sh.	E.	-4.2	-23.2	27/07/09	21.16.10	Dione	Sh.	I.	-7.7	-22.8	
14/07/09	3.59.55	Dione	Tr.	I.	-39.5	1.3	27/07/09	22.15.52	Tethys	Occ.	D.	-18.0	-27.3	
14/07/09	4.44.27	Dione	Sh.	I.	-35.9	8.5	27/07/09	23.52.19	Dione	Tr.	E.	-32.3	-28.5	
14/07/09	7.10.22	Dione	Tr.	E.	-15.3	34.9	28/07/09	0.37.36	Dione	Sh.	E.	-37.3	-26.4	
14/07/09	8.05.41	Dione	Sh.	E.	-5.5	45.1	28/07/09	1.43.01	Tethys	Ec.	R.	-41.4	-20.5	
14/07/09	16.57.48	Tethys	Occ.	D.	46.0	17.9	28/07/09	20.55.46	Tethys	Tr.	I.	-4.5	-20.9	
14/07/09	20.29.40	Tethys	Ec.	R.	9.9	-15.6	28/07/09	21.05.34	Rhea	Occ.	D.	-6.4	-21.9	
15/07/09	7.33.29	Rhea	Occ.	D.	-10.7	39.1	28/07/09	21.24.25	Tethys	Sh.	I.	-9.8	-23.8	
15/07/09	12.40.31	Rhea	Ec.	R.	43.7	63.1	28/07/09	23.53.34	Tethys	Tr.	E.	-33.0	-28.7	
15/07/09	12.56.21	Dione	Occ.	D.	45.9	60.9	29/07/09	0.22.28	Tethys	Sh.	E.	-36.2	-27.5	
15/07/09	15.37.38	Tethys	Tr.	I.	53.5	32.6	29/07/09	2.05.14	Rhea	Ec.	R.	-41.9	-18.1	
15/07/09	16.10.53	Tethys	Sh.	I.	51.0	26.4	29/07/09	5.33.51	Dione	Occ.	D.	-22.7	15.2	
15/07/09	17.02.14	Dione	Ec.	R.	44.9	17.0	29/07/09	9.34.06	Dione	Ec.	R.	20.4	57.8	
15/07/09	18.34.12	Tethys	Tr.	E.	30.3	1.4	29/07/09	19.35.41	Tethys	Occ.	D.	9.6	-10.7	
15/07/09	19.09.08	Tethys	Sh.	E.	24.1	-4.4	29/07/09	23.02.03	Tethys	Ec.	R.	-26.5	-29.4	
16/07/09	14.17.27	Tethys	Occ.	D.	53.8	47.2	30/07/09	14.20.55	Dione	Tr.	I.	53.9	44.8	
16/07/09	17.48.44	Tethys	Ec.	R.	37.3	8.7	30/07/09	14.58.30	Dione	Sh.	I.	52.0	38.0	
16/07/09	21.43.13	Dione	Tr.	I.	-5.1	-23.1	30/07/09	17.36.50	Dione	Tr.	E.	30.5	9.0	
16/07/09	22.26.48	Dione	Sh.	I.	-12.9	-25.7	30/07/09	18.15.36	Tethys	Tr.	I.	23.6	2.4	
17/07/09	0.54.39	Dione	Tr.	E.	-34.7	-23.0	30/07/09	18.19.56	Dione	Sh.	E.	22.9	1.7	
17/07/09	1.48.05	Dione	Sh.	E.	-39.3	-18.0	30/07/09	18.43.29	Tethys	Sh.	I.	18.6	-1.9	
17/07/09	12.57.17	Tethys	Tr.	I.	46.9	60.5	30/07/09	21.13.32	Tethys	Tr.	E.	-9.2	-23.2	
17/07/09	13.29.59	Tethys	Sh.	I.	50.6	55.4	30/07/09	21.41.29	Tethys	Sh.	E.	-14.1	-25.7	
17/07/09	13.48.54	Rhea	Tr.	I.	52.2	52.2	31/07/09	3.21.33	Rhea	Tr.	I.	-38.5	-7.8	
17/07/09	14.57.00	Rhea	Sh.	I.	54.6	39.9	31/07/09	4.21.16	Rhea	Sh.	I.	-32.2	2.3	
17/07/09	15.54.04	Tethys	Tr.	E.	51.8	29.4	31/07/09	7.06.35	Rhea	Tr.	E.	-5.7	32.0	
17/07/09	16.28.12	Tethys	Sh.	E.	48.3	23.1	31/07/09	8.18.50	Rhea	Sh.	E.	7.8	45.2	
17/07/09	17.23.21	Rhea	Tr.	E.	40.7	13.1	31/07/09	16.55.31	Tethys	Occ.	D.	36.8	16.2	
17/07/09	18.54.12	Rhea	Sh.	E.	25.4	-1.7	31/07/09	20.21.04	Tethys	Ec.	R.	0.2	-17.4	
17/07/09	23.48.50	Titan	Tr.	I.	-26.7	-26.6	31/07/09	23.17.35	Dione	Occ.	D.	-29.8	-30.0	
18/07/09	1.13.44	Titan	Tr.	E.	-37.0	-21.6	01/08/09	3.16.25	Dione	Ec.	R.	-38.6	-8.8	
18/07/09	2.01.09	Titan	Sh.	I.	-40.3	-16.7	01/08/09	15.35.26	Tethys	Tr.	I.	47.7	30.8	
18/07/09	6.39.42	Dione	Occ.	D.	-18.1	28.8	01/08/09	16.02.32	Tethys	Sh.	I.	44.2	25.8	
18/07/09	7.49.38	Titan	Sh.	E.	-6.0	41.7	01/08/09	18.33.30	Tethys	Tr.	E.	19.0	-0.6	
18/07/09	10.44.38	Dione	Ec.	R.	26.3	67.8	01/08/09	19.00.30	Tethys	Sh.	E.	14.1	-5.8	
18/07/09	11.37.08	Tethys	Occ.	D.	35.4	68.6	02/08/09	8.04.41	Dione	Tr.	I.	6.4	42.3	
18/07/09	15.07.48	Tethys	Ec.	R.	54.2	37.8	02/08/09	8.40.48	Dione	Sh.	I.	13.1	48.7	
19/07/09	10.16.59	Tethys	Tr.	I.	22.0	65.2	02/08/09	9.37.05	Rhea	Occ.	D.	23.4	57.5	
19/07/09	10.49.04	Tethys	Sh.	I.	27.7	67.9	02/08/09	11.21.23	Dione	Tr.	E.	41.0	65.7	
19/07/09	13.13.57	Tethys	Tr.	E.	49.6	57.7	02/08/09	12.02.16	Dione	Sh.	E.	46.6	63.9	
19/07/09	13.47.15	Tethys	Sh.	E.	52.6	52.2	02/08/09	14.15.22	Tethys	Occ.	D.	53.6	45.2	
19/07/09	15.26.36	Dione	Tr.	I.	53.2	34.3	02/08/09	14.33.23	Rhea	Ec.	R.	52.8	42.0	
19/07/09	16.09.09	Dione	Sh.	I.	49.5	26.4	02/08/09	17.40.05	Tethys	Ec.	R.	28.0	7.9	
19/07/09	18.39.00	Dione	Tr.	E.	26.8	0.3	02/08/09	22.28.29	Titan	Tr.	I.	-23.7	-29.4	
19/07/09	19.30.29	Dione	Sh.	E.	17.4	-8.3	03/08/09	1.12.09	Titan	Sh.	I.	-41.3	-25.0	
19/07/09	20.03.45	Rhea	Occ.	D.	11.3	-12.9	03/08/09	2.47.43	Titan	Tr.	E.	-40.3	-13.5	
20/07/09	1.08.48	Rhea	Ec.	R.	-37.2	-22.4	03/08/09	7.03.33	Titan	Sh.	E.	-4.3	31.0	
20/07/09	8.56.50	Tethys	Occ.	D.	7.8	53.4	03/08/09	12.55.18	Tethys	Tr.	I.	52.1	57.8	
20/07/09	12.26.51	Tethys	Ec.	R.	44.2	64.2	03/08/09	13.21.35	Tethys	Sh.	I.	53.5	54.0	
21/07/09	0.23.07	Dione	Occ.	D.	-32.8	-25.8	03/08/09	15.53.29	Tethys	Tr.	E.	44.4	27.1	
21/07/09	4.27.01	Dione	Ec.	R.	-35.3	4.7	03/08/09	16.19.31	Tethys	Sh.	E.	40.7	22.3	
21/07/09	7.36.41	Tethys	Tr.	I.	-6.4	39.0	03/08/09	17.01.23	Dione	Occ.	D.	34.0	14.6	
21/07/09	8.08.09	Tethys	Sh.	I.	-0.1	44.7	03/08/09	20.58.44	Dione	Ec.	R.	-9.2	-22.6	
21/07/09	10.33.51	Tethys	Tr.	E.	26.3	66.4	04/08/09	11.35.15	Tethys	Occ.	D.	43.9	64.9	
21/07/09	11.06.18	Tethys	Sh.	E.	32.0	68.2	04/08/09	14.59.05	Tethys	Ec.	R.	50.3	37.0	
22/07/09	2.19.22	Rhea	Tr.	I.	-41.5	-15.1	04/08/09	15.53.15	Rhea	Tr.	I.	43.9	27.0	
22/07/09	3.25.06	Rhea	Sh.	I.	-40.1	-5.7	04/08/09	16.49.19	Rhea	Sh.	I.	35.4	16.6	
22/07/09	5.57.36	Rhea	Tr.	E.	-22.7	20.5	04/08/09	19.41.14	Rhea	Tr.	E.	4.5	-12.7	
22/07/09	6.16.33	Tethys	Occ.	D.	-19.7	24.0	04/08/09	20.46.56	Rhea	Sh.	E.	-7.8	-21.5	
22/07/09	7.22.28	Rhea	Sh.	E.	-8.4	36.2	05/08/09	1.48.32	Dione	Tr.	I.	-42.1	-21.6	
22/07/09	9.10.04	Dione	Tr.	I.	11.6	55.3	05/08/09	2.23.06	Dione	Sh.	I.	-41.3	-17.3	
22/07/09	9.45.54	Tethys	Ec.	R.	18.2	60.7	05/08/09	5.05.57	Dione	Tr.	E.	-23.4	9.2	
22/07/09	9.51.30	Dione	Sh.	I.	19.2	61.5	05/08/09	5.44.35	Dione	Sh.	E.	-17.2	16.1	
22/07/09	12.23.23	Dione	Tr.	E.	44.6	64.2	05/08/09	10.15.12	Tethys	Tr.	I.	31.9	61.5	
22/07/09	13.12.52	Dione	Sh.	E.	50.5	57.5	05/08/09	10.40.37	Tethys	Sh.	I.	36.1	63.6	
23/07/09	4.56.25	Tethys	Tr.	I.	-31.0	9.4	05/08/09	13.13.29	Tethys	Tr.	E.	53.3	54.8	
23/07/09	5.27.13	Tethys	Sh.	I.	-26.8	14.9	05/08/09	13.38.31	Tethys	Sh.	E.	53.9	50.9	
23/07/09	7.53.45	Tethys	Tr.	E.	-1.3	41.8	06/08/09	8.55.08	Tethys	Occ.	D.	18.2	50.3	
23/07/09	8.25.21	Tethys	Sh.	E.	4.0	47.5	06/08/09	10.45.15	Dione	Occ.	D.	37.4	63.7	
23/07/09	18.06.37	Dione	Occ.	D.	29.9	4.9	06/08/09	12.18.06	Tethys	Ec.	R.	49.8	61.5	
23/07/09	22.09.23	Dione	Ec.	R.	-14.4	-26.1	06/08/09	14.41.03	Dione	Ec.	R.	51.1	39.9	
24/07/09	3.36.18	Tethys	Occ.	D.	-39.0	-4.1	06/08/09	22.09.00	Rhea	Occ.	D.	-23.0	-29.4	
24/07/09	7.04.57	Tethys	Ec.	R.	-10.3	32.7	07/08/09	3.01.28	Rhea	Ec.	R.	-38.4	-12.2	
24/07/09	8.34.27	Rhea	Occ.	D.	6.3	49.0	07/08/09	7.35.06	Tethys	Tr.	I.	4.1	36.2	
24/07/09	13.37.02	Rhea	Ec.	R.	52.9	53.3	07/08/09	7.59.40	Tethys	Sh.	I.	8.6	40.6	
25/07/09	2.16.11	Tethys	Tr.	I.	-41.7	-16.0	07/08/09	10.33.28	Tethys	Tr.	E.	36.1	62.6	
25/07/09	2.46.17	Tethys	Sh.	I.	-41.4	-12.0	07/08/09	10.57.32	Tethys	Sh.	E.	39.9	64.0	

Date	Times	Moon	Phenomen	Phase	h Sat	h Sun								
07/08/09	19.32.26	Dione	Tr.	I.	4.1	-12.1	21/08/09	12.12.55	Dione	Tr.	I.	52.5	57.4	
07/08/09	20.05.24	Dione	Sh.	I.	-1.4	-16.9	21/08/09	12.36.42	Dione	Sh.	I.	53.1	55.1	
07/08/09	22.50.32	Dione	Tr.	E.	-29.7	-31.5	21/08/09	14.49.53	Tethys	Ec.	R.	43.8	34.7	
07/08/09	23.26.53	Dione	Sh.	E.	-34.4	-31.8	21/08/09	15.33.35	Dione	Tr.	E.	37.4	26.8	
08/08/09	6.15.03	Tethys	Occ.	D.	21.3		21/08/09	15.58.08	Dione	Sh.	E.	33.4	22.2	
08/08/09	9.37.06	Tethys	Ec.	R.	27.0	56.3	22/08/09	10.14.58	Tethys	Tr.	I.	40.8	57.0	
09/08/09	4.25.20	Rhea	Tr.	I.	-27.6	1.5	22/08/09	10.31.45	Tethys	Sh.	I.	43.2	58.2	
09/08/09	4.29.11	Dione	Occ.	D.	-27.0	2.2	22/08/09	13.13.32	Tethys	Tr.	E.	52.4	50.1	
09/08/09	4.55.01	Tethys	Tr.	I.	-23.1	6.6	22/08/09	13.29.17	Tethys	Sh.	E.	51.5	47.8	
09/08/09	5.17.22	Rhea	Sh.	I.	-19.5	10.6	22/08/09	18.03.49	Rhea	Tr.	I.	10.2	-0.5	
09/08/09	5.18.41	Tethys	Sh.	I.	-19.2	10.8	22/08/09	18.41.22	Rhea	Sh.	I.	3.4	-7.8	
09/08/09	7.53.28	Tethys	Tr.	E.	8.7	39.2	22/08/09	21.09.50	Dione	Occ.	D.	-23.1	-29.3	
09/08/09	8.15.56	Rhea	Tr.	E.	12.9	43.2	22/08/09	21.59.58	Rhea	Tr.	E.	-30.6	-33.8	
09/08/09	8.16.31	Tethys	Sh.	E.	13.0	43.3	22/08/09	22.38.52	Rhea	Sh.	E.	-35.5	-35.9	
09/08/09	8.23.20	Dione	Ec.	R.	14.2	44.5	23/08/09	0.54.32	Dione	Ec.	R.	-42.8	-31.9	
09/08/09	9.15.00	Rhea	Sh.	E.	23.7	52.9	23/08/09	8.54.59	Tethys	Occ.	D.	28.4	46.8	
10/08/09	3.34.59	Tethys	Occ.	D.	-33.9	-7.6	23/08/09	12.08.50	Tethys	Ec.	R.	52.5	57.1	
10/08/09	6.56.05	Tethys	Ec.	R.	-0.7	28.6	24/08/09	5.57.12	Dione	Tr.	I.	-3.4	15.3	
10/08/09	13.16.24	Dione	Tr.	I.	53.6	53.1	24/08/09	6.18.56	Dione	Sh.	I.	0.8	19.4	
10/08/09	13.47.41	Dione	Sh.	I.	53.2	48.2	24/08/09	7.35.01	Tethys	Tr.	I.	14.6	33.2	
10/08/09	16.35.08	Dione	Tr.	E.	34.0	18.0	24/08/09	7.50.44	Tethys	Sh.	I.	17.5	36.0	
10/08/09	17.09.10	Dione	Sh.	E.	28.2	11.8	24/08/09	9.18.11	Dione	Tr.	E.	32.9	49.9	
10/08/09	23.43.38	Titan	Occ.	D.	-37.4	-32.4	24/08/09	9.40.20	Dione	Sh.	E.	36.5	52.8	
11/08/09	2.14.58	Tethys	Tr.	I.	-40.9	-19.7	24/08/09	10.33.32	Tethys	Tr.	E.	44.3	57.7	
11/08/09	2.37.43	Tethys	Sh.	I.	-39.3	-16.5	24/08/09	10.48.14	Tethys	Sh.	E.	46.1	58.5	
11/08/09	5.13.28	Tethys	Tr.	E.	-19.0	9.5	25/08/09	0.20.23	Rhea	Occ.	D.	-43.0	-35.1	
11/08/09	5.35.30	Tethys	Sh.	E.	-15.3	13.5	25/08/09	4.53.20	Rhea	Ec.	R.	-14.6	3.5	
11/08/09	8.46.19	Titan	Ec.	R.	19.7	48.0	25/08/09	6.15.02	Tethys	Occ.	D.	0.7	18.5	
11/08/09	10.41.18	Rhea	Occ.	D.	39.4	62.1	25/08/09	9.27.46	Tethys	Ec.	R.	35.0	51.0	
11/08/09	15.29.31	Rhea	Ec.	R.	43.5	30.0	25/08/09	14.54.08	Dione	Occ.	D.	41.1	32.8	
11/08/09	22.13.12	Dione	Occ.	D.	-26.5	-31.1	25/08/09	18.36.43	Dione	Ec.	R.	2.3	-7.9	
12/08/09	0.54.56	Tethys	Occ.	D.	-42.2	-28.8	26/08/09	4.55.04	Tethys	Tr.	I.	-13.7	3.7	
12/08/09	2.05.36	Dione	Ec.	R.	-41.2	-21.1	26/08/09	5.09.43	Tethys	Sh.	I.	-11.1	6.3	
12/08/09	4.15.04	Tethys	Ec.	R.	-27.7	-0.5	26/08/09	7.53.32	Tethys	Tr.	E.	19.2	36.1	
12/08/09	23.34.55	Tethys	Tr.	I.	-37.4	-33.2	26/08/09	8.07.10	Tethys	Sh.	E.	21.7	38.4	
12/08/09	23.56.44	Tethys	Sh.	I.	-39.3	-32.6	26/08/09	23.41.31	Dione	Tr.	I.	-42.1	-37.5	
13/08/09	2.33.29	Tethys	Tr.	E.	-39.2	-17.6	26/08/09	23.49.50	Titan	Occ.	D.	-42.5	-37.3	
13/08/09	2.54.29	Tethys	Sh.	E.	-37.3	-14.5	27/08/09	0.01.09	Dione	Sh.	I.	-42.8	-36.8	
13/08/09	7.00.26	Dione	Tr.	I.	1.6	28.9	27/08/09	3.02.46	Dione	Tr.	E.	-31.0	-16.2	
13/08/09	7.29.57	Dione	Sh.	I.	6.9	34.3	27/08/09	3.22.31	Dione	Sh.	E.	-28.2	-13.0	
13/08/09	10.19.45	Dione	Tr.	E.	37.1	59.9	27/08/09	3.35.06	Tethys	Occ.	D.	-26.3	-10.9	
13/08/09	10.51.26	Dione	Sh.	E.	41.9	62.0	27/08/09	6.37.20	Rhea	Tr.	I.	5.8	22.2	
13/08/09	16.57.48	Rhea	Tr.	I.	28.3	13.2	27/08/09	6.46.42	Tethys	Ec.	R.	7.5	23.9	
13/08/09	17.45.23	Rhea	Sh.	I.	19.7	4.6	27/08/09	7.09.19	Rhea	Sh.	I.	11.7	28.1	
13/08/09	20.50.39	Rhea	Tr.	E.	-14.3	-24.3	27/08/09	8.00.25	Titan	Ec.	R.	21.0	37.1	
13/08/09	21.43.01	Rhea	Sh.	E.	-23.0	-29.6	27/08/09	10.34.30	Rhea	Tr.	E.	45.6	56.8	
13/08/09	22.14.54	Tethys	Occ.	D.	-27.9	-31.8	27/08/09	11.06.43	Rhea	Sh.	E.	49.1	57.9	
14/08/09	1.34.03	Tethys	Ec.	R.	-42.3	-25.4	28/08/09	2.15.09	Tethys	Tr.	I.	-36.6	-23.7	
14/08/09	15.57.16	Dione	Occ.	D.	37.8	24.1	28/08/09	2.28.41	Tethys	Sh.	I.	-35.0	-21.7	
14/08/09	19.47.52	Dione	Ec.	R.	-3.4	-16.2	28/08/09	5.13.32	Tethys	Tr.	E.	-9.3	6.6	
14/08/09	20.54.54	Tethys	Tr.	I.	-15.7	-25.1	28/08/09	5.26.05	Tethys	Sh.	E.	-7.0	8.9	
14/08/09	21.15.45	Tethys	Sh.	I.	-19.2	-27.4	28/08/09	8.38.29	Dione	Occ.	D.	28.4	43.1	
14/08/09	23.53.29	Tethys	Tr.	E.	-39.7	-33.3	28/08/09	12.18.53	Dione	Ec.	R.	52.8	54.5	
15/08/09	0.13.28	Tethys	Sh.	E.	-41.0	-32.4	29/08/09	0.55.11	Tethys	Occ.	D.	-42.5	-33.6	
15/08/09	19.34.54	Tethys	Occ.	D.	-1.2	-14.5	29/08/09	4.05.37	Tethys	Ec.	R.	-20.4	-6.0	
15/08/09	22.53.01	Tethys	Ec.	R.	-34.0	-34.0	29/08/09	12.54.05	Rhea	Occ.	D.	51.8	50.4	
15/08/09	23.13.58	Rhea	Occ.	D.	-36.4	-34.3	29/08/09	17.21.10	Rhea	Ec.	R.	13.4	4.7	
16/08/09	0.44.32	Dione	Tr.	I.	-42.4	-30.7	29/08/09	17.25.54	Dione	Tr.	I.	12.5	3.9	
16/08/09	1.12.13	Dione	Sh.	I.	-42.6	-28.2	29/08/09	17.43.21	Dione	Sh.	I.	9.3	0.9	
16/08/09	3.57.31	Rhea	Ec.	R.	-28.3	-4.9	29/08/09	20.47.19	Dione	Tr.	E.	-23.7	-29.1	
16/08/09	4.04.22	Dione	Tr.	E.	-27.3	-3.4	29/08/09	21.04.41	Dione	Sh.	E.	-26.4	-31.1	
16/08/09	4.33.41	Dione	Sh.	E.	-22.8	1.7	29/08/09	23.35.14	Tethys	Tr.	I.	-42.4	-38.7	
16/08/09	18.14.54	Tethys	Tr.	I.	12.3	-0.8	29/08/09	23.47.39	Tethys	Sh.	I.	-42.9	-38.4	
16/08/09	18.34.46	Tethys	Sh.	I.	8.6	-5.0	30/08/09	2.33.32	Tethys	Tr.	E.	-33.6	-21.5	
16/08/09	21.13.30	Tethys	Tr.	E.	-20.1	-27.8	30/08/09	2.45.00	Tethys	Sh.	E.	-32.1	-19.7	
16/08/09	21.32.26	Tethys	Sh.	E.	-23.1	-29.6	30/08/09	2.55.19	Tethys	Occ.	D.	-36.4	-37.7	
17/08/09	9.41.24	Dione	Occ.	D.	32.9	54.7	31/08/09	22.15.16	Tethys	Occ.	D.	-36.4	-37.7	
17/08/09	13.30.06	Dione	Ec.	R.	52.6	49.2	31/08/09	1.24.32	Tethys	Ec.	R.	-40.5	-31.1	
17/08/09	16.54.54	Tethys	Occ.	D.	26.2	12.8	31/08/09	2.22.53	Dione	Occ.	D.	-34.6	-23.3	
17/08/09	20.11.59	Tethys	Ec.	R.	-10.1	-20.5	31/08/09	6.01.03	Dione	Ec.	R.	1.7	14.8	
18/08/09	5.30.38	Rhea	Tr.	I.	-12.1	11.5	31/08/09	19.11.09	Rhea	Tr.	I.	-8.5	-15.6	
18/08/09	6.13.23	Rhea	Sh.	I.	-4.2	19.4	31/08/09	19.37.15	Rhea	Sh.	I.	-13.1	-19.8	
18/08/09	9.25.20	Rhea	Tr.	E.	30.8	52.4	31/08/09	20.55.19	Tethys	Tr.	I.	-26.1	-30.7	
18/08/09	10.10.58	Rhea	Sh.	E.	38.3	57.8	31/08/09	21.06.36	Tethys	Sh.	I.	-27.8	-32.1	
18/08/09	15.34.54	Tethys	Tr.	I.	38.9	27.3	31/08/09	23.08.54	Rhea	Tr.	E.	-41.5	-39.7	
18/08/09	15.53.46	Tethys	Sh.	I.	35.9	23.8	31/08/09	23.34.31	Rhea	Sh.	E.	-42.8	-39.5	
18/08/09	18.28.42	Dione	Tr.	I.	8.4	-4.4	31/08/09	23.53.31	Tethys	Tr.	E.	-43.3	-38.8	
18/08/09	18.33.31	Tethys	Tr.	E.	7.5	-5.3	01/09/09	0.03.55	Tethys	Sh.	E.	-43.4	-38.3	
18/08/09	18.51.23	Tethys	Sh.	E.	4.2	-8.4	01/09/09	11.10.19	Dione	Tr.	I.	50.6	56.1	
18/08/09	18.54.28	Dione	Sh.	I.	3.7	-8.9	01/09/09	11.25.32	Dione	Sh.	I.	51.5	56.0	
18/08/09	21.48.59	Dione	Tr.	E.	-26.8	-31.7	01/09/09	14.31.51	Dione	Tr.	E.	40.5	34.6	
18/08/09	22.10.27	Titan	Tr.	I.	-30.0	-33.2	01/09/09	14.46.50	Dione	Sh.	E.	38.2	32.0	
18/08/09	22.15.55	Dione	Sh.	E.	-30.7	-33.5	01/09/09	19.35.22	Tethys	Occ.	D.	-13.4	-19.8	
19/08/09	0.24.14	Titan	Sh.	I.	-42.3	-33.0	01/09/09	22.43.26	Tethys	Ec.	R.	-39.9	-39.6	
19/08/09	3.40.34	Titan	Tr.	E.	-29.4	-8.4	02/09/09	18.15.26	Tethys	Tr.	I.	0.9	-6.6	
19/08/09	6.15.29	Titan	Sh.	E.	-2.9	19.6	02/09/09	18.25.33	Tethys	Sh.	I.	-0.7	-8.4	
19/08/09	14.14.54	Tethys	Occ.	D.	48.8	41.3	02/09/09	20.07.20	Dione	Occ.	D.	-19.5	-25.0	
19/08/09	17.30.56	Tethys	Ec.	R.	18.3	5.7	02/09/09	21.13.29	Tethys	Tr.	E.	-29.9	-33.6	
20/08/09	3.25.35	Dione	Occ.	D.	-31.0	-11.1	02/09/09	21.22.49	Tethys	Sh.	E.	-31.2	-34.5	
20/08/09	7.12.19	Dione	Ec.	R.	7.9	29.9	02/09/09	23.43.11	Dione	Ec.	R.	-43.3	-39.9	
20/08/09	11.47.00	Rhea	Occ.	D.	50.7	59.5	03/09/09	1.28.05	Rhea	Occ.	D.	-39.4	-31.5	
20/08/09	12.54.55	Tethys	Tr.	I.	53.1	53.2	03/09/09	5.48.56	Rhea	Ec.	R.	1.3	12.0	
20/08/09	13.12.46	Tethys	Sh.	I.	52.8	50.8	03/09/09	16.55.29	Tethys	Occ.	D.	14.7	7.9	
20/08/09	15.53.31	Tethys	Tr.	E.	34.8	23.4	03/09/09	20.02.20	Tethys	Ec.	R.	-19.3	-24.6	
20/08/09	16.10.21	Tethys	Sh.	E.	32.0	20.2	03/09/09	22.23.28	Titan	Tr.	I.	-38.8	-39.6	
20/08/09	16.25.27	Rhea	Ec.	R.	29.4	17.4	03/09/09	23.37.23	Titan	Sh.	I.	-43.3	-40.4	
21/08/09	11.34.56	Tethys	Occ.	D.	50.0	59.7	04/09/09	4.16.19	Titan	Tr.	E.	-15.3	-5.3	
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Date	Times	Moon	Phenomen	Phase	h Sat	h Sun								
04/09/09	5.25.24	Titan	Sh.	E.	-2.2	7.5	18/09/09	0.58.21	Dione	Tr.	E.	-37.9	-39.3	
04/09/09	8.16.22	Dione	Tr.	E.	28.5	38.0	18/09/09	0.59.22	Dione	Sh.	E.	-37.8	-39.2	
04/09/09	8.28.58	Dione	Sh.	E.	30.7	40.0	18/09/09	19.36.22	Tethys	Ec.	D.	-24.2	-25.8	
04/09/09	15.35.32	Tethys	Tr.	I.	28.4	22.3	18/09/09	21.28.43	Rhea	Sh.	I.	-39.3	-41.2	
04/09/09	15.44.30	Tethys	Sh.	I.	26.9	20.7	18/09/09	21.29.09	Rhea	Tr.	I.	-39.3	-41.3	
04/09/09	18.33.27	Tethys	Tr.	E.	-4.0	-10.4	18/09/09	22.33.15	Tethys	Ec.	R.	-43.7	-45.9	
04/09/09	18.41.42	Tethys	Sh.	E.	-5.7	-11.8	19/09/09	1.24.36	Rhea	Tr.	E.	-34.4	-36.4	
05/09/09	7.45.16	Rhea	Tr.	I.	23.6	32.6	19/09/09	1.25.06	Rhea	Sh.	E.	-34.3	-36.4	
05/09/09	8.05.09	Rhea	Sh.	I.	27.2	36.0	19/09/09	6.34.17	Dione	Ec.	D.	19.2	17.3	
05/09/09	11.43.08	Rhea	Tr.	E.	52.4	53.9	19/09/09	9.55.44	Dione	Occ.	R.	48.8	46.4	
05/09/09	12.02.15	Rhea	Sh.	E.	52.3	52.9	19/09/09	18.15.49	Tethys	Sh.	I.	-11.0	-12.2	
05/09/09	13.51.50	Dione	Occ.	D.	43.9	39.8	19/09/09	18.16.39	Tethys	Tr.	I.	-11.2	-12.3	
05/09/09	14.15.36	Tethys	Occ.	D.	40.7	36.0	19/09/09	21.12.36	Tethys	Sh.	E.	-38.0	-39.9	
05/09/09	17.21.13	Tethys	Ec.	R.	8.7	2.7	19/09/09	21.12.49	Tethys	Tr.	E.	-38.0	-39.9	
05/09/09	17.25.18	Dione	Ec.	R.	7.9	2.0	19/09/09	22.51.33	Titan	Sh.	I.	-44.3	-46.8	
06/09/09	12.55.40	Tethys	Tr.	I.	49.5	47.3	19/09/09	23.01.52	Titan	Tr.	I.	-44.3	-46.9	
06/09/09	13.03.26	Tethys	Sh.	I.	48.8	46.4	20/09/09	4.33.04	Titan	Tr.	E.	-2.1	-5.3	
06/09/09	15.53.25	Tethys	Tr.	E.	24.0	18.5	20/09/09	4.33.12	Titan	Sh.	E.	-2.1	-5.3	
06/09/09	16.00.36	Tethys	Sh.	E.	22.7	17.1	20/09/09	15.20.31	Dione	Sh.	I.	20.7	19.8	
06/09/09	22.39.17	Dione	Tr.	I.	-41.2	-41.4	20/09/09	15.22.19	Dione	Tr.	I.	20.4	19.5	
06/09/09	22.49.53	Dione	Sh.	I.	-41.9	-41.7	20/09/09	16.55.15	Tethys	Ec.	D.	3.4	2.7	
07/09/09	2.00.50	Dione	Tr.	E.	-34.6	-28.2	20/09/09	18.41.24	Dione	Sh.	E.	-16.2	-17.1	
07/09/09	2.11.05	Dione	Sh.	E.	-33.3	-26.8	20/09/09	18.42.36	Dione	Tr.	E.	-16.4	-17.3	
07/09/09	11.35.43	Tethys	Occ.	D.	52.3	53.5	20/09/09	19.52.48	Tethys	Occ.	R.	-27.9	-29.2	
07/09/09	14.02.22	Rhea	Occ.	D.	41.5	37.5	21/09/09	3.42.38	Rhea	Ec.	D.	-11.4	-14.8	
07/09/09	14.40.06	Tethys	Ec.	R.	35.8	31.2	21/09/09	7.41.53	Rhea	Occ.	R.	32.1	28.5	
07/09/09	18.16.39	Rhea	Ec.	R.	-2.6	-8.4	21/09/09	15.34.42	Tethys	Sh.	I.	17.5	17.0	
08/09/09	7.36.21	Dione	Occ.	D.	23.8	30.5	21/09/09	15.36.48	Tethys	Tr.	I.	17.1	16.6	
08/09/09	10.15.47	Tethys	Tr.	I.	47.7	51.7	21/09/09	18.31.25	Tethys	Sh.	E.	-15.1	-15.6	
08/09/09	10.22.22	Tethys	Sh.	I.	48.3	52.1	21/09/09	18.32.40	Tethys	Tr.	E.	-15.3	-15.9	
08/09/09	11.07.24	Dione	Ec.	R.	51.5	53.6	22/09/09	0.16.22	Dione	Ec.	D.	-40.8	-44.7	
08/09/09	13.13.22	Tethys	Tr.	E.	47.1	44.3	22/09/09	3.39.58	Dione	Occ.	R.	-11.3	-15.5	
08/09/09	13.19.28	Tethys	Sh.	E.	46.4	43.5	22/09/09	14.14.08	Tethys	Ec.	D.	31.0	30.3	
09/09/09	8.55.51	Tethys	Occ.	D.	37.7	42.8	22/09/09	17.12.40	Tethys	Occ.	R.	-0.7	-0.7	
09/09/09	11.58.59	Tethys	Ec.	R.	51.9	51.5	23/09/09	9.02.37	Dione	Sh.	I.	44.7	39.7	
09/09/09	16.23.50	Dione	Tr.	I.	16.5	11.9	23/09/09	9.06.59	Dione	Tr.	I.	45.2	40.2	
09/09/09	16.32.02	Dione	Sh.	I.	15.0	10.4	23/09/09	9.56.31	Rhea	Sh.	I.	49.7	45.1	
09/09/09	19.45.16	Dione	Tr.	E.	-20.2	-24.1	23/09/09	10.04.12	Rhea	Tr.	I.	50.2	45.7	
09/09/09	19.53.11	Dione	Sh.	E.	-21.5	-25.3	23/09/09	12.23.24	Dione	Sh.	E.	46.2	44.2	
09/09/09	20.19.39	Rhea	Tr.	I.	-25.8	-29.3	23/09/09	12.26.49	Dione	Tr.	E.	45.8	43.9	
09/09/09	20.33.02	Rhea	Sh.	I.	-27.8	-31.1	23/09/09	12.53.35	Tethys	Sh.	I.	42.6	41.1	
10/09/09	0.17.11	Rhea	Tr.	E.	-42.9	-40.6	23/09/09	12.56.58	Tethys	Tr.	I.	42.1	40.7	
10/09/09	0.29.55	Rhea	Sh.	E.	-42.3	-39.6	23/09/09	13.52.36	Rhea	Sh.	E.	33.9	33.3	
10/09/09	7.35.55	Tethys	Tr.	I.	24.9	30.0	23/09/09	13.57.55	Rhea	Tr.	E.	33.1	32.5	
10/09/09	7.41.18	Tethys	Sh.	I.	25.9	30.9	23/09/09	15.50.14	Tethys	Sh.	E.	13.3	13.5	
10/09/09	10.33.18	Tethys	Tr.	E.	49.7	52.0	23/09/09	15.52.31	Tethys	Tr.	E.	12.9	13.1	
10/09/09	10.38.21	Tethys	Sh.	E.	50.1	52.2	24/09/09	11.33.00	Tethys	Ec.	D.	50.1	46.9	
11/09/09	1.20.55	Dione	Occ.	D.	-37.8	-34.6	24/09/09	14.32.30	Tethys	Occ.	R.	26.6	26.7	
11/09/09	4.49.29	Dione	Ec.	R.	-5.1	0.0	24/09/09	17.58.27	Dione	Ec.	D.	-11.2	-10.7	
11/09/09	6.15.59	Tethys	Occ.	D.	11.0	15.5	24/09/09	21.24.09	Dione	Occ.	R.	-41.0	-43.1	
11/09/09	9.17.51	Tethys	Ec.	R.	41.8	45.1	25/09/09	10.12.27	Tethys	Sh.	I.	50.8	45.5	
12/09/09	0.28.27	Titan	Occ.	D.	-42.0	-40.4	25/09/09	10.17.07	Tethys	Tr.	I.	51.0	45.8	
12/09/09	2.36.55	Rhea	Occ.	D.	-27.3	-24.0	25/09/09	13.09.03	Tethys	Sh.	E.	39.4	38.5	
12/09/09	4.56.04	Tethys	Tr.	I.	-2.9	0.9	25/09/09	13.12.20	Tethys	Tr.	E.	39.0	38.1	
12/09/09	5.00.13	Tethys	Sh.	I.	-1.9	1.6	25/09/09	16.10.26	Rhea	Ec.	D.	8.2	9.2	
12/09/09	6.44.18	Rhea	Ec.	R.	16.8	20.5	25/09/09	20.15.04	Rhea	Occ.	R.	-33.8	-34.4	
12/09/09	7.12.08	Titan	Ec.	R.	21.8	25.4	26/09/09	2.44.41	Dione	Sh.	I.	-18.7	-26.0	
12/09/09	7.53.14	Tethys	Tr.	E.	29.1	32.4	26/09/09	2.51.41	Dione	Tr.	I.	-17.5	-24.8	
12/09/09	7.57.13	Tethys	Sh.	E.	29.7	33.1	26/09/09	6.05.24	Dione	Sh.	E.	18.1	10.6	
12/09/09	10.08.24	Dione	Tr.	I.	48.1	49.8	26/09/09	6.10.58	Dione	Tr.	E.	19.1	11.6	
12/09/09	10.14.11	Dione	Sh.	I.	48.6	50.2	26/09/09	8.51.52	Tethys	Ec.	D.	44.5	37.5	
12/09/09	13.29.40	Dione	Tr.	E.	43.3	40.6	26/09/09	11.52.19	Tethys	Occ.	R.	48.1	45.2	
12/09/09	13.35.16	Dione	Sh.	E.	42.6	39.8	27/09/09	7.31.19	Tethys	Sh.	I.	33.5	25.4	
13/09/09	3.36.08	Tethys	Occ.	D.	-17.1	-14.3	27/09/09	7.37.16	Tethys	Tr.	I.	34.5	26.3	
13/09/09	6.36.43	Tethys	Ec.	R.	16.0	18.9	27/09/09	10.27.51	Tethys	Sh.	E.	51.3	45.5	
13/09/09	19.05.31	Dione	Occ.	D.	-15.9	-18.9	27/09/09	10.32.09	Tethys	Tr.	E.	51.3	45.7	
13/09/09	22.31.33	Dione	Ec.	R.	-42.6	-43.8	27/09/09	11.40.30	Dione	Ec.	D.	48.7	45.4	
14/09/09	2.16.12	Tethys	Tr.	I.	-29.5	-27.7	27/09/09	15.08.16	Dione	Occ.	R.	18.3	19.6	
14/09/09	2.19.08	Tethys	Sh.	I.	-29.0	-27.3	27/09/09	22.24.18	Rhea	Sh.	I.	-44.7	-49.1	
14/09/09	5.13.09	Tethys	Tr.	E.	1.4	3.5	27/09/09	22.39.25	Rhea	Tr.	I.	-44.7	-49.6	
14/09/09	5.16.04	Tethys	Sh.	E.	1.9	4.0	28/09/09	0.25.48	Titan	Ec.	D.	-38.1	-45.9	
14/09/09	8.54.17	Rhea	Tr.	I.	39.8	41.2	28/09/09	2.20.02	Rhea	Sh.	E.	-21.7	-30.5	
14/09/09	9.00.53	Rhea	Sh.	I.	40.8	42.1	28/09/09	2.30.56	Rhea	Tr.	E.	-19.9	-28.8	
14/09/09	12.51.01	Rhea	Tr.	E.	47.0	44.9	28/09/09	6.10.44	Tethys	Ec.	D.	20.3	11.2	
14/09/09	12.57.32	Rhea	Sh.	E.	46.3	44.1	28/09/09	6.49.00	Titan	Occ.	R.	27.0	18.0	
15/09/09	0.56.17	Tethys	Occ.	D.	-39.0	-38.7	28/09/09	9.12.07	Tethys	Occ.	R.	47.3	39.3	
15/09/09	3.53.01	Dione	Tr.	I.	-13.0	-11.7	28/09/09	20.26.45	Dione	Sh.	I.	-36.7	-37.2	
15/09/09	3.55.34	Tethys	Ec.	R.	-12.6	-11.2	28/09/09	20.36.23	Dione	Tr.	I.	-37.8	-38.6	
15/09/09	3.56.18	Dione	Sh.	I.	-12.5	-11.1	28/09/09	23.47.22	Dione	Sh.	E.	-41.5	-49.1	
15/09/09	7.14.02	Dione	Tr.	E.	23.9	25.1	28/09/09	23.55.03	Dione	Tr.	E.	-40.9	-48.7	
15/09/09	7.17.20	Dione	Sh.	E.	24.5	25.7	29/09/09	4.50.10	Tethys	Sh.	I.	6.1	-3.7	
15/09/09	23.36.21	Tethys	Tr.	I.	-43.9	-44.8	29/09/09	4.57.24	Tethys	Tr.	I.	7.4	-1.9	
15/09/09	23.38.02	Tethys	Sh.	I.	-43.9	-44.8	29/09/09	7.46.39	Tethys	Sh.	E.	36.9	27.3	
16/09/09	2.33.03	Tethys	Tr.	E.	-25.9	-25.6	29/09/09	7.51.56	Tethys	Tr.	E.	37.7	28.1	
16/09/09	2.34.55	Tethys	Sh.	E.	-25.6	-25.3	30/09/09	3.29.35	Tethys	Ec.	D.	-8.4	-19.0	
16/09/09	12.50.08	Dione	Occ.	D.	46.2	44.2	30/09/09	4.38.13	Rhea	Ec.	D.	4.6	-6.4	
16/09/09	15.11.42	Rhea	Occ.	D.	24.9	22.7	30/09/09	5.22.33	Dione	Ec.	D.	12.7	2.2	
16/09/09	16.13.36	Dione	Ec.	R.	13.7	11.5	30/09/09	6.31.54	Tethys	Occ.	R.	25.2	14.5	
16/09/09	19.11.54	Rhea	Ec.	R.	-18.9	-21.0	30/09/09	8.47.58	Rhea	Occ.	R.	45.5	35.8	
16/09/09	22.16.26	Tethys	Occ.	D.	-42.4	-44.3	30/09/09	8.52.20	Dione	Occ.	R.	46.0	36.4	
17/09/09	1.14.25	Tethys	Ec.	R.	-36.4	-37.2	01/10/09	2.09.01	Tethys	Sh.	I.	-21.9	-33.1	
17/09/09	20.56.30	Tethys	Tr.	I.	-35.2	-37.2	01/10/09	2.17.33	Tethys	Tr.	I.	-20.5	-31.7	
17/09/09	20.56.56	Tethys	Sh.	I.	-35.3	-37.2	01/10/09	5.05.26	Tethys	Sh.	E.	10.1	-0.8	
17/09/09	21.37.39	Dione	Tr.	I.	-39.7	-41.7	01/10/09	5.11.43	Tethys	Tr.	E.	11.3	0.2	
17/09/09	21.38.25	Dione	Sh.	I.	-39.8	-41.8	01/10/09	14.08.48	Dione	Sh.	I.	26.3	28.0	
17/09/09	23.52.56	Tethys	Tr.	E.	-43.1	-44.9	01/10/09	14.21.06	Dione	Tr.	I.	24.1	26.0	
17/09/09	23.53.46	Tethys	Sh.	E.	-43.1	-44.8	01/10/09	17.29.19	Dione	Sh.	E.	-10.6	-	

Date	Times	Moon	Phenomen	Phase	h Sat	h Sun	15/10/09	10.18.14	Dione	Tr.	E.	49.2	38.6
02/10/09	0.48.26	Tethys	Ec.	D.	-33.7	-44.8	16/10/09	0.15.09	Rhea	Sh.	I.	-32.1	-52.7
02/10/09	3.51.39	Tethys	Occ.	R.	-2.5	-15.4	16/10/09	1.01.18	Rhea	Tr.	I.	-25.0	-47.2
02/10/09	10.52.03	Rhea	Sh.	I.	50.4	44.2	16/10/09	4.09.13	Rhea	Sh.	E.	9.0	-15.0
02/10/09	11.14.45	Rhea	Tr.	I.	49.1	44.2	16/10/09	4.39.34	Tethys	Sh.	I.	14.5	-9.4
02/10/09	14.47.25	Rhea	Sh.	E.	18.8	21.4	16/10/09	4.39.37	Rhea	Tr.	E.	14.5	-9.4
02/10/09	15.03.38	Rhea	Tr.	E.	15.8	18.7	16/10/09	4.58.25	Tethys	Tr.	I.	18.0	-5.9
02/10/09	23.04.35	Dione	Ec.	D.	-43.7	-51.9	16/10/09	7.35.28	Tethys	Sh.	E.	42.9	21.3
02/10/09	23.27.51	Tethys	Sh.	I.	-42.1	-51.5	16/10/09	7.49.10	Tethys	Tr.	E.	44.5	23.3
02/10/09	23.37.41	Tethys	Tr.	I.	-41.3	-51.1	16/10/09	15.34.35	Dione	Ec.	D.	0.9	9.0
03/10/09	2.24.13	Tethys	Sh.	E.	-18.2	-31.0	16/10/09	19.15.18	Dione	Occ.	R.	-36.4	-31.5
03/10/09	2.31.28	Tethys	Tr.	E.	-17.0	-29.8	17/10/09	3.18.57	Tethys	Ec.	D.	0.6	-24.5
03/10/09	2.36.20	Dione	Occ.	R.	-16.1	-29.0	17/10/09	6.29.02	Tethys	Occ.	R.	34.0	10.3
03/10/09	22.07.16	Tethys	Ec.	D.	-45.0	-50.5	18/10/09	0.20.50	Dione	Sh.	I.	-30.3	-52.8
04/10/09	1.11.24	Tethys	Occ.	R.	-29.5	-42.4	18/10/09	0.49.14	Dione	Tr.	I.	-25.9	-49.4
04/10/09	7.50.50	Dione	Sh.	I.	39.9	26.7	18/10/09	1.58.21	Tethys	Sh.	I.	-14.1	-38.9
04/10/09	8.05.48	Dione	Tr.	I.	41.9	28.9	18/10/09	2.18.28	Tethys	Tr.	I.	-10.5	-35.5
04/10/09	11.11.15	Dione	Sh.	E.	48.8	43.5	18/10/09	3.40.40	Dione	Sh.	E.	5.0	-20.7
04/10/09	11.23.03	Dione	Tr.	E.	47.8	43.2	18/10/09	4.01.50	Dione	Tr.	E.	8.8	-16.8
04/10/09	17.05.58	Rhea	Ec.	D.	-8.3	-3.9	18/10/09	4.54.11	Tethys	Sh.	E.	18.4	-7.1
04/10/09	20.46.41	Tethys	Sh.	I.	-41.2	-42.2	18/10/09	5.08.45	Tethys	Tr.	E.	21.0	-4.2
04/10/09	20.57.49	Tethys	Tr.	I.	-42.2	-43.7	18/10/09	6.29.03	Rhea	Ec.	D.	34.5	10.1
04/10/09	21.20.31	Rhea	Occ.	R.	-43.7	-46.5	18/10/09	10.56.00	Rhea	Occ.	R.	45.2	38.3
04/10/09	23.42.59	Tethys	Sh.	E.	-40.3	-51.5	19/10/09	0.37.44	Tethys	Ec.	D.	-27.2	-51.1
04/10/09	23.51.12	Tethys	Tr.	E.	-39.5	-51.0	19/10/09	3.48.36	Tethys	Occ.	R.	7.0	-19.4
05/10/09	16.46.37	Dione	Ec.	D.	-5.4	-0.2	19/10/09	9.16.33	Dione	Ec.	D.	50.3	33.1
05/10/09	19.26.06	Tethys	Ec.	D.	-32.3	-29.9	19/10/09	12.58.52	Dione	Occ.	R.	26.9	30.9
05/10/09	20.20.16	Dione	Occ.	R.	-39.1	-38.8	19/10/09	23.17.08	Tethys	Sh.	I.	-38.1	-58.0
05/10/09	22.06.51	Titan	Sh.	I.	-45.1	-51.2	19/10/09	23.38.31	Tethys	Tr.	I.	-35.4	-57.0
05/10/09	22.31.07	Tethys	Occ.	R.	-44.7	-52.5	20/10/09	2.12.54	Tethys	Sh.	E.	-10.3	-36.9
06/10/09	0.06.50	Titan	Tr.	I.	-37.4	-50.2	20/10/09	2.28.18	Tethys	Tr.	E.	-7.5	-34.2
06/10/09	3.38.48	Titan	Sh.	E.	-2.4	-18.6	20/10/09	12.42.48	Rhea	Sh.	I.	29.0	32.2
06/10/09	4.22.01	Titan	Tr.	E.	5.2	-10.6	20/10/09	13.36.51	Rhea	Tr.	I.	19.6	26.0
06/10/09	18.05.31	Tethys	Sh.	I.	-20.1	-15.8	20/10/09	16.36.22	Rhea	Sh.	E.	-13.6	-2.9
06/10/09	18.17.56	Tethys	Tr.	I.	-22.2	-18.1	20/10/09	17.10.51	Rhea	Tr.	E.	-19.6	-9.7
06/10/09	21.01.45	Tethys	Sh.	E.	-43.0	-45.0	20/10/09	18.02.48	Dione	Sh.	I.	-28.2	-19.3
06/10/09	21.10.55	Tethys	Tr.	E.	-43.6	-46.1	20/10/09	18.33.52	Dione	Tr.	I.	-32.8	-25.1
06/10/09	23.19.46	Rhea	Sh.	I.	-41.8	-53.2	20/10/09	21.22.30	Dione	Sh.	E.	-45.7	-52.5
06/10/09	23.50.13	Rhea	Tr.	I.	-38.9	-51.8	20/10/09	21.45.22	Dione	Tr.	E.	-45.2	-55.0
07/10/09	1.32.52	Dione	Sh.	I.	-24.7	-40.2	20/10/09	21.56.31	Tethys	Ec.	D.	-44.7	-56.0
07/10/09	1.50.31	Dione	Tr.	I.	-21.7	-37.5	21/10/09	1.08.09	Tethys	Occ.	R.	-21.1	-47.5
07/10/09	3.14.45	Rhea	Sh.	E.	-6.9	-23.1	21/10/09	20.35.54	Tethys	Sh.	I.	-45.1	-46.4
07/10/09	3.36.00	Rhea	Tr.	E.	-2.3	-19.3	21/10/09	20.58.33	Tethys	Tr.	I.	-45.7	-49.7
07/10/09	4.53.10	Dione	Sh.	E.	11.5	-4.9	21/10/09	21.23.25	Titan	Sh.	I.	-45.7	-52.9
07/10/09	5.06.57	Dione	Tr.	E.	14.1	-1.7	21/10/09	23.31.36	Tethys	Sh.	E.	-35.4	-58.1
07/10/09	16.44.55	Tethys	Ec.	D.	-6.5	-0.4	21/10/09	23.47.50	Tethys	Tr.	E.	-33.2	-57.1
07/10/09	19.50.50	Tethys	Occ.	R.	-36.5	-34.7	22/10/09	2.42.03	Titan	Sh.	E.	-3.3	-32.2
08/10/09	10.28.38	Dione	Ec.	D.	50.2	41.5	22/10/09	2.58.30	Dione	Ec.	D.	0.0	-29.2
08/10/09	14.04.08	Dione	Occ.	R.	22.6	26.2	22/10/09	6.42.21	Dione	Occ.	R.	38.4	11.4
08/10/09	15.24.20	Tethys	Sh.	I.	8.0	13.2	22/10/09	18.56.42	Rhea	Ec.	D.	-36.9	-29.8
08/10/09	15.38.03	Tethys	Tr.	I.	5.5	10.8	22/10/09	19.15.17	Tethys	Ec.	D.	-39.1	-33.1
08/10/09	18.20.30	Tethys	Sh.	E.	-23.9	-19.2	22/10/09	22.27.40	Tethys	Occ.	R.	-42.2	-58.7
08/10/09	18.30.36	Tethys	Tr.	E.	-25.5	-21.0	22/10/09	23.27.03	Rhea	Occ.	R.	-35.6	-58.7
09/10/09	5.33.41	Rhea	Ec.	D.	20.1	2.4	23/10/09	11.44.45	Dione	Sh.	I.	36.4	35.3
09/10/09	9.52.43	Rhea	Occ.	R.	50.8	39.3	23/10/09	12.18.27	Dione	Tr.	I.	31.2	33.2
09/10/09	14.03.45	Tethys	Ec.	D.	22.0	25.9	23/10/09	15.04.19	Dione	Sh.	E.	1.7	12.0
09/10/09	17.10.31	Tethys	Occ.	R.	-12.5	-6.5	23/10/09	15.28.49	Dione	Tr.	E.	-2.7	8.0
09/10/09	19.14.52	Dione	Sh.	I.	-32.8	-29.3	23/10/09	17.54.41	Tethys	Sh.	I.	-28.7	-18.6
09/10/09	19.35.13	Dione	Tr.	I.	-35.5	-32.8	23/10/09	18.18.33	Tethys	Tr.	I.	-32.3	-23.0
09/10/09	22.35.04	Dione	Sh.	E.	-44.2	-54.2	23/10/09	20.50.18	Tethys	Sh.	E.	-45.8	-49.1
09/10/09	22.50.47	Dione	Tr.	E.	-43.3	-54.6	23/10/09	21.07.21	Tethys	Tr.	E.	-45.9	-51.5
10/10/09	12.43.09	Tethys	Sh.	I.	34.9	35.7	24/10/09	16.34.03	Tethys	Ec.	D.	-15.8	-3.7
10/10/09	12.58.10	Tethys	Tr.	I.	32.5	34.1	24/10/09	19.47.10	Tethys	Occ.	R.	-43.0	-39.3
10/10/09	15.39.15	Tethys	Sh.	E.	3.9	10.0	24/10/09	20.40.27	Dione	Ec.	D.	-45.7	-48.0
10/10/09	15.50.17	Tethys	Tr.	E.	2.0	8.0	25/10/09	0.25.46	Dione	Occ.	R.	-25.9	-54.3
11/10/09	4.10.38	Dione	Ec.	D.	6.2	-13.7	25/10/09	1.10.26	Rhea	Sh.	I.	-18.4	-48.2
11/10/09	7.47.55	Dione	Occ.	R.	42.5	24.5	25/10/09	2.12.22	Rhea	Tr.	I.	-7.3	-38.1
11/10/09	11.22.33	Tethys	Ec.	D.	45.2	40.5	25/10/09	5.03.28	Rhea	Sh.	E.	24.2	-6.8
11/10/09	11.47.28	Rhea	Sh.	I.	42.3	39.6	25/10/09	5.41.41	Rhea	Tr.	E.	30.7	0.6
11/10/09	12.25.44	Rhea	Tr.	I.	37.0	37.0	25/10/09	15.13.26	Tethys	Sh.	I.	-0.9	10.0
11/10/09	14.30.10	Tethys	Occ.	R.	15.9	21.2	25/10/09	15.38.33	Tethys	Tr.	I.	-6.4	5.8
11/10/09	15.42.01	Rhea	Sh.	E.	2.8	9.2	25/10/09	18.09.00	Tethys	Sh.	E.	-32.0	-21.8
11/10/09	16.08.00	Rhea	Tr.	E.	-1.6	4.6	25/10/09	18.26.50	Tethys	Tr.	E.	-34.5	-25.1
12/10/09	10.01.58	Tethys	Sh.	I.	50.4	38.8	26/10/09	5.26.41	Dione	Sh.	I.	28.7	-2.1
12/10/09	10.18.16	Tethys	Tr.	I.	49.9	39.6	26/10/09	6.03.01	Dione	Tr.	I.	34.6	3.9
12/10/09	12.56.52	Dione	Sh.	I.	31.6	33.6	26/10/09	8.46.06	Dione	Sh.	E.	50.0	27.9
12/10/09	12.58.00	Tethys	Sh.	E.	31.4	33.4	26/10/09	9.12.12	Dione	Tr.	E.	49.8	30.5
12/10/09	13.09.56	Tethys	Tr.	E.	29.4	32.1	26/10/09	13.52.49	Tethys	Ec.	D.	12.7	22.0
12/10/09	13.19.54	Dione	Tr.	I.	27.7	30.9	26/10/09	17.06.38	Tethys	Occ.	R.	-22.7	-10.5
12/10/09	16.16.57	Dione	Sh.	E.	-4.6	2.8	27/10/09	7.24.20	Rhea	Ec.	D.	45.5	16.8
12/10/09	16.34.33	Dione	Tr.	E.	-7.9	-0.1	27/10/09	11.57.41	Rhea	Occ.	R.	32.1	33.3
13/10/09	8.41.22	Tethys	Ec.	D.	48.5	31.2	27/10/09	12.32.12	Tethys	Sh.	I.	26.4	30.8
13/10/09	11.49.49	Tethys	Occ.	R.	41.0	38.7	27/10/09	12.58.31	Tethys	Tr.	I.	21.8	28.3
13/10/09	18.01.23	Rhea	Ec.	D.	-23.8	-17.1	27/10/09	14.22.22	Dione	Ec.	D.	6.6	17.5
13/10/09	21.52.37	Dione	Ec.	D.	-45.3	-53.1	27/10/09	15.27.41	Tethys	Sh.	E.	-5.7	7.1
13/10/09	22.24.33	Rhea	Occ.	R.	-44.2	-55.3	27/10/09	15.46.18	Tethys	Tr.	E.	-9.2	4.0
13/10/09	23.46.09	Titan	Ec.	D.	-36.9	-54.5	27/10/09	18.09.06	Dione	Occ.	R.	-33.1	-22.3
14/10/09	1.31.39	Dione	Occ.	R.	-21.0	-42.2	28/10/09	11.11.34	Tethys	Ec.	D.	38.5	34.7
14/10/09	6.09.13	Titan	Occ.	R.	29.2	7.5	28/10/09	14.26.05	Tethys	Occ.	R.	5.2	16.7
14/10/09	7.20.46	Tethys	Sh.	I.	40.2	19.5	28/10/09	23.08.37	Dione	Sh.	I.	-35.5	-61.3
14/10/09	7.38.21	Tethys	Tr.	I.	42.5	22.2	28/10/09	23.47.31	Dione	Tr.	I.	-29.9	-59.3
14/10/09	10.16.44	Tethys	Sh.	E.	49.5	38.9	29/10/09	2.27.53	Dione	Sh.	E.	-1.1	-36.2
14/10/09	10.29.33	Tethys	Tr.	E.	48.8	39.3	29/10/09	2.55.29	Dione	Tr.	E.	3.5	-31.2
15/10/09	6.00.09	Tethys	Ec.	D.	28.2	5.7	29/10/09	9.50.57	Tethys	Sh.	I.	47.2	32.5
15/10/09	6.38.52	Dione	Sh.	I.	34.5	12.4	29/10/09	10.18.28	Tethys	Tr.	I.	44.6	33.8
15/10/09	7.04.35	Dione	Tr.	I.	38.4	16.7	29/10/09	12.46.21	Tethys	Sh.	E.	22.7	28.9
15/10/09	9.09.26	Tethys	Occ.	R.	50.1	33.6	29/10/09	13.05.44	Tethys	Tr.	E.	19.2	26.9
15/10/09	9.58.49	Dione	Sh.	E.	50.1	37.6	29/10/09	13.38.03	Rhea	Sh.			

Date	Times	Moon	Phenomen	Phase	h Sat	h Sun								
29/10/09	14.47.47	Rhea	Tr.	I.	0.8	13.1	12/11/09	13.41.24	Tethys	Ec.	D.	3.3	19.1	
29/10/09	17.30.31	Rhea	Sh.	E.	-28.4	-15.6	12/11/09	17.00.43	Tethys	Occ.	R.	-31.9	-12.7	
29/10/09	18.12.05	Rhea	Tr.	E.	-34.5	-23.3	13/11/09	0.33.44	Dione	Ec.	D.	-13.5	-58.2	
29/10/09	23.08.18	Titan	Ec.	D.	-35.1	-61.6	13/11/09	4.27.18	Dione	Occ.	R.	29.0	-17.3	
30/10/09	4.31.48	Titan	Ec.	R.	21.6	-13.7	13/11/09	12.20.46	Tethys	Sh.	I.	17.3	26.9	
30/10/09	8.04.17	Dione	Ec.	D.	49.1	21.7	13/11/09	12.57.09	Tethys	Tr.	I.	10.7	23.8	
30/10/09	8.30.19	Tethys	Ec.	D.	49.8	24.9	13/11/09	15.15.34	Tethys	Sh.	E.	-15.0	5.5	
30/10/09	11.45.30	Tethys	Occ.	R.	32.3	32.9	13/11/09	15.40.15	Tethys	Tr.	E.	-19.3	1.6	
30/10/09	11.52.20	Dione	Occ.	R.	31.2	32.6	14/11/09	9.14.41	Rhea	Ec.	D.	44.8	25.3	
31/10/09	7.09.42	Tethys	Sh.	I.	45.3	13.6	14/11/09	9.19.59	Dione	Sh.	I.	44.2	25.7	
31/10/09	7.38.24	Tethys	Tr.	I.	47.7	17.9	14/11/09	10.13.19	Dione	Tr.	I.	37.7	28.9	
31/10/09	10.05.02	Tethys	Sh.	E.	45.2	32.6	14/11/09	11.00.06	Tethys	Ec.	D.	30.6	29.7	
31/10/09	10.25.08	Tethys	Tr.	E.	43.0	33.4	14/11/09	12.38.16	Dione	Sh.	E.	13.5	25.3	
31/10/09	16.50.32	Dione	Sh.	I.	-23.1	-8.7	14/11/09	13.13.26	Dione	Tr.	E.	7.0	21.9	
31/10/09	17.31.59	Dione	Tr.	I.	-29.8	-16.3	14/11/09	13.55.54	Rhea	Occ.	R.	-0.3	16.9	
31/10/09	19.51.57	Rhea	Ec.	D.	-45.2	-41.8	14/11/09	14.19.56	Tethys	Occ.	R.	-5.5	13.6	
31/10/09	20.09.39	Dione	Sh.	E.	-45.9	-44.9	14/11/09	22.32.44	Titan	Ec.	D.	-32.5	-65.9	
31/10/09	20.38.41	Dione	Tr.	E.	-46.2	-49.6	15/11/09	3.32.22	Titan	Ec.	R.	20.7	-27.8	
01/11/09	0.27.53	Rhea	Occ.	R.	-21.7	-56.0	15/11/09	9.39.28	Tethys	Sh.	I.	41.6	26.9	
01/11/09	5.49.03	Tethys	Ec.	D.	35.5	0.4	15/11/09	10.16.52	Tethys	Tr.	I.	36.6	28.8	
01/11/09	9.04.54	Tethys	Occ.	R.	49.2	28.0	15/11/09	12.34.11	Tethys	Sh.	E.	13.6	25.4	
02/11/09	1.46.12	Dione	Ec.	D.	-7.1	-44.4	15/11/09	12.59.27	Tethys	Tr.	E.	8.9	23.1	
02/11/09	4.28.26	Tethys	Sh.	I.	22.8	-14.9	15/11/09	18.15.36	Dione	Ec.	D.	-42.6	-26.9	
02/11/09	4.58.18	Tethys	Tr.	I.	27.9	-9.4	15/11/09	22.10.01	Dione	Occ.	R.	-35.3	-64.7	
02/11/09	5.35.30	Dione	Occ.	R.	33.9	-2.0	16/11/09	8.18.48	Tethys	Ec.	D.	48.3	19.1	
02/11/09	7.23.42	Tethys	Sh.	E.	47.1	15.2	16/11/09	11.39.07	Tethys	Occ.	R.	22.7	28.4	
02/11/09	7.44.31	Tethys	Tr.	E.	48.5	18.2	16/11/09	15.28.19	Rhea	Sh.	I.	-19.2	3.0	
03/11/09	2.05.38	Rhea	Sh.	I.	-2.3	-41.2	16/11/09	17.07.39	Rhea	Tr.	I.	-35.1	-14.5	
03/11/09	3.07.48	Tethys	Ec.	D.	8.8	-30.0	16/11/09	19.18.10	Rhea	Sh.	E.	-46.6	-38.6	
03/11/09	3.23.05	Rhea	Tr.	I.	11.6	-27.2	16/11/09	20.09.23	Rhea	Tr.	E.	-46.2	-47.8	
03/11/09	5.57.30	Rhea	Sh.	E.	37.7	1.3	17/11/09	3.01.51	Dione	Sh.	I.	16.5	-33.8	
03/11/09	6.24.16	Tethys	Occ.	R.	41.3	5.7	17/11/09	3.57.21	Dione	Tr.	I.	26.2	-23.5	
03/11/09	6.42.03	Rhea	Tr.	E.	43.4	8.5	17/11/09	6.19.56	Dione	Sh.	E.	45.7	2.1	
03/11/09	10.32.27	Dione	Sh.	I.	40.7	32.6	17/11/09	6.56.07	Dione	Tr.	E.	48.2	7.6	
03/11/09	11.16.23	Dione	Tr.	I.	34.5	32.6	17/11/09	6.58.10	Tethys	Sh.	I.	48.3	7.9	
03/11/09	13.51.24	Dione	Sh.	E.	7.5	20.0	17/11/09	7.36.32	Tethys	Tr.	I.	49.2	13.5	
03/11/09	14.21.48	Dione	Tr.	E.	2.1	15.7	17/11/09	9.52.49	Tethys	Sh.	E.	38.9	27.2	
04/11/09	1.47.10	Tethys	Sh.	I.	-5.7	-44.6	17/11/09	10.18.37	Tethys	Tr.	E.	35.3	28.3	
04/11/09	2.18.11	Tethys	Tr.	I.	0.6	-39.2	18/11/09	5.37.30	Tethys	Ec.	D.	41.6	-5.7	
04/11/09	4.42.21	Tethys	Sh.	E.	26.3	-12.7	18/11/09	8.58.16	Tethys	Occ.	R.	44.8	22.9	
04/11/09	5.03.53	Tethys	Tr.	E.	29.9	-8.8	18/11/09	11.57.27	Dione	Ec.	D.	18.2	27.2	
04/11/09	19.28.06	Dione	Ec.	D.	-44.8	-38.5	18/11/09	15.52.40	Dione	Occ.	R.	-24.6	-0.8	
04/11/09	23.18.35	Dione	Occ.	R.	-30.7	-63.2	18/11/09	21.42.14	Rhea	Ec.	D.	-37.6	-62.4	
05/11/09	0.26.32	Tethys	Ec.	D.	-19.6	-57.2	19/11/09	2.24.22	Rhea	Occ.	R.	11.0	-41.1	
05/11/09	3.43.37	Tethys	Occ.	R.	16.6	-23.8	19/11/09	4.16.51	Tethys	Sh.	I.	30.6	-20.3	
05/11/09	8.19.32	Rhea	Ec.	D.	49.6	22.0	19/11/09	4.56.10	Tethys	Tr.	I.	36.6	-13.2	
05/11/09	12.57.40	Rhea	Occ.	R.	16.0	25.7	19/11/09	7.11.25	Tethys	Sh.	E.	48.9	9.5	
05/11/09	23.05.54	Tethys	Sh.	I.	-32.1	-63.9	19/11/09	7.37.45	Tethys	Tr.	E.	49.1	13.2	
05/11/09	23.38.02	Tethys	Tr.	I.	-27.2	-62.4	19/11/09	20.43.43	Dione	Sh.	I.	-43.6	-54.0	
06/11/09	2.01.01	Tethys	Sh.	E.	-1.1	-42.7	19/11/09	21.41.17	Dione	Tr.	I.	-37.3	-62.4	
06/11/09	2.23.13	Tethys	Tr.	E.	2.6	-38.7	20/11/09	0.01.36	Dione	Sh.	E.	-14.9	-63.9	
06/11/09	4.14.21	Dione	Sh.	I.	22.7	-18.3	20/11/09	0.38.43	Dione	Tr.	E.	-8.2	-59.1	
06/11/09	5.00.44	Dione	Tr.	I.	30.5	-9.8	20/11/09	2.56.12	Tethys	Ec.	D.	17.4	-35.4	
06/11/09	7.33.08	Dione	Sh.	E.	48.5	15.6	20/11/09	6.17.23	Tethys	Occ.	R.	46.3	1.1	
06/11/09	8.04.50	Dione	Tr.	E.	49.5	19.9	21/11/09	1.35.33	Tethys	Sh.	I.	3.3	-50.2	
06/11/09	20.41.32	Titan	Sh.	I.	-46.0	-51.4	21/11/09	2.15.46	Tethys	Tr.	I.	10.7	-43.0	
06/11/09	21.45.15	Tethys	Ec.	D.	-41.8	-60.1	21/11/09	3.55.51	Rhea	Sh.	I.	28.3	-24.5	
07/11/09	1.02.56	Tethys	Occ.	R.	-11.9	-52.5	21/11/09	4.30.02	Tethys	Sh.	E.	33.8	-18.3	
07/11/09	1.42.46	Titan	Sh.	E.	-4.5	-46.0	21/11/09	4.56.52	Tethys	Tr.	E.	37.7	-13.4	
07/11/09	13.09.59	Dione	Ec.	D.	12.4	23.9	21/11/09	5.39.18	Dione	Ec.	D.	43.0	-5.9	
07/11/09	14.33.12	Rhea	Sh.	I.	-2.6	13.1	21/11/09	5.41.53	Rhea	Tr.	I.	43.3	-5.5	
07/11/09	15.58.11	Rhea	Tr.	I.	-18.6	-0.1	21/11/09	7.44.58	Rhea	Sh.	E.	48.7	13.8	
07/11/09	17.01.34	Dione	Occ.	R.	-29.1	-12.1	21/11/09	8.37.38	Rhea	Tr.	E.	45.6	20.1	
07/11/09	18.24.26	Rhea	Sh.	E.	-40.3	-27.3	21/11/09	9.35.13	Dione	Occ.	R.	39.2	25.2	
07/11/09	19.11.36	Rhea	Tr.	E.	-44.5	-36.0	22/11/09	0.14.53	Tethys	Ec.	D.	-11.2	-62.8	
07/11/09	20.24.37	Tethys	Sh.	I.	-46.4	-48.9	22/11/09	3.36.29	Tethys	Occ.	R.	25.6	-28.3	
07/11/09	20.57.51	Tethys	Tr.	I.	-45.2	-54.2	22/11/09	14.25.34	Dione	Sh.	I.	-12.0	11.6	
07/11/09	23.19.39	Tethys	Sh.	E.	-29.0	-64.0	22/11/09	15.25.07	Dione	Tr.	I.	-22.5	2.8	
07/11/09	23.42.31	Tethys	Tr.	E.	-25.3	-62.6	22/11/09	17.43.16	Dione	Sh.	E.	-42.1	-21.6	
08/11/09	19.03.58	Tethys	Ec.	D.	-44.3	-34.8	22/11/09	18.21.14	Dione	Tr.	E.	-45.2	-28.6	
08/11/09	21.56.14	Dione	Sh.	I.	-39.9	-61.8	22/11/09	20.01.39	Titan	Sh.	I.	-45.8	-47.1	
08/11/09	22.22.13	Tethys	Occ.	R.	-36.8	-63.8	22/11/09	22.54.14	Tethys	Sh.	I.	-24.8	-68.3	
08/11/09	22.45.00	Dione	Tr.	I.	-33.7	-64.7	22/11/09	23.35.19	Tethys	Tr.	I.	-17.7	-67.0	
09/11/09	1.14.52	Dione	Sh.	E.	-8.5	-51.1	23/11/09	0.40.39	Titan	Sh.	E.	-5.8	-59.4	
09/11/09	1.47.47	Dione	Tr.	E.	-1.6	-45.6	23/11/09	1.48.38	Tethys	Sh.	E.	7.0	-48.2	
09/11/09	17.43.20	Tethys	Sh.	I.	-36.3	-20.1	23/11/09	2.15.57	Tethys	Tr.	E.	12.0	-43.3	
09/11/09	18.17.39	Tethys	Tr.	I.	-40.4	-26.4	23/11/09	10.09.46	Rhea	Ec.	D.	33.2	26.6	
09/11/09	20.38.18	Tethys	Sh.	E.	-45.8	-51.5	23/11/09	14.52.25	Rhea	Occ.	R.	-17.5	7.6	
09/11/09	20.47.07	Rhea	Ec.	D.	-45.4	-52.9	23/11/09	21.33.34	Tethys	Ec.	D.	-36.5	-62.0	
09/11/09	21.01.47	Tethys	Tr.	E.	-44.6	-55.2	23/11/09	23.21.08	Dione	Ec.	D.	-19.6	-68.0	
10/11/09	1.27.00	Rhea	Occ.	R.	-5.6	-49.3	24/11/09	0.55.33	Tethys	Occ.	R.	-1.7	-57.4	
10/11/09	6.51.52	Dione	Ec.	D.	46.5	8.5	24/11/09	3.17.41	Dione	Occ.	R.	23.6	-32.1	
10/11/09	10.44.29	Dione	Occ.	R.	35.3	30.7	24/11/09	20.12.55	Tethys	Sh.	I.	-44.7	-49.2	
10/11/09	16.22.41	Tethys	Ec.	D.	-24.7	-5.6	24/11/09	20.54.50	Tethys	Tr.	I.	-40.9	-56.4	
10/11/09	19.41.29	Tethys	Occ.	R.	-46.4	-42.0	24/11/09	23.07.14	Tethys	Sh.	E.	-21.4	-68.7	
11/11/09	15.02.03	Tethys	Sh.	I.	-11.2	7.9	24/11/09	23.35.00	Tethys	Tr.	E.	-16.5	-67.4	
11/11/09	15.37.25	Tethys	Tr.	I.	-17.5	2.4	25/11/09	8.07.24	Dione	Sh.	I.	46.8	15.8	
11/11/09	15.38.07	Dione	Sh.	I.	-17.7	2.3	25/11/09	9.08.51	Dione	Tr.	I.	40.7	22.3	
11/11/09	16.29.12	Dione	Tr.	I.	-26.4	-6.9	25/11/09	11.24.54	Dione	Sh.	E.	19.3	26.9	
11/11/09	17.56.56	Tethys	Sh.	E.	-39.0	-22.9	25/11/09	12.03.40	Dione	Tr.	E.	12.3	25.5	
11/11/09	18.21.02	Tethys	Tr.	E.	-41.6	-27.4	25/11/09	16.23.23	Rhea	Sh.	I.	-33.6	-7.6	
11/11/09	18.56.34	Dione	Sh.	E.	-44.6	-33.9	25/11/09	18.15.41	Rhea	Tr.	I.	-45.6	-27.8	
11/11/09	19.30.39	Dione	Tr.	E.	-46.3	-40.2	25/11/09	18.52.15	Tethys	Ec.	D.	-47.0	-34.6	
12/11/09	3.00.46	Rhea	Sh.	I.	13.2	-33.1	25/11/09	20.11.43	Rhea	Sh.	E.	-44.5	-49.1	
12/11/09	4.33.04	Rhea	Tr.	I.	29.3	-16.0	25/11/09	21.05.28	Rhea	Tr.	E.	-39.2	-58.1	
12/11/09	6.51.20	Rhea	Sh.	E.	47.0	8.0	25/11/09	22.14.35	Tethys	Occ.	R.	-29.5	-66.9	
12/11/09	7.40.42	Rhea	Tr.	E.	49.3	15.2	26/11/09	17.02.58	Dione	Ec.	D.	-39.4	-14.6	
		</												

Date	Times	Moon	Phenomen	Phase	h Sat	h Sun								
26/11/09	18.14.19	Tethys	Tr.	I.	-45.8	-27.6	10/12/09	13.30.42	Dione	Occ.	R.	-14.3	16.9	
26/11/09	20.25.50	Tethys	Sh.	E.	-43.1	-51.6	10/12/09	21.21.35	Tethys	Ec.	D.	-29.5	-61.3	
26/11/09	20.54.01	Tethys	Tr.	E.	-40.2	-56.4	11/12/09	0.45.51	Tethys	Occ.	R.	7.3	-61.7	
26/11/09	21.00.04	Dione	Occ.	R.	-39.5	-57.4	11/12/09	11.59.54	Rhea	Ec.	D.	2.1	23.8	
27/11/09	16.10.56	Tethys	Ec.	D.	-32.9	-5.5	11/12/09	16.40.49	Rhea	Occ.	R.	-43.2	-10.9	
27/11/09	19.33.36	Tethys	Occ.	R.	-46.4	-42.3	11/12/09	18.18.22	Dione	Sh.	I.	-47.4	-28.4	
27/11/09	22.37.18	Rhea	Ec.	D.	-24.7	-68.7	11/12/09	19.28.34	Dione	Tr.	I.	-43.6	-41.5	
28/11/09	1.49.15	Dione	Sh.	I.	10.3	-49.0	11/12/09	20.00.55	Tethys	Sh.	I.	-40.2	-47.4	
28/11/09	2.52.27	Dione	Tr.	I.	21.7	-37.5	11/12/09	20.48.34	Tethys	Tr.	I.	-33.9	-55.8	
28/11/09	3.20.04	Rhea	Occ.	R.	26.4	-32.4	11/12/09	21.34.33	Dione	Sh.	E.	-26.8	-63.2	
28/11/09	5.06.32	Dione	Sh.	E.	42.0	-13.0	11/12/09	22.16.27	Dione	Tr.	E.	-19.7	-68.5	
28/11/09	5.46.00	Dione	Tr.	E.	45.9	-6.1	11/12/09	22.54.29	Tethys	Sh.	E.	-12.9	-70.9	
28/11/09	14.50.16	Tethys	Sh.	I.	-20.4	7.4	11/12/09	23.25.10	Tethys	Tr.	E.	-7.3	-70.6	
28/11/09	15.33.46	Tethys	Tr.	I.	-27.7	1.0	12/12/09	18.40.14	Tethys	Ec.	D.	-46.7	-32.4	
28/11/09	17.44.26	Tethys	Sh.	E.	-44.3	-22.2	12/12/09	22.04.38	Tethys	Occ.	R.	-21.1	-67.2	
28/11/09	18.13.01	Tethys	Tr.	E.	-46.2	-27.5	13/12/09	3.13.53	Dione	Ec.	D.	34.0	-35.8	
29/11/09	10.44.48	Dione	Ec.	D.	23.7	26.4	13/12/09	7.12.35	Dione	Occ.	R.	45.5	5.6	
29/11/09	13.29.36	Tethys	Ec.	D.	-6.5	17.7	13/12/09	17.19.34	Tethys	Sh.	I.	-46.6	-17.7	
29/11/09	14.42.22	Dione	Occ.	R.	-19.7	8.5	13/12/09	18.07.38	Tethys	Tr.	I.	-47.5	-26.4	
29/11/09	16.52.34	Tethys	Occ.	R.	-39.5	-12.9	13/12/09	18.13.28	Rhea	Sh.	I.	-47.4	-27.5	
30/11/09	4.50.54	Rhea	Sh.	I.	41.0	-16.1	13/12/09	20.13.03	Tethys	Sh.	E.	-37.9	-49.5	
30/11/09	6.49.00	Rhea	Tr.	I.	48.8	4.1	13/12/09	20.25.18	Rhea	Tr.	I.	-36.2	-51.7	
30/11/09	8.38.26	Rhea	Sh.	E.	42.0	18.4	13/12/09	20.43.56	Tethys	Tr.	E.	-33.6	-55.0	
30/11/09	9.32.55	Rhea	Tr.	E.	34.7	23.2	13/12/09	21.58.21	Rhea	Sh.	E.	-21.5	-66.5	
30/11/09	12.08.56	Tethys	Sh.	I.	7.9	24.4	13/12/09	22.53.10	Rhea	Tr.	E.	-11.8	-71.0	
30/11/09	12.53.09	Tethys	Tr.	I.	0.1	21.2	14/12/09	12.00.11	Dione	Sh.	I.	0.2	23.6	
30/11/09	15.03.01	Tethys	Sh.	E.	-23.9	5.4	14/12/09	13.11.21	Dione	Tr.	I.	-13.6	18.7	
30/11/09	15.31.59	Tethys	Tr.	E.	-28.6	1.1	14/12/09	15.16.08	Dione	Sh.	E.	-34.4	3.3	
30/11/09	19.31.05	Dione	Sh.	I.	-46.1	-42.0	14/12/09	15.58.17	Dione	Tr.	E.	-39.9	-3.3	
30/11/09	20.35.57	Dione	Tr.	I.	-40.7	-53.6	14/12/09	15.58.54	Tethys	Ec.	D.	-40.0	-3.4	
30/11/09	22.00.14	Titan	Ec.	D.	-29.0	-66.1	14/12/09	19.23.23	Tethys	Occ.	R.	-43.1	-40.3	
30/11/09	22.48.10	Dione	Sh.	E.	-21.0	-69.6	15/12/09	14.38.14	Tethys	Sh.	I.	-29.2	8.7	
30/11/09	23.28.16	Dione	Tr.	E.	-13.9	-69.0	15/12/09	15.26.39	Tethys	Tr.	I.	-36.4	1.8	
01/12/09	2.29.06	Titan	Ec.	R.	19.4	-42.3	15/12/09	17.31.36	Tethys	Sh.	E.	-47.3	-19.7	
01/12/09	10.48.16	Tethys	Ec.	D.	21.8	26.1	15/12/09	18.02.41	Tethys	Tr.	E.	-47.5	-25.4	
01/12/09	14.11.32	Tethys	Occ.	R.	-15.6	12.5	15/12/09	20.55.42	Dione	Ec.	D.	-30.7	-56.9	
02/12/09	4.26.37	Dione	Ec.	D.	38.8	-20.8	16/12/09	0.27.27	Rhea	Ec.	D.	7.2	-65.0	
02/12/09	8.24.35	Dione	Occ.	R.	42.7	16.5	16/12/09	0.54.22	Dione	Occ.	R.	12.2	-61.0	
02/12/09	9.27.37	Tethys	Sh.	I.	34.4	22.5	16/12/09	5.07.08	Rhea	Occ.	R.	47.4	-15.5	
02/12/09	10.12.30	Tethys	Tr.	I.	27.3	25.0	16/12/09	13.17.33	Tethys	Ec.	D.	-16.0	18.2	
02/12/09	11.04.50	Rhea	Ec.	D.	18.2	26.0	16/12/09	16.42.06	Tethys	Occ.	R.	-45.0	-11.0	
02/12/09	12.21.36	Tethys	Sh.	E.	4.3	23.4	16/12/09	21.32.18	Titan	Ec.	D.	-24.1	-62.8	
02/12/09	12.50.55	Tethys	Tr.	E.	-0.7	21.2	17/12/09	1.20.46	Titan	Ec.	R.	17.6	-56.8	
02/12/09	15.47.19	Rhea	Occ.	R.	-32.2	-1.1	17/12/09	5.42.00	Dione	Sh.	I.	48.5	-9.6	
03/12/09	8.06.56	Tethys	Ec.	D.	44.1	14.3	17/12/09	6.53.58	Dione	Tr.	I.	45.7	2.5	
03/12/09	11.30.27	Tethys	Occ.	R.	12.9	25.5	17/12/09	8.57.43	Dione	Sh.	E.	30.2	18.1	
03/12/09	13.12.54	Dione	Sh.	I.	-6.2	19.1	17/12/09	9.40.03	Dione	Tr.	E.	23.1	21.6	
03/12/09	14.19.18	Dione	Tr.	I.	-18.3	11.4	17/12/09	11.56.53	Tethys	Sh.	I.	-1.1	23.7	
03/12/09	16.29.46	Dione	Sh.	E.	-38.6	-9.1	17/12/09	12.45.37	Tethys	Tr.	I.	-11.0	20.9	
03/12/09	17.10.26	Dione	Tr.	E.	-43.1	-16.2	17/12/09	14.50.10	Tethys	Sh.	E.	-32.2	7.1	
04/12/09	6.46.17	Tethys	Sh.	I.	48.6	3.0	17/12/09	15.21.23	Tethys	Tr.	E.	-36.7	2.6	
04/12/09	7.31.49	Tethys	Tr.	I.	46.7	9.5	18/12/09	6.41.00	Rhea	Sh.	I.	46.4	0.6	
04/12/09	9.40.11	Tethys	Sh.	E.	31.3	23.0	18/12/09	8.55.55	Rhea	Tr.	I.	29.9	17.8	
04/12/09	10.09.50	Tethys	Tr.	E.	26.5	24.6	18/12/09	10.24.56	Rhea	Sh.	E.	14.5	23.9	
04/12/09	17.18.25	Rhea	Sh.	I.	-44.1	-17.6	18/12/09	10.36.12	Tethys	Ec.	D.	12.5	24.2	
04/12/09	19.21.46	Rhea	Tr.	I.	-45.9	-40.3	18/12/09	11.19.21	Rhea	Tr.	E.	4.6	24.6	
04/12/09	21.05.06	Rhea	Sh.	E.	-35.2	-58.6	18/12/09	14.00.48	Tethys	Occ.	R.	-24.9	13.5	
04/12/09	21.59.59	Rhea	Tr.	E.	-26.7	-66.4	18/12/09	14.37.30	Dione	Ec.	D.	-30.8	8.9	
04/12/09	22.08.26	Dione	Ec.	D.	-25.3	-67.3	18/12/09	18.36.05	Dione	Occ.	R.	-45.8	-31.3	
05/12/09	2.06.42	Dione	Occ.	R.	18.0	-47.0	19/12/09	9.15.32	Tethys	Sh.	I.	26.0	19.6	
05/12/09	5.25.36	Tethys	Ec.	D.	46.2	-10.8	19/12/09	10.04.32	Tethys	Tr.	I.	17.5	22.9	
05/12/09	8.49.21	Tethys	Occ.	R.	38.2	18.7	19/12/09	12.08.44	Tethys	Sh.	E.	-5.5	23.2	
06/12/09	4.04.56	Tethys	Sh.	I.	37.7	-25.4	19/12/09	12.40.04	Tethys	Tr.	E.	-11.3	21.3	
06/12/09	4.51.05	Tethys	Tr.	I.	43.4	-17.0	19/12/09	23.23.49	Dione	Sh.	I.	-1.2	-71.2	
06/12/09	6.54.44	Dione	Sh.	I.	48.2	3.9	20/12/09	0.36.26	Dione	Tr.	I.	11.6	-64.1	
06/12/09	6.58.46	Tethys	Sh.	E.	48.1	4.5	20/12/09	2.39.17	Dione	Sh.	E.	32.7	-43.0	
06/12/09	7.28.42	Tethys	Tr.	E.	46.4	8.8	20/12/09	3.21.43	Dione	Tr.	E.	38.7	-35.1	
06/12/09	8.02.32	Dione	Tr.	I.	43.4	13.3	20/12/09	7.54.51	Tethys	Ec.	D.	37.8	10.7	
06/12/09	10.11.22	Dione	Sh.	E.	24.9	24.4	20/12/09	11.19.28	Tethys	Occ.	R.	3.2	24.6	
06/12/09	10.52.31	Dione	Tr.	E.	17.7	25.5	20/12/09	12.55.00	Rhea	Ec.	D.	-14.7	20.2	
06/12/09	23.32.22	Rhea	Ec.	D.	-9.3	-69.7	20/12/09	17.33.12	Rhea	Occ.	R.	-47.6	-19.7	
07/12/09	2.44.16	Tethys	Ec.	D.	25.8	-40.5	21/12/09	6.34.11	Tethys	Sh.	I.	46.0	-0.5	
07/12/09	4.14.14	Rhea	Occ.	R.	39.5	-23.8	21/12/09	7.23.23	Tethys	Tr.	I.	41.3	6.4	
07/12/09	6.08.13	Tethys	Occ.	R.	48.5	-3.6	21/12/09	8.19.19	Dione	Ec.	D.	33.8	13.7	
07/12/09	15.50.15	Dione	Ec.	D.	-35.4	-1.7	21/12/09	9.27.18	Tethys	Sh.	E.	22.7	20.4	
07/12/09	19.48.45	Dione	Occ.	R.	-43.0	-45.3	21/12/09	9.58.43	Tethys	Tr.	E.	17.2	22.5	
08/12/09	1.23.36	Tethys	Sh.	I.	12.2	-55.1	21/12/09	12.17.43	Dione	Occ.	R.	-8.6	22.8	
08/12/09	2.10.17	Tethys	Tr.	I.	20.6	-46.8	22/12/09	5.13.30	Tethys	Ec.	D.	48.3	-15.0	
08/12/09	4.17.20	Tethys	Sh.	E.	40.3	-23.4	22/12/09	8.38.06	Tethys	Occ.	R.	30.3	15.7	
08/12/09	4.47.34	Tethys	Tr.	E.	43.7	-17.9	22/12/09	17.05.38	Dione	Sh.	I.	-47.4	-14.6	
08/12/09	19.24.30	Titan	Sh.	I.	-44.8	-40.8	22/12/09	18.18.44	Dione	Tr.	I.	-46.0	-27.8	
08/12/09	23.35.10	Titan	Sh.	E.	-7.4	-69.8	22/12/09	19.08.33	Rhea	Sh.	I.	-41.7	-37.0	
09/12/09	0.02.55	Tethys	Ec.	D.	-1.5	-67.2	22/12/09	20.20.51	Dione	Sh.	E.	-32.1	-50.3	
09/12/09	0.36.33	Dione	Sh.	I.	4.3	-62.8	22/12/09	21.03.19	Dione	Tr.	E.	-25.2	-57.7	
09/12/09	1.45.37	Dione	Tr.	I.	16.8	-51.4	22/12/09	21.25.39	Rhea	Tr.	I.	-21.4	-61.3	
09/12/09	3.27.03	Tethys	Occ.	R.	33.8	-32.8	22/12/09	22.51.29	Rhea	Sh.	E.	-5.9	-71.0	
09/12/09	3.52.58	Dione	Sh.	E.	37.6	-28.0	22/12/09	23.45.19	Rhea	Tr.	E.	4.3	-70.1	
09/12/09	4.34.31	Dione	Tr.	E.	42.7	-20.4	23/12/09	3.52.50	Tethys	Sh.	I.	43.6	-29.6	
09/12/09	5.45.56	Rhea	Sh.	I.	48.1	-7.9	23/12/09	4.42.11	Tethys	Tr.	I.	47.4	-20.6	
09/12/09	7.53.54	Rhea	Tr.	I.	43.1	11.7	23/12/09	6.45.51	Tethys	Sh.	E.	44.4	0.9	
09/12/09	9.31.45	Rhea	Sh.	E.	29.6	21.7	23/12/09	7.17.20	Tethys	Tr.	E.	41.1	5.4	
09/12/09	10.26.44	Rhea	Tr.	E.	20.3	24.6	24/12/09	2.01.08	Dione	Ec.	D.	29.0	-50.3	
09/12/09	22.42.16	Tethys	Sh.	I.	-16.4	-70.3	24/12/09	2.32.09	Tethys	Ec.	D.	33.8	-44.7	
09/12/09	23.29.27	Tethys	Tr.	I.	-7.8	-70.2	24/12/09	5.56.42	Tethys	Occ.	R.	47.6	-7.7	
10/12/09	1.35.54	Tethys	Sh.	E.	15.7	-53.3	24/12/09	5.59.17	Dione	Occ.	R.	47.4	-7.3	
10/12/09	2.06.23	Tethys	Tr.	E.	21.1	-47.8	24/12/09	18.51.25	Titan	Sh.	I.	-42.7	-33.6	
10/12/09	9.32.04	Dione	Ec.	D.	28.9	21.7	24/12/09	22.25.15	Titan	Sh.	E.	-9.4	-69.0	
</														

Date	Times	Moon	Phenomen	Phase	h Sat	h Sun								
25/12/09	1.22.34	Rhea	Ec.	D.	23.1	-57.1	28/12/09	7.43.58	Dione	Sh.	E.	35.0	8.9	
25/12/09	2.00.56	Tethys	Tr.	I.	29.6	-50.4	28/12/09	8.26.18	Dione	Tr.	E.	28.4	14.2	
25/12/09	4.04.25	Tethys	Sh.	E.	45.3	-27.7	28/12/09	19.48.47	Tethys	Sh.	I.	-33.5	-43.8	
25/12/09	4.35.55	Tethys	Tr.	E.	47.4	-21.9	28/12/09	20.38.16	Tethys	Tr.	I.	-25.7	-52.7	
25/12/09	5.59.05	Rhea	Occ.	R.	47.2	-7.4	28/12/09	22.41.32	Tethys	Sh.	E.	-3.2	-70.1	
25/12/09	10.47.27	Dione	Sh.	I.	5.5	24.4	28/12/09	23.13.01	Tethys	Tr.	E.	2.6	-71.2	
25/12/09	12.00.51	Dione	Tr.	I.	-8.4	23.7	29/12/09	13.24.45	Dione	Ec.	D.	-25.9	18.2	
25/12/09	14.02.24	Dione	Sh.	E.	-29.5	13.8	29/12/09	13.50.09	Rhea	Ec.	D.	-30.0	15.6	
25/12/09	14.44.51	Dione	Tr.	E.	-35.9	8.4	29/12/09	17.22.10	Dione	Occ.	R.	-47.4	-16.7	
25/12/09	23.50.48	Tethys	Ec.	D.	7.4	-69.7	29/12/09	18.24.48	Rhea	Occ.	R.	-43.4	-28.1	
26/12/09	3.15.17	Tethys	Occ.	R.	40.7	-36.8	29/12/09	18.28.06	Tethys	Ec.	D.	-43.1	-28.7	
26/12/09	19.42.56	Dione	Ec.	D.	-35.4	-42.9	29/12/09	21.52.21	Tethys	Occ.	R.	-12.0	-64.6	
26/12/09	22.30.08	Tethys	Sh.	I.	-7.1	-69.3	30/12/09	17.07.26	Tethys	Sh.	I.	-47.6	-14.0	
26/12/09	23.19.38	Tethys	Tr.	I.	2.4	-71.3	30/12/09	17.56.51	Tethys	Tr.	I.	-45.4	-22.8	
26/12/09	23.40.45	Dione	Occ.	R.	6.2	-70.5	30/12/09	20.00.05	Tethys	Sh.	E.	-30.6	-45.6	
27/12/09	1.22.58	Tethys	Sh.	E.	24.5	-57.2	30/12/09	20.31.31	Tethys	Tr.	E.	-25.5	-51.3	
27/12/09	1.54.29	Tethys	Tr.	E.	29.7	-51.7	30/12/09	22.11.06	Dione	Sh.	I.	-7.8	-66.9	
27/12/09	7.36.07	Rhea	Sh.	I.	36.7	7.8	30/12/09	23.24.34	Dione	Tr.	I.	6.0	-71.0	
27/12/09	9.54.25	Rhea	Tr.	I.	13.8	22.2	31/12/09	1.25.31	Dione	Sh.	E.	27.5	-56.9	
27/12/09	11.18.01	Rhea	Sh.	E.	-1.0	24.7	31/12/09	2.07.40	Dione	Tr.	E.	34.1	-49.6	
27/12/09	12.11.07	Rhea	Tr.	E.	-11.6	23.4	31/12/09	15.46.46	Tethys	Ec.	D.	-45.3	0.3	
27/12/09	21.09.27	Tethys	Ec.	D.	-21.0	-58.2	31/12/09	19.10.50	Tethys	Occ.	R.	-37.3	-36.3	
28/12/09	0.33.50	Tethys	Occ.	R.	16.6	-64.9	31/12/09	20.03.42	Rhea	Sh.	I.	-29.4	-46.1	
28/12/09	4.29.17	Dione	Sh.	I.	47.6	-23.3	31/12/09	22.22.11	Rhea	Tr.	I.	-5.0	-68.0	
28/12/09	5.42.48	Dione	Tr.	I.	47.5	-10.3	31/12/09	23.44.32	Rhea	Sh.	E.	10.4	-70.1	

CONJUNCT. BETWEEN THE SATELLITES OF SATURN

Date	Times	Moons	Dist. ''	h Sat	h Sun								
01/01/09	3.29.41	Tethys/Dione	-1''	52.5	-34.5	16/02/09	11.17.32	Tethys/Rhea	3''	-37.4	35.8		
01/01/09	14.24.03	Dione/Rhea	1''	-38.1	11.9	16/02/09	12.36.58	Dione/Titan	8''	-41.9	33.4		
03/01/09	10.31.39	Tethys/Dione	-0''	-3.6	24.4	17/02/09	17.45.18	Rhea/Titan	7''	-7.3	-11.5		
04/01/09	15.39.38	Tethys/Dione	0''	-42.8	1.8	18/02/09	3.29.58	Tethys/Dione	2''	38.8	-29.2		
04/01/09	18.10.53	Dione/Rhea	-2''	-32.6	-24.7	18/02/09	4.23.21	Dione/Rhea	-4''	30.0	-19.4		
04/01/09	19.08.52	Tethys/Rhea	-1''	-24.3	-35.4	19/02/09	0.00.40	Tethys/Rhea	-3''	53.0	-58.4		
06/01/09	8.20.56	Tethys/Rhea	1''	18.3	13.7	19/02/09	7.15.00	Tethys/Dione	-3''	-1.6	11.9		
06/01/09	12.54.58	Dione/Rhea	2''	-29.8	21.8	20/02/09	10.43.53	Tethys/Dione	3''	-35.6	36.4		
06/01/09	17.03.39	Tethys/Dione	-1''	-39.1	-12.3	20/02/09	13.40.05	Tethys/Rhea	3''	-39.6	28.9		
07/01/09	3.48.35	Rhea/Titan	-4''	53.1	-31.1	21/02/09	9.02.58	Dione/Rhea	3''	-22.4	28.2		
07/01/09	7.16.15	Tethys/Titan	-2''	29.2	5.0	21/02/09	14.26.11	Tethys/Dione	-2''	-35.1	23.3		
07/01/09	20.48.31	Tethys/Dione	1''	-5.0	-53.1	23/02/09	4.50.29	Dione/Rhea	-5''	21.5	-13.1		
08/01/09	2.19.15	Tethys/Titan	-3''	49.6	-47.6	23/02/09	16.16.41	Tethys/Dione	2''	-18.2	6.1		
08/01/09	9.20.16	Dione/Rhea	-1''	5.9	20.2	23/02/09	19.54.12	Dione/Titan	-7''	21.4	-33.7		
08/01/09	9.48.36	Tethys/Titan	-3''	0.9	22.5	24/02/09	18.51.28	Dione/Titan	-5''	10.7	-22.2		
09/01/09	0.12.55	Tethys/Dione	-1''	32.9	-67.1	24/02/09	20.54.35	Tethys/Dione	-3''	32.9	-43.5		
10/01/09	4.09.13	Tethys/Dione	0''	52.0	-27.3	24/02/09	21.23.35	Tethys/Titan	-8''	37.7	-47.7		
11/01/09	11.49.18	Tethys/Rhea	1''	-22.8	25.9	24/02/09	23.37.15	Dione/Rhea	4''	53.3	-57.0		
11/01/09	13.32.57	Dione/Rhea	2''	-36.9	19.3	25/02/09	0.39.47	Rhea/Titan	-10''	53.9	-53.2		
12/01/09	6.10.34	Tethys/Dione	-1''	36.8	-5.6	25/02/09	7.57.18	Dione/Titan	-7''	-14.3	20.4		
13/01/09	1.22.07	Tethys/Rhea	-1''	45.7	-57.3	25/02/09	17.03.16	Tethys/Rhea	3''	-8.6	-1.2		
13/01/09	8.25.00	Dione/Rhea	-2''	12.5	14.8	27/02/09	3.55.22	Tethys/Dione	-3''	28.4	-22.1		
13/01/09	10.31.53	Tethys/Dione	1''	-11.0	25.6	27/02/09	6.13.43	Tethys/Rhea	-3''	3.2	3.6		
14/01/09	16.41.33	Rhea/Titan	3''	-38.1	-7.1	28/02/09	4.04.06	Dione/Rhea	-3''	26.2	-20.3		
15/01/09	2.35.09	Dione/Titan	4''	52.7	-44.5	28/02/09	8.52.31	Tethys/Dione	1''	-25.2	29.3		
15/01/09	4.16.17	Dione/Rhea	1''	50.1	-25.8	02/03/09	0.10.10	Dione/Rhea	6''	54.3	-53.8		
15/01/09	11.59.51	Rhea/Titan	2''	-26.9	26.4	02/03/09	10.24.47	Tethys/Dione	-3''	-37.5	39.1		
15/01/09	14.15.11	Tethys/Rhea	1''	-41.5	15.4	03/03/09	14.10.37	Tethys/Dione	4''	-31.7	28.3		
15/01/09	14.39.07	Tethys/Titan	3''	-42.4	12.3	03/03/09	18.59.40	Dione/Rhea	-5''	17.8	-22.1		
15/01/09	17.34.09	Tethys/Dione	1''	-31.6	-16.2	04/03/09	0.05.15	Tethys/Titan	9''	54.3	-53.3		
16/01/09	3.53.48	Dione/Titan	2''	51.5	-30.0	04/03/09	7.10.03	Rhea/Titan	12''	-11.0	14.9		
16/01/09	15.58.41	Dione/Titan	3''	-40.8	0.9	04/03/09	9.35.48	Tethys/Rhea	-4''	-33.2	35.8		
16/01/09	23.22.34	Tethys/Dione	-0''	29.9	-68.8	04/03/09	17.34.29	Tethys/Dione	-4''	2.9	-6.2		
16/01/09	23.45.28	Rhea/Titan	3''	33.8	-68.2	04/03/09	18.09.14	Dione/Titan	11''	9.3	-12.7		
18/01/09	4.14.21	Tethys/Rhea	-1''	49.1	-26.0	05/03/09	4.13.46	Tethys/Titan	9''	20.7	-17.0		
18/01/09	8.56.58	Dione/Rhea	-2''	3.0	19.1	05/03/09	21.27.51	Tethys/Dione	2''	44.3	-45.6		
19/01/09	0.08.10	Tethys/Dione	1''	38.7	-66.3	05/03/09	23.13.22	Tethys/Rhea	3''	54.2	-53.7		
19/01/09	20.06.39	Tethys/Rhea	1''	-3.5	-43.5	06/03/09	22.51.24	Dione/Rhea	3''	53.4	-52.7		
20/01/09	16.00.07	Tethys/Rhea	1''	-39.5	1.4	07/03/09	23.25.19	Tethys/Dione	-2''	54.7	-52.9		
21/01/09	7.12.45	Tethys/Dione	1''	19.9	5.5	08/03/09	11.59.09	Tethys/Rhea	-5''	-40.8	42.6		
21/01/09	23.27.42	Dione/Rhea	-2''	34.2	-67.7	08/03/09	19.34.36	Dione/Rhea	-6''	28.1	-27.2		
22/01/09	6.35.48	Tethys/Rhea	-1''	25.8	0.1	09/03/09	3.51.29	Tethys/Dione	4''	21.8	-19.9		
22/01/09	11.11.54	Tethys/Dione	-1''	-23.8	28.4	10/03/09	14.15.34	Dione/Rhea	6''	-26.8	29.6		
23/01/09	21.40.57	Tethys/Titan	-4''	16.8	-58.5	11/03/09	1.57.29	Tethys/Rhea	5''	40.0	-38.4		
24/01/09	0.38.59	Dione/Titan	-5''	46.0	-62.2	11/03/09	10.52.26	Tethys/Dione	3''	-41.0	44.0		
24/01/09	7.59.24	Rhea/Titan	-5''	9.1	12.8	11/03/09	13.51.34	Rhea/Titan	-11''	-29.5	33.3		
24/01/09	13.24.58	Tethys/Dione	1''	-40.5	22.9	11/03/09	23.44.32	Dione/Titan	-11''	54.1	-51.0		
24/01/09	20.33.07	Tethys/Rhea	2''	5.1	-47.2	12/03/09	6.22.42	Tethys/Titan	-11''	-8.5	9.1		
25/01/09	4.14.56	Dione/Rhea	2''	46.0	-25.3	12/03/09	16.20.46	Tethys/Dione	-2''	-4.4	9.2		
25/01/09	17.26.08	Tethys/Dione	-1''	-26.8	-12.8	12/03/09	18.36.37	Tethys/Rhea	-3''	20.7	-16.0		
27/01/09	9.43.39	Tethys/Rhea	-2''	-12.4	25.3	12/03/09	23.16.11	Tethys/Rhea	-3''	54.8	-51.0		
28/01/09	0.30.18	Tethys/Dione	-1''	47.0	-62.4	13/03/09	13.53.58	Tethys/Rhea	-4''	-28.0	33.5		
28/01/09	18.34.13	Dione/Rhea	2''	-13.7	-24.7	13/03/09	17.25.56	Dione/Rhea	-3''	8.5	-2.0		
28/01/09	23.02.47	Tethys/Rhea	2''	35.0	-65.5	14/03/09	17.25.11	Tethys/Dione	3''	9.1	-1.6		
29/01/09	9.39.42	Tethys/Dione	1''	-13.1	25.4	15/03/09	4.16.49	Tethys/Rhea	5''	12.6	-13.3		
29/01/09	11.28.01	Tethys/Dione	1''	-30.3	30.2	15/03/09	14.53.57	Dione/Rhea	7''	-17.4	25.0		
30/01/09	0.56.13	Tethys/Dione	1''	50.5	-58.9	15/03/09	21.00.52	Tethys/Dione	-5''	46.6	-39.1		
31/01/09	4.02.13	Tethys/Titan	4''	44.6	-26.9	17/03/09	0.30.07	Tethys/Dione	4''	48.7	-46.5		
31/01/09	6.07.37	Tethys/Titan	4''	24.4	-3.8	17/03/09	9.39.40	Dione/Rhea	-7''	-38.5	41.2		
31/01/09	7.03.29	Tethys/Dione	-1''	14.2	5.6	17/03/09	18.13.03	Tethys/Rhea	-6''	20.4	-10.6		
31/01/09	7.11.33	Dione/Titan	6''	12.7	6.9	18/03/09	4.25.59	Tethys/Dione	-3''	8.6	-10.7		
31/01/09	14.54.31	Rhea/Titan	7''	-40.7	13.7	19/03/09	10.00.41	Dione/Rhea	2''	-40.1	44.0		
31/01/09	23.33.57	Dione/Rhea	-2''	41.8	-65.1	19/03/09	19.45.36	Dione/Rhea	1''	38.1	-26.5		
01/02/09	5.34.49	Tethys/Titan	5''	29.5	-9.7	20/03/09	6.37.51	Tethys/Dione	3''	-16.7	14.4		
02/02/09	14.06.10	Tethys/Dione	-1''	-42.2	20.7	20/03/09	7.27.43	Tethys/Rhea	5''	-24.6	23.2		
03/02/09	2.31.22	Tethys/Rhea	2''	52.4	-43.0	20/03/09	11.12.38	Dione/Rhea	2''	-40.3	48.0		
03/02/09	18.22.43	Tethys/Dione	1''	-11.3	-21.3	20/03/09	14.16.31	Tethys/Titan	13''	-20.0	32.2		
04/02/09	13.51.39	Dione/Rhea	-2''	-42.3	23.0	20/03/09	23.22.53	Dione/Titan	13''	53.5	-47.8		
04/02/09	15.47.24	Tethys/Rhea	-2''	-34.4	6.6	21/03/09	10.41.02	Rhea/Titan	13''	-40.9	47.5		
05/02/09	20.25.28	Tethys/Dione	-1''	13.0	-43.3	21/03/09	10.42.39	Tethys/Dione	-5''	-40.9	47.6		
07/02/09	0.24.00	Tethys/Dione	2''	50.8	-60.6	21/03/09	20.44.01	Tethys/Rhea	-5''	47.8	-35.0		
07/02/09	18.46.30	Dione/Rhea	3''	-3.7	-24.9	22/03/09	10.17.44	Dione/Rhea	-7''	-40.9	46.5		
07/02/09	21.03.05	Rhea/Titan	-6''	21.4	-49.1	23/03/09	17.45.47	Tethys/Dione	-4''	20.1	-4.1		
08/02/09	3.48.05	Tethys/Dione	-2''	42.2	-28.1	24/03/09	4.57.31	Dione/Rhea	8''	-1.1	-2.3		
08/02/09	6.51.29	Tethys/Titan	-5''	10.5	5.3	25/03/09	0.55.18	Tethys/Dione	2''	40.8	-41.0		
09/02/09	5.39.30	Dione/Titan	-6''	22.9	-7.4	25/03/09	17.32.33	Tethys/Dione	2''	19.3	-0.6		
09/02/09	7.30.54	Tethys/Dione	1''	2.5	11.8	26/03/09	3.11.27	Dione/Rhea	-3''	16.3	-21.3		
09/02/09	18.58.29	Tethys/Rhea	-3''	0.4	-26.7	27/03/09	0.10.37	Tethys/Rhea	-6''	46.1	-43.9		
11/02/09	8.43.24	Tethys/Dione	-1''	-12.4	22.7	27/03/09	0.18.41	Tethys/Dione	-4''	45.0	-43.3		
11/02/09	9.02.54	Dione/Rhea	3''	-15.8	25.1	27/03/09	18.16.14	Tethys/Titan	-11''	28.8	-9.0		
11/02/09	9.17.42	Tethys/Rhea	2''	-18.3	26.8	28/03/09	0.51.56	Tethys/Titan	-9''	39.4	-40.2		
12/02/09	0.22.37	Tethys/Rhea	2''	52.4	-59.2	28/03/09	4.54.09	Dione/Titan	-15''	-4.1	-1.5		
12/02/09	4.28.47	Tethys/Rhea	2''	33.2	-19.7	28/03/09	13.28.05	Tethys/Rhea	5''	-22.1	41.4		
12/02/09	14.02.48	Tethys/Dione	2''	-40.5	23.9	28/03/09	17.01.39	Rhea/Titan	-16''	16.0	5.2		
13/02/09	21.19.03	Tethys/Rhea	-3''	28.9	-50.1	28/03/09	20.32.25	Tethys/Titan	-12''	50.1	-31.4		
14/02/09	13.58.46	Dione/Rhea	-3''	-40.2	24.9	29/03/09	5.37.03	Dione/Rhea	8''	-12.7	6.2		
14/02/09	21.03.24	Tethys/Dione	2''	26.9	-47.4	29/03/09	7.22.05	Tethys/Dione	-5''	-29.0	25.3		
16/02/09	1.29.39	Tethys/Dione	-1''	53.2	-50.0	30/03/09	11.33.41	Tethys/Dione	3''	-35.8	51.7		

Date	Times	Moons	Dist. ' h	Sat	Sun							
31/03/09	0.23.19	Dione/Rhea	-8''	42.0	-41.4	23/05/09	1.01.04	Tethys/Dione	-6''	-2.2	-22.3	
31/03/09	2.41.03	Tethys/Rhea	-7''	18.1	-24.6	23/05/09	4.25.49	Dione/Titan	18''	-34.1	6.2	
01/04/09	13.38.20	Tethys/Dione	-3''	-17.7	41.1	23/05/09	14.17.49	Tethys/Titan	15''	28.0	45.1	
01/04/09	21.21.50	Dione/Rhea	4''	55.0	-36.5	23/05/09	21.20.57	Rhea/Titan	17''	36.6	-22.5	
02/04/09	16.37.48	Tethys/Rhea	7''	15.5	10.5	24/05/09	5.10.14	Tethys/Dione	4''	-38.1	14.1	
02/04/09	17.40.06	Tethys/Dione	5''	26.9	-0.4	24/05/09	11.58.51	Dione/Rhea	-10''	3.3	66.4	
04/04/09	7.08.11	Tethys/Rhea	-4''	-30.3	24.7	24/05/09	14.46.34	Tethys/Rhea	-7''	33.7	40.0	
04/04/09	13.17.28	Dione/Titan	13''	-19.0	44.8	26/05/09	5.44.52	Tethys/Rhea	4''	-39.9	20.5	
04/04/09	20.45.22	Tethys/Rhea	-3''	54.0	-31.2	26/05/09	6.48.42	Dione/Rhea	8''	-39.1	32.3	
04/04/09	23.04.46	Tethys/Titan	14''	49.8	-41.9	26/05/09	7.17.20	Tethys/Dione	-3''	-37.4	37.6	
04/04/09	23.21.40	Rhea/Titan	17''	47.8	-42.0	27/05/09	1.54.10	Tethys/Rhea	4''	-14.9	-16.2	
05/04/09	0.45.47	Tethys/Dione	4''	35.1	-37.7	27/05/09	11.22.20	Tethys/Dione	6''	-0.8	69.2	
05/04/09	1.00.25	Dione/Rhea	-8''	32.6	-36.3	28/05/09	17.10.58	Tethys/Rhea	-7''	54.5	14.0	
05/04/09	2.46.02	Tethys/Rhea	-4''	13.4	-22.1	29/05/09	11.24.21	Dione/Rhea	-5''	0.7	69.4	
06/04/09	3.18.50	Dione/Titan	13''	6.6	-16.4	29/05/09	18.28.56	Tethys/Dione	5''	54.8	1.1	
06/04/09	18.57.50	Tethys/Rhea	7''	42.8	-14.2	30/05/09	11.02.55	Dione/Titan	-14''	-2.5	69.8	
06/04/09	19.43.16	Dione/Rhea	9''	49.0	-21.6	30/05/09	16.04.22	Tethys/Titan	-14''	49.0	26.3	
07/04/09	1.41.34	Tethys/Dione	-2''	23.8	-30.8	31/05/09	19.12.46	Tethys/Dione	-2''	50.5	-5.9	
08/04/09	7.18.59	Tethys/Dione	5''	-33.5	27.9	02/06/09	1.05.05	Tethys/Dione	5''	-10.6	-20.6	
08/04/09	16.11.33	Dione/Rhea	-4''	15.4	16.6	02/06/09	2.20.33	Dione/Rhea	-8''	-22.9	-12.2	
09/04/09	8.56.53	Tethys/Rhea	-7''	-40.3	44.3	02/06/09	20.14.54	Tethys/Rhea	-5''	40.9	-14.1	
10/04/09	14.20.15	Tethys/Dione	5''	-3.4	36.8	04/06/09	8.08.21	Tethys/Dione	5''	-28.4	47.5	
11/04/09	18.40.31	Tethys/Dione	-3''	43.4	-10.1	04/06/09	9.42.19	Tethys/Rhea	7''	-13.9	63.2	
11/04/09	20.19.46	Dione/Rhea	8''	54.3	-25.8	05/06/09	6.25.49	Dione/Rhea	4''	-38.4	28.6	
11/04/09	21.47.07	Tethys/Rhea	5''	54.3	-35.7	05/06/09	12.26.18	Tethys/Dione	-3''	16.7	65.0	
12/04/09	6.59.55	Rhea/Titan	-14''	-33.2	25.7	07/06/09	3.02.23	Dione/Rhea	-9''	-31.4	-6.1	
13/04/09	10.24.53	Dione/Titan	-16''	-36.4	55.6	07/06/09	10.03.54	Rhea/Titan	16''	-8.3	66.2	
13/04/09	11.22.09	Tethys/Rhea	-7''	-30.2	57.1	07/06/09	14.35.10	Tethys/Dione	4''	40.6	43.6	
13/04/09	15.10.56	Dione/Rhea	-9''	8.1	28.6	07/06/09	23.50.40	Tethys/Titan	15''	-0.6	-24.6	
13/04/09	20.45.44	Tethys/Dione	4''	55.6	-28.7	08/06/09	18.25.09	Tethys/Dione	-5''	52.1	2.7	
15/04/09	0.33.23	Tethys/Dione	-6''	30.2	-35.0	08/06/09	21.46.46	Dione/Rhea	8''	20.9	-22.3	
15/04/09	11.03.54	Dione/Rhea	5''	-31.4	57.9	09/06/09	13.16.11	Tethys/Rhea	6''	28.5	57.8	
16/04/09	4.02.35	Tethys/Dione	6''	-9.0	-5.8	09/06/09	21.55.13	Tethys/Dione	6''	18.7	-22.7	
17/04/09	7.43.37	Tethys/Dione	-4''	-38.6	34.9	11/06/09	1.36.23	Tethys/Dione	-4''	-21.5	-16.9	
18/04/09	14.47.17	Tethys/Rhea	-6''	7.6	33.9	11/06/09	2.31.16	Tethys/Rhea	-5''	-29.4	-10.3	
18/04/09	15.42.34	Dione/Rhea	-8''	17.8	23.8	12/06/09	1.19.11	Dione/Rhea	-4''	-19.4	-18.6	
19/04/09	9.26.34	Tethys/Dione	3''	-38.7	51.7	13/06/09	3.16.00	Tethys/Dione	2''	-35.4	-3.6	
20/04/09	3.58.23	Tethys/Rhea	6''	-11.1	-5.3	13/06/09	15.56.01	Tethys/Rhea	7''	53.3	29.2	
20/04/09	10.33.09	Dione/Rhea	10''	-32.6	58.6	13/06/09	22.33.02	Dione/Rhea	8''	8.8	-24.2	
20/04/09	14.14.19	Tethys/Dione	-5''	3.1	40.0	14/06/09	8.10.10	Tethys/Dione	-5''	-22.8	48.0	
20/04/09	16.52.11	Dione/Titan	16''	31.9	11.3	14/06/09	22.46.03	Rhea/Titan	-10''	5.7	-24.4	
21/04/09	14.04.23	Tethys/Titan	16''	2.1	41.9	15/06/09	16.36.05	Dione/Titan	-14''	55.5	22.0	
22/04/09	3.40.32	Rhea/Titan	17''	-9.3	-7.9	15/06/09	17.22.00	Dione/Rhea	8''	54.7	13.8	
22/04/09	6.14.44	Dione/Rhea	-6''	-32.6	20.1	15/06/09	21.47.28	Rhea/Titan	-6''	15.8	-21.8	
22/04/09	21.16.06	Tethys/Dione	-5''	53.5	-29.5	16/06/09	5.54.26	Tethys/Rhea	-6''	-37.9	22.9	
24/04/09	2.03.29	Tethys/Dione	3''	7.0	-22.3	16/06/09	7.18.02	Tethys/Titan	-13''	-29.2	38.3	
25/04/09	7.22.57	Tethys/Rhea	7''	-39.1	33.4	16/06/09	15.13.49	Tethys/Dione	-5''	50.4	37.2	
25/04/09	11.01.34	Dione/Rhea	8''	-26.2	61.3	17/06/09	3.30.22	Rhea/Titan	-10''	-37.9	-1.0	
26/04/09	3.45.35	Tethys/Dione	-4''	-13.0	-6.0	17/06/09	19.57.55	Tethys/Dione	2''	34.2	-10.7	
26/04/09	21.08.20	Tethys/Rhea	-5''	52.8	-27.6	17/06/09	20.00.48	Tethys/Rhea	4''	33.7	-11.0	
27/04/09	7.33.43	Tethys/Dione	6''	-39.8	35.8	17/06/09	20.38.43	Dione/Rhea	2''	27.0	-15.6	
28/04/09	10.58.10	Tethys/Dione	-6''	-24.9	62.2	17/06/09	22.35.46	Dione/Rhea	2''	5.5	-24.1	
28/04/09	16.01.01	Tethys/Titan	-14''	28.7	22.2	18/06/09	19.40.41	Dione/Rhea	3''	36.5	-8.3	
29/04/09	1.22.21	Dione/Rhea	6''	10.9	-25.8	19/06/09	21.45.10	Tethys/Dione	-3''	13.4	-21.5	
29/04/09	9.46.36	Rhea/Titan	-19''	-33.6	57.3	20/06/09	8.21.35	Tethys/Rhea	-6''	-17.6	49.9	
29/04/09	9.47.05	Tethys/Rhea	8''	-33.5	57.3	20/06/09	18.08.34	Dione/Rhea	-8''	48.8	6.1	
29/04/09	9.48.28	Tethys/Titan	-11''	-33.4	57.5	22/06/09	5.00.20	Tethys/Dione	-5''	-39.8	13.1	
29/04/09	14.49.40	Tethys/Dione	4''	16.4	35.5	22/06/09	12.51.33	Dione/Rhea	7''	32.6	62.5	
29/04/09	15.49.06	Dione/Titan	-16''	27.3	24.6	22/06/09	22.24.08	Tethys/Rhea	6''	4.2	-23.6	
29/04/09	18.52.27	Tethys/Titan	-13''	53.7	-8.3	23/06/09	8.51.45	Tethys/Dione	3''	-10.6	55.1	
01/05/09	16.44.12	Tethys/Dione	-3''	38.2	14.8	23/06/09	10.57.03	Tethys/Titan	11''	12.4	71.1	
01/05/09	23.47.23	Tethys/Rhea	-8''	26.2	-32.0	23/06/09	21.55.06	Tethys/Titan	9''	8.8	-22.1	
02/05/09	6.23.10	Dione/Rhea	-7''	-37.2	24.0	24/06/09	11.50.25	Dione/Rhea	-2''	22.9	70.0	
02/05/09	21.17.06	Tethys/Dione	6''	49.4	-26.9	24/06/09	15.03.39	Tethys/Titan	11''	52.2	39.4	
04/05/09	12.00.18	Tethys/Rhea	5''	-11.0	61.8	24/06/09	15.49.00	Rhea/Titan	14''	55.0	31.0	
05/05/09	4.18.56	Tethys/Dione	5''	-24.1	2.2	24/06/09	16.38.49	Dione/Titan	13''	54.9	21.9	
05/05/09	20.43.20	Dione/Rhea	6''	51.8	-22.6	25/06/09	4.29.09	Dione/Rhea	-1''	-40.5	7.6	
06/05/09	2.10.51	Tethys/Rhea	-8''	-2.9	-18.0	25/06/09	10.46.05	Tethys/Dione	-2''	11.7	70.5	
06/05/09	9.33.07	Tethys/Dione	-2''	-31.9	57.4	25/06/09	11.03.59	Tethys/Rhea	-4''	15.1	71.3	
06/05/09	16.11.21	Rhea/Titan	19''	36.1	21.7	25/06/09	12.47.13	Dione/Rhea	-2''	33.7	63.2	
06/05/09	22.21.06	Dione/Titan	18''	37.7	-30.2	26/06/09	15.22.24	Tethys/Dione	4''	54.0	36.0	
06/05/09	23.02.31	Tethys/Titan	16''	30.6	-31.2	27/06/09	0.52.29	Tethys/Rhea	6''	-24.2	-20.9	
08/05/09	10.53.12	Tethys/Dione	5''	-19.5	65.0	27/06/09	13.40.26	Dione/Rhea	7''	43.3	54.6	
09/05/09	1.40.36	Dione/Rhea	7''	0.5	-21.1	28/06/09	22.25.49	Tethys/Dione	4''	0.1	-23.8	
09/05/09	14.30.51	Tethys/Dione	-6''	20.4	40.6	29/06/09	8.29.21	Dione/Rhea	-7''	-10.8	50.8	
10/05/09	18.00.34	Tethys/Dione	6''	53.1	2.8	30/06/09	3.36.35	Tethys/Dione	-2''	-40.7	-0.6	
11/05/09	5.28.36	Tethys/Rhea	-6''	-35.6	15.6	01/07/09	5.56.37	Dione/Rhea	3''	-32.8	22.6	
11/05/09	21.54.47	Tethys/Dione	-4''	38.8	-27.6	01/07/09	17.07.21	Tethys/Titan	-11''	50.8	16.8	
12/05/09	15.59.28	Dione/Rhea	7''	38.1	24.8	02/07/09	4.23.32	Tethys/Rhea	4''	-40.1	6.2	
12/05/09	18.43.33	Tethys/Rhea	7''	55.8	-4.1	02/07/09	5.02.17	Tethys/Dione	3''	-37.8	12.8	
14/05/09	0.06.43	Tethys/Dione	3''	13.8	-27.9	03/07/09	8.41.13	Tethys/Dione	-4''	-6.1	52.6	
14/05/09	1.25.56	Rhea/Titan	-13''	-0.3	-21.6	03/07/09	17.37.06	Tethys/Rhea	-5''	46.4	11.5	
14/05/09	8.30.34	Dione/Titan	-12''	-35.1	49.3	04/07/09	9.16.22	Dione/Rhea	-6''	1.3	58.5	
14/05/09	19.37.18	Dione/Titan	-9''	54.3	-12.2	04/07/09	12.11.39	Tethys/Dione	4''	33.1	67.7	
15/05/09	4.16.00	Tethys/Dione	-6''	-29.2	3.5	05/07/09	16.06.05	Tethys/Dione	-3''	54.2	27.8	
15/05/09	6.25.05	Tethys/Titan	-15''	-39.8	26.6	06/07/09	4.01.32	Dione/Rhea	6''	-40.5	2.4	
15/05/09	20.16.56	Dione/Titan	-14''	50.4	-17.3	07/07/09	18.19.01	Tethys/Dione	2''	38.0	4.4	
15/05/09	20.59.22	Dione/Rhea	-6''	44.9	-22.1	08/07/09	0.51.58	Dione/Rhea	-3''	-30.1	-21.9	
17/05/09	11.20.13	Tethys/Dione	-5''	-9.0	67.3	08/07/09	21.09.36	Tethys/Rhea	-4''	6.7	-19.2	
17/05/09	22.15.35	Tethys/Rhea	7''	31.2	-27.3	08/07/09	22.30.09	Tethys/Dione	-4''	-8.2	-24.7	
18/05/09	17.52.06	Tethys/Dione	2''	54.7	5.5	09/07/09	5.06.27	Rhea/Titan	11''	-35.3	12.9	
19/05/09	10.16.25	Tethys/Dione	2''	-18.4	65.3	09/07/09	7.05.27	Dione/Titan	9''	-19.0	34.6	
19/05/09	11.26.48	Dione/Rhea	-8''	-6.4	67.5	10/07/09	1.19.47	Tethys/Titan	10''	-34.4	-19.9	
19/05/09	11.39.44	Tethys/Rhea	-6''	-3.8	66.9	10/07/09	10.49.36	Tethys/Rhea	4''	22.2	69.4	
20/05/09	17.55.17	Tethys/Dione	-5''	55.3	5.3	10/07/09	21.14.09	Dione/Titan	9''	4.5	-19.9	
22/05/09	0.46.30	Tethys/Rhea	8''	1.0	-23.7	11/07/09	4.48.46	Dione/Rhea	5''	-36.4	9.6	
22/05/09	16.12.25	Dione/Rhea	6''	46.1	23.8	11/07						

Date	Times	Moons	Dist. ' ' h	Sat	h Sun								
12/07/09	23.31.42	Tethys/Dione	1''	-21.2	-26.1	03/09/09	9.00.56	Dione/Titan	-0''	35.4	45.0		
12/07/09	23.40.44	Tethys/Rhea	-5''	-22.6	-26.0	03/09/09	12.27.54	Rhea/Titan	-0''	52.0	51.5		
12/07/09	23.41.15	Dione/Rhea	-6''	-22.7	-26.0	03/09/09	16.43.26	Dione/Rhea	0''	17.0	10.1		
13/07/09	4.17.15	Tethys/Dione	1''	-38.5	4.1	03/09/09	20.45.01	Tethys/Titan	0''	-26.2	-30.5		
14/07/09	12.13.01	Tethys/Dione	-3''	39.0	66.6	04/09/09	0.16.50	Tethys/Dione	0''	-43.3	-38.6		
14/07/09	19.52.18	Dione/Rhea	3''	16.9	-10.7	05/09/09	6.54.39	Tethys/Dione	1''	14.4	23.7		
15/07/09	13.43.59	Tethys/Rhea	4''	51.3	53.2	05/09/09	12.52.27	Dione/Rhea	0''	50.1	48.1		
16/07/09	19.20.23	Tethys/Dione	-3''	21.3	-6.4	05/09/09	13.09.02	Tethys/Rhea	1''	48.7	46.0		
17/07/09	6.52.39	Tethys/Rhea	-3''	-16.5	31.3	05/09/09	23.25.59	Tethys/Dione	-0''	-43.3	-41.4		
17/07/09	10.21.18	Tethys/Rhea	-2''	21.5	66.0	07/09/09	6.54.48	Tethys/Dione	1''	15.7	23.4		
17/07/09	23.29.49	Tethys/Dione	2''	-23.9	-26.9	07/09/09	7.41.23	Dione/Rhea	-0''	24.1	31.6		
18/07/09	0.24.22	Dione/Rhea	-5''	-31.5	-25.2	08/09/09	2.00.34	Tethys/Rhea	-1''	-34.2	-28.5		
18/07/09	1.50.37	Tethys/Rhea	-2''	-39.7	-17.9	09/09/09	14.02.23	Tethys/Dione	1''	40.4	36.8		
18/07/09	5.25.39	Dione/Titan	-9''	-29.4	15.3	09/09/09	15.41.33	Tethys/Rhea	1''	24.2	19.7		
18/07/09	8.42.50	Tethys/Titan	-8''	4.0	51.3	10/09/09	11.57.34	Dione/Rhea	0''	51.8	51.2		
19/07/09	1.06.19	Rhea/Titan	-8''	-36.6	-22.4	10/09/09	18.13.20	Tethys/Dione	-0''	-4.4	-8.8		
19/07/09	16.11.27	Tethys/Rhea	4''	49.3	25.9	10/09/09	23.36.26	Rhea/Titan	-1''	-43.9	-43.0		
19/07/09	19.15.28	Dione/Rhea	5''	20.2	-6.0	12/09/09	8.29.53	Dione/Rhea	-1''	35.1	38.2		
20/07/09	1.38.22	Tethys/Dione	-2''	-39.5	-19.5	12/09/09	8.54.23	Dione/Titan	-2''	38.9	41.8		
21/07/09	5.44.20	Tethys/Dione	3''	-25.3	18.2	12/09/09	20.22.01	Tethys/Dione	1''	-27.8	-30.7		
21/07/09	15.12.13	Dione/Rhea	-3''	53.5	36.7	13/09/09	7.39.11	Rhea/Titan	-1''	27.2	29.9		
22/07/09	6.12.14	Tethys/Rhea	-4''	-20.4	23.2	14/09/09	0.27.04	Tethys/Dione	-2''	-41.8	-41.1		
23/07/09	12.52.14	Tethys/Dione	2''	48.6	60.4	14/09/09	3.21.57	Dione/Rhea	1''	-19.0	-16.9		
24/07/09	19.35.25	Tethys/Rhea	3''	13.1	-9.7	14/09/09	19.16.17	Tethys/Rhea	2''	-18.4	-21.1		
24/07/09	19.56.25	Dione/Rhea	4''	9.2	-12.7	16/09/09	7.35.42	Tethys/Dione	-1''	28.3	28.6		
25/07/09	11.59.33	Tethys/Titan	7''	42.7	65.9	16/09/09	8.30.43	Tethys/Rhea	-1''	37.3	37.3		
25/07/09	12.26.26	Dione/Titan	8''	46.3	63.4	17/09/09	6.56.23	Dione/Rhea	-1''	22.0	21.6		
25/07/09	13.36.36	Tethys/Dione	-1''	53.0	53.2	18/09/09	8.27.50	Tethys/Dione	1''	37.8	36.4		
26/07/09	8.53.01	Tethys/Rhea	-3''	10.9	51.9	19/09/09	4.11.14	Dione/Rhea	2''	-7.4	-9.2		
26/07/09	10.54.29	Rhea/Titan	9''	32.9	66.8	19/09/09	14.13.58	Tethys/Dione	-2''	32.9	31.4		
26/07/09	16.19.14	Tethys/Titan	6''	45.1	23.7	19/09/09	14.52.33	Dione/Titan	3''	26.3	25.0		
26/07/09	19.30.17	Tethys/Dione	2''	12.7	-9.3	20/09/09	12.25.45	Tethys/Titan	4''	47.2	45.1		
28/07/09	10.29.15	Dione/Rhea	3''	29.7	64.6	20/09/09	18.02.55	Rhea/Titan	3''	-9.4	-10.2		
29/07/09	2.34.49	Tethys/Dione	2''	-41.4	-14.3	20/09/09	22.56.20	Dione/Rhea	-2''	-44.4	-47.2		
30/07/09	6.53.32	Tethys/Dione	-2''	-8.7	29.8	21/09/09	12.04.06	Tethys/Rhea	-2''	48.8	46.5		
31/07/09	12.29.56	Tethys/Rhea	-2''	49.0	61.7	21/09/09	21.18.36	Tethys/Dione	-2''	-39.4	-41.3		
31/07/09	15.30.41	Dione/Rhea	-3''	48.6	31.9	23/09/09	1.39.25	Tethys/Dione	0''	-30.6	-35.5		
01/08/09	9.03.27	Tethys/Dione	1''	16.6	52.6	23/09/09	1.55.17	Tethys/Rhea	1''	-28.3	-33.2		
02/08/09	1.55.13	Tethys/Rhea	2''	-42.0	-20.2	24/09/09	1.37.08	Dione/Rhea	1''	-30.5	-36.1		
02/08/09	12.53.57	Tethys/Dione	-2''	51.8	58.2	25/09/09	3.48.14	Tethys/Dione	-2''	-8.0	-14.6		
02/08/09	16.50.19	Rhea/Titan	-7''	36.4	16.8	25/09/09	14.34.31	Tethys/Rhea	-3''	25.6	26.0		
02/08/09	18.46.27	Tethys/Titan	-6''	16.0	-3.4	25/09/09	23.48.15	Dione/Rhea	-2''	-42.1	-48.0		
03/08/09	11.50.15	Dione/Titan	-6''	45.5	64.5	26/09/09	7.37.55	Tethys/Dione	3''	34.1	26.7		
03/08/09	16.24.34	Tethys/Dione	2''	39.9	21.4	27/09/09	11.08.35	Tethys/Dione	-2''	50.6	46.2		
04/08/09	5.59.24	Dione/Rhea	-2''	-15.2	19.0	27/09/09	15.51.22	Tethys/Titan	-4''	10.4	12.0		
04/08/09	15.06.03	Tethys/Rhea	-3''	49.6	35.7	27/09/09	18.37.48	Dione/Rhea	3''	-20.0	-18.8		
04/08/09	20.06.25	Tethys/Dione	-2''	0.2	-16.3	28/09/09	4.38.34	Tethys/Rhea	3''	3.4	-5.9		
06/08/09	21.47.52	Tethys/Dione	1''	-19.6	-28.0	28/09/09	11.08.39	Tethys/Titan	-3''	50.4	45.8		
07/08/09	5.08.48	Tethys/Rhea	2''	-21.9	9.3	28/09/09	14.51.05	Tethys/Dione	1''	20.7	22.2		
07/08/09	11.01.05	Dione/Rhea	2''	40.4	64.1	28/09/09	15.42.30	Dione/Titan	-5''	11.4	13.2		
08/08/09	2.41.41	Tethys/Dione	-1''	-39.7	-15.3	28/09/09	19.32.50	Tethys/Titan	-5''	-29.4	-28.7		
08/08/09	20.15.16	Tethys/Rhea	-2''	-4.6	-18.5	29/09/09	17.45.17	Dione/Rhea	-1''	-12.1	-9.9		
08/08/09	6.35.07	Tethys/Rhea	-1''	-5.9	24.8	30/09/09	9.06.23	Dione/Rhea	-1''	47.4	38.0		
09/08/09	16.23.08	Tethys/Rhea	-1''	36.6	20.5	30/09/09	16.36.11	Tethys/Dione	-1''	0.4	3.0		
10/08/09	1.24.28	Rhea/Titan	5''	-42.4	-25.4	30/09/09	17.05.30	Tethys/Rhea	-2''	-5.5	-2.1		
10/08/09	9.46.21	Tethys/Dione	-2''	29.8	57.0	30/09/09	19.03.30	Dione/Rhea	-1''	-26.0	-29.3		
10/08/09	18.58.14	Dione/Titan	5''	8.3	-7.5	01/10/09	21.26.00	Tethys/Dione	3''	-43.3	-46.0		
11/08/09	1.24.33	Dione/Rhea	2''	-42.4	-25.7	02/10/09	7.08.32	Tethys/Rhea	3''	32.5	20.4		
11/08/09	7.36.28	Tethys/Rhea	2''	6.8	35.8	02/10/09	19.28.22	Dione/Rhea	3''	-31.0	-29.3		
11/08/09	14.32.03	Tethys/Dione	1''	50.2	40.4	04/10/09	4.30.39	Tethys/Dione	2''	5.6	-8.6		
13/08/09	16.19.18	Tethys/Dione	-1''	34.8	20.3	04/10/09	14.13.05	Dione/Rhea	-3''	23.6	26.2		
13/08/09	21.39.29	Tethys/Rhea	-2''	-22.5	-29.3	05/10/09	8.26.52	Rhea/Titan	6''	44.9	31.6		
14/08/09	6.32.30	Dione/Rhea	-2''	-2.9	23.6	05/10/09	9.19.56	Tethys/Dione	1''	49.5	37.9		
14/08/09	20.09.17	Tethys/Dione	1''	-7.7	-19.3	05/10/09	21.27.15	Dione/Titan	6''	-44.2	-47.7		
15/08/09	23.35.08	Tethys/Dione	-1''	-38.5	-34.1	05/10/09	22.48.44	Tethys/Titan	7''	-44.1	-53.0		
16/08/09	10.48.56	Tethys/Rhea	1''	42.9	61.0	06/10/09	12.02.59	Dione/Rhea	1''	42.7	40.6		
17/08/09	3.27.23	Tethys/Dione	1''	-32.0	-10.2	07/10/09	10.37.00	Tethys/Rhea	3''	50.0	42.1		
17/08/09	21.00.09	Dione/Rhea	-2''	-18.5	-26.6	07/10/09	11.04.04	Tethys/Dione	3''	48.4	42.4		
18/08/09	0.15.29	Tethys/Rhea	-1''	-41.8	-33.2	08/10/09	14.53.17	Tethys/Dione	-4''	13.7	18.5		
18/08/09	7.31.00	Dione/Titan	-2''	10.1	33.6	08/10/09	23.52.33	Tethys/Rhea	-3''	-38.0	-52.3		
18/08/09	12.17.22	Dione/Titan	-2''	52.3	58.0	09/10/09	15.04.20	Dione/Rhea	-4''	11.0	16.3		
19/08/09	5.23.28	Tethys/Dione	-0''	-12.8	10.0	09/10/09	18.19.04	Tethys/Dione	3''	-24.3	-19.2		
19/08/09	10.29.35	Tethys/Titan	-2''	41.5	59.0	10/10/09	22.12.11	Tethys/Dione	-2''	-45.0	-53.5		
19/08/09	17.32.43	Dione/Titan	-3''	18.0	5.4	11/10/09	9.54.44	Dione/Rhea	4''	50.6	38.7		
19/08/09	21.47.43	Rhea/Titan	-3''	-27.2	-31.9	13/10/09	0.10.01	Tethys/Dione	2''	-34.2	-52.3		
20/08/09	9.58.55	Tethys/Dione	0''	37.4	56.0	13/10/09	6.45.47	Dione/Rhea	-2''	34.6	14.0		
21/08/09	1.59.05	Dione/Rhea	1''	-40.0	-24.1	13/10/09	9.22.40	Dione/Titan	-6''	50.4	35.6		
22/08/09	17.03.12	Tethys/Dione	1''	21.4	9.9	13/10/09	17.18.09	Dione/Titan	-5''	-16.4	-9.1		
23/08/09	3.53.00	Tethys/Rhea	-0''	-25.6	-7.1	14/10/09	3.29.48	Tethys/Rhea	-4''	0.7	-21.8		
23/08/09	22.17.31	Tethys/Dione	-1''	-33.4	-35.3	14/10/09	4.42.41	Tethys/Dione	-4''	13.9	-8.4		
24/08/09	16.29.58	Dione/Rhea	1''	26.0	15.5	14/10/09	7.41.55	Tethys/Titan	-9''	42.9	22.8		
24/08/09	17.10.27	Tethys/Rhea	1''	18.7	8.1	14/10/09	21.49.20	Dione/Titan	-7''	-45.4	-53.2		
25/08/09	23.40.54	Tethys/Dione	-0''	-41.9	-37.2	15/10/09	6.36.02	Rhea/Titan	-7''	34.1	11.9		
26/08/09	13.47.44	Tethys/Titan	2''	48.8	43.8	15/10/09	17.02.41	Tethys/Rhea	3''	-15.0	-6.8		
27/08/09	3.19.51	Tethys/Dione	0''	-28.6	-13.5	16/10/09	10.42.34	Dione/Rhea	4''	47.2	38.9		
27/08/09	17.55.02	Tethys/Titan	1''	8.5	-0.4	16/10/09	11.46.54	Tethys/Dione	-3''	39.9	37.7		
27/08/09	21.24.56	Dione/Rhea	-1''	-28.3	-32.6	17/10/09	17.07.10	Tethys/Dione	1''	-17.1	-8.2		
28/08/09	6.50.40	Tethys/Dione	0''	8.8	24.5	18/10/09	5.30.18	Dione/Rhea	-5''	24.8	0.1		
29/08/09	10.46.08	Tethys/Dione	-0''	47.6	56.7	18/10/09	6.02.46	Tethys/Rhea	-5''	30.3	5.6		
29/08/09	20.36.18	Tethys/Rhea	-0''	-21.9	-27.7	19/10/09	18.24.25	Tethys/Dione	-4''	-30.9	-23.1		
31/08/09	10.55.27	Tethys/Rhea	-1''	49.1	56.3	20/10/09	1.55.52	Dione/Rhea	3''	-13.3	-39.8		
31/08/09	12.08.43	Dione/Rhea	-0''	52.7	54.3	20/10/09	20.05.47	Tethys/Rhea	5''	-43.2	-41.3		
31/08/09	13.00.10	Tethys/Dione	-0''	51.0	48.9	21/10/09	12.22.14	Tethys/Titan	6''	31.8	33.6		
01/09/09	2.52.03	Tethys/Rhea	-0''	-30.3	-19.1	21/10/09	17.18.57	Tethys/Titan					

Date	Times	Moons	Dist. ' h	Sat	h	Sun								
23/10/09	5.29.48	Tethys/Dione	2''	27.6	-0.8		24/11/09	11.12.26	Tethys/Dione	-3''	22.2	27.3		
23/10/09	6.16.44	Dione/Rhea	-5''	35.2	6.9		25/11/09	15.58.49	Tethys/Dione	6''	-29.9	-2.9		
23/10/09	7.55.36	Tethys/Rhea	-3''	47.2	22.4		26/11/09	7.47.31	Dione/Rhea	6''	47.8	13.1		
24/10/09	22.33.57	Tethys/Rhea	5''	-41.0	-59.7		27/11/09	23.02.28	Tethys/Dione	6''	-20.4	-69.3		
25/10/09	1.11.33	Dione/Rhea	6''	-18.2	-48.1		28/11/09	10.04.12	Tethys/Rhea	-7''	31.1	25.4		
25/10/09	7.44.06	Tethys/Dione	-3''	46.8	20.2		29/11/09	3.53.48	Tethys/Dione	-2''	32.5	-26.3		
26/10/09	11.52.24	Tethys/Dione	5''	33.5	33.9		29/11/09	22.16.45	Dione/Rhea	7''	-26.9	-67.6		
26/10/09	21.05.59	Dione/Rhea	-3''	-45.9	-52.2		29/11/09	23.18.13	Tethys/Rhea	6''	-16.4	-69.3		
27/10/09	12.35.39	Tethys/Rhea	-6''	25.8	30.5		30/11/09	16.42.30	Rhea/Titan	-18''	-38.8	-11.2		
28/10/09	18.58.38	Tethys/Dione	4''	-39.9	-31.6		30/11/09	19.28.40	Tethys/Titan	-15''	-46.2	-41.5		
29/10/09	12.17.43	Dione/Titan	-10''	27.6	31.3		01/12/09	5.34.43	Tethys/Dione	5''	45.8	-8.6		
29/10/09	17.50.35	Tethys/Titan	-10''	-31.5	-19.3		02/12/09	9.22.56	Tethys/Dione	-8''	35.1	22.1		
29/10/09	21.31.32	Rhea/Titan	-13''	-44.7	-56.4		03/12/09	3.07.00	Dione/Rhea	-6''	27.2	-35.6		
30/10/09	1.51.56	Tethys/Rhea	5''	-8.0	-42.7		03/12/09	12.48.11	Tethys/Dione	7''	-0.8	21.3		
30/10/09	1.52.14	Dione/Rhea	5''	-7.9	-42.7		04/12/09	16.41.17	Tethys/Dione	-4''	-40.5	-11.1		
30/10/09	1.53.34	Tethys/Dione	-0''	-7.7	-42.4		05/12/09	2.43.34	Tethys/Rhea	9''	24.5	-40.3		
30/10/09	15.48.19	Tethys/Titan	-7''	-11.6	3.0		06/12/09	16.44.30	Tethys/Rhea	-5''	-41.7	-11.7		
30/10/09	16.58.37	Dione/Titan	-7''	-23.8	-9.9		06/12/09	17.42.47	Dione/Rhea	-8''	-46.3	-22.0		
30/10/09	18.33.12	Tethys/Dione	-1''	-37.8	-27.4		06/12/09	18.39.00	Tethys/Dione	4''	-47.3	-32.4		
30/10/09	20.27.42	Tethys/Titan	-9''	-46.1	-47.6		07/12/09	23.09.39	Tethys/Dione	-7''	-12.8	-70.7		
31/10/09	0.41.51	Dione/Titan	-8''	-19.9	-53.9		08/12/09	1.11.47	Rhea/Titan	14''	10.0	-57.1		
31/10/09	15.13.03	Tethys/Rhea	-5''	-5.7	8.5		08/12/09	8.27.05	Dione/Titan	14''	39.6	15.9		
01/11/09	1.35.56	Tethys/Dione	5''	-9.7	-45.9		09/12/09	3.55.33	Dione/Titan	9''	37.9	-27.5		
02/11/09	16.30.11	Dione/Rhea	4''	-20.9	-5.4		09/12/09	5.10.42	Tethys/Rhea	9''	46.1	-14.0		
03/11/09	8.42.38	Tethys/Dione	5''	49.5	25.2		09/12/09	21.06.23	Dione/Titan	13''	-32.4	-58.9		
04/11/09	12.54.54	Tethys/Dione	-2''	17.2	26.3		09/12/09	22.22.40	Dione/Rhea	5''	-19.8	-69.0		
05/11/09	18.50.47	Tethys/Rhea	-6''	-42.2	-31.9		10/12/09	6.12.44	Tethys/Dione	-6''	48.6	-3.1		
05/11/09	21.23.32	Dione/Rhea	-5''	-43.9	-57.3		11/12/09	11.35.25	Tethys/Dione	2''	6.5	24.6		
06/11/09	4.41.00	Rhea/Titan	11''	27.3	-13.4		11/12/09	18.22.32	Dione/Rhea	-10''	-47.3	-29.2		
06/11/09	15.02.35	Tethys/Dione	4''	-7.9	8.9		11/12/09	19.13.09	Tethys/Rhea	-10''	-44.9	-38.6		
07/11/09	8.11.39	Tethys/Rhea	4''	49.6	20.5		13/12/09	12.48.33	Tethys/Dione	-6''	-8.7	20.7		
07/11/09	10.48.56	Dione/Titan	12''	36.3	31.6		13/12/09	13.15.45	Dione/Rhea	9''	-13.7	18.3		
07/11/09	19.06.07	Tethys/Dione	-6''	-44.1	-35.0		14/12/09	7.46.20	Tethys/Rhea	6''	41.8	10.1		
08/11/09	22.32.00	Tethys/Dione	6''	-35.5	-64.3		15/12/09	19.56.02	Tethys/Dione	-7''	-39.1	-46.3		
09/11/09	11.50.09	Dione/Rhea	-5''	25.3	29.7		15/12/09	21.39.44	Tethys/Rhea	-8''	-23.5	-63.9		
10/11/09	2.14.31	Tethys/Dione	-4''	3.5	-41.1		16/12/09	17.28.09	Dione/Rhea	-5''	-47.3	-19.0		
12/11/09	3.12.49	Tethys/Dione	2''	15.4	-30.8		16/12/09	23.52.14	Tethys/Dione	4''	1.6	-69.2		
12/11/09	11.28.17	Tethys/Rhea	7''	27.2	29.8		17/12/09	7.14.43	Dione/Titan	-19''	43.9	5.5		
12/11/09	16.55.05	Dione/Rhea	6''	-31.0	-11.7		17/12/09	11.10.58	Tethys/Titan	-19''	6.8	24.7		
13/11/09	8.51.30	Tethys/Dione	-5''	47.1	23.4		17/12/09	22.28.14	Rhea/Titan	-19''	-13.6	-69.6		
14/11/09	2.09.29	Tethys/Rhea	-3''	5.1	-42.8		18/12/09	13.57.04	Dione/Rhea	10''	-24.3	14.0		
14/11/09	14.41.38	Tethys/Rhea	-2''	-9.5	10.5		19/12/09	2.05.22	Tethys/Dione	-5''	26.6	-49.1		
14/11/09	18.14.11	Dione/Titan	-14''	-42.1	-26.5		20/12/09	6.12.27	Tethys/Dione	8''	47.6	-4.6		
14/11/09	22.08.34	Tethys/Rhea	-4''	-35.9	-64.3		20/12/09	8.42.08	Dione/Rhea	-9''	30.8	16.3		
15/11/09	9.41.02	Tethys/Titan	-14''	41.4	27.0		21/12/09	1.06.55	Tethys/Rhea	-8''	17.8	-59.5		
15/11/09	15.55.15	Tethys/Dione	-5''	-23.2	-0.8		22/12/09	13.17.23	Tethys/Dione	6''	-20.1	18.4		
16/11/09	3.12.55	Rhea/Titan	-14''	17.9	-31.6		22/12/09	14.19.24	Tethys/Rhea	7''	-30.4	11.5		
16/11/09	7.20.07	Dione/Rhea	6''	49.0	11.4		23/12/09	12.23.08	Dione/Rhea	5''	-11.0	22.5		
16/11/09	13.55.26	Tethys/Rhea	7''	-1.6	16.6		23/12/09	20.15.27	Tethys/Dione	-1''	-32.3	-49.2		
16/11/09	20.17.35	Tethys/Dione	2''	-45.9	-49.2		24/12/09	12.51.31	Tethys/Titan	15''	-16.8	20.7		
18/11/09	22.24.20	Tethys/Dione	-5''	-31.7	-66.4		24/12/09	12.52.06	Dione/Titan	17''	-16.9	20.6		
19/11/09	3.58.04	Tethys/Rhea	-8''	27.5	-23.8		24/12/09	12.54.41	Tethys/Dione	-2''	-17.4	20.4		
19/11/09	12.21.56	Dione/Rhea	-6''	13.1	25.5		25/12/09	4.38.24	Tethys/Titan	11''	47.5	-21.5		
20/11/09	2.12.50	Tethys/Dione	7''	9.5	-43.4		25/12/09	9.26.37	Dione/Rhea	-11''	20.1	20.3		
21/11/09	16.57.01	Tethys/Rhea	6''	-36.2	-13.2		25/12/09	16.07.30	Tethys/Titan	16''	-45.1	-4.2		
22/11/09	9.25.37	Tethys/Dione	4''	40.0	24.3		25/12/09	19.52.34	Tethys/Dione	7''	-34.6	-44.8		
22/11/09	12.32.04	Tethys/Titan	11''	9.2	24.1		27/12/09	4.14.38	Dione/Rhea	10''	46.6	-25.9		
22/11/09	22.53.32	Tethys/Titan	8''	-24.9	-68.3		27/12/09	17.49.12	Tethys/Rhea	10''	-46.6	-21.8		
23/11/09	2.44.24	Dione/Rhea	-6''	17.1	-38.1		28/12/09	2.57.47	Tethys/Dione	7''	39.5	-40.2		
23/11/09	6.29.34	Tethys/Rhea	-7''	47.8	2.4		29/12/09	7.09.21	Tethys/Dione	-4''	39.2	4.0		
23/11/09	9.09.22	Rhea/Titan	17''	41.5	22.7		29/12/09	7.24.06	Tethys/Rhea	-6''	37.3	6.1		
23/11/09	15.41.55	Tethys/Titan	14''	-26.0	0.2		30/12/09	6.50.42	Dione/Rhea	-4''	41.1	1.3		
23/11/09	16.52.13	Dione/Titan	14''	-36.6	-12.5		31/12/09	9.15.33	Tethys/Dione	5''	18.0	19.4		
							31/12/09	20.17.51	Tethys/Rhea	10''	-27.2	-48.7		

Negative values of the distances show that the 2nd satellite transits to north of the other

TIMES IN U.T.

OCCULTAT. BETWEEN THE SATELLITES OF SATURN

MM	GG	HH	MM	Sec	Event Type	Ph	Durn	dMag	%Ill	Sep	PA	MinSep	T1	T2	T3	Tmax	T5	T6	T7
1	3	10	1	1	(II) occ (III)	P	7	0.0	100.0	26.9	85	0.119		10 0 57		10 1 1		10 1 5	
1	6	17	27	13	(II) occ (III)	P	106	0.0	99.6	36.1	265	0.115		17 26 20		17 27 13		17 28 6	
1	7	4	30	53	(I) occ (II)	P	268	0.1	88.5	25.0	86	0.045		4 28 39		4 30 53		4 33 7	
1	8	4	7	27	(III) occ (II)	P	66	0.1	94.9	31.4	265	0.093		4 6 54		4 7 27		4 8 0	
1	11	10	37	57	(III) occ (II)	P	51	0.0	99.6	36.6	85	0.116		10 37 31		10 37 57		10 38 22	
1	12	22	8	6	(II) occ (III)	A	127	0.2	81.9	34.9	85	0.036		22 7 2	22 7 52	22 8 6	22 8 19	22 9 9	
1	17	15	54	26	(III) occ (III)	P	177	0.2	82.3	37.3	265	0.048		15 52 57		15 54 26		15 55 54	
1	20	9	41	26	(I) occ (III)	P	136	0.0	98.8	27.5	85	0.104		9 40 18		9 41 26		9 42 34	
1	20	4	19	15	(I) occ (V)	P	112	0.0	99.6	7.2	256	0.145		4 18 19		4 19 15		4 20 11	
1	22	5	23	58	(I) occ (II)	P	745	0.1	92.1	21.2	87	0.052		5 17 46		5 23 58		5 30 11	
1	22	7	3	7	(I) occ (III)	A	294	0.1	87.7	27.9	85	0.009		7 0 40	7 2 1	7 3 7	7 4 13	7 5 34	
1	24	4	24	7	(I) occ (III)	P	186	0.1	94.5	28.3	85	0.085		4 22 34		4 24 7		4 25 40	
1	29	11	16	47	(I) occ (IV)	P	338	0.0	96.4	26.7	263	0.097		11 13 58		11 16 47		11 19 36	
1	29	11	16	47	(I) occ (IV)	P	337	0.0	96.4	26.7	263	0.097		11 13 59		11 16 47		11 19 36	
1	31	7	55	23	(I) ecl (III)	A	366	0.0	100.0	30.1	265	0.035	7 52 19	7 53 1	7 54 2	7 55 23	7 56 43	7 57 44	7 58 26
2	2	5	20	9	(I) ecl (III)	P	371	0.1	89.4	29.6	265	0.065	5 17 4	5 18 0		5 20 9		5 22 18	5 23 15
2	2	5	20	10	(I) ecl (III)	P	366	0.1	89.4	29.6	265	0.065	5 17 7	5 18 2		5 20 10		5 22 17	5 23 13
2	6	11	27	40	(III) occ (III)	A	292	0.2	81.9	38.0	85	0.028		11 25 14	11 26 57	11 27 40	11 28 22	11 30 6	
3	8	2	34	11	(I) ecl (II)	E	68	0.0	99.4	30.1	263	0.068	2 33 37			2 34 11			2 34 45
3	23	4	20	44	(I) ecl (II)	P	119	0.3	78.6	29.4	262	0.041	4 19 44	4 20 9		4 20 44		4 21 18	4 21 43
4	7	6	8	21	(I) ecl (II)	P	112	0.3	77.2	28.4	262	0.040	6 7 26	6 7 50		6 8 21		6 8 53	6 9 17
4	17	7	4	8	(II) ecl (III)	A	613	0.0	100.0	36.8	87	0.030	6 59 1	6 59 41	7 2 29	7 4 8	7 5 47	7 8 35	7 9 15
4	22	7	56	50	(I) ecl (II)	E	73	0.0	97.1	27.3	261	0.062	7 56 14			7 56 50			7 57 27
4	28	11	56	48	(II) ecl (I)	P	191	1.1	35.1	28.5	83	0.025	11 55 12	11 55 36		11 56 48		11 58 0	11 58 23
5	6	18	41	49	(III) ecl (I)	E	31	0.0	99.2	15.6	88	0.129	18 41 34			18 41 49			18 42 5
5	6	14	6	37	(III) ecl (II)	P	283	0.4	66.6	36.6	84	0.039	14 4 15	14 4 44		14 6 37		14 8 30	14 8 59
5	8	15	58	31	(III) ecl (I)	E	65	0.6	60.2	15.8	88	0.083	15 57 59			15 58 31			15 59 4
5	10	13	15	14	(III) ecl (I)	P	78	0.4	71.7	16.0	88	0.039	13 14 35	13 14 55		13 15 14		13 15 32	13 15 53
5	12	10	31	57	(III) ecl (I)	T	81	9.9	0.0	16.2	88	0.003	10 31 17	10 31 35	10 31 52	10 31 57	10 32 2	10 32 19	10 32 38
5	14	7	48	41	(III) ecl (I)	P	77	0.5	65.0	16.4	88	0.044	7 48 2	7 48 23		7 48 41		7 48 59	7 49 19
5	16	5	5	25	(III) ecl (I)	E	65	0.5	60.3	16.6	88	0.083	5 4 53			5 5 25			5 5 58
5	18	2	22	11	(III) ecl (I)	E	40	0.0	97.1	16.8	88	0.120	2 21 50			2 22 11			2 22 31
5	26	10	0	51	(II) ecl (III)	P	178	0.1	87.3	32.9	262	0.071	9 59 22	9 59 53		10 0 51		10 1 48	10 2 19
5	31	3	50	8	(III) ecl (II)	P	131	1.0	41.4	34.2	86	0.070	3 49 2	3 49 32		3 50 8		3 50 44	3 51 13
6	3	9	30	29	(I) ecl (III)	E	43	0.0	99.6	24.0	90	0.120	9 30 7			9 30 29			9 30 51
6	4	21	54	4	(II) ecl (III)	E	15	0.0	100.0	26.6	261	0.138	21 53 57			21 54 4			21 54 12
6	5	20	16	43	(III) occ (II)	P	1115	0.1	91.5	27.9	82	0.077		20 7 25		20 16 43		20 26 0	
6	5	6	47	19	(I) ecl (III)	A	80	0.1	89.0	23.7	90	0.068	6 46 39	6 47 6	6 47 7	6 47 19	6 47 31	6 47 32	6 47 59
6	6	8	26	36	(III) ecl (II)	P	277	0.3	78.5	34.5	265	0.093	8 24 18	8 25 13		8 26 36		8 28 0	8 28 55
6	7	4	4	9	(I) ecl (III)	A	92	0.0	100.0	23.4	90	0.017	4 3 23	4 3 43	4 3 43	4 4 9	4 4 34	4 4 35	4 4 54
6	9	1	20	57	(I) ecl (III)	A	89	0.1	89.7	23.2	90	0.033	1 20 13	1 20 34	1 20 34	1 20 57	1 21 21	1 21 21	1 21 42
6	10	22	37	46	(I) ecl (III)	E	72	0.1	93.4	22.9	90	0.083	22 37 10			22 37 46			22 38 22
6	12	19	54	33	(I) ecl (III)	E	20	0.0	100.0	22.6	90	0.132	19 54 23			19 54 33			19 54 43
6	20	11	19	0	(I) ecl (II)	E	27	0.0	98.6	6.4	104	0.081	11 18 46			11 19 0			11 19 13
6	20	0	7	52	(II) ecl (III)	E	61	0.0	99.6	27.4	262	0.122	0 7 22			0 7 52			0 8 22
6	22	16	13	19	(II) ecl (I)	E	42	0.0	96.9	22.4	264	0.068	16 12 58			16 13 19			16 13 40
6	23	6	11	31	(I) ecl (II)	E	51	0.4	68.3	12.9	93	0.013	6 11 6	6 11 22	6 11 22	6 11 31	6 11 41	6 11 41	6 11 57
6	23	19	51	38	(II) ecl (I)	E	18	0.0	99.7	10.5	89	0.088	19 51 29			19 51 38			19 51 47
6	24	18	14	28	(III) ecl (II)	E	84	0.3	79.1	28.3	87	0.096	18 13 46			18 14 28			18 15 10
6	24	14	3	53	(V) ecl (IV)	P	1098	0.3	75.4	47.9	83	0.019	13 54 44	13 56 20		14 3 53		14 11 27	14 13 3
6	25	11	38	51	(IV) ecl (III)	P	283	1.0	41.2	40.7	265	0.057	11 36 30	11 37 7		11 38 51		11 40 36	11 41 13
6	25	1	52	52	(V) ecl (IV)	P	1795	0.8	46.4	3.7	325	0.031	1 37 55	1 39 32		1 52 52		2 6 12	2 7 49
6	26	1	2	33	(I) ecl (II)	E	46	0.2	86.0	18.8	90	0.052	1 2 10			1 2 33			1 2 56
6	26	14	45	22	(II) ecl (I)	A	48	0.3	74.0	3.5	98	0.013	14 44 58	14 45 13	14 45 17	14 45 22	14 45 26	14 45 30	14 45 45
6	28	16	57	56	(III) ecl (II)	E	47	0.0	96.7	7.9	99	0.129	16 57 33			16 57 56			16 58 20
6	29	9	39	17	(II) ecl (I)	E	34	0.1	92.7	3.9	254	0.069	9 39 0			9 39 17			9 39 34
6	29	12	26	24	(II) ecl (III)	E	72	0.0	96.0	18.9	261	0.103	12 25 48			12 26 24			12 27 0
6	29	23	26	12	(I) ecl (II)	E	44	0.2	81.2	7.9	251	0.048	23 25 49			23 26 12			23 26 34
7	1	19	58	0	(I) ecl (V)	E	54	0.0	99.7	4.0	163	0.171	19 57 33			19 58 0			19 58 27
7	1	7	34	5	(IV) ecl (V)	P	600	0.7	54.0	48.3	262	0.055	7 29 5	7 30 15		7 34 5		7 37 55	7 39 5
7	2	18	18	33	(I) ecl (II)	E	42	0.2	82.2	2.0	199	0.050	18 18 12			18 18 33			18 18 54
7	2	5	49	19	(III) ecl (IV)	A	179	0.0	100.0	36.5	88	0.002	5 47 49	5 48 21	5 49 1	5 49 19	5 49 37	5 50 17	5 50 48
7	3	11	15	13	(II) ecl (III)	E	71	0.1	90.6	4.7	105	0.088	11 14 38			11 15 13			11 15 48
7	3	9	26	28	(IV) ecl (III)	E	39	0.0	99.9	6.1	251	0.198	9 26 8			9 26 28			9 26 47
7	4	3	33	41	(V) ecl (I)	E	95	0.4	70.3	2.0	106	0.106	3 32 54			3 33 41			3 34 28
7	4	6	38	27	(III) ecl (II)	E	56	0.1	94.7	19.7	89	0.121	6 37 59			6 38 27			6 38 55
7	4	15	39	23	(I) ecl (IV)	E	41	0.0	99.6	2.9	173	0.134	15 39 2			15 39 23			15 39 43
7	6	1	1	26	(IV) ecl (I)	E	67	0.4	67.7	3.5	97	0.091	1 0 53			1 1 26			1 2 0
7	6	2	53	19	(II) ecl (I)	E	27	0.0	98.6	15.9	87	0.079	2 53 5			2 53 19			2 53 32
7	6	8	13	11	(III) ecl (V)	E	77	0.0	99.5	3.7	180	0.222	8 12 32			8 13 11			8 13 49
7	6	11	19	14	(I) ecl (V)	E	118	0.0	100.0	13.4	101	0.018	11 18 15	11 18 47	11 18 33	11 19 14	11 19 55	11 19 41	11 20 13
7	7	10	37	13	(I) ecl (IV)	E	86	0.0	96.4	6.9	108	0.017	10 36 31	10 36 54	10 36 47	10 37 13	10 37 40	10 37 33	10 37 56
7	7	19	6	32	(III) ecl (IV)	P	174	0.1	92.0	42.3	87	0.134	19 5 5	19 6 19		19 6 32		19 6 45	19 7 59
7	8	2	15	41	(V) ecl (IV)	P	470	1.2	33.9	52.5	85	0.042	2 11 46	2 12 47		2 15 41		2 18 35	2 19 36
7	8	5	28	28	(III) ecl (II)	P	83												

MM	GG	HH	MM	Sec	Event	Type	Ph	Durn	dMag	%Ill	Sep	PA	MinSep	T1	T2	T3	Tmax	T5	T6	T7														
7	15	1	18	28	(I)	ecl (II)	E	45	0.2	79.8	7.6	254	0.047	1	18	5	1	18	28	1	18	50												
7	15	14	38	57	(III)	ecl (V)	P	154	0.2	82.5	22.2	93	0.127	14	37	40	14	38	57	14	39	11	14	40	14									
7	15	16	34	52	(III)	ecl (IV)	P	123	0.5	60.7	10.3	98	0.079	16	33	50	16	34	52	16	35	17	16	35	54									
7	15	16	55	45	(I)	ecl (V)	E	275	0.0	100.0	31.1	91	0.011	16	53	28	16	54	25	16	55	45	16	57	18	16	58	3						
7	16	22	18	45	(II)	ecl (III)	E	30	0.0	100.0	32.0	87	0.132	22	18	30	22	18	45	22	19	0	22	19	0	22	19	0						
7	16	20	0	48	(IV)	ecl (III)	E	69	0.0	99.0	22.6	88	0.179	20	0	14	20	0	48	20	0	48	20	1	22	20	1	22						
7	17	17	57	39	(III)	ecl (II)	P	94	0.2	86.2	14.2	260	0.017	17	56	52	17	57	39	17	58	4	17	58	26	17	58	26						
7	18	3	4	38	(V)	ecl (III)	P	367	0.2	85.3	39.9	265	0.007	3	1	35	3	4	38	3	6	46	3	7	42	3	7	42						
7	18	6	23	41	(VI)	ecl (I)	T	324	9.9	0.0	2.3	253	0.160	6	20	59	6	22	36	6	23	41	6	24	45	6	25	10	6	26	23			
7	18	7	38	48	(VII)	ecl (I)	E	112	0.2	82.8	6.7	90	0.086	7	37	52	7	38	10	7	38	48	7	39	26	7	39	44	7	39	44			
7	18	10	40	29	(VI)	ecl (III)	T	448	9.9	0.0	13.4	261	0.180	10	36	45	10	39	58	10	40	29	10	41	1	10	42	36	10	44	13			
7	18	12	30	14	(VII)	ecl (III)	E	142	0.1	95.5	3.5	247	0.165	12	29	2	12	29	31	12	30	14	12	30	56	12	31	25	12	31	25			
7	19	19	23	21	(I)	ecl (V)	E	131	0.0	100.0	10.8	250	0.031	19	22	16	19	22	50	19	23	21	19	24	6	19	23	52	19	24	27			
7	19	17	5	12	(III)	ecl (V)	A	195	0.3	73.5	20.0	257	0.071	17	3	34	17	4	17	17	5	12	17	5	46	17	6	6	17	6	49			
7	21	4	47	28	(II)	ecl (I)	P	49	0.7	53.9	14.8	87	0.032	4	47	4	4	47	22	4	47	28	4	47	34	4	47	53	4	47	53			
7	21	16	10	51	(III)	ecl (II)	E	114	0.1	90.4	31.4	264	0.104	16	9	54	16	10	51	16	10	51	16	11	48	16	11	48	16	11	48			
7	21	16	18	14	(V)	ecl (IV)	P	331	1.2	31.8	50.6	86	0.077	16	15	28	16	16	27	16	18	14	16	20	0	16	20	59	16	20	59			
7	22	2	55	37	(V)	ecl (I)	E	100	0.4	68.9	11.8	88	0.105	2	54	47	2	55	37	2	55	37	2	56	27	2	56	27	2	56	27			
7	22	9	48	9	(IV)	ecl (III)	P	122	0.5	62.7	11.3	90	0.088	9	47	8	9	48	9	9	48	9	9	48	31	9	49	9	9	49	9			
7	22	12	13	40	(II)	ecl (III)	A	100	0.2	82.4	23.4	87	0.030	12	12	50	12	13	13	12	13	40	12	14	3	12	14	7	12	14	30			
7	24	5	25	44	(II)	ecl (V)	E	156	0.1	88.1	20.7	258	0.071	5	24	26	5	25	13	5	25	44	5	26	27	5	26	16	5	27	2			
7	25	14	49	40	(IV)	ecl (VI)	E	627	0.0	98.8	29.9	254	0.210	14	44	26	14	46	49	14	46	16	14	49	40	14	53	4	14	52	31	14	54	53
7	25	15	8	15	(II)	ecl (VI)	E	574	0.0	99.7	29.1	253	0.482	15	3	28	15	8	15	15	8	15	15	8	15	15	13	2	15	13	2			
7	25	18	9	29	(II)	ecl (VI)	E	1478	0.0	100.0	21.4	249	0.101	17	57	10	18	9	29	18	9	29	18	19	56	18	17	15	18	21	48			
7	25	22	11	12	(II)	ecl (VI)	E	1656	0.0	100.0	11.6	234	0.065	21	57	24	22	1	51	21	59	30	22	11	12	22	22	55	22	20	34	22	25	0
7	26	7	2	55	(I)	ecl (VI)	E	332	0.0	100.0	14.8	109	0.189	7	0	8	7	2	55	7	2	55	7	5	19	7	4	17	7	5	41			
7	26	9	38	46	(II)	ecl (III)	A	304	0.2	81.0	33.8	86	0.048	9	36	14	9	36	44	9	38	46	9	39	11	9	40	48	9	41	18			
7	26	9	44	18	(V)	ecl (III)	P	222	0.8	48.0	34.1	86	0.045	9	42	27	9	43	13	9	44	18	9	45	23	9	45	23	9	46	9			
7	26	9	47	30	(V)	ecl (II)	P	234	0.6	56.1	32.6	85	0.104	9	45	33	9	46	56	9	47	30	9	48	4	9	48	4	9	49	27			
7	26	13	22	23	(V)	ecl (VI)	E	495	0.1	93.8	30.6	96	0.367	13	18	15	13	22	23	13	22	23	13	23	32	13	23	32	13	26	31			
7	26	14	41	15	(II)	ecl (VI)	E	32	0.0	100.0	34.0	95	0.514	14	40	59	14	41	15	14	41	15	14	41	15	14	41	15	14	41	15			
7	26	15	52	5	(V)	ecl (IV)	E	53	0.0	99.9	11.8	94	0.248	15	51	39	15	52	5	15	52	5	15	52	5	15	52	5	15	52	5			
7	26	18	45	5	(III)	ecl (VI)	E	594	0.0	100.0	44.3	93	0.192	18	40	8	18	42	16	18	41	44	18	45	5	18	48	25	18	47	53	18	50	2
7	26	20	2	16	(V)	ecl (II)	T	616	9.9	0.0	11.1	271	0.010	19	57	8	19	58	26	20	0	40	20	2	16	20	3	53	20	6	7	20	7	24
7	27	8	19	35	(I)	ecl (II)	E	33	0.0	98.0	13.6	260	0.074	8	19	18	8	19	35	8	19	35	8	19	35	8	19	35	8	19	35	8	19	35
7	27	6	21	52	(III)	ecl (II)	P	110	0.4	70.7	23.4	263	0.035	6	20	57	6	21	21	6	21	52	6	22	24	6	22	24	6	22	24			
7	28	11	27	51	(IV)	ecl (V)	E	205	0.0	96.0	44.3	263	0.177	11	26	9	11	27	51	11	27	51	11	27	51	11	27	51	11	27	51	11	27	51
7	29	3	9	40	(III)	ecl (IV)	A	148	0.7	53.7	19.4	260	0.027	3	8	27	3	8	58	3	9	40	3	9	40	3	9	40	3	9	40	3	9	40
7	29	5	10	15	(I)	ecl (IV)	E	85	0.2	87.0	10.1	255	0.064	5	9	32	5	10	4	5	9	54	5	10	15	5	10	35	5	10	26	5	10	57
7	29	11	39	12	(II)	ecl (VII)	E	116	0.1	92.3	17.4	105	0.080	11	38	14	11	38	49	11	39	12	11	39	34	11	39	34	11	40	9	11	40	9
7	30	12	56	15	(III)	occ (II)	P	223	0.2	85.8	32.4	85	0.054	12	54	24	12	56	15	12	56	15	12	56	15	12	56	15	12	56	15	12	56	15
7	30	14	33	2	(IV)	ecl (I)	P	88	0.1	95.2	11.5	88	0.018	14	32	19	14	32	42	14	33	2	14	33	23	14	33	46	14	33	46	14	33	46
7	31	10	35	31	(V)	ecl (II)	E	66	0.0	97.8	15.9	262	0.177	10	34	58	10	35	31	10	35	31	10	35	31	10	35	31	10	35	31	10	35	31
8	1	0	5	46	(I)	ecl (IV)	E	46	0.0	99.4	4.5	243	0.129	0	5	23	0	5	46	0	5	46	0	5	46	0	5	46	0	5	46	0	5	46
8	1	0	32	43	(II)	ecl (III)	A	131	0.0	100.0	30.0	86	0.018	0	31	38	0	32	0	0	32	13	0	32	43	0	33	13	0	33	26	0	33	49
8	2	2	47	9	(III)	ecl (V)	A	298	0.3	78.7	34.6	262	0.016	2	44	39	2	46	22	2	47	9	2	47	55	2	48	47	2	49	38	2	49	38
8	2	4	10	20	(IV)	ecl (II)	E	78	0.0	95.7	29.3	86	0.125	4	9	41	4	10	20	4	10	20	4	10	20	4	10	20	4	10	20	4	10	20
8	2	11	21	55	(IV)	ecl (V)	A	190	0.5	61.5	2.1	193	0.032	11	20	20	11	21	8	11	21	22	11	21	55	11	22	28	11	22	41	11	23	29
8	2	14	1	59	(II)	ecl (V)	E	127	0.2	86.7	10.5	96	0.056	14	0	56	14	1	35	14	1	21	14	1	59	14	2	38	14	2	24	14	3	3
8	2	18	55	52	(VI)	ecl (V)	T	599	9.9	0.0	29.7	89	0.123	18	50	53	18	52	58	18	55	14	18	55	52	18	56	31	18	58	47	19	0	52
8	2	20	20	42	(VI)	ecl (III)	E	319	0.3	75.6	23.7	87	0.429	20	18	3	20	20	42	20	20	42	20	20	42	20	20	42	20	20	42	20	20	42
8	3	6	22	35	(VI)	ecl (II)	T	389	9.9	0.0	4.4	252	0.014	6	19	21	6	20	38	6	21	6	6	22	35	6	24	5	6	24	32	6	25	50
8	3	13	38	8	(VI)	ecl (IV)	T	525	9.9	0.0	23.7																							

MM	GG	HH	MM	Sec	Event	Type	Ph	Durn	dMag	%Ill	Sep	PA	MinSep	T1	T2	T3	Tmax	T5	T6	T7
8	27	5	38	4	(III)	ecl (VI)	E	522	0.0	99.8	7.1	93	0.471	5 33 43			5 38 4			5 42 25
8	27	6	1	36	(II)	occ (III)	P	49	0.1	91.1	5.1	83	0.068		6 1 11		6 1 36		6 2 0	
8	27	7	10	18	(V)	ecl (I)	P	423	0.2	85.8	7.3	87	0.066	7 6 46	7 8 5		7 10 18		7 12 30	7 13 49
8	27	21	51	32	(V)	ecl (IV)	E	100	0.0	99.8	46.6	265	0.220	21 50 42			21 51 32			21 52 22
8	28	17	8	12	(II)	occ (I)	P	32	0.3	74.1	8.2	267	0.022		17 7 56		17 8 12		17 8 28	
8	28	10	28	4	(VII)	occ (VI)	A	384	0.0	99.7	77.9	86	0.277		10 24 51	10 25 45	10 28 4	10 30 22	10 31 16	
8	29	8	47	39	(VII)	occ (III)	P	89	0.1	93.7	30.2	86	0.055		8 46 54		8 47 39		8 48 23	
8	29	9	44	43	(I)	ecl (V)	E	83	0.0	99.7	20.5	265	0.161	9 44 2			9 44 43			9 45 25
8	29	11	1	21	(IV)	ecl (III)	P	219	1.6	24.0	36.3	86	0.033	10 59 32	11 0 5		11 1 21		11 2 38	11 3 11
8	29	20	49	0	(III)	occ (I)	T	83	0.1	87.7	21.7	87	0.038		20 48 18	20 48 50	20 49 0	20 49 10	20 49 41	
8	30	9	35	52	(VII)	occ (I)	A	196	0.4	66.3	24.7	267	0.004		9 34 14	9 35 39	9 35 52	9 36 6	9 37 30	
8	30	7	43	39	(III)	ecl (II)	P	379	2.1	15.1	30.6	265	0.050	7 40 30	7 41 4		7 43 39		7 46 14	7 46 49
8	31	4	46	41	(II)	occ (III)	P	48	0.0	97.6	25.0	85	0.089		4 46 17		4 46 41		4 47 5	
8	31	11	21	35	(V)	ecl (III)	E	39	0.0	100.0	39.0	86	0.219	11 21 16			11 21 35			11 21 55
8	31	12	8	23	(V)	occ (IV)	T	181	0.5	65.1	34.8	86	0.011		12 6 53	12 8 11	12 8 23	12 8 36	12 9 54	
8	31	18	7	10	(III)	occ (I)	T	89	0.1	87.7	21.8	87	0.023		18 6 25	18 6 52	18 7 10	18 7 28	18 7 55	
9	1	1	50	56	(V)	ecl (III)	T	1423	9.9	0.0	17.8	265	0.002	1 39 5	1 41 7	1 50 0	1 50 56	1 51 53	2 0 46	2 2 48
9	1	1	50	56	(V)	ecl (III)	T	1427	9.9	0.0	17.8	265	0.002	1 39 3	1 41 5	1 50 0	1 50 56	1 51 53	2 0 48	2 2 50
9	1	5	35	21	(V)	occ (III)	P	1882	0.4	69.0	32.7	266	0.040		5 19 40		5 35 21		5 51 2	
9	1	12	50	3	(IV)	occ (I)	P	25	0.0	98.9	0.1	296	0.092		12 49 50		12 50 3		12 50 16	
9	2	15	25	22	(III)	occ (I)	P	46	0.0	98.0	21.9	87	0.084		15 25 0		15 25 22		15 25 45	
9	2	22	16	58	(I)	occ (IV)	P	51	0.1	91.1	2.2	87	0.060		22 16 33		22 16 58		22 17 24	
9	3	0	28	42	(I)	occ (V)	P	46	0.0	98.4	12.0	266	0.111		0 28 19		0 28 42		0 29 5	
9	3	0	53	22	(II)	occ (IV)	P	28	0.0	99.2	14.4	86	0.100		0 53 9		0 53 22		0 53 36	
9	3	3	24	48	(II)	occ (V)	A	83	0.1	90.4	0.2	291	0.067		3 24 7	3 24 44	3 24 48	3 24 53	3 25 30	
9	3	12	28	52	(VI)	occ (V)	P	300	0.0	97.1	34.7	85	0.359		12 26 22		12 28 52		12 31 22	
9	3	16	42	54	(IV)	occ (V)	P	59	0.0	99.9	48.3	86	0.172		16 42 25		16 42 54		16 43 24	
9	3	21	31	32	(VI)	occ (II)	P	96	0.0	99.8	10.4	85	0.356		21 30 44		21 31 32		21 32 20	
9	4	0	16	27	(IV)	occ (III)	T	136	0.7	52.8	28.3	85	0.002		0 15 19	0 16 25	0 16 27	0 16 28	0 17 34	
9	4	0	50	58	(IV)	occ (II)	T	102	0.2	83.4	26.0	85	0.011		0 50 7	0 50 39	0 50 58	0 51 17	0 51 49	
9	4	10	28	41	(III)	ecl (I)	E	15	0.0	99.9	11.6	87	0.089	10 28 34			10 28 41			10 28 48
9	4	22	52	1	(III)	occ (II)	P	103	0.2	83.4	28.1	265	0.045		22 51 9		22 52 1		22 52 53	
9	4	16	58	9*	(VI)	occ (IV)	T	12104	0.1	95.5	41.8	265	0.180		15 17 17	16 5 6	16 58 9	17 51 12	18 39 1	
9	9	16	56	1	(II)	occ (III)	P	48	0.0	99.4	30.6	85	0.098		16 55 37		16 56 1		16 56 26	
9	10	13	52	58	(I)	ecl (II)	A	55	0.2	81.6	13.8	266	0.005	13 52 31	13 52 47	13 52 48	13 52 58	13 53 8	13 53 10	13 53 26
9	10	18	13	30	(III)	occ (IV)	P	211	0.5	63.5	37.2	266	0.030		18 11 45		18 13 30		18 15 15	
9	10	18	19	58	(III)	ecl (IV)	P	240	0.9	43.4	36.9	266	0.051	18 17 58	18 18 33		18 19 58		18 21 23	18 21 58
9	14	10	30	57	(III)	ecl (II)	P	183	0.2	81.7	31.2	265	0.095	10 29 26	10 30 16		10 30 57		10 31 39	10 32 29
9	15	2	11	41	(IV)	occ (I)	P	706	0.0	96.2	15.8	88	0.079		2 5 48		2 11 41		2 17 34	
9	16	17	29	56	(II)	occ (I)	P	36	0.2	81.4	16.4	87	0.030		17 29 38		17 29 56		17 30 14	
9	17	18	9	56	(IV)	occ (I)	T	123	0.1	88.8	23.4	87	0.003		18 8 54	18 9 27	18 9 56	18 10 26	18 10 58	
9	19	3	22	44	(I)	ecl (IV)	E	104	0.1	92.4	22.4	267	0.082	3 21 52		3 22 37	3 22 44	3 22 51		3 23 36
9	20	12	44	17	(IV)	ecl (I)	P	107	0.4	70.1	19.7	87	0.041	12 43 24	12 43 51		12 44 17		12 44 43	12 45 11
9	23	1	35	49	(IV)	ecl (III)	P	276	1.3	30.9	38.1	86	0.043		1 33 31	1 34 6	1 35 49		1 37 31	1 38 7
9	25	15	43	25	(I)	ecl (II)	E	29	0.0	98.9	14.0	268	0.078	15 43 11			15 43 25			15 43 40
10	1	19	22	53	(II)	ecl (I)	P	55	0.7	53.6	15.6	86	0.019	19 22 25	19 22 42		19 22 53		19 23 4	19 23 21
10	4	5	48	45	(II)	ecl (III)	P	370	0.1	94.7	29.1	84	0.091	5 45 40	5 46 40		5 48 45		5 50 50	5 51 50
10	5	9	6	25	(III)	ecl (IV)	A	343	1.5	24.5	39.7	267	0.020	9 3 33	9 4 10	9 6 14	9 6 25	9 6 37	9 8 41	9 9 17
10	7	22	44	48	(I)	ecl (II)	P	56	0.4	71.4	19.5	268	0.037	22 44 20	22 44 41		22 44 48		22 44 56	22 45 16
10	14	2	28	12	(II)	ecl (I)	E	56	0.3	77.6	20.1	86	0.049		2 27 44		2 28 12			2 28 39
10	17	16	40	46	(IV)	ecl (III)	P	342	0.2	79.6	39.3	87	0.111	16 37 55	16 38 49		16 40 46		16 42 42	16 43 36
10	20	5	51	26	(I)	ecl (II)	E	43	0.0	98.3	23.9	268	0.069		5 51 4		5 51 26			5 51 47
10	26	9	44	53	(II)	ecl (I)	P	94	0.8	47.0	23.6	86	0.011	9 44 6	9 44 23		9 44 53		9 45 23	9 45 40
10	30	11	40	9	(III)	ecl (IV)	A	1877	0.2	80.2	7.1	63	0.001	11 24 30	11 25 40	11 39 10	11 40 9	11 41 8	11 54 38	11 55 48
11	1	13	15	16	(I)	ecl (II)	P	118	0.8	49.7	26.6	268	0.019	13 14 17	13 14 35		13 15 16		13 15 56	13 16 14
12	23	18	53	25	(III)	ecl (IV)	P	671	0.7	52.1	44.2	270	0.063	18 47 49	18 48 43		18 53 25		18 58 6	18 59 0

Times in T.U.

Legenda :

date in the format month/day, an asterisk shows that the moons are near but they don't occult

Event type : eclipse or occultation

Ph : phenomenon, M=missed, E=penumbral eclipse, P=partial eclipse/occultation, T=total

eclipse/occultation, A=annular eclipse/occultation

Durn : duration in seconds

dMag : difference magnitude

%ill : defect of illumination, respect to integer

Sep : distance in " between the satellite and the center of the planet

Pa : position angle between the satellite and the center of the planet

MinD : least distance between the satellies

T1-T7 : penumbral phase begins/ends

T2-T6 : umbra phase begins/ends

T3-T5 : totalità phase begins/ends

Tmax : middle time of the event

Satellites :

I = Mimas

II = Enceladus

III = Tethys

IV = Dione

V = Rhea

VI = Titan

VII = Hyperion © (8)

CONJUNCTIONS AND ELONGATIONS OF THE SATELLITES OF SATURN

Tethys Superior conjunction

Date	Times	h Sat	h Sun				
01/01/2009	08.07.4	24.3	11.9	10/06/2009	18.35.4	50.3	1.4
03/01/2009	05.25.5	47.8	-13.5	12/06/2009	15.54.6	52.9	29.3
05/01/2009	02.43.7	50.7	-43.1	14/06/2009	13.13.8	31.4	58.6
07/01/2009	00.01.8	29.7	-68.4	16/06/2009	10.33.1	3.4	69.6
08/01/2009	21.19.8	1.8	-58.2	18/06/2009	07.52.4	-23.3	44.7
10/01/2009	18.37.9	-25.3	-28.7	20/06/2009	05.11.8	-39.6	15.2
12/01/2009	15.55.8	-41.9	0.7	22/06/2009	02.31.2	-34.5	-10.4
14/01/2009	13.13.8	-36.1	21.7	23/06/2009	23.50.6	-12.3	-24.1
16/01/2009	10.31.7	-13.1	26.1	25/06/2009	21.10.1	15.7	-18.6
18/01/2009	07.49.6	15.3	10.6	27/06/2009	18.29.5	42.3	2.9
20/01/2009	05.07.4	41.6	-16.2	29/06/2009	15.49.1	55.2	31.0
22/01/2009	02.25.2	53.3	-45.8	01/07/2009	13.08.6	40.7	59.9
23/01/2009	23.43.0	38.0	-66.9	03/07/2009	10.28.2	13.7	68.5
25/01/2009	21.00.7	10.9	-51.7	05/07/2009	07.47.8	-14.3	42.8
27/01/2009	18.18.4	-17.1	-21.9	07/07/2009	05.07.4	-35.9	13.3
29/01/2009	15.36.1	-38.3	7.0	09/07/2009	02.27.1	-39.7	-12.2
31/01/2009	12.53.7	-40.2	27.4	10/07/2009	23.46.7	-22.4	-25.6
02/02/2009	10.11.3	-21.1	28.9	12/07/2009	21.06.4	4.6	-19.3
04/02/2009	07.28.9	6.5	10.4	14/07/2009	18.26.2	32.3	2.7
06/02/2009	04.46.5	34.3	-17.7	16/07/2009	15.45.9	52.7	31.0
08/02/2009	02.04.0	52.9	-46.7	18/07/2009	13.05.7	48.3	59.1
09/02/2009	23.21.6	45.4	-62.4	20/07/2009	10.25.5	24.1	65.9
11/02/2009	20.39.1	20.2	-44.2	22/07/2009	07.45.3	-4.1	40.4
13/02/2009	17.56.6	-8.4	-14.4	24/07/2009	05.05.1	-29.4	10.8
15/02/2009	15.14.0	-32.6	14.6	26/07/2009	02.25.0	-41.7	-15.1
17/02/2009	12.31.5	-41.8	34.1	27/07/2009	23.44.8	-31.4	-28.7
19/02/2009	09.48.9	-28.2	32.4	29/07/2009	21.04.7	-7.0	-22.1
21/02/2009	07.06.4	-1.5	11.0	31/07/2009	18.24.6	21.3	0.8
23/02/2009	04.23.8	26.3	-18.0	02/08/2009	15.44.5	46.1	29.0
25/02/2009	01.41.2	49.6	-45.6	04/08/2009	13.04.5	52.8	56.3
26/02/2009	22.58.6	51.2	-55.9	06/08/2009	10.24.4	34.0	62.1
28/02/2009	20.16.1	29.2	-36.2	08/08/2009	07.44.3	6.4	37.7
02/03/2009	17.33.5	1.3	-6.4	10/08/2009	05.04.3	-21.1	8.0
04/03/2009	14.50.9	-25.5	22.6	12/08/2009	02.24.3	-40.1	-18.6
06/03/2009	12.08.3	-40.9	41.4	13/08/2009	23.44.3	-38.6	-33.3
08/03/2009	09.25.7	-33.9	36.2	15/08/2009	21.04.2	-17.9	-26.5
10/03/2009	06.43.2	-10.6	12.1	17/08/2009	18.24.2	9.9	-3.0
12/03/2009	04.00.6	17.8	-17.3	19/08/2009	15.44.2	36.9	25.3
14/03/2009	01.18.1	44.1	-42.7	21/08/2009	13.04.3	52.9	51.7
15/03/2009	22.35.5	54.6	-48.5	23/08/2009	10.24.3	42.6	57.4
17/03/2009	19.53.0	37.9	-28.2	25/08/2009	07.44.3	16.9	34.7
19/03/2009	17.10.5	10.4	1.8	27/08/2009	05.04.3	-11.5	5.1
21/03/2009	14.28.1	-17.4	30.7	29/08/2009	02.24.3	-35.2	-22.6
23/03/2009	11.45.6	-37.5	48.8	30/08/2009	23.44.4	-42.9	-38.8
25/03/2009	09.03.2	-38.1	39.8	01/09/2009	21.04.4	-28.0	-32.2
27/03/2009	06.20.8	-18.6	13.6	03/09/2009	18.24.4	-1.1	-8.5
29/03/2009	03.38.4	9.1	-15.7	05/09/2009	15.44.5	26.3	20.4
31/03/2009	00.56.0	36.8	-38.6	07/09/2009	13.04.5	48.4	45.9
01/04/2009	22.13.7	54.8	-41.1	09/09/2009	10.24.5	48.8	51.9
03/04/2009	19.31.4	45.8	-20.5	11/09/2009	07.44.5	27.0	31.2
05/04/2009	16.49.1	20.0	9.1	13/09/2009	05.04.6	-0.5	2.2
07/04/2009	14.06.9	-8.5	38.3	15/09/2009	02.24.6	-27.7	-26.7
09/04/2009	11.24.7	-32.0	55.6	16/09/2009	23.44.6	-43.6	-44.9
11/04/2009	08.42.5	-40.1	42.9	18/09/2009	21.04.6	-36.7	-38.5
13/04/2009	06.00.4	-26.1	15.0	20/09/2009	18.24.6	-13.2	-14.1
15/04/2009	03.18.3	0.3	-13.7	22/09/2009	15.44.6	15.0	14.9
17/04/2009	00.36.3	28.3	-34.1	24/09/2009	13.04.6	40.6	39.4
18/04/2009	21.54.3	51.4	-34.0	26/09/2009	10.24.5	51.2	45.8
20/04/2009	19.12.3	52.1	-13.4	28/09/2009	07.44.5	36.1	27.2
22/04/2009	16.30.4	29.5	15.7	30/09/2009	05.04.4	9.3	-0.8
24/04/2009	13.48.5	1.5	45.2	02/10/2009	02.24.4	-18.8	-30.8
26/04/2009	11.06.6	-24.9	61.6	03/10/2009	23.44.3	-40.5	-51.1
28/04/2009	08.24.8	-39.7	45.0	05/10/2009	21.04.2	-42.9	-44.9
30/04/2009	05.43.1	-32.6	16.1	07/10/2009	18.24.1	-23.9	-19.5
02/05/2009	03.01.4	-9.5	-11.7	09/10/2009	15.44.0	3.7	9.4
04/05/2009	00.19.7	18.8	-29.8	11/10/2009	13.03.9	31.0	33.1
05/05/2009	21.38.1	45.0	-27.9	13/10/2009	10.23.7	49.4	39.5
07/05/2009	18.56.5	55.6	-7.4	15/10/2009	07.43.5	43.5	22.7
09/05/2009	16.14.9	38.7	21.5	17/10/2009	05.03.3	19.4	-5.1
11/05/2009	13.33.4	11.2	51.0	19/10/2009	02.23.1	-9.0	-34.9
13/05/2009	10.52.0	-16.5	66.2	20/10/2009	23.42.9	-34.4	-57.1
15/05/2009	08.10.6	-36.5	46.0	22/10/2009	21.02.7	-45.8	-50.6
17/05/2009	05.29.2	-37.5	16.6	24/10/2009	18.22.4	-33.4	-24.0
19/05/2009	02.47.9	-18.6	-10.2	26/10/2009	15.42.1	-7.7	4.9
21/05/2009	00.06.6	8.8	-26.4	28/10/2009	13.01.8	20.6	27.6
22/05/2009	21.25.4	36.5	-23.1	30/10/2009	10.21.5	43.9	33.6
24/05/2009	18.44.2	55.1	-1.7	01/11/2009	07.41.1	48.1	18.0
26/05/2009	16.03.1	46.9	26.1	03/11/2009	05.00.7	28.9	-9.2
28/05/2009	13.22.0	21.3	55.5	05/11/2009	02.20.3	1.5	-39.0
30/05/2009	10.40.9	-7.0	69.0	06/11/2009	23.39.9	-26.3	-62.6
01/06/2009	07.59.9	-30.9	45.8	08/11/2009	20.59.4	-44.9	-54.6
03/06/2009	05.18.9	-40.1	16.3	10/11/2009	18.18.9	-41.0	-26.8
05/06/2009	02.38.0	-27.2	-9.7	12/11/2009	15.38.4	-18.4	2.0
06/06/2009	23.57.1	-1.1	-24.4	14/11/2009	12.57.9	9.9	23.5
08/06/2009	21.16.2	26.5	-19.9	16/11/2009	10.17.3	36.0	28.5

18/11/2009	07.36.7	49.2	13.3	10/12/2009	23.26.7	-7.7	-70.5
20/11/2009	04.56.0	37.1	-13.4	12/12/2009	20.45.6	-33.9	-55.3
22/11/2009	02.15.3	11.2	-43.3	14/12/2009	18.04.5	-47.5	-25.7
23/11/2009	23.34.6	-17.2	-67.2	16/12/2009	15.23.3	-36.4	2.3
25/11/2009	20.53.9	-40.6	-56.3	18/12/2009	12.42.1	-11.0	21.2
27/11/2009	18.13.1	-45.9	-27.4	20/12/2009	10.00.9	17.5	22.7
29/11/2009	15.32.3	-28.1	1.2	22/12/2009	07.19.6	41.3	5.8
01/12/2009	12.51.4	-0.2	21.3	24/12/2009	04.38.3	47.3	-21.4
03/12/2009	10.10.6	27.0	24.8	26/12/2009	01.56.9	29.5	-51.2
05/12/2009	07.29.6	46.6	9.1	27/12/2009	23.15.5	2.4	-71.3
07/12/2009	04.48.7	43.5	-17.6	29/12/2009	20.34.1	-25.7	-51.9
09/12/2009	02.07.7	20.7	-47.5	31/12/2009	17.52.6	-45.5	-21.9

Tethys Inferior conjunction

Date	Times	h Sat	h Sun				
02/01/2009	06.46.4	37.4	0.6	06/06/2009	01.17.5	-15.3	-19.1
04/01/2009	04.04.6	53.0	-28.1	07/06/2009	22.36.6	12.4	-24.7
06/01/2009	01.22.7	41.9	-57.5	09/06/2009	19.55.7	39.7	-10.9
07/01/2009	22.40.8	15.8	-68.7	11/06/2009	17.14.9	55.5	14.7
09/01/2009	19.58.8	-12.6	-43.8	13/06/2009	14.34.2	43.8	44.3
11/01/2009	17.16.8	-35.7	-13.8	15/06/2009	11.53.4	17.5	69.5
13/01/2009	14.34.8	-42.0	12.5	17/06/2009	09.12.7	-10.7	58.9
15/01/2009	11.52.7	-25.8	26.6	19/06/2009	06.32.1	-33.5	29.7
17/01/2009	09.10.6	1.3	20.4	21/06/2009	03.51.5	-40.0	1.8
19/01/2009	06.28.4	29.2	-1.3	23/06/2009	01.10.9	-24.7	-19.3
21/01/2009	03.46.3	50.6	-31.0	24/06/2009	22.30.3	1.8	-23.8
23/01/2009	01.04.0	48.4	-59.1	26/06/2009	19.49.8	29.6	-9.4
24/01/2009	22.21.8	25.0	-63.5	28/06/2009	17.09.3	51.8	16.5
26/01/2009	19.39.5	-3.1	-37.1	30/06/2009	14.28.8	50.8	45.9
28/01/2009	16.57.2	-29.2	-7.0	02/07/2009	11.48.4	27.7	69.9
30/01/2009	14.14.9	-42.4	18.8	04/07/2009	09.07.9	0.0	57.1
01/02/2009	11.32.5	-32.4	31.0	06/07/2009	06.27.6	-26.4	27.8
03/02/2009	08.50.1	-7.9	21.5	08/07/2009	03.47.2	-40.8	0.2
05/02/2009	06.07.7	20.8	-2.6	10/07/2009	01.06.9	-32.9	-21.0
07/02/2009	03.25.2	45.8	-32.5	11/07/2009	22.26.6	-9.6	-25.0
09/02/2009	00.42.8	52.7	-58.1	13/07/2009	19.46.3	18.7	-9.8
10/02/2009	22.00.3	33.8	-56.5	15/07/2009	17.06.0	44.4	16.4
12/02/2009	19.17.8	6.0	-29.6	17/07/2009	14.25.8	54.3	45.6
14/02/2009	16.35.3	-21.5	1.0	19/07/2009	11.45.5	37.4	68.0
16/02/2009	13.52.7	-40.0	26.3	21/07/2009	09.05.3	10.0	54.7
18/02/2009	11.10.2	-37.4	36.4	23/07/2009	06.25.2	-17.7	25.5
20/02/2009	08.27.6	-16.0	23.3	25/07/2009	03.45.0	-38.1	-2.5
22/02/2009	05.45.1	12.2	-2.7	27/07/2009	01.04.9	-39.2	-24.1
24/02/2009	03.02.5	39.4	-32.5	28/07/2009	22.24.7	-20.1	-28.0
26/02/2009	00.19.9	54.3	-54.6	30/07/2009	19.44.6	7.3	-12.2
27/02/2009	21.37.3	41.8	-48.6	01/08/2009	17.04.5	34.7	14.4
01/03/2009	18.54.7	15.3	-21.7	03/08/2009	14.24.5	53.0	43.4
03/03/2009	16.12.2	-13.0	8.8	05/08/2009	11.44.4	45.5	64.2
05/03/2009	13.29.6	-35.4	34.2	07/08/2009	09.04.3	20.5	51.6
07/03/2009	10.47.0	-40.3	42.2	09/08/2009	06.24.3	-7.9	22.8
09/03/2009	08.04.4	-23.4	25.5	11/08/2009	03.44.3	-32.3	-6.2
11/03/2009	05.21.9	3.7	-1.8	13/08/2009	01.04.2	-42.4	-28.2
13/03/2009	02.39.3	31.7	-31.1	14/08/2009	22.24.2	-29.8	-32.6
14/03/2009	23.56.8	52.7	-49.4	16/08/2009	19.44.2	-4.3	-16.2
16/03/2009	21.14.3	48.8	-40.5	18/08/2009	17.04.2	23.8	10.8
18/03/2009	18.31.7	24.6	-13.8	20/08/2009	14.24.2	47.4	39.5
20/03/2009	15.49.3	-3.7	16.7	22/08/2009	11.44.2	51.0	59.0
22/03/2009	13.06.8	-29.0	42.2	24/08/2009	09.04.3	30.6	48.0
24/03/2009	10.24.3	-40.8	47.8	26/08/2009	06.24.3	2.8	20.0
26/03/2009	07.41.9	-30.0	27.7	28/08/2009	03.44.3	-24.4	-9.6
28/03/2009	04.59.5	-5.2	-0.6	30/08/2009	01.04.3	-42.0	-33.0
30/03/2009	02.17.2	23.3	-28.6	31/08/2009	22.24.4	-37.8	-38.5
31/03/2009	23.34.8	48.2	-43.3	02/09/2009	19.44.4	-15.6	-21.5
02/04/2009	20.52.5	53.8	-32.7	04/09/2009	17.04.4	12.4	6.0
04/04/2009	18.10.2	33.7	-6.2	06/09/2009	14.24.4	38.8	34.2
06/04/2009	15.28.0	5.8	24.1	08/09/2009	11.44.5	52.3	52.7
08/04/2009	12.45.8	-21.4	49.9	10/09/2009	09.04.5	39.5	43.7
10/04/2009	10.03.6	-38.9	52.8	12/09/2009	06.24.5	13.2	16.9
12/04/2009	07.21.4	-35.4	29.6	14/09/2009	03.44.5	-15.1	-13.0
14/04/2009	04.39.3	-13.9	0.7	16/09/2009	01.04.5	-37.9	-38.0
16/04/2009	01.57.3	14.2	-25.6	17/09/2009	22.24.6	-43.1	-45.1
17/04/2009	23.15.2	41.3	-37.2	19/09/2009	19.44.6	-26.1	-27.5
19/04/2009	20.33.2	55.8	-25.5	21/09/2009	17.04.5	1.2	0.8
21/04/2009	17.51.3	42.3	1.1	23/09/2009	14.24.5	28.6	28.3
23/04/2009	15.09.4	15.5	30.8	25/09/2009	11.44.5	49.0	46.0
25/04/2009	12.27.5	-12.6	56.8	27/09/2009	09.04.5	46.3	38.7
27/04/2009	09.45.7	-34.5	56.6	29/09/2009	06.24.4	23.3	13.4
29/04/2009	07.03.9	-39.0	30.9	01/10/2009	03.44.4	-5.0	-16.5
01/05/2009	04.22.2	-22.2	1.9	03/10/2009	01.04.3	-31.1	-43.1
03/05/2009	01.40.5	4.7	-22.6	04/10/2009	22.24.2	-44.9	-51.8
04/05/2009	22.58.8	32.7	-31.8	06/10/2009	19.44.1	-35.2	-33.3
06/05/2009	20.17.2	53.8	-19.2	08/10/2009	17.04.0	-10.6	-4.9
08/05/2009	17.35.7	49.7	6.7	10/10/2009	14.23.9	17.7	22.5
10/05/2009	14.54.2	25.4	36.6	12/10/2009	11.43.7	42.3	39.4
12/05/2009	12.12.7	-2.5	62.6	14/10/2009	09.03.6	49.9	33.4
14/05/2009	09.31.3	-28.1	58.9	16/10/2009	06.23.4	32.6	9.6
16/05/2009	06.49.9	-40.0	31.4	18/10/2009	03.43.2	5.4	-20.2
18/05/2009	04.08.5	-29.8	2.7	20/10/2009	01.03.0	-22.5	-48.0
20/05/2009	01.27.2	-5.4	-20.3	21/10/2009	22.22.8	-42.9	-58.1
21/05/2009	22.46.0	22.9	-27.5	23/10/2009	19.42.5	-42.2	-38.2
23/05/2009	20.04.8	48.0	-14.3	25/10/2009	17.02.2	-21.3	-9.4
25/05/2009	17.23.6	54.6	11.4	27/10/2009	14.21.9	6.7	17.6
27/05/2009	14.42.5	35.0	41.1	29/10/2009	11.41.6	33.5	33.4
29/05/2009	12.01.4	7.2	67.0	31/10/2009	09.01.3	49.4	28.0
31/05/2009	09.20.4	-20.0	59.6	02/11/2009	06.20.9	40.4	5.3
02/06/2009	06.39.4	-38.2	31.0	04/11/2009	03.40.5	15.4	-24.1
04/06/2009	03.58.4	-36.0	2.7	06/11/2009	01.00.1	-13.1	-52.7

07/11/2009	22.19.6	-37.6	-63.4	06/12/2009	06.09.1	48.5	-3.2
09/11/2009	19.39.1	-46.2	-41.4	08/12/2009	03.28.2	33.4	-32.5
11/11/2009	16.58.6	-31.0	-12.2	10/12/2009	00.47.1	6.8	-61.4
13/11/2009	14.18.1	-4.3	14.1	11/12/2009	22.06.1	-21.5	-67.4
15/11/2009	11.37.5	23.7	28.7	13/12/2009	19.25.0	-43.3	-40.7
17/11/2009	08.56.9	45.3	23.0	15/12/2009	16.43.9	-44.8	-11.3
19/11/2009	06.16.3	46.0	1.1	17/12/2009	14.02.7	-24.6	13.3
21/11/2009	03.35.7	24.9	-28.3	19/12/2009	11.21.5	3.5	24.6
23/11/2009	00.55.0	-2.7	-57.3	21/12/2009	08.40.2	30.5	16.0
24/11/2009	22.14.2	-30.1	-66.7	23/12/2009	05.58.9	47.6	-7.2
26/11/2009	19.33.5	-46.5	-42.3	25/12/2009	03.17.6	40.5	-36.3
28/11/2009	16.52.7	-39.1	-12.9	27/12/2009	00.36.2	16.3	-64.5
30/11/2009	14.11.8	-14.9	12.6	28/12/2009	21.54.8	-12.2	-65.0
02/12/2009	11.31.0	13.5	25.7	30/12/2009	19.13.3	-37.4	-36.9
04/12/2009	08.50.1	38.6	18.9				

Tethys Maxima est elongation

Date	Times	h Sat	h Sun				
02/01/2009	02.28.8	48.2	-45.8	01/06/2009	19.36.4	47.1	-9.2
03/01/2009	23.51.2	25.7	-69.4	03/06/2009	16.56.8	55.0	17.2
05/01/2009	21.16.8	-0.6	-58.2	05/06/2009	14.17.3	36.5	46.7
07/01/2009	18.45.9	-26.0	-30.7	07/06/2009	11.37.9	9.1	70.0
09/01/2009	16.19.2	-41.4	-4.0	09/06/2009	08.58.6	-18.1	56.5
11/01/2009	13.57.2	-39.2	16.7	11/06/2009	06.19.4	-37.4	27.5
13/01/2009	11.40.8	-22.7	26.5	13/06/2009	03.40.4	-37.5	0.4
15/01/2009	09.30.9	-0.6	22.0	15/06/2009	01.01.5	-18.4	-20.0
17/01/2009	07.28.6	19.9	7.5	16/06/2009	22.22.7	8.6	-23.6
19/01/2009	05.34.5	38.2	-11.4	18/06/2009	19.44.1	35.9	-8.8
22/01/2009	02.58.5	53.1	-39.8	20/06/2009	17.05.6	54.4	16.9
24/01/2009	01.22.0	50.5	-56.2	22/06/2009	14.27.3	47.4	46.0
25/01/2009	23.47.8	40.1	-66.2	24/06/2009	11.49.2	22.7	70.1
27/01/2009	22.11.6	25.4	-61.6	26/06/2009	09.11.3	-5.1	58.3
29/01/2009	20.30.0	8.4	-45.6	28/06/2009	06.33.6	-29.5	29.6
31/01/2009	18.41.1	-10.3	-25.3	30/06/2009	03.56.1	-40.8	2.1
02/02/2009	16.44.5	-28.0	-3.4	02/07/2009	01.19.0	-30.6	-19.1
04/02/2009	14.40.6	-40.5	16.7	03/07/2009	22.42.1	-7.0	-24.7
06/02/2009	12.30.3	-40.1	30.7	05/07/2009	20.05.5	20.6	-11.7
08/02/2009	10.14.8	-25.5	30.8	07/07/2009	17.29.3	45.4	12.7
10/02/2009	07.54.9	-2.3	15.7	09/07/2009	14.53.5	54.5	41.1
12/02/2009	05.31.4	22.2	-8.2	11/07/2009	12.18.2	38.2	66.4
14/02/2009	03.05.0	44.8	-34.7	13/07/2009	09.43.4	12.0	61.7
16/02/2009	00.36.3	53.8	-56.7	15/07/2009	07.09.2	-14.9	34.6
17/02/2009	22.05.6	39.5	-55.0	17/07/2009	04.35.7	-35.7	6.7
19/02/2009	19.33.3	14.4	-30.9	19/07/2009	02.03.1	-40.6	-16.6
21/02/2009	16.59.6	-12.3	-1.4	20/07/2009	23.31.4	-25.8	-27.5
23/02/2009	14.24.8	-34.3	24.1	22/07/2009	21.00.9	-0.8	-20.3
25/02/2009	11.49.1	-41.4	38.8	24/07/2009	18.31.8	24.7	0.8
27/02/2009	09.12.6	-27.6	31.4	26/07/2009	16.04.3	47.0	26.4
01/03/2009	06.35.4	-1.9	8.0	28/07/2009	13.39.0	53.6	52.4
03/03/2009	03.57.7	25.1	-20.6	30/07/2009	11.16.1	38.6	66.4
05/03/2009	01.19.4	48.6	-45.8	01/08/2009	08.56.5	15.4	51.5
06/03/2009	22.40.7	52.7	-52.1	03/08/2009	06.41.0	-8.5	26.8
08/03/2009	20.01.7	32.8	-31.8	05/08/2009	04.30.7	-28.7	3.0
10/03/2009	17.22.3	5.4	-1.9	07/08/2009	02.27.0	-40.8	-17.2
12/03/2009	14.42.7	-21.4	26.0	09/08/2009	00.31.8	-40.6	-29.7
14/03/2009	12.02.8	-39.2	44.7	10/08/2009	22.47.1	-30.8	-32.3
16/03/2009	09.22.7	-36.8	38.9	12/08/2009	21.14.6	-17.8	-26.7
18/03/2009	06.42.5	-16.1	14.6	14/08/2009	19.54.4	-4.9	-17.2
20/03/2009	04.02.1	11.5	-14.4	16/08/2009	18.43.2	7.1	-6.5
22/03/2009	01.21.6	38.6	-39.2	19/08/2009	16.58.1	24.3	11.7
23/03/2009	22.40.9	54.9	-45.8	21/08/2009	15.38.7	36.6	25.8
25/03/2009	20.00.2	44.3	-27.3	23/08/2009	14.07.0	48.0	41.5
27/03/2009	17.19.4	18.4	1.8	25/08/2009	12.23.2	52.9	55.2
29/03/2009	14.38.5	-9.7	31.0	27/08/2009	10.28.7	44.9	56.5
31/03/2009	11.57.5	-32.8	51.2	29/08/2009	08.25.6	26.7	40.9
02/04/2009	09.16.6	-40.3	44.6	31/08/2009	06.15.7	4.3	17.5
04/04/2009	06.35.6	-25.9	18.8	02/09/2009	04.00.5	-19.1	-7.8
06/04/2009	03.54.5	0.4	-10.3	04/09/2009	01.41.2	-37.9	-30.1
08/04/2009	01.13.5	28.1	-33.8	05/09/2009	23.18.6	-43.1	-41.5
09/04/2009	22.32.4	51.2	-39.2	07/09/2009	20.53.5	-29.7	-33.1
11/04/2009	19.51.3	52.1	-21.7	09/09/2009	18.26.3	-6.3	-10.8
13/04/2009	17.10.2	29.9	6.7	11/09/2009	15.57.4	20.0	16.1
15/04/2009	14.29.2	2.1	36.4	13/09/2009	13.27.1	43.2	40.6
17/04/2009	11.48.1	-24.3	57.6	15/09/2009	10.55.7	51.6	50.8
19/04/2009	09.07.1	-39.6	49.1	17/09/2009	08.23.3	36.6	36.0
21/04/2009	06.26.1	-33.4	21.9	19/09/2009	05.50.0	11.1	9.2
23/04/2009	03.45.1	-10.8	-6.9	21/09/2009	03.16.1	-16.1	-19.5
25/04/2009	01.04.2	17.3	-28.9	23/09/2009	00.41.5	-38.0	-42.7
26/04/2009	22.23.2	43.7	-33.2	24/09/2009	22.06.4	-43.7	-46.8
28/04/2009	19.42.4	55.8	-16.3	26/09/2009	19.30.9	-28.0	-27.7
30/04/2009	17.01.5	40.3	11.4	28/09/2009	16.55.0	-1.5	0.4
02/05/2009	14.20.7	13.3	41.2	30/09/2009	14.18.7	25.2	26.8
04/05/2009	11.40.0	-14.5	63.2	02/10/2009	11.42.0	46.8	43.4
06/05/2009	08.59.3	-35.4	52.5	04/10/2009	09.05.1	48.3	36.6
08/05/2009	06.18.7	-38.4	24.3	06/10/2009	06.28.0	27.9	12.5
10/05/2009	03.38.1	-20.9	-3.8	08/10/2009	03.50.6	0.9	-16.8
12/05/2009	00.57.5	5.9	-24.8	10/10/2009	01.13.0	-26.3	-43.9
13/05/2009	22.17.1	33.7	-28.3	11/10/2009	22.35.1	-44.0	-55.0
15/05/2009	19.36.7	54.1	-11.9	13/10/2009	19.57.2	-39.9	-37.7
17/05/2009	16.56.3	49.3	15.1	15/10/2009	17.19.0	-17.8	-9.9
19/05/2009	14.16.1	24.9	44.9	17/10/2009	14.40.7	10.0	17.6
21/05/2009	11.35.9	-2.9	67.5	19/10/2009	12.02.3	36.0	35.8
23/05/2009	08.55.7	-28.1	54.8	21/10/2009	09.23.7	50.2	33.1
25/05/2009	06.15.7	-40.1	26.1	23/10/2009	06.45.0	39.3	11.6
27/05/2009	03.35.7	-30.1	-1.1	25/10/2009	04.06.2	13.9	-17.4
29/05/2009	00.55.9	-6.2	-21.8	27/10/2009	01.27.2	-14.3	-46.1
30/05/2009	22.16.1	22.0	-25.0	28/10/2009	22.48.2	-38.1	-61.4

30/10/2009	20.09.1	-45.7	-44.5	01/12/2009	22.50.7	-20.0	-69.8
01/11/2009	17.29.8	-30.0	-16.1	03/12/2009	20.10.1	-42.3	-49.2
03/11/2009	14.50.5	-3.3	11.4	05/12/2009	17.29.5	-45.3	-19.6
05/11/2009	12.11.1	24.3	29.7	07/12/2009	14.48.8	-25.9	7.2
07/11/2009	09.31.6	45.8	28.5	09/12/2009	12.08.0	2.0	23.5
09/11/2009	06.52.0	46.3	8.7	11/12/2009	09.27.1	29.1	21.2
11/11/2009	04.12.3	25.3	-19.6	13/12/2009	06.46.2	47.3	1.8
13/11/2009	01.32.5	-2.0	-49.1	15/12/2009	04.05.2	41.8	-26.6
14/11/2009	22.52.7	-29.5	-66.4	17/12/2009	01.24.1	18.2	-56.2
16/11/2009	20.12.8	-46.1	-48.4	18/12/2009	22.42.9	-10.3	-70.6
18/11/2009	17.32.8	-39.3	-19.3	20/12/2009	20.01.7	-35.9	-47.0
20/11/2009	14.52.7	-15.5	7.9	22/12/2009	17.20.4	-47.6	-17.2
22/11/2009	12.12.5	12.7	25.5	24/12/2009	14.39.0	-34.5	9.1
24/11/2009	09.32.3	38.1	24.3	26/12/2009	11.57.6	-8.5	23.9
26/11/2009	06.52.0	48.8	5.2	28/12/2009	09.16.0	20.0	19.3
28/11/2009	04.11.7	34.7	-22.9	30/12/2009	06.34.4	42.9	-1.0
30/11/2009	01.31.2	8.3	-52.5				

Tethys Maxima west elongation

Date	Times	h Sat	h Sun				
01/01/2009	03.48.7	53.1	-31.0	26/05/2009	04.55.7	-37.7	11.7
03/01/2009	01.09.6	38.2	-59.6	28/05/2009	02.15.8	-19.1	-13.4
04/01/2009	22.33.6	12.3	-68.6	29/05/2009	23.36.0	7.9	-26.0
06/01/2009	20.00.9	-14.3	-44.7	31/05/2009	20.56.2	35.5	-19.0
08/01/2009	17.32.0	-35.4	-17.0	02/06/2009	18.16.6	54.6	3.5
10/01/2009	15.07.5	-42.7	7.4	04/06/2009	15.37.0	47.9	31.9
12/01/2009	12.48.2	-32.0	23.3	06/06/2009	12.57.6	23.1	60.5
14/01/2009	10.35.0	-12.3	25.9	08/06/2009	10.18.2	-4.9	67.9
16/01/2009	08.28.8	9.6	15.6	10/06/2009	07.39.0	-29.3	42.3
18/01/2009	06.30.5	29.6	-1.0	12/06/2009	04.59.9	-40.4	13.2
20/01/2009	04.40.6	45.3	-21.0	14/06/2009	02.20.9	-29.6	-11.6
21/01/2009	03.48.7	50.4	-30.6	15/06/2009	23.42.1	-5.4	-24.3
23/01/2009	02.09.7	53.1	-48.4	17/06/2009	21.03.3	22.6	-18.1
25/01/2009	00.34.9	46.0	-62.5	19/06/2009	18.24.8	47.3	3.5
26/01/2009	23.00.2	33.1	-65.9	21/06/2009	15.46.4	54.5	31.4
28/01/2009	21.21.6	17.1	-54.4	23/06/2009	13.08.2	36.0	59.9
30/01/2009	19.36.5	-0.3	-35.8	25/06/2009	10.30.2	8.8	69.2
01/02/2009	17.43.7	-19.4	-14.6	27/06/2009	07.52.4	-18.2	44.2
03/02/2009	15.43.4	-35.3	7.0	29/06/2009	05.14.8	-37.6	15.2
05/02/2009	13.36.2	-42.3	24.9	01/07/2009	02.37.5	-38.2	-10.0
07/02/2009	11.23.2	-34.2	32.8	03/07/2009	00.00.5	-19.7	-24.3
09/02/2009	09.05.3	-14.8	24.8	04/07/2009	21.23.8	6.9	-20.2
11/02/2009	06.43.6	9.7	4.6	06/07/2009	18.47.4	33.9	0.2
13/02/2009	04.18.6	34.3	-21.4	08/07/2009	16.11.4	53.2	26.8
15/02/2009	01.50.9	52.1	-47.1	10/07/2009	13.35.8	48.7	55.0
16/02/2009	23.21.2	49.0	-60.0	12/07/2009	11.00.7	25.5	69.6
18/02/2009	20.49.6	27.5	-44.2	14/07/2009	08.26.2	-1.0	48.8
20/02/2009	18.16.6	1.2	-16.6	16/07/2009	05.52.4	-26.6	20.3
22/02/2009	15.42.4	-24.3	11.7	18/07/2009	03.19.3	-40.9	-6.0
24/02/2009	13.07.1	-40.5	33.7	20/07/2009	00.47.1	-35.1	-24.1
26/02/2009	10.31.0	-36.6	38.0	21/07/2009	22.16.0	-14.3	-26.1
28/02/2009	07.54.1	-15.8	20.9	23/07/2009	19.46.2	11.8	-11.1
02/03/2009	05.16.6	11.4	-6.2	25/07/2009	17.17.8	36.9	13.1
04/03/2009	02.38.6	38.0	-34.2	27/07/2009	14.51.4	53.2	39.8
06/03/2009	00.00.1	54.3	-52.8	29/07/2009	12.27.2	48.0	62.5
07/03/2009	21.21.2	44.6	-44.1	31/07/2009	10.05.9	27.4	61.6
09/03/2009	18.42.0	19.3	-17.6	02/08/2009	07.48.2	3.4	39.4
11/03/2009	16.02.5	-8.6	12.3	04/08/2009	05.35.1	-19.3	14.6
13/03/2009	13.22.8	-32.1	37.5	06/08/2009	03.27.9	-36.1	-8.0
15/03/2009	10.42.8	-41.0	45.2	08/08/2009	01.28.2	-42.3	-24.6
17/03/2009	08.02.6	-27.9	28.0	09/08/2009	23.38.0	-36.5	-32.2
19/03/2009	05.22.3	-2.0	0.6	11/08/2009	21.59.3	-24.4	-30.3
21/03/2009	02.41.8	25.5	-28.0	13/08/2009	20.33.1	-11.2	-22.2
23/03/2009	00.01.3	49.3	-46.0	15/08/2009	19.18.0	1.5	-11.9
24/03/2009	21.20.6	52.9	-38.8	17/08/2009	18.08.9	12.7	-0.1
26/03/2009	18.39.8	32.1	-13.5	18/08/2009	17.34.3	18.4	5.4
28/03/2009	15.58.9	4.4	16.6	20/08/2009	16.19.8	30.4	18.5
30/03/2009	13.18.0	-22.3	43.3	22/08/2009	14.54.4	42.6	33.6
01/04/2009	10.37.1	-39.3	51.7	24/08/2009	13.16.6	51.8	49.1
03/04/2009	07.56.1	-35.3	32.7	26/08/2009	11.27.1	50.6	58.1
05/04/2009	05.15.0	-13.8	4.3	28/08/2009	09.28.1	36.6	50.2
07/04/2009	02.34.0	14.2	-23.3	30/08/2009	07.21.4	15.7	29.7
08/04/2009	23.52.9	41.1	-39.7	01/09/2009	05.08.7	-7.7	5.0
10/04/2009	21.11.8	55.6	-32.6	03/09/2009	02.51.3	-29.5	-19.6
12/04/2009	18.30.8	42.6	-8.2	05/09/2009	00.30.3	-42.9	-37.9
14/04/2009	15.49.7	16.0	21.8	06/09/2009	22.06.4	-38.3	-39.7
16/04/2009	13.08.7	-12.0	49.3	08/09/2009	19.40.2	-18.7	-22.9
18/04/2009	10.27.6	-34.1	57.5	10/09/2009	17.12.1	7.0	2.8
20/04/2009	07.46.6	-39.4	36.3	12/09/2009	14.42.4	32.4	29.2
22/04/2009	05.05.6	-23.3	7.4	14/09/2009	12.11.5	50.3	48.7
24/04/2009	02.24.6	3.2	-19.3	16/09/2009	09.39.6	46.4	46.0
25/04/2009	23.43.7	31.1	-34.0	18/09/2009	07.06.7	24.4	23.2
27/04/2009	21.02.8	52.9	-26.8	20/09/2009	04.33.1	-2.1	-5.3
29/04/2009	18.21.9	50.8	-2.6	22/09/2009	01.58.9	-28.2	-32.4
01/05/2009	15.41.1	27.3	26.4	23/09/2009	23.24.0	-43.8	-48.2
03/05/2009	13.00.4	-0.3	54.5	25/09/2009	20.48.7	-37.9	-39.2
05/05/2009	10.19.6	-26.4	62.3	27/09/2009	18.13.0	-15.7	-14.3
07/05/2009	07.39.0	-39.9	38.9	29/09/2009	15.36.8	11.7	13.9
09/05/2009	04.58.4	-31.5	9.8	01/10/2009	13.00.4	37.4	37.3
11/05/2009	02.17.8	-8.2	-15.9	03/10/2009	10.23.6	51.0	43.1
12/05/2009	23.37.3	20.0	-29.3	05/10/2009	07.46.6	39.8	25.8
14/05/2009	20.56.9	45.8	-22.1	07/10/2009	05.09.3	14.5	-1.2
16/05/2009	18.16.5	55.5	1.3	09/10/2009	02.31.8	-13.4	-31.1
18/05/2009	15.36.2	38.2	30.0	10/10/2009	23.54.1	-37.0	-52.9
20/05/2009	12.56.0	10.8	58.5	12/10/2009	21.16.2	-45.0	-49.0
22/05/2009	10.15.8	-16.6	65.7	14/10/2009	18.38.1	-30.2	-24.2
24/05/2009	07.35.7	-36.6	40.8	16/10/2009	15.59.9	-4.0	4.6

18/10/2009	13.21.5	23.6	28.6	25/11/2009	08.12.2	46.4	16.4
20/10/2009	10.43.0	45.7	37.5	27/11/2009	05.31.9	44.4	-8.4
22/10/2009	08.04.4	47.7	23.8	29/11/2009	02.51.5	22.1	-37.9
24/10/2009	05.25.6	27.4	-1.9	01/12/2009	00.11.0	-6.1	-65.0
26/10/2009	02.46.7	0.3	-32.2	02/12/2009	21.30.4	-32.5	-62.4
28/10/2009	00.07.7	-27.2	-57.2	04/12/2009	18.49.8	-47.1	-34.4
29/10/2009	21.28.6	-44.9	-56.0	06/12/2009	16.09.1	-37.4	-5.6
31/10/2009	18.49.5	-40.1	-30.6	08/12/2009	13.28.4	-12.5	17.2
02/11/2009	16.10.2	-17.4	-1.0	10/12/2009	10.47.5	15.9	25.0
04/11/2009	13.30.8	10.6	22.3	12/12/2009	08.06.6	40.3	12.9
06/11/2009	10.51.3	36.6	31.9	14/12/2009	05.25.7	47.9	-12.0
08/11/2009	08.11.8	49.5	20.3	16/12/2009	02.44.6	31.2	-41.6
10/11/2009	05.32.1	37.4	-4.9	18/12/2009	00.03.5	4.2	-68.1
12/11/2009	02.52.4	11.6	-34.6	19/12/2009	21.22.3	-23.9	-61.0
14/11/2009	00.12.6	-16.6	-61.2	21/12/2009	18.41.0	-44.6	-32.0
15/11/2009	21.32.7	-40.0	-60.7	23/12/2009	15.59.7	-43.8	-2.8
17/11/2009	18.52.8	-45.8	-34.0	25/12/2009	13.18.3	-22.2	18.5
19/11/2009	16.12.7	-28.5	-5.1	27/12/2009	10.36.8	6.1	24.2
21/11/2009	13.32.6	-0.8	18.5	29/12/2009	07.55.2	32.8	10.3
23/11/2009	10.52.4	26.3	27.6	31/12/2009	05.13.6	48.1	-15.5

Dione Superior conjunction

Date	Times	h Sat	h Sun				
02/01/2009	07.20.5	31.8	5.5	04/07/2009	15.37.4	55.1	33.2
05/01/2009	01.01.3	38.2	-60.9	07/07/2009	09.21.0	4.0	59.0
07/01/2009	18.41.9	-26.6	-29.9	10/07/2009	03.04.6	-41.1	-7.2
10/01/2009	12.22.4	-27.3	24.5	12/07/2009	20.48.3	7.9	-17.5
13/01/2009	06.02.7	37.5	-6.9	15/07/2009	14.32.0	54.3	44.7
15/01/2009	23.43.0	32.7	-68.5	18/07/2009	08.15.8	-0.5	46.5
18/01/2009	17.23.1	-31.4	-13.6	21/07/2009	01.59.7	-40.8	-17.3
21/01/2009	11.03.1	-21.7	28.0	23/07/2009	19.43.7	12.2	-10.8
24/01/2009	04.43.0	42.9	-20.2	26/07/2009	13.27.7	52.7	54.5
26/01/2009	22.22.8	26.7	-63.1	29/07/2009	07.11.8	-6.0	33.3
29/01/2009	16.02.5	-35.6	2.9	01/08/2009	00.55.9	-40.0	-25.9
01/02/2009	09.42.1	-15.6	26.4	03/08/2009	18.40.1	16.5	-2.2
04/02/2009	03.21.6	47.7	-33.7	06/08/2009	12.24.3	50.3	60.9
06/02/2009	21.01.1	20.3	-49.0	09/08/2009	06.08.6	-10.7	19.9
09/02/2009	14.40.4	-38.9	18.0	11/08/2009	23.52.9	-38.7	-32.4
12/02/2009	08.19.7	-8.9	19.8	14/08/2009	17.37.3	20.5	5.8
15/02/2009	01.59.0	51.5	-45.8	17/08/2009	11.21.6	47.4	61.3
17/02/2009	19.38.2	13.7	-32.2	20/08/2009	05.06.0	-15.2	6.7
20/02/2009	13.17.3	-40.9	31.4	22/08/2009	22.50.5	-36.8	-36.3
23/02/2009	06.56.4	-1.1	9.9	25/08/2009	16.34.9	24.5	14.3
26/02/2009	00.35.5	54.0	-53.3	28/08/2009	10.19.4	44.1	55.5
28/02/2009	18.14.5	7.0	-14.5	31/08/2009	04.03.9	-19.6	-6.8
03/03/2009	11.53.6	-41.5	40.9	02/09/2009	21.48.3	-34.6	-36.9
06/03/2009	05.32.6	5.4	-1.3	05/09/2009	15.32.8	28.3	22.5
08/03/2009	23.11.7	54.6	-52.5	08/09/2009	09.17.3	40.4	45.9
11/03/2009	16.50.8	0.7	3.7	11/09/2009	03.01.8	-23.9	-19.7
14/03/2009	10.29.9	-40.6	44.1	13/09/2009	20.46.3	-31.9	-34.4
17/03/2009	04.09.0	12.5	-14.1	16/09/2009	14.30.8	31.9	29.7
19/03/2009	21.48.2	53.3	-43.4	19/09/2009	08.15.3	36.4	34.3
22/03/2009	15.27.4	-6.3	21.0	22/09/2009	01.59.7	-28.1	-32.3
25/03/2009	09.06.7	-38.3	40.3	24/09/2009	19.44.2	-28.9	-29.2
28/03/2009	02.46.0	19.5	-24.8	27/09/2009	13.28.6	35.4	35.2
30/03/2009	20.25.5	50.3	-29.8	30/09/2009	07.13.0	32.1	21.6
02/04/2009	14.05.0	-12.5	37.4	03/10/2009	00.57.3	-32.1	-44.0
05/04/2009	07.44.5	-35.0	31.4	05/10/2009	18.41.7	-25.5	-22.1
08/04/2009	01.24.2	26.2	-32.5	08/10/2009	12.25.9	38.6	38.1
10/04/2009	19.04.0	46.1	-14.3	11/10/2009	06.10.2	27.7	8.4
13/04/2009	12.43.9	-18.3	51.6	13/10/2009	23.54.4	-35.8	-53.9
16/04/2009	06.23.9	-30.8	20.2	16/10/2009	17.38.6	-21.8	-13.8
19/04/2009	00.04.0	32.5	-35.5	19/10/2009	11.22.7	41.6	37.6
21/04/2009	17.44.2	41.2	2.2	22/10/2009	05.06.7	23.0	-5.6
24/04/2009	11.24.6	-23.5	60.8	24/10/2009	22.50.7	-39.3	-60.0
27/04/2009	05.05.0	-26.2	8.5	27/10/2009	16.34.7	-17.8	-4.7
29/04/2009	22.45.6	38.3	-33.0	30/10/2009	10.18.5	44.2	33.5
02/05/2009	16.26.3	35.9	18.2	02/11/2009	04.02.3	18.1	-19.7
05/05/2009	10.07.2	-28.1	61.2	04/11/2009	21.46.0	-42.3	-59.7
08/05/2009	03.48.2	-21.3	-2.1	07/11/2009	15.29.7	-13.5	4.3
10/05/2009	21.29.3	43.4	-26.0	10/11/2009	09.13.3	46.3	26.2
13/05/2009	15.10.5	30.4	34.0	13/11/2009	02.56.8	13.1	-34.0
16/05/2009	08.51.9	-32.0	53.2	15/11/2009	20.40.2	-44.8	-52.9
19/05/2009	02.33.4	-16.2	-12.3	18/11/2009	14.23.5	-8.9	12.4
21/05/2009	20.15.0	47.7	-15.9	21/11/2009	08.06.7	47.8	16.6
24/05/2009	13.56.8	24.9	49.0	24/11/2009	01.49.8	7.8	-48.2
27/05/2009	07.38.7	-35.3	41.6	26/11/2009	19.32.9	-46.5	-42.1
30/05/2009	01.20.7	-11.3	-19.4	29/11/2009	13.15.8	-3.7	19.2
01/06/2009	19.02.9	51.1	-4.1	02/12/2009	06.58.6	48.6	5.1
04/06/2009	12.45.1	19.5	62.2	05/12/2009	00.41.3	2.5	-61.5
07/06/2009	06.27.5	-37.8	29.0	07/12/2009	18.23.9	-47.4	-29.6
10/06/2009	00.10.0	-6.3	-23.6	10/12/2009	12.06.4	1.6	23.6
12/06/2009	17.52.7	53.5	8.3	13/12/2009	05.48.8	48.4	-7.9
15/06/2009	11.35.4	14.1	70.7	15/12/2009	23.31.0	-3.0	-70.7
18/06/2009	05.18.2	-39.6	16.4	18/12/2009	17.13.1	-47.1	-16.2
20/06/2009	23.01.2	-0.7	-24.5	21/12/2009	10.55.1	6.9	24.5
23/06/2009	16.44.3	54.8	20.8	24/12/2009	04.37.0	47.3	-21.6
26/06/2009	10.27.4	9.0	68.9	26/12/2009	22.18.8	-9.2	-68.2
29/06/2009	04.10.7	-40.7	4.4	29/12/2009	16.00.4	-45.7	-2.1
01/07/2009	21.54.0	3.5	-22.3				

Dione Inferior conjunction

Date	Times	h Sat	h Sun				
03/01/2009	16.05.5	-42.7	-2.3	09/01/2009	03.26.7	53.2	-35.2
06/01/2009	09.46.2	2.7	22.2	11/01/2009	21.07.1	1.7	-55.6

14/01/2009	14.47.4	-42.5	11.0	11/07/2009	11.51.4	33.8	68.8
17/01/2009	08.27.6	9.0	15.5	14/07/2009	05.35.1	-29.9	17.4
20/01/2009	02.07.7	52.4	-49.1	16/07/2009	23.18.9	-21.6	-26.8
22/01/2009	19.47.6	-5.0	-39.4	19/07/2009	17.02.8	42.7	16.6
25/01/2009	13.27.5	-40.9	22.9	22/07/2009	10.46.7	29.2	67.2
28/01/2009	07.07.2	15.8	5.7	25/07/2009	04.30.7	-33.4	4.7
31/01/2009	00.46.9	50.1	-59.9	27/07/2009	22.14.8	-17.9	-27.3
02/02/2009	18.26.5	-11.4	-22.2	30/07/2009	15.58.9	45.7	26.8
05/02/2009	12.06.0	-37.9	31.5	02/08/2009	09.43.0	24.5	58.3
08/02/2009	05.45.4	22.6	-6.5	05/08/2009	03.27.2	-36.5	-7.9
10/02/2009	23.24.7	46.3	-62.1	07/08/2009	21.11.5	-14.1	-25.0
13/02/2009	17.04.0	-17.5	-4.7	10/08/2009	14.55.8	48.2	36.4
16/02/2009	10.43.2	-33.7	34.9	13/08/2009	08.40.1	19.8	46.6
19/02/2009	04.22.4	29.4	-19.3	16/08/2009	02.24.5	-39.2	-19.5
21/02/2009	22.01.5	41.5	-53.3	18/08/2009	20.08.8	-10.2	-20.4
24/02/2009	15.40.6	-23.3	12.5	21/08/2009	13.53.3	50.1	44.4
27/02/2009	09.19.7	-28.6	32.2	24/08/2009	07.37.7	15.1	33.7
02/03/2009	02.58.7	36.0	-31.4	27/08/2009	01.22.1	-41.4	-30.2
04/03/2009	20.37.8	35.9	-38.7	29/08/2009	19.06.6	-6.3	-14.2
07/03/2009	14.16.8	-28.5	28.6	01/09/2009	12.51.1	51.3	49.7
10/03/2009	07.55.9	-22.8	24.5	04/09/2009	06.35.6	10.3	20.4
13/03/2009	01.35.0	42.2	-40.9	07/09/2009	00.20.1	-43.1	-39.4
15/03/2009	19.14.1	29.8	-22.0	09/09/2009	18.04.6	-1.5	-6.9
18/03/2009	12.53.3	-33.0	42.3	12/09/2009	11.49.1	51.8	51.0
21/03/2009	06.32.5	-16.5	13.8	15/09/2009	05.33.5	5.6	7.0
24/03/2009	00.11.8	47.6	-45.0	17/09/2009	23.18.0	-44.2	-46.0
26/03/2009	17.51.1	23.5	-4.5	20/09/2009	17.02.5	2.1	1.5
29/03/2009	11.30.5	-36.5	51.4	23/09/2009	10.46.9	51.5	47.6
01/04/2009	05.10.0	-10.1	2.2	26/09/2009	04.31.3	1.0	-6.9
03/04/2009	22.49.5	51.8	-42.0	28/09/2009	22.15.7	-44.6	-49.0
06/04/2009	16.29.2	17.1	12.9	01/10/2009	16.00.1	6.1	9.1
09/04/2009	10.08.9	-38.8	52.9	04/10/2009	09.44.5	50.5	40.4
12/04/2009	03.48.7	-3.2	-9.4	07/10/2009	03.28.8	-4.1	-20.6
14/04/2009	21.28.7	54.7	-33.1	09/10/2009	21.13.0	-44.4	-47.5
17/04/2009	15.08.7	10.7	29.8	12/10/2009	14.57.3	10.3	16.5
20/04/2009	08.48.9	-40.0	46.7	15/10/2009	08.41.4	48.8	30.6
23/04/2009	02.29.2	3.1	-18.9	18/10/2009	02.25.6	-9.2	-34.2
25/04/2009	20.09.6	55.8	-20.8	20/10/2009	20.09.6	-43.4	-41.9
28/04/2009	13.50.2	4.7	45.7	23/10/2009	13.53.7	14.5	22.8
01/05/2009	07.30.8	-40.0	36.2	26/10/2009	07.37.6	46.5	19.0
04/05/2009	01.11.6	9.2	-25.5	29/10/2009	01.21.5	-14.1	-47.5
06/05/2009	18.52.6	55.4	-6.9	31/10/2009	19.05.4	-41.7	-33.5
09/05/2009	12.33.6	-0.7	59.5	03/11/2009	12.49.1	18.9	27.1
12/05/2009	06.14.8	-39.0	24.3	06/11/2009	06.32.8	43.5	6.4
14/05/2009	23.56.1	15.1	-28.2	09/11/2009	00.16.4	-19.0	-59.5
17/05/2009	17.37.6	53.5	7.8	11/11/2009	17.60.0	-39.3	-23.4
20/05/2009	11.19.1	-7.1	68.0	14/11/2009	11.43.4	23.3	28.7
23/05/2009	05.00.8	-37.2	12.3	17/11/2009	05.26.8	39.9	-7.4
25/05/2009	22.42.7	20.7	-26.6	19/11/2009	23.10.0	-23.9	-67.5
28/05/2009	16.24.7	50.5	22.4	22/11/2009	16.53.2	-36.2	-12.6
31/05/2009	10.06.7	-12.3	66.0	25/11/2009	10.36.3	27.7	27.0
03/06/2009	03.49.0	-34.8	1.3	28/11/2009	04.19.3	35.8	-21.5
05/06/2009	21.31.3	25.9	-21.4	30/11/2009	22.02.1	-28.7	-66.3
08/06/2009	15.13.8	46.8	36.6	03/12/2009	15.44.9	-32.4	-0.7
11/06/2009	08.56.3	-17.3	56.1	06/12/2009	09.27.6	32.1	21.8
14/06/2009	02.39.0	-31.8	-9.2	09/12/2009	03.10.1	31.2	-36.0
16/06/2009	20.21.8	30.7	-13.7	11/12/2009	20.52.5	-33.4	-56.5
19/06/2009	14.04.7	42.7	50.0	14/12/2009	14.34.9	-28.0	9.1
22/06/2009	07.47.7	-21.8	43.6	17/12/2009	08.17.1	36.3	13.7
25/06/2009	01.30.8	-28.6	-17.5	20/12/2009	01.59.1	26.2	-50.3
27/06/2009	19.14.0	35.1	-4.1	22/12/2009	19.41.1	-37.7	-43.0
30/06/2009	12.57.3	38.3	61.7	25/12/2009	13.22.9	-23.0	18.0
03/07/2009	06.40.7	-26.1	30.5	28/12/2009	07.04.6	40.3	3.3
06/07/2009	00.24.2	-25.2	-23.5	31/12/2009	00.46.2	20.8	-63.2
08/07/2009	18.07.8	39.1	6.1				

Dione Maxima est elongation

Date	Times	h Sat	h Sun				
02/01/2009	23.34.6	22.0	-70.5	23/03/2009	07.47.9	-29.2	27.7
05/01/2009	17.15.5	-38.4	-14.5	26/03/2009	01.27.3	35.0	-37.0
08/01/2009	10.56.3	-11.9	25.6	28/03/2009	19.06.8	38.1	-17.7
11/01/2009	04.37.1	49.6	-22.2	31/03/2009	12.46.3	-26.4	47.3
13/01/2009	22.17.7	16.1	-65.4	03/04/2009	06.25.9	-23.9	16.7
16/01/2009	15.58.3	-40.9	1.0	06/04/2009	00.05.6	41.0	-40.2
19/01/2009	09.38.7	-5.7	23.3	08/04/2009	17.45.3	32.4	-0.2
22/01/2009	03.19.1	52.2	-36.0	11/04/2009	11.25.2	-30.9	56.4
24/01/2009	20.59.3	9.9	-51.7	14/04/2009	05.05.2	-18.2	5.2
27/01/2009	14.39.4	-42.2	14.9	16/04/2009	22.45.2	46.3	-37.2
30/01/2009	08.19.4	1.2	16.7	19/04/2009	16.25.4	26.4	16.1
02/02/2009	01.59.3	53.6	-48.7	22/04/2009	10.05.7	-34.6	57.1
04/02/2009	19.39.2	3.7	-35.2	25/04/2009	03.46.1	-12.4	-6.1
07/02/2009	13.18.9	-42.2	27.3	27/04/2009	21.26.7	50.6	-29.1
10/02/2009	06.58.5	7.7	6.8	30/04/2009	15.07.3	20.4	32.5
13/02/2009	00.38.0	53.4	-57.4	03/05/2009	08.48.1	-37.4	50.0
15/02/2009	18.17.5	-2.4	-17.8	06/05/2009	02.29.0	-6.6	-15.5
18/02/2009	11.56.9	-40.8	36.1	08/05/2009	20.10.0	53.7	-17.9
21/02/2009	05.36.2	14.6	-5.0	11/05/2009	13.51.2	14.5	48.0
23/02/2009	23.15.5	51.5	-57.4	14/05/2009	07.32.5	-39.2	39.0
26/02/2009	16.54.8	-9.4	0.4	17/05/2009	01.13.9	-0.2	-22.2
01/03/2009	10.34.0	-38.0	39.3	19/05/2009	18.55.4	55.5	-4.9
04/03/2009	04.13.2	21.6	-17.4	22/05/2009	12.37.1	8.8	61.5
06/03/2009	21.52.4	48.0	-48.2	25/05/2009	06.18.9	-40.1	26.7
09/03/2009	15.31.6	-15.5	17.2	28/05/2009	00.00.8	4.8	-25.5
12/03/2009	09.10.8	-34.0	36.0	30/05/2009	17.42.9	55.8	8.7
15/03/2009	02.50.1	28.4	-28.7	02/06/2009	11.25.0	3.4	70.0
17/03/2009	20.29.3	43.5	-33.9	05/06/2009	05.07.3	-40.1	14.4
20/03/2009	14.08.6	-21.2	33.4	07/06/2009	22.49.7	10.0	-25.0

10/06/2009	16.32.2	54.9	22.3	22/09/2009	18.32.4	-15.9	-16.2
13/06/2009	10.14.9	-1.5	67.8	25/09/2009	12.15.8	46.2	44.0
16/06/2009	03.57.6	-39.3	2.9	28/09/2009	05.59.5	18.2	9.2
18/06/2009	21.40.4	15.0	-21.2	30/09/2009	23.43.2	-41.4	-50.1
21/06/2009	15.23.3	53.0	35.6	03/10/2009	17.27.0	-11.5	-7.7
24/06/2009	09.06.4	-7.4	57.6	06/10/2009	11.10.9	48.2	42.7
27/06/2009	02.49.5	-37.9	-8.1	09/10/2009	04.54.9	13.1	-5.1
29/06/2009	20.32.7	19.8	-14.8	11/10/2009	22.38.8	-43.7	-55.1
02/07/2009	14.16.0	50.2	48.2	14/10/2009	16.22.7	-7.1	1.2
05/07/2009	07.59.4	-12.3	44.9	17/10/2009	10.06.7	49.4	37.3
08/07/2009	01.42.8	-36.0	-17.3	20/10/2009	03.50.6	8.0	-19.3
10/07/2009	19.26.3	24.4	-6.7	22/10/2009	21.34.4	-45.4	-54.5
13/07/2009	13.09.9	46.8	59.0	25/10/2009	15.18.2	-1.9	9.2
16/07/2009	06.53.5	-17.0	31.6	28/10/2009	09.02.0	49.8	28.9
19/07/2009	00.37.2	-33.6	-24.6	31/10/2009	02.45.8	3.0	-33.4
21/07/2009	18.21.0	28.7	2.8	02/11/2009	20.29.4	-46.3	-48.6
24/07/2009	12.04.7	42.9	65.7	05/11/2009	14.13.0	2.3	16.5
27/07/2009	05.48.5	-21.5	18.2	08/11/2009	07.56.6	49.4	18.3
29/07/2009	23.32.4	-30.8	-29.4	11/11/2009	01.40.0	-1.8	-47.4
01/08/2009	17.16.2	32.8	12.3	13/11/2009	19.23.4	-46.3	-39.2
04/08/2009	10.60.0	38.7	64.8	16/11/2009	13.06.8	6.9	22.2
07/08/2009	04.43.8	-25.8	4.9	19/11/2009	06.50.0	48.2	6.3
09/08/2009	22.27.5	-27.5	-31.3	22/11/2009	00.33.1	-7.9	-60.3
12/08/2009	16.11.2	36.7	22.0	24/11/2009	18.16.2	-45.4	-27.8
15/08/2009	09.54.6	34.0	56.8	27/11/2009	11.59.1	11.8	25.4
18/08/2009	03.37.9	-30.2	-8.7	30/11/2009	05.42.0	46.1	-7.2
20/08/2009	21.20.7	-23.6	-29.8	02/12/2009	23.24.8	-13.3	-69.5
23/08/2009	15.02.8	40.9	31.8	05/12/2009	17.07.4	-43.5	-15.7
26/08/2009	08.43.5	28.1	44.4	08/12/2009	10.49.9	16.8	25.2
29/08/2009	02.21.1	-35.5	-23.1	11/12/2009	04.32.4	43.2	-21.1
31/08/2009	19.48.3	-15.0	-21.5	13/12/2009	22.14.7	-18.7	-68.3
03/09/2009	11.44.1	52.4	54.7	16/12/2009	15.56.9	-40.7	-2.9
06/09/2009	09.12.9	38.8	45.9	19/12/2009	09.39.0	22.0	21.4
09/09/2009	02.13.6	-32.1	-26.9	22/12/2009	03.21.0	39.6	-35.5
11/09/2009	19.46.4	-21.6	-25.0	24/12/2009	21.02.8	-24.1	-57.4
14/09/2009	13.25.5	42.9	40.5	27/12/2009	14.44.5	-36.9	8.6
17/09/2009	07.06.9	23.8	23.5	30/12/2009	08.26.1	27.2	14.2
20/09/2009	00.49.4	-38.2	-40.9				

Dione Maxima west elongation

Date	Times	h Sat	h Sun				
01/01/2009	14.43.7	-39.8	9.3	03/06/2009	20.14.1	40.5	-13.9
04/01/2009	08.24.6	19.1	14.1	06/06/2009	13.56.4	33.6	50.6
07/01/2009	02.05.4	47.9	-50.1	09/06/2009	07.38.8	-29.8	42.2
09/01/2009	19.46.2	-14.8	-41.5	12/06/2009	01.21.4	-19.8	-18.3
12/01/2009	13.26.9	-36.7	20.1	14/06/2009	19.04.1	44.6	-2.7
15/01/2009	07.07.4	25.2	4.1	17/06/2009	12.46.8	28.5	63.1
18/01/2009	00.47.9	43.9	-62.0	20/06/2009	06.29.7	-33.4	29.3
20/01/2009	18.28.3	-20.3	-25.1	23/06/2009	00.12.7	-15.4	-23.2
23/01/2009	12.08.6	-32.5	27.8	25/06/2009	17.55.7	48.0	8.4
26/01/2009	05.48.7	31.3	-8.1	28/06/2009	11.38.9	23.5	70.6
28/01/2009	23.28.8	39.1	-66.0	01/07/2009	05.22.1	-36.4	16.4
31/01/2009	17.08.7	-25.7	-8.5	03/07/2009	23.05.5	-11.1	-25.1
03/02/2009	10.48.5	-27.5	31.0	06/07/2009	16.48.9	50.7	20.0
06/02/2009	04.28.2	37.3	-21.1	09/07/2009	10.32.3	18.4	68.2
08/02/2009	22.07.9	33.6	-57.9	12/07/2009	04.15.9	-38.8	4.0
11/02/2009	15.47.4	-30.5	8.3	14/07/2009	21.59.5	-6.8	-23.9
14/02/2009	09.26.9	-21.8	28.6	17/07/2009	15.43.1	52.6	31.4
17/02/2009	03.06.3	43.0	-33.7	20/07/2009	09.26.9	13.4	58.3
19/02/2009	20.45.6	27.6	-43.3	23/07/2009	03.10.6	-40.7	-8.1
22/02/2009	14.24.9	-34.8	23.8	25/07/2009	20.54.4	-1.6	-20.1
25/02/2009	08.04.1	-15.4	21.4	28/07/2009	14.38.2	53.6	42.0
28/02/2009	01.43.3	48.1	-44.3	31/07/2009	08.22.0	8.4	45.7
02/03/2009	19.22.5	21.2	-26.5	03/08/2009	02.05.9	-41.9	-19.1
05/03/2009	13.01.7	-38.0	37.2	05/08/2009	19.49.7	2.4	-14.2
08/03/2009	06.40.9	-8.8	11.1	08/08/2009	13.33.4	53.7	51.0
11/03/2009	00.20.0	52.1	-49.6	11/08/2009	07.17.1	3.3	32.3
13/03/2009	17.59.2	14.6	-8.9	14/08/2009	01.00.7	-42.5	-28.8
16/03/2009	11.38.4	-40.0	46.3	16/08/2009	18.44.0	6.9	-6.6
19/03/2009	05.17.6	-1.1	-0.1	19/08/2009	12.27.1	52.8	56.8
21/03/2009	22.56.9	54.6	-47.1	22/08/2009	06.09.6	-1.9	18.0
24/03/2009	16.36.2	8.1	9.0	24/08/2009	23.51.1	-42.1	-36.6
27/03/2009	10.15.6	-40.7	48.4	27/08/2009	17.30.6	13.0	3.6
30/03/2009	03.55.1	5.2	-12.4	30/08/2009	11.04.7	49.7	56.8
01/04/2009	21.34.6	55.3	-37.8	02/09/2009	04.14.1	-16.8	-5.3
04/04/2009	15.14.2	1.8	26.2	04/09/2009	09.20.6	39.0	47.4
07/04/2009	08.53.9	-40.1	43.2	05/09/2009	02.38.6	-30.4	-22.1
10/04/2009	02.33.6	11.9	-22.4	07/09/2009	17.32.6	5.2	0.2
12/04/2009	20.13.5	54.2	-24.7	10/09/2009	10.56.7	51.2	52.7
15/04/2009	13.53.5	-4.7	42.3	13/09/2009	04.33.6	-6.9	-3.6
18/04/2009	07.33.6	-38.3	33.5	15/09/2009	22.14.0	-42.0	-43.7
21/04/2009	01.13.8	18.5	-29.2	18/09/2009	15.56.0	15.6	14.1
23/04/2009	18.54.1	51.6	-9.8	21/09/2009	09.38.8	47.9	44.3
26/04/2009	12.34.6	-10.7	56.2	24/09/2009	03.22.1	-13.3	-19.1
29/04/2009	06.15.1	-35.5	21.8	26/09/2009	21.05.6	-40.1	-41.7
01/05/2009	23.55.8	24.7	-31.7	29/09/2009	14.49.3	20.4	22.2
04/05/2009	17.36.6	47.8	5.9	02/10/2009	08.33.1	44.5	33.3
07/05/2009	11.17.6	-16.2	64.9	05/10/2009	02.16.9	-18.4	-32.7
10/05/2009	04.58.7	-32.0	10.0	07/10/2009	20.00.9	-37.7	-36.4
12/05/2009	22.39.9	30.4	-29.3	10/10/2009	13.44.8	24.7	28.3
15/05/2009	16.21.2	43.4	21.2	13/10/2009	07.28.7	40.8	21.0
18/05/2009	10.02.7	-21.2	63.7	16/10/2009	01.12.7	-23.1	-45.6
21/05/2009	03.44.2	-28.2	-0.5	18/10/2009	18.56.6	-34.9	-28.7
23/05/2009	21.26.0	35.7	-23.0	21/10/2009	12.40.5	28.8	32.0
26/05/2009	15.07.8	38.6	36.3	24/10/2009	06.24.3	36.8	7.9
29/05/2009	08.49.8	-25.8	54.4	27/10/2009	00.08.1	-27.7	-56.8
01/06/2009	02.31.9	-24.0	-10.8	29/10/2009	17.51.9	-31.7	-19.5

01/11/2009	11.35.6	32.7	32.7	04/12/2009	08.14.1	43.0	15.0
04/11/2009	05.19.2	32.4	-6.0	07/12/2009	01.56.7	17.5	-49.2
06/11/2009	23.02.8	-32.1	-64.2	09/12/2009	19.39.1	-43.3	-43.5
09/11/2009	16.46.3	-27.9	-9.7	12/12/2009	13.21.5	-14.0	17.8
12/11/2009	10.29.7	36.4	29.9	15/12/2009	07.03.8	45.6	4.1
15/11/2009	04.13.1	27.7	-20.2	18/12/2009	00.45.9	12.0	-62.5
17/11/2009	21.56.4	-36.2	-63.8	20/12/2009	18.27.9	-45.8	-29.6
20/11/2009	15.39.6	-23.7	0.8	23/12/2009	12.09.8	-8.6	23.2
23/11/2009	09.22.7	39.9	23.8	26/12/2009	05.51.6	47.4	-8.7
26/11/2009	03.05.7	22.8	-34.7	28/12/2009	23.33.2	6.2	-70.8
28/11/2009	20.48.6	-40.0	-55.6	31/12/2009	17.14.7	-47.4	-15.2
01/12/2009	14.31.4	-19.1	9.9				

Rhea Superior conjunction

Date	Times	h Sat	h Sun				
02/01/2009	04.12.6	53.0	-26.6	06/07/2009	08.16.6	-8.7	47.9
06/01/2009	16.36.9	-41.1	-7.7	10/07/2009	20.48.1	9.3	-17.2
11/01/2009	05.00.6	47.1	-17.9	15/07/2009	09.19.9	8.9	57.9
15/01/2009	17.23.8	-32.9	-14.3	19/07/2009	21.52.2	-8.8	-24.3
20/01/2009	05.46.4	35.6	-9.2	24/07/2009	10.24.7	26.5	65.0
24/01/2009	18.08.5	-20.9	-20.7	28/07/2009	22.57.5	-25.3	-29.1
29/01/2009	06.30.2	21.8	0.1	02/08/2009	11.30.6	42.3	65.5
02/02/2009	18.51.4	-6.9	-26.8	07/08/2009	00.03.9	-37.9	-30.6
07/02/2009	07.12.1	7.4	8.4	11/08/2009	12.37.4	52.4	58.1
11/02/2009	19.32.6	7.9	-32.5	16/08/2009	01.11.1	-42.6	-28.3
16/02/2009	07.52.7	-7.0	17.0	20/08/2009	13.45.0	51.0	46.0
20/02/2009	20.12.6	22.4	-37.6	25/08/2009	02.19.0	-37.1	-22.4
25/02/2009	08.32.3	-20.1	25.5	29/08/2009	14.53.1	39.0	31.8
01/03/2009	20.51.8	36.1	-41.7	03/09/2009	03.27.3	-24.0	-13.7
06/03/2009	09.11.3	-31.2	33.8	07/09/2009	16.01.5	21.9	16.6
10/03/2009	21.30.8	47.6	-44.4	12/09/2009	04.35.8	-7.1	-2.8
15/03/2009	09.50.4	-38.7	41.5	16/09/2009	17.10.1	3.4	1.4
19/03/2009	22.10.1	54.4	-45.4	21/09/2009	05.44.3	11.2	7.8
24/03/2009	10.29.9	-40.8	48.1	25/09/2009	18.18.5	-15.4	-14.6
28/03/2009	22.50.1	53.7	-44.3	30/09/2009	06.52.6	28.7	18.1
02/04/2009	11.10.5	-36.7	53.1	04/10/2009	19.26.6	-31.8	-29.7
06/04/2009	23.31.3	45.4	-41.1	09/10/2009	08.00.5	43.2	26.8
11/04/2009	11.52.6	-27.3	55.4	13/10/2009	20.34.2	-43.1	-43.6
16/04/2009	00.14.2	32.9	-36.0	18/10/2009	09.07.7	50.2	32.5
20/04/2009	12.36.3	-14.7	54.4	22/10/2009	21.41.0	-45.2	-55.2
25/04/2009	00.59.0	18.2	-29.4	27/10/2009	10.14.1	45.8	34.3
29/04/2009	13.22.2	0.6	50.4	31/10/2009	22.46.9	-37.0	-62.3
04/05/2009	01.45.9	3.0	-21.7	05/11/2009	11.19.4	32.9	32.0
08/05/2009	14.10.2	15.8	44.1	09/11/2009	23.51.6	-22.7	-62.4
13/05/2009	02.35.1	-12.6	-13.1	14/11/2009	12.23.4	16.2	26.4
17/05/2009	15.00.6	31.5	36.4	19/11/2009	00.54.9	-5.8	-56.5
22/05/2009	03.26.7	-26.3	-3.6	23/11/2009	13.25.9	-0.9	18.9
26/05/2009	15.53.3	45.6	27.9	28/11/2009	01.56.6	11.7	-47.7
31/05/2009	04.20.5	-36.5	6.1	02/12/2009	14.26.7	-18.9	10.4
04/06/2009	16.48.2	54.7	18.9	07/12/2009	02.56.4	27.8	-38.2
09/06/2009	05.16.5	-40.3	16.1	11/12/2009	15.25.6	-34.1	1.8
13/06/2009	17.45.3	53.8	9.6	16/12/2009	03.54.3	41.0	-28.7
18/06/2009	06.14.7	-35.7	26.6	20/12/2009	16.22.4	-44.7	-7.3
22/06/2009	18.44.5	42.9	0.7	25/12/2009	04.50.0	48.0	-19.4
27/06/2009	07.14.7	-24.1	37.3	29/12/2009	17.17.0	-47.5	-15.8
01/07/2009	19.45.4	27.0	-8.9				

Rhea Inferior conjunction

Date	Times	h Sat	h Sun				
04/01/2009	10.24.7	-2.8	24.2	16/06/2009	00.00.2	-8.7	-23.8
08/01/2009	22.48.7	18.0	-69.1	20/06/2009	12.29.7	27.4	65.6
13/01/2009	11.12.2	-18.0	26.6	25/06/2009	00.59.7	-24.2	-20.3
17/01/2009	23.35.1	32.7	-68.4	29/06/2009	13.30.2	42.9	56.3
22/01/2009	11.57.5	-30.5	28.0	04/07/2009	02.01.1	-36.2	-14.9
27/01/2009	00.19.4	45.1	-63.8	08/07/2009	14.32.4	53.3	45.1
31/01/2009	12.40.8	-39.2	28.3	13/07/2009	03.04.1	-41.2	-7.6
05/02/2009	01.01.8	52.7	-56.8	17/07/2009	15.36.1	53.1	32.7
09/02/2009	13.22.4	-42.2	27.5	22/07/2009	04.08.5	-36.8	1.6
14/02/2009	01.42.7	52.9	-48.6	26/07/2009	16.41.1	42.0	19.6
18/02/2009	14.02.7	-38.6	25.6	31/07/2009	05.14.1	-24.8	11.4
23/02/2009	02.22.5	45.7	-39.7	04/08/2009	17.47.2	25.4	6.2
27/02/2009	14.42.1	-29.9	22.7	09/08/2009	06.20.6	-8.6	22.2
04/03/2009	03.01.6	34.2	-30.3	13/08/2009	18.54.2	7.0	-7.5
08/03/2009	15.21.1	-18.0	18.7	18/08/2009	07.28.0	9.6	33.1
13/03/2009	03.40.7	20.8	-20.5	22/08/2009	20.01.9	-11.6	-20.6
17/03/2009	16.00.3	-4.1	14.0	27/08/2009	08.35.9	27.4	43.0
22/03/2009	04.20.1	6.7	-10.5	31/08/2009	21.10.0	-28.3	-32.4
26/03/2009	16.40.1	10.4	8.7	05/09/2009	09.44.2	42.8	49.8
31/03/2009	05.00.4	-7.7	0.4	09/09/2009	22.18.4	-40.5	-41.6
04/04/2009	17.21.1	25.0	3.1	14/09/2009	10.52.7	51.5	51.1
09/04/2009	05.42.1	-20.9	10.5	18/09/2009	23.26.9	-44.0	-46.2
13/04/2009	18.03.5	39.0	-2.6	23/09/2009	12.01.1	48.3	45.9
18/04/2009	06.25.5	-32.0	21.0	28/09/2009	00.35.2	-37.0	-45.0
22/04/2009	18.47.9	50.5	-9.0	02/10/2009	13.09.2	35.5	35.8
27/04/2009	07.10.8	-38.9	31.7	07/10/2009	01.43.1	-23.0	-38.6
01/05/2009	19.34.2	55.9	-14.4	11/10/2009	14.16.9	18.3	23.3
06/05/2009	07.58.3	-39.4	42.2	16/10/2009	02.50.5	-5.8	-29.4
10/05/2009	20.22.9	51.9	-19.1	20/10/2009	15.23.9	0.3	9.6
15/05/2009	08.48.1	-32.9	52.4	25/10/2009	03.57.1	12.3	-19.1
19/05/2009	21.13.8	40.3	-22.7	29/10/2009	16.30.0	-18.3	-4.3
24/05/2009	09.40.2	-21.1	61.8	03/11/2009	05.02.6	29.2	-8.9
28/05/2009	22.07.1	25.0	-24.8	07/11/2009	17.34.9	-34.1	-18.2
02/06/2009	10.34.5	-6.1	68.9	12/11/2009	06.06.9	42.8	1.0
06/06/2009	23.02.6	8.4	-25.3	16/11/2009	18.38.6	-44.8	-31.3
11/06/2009	11.31.1	10.6	70.7	21/11/2009	07.09.8	49.0	8.8

25/11/2009	19.40.6	-46.4	-43.5	18/12/2009	10.07.7	17.6	23.1
30/11/2009	08.11.0	44.9	15.3	22/12/2009	22.35.5	-8.9	-70.0
04/12/2009	20.40.9	-38.4	-54.6	27/12/2009	11.02.8	1.4	24.7
09/12/2009	09.10.3	33.0	20.0	31/12/2009	23.29.5	7.6	-70.8
13/12/2009	21.39.3	-24.8	-63.9				

Rhea Maxima est elongation

Date	Times	h Sat	h Sun				
03/01/2009	07.27.1	30.0	6.5	02/07/2009	22.56.7	-8.9	-24.9
07/01/2009	19.51.0	-15.3	-42.7	07/07/2009	11.28.0	27.3	70.4
12/01/2009	08.14.2	15.2	13.3	11/07/2009	23.59.8	-24.9	-25.3
16/01/2009	20.36.8	0.1	-49.4	16/07/2009	12.31.9	42.9	64.1
21/01/2009	08.58.9	0.6	19.8	21/07/2009	01.04.4	-37.2	-22.9
25/01/2009	21.20.4	14.6	-54.9	25/07/2009	13.37.2	53.1	53.1
30/01/2009	09.41.5	-14.1	25.8	30/07/2009	02.10.4	-41.9	-17.7
03/02/2009	22.02.2	29.0	-58.6	03/08/2009	14.43.9	51.8	40.0
08/02/2009	10.22.6	-26.6	31.3	08/08/2009	03.17.8	-36.5	-9.9
12/02/2009	22.42.6	41.8	-59.9	12/08/2009	15.52.1	39.7	25.6
17/02/2009	11.02.4	-36.3	35.9	17/08/2009	04.27.0	-23.4	0.5
21/02/2009	23.22.0	51.2	-58.2	21/08/2009	17.02.7	22.1	10.3
26/02/2009	11.41.4	-41.2	39.3	26/08/2009	05.40.5	-5.5	11.9
03/03/2009	00.00.7	54.4	-53.9	30/08/2009	18.25.9	1.0	-7.5
07/03/2009	12.20.1	-40.1	41.2	08/09/2009	18.48.3	-9.6	-14.3
12/03/2009	00.39.5	49.9	-47.6	13/09/2009	07.34.3	26.4	29.1
16/03/2009	12.58.9	-33.4	41.1	17/09/2009	20.12.4	-29.2	-31.1
21/03/2009	01.18.6	39.7	-40.0	22/09/2009	08.48.6	42.5	38.2
25/03/2009	13.38.4	-22.5	39.1	26/09/2009	21.23.9	-41.7	-43.8
30/03/2009	01.58.6	26.6	-31.4	01/10/2009	09.58.7	50.8	42.5
03/04/2009	14.19.1	-9.3	35.4	05/10/2009	22.33.2	-44.7	-52.6
08/04/2009	02.39.9	12.3	-22.1	10/10/2009	11.07.4	47.1	41.2
12/04/2009	15.01.2	5.5	30.2	14/10/2009	23.41.3	-37.1	-55.2
17/04/2009	03.22.9	-1.8	-12.3	19/10/2009	12.15.0	34.1	34.9
21/04/2009	15.45.2	20.6	23.9	24/10/2009	00.48.5	-22.7	-51.1
26/04/2009	04.07.9	-16.7	-1.3	28/10/2009	13.21.6	17.0	25.4
30/04/2009	16.31.2	35.4	17.0	02/11/2009	01.54.5	-5.6	-42.9
05/05/2009	04.55.1	-29.2	8.5	06/11/2009	14.27.0	-0.6	14.3
09/05/2009	17.19.6	48.2	9.7	11/11/2009	02.59.2	12.3	-33.2
14/05/2009	05.44.6	-37.8	19.0	15/11/2009	15.31.0	-19.0	2.7
18/05/2009	18.10.2	55.6	2.5	20/11/2009	04.02.4	28.8	-23.2
23/05/2009	06.36.4	-39.9	29.7	24/11/2009	16.33.4	-34.5	-9.2
27/05/2009	19.03.2	53.0	-4.9	29/11/2009	05.04.0	42.1	-13.6
01/06/2009	07.30.6	-34.2	40.4	03/12/2009	17.34.0	-45.0	-20.4
05/06/2009	19.58.5	41.7	-11.7	08/12/2009	06.03.6	48.5	-4.7
10/06/2009	08.26.9	-22.5	51.0	12/12/2009	18.32.7	-47.0	-31.1
14/06/2009	20.55.9	26.0	-17.5	17/12/2009	07.01.3	45.1	3.5
19/06/2009	09.25.4	-7.2	60.9	21/12/2009	19.29.3	-39.7	-40.9
23/06/2009	21.55.4	8.7	-22.1	26/12/2009	07.56.7	34.3	10.6
28/06/2009	10.25.8	10.0	68.6	30/12/2009	20.23.6	-26.8	-49.8

Rhea Maxima west elongation

Date	Times	h Sat	h Sun				
01/01/2009	01.11.4	37.3	-59.3	05/07/2009	05.08.9	-36.4	13.7
05/01/2009	13.35.6	-34.6	18.0	09/07/2009	17.40.4	42.8	10.7
10/01/2009	01.59.2	48.5	-51.2	14/07/2009	06.12.3	-24.6	24.2
14/01/2009	14.22.1	-41.6	14.3	18/07/2009	18.44.6	26.5	-0.3
19/01/2009	02.44.4	53.3	-42.6	23/07/2009	07.17.3	-8.7	35.1
23/01/2009	15.06.2	-41.9	10.2	27/07/2009	19.50.3	8.3	-12.4
28/01/2009	03.27.5	49.9	-33.7	01/08/2009	08.23.6	9.3	45.9
01/02/2009	15.48.4	-35.7	5.8	05/08/2009	20.57.3	-10.3	-22.9
06/02/2009	04.08.9	40.3	-24.6	10/08/2009	09.31.4	27.2	55.0
10/02/2009	16.29.1	-25.2	1.2	14/08/2009	22.06.0	-27.1	-31.6
15/02/2009	04.49.0	27.6	-15.3	19/08/2009	10.41.2	43.2	59.7
19/02/2009	17.08.7	-12.3	-4.1	23/08/2009	23.17.8	-39.8	-36.9
24/02/2009	05.28.2	13.8	-5.8	28/08/2009	11.57.9	52.5	56.1
28/02/2009	17.47.6	2.2	-9.5	02/09/2009	01.01.9	-41.6	-34.1
05/03/2009	06.06.9	0.2	4.2	06/09/2009	12.03.2	52.2	52.4
09/03/2009	18.26.3	16.4	-14.7	11/09/2009	01.09.9	-38.9	-35.9
14/03/2009	06.45.7	-13.9	13.9	15/09/2009	13.50.3	38.9	36.5
18/03/2009	19.05.2	30.5	-19.8	20/09/2009	02.27.2	-24.8	-27.5
23/03/2009	07.25.0	-26.0	23.8	24/09/2009	15.02.9	21.3	21.6
27/03/2009	19.45.0	43.4	-24.4	29/09/2009	03.37.9	-7.5	-17.3
01/04/2009	08.05.3	-35.5	33.6	03/10/2009	16.12.5	2.6	6.3
05/04/2009	20.25.9	52.9	-28.3	08/10/2009	04.46.9	11.0	-6.4
10/04/2009	08.47.0	-40.2	43.2	12/10/2009	17.21.0	-16.3	-9.4
14/04/2009	21.08.5	55.5	-31.1	17/10/2009	05.54.8	28.4	4.4
19/04/2009	09.30.5	-38.5	52.3	21/10/2009	18.28.4	-32.6	-24.3
23/04/2009	21.53.0	49.4	-32.4	26/10/2009	07.01.7	42.7	13.6
28/04/2009	10.16.0	-30.6	60.0	30/10/2009	19.34.7	-43.9	-38.6
02/05/2009	22.39.6	37.3	-32.0	04/11/2009	08.07.4	49.5	20.8
07/05/2009	11.03.8	-18.4	64.9	08/11/2009	20.39.8	-45.9	-51.6
11/05/2009	23.28.5	22.4	-29.7	13/11/2009	09.11.8	45.4	25.3
16/05/2009	11.53.9	-3.3	65.2	17/11/2009	21.43.4	-37.9	-62.4
21/05/2009	00.19.8	6.3	-25.7	22/11/2009	10.14.6	33.0	27.0
25/05/2009	12.46.3	12.6	60.7	26/11/2009	22.45.4	-23.9	-68.9
30/05/2009	01.13.3	-10.0	-20.1	01/12/2009	11.15.7	16.9	26.1
03/06/2009	13.41.0	28.9	53.0	05/12/2009	23.45.6	-7.5	-68.5
08/06/2009	02.09.2	-24.7	-13.3	10/12/2009	12.14.9	0.2	23.1
12/06/2009	14.37.9	43.9	43.6	15/12/2009	00.43.7	9.6	-62.5
17/06/2009	03.07.1	-36.1	-5.1	19/12/2009	13.12.0	-17.1	18.7
21/06/2009	15.36.9	53.9	33.1	24/12/2009	01.39.8	25.4	-54.1
26/06/2009	04.07.1	-40.7	4.0	28/12/2009	14.06.9	-32.0	13.5
30/06/2009	16.37.8	53.6	22.1				

Titano Superior conjunction

Date	Times	h Sat	h Sun				
15/01/2009	20.20.4	-4.1	-46.7	10/07/2009	01.47.0	-37.1	-17.1
31/01/2009	18.23.9	-13.3	-22.2	26/07/2009	01.56.5	-41.5	-18.6
16/02/2009	16.06.6	-24.6	6.2	11/08/2009	02.20.1	-40.6	-19.0
04/03/2009	13.36.5	-35.1	33.1	27/08/2009	02.53.5	-32.3	-17.7
20/03/2009	11.03.6	-40.6	47.9	12/09/2009	03.32.6	-18.3	-14.7
05/04/2009	08.38.0	-39.1	40.2	28/09/2009	04.13.2	-0.8	-10.6
21/04/2009	06.28.7	-33.7	22.4	14/10/2009	04.50.7	15.4	-6.9
07/05/2009	04.41.9	-28.5	6.5	30/10/2009	05.20.8	30.0	-4.6
23/05/2009	03.20.7	-26.0	-4.6	15/11/2009	05.38.6	40.5	-4.8
08/06/2009	02.25.9	-27.1	-11.1	01/12/2009	05.39.5	46.2	-7.7
24/06/2009	01.55.6	-31.3	-14.8	17/12/2009	05.19.2	48.0	-13.5

Titano Inferior conjunction

Date	Times	h Sat	h Sun				
07/01/2009	19.23.9	-19.9	-37.7	18/07/2009	00.31.0	-32.4	-24.8
23/01/2009	17.42.8	-25.6	-16.2	03/08/2009	00.37.9	-39.3	-27.7
08/02/2009	15.40.5	-33.1	8.7	19/08/2009	00.55.4	-42.8	-30.6
24/02/2009	13.23.0	-39.5	32.1	04/09/2009	01.19.9	-39.9	-32.7
12/03/2009	10.58.4	-41.1	44.5	20/09/2009	01.47.6	-30.8	-33.5
28/03/2009	08.36.0	-36.8	37.1	06/10/2009	02.14.8	-18.2	-33.3
13/04/2009	06.24.4	-29.4	19.4	22/10/2009	02.37.3	-4.4	-33.0
29/04/2009	04.30.4	-22.2	2.9	07/11/2009	02.51.1	8.3	-33.8
15/05/2009	02.58.3	-17.7	-9.4	23/11/2009	02.52.0	18.5	-36.7
31/05/2009	01.49.6	-16.8	-16.2	09/12/2009	02.35.8	25.6	-42.3
16/06/2009	01.03.7	-19.4	-19.8	25/12/2009	01.58.8	29.2	-50.8
02/07/2009	00.38.5	-25.0	-22.3				

Titano Maxima est elongation

Date	Times	h Sat	h Sun				
04/01/2009	00.31.4	32.7	-65.2	14/07/2009	04.48.7	-35.4	9.3
19/01/2009	22.49.6	26.3	-67.0	30/07/2009	04.59.3	-27.5	8.9
04/02/2009	20.44.3	15.7	-46.7	15/08/2009	05.26.9	-14.5	11.3
20/02/2009	18.23.1	2.4	-17.8	31/08/2009	07.09.1	14.1	27.3
08/03/2009	15.53.7	-12.4	13.1	16/09/2009	05.34.8	6.4	7.0
24/03/2009	13.25.2	-25.2	40.6	02/10/2009	06.24.8	25.1	12.9
09/04/2009	11.06.5	-34.1	55.7	18/10/2009	06.57.4	38.7	14.8
25/04/2009	09.05.2	-38.5	50.6	03/11/2009	07.19.1	47.0	14.3
11/05/2009	07.26.3	-39.8	37.3	19/11/2009	07.27.3	49.1	11.8
27/05/2009	06.12.1	-40.1	25.6	05/12/2009	07.18.2	47.3	7.5
12/06/2009	05.22.4	-40.1	17.2	21/12/2009	06.48.2	44.9	1.3
28/06/2009	04.55.5	-39.1	11.9				

Titano Maxima west elongation

Date	Times	h Sat	h Sun				
11/01/2009	16.46.7	-38.8	-8.5	21/07/2009	21.46.8	-9.2	-24.2
27/01/2009	14.51.5	-41.8	13.2	06/08/2009	22.07.5	-22.8	-29.4
12/02/2009	12.36.1	-41.5	32.2	22/08/2009	22.51.7	-37.0	-36.3
28/02/2009	10.08.1	-35.1	37.2	04/09/2009	08.48.5	33.9	43.0
16/03/2009	07.36.3	-23.5	23.3	07/09/2009	21.01.8	-30.9	-34.1
01/04/2009	05.10.0	-10.1	2.3	23/09/2009	23.08.9	-44.3	-48.4
17/04/2009	02.57.9	2.4	-16.4	09/10/2009	23.52.1	-37.7	-52.7
03/05/2009	01.06.3	10.9	-26.3	26/10/2009	00.23.9	-25.7	-54.8
18/05/2009	23.38.9	15.3	-27.9	11/11/2009	00.43.6	-13.0	-56.4
03/06/2009	22.36.9	15.3	-25.2	27/11/2009	00.47.6	-1.1	-59.2
19/06/2009	21.59.1	10.9	-22.4	13/12/2009	00.31.8	6.0	-64.0
05/07/2009	21.43.4	2.7	-21.8	28/12/2009	23.52.4	9.7	-69.6

TIMES IN U.T.

CENTRAL MERIDIAN OF SATURN I

(North Equatorial Band, equatorial zone, Sud Equatorial Band)

Date	Time										
01/01/2009	00.04.5	10.18.5	20.32.4	17/03/2009	00.57.6	11.11.6	21.25.5	31/05/2009	02.04.6	12.18.7	22.32.7
02/01/2009	06.46.4	17.00.3		18/03/2009	07.39.5	17.53.5		01/06/2009	08.46.8	19.00.9	
03/01/2009	03.14.2	13.28.2	23.42.1	19/03/2009	04.07.4	14.21.4		02/06/2009	05.15.0	15.29.0	
04/01/2009	09.56.1	20.10.0		20/03/2009	00.35.3	10.49.3	21.03.3	03/06/2009	01.43.1	11.57.2	22.11.3
05/01/2009	06.24.0	16.37.9		21/03/2009	07.17.2	17.31.2		04/06/2009	08.25.4	18.39.4	
06/01/2009	02.51.8	13.05.8	23.19.7	22/03/2009	03.45.2	13.59.1		05/06/2009	04.53.5	15.07.6	
07/01/2009	09.33.7	19.47.6		23/03/2009	00.13.1	10.27.1	20.41.0	06/06/2009	01.21.7	11.35.7	21.49.8
08/01/2009	06.01.5	16.15.5		24/03/2009	06.55.0	17.09.0		07/06/2009	08.03.9	18.18.0	
09/01/2009	02.29.4	12.43.4	22.57.3	25/03/2009	03.22.9	13.36.9	23.50.9	08/06/2009	04.32.1	14.46.2	
10/01/2009	09.11.2	19.25.2		26/03/2009	10.04.8	20.18.8		09/06/2009	01.00.2	11.14.3	21.28.4
11/01/2009	05.39.1	15.53.0		27/03/2009	06.32.8	16.46.8		10/06/2009	07.42.5	17.56.6	
12/01/2009	02.07.0	12.20.9	22.34.9	28/03/2009	03.00.7	13.14.7	23.28.7	11/06/2009	04.10.7	14.24.7	
13/01/2009	08.48.8	19.02.7		29/03/2009	09.42.7	19.56.6		12/06/2009	00.38.8	10.52.9	21.07.0
14/01/2009	05.16.7	15.30.6		30/03/2009	06.10.6	16.24.6		13/06/2009	07.21.1	17.35.2	
15/01/2009	01.44.5	11.58.5	22.12.4	31/03/2009	02.38.6	12.52.6	23.06.5	14/06/2009	03.49.3	14.03.3	
16/01/2009	08.26.3	18.40.3		01/04/2009	09.20.5	19.34.5		15/06/2009	00.17.4	10.31.5	20.45.6
17/01/2009	04.54.2	15.08.2		02/04/2009	05.48.5	16.02.5		16/06/2009	06.59.7	17.13.8	
18/01/2009	01.22.1	11.36.0	21.50.0	03/04/2009	02.16.4	12.30.4	22.44.4	17/06/2009	03.27.9	13.42.0	23.56.1
19/01/2009	08.03.9	18.17.8		04/04/2009	08.58.4	19.12.4		18/06/2009	10.10.1	20.24.2	
20/01/2009	04.31.8	14.45.7		05/04/2009	05.26.4	15.40.4		19/06/2009	06.38.3	16.52.4	
21/01/2009	00.59.6	11.13.6	21.27.5	06/04/2009	01.54.3	12.08.3	22.22.3	20/06/2009	03.06.5	13.20.6	23.34.7
22/01/2009	07.41.4	17.55.4		07/04/2009	08.36.3	18.50.3		21/06/2009	09.48.8	20.02.9	
23/01/2009	04.09.3	14.23.2		08/04/2009	05.04.3	15.18.3		22/06/2009	06.17.0	16.31.1	
24/01/2009	00.37.1	10.51.1	21.05.0	09/04/2009	01.32.3	11.46.3	22.00.3	23/06/2009	02.45.2	12.59.3	23.13.4
25/01/2009	07.18.9	17.32.9		10/04/2009	08.14.3	18.28.3		24/06/2009	09.27.4	19.41.5	
26/01/2009	03.46.8	14.00.7		11/04/2009	04.42.3	14.56.3		25/06/2009	05.55.6	16.09.7	
27/01/2009	00.14.7	10.28.6	20.42.5	12/04/2009	01.10.3	11.24.3	21.38.2	26/06/2009	02.23.8	12.37.9	22.52.0
28/01/2009	06.56.5	17.10.4		13/04/2009	07.52.2	18.06.3		27/06/2009	09.06.1	19.20.2	
29/01/2009	03.24.3	13.38.3	23.52.2	14/04/2009	04.20.3	14.34.3		28/06/2009	05.34.3	15.48.4	
30/01/2009	10.06.1	20.20.0		15/04/2009	00.48.3	11.02.3	21.16.3	29/06/2009	02.02.5	12.16.6	22.30.7
31/01/2009	06.34.0	16.47.9		16/04/2009	07.30.3	17.44.3		30/06/2009	08.44.8	18.58.9	
01/02/2009	03.01.8	13.15.8	23.29.7	17/04/2009	03.58.3	14.12.3		01/07/2009	05.13.0	15.27.1	
02/02/2009	09.43.6	19.57.6		18/04/2009	00.26.3	10.40.3	20.54.3	02/07/2009	01.41.2	11.55.3	22.09.4
03/02/2009	06.11.5	16.25.4		19/04/2009	07.08.3	17.22.3		03/07/2009	08.23.5	18.37.6	
04/02/2009	02.39.3	12.53.3	23.07.2	20/04/2009	03.36.3	13.50.4		04/07/2009	04.51.7	15.05.8	
05/02/2009	09.21.1	19.35.1		21/04/2009	00.04.4	10.18.4	20.32.4	05/07/2009	01.19.9	11.34.0	21.48.1
06/02/2009	05.49.0	16.02.9		22/04/2009	06.46.4	17.00.4		06/07/2009	08.02.2	18.16.3	
07/02/2009	02.16.9	12.30.8	22.44.7	23/04/2009	03.14.4	13.28.5	23.42.5	07/07/2009	04.30.4	14.44.5	
08/02/2009	08.58.7	19.12.6		24/04/2009	09.56.5	20.10.5		08/07/2009	00.58.6	11.12.7	21.26.8
09/02/2009	05.26.5	15.40.4		25/04/2009	06.24.5	16.38.6		09/07/2009	07.40.9	17.55.0	
10/02/2009	01.54.4	12.08.3	22.22.2	26/04/2009	02.52.6	13.06.6	23.20.6	10/07/2009	04.09.1	14.23.2	
11/02/2009	08.36.2	18.50.1		27/04/2009	09.34.7	19.48.7		11/07/2009	00.37.3	10.51.4	21.05.5
12/02/2009	05.04.0	15.18.0		28/04/2009	06.02.7	16.16.7		12/07/2009	07.19.7	17.33.8	
13/02/2009	01.31.9	11.45.8	21.59.8	29/04/2009	02.30.8	12.44.8	22.58.8	13/07/2009	03.47.9	14.02.0	
14/02/2009	08.13.7	18.27.6		30/04/2009	09.12.8	19.26.9		14/07/2009	00.16.1	10.30.2	20.44.3
15/02/2009	04.41.6	14.55.5		01/05/2009	05.40.9	15.54.9		15/07/2009	06.58.4	17.12.5	
16/02/2009	01.09.4	11.23.4	21.37.3	02/05/2009	02.09.0	12.23.0	22.37.0	16/07/2009	03.26.6	13.40.7	23.54.8
17/02/2009	07.51.2	18.05.2		03/05/2009	08.51.1	19.05.1		17/07/2009	10.08.9	20.23.0	
18/02/2009	04.19.1	14.33.0		04/05/2009	05.19.1	15.33.2		18/07/2009	06.37.1	16.51.2	
19/02/2009	00.47.0	11.00.9	21.14.8	05/05/2009	01.47.2	12.01.2	22.15.3	19/07/2009	03.05.3	13.19.4	23.33.5
20/02/2009	07.28.8	17.42.7		06/05/2009	08.29.3	18.43.4		20/07/2009	09.47.6	20.01.7	
21/02/2009	03.56.6	14.10.6		07/05/2009	04.57.4	15.11.4		21/07/2009	06.15.8	16.29.9	
22/02/2009	00.24.5	10.38.5	20.52.4	08/05/2009	01.25.5	11.39.5	21.53.6	22/07/2009	02.44.1	12.58.2	23.12.3
23/02/2009	07.06.3	17.20.3		09/05/2009	08.07.6	18.21.6		23/07/2009	09.26.4	19.40.5	
24/02/2009	03.34.2	13.48.1		10/05/2009	04.35.7	14.49.7		24/07/2009	05.54.6	16.08.7	
25/02/2009	00.02.1	10.16.0	20.29.9	11/05/2009	01.03.8	11.17.8	21.31.9	25/07/2009	02.22.8	12.36.9	22.51.0
26/02/2009	06.43.9	16.57.8		12/05/2009	07.45.9	17.60.0		26/07/2009	09.05.1	19.19.2	
27/02/2009	03.11.8	13.25.7	23.39.7	13/05/2009	04.14.0	14.28.1		27/07/2009	05.33.3	15.47.4	
28/02/2009	09.53.6	20.07.5		14/05/2009	00.42.1	10.56.2	21.10.2	28/07/2009	02.01.5	12.15.6	22.29.7
01/03/2009	06.21.5	16.35.4		15/05/2009	07.24.3	17.38.3		29/07/2009	08.43.8	18.57.9	
02/03/2009	02.49.4	13.03.3	23.17.2	16/05/2009	03.52.4	14.06.4		30/07/2009	05.12.1	15.26.2	
03/03/2009	09.31.2	19.45.1		17/05/2009	00.20.5	10.34.5	20.48.6	31/07/2009	01.40.3	11.54.4	22.08.5
04/03/2009	05.59.1	16.13.0		18/05/2009	07.02.6	17.16.7		01/08/2009	08.22.6	18.36.7	
05/03/2009	02.27.0	12.40.9	22.54.9	19/05/2009	03.30.8	13.44.8	23.58.9	02/08/2009	04.50.8	15.04.9	
06/03/2009	09.08.8	19.22.7		20/05/2009	10.12.9	20.27.0		03/08/2009	01.19.0	11.33.1	21.47.2
07/03/2009	05.36.7	15.50.6		21/05/2009	06.41.1	16.55.1		04/08/2009	08.01.3	18.15.4	
08/03/2009	02.04.6	12.18.5	22.32.5	22/05/2009	03.09.2	13.23.2	23.37.3	05/08/2009	04.29.5	14.43.6	
09/03/2009	08.46.4	19.00.4		23/05/2009	09.51.4	20.05.4		06/08/2009	00.57.7	11.11.8	21.25.9
10/03/2009	05.14.3	15.28.3		24/05/2009	06.19.5	16.33.6		07/08/2009	07.40.0	17.54.1	
11/03/2009	01.42.2	11.56.2	22.10.1	25/05/2009	02.47.6	13.01.7	23.15.8	08/08/2009	04.08.2	14.22.3	
12/03/2009	08.24.1	18.38.1		26/05/2009	09.29.8	19.43.9		09/08/2009	00.36.5	10.50.6	21.04.7
13/03/2009	04.52.0	15.06.0		27/05/2009	05.58.0	16.12.0		10/08/2009	07.18.8	17.32.9	
14/03/2009	01.19.9	11.33.9	21.47.8	28/05/2009	02.26.1	12.40.2	22.54.2	11/08/2009	03.47.0	14.01.1	
15/03/2009	08.01.8	18.15.7		29/05/2009	09.08.3	19.22.4		12/08/2009	00.15.2	10.29.3	20.43.4
16/03/2009	04.29.7	14.43.7		30/05/2009	05.36.4	15.50.5		13/08/2009	06.57.5	17.11.6	

Date	Time									
14/08/2009	03.25.7	13.39.8	23.53.9	30/09/2009	01.15.3	11.29.4	21.43.5	16/11/2009	09.14.0	19.28.1
15/08/2009	10.08.0	20.22.1		01/10/2009	07.57.5	18.11.6		17/11/2009	05.42.1	15.56.1
16/08/2009	06.36.2	16.50.3		02/10/2009	04.25.7	14.39.7		18/11/2009	02.10.1	12.24.1
17/08/2009	03.04.4	13.18.5	23.32.6	03/10/2009	00.53.8	11.07.9	21.21.9	19/11/2009	08.52.1	19.06.1
18/08/2009	09.46.7	20.00.8		04/10/2009	07.36.0	17.50.1		20/11/2009	05.20.1	15.34.1
19/08/2009	06.14.9	16.29.0		05/10/2009	04.04.1	14.18.2		21/11/2009	01.48.2	12.02.2
20/08/2009	02.43.1	12.57.2	23.11.3	06/10/2009	00.32.3	10.46.3	21.00.4	22/11/2009	08.30.2	18.44.2
21/08/2009	09.25.4	19.39.5		07/10/2009	07.14.4	17.28.5		23/11/2009	04.58.2	15.12.2
22/08/2009	05.53.6	16.07.7		08/10/2009	03.42.6	13.56.6		24/11/2009	01.26.2	11.40.2
23/08/2009	02.21.8	12.35.9	22.50.0	09/10/2009	00.10.7	10.24.7	20.38.8	25/11/2009	08.08.2	18.22.2
24/08/2009	09.04.1	19.18.2		10/10/2009	06.52.9	17.06.9		26/11/2009	04.36.2	14.50.2
25/08/2009	05.32.3	15.46.4		11/10/2009	03.21.0	13.35.0	23.49.1	27/11/2009	01.04.2	11.18.2
26/08/2009	02.00.5	12.14.6	22.28.6	12/10/2009	10.03.1	20.17.2		28/11/2009	07.46.2	18.00.2
27/08/2009	08.42.7	18.56.8		13/10/2009	06.31.3	16.45.3		29/11/2009	04.14.2	14.28.2
28/08/2009	05.10.9	15.25.0		14/10/2009	02.59.4	13.13.4	23.27.5	30/11/2009	00.42.2	10.56.2
29/08/2009	01.39.1	11.53.2	22.07.3	15/10/2009	09.41.5	19.55.6		01/12/2009	07.24.2	17.38.2
30/08/2009	08.21.4	18.35.5		16/10/2009	06.09.6	16.23.7		02/12/2009	03.52.2	14.06.2
31/08/2009	04.49.6	15.03.7		17/10/2009	02.37.7	12.51.8	23.05.8	03/12/2009	00.20.1	10.34.1
01/09/2009	01.17.8	11.31.9	21.46.0	18/10/2009	09.19.9	19.33.9		04/12/2009	07.02.1	17.16.1
02/09/2009	08.00.1	18.14.2		19/10/2009	05.48.0	16.02.0		05/12/2009	03.30.1	13.44.1
03/09/2009	04.28.2	14.42.3		20/10/2009	02.16.1	12.30.1	22.44.2	06/12/2009	10.12.1	20.26.1
04/09/2009	00.56.4	11.10.5	21.24.6	21/10/2009	08.58.2	19.12.3		07/12/2009	06.40.0	16.54.0
05/09/2009	07.38.7	17.52.8		22/10/2009	05.26.3	15.40.4		08/12/2009	03.08.0	13.22.0
06/09/2009	04.06.9	14.21.0		23/10/2009	01.54.4	12.08.4	22.22.5	09/12/2009	09.50.0	20.04.0
07/09/2009	00.35.1	10.49.1	21.03.2	24/10/2009	08.36.5	18.50.6		10/12/2009	06.17.9	16.31.9
08/09/2009	07.17.3	17.31.4		25/10/2009	05.04.6	15.18.6		11/12/2009	02.45.9	12.59.9
09/09/2009	03.45.5	13.59.6		26/10/2009	01.32.7	11.46.7	22.00.8	12/12/2009	09.27.8	19.41.8
10/09/2009	00.13.7	10.27.7	20.41.8	27/10/2009	08.14.8	18.28.8		13/12/2009	05.55.8	16.09.8
11/09/2009	06.55.9	17.10.0		28/10/2009	04.42.9	14.56.9		14/12/2009	02.23.8	12.37.7
12/09/2009	03.24.1	13.38.2	23.52.3	29/10/2009	01.11.0	11.25.0	21.39.0	15/12/2009	09.05.7	19.19.7
13/09/2009	10.06.3	20.20.4		30/10/2009	07.53.1	18.07.1		16/12/2009	05.33.6	15.47.6
14/09/2009	06.34.5	16.48.6		31/10/2009	04.21.1	14.35.2		17/12/2009	02.01.6	12.15.6
15/09/2009	03.02.7	13.16.8	23.30.8	01/11/2009	00.49.2	11.03.2	21.17.3	18/12/2009	08.43.5	18.57.5
16/09/2009	09.44.9	19.59.0		02/11/2009	07.31.3	17.45.3		19/12/2009	05.11.5	15.25.4
17/09/2009	06.13.1	16.27.2		03/11/2009	03.59.4	14.13.4		20/12/2009	01.39.4	11.53.4
18/09/2009	02.41.3	12.55.3	23.09.4	04/11/2009	00.27.4	10.41.4	20.55.5	21/12/2009	08.21.3	18.35.3
19/09/2009	09.23.5	19.37.6		05/11/2009	07.09.5	17.23.5		22/12/2009	04.49.2	15.03.2
20/09/2009	05.51.6	16.05.7		06/11/2009	03.37.6	13.51.6		23/12/2009	01.17.2	11.31.2
21/09/2009	02.19.8	12.33.9	22.47.9	07/11/2009	00.05.6	10.19.6	20.33.7	24/12/2009	07.59.1	18.13.1
22/09/2009	09.02.0	19.16.1		08/11/2009	06.47.7	17.01.7		25/12/2009	04.27.0	14.41.0
23/09/2009	05.30.2	15.44.3		09/11/2009	03.15.7	13.29.8	23.43.8	26/12/2009	00.54.9	11.08.9
24/09/2009	01.58.3	12.12.4	22.26.5	10/11/2009	09.57.8	20.11.8		27/12/2009	07.36.8	17.50.8
25/09/2009	08.40.6	18.54.6		11/11/2009	06.25.8	16.39.9		28/12/2009	04.04.8	14.18.7
26/09/2009	05.08.7	15.22.8		12/11/2009	02.53.9	13.07.9	23.21.9	29/12/2009	00.32.7	10.46.6
27/09/2009	01.36.8	11.50.9	22.05.0	13/11/2009	09.35.9	19.49.9		30/12/2009	07.14.6	17.28.5
28/09/2009	08.19.1	18.33.1		14/11/2009	06.04.0	16.18.0		31/12/2009	03.42.5	13.56.4
29/09/2009	04.47.2	15.01.3		15/11/2009	02.32.0	12.46.0	23.00.0			

TIMES IN U.T.

CENTRAL MERIDIAN OF SATURN III

(Radio emissions)

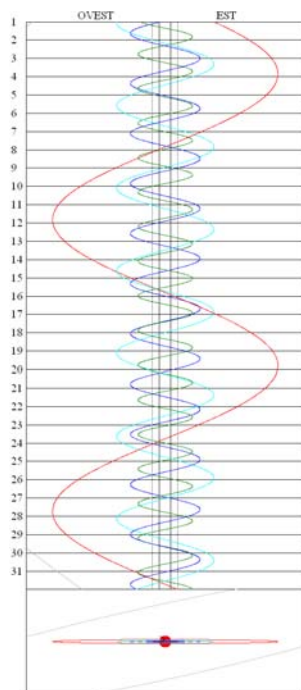
Date	Time										
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02/01/2009	02.39.2	13.18.5	23.57.9	18/03/2009	03.22.3	14.01.6		01/06/2009	04.19.5	14.59.0	
03/01/2009	10.37.2	21.16.5		19/03/2009	00.40.9	11.20.2	21.59.6	02/06/2009	01.38.4	12.17.9	22.57.3
04/01/2009	07.55.8	18.35.1		20/03/2009	08.38.9	19.18.2		03/06/2009	09.36.8	20.16.2	
05/01/2009	05.14.4	15.53.7		21/03/2009	05.57.6	16.36.9		04/06/2009	06.55.7	17.35.1	
06/01/2009	02.33.1	13.12.4	23.51.7	22/03/2009	03.16.2	13.55.6		05/06/2009	04.14.6	14.54.0	
07/01/2009	10.31.0	21.10.3		23/03/2009	00.34.9	11.14.3	21.53.6	06/06/2009	01.33.5	12.13.0	22.52.4
08/01/2009	07.49.6	18.28.9		24/03/2009	08.32.9	19.12.3		07/06/2009	09.31.9	20.11.3	
09/01/2009	05.08.2	15.47.5		25/03/2009	05.51.6	16.31.0		08/06/2009	06.50.8	17.30.3	
10/01/2009	02.26.9	13.06.2	23.45.5	26/03/2009	03.10.3	13.49.6		09/06/2009	04.09.7	14.49.2	
11/01/2009	10.24.8	21.04.1		27/03/2009	00.29.0	11.08.3	21.47.7	10/06/2009	01.28.6	12.08.1	22.47.6
12/01/2009	07.43.4	18.22.7		28/03/2009	08.27.0	19.06.4		11/06/2009	09.27.0	20.06.5	
13/01/2009	05.02.0	15.41.3		29/03/2009	05.45.7	16.25.0		12/06/2009	06.45.9	17.25.4	
14/01/2009	02.20.6	12.59.9	23.39.2	30/03/2009	03.04.4	13.43.7		13/06/2009	04.04.9	14.44.3	
15/01/2009	10.18.5	20.57.9		31/03/2009	00.23.1	11.02.4	21.41.8	14/06/2009	01.23.8	12.03.3	22.42.7
16/01/2009	07.37.2	18.16.5		01/04/2009	08.21.1	19.00.5		15/06/2009	09.22.2	20.01.7	
17/01/2009	04.55.8	15.35.1		02/04/2009	05.39.9	16.19.2		16/06/2009	06.41.1	17.20.6	
18/01/2009	02.14.4	12.53.7	23.33.0	03/04/2009	02.58.6	13.37.9		17/06/2009	04.00.1	14.39.6	
19/01/2009	10.12.3	20.51.6		04/04/2009	00.17.3	10.56.6	21.36.0	18/06/2009	01.19.0	11.58.5	22.38.0
20/01/2009	07.30.9	18.10.2		05/04/2009	08.15.3	18.54.7		19/06/2009	09.17.4	19.56.9	
21/01/2009	04.49.5	15.28.8		06/04/2009	05.34.1	16.13.4		20/06/2009	06.36.4	17.15.8	
22/01/2009	02.08.1	12.47.4	23.26.7	07/04/2009	02.52.8	13.32.1		21/06/2009	03.55.3	14.34.8	
23/01/2009	10.06.0	20.45.3		08/04/2009	00.11.5	10.50.9	21.30.2	22/06/2009	01.14.3	11.53.7	22.33.2
24/01/2009	07.24.6	18.03.9		09/04/2009	08.09.6	18.49.0		23/06/2009	09.12.7	19.52.2	
25/01/2009	04.43.2	15.22.5		10/04/2009	05.28.3	16.07.7		24/06/2009	06.31.6	17.11.1	
26/01/2009	02.01.8	12.41.1	23.20.4	11/04/2009	02.47.1	13.26.4		25/06/2009	03.50.6	14.30.1	
27/01/2009	09.59.7	20.39.0		12/04/2009	00.05.8	10.45.2	21.24.6	26/06/2009	01.09.5	11.49.0	22.28.5
28/01/2009	07.18.3	17.57.6		13/04/2009	08.03.9	18.43.3		27/06/2009	09.08.0	19.47.4	
29/01/2009	04.36.9	15.16.2		14/04/2009	05.22.7	16.02.0		28/06/2009	06.26.9	17.06.4	
30/01/2009	01.55.5	12.34.8	23.14.1	15/04/2009	02.41.4	13.20.8		29/06/2009	03.45.9	14.25.3	
31/01/2009	09.53.4	20.32.7		16/04/2009	00.00.2	10.39.5	21.18.9	30/06/2009	01.04.8	11.44.3	22.23.8
01/02/2009	07.12.0	17.51.3		17/04/2009	07.58.3	18.37.7		01/07/2009	09.03.3	19.42.7	
02/02/2009	04.30.6	15.09.9		18/04/2009	05.17.1	15.56.5		02/07/2009	06.22.2	17.01.7	
03/02/2009	01.49.2	12.28.5	23.07.8	19/04/2009	02.35.8	13.15.2	23.54.6	03/07/2009	03.41.2	14.20.6	
04/02/2009	09.47.1	20.26.4		20/04/2009	10.34.0	21.13.4		04/07/2009	01.00.1	11.39.6	22.19.1
05/02/2009	07.05.7	17.45.0		21/04/2009	07.52.8	18.32.1		05/07/2009	08.58.6	19.38.1	
06/02/2009	04.24.3	15.03.6		22/04/2009	05.11.5	15.50.9		06/07/2009	06.17.5	16.57.0	
07/02/2009	01.42.9	12.22.2	23.01.5	23/04/2009	02.30.3	13.09.7	23.49.1	07/07/2009	03.36.5	14.16.0	
08/02/2009	09.40.8	20.20.1		24/04/2009	10.28.5	21.07.9		08/07/2009	00.55.5	11.34.9	22.14.4
09/02/2009	06.59.4	17.38.7		25/04/2009	07.47.3	18.26.7		09/07/2009	08.53.9	19.33.4	
10/02/2009	04.18.0	14.57.3		26/04/2009	05.06.1	15.45.5		10/07/2009	06.12.9	16.52.4	
11/02/2009	01.36.6	12.15.9	22.55.2	27/04/2009	02.24.9	13.04.2	23.43.6	11/07/2009	03.31.8	14.11.3	
12/02/2009	09.34.5	20.13.8		28/04/2009	10.23.0	21.02.4		12/07/2009	00.50.8	11.30.3	22.09.8
13/02/2009	06.53.1	17.32.4		29/04/2009	07.41.8	18.21.2		13/07/2009	08.49.3	19.28.8	
14/02/2009	04.11.7	14.51.0		30/04/2009	05.00.7	15.40.1		14/07/2009	06.08.2	16.47.7	
15/02/2009	01.30.3	12.09.6	22.48.9	01/05/2009	02.19.5	12.58.9	23.38.3	15/07/2009	03.27.2	14.06.7	
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17/02/2009	06.46.8	17.26.1		03/05/2009	07.36.5	18.15.9		17/07/2009	08.44.6	19.24.1	
18/02/2009	04.05.4	14.44.7		04/05/2009	04.55.3	15.34.7		18/07/2009	06.03.6	16.43.1	
19/02/2009	01.24.0	12.03.3	22.42.7	05/05/2009	02.14.1	12.53.5	23.32.9	19/07/2009	03.22.6	14.02.0	
20/02/2009	09.22.0	20.01.3		06/05/2009	10.12.4	20.51.8		20/07/2009	00.41.5	11.21.0	22.00.5
21/02/2009	06.40.6	17.19.9		07/05/2009	07.31.2	18.10.6		21/07/2009	08.40.0	19.19.5	
22/02/2009	03.59.2	14.38.5		08/05/2009	04.50.0	15.29.4		22/07/2009	05.59.0	16.38.4	
23/02/2009	01.17.8	11.57.1	22.36.4	09/05/2009	02.08.9	12.48.3	23.27.7	23/07/2009	03.17.9	13.57.4	
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25/02/2009	06.34.3	17.13.6		11/05/2009	07.26.0	18.05.4		25/07/2009	08.35.4	19.14.9	
26/02/2009	03.52.9	14.32.2		12/05/2009	04.44.8	15.24.2		26/07/2009	05.54.3	16.33.8	
27/02/2009	01.11.6	11.50.9	22.30.2	13/05/2009	02.03.6	12.43.1	23.22.5	27/07/2009	03.13.3	13.52.8	
28/02/2009	09.09.5	19.48.8		14/05/2009	10.01.9	20.41.3		28/07/2009	00.32.3	11.11.8	21.51.3
01/03/2009	06.28.1	17.07.4		15/05/2009	07.20.8	18.00.2		29/07/2009	08.30.7	19.10.2	
02/03/2009	03.46.7	14.26.0		16/05/2009	04.39.6	15.19.1		30/07/2009	05.49.7	16.29.2	
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04/03/2009	09.03.3	19.42.6		18/05/2009	09.56.8	20.36.2		01/08/2009	00.27.7	11.07.1	21.46.6
05/03/2009	06.21.9	17.01.2		19/05/2009	07.15.7	17.55.1		02/08/2009	08.26.1	19.05.6	
06/03/2009	03.40.5	14.19.9		20/05/2009	04.34.5	15.14.0		03/08/2009	05.45.1	16.24.6	
07/03/2009	00.59.2	11.38.5	22.17.8	21/05/2009	01.53.4	12.32.8	23.12.3	04/08/2009	03.04.0	13.43.5	
08/03/2009	08.57.1	19.36.4		22/05/2009	09.51.7	20.31.1		05/08/2009	00.23.0	11.02.5	21.42.0
09/03/2009	06.15.8	16.55.1		23/05/2009	07.10.6	17.50.0		06/08/2009	08.21.5	19.01.0	
10/03/2009	03.34.4	14.13.7		24/05/2009	04.29.5	15.08.9		07/08/2009	05.40.4	16.19.9	
11/03/2009	00.53.0	11.32.4	22.11.7	25/05/2009	01.48.3	12.27.8	23.07.2	08/08/2009	02.59.4	13.38.9	
12/03/2009	08.51.0	19.30.3		26/05/2009	09.46.7	20.26.1		09/08/2009	00.18.4	10.57.9	21.37.4
13/03/2009	06.09.7	16.49.0		27/05/2009	07.05.6	17.45.0		10/08/2009	08.16.8	18.56.3	
14/03/2009	03.28.3	14.07.6		28/05/2009	04.24.5	15.03.9		11/08/2009	05.35.8	16.15.3	
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Date	Time										
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15/08/2009	05.31.1	16.10.6		01/10/2009	07.14.7	17.54.1		17/11/2009	08.53.2	19.32.5	
16/08/2009	02.50.1	13.29.6		02/10/2009	04.33.6	15.13.0		18/11/2009	06.11.9	16.51.3	
17/08/2009	00.09.1	10.48.6	21.28.0	03/10/2009	01.52.5	12.31.9	23.11.4	19/11/2009	03.30.7	14.10.1	
18/08/2009	08.07.5	18.47.0		04/10/2009	09.50.8	20.30.3		20/11/2009	00.49.5	11.28.9	22.08.3
19/08/2009	05.26.5	16.06.0		05/10/2009	07.09.7	17.49.1		21/11/2009	08.47.6	19.27.0	
20/08/2009	02.45.4	13.24.9		06/10/2009	04.28.6	15.08.0		22/11/2009	06.06.4	16.45.8	
21/08/2009	00.04.4	10.43.9	21.23.4	07/10/2009	01.47.5	12.26.9	23.06.4	23/11/2009	03.25.2	14.04.5	
22/08/2009	08.02.8	18.42.3		08/10/2009	09.45.8	20.25.2		24/11/2009	00.43.9	11.23.3	22.02.7
23/08/2009	05.21.8	16.01.3		09/10/2009	07.04.7	17.44.1		25/11/2009	08.42.1	19.21.4	
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03/09/2009	07.48.7	18.28.2		20/10/2009	09.30.5	20.09.9		06/12/2009	00.27.0	11.06.3	21.45.7
04/09/2009	05.07.6	15.47.1		21/10/2009	06.49.3	17.28.8		07/12/2009	08.25.0	19.04.4	
05/09/2009	02.26.6	13.06.0	23.45.5	22/10/2009	04.08.2	14.47.6		08/12/2009	05.43.8	16.23.1	
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07/09/2009	07.43.9	18.23.4		24/10/2009	09.25.3	20.04.7		10/12/2009	00.21.2	11.00.6	21.39.9
08/09/2009	05.02.9	15.42.3		25/10/2009	06.44.1	17.23.5		11/12/2009	08.19.3	18.58.6	
09/09/2009	02.21.8	13.01.3	23.40.7	26/10/2009	04.03.0	14.42.4		12/12/2009	05.38.0	16.17.3	
10/09/2009	10.20.2	20.59.7		27/10/2009	01.21.8	12.01.2	22.40.6	13/12/2009	02.56.7	13.36.0	
11/09/2009	07.39.1	18.18.6		28/10/2009	09.20.1	19.59.5		14/12/2009	00.15.4	10.54.7	21.34.1
12/09/2009	04.58.1	15.37.5		29/10/2009	06.38.9	17.18.3		15/12/2009	08.13.5	18.52.8	
13/09/2009	02.17.0	12.56.5	23.35.9	30/10/2009	03.57.7	14.37.1		16/12/2009	05.32.2	16.11.5	
14/09/2009	10.15.4	20.54.8		31/10/2009	01.16.5	11.55.9	22.35.4	17/12/2009	02.50.8	13.30.2	
15/09/2009	07.34.3	18.13.8		01/11/2009	09.14.8	19.54.2		18/12/2009	00.09.5	10.48.9	21.28.2
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17/09/2009	02.12.2	12.51.6	23.31.1	03/11/2009	03.52.4	14.31.8		20/12/2009	05.26.3	16.05.6	
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19/09/2009	07.29.5	18.08.9		05/11/2009	09.09.4	19.48.8		22/12/2009	00.03.6	10.43.0	21.22.3
20/09/2009	04.48.4	15.27.8		06/11/2009	06.28.2	17.07.7		23/12/2009	08.01.7	18.41.0	
21/09/2009	02.07.3	12.46.7	23.26.2	07/11/2009	03.47.1	14.26.5		24/12/2009	05.20.4	15.59.7	
22/09/2009	10.05.7	20.45.1		08/11/2009	01.05.9	11.45.3	22.24.7	25/12/2009	02.39.0	13.18.4	23.57.7
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25/09/2009	02.02.4	12.41.8	23.21.3	11/11/2009	03.41.7	14.21.1		28/12/2009	05.14.4	15.53.7	
26/09/2009	10.00.8	20.40.2		12/11/2009	01.00.4	11.39.8	22.19.2	29/12/2009	02.33.1	13.12.4	23.51.7
27/09/2009	07.19.7	17.59.1		13/11/2009	08.58.6	19.38.0		30/12/2009	10.31.1	21.10.4	
28/09/2009	04.38.6	15.18.0		14/11/2009	06.17.4	16.56.8		31/12/2009	07.49.7	18.29.0	
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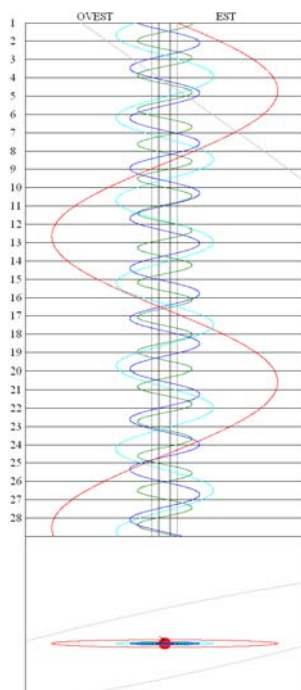
TIMES IN U.T.

POSITION OF THE SATELLITES OF SATURN

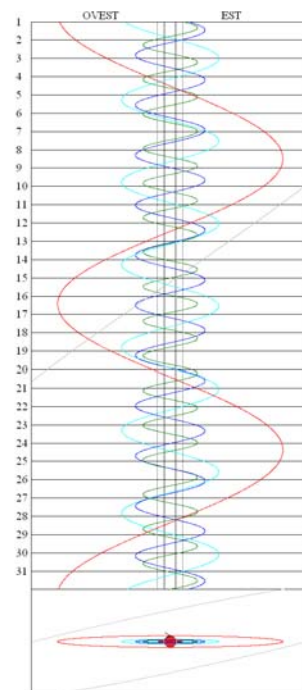
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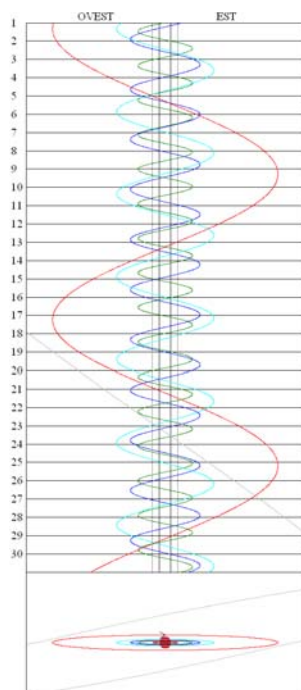
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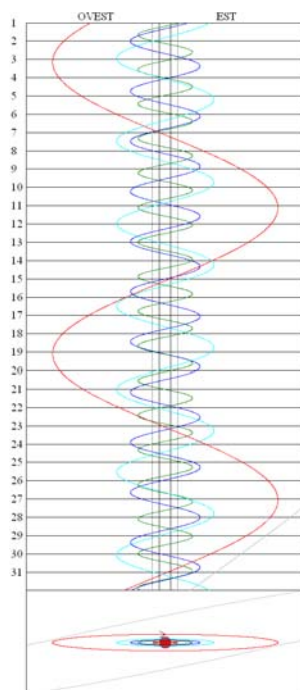
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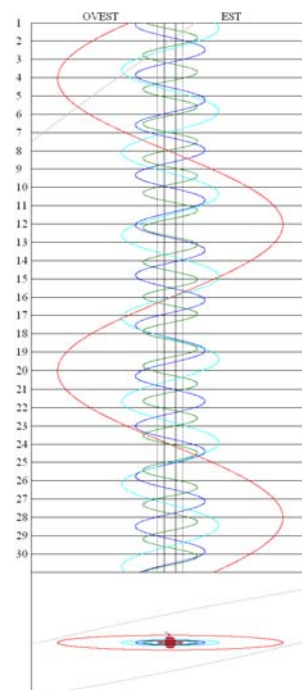
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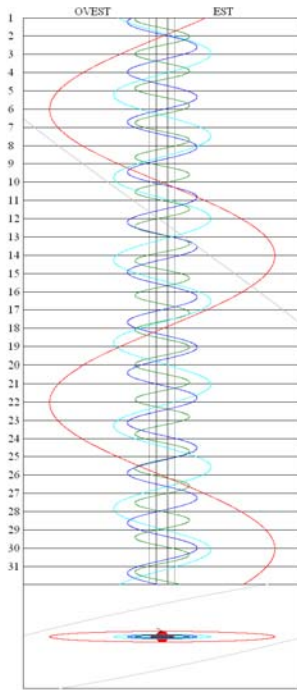


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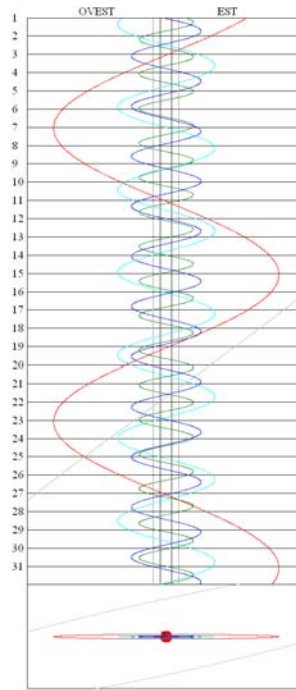


In green Tethys, in blue Dione, in light blue Rhea, in red Titano, in black Japetus

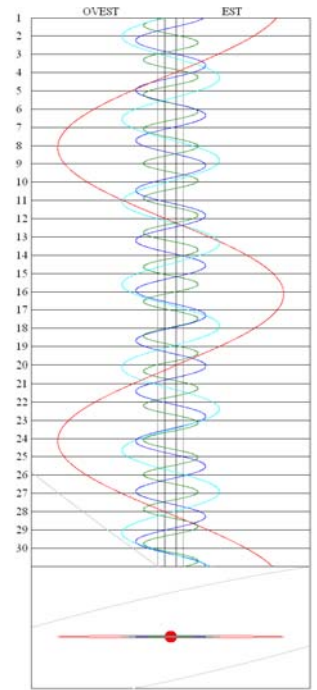
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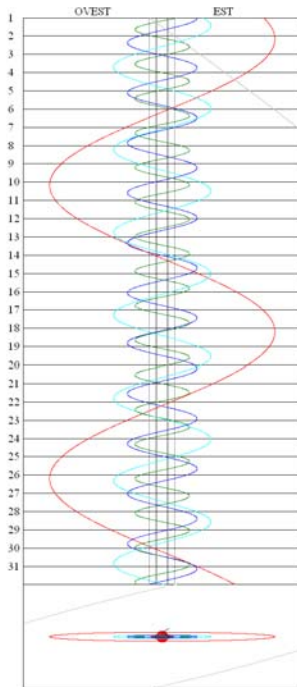
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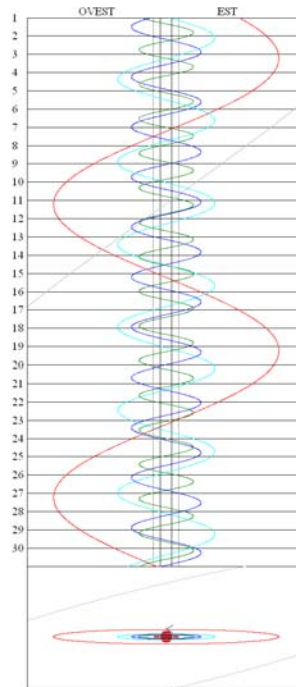
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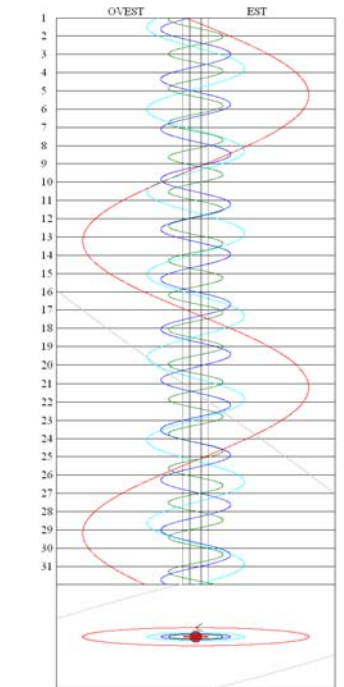
Oct



Nov



Dec



In green Tethys, in blue Dione, in light blue Rhea, in red Titano, in black Japetus

EPHEMERIDES OF URANUS

Date	A.R. Geoc.	Dec. Geoc.	R A.U.	Distance A.U.	Light (m)	El. °	Diam. "	Mag.	Rise	Transit	Set
1-Jan	23h 21m 36.65s	-04° 57' 08.5"	20.09878	20.437735	169.98	68.5	3.4	5.9	11.01	16.45	22.30
2-Jan	23h 21m 42.98s	-04° 56' 25.8"	20.09878	20.453786	170.11	67.5	3.4	5.9	10.57	16.42	22.26
3-Jan	23h 21m 49.47s	-04° 55' 42.0"	20.09878	20.469724	170.24	66.6	3.4	5.9	10.53	16.38	22.22
4-Jan	23h 21m 56.13s	-04° 54' 57.2"	20.09878	20.485543	170.37	65.6	3.4	5.9	10.50	16.34	22.19
5-Jan	23h 22m 02.94s	-04° 54' 11.4"	20.09878	20.501239	170.50	64.6	3.4	5.9	10.46	16.30	22.15
6-Jan	23h 22m 09.93s	-04° 53' 24.6"	20.09879	20.516808	170.63	63.6	3.4	5.9	10.42	16.26	22.11
7-Jan	23h 22m 17.07s	-04° 52' 36.8"	20.09879	20.532245	170.76	62.6	3.4	5.9	10.38	16.23	22.07
8-Jan	23h 22m 24.38s	-04° 51' 47.9"	20.09879	20.547546	170.89	61.6	3.4	5.9	10.34	16.19	22.03
9-Jan	23h 22m 31.84s	-04° 50' 58.0"	20.09879	20.562708	171.01	60.6	3.4	5.9	10.30	16.15	22.00
10-Jan	23h 22m 39.46s	-04° 50' 07.2"	20.09879	20.577726	171.14	59.7	3.4	5.9	10.26	16.11	21.56
11-Jan	23h 22m 47.23s	-04° 49' 15.5"	20.09880	20.592597	171.26	58.7	3.4	5.9	10.23	16.07	21.52
12-Jan	23h 22m 55.14s	-04° 48' 22.9"	20.09880	20.607317	171.39	57.7	3.4	5.9	10.19	16.04	21.48
13-Jan	23h 23m 03.20s	-04° 47' 29.3"	20.09880	20.621882	171.51	56.7	3.4	5.9	10.15	16.00	21.45
14-Jan	23h 23m 11.40s	-04° 46' 34.9"	20.09880	20.636289	171.63	55.7	3.4	5.9	10.11	15.56	21.41
15-Jan	23h 23m 19.74s	-04° 45' 39.6"	20.09880	20.650534	171.75	54.7	3.4	5.9	10.07	15.52	21.37
16-Jan	23h 23m 28.22s	-04° 44' 43.4"	20.09880	20.664612	171.86	53.8	3.4	5.9	10.03	15.48	21.34
17-Jan	23h 23m 36.84s	-04° 43' 46.3"	20.09881	20.678519	171.98	52.8	3.4	5.9	9.59	15.45	21.30
18-Jan	23h 23m 45.60s	-04° 42' 48.4"	20.09881	20.692253	172.09	51.8	3.4	5.9	9.56	15.41	21.26
19-Jan	23h 23m 54.50s	-04° 41' 49.5"	20.09881	20.705808	172.21	50.8	3.4	5.9	9.52	15.37	21.22
20-Jan	23h 24m 03.53s	-04° 40' 49.9"	20.09881	20.719180	172.32	49.9	3.4	5.9	9.48	15.33	21.19
21-Jan	23h 24m 12.71s	-04° 39' 49.3"	20.09881	20.732367	172.43	48.9	3.4	5.9	9.44	15.29	21.15
22-Jan	23h 24m 22.01s	-04° 38' 48.0"	20.09881	20.745363	172.53	47.9	3.4	5.9	9.40	15.26	21.11
23-Jan	23h 24m 31.44s	-04° 37' 45.8"	20.09881	20.758165	172.64	46.9	3.4	5.9	9.36	15.22	21.07
24-Jan	23h 24m 41.00s	-04° 36' 42.9"	20.09882	20.770770	172.75	45.9	3.4	5.9	9.33	15.18	21.04
25-Jan	23h 24m 50.68s	-04° 35' 39.2"	20.09882	20.783173	172.85	45.0	3.4	5.9	9.29	15.14	21.00
26-Jan	23h 25m 00.49s	-04° 34' 34.7"	20.09882	20.795370	172.95	44.0	3.4	5.9	9.25	15.11	20.56
27-Jan	23h 25m 10.40s	-04° 33' 29.6"	20.09882	20.807360	173.05	43.0	3.4	5.9	9.21	15.07	20.53
28-Jan	23h 25m 20.44s	-04° 32' 23.7"	20.09882	20.819137	173.15	42.1	3.4	5.9	9.17	15.03	20.49
29-Jan	23h 25m 30.58s	-04° 31' 17.1"	20.09882	20.830699	173.24	41.1	3.4	5.9	9.13	14.59	20.45
30-Jan	23h 25m 40.83s	-04° 30' 09.9"	20.09882	20.842042	173.34	40.1	3.4	5.9	9.10	14.56	20.42
31-Jan	23h 25m 51.20s	-04° 29' 02.0"	20.09882	20.853164	173.43	39.2	3.4	5.9	9.06	14.52	20.38
1-Feb	23h 26m 01.66s	-04° 27' 53.4"	20.09882	20.864061	173.52	38.2	3.4	5.9	9.02	14.48	20.34
2-Feb	23h 26m 12.24s	-04° 26' 44.1"	20.09883	20.874731	173.61	37.2	3.4	5.9	8.58	14.44	20.30
3-Feb	23h 26m 22.92s	-04° 25' 34.2"	20.09883	20.885171	173.70	36.3	3.4	5.9	8.54	14.41	20.27
4-Feb	23h 26m 33.70s	-04° 24' 23.7"	20.09883	20.895379	173.78	35.3	3.4	5.9	8.50	14.37	20.23
5-Feb	23h 26m 44.58s	-04° 23' 12.6"	20.09883	20.905352	173.86	34.3	3.4	5.9	8.47	14.33	20.19
6-Feb	23h 26m 55.56s	-04° 22' 00.9"	20.09883	20.915089	173.95	33.4	3.4	5.9	8.43	14.29	20.16
7-Feb	23h 27m 06.62s	-04° 20' 48.6"	20.09883	20.924586	174.02	32.4	3.4	5.9	8.39	14.26	20.12
8-Feb	23h 27m 17.78s	-04° 19' 35.8"	20.09883	20.933843	174.10	31.4	3.4	5.9	8.35	14.22	20.08
9-Feb	23h 27m 29.01s	-04° 18' 22.5"	20.09883	20.942857	174.18	30.5	3.3	5.9	8.31	14.18	20.05
10-Feb	23h 27m 40.33s	-04° 17' 08.7"	20.09883	20.951627	174.25	29.5	3.3	5.9	8.28	14.14	20.01
11-Feb	23h 27m 51.72s	-04° 15' 54.5"	20.09883	20.960150	174.32	28.6	3.3	5.9	8.24	14.11	19.57
12-Feb	23h 28m 03.19s	-04° 14' 39.7"	20.09883	20.968424	174.39	27.6	3.3	5.9	8.20	14.07	19.54
13-Feb	23h 28m 14.73s	-04° 13' 24.5"	20.09883	20.976447	174.46	26.6	3.3	5.9	8.16	14.03	19.50
14-Feb	23h 28m 26.35s	-04° 12' 08.9"	20.09883	20.984218	174.52	25.7	3.3	5.9	8.12	13.59	19.46
15-Feb	23h 28m 38.05s	-04° 10' 52.7"	20.09884	20.991734	174.58	24.7	3.3	5.9	8.08	13.56	19.43
16-Feb	23h 28m 49.82s	-04° 09' 36.2"	20.09884	20.998992	174.64	23.8	3.3	5.9	8.05	13.52	19.39
17-Feb	23h 29m 01.65s	-04° 08' 19.2"	20.09884	21.005992	174.70	22.8	3.3	5.9	8.01	13.48	19.35
18-Feb	23h 29m 13.55s	-04° 07' 01.8"	20.09884	21.012730	174.76	21.9	3.3	5.9	7.57	13.44	19.32
19-Feb	23h 29m 25.52s	-04° 05' 44.0"	20.09884	21.019206	174.81	20.9	3.3	5.9	7.53	13.41	19.28
20-Feb	23h 29m 37.54s	-04° 04' 25.9"	20.09884	21.025417	174.86	19.9	3.3	5.9	7.49	13.37	19.24
21-Feb	23h 29m 49.63s	-04° 03' 07.4"	20.09884	21.031361	174.91	19.0	3.3	5.9	7.46	13.33	19.21
22-Feb	23h 30m 01.76s	-04° 01' 48.7"	20.09884	21.037037	174.96	18.0	3.3	5.9	7.42	13.29	19.17
23-Feb	23h 30m 13.94s	-04° 00' 29.6"	20.09884	21.042443	175.00	17.1	3.3	5.9	7.38	13.26	19.14
24-Feb	23h 30m 26.17s	-03° 59' 10.3"	20.09884	21.047578	175.05	16.1	3.3	5.9	7.34	13.22	19.10
25-Feb	23h 30m 38.44s	-03° 57' 50.7"	20.09884	21.052441	175.09	15.2	3.3	5.9	7.30	13.18	19.06
26-Feb	23h 30m 50.76s	-03° 56' 30.8"	20.09884	21.057030	175.13	14.2	3.3	5.9	7.27	13.15	19.03
27-Feb	23h 31m 03.11s	-03° 55' 10.8"	20.09884	21.061344	175.16	13.3	3.3	5.9	7.23	13.11	18.59
28-Feb	23h 31m 15.50s	-03° 53' 50.5"	20.09884	21.065382	175.20	12.3	3.3	5.9	7.19	13.07	18.55
1-Mar	23h 31m 27.92s	-03° 52' 30.0"	20.09884	21.069144	175.23	11.4	3.3	5.9	7.15	13.03	18.52
2-Mar	23h 31m 40.38s	-03° 51' 09.3"	20.09884	21.072628	175.26	10.5	3.3	5.9	7.11	13.00	18.48
3-Mar	23h 31m 52.88s	-03° 49' 48.5"	20.09884	21.075835	175.28	9.5	3.3	5.9	7.08	12.56	18.44
4-Mar	23h 32m 05.40s	-03° 48' 27.4"	20.09884	21.078764	175.31	8.6	3.3	5.9	7.04	12.52	18.41
5-Mar	23h 32m 17.95s	-03° 47' 06.3"	20.09884	21.081415	175.33	7.6	3.3	5.9	7.00	12.48	18.37
6-Mar	23h 32m 30.52s	-03° 45' 45.0"	20.09884	21.083787	175.35	6.7	3.3	5.9	6.56	12.45	18.33
7-Mar	23h 32m 43.10s	-03° 44' 23.6"	20.09884	21.085882	175.37	5.8	3.3	5.9	6.52	12.41	18.30
8-Mar	23h 32m 55.70s	-03° 43' 02.3"	20.09884	21.087699	175.38	4.8	3.3	5.9	6.48	12.37	18.26
9-Mar	23h 33m 08.31s	-03° 41' 40.8"	20.09884	21.089237	175.39	3.9	3.3	5.9	6.45	12.34	18.23
10-Mar	23h 33m 20.93s	-03° 40' 19.4"	20.09884	21.090498	175.40	3.0	3.3	5.9	6.41	12.30	18.19
11-Mar	23h 33m 33.55s	-03° 38' 57.9"	20.09884	21.091481	175.41	2.1	3.3	5.9	6.37	12.26	18.15
12-Mar	23h 33m 46.18s	-03° 37' 36.5"	20.09883	21.092187	175.42	1.3	3.3	5.9	6.33	12.22	18.12
13-Mar	23h 33m 58.80s	-03° 36' 15.5"	20.09883	21.092615	175.42	0.8	3.3	5.9	6.29	12.19	18.08

Date	A.R. Geoc.	Dec. Geoc.	R A.U.	Distance A.U.	Light (m)	El. °	Diam. "	Mag.	Rise	Transit	Set
14-Mar	23h 34m 11.40s	-03° 34' 53.9"	20.09883	21.092765	175.42	1.2	3.3	5.9	6.26	12.15	18.04
15-Mar	23h 34m 24.03s	-03° 33' 32.2"	20.09883	21.092637	175.42	2.0	3.3	5.9	6.22	12.11	18.01
16-Mar	23h 34m 36.66s	-03° 32' 10.7"	20.09883	21.092231	175.42	2.9	3.3	5.9	6.18	12.08	17.57
17-Mar	23h 34m 49.29s	-03° 30' 49.3"	20.09883	21.091548	175.41	3.8	3.3	5.9	6.14	12.04	17.53
18-Mar	23h 35m 01.91s	-03° 29' 28.0"	20.09883	21.090587	175.41	4.7	3.3	5.9	6.10	12.00	17.50
19-Mar	23h 35m 14.52s	-03° 28' 06.8"	20.09883	21.089348	175.39	5.6	3.3	5.9	6.07	11.56	17.46
20-Mar	23h 35m 27.11s	-03° 26' 45.8"	20.09883	21.087833	175.38	6.5	3.3	5.9	6.03	11.53	17.42
21-Mar	23h 35m 39.68s	-03° 25' 24.8"	20.09883	21.086040	175.37	7.5	3.3	5.9	5.59	11.49	17.39
22-Mar	23h 35m 52.24s	-03° 24' 04.0"	20.09883	21.083971	175.35	8.4	3.3	5.9	5.55	11.45	17.35
23-Mar	23h 36m 04.77s	-03° 22' 43.5"	20.09883	21.081626	175.33	9.3	3.3	5.9	5.51	11.41	17.32
24-Mar	23h 36m 17.27s	-03° 21' 23.1"	20.09883	21.079005	175.31	10.3	3.3	5.9	5.48	11.38	17.28
25-Mar	23h 36m 29.74s	-03° 20' 02.9"	20.09882	21.076110	175.28	11.2	3.3	5.9	5.44	11.34	17.24
26-Mar	23h 36m 42.18s	-03° 18' 43.0"	20.09882	21.072941	175.26	12.1	3.3	5.9	5.40	11.30	17.21
27-Mar	23h 36m 54.59s	-03° 17' 23.3"	20.09882	21.069500	175.23	13.1	3.3	5.9	5.36	11.27	17.17
28-Mar	23h 37m 06.96s	-03° 16' 03.8"	20.09882	21.065786	175.20	14.0	3.3	5.9	5.32	11.23	17.13
29-Mar	23h 37m 19.30s	-03° 14' 44.6"	20.09882	21.061803	175.17	14.9	3.3	5.9	5.29	11.19	17.10
30-Mar	23h 37m 31.60s	-03° 13' 25.7"	20.09882	21.057550	175.13	15.9	3.3	5.9	5.25	11.15	17.06
31-Mar	23h 37m 43.86s	-03° 12' 07.0"	20.09882	21.053030	175.09	16.8	3.3	5.9	5.21	11.12	17.02
1-Apr	23h 37m 56.07s	-03° 10' 48.7"	20.09882	21.048245	175.05	17.7	3.3	5.9	5.17	11.08	16.59
2-Apr	23h 38m 08.24s	-03° 09' 30.7"	20.09882	21.043196	175.01	18.7	3.3	5.9	5.13	11.04	16.55
3-Apr	23h 38m 20.36s	-03° 08' 13.1"	20.09881	21.037885	174.97	19.6	3.3	5.9	5.10	11.00	16.51
4-Apr	23h 38m 32.42s	-03° 06' 55.9"	20.09881	21.032315	174.92	20.5	3.3	5.9	5.06	10.57	16.48
5-Apr	23h 38m 44.42s	-03° 05' 39.0"	20.09881	21.026486	174.87	21.5	3.3	5.9	5.02	10.53	16.44
6-Apr	23h 38m 56.36s	-03° 04' 22.6"	20.09881	21.020402	174.82	22.4	3.3	5.9	4.58	10.49	16.40
7-Apr	23h 39m 08.24s	-03° 03' 06.7"	20.09881	21.014064	174.77	23.3	3.3	5.9	4.54	10.46	16.37
8-Apr	23h 39m 20.05s	-03° 01' 51.1"	20.09881	21.007475	174.71	24.3	3.3	5.9	4.51	10.42	16.33
9-Apr	23h 39m 31.79s	-03° 00' 36.1"	20.09881	21.000635	174.66	25.2	3.3	5.9	4.47	10.38	16.29
10-Apr	23h 39m 43.48s	-02° 59' 21.4"	20.09880	20.993547	174.60	26.1	3.3	5.9	4.43	10.34	16.26
11-Apr	23h 39m 55.09s	-02° 58' 07.2"	20.09880	20.986212	174.54	27.0	3.3	5.9	4.39	10.31	16.22
12-Apr	23h 40m 06.64s	-02° 56' 53.5"	20.09880	20.978633	174.47	28.0	3.3	5.9	4.35	10.27	16.18
13-Apr	23h 40m 18.12s	-02° 55' 40.3"	20.09880	20.970811	174.41	28.9	3.3	5.9	4.31	10.23	16.15
14-Apr	23h 40m 29.52s	-02° 54' 27.5"	20.09880	20.962749	174.34	29.8	3.3	5.9	4.28	10.19	16.11
15-Apr	23h 40m 40.84s	-02° 53' 15.3"	20.09880	20.954447	174.27	30.7	3.3	5.9	4.24	10.16	16.07
16-Apr	23h 40m 52.09s	-02° 52' 03.6"	20.09879	20.945908	174.20	31.7	3.3	5.9	4.20	10.12	16.04
17-Apr	23h 41m 03.25s	-02° 50' 52.5"	20.09879	20.937135	174.13	32.6	3.4	5.9	4.16	10.08	16.00
18-Apr	23h 41m 14.33s	-02° 49' 42.0"	20.09879	20.928129	174.05	33.5	3.4	5.9	4.12	10.04	15.56
19-Apr	23h 41m 25.32s	-02° 48' 32.1"	20.09879	20.918892	173.98	34.5	3.4	5.9	4.09	10.01	15.53
20-Apr	23h 41m 36.21s	-02° 47' 22.8"	20.09879	20.909427	173.90	35.4	3.4	5.9	4.05	9.57	15.49
21-Apr	23h 41m 47.02s	-02° 46' 14.1"	20.09878	20.899737	173.82	36.3	3.4	5.9	4.01	9.53	15.45
22-Apr	23h 41m 57.72s	-02° 45' 06.1"	20.09878	20.889822	173.74	37.2	3.4	5.9	3.57	9.49	15.42
23-Apr	23h 42m 08.33s	-02° 43' 58.7"	20.09878	20.879687	173.65	38.2	3.4	5.9	3.53	9.46	15.38
24-Apr	23h 42m 18.85s	-02° 42' 52.0"	20.09878	20.869334	173.56	39.1	3.4	5.9	3.49	9.42	15.34
25-Apr	23h 42m 29.26s	-02° 41' 45.9"	20.09878	20.858766	173.48	40.0	3.4	5.9	3.46	9.38	15.31
26-Apr	23h 42m 39.58s	-02° 40' 40.5"	20.09877	20.847986	173.39	40.9	3.4	5.9	3.42	9.34	15.27
27-Apr	23h 42m 49.79s	-02° 39' 35.8"	20.09877	20.836997	173.30	41.9	3.4	5.9	3.38	9.31	15.23
28-Apr	23h 42m 59.90s	-02° 38' 31.8"	20.09877	20.825802	173.20	42.8	3.4	5.9	3.34	9.27	15.19
29-Apr	23h 43m 09.90s	-02° 37' 28.5"	20.09877	20.814405	173.11	43.7	3.4	5.9	3.30	9.23	15.16
30-Apr	23h 43m 19.79s	-02° 36' 26.0"	20.09876	20.802809	173.01	44.7	3.4	5.9	3.26	9.19	15.12
1-May	23h 43m 29.56s	-02° 35' 24.3"	20.09876	20.791018	172.91	45.6	3.4	5.9	3.23	9.15	15.08
2-May	23h 43m 39.22s	-02° 34' 23.3"	20.09876	20.779036	172.81	46.5	3.4	5.9	3.19	9.12	15.05
3-May	23h 43m 48.75s	-02° 33' 23.2"	20.09876	20.766865	172.71	47.4	3.4	5.9	3.15	9.08	15.01
4-May	23h 43m 58.16s	-02° 32' 23.9"	20.09875	20.754510	172.61	48.4	3.4	5.9	3.11	9.04	14.57
5-May	23h 44m 07.45s	-02° 31' 25.3"	20.09875	20.741973	172.51	49.3	3.4	5.9	3.07	9.00	14.53
6-May	23h 44m 16.61s	-02° 30' 27.6"	20.09875	20.729259	172.40	50.2	3.4	5.9	3.03	8.57	14.50
7-May	23h 44m 25.65s	-02° 29' 30.8"	20.09875	20.716370	172.29	51.1	3.4	5.9	3.00	8.53	14.46
8-May	23h 44m 34.57s	-02° 28' 34.7"	20.09874	20.703310	172.18	52.1	3.4	5.9	2.56	8.49	14.42
9-May	23h 44m 43.36s	-02° 27' 39.5"	20.09874	20.690081	172.07	53.0	3.4	5.9	2.52	8.45	14.39
10-May	23h 44m 52.03s	-02° 26' 45.1"	20.09874	20.676688	171.96	53.9	3.4	5.9	2.48	8.41	14.35
11-May	23h 45m 00.57s	-02° 25' 51.6"	20.09874	20.663134	171.85	54.9	3.4	5.9	2.44	8.38	14.31
12-May	23h 45m 08.98s	-02° 24' 58.9"	20.09873	20.649421	171.74	55.8	3.4	5.9	2.40	8.34	14.27
13-May	23h 45m 17.25s	-02° 24' 07.1"	20.09873	20.635553	171.62	56.7	3.4	5.9	2.37	8.30	14.24
14-May	23h 45m 25.39s	-02° 23' 16.3"	20.09873	20.621534	171.50	57.6	3.4	5.9	2.33	8.26	14.20
15-May	23h 45m 33.39s	-02° 22' 26.3"	20.09872	20.607366	171.39	58.6	3.4	5.9	2.29	8.22	14.16
16-May	23h 45m 41.24s	-02° 21' 37.3"	20.09872	20.593054	171.27	59.5	3.4	5.9	2.25	8.19	14.12
17-May	23h 45m 48.96s	-02° 20' 49.3"	20.09872	20.578601	171.15	60.4	3.4	5.9	2.21	8.15	14.09
18-May	23h 45m 56.52s	-02° 20' 02.1"	20.09871	20.564010	171.03	61.4	3.4	5.9	2.17	8.11	14.05
19-May	23h 46m 03.95s	-02° 19' 16.0"	20.09871	20.549286	170.90	62.3	3.4	5.9	2.13	8.07	14.01
20-May	23h 46m 11.22s	-02° 18' 30.9"	20.09871	20.534432	170.78	63.2	3.4	5.9	2.10	8.03	13.57
21-May	23h 46m 18.35s	-02° 17' 46.7"	20.09871	20.519452	170.65	64.1	3.4	5.9	2.06	8.00	13.54
22-May	23h 46m 25.33s	-02° 17' 03.5"	20.09870	20.504349	170.53	65.1	3.4	5.9	2.02	7.56	13.50
23-May	23h 46m 32.16s	-02° 16' 21.2"	20.09870	20.489129	170.40	66.0	3.4	5.9	1.58	7.52	13.46
24-May	23h 46m 38.85s	-02° 15' 40.0"	20.09870	20.473795	170.28	66.9	3.4	5.9	1.54	7.48	13.42
25-May	23h 46m 45.38s	-02° 14' 59.7"	20.09869	20.458352	170.15	67.9	3.4	5.9	1.50	7.44	13.38
26-May	23h 46m 51.77s	-02° 14' 20.5"	20.09869	20.442804	170.02	68.8	3.4	5.9	1.46	7.41	13.35
27-May	23h 46m 57.99s	-02° 13' 42.3"	20.09869	20.427156	169.89	69.7	3.4	5.9	1.43	7.37	13.31
28-May	23h 47m 04.05s	-02° 13' 05.1"	20.09868	20.411413	169.76	70.7	3.4	5.9	1.39	7.33	13.27
29-May	23h 47m 09.95s	-02° 12' 29.0"	20.09868	20.395579	169.62	71.6	3.4	5.9	1.35	7.29	13.23

Date	A.R. Geoc.	Dec. Geoc.	R A.U.	Distance A.U.	Light (m)	El. °	Diam. "	Mag.	Rise	Transit	Set
30-May	23h 47m 15.69s	-02° 11' 54.0"	20.09867	20.379658	169.49	72.5	3.4	5.9	1.31	7.25	13.19
31-May	23h 47m 21.26s	-02° 11' 20.1"	20.09867	20.363656	169.36	73.5	3.4	5.9	1.27	7.21	13.16
1-Jun	23h 47m 26.66s	-02° 10' 47.3"	20.09867	20.347577	169.23	74.4	3.4	5.9	1.23	7.17	13.12
2-Jun	23h 47m 31.91s	-02° 10' 15.6"	20.09866	20.331425	169.09	75.3	3.4	5.9	1.19	7.14	13.08
3-Jun	23h 47m 36.98s	-02° 09' 44.9"	20.09866	20.315204	168.96	76.3	3.5	5.9	1.15	7.10	13.04
4-Jun	23h 47m 41.90s	-02° 09' 15.3"	20.09866	20.298919	168.82	77.2	3.5	5.9	1.12	7.06	13.00
5-Jun	23h 47m 46.65s	-02° 08' 46.7"	20.09865	20.282573	168.68	78.1	3.5	5.9	1.08	7.02	12.56
6-Jun	23h 47m 51.24s	-02° 08' 19.3"	20.09865	20.266171	168.55	79.1	3.5	5.8	1.04	6.58	12.53
7-Jun	23h 47m 55.66s	-02° 07' 52.9"	20.09864	20.249718	168.41	80.0	3.5	5.8	1.00	6.54	12.49
8-Jun	23h 47m 59.92s	-02° 07' 27.6"	20.09864	20.233216	168.27	81.0	3.5	5.8	0.56	6.51	12.45
9-Jun	23h 48m 04.00s	-02° 07' 03.4"	20.09864	20.216672	168.14	81.9	3.5	5.8	0.52	6.47	12.41
10-Jun	23h 48m 07.92s	-02° 06' 40.3"	20.09863	20.200087	168.00	82.8	3.5	5.8	0.48	6.43	12.37
11-Jun	23h 48m 11.66s	-02° 06' 18.4"	20.09863	20.183467	167.86	83.8	3.5	5.8	0.44	6.39	12.33
12-Jun	23h 48m 15.23s	-02° 05' 57.5"	20.09862	20.166817	167.72	84.7	3.5	5.8	0.40	6.35	12.30
13-Jun	23h 48m 18.63s	-02° 05' 37.9"	20.09862	20.150139	167.58	85.6	3.5	5.8	0.37	6.31	12.26
14-Jun	23h 48m 21.85s	-02° 05' 19.4"	20.09862	20.133439	167.44	86.6	3.5	5.8	0.33	6.27	12.22
15-Jun	23h 48m 24.89s	-02° 05' 02.0"	20.09861	20.116722	167.31	87.5	3.5	5.8	0.29	6.23	12.18
16-Jun	23h 48m 27.76s	-02° 04' 45.7"	20.09861	20.099990	167.17	88.5	3.5	5.8	0.25	6.20	12.14
17-Jun	23h 48m 30.45s	-02° 04' 30.6"	20.09860	20.083250	167.03	89.4	3.5	5.8	0.21	6.16	12.10
18-Jun	23h 48m 32.97s	-02° 04' 16.7"	20.09860	20.066505	166.89	90.4	3.5	5.8	0.17	6.12	12.06
19-Jun	23h 48m 35.32s	-02° 04' 03.9"	20.09859	20.049760	166.75	91.3	3.5	5.8	0.13	6.08	12.03
20-Jun	23h 48m 37.49s	-02° 03' 52.2"	20.09859	20.033021	166.61	92.3	3.5	5.8	0.09	6.04	11.59
21-Jun	23h 48m 39.49s	-02° 03' 41.6"	20.09859	20.016291	166.47	93.2	3.5	5.8	0.05	6.00	11.55
22-Jun	23h 48m 41.31s	-02° 03' 32.2"	20.09858	19.999576	166.33	94.1	3.5	5.8	0.01	5.56	11.51
23-Jun	23h 48m 42.95s	-02° 03' 24.0"	20.09858	19.982882	166.19	95.1	3.5	5.8	23.54	5.52	11.47
24-Jun	23h 48m 44.42s	-02° 03' 16.9"	20.09857	19.966212	166.05	96.0	3.5	5.8	23.50	5.48	11.43
25-Jun	23h 48m 45.70s	-02° 03' 11.0"	20.09857	19.949573	165.92	97.0	3.5	5.8	23.46	5.44	11.39
26-Jun	23h 48m 46.80s	-02° 03' 06.3"	20.09856	19.932970	165.78	97.9	3.5	5.8	23.42	5.41	11.35
27-Jun	23h 48m 47.71s	-02° 03' 02.8"	20.09856	19.916406	165.64	98.9	3.5	5.8	23.38	5.37	11.31
28-Jun	23h 48m 48.45s	-02° 03' 00.4"	20.09855	19.899888	165.50	99.8	3.5	5.8	23.34	5.33	11.27
29-Jun	23h 48m 49.00s	-02° 02' 59.2"	20.09855	19.883420	165.37	100.8	3.5	5.8	23.30	5.29	11.23
30-Jun	23h 48m 49.38s	-02° 02' 59.2"	20.09854	19.867006	165.23	101.7	3.5	5.8	23.26	5.25	11.20
1-Jul	23h 48m 49.58s	-02° 03' 00.3"	20.09854	19.850652	165.09	102.7	3.5	5.8	23.22	5.21	11.16
2-Jul	23h 48m 49.61s	-02° 03' 02.5"	20.09853	19.834361	164.96	103.6	3.5	5.8	23.18	5.17	11.12
3-Jul	23h 48m 49.46s	-02° 03' 05.8"	20.09853	19.818137	164.82	104.6	3.5	5.8	23.14	5.13	11.08
4-Jul	23h 48m 49.14s	-02° 03' 10.3"	20.09852	19.801987	164.69	105.6	3.5	5.8	23.10	5.09	11.04
5-Jul	23h 48m 48.64s	-02° 03' 15.8"	20.09852	19.785912	164.55	106.5	3.5	5.8	23.07	5.05	11.00
6-Jul	23h 48m 47.97s	-02° 03' 22.6"	20.09851	19.769919	164.42	107.5	3.5	5.8	23.03	5.01	10.56
7-Jul	23h 48m 47.12s	-02° 03' 30.4"	20.09851	19.754011	164.29	108.4	3.6	5.8	22.59	4.57	10.52
8-Jul	23h 48m 46.10s	-02° 03' 39.4"	20.09850	19.738193	164.16	109.4	3.6	5.8	22.55	4.53	10.48
9-Jul	23h 48m 44.90s	-02° 03' 49.5"	20.09850	19.722468	164.03	110.3	3.6	5.8	22.51	4.49	10.44
10-Jul	23h 48m 43.52s	-02° 04' 00.7"	20.09849	19.706841	163.90	111.3	3.6	5.8	22.47	4.45	10.40
11-Jul	23h 48m 41.97s	-02° 04' 13.1"	20.09849	19.691317	163.77	112.3	3.6	5.8	22.43	4.41	10.36
12-Jul	23h 48m 40.25s	-02° 04' 26.6"	20.09848	19.675900	163.64	113.2	3.6	5.8	22.39	4.37	10.32
13-Jul	23h 48m 38.35s	-02° 04' 41.2"	20.09848	19.660593	163.51	114.2	3.6	5.8	22.35	4.34	10.28
14-Jul	23h 48m 36.28s	-02° 04' 56.9"	20.09847	19.645403	163.39	115.1	3.6	5.8	22.31	4.30	10.24
15-Jul	23h 48m 34.03s	-02° 05' 13.7"	20.09846	19.630332	163.26	116.1	3.6	5.8	22.27	4.26	10.20
16-Jul	23h 48m 31.63s	-02° 05' 31.5"	20.09846	19.615386	163.14	117.1	3.6	5.8	22.23	4.22	10.16
17-Jul	23h 48m 29.05s	-02° 05' 50.4"	20.09845	19.600569	163.01	118.0	3.6	5.8	22.19	4.18	10.12
18-Jul	23h 48m 26.31s	-02° 06' 10.4"	20.09845	19.585886	162.89	119.0	3.6	5.8	22.15	4.14	10.08
19-Jul	23h 48m 23.41s	-02° 06' 31.4"	20.09844	19.571341	162.77	120.0	3.6	5.8	22.11	4.10	10.04
20-Jul	23h 48m 20.34s	-02° 06' 53.5"	20.09844	19.556939	162.65	120.9	3.6	5.8	22.07	4.06	10.00
21-Jul	23h 48m 17.11s	-02° 07' 16.6"	20.09843	19.542685	162.53	121.9	3.6	5.8	22.03	4.02	9.56
22-Jul	23h 48m 13.71s	-02° 07' 40.8"	20.09843	19.528584	162.41	122.9	3.6	5.8	21.59	3.58	9.52
23-Jul	23h 48m 10.15s	-02° 08' 06.0"	20.09842	19.514641	162.30	123.9	3.6	5.8	21.55	3.54	9.48
24-Jul	23h 48m 06.42s	-02° 08' 32.3"	20.09841	19.500859	162.18	124.8	3.6	5.8	21.51	3.50	9.44
25-Jul	23h 48m 02.53s	-02° 08' 59.6"	20.09841	19.487244	162.07	125.8	3.6	5.8	21.47	3.46	9.40
26-Jul	23h 47m 58.47s	-02° 09' 28.0"	20.09840	19.473800	161.96	126.8	3.6	5.8	21.43	3.42	9.36
27-Jul	23h 47m 54.26s	-02° 09' 57.3"	20.09840	19.460530	161.85	127.8	3.6	5.8	21.39	3.38	9.32
28-Jul	23h 47m 49.90s	-02° 10' 27.6"	20.09839	19.447440	161.74	128.7	3.6	5.8	21.35	3.34	9.28
29-Jul	23h 47m 45.39s	-02° 10' 58.8"	20.09838	19.434532	161.63	129.7	3.6	5.8	21.32	3.30	9.24
30-Jul	23h 47m 40.74s	-02° 11' 30.9"	20.09838	19.421811	161.53	130.7	3.6	5.8	21.28	3.26	9.20
31-Jul	23h 47m 35.93s	-02° 12' 03.9"	20.09837	19.409280	161.42	131.7	3.6	5.8	21.24	3.22	9.16
1-Aug	23h 47m 30.99s	-02° 12' 37.9"	20.09836	19.396943	161.32	132.6	3.6	5.8	21.20	3.18	9.12
2-Aug	23h 47m 25.89s	-02° 13' 12.8"	20.09836	19.384803	161.22	133.6	3.6	5.8	21.16	3.14	9.08
3-Aug	23h 47m 20.66s	-02° 13' 48.5"	20.09835	19.372864	161.12	134.6	3.6	5.8	21.12	3.10	9.04
4-Aug	23h 47m 15.29s	-02° 14' 25.1"	20.09835	19.361129	161.02	135.6	3.6	5.8	21.08	3.06	9.00
5-Aug	23h 47m 09.77s	-02° 15' 02.6"	20.09834	19.349602	160.93	136.6	3.6	5.8	21.04	3.02	8.56
6-Aug	23h 47m 04.12s	-02° 15' 41.0"	20.09833	19.338286	160.83	137.5	3.6	5.8	21.00	2.58	8.52
7-Aug	23h 46m 58.33s	-02° 16' 20.3"	20.09833	19.327184	160.74	138.5	3.6	5.8	20.56	2.54	8.47
8-Aug	23h 46m 52.41s	-02° 17' 00.3"	20.09832	19.316300	160.65	139.5	3.6	5.8	20.52	2.50	8.43
9-Aug	23h 46m 46.36s	-02° 17' 41.2"	20.09831	19.305638	160.56	140.5	3.6	5.8	20.48	2.45	8.39
10-Aug	23h 46m 40.17s	-02° 18' 22.9"	20.09831	19.295200	160.47	141.5	3.6	5.8	20.44	2.41	8.35
11-Aug	23h 46m 33.87s	-02° 19' 05.3"	20.09830	19.284989	160.39	142.5	3.6	5.8	20.40	2.37	8.31
12-Aug	23h 46m 27.44s	-02° 19' 48.5"	20.09829	19.275010	160.31	143.5	3.6	5.8	20.36	2.33	8.27
13-Aug	23h 46m 20.89s	-02° 20' 32.4"	20.09829	19.265266	160.22	144.5	3.6	5.7	20.32	2.29	8.23
14-Aug	23h 46m 14.23s	-02° 21' 17.1"	20.09828	19.255759	160.15	145.4	3.6	5.7	20.28	2.25	8.19

Date	A.R. Geoc.	Dec. Geoc.	R A.U.	Distance A.U.	Light (m)	El. °	Diam. "	Mag.	Rise	Transit	Set
15-Aug	23h 46m 07.46s	-02° 22' 02.4"	20.09827	19.246494	160.07	146.4	3.6	5.7	20.24	2.21	8.15
16-Aug	23h 46m 00.57s	-02° 22' 48.4"	20.09827	19.237474	159.99	147.4	3.6	5.7	20.20	2.17	8.11
17-Aug	23h 45m 53.58s	-02° 23' 35.1"	20.09826	19.228702	159.92	148.4	3.6	5.7	20.16	2.13	8.07
18-Aug	23h 45m 46.47s	-02° 24' 22.4"	20.09825	19.220182	159.85	149.4	3.6	5.7	20.12	2.09	8.03
19-Aug	23h 45m 39.26s	-02° 25' 10.4"	20.09824	19.211916	159.78	150.4	3.7	5.7	20.08	2.05	7.58
20-Aug	23h 45m 31.94s	-02° 25' 59.1"	20.09824	19.203909	159.71	151.4	3.7	5.7	20.04	2.01	7.54
21-Aug	23h 45m 24.52s	-02° 26' 48.4"	20.09823	19.196163	159.65	152.4	3.7	5.7	20.00	1.57	7.50
22-Aug	23h 45m 16.99s	-02° 27' 38.3"	20.09822	19.188681	159.59	153.4	3.7	5.7	19.56	1.53	7.46
23-Aug	23h 45m 09.38s	-02° 28' 28.7"	20.09822	19.181465	159.53	154.4	3.7	5.7	19.52	1.49	7.42
24-Aug	23h 45m 01.67s	-02° 29' 19.7"	20.09821	19.174519	159.47	155.4	3.7	5.7	19.48	1.45	7.38
25-Aug	23h 44m 53.89s	-02° 30' 11.1"	20.09820	19.167844	159.41	156.4	3.7	5.7	19.44	1.41	7.34
26-Aug	23h 44m 46.02s	-02° 31' 03.1"	20.09819	19.161442	159.36	157.4	3.7	5.7	19.40	1.37	7.30
27-Aug	23h 44m 38.07s	-02° 31' 55.4"	20.09819	19.155315	159.31	158.4	3.7	5.7	19.36	1.33	7.26
28-Aug	23h 44m 30.06s	-02° 32' 48.3"	20.09818	19.149466	159.26	159.4	3.7	5.7	19.32	1.29	7.21
29-Aug	23h 44m 21.97s	-02° 33' 41.5"	20.09817	19.143896	159.21	160.4	3.7	5.7	19.28	1.24	7.17
30-Aug	23h 44m 13.81s	-02° 34' 35.1"	20.09816	19.138606	159.17	161.4	3.7	5.7	19.24	1.20	7.13
31-Aug	23h 44m 05.58s	-02° 35' 29.1"	20.09816	19.133599	159.13	162.4	3.7	5.7	19.20	1.16	7.09
1-Sep	23h 43m 57.29s	-02° 36' 23.5"	20.09815	19.128875	159.09	163.4	3.7	5.7	19.16	1.12	7.05
2-Sep	23h 43m 48.94s	-02° 37' 18.2"	20.09814	19.124436	159.05	164.4	3.7	5.7	19.12	1.08	7.01
3-Sep	23h 43m 40.53s	-02° 38' 13.3"	20.09813	19.120285	159.02	165.4	3.7	5.7	19.08	1.04	6.57
4-Sep	23h 43m 32.06s	-02° 39' 08.7"	20.09813	19.116421	158.99	166.4	3.7	5.7	19.03	1.00	6.53
5-Sep	23h 43m 23.54s	-02° 40' 04.3"	20.09812	19.112846	158.96	167.4	3.7	5.7	18.59	0.56	6.48
6-Sep	23h 43m 14.97s	-02° 41' 00.2"	20.09811	19.109562	158.93	168.4	3.7	5.7	18.55	0.52	6.44
7-Sep	23h 43m 06.37s	-02° 41' 56.4"	20.09810	19.106570	158.90	169.4	3.7	5.7	18.51	0.48	6.40
8-Sep	23h 42m 57.72s	-02° 42' 52.7"	20.09810	19.103872	158.88	170.4	3.7	5.7	18.47	0.44	6.36
9-Sep	23h 42m 49.04s	-02° 43' 49.2"	20.09809	19.101467	158.86	171.4	3.7	5.7	18.43	0.40	6.32
10-Sep	23h 42m 40.33s	-02° 44' 45.8"	20.09808	19.099358	158.84	172.5	3.7	5.7	18.39	0.36	6.28
11-Sep	23h 42m 31.59s	-02° 45' 42.6"	20.09807	19.097546	158.83	173.5	3.7	5.7	18.35	0.32	6.24
12-Sep	23h 42m 22.83s	-02° 46' 39.4"	20.09806	19.096032	158.82	174.5	3.7	5.7	18.31	0.27	6.20
13-Sep	23h 42m 14.05s	-02° 47' 36.4"	20.09806	19.094816	158.81	175.5	3.7	5.7	18.27	0.23	6.15
14-Sep	23h 42m 05.25s	-02° 48' 33.4"	20.09805	19.093901	158.80	176.5	3.7	5.7	18.23	0.19	6.11
15-Sep	23h 41m 56.43s	-02° 49' 30.5"	20.09804	19.093287	158.79	177.5	3.7	5.7	18.19	0.15	6.07
16-Sep	23h 41m 47.60s	-02° 50' 27.6"	20.09803	19.092975	158.79	178.4	3.7	5.7	18.15	0.11	6.03
17-Sep	23h 41m 38.75s	-02° 51' 24.8"	20.09802	19.092965	158.79	179.2	3.7	5.7	18.11	0.07	5.59
18-Sep	23h 41m 29.90s	-02° 52' 21.9"	20.09801	19.093259	158.79	179.1	3.7	5.7	18.07	0.03	5.55
19-Sep	23h 41m 21.05s	-02° 53' 19.0"	20.09801	19.093856	158.80	178.2	3.7	5.7	18.03	23.55	5.51
20-Sep	23h 41m 12.20s	-02° 54' 16.0"	20.09800	19.094756	158.81	177.3	3.7	5.7	17.59	23.51	5.46
21-Sep	23h 41m 03.36s	-02° 55' 12.8"	20.09799	19.095960	158.82	176.3	3.7	5.7	17.55	23.47	5.42
22-Sep	23h 40m 54.54s	-02° 56' 09.6"	20.09798	19.097466	158.83	175.3	3.7	5.7	17.51	23.43	5.38
23-Sep	23h 40m 45.74s	-02° 57' 06.1"	20.09797	19.099275	158.84	174.3	3.7	5.7	17.47	23.39	5.34
24-Sep	23h 40m 36.96s	-02° 58' 02.4"	20.09796	19.101386	158.86	173.2	3.7	5.7	17.43	23.34	5.30
25-Sep	23h 40m 28.20s	-02° 58' 58.5"	20.09795	19.103797	158.88	172.2	3.7	5.7	17.39	23.30	5.26
26-Sep	23h 40m 19.47s	-02° 59' 54.4"	20.09795	19.106508	158.90	171.2	3.7	5.7	17.35	23.26	5.22
27-Sep	23h 40m 10.78s	-03° 00' 50.1"	20.09794	19.109519	158.93	170.2	3.7	5.7	17.31	23.22	5.17
28-Sep	23h 40m 02.11s	-03° 01' 45.4"	20.09793	19.112827	158.96	169.2	3.7	5.7	17.27	23.18	5.13
29-Sep	23h 39m 53.49s	-03° 02' 40.5"	20.09792	19.116432	158.99	168.1	3.7	5.7	17.23	23.14	5.09
30-Sep	23h 39m 44.90s	-03° 03' 35.3"	20.09791	19.120333	159.02	167.1	3.7	5.7	17.19	23.10	5.05
1-Oct	23h 39m 36.36s	-03° 04' 29.7"	20.09790	19.124528	159.05	166.1	3.7	5.7	17.15	23.06	5.01
2-Oct	23h 39m 27.87s	-03° 05' 23.7"	20.09789	19.129016	159.09	165.1	3.7	5.7	17.11	23.02	4.57
3-Oct	23h 39m 19.42s	-03° 06' 17.4"	20.09788	19.133796	159.13	164.1	3.7	5.7	17.07	22.58	4.53
4-Oct	23h 39m 11.03s	-03° 07' 10.7"	20.09788	19.138866	159.17	163.0	3.7	5.7	17.03	22.54	4.49
5-Oct	23h 39m 02.71s	-03° 08' 03.5"	20.09787	19.144226	159.22	162.0	3.7	5.7	16.59	22.50	4.44
6-Oct	23h 38m 54.45s	-03° 08' 55.9"	20.09786	19.149872	159.26	161.0	3.7	5.7	16.55	22.46	4.40
7-Oct	23h 38m 46.25s	-03° 09' 47.7"	20.09785	19.155805	159.31	160.0	3.7	5.7	16.51	22.41	4.36
8-Oct	23h 38m 38.13s	-03° 10' 39.0"	20.09784	19.162022	159.37	159.0	3.7	5.7	16.47	22.37	4.32
9-Oct	23h 38m 30.09s	-03° 11' 29.9"	20.09783	19.168522	159.42	157.9	3.7	5.7	16.43	22.33	4.28
10-Oct	23h 38m 22.13s	-03° 12' 20.1"	20.09782	19.175303	159.48	156.9	3.7	5.7	16.39	22.29	4.24
11-Oct	23h 38m 14.24s	-03° 13' 09.8"	20.09781	19.182364	159.53	155.9	3.7	5.7	16.35	22.25	4.20
12-Oct	23h 38m 06.44s	-03° 13' 58.9"	20.09780	19.189704	159.60	154.9	3.7	5.7	16.31	22.21	4.16
13-Oct	23h 37m 58.71s	-03° 14' 47.4"	20.09779	19.197320	159.66	153.8	3.7	5.7	16.27	22.17	4.12
14-Oct	23h 37m 51.08s	-03° 15' 35.4"	20.09778	19.205210	159.72	152.8	3.7	5.7	16.23	22.13	4.07
15-Oct	23h 37m 43.53s	-03° 16' 22.7"	20.09777	19.213372	159.79	151.8	3.7	5.7	16.19	22.09	4.03
16-Oct	23h 37m 36.08s	-03° 17' 09.3"	20.09776	19.221805	159.86	150.8	3.6	5.7	16.15	22.05	3.59
17-Oct	23h 37m 28.73s	-03° 17' 55.2"	20.09776	19.230504	159.94	149.8	3.6	5.7	16.11	22.01	3.55
18-Oct	23h 37m 21.49s	-03° 18' 40.5"	20.09775	19.239469	160.01	148.7	3.6	5.7	16.07	21.57	3.51
19-Oct	23h 37m 14.36s	-03° 19' 24.9"	20.09774	19.248694	160.09	147.7	3.6	5.7	16.03	21.53	3.47
20-Oct	23h 37m 07.34s	-03° 20' 08.6"	20.09773	19.258179	160.17	146.7	3.6	5.7	15.59	21.49	3.43
21-Oct	23h 37m 00.43s	-03° 20' 51.4"	20.09772	19.267918	160.25	145.7	3.6	5.7	15.55	21.45	3.39
22-Oct	23h 36m 53.65s	-03° 21' 33.5"	20.09771	19.277910	160.33	144.6	3.6	5.8	15.51	21.41	3.35
23-Oct	23h 36m 46.98s	-03° 22' 14.7"	20.09770	19.288150	160.41	143.6	3.6	5.8	15.47	21.37	3.31
24-Oct	23h 36m 40.44s	-03° 22' 55.1"	20.09769	19.298635	160.50	142.6	3.6	5.8	15.43	21.33	3.27
25-Oct	23h 36m 34.03s	-03° 23' 34.7"	20.09768	19.309361	160.59	141.6	3.6	5.8	15.39	21.29	3.22
26-Oct	23h 36m 27.74s	-03° 24' 13.4"	20.09767	19.320325	160.68	140.5	3.6	5.8	15.35	21.25	3.18
27-Oct	23h 36m 21.58s	-03° 24' 51.3"	20.09766	19.331523	160.78	139.5	3.6	5.8	15.31	21.20	3.14
28-Oct	23h 36m 15.55s	-03° 25' 28.2"	20.09765	19.342951	160.87	138.5	3.6	5.8	15.27	21.16	3.10
29-Oct	23h 36m 09.65s	-03° 26' 04.3"	20.09764	19.354606	160.97	137.5	3.6	5.8	15.23	21.12	3.06
30-Oct	23h 36m 03.90s	-03° 26' 39.4"	20.09763	19.366483	161.07	136.4	3.6	5.8	15.19	21.08	3.02

Date	A.R. Geoc.	Dec. Geoc.	R A.U.	Distance A.U.	Light (m)	El. °	Diam. "	Mag.	Rise	Transit	Set
31-Oct	23h 35m 58.28s	-03° 27' 13.6"	20.09762	19.378579	161.17	135.4	3.6	5.8	15.15	21.04	2.58
1-Nov	23h 35m 52.80s	-03° 27' 46.8"	20.09761	19.390891	161.27	134.4	3.6	5.8	15.11	21.00	2.54
2-Nov	23h 35m 47.48s	-03° 28' 19.1"	20.09760	19.403414	161.37	133.4	3.6	5.8	15.07	20.56	2.50
3-Nov	23h 35m 42.30s	-03° 28' 50.3"	20.09759	19.416144	161.48	132.3	3.6	5.8	15.03	20.52	2.46
4-Nov	23h 35m 37.28s	-03° 29' 20.5"	20.09758	19.429078	161.59	131.3	3.6	5.8	14.59	20.48	2.42
5-Nov	23h 35m 32.42s	-03° 29' 49.7"	20.09757	19.442212	161.70	130.3	3.6	5.8	14.55	20.44	2.38
6-Nov	23h 35m 27.70s	-03° 30' 17.9"	20.09756	19.455542	161.81	129.3	3.6	5.8	14.51	20.40	2.34
7-Nov	23h 35m 23.15s	-03° 30' 45.0"	20.09755	19.469064	161.92	128.2	3.6	5.8	14.47	20.36	2.30
8-Nov	23h 35m 18.75s	-03° 31' 11.1"	20.09754	19.482776	162.03	127.2	3.6	5.8	14.43	20.32	2.26
9-Nov	23h 35m 14.51s	-03° 31' 36.1"	20.09752	19.496672	162.15	126.2	3.6	5.8	14.39	20.28	2.22
10-Nov	23h 35m 10.43s	-03° 32' 00.2"	20.09751	19.510748	162.27	125.2	3.6	5.8	14.35	20.24	2.18
11-Nov	23h 35m 06.51s	-03° 32' 23.1"	20.09750	19.525001	162.38	124.1	3.6	5.8	14.31	20.20	2.14
12-Nov	23h 35m 02.75s	-03° 32' 45.0"	20.09749	19.539426	162.50	123.1	3.6	5.8	14.27	20.16	2.10
13-Nov	23h 34m 59.16s	-03° 33' 05.7"	20.09748	19.554019	162.63	122.1	3.6	5.8	14.23	20.12	2.06
14-Nov	23h 34m 55.74s	-03° 33' 25.3"	20.09747	19.568774	162.75	121.1	3.6	5.8	14.19	20.08	2.02
15-Nov	23h 34m 52.49s	-03° 33' 43.8"	20.09746	19.583688	162.87	120.1	3.6	5.8	14.15	20.04	1.58
16-Nov	23h 34m 49.42s	-03° 34' 01.1"	20.09745	19.598755	163.00	119.0	3.6	5.8	14.11	20.00	1.54
17-Nov	23h 34m 46.53s	-03° 34' 17.3"	20.09744	19.613970	163.12	118.0	3.6	5.8	14.07	19.56	1.50
18-Nov	23h 34m 43.82s	-03° 34' 32.2"	20.09743	19.629328	163.25	117.0	3.6	5.8	14.03	19.52	1.46
19-Nov	23h 34m 41.29s	-03° 34' 46.0"	20.09742	19.644824	163.38	116.0	3.6	5.8	13.59	19.48	1.42
20-Nov	23h 34m 38.94s	-03° 34' 58.6"	20.09741	19.660453	163.51	115.0	3.6	5.8	13.55	19.44	1.38
21-Nov	23h 34m 36.77s	-03° 35' 10.1"	20.09740	19.676209	163.64	113.9	3.6	5.8	13.51	19.41	1.34
22-Nov	23h 34m 34.78s	-03° 35' 20.4"	20.09739	19.692087	163.77	112.9	3.6	5.8	13.47	19.37	1.30
23-Nov	23h 34m 32.97s	-03° 35' 29.5"	20.09737	19.708082	163.91	111.9	3.6	5.8	13.43	19.33	1.26
24-Nov	23h 34m 31.34s	-03° 35' 37.4"	20.09736	19.724189	164.04	110.9	3.6	5.8	13.39	19.29	1.22
25-Nov	23h 34m 29.89s	-03° 35' 44.1"	20.09735	19.740403	164.18	109.9	3.6	5.8	13.36	19.25	1.18
26-Nov	23h 34m 28.62s	-03° 35' 49.6"	20.09734	19.756717	164.31	108.9	3.6	5.8	13.32	19.21	1.14
27-Nov	23h 34m 27.54s	-03° 35' 54.0"	20.09733	19.773128	164.45	107.8	3.5	5.8	13.28	19.17	1.10
28-Nov	23h 34m 26.65s	-03° 35' 57.1"	20.09732	19.789629	164.59	106.8	3.5	5.8	13.24	19.13	1.06
29-Nov	23h 34m 25.95s	-03° 35' 59.0"	20.09731	19.806216	164.72	105.8	3.5	5.8	13.20	19.09	1.02
30-Nov	23h 34m 25.43s	-03° 35' 59.6"	20.09730	19.822884	164.86	104.8	3.5	5.8	13.16	19.05	0.58
1-Dec	23h 34m 25.11s	-03° 35' 59.1"	20.09728	19.839628	165.00	103.8	3.5	5.8	13.12	19.01	0.54
2-Dec	23h 34m 24.98s	-03° 35' 57.3"	20.09727	19.856442	165.14	102.8	3.5	5.8	13.08	18.57	0.50
3-Dec	23h 34m 25.04s	-03° 35' 54.2"	20.09726	19.873323	165.28	101.7	3.5	5.8	13.04	18.53	0.46
4-Dec	23h 34m 25.28s	-03° 35' 50.0"	20.09725	19.890265	165.42	100.7	3.5	5.8	13.00	18.49	0.42
5-Dec	23h 34m 25.72s	-03° 35' 44.5"	20.09724	19.907263	165.56	99.7	3.5	5.8	12.56	18.45	0.38
6-Dec	23h 34m 26.34s	-03° 35' 37.8"	20.09723	19.924312	165.71	98.7	3.5	5.8	12.52	18.41	0.34
7-Dec	23h 34m 27.15s	-03° 35' 29.9"	20.09722	19.941409	165.85	97.7	3.5	5.8	12.48	18.37	0.31
8-Dec	23h 34m 28.14s	-03° 35' 20.9"	20.09720	19.958547	165.99	96.7	3.5	5.8	12.44	18.34	0.27
9-Dec	23h 34m 29.32s	-03° 35' 10.6"	20.09719	19.975722	166.13	95.7	3.5	5.8	12.40	18.30	0.23
10-Dec	23h 34m 30.68s	-03° 34' 59.1"	20.09718	19.992928	166.28	94.7	3.5	5.8	12.37	18.26	0.19
11-Dec	23h 34m 32.24s	-03° 34' 46.4"	20.09717	20.010161	166.42	93.7	3.5	5.8	12.33	18.22	0.15
12-Dec	23h 34m 33.99s	-03° 34' 32.5"	20.09716	20.027414	166.56	92.7	3.5	5.8	12.29	18.18	0.11
13-Dec	23h 34m 35.93s	-03° 34' 17.3"	20.09714	20.044682	166.71	91.7	3.5	5.8	12.25	18.14	0.07
14-Dec	23h 34m 38.07s	-03° 34' 00.8"	20.09713	20.061960	166.85	90.6	3.5	5.8	12.21	18.10	0.03
15-Dec	23h 34m 40.39s	-03° 33' 43.1"	20.09712	20.079242	166.99	89.6	3.5	5.8	12.17	18.06	23.56
16-Dec	23h 34m 42.91s	-03° 33' 24.2"	20.09711	20.096523	167.14	88.6	3.5	5.8	12.13	18.02	23.52
17-Dec	23h 34m 45.62s	-03° 33' 04.1"	20.09710	20.113796	167.28	87.6	3.5	5.8	12.09	17.58	23.48
18-Dec	23h 34m 48.51s	-03° 32' 42.8"	20.09708	20.131058	167.43	86.6	3.5	5.8	12.05	17.55	23.44
19-Dec	23h 34m 51.59s	-03° 32' 20.3"	20.09707	20.148301	167.57	85.6	3.5	5.8	12.01	17.51	23.40
20-Dec	23h 34m 54.86s	-03° 31' 56.6"	20.09706	20.165520	167.71	84.6	3.5	5.8	11.57	17.47	23.36
21-Dec	23h 34m 58.31s	-03° 31' 31.8"	20.09705	20.182711	167.85	83.6	3.5	5.8	11.54	17.43	23.32
22-Dec	23h 35m 01.94s	-03° 31' 05.7"	20.09704	20.199867	168.00	82.6	3.5	5.8	11.50	17.39	23.29
23-Dec	23h 35m 05.75s	-03° 30' 38.5"	20.09702	20.216983	168.14	81.6	3.5	5.8	11.46	17.35	23.25
24-Dec	23h 35m 09.75s	-03° 30' 10.2"	20.09701	20.234055	168.28	80.6	3.5	5.8	11.42	17.31	23.21
25-Dec	23h 35m 13.92s	-03° 29' 40.6"	20.09700	20.251077	168.42	79.6	3.5	5.8	11.38	17.28	23.17
26-Dec	23h 35m 18.28s	-03° 29' 09.9"	20.09699	20.268044	168.56	78.6	3.5	5.8	11.34	17.24	23.13
27-Dec	23h 35m 22.82s	-03° 28' 38.1"	20.09697	20.284950	168.70	77.6	3.5	5.9	11.30	17.20	23.09
28-Dec	23h 35m 27.55s	-03° 28' 05.1"	20.09696	20.301792	168.85	76.6	3.5	5.9	11.26	17.16	23.06
29-Dec	23h 35m 32.45s	-03° 27' 30.9"	20.09695	20.318565	168.98	75.6	3.5	5.9	11.22	17.12	23.02
30-Dec	23h 35m 37.53s	-03° 26' 55.6"	20.09694	20.335263	169.12	74.6	3.4	5.9	11.19	17.08	22.58
31-Dec	23h 35m 42.79s	-03° 26' 19.2"	20.09692	20.351882	169.26	73.6	3.4	5.9	11.15	17.04	22.54

Legenda :

A.R., Dec. = apparent coordinates

R. = distance from the Sun in A.U.

Distance = distance from the Earth in A.U.

Light = Distance in minutes

El. = elongation from the Sun in °

Diam. = diameter in "

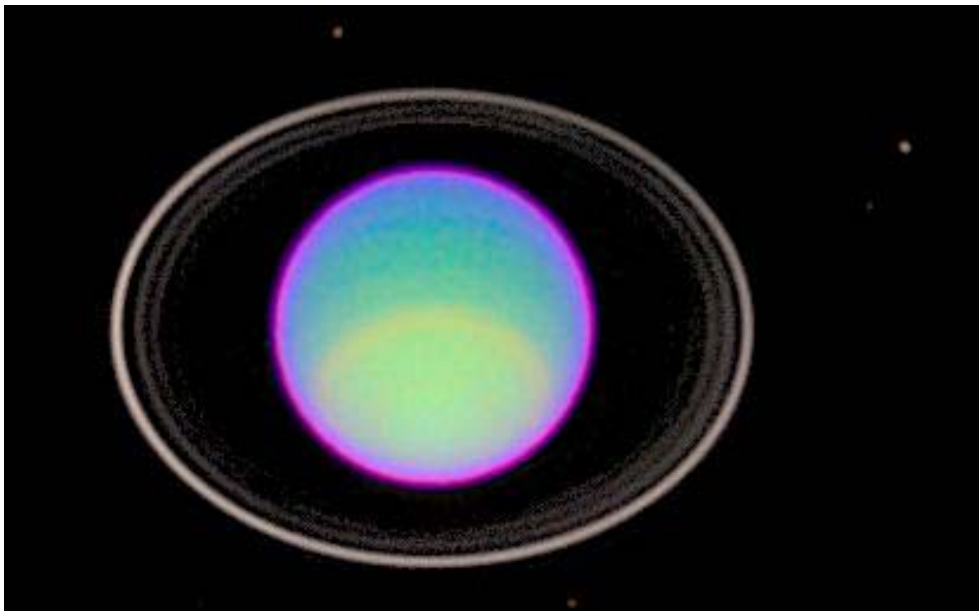
Mag. = magnitude

Times of rising and setting of the planet for Rome (42°N, 12°E), in U.T.+1

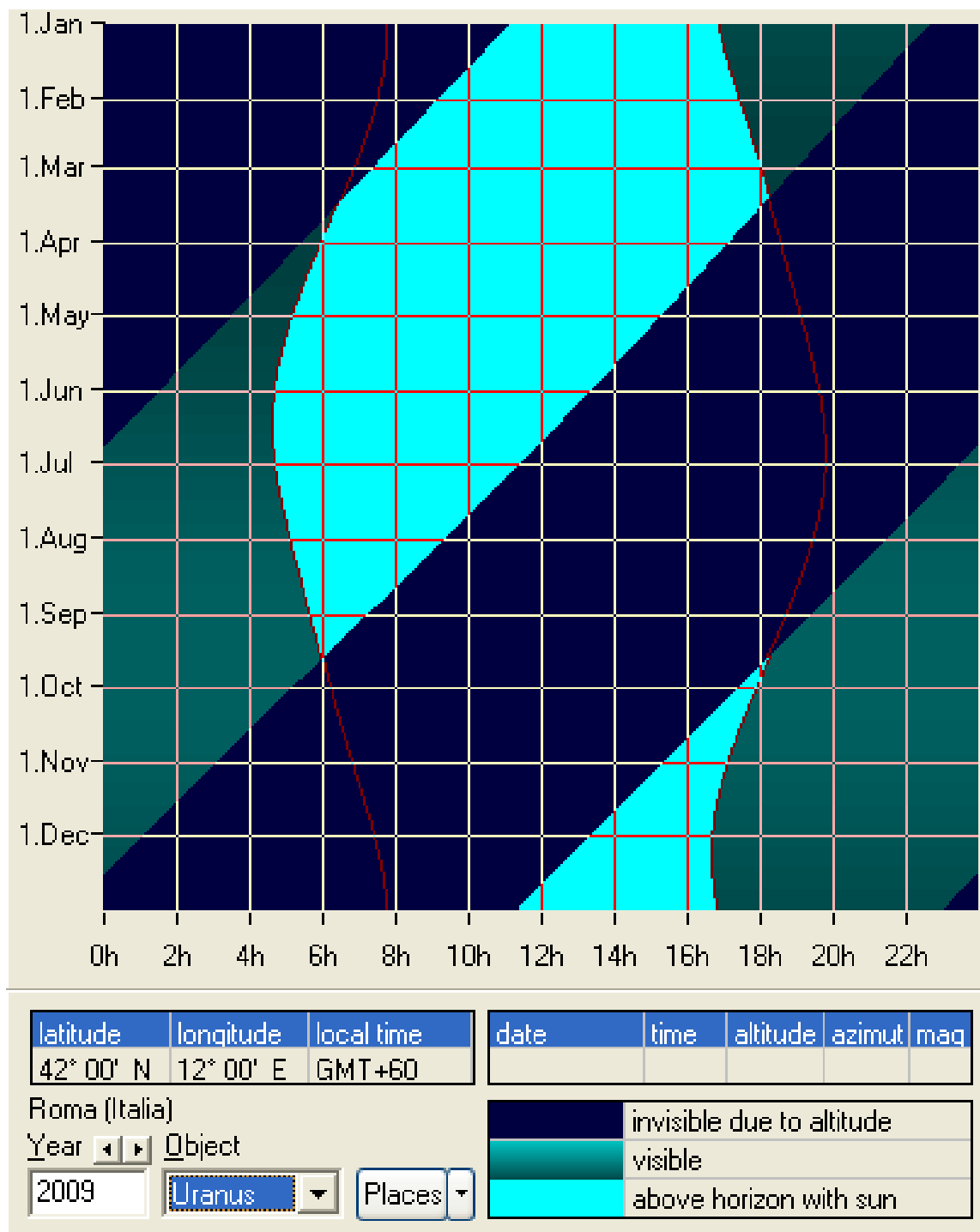
PHENOMENA OF URANUS

Perihelion	-----				
Aphelion	27/02/2009	03.36	20.09888 A.U.		
Perigee	16/09/2009	12.46	19.09297 A.U.		
Apogee	14/03/2009	00.58	21.09280 A.U.		
Maxima magnitude	16/09/2009	13.23	5.7	Mag	
Minima magnitude	14/03/2009	00.55	5.9	Mag	
Opposition	17/09/2009	09.41			
Conjunction	13/03/2009	01.27			
Retrograde motion	01/07/2009	15.36			
Direct motion	02/12/2009	04.34			
Maxima phase angle	18/06/2009	00.57	2.9	°	
Maxima phase angle	14/12/2009	09.33	2.8	°	
Minima phase angle	13/03/2009	01.48	0.0	°	
Minima phase angle	17/09/2009	12.43	0.0	°	

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VISIBILITY OF URANUS



Visibility of Uranus during the year

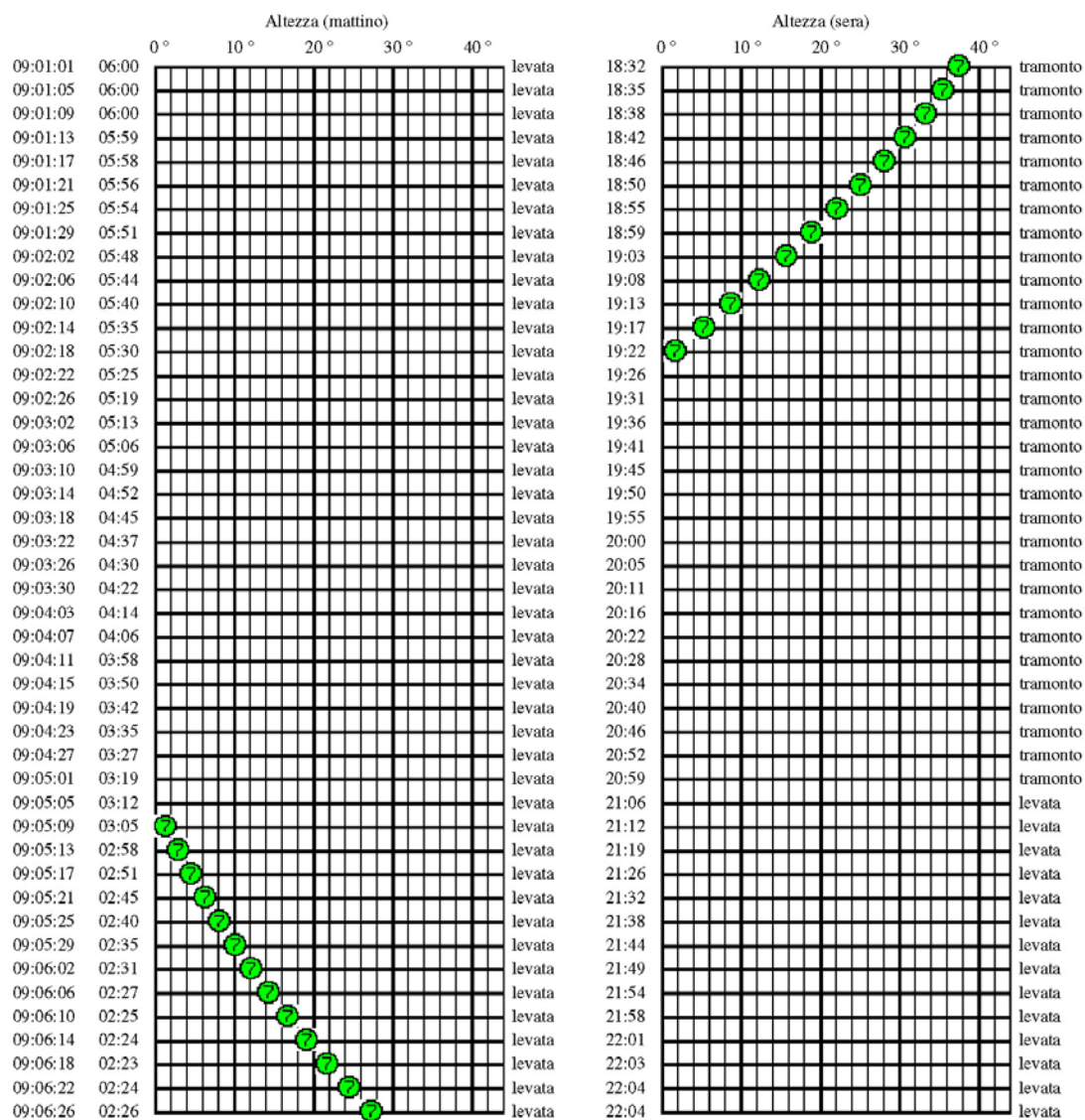
© (3)

Altezza ai crepuscoli

di Urano

nel momento il cui il Sole è 18 ° sotto l'orizzonte

Postazione: Roma 42:00 N, 12:00 E (UT +01:00)

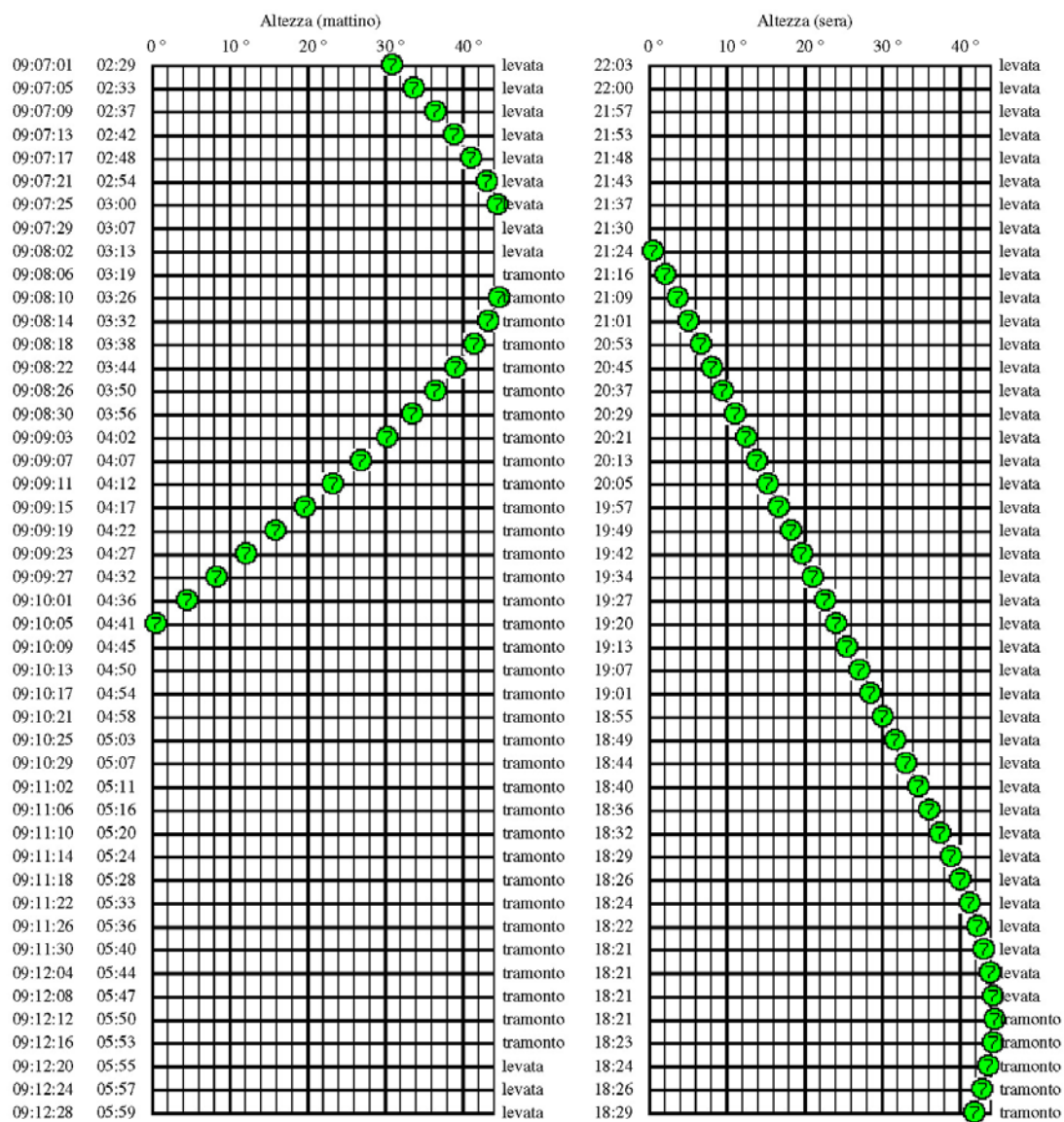


Altezza ai crepuscoli

di Urano

nel momento il cui il Sole è 18 ° sotto l'orizzonte

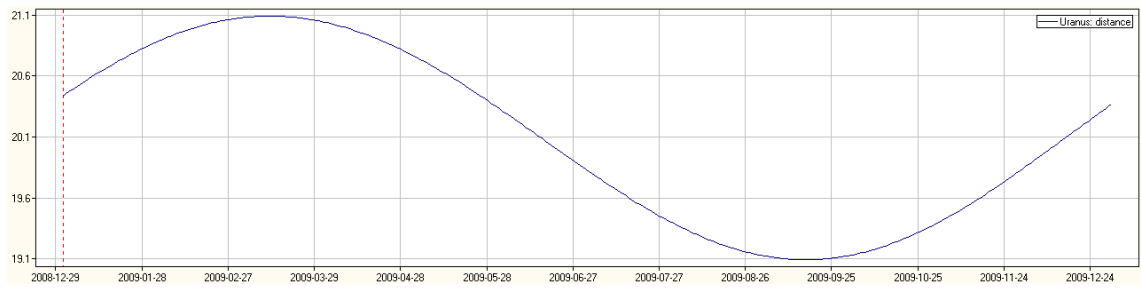
Postazione: Roma 42:00 N, 12:00 E (UT +01:00)



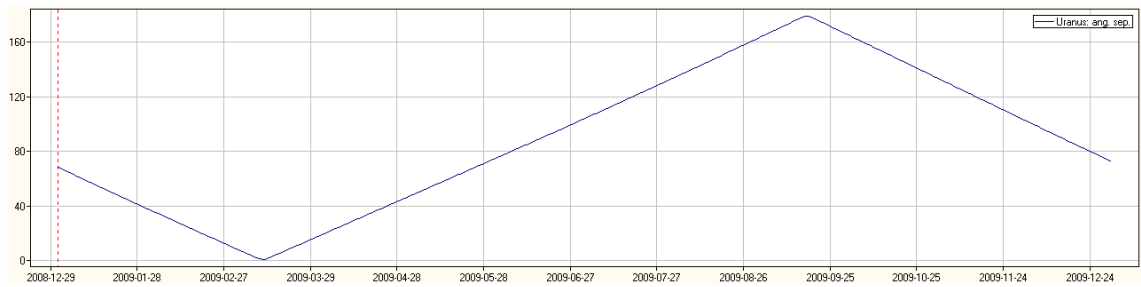
Height in the twilights. The Sun is 18° under the horizon

Date	Morning twilight				Evening twilight			
	Times	Alt	Az	Elong	Times	Alt	Az	Elong
2009:01:01	06:00	-49.8	27.6	68.3	18:32	37.4	213.4	67.8
2009:01:05	06:00	-48.3	33.1	64.4	18:35	35.4	218.6	63.9
2009:01:09	06:00	-46.6	38.1	60.4	18:38	33.2	223.5	59.9
2009:01:13	05:59	-44.8	42.7	56.5	18:42	30.7	228.3	56.0
2009:01:17	05:58	-42.9	46.7	52.6	18:46	28.0	232.8	52.1
2009:01:21	05:56	-41.0	50.4	48.7	18:50	25.1	237.1	48.2
2009:01:25	05:54	-39.0	53.7	44.8	18:55	22.1	241.2	44.3
2009:01:29	05:51	-37.1	56.8	40.9	18:59	18.9	245.2	40.4
2009:02:02	05:48	-35.2	59.5	37.0	19:03	15.6	248.9	36.5
2009:02:06	05:44	-33.3	62.0	33.2	19:08	12.2	252.6	32.6
2009:02:10	05:40	-31.5	64.3	29.3	19:13	8.8	256.1	28.8
2009:02:14	05:35	-29.7	66.5	25.5	19:17	5.3	259.5	25.0
2009:02:18	05:30	-27.9	68.4	21.7	19:22	1.8	262.9	21.1
2009:02:22	05:25	-26.2	70.2	17.9	19:26	-1.8	266.2	17.3
2009:02:26	05:19	-24.6	72.0	14.1	19:31	-5.4	269.6	13.5
2009:03:02	05:13	-22.9	73.6	10.3	19:36	-9.0	272.9	9.7
2009:03:06	05:06	-21.4	75.1	6.5	19:41	-12.6	276.4	6.0
2009:03:10	04:59	-19.8	76.5	2.8	19:45	-16.1	279.9	2.3
2009:03:14	04:52	-18.4	77.9	1.3	19:50	-19.7	283.5	1.8
2009:03:18	04:45	-16.9	79.2	4.8	19:55	-23.2	287.3	5.4
2009:03:22	04:37	-15.5	80.4	8.5	20:00	-26.6	291.3	9.1
2009:03:26	04:30	-14.1	81.6	12.3	20:05	-30.0	295.5	12.9
2009:03:30	04:22	-12.7	82.8	16.0	20:11	-33.3	300.1	16.6
2009:04:03	04:14	-11.3	83.9	19.7	20:16	-36.4	305.0	20.3
2009:04:07	04:06	-10.0	85.1	23.4	20:22	-39.4	310.3	24.1
2009:04:11	03:58	-8.6	86.2	27.1	20:28	-42.1	316.1	27.8
2009:04:15	03:50	-7.3	87.3	30.9	20:34	-44.6	322.5	31.5
2009:04:19	03:42	-5.9	88.5	34.6	20:40	-46.7	329.4	35.2
2009:04:23	03:35	-4.5	89.6	38.3	20:46	-48.5	336.9	38.9
2009:04:27	03:27	-3.1	90.8	42.0	20:52	-49.7	344.9	42.6
2009:05:01	03:19	-1.7	92.0	45.7	20:59	-50.4	353.3	46.3
2009:05:05	03:12	-0.2	93.2	49.4	21:06	-50.5	1.8	50.1
2009:05:09	03:05	1.3	94.5	53.1	21:12	-50.0	10.4	53.8
2009:05:13	02:58	2.9	95.8	56.8	21:19	-48.9	18.6	57.5
2009:05:17	02:51	4.5	97.3	60.5	21:26	-47.3	26.4	61.2
2009:05:21	02:45	6.3	98.8	64.2	21:32	-45.2	33.7	64.9
2009:05:25	02:40	8.1	100.4	67.9	21:38	-42.8	40.4	68.7
2009:05:29	02:35	10.0	102.2	71.7	21:44	-40.1	46.4	72.4
2009:06:02	02:31	12.1	104.2	75.4	21:49	-37.1	51.8	76.1
2009:06:06	02:27	14.3	106.3	79.1	21:54	-34.1	56.8	79.9
2009:06:10	02:25	16.7	108.7	82.9	21:58	-30.9	61.2	83.6
2009:06:14	02:24	19.1	111.4	86.6	22:01	-27.8	65.1	87.4
2009:06:18	02:23	21.8	114.3	90.4	22:03	-24.8	68.7	91.2
2009:06:22	02:24	24.5	117.6	94.2	22:04	-21.9	72.0	95.0
2009:06:26	02:26	27.3	121.3	98.0	22:04	-19.1	74.9	98.8
2009:06:30	02:28	30.2	125.4	101.8	22:03	-16.4	77.6	102.6

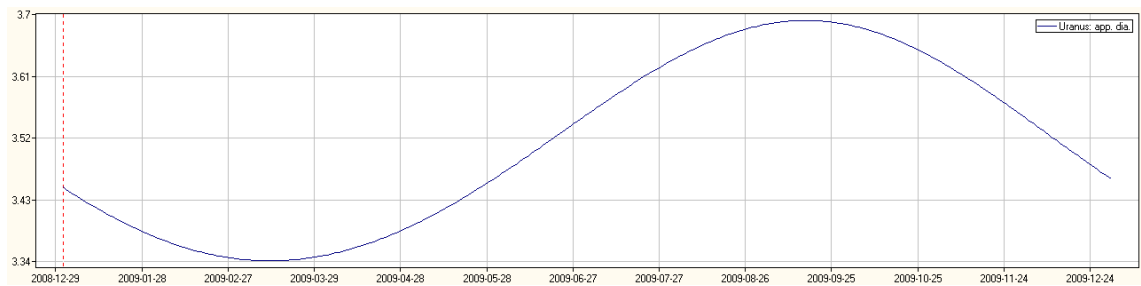
Date	Morning twilight				Evening twilight			
	Times	Alt	Az	Elong	Times	Alt	Az	Elong
2009:07:01	02:29	30.9	126.5	102.7	22:03	-15.8	78.2	103.5
2009:07:05	02:33	33.7	131.2	106.6	22:00	-13.3	80.6	107.3
2009:07:09	02:37	36.4	136.4	110.4	21:57	-11.0	82.8	111.2
2009:07:13	02:42	38.9	142.2	114.2	21:53	-8.8	84.8	115.0
2009:07:17	02:48	41.2	148.6	118.1	21:48	-6.8	86.7	118.9
2009:07:21	02:54	43.1	155.6	122.0	21:43	-4.8	88.5	122.7
2009:07:25	03:00	44.5	163.0	125.9	21:37	-3.0	90.2	126.6
2009:07:29	03:07	45.4	170.8	129.8	21:30	-1.2	91.8	130.5
2009:08:02	03:13	45.8	178.9	133.7	21:24	0.4	93.4	134.4
2009:08:06	03:19	45.5	186.9	137.6	21:16	2.1	94.9	138.4
2009:08:10	03:26	44.7	194.9	141.6	21:09	3.6	96.4	142.3
2009:08:14	03:32	43.3	202.4	145.5	21:01	5.2	97.9	146.3
2009:08:18	03:38	41.4	209.6	149.5	20:53	6.7	99.3	150.2
2009:08:22	03:44	39.1	216.3	153.5	20:45	8.1	100.8	154.2
2009:08:26	03:50	36.4	222.4	157.5	20:37	9.6	102.3	158.2
2009:08:30	03:56	33.5	228.1	161.5	20:29	11.0	103.7	162.2
2009:09:03	04:02	30.3	233.3	165.5	20:21	12.5	105.2	166.2
2009:09:07	04:07	26.9	238.1	169.6	20:13	13.9	106.8	170.2
2009:09:11	04:12	23.4	242.6	173.6	20:05	15.3	108.3	174.3
2009:09:15	04:17	19.7	246.8	177.6	19:57	16.8	109.9	178.2
2009:09:19	04:22	16.0	250.8	178.1	19:49	18.2	111.6	177.5
2009:09:23	04:27	12.2	254.6	174.1	19:42	19.7	113.3	173.5
2009:09:27	04:32	8.4	258.2	170.0	19:34	21.1	115.1	169.4
2009:10:01	04:36	4.5	261.8	166.0	19:27	22.6	117.0	165.3
2009:10:05	04:41	0.6	265.3	161.9	19:20	24.1	118.9	161.3
2009:10:09	04:45	-3.3	268.7	157.8	19:13	25.6	120.9	157.2
2009:10:13	04:50	-7.2	272.1	153.7	19:07	27.1	123.1	153.1
2009:10:17	04:54	-11.1	275.6	149.6	19:01	28.6	125.4	149.0
2009:10:21	04:58	-14.9	279.1	145.5	18:55	30.1	127.8	144.9
2009:10:25	05:03	-18.7	282.7	141.4	18:49	31.6	130.4	140.8
2009:10:29	05:07	-22.4	286.5	137.3	18:44	33.1	133.1	136.7
2009:11:02	05:11	-26.0	290.4	133.2	18:40	34.6	136.1	132.6
2009:11:06	05:16	-29.6	294.6	129.1	18:36	36.1	139.3	128.5
2009:11:10	05:20	-33.0	299.0	125.0	18:32	37.5	142.7	124.4
2009:11:14	05:24	-36.2	303.7	120.9	18:29	38.8	146.3	120.3
2009:11:18	05:28	-39.2	308.8	116.8	18:26	40.1	150.3	116.3
2009:11:22	05:33	-42.0	314.3	112.7	18:24	41.3	154.6	112.2
2009:11:26	05:36	-44.5	320.1	108.7	18:22	42.3	159.1	108.1
2009:11:30	05:40	-46.7	326.4	104.6	18:21	43.2	164.0	104.1
2009:12:04	05:44	-48.5	333.0	100.5	18:21	43.9	169.2	100.0
2009:12:08	05:47	-49.9	340.0	96.5	18:21	44.3	174.7	96.0
2009:12:12	05:50	-50.9	347.2	92.5	18:21	44.4	180.3	91.9
2009:12:16	05:53	-51.4	354.4	88.4	18:23	44.3	186.2	87.9
2009:12:20	05:55	-51.5	1.6	84.4	18:24	43.8	192.1	83.9
2009:12:24	05:57	-51.2	8.5	80.4	18:26	43.0	198.0	79.9
2009:12:28	05:59	-50.5	15.1	76.4	18:29	41.8	203.9	75.9



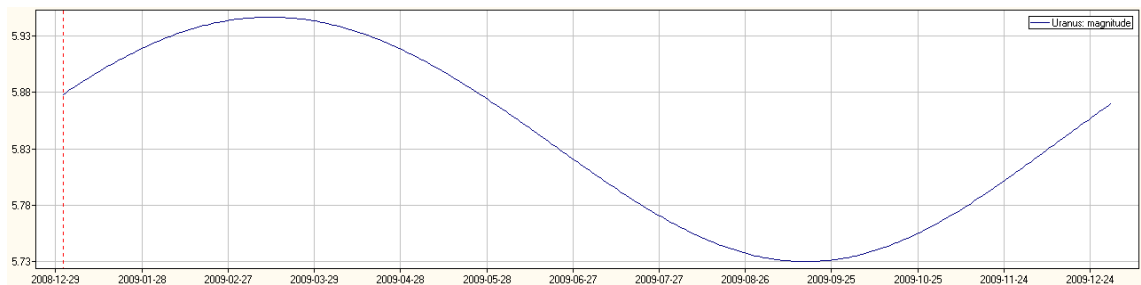
Distance of Uranus in A.U. during the year



Elongation of Uranus in $^{\circ}$ during the year



Diameter of Uranus in $''$ during the year



Magnitude of Uranus during the year

OCCULTATIONS BETWEEN THE SATELLITES OF URANUS

MM	GG	HH	MM	Sec	Event Type	Ph	Durn	dMag	%Ill	Sep	PA	MinSep	T1	T2	T3	Tmax	T5	T6	T7
1	11	3	6	46	(I) occ (V)	P	522	0.1	93.1	8.3	163	0.038	|						
1	11	16	36	37	(I) occ (V)	T	750	0.2	85.8	8.2	347	0.009	|						
6	11	19	0	6	(I) ecl (V)	T	2531	9.9	0.0	5.4	1	0.014	|	18 39	1				
8	8	15	20	9	(I) occ (V)	T	1347	0.2	85.8	2.6	35	0.020	|						
11	26	3	19	49*	(III) ecl (II)	T	0	9.9	0.0	12.7	350	4.230	|						
12	2	8	52	3	(I) ecl (V)	T	3015	9.9	0.0	5.4	151	0.002	|	8 26	55				

Times in T.U.

Legenda :

date in the format month/day, an asterisk shows that the moons are near but they don't occult

Event type : eclipse or occultation

Ph : phenomenon, M=missed, E=penumbral eclipse, P=partial eclipse/occultation, T=total eclipse/occultation, A=annular eclipse/occultation

Durn : duration in seconds

dMag : difference magnitude

%ill : defect of illumination, respect to integer

Sep : distance in " between the satellite and the center of the planet

Pa : position angle between the satellite and the center of the planet

MinD : least distance between the satellites

T1-T7 : penumbral phase begins/ends

T2-T6 : umbra phase begins/ends

T3-T5 : totalità phase begins/ends

Tmax : middle time of the event

Satellites :

I = Miranda

II = Ariel

III = Umbriel

IV = Titania

V = Oberon

EPHEMERIDES OF NEPTUNE

Date	A.R. Geoc.	Dec. Geoc.	R A.U.	Distance A.U.	Light (m)	El. °	Diam. "	Mag.	Rise	Transit	Set
1-Jan	21h 39m 37.65s	-14° 22' 11.8"	30.03400	30.760664	255.83	41.7	2.2	8.0	9.54	15.04	20.13
2-Jan	21h 39m 44.76s	-14° 21' 36.4"	30.03398	30.772093	255.92	40.7	2.2	8.0	9.51	15.00	20.09
3-Jan	21h 39m 51.96s	-14° 21' 00.6"	30.03395	30.783297	256.02	39.8	2.2	8.0	9.47	14.56	20.06
4-Jan	21h 39m 59.23s	-14° 20' 24.3"	30.03393	30.794273	256.11	38.8	2.2	8.0	9.43	14.52	20.02
5-Jan	21h 40m 06.58s	-14° 19' 47.7"	30.03390	30.805018	256.20	37.8	2.2	8.0	9.39	14.49	19.58
6-Jan	21h 40m 14.00s	-14° 19' 10.7"	30.03388	30.815529	256.29	36.8	2.2	8.0	9.35	14.45	19.54
7-Jan	21h 40m 21.51s	-14° 18' 33.2"	30.03385	30.825804	256.37	35.8	2.2	8.0	9.31	14.41	19.50
8-Jan	21h 40m 29.09s	-14° 17' 55.4"	30.03383	30.835840	256.45	34.8	2.2	8.0	9.28	14.37	19.47
9-Jan	21h 40m 36.75s	-14° 17' 17.2"	30.03380	30.845635	256.54	33.8	2.2	8.0	9.24	14.33	19.43
10-Jan	21h 40m 44.48s	-14° 16' 38.6"	30.03378	30.855186	256.61	32.8	2.2	8.0	9.20	14.30	19.39
11-Jan	21h 40m 52.27s	-14° 15' 59.8"	30.03376	30.864491	256.69	31.9	2.2	8.0	9.16	14.26	19.35
12-Jan	21h 41m 00.12s	-14° 15' 20.6"	30.03373	30.873548	256.77	30.9	2.2	8.0	9.12	14.22	19.32
13-Jan	21h 41m 08.04s	-14° 14' 41.1"	30.03371	30.882354	256.84	29.9	2.2	8.0	9.08	14.18	19.28
14-Jan	21h 41m 16.01s	-14° 14' 01.4"	30.03368	30.890908	256.91	28.9	2.2	8.0	9.04	14.14	19.24
15-Jan	21h 41m 24.03s	-14° 13' 21.3"	30.03366	30.899206	256.98	27.9	2.2	8.0	9.01	14.11	19.20
16-Jan	21h 41m 32.12s	-14° 12' 40.9"	30.03363	30.907246	257.05	26.9	2.2	8.0	8.57	14.07	19.17
17-Jan	21h 41m 40.25s	-14° 12' 00.2"	30.03361	30.915026	257.11	26.0	2.2	8.0	8.53	14.03	19.13
18-Jan	21h 41m 48.45s	-14° 11' 19.2"	30.03358	30.922543	257.18	25.0	2.2	8.0	8.49	13.59	19.09
19-Jan	21h 41m 56.70s	-14° 10' 38.0"	30.03356	30.929796	257.24	24.0	2.2	8.0	8.45	13.55	19.05
20-Jan	21h 42m 05.00s	-14° 09' 56.4"	30.03353	30.936780	257.29	23.0	2.2	8.0	8.41	13.52	19.02
21-Jan	21h 42m 13.35s	-14° 09' 14.6"	30.03351	30.943495	257.35	22.0	2.2	8.0	8.38	13.48	18.58
22-Jan	21h 42m 21.75s	-14° 08' 32.5"	30.03348	30.949938	257.40	21.0	2.2	8.0	8.34	13.44	18.54
23-Jan	21h 42m 30.20s	-14° 07' 50.2"	30.03346	30.956107	257.45	20.1	2.2	8.0	8.30	13.40	18.50
24-Jan	21h 42m 38.69s	-14° 07' 07.7"	30.03343	30.962001	257.50	19.1	2.2	8.0	8.26	13.36	18.47
25-Jan	21h 42m 47.22s	-14° 06' 25.0"	30.03341	30.967617	257.55	18.1	2.2	8.0	8.22	13.33	18.43
26-Jan	21h 42m 55.78s	-14° 05' 42.1"	30.03339	30.972954	257.59	17.1	2.2	8.0	8.18	13.29	18.39
27-Jan	21h 43m 04.38s	-14° 04' 59.0"	30.03336	30.978010	257.64	16.1	2.2	8.0	8.15	13.25	18.35
28-Jan	21h 43m 13.01s	-14° 04' 15.8"	30.03334	30.982784	257.68	15.2	2.2	8.0	8.11	13.21	18.32
29-Jan	21h 43m 21.67s	-14° 03' 32.4"	30.03331	30.987274	257.71	14.2	2.2	8.0	8.07	13.17	18.28
30-Jan	21h 43m 30.35s	-14° 02' 48.8"	30.03329	30.991480	257.75	13.2	2.2	8.0	8.03	13.14	18.24
31-Jan	21h 43m 39.06s	-14° 02' 05.1"	30.03326	30.995400	257.78	12.2	2.2	8.0	7.59	13.10	18.20
1-Feb	21h 43m 47.80s	-14° 01' 21.2"	30.03324	30.999034	257.81	11.2	2.2	8.0	7.55	13.06	18.17
2-Feb	21h 43m 56.56s	-14° 00' 37.2"	30.03321	31.002381	257.84	10.3	2.2	8.0	7.52	13.02	18.13
3-Feb	21h 44m 05.35s	-13° 59' 53.0"	30.03319	31.005441	257.86	9.3	2.2	8.0	7.48	12.58	18.09
4-Feb	21h 44m 14.16s	-13° 59' 08.7"	30.03316	31.008212	257.89	8.3	2.2	8.0	7.44	12.55	18.06
5-Feb	21h 44m 22.99s	-13° 58' 24.3"	30.03314	31.010696	257.91	7.3	2.2	8.0	7.40	12.51	18.02
6-Feb	21h 44m 31.84s	-13° 57' 39.8"	30.03311	31.012891	257.93	6.4	2.2	8.0	7.36	12.47	17.58
7-Feb	21h 44m 40.70s	-13° 56' 55.3"	30.03309	31.014798	257.94	5.4	2.2	8.0	7.32	12.43	17.54
8-Feb	21h 44m 49.56s	-13° 56' 10.7"	30.03306	31.016417	257.96	4.4	2.2	8.0	7.29	12.40	17.51
9-Feb	21h 44m 58.44s	-13° 55' 26.1"	30.03304	31.017747	257.97	3.5	2.2	8.0	7.25	12.36	17.47
10-Feb	21h 45m 07.32s	-13° 54' 41.5"	30.03301	31.018789	257.98	2.5	2.2	8.0	7.21	12.32	17.43
11-Feb	21h 45m 16.20s	-13° 53' 56.8"	30.03299	31.019543	257.98	1.6	2.2	8.0	7.17	12.28	17.39
12-Feb	21h 45m 25.10s	-13° 53' 12.4"	30.03296	31.020007	257.99	0.7	2.2	8.0	7.13	12.24	17.36
13-Feb	21h 45m 33.90s	-13° 52' 28.1"	30.03294	31.020183	257.99	0.7	2.2	8.0	7.09	12.21	17.32
14-Feb	21h 45m 42.79s	-13° 51' 42.9"	30.03291	31.020070	257.99	1.5	2.2	8.0	7.06	12.17	17.28
15-Feb	21h 45m 51.67s	-13° 50' 58.1"	30.03289	31.019668	257.98	2.4	2.2	8.0	7.02	12.13	17.24
16-Feb	21h 46m 00.54s	-13° 50' 13.3"	30.03286	31.018976	257.98	3.4	2.2	8.0	6.58	12.09	17.21
17-Feb	21h 46m 09.41s	-13° 49' 28.6"	30.03284	31.017995	257.97	4.4	2.2	8.0	6.54	12.05	17.17
18-Feb	21h 46m 18.28s	-13° 48' 43.8"	30.03281	31.016725	257.96	5.3	2.2	8.0	6.50	12.02	17.13
19-Feb	21h 46m 27.13s	-13° 47' 59.2"	30.03279	31.015166	257.95	6.3	2.2	8.0	6.46	11.58	17.09
20-Feb	21h 46m 35.97s	-13° 47' 14.6"	30.03276	31.013319	257.93	7.3	2.2	8.0	6.43	11.54	17.06
21-Feb	21h 46m 44.79s	-13° 46' 30.0"	30.03274	31.011183	257.91	8.2	2.2	8.0	6.39	11.50	17.02
22-Feb	21h 46m 53.60s	-13° 45' 45.6"	30.03271	31.008760	257.89	9.2	2.2	8.0	6.35	11.47	16.58
23-Feb	21h 47m 02.38s	-13° 45' 01.3"	30.03269	31.006051	257.87	10.2	2.2	8.0	6.31	11.43	16.54
24-Feb	21h 47m 11.14s	-13° 44' 17.1"	30.03267	31.003055	257.84	11.1	2.2	8.0	6.27	11.39	16.51
25-Feb	21h 47m 19.87s	-13° 43' 33.0"	30.03264	30.999774	257.82	12.1	2.2	8.0	6.23	11.35	16.47
26-Feb	21h 47m 28.58s	-13° 42' 49.0"	30.03262	30.996209	257.79	13.1	2.2	8.0	6.20	11.31	16.43
27-Feb	21h 47m 37.26s	-13° 42' 05.2"	30.03259	30.992361	257.76	14.0	2.2	8.0	6.16	11.28	16.40
28-Feb	21h 47m 45.90s	-13° 41' 21.5"	30.03257	30.988232	257.72	15.0	2.2	8.0	6.12	11.24	16.36
1-Mar	21h 47m 54.52s	-13° 40' 37.9"	30.03254	30.983824	257.68	16.0	2.2	8.0	6.08	11.20	16.32
2-Mar	21h 48m 03.10s	-13° 39' 54.5"	30.03252	30.979137	257.65	16.9	2.2	8.0	6.04	11.16	16.28
3-Mar	21h 48m 11.65s	-13° 39' 11.2"	30.03249	30.974174	257.60	17.9	2.2	8.0	6.00	11.12	16.25
4-Mar	21h 48m 20.17s	-13° 38' 28.1"	30.03247	30.968937	257.56	18.9	2.2	8.0	5.57	11.09	16.21
5-Mar	21h 48m 28.65s	-13° 37' 45.2"	30.03244	30.963427	257.51	19.8	2.2	8.0	5.53	11.05	16.17
6-Mar	21h 48m 37.09s	-13° 37' 02.5"	30.03242	30.957647	257.47	20.8	2.2	8.0	5.49	11.01	16.13
7-Mar	21h 48m 45.49s	-13° 36' 20.1"	30.03239	30.951600	257.42	21.8	2.2	8.0	5.45	10.57	16.10
8-Mar	21h 48m 53.84s	-13° 35' 37.9"	30.03237	30.945287	257.36	22.7	2.2	8.0	5.41	10.54	16.06
9-Mar	21h 49m 02.13s	-13° 34' 55.9"	30.03234	30.938710	257.31	23.7	2.2	8.0	5.37	10.50	16.02
10-Mar	21h 49m 10.37s	-13° 34' 14.3"	30.03232	30.931871	257.25	24.7	2.2	8.0	5.34	10.46	15.58
11-Mar	21h 49m 18.56s	-13° 33' 32.9"	30.03229	30.924773	257.19	25.6	2.2	8.0	5.30	10.42	15.55
12-Mar	21h 49m 26.70s	-13° 32' 51.7"	30.03227	30.917417	257.13	26.6	2.2	8.0	5.26	10.38	15.51
13-Mar	21h 49m 34.78s	-13° 32' 10.8"	30.03224	30.909805	257.07	27.6	2.2	8.0	5.22	10.35	15.47

Date	A.R. Geoc.	Dec. Geoc.	R A.U.	Distance A.U.	Light (m)	El. °	Diam. "	Mag.	Rise	Transit	Set
14-Mar	21h 49m 42.81s	-13° 31' 30.1"	30.03222	30.901940	257.00	28.5	2.2	8.0	5.18	10.31	15.43
15-Mar	21h 49m 50.79s	-13° 30' 49.7"	30.03219	30.893823	256.94	29.5	2.2	8.0	5.14	10.27	15.40
16-Mar	21h 49m 58.70s	-13° 30' 09.6"	30.03217	30.885457	256.87	30.4	2.2	8.0	5.10	10.23	15.36
17-Mar	21h 50m 06.57s	-13° 29' 29.8"	30.03214	30.876843	256.79	31.4	2.2	8.0	5.07	10.19	15.32
18-Mar	21h 50m 14.37s	-13° 28' 50.3"	30.03212	30.867984	256.72	32.4	2.2	8.0	5.03	10.16	15.28
19-Mar	21h 50m 22.10s	-13° 28' 11.2"	30.03209	30.858882	256.65	33.3	2.2	8.0	4.59	10.12	15.25
20-Mar	21h 50m 29.77s	-13° 27' 32.4"	30.03207	30.849539	256.57	34.3	2.2	8.0	4.55	10.08	15.21
21-Mar	21h 50m 37.37s	-13° 26' 53.9"	30.03204	30.839959	256.49	35.3	2.2	8.0	4.51	10.04	15.17
22-Mar	21h 50m 44.90s	-13° 26' 15.9"	30.03202	30.830143	256.41	36.2	2.2	8.0	4.47	10.00	15.13
23-Mar	21h 50m 52.36s	-13° 25' 38.1"	30.03199	30.820094	256.32	37.2	2.2	8.0	4.44	9.56	15.09
24-Mar	21h 50m 59.74s	-13° 25' 00.8"	30.03197	30.809816	256.24	38.1	2.2	8.0	4.40	9.53	15.06
25-Mar	21h 51m 07.05s	-13° 24' 23.9"	30.03194	30.799311	256.15	39.1	2.2	8.0	4.36	9.49	15.02
26-Mar	21h 51m 14.27s	-13° 23' 47.4"	30.03191	30.788583	256.06	40.1	2.2	8.0	4.32	9.45	14.58
27-Mar	21h 51m 21.42s	-13° 23' 11.3"	30.03189	30.777633	255.97	41.0	2.2	8.0	4.28	9.41	14.54
28-Mar	21h 51m 28.49s	-13° 22' 35.5"	30.03186	30.766467	255.88	42.0	2.2	8.0	4.24	9.37	14.51
29-Mar	21h 51m 35.48s	-13° 22' 00.1"	30.03184	30.755088	255.78	42.9	2.2	8.0	4.20	9.34	14.47
30-Mar	21h 51m 42.39s	-13° 21' 25.2"	30.03181	30.743498	255.69	43.9	2.2	8.0	4.17	9.30	14.43
31-Mar	21h 51m 49.22s	-13° 20' 50.7"	30.03179	30.731702	255.59	44.9	2.2	8.0	4.13	9.26	14.39
1-Apr	21h 51m 55.97s	-13° 20' 16.6"	30.03176	30.719704	255.49	45.8	2.2	8.0	4.09	9.22	14.35
2-Apr	21h 52m 02.63s	-13° 19' 43.0"	30.03174	30.707507	255.39	46.8	2.2	8.0	4.05	9.18	14.32
3-Apr	21h 52m 09.21s	-13° 19' 09.9"	30.03171	30.695116	255.28	47.7	2.2	8.0	4.01	9.15	14.28
4-Apr	21h 52m 15.69s	-13° 18' 37.2"	30.03169	30.682534	255.18	48.7	2.2	8.0	3.57	9.11	14.24
5-Apr	21h 52m 22.07s	-13° 18' 05.1"	30.03166	30.669765	255.07	49.6	2.2	8.0	3.53	9.07	14.20
6-Apr	21h 52m 28.36s	-13° 17' 33.5"	30.03164	30.656813	254.96	50.6	2.2	8.0	3.50	9.03	14.16
7-Apr	21h 52m 34.55s	-13° 17' 02.3"	30.03161	30.643681	254.86	51.6	2.2	7.9	3.46	8.59	14.13
8-Apr	21h 52m 40.64s	-13° 16' 31.7"	30.03159	30.630373	254.74	52.5	2.2	7.9	3.42	8.55	14.09
9-Apr	21h 52m 46.64s	-13° 16' 01.5"	30.03156	30.616893	254.63	53.5	2.2	7.9	3.38	8.52	14.05
10-Apr	21h 52m 52.54s	-13° 15' 31.8"	30.03154	30.603244	254.52	54.4	2.2	7.9	3.34	8.48	14.01
11-Apr	21h 52m 58.35s	-13° 15' 02.6"	30.03151	30.589430	254.40	55.4	2.2	7.9	3.30	8.44	13.57
12-Apr	21h 53m 04.06s	-13° 14' 34.0"	30.03149	30.575455	254.29	56.3	2.2	7.9	3.26	8.40	13.54
13-Apr	21h 53m 09.67s	-13° 14' 05.8"	30.03146	30.561321	254.17	57.3	2.2	7.9	3.23	8.36	13.50
14-Apr	21h 53m 15.18s	-13° 13' 38.2"	30.03144	30.547033	254.05	58.3	2.2	7.9	3.19	8.32	13.46
15-Apr	21h 53m 20.59s	-13° 13' 11.1"	30.03141	30.532595	253.93	59.2	2.2	7.9	3.15	8.29	13.42
16-Apr	21h 53m 25.90s	-13° 12' 44.6"	30.03139	30.518010	253.81	60.2	2.2	7.9	3.11	8.25	13.38
17-Apr	21h 53m 31.10s	-13° 12' 18.6"	30.03136	30.503282	253.69	61.1	2.2	7.9	3.07	8.21	13.35
18-Apr	21h 53m 36.19s	-13° 11' 53.2"	30.03134	30.488414	253.56	62.1	2.2	7.9	3.03	8.17	13.31
19-Apr	21h 53m 41.17s	-13° 11' 28.4"	30.03131	30.473413	253.44	63.0	2.2	7.9	2.59	8.13	13.27
20-Apr	21h 53m 46.04s	-13° 11' 04.2"	30.03129	30.458280	253.31	64.0	2.2	7.9	2.55	8.09	13.23
21-Apr	21h 53m 50.80s	-13° 10' 40.6"	30.03126	30.443021	253.19	64.9	2.2	7.9	2.52	8.05	13.19
22-Apr	21h 53m 55.44s	-13° 10' 17.5"	30.03123	30.427639	253.06	65.9	2.2	7.9	2.48	8.02	13.15
23-Apr	21h 53m 59.97s	-13° 09' 55.1"	30.03121	30.412140	252.93	66.9	2.2	7.9	2.44	7.58	13.12
24-Apr	21h 54m 04.39s	-13° 09' 33.2"	30.03118	30.396527	252.80	67.8	2.2	7.9	2.40	7.54	13.08
25-Apr	21h 54m 08.70s	-13° 09' 11.9"	30.03116	30.380806	252.67	68.8	2.2	7.9	2.36	7.50	13.04
26-Apr	21h 54m 12.89s	-13° 08' 51.2"	30.03113	30.364981	252.54	69.7	2.2	7.9	2.32	7.46	13.00
27-Apr	21h 54m 16.97s	-13° 08' 31.1"	30.03111	30.349056	252.41	70.7	2.2	7.9	2.28	7.42	12.56
28-Apr	21h 54m 20.94s	-13° 08' 11.6"	30.03108	30.333038	252.27	71.6	2.2	7.9	2.24	7.38	12.52
29-Apr	21h 54m 24.80s	-13° 07' 52.7"	30.03106	30.316931	252.14	72.6	2.2	7.9	2.20	7.35	12.49
30-Apr	21h 54m 28.53s	-13° 07' 34.4"	30.03103	30.300739	252.00	73.5	2.2	7.9	2.17	7.31	12.45
1-May	21h 54m 32.15s	-13° 07' 16.9"	30.03101	30.284468	251.87	74.5	2.2	7.9	2.13	7.27	12.41
2-May	21h 54m 35.64s	-13° 06' 59.9"	30.03098	30.268123	251.73	75.5	2.2	7.9	2.09	7.23	12.37
3-May	21h 54m 39.00s	-13° 06' 43.7"	30.03096	30.251708	251.60	76.4	2.2	7.9	2.05	7.19	12.33
4-May	21h 54m 42.24s	-13° 06' 28.1"	30.03093	30.235227	251.46	77.4	2.2	7.9	2.01	7.15	12.29
5-May	21h 54m 45.36s	-13° 06' 13.1"	30.03091	30.218686	251.32	78.3	2.2	7.9	1.57	7.11	12.25
6-May	21h 54m 48.36s	-13° 05' 58.7"	30.03088	30.202089	251.18	79.3	2.2	7.9	1.53	7.07	12.22
7-May	21h 54m 51.23s	-13° 05' 45.0"	30.03085	30.185440	251.04	80.2	2.2	7.9	1.49	7.03	12.18
8-May	21h 54m 53.99s	-13° 05' 31.9"	30.03083	30.168743	250.91	81.2	2.2	7.9	1.45	7.00	12.14
9-May	21h 54m 56.62s	-13° 05' 19.4"	30.03080	30.152004	250.77	82.2	2.2	7.9	1.42	6.56	12.10
10-May	21h 54m 59.14s	-13° 05' 07.6"	30.03078	30.135226	250.63	83.1	2.2	7.9	1.38	6.52	12.06
11-May	21h 55m 01.53s	-13° 04' 56.5"	30.03075	30.118413	250.49	84.1	2.2	7.9	1.34	6.48	12.02
12-May	21h 55m 03.81s	-13° 04' 45.9"	30.03073	30.101571	250.35	85.0	2.2	7.9	1.30	6.44	11.58
13-May	21h 55m 05.95s	-13° 04' 36.1"	30.03070	30.084703	250.21	86.0	2.2	7.9	1.26	6.40	11.54
14-May	21h 55m 07.98s	-13° 04' 26.9"	30.03068	30.067815	250.07	86.9	2.2	7.9	1.22	6.36	11.51
15-May	21h 55m 09.87s	-13° 04' 18.4"	30.03065	30.050910	249.93	87.9	2.2	7.9	1.18	6.32	11.47
16-May	21h 55m 11.64s	-13° 04' 10.6"	30.03063	30.033993	249.78	88.8	2.2	7.9	1.14	6.28	11.43
17-May	21h 55m 13.28s	-13° 04' 03.4"	30.03060	30.017069	249.64	89.8	2.2	7.9	1.10	6.25	11.39
18-May	21h 55m 14.79s	-13° 03' 57.0"	30.03057	30.000143	249.50	90.8	2.2	7.9	1.06	6.21	11.35
19-May	21h 55m 16.18s	-13° 03' 51.2"	30.03055	29.983219	249.36	91.7	2.2	7.9	1.02	6.17	11.31
20-May	21h 55m 17.43s	-13° 03' 46.1"	30.03052	29.966302	249.22	92.7	2.2	7.9	0.59	6.13	11.27
21-May	21h 55m 18.56s	-13° 03' 41.6"	30.03050	29.949397	249.08	93.6	2.2	7.9	0.55	6.09	11.23
22-May	21h 55m 19.56s	-13° 03' 37.8"	30.03047	29.932509	248.94	94.6	2.2	7.9	0.51	6.05	11.19
23-May	21h 55m 20.44s	-13° 03' 34.6"	30.03045	29.915643	248.80	95.5	2.2	7.9	0.47	6.01	11.15
24-May	21h 55m 21.20s	-13° 03' 32.1"	30.03042	29.898804	248.66	96.5	2.2	7.9	0.43	5.57	11.11
25-May	21h 55m 21.83s	-13° 03' 30.3"	30.03040	29.881998	248.52	97.5	2.2	7.9	0.39	5.53	11.08
26-May	21h 55m 22.34s	-13° 03' 29.1"	30.03037	29.865229	248.38	98.4	2.2	7.9	0.35	5.49	11.04
27-May	21h 55m 22.72s	-13° 03' 28.6"	30.03034	29.848503	248.24	99.4	2.2	7.9	0.31	5.45	11.00
28-May	21h 55m 22.98s	-13° 03' 28.8"	30.03032	29.831825	248.10	100.3	2.3	7.9	0.27	5.41	10.56
29-May	21h 55m 23.10s	-13° 03' 29.7"	30.03029	29.815200	247.97	101.3	2.3	7.9	0.23	5.38	10.52

Date	A.R. Geoc.	Dec. Geoc.	R A.U.	Distance A.U.	Light (m)	El. °	Diam. "	Mag.	Rise	Transit	Set
30-May	21h 55m 23.10s	-13° 03' 31.3"	30.03027	29.798633	247.83	102.3	2.3	7.9	0.19	5.34	10.48
31-May	21h 55m 22.96s	-13° 03' 33.5"	30.03024	29.782129	247.69	103.2	2.3	7.9	0.15	5.30	10.44
1-Jun	21h 55m 22.70s	-13° 03' 36.5"	30.03022	29.765691	247.55	104.2	2.3	7.9	0.11	5.26	10.40
2-Jun	21h 55m 22.31s	-13° 03' 40.0"	30.03019	29.749326	247.42	105.1	2.3	7.9	0.07	5.22	10.36
3-Jun	21h 55m 21.79s	-13° 03' 44.3"	30.03017	29.733036	247.28	106.1	2.3	7.9	0.04	5.18	10.32
4-Jun	21h 55m 21.16s	-13° 03' 49.1"	30.03014	29.716827	247.15	107.1	2.3	7.9	23.56	5.14	10.28
5-Jun	21h 55m 20.40s	-13° 03' 54.6"	30.03011	29.700703	247.01	108.0	2.3	7.9	23.52	5.10	10.24
6-Jun	21h 55m 19.53s	-13° 04' 00.7"	30.03009	29.684668	246.88	109.0	2.3	7.9	23.48	5.06	10.20
7-Jun	21h 55m 18.53s	-13° 04' 07.4"	30.03006	29.668727	246.75	109.9	2.3	7.9	23.44	5.02	10.16
8-Jun	21h 55m 17.42s	-13° 04' 14.8"	30.03004	29.652882	246.62	110.9	2.3	7.9	23.40	4.58	10.12
9-Jun	21h 55m 16.19s	-13° 04' 22.8"	30.03001	29.637140	246.48	111.9	2.3	7.9	23.36	4.54	10.08
10-Jun	21h 55m 14.83s	-13° 04' 31.5"	30.02999	29.621504	246.35	112.8	2.3	7.9	23.32	4.50	10.04
11-Jun	21h 55m 13.35s	-13° 04' 40.8"	30.02996	29.605978	246.23	113.8	2.3	7.9	23.28	4.46	10.00
12-Jun	21h 55m 11.76s	-13° 04' 50.8"	30.02993	29.590567	246.10	114.8	2.3	7.9	23.24	4.42	9.96
13-Jun	21h 55m 10.04s	-13° 05' 01.4"	30.02991	29.575274	245.97	115.7	2.3	7.9	23.20	4.38	9.93
14-Jun	21h 55m 08.20s	-13° 05' 12.6"	30.02988	29.560105	245.84	116.7	2.3	7.9	23.16	4.34	9.49
15-Jun	21h 55m 06.24s	-13° 05' 24.4"	30.02986	29.545064	245.72	117.6	2.3	7.9	23.12	4.30	9.45
16-Jun	21h 55m 04.16s	-13° 05' 36.9"	30.02983	29.530154	245.59	118.6	2.3	7.9	23.08	4.26	9.41
17-Jun	21h 55m 01.96s	-13° 05' 49.9"	30.02981	29.515381	245.47	119.6	2.3	7.9	23.04	4.22	9.37
18-Jun	21h 54m 59.66s	-13° 06' 03.5"	30.02978	29.500749	245.35	120.5	2.3	7.9	23.00	4.18	9.33
19-Jun	21h 54m 57.24s	-13° 06' 17.8"	30.02975	29.486262	245.23	121.5	2.3	7.9	22.56	4.15	9.29
20-Jun	21h 54m 54.71s	-13° 06' 32.5"	30.02973	29.471925	245.11	122.5	2.3	7.9	22.52	4.11	9.25
21-Jun	21h 54m 52.07s	-13° 06' 47.9"	30.02970	29.457742	244.99	123.4	2.3	7.9	22.48	4.07	9.21
22-Jun	21h 54m 49.32s	-13° 07' 03.8"	30.02968	29.443719	244.88	124.4	2.3	7.9	22.45	4.03	9.17
23-Jun	21h 54m 46.47s	-13° 07' 20.3"	30.02965	29.429859	244.76	125.4	2.3	7.9	22.41	3.59	9.13
24-Jun	21h 54m 43.50s	-13° 07' 37.4"	30.02962	29.416167	244.65	126.3	2.3	7.9	22.37	3.55	9.09
25-Jun	21h 54m 40.43s	-13° 07' 55.0"	30.02960	29.402648	244.53	127.3	2.3	7.8	22.33	3.51	9.05
26-Jun	21h 54m 37.24s	-13° 08' 13.3"	30.02957	29.389306	244.42	128.3	2.3	7.8	22.29	3.47	9.01
27-Jun	21h 54m 33.95s	-13° 08' 32.1"	30.02955	29.376144	244.31	129.2	2.3	7.8	22.25	3.43	8.57
28-Jun	21h 54m 30.54s	-13° 08' 51.5"	30.02952	29.363166	244.21	130.2	2.3	7.8	22.21	3.39	8.53
29-Jun	21h 54m 27.03s	-13° 09' 11.4"	30.02949	29.350377	244.10	131.2	2.3	7.8	22.17	3.35	8.49
30-Jun	21h 54m 23.43s	-13° 09' 31.8"	30.02947	29.337779	243.99	132.1	2.3	7.8	22.13	3.31	8.45
1-Jul	21h 54m 19.72s	-13° 09' 52.6"	30.02944	29.325377	243.89	133.1	2.3	7.8	22.09	3.27	8.41
2-Jul	21h 54m 15.92s	-13° 10' 14.0"	30.02942	29.313173	243.79	134.1	2.3	7.8	22.05	3.23	8.37
3-Jul	21h 54m 12.02s	-13° 10' 35.8"	30.02939	29.301171	243.69	135.1	2.3	7.8	22.01	3.19	8.33
4-Jul	21h 54m 08.04s	-13° 10' 58.1"	30.02936	29.289374	243.59	136.0	2.3	7.8	21.57	3.15	8.29
5-Jul	21h 54m 03.96s	-13° 11' 20.9"	30.02934	29.277786	243.50	137.0	2.3	7.8	21.53	3.11	8.25
6-Jul	21h 53m 59.79s	-13° 11' 44.2"	30.02931	29.266408	243.40	138.0	2.3	7.8	21.49	3.07	8.20
7-Jul	21h 53m 55.53s	-13° 12' 08.0"	30.02929	29.255245	243.31	138.9	2.3	7.8	21.45	3.03	8.16
8-Jul	21h 53m 51.18s	-13° 12' 32.2"	30.02926	29.244300	243.22	139.9	2.3	7.8	21.41	2.59	8.12
9-Jul	21h 53m 46.74s	-13° 12' 56.8"	30.02923	29.233576	243.13	140.9	2.3	7.8	21.37	2.55	8.08
10-Jul	21h 53m 42.21s	-13° 13' 21.9"	30.02921	29.223075	243.04	141.9	2.3	7.8	21.33	2.51	8.04
11-Jul	21h 53m 37.59s	-13° 13' 47.5"	30.02918	29.212802	242.96	142.8	2.3	7.8	21.29	2.47	8.00
12-Jul	21h 53m 32.89s	-13° 14' 13.5"	30.02916	29.202758	242.87	143.8	2.3	7.8	21.25	2.43	7.56
13-Jul	21h 53m 28.11s	-13° 14' 39.9"	30.02913	29.192948	242.79	144.8	2.3	7.8	21.21	2.39	7.52
14-Jul	21h 53m 23.24s	-13° 15' 06.6"	30.02910	29.183373	242.71	145.8	2.3	7.8	21.17	2.35	7.48
15-Jul	21h 53m 18.30s	-13° 15' 33.8"	30.02908	29.174038	242.63	146.7	2.3	7.8	21.13	2.31	7.44
16-Jul	21h 53m 13.29s	-13° 16' 01.3"	30.02905	29.164945	242.56	147.7	2.3	7.8	21.09	2.27	7.40
17-Jul	21h 53m 08.20s	-13° 16' 29.2"	30.02903	29.156098	242.48	148.7	2.3	7.8	21.05	2.23	7.36
18-Jul	21h 53m 03.05s	-13° 16' 57.4"	30.02900	29.147499	242.41	149.7	2.3	7.8	21.01	2.19	7.32
19-Jul	21h 52m 57.83s	-13° 17' 25.9"	30.02897	29.139151	242.34	150.6	2.3	7.8	20.57	2.15	7.28
20-Jul	21h 52m 52.54s	-13° 17' 54.8"	30.02895	29.131058	242.28	151.6	2.3	7.8	20.53	2.11	7.24
21-Jul	21h 52m 47.18s	-13° 18' 24.1"	30.02892	29.123222	242.21	152.6	2.3	7.8	20.49	2.07	7.20
22-Jul	21h 52m 41.76s	-13° 18' 53.6"	30.02890	29.115647	242.15	153.6	2.3	7.8	20.45	2.03	7.16
23-Jul	21h 52m 36.28s	-13° 19' 23.6"	30.02887	29.108335	242.09	154.6	2.3	7.8	20.41	1.58	7.12
24-Jul	21h 52m 30.72s	-13° 19' 53.8"	30.02884	29.101289	242.03	155.5	2.3	7.8	20.37	1.54	7.08
25-Jul	21h 52m 25.11s	-13° 20' 24.3"	30.02882	29.094510	241.97	156.5	2.3	7.8	20.33	1.50	7.04
26-Jul	21h 52m 19.44s	-13° 20' 55.1"	30.02879	29.088000	241.92	157.5	2.3	7.8	20.29	1.46	7.00
27-Jul	21h 52m 13.71s	-13° 21' 26.1"	30.02876	29.081763	241.87	158.5	2.3	7.8	20.25	1.42	6.56
28-Jul	21h 52m 07.93s	-13° 21' 57.4"	30.02874	29.075798	241.82	159.5	2.3	7.8	20.21	1.38	6.51
29-Jul	21h 52m 02.11s	-13° 22' 28.8"	30.02871	29.070109	241.77	160.4	2.3	7.8	20.17	1.34	6.47
30-Jul	21h 51m 56.24s	-13° 23' 00.5"	30.02869	29.064695	241.72	161.4	2.3	7.8	20.13	1.30	6.43
31-Jul	21h 51m 50.33s	-13° 23' 32.4"	30.02866	29.059560	241.68	162.4	2.3	7.8	20.09	1.26	6.39
1-Aug	21h 51m 44.38s	-13° 24' 04.4"	30.02863	29.054703	241.64	163.4	2.3	7.8	20.05	1.22	6.35
2-Aug	21h 51m 38.40s	-13° 24' 36.7"	30.02861	29.050127	241.60	164.4	2.3	7.8	20.01	1.18	6.31
3-Aug	21h 51m 32.37s	-13° 25' 09.1"	30.02858	29.045832	241.57	165.3	2.3	7.8	19.57	1.14	6.27
4-Aug	21h 51m 26.31s	-13° 25' 41.7"	30.02855	29.041820	241.53	166.3	2.3	7.8	19.53	1.10	6.23
5-Aug	21h 51m 20.21s	-13° 26' 14.4"	30.02853	29.038093	241.50	167.3	2.3	7.8	19.49	1.06	6.19
6-Aug	21h 51m 14.08s	-13° 26' 47.4"	30.02850	29.034650	241.47	168.3	2.3	7.8	19.45	1.02	6.15
7-Aug	21h 51m 07.91s	-13° 27' 20.4"	30.02848	29.031493	241.45	169.3	2.3	7.8	19.41	0.58	6.11
8-Aug	21h 51m 01.72s	-13° 27' 53.6"	30.02845	29.028623	241.42	170.2	2.3	7.8	19.37	0.54	6.07
9-Aug	21h 50m 55.50s	-13° 28' 26.9"	30.02842	29.026042	241.40	171.2	2.3	7.8	19.33	0.50	6.03
10-Aug	21h 50m 49.26s	-13° 29' 00.3"	30.02840	29.023750	241.38	172.2	2.3	7.8	19.29	0.46	5.59
11-Aug	21h 50m 42.99s	-13° 29' 33.7"	30.02837	29.021748	241.37	173.2	2.3	7.8	19.25	0.42	5.55
12-Aug	21h 50m 36.71s	-13° 30' 07.2"	30.02834	29.020037	241.35	174.2	2.3	7.8	19.21	0.38	5.50
13-Aug	21h 50m 30.42s	-13° 30' 40.7"	30.02832	29.018618	241.34	175.2	2.3	7.8	19.17	0.34	5.46
14-Aug	21h 50m 24.12s	-13° 31' 14.2"	30.02829	29.017493	241.33	176.2	2.3	7.8	19.13	0.30	5.42

Date	A.R. Geoc.	Dec. Geoc.	R A.U.	Distance A.U.	Light (m)	El. °	Diam. "	Mag.	Rise	Transit	Set
15-Aug	21h 50m 17.81s	-13° 31' 47.8"	30.02826	29.016661	241.32	177.2	2.3	7.8	19.09	0.26	5.38
16-Aug	21h 50m 11.49s	-13° 32' 21.4"	30.02824	29.016124	241.32	178.1	2.3	7.8	19.05	0.22	5.34
17-Aug	21h 50m 05.17s	-13° 32' 54.9"	30.02821	29.015882	241.32	179.1	2.3	7.8	19.01	0.18	5.30
18-Aug	21h 49m 58.84s	-13° 33' 28.5"	30.02819	29.015937	241.32	179.8	2.3	7.8	18.57	0.14	5.26
19-Aug	21h 49m 52.51s	-13° 34' 02.1"	30.02816	29.016288	241.32	178.9	2.3	7.8	18.53	0.10	5.22
20-Aug	21h 49m 46.18s	-13° 34' 35.7"	30.02813	29.016936	241.33	177.9	2.3	7.8	18.49	0.06	5.18
21-Aug	21h 49m 39.84s	-13° 35' 09.3"	30.02811	29.017881	241.33	176.9	2.3	7.8	18.45	0.02	5.14
22-Aug	21h 49m 33.51s	-13° 35' 42.8"	30.02808	29.019122	241.34	175.9	2.3	7.8	18.41	23.53	5.10
23-Aug	21h 49m 27.19s	-13° 36' 16.2"	30.02805	29.020660	241.36	174.9	2.3	7.8	18.37	23.49	5.06
24-Aug	21h 49m 20.88s	-13° 36' 49.5"	30.02803	29.022494	241.37	173.9	2.3	7.8	18.33	23.45	5.02
25-Aug	21h 49m 14.58s	-13° 37' 22.7"	30.02800	29.024623	241.39	172.9	2.3	7.8	18.29	23.41	4.58
26-Aug	21h 49m 08.31s	-13° 37' 55.8"	30.02797	29.027045	241.41	171.9	2.3	7.8	18.25	23.37	4.53
27-Aug	21h 49m 02.06s	-13° 38' 28.7"	30.02795	29.029762	241.43	170.9	2.3	7.8	18.21	23.33	4.49
28-Aug	21h 48m 55.83s	-13° 39' 01.4"	30.02792	29.032770	241.46	169.9	2.3	7.8	18.17	23.29	4.45
29-Aug	21h 48m 49.63s	-13° 39' 34.0"	30.02789	29.036069	241.49	168.9	2.3	7.8	18.13	23.25	4.41
30-Aug	21h 48m 43.45s	-13° 40' 06.5"	30.02787	29.039658	241.52	168.0	2.3	7.8	18.09	23.21	4.37
31-Aug	21h 48m 37.30s	-13° 40' 38.8"	30.02784	29.043536	241.55	167.0	2.3	7.8	18.05	23.17	4.33
1-Sep	21h 48m 31.18s	-13° 41' 10.9"	30.02781	29.047702	241.58	166.0	2.3	7.8	18.01	23.13	4.29
2-Sep	21h 48m 25.09s	-13° 41' 42.9"	30.02779	29.052154	241.62	165.0	2.3	7.8	17.57	23.09	4.25
3-Sep	21h 48m 19.04s	-13° 42' 14.6"	30.02776	29.056891	241.66	164.0	2.3	7.8	17.53	23.05	4.21
4-Sep	21h 48m 13.02s	-13° 42' 46.1"	30.02773	29.061912	241.70	163.0	2.3	7.8	17.49	23.01	4.17
5-Sep	21h 48m 07.03s	-13° 43' 17.4"	30.02771	29.067215	241.74	162.0	2.3	7.8	17.45	22.57	4.13
6-Sep	21h 48m 01.09s	-13° 43' 48.5"	30.02768	29.072798	241.79	161.0	2.3	7.8	17.41	22.53	4.09
7-Sep	21h 47m 55.19s	-13° 44' 19.3"	30.02765	29.078662	241.84	160.0	2.3	7.8	17.37	22.49	4.05
8-Sep	21h 47m 49.35s	-13° 44' 49.8"	30.02763	29.084803	241.89	159.0	2.3	7.8	17.33	22.45	4.01
9-Sep	21h 47m 43.55s	-13° 45' 20.0"	30.02760	29.091221	241.94	158.0	2.3	7.8	17.29	22.41	3.57
10-Sep	21h 47m 37.80s	-13° 45' 49.9"	30.02757	29.097914	242.00	157.0	2.3	7.8	17.25	22.37	3.52
11-Sep	21h 47m 32.12s	-13° 46' 19.5"	30.02755	29.104880	242.06	156.0	2.3	7.8	17.21	22.33	3.48
12-Sep	21h 47m 26.49s	-13° 46' 48.8"	30.02752	29.112119	242.12	155.0	2.3	7.8	17.17	22.29	3.44
13-Sep	21h 47m 20.92s	-13° 47' 17.7"	30.02749	29.119627	242.18	154.0	2.3	7.8	17.13	22.25	3.40
14-Sep	21h 47m 15.41s	-13° 47' 46.4"	30.02747	29.127405	242.25	153.0	2.3	7.8	17.09	22.21	3.36
15-Sep	21h 47m 09.96s	-13° 48' 14.7"	30.02744	29.135449	242.31	152.0	2.3	7.8	17.05	22.17	3.32
16-Sep	21h 47m 04.57s	-13° 48' 42.7"	30.02741	29.143757	242.38	151.0	2.3	7.8	17.01	22.13	3.28
17-Sep	21h 46m 59.24s	-13° 49' 10.3"	30.02739	29.152328	242.45	150.0	2.3	7.8	16.57	22.09	3.24
18-Sep	21h 46m 53.98s	-13° 49' 37.6"	30.02736	29.161158	242.53	149.0	2.3	7.8	16.53	22.05	3.20
19-Sep	21h 46m 48.79s	-13° 50' 04.5"	30.02733	29.170246	242.60	148.0	2.3	7.8	16.49	22.01	3.16
20-Sep	21h 46m 43.67s	-13° 50' 30.9"	30.02731	29.179588	242.68	147.0	2.3	7.8	16.45	21.57	3.12
21-Sep	21h 46m 38.63s	-13° 50' 56.9"	30.02728	29.189181	242.76	146.0	2.3	7.8	16.41	21.53	3.08
22-Sep	21h 46m 33.67s	-13° 51' 22.5"	30.02725	29.199022	242.84	145.0	2.3	7.8	16.37	21.49	3.04
23-Sep	21h 46m 28.80s	-13° 51' 47.6"	30.02723	29.209107	242.92	144.0	2.3	7.8	16.33	21.45	3.00
24-Sep	21h 46m 24.00s	-13° 52' 12.3"	30.02720	29.219434	243.01	143.0	2.3	7.8	16.29	21.41	2.56
25-Sep	21h 46m 19.30s	-13° 52' 36.5"	30.02717	29.229999	243.10	142.0	2.3	7.8	16.25	21.37	2.52
26-Sep	21h 46m 14.68s	-13° 53' 00.3"	30.02715	29.240798	243.19	141.0	2.3	7.8	16.21	21.33	2.48
27-Sep	21h 46m 10.15s	-13° 53' 23.6"	30.02712	29.251829	243.28	140.0	2.3	7.8	16.17	21.29	2.44
28-Sep	21h 46m 05.70s	-13° 53' 46.5"	30.02709	29.263087	243.37	139.0	2.3	7.8	16.14	21.25	2.40
29-Sep	21h 46m 01.35s	-13° 54' 08.9"	30.02707	29.274569	243.47	138.0	2.3	7.8	16.10	21.21	2.36
30-Sep	21h 45m 57.09s	-13° 54' 30.8"	30.02704	29.286272	243.57	137.0	2.3	7.8	16.06	21.17	2.32
1-Oct	21h 45m 52.91s	-13° 54' 52.2"	30.02701	29.298192	243.67	136.0	2.3	7.8	16.02	21.13	2.28
2-Oct	21h 45m 48.84s	-13° 55' 13.1"	30.02699	29.310325	243.77	135.0	2.3	7.8	15.58	21.09	2.24
3-Oct	21h 45m 44.85s	-13° 55' 33.5"	30.02696	29.322668	243.87	134.0	2.3	7.8	15.54	21.05	2.20
4-Oct	21h 45m 40.97s	-13° 55' 53.4"	30.02693	29.335218	243.97	133.0	2.3	7.8	15.50	21.01	2.16
5-Oct	21h 45m 37.19s	-13° 56' 12.7"	30.02691	29.347970	244.08	132.0	2.3	7.8	15.46	20.57	2.11
6-Oct	21h 45m 33.51s	-13° 56' 31.5"	30.02688	29.360921	244.19	131.0	2.3	7.8	15.42	20.53	2.07
7-Oct	21h 45m 29.94s	-13° 56' 49.7"	30.02685	29.374068	244.30	130.0	2.3	7.8	15.38	20.49	2.03
8-Oct	21h 45m 26.48s	-13° 57' 07.3"	30.02683	29.387407	244.41	129.0	2.3	7.8	15.34	20.45	1.59
9-Oct	21h 45m 23.12s	-13° 57' 24.4"	30.02680	29.400934	244.52	128.0	2.3	7.8	15.30	20.41	1.55
10-Oct	21h 45m 19.88s	-13° 57' 40.9"	30.02677	29.414647	244.63	127.0	2.3	7.9	15.26	20.37	1.51
11-Oct	21h 45m 16.75s	-13° 57' 56.8"	30.02674	29.428540	244.75	126.0	2.3	7.9	15.22	20.33	1.47
12-Oct	21h 45m 13.73s	-13° 58' 12.2"	30.02672	29.442611	244.87	125.0	2.3	7.9	15.18	20.29	1.43
13-Oct	21h 45m 10.81s	-13° 58' 27.0"	30.02669	29.456854	244.99	124.0	2.3	7.9	15.14	20.25	1.39
14-Oct	21h 45m 08.01s	-13° 58' 41.3"	30.02666	29.471267	245.11	123.0	2.3	7.9	15.10	20.21	1.35
15-Oct	21h 45m 05.31s	-13° 58' 54.9"	30.02664	29.485845	245.23	122.0	2.3	7.9	15.06	20.17	1.31
16-Oct	21h 45m 02.74s	-13° 59' 08.0"	30.02661	29.500583	245.35	121.0	2.3	7.9	15.02	20.13	1.27
17-Oct	21h 45m 00.28s	-13° 59' 20.4"	30.02658	29.515476	245.47	120.0	2.3	7.9	14.58	20.09	1.24
18-Oct	21h 44m 57.93s	-13° 59' 32.2"	30.02656	29.530521	245.60	119.0	2.3	7.9	14.54	20.05	1.20
19-Oct	21h 44m 55.72s	-13° 59' 43.3"	30.02653	29.545711	245.72	118.0	2.3	7.9	14.50	20.01	1.16
20-Oct	21h 44m 53.62s	-13° 59' 53.8"	30.02650	29.561042	245.85	117.0	2.3	7.9	14.46	19.57	1.12
21-Oct	21h 44m 51.66s	-14° 00' 03.7"	30.02648	29.576510	245.98	116.0	2.3	7.9	14.42	19.53	1.08
22-Oct	21h 44m 49.82s	-14° 00' 12.9"	30.02645	29.592108	246.11	115.0	2.3	7.9	14.38	19.49	1.04
23-Oct	21h 44m 48.10s	-14° 00' 21.4"	30.02642	29.607833	246.24	114.0	2.3	7.9	14.34	19.45	1.00
24-Oct	21h 44m 46.51s	-14° 00' 29.4"	30.02639	29.623678	246.37	113.0	2.3	7.9	14.30	19.41	0.56
25-Oct	21h 44m 45.05s	-14° 00' 36.6"	30.02637	29.639639	246.51	112.0	2.3	7.9	14.26	19.37	0.52
26-Oct	21h 44m 43.71s	-14° 00' 43.3"	30.02634	29.655711	246.64	111.0	2.3	7.9	14.23	19.33	0.48
27-Oct	21h 44m 42.49s	-14° 00' 49.3"	30.02631	29.671889	246.77	110.0	2.3	7.9	14.19	19.29	0.44
28-Oct	21h 44m 41.40s	-14° 00' 54.7"	30.02629	29.688167	246.91	109.0	2.3	7.9	14.15	19.25	0.40
29-Oct	21h 44m 40.44s	-14° 00' 59.4"	30.02626	29.704542	247.05	108.0	2.3	7.9	14.11	19.21	0.36
30-Oct	21h 44m 39.61s	-14° 01' 03.5"	30.02623	29.721007	247.18	107.0	2.3	7.9	14.07	19.17	0.32

Date	A.R. Geoc.	Dec. Geoc.	R A.U.	Distance A.U.	Light (m)	El. °	Diam. "	Mag.	Rise	Transit	Set
31-Oct	21h 44m 38.90s	-14° 01' 06.8"	30.02621	29.737558	247.32	106.0	2.3	7.9	14.03	19.13	0.28
1-Nov	21h 44m 38.32s	-14° 01' 09.5"	30.02618	29.754191	247.46	105.0	2.3	7.9	13.59	19.09	0.24
2-Nov	21h 44m 37.88s	-14° 01' 11.6"	30.02615	29.770900	247.60	104.0	2.3	7.9	13.55	19.06	0.20
3-Nov	21h 44m 37.57s	-14° 01' 12.9"	30.02612	29.787680	247.74	103.0	2.3	7.9	13.51	19.02	0.16
4-Nov	21h 44m 37.39s	-14° 01' 13.5"	30.02610	29.804528	247.88	102.0	2.3	7.9	13.47	18.58	0.12
5-Nov	21h 44m 37.35s	-14° 01' 13.4"	30.02607	29.821438	248.02	101.0	2.3	7.9	13.43	18.54	0.08
6-Nov	21h 44m 37.45s	-14° 01' 12.7"	30.02604	29.838405	248.16	100.0	2.3	7.9	13.39	18.50	0.04
7-Nov	21h 44m 37.67s	-14° 01' 11.3"	30.02602	29.855425	248.30	99.0	2.2	7.9	13.35	18.46	23.57
8-Nov	21h 44m 38.03s	-14° 01' 09.3"	30.02599	29.872493	248.44	98.0	2.2	7.9	13.31	18.42	23.53
9-Nov	21h 44m 38.52s	-14° 01' 06.6"	30.02596	29.889604	248.58	97.0	2.2	7.9	13.27	18.38	23.49
10-Nov	21h 44m 39.13s	-14° 01' 03.3"	30.02593	29.906753	248.73	96.0	2.2	7.9	13.24	18.34	23.45
11-Nov	21h 44m 39.88s	-14° 00' 59.2"	30.02591	29.923935	248.87	95.0	2.2	7.9	13.20	18.30	23.41
12-Nov	21h 44m 40.76s	-14° 00' 54.5"	30.02588	29.941145	249.01	94.0	2.2	7.9	13.16	18.26	23.37
13-Nov	21h 44m 41.77s	-14° 00' 49.1"	30.02585	29.958377	249.16	93.0	2.2	7.9	13.12	18.22	23.33
14-Nov	21h 44m 42.91s	-14° 00' 43.0"	30.02583	29.975625	249.30	92.0	2.2	7.9	13.08	18.18	23.29
15-Nov	21h 44m 44.19s	-14° 00' 36.2"	30.02580	29.992885	249.44	91.0	2.2	7.9	13.04	18.15	23.25
16-Nov	21h 44m 45.61s	-14° 00' 28.7"	30.02577	30.010151	249.59	90.0	2.2	7.9	13.00	18.11	23.21
17-Nov	21h 44m 47.16s	-14° 00' 20.5"	30.02574	30.027417	249.73	89.0	2.2	7.9	12.56	18.07	23.17
18-Nov	21h 44m 48.85s	-14° 00' 11.6"	30.02572	30.044677	249.87	88.0	2.2	7.9	12.52	18.03	23.14
19-Nov	21h 44m 50.68s	-14° 00' 02.1"	30.02569	30.061926	250.02	87.0	2.2	7.9	12.48	17.59	23.10
20-Nov	21h 44m 52.64s	-13° 59' 51.8"	30.02566	30.079159	250.16	86.0	2.2	7.9	12.44	17.55	23.06
21-Nov	21h 44m 54.73s	-13° 59' 40.9"	30.02564	30.096370	250.30	85.0	2.2	7.9	12.40	17.51	23.02
22-Nov	21h 44m 56.95s	-13° 59' 29.4"	30.02561	30.113553	250.45	84.0	2.2	7.9	12.37	17.47	22.58
23-Nov	21h 44m 59.30s	-13° 59' 17.2"	30.02558	30.130703	250.59	83.0	2.2	7.9	12.33	17.43	22.54
24-Nov	21h 45m 01.78s	-13° 59' 04.3"	30.02555	30.147816	250.73	82.0	2.2	7.9	12.29	17.39	22.50
25-Nov	21h 45m 04.38s	-13° 58' 50.8"	30.02553	30.164885	250.87	81.0	2.2	7.9	12.25	17.36	22.46
26-Nov	21h 45m 07.12s	-13° 58' 36.6"	30.02550	30.181906	251.02	80.0	2.2	7.9	12.21	17.32	22.43
27-Nov	21h 45m 09.98s	-13° 58' 21.8"	30.02547	30.198874	251.16	79.0	2.2	7.9	12.17	17.28	22.39
28-Nov	21h 45m 12.97s	-13° 58' 06.2"	30.02545	30.215783	251.30	78.0	2.2	7.9	12.13	17.24	22.35
29-Nov	21h 45m 16.10s	-13° 57' 50.1"	30.02542	30.232629	251.44	77.0	2.2	7.9	12.09	17.20	22.31
30-Nov	21h 45m 19.35s	-13° 57' 33.2"	30.02539	30.249407	251.58	76.0	2.2	7.9	12.05	17.16	22.27
1-Dec	21h 45m 22.73s	-13° 57' 15.7"	30.02536	30.266112	251.72	75.0	2.2	7.9	12.01	17.12	22.23
2-Dec	21h 45m 26.24s	-13° 56' 57.5"	30.02534	30.282740	251.85	74.0	2.2	7.9	11.58	17.08	22.19
3-Dec	21h 45m 29.88s	-13° 56' 38.7"	30.02531	30.299286	251.99	73.0	2.2	7.9	11.54	17.05	22.16
4-Dec	21h 45m 33.64s	-13° 56' 19.3"	30.02528	30.315746	252.13	72.0	2.2	7.9	11.50	17.01	22.12
5-Dec	21h 45m 37.52s	-13° 55' 59.3"	30.02525	30.332115	252.26	71.0	2.2	7.9	11.46	16.57	22.08
6-Dec	21h 45m 41.53s	-13° 55' 38.6"	30.02523	30.348388	252.40	70.0	2.2	7.9	11.42	16.53	22.04
7-Dec	21h 45m 45.65s	-13° 55' 17.4"	30.02520	30.364561	252.53	69.0	2.2	7.9	11.38	16.49	22.00
8-Dec	21h 45m 49.89s	-13° 54' 55.5"	30.02517	30.380629	252.67	68.0	2.2	7.9	11.34	16.45	21.56
9-Dec	21h 45m 54.25s	-13° 54' 33.1"	30.02514	30.396587	252.80	67.0	2.2	7.9	11.30	16.41	21.52
10-Dec	21h 45m 58.72s	-13° 54' 10.0"	30.02512	30.412431	252.93	66.0	2.2	7.9	11.26	16.38	21.49
11-Dec	21h 46m 03.31s	-13° 53' 46.4"	30.02509	30.428155	253.06	65.0	2.2	7.9	11.23	16.34	21.45
12-Dec	21h 46m 08.02s	-13° 53' 22.1"	30.02506	30.443755	253.19	64.0	2.2	7.9	11.19	16.30	21.41
13-Dec	21h 46m 12.85s	-13° 52' 57.1"	30.02504	30.459225	253.32	63.0	2.2	7.9	11.15	16.26	21.37
14-Dec	21h 46m 17.80s	-13° 52' 31.6"	30.02501	30.474560	253.45	62.0	2.2	7.9	11.11	16.22	21.33
15-Dec	21h 46m 22.87s	-13° 52' 05.5"	30.02498	30.489756	253.58	61.0	2.2	7.9	11.07	16.18	21.30
16-Dec	21h 46m 28.05s	-13° 51' 38.8"	30.02495	30.504808	253.70	60.0	2.2	7.9	11.03	16.14	21.26
17-Dec	21h 46m 33.34s	-13° 51' 11.5"	30.02493	30.519711	253.82	59.0	2.2	7.9	10.59	16.11	21.22
18-Dec	21h 46m 38.74s	-13° 50' 43.7"	30.02490	30.534461	253.95	58.0	2.2	7.9	10.55	16.07	21.18
19-Dec	21h 46m 44.25s	-13° 50' 15.4"	30.02487	30.549052	254.07	57.0	2.2	7.9	10.52	16.03	21.14
20-Dec	21h 46m 49.86s	-13° 49' 46.5"	30.02484	30.563480	254.19	56.0	2.2	7.9	10.48	15.59	21.10
21-Dec	21h 46m 55.58s	-13° 49' 17.1"	30.02482	30.577742	254.31	55.0	2.2	7.9	10.44	15.55	21.07
22-Dec	21h 47m 01.39s	-13° 48' 47.1"	30.02479	30.591832	254.42	54.0	2.2	7.9	10.40	15.51	21.03
23-Dec	21h 47m 07.31s	-13° 48' 16.7"	30.02476	30.605747	254.54	53.1	2.2	7.9	10.36	15.48	20.59
24-Dec	21h 47m 13.33s	-13° 47' 45.7"	30.02473	30.619482	254.65	52.1	2.2	7.9	10.32	15.44	20.55
25-Dec	21h 47m 19.45s	-13° 47' 14.2"	30.02471	30.633034	254.77	51.1	2.2	7.9	10.28	15.40	20.51
26-Dec	21h 47m 25.67s	-13° 46' 42.1"	30.02468	30.646399	254.88	50.1	2.2	7.9	10.25	15.36	20.48
27-Dec	21h 47m 31.98s	-13° 46' 09.6"	30.02465	30.659573	254.99	49.1	2.2	8.0	10.21	15.32	20.44
28-Dec	21h 47m 38.39s	-13° 45' 36.5"	30.02462	30.672553	255.10	48.1	2.2	8.0	10.17	15.28	20.40
29-Dec	21h 47m 44.90s	-13° 45' 03.0"	30.02460	30.685335	255.20	47.1	2.2	8.0	10.13	15.25	20.36
30-Dec	21h 47m 51.51s	-13° 44' 28.9"	30.02457	30.697916	255.31	46.1	2.2	8.0	10.09	15.21	20.33
31-Dec	21h 47m 58.20s	-13° 43' 54.5"	30.02454	30.710292	255.41	45.1	2.2	8.0	10.05	15.17	20.29

Legenda :

A.R., Dec. = apparent coordinates

R. = distance from the Sun in A.U.

Distance = distance from the Earth in A.U.

Light = Distance in minutes

El. = elongation from the Sun in °

Diam. = diameter in "

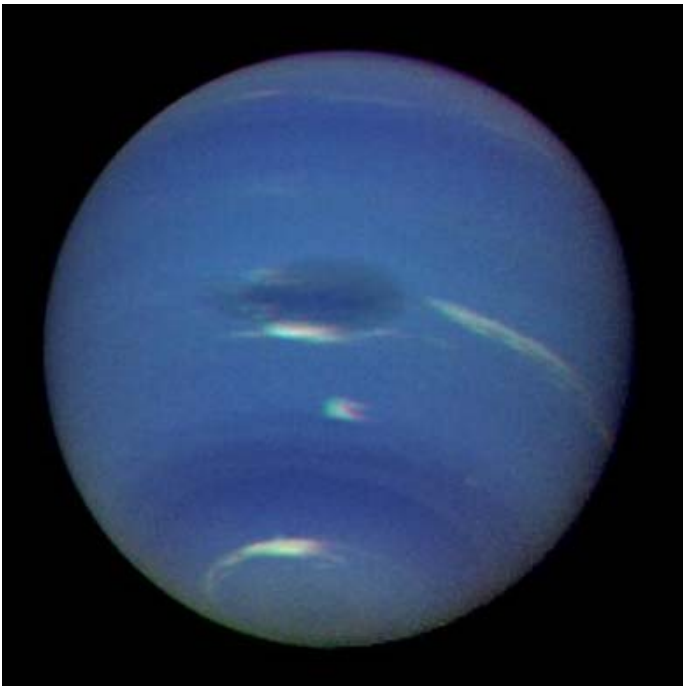
Mag. = magnitude

Times of rising and setting of the planet for Rome (42°N, 12°E), in U.T.+1

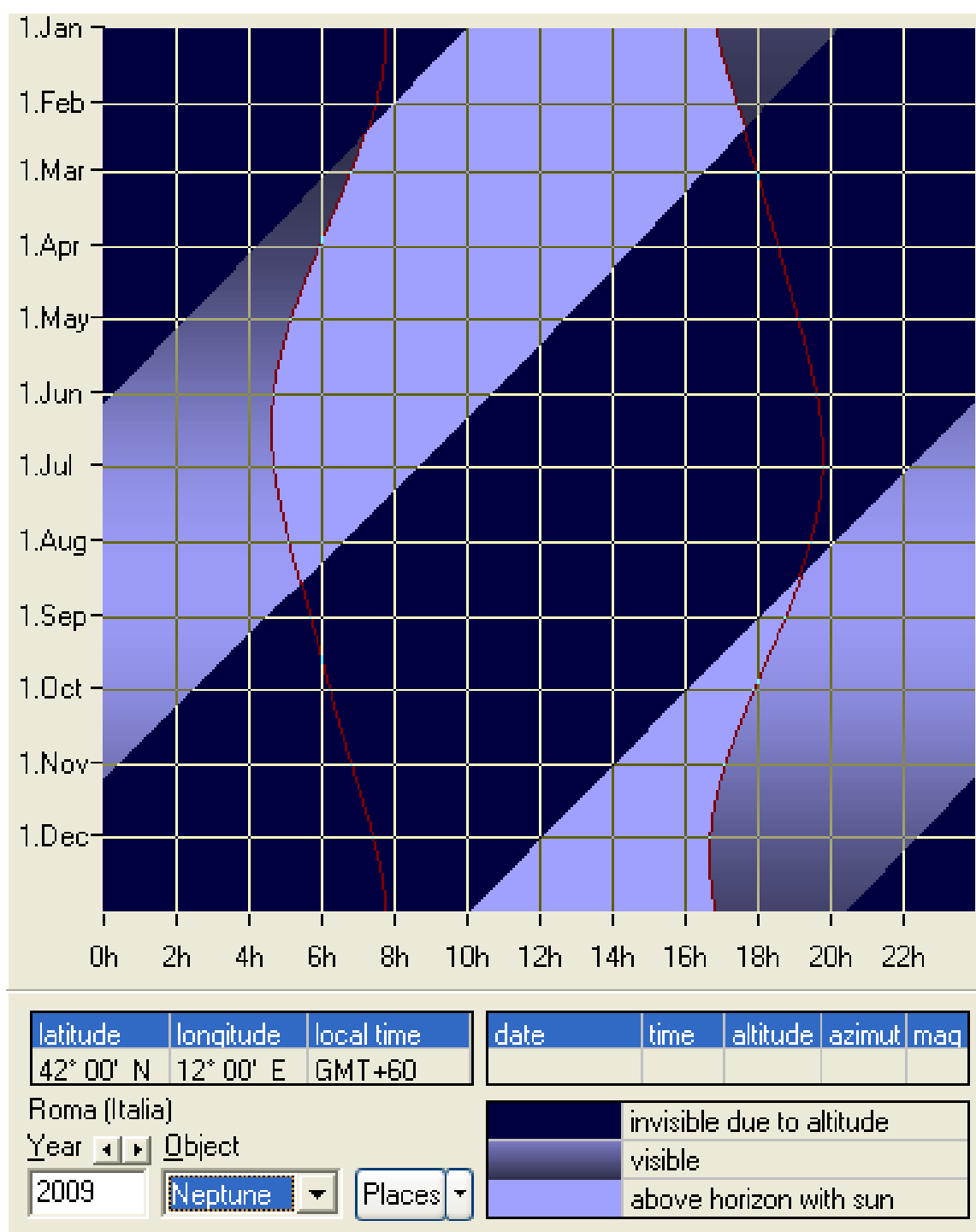
PHENOMENA OF NEPTUNE

Perihelion	-----			
Aphelion	-----			
Perigee	17/08/2009	07.36	29.01578 A.U.	
Apogee	13/02/2009	02.37	31.02010 A.U.	
Maxima magnitude	17/08/2009	09.40	7.8	Mag
Minima magnitude	13/02/2009	00.29	8.0	Mag
Opposition	17/08/2009	20.55		
Conjunction	12/02/2009	12.41		
Retrograde motion	29/05/2009	10.47		
Direct motion	04/11/2009	19.09		

© (5)



VISIBILITY OF NEPTUNE



Visibility of Neptune during the year

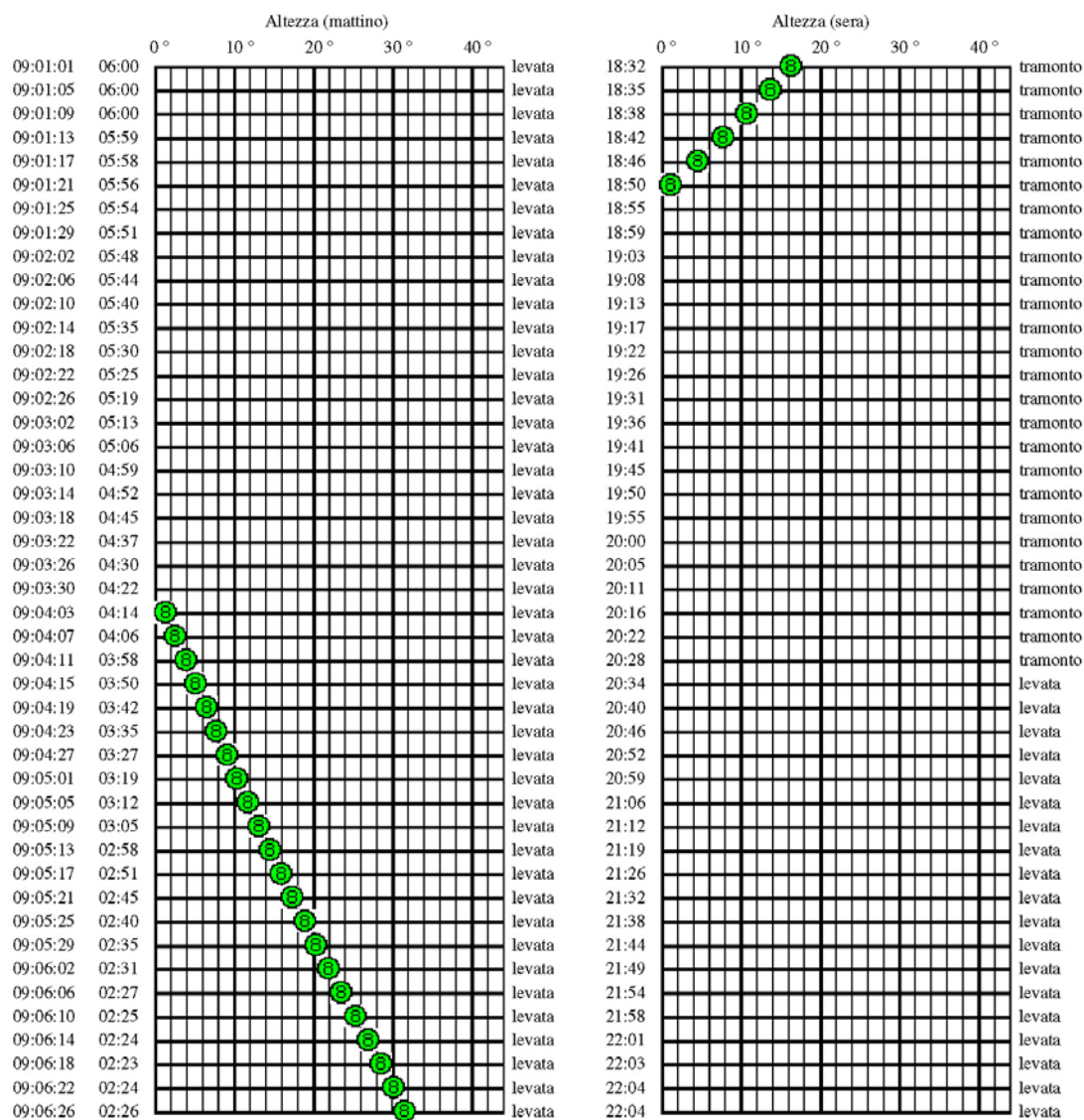
© (3)

Altezza ai crepuscoli

di Nettuno

nel momento il cui il Sole è 18 ° sotto l'orizzonte

Postazione: Roma 42:00 N, 12:00 E (UT +01:00)

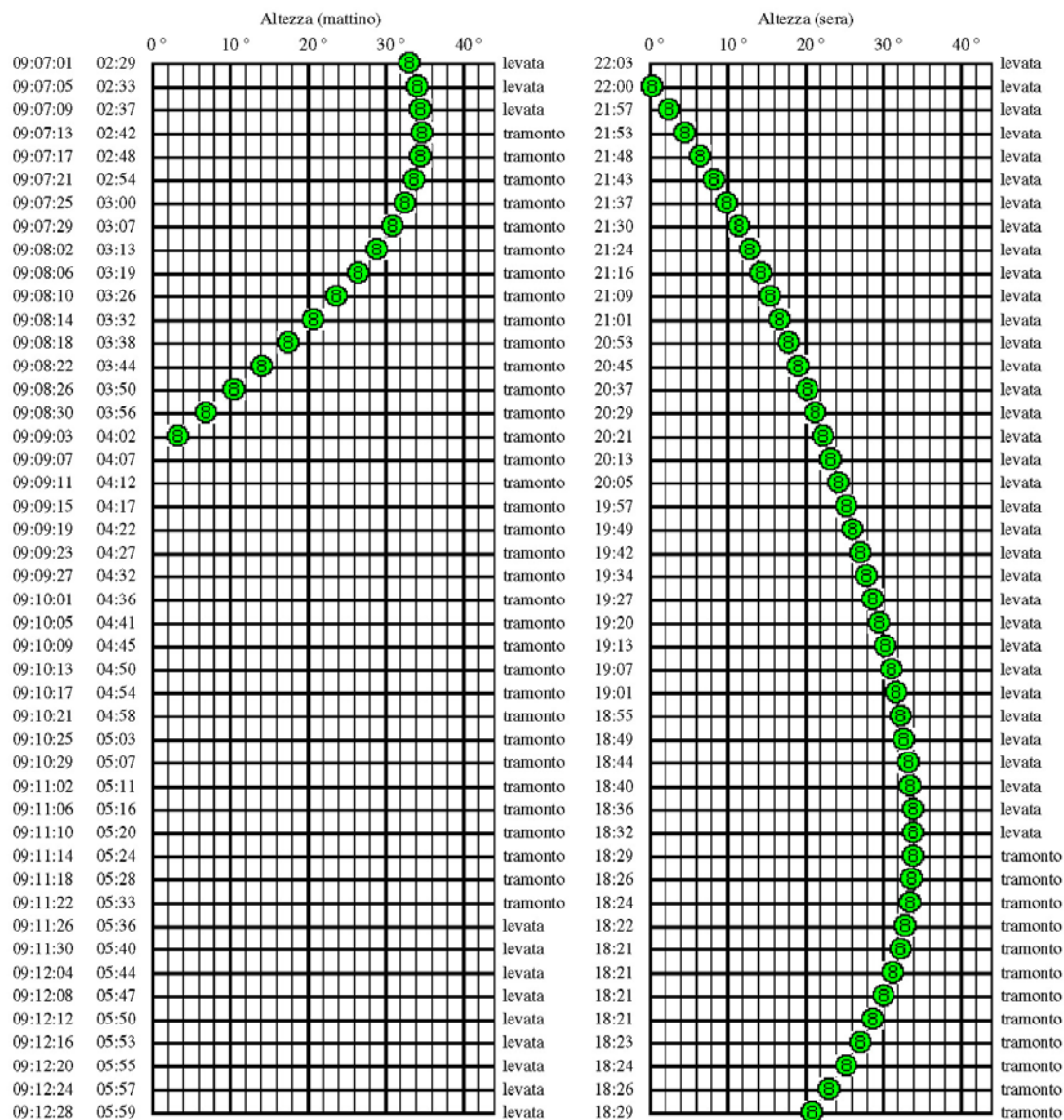


Altezza ai crepuscoli

di Nettuno

nel momento il cui il Sole è 18 ° sotto l'orizzonte

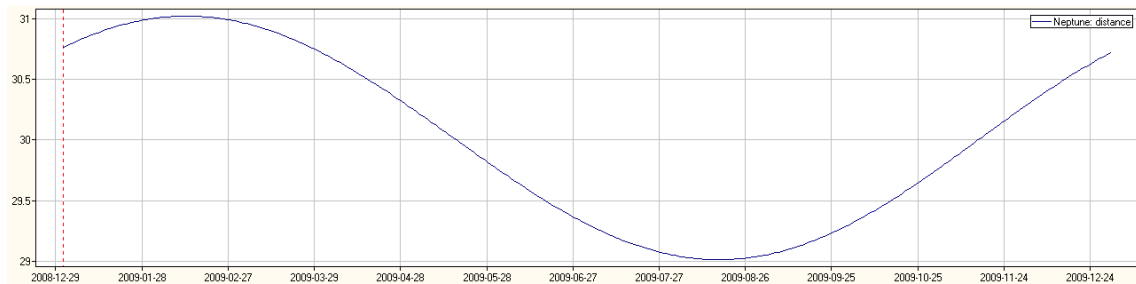
Postazione: Roma 42:00 N, 12:00 E (UT +01:00)



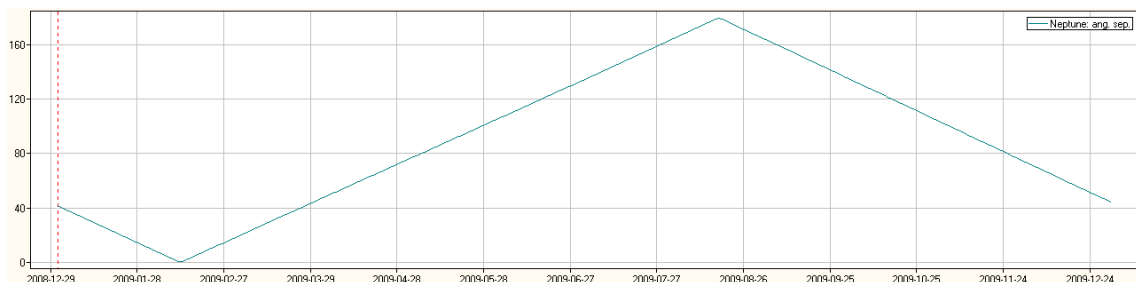
Height in the twilights. The Sun is 18° under the horizon

Date	Morning twilight				Evening twilight			
	Times	Alt	Az	Elong	Times	Alt	Az	Elong
2009:01:01	06:00	-43.9	66.3	41.5	18:32	16.4	232.2	41.0
2009:01:05	06:00	-41.1	69.9	37.6	18:35	13.6	235.9	37.1
2009:01:09	06:00	-38.4	73.1	33.6	18:38	10.7	239.4	33.1
2009:01:13	05:59	-35.8	76.1	29.7	18:42	7.7	242.9	29.2
2009:01:17	05:58	-33.2	78.8	25.8	18:46	4.5	246.3	25.2
2009:01:21	05:56	-30.7	81.2	21.8	18:50	1.2	249.7	21.3
2009:01:25	05:54	-28.3	83.6	17.9	18:55	-2.2	253.0	17.4
2009:01:29	05:51	-26.0	85.7	14.0	18:59	-5.7	256.2	13.5
2009:02:02	05:48	-23.7	87.7	10.1	19:03	-9.2	259.4	9.5
2009:02:06	05:44	-21.6	89.6	6.2	19:08	-12.8	262.7	5.6
2009:02:10	05:40	-19.5	91.4	2.3	19:13	-16.4	265.9	1.8
2009:02:14	05:35	-17.6	93.0	1.6	19:17	-20.1	269.2	2.2
2009:02:18	05:30	-15.7	94.6	5.5	19:22	-23.7	272.6	6.1
2009:02:22	05:25	-13.8	96.2	9.4	19:26	-27.4	276.1	9.9
2009:02:26	05:19	-12.1	97.6	13.2	19:31	-31.0	279.7	13.8
2009:03:02	05:13	-10.4	99.1	17.1	19:36	-34.6	283.6	17.7
2009:03:06	05:06	-8.8	100.4	21.0	19:41	-38.1	287.7	21.6
2009:03:10	04:59	-7.2	101.8	24.8	19:45	-41.6	292.2	25.4
2009:03:14	04:52	-5.7	103.1	28.7	19:50	-45.0	297.1	29.3
2009:03:18	04:45	-4.3	104.3	32.5	19:55	-48.2	302.5	33.1
2009:03:22	04:37	-2.8	105.6	36.4	20:00	-51.2	308.5	37.0
2009:03:26	04:30	-1.4	106.8	40.2	20:05	-54.0	315.3	40.8
2009:03:30	04:22	-0.1	108.0	44.0	20:11	-56.5	323.0	44.7
2009:04:03	04:14	1.3	109.3	47.8	20:16	-58.6	331.6	48.5
2009:04:07	04:06	2.6	110.5	51.7	20:22	-60.1	341.2	52.3
2009:04:11	03:58	3.9	111.7	55.5	20:28	-61.0	351.5	56.2
2009:04:15	03:50	5.2	113.0	59.3	20:34	-61.2	2.3	60.0
2009:04:19	03:42	6.5	114.3	63.1	20:40	-60.6	13.0	63.8
2009:04:23	03:35	7.8	115.6	67.0	20:46	-59.3	23.3	67.6
2009:04:27	03:27	9.1	117.0	70.8	20:52	-57.4	32.8	71.5
2009:05:01	03:19	10.4	118.4	74.6	20:59	-54.9	41.4	75.3
2009:05:05	03:12	11.7	119.9	78.4	21:06	-52.0	49.0	79.1
2009:05:09	03:05	13.1	121.4	82.2	21:12	-48.7	55.8	82.9
2009:05:13	02:58	14.4	123.1	86.0	21:19	-45.1	61.8	86.8
2009:05:17	02:51	15.8	124.9	89.9	21:26	-41.4	67.2	90.6
2009:05:21	02:45	17.3	126.8	93.7	21:32	-37.5	72.1	94.4
2009:05:25	02:40	18.8	128.9	97.5	21:38	-33.6	76.5	98.3
2009:05:29	02:35	20.4	131.2	101.4	21:44	-29.7	80.6	102.1
2009:06:02	02:31	22.0	133.7	105.2	21:49	-25.8	84.4	106.0
2009:06:06	02:27	23.6	136.5	109.0	21:54	-22.0	88.0	109.8
2009:06:10	02:25	25.3	139.6	112.9	21:58	-18.3	91.3	113.7
2009:06:14	02:24	26.9	143.1	116.7	22:01	-14.8	94.4	117.5
2009:06:18	02:23	28.6	146.9	120.6	22:03	-11.5	97.4	121.4
2009:06:22	02:24	30.2	151.2	124.5	22:04	-8.4	100.1	125.2
2009:06:26	02:26	31.6	155.9	128.3	22:04	-5.5	102.8	129.1
2009:06:30	02:28	32.8	161.1	132.2	22:03	-2.8	105.2	133.0

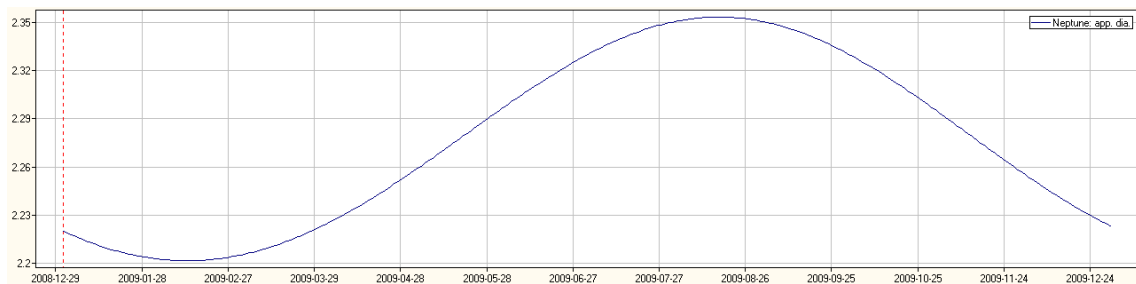
Date	Morning twilight				Evening twilight			
	Times	Alt	Az	Elong	Times	Alt	Az	Elong
2009:07:01	02:29	33.1	162.4	133.2	22:03	-2.2	105.8	134.0
2009:07:05	02:33	34.0	168.1	137.1	22:00	0.3	108.1	137.8
2009:07:09	02:37	34.6	174.1	140.9	21:57	2.5	110.3	141.7
2009:07:13	02:42	34.8	180.4	144.8	21:53	4.6	112.4	145.6
2009:07:17	02:48	34.5	186.8	148.8	21:48	6.5	114.4	149.5
2009:07:21	02:54	33.7	193.2	152.7	21:43	8.2	116.3	153.4
2009:07:25	03:00	32.5	199.6	156.6	21:37	9.9	118.2	157.3
2009:07:29	03:07	30.9	205.7	160.5	21:30	11.4	120.0	161.3
2009:08:02	03:13	28.8	211.6	164.4	21:24	12.9	121.8	165.2
2009:08:06	03:19	26.4	217.2	168.4	21:16	14.3	123.5	169.1
2009:08:10	03:26	23.7	222.5	172.3	21:09	15.6	125.2	173.0
2009:08:14	03:32	20.7	227.4	176.3	21:01	16.8	126.9	177.0
2009:08:18	03:38	17.5	232.1	179.5	20:53	18.0	128.6	179.0
2009:08:22	03:44	14.1	236.5	175.8	20:45	19.1	130.3	175.1
2009:08:26	03:50	10.6	240.6	171.8	20:37	20.2	132.1	171.1
2009:08:30	03:56	6.9	244.5	167.8	20:29	21.3	133.8	167.2
2009:09:03	04:02	3.2	248.3	163.9	20:21	22.3	135.6	163.2
2009:09:07	04:07	-0.6	251.9	159.9	20:13	23.4	137.5	159.2
2009:09:11	04:12	-4.4	255.4	155.9	20:05	24.3	139.4	155.2
2009:09:15	04:17	-8.3	258.8	151.9	19:57	25.3	141.3	151.3
2009:09:19	04:22	-12.1	262.2	147.9	19:49	26.2	143.3	147.3
2009:09:23	04:27	-16.0	265.6	143.9	19:42	27.1	145.4	143.3
2009:09:27	04:32	-19.9	269.0	139.9	19:34	27.9	147.5	139.3
2009:10:01	04:36	-23.8	272.5	135.9	19:27	28.8	149.7	135.3
2009:10:05	04:41	-27.6	276.0	131.9	19:20	29.6	152.1	131.3
2009:10:09	04:45	-31.4	279.7	127.9	19:13	30.3	154.5	127.3
2009:10:13	04:50	-35.1	283.6	123.9	19:07	31.0	157.0	123.3
2009:10:17	04:54	-38.7	287.8	119.9	19:01	31.7	159.7	119.3
2009:10:21	04:58	-42.3	292.3	115.9	18:55	32.3	162.5	115.3
2009:10:25	05:03	-45.7	297.2	111.8	18:49	32.8	165.4	111.3
2009:10:29	05:07	-49.0	302.6	107.8	18:44	33.2	168.5	107.3
2009:11:02	05:11	-52.0	308.6	103.8	18:40	33.6	171.7	103.3
2009:11:06	05:16	-54.8	315.3	99.8	18:36	33.8	175.1	99.2
2009:11:10	05:20	-57.2	322.8	95.8	18:32	34.0	178.6	95.2
2009:11:14	05:24	-59.3	331.2	91.8	18:29	34.0	182.2	91.2
2009:11:18	05:28	-60.8	340.4	87.8	18:26	33.8	186.0	87.2
2009:11:22	05:33	-61.7	350.1	83.8	18:24	33.5	189.9	83.2
2009:11:26	05:36	-62.0	0.2	79.8	18:22	32.9	194.0	79.2
2009:11:30	05:40	-61.6	10.1	75.8	18:21	32.2	198.0	75.2
2009:12:04	05:44	-60.7	19.5	71.8	18:21	31.3	202.2	71.2
2009:12:08	05:47	-59.3	28.2	67.8	18:21	30.1	206.4	67.3
2009:12:12	05:50	-57.4	36.0	63.8	18:21	28.7	210.5	63.3
2009:12:16	05:53	-55.2	42.9	59.8	18:23	27.1	214.7	59.3
2009:12:20	05:55	-52.8	49.0	55.8	18:24	25.2	218.8	55.3
2009:12:24	05:57	-50.3	54.4	51.9	18:26	23.1	222.8	51.3
2009:12:28	05:59	-47.7	59.1	47.9	18:29	20.8	226.8	47.4



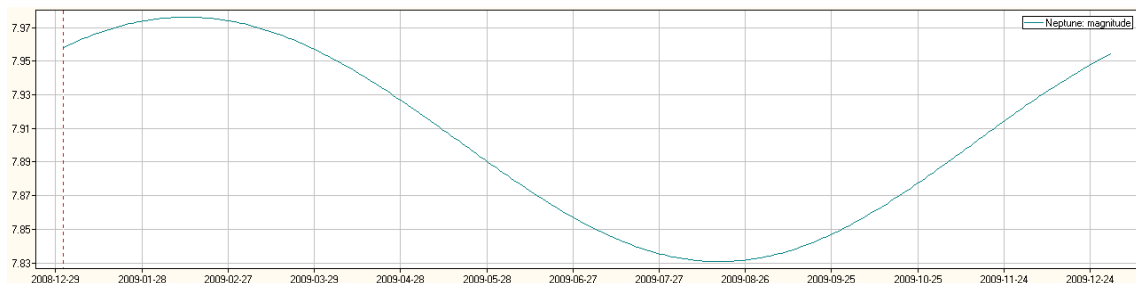
Distance of Neptune in A.U. during the year



Elongation of Neptune in ° during the year



Diameter of Neptune in " during the year



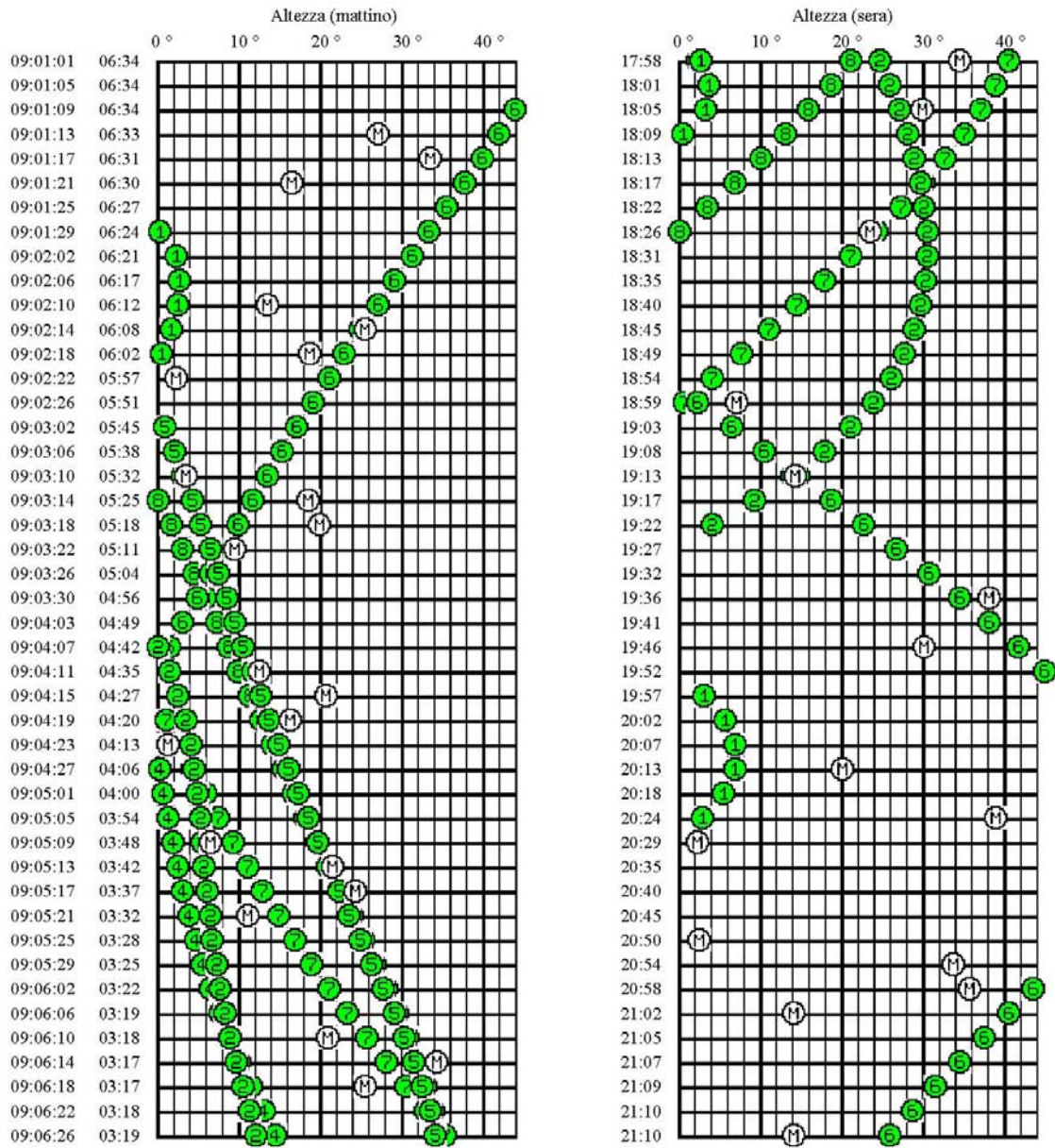
Magnitude of Neptune during the year

Altezza ai crepuscoli

di Luna e Pianeti

nel momento il cui il Sole è 12 ° sotto l'orizzonte

Postazione: IT:Roma 42:00 N, 12:00 E (UT +01:00)



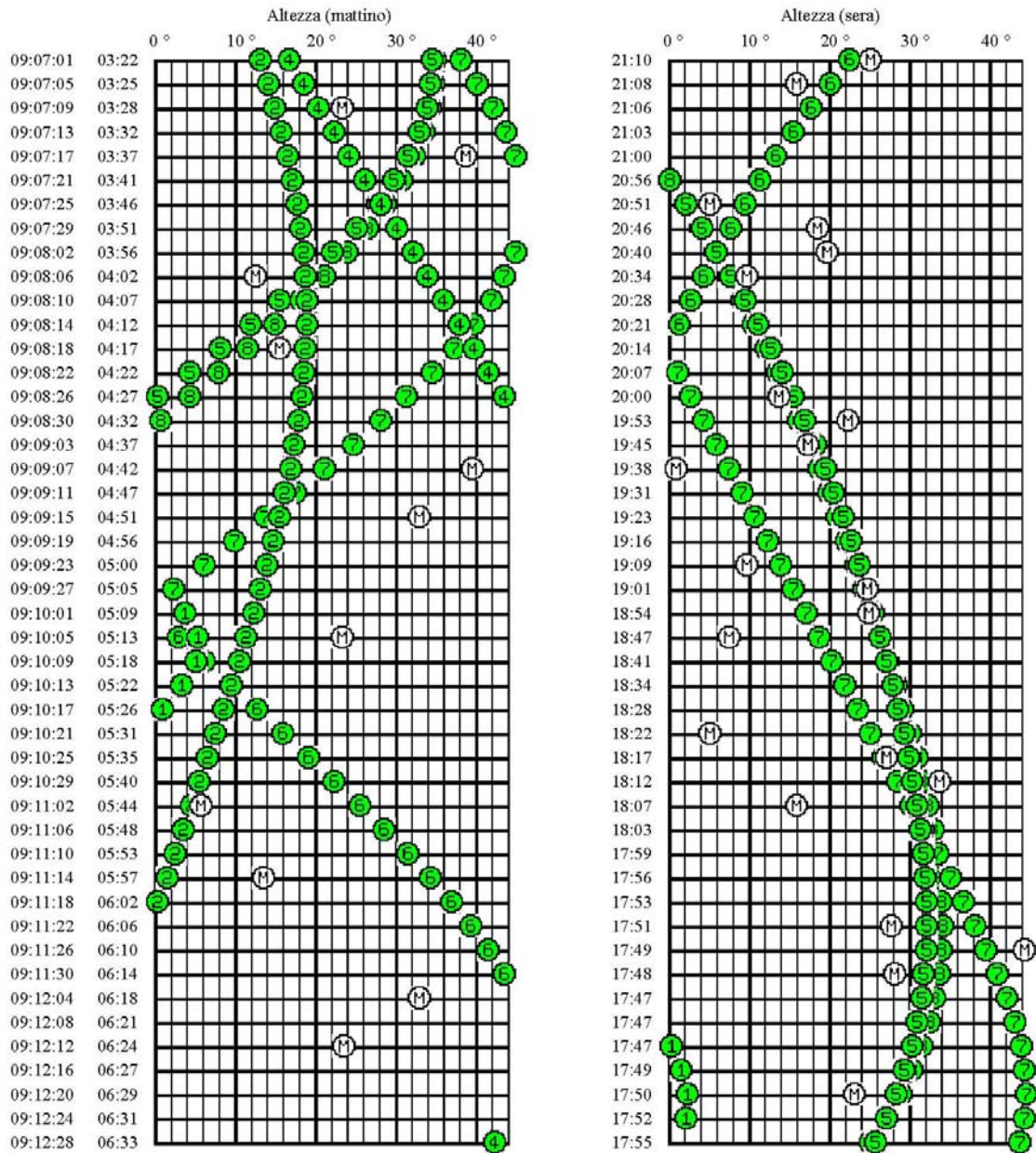
1 = Mercury , 2 = Venus , 4 = Mars , 5 = Jupiter, 6 = Saturn , 7 = Uranus, 8 = Neptune, M = Moon

Altezza ai crepuscoli

di Luna e Pianeti

nel momento il cui il Sole è 12 ° sotto l'orizzonte

Postazione: IT:Roma 42:00 N, 12:00 E (UT +01:00)



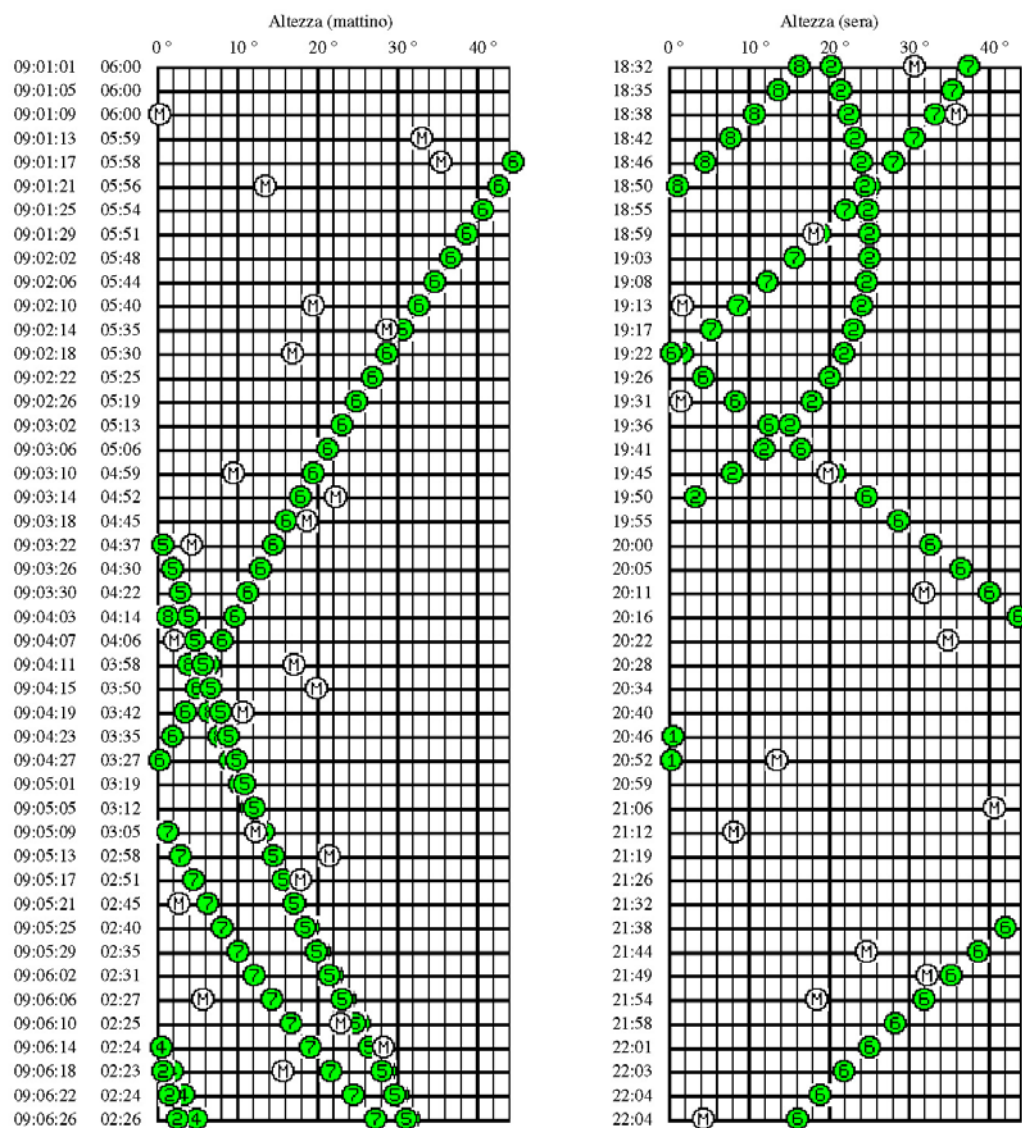
1 = Mercury , 2 = Venus , 4 = Mars , 5 = Jupiter, 6 = Saturn , 7 = Uranus, 8 = Neptune, M = Moon

Altezza ai crepuscoli

di Luna e Pianeti

nel momento il cui il Sole è 18 ° sotto l'orizzonte

Postazione: IT:Roma 42:00 N, 12:00 E (UT +01:00)



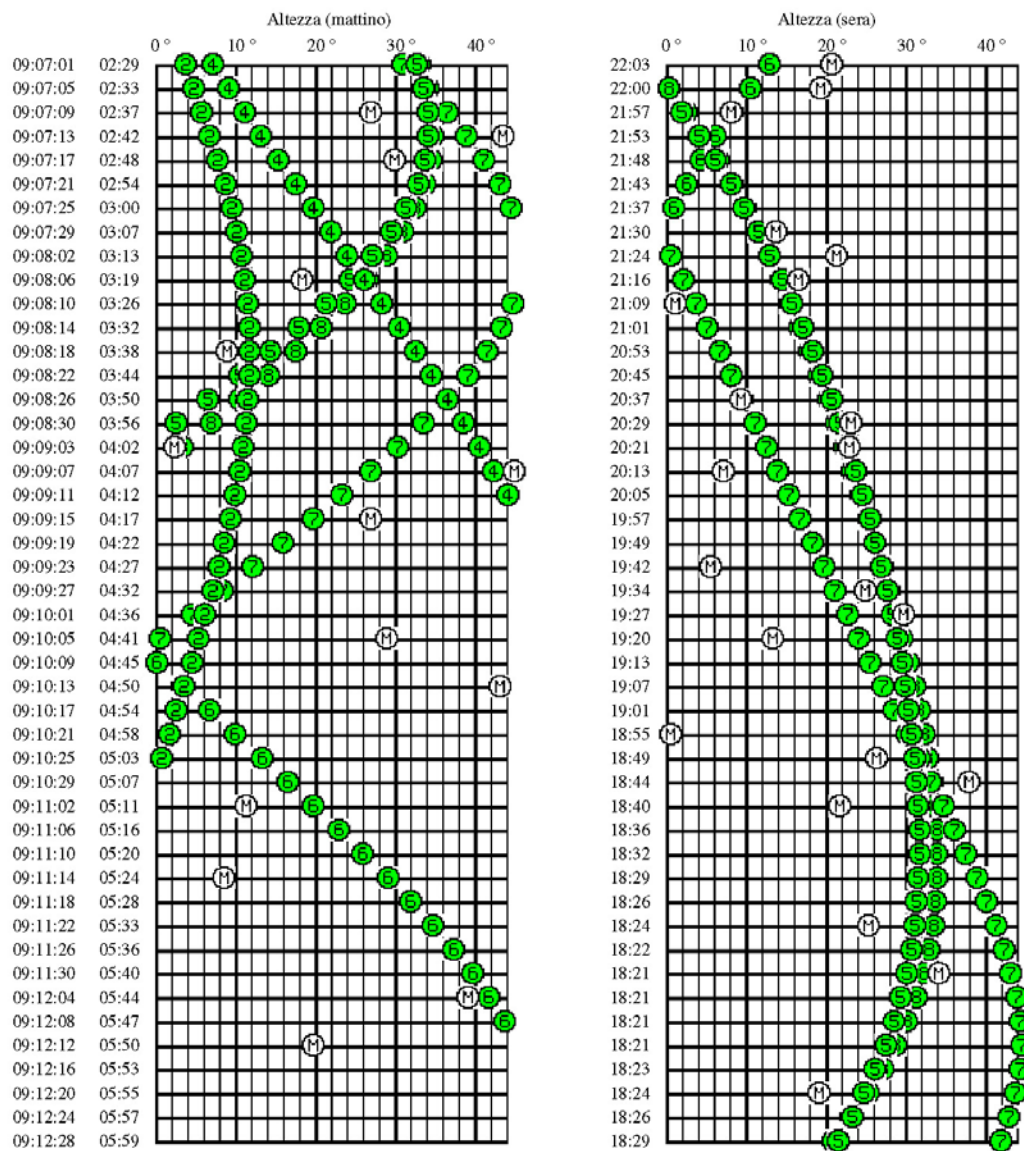
1 = Mercury , 2 = Venus , 4 = Mars , 5 = Jupiter, 6 = Saturn , 7 = Uranus, 8 = Neptune, M = Moon

Altezza ai crepuscoli

di Luna e Pianeti

nel momento il cui il Sole è 18 ° sotto l'orizzonte

Postazione: IT:Roma 42:00 N, 12:00 E (UT +01:00)



1 = Mercury , 2 = Venus , 4 = Mars , 5 = Jupiter, 6 = Saturn , 7 = Uranus, 8 = Neptune, M = Moon

4 in the even. M V M G S U N L

2009:10:29	0	0	0	1	0	1	1	1
2009:10:30	0	0	0	1	0	1	1	1
2009:10:31	0	0	0	1	0	1	1	1
2009:11:01	0	0	0	1	0	1	1	1
2009:11:02	0	0	0	1	0	1	1	1
2009:11:03	0	0	0	1	0	1	1	1
2009:11:04	0	0	0	1	0	1	1	1
2009:11:20	0	0	0	1	0	1	1	1
2009:11:21	0	0	0	1	0	1	1	1
2009:11:22	0	0	0	1	0	1	1	1
2009:11:23	0	0	0	1	0	1	1	1
2009:11:24	0	0	0	1	0	1	1	1
2009:11:25	0	0	0	1	0	1	1	1
2009:11:26	0	0	0	1	0	1	1	1
2009:11:27	0	0	0	1	0	1	1	1
2009:11:28	0	0	0	1	0	1	1	1
2009:11:29	0	0	0	1	0	1	1	1
2009:11:30	0	0	0	1	0	1	1	1
2009:12:01	0	0	0	1	0	1	1	1
2009:12:02	0	0	0	1	0	1	1	1
2009:12:03	0	0	0	1	0	1	1	1
2009:12:19	0	0	0	1	0	1	1	1
2009:12:20	0	0	0	1	0	1	1	1
2009:12:21	0	0	0	1	0	1	1	1
2009:12:22	0	0	0	1	0	1	1	1
2009:12:23	0	0	0	1	0	1	1	1
2009:12:24	0	0	0	1	0	1	1	1
2009:12:25	0	0	0	1	0	1	1	1
2009:12:26	0	0	0	1	0	1	1	1
2009:12:27	0	0	0	1	0	1	1	1
2009:12:28	0	0	0	1	0	1	1	1
2009:12:29	0	0	0	1	0	1	1	1
2009:12:30	0	0	0	1	0	1	1	1
2009:12:31	0	0	0	1	0	1	1	1

M = Mercury
V = Venus
M = Mars
G = Jupiter
S = Saturn
U = Uranus
N = Neptune
L = Moon

In the days with the value "1" they will be contemporarily visible in the morning or in the evening more planets. (Valid for Rome)

GEOCENTR. CONJUNCTIONS <5° BETWEEN PLANETS

Date	TT	Dm (°)	Dl	r1	r2	p (°)	e	m1	m2	tm(s)	tw(h)		
2009/01/18	09:36:05	3.25113	0.00895	0.680	6.088	177	6	2.2	-1.8		64.5	Mercury	Jupiter
2009/01/22	21:04:37	1.21273	0.00792	0.626	20.755	150	47	-4.5	5.9		126.5	Venus	Uranus
2009/01/27	10:19:43	4.31688	0.00435	0.697	2.364	167	-15	0.7	1.2		41.4	Mercury	Mars
2009/02/17	16:19:03	0.56025	0.00565	2.305	6.022	345	-19	1.1	-1.9		217.6	Mars	Jupiter
2009/02/24	05:31:42	0.61420	0.00704	1.131	5.983	350	-24	0.1	-1.9		106.5	Mercury	Jupiter
2009/03/02	00:41:02	0.59269	0.00231	1.200	2.270	348	-22	-0.1	1.1		174.0	Mercury	Mars
2009/03/05	08:36:54	1.57264	0.00293	1.235	30.962	343	-20	-0.2	8.0		76.4	Mercury	Neptune
2009/03/08	12:45:18	0.76182	0.00186	2.251	30.943	341	-23	1.1	8.0		158.8	Mars	Neptune
2009/03/22	05:37:39	1.26863	0.00281	1.348	21.084	335	-9	-1.1	5.9		64.3	Mercury	Uranus
2009/04/15	10:03:06	0.43322	0.00206	2.139	20.952	337	-31	1.0	5.9		164.5	Mars	Uranus
2009/04/24	16:06:21	4.13117	0.01189	0.383	2.112	135	-35	-4.5	1.0		120.2	Venus	Mars
2009/05/27	09:26:58	0.38983	0.00629	4.794	29.845	344	-100	-2.3	7.9		2054.8	Jupiter	Neptune
2009/06/21	05:20:45	1.97355	0.00518	0.824	1.929	346	-45	-4.1	1.0		352.8	Venus	Mars
2009/07/09	16:53:36	0.56194	0.00713	4.216	29.228	336	-142	-2.6	7.8		2157.6	Jupiter	Neptune
2009/08/17	06:16:54	2.93828	0.00520	1.029	10.327	31	26	0.3	0.6		85.7	Mercury	Saturn
2009/09/23	15:05:27	4.21807	0.00689	0.676	10.444	42	-7	2.2	0.7		61.4	Mercury	Saturn
2009/10/08	07:11:41	0.30237	0.00520	1.025	10.397	18	-18	-0.6	0.7		107.0	Mercury	Saturn
2009/10/13	10:58:54	0.51442	0.00501	1.537	10.368	23	-22	-3.9	0.7		106.6	Venus	Saturn
2009/12/21	09:24:04	0.52664	0.00550	5.510	30.581	340	55	-2.1	7.9		741.9	Jupiter	Neptune

OCCULTATION BETWEEN PLANETS

Date	TT	Dm (°)	Dl	r1	r2	p (°)	e	m1	m2	tm(s)	tw(h)		
2009/11/05	09:28:10	0.20244	0.27026	0.991	1.438	28	-0		-1.0	49194	191.2	Sun	Mercury

NB: this year don't happen occultations between planets; there is this unusual occultation planet-Sun

date in the format year/month/day
Dm = least distance between the centers of the planets
Dl = parameter limit, if Dm < Dl there is an occultation between the planets
R1 = distance in A.U. of the body 1 from the Earth
R2 = distance in A.U. of the body 2 from the Earth
P = angle of position between the planets, in degrees
e = elongation, in degree
m1 = magnitude of the first planet
m2 = magnitude of the second planet
tm = if present, one of the planets is occulted maximum for x seconds
tw = semiperiod in hours in which the two planets are near less than 5°

MULTIPLE PLANETARY CONJUNCTIONS

(events with 3 or more planets within 5°)

Date	TT	Dmed (°)	Dmax	emin	m2d	mmax			
2009/02/24 06:07:51		3.008	3.664	-24	0.1	1.1	Mercury	Mars	Jupiter
2009/03/05 08:37:52		2.209	2.486	-23	1.1	8.0	Mercury	Mars	Neptune

date in the format year/month/day

Dmed = middle distance between the center of the planets, in gradi

Dmax = diameter of the group, in degrees

emin = least elongation, in degrees

m2d = magnitude of the 2nd brightest planet

mmax = least magnitude

© (6)

MULTIPLE CONJUNCTIONS

LEAST TOPOCENTRIC GROUPING BETWEEN PLANETS

42°N - 12°E

DATE	TIME	BODIES			D12	D13	D23	GROUP	EL.	MAG1	MAG2	MAG3	MAGT	ALT	AZ
21 Feb 2009	16:00	MERCURY	MARS	JUPITER	5.0	2.8	2.2	5.0	22	0.0	1.2	-2.0	-2.2	-12	257
21 Feb 2009	20:00	MERCURY	MARS	JUPITER	4.9	2.6	2.3	4.9	22	0.0	1.2	-2.0	-2.2	-55	306
22 Feb 2009	00:00	MERCURY	MARS	JUPITER	4.8	2.5	2.4	4.9	22	0.0	1.2	-2.0	-2.2	-55	60
22 Feb 2009	04:00	MERCURY	MARS	JUPITER	4.7	2.3	2.5	4.8	22	0.0	1.2	-2.0	-2.2	-12	105
22 Feb 2009	08:00	MERCURY	MARS	JUPITER	4.6	2.1	2.6	4.7	23	0.0	1.2	-2.0	-2.2	24	151
22 Feb 2009	12:00	MERCURY	MARS	JUPITER	4.6	1.9	2.7	4.6	23	0.0	1.2	-2.0	-2.2	24	213
22 Feb 2009	16:00	MERCURY	MARS	JUPITER	4.5	1.8	2.8	4.5	23	0.0	1.2	-2.0	-2.2	-12	257
22 Feb 2009	20:00	MERCURY	MARS	JUPITER	4.4	1.6	2.8	4.4	23	-0.1	1.2	-2.0	-2.2	-55	306
23 Feb 2009	00:00	MERCURY	MARS	JUPITER	4.3	1.4	2.9	4.3	23	-0.1	1.2	-2.0	-2.2	-55	59
23 Feb 2009	04:00	MERCURY	MARS	JUPITER	4.2	1.3	3.0	4.2	23	-0.1	1.2	-2.0	-2.2	-12	105
23 Feb 2009	08:00	MERCURY	MARS	JUPITER	4.1	1.1	3.1	4.2	23	-0.1	1.2	-2.0	-2.2	24	151
23 Feb 2009	12:00	MERCURY	MARS	JUPITER	4.0	1.0	3.2	4.1	23	-0.1	1.2	-2.0	-2.2	24	213
23 Feb 2009	16:00	MERCURY	MARS	JUPITER	3.9	0.8	3.3	4.0	23	-0.1	1.2	-2.0	-2.2	-12	257
23 Feb 2009	20:00	MERCURY	MARS	JUPITER	3.8	0.7	3.4	3.9	23	-0.1	1.2	-2.0	-2.2	-55	306
24 Feb 2009	00:00	MERCURY	MARS	JUPITER	3.7	0.6	3.5	3.8	23	-0.1	1.2	-2.0	-2.2	-54	58
24 Feb 2009	04:00	MERCURY	MARS	JUPITER	3.7	0.6	3.6	3.7	23	-0.1	1.2	-2.0	-2.2	-11	105
24 Feb 2009	08:00	MERCURY	MARS	JUPITER	3.6	0.6	3.7	3.7	23	-0.1	1.2	-2.0	-2.2	24	150
24 Feb 2009	12:00	MERCURY	MARS	JUPITER	3.5	0.6	3.8	3.8	23	-0.1	1.2	-2.0	-2.2	24	212
24 Feb 2009	16:00	MERCURY	MARS	JUPITER	3.4	0.7	3.8	3.9	23	-0.1	1.2	-2.0	-2.2	-12	257
24 Feb 2009	20:00	MERCURY	MARS	JUPITER	3.3	0.9	3.9	4.0	23	-0.1	1.2	-2.0	-2.2	-55	305
25 Feb 2009	00:00	MERCURY	MARS	JUPITER	3.2	1.0	4.0	4.1	23	-0.1	1.2	-2.0	-2.2	-54	58
25 Feb 2009	04:00	MERCURY	MARS	JUPITER	3.1	1.2	4.1	4.2	23	-0.1	1.2	-2.0	-2.2	-11	104
25 Feb 2009	08:00	MERCURY	MARS	JUPITER	3.0	1.3	4.2	4.3	23	-0.1	1.2	-2.0	-2.2	25	150
25 Feb 2009	12:00	MERCURY	MARS	JUPITER	2.9	1.5	4.3	4.3	23	-0.1	1.2	-2.0	-2.2	24	212
25 Feb 2009	16:00	MERCURY	MARS	JUPITER	2.8	1.7	4.4	4.4	23	-0.1	1.2	-2.0	-2.2	-12	257
25 Feb 2009	20:00	MERCURY	MARS	JUPITER	2.7	1.9	4.5	4.5	23	-0.1	1.2	-2.0	-2.2	-55	305
26 Feb 2009	00:00	MERCURY	MARS	JUPITER	2.6	2.1	4.6	4.6	23	-0.1	1.2	-2.0	-2.2	-54	57
26 Feb 2009	04:00	MERCURY	MARS	JUPITER	2.5	2.2	4.7	4.7	23	-0.1	1.2	-2.0	-2.2	-11	104
26 Feb 2009	08:00	MERCURY	MARS	JUPITER	2.4	2.4	4.8	4.8	23	-0.1	1.2	-2.0	-2.2	25	149
26 Feb 2009	12:00	MERCURY	MARS	JUPITER	2.3	2.6	4.9	4.9	23	-0.1	1.2	-2.0	-2.2	24	212
26 Feb 2009	16:00	MERCURY	MARS	JUPITER	2.2	2.8	4.9	5.0	24	-0.1	1.2	-2.0	-2.2	-12	257
02 mar 2009	04:00	MERCURY	MARS	NEPTUNE	0.6	4.9	4.8	4.9	20	-0.1	1.2	8.0	-0.4	-12	101
02 mar 2009	08:00	MERCURY	MARS	NEPTUNE	0.6	4.6	4.6	4.7	20	-0.1	1.2	8.0	-0.4	26	147
02 mar 2009	12:00	MERCURY	MARS	NEPTUNE	0.6	4.4	4.5	4.6	20	-0.1	1.2	8.0	-0.4	27	211
02 mar 2009	16:00	MERCURY	MARS	NEPTUNE	0.7	4.2	4.4	4.4	20	-0.1	1.2	8.0	-0.4	-9	257
02 mar 2009	20:00	MERCURY	MARS	NEPTUNE	0.8	4.0	4.3	4.3	20	-0.2	1.2	8.0	-0.5	-52	304
03 mar 2009	00:00	MERCURY	MARS	NEPTUNE	0.8	3.7	4.1	4.2	20	-0.2	1.2	8.0	-0.5	-54	52
03 mar 2009	04:00	MERCURY	MARS	NEPTUNE	0.9	3.5	4.0	4.1	21	-0.2	1.2	8.0	-0.5	-11	101
03 mar 2009	08:00	MERCURY	MARS	NEPTUNE	1.0	3.3	3.9	4.0	21	-0.2	1.2	8.0	-0.5	26	146
03 mar 2009	12:00	MERCURY	MARS	NEPTUNE	1.1	3.1	3.8	3.8	21	-0.2	1.2	8.0	-0.5	27	210
03 mar 2009	16:00	MERCURY	MARS	NEPTUNE	1.2	2.9	3.7	3.7	21	-0.2	1.2	8.0	-0.5	-9	257
03 mar 2009	20:00	MERCURY	MARS	NEPTUNE	1.3	2.7	3.5	3.6	21	-0.2	1.2	8.0	-0.5	-52	304
04 mar 2009	00:00	MERCURY	MARS	NEPTUNE	1.5	2.5	3.4	3.5	21	-0.2	1.2	8.0	-0.5	-54	51
04 mar 2009	04:00	MERCURY	MARS	NEPTUNE	1.6	2.3	3.3	3.3	21	-0.2	1.2	8.0	-0.5	-11	100
04 mar 2009	08:00	MERCURY	MARS	NEPTUNE	1.7	2.1	3.2	3.2	21	-0.2	1.2	8.0	-0.5	26	145
04 mar 2009	12:00	MERCURY	MARS	NEPTUNE	1.8	2.0	3.1	3.1	21	-0.2	1.2	8.0	-0.5	27	210
04 mar 2009	16:00	MERCURY	MARS	NEPTUNE	1.9	1.8	2.9	3.0	21	-0.2	1.2	8.0	-0.5	-9	257
04 mar 2009	20:00	MERCURY	MARS	NEPTUNE	2.0	1.7	2.8	2.9	21	-0.2	1.2	8.0	-0.5	-52	304
05 mar 2009	00:00	MERCURY	MARS	NEPTUNE	2.1	1.6	2.7	2.7	21	-0.2	1.2	8.0	-0.5	-53	50
05 mar 2009	04:00	MERCURY	MARS	NEPTUNE	2.3	1.5	2.6	2.6	21	-0.2	1.2	8.0	-0.5	-11	99
05 mar 2009	08:00	MERCURY	MARS	NEPTUNE	2.4	1.5	2.5	2.6	21	-0.2	1.2	8.0	-0.5	26	145
05 mar 2009	12:00	MERCURY	MARS	NEPTUNE	2.5	1.5	2.3	2.6	21	-0.2	1.2	8.0	-0.5	28	210
05 mar 2009	16:00	MERCURY	MARS	NEPTUNE	2.6	1.6	2.2	2.7	21	-0.2	1.2	8.0	-0.5	-9	257
05 mar 2009	20:00	MERCURY	MARS	NEPTUNE	2.7	1.7	2.1	2.8	21	-0.2	1.2	8.0	-0.5	-51	304
06 mar 2009	00:00	MERCURY	MARS	NEPTUNE	2.9	1.8	2.0	2.9	21	-0.2	1.2	8.0	-0.5	-53	49
06 mar 2009	04:00	MERCURY	MARS	NEPTUNE	3.0	1.9	1.9	3.0	21	-0.2	1.2	8.0	-0.5	-10	99
06 mar 2009	08:00	MERCURY	MARS	NEPTUNE	3.1	2.1	1.8	3.2	21	-0.2	1.2	8.0	-0.5	27	144
06 mar 2009	12:00	MERCURY	MARS	NEPTUNE	3.2	2.3	1.6	3.3	21	-0.2	1.2	8.0	-0.5	28	209
06 mar 2009	16:00	MERCURY	MARS	NEPTUNE	3.4	2.5	1.5	3.4	21	-0.3	1.2	8.0	-0.5	-9	257
06 mar 2009	20:00	MERCURY	MARS	NEPTUNE	3.5	2.7	1.4	3.5	21	-0.3	1.2	8.0	-0.5	-51	303
07 mar 2009	00:00	MERCURY	MARS	NEPTUNE	3.6	2.9	1.3	3.7	21	-0.3	1.2	8.0	-0.5	-53	47
07 mar 2009	04:00	MERCURY	MARS	NEPTUNE	3.7	3.1	1.2	3.8	21	-0.3	1.2	8.0	-0.5	-10	98
07 mar 2009	08:00	MERCURY	MARS	NEPTUNE	3.9	3.3	1.1	3.9	21	-0.3	1.2	8.0	-0.5	27	143
07 mar 2009	12:00	MERCURY	MARS	NEPTUNE	4.0	3.5	1.0	4.1	22	-0.3	1.2	8.0	-0.5	28	209
07 mar 2009	16:00	MERCURY	MARS	NEPTUNE	4.1	3.8	0.9	4.2	22	-0.3	1.2	8.0	-0.5	-9	257
07 mar 2009	20:00	MERCURY	MARS	NEPTUNE	4.3	4.0	0.9	4.3	22	-0.3	1.2	8.0	-0.5	-51	303
08 mar 2009	00:00	MERCURY	MARS	NEPTUNE	4.4	4.2	0.8	4.4	22	-0.3	1.2	8.0	-0.5	-52	46
08 mar 2009	04:00	MERCURY	MARS	NEPTUNE	4.5	4.5	0.8	4.6	22	-0.3	1.2	8.0	-0.5	-10	97
08 mar 2009	08:00	MERCURY	MARS	NEPTUNE	4.7	4.7	0.7	4.8	22	-0.3	1.2	8.0	-0.5	27	142
08 mar 2009	12:00	MERCURY	MARS	NEPTUNE	4.8	5.0	0.7	5.0	22	-0.3	1.2	8.0	-0.5	28	209

Dxy = distance between the body x and y, in degrees
 GROUP = least group, in degree
 EL = elongation from the Sun, in degrees
 MAGx = magnitude of body x
 MAGT = total magnitude
 ALT = height on the horizon of the baricenter of the group, in degrees
 AZ = azimuth of the baricenter of the group, in degrees from north
 Times in U.T.

3 PLANETS IN STRAIGHT LINE

DATE	TIMES	BODIES	C
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PLANETARY SPATIAL GEOMETRIES EQUILATERAL TRIANGLES

DATE	TIMES	BODIES	D12	D13	D23	GROUP	EL.	MAG1	MAG2	MAG3	MAGT
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PLANETARY SPATIAL GEOMETRIES – SQUARES

DATE	TIMES	BODIES	D12	D13	D14	D23	D24	D34	DQM	MAX	EL.	MAG1	MAG2	MAG3	MAG4	MAGT
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Dxy = distance between the body x and y, in degrees
DQM = middle distance between the 4 bodies, in degrees
MAX = maxima distance between the 4 bodies, in degrees
GROUP = least group, in degree
EL = elongation from the Sun, in degrees
MAGx = magnitude of body x
MAGT = total magnitude
ALT = height on the horizon of the baricenter of the group, in degrees
AZ = azimuth of the baricenter of the group, in degrees from north

Times in U.T.

I have considered equilateral every triangle in which every cathetus differs from the other for maximum $\pm 10\%$.

I have considered square every quadrilateral in which every side differs from the other for maximum $\pm 10\%$ and with diagonal different less than 15%.

NB: these charts are been created exclusively to the goals of "photo of effect", with three or four equidistant celestial bodies!

GEOCENTRIC CONJUNCTIONS <0,2°

PLANETS-STARs m<6

Date	TT	Dm (°)	Dl	Ar (°)	Dec	r1	p (°)	e	m1	m*	tm(s)	tw(h)			
2009/01/06	17:59:57	0.07262	0.00155	278.611	-23.954	2.42	3	-9	1.2	5.7		15.7	Mars		SGR
2009/01/14	15:00:37	0.01675	0.00693	343.283	-7.545	0.69	208	47	-4.4	3.8		11.7	Venus	Lambda	AQR
2009/01/21	02:58:05	0.15271	0.00036	325.565	-14.151	30.94	199	22	8.0	5.2		319.2	Neptune		CAP
2009/01/27	19:55:59	0.07237	0.00481	294.375	-18.143	0.70	19	-15	0.7	5.8		18.5	Mercury		
2009/02/09	03:31:54	0.17133	0.00374	296.715	-19.910	0.90	176	-26	0.2	5.0		14.6	Mercury		SGR
2009/02/22	13:36:29	0.00873	0.00487	313.830	-17.879	5.99	15	-23	-1.9	5.9		52.7	Jupiter		CAP
2009/03/06	18:09:04	0.05801	0.00166	326.152	-14.762	2.26	199	-23	1.1	6.0		15.2	Mars		CAP
2009/03/06	20:53:02	0.06953	0.00494	316.599	-17.129	5.90	16	-32	-1.9	4.2		54.5	Jupiter	Theta	CAP
2009/03/08	01:29:19	0.00155	0.00268	331.737	-13.823	1.26	19	-19	-0.3	4.3	66.0	7.6	Mercury	Iota	AQR
2009/03/09	18:29:35	0.14418	0.00265	334.377	-12.920	1.28	200	-18	-0.4	5.5		7.1	Mercury		AQR
2009/03/22	04:22:05	0.06853	0.00169	337.762	-10.566	2.21	21	-26	1.0	4.8		15.2	Mars	Sigma	AQR
2009/04/01	23:57:05	0.01643	0.01665	0.756	8.526	0.29	219	-11	-2.6	5.7	2388.7	20.4	Venus		PSC
2009/04/04	17:52:36	0.17520	0.00258	18.638	7.470	1.31	207	5	-1.8	5.2		5.4	Mercury	Zeta1	PSC
2009/04/06	04:57:55	0.11916	0.00173	348.751	-6.107	2.17	203	-29	1.0	4.4		14.9	Mars	Phi	AQR
2009/04/17	18:15:29	0.17436	0.00175	357.039	-2.549	2.13	24	-32	1.0	5.6		14.5	Mars		PSC
2009/04/17	20:39:04	0.02943	0.00317	42.280	18.297	1.06	202	17	-0.6	6.0		7.3	Mercury		ARI
2009/04/21	01:08:29	0.05600	0.01319	358.080	2.939	0.36	143	-32	-4.5	5.8		47.4	Venus		PSC
2009/04/23	14:49:36	0.01418	0.00367	50.450	21.169	0.92	198	20	-0.1	5.3		10.0	Mercury	Tau1	ARI
2009/04/26	17:04:30	0.00590	0.00553	325.902	-14.362	5.27	198	-73	-2.1	5.9		86.1	Jupiter		CAP
2009/05/06	22:22:26	0.14926	0.00520	59.207	22.456	0.65	110	15	1.2	5.7		65.4	Mercury		TAU
2009/05/20	09:13:44	0.06686	0.00595	328.476	-13.570	4.90	197	-94	-2.3	5.1		149.5	Jupiter	Mu	CAP
2009/05/24	05:53:53	0.06849	0.00794	17.237	5.636	0.60	197	-45	-4.4	5.7		13.9	Venus		PSC
2009/06/17	06:37:38	0.01485	0.00601	39.287	12.505	0.79	17	-45	-4.2	5.7		11.7	Venus		ARI
2009/06/21	07:54:37	0.13353	0.00345	67.258	19.331	0.98	16	-22	-0.0	3.7		8.2	Mercury	Epsilon	TAU
2009/06/27	09:58:05	0.09705	0.00305	77.148	21.623	1.11	192	-18	-0.5	5.9		6.8	Mercury		TAU
2009/06/28	22:06:38	0.02560	0.00297	79.961	22.132	1.14	10	-17	-0.7	5.1		6.6	Mercury		TAU
2009/07/13	03:42:53	0.13267	0.00479	67.272	19.333	0.99	11	-42	-4.0	3.7		10.4	Venus	Epsilon	TAU
2009/07/21	20:28:27	0.14624	0.00207	65.033	21.023	1.81	191	-52	1.0	5.5		16.6	Mars		TAU
2009/07/23	04:08:40	0.18784	0.00207	65.994	21.190	1.80	10	-53	1.0	6.0		16.1	Mars		
2009/08/03	23:57:21	0.00486	0.00721	326.137	-14.700	4.05	21	-168	-2.8	6.0	6723	95.8	Jupiter		CAP
2009/08/11	11:44:59	0.06300	0.00396	103.039	21.813	1.20	358	-37	-3.9	5.3		10.2	Venus		GEM
2009/08/12	06:05:47	0.05066	0.00308	165.340	6.093	1.10	331	24	0.1	5.0		8.5	Mercury		LEO
2009/09/03	02:05:20	0.06252	0.00355	131.328	18.179	1.34	347	-32	-3.8	4.1		9.9	Venus	Delta	CNC
2009/09/28	06:50:49	0.12232	0.00446	172.234	2.824	0.76	281	-14	0.5	5.1		30.3	Mercury	Tau	LEO
2009/10/02	12:27:57	0.05039	0.00319	166.365	7.235	1.49	158	-25	-3.9	4.7		9.7	Venus	Chi	LEO
2009/10/18	22:48:48	0.17137	0.00306	185.173	-0.565	1.56	337	-21	-3.9	3.9		9.1	Venus	Eta	VIR
2009/10/21	13:24:30	0.05573	0.00257	197.595	-5.644	1.31	155	-10	-1.1	4.4		7.0	Mercury	Theta	VIR
2009/10/22	01:35:32	0.06593	0.00297	125.247	20.781	1.26	350	-86	0.5	5.9		24.8	Mars		
2009/10/28	06:35:59	0.16156	0.00308	128.291	20.248	1.21	169	-89	0.4	5.5		25.1	Mars	Eta	CNC
2009/11/01	16:39:55	0.12317	0.00237	214.964	-13.304	1.42	337	-2	-1.0	4.5		7.1	Mercury	Lambda	VIR
2009/11/13	07:14:57	0.15377	0.00234	233.250	-19.852	1.44	162	5	-0.8	5.5		7.2	Mercury		
2009/11/23	02:07:57	0.15969	0.00287	226.750	-16.449	1.66	163	-12	-3.9	5.4		9.1	Venus	Nu	LIB
2009/12/09	16:27:05	0.01714	0.00282	248.190	-21.473	1.69	350	-8	-3.9	4.5		9.5	Venus	Omega	OPH
2009/12/10	05:01:00	0.18665	0.00284	277.164	-25.602	1.19	184	18	-0.5	2.9		7.9	Mercury	Lambda	SGR
2009/12/16	03:36:34	0.16619	0.00317	285.738	-24.669	1.06	11	20	-0.4	5.8		9.4	Mercury		
2009/12/16	17:35:17	0.11039	0.00535	326.105	-14.599	5.45	20	59	-2.1	6.0		66.0	Jupiter		CAP
2009/12/25	20:08:25	0.18166	0.00279	270.112	-23.636	1.70	358	-4	-3.9	4.7		8.9	Venus		SGR
2009/12/28	00:06:55	0.00850	0.00279	273.088	-23.691	1.71	359	-4	-3.9	5.1		9.5	Venus		SGR

date in the format year/month/day

Dm = least distance between the centers of the bodies

Dl = parameter limit, if Dm < Dl there is an occultation between the bodies

A.R. e DEC. = apparent geocentric coordinates

R1 = distance in A.U. of the planet

P = angle of position between the bodies, in degrees

e = elongation, in degree

m1 = magnitude of the planet

m* = magnitude of the star

tm = if present, the star is occulted maximum for x seconds

tw = semiperiod in hours in which the two bodies are near less than 0.2°

GEOCENTRIC CONJUNCTIONS <5° PLANETS-STARS m<2

Date	TT	Dm (°)	Dl	r1	p (°)	e	m1	m*	tm(s)			
2009/06/22 00:00:26		3.17526	0.00340	0.993	165	-21	-0.1	1.2		Mercury	Alpha	TAU Aldebaran
2009/07/14 06:20:34		3.07112	0.00475	1.002	170	-42	-4.0	1.2		Venus	Alpha	TAU Aldebaran
2009/08/02 23:08:11		0.59251	0.00278	1.212	204	19	-0.3	1.3		Mercury	Alpha	LEO Regulus
2009/09/20 12:33:47		0.45197	0.00332	1.435	199	-28	-3.9	1.3		Venus	Alpha	LEO Regulus
2009/10/24 23:07:08		3.46646	0.00249	1.357	205	-8	-1.1	1.1		Mercury	Alpha	VIR Spica
2009/11/03 05:31:58		3.53272	0.00296	1.608	202	-17	-3.9	1.1		Venus	Alpha	VIR Spica
2009/11/22 12:34:57		3.00361	0.00240	1.404	192	10	-0.7	1.0		Mercury	Alpha	SCO Antares

date in the format year/month/day

Dm = least distance between the centers of the bodies

Dl = parameter limit, if Dm < Dl there is an occultation between the bodies

R1 = distance in A.U. of the planet from the Earth

P = angle of position between the bodies, in degrees

e = elongation, in degree

m1 = magnitude of the planet

m* = magnitude of the star

tm = if present, the star is occulted maximum for x seconds

MULTIPLE CONJUNCTIONS PLANETS-STARS (events with 2 or more planets and a star with mag<2 within 5°)

Date	TDT	Dmed (°)	Dmax	emin	mmax
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MULTIPLE CONJUNCTIONS LEAST GROUPING PLANETS-STARS (events with 2 or more planets and a star with mag<2 within 5°)

GEOCENTRIC OCCULTATIONS

PLANETS-STARs m<9

Date	U.T.	Diameter	Durn	Star	Mag	Elon	%	Star	Planet	R.A. (J2000)	Dec.
a m g	h m	km "	m/sec	Mag drop		o	Ill	No.		h m s	o ' "
2009 Jan 07	5 16.2	5268 1.20	106s	9.0	0.04	13		HIP 99385	Ganymede (III)	20 10 19.282	-20 29 39.75
2009 Jan 07	6 16.2	3130 0.71	74.9s	9.0	0.07	13		HIP 99385	Europa (II)	20 10 19.282	-20 29 39.75
2009 Jan 07	10 37.1142793	32.46	55.7m	9.0	0.00	13	100	HIP 99385	Jupiter	20 10 19.282	-20 29 39.75
2009 Jan 17	19 54.2142793	32.34	54.8m	9.0	0.00	5	100	TYC 6336 00305	Jupiter	20 20 28.054	-19 57 57.38
2009 Jan 19	10 41.9	4878 10.02	191s	8.9	0.02	4	1	HIP 99800	Mercury	20 14 53.476	-16 45 2.96
2009 Feb 03	9 35.7	6794 3.99	124s	7.3	0.00	16	99	HIP 98896	Mars	20 4 58.078	-21 18 51.09
2009 Feb 03	9 36.7	12 0.01	0.2s	7.3	8.2	16		HIP 98896	Deimos (II)	20 4 58.078	-21 18 51.09
2009 Feb 25	11 7.3	3130 0.72	59.4s	8.9	0.07	25		TYC 6349 00557	Europa (II)	20 57 32.016	-17 43 57.62
2009 Feb 25	13 18.3	5268 1.22	102s	8.9	0.04	25		TYC 6349 00557	Ganymede (III)	20 57 32.016	-17 43 57.62
2009 Feb 25	13 26.2142793	32.96	58.4m	8.9	0.00	25	100	TYC 6349 00557	Jupiter	20 57 32.016	-17 43 57.62
2009 Mar 08	1 28.3	4878 5.33	81.0s	4.3	0.02	19	85	HIP 109139	Mercury	22 6 26.255	-13 52 11.37
2009 Mar 12	12 17.8	12244 53.93	81.1m	7.8	0.00	24	9	HIP 3262	Venus	0 41 31.658	12 57 32.39
2009 Apr 01	23 56.0	12244 59.03	40.1m	5.8	0.00	11	2	HIP 194	Venus	0 2 29.644	8 29 7.23
2009 Apr 03	6 14.3	12244 58.62	41.4m	7.7	0.00	13	2	HIP 21	Venus	0 0 15.972	8 0 26.04
2009 Apr 04	20 43.6	12244 57.81	43.7m	8.5	0.00	15	3	TYC 593 01574	Venus	23 57 39.096	7 24 44.40
2009 Apr 07	3 54.7	12244 56.65	48.3m	8.7	0.00	17	4	TYC 593 00246	Venus	23 54 28.510	6 34 26.02
2009 May 09	1 9.0	12244 35.02	21.8m	7.8	0.00	42	32	HIP 1869	Venus	0 23 38.535	2 44 34.81
2009 May 16	0 4.6	12244 31.55	16.7m	8.9	0.00	44	37	HIP 3357	Venus	0 42 43.381	3 47 24.68
2009 May 22	18 50.3	12244 28.71	821s	7.8	0.00	45	41	HIP 4968	Venus	1 3 40.660	5 14 7.29
2009 May 24	23 36.9	4878 11.88	621s	8.4	0.01	10	4	HIP 16241	Mercury	3 29 19.603	16 11 53.72
2009 Jul 02	21 46.7	4878 5.55	67.0s	8.3	0.00	13	85	HIP 27685	Mercury	5 51 39.454	23 13 47.93
2009 Jul 08	17 21.0	4878 5.19	58.0s	8.9	0.00	7	96	HIP 32266	Mercury	6 44 12.486	23 53 7.86
2009 Jul 20	20 54.8	4878 5.08	60.0s	8.9	0.00	8	96	TYC 1398 00400	Mercury	8 34 43.852	20 33 41.37
2009 Jul 25	22 8.7	12244 15.52	327s	8.3	0.00	40	71	HIP 25694	Venus	5 29 15.604	21 18 56.96
2009 Jul 27	14 36.8	22 0.02	0.6s	8.3	5.6	54		HIP 21442	Phobos (I)	4 36 17.642	21 41 20.47
2009 Jul 27	14 37.7	6794 5.25	184s	8.3	0.00	54	91	HIP 21442	Mars	4 36 17.642	21 41 20.47
2009 Jul 28	15 55.2	12244 15.25	320s	9.0	0.00	40	72	TYC 1310 01587	Venus	5 42 39.816	21 34 43.24
2009 Aug 03	23 56.9142793	48.66	155m	6.0	0.00	168	100	HIP 107302	Jupiter	21 44 0.950	-14 44 57.63
2009 Aug 10	15 59.4	4878 6.02	100s	8.8	0.00	24	71	HIP 53201	Mercury	10 52 50.649	7 13 3.76
2009 Aug 18	12 38.5	12 0.01	0.4s	7.6	7.2	60		HIP 26599	Deimos (II)	5 39 14.826	23 19 24.03
2009 Aug 18	12 39.7	6794 5.59	206s	7.6	0.00	60	90	HIP 26599	Mars	5 39 14.826	23 19 24.03
2009 Aug 18	12 44.1	22 0.02	0.7s	7.6	6.2	60		HIP 26599	Phobos (I)	5 39 14.826	23 19 24.03
2009 Aug 30	16 50.9	4878 8.07	303s	7.7	0.00	26	42	HIP 59182	Mercury	12 8 12.459	- 4 17 13.23
2009 Aug 30	19 56.0	4878 8.09	308s	8.4	0.00	26	42	TYC 4942 00410	Mercury	12 8 27.768	- 4 20 17.19
2009 Aug 31	5 0.8	12244 12.74	256s	8.7	0.00	33	83	HIP 41727	Venus	8 30 31.007	18 56 34.61
2009 Sep 06	3 38.8	12 0.01	0.4s	8.3	6.4	67		HIP 31029	Deimos (II)	6 30 39.487	23 32 16.51
2009 Sep 17	17 38.0	4878 10.46	243s	9.0	0.01	6	2	TYC 4935 00646	Mercury	11 55 15.759	- 3 26 37.75
2009 Oct 19	22 19.8	4878 5.23	74.0s	8.8	0.00	11	92	HIP 63419	Mercury	12 59 45.519	- 4 25 49.27
2009 Dec 14	23 55.7	4878 6.17	118s	9.0	0.00	20	72	TYC 6864 00260	Mercury	18 56 10.908	-24 55 22.69

TOPOCENTRIC OCCULTATIONS

PLANETS-STARs m<9

Date	U.T.	Diameter	Durn	Star	Mag	Elon	%	Star	Placet	Alt Sun	Proba-	R.A. (J2000)	Dec.
a m g	h m	km "	m/sec	Mag drop		o	Ill	No.		o Alt	bility	h m s	o ' "
2009 Apr 07	3 54.0	12244 56.65	48.3m	8.7	0.00	17	4	TYC 593 00246	Venus	2 -10	100%	23 54 28.510	6 34 26.02
2009 Aug 03	23 55.1142793	48.66	155m	6.0	0.00	168	100	HIP 107302	Jupiter	33	100%	21 44 0.950	-14 44 57.63

Date = date in the format year/month/day
 U.T. = times
 Diameter = diameter in km and in " of the planet
 Durn = duration of the event, in minutes or seconds
 Stella Mag = magnitude of the star
 Mag drop = drop of magnitude of the planet
 Elon = elongation, in degree
 % ill = illumination of the planet
 Alt = height on the horizon of the planet, in degrees
 Sun alt = height on the horizon of the Sun, in degrees

CONJUNCTIONS $<1^\circ$ WITH OBJECTS MESSIER $m < 9$

Date	TT	Dm ($^\circ$)	Dl	r1	p ($^\circ$)	e	m1	m*	tm(s)	tw(h)			
2009/01/03	21:27:43	0.82548	0.00154	2.422	178	-8	1.2	6.8		156.8	Mars	NGC6626	M28
2009/01/07	12:22:39	0.02763	0.00155	2.414	357	-9	1.2	5.1		158.5	Mars	NGC6656	M22
2009/02/03	13:43:51	0.64470	0.00159	2.345	168	-16	1.1	8.5		154.0	Mars	NGC6864	M75
2009/06/30	19:14:56	0.69048	0.00287	1.174	171	-15	-0.9	8.4		62.8	Mercury	NGC1952	M1
2009/07/04	21:42:20	0.72745	0.00271	1.245	356	-11	-1.4	5.3		57.9	Mercury	NGC2168	M35
2009/07/21	13:14:39	0.24058	0.00255	1.322	195	9	-1.3	3.7		60.0	Mercury	NGC2632	M44
2009/07/27	01:09:17	0.58333	0.00434	1.096	355	-40	-3.9	8.4		104.4	Venus	NGC1952	M1
2009/08/29	04:02:22	0.76728	0.00231	1.619	359	-64	0.9	5.3		188.1	Mars	NGC2168	M35
2009/11/01	07:31:50	0.04326	0.00316	1.181	11	-92	0.4	3.7		276.9	Mars	NGC2632	M44
2009/11/20	06:09:44	0.24829	0.00238	1.418	193	9	-0.7	7.3		77.5	Mercury	NGC6093	M80
2009/12/09	16:20:42	0.78267	0.00282	1.196	357	18	-0.5	6.8		83.9	Mercury	NGC6626	M28
2009/12/26	07:42:02	0.67976	0.00279	1.705	1	-4	-3.9	9.0		94.4	Venus	NGC6514	M20
2009/12/26	13:25:41	0.71651	0.00279	1.705	181	-4	-3.9	6.0		94.3	Venus	NGC6523	M8

date in the format year/month/day

Dm = least distance between the centers of the bodies

Dl = parameter limit, if $Dm < Dl$ there is an occultation between the bodies

R1 = distance in A.U. of the planet from the Earth

p = angle of position between the bodies, in degrees

e = elongation, in degree

m1 = magnitude of the planet

m* = magnitude of the object

tm = if present, the object is occulted maximum for x seconds

tw = semiperiod in hours in which the two bodies are near less than 1°

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MULTIPLE CONJUNCTIONS PLANETS-OBJECTS (events with 2 or more planets and a Messier object within 5°)

Date TT Dmed ($^\circ$) Dmax emin m2d mmax

MULTIPLE CONJUNCTIONS LEAST GROUPING PLANETS-OBJECTS (events with 2 or more planets and a Messier object within 5°)

EPHEMERIDES OF THE MOON

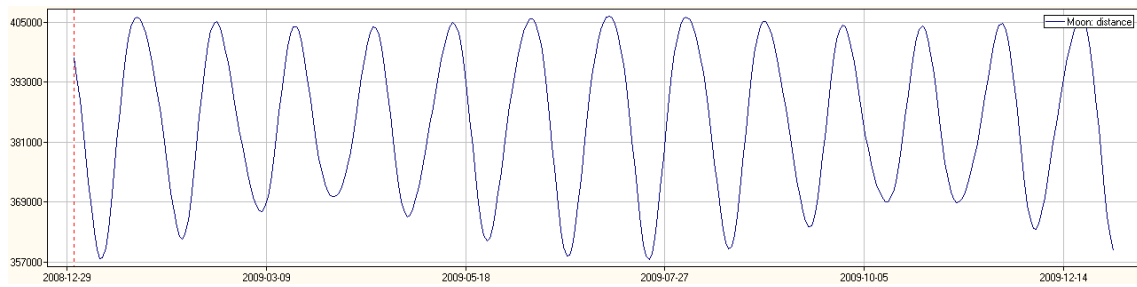
Date	A.R. Geoc.	Dec. Geoc.	A.R. Top.	Dec. Top.	Dist. km	El °	Diam. "	Mag	Phase	Phase. angle°	Par.	L1	L2	L3	L4	L5	L6
1-Jan	22h 04m 53.14s	-09° 50' 37.6"	22h 03m 10.55s	-10° 20' 56.1"	397730	49.1	1802.59	-8.2	0.173	130.8	3307	-6.0	-2.3	-6.0	-2.3	-6.6	-1.9
2-Jan	22h 49m 43.87s	-04° 23' 28.0"	22h 47m 40.06s	-04° 58' 00.0"	393893	60.4	1820.15	-8.8	0.254	119.4	3340	-6.9	-3.6	-6.9	-3.6	-7.6	-3.2
3-Jan	23h 34m 47.12s	+01° 20' 16.4"	23h 32m 24.36s	+00° 42' 31.2"	389354	72.0	1841.37	-9.4	0.347	107.8	3379	-7.4	-4.8	-7.5	-4.8	-8.2	-4.4
4-Jan	00h 21m 08.69s	+07° 08' 58.7"	00h 18m 28.95s	+06° 29' 31.8"	384209	83.9	1866.03	-9.9	0.449	95.9	3424	-7.7	-5.8	-7.7	-5.7	-8.5	-5.4
5-Jan	01h 10m 01.01s	+12° 48' 47.8"	01h 07m 06.86s	+12° 09' 36.2"	378650	96.2	1893.43	-10.4	0.555	83.6	3474	-7.5	-6.4	-7.5	-6.4	-8.4	-6.0
6-Jan	02h 02m 36.90s	+18° 02' 02.9"	01h 59m 32.97s	+17° 25' 17.7"	372972	108.9	1922.25	-10.8	0.663	71.0	3527	-6.9	-6.8	-6.9	-6.7	-7.8	-6.4
7-Jan	02h 59m 54.79s	+22° 26' 07.3"	02h 56m 49.66s	+21° 53' 48.8"	367573	122.0	1950.48	-11.2	0.766	57.9	3579	-5.8	-6.7	-5.8	-6.7	-6.7	-6.3
8-Jan	04h 02m 10.98s	+25° 34' 17.6"	03h 59m 18.55s	+25° 07' 34.5"	362920	135.5	1975.49	-11.6	0.857	44.4	3625	-4.4	-6.2	-4.4	-6.2	-5.1	-5.9
9-Jan	05h 08m 26.54s	+27° 00' 25.5"	05h 06m 04.59s	+26° 38' 49.1"	359490	149.4	1994.34	-11.9	0.931	30.5	3659	-2.6	-5.3	-2.6	-5.3	-3.2	-4.9
10-Jan	06h 16m 18.98s	+26° 27' 37.0"	06h 14m 43.38s	+26° 08' 46.7"	357695	163.5	2004.35	-12.3	0.980	16.5	3678	-0.6	-4.0	-0.6	-4.0	-1.0	-3.6
11-Jan	07h 22m 48.66s	+23° 56' 13.5"	07h 22m 06.79s	+23° 36' 42.9"	357792	177.3	2003.80	-12.7	0.999	2.7	3677	1.4	-2.4	1.4	-2.4	1.3	-2.0
12-Jan	08h 25m 36.00s	+19° 44' 34.4"	08h 25m 45.47s	+19° 21' 19.0"	359827	167.9	1992.47	-12.4	0.989	12.0	3656	3.3	-0.7	3.3	-0.6	3.3	-0.2
13-Jan	09h 23m 45.57s	+14° 21' 46.1"	09h 24m 38.37s	+13° 53' 07.8"	363614	154.1	1971.72	-12.1	0.950	25.8	3618	4.9	1.1	4.9	1.1	4.8	1.7
14-Jan	10h 17m 35.90s	+08° 18' 36.3"	10h 19m 03.09s	+07° 44' 36.1"	368774	140.6	1944.13	-11.7	0.887	39.3	3567	6.2	2.7	6.1	2.8	6.0	3.4
15-Jan	11h 08m 06.07s	+02° 01' 48.2"	11h 10m 00.22s	+01° 23' 40.6"	374809	127.6	1912.83	-11.3	0.806	52.3	3510	7.0	4.2	7.0	4.2	6.8	5.0
16-Jan	11h 56m 28.30s	-04° 07' 45.5"	11h 58m 43.81s	-04° 48' 07.7"	381183	115.1	1880.84	-11.0	0.713	64.8	3451	7.4	5.3	7.4	5.4	7.1	6.2
17-Jan	12h 43m 52.94s	-09° 54' 20.4"	12h 46m 25.42s	-10° 34' 55.2"	387398	103.0	1850.67	-10.6	0.614	76.9	3396	7.3	6.2	7.3	6.2	7.0	7.1
18-Jan	13h 31m 21.51s	-15° 05' 45.9"	13h 34m 06.86s	-15° 44' 40.7"	393043	91.3	1824.09	-10.2	0.513	88.5	3347	6.9	6.7	6.9	6.7	6.5	7.5
19-Jan	14h 19m 42.37s	-19° 31' 52.8"	14h 22m 35.85s	-20° 07' 37.0"	397819	80.0	1802.19	-9.7	0.414	99.9	3307	6.2	6.8	6.2	6.9	5.7	7.7
20-Jan	15h 09m 26.19s	-23° 03' 35.2"	15h 12m 21.71s	-23° 35' 08.3"	401544	68.9	1785.47	-9.2	0.321	111.0	3276	5.2	6.7	5.2	6.7	4.7	7.4
21-Jan	16h 00m 40.85s	-25° 32' 38.5"	16h 03m 30.73s	-25° 59' 37.5"	404146	58.0	1773.98	-8.7	0.236	121.9	3255	4.0	6.3	4.0	6.3	3.5	6.9
22-Jan	16h 53m 08.25s	-26° 52' 16.7"	16h 55m 43.76s	-27° 15' 01.2"	405642	47.2	1767.44	-8.0	0.161	132.7	3243	2.7	5.6	2.7	5.6	2.2	6.1
23-Jan	17h 46m 07.05s	-26° 58' 22.5"	17h 48m 19.77s	-27° 17' 53.9"	406118	36.4	1765.36	-7.3	0.098	143.5	3239	1.4	4.6	1.3	4.7	0.9	5.0
24-Jan	18h 38m 43.68s	-25° 50' 34.0"	18h 40m 27.08s	-26° 08' 26.6"	405702	25.5	1767.18	-6.4	0.049	154.4	3242	0.0	3.5	0.0	3.5	-0.4	3.8
25-Jan	19h 30m 08.43s	-23° 32' 40.1"	19h 31m 18.91s	-23° 50' 44.5"	404539	14.7	1772.26	-5.4	0.016	165.3	3252	-1.3	2.2	-1.4	2.2	-1.7	2.5
26-Jan	20h 19m 49.57s	-20° 12' 08.2"	20h 20m 26.39s	-20° 32' 11.4"	402769	3.7	1780.04	-4.3	0.001	176.3	3266	-2.6	0.8	-2.6	0.9	-2.8	1.2
27-Jan	21h 07m 39.83s	-15° 58' 54.9"	21h 07m 44.19s	-16° 22' 23.8"	400508	7.4	1790.09	-4.7	0.004	172.5	3284	-3.7	-0.6	-3.8	-0.6	-3.9	-0.2
28-Jan	21h 53m 55.30s	-11° 04' 14.0"	21h 53m 29.21s	-11° 32' 04.8"	397838	18.7	1802.10	-5.8	0.026	161.3	3306	-4.7	-2.1	-4.8	-2.0	-5.0	-1.6
29-Jan	22h 39m 10.45s	-05° 39' 48.5"	22h 38m 15.85s	-06° 12' 20.6"	394806	30.1	1815.94	-6.8	0.068	149.8	3332	-5.5	-3.4	-5.6	-3.4	-6.0	-2.9
30-Jan	23h 24m 12.98s	+00° 02' 25.3"	23h 22m 51.24s	-00° 34' 30.0"	391431	41.7	1831.60	-7.7	0.127	138.2	3361	-6.1	-4.6	-6.2	-4.6	-6.7	-4.1
31-Jan	00h 09m 59.91s	+05° 50' 01.0"	00h 08m 11.81s	+05° 09' 37.3"	387723	53.5	1849.12	-8.4	0.203	126.4	3393	-6.5	-5.6	-6.5	-5.6	-7.2	-5.1
1-Feb	00h 53m 46.08s	+11° 29' 20.1"	00h 55m 20.63s	+10° 46' 56.2"	383709	65.5	1868.46	-9.1	0.294	114.3	3428	-6.6	-6.4	-6.6	-6.3	-7.4	-5.9
2-Feb	01h 48m 02.03s	+16° 44' 32.7"	01h 45m 23.37s	+16° 02' 03.9"	379457	77.8	1889.40	-9.6	0.396	102.0	3467	-6.4	-6.8	-6.4	-6.7	-7.2	-6.3
3-Feb	02h 42m 19.42s	+21° 16' 44.9"	02h 39m 19.43s	+20° 36' 20.3"	375104	90.4	1911.33	-10.1	0.505	89.4	3507	-5.8	-6.8	-5.9	-6.8	-6.8	-6.3
4-Feb	03h 40m 57.79s	+24° 43' 59.5"	03h 37m 44.10s	+24° 07' 37.1"	370866	103.3	1933.17	-10.6	0.616	76.5	3547	-5.0	-6.4	-5.0	-6.4	-5.9	-6.0
5-Feb	04h 43m 36.83s	+26° 43' 29.2"	04h 40m 22.67s	+26° 12' 17.9"	367040	116.6	1953.32	-11.0	0.725	63.3	3584	-3.9	-5.7	-3.9	-5.6	-4.7	-5.2
6-Feb	05h 48m 48.05s	+26° 56' 49.2"	05h 45m 50.74s	+26° 30' 30.3"	363976	130.1	1969.76	-11.4	0.823	49.8	3614	-2.5	-4.6	-2.5	-4.5	-3.2	-4.1
7-Feb	06h 54m 11.27s	+25° 16' 39.4"	06h 51m 47.11s	+24° 53' 15.7"	362032	143.8	1980.34	-11.8	0.904	36.1	3634	-1.0	-3.1	-1.0	-3.1	-1.5	-2.6
8-Feb	07h 57m 27.53s	+21° 50' 38.4"	07h 55m 46.50s	+21° 27' 12.3"	361509	157.7	1983.20	-12.2	0.963	22.2	3639	0.7	-1.4	0.6	-1.4	0.3	-0.9
9-Feb	08h 57m 11.14s	+16° 59' 24.1"	08h 56m 15.61s	+16° 33' 04.5"	362581	171.5	1977.34	-12.5	0.995	8.4	3628	2.3	0.3	2.2	0.4	2.1	0.8
10-Feb	09h 53m 04.56s	+11° 10' 24.5"	09h 52m 51.89s	+10° 39' 22.8"	365253	174.6	1962.87	-12.6	0.998	5.4	3602	3.7	2.0	3.7	2.1	3.8	2.6
11-Feb	10h 53m 40.68s	+04° 51' 46.9"	10h 46m 06.39s	+04° 15' 37.3"	369341	161.2	1941.15	-12.2	0.973	18.8	3562	5.0	3.6	4.9	3.6	5.1	4.2
12-Feb	11h 35m 57.14s	-01° 31' 30.1"	11h 36m 56.94s	-02° 12' 01.2"	374501	148.1	1914.40	-11.9	0.925	31.8	3513	5.9	4.9	5.8	4.9	5.9	5.7
13-Feb	12h 24m 57.59s	-07° 38' 58.2"	12h 26m 27.96s	-08° 22' 16.9"	380288	135.5	1885.27	-11.6	0.857	44.4	3459	6.4	5.9	6.3	5.9	6.3	6.7
14-Feb	13h 13m 41.03s	-13° 14' 26.2"	13h 15m 38.92s	-13° 58' 37.9"	386216	123.3	1856.34	-11.2	0.775	56.6	3406	6.5	6.5	6.4	6.6	6.3	7.4
15-Feb	14h 02m 55.50s	-18° 05' 06.0"	14h 05m 17.62s	-18° 48' 16.4"	391826	111.5	1829.76	-10.9	0.684	68.4	3357	6.2	6.8	6.1	6.8	5.9	7.7
16-Feb	14h 53m 13.07s	-22° 00' 37.2"	14h 55m 55.03s	-22° 41' 08.2"	396729	100.0	1807.14	-10.5	0.589	79.8	3316	5.5	6.7	5.5	6.8	5.1	7.6
17-Feb	15h 44m 45.23s	-24° 52' 35.4"	15h 47m 40.79s	-25° 29' 17.1"	400634	88.9	1879.53	-10.1	0.492	90.9	3283	4.6	6.4	4.5	6.4	4.0	7.2
18-Feb	16h 37m 20.01s	-26° 34' 37.8"	16h 40m 20.96s	-27° 06' 57.6"	403359	78.0	1777.44	-9.6	0.397	101.9	3261	3.4	5.7	3.4	5.8	2.8	6.4
19-Feb	17h 30m 24.01s	-27° 02' 56.6"	17h 33m 20.93s	-27° 31' 04.8"	404832	67.1	1770.97	-9.2	0.307	112.7	3249	2.1	4.9	2.1	4.9	1.4	5.4
20-Feb	18h 23m 11.32s	-26° 16' 59.4"	18h 25m 54.97s	-26° 41' 47.8"	405080	56.3	1769.89	-8.6	0.224	123.5	3247	0.7	3.8	0.7	3.8	0.1	4.2
21-Feb	19h 14m 57.13s	-24° 19' 45.0"	19h 17m 19.99s	-24° 42' 38.1"	404214	45.5	1773.68	-7.9	0.150	134.4	3254	-0.7	2.5	-0.7	2.6	-1.3	2.9
22-Feb	20h 05m 10.66s	-21° 17' 23.9"	20h 07m 07.72s	-21° 40' 03.9"	402409	34.6	1781.64	-7.2	0.089	145.4	3269	-1.9	1.2	-2.0	1.2	-2.5	1.5
23-Feb	20h 53m 42.16s	-17° 18' 32.4"	20h 55m 10.80s	-17° 42' 42.8"	399877	23.5	1792.92	-6.3	0.042	156.5	3290	-3.1	-0.2	-3.1	-0.2	-3.6	0.1
24-Feb	21h 40m 43.27s	-12° 33' 25.1"	21h 41m 42.50s	-13° 00' 35.6"	396844	12.3	1806.62	-5.2	0.012	167.7	3315	-4.0	-1.7	-4.1	-1.6	-4.4	-1.3
25-Feb	22h 26m 43.21s	-07° 13' 22.9"	22h 27m 12.78s	-07° 44' 38.0"	393526	2.5	1821.85	-4.1	0.000	177.5	3343	-4.8	-3.1	-4.8	-3.0	-5.1	-2.6
26-Feb	23h 12m 24.16s	-01° 30' 43.4"	23h 12m 23.80s	-02° 06' 34.3"	390102	11.4	1837.84	-5.1	0.010	168.5	3372	-5.2	-4.3	-5.3	-4.3	-5.5	-3.7
27-Feb	23h 58m 37.19s	+04° 21' 11.5"	23h 58m 06.16s	+03° 40' 51.8"	386708	23.2	1853.97	-6.2	0.041	156.7	3402	-5.5	-5.4	-5.5	-5.3	-5.9	-4.8
28-Feb	00h 46m 18.85s	+10° 07' 33.9"	00h 45m 15.84s	+09° 23' 32.8"	383427	35.3	1869.84	-7.2	0.093	144.6	3431	-5.4	-6.2	-5.5	-6.1	-6.0	-5.5
1-Mar	01h 36m 26.48s	+15° 31' 45.1"	01h 34m 50.04s	+14° 45' 28.1"	380299	47.7	1885.21	-8.1	0.164	132.2	3459	-5.2	-6.6	-5.2	-6.6	-5.9	-6.0
2-Mar	02h 29m 49.87s	+20° 14' 59.0"															

Date	A.R. Geoc.	Dec. Geoc.	A.R. Top.	Dec. Top.	Dist. km	Ei °	Diam. "	Mag	Phase	Phase. angle°	Par.	L1	L2	L3	L4	L5	L6
14-Mar	13h 43m 25.41s	-16° 09' 12.1"	13h 44m 32.28s	-16° 56' 39.0"	387044	143.4	1852.36	-11.8	0.902	36.5	3399	5.3	6.6	5.3	6.7	5.3	7.5
15-Mar	14h 34m 13.94s	-20° 30' 57.1"	14h 35m 53.99s	-21° 18' 10.6"	391990	131.7	1828.99	-11.4	0.833	48.2	3356	5.1	6.7	5.0	6.7	4.9	7.6
16-Mar	15h 26m 15.05s	-23° 49' 54.9"	15h 28m 25.37s	-24° 35' 15.9"	396465	120.2	1808.35	-11.1	0.753	59.7	3318	4.4	6.4	6.4	6.4	4.1	7.3
17-Mar	16h 19m 16.67s	-25° 58' 26.2"	16h 21m 51.83s	-26° 40' 36.9"	400132	109.0	1791.77	-10.8	0.664	70.8	3288	3.5	5.8	3.5	5.9	3.1	6.7
18-Mar	17h 12m 45.40s	-26° 52' 14.0"	17h 15m 37.42s	-27° 30' 30.9"	402732	98.1	1780.20	-10.4	0.571	81.8	3266	2.4	5.0	2.4	5.0	1.8	5.7
19-Mar	18h 05m 55.47s	-26° 30' 43.8"	18h 08m 54.85s	-27° 05' 04.3"	404100	87.2	1774.18	-10.0	0.477	92.6	3255	1.1	4.0	1.0	4.0	0.4	4.6
20-Mar	18h 58m 02.50s	-24° 56' 55.7"	19h 00m 59.78s	-25° 27' 57.1"	404169	76.4	1773.88	-9.6	0.384	103.5	3255	-0.3	2.8	-0.3	2.8	-1.0	3.3
21-Mar	19h 48m 36.24s	-22° 16' 43.4"	19h 51m 23.46s	-22° 45' 34.8"	402978	65.5	1779.12	-9.1	0.294	114.3	3264	-1.7	1.5	-1.7	1.5	-2.4	1.9
22-Mar	20h 37m 27.45s	-18° 37' 58.8"	20h 39m 58.75s	-19° 06' 08.1"	400657	54.6	1789.43	-8.5	0.211	125.3	3283	-2.9	0.1	-2.9	0.1	-3.6	0.5
23-Mar	21h 24m 48.09s	-14° 09' 45.3"	21h 26m 59.50s	-14° 38' 46.4"	397420	43.4	1804.00	-7.8	0.137	136.5	3310	-4.0	-1.3	-4.0	-1.3	-4.7	-1.0
24-Mar	22h 11m 07.51s	-09° 01' 59.5"	22h 12m 56.30s	-09° 33' 20.3"	393542	32.0	1821.78	-7.0	0.077	147.9	3343	-4.8	-2.7	-4.8	-2.7	-5.4	-2.3
25-Mar	22h 57m 07.77s	-03° 25' 41.4"	22h 58m 31.64s	-04° 00' 33.1"	389331	20.5	1841.48	-6.0	0.032	159.5	3379	-5.3	-4.0	-5.3	-3.9	-5.8	-3.5
26-Mar	23h 43m 39.70s	+02° 26' 35.6"	23h 44m 36.12s	+01° 47' 27.8"	385102	9.1	1861.70	-4.9	0.006	170.9	3416	-5.4	-5.1	-5.5	-5.0	-5.9	-4.5
27-Mar	00h 31m 39.36s	+08° 20' 05.5"	00h 32m 05.06s	+07° 36' 31.7"	381136	6.1	1881.07	-4.5	0.003	173.9	3451	-5.2	-5.9	-5.3	-5.9	-5.7	-5.2
28-Mar	01h 22m 03.38s	+13° 57' 19.4"	01h 21m 54.27s	+13° 09' 51.7"	377657	17.4	1898.40	-5.7	0.023	162.5	3483	-4.8	-6.4	-4.8	-6.4	-5.1	-5.7
29-Mar	02h 15m 40.35s	+18° 50' 00.9"	02h 14m 52.11s	+18° 07' 56.2"	374809	30.0	1912.83	-6.8	0.067	150.0	3510	-4.1	-6.6	-4.1	-6.6	-4.6	-5.8
30-Mar	03h 12m 56.18s	+23° 00' 00.3"	03h 11m 25.85s	+22° 09' 13.2"	372652	42.8	1923.90	-7.8	0.134	137.1	3530	-3.2	-6.4	-3.2	-6.3	-3.8	-5.6
31-Mar	04h 13m 35.07s	+25° 41' 41.2"	04h 11m 23.61s	+24° 52' 24.1"	371174	55.8	1931.57	-8.6	0.220	124.1	3544	-2.3	-5.8	-2.3	-5.7	-2.9	-5.0
1-Apr	05h 16m 27.12s	+26° 46' 10.7"	05h 13m 41.66s	+26° 00' 18.6"	370318	68.9	1936.03	-9.2	0.321	111.0	3552	-1.3	-4.8	-1.3	-4.8	-2.0	-4.1
2-Apr	06h 19m 39.71s	+26° 05' 52.9"	06h 16m 33.23s	+25° 24' 25.2"	370015	82.0	1937.61	-9.8	0.432	97.8	3555	-0.3	-3.5	-0.3	-3.5	-1.0	-2.8
3-Apr	07h 21m 15.89s	+23° 44' 47.9"	07h 18m 03.71s	+23° 07' 28.3"	370211	95.2	1936.59	-10.3	0.546	84.7	3553	0.6	-2.1	0.6	-2.0	-0.1	-1.3
4-Apr	08h 19m 56.13s	+19° 56' 55.8"	08h 16m 51.60s	+19° 22' 22.7"	370886	108.3	1933.06	-10.8	0.658	71.6	3547	1.5	-0.5	1.4	-0.4	0.8	0.3
5-Apr	09h 15m 15.85s	+15° 02' 06.5"	09h 12m 28.24s	+14° 28' 24.8"	372059	121.3	1926.97	-11.2	0.761	58.6	3536	2.3	1.1	2.2	1.2	1.7	1.9
6-Apr	10h 07m 36.52s	+09° 21' 58.0"	10h 05m 11.31s	+08° 47' 13.1"	373768	134.2	1918.15	-11.5	0.849	45.7	3519	3.0	2.7	3.0	2.7	2.6	3.5
7-Apr	10h 57m 46.45s	+03° 17' 34.0"	10h 55m 46.86s	+02° 40' 16.2"	376055	147.0	1906.49	-11.9	0.920	33.0	3498	3.6	4.0	3.6	4.1	3.4	4.8
8-Apr	11h 46m 44.19s	-02° 51' 28.1"	11h 45m 12.57s	-03° 32' 10.1"	378925	159.4	1892.05	-12.2	0.968	20.5	3472	4.2	5.2	4.1	5.2	4.0	6.0
9-Apr	12h 35m 27.54s	-08° 47' 02.7"	12h 34m 26.30s	-09° 31' 18.1"	382328	171.1	1875.21	-12.5	0.994	8.9	3441	4.5	6.0	4.5	6.0	4.5	6.8
10-Apr	13h 24m 46.30s	-14° 12' 33.0"	13h 24m 18.17s	-14° 59' 51.4"	386142	173.3	1856.69	-12.6	0.997	6.7	3407	4.6	6.4	4.6	6.5	4.8	7.3
11-Apr	14h 15m 15.96s	-18° 52' 57.6"	14h 15m 23.68s	-19° 42' 16.1"	390171	162.6	1837.52	-12.3	0.977	17.3	3371	4.5	6.6	4.5	6.6	4.7	7.4
12-Apr	15h 07m 11.49s	-22° 35' 17.7"	15h 07m 56.88s	-23° 25' 12.2"	394163	151.2	1818.91	-12.0	0.939	28.7	3337	4.1	6.3	4.1	6.4	4.1	7.2
13-Apr	16h 00m 22.62s	-25° 09' 24.9"	16h 01m 45.26s	-25° 58' 24.7"	397830	139.9	1802.14	-11.7	0.883	40.0	3307	3.4	5.8	3.4	5.9	3.3	6.7
14-Apr	16h 54m 14.28s	-26° 28' 59.3"	16h 56m 10.59s	-27° 15' 44.5"	400882	128.8	1788.42	-11.4	0.814	51.1	3281	2.5	5.1	2.4	5.1	2.1	5.9
15-Apr	17h 47m 55.29s	-26° 32' 11.0"	17h 50m 18.50s	-27° 15' 47.6"	403056	117.8	1778.78	-11.1	0.734	62.0	3264	1.3	4.1	1.3	4.1	0.8	4.9
16-Apr	18h 40m 33.72s	-25° 21' 35.7"	18h 43m 15.11s	-26° 01' 45.5"	404137	107.0	1774.02	-10.7	0.647	72.9	3255	0.0	2.9	-0.1	3.0	-0.7	3.6
17-Apr	19h 31m 32.32s	-23° 03' 17.6"	19h 34m 22.96s	-23° 40' 18.7"	403990	96.1	1774.66	-10.4	0.555	83.7	3256	-1.4	1.7	-1.5	1.7	-2.2	2.2
18-Apr	20h 20m 37.23s	-19° 45' 24.5"	20h 23m 29.38s	-20° 20' 04.5"	402565	85.3	1780.95	-9.9	0.460	94.6	3268	-2.8	0.3	-2.8	0.3	-3.6	0.8
19-Apr	21h 07m 58.61s	-15° 36' 53.1"	21h 10m 46.25s	-16° 10' 20.0"	399911	74.3	1792.76	-9.5	0.366	105.6	3289	-4.0	-1.1	-4.1	-1.0	-4.9	-0.7
20-Apr	21h 54m 06.17s	-10° 46' 53.3"	21h 56m 44.79s	-11° 20' 25.3"	396182	63.1	1809.64	-8.9	0.275	116.8	3320	-5.1	-2.4	-5.1	-2.4	-5.9	-2.1
21-Apr	22h 39m 43.77s	-05° 24' 54.5"	22h 42m 09.73s	-05° 59' 51.6"	391624	51.7	1830.70	-8.3	0.191	128.2	3359	-5.8	-3.7	-5.8	-3.7	-6.6	-3.3
22-Apr	23h 25m 45.02s	+00° 18' 32.0"	23h 27m 54.78s	-00° 19' 04.4"	386567	39.9	1854.65	-7.5	0.117	140.0	3403	-6.1	-4.8	-6.2	-4.8	-6.9	-4.4
23-Apr	00h 13m 10.08s	+06° 10' 47.9"	00h 14m 59.40s	+05° 29' 33.1"	381397	27.8	1879.79	-6.6	0.058	152.1	3449	-6.1	-5.7	-6.1	-5.7	-6.8	-5.2
24-Apr	01h 03m 01.69s	+11° 55' 58.4"	01h 04m 25.03s	+11° 10' 32.5"	376517	15.6	1904.15	-5.5	0.019	164.4	3494	-5.6	-6.3	-5.7	-6.3	-6.3	-5.7
25-Apr	01h 56m 17.56s	+17° 14' 04.4"	01h 57m 07.73s	+16° 24' 33.7"	372304	5.3	1925.70	-4.5	0.002	174.7	3533	-4.8	-6.5	-4.8	-6.5	-5.3	-5.8
26-Apr	02h 53m 35.27s	+21° 41' 21.3"	02h 53m 44.22s	+20° 48' 41.5"	369059	12.4	1942.63	-5.2	0.012	167.5	3564	-3.7	-6.4	-3.7	-6.4	-4.0	-5.5
27-Apr	03h 54m 49.66s	+24° 52' 43.3"	03h 54m 10.80s	+23° 58' 40.2"	366966	25.3	1953.71	-6.4	0.048	154.7	3585	-2.4	-5.8	-2.4	-5.8	-2.7	-4.9
28-Apr	04h 58m 53.00s	+26° 26' 47.3"	04h 57m 24.91s	+25° 33' 35.8"	366079	38.6	1958.45	-7.5	0.110	141.3	3593	-1.0	-4.9	-1.0	-4.9	-1.5	-4.0
29-Apr	06h 03m 40.51s	+26° 12' 12.9"	06h 01m 29.46s	+25° 21' 55.9"	366324	52.1	1957.14	-8.3	0.193	127.8	3591	0.3	-3.6	0.3	-3.6	-0.2	-2.8
30-Apr	07h 06m 52.62s	+24° 21' 34.2"	07h 04m 11.25s	+23° 25' 20.4"	367534	65.4	1950.69	-9.1	0.293	114.4	3579	1.5	-2.1	1.5	-2.1	1.0	-1.3
1-May	08h 06m 48.79s	+20° 39' 46.3"	08h 03m 51.47s	+19° 57' 33.2"	369496	78.7	1940.33	-9.7	0.403	101.2	3560	2.6	-0.5	2.5	-0.5	2.0	0.3
2-May	09h 02m 53.47s	+15° 58' 29.4"	08h 59m 52.33s	+15° 19' 17.8"	371993	91.8	1927.31	-10.2	0.517	88.1	3536	3.4	1.1	3.4	1.1	2.8	1.9
3-May	09h 55m 26.93s	+10° 30' 35.8"	09h 52m 30.51s	+09° 52' 56.9"	374844	104.6	1912.65	-10.6	0.628	75.2	3509	4.0	2.6	4.0	2.6	3.5	3.5
4-May	10h 45m 21.65s	+04° 37' 05.5"	10h 42m 35.61s	+03° 59' 26.6"	377917	117.3	1897.10	-11.0	0.730	62.6	3481	4.5	4.0	4.5	4.0	4.1	4.8
5-May	11h 33m 42.20s	-01° 23' 35.3"	11h 31m 10.64s	-02° 02' 34.8"	381129	129.8	1881.11	-11.4	0.821	50.1	3451	4.8	5.1	4.8	5.1	4.5	6.0
6-May	12h 21m 32.93s	-07° 15' 04.6"	12h 19m 19.62s	-07° 56' 22.8"	384434	142.0	1864.94	-11.7	0.894	37.9	3422	5.0	5.9	4.9	5.9	4.7	6.8
7-May	13h 09m 50.90s	-12° 42' 17.7"	13h 08m 00.05s	-13° 26' 25.3"	387799	153.9	1848.76	-12.1	0.949	26.0	3392	4.9	6.4	4.9	6.4	4.8	7.3
8-May	13h 59m 20.03s	-17° 30' 59.4"	13h 57m 56.61s	-18° 17' 57.0"	391176	165.4	1832.80	-12.4	0.984	14.5	3363	4.7	6.6	4.7	6.6	4.7	7.4
9-May	14h 50m 24.82s	-21° 27' 50.9"	14h 49m 34.17s	-22° 17' 07.8"	394490	174.7	1817.40	-12.6	0.998	5.2	3335	4.3	6.4	4.3	6.4	4.3	7.3
10-May	15h 43m 03.96s	-24° 21' 17.3"	15h 42m 50.71s	-25° 11' 55.8"	397626	169.4	1803.07	-12.4	0.992	10.6	3308	3.6	5.9	3.6	6.0	3.8	6.8
11-May	16h 36m 47.76s	-26° 02' 48.5"	16h 37m 14.25s	-26° 53' 33.4"	400426	158.7	1790.46	-12.2	0.966	21.2	3285	2.7	5.2	2.7	5.2	2.8	6.1
12-May	17h 30m 43.81s	-26° 28' 20.5"	17h 31m 48.87s	-27° 17' 54.6"	402704	147.8	1780.33	-11.9	0.924	32.1	3267	1.7	4.2	1.6	4.2	1.5	5.1
13-May	18h 23m 52.04s	-25° 38' 53.6"	18h 25m 30.89s	-26° 26' 14.8"	404261</												

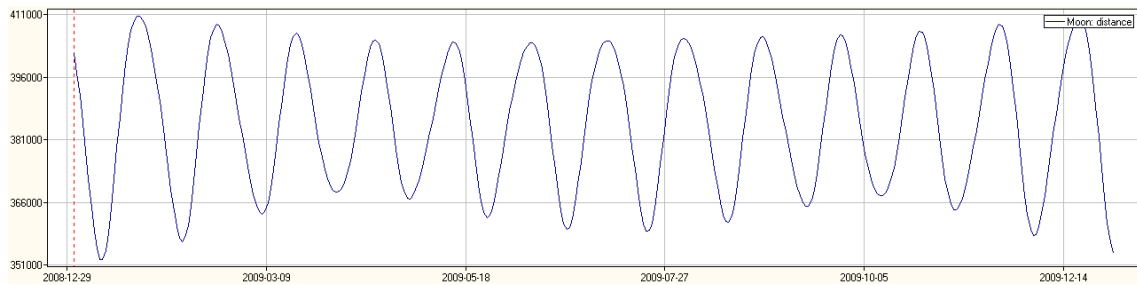
Date	A.R. Geoc.	Dec. Geoc.	A.R. Top.	Dec. Top.	Dist. km	Ei °	Diam. "	Mag	Phase	Phase. angle°	Par.	L1	L2	L3	L4	L5	L6
30-May	09h 42m 36.98s	+11° 40' 06.6"	09h 39m 53.61s	+10° 58' 00.8"	370769	75.3	1933.67	-9.5	0.374	104.6	3548	4.9	2.5	4.9	2.5	4.5	3.4
31-May	10h 33m 42.98s	+05° 46' 45.7"	10h 30m 52.50s	+05° 07' 10.0"	375149	88.2	1911.10	-10.1	0.486	91.6	3507	5.6	3.9	5.6	4.0	5.2	4.8
1-Jun	11h 22m 33.87s	-00° 14' 28.9"	11h 19m 42.01s	-00° 52' 54.3"	379664	100.8	1888.37	-10.5	0.595	79.0	3465	6.0	5.1	6.0	5.1	5.6	6.0
2-Jun	12h 10m 20.35s	-06° 06' 58.8"	12h 07m 31.65s	-06° 45' 33.3"	384080	113.1	1866.66	-10.9	0.697	66.7	3425	6.2	5.9	6.2	6.0	5.8	6.8
3-Jun	12h 58m 06.85s	-11° 36' 33.2"	12h 55m 25.84s	-12° 16' 26.1"	388240	125.1	1846.66	-11.3	0.789	54.7	3388	6.1	6.5	6.1	6.5	5.7	7.4
4-Jun	13h 46m 45.99s	-16° 30' 20.1"	13h 44m 17.94s	-17° 12' 23.3"	392055	136.9	1828.69	-11.6	0.866	43.0	3355	5.8	6.7	5.8	6.7	5.4	7.6
5-Jun	14h 36m 52.91s	-20° 36' 11.1"	14h 34m 44.22s	-21° 20' 52.8"	395479	148.4	1812.85	-11.9	0.926	31.5	3326	5.2	6.5	5.2	6.6	5.0	7.4
6-Jun	15h 28m 38.79s	-23° 42' 54.4"	15h 26m 56.67s	-24° 30' 13.1"	398491	159.7	1799.15	-12.2	0.969	20.2	3301	4.5	6.1	4.5	6.1	4.3	7.0
7-Jun	16h 21m 46.08s	-25° 41' 16.4"	16h 20m 37.35s	-26° 30' 39.2"	401066	170.6	1787.60	-12.5	0.993	9.4	3280	3.6	5.4	3.6	5.4	3.5	6.3
8-Jun	17h 15m 30.10s	-26° 25' 33.5"	17h 14m 59.43s	-27° 16' 01.1"	403160	175.7	1778.31	-12.6	0.999	4.3	3263	2.5	4.4	2.5	4.4	2.5	5.3
9-Jun	18h 08m 50.56s	-25° 54' 46.8"	18h 08m 59.16s	-26° 45' 06.9"	404705	166.1	1771.53	-12.4	0.985	13.9	3250	1.3	3.3	1.3	3.3	1.2	4.1
10-Jun	19h 00m 50.05s	-24° 12' 54.0"	19h 01m 35.47s	-25° 01' 57.8"	405604	155.4	1767.60	-12.1	0.955	24.6	3243	-0.1	2.0	-0.1	2.0	-0.3	2.8
11-Jun	19h 50m 50.71s	-21° 27' 44.8"	19h 52m 08.02s	-22° 14' 40.8"	405739	144.6	1767.01	-11.8	0.908	35.3	3242	-1.5	0.6	-1.5	0.7	-1.9	1.4
12-Jun	20h 38m 41.94s	-17° 49' 14.9"	20h 40m 25.36s	-18° 33' 35.8"	404993	133.7	1770.27	-11.5	0.846	46.1	3248	-2.9	-0.7	-2.9	-0.7	-3.5	-0.1
13-Jun	21h 24m 38.90s	-13° 27' 48.5"	21h 26m 43.06s	-14° 09' 31.7"	403262	122.8	1777.87	-11.2	0.772	57.0	3262	-4.3	-2.1	-4.3	-2.1	-5.0	-1.5
14-Jun	22h 09m 16.56s	-08° 33' 23.6"	22h 11m 37.07s	-09° 12' 48.5"	400481	111.8	1790.21	-10.9	0.687	68.0	3285	-5.5	-3.4	-5.5	-3.4	-6.3	-2.9
15-Jun	22h 53m 23.63s	-03° 15' 25.8"	22h 55m 57.07s	-03° 53' 10.5"	396652	100.6	1807.50	-10.5	0.593	79.2	3316	-6.5	-4.5	-6.5	-4.5	-7.4	-4.2
16-Jun	23h 37m 58.63s	+02° 16' 37.0"	23h 40m 42.16s	+01° 39' 37.6"	391856	89.1	1829.62	-10.1	0.494	90.7	3357	-7.3	-5.5	-7.3	-5.5	-8.1	-5.2
17-Jun	00h 24m 07.56s	+07° 52' 06.6"	00h 26m 58.15s	+07° 14' 43.2"	386279	77.3	1856.03	-9.6	0.392	102.5	3405	-7.6	-6.2	-7.6	-6.2	-8.5	-5.9
18-Jun	01h 13m 01.19s	+13° 17' 44.3"	01h 15m 54.59s	+12° 38' 36.6"	380218	65.1	1885.62	-9.1	0.291	114.7	3460	-7.5	-6.7	-7.5	-6.6	-8.5	-6.3
19-Jun	02h 05m 48.32s	+18° 15' 56.8"	02h 08m 37.72s	+17° 33' 43.2"	374070	52.5	1916.61	-8.4	0.196	127.4	3517	-7.0	-6.7	-7.0	-6.7	-7.9	-6.3
20-Jun	03h 03m 19.98s	+22° 24' 04.7"	03h 05m 54.80s	+21° 37' 40.9"	368315	39.4	1946.56	-7.5	0.114	140.6	3572	-6.0	-6.4	-6.0	-6.4	-6.8	-5.8
21-Jun	04h 05m 41.75s	+25° 15' 44.5"	04h 07m 47.74s	+24° 24' 52.9"	363460	25.8	1972.56	-6.5	0.050	154.1	3619	-4.5	-5.6	-4.6	-5.6	-5.2	-4.9
22-Jun	05h 11m 44.34s	+26° 26' 04.6"	05h 13m 06.81s	+25° 31' 40.1"	359973	12.0	1991.67	-5.2	0.011	167.9	3654	-2.8	-4.5	-2.8	-4.5	-3.2	-3.6
23-Jun	06h 19m 02.66s	+25° 40' 21.4"	06h 19m 32.24s	+24° 44' 29.4"	358201	3.5	2001.52	-4.3	0.001	176.5	3672	-0.9	-3.0	-0.9	-3.0	-1.0	-2.1
24-Jun	07h 24m 46.22s	+23° 00' 55.1"	07h 24m 22.74s	+22° 06' 09.6"	358305	16.8	2000.94	-5.7	0.022	163.1	3671	1.0	-1.3	1.0	-1.3	1.0	-0.4
25-Jun	08h 26m 50.57s	+18° 46' 40.0"	08h 25m 41.50s	+17° 55' 07.6"	360228	30.9	1990.25	-6.9	0.071	149.0	3652	2.8	0.4	2.8	0.5	2.8	1.4
26-Jun	09h 24m 32.38s	+13° 25' 41.7"	09h 22m 48.01s	+12° 38' 27.6"	363713	44.7	1971.18	-7.9	0.145	135.2	3617	4.4	2.2	4.4	2.2	4.2	3.1
27-Jun	10h 18m 15.98s	+07° 27' 01.6"	10h 16m 05.73s	+06° 44' 08.2"	368362	58.3	1946.31	-8.7	0.238	121.6	3571	5.7	3.7	5.7	3.7	5.4	4.6
28-Jun	11h 09m 01.81s	+01° 15' 46.9"	11h 06m 32.98s	+00° 36' 29.3"	373714	71.4	1918.43	-9.3	0.341	108.5	3520	6.6	5.0	6.6	5.0	6.2	5.9
29-Jun	11h 58m 01.42s	-04° 48' 01.2"	11h 55m 19.54s	-05° 24' 56.0"	379322	84.1	1890.07	-9.9	0.450	95.8	3468	7.1	5.9	7.1	6.0	6.7	6.8
30-Jun	12h 46m 23.56s	-10° 28' 37.3"	12h 43m 33.31s	-11° 04' 34.6"	384805	96.4	1863.14	-10.4	0.557	83.5	3418	7.2	6.5	7.2	6.6	6.8	7.4
1-Jul	13h 35m 06.78s	-15° 33' 05.7"	13h 32m 13.08s	-16° 09' 30.4"	389873	108.3	1838.92	-10.8	0.658	71.5	3374	7.0	6.8	7.0	6.8	6.6	7.6
2-Jul	14h 24m 54.06s	-19° 50' 08.6"	14h 22m 02.83s	-20° 28' 14.8"	394339	120.0	1818.09	-11.1	0.751	59.9	3336	6.5	6.7	6.5	6.7	6.1	7.6
3-Jul	15h 16m 06.95s	-23° 09' 37.0"	15h 13m 25.58s	-23° 50' 17.7"	398102	131.4	1800.91	-11.4	0.831	48.5	3304	5.8	6.3	5.8	6.3	5.4	7.1
4-Jul	16h 08m 40.45s	-25° 22' 51.9"	16h 06m 17.42s	-26° 06' 29.8"	401128	142.6	1787.32	-11.8	0.898	37.3	3279	4.8	5.6	4.8	5.6	4.5	6.5
5-Jul	17h 02m 02.13s	-26° 23' 50.9"	17h 00m 05.77s	-27° 10' 12.9"	403428	153.7	1777.13	-12.0	0.948	26.3	3261	3.7	4.7	3.7	4.7	3.4	5.5
6-Jul	17h 55m 19.61s	-26° 10' 23.6"	17h 53m 56.34s	-26° 58' 43.7"	405030	164.6	1770.11	-12.3	0.982	15.3	3248	2.5	3.6	2.5	3.6	2.2	4.4
7-Jul	18h 47m 36.03s	-24° 44' 53.8"	18h 46m 49.03s	-25° 34' 03.9"	405960	175.4	1766.05	-12.6	0.998	4.6	3240	1.1	2.3	1.1	2.3	0.9	3.1
8-Jul	19h 38m 07.20s	-22° 13' 55.0"	19h 37m 56.30s	-23° 02' 40.5"	406228	173.3	1764.89	-12.6	0.997	6.6	3238	-0.3	0.9	-0.3	1.0	-0.4	1.8
9-Jul	20h 26m 32.45s	-18° 46' 51.3"	20h 26m 55.11s	-19° 34' 05.7"	405819	162.5	1766.67	-12.3	0.977	17.4	3241	-1.7	-0.5	-1.7	-0.5	-2.0	0.3
10-Jul	21h 12m 56.53s	-14° 34' 23.0"	21h 13m 49.14s	-15° 19' 17.1"	404694	151.6	1771.58	-12.0	0.940	28.3	3250	-3.1	-1.9	-3.1	-1.8	-3.5	-1.2
11-Jul	21h 57m 45.24s	-09° 47' 15.3"	21h 59m 04.29s	-10° 29' 21.8"	402800	140.6	1779.90	-11.7	0.887	39.3	3266	-4.4	-3.2	-4.4	-3.2	-4.9	-2.6
12-Jul	22h 41m 39.58s	-04° 35' 46.3"	22h 43m 22.18s	-05° 15' 01.0"	400089	129.5	1791.96	-11.4	0.819	50.4	3288	-5.5	-4.4	-5.5	-4.4	-6.2	-3.9
13-Jul	23h 25m 31.14s	+00° 50' 06.3"	23h 27m 35.18s	+00° 13' 24.2"	396534	118.3	1808.03	-11.1	0.738	61.6	3317	-6.5	-5.4	-6.5	-5.4	-7.2	-5.0
14-Jul	00h 10m 19.35s	+05° 20' 05.8"	00h 12m 43.18s	+05° 45' 13.3"	392158	106.8	1828.21	-10.7	0.645	73.1	3354	-7.1	-6.2	-7.1	-6.1	-7.9	-5.8
15-Jul	00h 57m 09.42s	+11° 42' 33.2"	00h 59m 51.25s	+11° 08' 23.3"	387056	95.0	1852.31	-10.3	0.544	84.9	3399	-7.5	-6.7	-7.5	-6.6	-8.3	-6.4
16-Jul	01h 47m 08.57s	+16° 43' 06.5"	01h 50m 05.33s	+16° 08' 10.2"	381415	82.8	1879.70	-9.8	0.439	97.1	3449	-7.5	-6.8	-7.5	-6.8	-8.4	-6.5
17-Jul	02h 41m 16.63s	+21° 03' 28.6"	02h 44m 22.42s	+20° 26' 03.8"	375529	70.2	1909.16	-9.3	0.332	109.6	3503	-7.1	-6.6	-7.1	-6.6	-7.9	-6.2
18-Jul	03h 40m 06.98s	+24° 21' 16.2"	03h 43m 11.41s	+23° 39' 48.0"	369791	57.2	1938.79	-8.6	0.230	122.6	3557	-6.2	-6.0	-6.2	-6.0	-7.1	-5.5
19-Jul	04h 43m 19.05s	+26° 12' 19.0"	04h 46m 07.12s	+25° 25' 54.8"	364665	43.8	1966.04	-7.8	0.140	136.1	3607	-4.9	-5.0	-4.9	-5.0	-5.7	-4.3
20-Jul	05h 49m 19.13s	+26° 16' 35.4"	05h 51m 34.25s	+25° 25' 40.0"	360639	30.0	1987.98	-6.8	0.067	150.0	3648	-3.3	-3.7	-3.4	-3.7	-3.9	-2.8
21-Jul	06h 55m 37.66s	+24° 26' 00.4"	06h 57m 07.34s	+23° 32' 24.0"	358147	15.8	2001.82	-5.5	0.019	164.1	3673	-1.5	-2.1	-1.5	-2.0	-1.8	-1.1
22-Jul	07h 59m 47.09s	+20° 48' 59.7"	08h 00m 26.94s	+19° 55' 23.1"	357486	1.5	2005.52	-4.0	0.000	178.5	3680	0.4	-0.3	0.4	-0.3	0.4	0.6
23-Jul	09h 00m 18.43s	+15° 48' 06.0"	09h 00m 11.24s	+14° 57' 03.8"	358753	12.7	1998.44	-5.3	0.012	167.3	3667	2.4	1.5	2.4	1.5	2.6	2.4
24-Jul	09h 56m 55.93s	+09° 52' 44.3"	09h 56m 07.97s	+09° 06' 01.4"	361819	26.8	1981.50	-6.5	0.054	153.2	3636	4.1	3.2	4.1	3.2	4.2	4.0
25-Jul	10h 50m 16.43s	+03° 32' 12.6"	10h 48m 54.31s	+02° 50' 27.7"	366360	40.5	1956.94	-7.6	0.120	139.4	3591	5.6	4.6	5.6	4.6	5.5	5.4
26-Jul	11h 41m 21.48s	-02° 48' 15.6"	11h 39m 30.76s	-03° 25' 24.4"	371916	53.8	1927.71	-8.4	0.206	126.1	3537	6.7	5.7	6.7	5.7	6.5	6.5
27-Jul	12h 31m 17.35s	-08° 48' 32.6"	12h 29m 02.60s	-09° 22' 11.7"	377981	66.6	1896.78	-9.1	0.303	113.2	3480	7.4	6.4	7.4	6.5	7.1	7.2
28-Jul	13h 21m 03.79s	-14° 12' 57.1"	13h 18m 29.23s	-14° 44' 39.0"	384072	79.0	1866.70	-9.7	0.406	100.8	3425	7.6	6.8	7.6	6.8	7.2	7.5
29-Jul	14h 11m 27.00s	-18° 49' 02.4"	14h 08m 37.47s	-19° 20' 29.2"	38978												

Date	A.R. Geoc.	Dec. Geoc.	A.R. Top.	Dec. Top.	Dist. km	Ei °	Diam. "	Mag	Phase	Phase. angle°	Par.	L1	L2	L3	L4	L5	L6
15-Aug	04h 21m 24.34s	+25° 43' 24.3"	04h 24m 39.09s	+25° 07' 48.9"	372033	74.5	1927.10	-9.5	0.367	105.4	3536	-5.7	-5.4	-5.7	-5.3	-6.5	-4.9
16-Aug	05h 24m 31.29s	+26° 26' 16.0"	05h 27m 42.58s	+25° 45' 29.5"	367425	61.3	1951.27	-8.8	0.261	118.6	3580	-4.7	-4.2	-4.7	-4.1	-5.4	-3.5
17-Aug	06h 29m 01.59s	+25° 22' 34.9"	06h 31m 52.88s	+24° 36' 42.4"	363569	47.7	1971.96	-8.1	0.164	132.2	3618	-3.3	-2.7	-3.3	-2.7	-4.0	-1.9
18-Aug	07h 32m 46.02s	+22° 32' 26.8"	07h 35m 03.85s	+21° 43' 02.5"	360871	33.9	1986.71	-7.1	0.085	146.0	3645	-1.8	-1.0	-1.8	-1.0	-2.2	-0.1
19-Aug	08h 34m 03.31s	+18° 09' 19.3"	08h 35m 40.42s	+17° 18' 58.6"	359675	19.9	1993.31	-5.9	0.030	160.1	3657	-0.1	0.8	0.0	0.8	-0.2	1.7
20-Aug	09h 32m 09.62s	+12° 36' 35.7"	09h 33m 04.52s	+11° 48' 04.9"	360194	6.1	1990.45	-4.5	0.003	173.8	3652	1.7	2.5	1.7	2.5	1.8	3.4
21-Aug	10h 27m 15.48s	+06° 22' 04.1"	10h 27m 29.93s	+05° 37' 35.6"	362452	8.7	1978.04	-4.8	0.006	171.3	3629	3.4	4.0	3.5	4.1	3.7	4.8
22-Aug	11h 20m 05.11s	-00° 06' 45.5"	11h 19m 41.88s	-00° 46' 00.7"	366275	22.2	1957.40	-6.1	0.037	157.8	3591	5.0	5.3	5.0	5.3	5.1	5.9
23-Aug	12h 11m 35.79s	-06° 25' 30.3"	12h 10m 37.51s	-06° 59' 28.4"	371316	35.5	1930.83	-7.2	0.093	144.4	3543	6.1	6.2	6.2	6.2	6.2	6.8
24-Aug	13h 02m 43.43s	-12° 13' 58.2"	13h 01m 12.49s	-12° 43' 33.5"	377117	48.4	1901.12	-8.1	0.169	131.5	3488	6.9	6.6	6.9	6.7	6.8	7.3
25-Aug	13h 54m 13.20s	-17° 16' 04.5"	13h 52m 12.31s	-17° 42' 52.1"	383182	60.8	1871.03	-8.8	0.257	119.1	3433	7.3	6.7	7.3	6.8	7.0	7.4
26-Aug	14h 46m 32.63s	-21° 19' 24.0"	14h 44m 05.73s	-21° 45' 19.0"	389044	72.8	1842.84	-9.4	0.354	107.0	3381	7.2	6.5	7.2	6.5	6.8	7.1
27-Aug	15h 39m 46.58s	-24° 14' 50.4"	15h 36m 59.59s	-24° 41' 46.7"	394310	84.5	1818.23	-9.9	0.453	95.4	3336	6.6	5.9	6.7	5.9	6.2	6.5
28-Aug	16h 33m 35.73s	-25° 56' 38.9"	16h 30m 36.81s	-26° 26' 09.8"	398686	95.8	1798.27	-10.3	0.552	84.1	3299	5.8	5.1	5.8	5.1	5.2	5.7
29-Aug	17h 27m 21.43s	-26° 22' 44.0"	17h 24m 20.25s	-26° 55' 47.2"	401991	106.9	1783.49	-10.7	0.646	73.0	3272	4.7	4.0	4.7	4.1	4.1	4.7
30-Aug	18h 20m 17.06s	-25° 34' 48.7"	18h 17m 23.33s	-26° 11' 38.8"	404145	117.8	1773.98	-11.1	0.734	62.1	3255	3.4	2.8	3.4	2.9	2.7	3.5
31-Aug	19h 11m 42.26s	-23° 38' 03.6"	19h 09m 04.14s	-24° 18' 14.1"	405161	128.6	1769.53	-11.4	0.813	51.2	3247	2.0	1.5	2.0	1.5	1.3	2.2
1-Sep	20h 01m 13.71s	-20° 40' 15.7"	19h 58m 56.98s	-21° 22' 47.8"	405127	139.5	1769.68	-11.7	0.881	40.4	3247	0.6	0.1	0.6	0.2	-0.1	0.8
2-Sep	20h 48m 49.12s	-16° 50' 46.8"	20h 46m 57.21s	-17° 34' 21.8"	404178	150.3	1773.84	-11.9	0.935	29.6	3255	-0.8	-1.2	-0.8	-1.2	-1.4	-0.6
3-Sep	21h 34m 45.29s	-12° 19' 45.0"	21h 33m 19.96s	-13° 02' 56.7"	402476	161.2	1781.34	-12.2	0.974	18.7	3268	-2.0	-2.6	-2.0	-2.6	-2.6	-2.0
4-Sep	22h 19m 33.57s	-07° 17' 40.3"	22h 18m 35.71s	-07° 59' 05.8"	400191	171.9	1791.51	-12.5	0.995	8.1	3287	-3.1	-3.8	-3.1	-3.8	-3.6	-3.2
5-Sep	23h 03m 55.33s	-01° 55' 33.3"	23h 03m 25.73s	-02° 33' 52.8"	397475	174.7	1803.75	-12.6	0.998	5.3	3310	-4.0	-4.9	-4.0	-4.9	-4.4	-4.3
6-Sep	23h 48m 38.64s	+03° 35' 39.7"	23h 48m 38.47s	+03° 00' 53.2"	394450	164.1	1817.59	-12.3	0.981	15.9	3335	-4.7	-5.8	-4.7	-5.8	-4.9	-5.2
7-Sep	00h 34m 35.75s	+09° 03' 01.1"	00h 35m 06.75s	+08° 32' 12.6"	391204	152.6	1832.67	-12.0	0.944	27.3	3363	-5.2	-6.4	-5.2	-6.3	-5.5	-5.9
8-Sep	01h 22m 39.99s	+14° 12' 41.8"	01h 23m 44.32s	+13° 45' 26.6"	387793	140.8	1848.79	-11.7	0.888	39.1	3392	-5.4	-6.7	-5.4	-6.6	-5.9	-6.3
9-Sep	02h 13m 40.17s	+18° 48' 47.3"	02h 15m 19.63s	+18° 23' 55.9"	384253	128.8	1865.82	-11.4	0.814	51.1	3423	-5.5	-6.6	-5.5	-6.6	-6.0	-6.3
10-Sep	03h 08m 10.17s	+22° 33' 28.9"	03h 10m 24.75s	+22° 09' 09.8"	380622	116.5	1883.62	-11.0	0.724	63.4	3456	-5.3	-6.2	-5.3	-6.2	-5.9	-5.9
11-Sep	04h 06m 13.81s	+25° 08' 04.1"	04h 08m 59.63s	+24° 42' 00.3"	376962	104.0	1901.91	-10.6	0.622	75.9	3490	-4.9	-5.4	-4.9	-5.4	-5.6	-5.1
12-Sep	05h 07m 10.56s	+26° 15' 31.3"	05h 10m 18.36s	+25° 45' 32.1"	373384	91.2	1920.13	-10.2	0.512	88.6	3523	-4.3	-4.3	-4.3	-4.3	-5.1	-3.9
13-Sep	06h 09m 35.13s	+25° 44' 25.9"	06h 12m 50.93s	+25° 09' 09.7"	370061	78.2	1937.37	-9.7	0.399	101.7	3555	-3.5	-3.0	-3.5	-3.0	-4.2	-2.4
14-Sep	07h 11m 40.91s	+23° 32' 41.9"	07h 14m 49.37s	+22° 52' 07.8"	367226	64.9	1952.33	-9.0	0.289	114.9	3582	-2.5	-1.4	-2.5	-1.4	-3.1	-0.6
15-Sep	08h 11m 57.64s	+19° 48' 47.4"	08h 14m 46.04s	+19° 04' 19.6"	365155	51.5	1963.40	-8.3	0.189	128.4	3602	-1.3	0.3	-1.3	0.3	-1.8	1.1
16-Sep	09h 09m 38.89s	+14° 49' 56.1"	09h 11m 59.02s	+14° 03' 57.6"	364124	37.9	1968.96	-7.4	0.106	142.0	3613	0.1	1.9	0.1	2.0	-0.2	2.8
17-Sep	10h 04m 45.38s	+08° 58' 40.2"	10h 06m 33.08s	+08° 13' 52.7"	364356	24.3	1967.71	-6.3	0.045	155.6	3610	1.5	3.5	1.6	3.5	1.4	4.4
18-Sep	10h 57m 51.43s	+02° 39' 32.4"	10h 59m 04.85s	+01° 58' 17.1"	365969	11.2	1959.03	-5.1	0.010	168.8	3594	3.0	4.8	3.0	4.8	3.0	5.6
19-Sep	11h 49m 47.62s	-03° 43' 15.1"	11h 50m 25.77s	-04° 19' 26.6"	368936	5.3	1943.28	-4.5	0.002	174.7	3566	4.3	5.8	4.3	5.8	4.4	6.4
20-Sep	12h 41m 26.71s	-09° 47' 20.9"	12h 41m 28.73s	-10° 18' 01.1"	373073	16.9	1921.73	-5.7	0.022	163.1	3526	5.4	6.4	5.4	6.4	5.6	6.9
21-Sep	13h 33m 33.24s	-15° 13' 10.0"	13h 32m 58.37s	-15° 38' 55.5"	378063	29.5	1896.36	-6.8	0.065	150.4	3479	6.1	6.6	6.1	6.6	6.2	7.1
22-Sep	14h 36m 35.14s	-19° 44' 29.7"	14h 25m 23.45s	-20° 06' 48.8"	383504	41.8	1869.46	-7.7	0.128	138.1	3430	6.4	6.5	6.5	6.5	6.3	6.9
23-Sep	15h 20m 37.28s	-23° 08' 59.4"	15h 18m 50.68s	-23° 29' 51.7"	388956	53.8	1843.26	-8.4	0.206	126.1	3382	6.3	6.0	6.4	6.0	6.1	6.4
24-Sep	16h 15m 18.88s	-25° 18' 41.1"	16h 13m 02.05s	-25° 40' 12.2"	394004	65.4	1819.64	-9.1	0.293	114.4	3339	5.9	5.2	5.9	5.2	5.4	5.7
25-Sep	17h 09m 58.15s	-26° 10' 22.4"	17h 07m 18.61s	-26° 34' 19.3"	398291	76.7	1800.06	-9.6	0.386	103.1	3303	5.0	4.2	5.0	4.2	4.5	4.7
26-Sep	18h 03m 44.62s	-25° 45' 32.5"	18h 00m 51.75s	-26° 13' 05.6"	401550	87.8	1785.45	-10.0	0.482	92.1	3276	3.9	3.0	3.9	3.0	3.3	3.5
27-Sep	18h 55m 54.73s	-24° 09' 36.0"	18h 52m 58.06s	-24° 41' 11.3"	403613	98.7	1776.32	-10.4	0.577	81.1	3259	2.6	1.7	2.6	1.7	1.9	2.2
28-Sep	19h 46m 03.54s	-21° 30' 34.3"	19h 43m 11.30s	-22° 05' 55.6"	404418	109.5	1772.78	-10.8	0.668	70.3	3253	1.2	0.4	1.2	0.4	0.5	0.9
29-Sep	20h 34m 08.83s	-17° 57' 45.0"	20h 31m 27.26s	-18° 36' 02.3"	404001	120.4	1774.61	-11.1	0.754	59.5	3256	-0.2	-1.0	-0.2	-1.0	-1.0	-0.5
30-Sep	21h 20m 28.51s	-13° 40' 47.1"	21h 18m 02.00s	-14° 20' 46.8"	402482	131.2	1781.31	-11.4	0.830	48.6	3268	-1.5	-2.3	-1.5	-2.3	-2.3	-1.8
1-Oct	22h 05m 35.40s	-08° 49' 22.3"	22h 03m 27.08s	-09° 29' 36.9"	400051	142.3	1792.13	-11.7	0.896	37.7	3288	-2.7	-3.6	-2.7	-3.6	-3.4	-3.1
2-Oct	22h 50m 12.18s	-03° 33' 27.1"	22h 48m 24.64s	-04° 12' 24.9"	396945	153.4	1806.16	-12.0	0.947	26.5	3314	-3.6	-4.7	-3.6	-4.7	-4.2	-4.2
3-Oct	23h 35m 07.83s	+01° 56' 13.8"	23h 33m 43.82s	+01° 19' 58.5"	393419	164.6	1822.35	-12.3	0.982	15.4	3344	-4.3	-5.6	-4.2	-5.5	-4.8	-5.1
4-Oct	00h 21m 14.99s	+07° 27' 27.7"	00h 20m 17.92s	+06° 55' 02.0"	389723	174.4	1839.63	-12.6	0.998	5.6	3375	-4.6	-6.2	-4.6	-6.2	-5.1	-5.8
5-Oct	01h 09m 26.71s	+12° 45' 55.5"	01h 09m 00.93s	+12° 17' 53.6"	386076	169.7	1857.01	-12.5	0.992	10.2	3407	-4.8	-6.5	-4.7	-6.5	-5.0	-6.1
6-Oct	02h 00m 30.72s	+17° 34' 51.9"	02h 00m 41.28s	+17° 11' 00.2"	382645	158.2	1873.66	-12.2	0.964	21.8	3438	-4.6	-6.5	-4.6	-6.5	-4.8	-6.1
7-Oct	02h 54m 58.99s	+21° 35' 23.5"	02h 55m 50.55s	+21° 14' 31.1"	379539	146.0	1888.99	-11.8	0.915	34.0	3466	-4.3	-6.1	-4.3	-6.1	-4.6	-5.8
8-Oct	03h 52m 52.77s	+24° 27' 56.2"	03h 54m 27.51s	+24° 07' 58.6"	376808	133.4	1902.68	-11.5	0.844	46.5	3491	-3.8	-5.4	-3.8	-5.4	-4.2	-5.1
9-Oct	04h 53m 29.25s	+25° 55' 12.5"	04h 55m 44.34s	+25° 33' 35.5"	374463	120.7	1914.59	-11.1	0.756	59.2	3513	-3.2	-4.4	-3.2	-4.3	-3.7	-4.0
10-Oct	05h 55m 22.48s	+25° 46' 08.0"	05h 58m 08.93s	+25° 20' 31.9"	372502	107.9	1924.68	-10.8	0.654	72.0	3531	-2.5	-3.0	-2.4	-3.0	-3.1	-2.6
11-Oct	06h 56m 47.44s	+23° 59' 02.0"	06h 59m 51.88s	+23° 28' 06.2"	370931	94.9	1932.83	-10.3	0.544	85.0	3546	-1.7	-1.5	-1.7	-1.5	-2.3	-0.9
12-Oct	07h 56m 16.86s	+20° 42' 03.9"	07h 59m 25.34s	+20° 05' 51.3"	369788	81.8	1938.80	-9.8	0.430	98.1	3557	-0.8	0.1	-0.8	0.1	-1.4	0.8
13-Oct	08h 53m 07.10s	+16° 10' 49.8"	08h 56m 08.23s	+15° 30' 41.1"	369156	68.6	1942.12	-9.2	0.319	111.3	3563	0.1	1.7	0.2	1.7	-0.4	2.5
14-Oct	09h 47m 20.75s	+10° 44' 58.0"	09h 50m 06.62s	+10° 03' 04.9"	369150</												

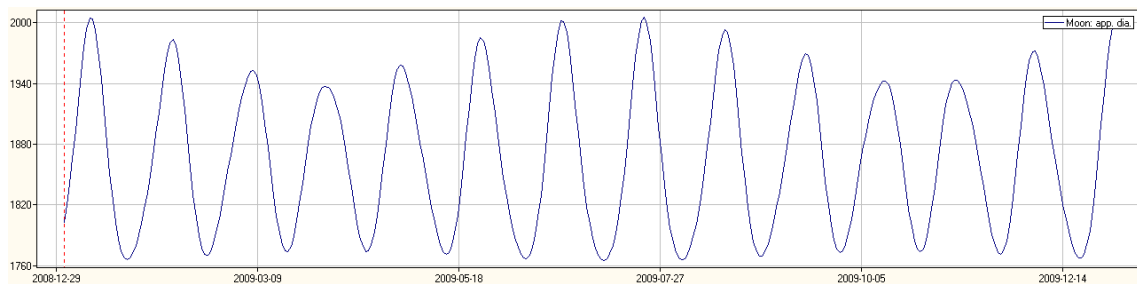
Date	A.R. Geoc.	Dec. Geoc.	A.R. Top.	Dec. Top.	Dist. km	El °	Diam. "	Mag	Phase	Phase. angle°	Par.	L1	L2	L3	L4	L5	L6
31-Oct	00h 04m 23.31s	+05° 34' 54.2"	00h 02m 12.89s	+04° 59' 56.8"	390127	145.3	1837.72	-11.8	0.911	34.7	3372	-5.0	-6.1	-5.0	-6.1	-5.7	-5.8
1-Nov	00h 52m 03.70s	+10° 58' 19.3"	00h 50m 13.13s	+10° 26' 59.9"	385456	157.0	1859.99	-12.1	0.961	22.9	3413	-5.2	-6.5	-5.1	-6.5	-5.8	-6.2
2-Nov	01h 42m 43.19s	+15° 59' 52.9"	01h 41m 19.30s	+15° 33' 07.3"	380933	168.7	1882.08	-12.4	0.990	11.2	3453	-4.9	-6.5	-4.9	-6.5	-5.4	-6.2
3-Nov	02h 37m 03.41s	+20° 20' 01.2"	02h 36m 14.58s	+19° 57' 53.2"	376880	174.6	1902.32	-12.6	0.998	5.4	3490	-4.4	-6.2	-4.4	-6.2	-4.7	-5.9
4-Nov	03h 35m 15.05s	+23° 36' 57.0"	03h 35m 09.78s	+23° 18' 20.6"	373550	164.0	1919.28	-12.3	0.981	16.0	3522	-3.7	-5.5	-3.7	-5.5	-3.8	-5.2
5-Nov	04h 36m 39.43s	+25° 30' 01.6"	04h 37m 23.23s	+25° 12' 42.2"	371099	151.3	1931.95	-12.0	0.939	28.7	3545	-2.8	-4.5	-2.7	-4.5	-3.0	-4.2
6-Nov	05h 39m 43.88s	+25° 44' 53.5"	05h 41m 15.85s	+25° 26' 00.3"	369578	138.2	1939.91	-11.6	0.873	41.7	3559	-1.8	-3.1	-1.7	-3.1	-2.1	-2.8
7-Nov	06h 42m 25.97s	+24° 18' 04.1"	06h 44m 37.94s	+23° 55' 07.0"	368938	125.0	1943.27	-11.3	0.788	54.8	3566	-0.7	-1.6	-0.7	-1.6	-1.2	-1.2
8-Nov	07h 42m 58.48s	+21° 17' 57.5"	07h 45m 37.85s	+20° 49' 36.8"	369069	111.8	1942.58	-10.9	0.687	68.0	3564	0.3	0.0	0.3	0.0	-0.3	0.6
9-Nov	08h 40m 24.15s	+17° 01' 38.0"	08h 43m 18.19s	+16° 28' 01.9"	369831	98.7	1938.57	-10.4	0.577	81.2	3557	1.2	1.6	1.2	1.7	0.7	2.4
10-Nov	09h 34m 41.01s	+11° 49' 58.7"	09h 37m 39.44s	+11° 12' 28.5"	371096	85.6	1931.97	-10.0	0.463	94.2	3545	2.1	3.2	2.1	3.2	1.6	4.0
11-Nov	10h 26m 26.55s	+06° 04' 02.3"	10h 29m 21.96s	+05° 24' 43.2"	372771	72.6	1923.29	-9.4	0.352	107.2	3529	2.9	4.5	2.9	4.5	2.5	5.4
12-Nov	11h 16m 38.24s	+00° 03' 27.9"	11h 19m 25.14s	-00° 35' 21.0"	374809	59.8	1912.83	-8.8	0.250	120.1	3510	3.6	5.5	3.6	5.5	3.3	6.4
13-Nov	12h 06m 18.75s	-05° 53' 33.8"	12h 08m 52.41s	-06° 29' 44.3"	377198	47.1	1900.71	-8.0	0.161	132.8	3487	4.3	6.2	4.3	6.2	3.9	7.0
14-Nov	12h 56m 26.20s	-11° 29' 51.2"	12h 58m 41.60s	-12° 01' 46.3"	379947	34.6	1886.96	-7.2	0.089	145.3	3462	4.8	6.6	4.8	6.6	4.5	7.3
15-Nov	13h 47m 46.05s	-16° 28' 54.6"	13h 49m 37.43s	-16° 55' 43.7"	383049	22.4	1871.68	-6.2	0.038	157.5	3434	5.1	6.6	5.1	6.6	4.8	7.1
16-Nov	14h 40m 42.77s	-20° 35' 15.9"	14h 42m 03.80s	-20° 57' 03.9"	386461	10.7	1855.16	-5.0	0.009	169.3	3404	5.2	6.2	5.2	6.2	5.0	6.6
17-Nov	15h 35m 11.85s	-23° 35' 37.5"	15h 35m 56.65s	-23° 53' 25.0"	390085	4.8	1837.92	-4.4	0.002	175.2	3372	5.0	5.5	5.0	5.5	4.9	5.8
18-Nov	16h 30m 36.86s	-25° 20' 37.5"	16h 30m 41.66s	-25° 36' 09.0"	393760	14.5	1820.77	-5.4	0.016	165.5	3341	4.6	4.5	4.6	4.5	4.6	4.8
19-Nov	17h 25m 56.86s	-25° 46' 29.0"	17h 25m 21.48s	-26° 01' 48.9"	397272	25.7	1804.67	-6.5	0.050	154.3	3311	3.9	3.4	3.9	3.4	3.8	3.7
20-Nov	18h 20m 04.80s	-24° 55' 33.0"	18h 18m 52.89s	-25° 12' 38.3"	400372	36.8	1790.70	-7.3	0.100	143.1	3286	2.9	2.1	2.9	2.1	2.6	2.4
21-Nov	19h 12m 08.51s	-22° 55' 16.0"	19h 10m 26.38s	-23° 15' 33.8"	402799	47.8	1779.91	-8.1	0.165	132.1	3266	1.7	0.7	1.7	0.7	1.3	1.0
22-Nov	20h 01m 43.71s	-19° 56' 01.7"	19h 59m 38.53s	-20° 20' 19.1"	404313	58.6	1773.25	-8.7	0.241	121.2	3254	0.3	-0.7	0.4	-0.7	-0.2	-0.3
23-Nov	20h 48m 55.38s	-16° 08' 59.8"	20h 46m 33.70s	-16° 37' 24.7"	404716	69.4	1771.48	-9.3	0.325	110.4	3250	-1.1	-2.0	-1.1	-2.0	-1.7	-1.7
24-Nov	21h 34m 11.57s	-11° 44' 42.1"	21h 31m 38.69s	-12° 16' 48.8"	403881	80.2	1775.14	-9.7	0.416	99.6	3257	-2.5	-3.3	-2.5	-3.3	-3.2	-2.9
25-Nov	22h 18m 15.62s	-06° 52' 36.1"	22h 15m 35.64s	-07° 27' 32.4"	401765	91.1	1784.49	-10.2	0.511	88.8	3274	-3.8	-4.4	-3.7	-4.4	-3.6	-4.1
26-Nov	23h 02m 00.47s	-01° 41' 27.6"	22h 59m 16.68s	-02° 18' 00.5"	398428	102.1	1799.44	-10.6	0.606	77.7	3302	-4.9	-5.4	-4.8	-5.4	-5.7	-5.0
27-Nov	23h 46m 25.33s	+03° 39' 45.0"	23h 43m 40.89s	+03° 03' 04.6"	394035	113.4	1819.50	-10.9	0.700	66.5	3338	-5.7	-6.1	-5.7	-6.1	-6.5	-5.8
28-Nov	00h 32m 33.65s	+09° 00' 35.4"	00h 29m 52.41s	+08° 25' 26.4"	388857	125.0	1843.73	-11.3	0.788	54.9	3383	-6.1	-6.6	-6.1	-6.5	-7.0	-6.3
29-Nov	01h 21m 29.89s	+14° 07' 45.5"	01h 18m 57.36s	+13° 35' 45.3"	383260	137.0	1870.65	-11.6	0.866	42.9	3432	-6.2	-6.7	-6.2	-6.7	-7.0	-6.4
30-Nov	02h 14m 11.88s	+18° 43' 56.0"	02h 11m 56.22s	+18° 16' 21.0"	377674	149.3	1898.32	-11.9	0.930	30.6	3483	-5.8	-6.5	-5.8	-6.4	-6.5	-6.2
1-Dec	03h 11m 15.10s	+22° 27' 37.3"	03h 09m 27.38s	+22° 04' 54.4"	372554	162.0	1924.41	-12.3	0.976	17.9	3531	-5.1	-5.8	-5.1	-5.8	-5.6	-5.6
2-Dec	04h 12m 29.16s	+24° 55' 15.0"	04h 11m 21.90s	+24° 36' 33.7"	368324	174.4	1946.51	-12.6	0.998	5.6	3571	-4.0	-4.9	-4.0	-4.8	-4.3	-4.6
3-Dec	05h 16m 38.79s	+25° 46' 20.6"	05h 16m 21.96s	+25° 29' 26.2"	365319	170.3	1962.52	-12.5	0.993	9.6	3601	-2.7	-3.5	-2.7	-3.5	-2.8	-3.2
4-Dec	06h 21m 32.73s	+24° 50' 26.0"	06h 22m 09.09s	+24° 32' 15.0"	363732	157.0	1971.08	-12.1	0.961	22.9	3617	-1.3	-2.0	-1.2	-2.0	-1.4	-1.7
5-Dec	07h 24m 50.10s	+22° 11' 28.8"	07h 26m 13.97s	+21° 49' 16.7"	363592	143.4	1971.84	-11.8	0.902	36.5	3618	0.2	-0.3	0.2	-0.3	-0.1	0.1
6-Dec	08h 24m 54.60s	+18° 06' 21.3"	08h 26m 55.16s	+17° 38' 40.7"	364771	129.8	1965.47	-11.4	0.821	50.1	3606	1.6	1.4	1.6	1.4	1.3	2.0
7-Dec	09h 21m 17.24s	+12° 58' 51.1"	09h 23m 43.06s	+12° 25' 48.8"	367027	116.3	1953.39	-11.0	0.723	63.5	3584	2.9	3.0	2.9	3.1	2.5	3.8
8-Dec	10h 14m 24.10s	+07° 13' 38.3"	10h 17m 05.76s	+06° 36' 36.0"	370058	103.1	1937.39	-10.6	0.614	76.8	3555	3.9	4.4	3.9	4.4	3.5	5.3
9-Dec	11h 05m 11.72s	+01° 12' 53.5"	11h 08m 02.12s	+00° 33' 55.2"	373564	90.1	1919.20	-10.1	0.502	89.7	3521	4.8	5.5	4.8	5.5	4.4	6.4
10-Dec	11h 54m 46.99s	-04° 44' 27.4"	11h 57m 40.55s	-05° 23' 05.9"	377292	77.4	1900.24	-9.6	0.392	102.5	3487	5.4	6.3	5.4	6.3	5.0	7.2
11-Dec	12h 44m 14.76s	-10° 22' 03.8"	12h 47m 06.30s	-10° 58' 18.6"	381055	65.0	1881.48	-9.0	0.289	114.9	3452	5.8	6.7	5.8	6.7	5.4	7.5
12-Dec	13h 34m 29.71s	-15° 25' 12.2"	13h 37m 13.49s	-15° 57' 28.3"	384738	52.7	1863.47	-8.4	0.198	127.1	3419	5.9	6.7	6.0	6.7	5.5	7.5
13-Dec	14h 26m 08.97s	-19° 40' 10.7"	14h 28m 38.11s	-20° 07' 35.4"	388283	40.8	1846.45	-7.6	0.122	139.1	3388	5.9	6.4	5.9	6.4	5.5	7.0
14-Dec	15h 19m 24.25s	-22° 54' 33.7"	15h 21m 30.89s	-23° 17' 04.9"	391664	29.0	1830.51	-6.7	0.063	150.9	3359	5.6	5.7	5.6	5.8	5.2	6.3
15-Dec	16h 13m 56.14s	-24° 58' 20.6"	16h 15m 32.50s	-25° 16' 49.0"	394863	17.4	1815.68	-5.7	0.023	162.5	3331	5.0	4.8	5.0	4.8	4.7	5.2
16-Dec	17h 08m 55.79s	-25° 45' 38.3"	17h 09m 55.97s	-26° 01' 37.7"	397841	6.3	1802.09	-4.6	0.003	173.7	3306	4.3	3.7	4.3	3.7	4.1	4.0
17-Dec	18h 03m 17.95s	-25° 16' 02.1"	18h 03m 39.42s	-25° 31' 29.4"	400527	5.9	1790.01	-4.5	0.003	174.1	3284	3.3	2.4	3.3	2.4	3.3	2.7
18-Dec	18h 56m 01.32s	-23° 34' 41.5"	18h 55m 45.30s	-23° 51' 30.6"	402808	16.6	1779.87	-5.6	0.021	163.3	3266	2.2	1.0	2.2	1.0	2.1	1.3
19-Dec	19h 46m 26.42s	-20° 50' 55.7"	19h 45m 36.87s	-21° 10' 37.1"	404538	27.5	1772.26	-6.6	0.057	152.4	3252	0.9	-0.4	0.9	-0.4	0.7	-0.1
20-Dec	20h 34m 22.82s	-17° 16' 06.8"	20h 33m 04.84s	-17° 39' 36.0"	405545	38.4	1767.86	-7.4	0.109	141.5	3244	-0.5	-1.8	-0.5	-1.8	-0.9	-1.5
21-Dec	21h 20m 06.40s	-13° 01' 46.1"	21h 18m 24.93s	-13° 29' 22.4"	405657	49.2	1767.37	-8.2	0.174	130.7	3243	-1.9	-3.1	-1.9	-3.1	-2.4	-2.7
22-Dec	22h 04m 12.12s	-08° 18' 30.0"	22h 02m 11.25s	-08° 50' 00.1"	404724	59.9	1771.44	-8.8	0.251	119.9	3250	-3.3	-4.3	-3.3	-4.3	-3.9	-3.9
23-Dec	22h 47m 27.23s	-03° 15' 47.5"	22h 45m 10.09s	-03° 50' 31.0"	402641	70.8	1780.61	-9.3	0.337	109.1	3267	-4.6	-5.3	-4.6	-5.3	-5.3	-4.9
24-Dec	23h 30m 46.98s	+01° 57' 31.7"	23h 28m 15.99s	+01° 20' 37.7"	399378	81.8	1795.16	-9.8	0.430	98.1	3294	-5.7	-6.1	-5.7	-6.0	-6.5	-5.7
25-Dec	00h 15m 12.38s	+07° 12' 20.5"	00h 12m 29.76s	+06° 34' 38.1"	394993	93.0	1815.09	-10.2	0.528	86.8	3330	-6.6	-6.6	-6.6	-6.6	-7.5	-6.3
26-Dec	01h 01m 48.40s	+12° 17' 59.1"	00h 58m 57.03s	+11° 41' 04.6"	389655	104.6	1839.95	-10.6	0.627	75.3	3376	-7.1	-6.8	-7.1	-6.8	-8.0	-6.5
27-Dec	01h 51m 40.04s	+17° 00' 49.7"	01h 48m 44.58s	+16° 26' 25.0"	383650	116.5	1868.75	-11.0	0.724	63.4	3429	-7.3	-6.7	-7.3	-6.7	-8.1	-6.4
28-Dec	02h 45m 42.40s	+21° 03' 08.2"	02h 42m 50.68s	+20° 32' 43.2"	377372	128.9	1899.84	-11.4	0.814	51.0	3486	-7.0	-6.2	-7.0	-6.2	-7.8	-5.9
29-Dec	03h 44m 21.52s	+24° 03' 09.4"	03h 41m 45.48s	+23° 37' 32.4"	371304	141.7	1930.89	-11.7	0.893	38.2	3543	-6.2	-5.4	-6.2	-5.4	-6.9	-5.1
30-Dec	04h 47m 08.97s	+25° 37' 49.5"	04h 45m 03.66s	+25° 16' 32.9"	365968												



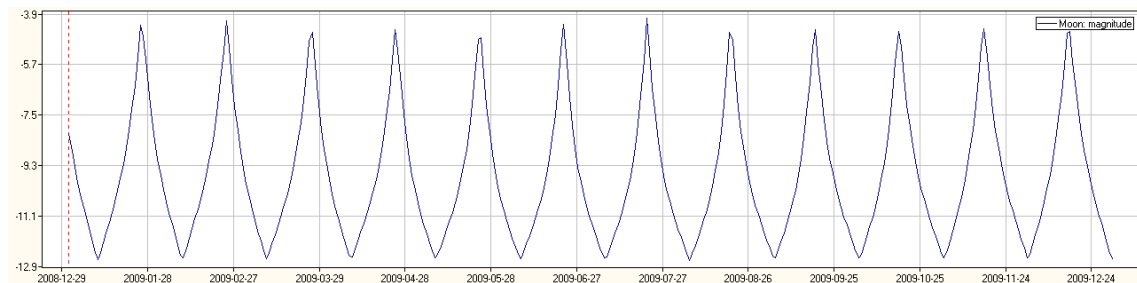
Geocentric distance of the Moon in km during the year



Topocentric distance of the Moon in km during the year



Geocentric diameter of the Moon in " during the year



Magnitude of the Moon during the year

PHYSICAL EPHEMERIDES OF THE MOON

Date	l	b	Axis	Coln	Lat	%ill	Date	l	b	Axis	Coln	Lat	%ill
	°	°	°	°	°			°	°	°	°	°	
Jan 1	-6.0	-2.3	341.0	325.1	-0.8	17	Apr 3	0.6	-2.1	6.4	4.7	1.4	54
3	-7.4	-4.8	337.8	349.5	-0.7	35	5	2.2	1.2	15.9	29.1	1.4	76
5	-7.4	-6.4	338.1	13.8	-0.7	55	7	3.6	4.1	21.4	53.4	1.5	92
7	-5.7	-6.7	343.4	38.1	-0.6	77	9	4.5	6.0	22.6	77.8	1.5	100
9	-2.4	-5.2	354.0	62.3	-0.6	93	11	4.5	6.6	19.4	102.1	1.5	98
11	1.5	-2.4	6.7	86.6	-0.5	100	13	3.4	5.8	12.2	126.4	1.5	88
13	4.9	1.0	16.5	110.8	-0.5	95	15	1.3	4.1	2.4	150.8	1.5	73
15	7.0	4.1	21.6	135.1	-0.4	81	17	-1.3	1.7	352.6	175.2	1.5	55
17	7.3	6.1	22.4	159.4	-0.3	61	19	-4.0	-1.1	344.6	199.6	1.5	36
19	6.1	6.8	19.1	183.7	-0.3	41	21	-5.7	-3.7	339.3	224.0	1.5	19
21	3.9	6.2	12.1	208.1	-0.2	23	23	-6.0	-5.7	337.3	248.4	1.5	6
23	1.3	4.6	2.6	232.4	-0.2	10	25	-4.7	-6.5	339.6	272.9	1.5	0
25	-1.4	2.2	352.7	256.8	-0.1	2	27	-2.3	-5.8	347.4	297.4	1.5	5
27	-3.8	-0.6	344.7	281.2	-0.1	0	29	0.4	-3.7	359.1	321.8	1.5	19
29	-5.6	-3.4	339.4	305.5	0.0	7	May 1	2.6	-0.6	10.5	346.3	1.5	40
31	-6.5	-5.6	337.4	329.9	0.0	20	3	4.0	2.6	18.5	10.7	1.5	63
Feb 2	-6.3	-6.8	339.4	354.2	0.1	39	5	4.7	5.1	22.3	35.1	1.5	82
4	-4.9	-6.4	346.4	18.6	0.2	62	7	4.8	6.4	22.0	59.4	1.5	95
6	-2.4	-4.5	357.8	42.9	0.2	82	9	4.2	6.4	17.5	83.8	1.5	100
8	0.9	-1.4	9.8	67.1	0.3	96	11	2.6	5.2	9.1	108.2	1.5	97
10	3.9	2.0	18.4	91.4	0.3	100	13	0.3	3.1	359.0	132.5	1.5	87
12	6.0	4.9	22.3	115.7	0.4	92	15	-2.4	0.5	349.6	156.9	1.4	71
14	6.6	6.5	21.8	140.0	0.4	77	17	-5.0	-2.2	342.5	181.3	1.4	53
16	5.6	6.7	17.1	164.3	0.5	59	19	-6.7	-4.7	338.3	205.8	1.4	33
18	3.4	5.7	8.9	188.6	0.6	40	21	-6.9	-6.3	337.4	230.2	1.4	16
20	0.7	3.7	359.0	213.0	0.6	22	23	-5.2	-6.5	341.3	254.7	1.3	3
22	-2.0	1.2	349.6	237.3	0.7	9	25	-2.2	-5.2	350.7	279.2	1.3	0
24	-4.2	-1.7	342.5	261.7	0.7	1	27	1.2	-2.5	3.2	303.7	1.3	9
26	-5.4	-4.3	338.2	286.1	0.8	1	29	4.0	0.8	14.0	328.2	1.3	27
28	-5.5	-6.2	337.6	310.5	0.8	9	31	5.7	3.9	20.5	352.6	1.2	49
Mar 2	-4.7	-6.7	341.4	334.9	0.9	25	Jun 2	6.2	6.0	22.8	17.0	1.2	70
4	-3.3	-5.8	350.2	359.3	0.9	46	4	5.7	6.7	20.9	41.4	1.2	87
6	-1.3	-3.4	2.0	23.6	0.9	69	6	4.4	6.1	14.8	65.8	1.1	97
8	1.0	-0.2	12.9	47.9	1.0	88	8	2.4	4.4	5.6	90.2	1.1	100
10	3.3	3.0	20.0	72.2	1.0	98	10	-0.2	2.0	355.5	114.6	1.0	96
12	5.0	5.5	22.6	96.5	1.1	99	12	-3.0	-0.7	346.9	139.0	1.0	85
14	5.5	6.6	20.8	120.8	1.1	90	14	-5.6	-3.3	340.7	163.4	1.0	69
16	4.6	6.4	14.8	145.1	1.2	75	16	-7.4	-5.5	337.5	187.9	0.9	49
18	2.5	5.0	5.7	169.5	1.2	57	18	-7.6	-6.7	338.0	212.3	0.9	29
20	-0.2	2.8	355.7	193.9	1.2	38	20	-5.9	-6.4	343.4	236.8	0.8	11
22	-2.9	0.1	346.9	218.2	1.3	21	22	-2.8	-4.5	354.1	261.3	0.8	1
24	-4.8	-2.7	340.7	242.6	1.3	8	24	1.1	-1.4	6.8	285.8	0.7	2
26	-5.5	-5.1	337.5	267.1	1.3	1	26	4.5	2.1	16.6	310.3	0.7	15
28	-4.8	-6.4	338.4	291.5	1.3	2	28	6.7	4.9	21.8	334.8	0.7	34
30	-3.2	-6.4	344.2	315.9	1.4	13	30	7.3	6.5	22.6	359.2	0.6	56
Apr 1	-1.3	-4.8	354.6	340.3	1.4	32	Jul 2	6.6	6.7	19.0	23.7	0.6	75

Legenda:

l = libration in longitude, in °
b = libration in latitude, in °
axis = angle of position from the lunar north pole, in °
coln = solar colongitude, alias longitude of the lunar limb, in °
lat = latitude of the Sun, referred to the lunar equator, in °
ill = lunar lightning

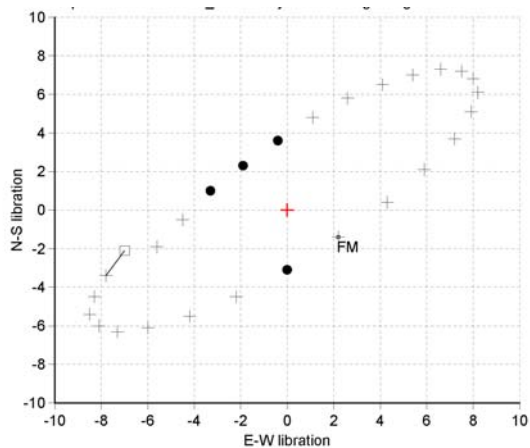
Date		l	b	Axis	Coln	Lat	%ill	Date		l	b	Axis	Coln	Lat	%ill
		°	°	°	°	°				°	°	°	°	°	
Jul	1	7.1	6.8	21.3	11.5	0.6	66	Oct	1	-2.7	-3.6	340.8	55.0	-1.5	90
	3	5.9	6.3	15.7	35.9	0.5	83		3	-4.2	-5.6	337.4	79.4	-1.5	98
	5	3.8	4.6	6.8	60.3	0.5	95		5	-4.7	-6.5	337.7	103.7	-1.5	99
	7	1.1	2.3	356.7	84.7	0.4	100		7	-4.2	-6.1	342.7	128.0	-1.5	92
	9	-1.7	-0.4	347.8	109.1	0.4	98		9	-3.1	-4.4	352.3	152.3	-1.5	76
	11	-4.5	-3.1	341.3	133.5	0.3	89		11	-1.6	-1.5	4.1	176.7	-1.5	54
	13	-6.6	-5.4	337.7	157.9	0.3	74		13	0.2	1.7	14.4	201.1	-1.5	32
	15	-7.6	-6.7	337.6	182.3	0.2	54		15	2.2	4.6	20.9	225.5	-1.5	13
	17	-7.2	-6.6	341.9	206.8	0.2	33		17	4.2	6.2	22.9	249.9	-1.5	2
	19	-5.0	-5.0	351.4	231.3	0.1	14		19	5.4	6.4	20.2	274.3	-1.5	1
	21	-1.6	-2.0	4.0	255.8	0.1	2		21	5.4	5.3	12.9	298.8	-1.5	9
	23	2.3	1.5	14.8	280.3	0.0	1		23	3.9	3.2	2.8	323.2	-1.5	23
	25	5.6	4.5	21.2	304.8	-0.1	12		25	1.4	0.5	352.9	347.5	-1.5	40
	27	7.4	6.4	22.8	329.3	-0.1	30		27	-1.4	-2.2	344.8	11.9	-1.5	59
	29	7.5	6.8	19.8	353.7	-0.2	51		29	-3.8	-4.5	339.4	36.2	-1.5	77
	31	6.2	5.8	12.7	18.1	-0.2	70		31	-5.1	-6.1	337.1	60.5	-1.5	91
Aug	2	3.9	3.8	3.0	42.6	-0.3	86	Nov	2	-5.1	-6.5	338.8	84.8	-1.5	99
	4	1.1	1.2	353.1	66.9	-0.3	96		4	-3.8	-5.5	345.5	109.1	-1.5	98
	6	-1.7	-1.5	345.0	91.3	-0.4	100		6	-1.8	-3.2	356.6	133.4	-1.4	87
	8	-4.1	-4.1	339.6	115.7	-0.4	96		8	0.3	0.0	8.4	157.7	-1.4	69
	10	-5.9	-6.0	337.2	140.1	-0.5	86		10	2.1	3.1	17.4	182.1	-1.4	46
	12	-6.7	-6.8	338.5	164.5	-0.5	69		12	3.7	5.5	22.2	206.4	-1.4	25
	14	-6.4	-6.2	344.6	188.9	-0.6	48		14	4.8	6.6	22.6	230.8	-1.4	9
	16	-4.8	-4.1	355.2	213.4	-0.6	26		16	5.3	6.2	18.3	255.2	-1.3	1
	18	-1.9	-0.9	7.4	237.9	-0.7	9		18	4.7	4.5	9.8	279.6	-1.3	2
	20	1.6	2.5	17.1	262.4	-0.7	0		20	3.0	2.1	359.4	304.0	-1.3	10
	22	4.9	5.2	22.2	286.8	-0.8	4		22	0.4	-0.6	349.9	328.3	-1.2	24
	24	6.9	6.6	22.4	311.3	-0.8	17		24	-2.5	-3.3	342.7	352.7	-1.2	41
	26	7.2	6.5	17.8	335.8	-0.9	35		26	-4.9	-5.4	338.2	17.0	-1.2	60
	28	5.9	5.1	9.5	0.2	-0.9	55		28	-6.2	-6.6	337.0	41.3	-1.1	79
	30	3.5	2.8	359.4	24.6	-1.0	73		30	-6.0	-6.4	340.2	65.6	-1.1	93
Sep	1	0.7	0.1	349.9	49.0	-1.0	88	Dec	2	-4.2	-4.9	348.5	89.9	-1.1	100
	3	-1.9	-2.6	342.7	73.4	-1.0	97		4	-1.4	-2.0	0.6	114.1	-1.0	96
	5	-3.9	-4.9	338.3	97.7	-1.1	100		6	1.5	1.3	12.1	138.4	-1.0	82
	7	-5.1	-6.4	337.2	122.1	-1.1	95		8	3.9	4.4	19.7	162.7	-0.9	61
	9	-5.4	-6.6	340.3	146.5	-1.2	81		10	5.4	6.3	22.9	187.0	-0.9	39
	11	-4.9	-5.4	348.1	170.8	-1.2	62		12	5.9	6.7	21.6	211.4	-0.8	20
	13	-3.5	-2.9	359.6	195.2	-1.2	40		14	5.6	5.7	15.7	235.7	-0.8	6
	15	-1.3	0.3	10.9	219.7	-1.3	19		16	4.4	3.7	6.3	260.1	-0.7	0
	17	1.5	3.5	19.1	244.1	-1.3	4		18	2.3	1.0	355.9	284.5	-0.7	2
	19	4.2	5.8	22.8	268.6	-1.3	0		20	-0.4	-1.7	347.1	308.8	-0.6	11
	21	6.0	6.6	21.5	293.1	-1.3	6		22	-3.2	-4.2	340.8	333.2	-0.6	25
	23	6.3	6.0	15.5	317.5	-1.4	20		24	-5.6	-6.0	337.4	357.5	-0.5	43
	25	5.0	4.2	6.2	341.9	-1.4	38		26	-7.1	-6.8	337.4	21.8	-0.5	63
	27	2.6	1.7	356.0	6.3	-1.4	58		28	-7.0	-6.2	342.0	46.1	-0.4	81
Sep	29	-0.2	-1.1	347.2	30.7	-1.4	75	Dec	30	-5.1	-4.1	351.6	70.4	-0.4	95

Legenda:

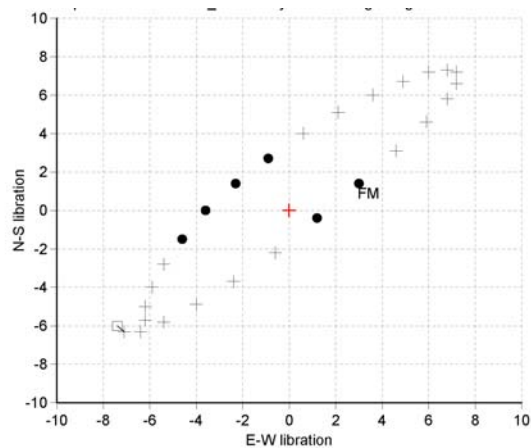
l = libration in longitude, in °
b = libration in latitude, in °
axis = angle of position from the lunar north pole, in °
coln = solar colongitude, alias longitude of the lunar limb, in °
lat = latitude of the Sun, referred to the lunar equator, in °
ill = lunar lightning

LUNAR LIBRATIONS

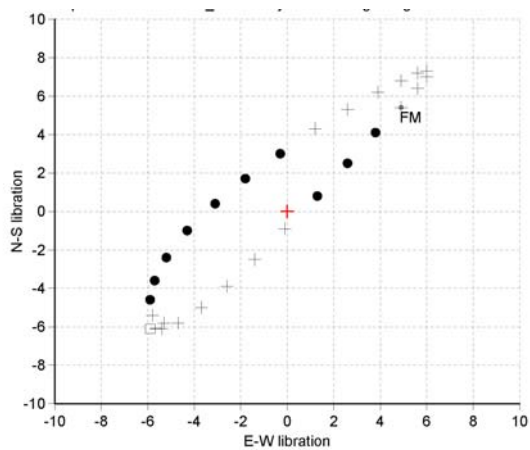
January



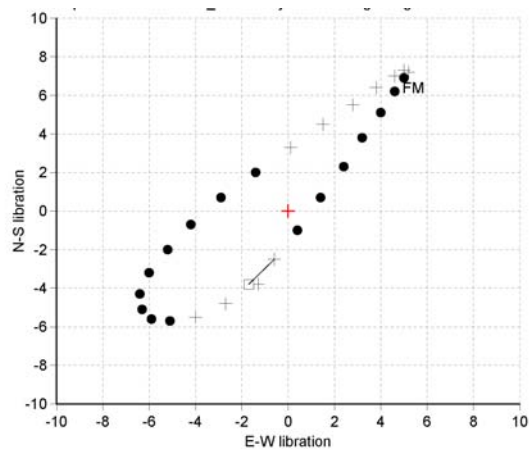
February



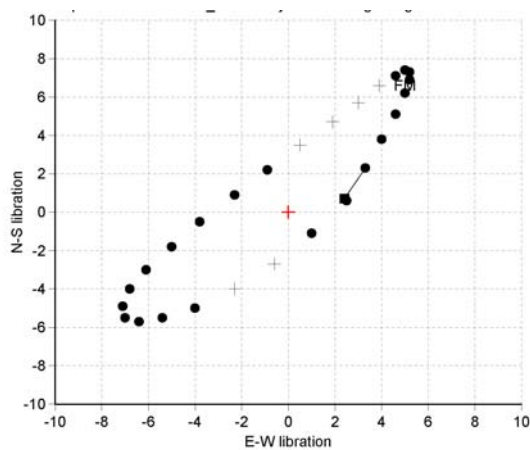
March



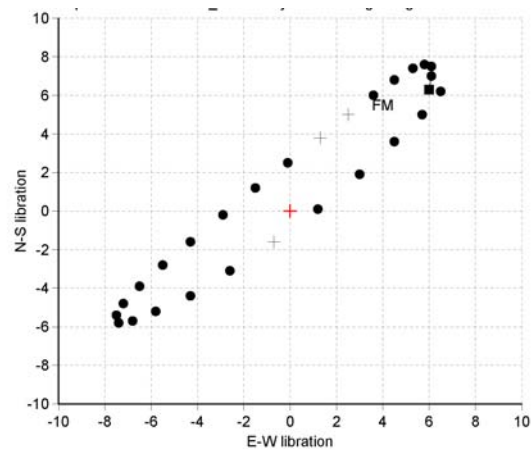
April



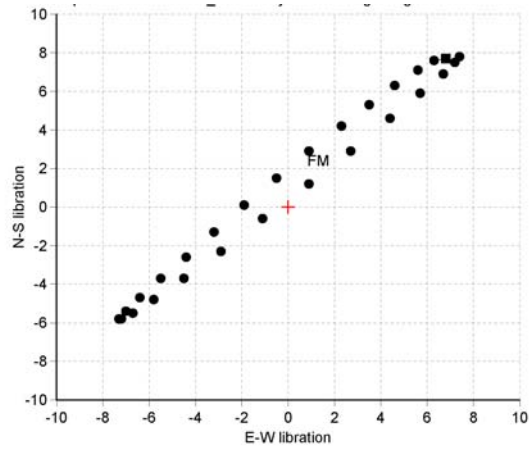
May



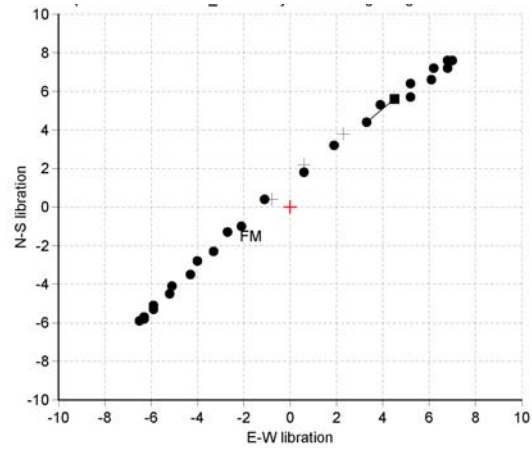
June



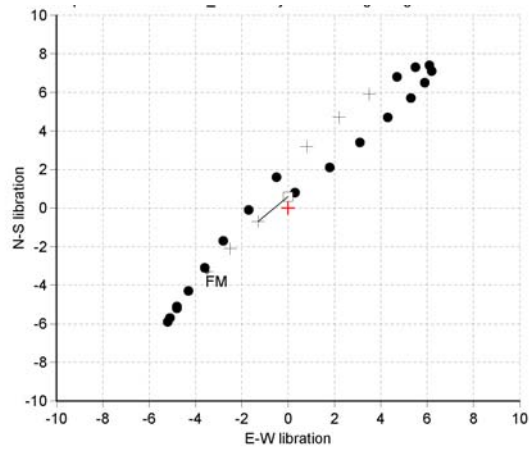
July



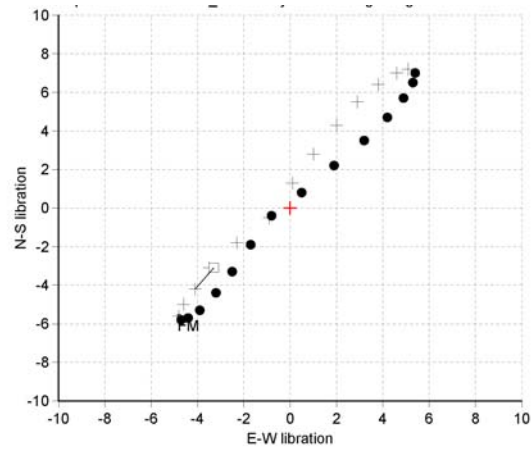
August



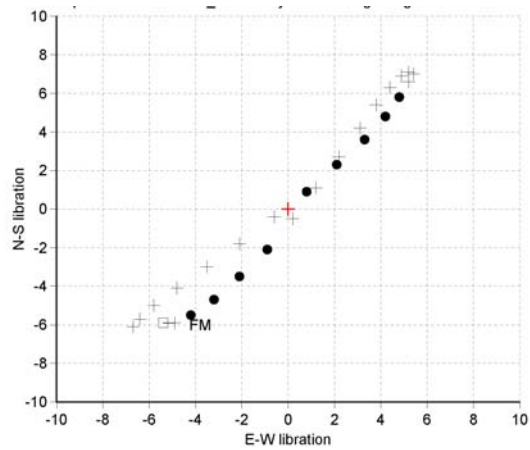
September



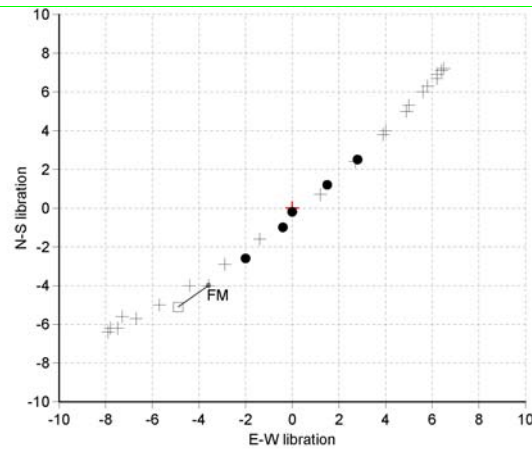
October



November



December



A little square shows the beginning of the month, a circle means that the librated side is visible, while a cross means that the librated side is in shade.

LUNAR PHENOMENA

Perigea					Apogea				
Jan 10	10:53	357497 km	F-	16h	Jan 23	0:12	406118 km	N-3d	7h
Feb 7	20:09	361488 km	F-1d	18h	Feb 19	17:01	405129 km	N-5d	8h
Mar 7	15:08	367017 km	F-3d	11h	Mar 19	13:17	404299 km	N-7d	2h
Apr 2	2:32	370013 km	N+6d	10h	Apr 16	9:17	404231 km	F+6d	18h
Apr 28	6:28	366039 km	N+3d	3h	May 14	2:58	404915 km	F+4d	22h
May 26	3:45	361153 km	N+1d	15h	Jun 10	16:05	405787 km	F+2d	21h
Jun 23	10:40	358014 km	N+	15h	Jul 7	21:40	406232 km	F+	12h
Jul 21	20:17	357463 km	N-	6h	Aug 4	0:43	406028 km	F-2d	0h
Aug 19	4:54	359639 km	N-1d	5h	Aug 31	11:05	405269 km	F-4d	4h
Sep 16	7:57	364053 km	N-2d	10h	Sep 28	3:34	404431 km	F-6d	2h
Oct 13	12:29	369067 km	N-4d	17h	Oct 25	23:19	404166 km	N+7d	17h
Nov 7	7:31	368903 km	F+4d	12h	Nov 22	20:08	404733 km	N+6d	0h
Dec 4	14:13	363479 km	F+2d	6h	Dec 20	14:55	405731 km	N+4d	2h

All the scheduled times are in U.T., the distances are calculated from the center of the Moon to the center of the Earth; F means that the phenomenon happens in proximity of the full moon, N that happens in proximity of the new moon, "-" or "+" shows how many days and hour the lunar phase precedes or follows the perigeum or the apogeuem.

Cross the node	12/01/2009	08.34
Cross the node	26/01/2009	13.27
Cross the node	08/02/2009	19.47
Cross the node	22/02/2009	20.30
Cross the node	08/03/2009	04.06
Cross the node	22/03/2009	02.11
Cross the node	04/04/2009	07.22
Cross the node	18/04/2009	05.18
Cross the node	01/05/2009	07.50
Cross the node	15/05/2009	07.11
Cross the node	28/05/2009	10.20
Cross the node	11/06/2009	10.15
Cross the node	24/06/2009	17.24
Cross the node	08/07/2009	15.24
Cross the node	22/07/2009	03.48
Cross the node	04/08/2009	21.40
Cross the node	18/08/2009	14.07
Cross the node	01/09/2009	03.17
Cross the node	14/09/2009	20.56
Cross the node	28/09/2009	06.53
Cross the node	11/10/2009	23.01
Cross the node	25/10/2009	08.51
Cross the node	07/11/2009	23.24
Cross the node	21/11/2009	11.33
Cross the node	05/12/2009	03.17
Cross the node	18/12/2009	16.41

Maxima libration	04/01/2009	01.28	-7.7	°
Maxima libration	16/01/2009	10.02	+7.4	°
Maxima libration	31/01/2009	18.46	-6.6	°
Maxima libration	13/02/2009	18.10	+6.5	°
Maxima libration	27/02/2009	09.46	-5.5	°
Maxima libration	13/03/2009	17.27	+5.3	°
Maxima libration	25/03/2009	23.21	-5.4	°
Maxima libration	10/04/2009	00.14	+4.6	°
Maxima libration	22/04/2009	08.47	-6.2	°
Maxima libration	06/05/2009	07.33	+5.0	°
Maxima libration	20/05/2009	05.26	-7.1	°
Maxima libration	02/06/2009	02.28	+6.2	°
Maxima libration	17/06/2009	07.29	-7.6	°
Maxima libration	29/06/2009	22.19	+7.2	°
Maxima libration	15/07/2009	11.00	-7.5	°
Maxima libration	28/07/2009	02.08	+7.6	°
Maxima libration	12/08/2009	09.38	-6.7	°
Maxima libration	25/08/2009	06.33	+7.3	°
Maxima libration	08/09/2009	15.33	-5.5	°

Maxima libration	22/09/2009	06.58	+6.5	°
Maxima libration	04/10/2009	22.38	-4.7	°
Maxima libration	19/10/2009	22.50	+5.6	°
Maxima libration	15/11/2009	21.37	+5.2	°
Maxima libration	28/11/2009	15.34	-6.2	°
Maxima libration	12/12/2009	04.11	+6.0	°
Maxima libration	26/12/2009	20.03	-7.2	°

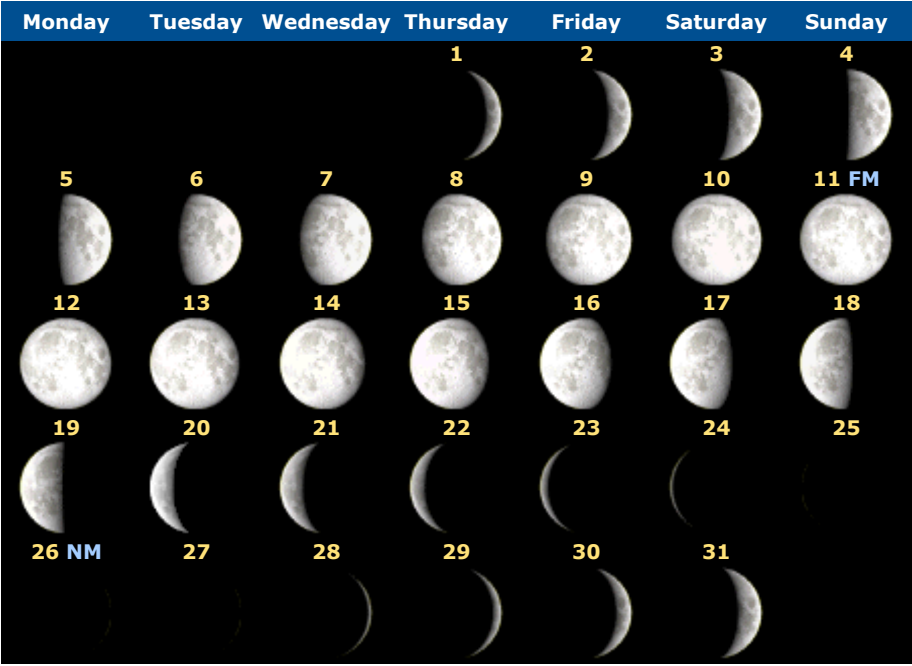
© (5)

LUNAR PHASES

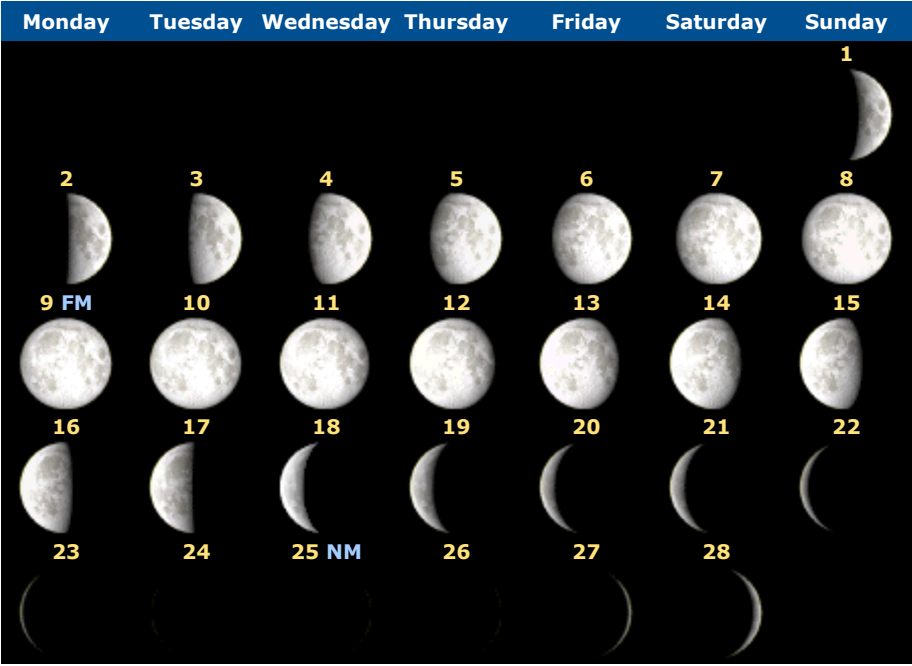
Lunation	New moon		First quarter		Full moon		Last quarter	
1064			Jan 04	11h57m	Jan 11	03h28m	Jan 18	02h47m
1065	Jan 26	07h56m	Feb 02	23h14m	Feb 09	14h50m	Feb 16	21h38m
1066	Feb 25	01h36m	Mar 04	07h47m	Mar 11	02h39m	Mar 18	17h48m
1067	Mar 26	16h07m	Apr 02	14h35m	Apr 09	14h57m	Apr 17	13h37m
1068	Apr 25	03h24m	May 01	20h45m	May 09	04h02m	May 17	07h27m
1069	May 24	12h12m	May 31	03h23m	Jun 07	18h13m	Jun 15	22h16m
1070	Jun 22	19h36m	Jun 29	11h30m	Jul 07	09h23m	Jul 15	09h54m
1071	Jul 22	02h36m	Jul 28	22h01m	Aug 06	00h56m	Aug 13	18h56m
1072	Aug 20	10h03m	Aug 27	11h43m	Sep 04	16h04m	Sep 12	02h17m
1073	Sep 18	18h45m	Sep 26	04h51m	Oct 04	06h11m	Oct 11	08h57m
1074	Oct 18	05h34m	Oct 26	00h43m	Nov 02	19h15m	Nov 09	15h57m
1075	Nov 16	19h15m	Nov 24	21h40m	Dec 02	07h32m	Dec 09	00h14m
1076	Dec 16	12h03m	Dec 24	17h37m	Dec 31	19h14m		

Times in TDT

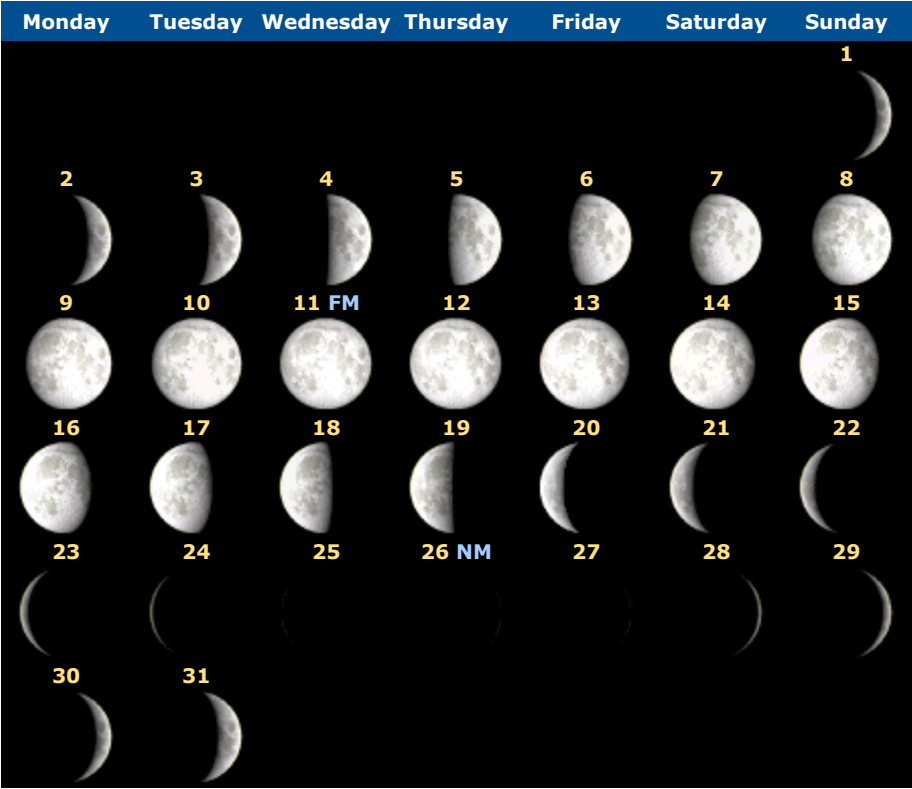




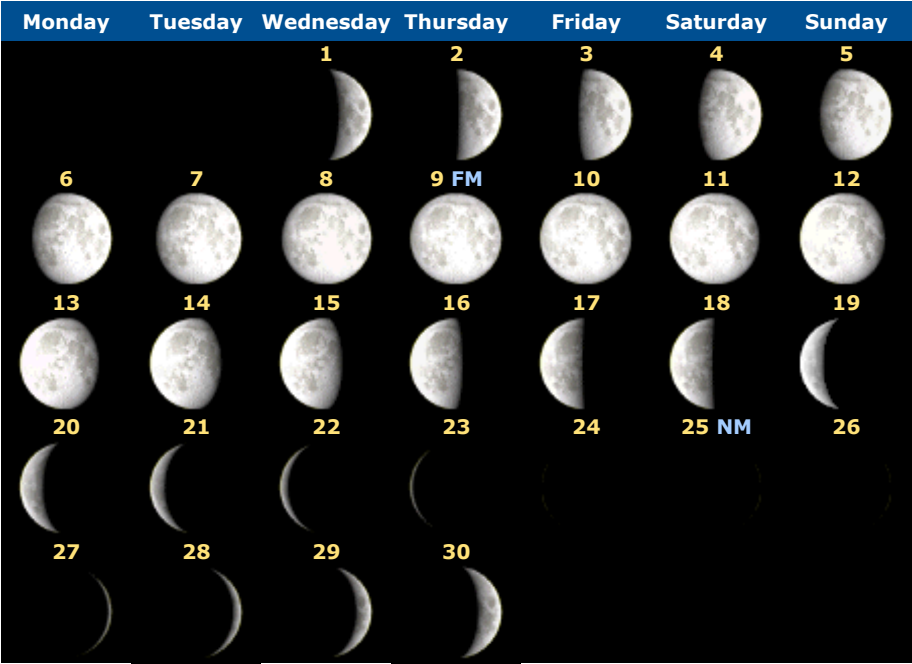
January



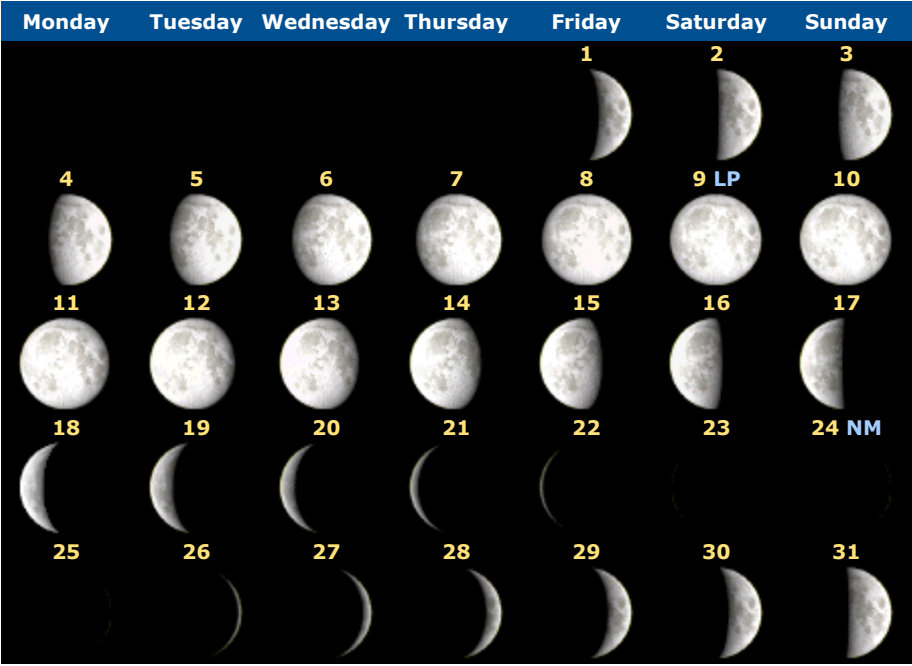
February



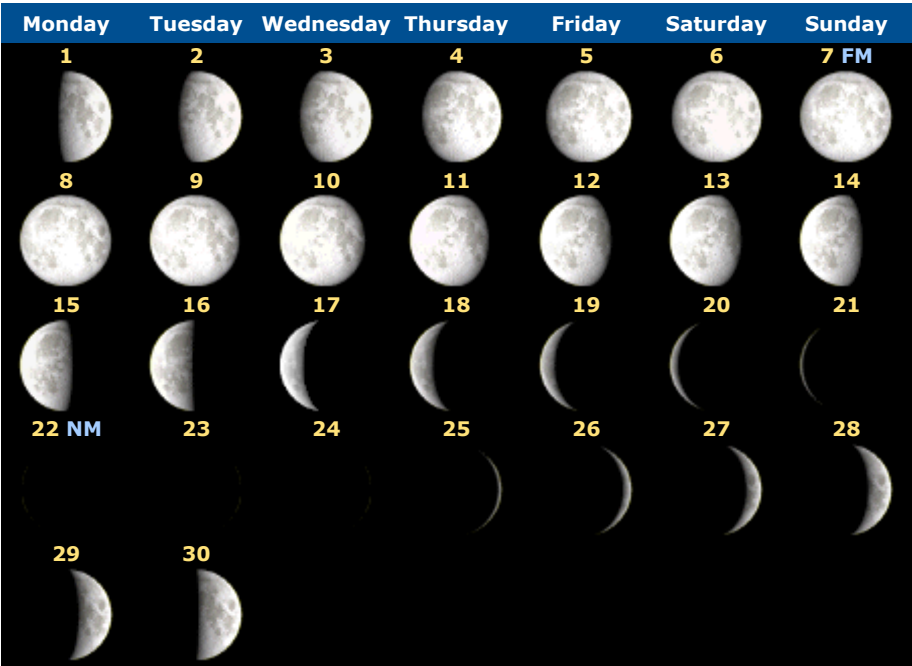
March



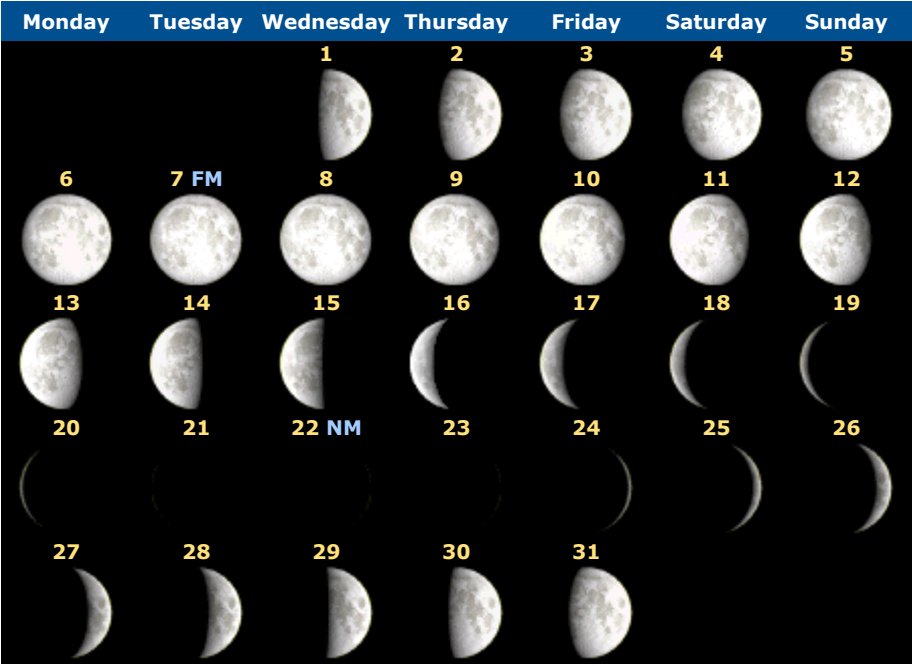
April



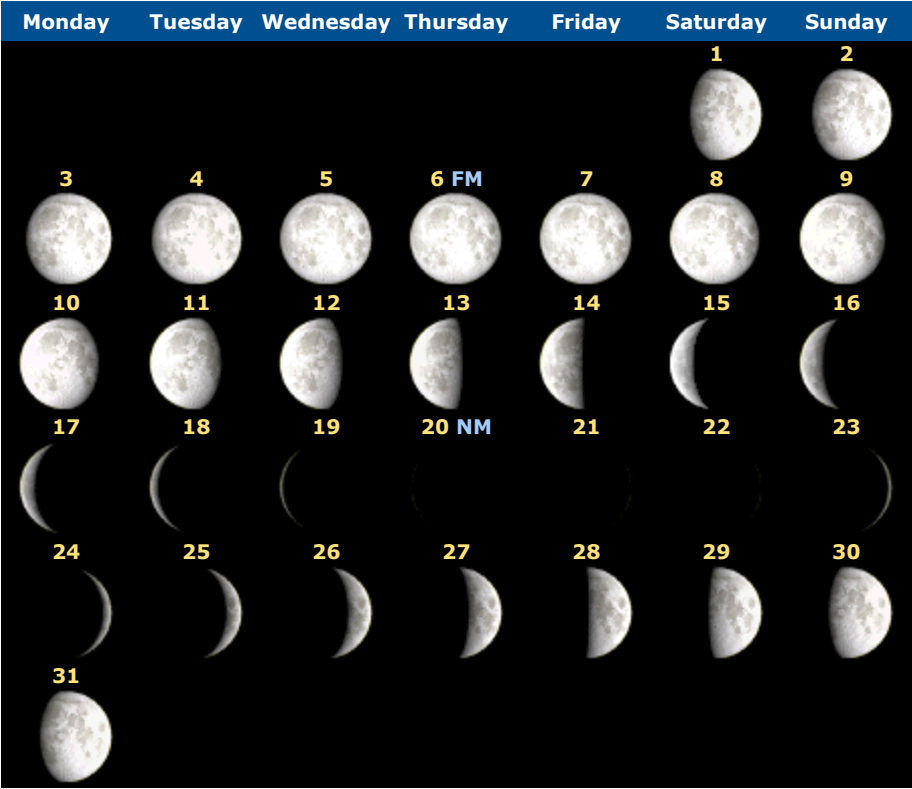
May



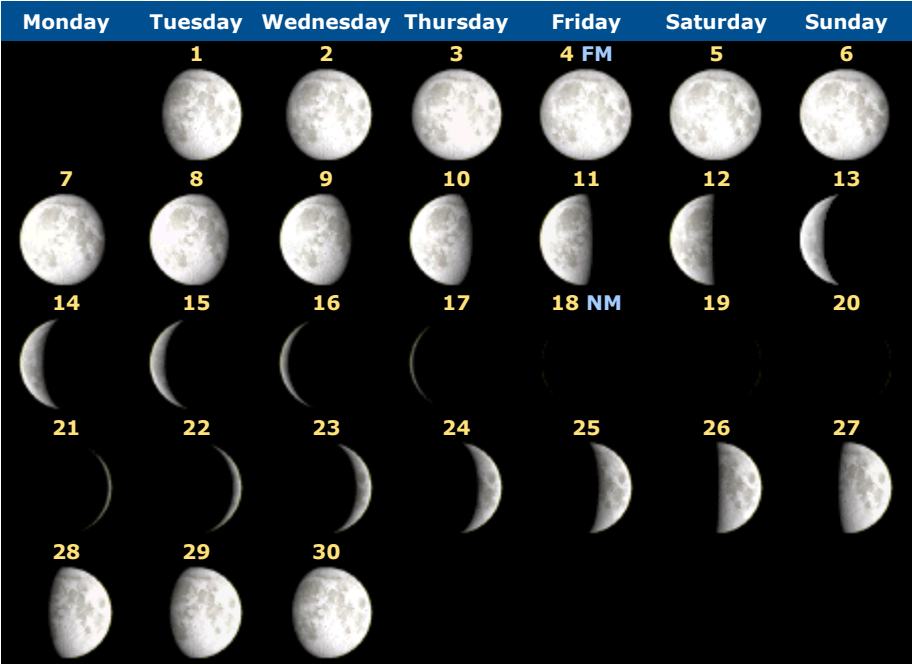
June



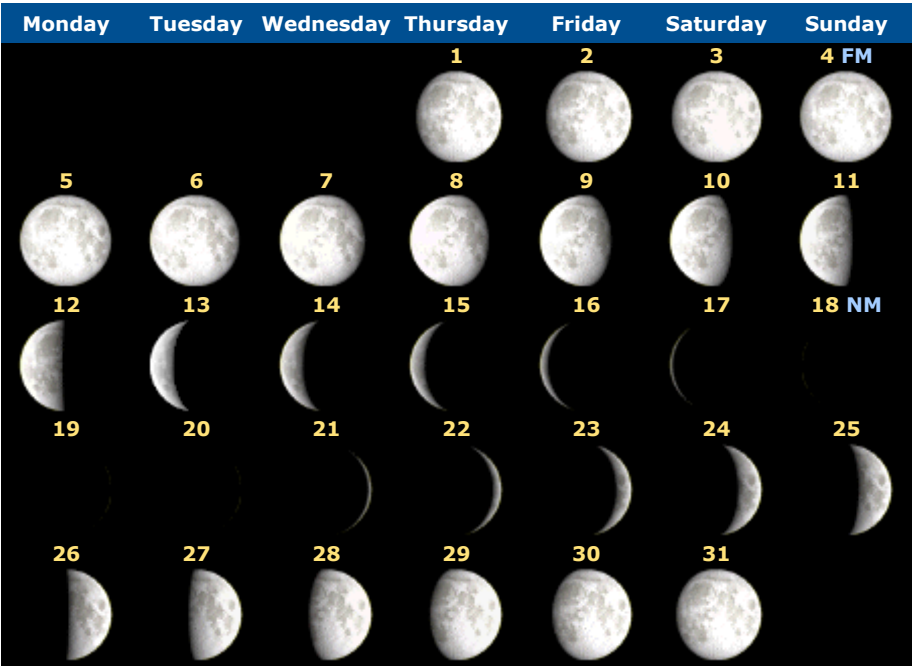
July



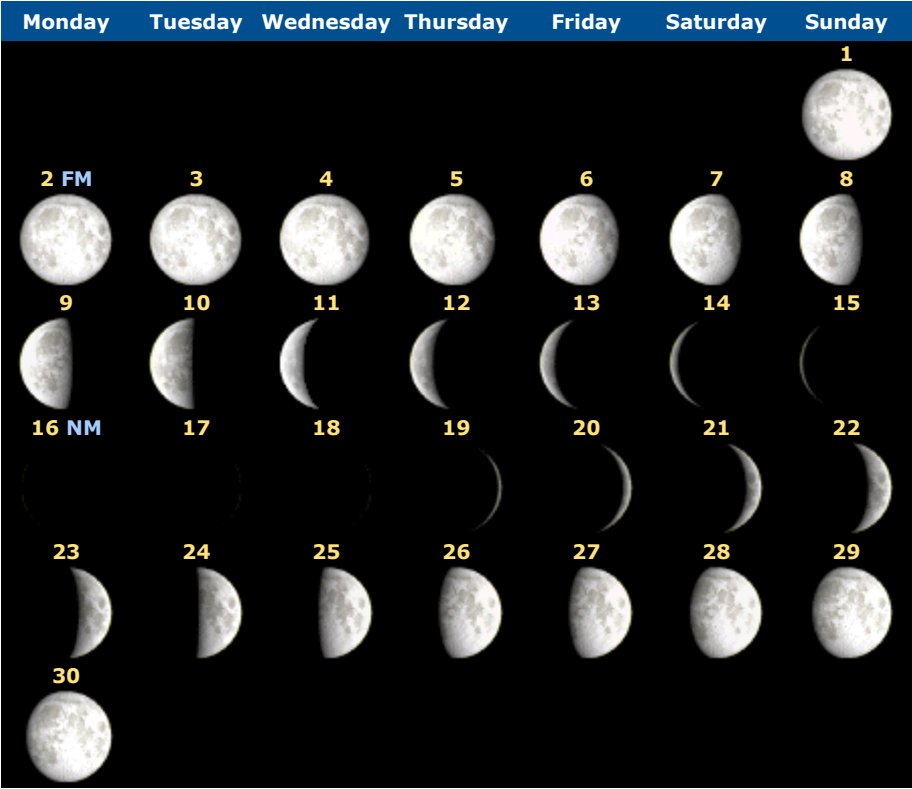
August



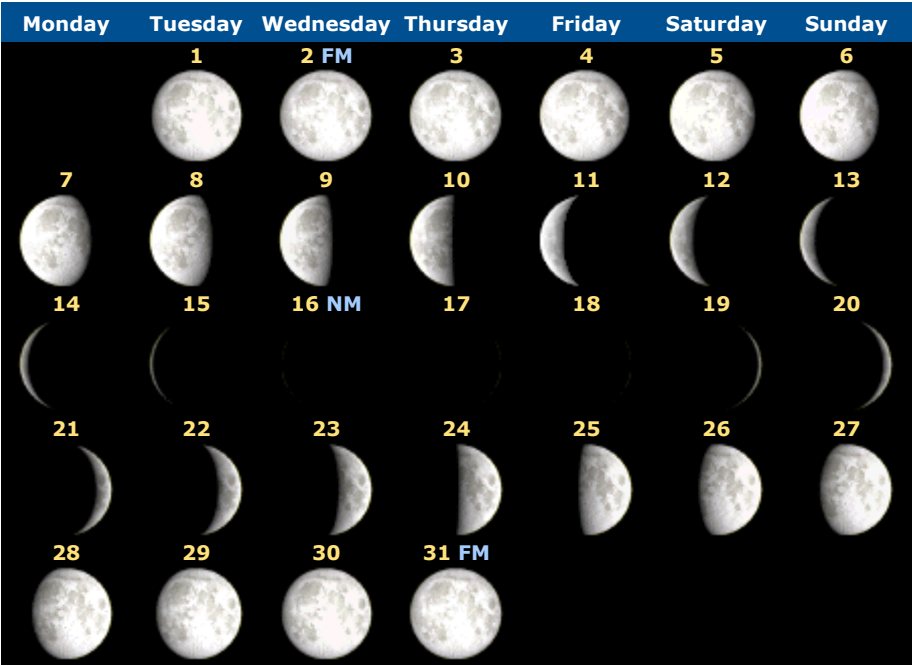
September



October



November



December

RISING AND SETTING OF THE MOON

At Greenwich meridian

```
Rome  Longitude  E  12°
      Latitude   N  42°
      Time zone  UT +1
```

Date				Transit		TDT		Rise (Az _m)		Trans (Alt)		Set (Az _m)	
				JD		h	m	s	h	m	h	m	h	m
	Year	Month	Day	JD	h	m	s	h	m	h	m	h	m
2009	Jan	1	2454833.158821	15	48	42.2		10	19 (101)	15	59 (42)	21	50 (263)
2009	Jan	2	2454834.188078	16	30	49.9		10	39 (93)	16	41 (47)	22	54 (271)
2009	Jan	3	2454835.218053	17	13	59.8		11	00 (85)	17	25 (53)	f 0	01 (279)
2009	Jan	4	2454836.249676	17	59	32.0		11	23 (77)	18	10 (59)	f 1	10 (287)
2009	Jan	5	2454837.283924	18	48	51.1		11	49 (69)	18	59 (65)	f 2	23 (295)
2009	Jan	6	2454838.321668	19	43	12.1		12	20 (62)	19	53 (70)	f 3	40 (301)
2009	Jan	7	2454839.363308	20	43	09.8		12	59 (57)	20	53 (73)	f 4	56 (306)
2009	Jan	8	2454840.408260	21	47	53.7		13	51 (53)	21	58 (75)	f 6	08 (308)
2009	Jan	9	2454841.454698	22	54	45.9		14	55 (53)	23	05 (75)	f 7	09 (306)
2009	Jan	11	2454842.500151	0	00	13.1		p16	11 (55)	0	10 (72)	f 7	58 (301)
2009	Jan	12	2454843.542687	1	01	28.1		p17	33 (61)	1	11 (68)	8	36 (295)
2009	Jan	13	2454844.581599	1	57	30.2		p18	54 (69)	2	08 (62)	9	07 (287)
2009	Jan	14	2454845.617213	2	48	47.2		p20	11 (77)	2	59 (56)	9	33 (278)
2009	Jan	15	2454846.650368	3	36	31.8		p21	25 (86)	3	47 (49)	9	57 (269)
2009	Jan	16	2454847.682030	4	22	07.4		p22	35 (95)	4	33 (43)	10	19 (261)
2009	Jan	17	2454848.713112	5	06	52.8		p23	43 (103)	5	17 (37)	10	42 (254)
2009	Jan	18	2454849.744388	5	51	55.1		0	50 (111)	6	02 (32)	11	07 (247)
2009	Jan	19	2454850.776446	6	38	05.0		1	55 (117)	6	49 (28)	11	35 (241)
2009	Jan	20	2454851.809620	7	25	51.1		2	59 (122)	7	36 (24)	12	08 (236)
2009	Jan	21	2454852.843916	8	15	14.4		4	00 (126)	8	26 (22)	12	48 (233)
2009	Jan	22	2454853.878991	9	05	44.8		4	57 (128)	9	16 (21)	13	35 (232)
2009	Jan	23	2454854.914215	9	56	28.2		5	47 (128)	10	07 (21)	14	28 (233)
2009	Jan	24	2454855.948875	10	46	22.8		6	30 (125)	10	57 (23)	15	28 (236)
2009	Jan	25	2454856.982398	11	34	39.2		7	06 (122)	11	45 (26)	16	30 (240)
2009	Jan	26	2454858.014518	12	20	54.4		7	36 (116)	12	31 (30)	17	35 (246)
2009	Jan	27	2454859.045303	13	05	14.1		8	01 (110)	13	16 (34)	18	39 (253)
2009	Jan	28	2454860.075101	13	48	08.7		8	24 (103)	13	59 (40)	19	43 (261)
2009	Jan	29	2454861.104467	14	30	26.0		8	45 (95)	14	41 (46)	20	47 (269)
2009	Jan	30	2454862.134097	15	13	06.0		9	06 (87)	15	24 (52)	21	53 (277)
2009	Jan	31	2454863.164791	15	57	18.0		9	28 (80)	16	08 (57)	23	00 (285)
2009	Feb	1	2454864.197406	16	44	15.9		9	52 (72)	16	55 (63)	f 0	10 (292)
2009	Feb	2	2454865.232763	17	35	10.7		10	20 (65)	17	45 (68)	f 1	23 (299)
2009	Feb	3	2454866.271429	18	30	51.4		10	55 (59)	18	41 (72)	f 2	38 (304)
2009	Feb	4	2454867.313359	19	31	14.2		11	39 (54)	19	41 (74)	f 3	49 (307)
2009	Feb	5	2454868.357566	20	34	53.7		12	35 (52)	20	45 (75)	f 4	53 (307)
2009	Feb	6	2454869.402213	21	39	11.2		13	44 (54)	21	49 (74)	f 5	46 (304)
2009	Feb	7	2454870.445352	22	41	18.4		15	01 (58)	22	51 (70)	f 6	29 (298)
2009	Feb	8	2454871.485754	23	39	29.2		16	22 (64)	23	50 (65)	f 7	03 (291)
2009	Feb	10	2454872.523171	0	33	21.9		p17	42 (73)	0	44 (59)	7	31 (283)
2009	Feb	11	2454873.558062	1	23	36.6		p18	58 (81)	1	34 (53)	7	56 (274)
2009	Feb	12	2454874.591213	2	11	20.8		p20	12 (91)	2	22 (46)	8	20 (265)
2009	Feb	13	2454875.623466	2	57	47.5		p21	23 (99)	3	08 (40)	8	43 (257)
2009	Feb	14	2454876.655586	3	44	02.6		p22	32 (107)	3	55 (34)	9	08 (250)
2009	Feb	15	2454877.688177	4	30	58.5		p23	40 (114)	4	41 (29)	9	35 (243)
2009	Feb	16	2454878.721622	5	19	08.1		0	46 (120)	5	30 (25)	10	07 (238)
2009	Feb	17	2454879.756010	6	08	39.3		1	50 (125)	6	19 (23)	10	45 (234)
2009	Feb	18	2454880.791114	6	59	12.3		2	49 (127)	7	10 (21)	11	29 (232)
2009	Feb	19	2454881.826431	7	50	03.7		3	42 (128)	8	00 (21)	12	20 (232)
2009	Feb	20	2454882.861337	8	40	19.5		4	27 (126)	8	51 (22)	13	18 (235)
2009	Feb	21	2454883.895286	9	29	12.7		5	05 (123)	9	40 (25)	14	19 (239)
2009	Feb	22	2454884.927975	10	16	17.1		5	37 (118)	10	27 (28)	15	23 (244)
2009	Feb	23	2454885.959400	11	01	32.2		6	05 (112)	11	12 (33)	16	28 (250)
2009	Feb	24	2454886.989826	11	45	20.9		6	29 (106)	11	56 (38)	17	32 (258)
2009	Feb	25	2454888.019722	12	28	23.9		6	51 (98)	12	39 (44)	18	38 (266)
2009	Feb	26	2454889.049702	13	11	34.2		7	12 (90)	13	22 (50)	19	44 (274)
2009	Feb	27	2454890.080476	13	55	53.1		7	34 (82)	14	06 (56)	20	51 (282)
2009	Feb	28	2454891.112802	14	42	26.1		7	57 (74)	14	53 (61)	22	01 (290)
2009	Mar	1	2454892.147404	15	32	15.7		8	24 (67)	15	43 (67)	23	14 (297)
2009	Mar	2	2454893.184800	16	26	06.7		8	57 (60)	16	36 (71)	f 0	27 (303)
2009	Mar	3	2454894.225043	17	24	03.8		9	37 (56)	17	34 (74)	f 1	38 (306)
2009	Mar	4	2454895.267452	18	25	07.8		10	28 (53)	18	35 (75)	f 2	43 (307)
2009	Mar	5	2454896.310622	19	27	17.8		11	30 (53)	19	37 (74)	f 3	39 (305)
2009	Mar	6	2454897.352088	20	28	11.2		12	42 (56)	20	38 (72)	f 4	24 (301)
2009	Mar	7	2454898.393908	21	26	02.8		13	59 (61)	21	36 (68)	f 5	00 (294)
2009	Mar	8	2454899.430723	22	20	14.4		15	17 (69)	22	30 (62)	f 5	30 (287)
2009	Mar	9	2454900.466049	23	11	06.6		16	33 (77)	23	21 (56)	f 5	56 (278)
2009	Mar	10	2454901.499692	23	59	33.4		17	47 (86)	f 0	10 (49)	f 6	20 (270)
2009	Mar	12	2454902.532409	0	46	40.2		p18	59 (95)	0	57 (43)	6	44 (261)
2009	Mar	13	2454903.564933	1	33	30.2		p20	10 (103)	1	44 (37)	7	08 (253)
2009	Mar	14	2454904.597867	2	20	55.7		p21	20 (111)	2	31 (32)	7	35 (246)
2009	Mar	15	2454905.631609	3	09	31.0		p22	28 (118)	3	20 (27)	8	05 (240)
2009	Mar	16	2454906.666275	3	59	26.2		p23	34 (123)	4	10 (24)	8	41 (236)
2009	Mar	17	2454907.701662	4	50	23.6		0	36 (126)	5	01 (22)	9	23 (233)

Date	TDT JD	TDT			Rise (Az _m)		Trans (Alt)		Set (Az _m)	
		h	m	s	h	m	h	m	h	m
2009 Mar 18	2454908.737286	5	41	41.5	1	32 (128)	5	52 (21)	10	12 (232)
2009 Mar 19	2454909.772528	6	32	26.4	2	21 (127)	6	43 (22)	11	07 (234)
2009 Mar 20	2454910.806833	7	21	50.4	3	02 (124)	7	32 (24)	12	07 (237)
2009 Mar 21	2454911.839882	8	09	25.8	3	37 (120)	8	20 (27)	13	09 (242)
2009 Mar 22	2454912.871649	8	55	10.5	4	06 (115)	9	06 (31)	14	13 (248)
2009 Mar 23	2454913.902384	9	39	25.9	4	31 (108)	9	50 (36)	15	18 (255)
2009 Mar 24	2454914.932541	10	22	51.5	4	54 (101)	10	33 (41)	16	23 (262)
2009 Mar 25	2454915.962723	11	06	19.2	5	16 (93)	11	17 (47)	17	29 (271)
2009 Mar 26	2454916.993629	11	50	49.5	5	38 (85)	12	01 (53)	18	37 (279)
2009 Mar 27	2454918.026009	12	37	27.2	6	01 (77)	12	48 (59)	19	48 (287)
2009 Mar 28	2454919.060582	13	27	14.3	6	27 (70)	13	38 (65)	21	01 (295)
2009 Mar 29	2454920.097873	14	20	56.2	6	59 (63)	14	31 (69)	22	16 (301)
2009 Mar 30	2454921.137955	15	18	39.3	7	37 (57)	15	29 (73)	23	29 (305)
2009 Mar 31	2454922.180183	16	19	27.8	8	25 (54)	16	29 (75)	f 0	37 (307)
2009 Apr 1	2454923.223188	17	21	23.4	9	24 (53)	17	31 (74)	f 1	35 (306)
2009 Apr 2	2454924.265327	18	22	04.3	10	33 (55)	18	32 (73)	f 2	22 (302)
2009 Apr 3	2454925.305357	19	19	42.8	11	47 (60)	19	30 (69)	f 3	00 (297)
2009 Apr 4	2454926.342798	20	13	37.8	13	03 (66)	20	24 (64)	f 3	31 (289)
2009 Apr 5	2454927.377862	21	04	07.3	14	17 (74)	21	14 (58)	f 3	58 (281)
2009 Apr 6	2454928.411167	21	52	04.8	15	30 (82)	22	02 (52)	f 4	22 (273)
2009 Apr 7	2454929.443482	22	38	36.9	16	41 (91)	22	49 (46)	f 4	46 (265)
2009 Apr 8	2454930.475573	23	24	49.5	17	51 (100)	23	35 (40)	f 5	09 (257)
2009 Apr 10	2454931.508100	0	11	39.9	p19	00 (108)	0	22 (34)	5	35 (249)
2009 Apr 11	2454932.541533	0	59	48.5	p20	09 (115)	1	10 (29)	6	04 (243)
2009 Apr 12	2454933.576064	1	49	31.9	p21	17 (121)	2	00 (25)	6	37 (238)
2009 Apr 13	2454934.611539	2	40	36.9	p22	21 (125)	2	51 (23)	7	17 (234)
2009 Apr 14	2454935.647468	3	32	21.2	p23	21 (127)	3	43 (21)	8	04 (233)
2009 Apr 15	2454936.683158	4	23	44.8	0	13 (127)	4	34 (22)	8	57 (233)
2009 Apr 16	2454937.717940	5	13	50.0	0	57 (125)	5	24 (23)	9	55 (236)
2009 Apr 17	2454938.751380	6	01	59.2	1	34 (122)	6	12 (26)	10	56 (240)
2009 Apr 18	2454939.783378	6	48	03.8	2	05 (117)	6	59 (29)	11	59 (245)
2009 Apr 19	2454940.814147	7	32	22.3	2	31 (111)	7	43 (34)	13	03 (252)
2009 Apr 20	2454941.844140	8	15	33.7	2	55 (104)	8	26 (39)	14	07 (259)
2009 Apr 21	2454942.873975	8	58	31.4	3	17 (97)	9	09 (44)	15	12 (267)
2009 Apr 22	2454943.904387	9	42	19.0	3	39 (89)	9	53 (50)	16	18 (275)
2009 Apr 23	2454944.936183	10	28	06.2	4	02 (81)	10	39 (57)	17	28 (284)
2009 Apr 24	2454945.970185	11	17	04.0	4	27 (73)	11	27 (62)	18	41 (291)
2009 Apr 25	2454947.007086	12	10	12.2	4	57 (66)	12	20 (67)	19	57 (298)
2009 Apr 26	2454948.047171	13	07	55.6	5	34 (59)	13	18 (72)	21	13 (304)
2009 Apr 27	2454949.089968	14	09	33.2	6	19 (55)	14	19 (74)	22	25 (307)
2009 Apr 28	2454950.134080	15	13	04.5	7	16 (53)	15	23 (75)	23	28 (306)
2009 Apr 29	2454951.177587	16	15	43.6	8	24 (54)	16	26 (73)	f 0	20 (303)
2009 Apr 30	2454952.218871	17	15	10.5	9	38 (58)	17	25 (70)	f 1	01 (298)
2009 May 1	2454953.257195	18	10	21.6	10	54 (64)	18	21 (65)	f 1	34 (291)
2009 May 2	2454954.292681	19	01	27.7	12	08 (72)	19	12 (60)	f 2	02 (284)
2009 May 3	2454955.325975	19	49	24.3	13	21 (80)	20	00 (54)	f 2	26 (276)
2009 May 4	2454956.357922	20	35	24.5	14	31 (88)	20	46 (48)	f 2	50 (267)
2009 May 5	2454957.389376	21	20	42.1	15	39 (97)	21	31 (42)	f 3	13 (259)
2009 May 6	2454958.421101	22	06	23.2	16	47 (105)	22	17 (36)	f 3	37 (252)
2009 May 7	2454959.453695	22	53	19.2	17	55 (112)	23	04 (31)	f 4	04 (245)
2009 May 8	2454960.487499	23	41	59.9	19	02 (118)	23	52 (27)	f 4	36 (240)
2009 May 10	2454961.522513	0	32	25.1	p20	08 (123)	0	43 (24)	5	13 (236)
2009 May 11	2454962.558343	1	24	00.9	p21	09 (126)	1	34 (22)	5	57 (233)
2009 May 12	2454963.594287	2	15	46.4	p22	04 (127)	2	26 (22)	6	48 (233)
2009 May 13	2454964.629548	3	06	32.9	p22	52 (126)	3	17 (23)	7	45 (235)
2009 May 14	2454965.663506	3	55	26.9	p23	31 (123)	4	06 (25)	8	45 (238)
2009 May 15	2454966.695883	4	42	04.3	0	04 (119)	4	53 (28)	9	47 (243)
2009 May 16	2454967.726768	5	26	32.7	0	32 (113)	5	37 (32)	10	50 (249)
2009 May 17	2454968.756546	6	09	25.5	0	56 (107)	6	20 (37)	11	52 (256)
2009 May 18	2454969.785805	6	51	33.6	1	19 (100)	7	02 (42)	12	55 (264)
2009 May 19	2454970.815276	7	33	59.9	1	40 (92)	7	45 (48)	14	00 (272)
2009 May 20	2454971.845793	8	17	56.5	2	02 (84)	8	28 (54)	15	07 (280)
2009 May 21	2454972.878261	9	04	41.7	2	26 (77)	9	15 (60)	16	17 (288)
2009 May 22	2454973.913566	9	55	32.1	2	53 (69)	10	06 (65)	17	32 (295)
2009 May 23	2454974.952368	10	51	24.6	3	27 (62)	11	02 (70)	18	48 (301)
2009 May 24	2454975.994701	11	52	22.2	4	09 (57)	12	02 (73)	20	04 (305)
2009 May 25	2454977.039563	12	56	58.2	5	02 (54)	13	07 (74)	21	13 (307)
2009 May 26	2454978.084952	14	02	19.8	6	07 (54)	14	12 (74)	22	11 (305)
2009 May 27	2454979.128677	15	05	17.7	7	22 (57)	15	15 (71)	22	58 (300)
2009 May 28	2454980.169337	16	03	50.7	8	40 (62)	16	14 (67)	23	35 (294)
2009 May 29	2454981.206648	16	57	34.4	9	57 (70)	17	08 (62)	f 0	05 (286)
2009 May 30	2454982.241125	17	47	13.2	11	12 (78)	17	58 (56)	f 0	31 (278)
2009 May 31	2454983.273640	18	34	02.5	12	23 (86)	18	44 (49)	f 0	54 (270)
2009 Jun 1	2454984.305135	19	19	23.7	13	32 (95)	19	30 (43)	f 1	17 (262)
2009 Jun 2	2454985.336479	20	04	31.8	14	39 (103)	20	15 (37)	f 1	41 (254)
2009 Jun 3	2454986.368394	20	50	29.2	15	46 (110)	21	01 (32)	f 2	07 (247)
2009 Jun 4	2454987.401382	21	37	59.4	16	53 (117)	21	48 (28)	f 2	37 (241)
2009 Jun 5	2454988.435634	22	27	18.8	17	58 (122)	22	38 (25)	f 3	12 (237)
2009 Jun 6	2454989.470954	23	18	10.4	19	01 (125)	23	28 (22)	f 3	54 (234)
2009 Jun 8	2454990.506766	0	09	44.6	p19	58 (127)	0	20 (22)	4	42 (233)
2009 Jun 9	2454991.542270	1	00	52.2	p20	47 (126)	1	11 (22)	5	37 (234)
2009 Jun 10	2454992.576712	1	50	27.9	p21	30 (124)	2	01 (24)	6	36 (237)

Date	TDT JD	TDT			Rise (Az)		Trans (Alt)		Set (Az)	
		h	m	s	h	m	h	m	h	m
2009 Jun 11	2454993.609613	2	37	50.6	p22	05 (120)	2	48 (27)	7	38 (242)
2009 Jun 12	2454994.640876	3	22	51.7	p22	34 (115)	3	33 (31)	8	40 (247)
2009 Jun 13	2454995.670741	4	05	52.0	p22	59 (109)	4	16 (35)	9	42 (254)
2009 Jun 14	2454996.699699	4	47	34.0	p23	22 (102)	4	58 (40)	10	44 (261)
2009 Jun 15	2454997.728411	5	28	54.7	p23	43 (95)	5	40 (46)	11	46 (269)
2009 Jun 16	2454998.757657	6	11	01.6	0	04 (87)	6	22 (52)	12	50 (277)
2009 Jun 17	2454999.788318	6	55	10.6	0	26 (80)	7	06 (57)	13	57 (284)
2009 Jun 18	2455000.821333	7	42	43.2	0	51 (72)	7	53 (63)	15	08 (292)
2009 Jun 19	2455001.857589	8	34	55.7	1	21 (65)	8	45 (68)	16	22 (299)
2009 Jun 20	2455002.897641	9	32	36.1	1	58 (59)	9	43 (72)	17	38 (304)
2009 Jun 21	2455003.941252	10	35	24.2	2	45 (55)	10	45 (74)	18	51 (306)
2009 Jun 22	2455004.987025	11	41	19.0	3	44 (53)	11	51 (74)	19	55 (306)
2009 Jun 23	2455006.032685	12	47	04.0	4	56 (55)	12	57 (73)	20	48 (302)
2009 Jun 24	2455007.076109	13	49	35.8	6	15 (60)	14	00 (69)	21	31 (296)
2009 Jun 25	2455008.116217	14	47	21.2	7	36 (66)	14	57 (64)	22	04 (289)
2009 Jun 26	2455009.153043	15	40	22.9	8	55 (75)	15	51 (58)	22	33 (281)
2009 Jun 27	2455010.187284	16	29	41.4	10	10 (83)	16	40 (51)	22	58 (272)
2009 Jun 28	2455011.219880	17	16	37.6	11	21 (92)	17	27 (45)	23	21 (264)
2009 Jun 29	2455012.251761	18	02	32.2	12	31 (100)	18	13 (39)	23	45 (256)
2009 Jun 30	2455013.283741	18	48	35.2	13	39 (108)	18	59 (34)	f	0 11 (249)
2009 Jul 1	2455014.316436	19	35	40.1	14	46 (115)	19	46 (29)	f	0 39 (243)
2009 Jul 2	2455015.350195	20	24	16.9	15	51 (120)	20	35 (25)	f	1 13 (238)
2009 Jul 3	2455016.385018	21	14	25.5	16	54 (124)	21	25 (23)	f	1 52 (235)
2009 Jul 4	2455017.420521	22	05	33.0	17	53 (127)	22	16 (22)	f	2 38 (233)
2009 Jul 5	2455018.456030	22	56	41.0	18	45 (127)	23	07 (22)	f	3 31 (234)
2009 Jul 6	2455019.490786	23	46	43.9	19	29 (125)	23	57 (23)	f	4 29 (236)
2009 Jul 8	2455020.524202	0	34	51.0	p20	06 (122)	0	45 (26)	5	30 (240)
2009 Jul 9	2455021.556012	1	20	39.5	p20	37 (117)	1	31 (29)	6	32 (246)
2009 Jul 10	2455022.586299	2	04	16.2	p21	03 (111)	2	15 (34)	7	34 (252)
2009 Jul 11	2455023.615419	2	46	12.2	p21	27 (104)	2	57 (39)	8	36 (259)
2009 Jul 12	2455024.643923	3	27	14.9	p21	48 (97)	3	38 (44)	9	38 (266)
2009 Jul 13	2455025.672494	4	08	23.4	p22	09 (90)	4	19 (50)	10	40 (274)
2009 Jul 14	2455026.701916	4	50	45.6	p22	30 (82)	5	01 (55)	11	44 (282)
2009 Jul 15	2455027.733053	5	35	35.8	p22	53 (75)	5	46 (61)	12	52 (289)
2009 Jul 16	2455028.766791	6	24	10.7	p23	19 (68)	6	35 (66)	14	02 (296)
2009 Jul 17	2455029.803885	7	17	35.6	p23	52 (62)	7	28 (70)	15	15 (302)
2009 Jul 18	2455030.844646	8	16	17.4	0	32 (57)	8	26 (73)	16	28 (306)
2009 Jul 19	2455031.888518	9	19	27.9	1	24 (54)	9	29 (74)	17	36 (307)
2009 Jul 20	2455032.933890	10	24	48.1	2	29 (54)	10	35 (74)	18	34 (305)
2009 Jul 21	2455033.978609	11	29	11.8	3	45 (57)	11	39 (71)	19	22 (300)
2009 Jul 22	2455035.020957	12	30	10.7	5	07 (63)	12	40 (67)	20	00 (293)
2009 Jul 23	2455036.060250	13	26	45.6	6	28 (70)	13	37 (61)	20	31 (285)
2009 Jul 24	2455037.096727	14	19	17.2	7	47 (79)	14	30 (54)	20	58 (276)
2009 Jul 25	2455038.131125	15	08	49.2	9	03 (88)	15	19 (48)	21	23 (267)
2009 Jul 26	2455039.164329	15	56	38.0	10	15 (97)	16	07 (41)	21	48 (259)
2009 Jul 27	2455040.197170	16	43	55.5	11	26 (105)	16	54 (36)	22	13 (251)
2009 Jul 28	2455041.230323	17	31	39.9	12	35 (113)	17	42 (30)	22	41 (245)
2009 Jul 29	2455042.264224	18	20	28.9	13	42 (119)	18	31 (26)	23	13 (239)
2009 Jul 30	2455043.298997	19	10	33.4	14	47 (123)	19	21 (24)	23	51 (235)
2009 Jul 31	2455044.334419	20	01	33.8	15	47 (126)	20	12 (22)	f	0 35 (233)
2009 Aug 1	2455045.369958	20	52	44.4	16	41 (127)	21	03 (22)	f	1 25 (233)
2009 Aug 2	2455046.404947	21	43	07.4	17	28 (126)	21	53 (23)	f	2 22 (235)
2009 Aug 3	2455047.438793	22	31	51.7	18	07 (123)	22	42 (25)	f	3 22 (239)
2009 Aug 4	2455048.471159	23	18	28.1	18	40 (118)	23	29 (28)	f	4 24 (244)
2009 Aug 6	2455049.502017	0	02	54.2	p19	08 (113)	0	13 (32)	5	27 (250)
2009 Aug 7	2455050.531614	0	45	31.5	p19	32 (107)	0	56 (37)	6	29 (257)
2009 Aug 8	2455051.560401	1	26	58.6	p19	54 (100)	1	38 (42)	7	31 (264)
2009 Aug 9	2455052.588962	2	08	06.3	p20	15 (92)	2	19 (48)	8	33 (272)
2009 Aug 10	2455053.617981	2	49	53.6	p20	36 (85)	3	01 (53)	9	36 (279)
2009 Aug 11	2455054.648211	3	33	25.5	p20	58 (77)	3	44 (59)	10	42 (287)
2009 Aug 12	2455055.680437	4	19	49.7	p21	23 (70)	4	30 (64)	11	50 (294)
2009 Aug 13	2455056.715380	5	10	08.9	p21	52 (64)	5	20 (69)	13	00 (300)
2009 Aug 14	2455057.753505	6	05	02.8	p22	28 (58)	6	15 (72)	14	11 (304)
2009 Aug 15	2455058.794706	7	04	22.6	p23	14 (55)	7	14 (74)	15	19 (307)
2009 Aug 16	2455059.838056	8	06	48.1	0	11 (53)	8	17 (74)	16	20 (306)
2009 Aug 17	2455060.881928	9	09	58.6	1	20 (55)	9	20 (73)	17	11 (302)
2009 Aug 18	2455061.924620	10	11	27.2	2	37 (60)	10	21 (69)	17	53 (297)
2009 Aug 19	2455062.965054	11	09	40.7	3	58 (66)	11	20 (64)	18	27 (289)
2009 Aug 20	2455064.003001	12	04	19.3	5	18 (75)	12	14 (58)	18	57 (281)
2009 Aug 21	2455065.038871	12	55	58.4	6	36 (84)	13	06 (51)	19	23 (272)
2009 Aug 22	2455066.073381	13	45	40.1	7	52 (93)	13	56 (44)	19	48 (263)
2009 Aug 23	2455067.107300	14	34	30.7	9	05 (102)	14	45 (38)	20	14 (255)
2009 Aug 24	2455068.141295	15	23	27.9	10	17 (110)	15	34 (33)	20	42 (247)
2009 Aug 25	2455069.175830	16	13	11.7	11	27 (116)	16	24 (28)	21	13 (241)
2009 Aug 26	2455070.211075	17	03	56.9	12	35 (122)	17	14 (25)	21	49 (237)
2009 Aug 27	2455071.246874	17	55	29.9	13	38 (125)	18	06 (22)	22	31 (234)
2009 Aug 28	2455072.282770	18	47	11.3	14	35 (127)	18	57 (22)	23	20 (233)
2009 Aug 29	2455073.318153	19	38	08.4	15	25 (126)	19	48 (22)	f	0 14 (234)
2009 Aug 30	2455074.352458	20	27	32.4	16	06 (124)	20	38 (24)	f	1 14 (237)
2009 Aug 31	2455075.385339	21	14	53.3	16	41 (120)	21	25 (27)	f	2 15 (242)
2009 Sep 1	2455076.416735	22	00	05.9	17	11 (115)	22	11 (31)	f	3 17 (248)
2009 Sep 2	2455077.446848	22	43	27.6	17	36 (109)	22	54 (35)	f	4 20 (254)

Date	TDT JD		TDT			Rise (Az)		Trans (Alt)		Set (Az)	
			h	m	s	h	m	h	m	h	m
2009 Sep 3	2455078.476078		23	25	33.1	17	59 (102)	23	36 (40)	f	5 22 (261)
2009 Sep 5	2455079.504960		0	07	08.6	p18	21 (95)	0	18 (46)	f	6 25 (269)
2009 Sep 6	2455080.534117		0	49	07.7	p18	42 (87)	1	00 (52)	f	7 29 (277)
2009 Sep 7	2455081.564229		1	32	29.4	p19	04 (80)	1	43 (57)	f	8 34 (284)
2009 Sep 8	2455082.595995		2	18	14.0	p19	28 (72)	2	29 (63)	f	9 41 (292)
2009 Sep 9	2455083.630057		3	07	16.9	p19	56 (66)	3	18 (67)	f	10 51 (298)
2009 Sep 10	2455084.666844		4	00	15.4	p20	30 (60)	4	10 (71)	f	12 01 (303)
2009 Sep 11	2455085.706350		4	57	08.7	p21	11 (56)	5	07 (73)	f	13 09 (306)
2009 Sep 12	2455086.747923		5	57	00.5	p22	03 (54)	6	07 (74)	f	14 11 (306)
2009 Sep 13	2455087.790306		6	58	02.4	p23	06 (54)	7	08 (73)	f	15 04 (304)
2009 Sep 14	2455088.832061		7	58	10.1	0	18 (58)	8	08 (71)	f	15 48 (299)
2009 Sep 15	2455089.872125		8	55	51.6	1	35 (63)	9	06 (66)	f	16 24 (293)
2009 Sep 16	2455090.910113		9	50	33.7	2	53 (71)	10	01 (61)	f	16 55 (285)
2009 Sep 17	2455091.946247		10	42	35.7	4	10 (79)	10	53 (54)	f	17 22 (276)
2009 Sep 18	2455092.981109		11	32	47.8	5	26 (88)	11	43 (48)	f	17 48 (267)
2009 Sep 19	2455094.015406		12	22	11.1	6	41 (97)	12	33 (41)	f	18 13 (259)
2009 Sep 20	2455095.049797		13	11	42.4	7	54 (106)	13	22 (35)	f	18 41 (251)
2009 Sep 21	2455096.084767		14	02	03.9	9	06 (113)	14	12 (30)	f	19 11 (244)
2009 Sep 22	2455097.120522		14	53	33.1	10	16 (119)	15	04 (26)	f	19 45 (239)
2009 Sep 23	2455098.156923		15	45	58.2	11	23 (124)	15	56 (23)	f	20 26 (235)
2009 Sep 24	2455099.193500		16	38	38.4	12	24 (126)	16	49 (22)	f	21 13 (234)
2009 Sep 25	2455100.229597		17	30	37.2	13	17 (126)	17	41 (22)	f	22 06 (234)
2009 Sep 26	2455101.264590		18	21	00.5	14	02 (125)	18	31 (23)	f	23 04 (236)
2009 Sep 27	2455102.298080		19	09	14.1	14	40 (121)	19	20 (26)	f	0 04 (240)
2009 Sep 28	2455103.329981		19	55	10.4	15	12 (117)	20	06 (29)	f	1 06 (245)
2009 Sep 29	2455104.360489		20	39	06.2	15	39 (111)	20	50 (34)	f	2 09 (252)
2009 Sep 30	2455105.390009		21	21	36.8	16	03 (105)	21	32 (38)	f	3 11 (259)
2009 Oct 1	2455106.419085		22	03	28.9	16	25 (98)	22	14 (44)	f	4 13 (266)
2009 Oct 2	2455107.448347		22	45	37.2	16	46 (90)	22	56 (49)	f	5 17 (274)
2009 Oct 3	2455108.478477		23	29	00.4	17	08 (83)	23	40 (55)	f	6 23 (282)
2009 Oct 5	2455109.510172		0	14	38.9	p17	32 (75)	0	25 (61)	f	7 30 (289)
2009 Oct 6	2455110.544068		1	03	27.5	p17	59 (68)	1	14 (66)	f	8 40 (296)
2009 Oct 7	2455111.580595		1	56	03.4	p18	32 (62)	2	06 (70)	f	9 51 (301)
2009 Oct 8	2455112.619755		2	52	26.8	p19	11 (57)	3	03 (73)	f	11 01 (305)
2009 Oct 9	2455113.660923		3	51	43.7	p20	01 (54)	4	02 (74)	f	12 05 (306)
2009 Oct 10	2455114.702877		4	52	08.6	p21	00 (54)	5	02 (74)	f	13 00 (305)
2009 Oct 11	2455115.744200		5	51	38.9	p22	08 (57)	6	02 (71)	f	13 46 (301)
2009 Oct 12	2455116.783825		6	48	42.5	p23	22 (61)	6	59 (68)	f	14 24 (295)
2009 Oct 13	2455117.821344		7	42	44.1	0	38 (68)	7	53 (63)	f	14 55 (288)
2009 Oct 14	2455118.856957		8	34	01.1	1	53 (76)	8	44 (57)	f	15 23 (280)
2009 Oct 15	2455119.891244		9	23	23.5	3	07 (84)	9	34 (51)	f	15 48 (271)
2009 Oct 16	2455120.924937		10	11	54.5	4	20 (93)	10	22 (44)	f	16 14 (263)
2009 Oct 17	2455121.958753		11	00	36.2	5	32 (102)	11	11 (38)	f	16 40 (255)
2009 Oct 18	2455122.993274		11	50	18.9	6	44 (110)	12	01 (33)	f	17 08 (247)
2009 Oct 19	2455124.028823		12	41	30.3	7	55 (116)	12	52 (28)	f	17 41 (241)
2009 Oct 20	2455125.065359		13	34	07.0	9	04 (122)	13	44 (25)	f	18 20 (237)
2009 Oct 21	2455126.102439		14	27	30.7	10	09 (125)	14	38 (23)	f	19 04 (234)
2009 Oct 22	2455127.139324		15	20	37.6	11	06 (126)	15	31 (22)	f	19 56 (234)
2009 Oct 23	2455128.175225		16	12	19.4	11	55 (125)	16	23 (23)	f	20 52 (235)
2009 Oct 24	2455129.209562		17	01	46.2	12	36 (123)	17	12 (25)	f	21 52 (239)
2009 Oct 25	2455130.242118		17	48	39.0	13	10 (119)	17	59 (28)	f	22 54 (243)
2009 Oct 26	2455131.273025		18	33	09.3	13	39 (113)	18	44 (32)	f	23 56 (249)
2009 Oct 27	2455132.302679		19	15	51.4	14	04 (107)	19	26 (37)	f	0 57 (256)
2009 Oct 28	2455133.331645		19	57	34.2	14	27 (100)	20	08 (42)	f	1 59 (263)
2009 Oct 29	2455134.360593		20	39	15.2	14	48 (93)	20	50 (47)	f	3 02 (271)
2009 Oct 30	2455135.390255		21	21	58.0	15	10 (86)	21	33 (53)	f	4 06 (278)
2009 Oct 31	2455136.421401		22	06	49.1	15	33 (78)	22	17 (58)	f	5 13 (286)
2009 Nov 1	2455137.454775		22	54	52.6	15	59 (71)	23	05 (64)	f	6 23 (293)
2009 Nov 2	2455138.490960		23	46	58.9	16	30 (64)	23	57 (68)	f	7 36 (299)
2009 Nov 4	2455139.530134		0	43	23.6	p17	08 (59)	0	54 (72)	f	8 48 (304)
2009 Nov 5	2455140.571790		1	43	22.6	p17	55 (55)	1	53 (74)	f	9 55 (306)
2009 Nov 6	2455141.614646		2	45	05.4	p18	53 (54)	2	55 (74)	f	10 55 (305)
2009 Nov 7	2455142.657029		3	46	07.3	p20	00 (56)	3	56 (72)	f	11 44 (302)
2009 Nov 8	2455143.697558		4	44	29.0	p21	13 (60)	4	55 (69)	f	12 24 (296)
2009 Nov 9	2455144.735607		5	39	16.5	p22	28 (66)	5	49 (64)	f	12 58 (290)
2009 Nov 10	2455145.771300		6	30	40.3	p23	43 (74)	6	41 (59)	f	13 26 (282)
2009 Nov 11	2455146.805236		7	19	32.4	0	56 (82)	7	30 (52)	f	13 52 (274)
2009 Nov 12	2455147.838217		8	07	01.9	2	07 (90)	8	17 (46)	f	14 16 (265)
2009 Nov 13	2455148.871061		8	54	19.7	3	18 (99)	9	05 (40)	f	14 41 (257)
2009 Nov 14	2455149.904487		9	42	27.7	4	28 (107)	9	53 (35)	f	15 08 (250)
2009 Nov 15	2455150.939002		10	32	09.8	5	38 (114)	10	43 (30)	f	15 39 (244)
2009 Nov 16	2455151.974784		11	23	41.3	6	47 (120)	11	34 (26)	f	16 15 (239)
2009 Nov 17	2455153.011579		12	16	40.4	7	53 (124)	12	27 (23)	f	16 57 (235)
2009 Nov 18	2455154.048720		13	10	09.4	8	54 (126)	13	20 (22)	f	17 46 (234)
2009 Nov 19	2455155.085315		14	02	51.2	9	47 (126)	14	13 (23)	f	18 41 (235)
2009 Nov 20	2455156.120555		14	53	35.9	10	31 (124)	15	04 (24)	f	19 40 (238)
2009 Nov 21	2455157.153967		15	41	42.8	11	08 (120)	15	52 (27)	f	20 42 (242)
2009 Nov 22	2455158.185493		16	27	06.6	11	39 (115)	16	38 (30)	f	21 43 (247)
2009 Nov 23	2455159.215418		17	10	12.2	12	05 (109)	17	21 (35)	f	22 45 (253)
2009 Nov 25	2455161.272685		18	32	40.0	12	50 (96)	18	43 (45)	f	0 46 (268)
2009 Nov 26	2455162.301437		19	14	04.1	13	11 (89)	19	25 (50)	f	1 49 (275)
2009 Nov 27	2455163.331332		19	57	07.1	13	33 (81)	20	08 (56)	f	2 54 (283)

Date	TDT JD	TDT			Rise (Azm)	Trans (Alt)	Set (Azm)
		h	m	s	h m °	h m °	h m °
2009 Nov 24	2455160.244263	17	51	44.3	12 28 (103)	18 02 (40)	23 45 (260)
2009 Nov 28	2455164.363220	20	43	02.2	13 58 (74)	20 54 (61)	f 4 01 (290)
2009 Nov 29	2455165.397899	21	32	58.5	14 26 (67)	21 43 (66)	f 5 12 (296)
2009 Nov 30	2455166.435916	22	27	43.1	15 01 (61)	22 38 (70)	f 6 25 (302)
2009 Dec 1	2455167.477221	23	27	11.9	15 44 (57)	23 37 (73)	f 7 37 (305)
2009 Dec 3	2455168.520855	0	30	01.8	p16 38 (55)	0 40 (74)	8 42 (305)
2009 Dec 4	2455169.565032	1	33	38.8	p17 44 (55)	1 44 (73)	9 37 (303)
2009 Dec 5	2455170.607841	2	35	17.4	p18 57 (58)	2 45 (70)	10 22 (298)
2009 Dec 6	2455171.648051	3	33	11.6	p20 15 (64)	3 43 (66)	10 59 (292)
2009 Dec 7	2455172.685401	4	26	58.6	p21 32 (71)	4 37 (60)	11 29 (284)
2009 Dec 8	2455173.720345	5	17	17.8	p22 47 (80)	5 28 (54)	11 56 (276)
2009 Dec 9	2455174.753690	6	05	18.9	p23 59 (88)	6 16 (48)	12 21 (268)
2009 Dec 10	2455175.786328	6	52	18.8	1 10 (97)	7 03 (42)	12 45 (260)
2009 Dec 11	2455176.819086	7	39	29.0	2 19 (105)	7 50 (36)	13 11 (252)
2009 Dec 12	2455177.852624	8	27	46.7	3 28 (112)	8 38 (31)	13 40 (246)
2009 Dec 13	2455178.887335	9	17	45.7	4 36 (118)	9 28 (27)	14 14 (240)
2009 Dec 14	2455179.923228	10	09	26.9	5 43 (122)	10 20 (24)	14 53 (236)
2009 Dec 15	2455180.959880	11	02	13.7	6 44 (125)	11 12 (23)	15 39 (234)
2009 Dec 16	2455181.996515	11	54	58.9	7 40 (126)	12 05 (22)	16 32 (234)
2009 Dec 17	2455183.032254	12	46	26.8	8 27 (125)	12 57 (23)	17 30 (236)
2009 Dec 18	2455184.066415	13	35	38.2	9 06 (121)	13 46 (26)	18 31 (240)
2009 Dec 19	2455185.098691	14	22	06.9	9 39 (117)	14 33 (29)	19 32 (245)
2009 Dec 20	2455186.129167	15	06	00.0	10 07 (111)	15 17 (33)	20 34 (251)
2009 Dec 21	2455187.158220	15	47	50.2	10 31 (105)	15 58 (38)	21 34 (258)
2009 Dec 22	2455188.186419	16	28	26.6	10 53 (99)	16 39 (43)	22 35 (265)
2009 Dec 23	2455189.214449	17	08	48.4	11 14 (92)	17 19 (48)	23 35 (272)
2009 Dec 24	2455190.243079	17	50	02.0	11 35 (84)	18 01 (54)	f 0 37 (279)
2009 Dec 25	2455191.273145	18	33	19.7	11 58 (77)	18 44 (59)	f 1 42 (287)
2009 Dec 26	2455192.305510	19	19	56.1	12 23 (70)	19 30 (64)	f 2 49 (294)
2009 Dec 27	2455193.340964	20	10	59.3	12 54 (64)	20 21 (68)	f 4 00 (299)
2009 Dec 28	2455194.379973	21	07	09.7	13 31 (59)	21 17 (72)	f 5 12 (304)
2009 Dec 29	2455195.422306	22	08	07.3	14 19 (55)	22 18 (74)	f 6 20 (306)
2009 Dec 30	2455196.466749	23	12	07.1	15 19 (54)	23 22 (74)	f 7 21 (305)
2010 Jan 1	2455197.511344	0	16	20.1	p16 31 (56)	0 26 (72)	8 12 (301)

Times in U.T., to add an hour when it is in use daylight saving time

p = past day
f = forward day

Legenda:

Rise, trans, set = times of riseng, transit and setting, height in degrees during the transit.

For others locations to see the table at the end of the Almanac.

VISIBILITY OF THE MOON

First and last visibility of the Moon

Location : Rome Latitude : 42° N Longitude : 12° E

Probability : difficult

	Date	Sun s/t	Moon s/t	d s/t	lunar phase	lunar age	period
L.M.V.	2009-01-24	07:32	06:30	-1:01h	3.8%	-49:24h	
F.E.V.	2009-01-27	17:20	18:38	1:18h	1.7%	32:24h	30
L.M.V.	2009-02-23	06:56	06:05	-0:51h	3.2%	-43:39h	
F.E.V.	2009-02-25	17:57	18:37	0:39h	0.5%	15:21h	29
L.M.V.	2009-03-25	06:06	05:15	-0:51h	2.5%	-35:00h	
F.E.V.	2009-03-27	18:32	19:48	1:16h	1.5%	25:24h	30
L.M.V.	2009-04-24	05:17	04:27	-0:50h	1.4%	-23:05h	
F.E.V.	2009-04-25	19:04	19:56	0:52h	0.7%	14:40h	29
L.M.V.	2009-05-23	04:44	03:26	-1:17h	2.8%	-32:27h	
F.E.V.	2009-05-25	19:35	21:13	1:38h	2.4%	30:23h	30
L.M.V.	2009-06-22	04:36	03:44	-0:52h	0.8%	-15:59h	
F.E.V.	2009-06-23	19:51	20:48	0:57h	1.4%	23:15h	29
L.M.V.	2009-07-21	04:54	03:45	-1:09h	1.4%	-22:40h	
F.E.V.	2009-07-23	19:39	20:31	0:51h	4.2%	40:04h	30
L.M.V.	2009-08-19	05:23	03:57	-1:26h	2.3%	-29:38h	
F.E.V.	2009-08-21	19:03	19:23	0:19h	2.7%	32:00h	29
L.M.V.	2009-09-17	05:54	04:10	-1:43h	3.5%	-37:51h	
F.E.V.	2009-09-20	18:12	18:40	0:27h	5.0%	46:27h	30
L.M.V.	2009-10-17	06:26	05:32	-0:54h	1.4%	-24:07h	
F.E.V.	2009-10-19	17:24	17:41	0:16h	2.6%	34:50h	29
L.M.V.	2009-11-15	07:01	05:38	-1:23h	2.8%	-37:12h	
F.E.V.	2009-11-18	16:48	17:45	0:57h	3.6%	44:33h	30
L.M.V.	2009-12-15	07:32	06:44	-0:48h	1.6%	-29:30h	
F.E.V.	2009-12-17	16:41	17:29	0:47h	1.3%	27:38h	29

Legenda:

date in the format year/month/day

P.V.S.: first day of evening visibility after the conjunction with the Sun

U.V.M.: last day of morning visibility before the conjunction with the Sun

Sun s/t : sunrise and sunset

Moon : rising and setting of the Moon

D s/t : difference in hours and minuts between the rising or setting of the 2 bodies

	Date	Sun s/t	Moon s/t	Sun lon	Moon lon	Moon lat	Moon alt	lunar phase	az	d lon
L vis	2009-01-24	07:32	06:30	304° 24'	281° 56'	-2° 26'	7° 51'	3.8%	20° 35'	-22° 28'
F vis	2009-01-27	17:20	18:38	307° 52'	322° 54'	1° 15'	12° 01'	1.7%	-6° 24'	15° 02'
L vis	2009-02-23	06:56	06:05	334° 45'	314° 02'	0° 26'	7° 45'	3.2%	18° 33'	-20° 43'
F vis	2009-02-25	17:57	18:37	337° 14'	344° 43'	3° 02'	6° 24'	0.5%	0° 13'	7° 29'
L vis	2009-03-25	06:06	05:15	4° 41'	346° 57'	3° 13'	8° 36'	2.5%	14° 53'	-17° 44'
F vis	2009-03-27	18:32	19:48	7° 11'	20° 29'	4° 51'	12° 26'	1.5%	0° 21'	13° 18'
L vis	2009-04-24	05:17	04:27	34° 08'	21° 34'	4° 52'	8° 18'	1.4%	9° 03'	-12° 33'
F vis	2009-04-25	19:04	19:56	35° 40'	43° 47'	4° 57'	7° 46'	0.7%	1° 12'	8° 08'
L vis	2009-05-23	04:44	03:26	62° 10'	43° 41'	4° 58'	12° 20'	2.8%	13° 02'	-18° 28'
F vis	2009-05-25	19:35	21:13	64° 41'	82° 19'	3° 14'	14° 25'	2.4%	-7° 48'	17° 38'
L vis	2009-06-22	04:36	03:44	90° 52'	81° 27'	3° 17'	7° 06'	0.8%	4° 39'	-9° 25'
F vis	2009-06-23	19:51	20:48	92° 26'	106° 12'	1° 17'	8° 19'	1.4%	-9° 30'	13° 46'
L vis	2009-07-21	04:54	03:45	118° 32'	105° 07'	1° 23'	10° 06'	1.4%	6° 29'	-13° 26'
F vis	2009-07-23	19:39	20:31	121° 02'	144° 37'	-2° 12'	8° 31'	4.2%	-21° 26'	23° 34'
L vis	2009-08-19	05:23	03:57	146° 20'	129° 02'	-0° 49'	13° 43'	2.3%	7° 53'	-17° 19'
F vis	2009-08-21	19:03	19:23	148° 49'	167° 16'	-3° 50'	3° 01'	2.7%	-18° 16'	18° 27'
L vis	2009-09-17	05:54	04:10	174° 27'	153° 02'	-2° 52'	17° 30'	3.5%	9° 59'	-21° 25'
F vis	2009-09-20	18:12	18:40	177° 53'	203° 21'	-5° 04'	4° 05'	5.0%	-25° 20'	25° 28'
L vis	2009-10-17	06:26	05:32	203° 59'	191° 05'	-4° 50'	8° 33'	1.4%	9° 13'	-12° 54'
F vis	2009-10-19	17:24	17:41	206° 25'	224° 34'	-4° 44'	2° 09'	2.6%	-18° 23'	18° 08'
L vis	2009-11-15	07:01	05:38	233° 00'	214° 14'	-4° 58'	11° 55'	2.8%	13° 56'	-18° 46'
F vis	2009-11-18	16:48	17:45	236° 27'	258° 06'	-2° 53'	7° 08'	3.6%	-20° 04'	21° 40'
L vis	2009-12-15	07:32	06:44	263° 25'	249° 29'	-3° 29'	6° 03'	1.6%	12° 10'	-13° 56'
F vis	2009-12-17	16:41	17:29	265° 50'	278° 39'	-1° 08'	6° 05'	1.3%	-10° 21'	12° 49'

Legenda:

Sun lon : celestial longitude of the Sun

Moon lon : celestial longitude of the Moon

Moon lat : celestial latitude of the Moon

Moon alt : height of the Moon on the horizon when the Sun is on the horizon

D az : difference in azimuth between the center of the Sun and of the Moon

D lon : difference in longitude between the center of the Sun and the Moon

First and last visibility of the Moon

Location : Rome Latitude : 42° N Longitude : 12° E

Probability : medium

	Date	Sun s/t	Moon s/t	d s/t	lunar phase	lunar age	period
L.M.V.	2009-01-25	07:31	07:05	-0:25h	1.0%	-25:25h	
F.E.V.	2009-01-27	17:20	18:38	1:18h	1.7%	32:24h	30
L.M.V.	2009-02-24	06:54	06:28	-0:26h	0.7%	-19:41h	
F.E.V.	2009-02-25	17:57	18:37	0:39h	0.5%	15:21h	29
L.M.V.	2009-03-26	06:05	05:37	-0:27h	0.4%	-11:01h	
F.E.V.	2009-03-27	18:32	19:48	1:16h	1.5%	25:24h	30
L.M.V.	2009-04-24	05:17	04:27	-0:50h	1.4%	-23:05h	
F.E.V.	2009-04-25	19:04	19:56	0:52h	0.7%	14:40h	29
L.M.V.	2009-05-24	04:43	04:08	-0:35h	0.3%	-8:28h	
F.E.V.	2009-05-24	19:34	20:04	0:29h	0.2%	6:22h	29
L.M.V.	2009-06-22	04:36	03:44	-0:52h	0.8%	-15:59h	
F.E.V.	2009-06-23	19:51	20:48	0:57h	1.4%	23:15h	30
L.M.V.	2009-07-21	04:54	03:45	-1:09h	1.4%	-22:40h	
F.E.V.	2009-07-22	19:40	20:00	0:19h	0.7%	16:04h	29
L.M.V.	2009-08-19	05:23	03:57	-1:26h	2.3%	-29:38h	
F.E.V.	2009-08-21	19:03	19:23	0:19h	2.7%	32:00h	30
L.M.V.	2009-09-18	05:55	05:25	-0:29h	0.6%	-13:50h	
F.E.V.	2009-09-20	18:12	18:40	0:27h	5.0%	46:27h	30
L.M.V.	2009-10-17	06:26	05:32	-0:54h	1.4%	-24:07h	
F.E.V.	2009-10-19	17:24	17:41	0:16h	2.6%	34:50h	29
L.M.V.	2009-11-16	07:03	06:47	-0:15h	0.5%	-13:11h	
F.E.V.	2009-11-17	16:49	16:56	0:07h	0.9%	20:34h	29
L.M.V.	2009-12-15	07:32	06:44	-0:48h	1.6%	-29:30h	
F.E.V.	2009-12-17	16:41	17:29	0:47h	1.3%	27:38h	30

Legenda:

date in the format year/month/day

P.V.S.: first day of evening visibility after the conjunction with the Sun

U.V.M.: last day of morning visibility before the conjunction with the Sun

Sun s/t : sunrise and sunset

Moon s/t : rising and setting of the Moon

D s/t : difference in hours and minuts between the rising or setting of the 2 bodies

	Date	Sun s/t	Moon s/t	Sun lon	Moon lon	Moon lat	Moon alt	lunar phase	az	d lon
L vis	2009-01-25	07:31	07:05	305° 25'	293° 49'	-1° 25'	3° 17'	1.0%	10° 40'	-11° 36'
F vis	2009-01-27	17:20	18:38	307° 52'	322° 54'	1° 15'	12° 01'	1.7%	-6° 24'	15° 02'
L vis	2009-02-24	06:54	06:28	335° 46'	326° 20'	1° 33'	3° 57'	0.7%	7° 49'	-9° 26'
F vis	2009-02-25	17:57	18:37	337° 14'	344° 43'	3° 02'	6° 24'	0.5%	0° 13'	7° 29'
L vis	2009-03-26	06:05	05:37	5° 41'	0° 01'	4° 01'	4° 25'	0.4%	3° 28'	-5° 39'
F vis	2009-03-27	18:32	19:48	7° 11'	20° 29'	4° 51'	12° 26'	1.5%	0° 21'	13° 18'
L vis	2009-04-24	05:17	04:27	34° 08'	21° 34'	4° 52'	8° 18'	1.4%	9° 03'	-12° 33'
F vis	2009-04-25	19:04	19:56	35° 40'	43° 47'	4° 57'	7° 46'	0.7%	1° 12'	8° 08'
L vis	2009-05-24	04:43	04:08	63° 07'	58° 16'	4° 33'	4° 48'	0.3%	1° 37'	-4° 52'
F vis	2009-05-24	19:34	20:04	63° 43'	67° 24'	4° 08'	3° 48'	0.2%	1° 16'	3° 41'
L vis	2009-06-22	04:36	03:44	90° 52'	81° 27'	3° 17'	7° 06'	0.8%	4° 39'	-9° 25'
F vis	2009-06-23	19:51	20:48	92° 26'	106° 12'	1° 17'	8° 19'	1.4%	-9° 30'	13° 46'
L vis	2009-07-21	04:54	03:45	118° 32'	105° 07'	1° 23'	10° 06'	1.4%	6° 29'	-13° 26'
F vis	2009-07-22	19:40	20:00	120° 05'	129° 36'	-0° 52'	2° 42'	0.7%	-8° 33'	9° 31'
L vis	2009-08-19	05:23	03:57	146° 20'	129° 02'	-0° 49'	13° 43'	2.3%	7° 53'	-17° 19'
F vis	2009-08-21	19:03	19:23	148° 49'	167° 16'	-3° 50'	3° 01'	2.7%	-18° 16'	18° 27'
L vis	2009-09-18	05:55	05:25	175° 25'	167° 39'	-3° 50'	4° 28'	0.6%	6° 09'	-7° 47'
F vis	2009-09-20	18:12	18:40	177° 53'	203° 21'	-5° 04'	4° 05'	5.0%	-25° 20'	25° 28'
L vis	2009-10-17	06:26	05:32	203° 59'	191° 05'	-4° 50'	8° 33'	1.4%	9° 13'	-12° 54'
F vis	2009-10-19	17:24	17:41	206° 25'	224° 34'	-4° 44'	2° 09'	2.6%	-18° 23'	18° 08'
L vis	2009-11-16	07:03	06:47	234° 01'	227° 26'	-4° 37'	1° 52'	0.5%	7° 18'	-6° 35'
F vis	2009-11-17	16:49	16:56	235° 26'	245° 33'	-3° 43'	0° 48'	0.9%	-10° 34'	10° 07'
L vis	2009-12-15	07:32	06:44	263° 25'	249° 29'	-3° 29'	6° 03'	1.6%	12° 10'	-13° 56'
F vis	2009-12-17	16:41	17:29	265° 50'	278° 39'	-1° 08'	6° 05'	1.3%	-10° 21'	12° 49'

Legenda:

date in the format year/month/day

Sun lon : celestial longitude of the Sun

Moon lon : celestial longitude of the Moon

Moon lat : celestial latitude of the Moon

Moon alt : height of the Moon on the horizon when the Sun is on the horizon

D az : difference in azimuth between the center of the Sun and of the Moon

D lon : difference in longitude between the center of the Sun and the Moon

First and last visibility of the Moon

Location : Rome Latitude : 42° N Longitude : 12° E

Probability : easy

	Date	Sun s/t	Moon s/t	d s/t	lunar phase	lunar age	period
L.M.V.	2009-01-25	07:31	07:05	-0:25h	1.0%	-25:25h	
F.E.V.	2009-01-26	17:18	17:34	0:15h	0.1%	8:22h	29
L.M.V.	2009-02-25	06:53	06:50	-0:02h	0.1%	4:16h	
F.E.V.	2009-02-25	17:57	18:37	0:39h	0.5%	15:21h	30
L.M.V.	2009-03-27	06:03	06:00	-0:02h	0.5%	12:56h	
F.E.V.	2009-03-26	18:31	18:37	0:06h	0.1%	1:24h	29
L.M.V.	2009-04-25	05:16	04:56	-0:19h	0.2%	0:52h	
F.E.V.	2009-04-25	19:04	19:56	0:52h	0.7%	14:40h	30
L.M.V.	2009-05-24	04:43	04:08	-0:35h	0.3%	-8:28h	
F.E.V.	2009-05-24	19:34	20:04	0:29h	0.2%	6:22h	29
L.M.V.	2009-06-22	04:36	03:44	-0:52h	0.8%	-15:59h	
F.E.V.	2009-06-23	19:51	20:48	0:57h	1.4%	23:15h	30
L.M.V.	2009-07-21	04:54	03:45	-1:09h	1.4%	-22:40h	
F.E.V.	2009-07-22	19:40	20:00	0:19h	0.7%	16:04h	29
L.M.V.	2009-08-20	05:25	05:17	-0:07h	0.1%	-5:37h	
F.E.V.	2009-08-21	19:03	19:23	0:19h	2.7%	32:00h	30
L.M.V.	2009-09-18	05:55	05:25	-0:29h	0.6%	-13:50h	
F.E.V.	2009-09-20	18:12	18:40	0:27h	5.0%	46:27h	30
L.M.V.	2009-10-17	06:26	05:32	-0:54h	1.4%	-24:07h	
F.E.V.	2009-10-19	17:24	17:41	0:16h	2.6%	34:50h	29
L.M.V.	2009-11-16	07:03	06:47	-0:15h	0.5%	-13:11h	
F.E.V.	2009-11-17	16:49	16:56	0:07h	0.9%	20:34h	29
L.M.V.	2009-12-15	07:32	06:44	-0:48h	1.6%	-29:30h	
F.E.V.	2009-12-17	16:41	17:29	0:47h	1.3%	27:38h	30

Legenda:

date in the format year/month/day

P.V.S.: first day of evening visibility after the conjunction with the Sun

U.V.M.: last day of morning visibility before the conjunction with the Sun

Sun s/t : sunrise and sunset

Moon s/t : rising and setting of the Moon

D s/t : difference in hours and minutes between the rising or setting of the 2 bodies

	Date	Sun s/t	Moon s/t	Sun lon	Moon lon	Moon lat	Moon alt	lunar phase	az	d lon
L vis	2009-01-25	07:31	07:05	305° 25'	293° 49'	-1° 25'	3° 17'	1.0%	10° 40'	-11° 36'
F vis	2009-01-26	17:18	17:34	306° 51'	310° 43'	0° 08'	2° 01'	0.1%	-1° 49'	3° 52'
L vis	2009-02-25	06:53	06:50	336° 46'	338° 51'	2° 35'	0° 03'	0.1%	-3° 00'	2° 05'
F vis	2009-02-25	17:57	18:37	337° 14'	344° 43'	3° 02'	6° 24'	0.5%	0° 13'	7° 29'
L vis	2009-03-27	06:03	06:00	6° 40'	13° 24'	4° 38'	0° 03'	0.5%	-8° 03'	6° 44'
F vis	2009-03-26	18:31	18:37	6° 11'	6° 56'	4° 22'	0° 43'	0.1%	3° 54'	0° 44'
L vis	2009-04-25	05:16	04:56	35° 06'	35° 36'	5° 00'	2° 40'	0.2%	-2° 42'	0° 30'
F vis	2009-04-25	19:04	19:56	35° 40'	43° 47'	4° 57'	7° 46'	0.7%	1° 12'	8° 08'
L vis	2009-05-24	04:43	04:08	63° 07'	58° 16'	4° 33'	4° 48'	0.3%	1° 37'	-4° 52'
F vis	2009-05-24	19:34	20:04	63° 43'	67° 24'	4° 08'	3° 48'	0.2%	1° 16'	3° 41'
L vis	2009-06-22	04:36	03:44	90° 52'	81° 27'	3° 17'	7° 06'	0.8%	4° 39'	-9° 25'
F vis	2009-06-23	19:51	20:48	92° 26'	106° 12'	1° 17'	8° 19'	1.4%	-9° 30'	13° 46'
L vis	2009-07-21	04:54	03:45	118° 32'	105° 07'	1° 23'	10° 06'	1.4%	6° 29'	-13° 26'
F vis	2009-07-22	19:40	20:00	120° 05'	129° 36'	-0° 52'	2° 42'	0.7%	-8° 33'	9° 31'
L vis	2009-08-20	05:25	05:17	147° 18'	144° 02'	-2° 08'	0° 45'	0.1%	3° 15'	-3° 16'
F vis	2009-08-21	19:03	19:23	148° 49'	167° 16'	-3° 50'	3° 01'	2.7%	-18° 16'	18° 27'
L vis	2009-09-18	05:55	05:25	175° 25'	167° 39'	-3° 50'	4° 28'	0.6%	6° 09'	-7° 47'
F vis	2009-09-20	18:12	18:40	177° 53'	203° 21'	-5° 04'	4° 05'	5.0%	-25° 20'	25° 28'
L vis	2009-10-17	06:26	05:32	203° 59'	191° 05'	-4° 50'	8° 33'	1.4%	9° 13'	-12° 54'
F vis	2009-10-19	17:24	17:41	206° 25'	224° 34'	-4° 44'	2° 09'	2.6%	-18° 23'	18° 08'
L vis	2009-11-16	07:03	06:47	234° 01'	227° 26'	-4° 37'	1° 52'	0.5%	7° 18'	-6° 35'
F vis	2009-11-17	16:49	16:56	235° 26'	245° 33'	-3° 43'	0° 48'	0.9%	-10° 34'	10° 07'
L vis	2009-12-15	07:32	06:44	263° 25'	249° 29'	-3° 29'	6° 03'	1.6%	12° 10'	-13° 56'
F vis	2009-12-17	16:41	17:29	265° 50'	278° 39'	-1° 08'	6° 05'	1.3%	-10° 21'	12° 49'

Legenda:

date in the format year/month/day

Sun lon : celestial longitude of the Sun

Moon lon : celestial longitude of the Moon

Moon lat : celestial latitude of the Moon

Moon alt : height of the Moon on the horizon when the Sun is on the horizon

D az : difference in azimuth between the center of the Sun and of the Moon

D lon : difference in longitude between the center of the Sun and the Moon

- Friday 27/03/2009
- Topocentric calculation
- Rome, Long: 12:14:00.0, Lat: 41:48:00.0, Ele:0.0, Zone:1.00
- The calculations are in winter times, in the summer to add a hour
- Delta T: 65.18 Seconds

- T. of conjunction: 26/03/2009, 18.51 LT
- Julian day of conjunction: 2454918.22988

- Sunsetting: 18.31 LT Age of the Moon: +23H 40M
- Moon setting: 19.47 LT Moon Lag Time: +01H 16M

- T. Lunar right ascension: +01H 05M 13S T. Lunar declination: +11°:52':18"
- T. Solar right ascension: +00H 26M 22S T. Solar declination: +02°:50':56"

- T. Lunar longitude : +19°:34':07" T. Lunar latitude: +04°:33':29"
- T. Solar longitude : +07°:10':45" T. Solar latitude: -00°:00':02"

- T. Lunar altitude : +12°:20':47" T. Lunar azimuth: +274°:58':44"
- T. Solar altitude : -00°:50':11" T. Solar azimuth: +274°:34':23"

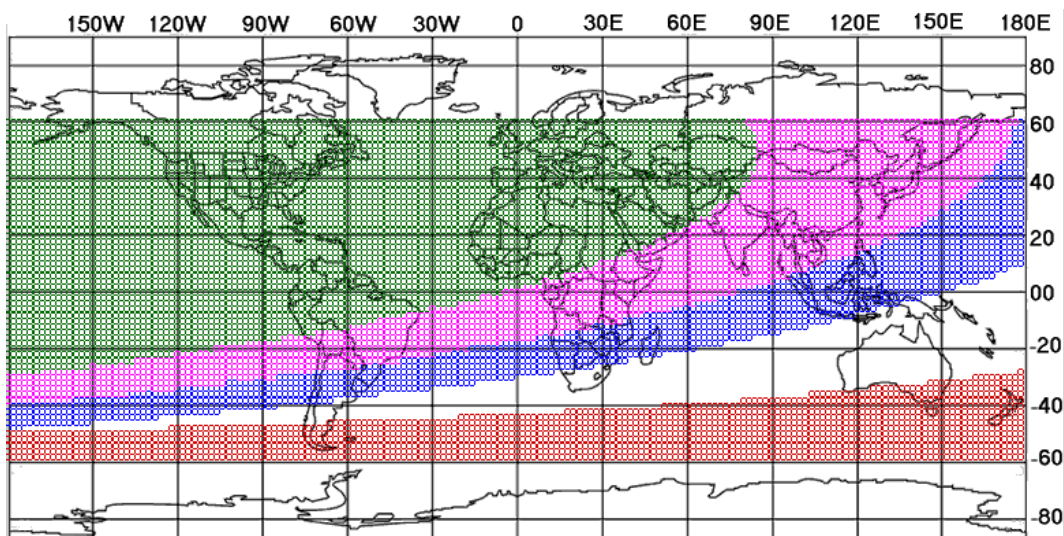
- T. Relative altitude : +13°:10':58" T. Elongation: +13°:11':20"
- T. Relative azimuth : +00°:24':20" T. Phase angle: +166°:46':40"

- T. Lunar limb: +00°:00':25" T. Lunar semidiameter: +00°:15':51"
- T. Illumination: 01.33 % G. Horizontal parallax: +00°:57':56"

- T. Magnitude : -05.30 G. Distance: 378540.51 Km

Note

- "G" means geocentric, "T" topocentric
- LT = local time



Red: not visible
White: impossible to see
Blue: visible with tools
Rosa: it could be seen to naked eye
Green: easily visible to naked eye

- Friday 24/04/2009
- Topocentric calculation
- Rome, Long: 12:14:00.0, Lat: 41:48:00.0, Ele:0.0, Zone:1.00
- The calculations are in winter times, in the summer to add a hour
- Delta T: 65.18 Seconds

- T. of conjunction: 25/04/2009, 03.48 LT
- Julian day of conjunction: 2454945.67868

- Moon rising : 04.26 LT Age of the Moon: -22H 30M
- Sunrising : 05.17 LT Moon Lag Time: +00H 51M

- T. Lunar right ascension : +01H 15M 15S T. Lunar declination: +12°:17':40"
- T. Solar right ascension : +02H 07M 30S T. Solar declination: +12°:53':38"

- T. Lunar longitude : +22°:00':16" T. Lunar latitude: +04°:00':58"
- T. Solar longitude : +34°:07':45" T. Solar latitude: -00°:00':07"

- T. Lunar altitude : +08°:13':04" T. Lunar azimuth: +80°:49':25"
- T. Solar altitude : -00°:50':04" T. Solar azimuth: +71°:47':49"

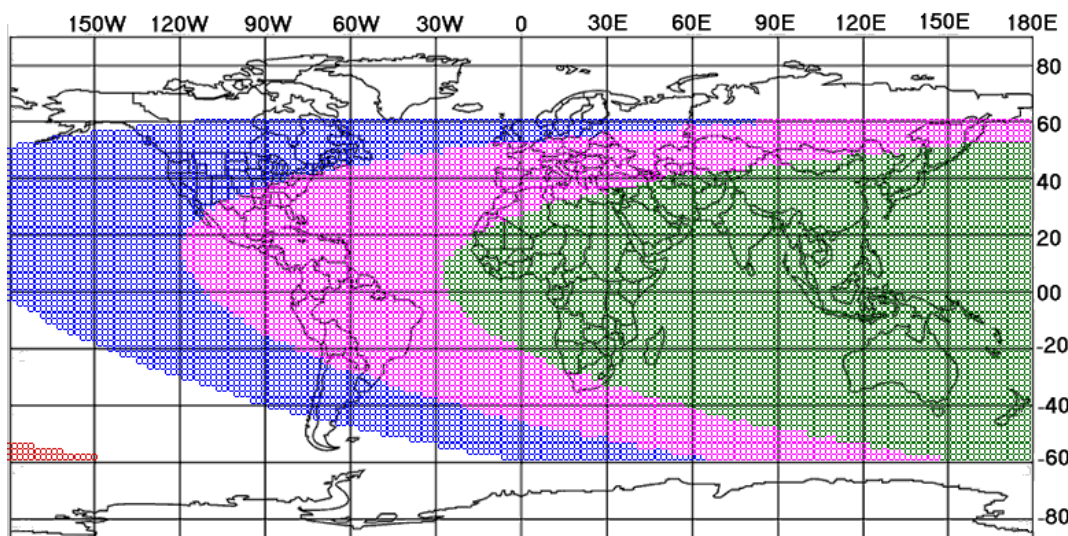
- T. Relative altitude : +09°:03':07" T. Elongation: +12°:45':49"
- T. Relative azimuth : +09°:01':36" T. Phase angle: +167°:12':17"

- T. Lunar limb : +00°:00':24" T. Lunar semidiameter: +00°:15':57"
- T. Illumination : 01.24 % G. Horizontal parallax: +00°:58':22"

- T. Magnitude : -05.26 G. Distance: 375706.64 Km

Note

- "G" means geocentric, "T" topocentric
- LT = local time



Red: not visible
White: impossible to see
Blue: visible with tools
Rosa: it could be seen to naked eye
Green: easily visible to naked eye

- Saturday 25/04/2009
- Topocentric calculation
- Rome, Long: 12:14:00.0, Lat: 41:48:00.0, Ele:0.0, Zone:1.00
- The calculations are in winter times, in the summer to add a hour
- Delta T: 65.18 Seconds

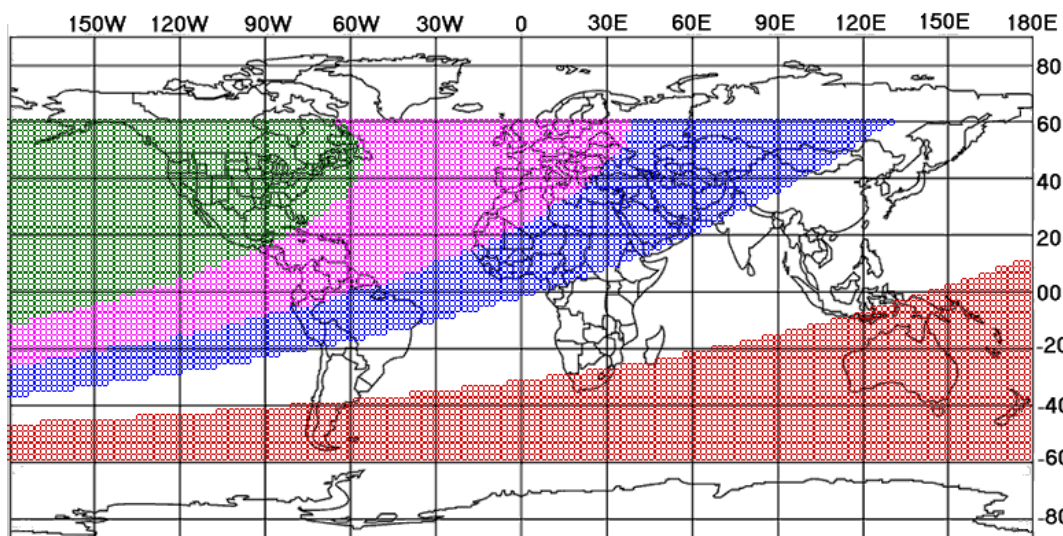
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- T. of conjunction: 25/04/2009, 03.48 LT
- Julian day of conjunction: 2454947.25201

- Sunsetting: 19.03 LT	Age of the Moon: +15H 15M
- Moon setting: 19.55 LT	Moon Lag Time: +00H 52M
- T. Lunar right ascension : +02H 35M 52S	T. Lunar declination: +20°:02':15"
- T. Solar right ascension : +02H 13M 25S	T. Solar declination: +13°:24':27"
- T. Lunar longitude : +42°:52':49"	T. Lunar latitude: +04°:33':06"
- T. Solar longitude : +35°:39':31"	T. Solar latitude: -00°:00':03"
- T. Lunar altitude : +07°:36':29"	T. Lunar azimuth: +290°:08':15"
- T. Solar altitude : -00°:50':03"	T. Solar azimuth: +288°:54':39"
- T. Relative altitude : +08°:26':32"	T. Elongation: +08°:31':50"
- T. Relative azimuth : +01°:13':36"	T. Phase angle: +171°:26':55"
- T. Lunar limb : +00°:00':11"	T. Lunar semidiameter: +00°:16':12"
- T. Illumination : 00.56 %	G. Horizontal parallax: +00°:59':18"
- T. Magnitude : -04.82	G. Distance: 369762.00 Km

Note

- "G" means geocentric, "T" topocentric
- LT = local time



Red: not visible
 White: impossible to see
 Blue: visible with tools
 Rosa: it could be seen to naked eye
 Green: easily visible to naked eye

- Tuesday 23/06/2009
 - Topocentric calculation
 - Rome, Long: 12:14:00.0, Lat: 41:48:00.0, Ele:0.0, Zone:1.00
 - The calculations are in winter times, in the summer to add a hour
 - Delta T: 65.19 Seconds

- T. of conjunction: 22/06/2009, 21.26 LT
 - Julian day of conjunction: 2455006.28457

- Sunsetting: 19.50 LT Age of the Moon: +22H 24M
 - Moon setting: 20.47 LT Moon Lag Time: +00H 57M

- T. Lunar right ascension : +07H 07M 35S T. Lunar declination: +23°:03':52"
 - T. Solar right ascension : +06H 10M 35S T. Solar declination: +23°:24':55"

- T. Lunar longitude : +105°:30':35" T. Lunar latitude: +00°:31':49"
 - T. Solar longitude : +92°:25':39" T. Solar latitude: -00°:00':06"

- T. Lunar altitude : +08°:15':49" T. Lunar azimuth: +293°:39':07"
 - T. Solar altitude : -00°:49':53" T. Solar azimuth: +303°:06':00"

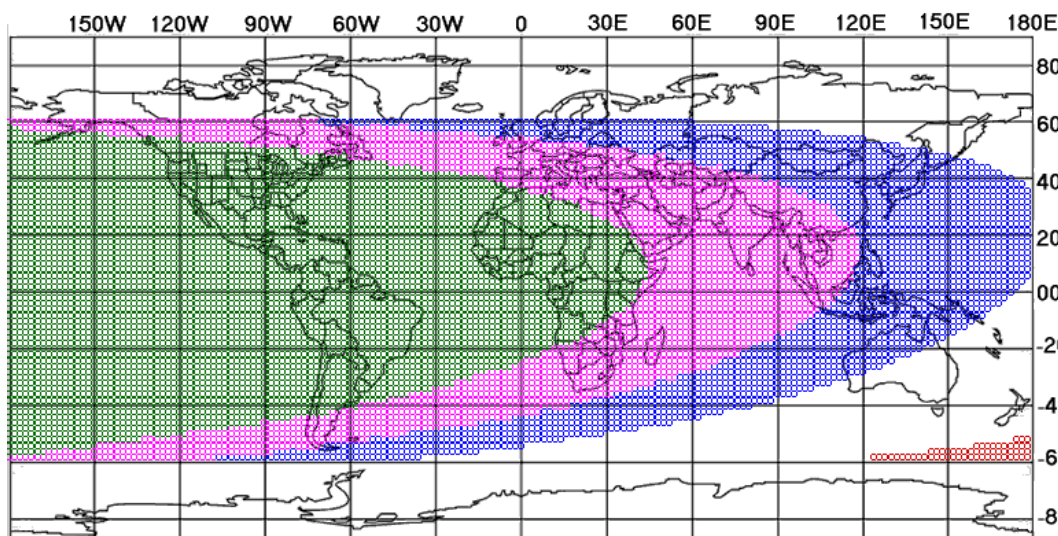
- T. Relative altitude : +09°:05':43" T. Elongation: +13°:05':35"
 - T. Relative azimuth : -09°:26':53" T. Phase angle: +166°:52':35"

- T. Lunar limb : +00°:00':26" T. Lunar semidiameter: +00°:16':44"
 - T. Illumination : 01.31 % G. Horizontal parallax: +01°:01':14"

- T. Magnitude : -05.29 G. Distance: 358124.16 Km

Note

- "G" means geocentric, "T" topocentric
 - LT = local time



Red: not visible
 White: impossible to see
 Blue: visible with tools
 Rosa: it could be seen to naked eye
 Green: easily visible to naked eye

- Tuesday 21/07/2009
- Topocentric calculation
- Rome, Long: 12:14:00.0, Lat: 41:48:00.0, Ele:0.0, Zone:1.00
- The calculations are in winter times, in the summer to add a hour
- Delta T: 65.19 Seconds

- T. of conjunction: 22/07/2009, 02.34 LT
- Julian day of conjunction: 2455033.66285

- Moon rising : 03.45 LT Age of the Moon: -21H 40M
- Sunrising : 04.55 LT Moon Lag Time: +01H 10M

- T. Lunar right ascension : +07H 09M 35S T. Lunar declination: +23°:17':57"
- T. Solar right ascension : +08H 02M 38S T. Solar declination: +20°:27':05"

- T. Lunar longitude : +105°:56':16" T. Lunar latitude: +00°:49':02"
- T. Solar longitude : +118°:32':31" T. Solar latitude: -00°:00':05"

- T. Lunar altitude : +10°:03':02" T. Lunar azimuth: +67°:38':34"
- T. Solar altitude : -00°:49':54" T. Solar azimuth: +61°:12':03"

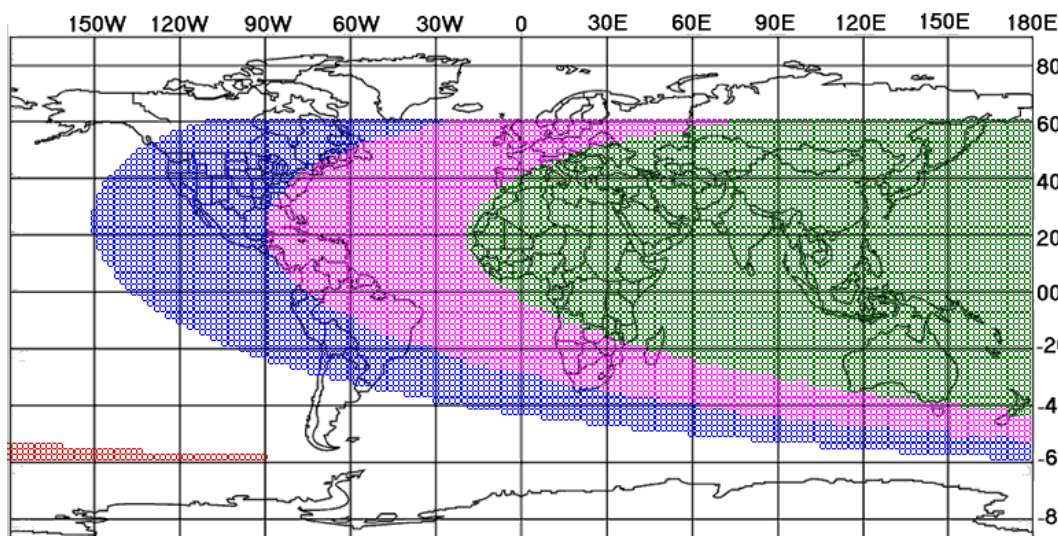
- T. Relative altitude : +10°:52':56" T. Elongation: +12°:37':49"
- T. Relative azimuth : +06°:26':31" T. Phase angle: +167°:20':25"

- T. Lunar limb : +00°:00':24" T. Lunar semidiameter: +00°:16':45"
- T. Illumination : 01.22 % G. Horizontal parallax: +01°:01':16"

- T. Magnitude : -05.24 G. Distance: 357910.32 Km

Note

- "G" means geocentric, "T" topocentric
- LT = local time



Red: not visible
White: impossible to see
Blue: visible with tools
Rosa: it could be seen with naked eye
Green: easily visible to naked eye

- Saturday 17/10/2009
- Topocentric calculation
- Rome, Long: 12:14:00.0, Lat: 41:48:00.0, Ele:0.0, Zone:1.00
- The calculations are in winter times, in the summer to add a hour
- Delta T: 65.19 Seconds

=====

- T. of conjunction: 18/10/2009, 04.55 LT
- Julian day of conjunction: 2455121.72609

- Moon rising : 05.31 LT
- Sunrising : 06.26 LT

- Age of the Moon: -22H 29M
- Moon Lag Time: +00H 55M

- T. Lunar right ascension : +12H 35M 48S
- T. Solar right ascension : +13H 28M 49S

- T. Lunar declination: -09°:30':34"
- T. Solar declination: -09°:18':20"

- T. Lunar longitude : +191°:58':02"
- T. Solar longitude : +203°:58':58"

- T. Lunar latitude: -05°:11':41"
- T. Solar latitude: -00°:00':03"

- T. Lunar altitude : +08°:29':39"
- T. Solar altitude : -00°:50':13"

- T. Lunar azimuth: +110°:57':12"
- T. Solar azimuth: +101°:45':48"

- T. Relative altitude : +09°:19':51"
- T. Relative azimuth : +09°:11':24"

- T. Elongation: +13°:04':30"
- T. Phase angle: +166°:53':32"

- T. Lunar limb : +00°:00':25"
- T. Illumination : 01.30 %

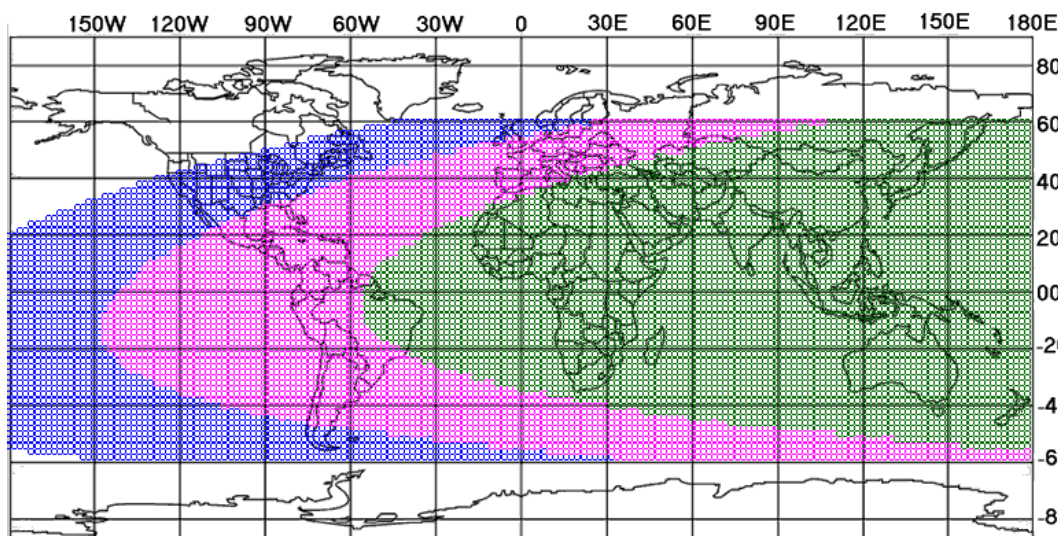
- T. Lunar semidiameter: +00°:15':59"
- G. Horizontal parallax: +00°:58':31"

- T. Magnitude : -05.29

- G. Distance: 374685.55 Km

Note

- "G" means geocentric, "T" topocentric
- LT = local time



Red: not visible
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 Blue: visible with tools
 Rosa: it could be seen with naked eye
 Green: easily visible to naked eye

Height in the twilights. The Sun is 12° under the horizon

Date	Times	Morning twilight			Times	Evening twilight		
		Alt	Az	Elong		Alt	Az	Elong
2009:01:01	06:34	-40.6	60.7	51.7	17:58	34.5	215.9	57.1
2009:01:02	06:34	-42.2	45.6	63.1	17:59	43.7	206.7	68.6
2009:01:03	06:34	-41.7	29.9	74.8	17:59	52.1	194.0	80.4
2009:01:04	06:34	-39.2	14.4	86.7	18:00	58.6	175.5	92.6
2009:01:05	06:34	-34.7	360.0	99.1	18:01	61.4	150.5	105.1
2009:01:06	06:34	-28.7	346.7	111.9	18:02	58.9	124.4	118.1
2009:01:07	06:34	-21.3	334.5	125.1	18:03	51.7	104.0	131.6
2009:01:08	06:34	-13.1	322.9	138.7	18:04	41.6	90.0	145.4
2009:01:09	06:34	-4.4	311.8	152.7	18:05	29.9	80.2	159.4
2009:01:10	06:33	4.5	300.5	166.8	18:06	17.3	72.7	173.5
2009:01:11	06:33	13.0	288.7	178.0	18:07	4.6	66.5	171.9
2009:01:12	06:33	20.7	276.0	164.8	18:08	-8.2	60.9	158.1
2009:01:13	06:33	27.1	262.2	151.0	18:09	-20.5	55.2	144.5
2009:01:14	06:33	31.8	247.4	137.6	18:10	-32.3	49.1	131.3
2009:01:15	06:32	34.4	231.9	124.7	18:11	-43.2	41.5	118.6
2009:01:16	06:32	34.9	216.3	112.3	18:12	-53.1	31.3	106.4
2009:01:17	06:31	33.6	201.5	100.3	18:13	-61.3	16.2	94.6
2009:01:18	06:31	30.7	187.8	88.7	18:14	-66.6	353.5	83.2
2009:01:19	06:31	26.6	175.4	77.4	18:15	-67.4	325.4	72.0
2009:01:20	06:30	21.8	164.1	66.4	18:16	-63.5	301.2	61.0
2009:01:21	06:30	16.4	153.7	55.5	18:17	-56.6	285.0	50.2
2009:01:22	06:29	10.7	143.9	44.7	18:18	-48.2	274.4	39.4
2009:01:23	06:28	4.8	134.5	33.9	18:19	-39.0	267.2	28.6
2009:01:24	06:28	-1.1	125.1	23.1	18:21	-29.3	261.9	17.7
2009:01:25	06:27	-7.0	115.5	12.2	18:22	-19.2	257.6	6.8
2009:01:26	06:26	-12.6	105.6	1.2	18:23	-8.9	253.9	4.3
2009:01:27	06:26	-17.8	95.1	9.9	18:24	1.7	250.6	15.5
2009:01:28	06:25	-22.4	83.9	21.2	18:25	12.5	247.2	26.9
2009:01:29	06:24	-26.3	71.7	32.7	18:26	23.4	243.5	38.5
2009:01:30	06:23	-29.1	58.7	44.3	18:27	34.5	239.0	50.2
2009:01:31	06:23	-30.6	44.9	56.2	18:28	45.6	232.9	62.2
2009:02:01	06:22	-30.8	30.6	68.2	18:30	56.3	223.5	74.4
2009:02:02	06:21	-29.5	16.1	80.6	18:31	65.9	206.3	87.0
2009:02:03	06:20	-26.7	1.8	93.2	18:32	71.5	173.6	99.8
2009:02:04	06:19	-22.6	347.9	106.2	18:33	69.1	134.3	113.0
2009:02:05	06:18	-17.5	334.6	119.5	18:34	60.0	110.3	126.4
2009:02:06	06:17	-11.5	321.6	133.1	18:35	48.2	97.9	140.1
2009:02:07	06:16	-5.1	308.9	146.9	18:37	35.4	90.6	154.0
2009:02:08	06:15	1.4	296.2	160.7	18:38	22.2	85.6	167.9
2009:02:09	06:14	7.7	283.4	174.5	18:39	9.0	81.8	178.0
2009:02:10	06:12	13.5	270.3	171.7	18:40	-4.0	78.4	164.7
2009:02:11	06:11	18.3	256.8	158.3	18:41	-16.6	75.1	151.5
2009:02:12	06:10	22.0	243.0	145.4	18:42	-28.8	71.6	138.8
2009:02:13	06:09	24.4	229.1	132.8	18:44	-40.3	67.3	126.4
2009:02:14	06:08	25.5	215.2	120.7	18:45	-51.2	61.3	114.5
2009:02:15	06:06	25.3	201.7	109.0	18:46	-61.2	51.9	103.0
2009:02:16	06:05	24.0	188.7	97.7	18:47	-69.6	34.9	91.8
2009:02:17	06:04	21.7	176.4	86.6	18:48	-74.5	3.3	80.8
2009:02:18	06:02	18.8	164.7	75.7	18:49	-72.8	325.5	69.9
2009:02:19	06:01	15.2	153.5	64.9	18:51	-66.1	302.0	59.1
2009:02:20	06:00	11.2	142.6	54.1	18:52	-57.2	289.7	48.3
2009:02:21	05:58	6.8	132.0	43.2	18:53	-47.5	282.6	37.4
2009:02:22	05:57	2.3	121.5	32.3	18:54	-37.2	277.9	26.3
2009:02:23	05:55	-2.4	110.9	21.2	18:55	-26.6	274.4	15.2
2009:02:24	05:54	-7.0	100.0	10.0	18:56	-15.6	271.6	4.2
2009:02:25	05:53	-11.4	88.8	3.0	18:58	-4.4	269.1	8.5
2009:02:26	05:51	-15.5	76.9	13.8	18:59	7.2	266.6	20.2
2009:02:27	05:50	-19.0	64.5	25.6	19:00	18.9	263.8	32.3
2009:02:28	05:48	-21.8	51.4	37.8	19:01	30.8	260.5	44.6
2009:03:01	05:46	-23.6	37.7	50.1	19:02	42.7	255.8	57.1
2009:03:02	05:45	-24.3	23.5	62.7	19:03	54.5	248.5	69.7
2009:03:03	05:43	-23.8	9.2	75.4	19:05	65.5	234.7	82.6
2009:03:04	05:42	-22.2	354.8	88.3	19:06	73.5	204.1	95.6
2009:03:05	05:40	-19.4	340.7	101.4	19:07	73.0	156.8	108.8
2009:03:06	05:38	-15.8	326.9	114.6	19:08	64.1	128.3	122.1
2009:03:07	05:37	-11.4	313.4	128.0	19:09	52.4	115.4	135.5
2009:03:08	05:35	-6.5	300.2	141.3	19:10	39.8	108.3	148.9
2009:03:09	05:34	-1.4	287.3	154.6	19:12	27.0	103.7	162.1
2009:03:10	05:32	3.6	274.4	167.7	19:13	14.3	100.3	174.4
2009:03:11	05:30	8.3	261.6	176.3	19:14	1.8	97.3	170.7
2009:03:12	05:28	12.5	248.7	165.5	19:15	-10.4	94.4	158.5
2009:03:13	05:27	15.9	235.7	153.3	19:16	-22.1	91.3	146.3
2009:03:14	05:25	18.5	222.7	141.3	19:17	-33.4	87.7	134.5
2009:03:15	05:23	20.2	209.8	129.6	19:19	-44.0	82.9	122.9
2009:03:16	05:22	20.9	197.0	118.2	19:20	-54.1	76.0	111.7
2009:03:17	05:20	20.8	184.5	107.1	19:21	-63.2	64.9	100.6
2009:03:18	05:18	19.8	172.2	96.1	19:22	-70.4	44.8	89.8
2009:03:19	05:16	18.1	160.2	85.3	19:23	-73.4	11.8	78.9

Date	Times	Morning twilight			Times	Evening twilight		
		Alt	Az	Elong		Alt	Az	Elong
2009:03:20	05:15	15.8	148.6	74.5	19:24	-70.2	338.9	68.1
2009:03:21	05:13	12.9	137.1	63.6	19:26	-62.9	319.0	57.1
2009:03:22	05:11	9.5	125.9	52.6	19:27	-53.8	307.8	46.0
2009:03:23	05:09	5.7	114.6	41.5	19:28	-43.6	300.7	34.7
2009:03:24	05:07	1.6	103.3	30.1	19:29	-32.9	295.7	23.2
2009:03:25	05:06	-2.6	91.8	18.5	19:30	-21.7	291.7	11.6
2009:03:26	05:04	-6.9	79.9	7.4	19:32	-10.2	288.2	4.6
2009:03:27	05:02	-11.1	67.6	7.7	19:33	1.7	284.7	14.6
2009:03:28	05:00	-14.8	54.7	19.5	19:34	13.8	281.0	27.1
2009:03:29	04:58	-18.0	41.3	32.1	19:35	26.0	276.5	39.9
2009:03:30	04:56	-20.4	27.3	44.9	19:36	38.0	270.7	52.9
2009:03:31	04:55	-21.8	12.9	57.9	19:38	49.6	262.1	66.0
2009:04:01	04:53	-22.1	358.3	71.0	19:39	60.0	247.8	79.1
2009:04:02	04:51	-21.3	343.7	84.1	19:40	67.4	222.7	92.2
2009:04:03	04:49	-19.4	329.3	97.2	19:41	68.4	187.2	105.3
2009:04:04	04:47	-16.5	315.4	110.3	19:43	62.4	158.7	118.4
2009:04:05	04:45	-12.9	301.9	123.3	19:44	52.7	142.2	131.3
2009:04:06	04:44	-8.8	288.9	136.2	19:45	41.6	132.3	144.2
2009:04:07	04:42	-4.4	276.2	148.9	19:46	30.1	125.6	156.7
2009:04:08	04:40	0.2	263.9	161.3	19:48	18.6	120.4	168.7
2009:04:09	04:38	4.7	251.7	172.6	19:49	7.2	115.9	174.8
2009:04:10	04:36	8.8	239.5	171.9	19:50	-3.9	111.6	165.1
2009:04:11	04:35	12.5	227.4	161.0	19:52	-14.6	107.3	153.7
2009:04:12	04:33	15.7	215.2	149.6	19:53	-24.9	102.4	142.3
2009:04:13	04:31	18.1	203.0	138.3	19:54	-34.6	96.5	131.2
2009:04:14	04:29	19.8	190.7	127.2	19:55	-43.7	89.1	120.1
2009:04:15	04:27	20.7	178.4	116.3	19:57	-51.9	79.0	109.3
2009:04:16	04:26	20.8	166.2	105.4	19:58	-58.7	64.6	98.4
2009:04:17	04:24	20.1	154.0	94.6	19:59	-63.0	44.7	87.6
2009:04:18	04:22	18.6	142.0	83.8	20:01	-63.6	20.9	76.6
2009:04:19	04:20	16.4	130.1	72.8	20:02	-60.3	358.8	65.5
2009:04:20	04:18	13.4	118.2	61.6	20:03	-53.9	342.0	54.1
2009:04:21	04:17	9.9	106.4	50.1	20:05	-45.5	329.9	42.4
2009:04:22	04:15	5.8	94.6	38.3	20:06	-35.8	320.7	30.3
2009:04:23	04:13	1.3	82.6	26.2	20:07	-25.4	313.4	18.1
2009:04:24	04:12	-3.5	70.4	14.0	20:09	-14.3	306.9	6.7
2009:04:25	04:10	-8.4	57.8	5.0	20:10	-2.9	300.7	10.0
2009:04:26	04:08	-13.0	44.7	14.0	20:11	8.6	294.2	22.6
2009:04:27	04:06	-17.1	31.0	27.0	20:13	20.1	287.0	35.9
2009:04:28	04:05	-20.5	16.7	40.3	20:14	31.0	278.3	49.4
2009:04:29	04:03	-22.9	2.0	53.7	20:16	41.0	267.2	62.8
2009:04:30	04:02	-24.0	347.0	67.1	20:17	49.2	252.3	76.1
2009:05:01	04:00	-23.8	332.1	80.3	20:18	54.6	232.7	89.2
2009:05:02	03:58	-22.4	317.5	93.4	20:20	55.9	210.0	102.1
2009:05:03	03:57	-19.9	303.6	106.2	20:21	52.9	188.6	114.9
2009:05:04	03:55	-16.5	290.3	118.8	20:22	46.8	171.6	127.4
2009:05:05	03:54	-12.5	277.7	131.2	20:24	38.9	158.7	139.6
2009:05:06	03:52	-8.0	265.6	143.4	20:25	30.0	148.8	151.6
2009:05:07	03:51	-3.2	254.0	155.3	20:27	20.8	140.6	163.3
2009:05:08	03:49	1.7	242.8	166.7	20:28	11.5	133.4	173.5
2009:05:09	03:48	6.4	231.6	175.1	20:29	2.3	126.6	171.3
2009:05:10	03:46	10.9	220.4	168.3	20:31	-6.6	120.0	160.8
2009:05:11	03:45	15.0	209.2	157.5	20:32	-15.1	113.0	149.9
2009:05:12	03:43	18.6	197.7	146.6	20:33	-23.1	105.4	139.0
2009:05:13	03:42	21.4	185.9	135.7	20:35	-30.5	96.8	128.1
2009:05:14	03:41	23.5	173.9	124.9	20:36	-37.1	86.8	117.3
2009:05:15	03:39	24.8	161.5	114.1	20:37	-42.5	74.9	106.4
2009:05:16	03:38	25.0	149.0	103.2	20:39	-46.4	61.0	95.5
2009:05:17	03:37	24.3	136.4	92.2	20:40	-48.3	45.1	84.3
2009:05:18	03:36	22.5	123.8	81.0	20:41	-47.8	28.5	72.9
2009:05:19	03:35	19.7	111.4	69.5	20:42	-45.0	12.3	61.1
2009:05:20	03:33	15.9	99.1	57.7	20:44	-40.0	357.7	49.0
2009:05:21	03:32	11.2	86.9	45.4	20:45	-33.2	344.8	36.4
2009:05:22	03:31	5.7	74.8	32.8	20:46	-25.2	333.3	23.5
2009:05:23	03:30	-0.2	62.7	19.8	20:47	-16.3	322.9	10.5
2009:05:24	03:29	-6.5	50.3	7.2	20:49	-6.9	312.9	6.0
2009:05:25	03:28	-12.8	37.5	9.1	20:50	2.6	303.0	18.6
2009:05:26	03:27	-18.6	24.1	22.4	20:51	11.8	292.6	32.3
2009:05:27	03:26	-23.7	9.9	36.1	20:52	20.4	281.3	46.1
2009:05:28	03:25	-27.5	355.0	49.8	20:53	27.8	268.8	59.7
2009:05:29	03:25	-29.8	339.6	63.4	20:54	33.6	254.9	73.0
2009:05:30	03:24	-30.5	324.1	76.6	20:55	37.5	239.6	86.0
2009:05:31	03:23	-29.5	309.1	89.5	20:56	39.0	223.5	98.7
2009:06:01	03:22	-27.0	294.9	102.0	20:57	38.3	207.7	111.0
2009:06:02	03:22	-23.4	281.7	114.3	20:58	35.6	192.9	123.1
2009:06:03	03:21	-18.8	269.6	126.3	20:59	31.5	179.6	134.9
2009:06:04	03:20	-13.5	258.5	138.0	21:00	26.3	167.7	146.5
2009:06:05	03:20	-7.9	248.0	149.5	21:01	20.4	157.0	157.9
2009:06:06	03:19	-1.9	238.0	160.8	21:02	14.2	147.2	168.9
2009:06:07	03:19	4.0	228.2	171.6	21:03	7.8	138.0	176.4
2009:06:08	03:19	9.9	218.5	175.0	21:04	1.5	129.0	167.8

Date	Times	Morning twilight			Times	Evening twilight		
		Alt	Az	Elong		Alt	Az	Elong
2009:06:09	03:18	15.6	208.6	165.1	21:04	-4.7	120.1	157.2
2009:06:10	03:18	20.9	198.3	154.4	21:05	-10.6	110.9	146.4
2009:06:11	03:18	25.7	187.4	143.6	21:06	-16.0	101.4	135.5
2009:06:12	03:17	29.7	175.7	132.7	21:06	-21.0	91.3	124.6
2009:06:13	03:17	32.6	163.1	121.8	21:07	-25.3	80.3	113.6
2009:06:14	03:17	34.4	149.8	110.8	21:07	-28.7	68.5	102.5
2009:06:15	03:17	34.6	135.9	99.6	21:08	-31.1	55.7	91.0
2009:06:16	03:17	33.2	121.9	88.1	21:08	-32.3	42.1	79.3
2009:06:17	03:17	30.2	108.2	76.2	21:09	-32.0	27.9	67.2
2009:06:18	03:17	25.6	95.1	64.0	21:09	-30.3	13.4	54.6
2009:06:19	03:17	19.5	82.8	51.3	21:10	-27.1	359.1	41.5
2009:06:20	03:17	12.3	71.2	38.1	21:10	-22.6	345.2	28.0
2009:06:21	03:18	4.2	60.0	24.5	21:10	-17.0	331.7	14.3
2009:06:22	03:18	-4.5	49.0	10.7	21:10	-10.7	318.7	2.5
2009:06:23	03:18	-13.3	37.8	4.5	21:10	-4.1	305.9	14.6
2009:06:24	03:19	-21.9	25.9	18.2	21:10	2.5	293.3	28.6
2009:06:25	03:19	-29.6	13.0	32.2	21:10	8.7	280.6	42.5
2009:06:26	03:19	-35.9	358.5	46.1	21:10	14.1	267.8	56.1
2009:06:27	03:20	-40.4	342.4	59.5	21:10	18.7	254.7	69.3
2009:06:28	03:20	-42.4	325.4	72.6	21:10	22.1	241.3	82.1
2009:06:29	03:21	-42.0	308.6	85.3	21:10	24.3	227.9	94.4
2009:06:30	03:21	-39.4	293.0	97.5	21:10	25.3	214.5	106.4
2009:07:01	03:22	-34.9	279.3	109.5	21:10	25.2	201.3	118.1
2009:07:02	03:23	-29.2	267.6	121.1	21:09	24.0	188.6	129.5
2009:07:03	03:23	-22.6	257.5	132.5	21:09	22.0	176.3	140.8
2009:07:04	03:24	-15.4	248.5	143.7	21:09	19.2	164.6	151.9
2009:07:05	03:25	-7.9	240.4	154.8	21:08	15.9	153.3	162.9
2009:07:06	03:26	-0.1	232.8	165.7	21:08	12.1	142.5	173.7
2009:07:07	03:27	7.8	225.4	176.5	21:07	8.1	132.0	175.1
2009:07:08	03:28	15.6	217.8	172.3	21:07	3.9	121.6	164.3
2009:07:09	03:28	23.3	209.7	161.4	21:06	-0.4	111.3	153.4
2009:07:10	03:29	30.7	200.7	150.5	21:05	-4.6	101.0	142.5
2009:07:11	03:30	37.5	190.2	139.5	21:05	-8.7	90.4	131.4
2009:07:12	03:31	43.3	177.8	128.4	21:04	-12.6	79.4	120.1
2009:07:13	03:32	47.5	162.9	117.1	21:03	-16.1	67.9	108.7
2009:07:14	03:33	49.5	145.7	105.5	21:02	-19.1	55.8	96.9
2009:07:15	03:34	48.7	127.6	93.7	21:02	-21.5	43.0	84.9
2009:07:16	03:36	45.0	110.6	81.5	21:01	-23.0	29.4	72.4
2009:07:17	03:37	38.7	95.9	68.9	21:00	-23.5	15.1	59.5
2009:07:18	03:38	30.4	83.7	55.8	20:59	-22.9	0.3	46.1
2009:07:19	03:39	20.7	73.4	42.3	20:58	-21.1	345.4	32.3
2009:07:20	03:40	9.9	64.5	28.4	20:57	-18.1	330.5	18.2
2009:07:21	03:41	-1.4	56.2	14.2	20:56	-14.2	316.0	4.0
2009:07:22	03:42	-12.9	48.1	0.1	20:54	-9.6	301.9	10.3
2009:07:23	03:44	-24.3	39.4	14.3	20:53	-4.7	288.3	24.4
2009:07:24	03:45	-35.0	29.5	28.4	20:52	0.3	275.0	38.2
2009:07:25	03:46	-44.5	17.3	42.0	20:51	5.1	262.1	51.5
2009:07:26	03:47	-52.1	1.6	55.3	20:50	9.4	249.5	64.4
2009:07:27	03:49	-56.8	341.7	68.1	20:48	13.2	236.9	76.9
2009:07:28	03:50	-57.7	319.6	80.4	20:47	16.2	224.5	88.9
2009:07:29	03:51	-54.8	299.3	92.4	20:46	18.5	212.0	100.6
2009:07:30	03:53	-49.2	283.5	103.9	20:44	20.0	199.6	111.9
2009:07:31	03:54	-42.0	271.6	115.3	20:43	20.7	187.3	123.1
2009:08:01	03:55	-33.8	262.7	126.4	20:42	20.6	175.0	134.1
2009:08:02	03:56	-25.0	255.6	137.4	20:40	19.7	163.0	145.0
2009:08:03	03:58	-15.9	249.7	148.3	20:39	18.1	151.1	155.8
2009:08:04	03:59	-6.6	244.5	159.2	20:37	15.9	139.5	166.7
2009:08:05	04:00	2.9	239.6	170.0	20:36	13.0	128.1	177.4
2009:08:06	04:02	12.6	234.8	178.4	20:34	9.8	116.9	171.3
2009:08:07	04:03	22.3	229.6	167.8	20:33	6.1	105.8	160.2
2009:08:08	04:04	31.9	223.6	156.7	20:31	2.2	94.8	149.0
2009:08:09	04:06	41.4	216.2	145.4	20:29	-2.0	83.7	137.6
2009:08:10	04:07	50.4	206.0	134.0	20:28	-6.1	72.4	126.1
2009:08:11	04:08	58.1	191.1	122.3	20:26	-10.2	60.8	114.3
2009:08:12	04:09	63.3	169.1	110.4	20:25	-14.0	48.6	102.2
2009:08:13	04:11	63.8	141.6	98.2	20:23	-17.4	35.8	89.8
2009:08:14	04:12	59.0	117.2	85.7	20:21	-20.2	22.2	77.0
2009:08:15	04:13	50.5	100.3	72.8	20:20	-22.1	7.9	63.9
2009:08:16	04:15	39.9	89.1	59.5	20:18	-22.9	352.9	50.4
2009:08:17	04:16	28.0	81.1	45.9	20:16	-22.4	337.6	36.6
2009:08:18	04:17	15.4	74.9	32.0	20:14	-20.6	322.2	22.7
2009:08:19	04:19	2.5	69.6	18.0	20:13	-17.7	307.2	8.8
2009:08:20	04:20	-10.4	64.6	4.4	20:11	-13.7	292.8	6.0
2009:08:21	04:21	-23.2	59.5	10.5	20:09	-9.2	279.1	19.4
2009:08:22	04:22	-35.5	53.5	24.1	20:07	-4.3	266.0	32.8
2009:08:23	04:24	-47.1	45.6	37.3	20:06	0.7	253.4	45.8
2009:08:24	04:25	-57.5	34.1	50.2	20:04	5.4	241.3	58.3
2009:08:25	04:26	-65.6	15.3	62.6	20:02	9.8	229.3	70.4
2009:08:26	04:27	-69.7	346.3	74.5	20:00	13.7	217.5	82.0
2009:08:27	04:29	-67.8	315.4	86.1	19:58	16.9	205.6	93.4
2009:08:28	04:30	-61.6	294.1	97.4	19:57	19.5	193.6	104.5

Date	Times	Morning twilight			Times	Evening twilight		
		Alt	Az	Elong		Alt	Az	Elong
2009:08:29	04:31	-53.3	281.4	108.4	19:55	21.3	181.5	115.4
2009:08:30	04:32	-44.0	273.3	119.4	19:53	22.3	169.2	126.3
2009:08:31	04:34	-34.4	267.7	130.2	19:51	22.4	156.8	137.1
2009:09:01	04:35	-24.4	263.5	141.1	19:49	21.6	144.5	148.0
2009:09:02	04:36	-14.2	260.0	152.0	19:47	19.9	132.3	158.9
2009:09:03	04:37	-3.8	257.0	162.9	19:45	17.3	120.3	169.6
2009:09:04	04:38	6.8	254.0	173.4	19:44	14.1	108.5	176.2
2009:09:05	04:40	17.6	250.8	173.3	19:42	10.2	96.9	166.6
2009:09:06	04:41	28.6	247.2	162.4	19:40	5.7	85.4	155.2
2009:09:07	04:42	39.6	242.5	150.8	19:38	0.9	74.0	143.5
2009:09:08	04:43	50.5	235.8	139.0	19:36	-4.0	62.5	131.5
2009:09:09	04:44	60.9	224.6	126.9	19:34	-9.1	50.7	119.3
2009:09:10	04:45	69.4	203.0	114.6	19:32	-13.9	38.5	106.9
2009:09:11	04:47	72.6	164.7	102.0	19:31	-18.3	25.6	94.2
2009:09:12	04:48	67.5	129.2	89.2	19:29	-22.0	11.8	81.2
2009:09:13	04:49	57.5	110.4	76.1	19:27	-24.6	357.3	68.1
2009:09:14	04:50	45.7	100.4	62.8	19:25	-26.1	342.0	54.7
2009:09:15	04:51	33.0	94.2	49.3	19:23	-26.0	326.4	41.1
2009:09:16	04:52	19.9	89.8	35.7	19:21	-24.3	310.9	27.5
2009:09:17	04:53	6.7	86.2	22.2	19:19	-21.3	296.0	14.2
2009:09:18	04:55	-6.4	82.9	9.2	19:18	-17.1	281.9	4.3
2009:09:19	04:56	-19.2	79.6	6.8	19:16	-12.1	268.7	13.9
2009:09:20	04:57	-31.7	75.8	19.0	19:14	-6.7	256.3	26.5
2009:09:21	04:58	-43.6	70.8	31.5	19:12	-1.1	244.5	38.9
2009:09:22	04:59	-54.7	63.6	43.8	19:10	4.4	233.1	50.9
2009:09:23	05:00	-64.6	51.3	55.8	19:09	9.7	221.9	62.6
2009:09:24	05:01	-72.1	28.0	67.3	19:07	14.4	210.7	74.0
2009:09:25	05:02	-74.2	350.0	78.6	19:05	18.6	199.3	85.1
2009:09:26	05:03	-69.7	317.9	89.6	19:03	22.1	187.6	96.0
2009:09:27	05:05	-61.6	300.8	100.5	19:01	24.8	175.5	106.8
2009:09:28	05:06	-52.3	291.4	111.4	19:00	26.5	162.9	117.6
2009:09:29	05:07	-42.5	285.6	122.2	18:58	27.1	150.1	128.5
2009:09:30	05:08	-32.2	281.5	133.1	18:56	26.6	137.0	139.4
2009:10:01	05:09	-21.7	278.3	144.2	18:54	24.8	124.1	150.5
2009:10:02	05:10	-10.9	275.5	155.3	18:53	21.9	111.4	161.7
2009:10:03	05:11	0.2	272.8	166.5	18:51	17.9	99.1	172.3
2009:10:04	05:12	11.6	270.1	175.1	18:49	13.1	87.1	172.3
2009:10:05	05:13	23.2	266.9	167.8	18:47	7.5	75.5	161.3
2009:10:06	05:14	34.9	262.8	156.1	18:46	1.5	64.1	149.2
2009:10:07	05:16	46.6	257.0	143.7	18:44	-4.8	52.7	136.7
2009:10:08	05:17	57.9	247.4	131.2	18:42	-11.2	41.0	124.1
2009:10:09	05:18	67.7	228.9	118.4	18:41	-17.2	28.8	111.3
2009:10:10	05:19	73.0	192.6	105.5	18:39	-22.7	15.8	98.3
2009:10:11	05:20	69.4	152.5	92.5	18:38	-27.2	1.7	85.3
2009:10:12	05:21	59.8	130.7	79.4	18:36	-30.3	346.7	72.1
2009:10:13	05:22	48.2	119.5	66.2	18:34	-31.8	331.0	59.0
2009:10:14	05:23	35.9	112.8	53.0	18:33	-31.4	315.0	45.8
2009:10:15	05:24	23.3	108.1	39.9	18:31	-29.2	299.5	32.7
2009:10:16	05:25	10.7	104.3	26.9	18:30	-25.4	285.0	19.9
2009:10:17	05:26	-1.8	100.8	14.3	18:28	-20.3	271.7	8.1
2009:10:18	05:27	-14.0	97.3	5.0	18:27	-14.4	259.5	8.0
2009:10:19	05:29	-25.7	93.4	12.9	18:25	-8.0	248.2	19.2
2009:10:20	05:30	-37.0	88.6	24.6	18:24	-1.5	237.6	31.0
2009:10:21	05:31	-47.6	82.1	36.3	18:22	5.0	227.4	42.5
2009:10:22	05:32	-57.2	72.5	47.8	18:21	11.3	217.2	53.8
2009:10:23	05:33	-65.3	56.7	59.0	18:20	17.2	206.8	64.9
2009:10:24	05:34	-70.2	31.1	70.1	18:18	22.5	196.1	75.8
2009:10:25	05:35	-70.0	359.5	80.9	18:17	27.1	184.6	86.6
2009:10:26	05:36	-64.9	335.1	91.7	18:16	30.7	172.3	97.4
2009:10:27	05:37	-57.1	320.2	102.6	18:14	33.2	159.2	108.3
2009:10:28	05:38	-48.0	310.8	113.5	18:13	34.2	145.4	119.3
2009:10:29	05:40	-38.1	304.3	124.6	18:12	33.7	131.2	130.5
2009:10:30	05:41	-27.8	299.2	135.9	18:11	31.4	117.1	141.9
2009:10:31	05:42	-17.0	294.9	147.5	18:09	27.6	103.7	153.6
2009:11:01	05:43	-5.8	290.9	159.3	18:08	22.3	90.9	165.4
2009:11:02	05:44	5.7	286.8	170.9	18:07	15.9	79.0	175.0
2009:11:03	05:45	17.5	282.2	173.1	18:06	8.5	67.8	167.5
2009:11:04	05:46	29.3	276.5	161.5	18:05	0.6	56.9	155.0
2009:11:05	05:47	40.8	268.9	148.7	18:04	-7.5	46.1	142.0
2009:11:06	05:48	51.6	257.7	135.6	18:03	-15.5	34.9	128.9
2009:11:07	05:50	60.5	239.7	122.4	18:02	-23.1	23.1	115.7
2009:11:08	05:51	65.3	212.1	109.2	18:01	-29.9	10.0	102.5
2009:11:09	05:52	63.6	181.2	96.1	18:00	-35.3	355.5	89.4
2009:11:10	05:53	56.6	158.6	83.0	17:59	-38.8	339.6	76.5
2009:11:11	05:54	46.8	144.5	70.0	17:58	-40.1	322.7	63.6
2009:11:12	05:55	36.0	135.1	57.2	17:57	-39.0	305.9	50.9
2009:11:13	05:56	24.8	128.1	44.6	17:56	-35.7	290.3	38.3
2009:11:14	05:57	13.5	122.3	32.1	17:56	-30.6	276.4	26.0
2009:11:15	05:58	2.4	117.1	19.9	17:55	-24.3	264.3	14.1
2009:11:16	05:59	-8.5	112.0	8.5	17:54	-17.2	253.7	4.5
2009:11:17	06:01	-19.0	106.5	6.3	17:54	-9.6	244.1	11.2

Date	Times	Morning twilight			Times	Evening twilight		
		Alt	Az	Elong		Alt	Az	Elong
2009:11:18	06:02	-28.9	100.2	16.8	17:53	-1.8	235.2	22.3
2009:11:19	06:03	-38.2	92.6	28.0	17:52	5.9	226.6	33.5
2009:11:20	06:04	-46.5	82.9	39.1	17:52	13.5	217.9	44.5
2009:11:21	06:05	-53.4	70.1	50.0	17:51	20.8	209.0	55.4
2009:11:22	06:06	-58.3	53.1	60.9	17:51	27.6	199.3	66.2
2009:11:23	06:07	-60.2	32.7	71.7	17:50	33.8	188.4	77.0
2009:11:24	06:08	-58.7	11.9	82.5	17:50	38.8	176.0	87.8
2009:11:25	06:09	-54.2	354.3	93.4	17:49	42.5	161.8	98.8
2009:11:26	06:10	-47.5	340.6	104.5	17:49	44.3	146.1	110.0
2009:11:27	06:11	-39.4	330.0	115.8	17:48	43.7	129.6	121.5
2009:11:28	06:12	-30.3	321.4	127.5	17:48	40.6	113.6	133.3
2009:11:29	06:13	-20.5	313.9	139.6	17:48	35.3	99.0	145.6
2009:11:30	06:14	-10.0	307.0	152.1	17:48	28.1	86.3	158.2
2009:12:01	06:15	0.8	300.1	164.8	17:47	19.4	75.1	170.9
2009:12:02	06:16	11.8	292.7	176.2	17:47	9.9	65.0	174.0
2009:12:03	06:17	22.6	284.2	167.5	17:47	-0.3	55.6	161.1
2009:12:04	06:18	32.9	273.9	154.1	17:47	-10.6	46.3	147.5
2009:12:05	06:18	42.0	260.7	140.4	17:47	-20.8	36.7	133.9
2009:12:06	06:19	48.8	243.6	126.8	17:47	-30.4	25.9	120.4
2009:12:07	06:20	52.2	222.9	113.4	17:47	-38.8	13.4	107.1
2009:12:08	06:21	51.5	201.2	100.2	17:47	-45.6	358.3	94.0
2009:12:09	06:22	47.2	182.2	87.3	17:47	-50.0	340.4	81.2
2009:12:10	06:23	40.4	167.1	74.6	17:47	-51.2	320.7	68.7
2009:12:11	06:23	32.3	155.3	62.2	17:47	-49.1	301.8	56.4
2009:12:12	06:24	23.5	145.7	50.1	17:47	-44.4	285.7	44.4
2009:12:13	06:25	14.4	137.3	38.1	17:48	-37.8	272.6	32.5
2009:12:14	06:26	5.4	129.7	26.4	17:48	-30.0	262.2	20.9
2009:12:15	06:26	-3.5	122.3	14.9	17:48	-21.5	253.6	9.6
2009:12:16	06:27	-12.0	114.8	4.1	17:49	-12.7	246.1	3.1
2009:12:17	06:28	-20.1	106.7	8.2	17:49	-3.7	239.4	13.4
2009:12:18	06:28	-27.5	97.9	19.1	17:49	5.3	233.1	24.3
2009:12:19	06:29	-34.1	87.8	30.0	17:50	14.3	226.7	35.1
2009:12:20	06:29	-39.5	76.2	40.8	17:50	23.2	220.0	45.9
2009:12:21	06:30	-43.6	62.9	51.6	17:51	31.8	212.4	56.7
2009:12:22	06:30	-45.8	48.1	62.4	17:51	39.9	203.2	67.5
2009:12:23	06:31	-46.0	32.6	73.3	17:52	47.2	191.7	78.5
2009:12:24	06:31	-44.1	17.3	84.3	17:52	53.1	176.6	89.6
2009:12:25	06:32	-40.3	3.0	95.6	17:53	56.5	157.3	101.1
2009:12:26	06:32	-34.8	350.1	107.2	17:53	56.3	135.6	112.9
2009:12:27	06:32	-28.1	338.5	119.3	17:54	52.3	115.4	125.1
2009:12:28	06:33	-20.3	327.9	131.8	17:55	45.0	99.2	137.8
2009:12:29	06:33	-11.7	317.7	144.7	17:55	35.5	87.0	151.0
2009:12:30	06:33	-2.7	307.7	158.1	17:56	24.6	77.4	164.6
2009:12:31	06:33	6.5	297.3	171.9	17:57	12.7	69.5	178.2

Height in the twilights. The Sun is 12° under the horizon

Date	Times	Morning twilight			Times	Evening twilight		
		Alt	Az	Elong		Alt	Az	Elong
2009:01:01	06:00	-45.7	52.2	51.4	18:32	30.6	224.6	57.3
2009:01:02	06:00	-46.3	35.7	62.8	18:33	40.6	217.1	68.9
2009:01:03	06:00	-44.4	19.4	74.5	18:33	50.1	206.8	80.7
2009:01:04	06:00	-40.3	4.1	86.5	18:34	58.4	191.2	92.9
2009:01:05	06:00	-34.4	350.4	98.8	18:35	63.8	167.1	105.4
2009:01:06	06:00	-27.0	338.3	111.6	18:36	63.7	137.0	118.5
2009:01:07	06:00	-18.5	327.2	124.8	18:37	57.6	112.0	131.9
2009:01:08	06:00	-9.3	316.7	138.4	18:38	47.6	95.7	145.7
2009:01:09	06:00	0.3	306.3	152.3	18:38	35.8	85.0	159.8
2009:01:10	06:00	9.8	295.5	166.4	18:39	23.1	77.5	173.8
2009:01:11	06:00	18.8	283.9	178.2	18:40	10.1	71.7	171.6
2009:01:12	06:00	26.8	270.9	165.1	18:41	-2.9	66.6	157.8
2009:01:13	05:59	33.1	256.3	151.3	18:42	-15.5	61.7	144.2
2009:01:14	05:59	37.3	240.2	137.9	18:43	-27.6	56.6	131.0
2009:01:15	05:59	39.0	223.4	125.0	18:44	-39.1	50.6	118.3
2009:01:16	05:58	38.2	207.1	112.5	18:45	-49.6	42.7	106.1
2009:01:17	05:58	35.4	192.0	100.6	18:46	-59.0	31.1	94.3
2009:01:18	05:58	31.1	178.7	89.0	18:47	-66.4	12.5	82.9
2009:01:19	05:57	25.8	167.0	77.7	18:48	-70.0	344.5	71.8
2009:01:20	05:57	19.8	156.5	66.6	18:49	-68.2	314.6	60.8
2009:01:21	05:56	13.5	146.9	55.8	18:50	-62.2	293.6	49.9
2009:01:22	05:56	6.9	137.8	44.9	18:51	-54.0	280.7	39.1
2009:01:23	05:55	0.3	128.9	34.2	18:53	-44.8	272.6	28.3
2009:01:24	05:55	-6.2	119.9	23.3	18:54	-35.1	266.9	17.5
2009:01:25	05:54	-12.5	110.6	12.4	18:55	-25.0	262.6	6.5
2009:01:26	05:53	-18.4	100.7	1.5	18:56	-14.6	259.1	4.6
2009:01:27	05:53	-23.7	89.9	9.7	18:57	-3.9	256.0	15.8
2009:01:28	05:52	-28.3	78.2	21.0	18:58	7.0	253.0	27.2
2009:01:29	05:51	-31.8	65.3	32.4	18:59	18.1	249.9	38.7
2009:01:30	05:51	-34.0	51.4	44.0	19:00	29.3	246.2	50.5
2009:01:31	05:50	-34.6	36.9	55.9	19:01	40.6	241.4	62.5
2009:02:01	05:49	-33.5	22.1	68.0	19:02	51.9	234.3	74.7
2009:02:02	05:48	-30.8	7.6	80.3	19:03	62.6	221.9	87.3
2009:02:03	05:47	-26.6	353.7	93.0	19:05	71.1	196.5	100.1
2009:02:04	05:46	-21.1	340.5	105.9	19:06	72.6	153.2	113.3
2009:02:05	05:45	-14.7	327.9	119.2	19:07	65.3	120.5	126.7
2009:02:06	05:44	-7.7	315.7	132.8	19:08	54.0	104.7	140.4
2009:02:07	05:43	-0.4	303.6	146.5	19:09	41.2	96.2	154.3
2009:02:08	05:42	6.8	291.3	160.4	19:10	28.0	90.9	168.2
2009:02:09	05:41	13.6	278.5	174.2	19:11	14.7	87.0	177.7
2009:02:10	05:40	19.4	265.1	172.0	19:13	1.7	83.8	164.4
2009:02:11	05:39	24.1	251.0	158.6	19:14	-11.1	80.8	151.2
2009:02:12	05:38	27.2	236.4	145.7	19:15	-23.3	77.7	138.5
2009:02:13	05:36	28.7	221.8	133.1	19:16	-35.0	74.1	126.2
2009:02:14	05:35	28.6	207.4	121.0	19:17	-46.0	69.4	114.3
2009:02:15	05:34	27.1	193.6	109.3	19:18	-56.4	62.4	102.8
2009:02:16	05:33	24.5	180.8	97.9	19:19	-65.8	50.5	91.5
2009:02:17	05:31	21.0	168.8	86.8	19:21	-73.0	27.5	80.5
2009:02:18	05:30	16.9	157.6	75.9	19:22	-75.1	349.1	69.7
2009:02:19	05:29	12.3	146.9	65.1	19:23	-70.5	316.3	58.9
2009:02:20	05:27	7.4	136.6	54.3	19:24	-62.4	299.1	48.0
2009:02:21	05:26	2.3	126.5	43.5	19:25	-52.9	289.8	37.1
2009:02:22	05:25	-2.9	116.3	32.5	19:26	-42.8	284.1	26.1
2009:02:23	05:23	-8.0	105.9	21.5	19:28	-32.2	280.2	14.9
2009:02:24	05:22	-12.8	95.0	10.3	19:29	-21.3	277.1	4.0
2009:02:25	05:20	-17.3	83.5	2.8	19:30	-10.1	274.4	8.8
2009:02:26	05:19	-21.2	71.3	13.5	19:31	1.4	271.9	20.5
2009:02:27	05:17	-24.2	58.3	25.4	19:32	13.1	269.3	32.6
2009:02:28	05:16	-26.2	44.6	37.5	19:33	25.1	266.2	44.8
2009:03:01	05:14	-26.9	30.3	49.9	19:35	37.1	262.1	57.3
2009:03:02	05:13	-26.3	15.9	62.4	19:36	49.0	256.1	70.0
2009:03:03	05:11	-24.4	1.5	75.1	19:37	60.5	245.8	82.9
2009:03:04	05:09	-21.3	347.4	88.0	19:38	70.2	224.2	95.9
2009:03:05	05:08	-17.2	333.8	101.1	19:39	74.0	181.7	109.1
2009:03:06	05:06	-12.3	320.6	114.3	19:41	68.2	143.3	122.4
2009:03:07	05:04	-6.9	307.7	127.7	19:42	57.4	125.0	135.8
2009:03:08	05:03	-1.3	294.9	141.0	19:43	45.2	115.8	149.2
2009:03:09	05:01	4.3	282.2	154.3	19:44	32.6	110.1	162.4
2009:03:10	04:59	9.6	269.3	167.4	19:45	19.9	106.1	174.7
2009:03:11	04:57	14.2	256.1	176.4	19:47	7.5	102.8	170.5
2009:03:12	04:56	18.0	242.8	165.8	19:48	-4.7	99.7	158.2
2009:03:13	04:54	20.7	229.2	153.6	19:49	-16.3	96.6	146.0
2009:03:14	04:52	22.4	215.7	141.5	19:50	-27.6	93.1	134.2
2009:03:15	04:50	22.9	202.3	129.8	19:51	-38.3	88.7	122.7
2009:03:16	04:49	22.3	189.3	118.4	19:53	-48.4	82.8	111.4
2009:03:17	04:47	20.9	176.8	107.3	19:54	-57.7	73.9	100.4
2009:03:18	04:45	18.6	164.7	96.4	19:55	-65.8	59.1	89.5
2009:03:19	04:43	15.7	153.1	85.5	19:56	-71.0	34.0	78.7
2009:03:20	04:41	12.3	141.9	74.7	19:58	-71.2	1.0	67.8

Date	Times	Morning twilight			Times	Evening twilight		
		Alt	Az	Elong		Alt	Az	Elong
2009:03:21	04:39	8.5	130.9	63.9	19:59	-66.1	334.9	56.9
2009:03:22	04:37	4.3	120.0	52.9	20:00	-58.0	319.3	45.8
2009:03:23	04:36	-0.0	109.1	41.7	20:02	-48.4	309.8	34.4
2009:03:24	04:34	-4.4	97.9	30.4	20:03	-38.1	303.4	22.9
2009:03:25	04:32	-8.8	86.4	18.8	20:04	-27.1	298.4	11.4
2009:03:26	04:30	-13.0	74.3	7.6	20:05	-15.7	294.2	4.7
2009:03:27	04:28	-16.7	61.6	7.5	20:07	-4.0	290.3	14.9
2009:03:28	04:26	-19.7	48.2	19.2	20:08	7.9	286.3	27.4
2009:03:29	04:24	-21.8	34.1	31.8	20:09	20.0	281.7	40.2
2009:03:30	04:22	-22.9	19.7	44.6	20:11	31.9	276.0	53.2
2009:03:31	04:20	-22.8	5.0	57.6	20:12	43.4	268.2	66.3
2009:04:01	04:18	-21.5	350.4	70.7	20:13	54.1	256.3	79.4
2009:04:02	04:16	-19.1	336.1	83.8	20:15	62.6	236.9	92.6
2009:04:03	04:14	-15.8	322.2	96.9	20:16	66.4	207.4	105.7
2009:04:04	04:12	-11.8	308.8	110.0	20:18	63.6	176.7	118.7
2009:04:05	04:10	-7.3	295.8	123.0	20:19	55.9	155.7	131.7
2009:04:06	04:08	-2.6	283.1	135.8	20:20	45.9	142.8	144.5
2009:04:07	04:06	2.1	270.6	148.6	20:22	35.0	134.1	157.0
2009:04:08	04:04	6.6	258.1	161.0	20:23	23.8	127.7	169.0
2009:04:09	04:02	10.8	245.6	172.3	20:25	12.8	122.4	174.6
2009:04:10	04:00	14.3	233.0	172.1	20:26	1.9	117.5	164.8
2009:04:11	03:58	17.1	220.3	161.2	20:28	-8.6	112.7	153.4
2009:04:12	03:56	19.1	207.5	149.8	20:29	-18.7	107.6	142.0
2009:04:13	03:54	20.3	194.8	138.6	20:31	-28.2	101.8	130.9
2009:04:14	03:52	20.6	182.3	127.5	20:32	-37.2	94.8	119.9
2009:04:15	03:50	20.0	169.9	116.5	20:34	-45.4	85.9	109.0
2009:04:16	03:48	18.7	157.8	105.7	20:35	-52.5	73.9	98.1
2009:04:17	03:46	16.6	146.0	94.9	20:37	-57.7	57.9	87.3
2009:04:18	03:44	14.0	134.4	84.0	20:38	-60.3	37.8	76.3
2009:04:19	03:42	10.8	123.0	73.1	20:40	-59.3	16.3	65.2
2009:04:20	03:41	7.1	111.6	61.9	20:41	-54.9	357.4	53.8
2009:04:21	03:39	3.1	100.1	50.4	20:43	-48.1	342.7	42.0
2009:04:22	03:37	-1.3	88.5	38.6	20:44	-39.5	331.4	30.0
2009:04:23	03:35	-5.7	76.4	26.5	20:46	-29.9	322.3	17.8
2009:04:24	03:33	-10.1	63.9	14.3	20:48	-19.5	314.5	6.5
2009:04:25	03:31	-14.1	50.8	5.0	20:49	-8.6	307.4	10.3
2009:04:26	03:29	-17.7	37.0	13.7	20:51	2.4	300.2	23.0
2009:04:27	03:27	-20.4	22.6	26.6	20:52	13.4	292.6	36.3
2009:04:28	03:25	-22.0	7.8	40.0	20:54	24.0	283.9	49.7
2009:04:29	03:23	-22.5	352.7	53.4	20:56	33.7	273.5	63.2
2009:04:30	03:21	-21.7	337.7	66.7	20:57	42.1	260.5	76.5
2009:05:01	03:19	-19.8	323.2	80.0	20:59	48.2	244.0	89.6
2009:05:02	03:17	-17.0	309.3	93.0	21:01	51.2	224.6	102.5
2009:05:03	03:15	-13.4	295.9	105.8	21:02	50.6	204.5	115.2
2009:05:04	03:14	-9.3	283.2	118.5	21:04	46.8	186.5	127.7
2009:05:05	03:12	-4.9	270.9	130.9	21:06	40.7	171.8	140.0
2009:05:06	03:10	-0.3	259.0	143.0	21:07	33.2	160.0	152.0
2009:05:07	03:08	4.1	247.2	154.9	21:09	25.0	150.3	163.6
2009:05:08	03:06	8.4	235.5	166.4	21:11	16.6	141.9	173.8
2009:05:09	03:05	12.3	223.7	175.0	21:12	8.2	134.2	171.0
2009:05:10	03:03	15.6	211.9	168.6	21:14	-0.1	126.8	160.5
2009:05:11	03:01	18.3	199.9	157.8	21:16	-8.1	119.4	149.5
2009:05:12	02:59	20.3	187.7	146.9	21:17	-15.7	111.7	138.6
2009:05:13	02:58	21.5	175.5	136.1	21:19	-22.7	103.3	127.8
2009:05:14	02:56	21.9	163.2	125.3	21:21	-29.0	93.9	117.0
2009:05:15	02:54	21.4	151.0	114.4	21:22	-34.5	83.3	106.1
2009:05:16	02:53	20.1	138.8	103.6	21:24	-38.8	71.2	95.1
2009:05:17	02:51	18.0	126.8	92.6	21:26	-41.7	57.5	83.9
2009:05:18	02:50	15.1	115.0	81.4	21:27	-42.9	42.6	72.5
2009:05:19	02:48	11.5	103.2	69.9	21:29	-42.0	27.1	60.7
2009:05:20	02:47	7.3	91.4	58.1	21:30	-39.1	12.0	48.6
2009:05:21	02:45	2.6	79.6	45.8	21:32	-34.3	357.8	36.0
2009:05:22	02:44	-2.4	67.4	33.2	21:34	-28.1	344.8	23.0
2009:05:23	02:42	-7.6	54.9	20.2	21:35	-20.7	332.9	10.1
2009:05:24	02:41	-12.8	41.8	7.6	21:37	-12.7	321.6	6.3
2009:05:25	02:40	-17.5	28.0	8.7	21:38	-4.3	310.7	19.0
2009:05:26	02:38	-21.4	13.5	21.9	21:40	4.0	299.7	32.8
2009:05:27	02:37	-24.2	358.4	35.7	21:41	11.8	288.4	46.6
2009:05:28	02:36	-25.7	342.9	49.4	21:43	18.8	276.5	60.2
2009:05:29	02:35	-25.8	327.6	62.9	21:44	24.7	263.7	73.5
2009:05:30	02:34	-24.4	312.8	76.1	21:45	29.1	250.1	86.5
2009:05:31	02:33	-21.9	298.7	89.0	21:47	31.9	235.8	99.1
2009:06:01	02:32	-18.4	285.5	101.6	21:48	32.9	221.3	111.5
2009:06:02	02:31	-14.2	273.2	113.9	21:49	32.3	207.1	123.5
2009:06:03	02:30	-9.5	261.6	125.9	21:51	30.3	193.5	135.3
2009:06:04	02:29	-4.5	250.6	137.6	21:52	27.1	180.9	146.9
2009:06:05	02:28	0.6	239.9	149.1	21:53	23.0	169.1	158.3
2009:06:06	02:27	5.6	229.4	160.4	21:54	18.4	158.2	169.2
2009:06:07	02:27	10.5	218.8	171.2	21:55	13.5	148.0	176.3
2009:06:08	02:26	15.1	208.2	175.3	21:56	8.3	138.2	167.5
2009:06:09	02:26	19.3	197.2	165.5	21:57	3.2	128.6	156.8

Date	Times	Morning twilight			Times	Evening twilight		
		Alt	Az	Elong		Alt	Az	Elong
2009:06:10	02:25	22.9	185.8	154.8	21:58	-1.9	119.1	146.0
2009:06:11	02:25	25.7	174.0	144.0	21:59	-6.8	109.4	135.1
2009:06:12	02:24	27.6	161.8	133.1	21:59	-11.4	99.5	124.2
2009:06:13	02:24	28.5	149.2	122.2	22:00	-15.6	89.2	113.2
2009:06:14	02:24	28.3	136.3	111.2	22:01	-19.4	78.3	102.0
2009:06:15	02:24	26.9	123.5	100.0	22:02	-22.5	66.6	90.6
2009:06:16	02:23	24.3	110.9	88.5	22:02	-24.9	54.1	78.8
2009:06:17	02:23	20.6	98.5	76.7	22:03	-26.4	40.8	66.7
2009:06:18	02:23	15.7	86.5	64.4	22:03	-26.8	26.8	54.1
2009:06:19	02:23	9.9	74.8	51.8	22:03	-26.0	12.4	41.0
2009:06:20	02:24	3.3	63.2	38.6	22:04	-23.9	357.7	27.5
2009:06:21	02:24	-3.8	51.6	25.0	22:04	-20.6	343.2	13.7
2009:06:22	02:24	-11.2	39.6	11.3	22:04	-16.4	329.0	2.6
2009:06:23	02:24	-18.4	27.0	4.1	22:04	-11.4	315.2	15.1
2009:06:24	02:25	-24.9	13.5	17.6	22:04	-6.1	301.9	29.2
2009:06:25	02:25	-30.4	359.0	31.7	22:04	-0.8	288.9	43.0
2009:06:26	02:26	-34.2	343.4	45.5	22:04	4.4	276.2	56.6
2009:06:27	02:26	-36.1	327.2	59.1	22:04	9.0	263.7	69.8
2009:06:28	02:27	-35.9	311.2	72.2	22:04	13.1	251.1	82.5
2009:06:29	02:28	-33.8	296.2	84.8	22:03	16.4	238.6	94.9
2009:06:30	02:28	-30.2	282.6	97.1	22:03	18.9	226.1	106.8
2009:07:01	02:29	-25.4	270.4	109.0	22:03	20.6	213.6	118.5
2009:07:02	02:30	-19.8	259.6	120.7	22:02	21.5	201.1	130.0
2009:07:03	02:31	-13.5	249.9	132.1	22:02	21.5	188.7	141.2
2009:07:04	02:32	-6.9	240.8	143.3	22:01	20.7	176.6	152.3
2009:07:05	02:33	-0.1	232.3	154.4	22:00	19.3	164.6	163.3
2009:07:06	02:34	6.8	223.9	165.3	22:00	17.2	153.0	174.1
2009:07:07	02:35	13.7	215.5	176.1	21:59	14.6	141.7	174.7
2009:07:08	02:36	20.5	206.7	172.6	21:58	11.5	130.7	163.9
2009:07:09	02:37	26.9	197.2	161.8	21:57	8.1	119.9	153.0
2009:07:10	02:39	32.7	186.7	150.9	21:56	4.4	109.1	142.1
2009:07:11	02:40	37.7	174.8	139.9	21:55	0.5	98.4	131.0
2009:07:12	02:41	41.4	161.3	128.8	21:54	-3.5	87.6	119.7
2009:07:13	02:42	43.4	146.3	117.5	21:53	-7.4	76.4	108.3
2009:07:14	02:44	43.3	130.6	105.9	21:52	-11.2	64.9	96.5
2009:07:15	02:45	40.9	115.1	94.1	21:51	-14.8	52.7	84.4
2009:07:16	02:47	36.3	100.7	81.9	21:50	-17.9	39.8	72.0
2009:07:17	02:48	29.8	88.0	69.3	21:48	-20.4	26.0	59.0
2009:07:18	02:49	21.8	76.8	56.3	21:47	-22.0	11.5	45.6
2009:07:19	02:51	12.6	66.7	42.8	21:46	-22.5	356.3	31.9
2009:07:20	02:52	2.5	57.3	28.9	21:44	-21.7	340.8	17.8
2009:07:21	02:54	-8.0	48.2	14.7	21:43	-19.6	325.4	3.5
2009:07:22	02:56	-18.5	38.8	0.4	21:41	-16.5	310.4	10.7
2009:07:23	02:57	-28.7	28.5	13.8	21:40	-12.5	296.1	24.8
2009:07:24	02:59	-38.0	16.5	27.9	21:38	-8.0	282.5	38.6
2009:07:25	03:00	-45.7	1.9	41.6	21:37	-3.3	269.5	51.9
2009:07:26	03:02	-50.9	344.2	54.9	21:35	1.4	257.0	64.8
2009:07:27	03:03	-53.0	324.3	67.7	21:34	5.9	244.9	77.3
2009:07:28	03:05	-51.6	304.9	80.1	21:32	10.0	233.0	89.3
2009:07:29	03:07	-47.5	288.3	92.0	21:30	13.6	221.2	100.9
2009:07:30	03:08	-41.4	275.1	103.6	21:29	16.6	209.3	112.3
2009:07:31	03:10	-34.1	264.8	114.9	21:27	19.0	197.3	123.4
2009:08:01	03:11	-26.1	256.4	126.0	21:25	20.6	185.2	134.4
2009:08:02	03:13	-17.7	249.4	137.0	21:24	21.4	172.9	145.3
2009:08:03	03:15	-8.9	243.3	148.0	21:22	21.3	160.7	156.2
2009:08:04	03:16	0.1	237.7	158.8	21:20	20.5	148.5	167.0
2009:08:05	03:18	9.2	232.1	169.7	21:18	18.8	136.5	177.6
2009:08:06	03:19	18.4	226.4	178.6	21:16	16.4	124.6	170.9
2009:08:07	03:21	27.5	220.1	168.1	21:14	13.3	113.0	159.9
2009:08:08	03:23	36.5	212.6	157.0	21:13	9.7	101.6	148.7
2009:08:09	03:24	45.0	203.1	145.7	21:11	5.6	90.3	137.3
2009:08:10	03:26	52.6	190.3	134.3	21:09	1.1	79.0	125.7
2009:08:11	03:27	58.2	172.4	122.6	21:07	-3.5	67.6	113.9
2009:08:12	03:29	60.5	149.6	110.7	21:05	-8.2	55.9	101.8
2009:08:13	03:31	58.4	126.0	98.5	21:03	-12.8	43.6	89.4
2009:08:14	03:32	52.2	106.9	86.0	21:01	-17.0	30.7	76.7
2009:08:15	03:34	43.4	93.1	73.1	20:59	-20.6	16.8	63.5
2009:08:16	03:35	32.8	83.1	59.9	20:57	-23.2	2.1	50.0
2009:08:17	03:37	21.2	75.4	46.2	20:55	-24.6	346.6	36.3
2009:08:18	03:38	8.9	69.0	32.4	20:53	-24.5	330.7	22.3
2009:08:19	03:40	-3.7	63.3	18.4	20:51	-23.0	315.0	8.4
2009:08:20	03:41	-16.3	57.6	4.7	20:49	-20.0	299.8	6.4
2009:08:21	03:43	-28.7	51.4	10.2	20:47	-15.9	285.4	19.8
2009:08:22	03:44	-40.5	43.8	23.7	20:45	-11.2	272.0	33.1
2009:08:23	03:46	-51.2	33.5	37.0	20:43	-6.0	259.4	46.1
2009:08:24	03:47	-60.3	18.0	49.8	20:41	-0.7	247.4	58.6
2009:08:25	03:49	-66.1	354.6	62.2	20:39	4.4	235.9	70.7
2009:08:26	03:50	-66.9	325.3	74.2	20:37	9.2	224.6	82.3
2009:08:27	03:52	-62.7	300.8	85.8	20:35	13.6	213.2	93.7
2009:08:28	03:53	-55.4	284.7	97.1	20:33	17.5	201.8	104.8
2009:08:29	03:55	-46.9	274.4	108.2	20:31	20.7	190.0	115.7

Date	Times	Morning twilight			Times	Evening twilight		
		Alt	Az	Elong		Alt	Az	Elong
2009:08:30	03:56	-37.6	267.4	119.1	20:29	23.1	177.9	126.6
2009:08:31	03:57	-28.0	262.2	129.9	20:27	24.6	165.5	137.4
2009:09:01	03:59	-18.1	258.0	140.8	20:25	25.0	152.8	148.2
2009:09:02	04:00	-8.0	254.4	151.7	20:23	24.5	140.0	159.1
2009:09:03	04:02	2.3	251.1	162.6	20:21	22.8	127.3	169.9
2009:09:04	04:03	12.8	247.7	173.2	20:19	20.1	114.9	176.1
2009:09:05	04:04	23.5	244.0	173.5	20:17	16.5	102.8	166.3
2009:09:06	04:06	34.2	239.6	162.7	20:15	12.2	91.0	154.9
2009:09:07	04:07	44.9	233.6	151.1	20:13	7.2	79.5	143.2
2009:09:08	04:08	55.3	224.6	139.2	20:11	1.7	68.1	131.2
2009:09:09	04:10	64.6	209.0	127.2	20:09	-4.0	56.6	119.0
2009:09:10	04:11	70.7	180.3	114.9	20:07	-9.7	44.9	106.6
2009:09:11	04:12	69.8	142.6	102.3	20:05	-15.3	32.6	93.9
2009:09:12	04:13	62.3	116.5	89.5	20:03	-20.3	19.5	80.9
2009:09:13	04:15	51.6	102.4	76.4	20:01	-24.6	5.5	67.7
2009:09:14	04:16	39.6	94.1	63.1	19:59	-27.6	350.4	54.3
2009:09:15	04:17	26.9	88.5	49.7	19:57	-29.1	334.5	40.8
2009:09:16	04:18	13.9	84.3	36.0	19:55	-28.7	318.4	27.2
2009:09:17	04:20	0.8	80.7	22.5	19:53	-26.6	302.6	13.9
2009:09:18	04:21	-12.2	77.2	9.5	19:51	-23.0	287.8	4.3
2009:09:19	04:22	-25.0	73.5	6.6	19:49	-18.2	274.1	14.2
2009:09:20	04:23	-37.3	69.0	18.7	19:47	-12.6	261.4	26.8
2009:09:21	04:25	-48.9	62.9	31.2	19:46	-6.6	249.7	39.1
2009:09:22	04:26	-59.6	53.3	43.5	19:44	-0.6	238.6	51.2
2009:09:23	04:27	-68.6	36.1	55.5	19:42	5.4	227.9	62.9
2009:09:24	04:28	-73.7	4.2	67.1	19:40	11.1	217.2	74.2
2009:09:25	04:29	-72.1	326.7	78.3	19:38	16.3	206.5	85.3
2009:09:26	04:30	-65.2	303.4	89.4	19:36	21.0	195.3	96.2
2009:09:27	04:32	-56.4	291.1	100.3	19:34	24.9	183.7	107.1
2009:09:28	04:33	-46.8	283.9	111.1	19:32	27.9	171.3	117.9
2009:09:29	04:34	-36.8	279.1	122.0	19:31	29.8	158.3	128.7
2009:09:30	04:35	-26.5	275.6	132.9	19:29	30.4	144.9	139.7
2009:10:01	04:36	-15.9	272.7	143.9	19:27	29.6	131.3	150.8
2009:10:02	04:37	-5.1	270.0	155.1	19:25	27.4	117.8	162.0
2009:10:03	04:39	6.1	267.4	166.2	19:24	23.8	104.7	172.5
2009:10:04	04:40	17.4	264.6	175.1	19:22	19.1	92.3	172.1
2009:10:05	04:41	29.0	261.2	168.1	19:20	13.3	80.5	161.0
2009:10:06	04:42	40.7	256.6	156.3	19:18	6.9	69.1	148.9
2009:10:07	04:43	52.2	249.6	144.0	19:17	-0.0	58.0	136.4
2009:10:08	04:44	63.1	237.2	131.5	19:15	-7.1	46.8	123.8
2009:10:09	04:45	71.5	211.5	118.7	19:13	-14.2	35.3	111.0
2009:10:10	04:46	73.0	168.0	105.8	19:12	-20.8	23.1	98.0
2009:10:11	04:47	65.9	135.6	92.8	19:10	-26.7	9.8	85.0
2009:10:12	04:49	55.1	120.0	79.7	19:08	-31.3	355.2	71.9
2009:10:13	04:50	43.0	111.6	66.5	19:07	-34.3	339.5	58.7
2009:10:14	04:51	30.4	106.2	53.3	19:05	-35.3	322.9	45.5
2009:10:15	04:52	17.7	102.2	40.2	19:04	-34.2	306.5	32.4
2009:10:16	04:53	5.1	98.8	27.2	19:02	-31.0	291.0	19.6
2009:10:17	04:54	-7.4	95.6	14.6	19:01	-26.2	277.0	7.9
2009:10:18	04:55	-19.6	92.2	5.1	18:59	-20.2	264.4	8.2
2009:10:19	04:56	-31.4	88.2	12.7	18:58	-13.5	253.1	19.5
2009:10:20	04:57	-42.7	83.0	24.4	18:56	-6.5	242.6	31.2
2009:10:21	04:58	-53.2	75.5	36.1	18:55	0.6	232.8	42.8
2009:10:22	05:00	-62.5	63.6	47.6	18:53	7.6	223.2	54.1
2009:10:23	05:01	-69.7	42.6	58.8	18:52	14.3	213.6	65.2
2009:10:24	05:02	-72.3	10.1	69.8	18:51	20.6	203.6	76.1
2009:10:25	05:03	-69.0	339.1	80.7	18:49	26.3	192.9	86.9
2009:10:26	05:04	-61.9	320.1	91.5	18:48	31.2	181.2	97.7
2009:10:27	05:05	-53.0	309.1	102.3	18:47	34.9	168.4	108.5
2009:10:28	05:06	-43.4	302.0	113.3	18:46	37.3	154.3	119.5
2009:10:29	05:07	-33.2	296.8	124.3	18:44	37.9	139.5	130.7
2009:10:30	05:08	-22.7	292.7	135.7	18:43	36.6	124.4	142.2
2009:10:31	05:09	-11.7	289.1	147.3	18:42	33.3	109.8	153.9
2009:11:01	05:10	-0.3	285.5	159.1	18:41	28.3	96.3	165.7
2009:11:02	05:11	11.3	281.7	170.6	18:40	21.7	83.9	175.1
2009:11:03	05:13	23.2	277.2	173.3	18:39	14.1	72.5	167.2
2009:11:04	05:14	35.1	271.5	161.8	18:38	5.7	61.9	154.7
2009:11:05	05:15	46.7	263.3	149.0	18:37	-3.1	51.6	141.7
2009:11:06	05:16	57.3	250.2	135.9	18:36	-12.0	41.3	128.6
2009:11:07	05:17	65.4	227.7	122.7	18:35	-20.6	30.4	115.4
2009:11:08	05:18	67.7	194.2	109.5	18:34	-28.5	18.4	102.2
2009:11:09	05:19	63.0	164.1	96.4	18:33	-35.4	4.9	89.1
2009:11:10	05:20	53.9	145.6	83.3	18:32	-40.5	349.4	76.2
2009:11:11	05:21	43.1	134.5	70.3	18:31	-43.4	332.2	63.3
2009:11:12	05:22	31.6	126.9	57.5	18:30	-43.6	314.4	50.6
2009:11:13	05:23	20.0	121.2	44.9	18:29	-41.2	297.4	38.0
2009:11:14	05:24	8.4	116.3	32.4	18:29	-36.5	282.3	25.7
2009:11:15	05:25	-2.9	111.7	20.2	18:28	-30.2	269.4	13.8
2009:11:16	05:26	-14.0	106.9	8.7	18:27	-22.9	258.5	4.4
2009:11:17	05:27	-24.6	101.6	6.1	18:27	-15.0	248.9	11.5
2009:11:18	05:28	-34.7	95.3	16.5	18:26	-6.8	240.3	22.6

Date	Times	Morning twilight			Times	Evening twilight		
		Alt	Az	Elong		Alt	Az	Elong
2009:11:19	05:29	-44.0	87.3	27.7	18:25	1.4	232.2	33.7
2009:11:20	05:31	-52.3	76.4	38.8	18:25	9.7	224.3	44.7
2009:11:21	05:32	-58.8	61.1	49.8	18:24	17.7	216.2	55.6
2009:11:22	05:33	-62.7	40.7	60.6	18:24	25.3	207.5	66.4
2009:11:23	05:34	-62.8	17.4	71.4	18:23	32.5	197.8	77.2
2009:11:24	05:35	-59.3	356.7	82.2	18:23	38.8	186.4	88.0
2009:11:25	05:36	-53.0	341.0	93.2	18:23	44.0	172.9	99.0
2009:11:26	05:36	-45.1	329.5	104.2	18:22	47.3	157.0	110.2
2009:11:27	05:37	-36.1	320.7	115.6	18:22	48.1	139.4	121.7
2009:11:28	05:38	-26.4	313.6	127.3	18:22	46.1	121.6	133.6
2009:11:29	05:39	-16.0	307.2	139.3	18:21	41.3	105.4	145.8
2009:11:30	05:40	-5.1	301.1	151.8	18:21	34.2	91.5	158.5
2009:12:01	05:41	6.1	294.8	164.5	18:21	25.4	79.9	171.2
2009:12:02	05:42	17.4	287.8	176.1	18:21	15.4	69.9	173.7
2009:12:03	05:43	28.5	279.4	167.8	18:21	4.8	60.9	160.8
2009:12:04	05:44	39.0	268.6	154.4	18:21	-6.1	52.3	147.2
2009:12:05	05:45	48.0	254.0	140.7	18:21	-17.0	43.6	133.6
2009:12:06	05:46	54.1	234.3	127.1	18:21	-27.5	34.2	120.1
2009:12:07	05:46	56.0	210.6	113.7	18:21	-37.1	23.3	106.8
2009:12:08	05:47	53.2	188.0	100.5	18:21	-45.4	9.8	93.7
2009:12:09	05:48	46.9	170.0	87.6	18:21	-51.5	352.9	80.9
2009:12:10	05:49	38.6	156.7	74.9	18:21	-54.6	332.8	68.4
2009:12:11	05:49	29.4	146.5	62.5	18:21	-54.1	311.7	56.1
2009:12:12	05:50	19.8	138.1	50.3	18:21	-50.1	293.2	44.1
2009:12:13	05:51	10.1	130.8	38.4	18:22	-43.8	278.6	32.2
2009:12:14	05:52	0.5	123.9	26.6	18:22	-36.0	267.3	20.6
2009:12:15	05:52	-8.8	117.1	15.2	18:22	-27.4	258.4	9.3
2009:12:16	05:53	-17.7	109.8	4.3	18:23	-18.3	251.1	3.3
2009:12:17	05:54	-26.0	101.9	8.0	18:23	-9.1	244.7	13.6
2009:12:18	05:54	-33.6	92.7	18.8	18:23	0.3	238.9	24.5
2009:12:19	05:55	-40.2	81.9	29.7	18:24	9.7	233.2	35.4
2009:12:20	05:55	-45.4	69.1	40.6	18:24	19.0	227.4	46.2
2009:12:21	05:56	-48.8	54.2	51.3	18:25	28.2	220.9	57.0
2009:12:22	05:56	-50.1	37.8	62.1	18:25	37.1	213.3	67.8
2009:12:23	05:57	-48.9	21.3	73.0	18:26	45.4	203.5	78.7
2009:12:24	05:57	-45.4	5.9	84.1	18:26	52.8	190.4	89.9
2009:12:25	05:58	-40.2	352.4	95.4	18:27	58.2	172.2	101.4
2009:12:26	05:58	-33.4	340.7	107.0	18:27	60.2	148.9	113.2
2009:12:27	05:58	-25.5	330.3	119.0	18:28	57.7	125.2	125.4
2009:12:28	05:59	-16.8	320.8	131.5	18:29	51.0	106.1	138.1
2009:12:29	05:59	-7.5	311.6	144.4	18:29	41.6	92.4	151.3
2009:12:30	05:59	2.3	302.3	157.8	18:30	30.5	82.3	164.9
2009:12:31	05:59	12.0	292.3	171.5	18:31	18.5	74.5	178.5

GEOCENTRIC CONJUNCTIONS <5° MOON-PLANETS

Date	TT	Dm (°)	Dl	r1	p (°)	e	m1	m2	tm(s)	
2009/01/02	13:09:05	4.10478	1.18793	20.461	333	67	5.9			Uranus
2009/01/25	02:44:48	0.69187	1.14931	2.370	165	-13	1.2	-6.8	3041	Mars
2009/01/25	09:54:49	4.80981	1.14896	0.677	164	-11	1.2	-6.2		Mercury
2009/01/26	04:36:52	0.03273	1.15948	6.090	341	-2	-1.8	-2.2	3670	Jupiter
2009/01/27	16:56:15	1.63905	1.16644	30.981	336	15	8.0	-7.2		Neptune
2009/01/29	20:42:15	4.21024	1.18663	20.839	333	40	5.9	-9.2		Uranus
2009/01/30	09:07:37	2.51401	1.19174	0.571	333	46	-4.6	-9.5		Venus
2009/02/22	21:19:37	0.98760	1.16044	1.113	338	-25	0.1	-8.2	2077	Mercury
2009/02/23	00:30:44	0.68104	1.16692	5.991	339	-23	-1.9	-8.0	2966	Jupiter
2009/02/23	06:30:38	1.54242	1.16447	2.289	338	-20	1.1	-7.8		Mars
2009/02/24	01:51:28	1.72473	1.17252	31.003	336	-11	8.0	-6.5		Neptune
2009/02/26	05:38:20	4.25852	1.19460	21.058	333	14	5.9	-7.0		Uranus
2009/02/28	00:01:18	1.16774	1.21226	0.376	156	35	-4.6	-9.0	948.4	Venus
2009/03/22	20:18:48	1.37959	1.17250	5.742	337	-45	-2.0	-9.4		Jupiter
2009/03/23	11:51:19	1.88680	1.17557	30.817	336	-38	8.0	-9.1		Neptune
2009/03/24	10:26:44	3.65639	1.18635	2.204	334	-27	1.0	-8.4		Mars
2009/03/25	16:23:49	4.35202	1.20348	21.074	333	-12	5.9	-6.8		Uranus
2009/03/26	19:34:30	3.83245	1.21718	0.282	154	-8	-2.0	-4.7		Venus
2009/04/19	14:32:45	2.09812	1.17338	5.379	336	-67	-2.1			Jupiter
2009/04/19	21:55:48	2.15188	1.17268	30.462	336	-64	7.9			Neptune
2009/04/22	04:10:35	4.55254	1.20585	20.889	333	-37	5.9	-9.1		Uranus
2009/04/22	13:22:57	0.95306	1.21146	0.370	333	-33	-4.5	-8.9	2169	Venus
2009/04/26	15:50:18	1.89085	1.26321	0.848	348	20	0.1	-7.9		Mercury
2009/05/17	05:21:04	2.73442	1.16924	4.953	336	-91	-2.3			Jupiter
2009/05/17	06:52:22	2.44467	1.16522	30.015	336	-90	7.9			Neptune
2009/05/19	15:27:56	4.82554	1.19935	20.542	334	-63	5.9			Uranus
2009/06/13	13:57:00	2.65114	1.15742	29.569	336	-116	7.9			Neptune
2009/06/13	15:03:56	3.15545	1.16294	4.536	336	-116	-2.5			Jupiter
2009/06/16	00:48:45	5.06697	1.18735	20.101	334	-89	5.8			Uranus
2009/07/10	19:10:23	3.26843	1.15876	4.205	336	-143	-2.6			Jupiter
2009/07/10	19:18:50	2.70761	1.15324	29.216	336	-143	7.8			Neptune
2009/07/18	10:34:15	4.84749	1.26474	1.824	352	-52	1.0	-9.8		Mars
2009/07/22	18:29:16	2.66290	1.29650	1.315	201	10	-1.2	-6.3		Mercury
2009/08/06	19:16:44	3.10472	1.15850	4.038	336	-171	-2.8			Jupiter
2009/08/06	23:54:20	2.64987	1.15372	29.032	336	-169	7.8			Neptune
2009/08/16	03:23:08	3.17179	1.26677	1.690	2	-60	0.9			Mars
2009/08/17	21:30:37	1.68032	1.28750	1.244	14	-36	-3.9	-9.1		Venus
2009/08/22	09:23:19	2.58016	1.26142	0.956	206	27	0.3	-8.5		Mercury
2009/09/02	18:58:14	2.85808	1.15996	4.079	337	159	-2.7			Jupiter
2009/09/03	04:54:58	2.59267	1.15663	29.057	336	164	7.8			Neptune
2009/09/05	16:24:42	5.03987	1.17610	19.111	334	-168	5.7			Uranus
2009/09/13	16:21:51	1.10065	1.26246	1.527	10	-69	0.8		1673	Mars
2009/09/16	15:42:28	3.02697	1.27679	1.415	205	-29	-3.8	-8.7		Venus
2009/09/18	23:51:53	1.06444	1.25795	0.644	207	4	3.3	-5.0	1621	Mercury
2009/09/29	21:59:04	2.77596	1.16032	4.318	338	131	-2.6			Jupiter
2009/09/30	11:09:58	2.65054	1.15835	29.290	336	137	7.8			Neptune
2009/10/02	21:35:59	4.98961	1.18103	19.133	334	164	5.7			Uranus
2009/10/12	00:53:08	1.10810	1.25656	1.335	197	-81	0.6		1610	Mars
2009/10/27	06:11:18	2.96960	1.15860	4.693	338	104	-2.4			Jupiter
2009/10/27	18:45:01	2.84993	1.15659	29.682	337	109	7.9			Neptune
2009/10/30	04:30:06	5.07221	1.18102	19.367	334	136	5.8			Uranus
2009/11/09	03:51:54	3.22989	1.25555	1.119	201	-96	0.2			Mars
2009/11/17	09:49:58	2.81924	1.18625	1.432	187	7	-0.8	-5.8		Mercury
2009/11/23	19:12:59	3.36595	1.15515	5.119	337	78	-2.2			Jupiter
2009/11/24	03:07:36	3.10522	1.15196	30.147	337	82	7.9			Neptune
2009/12/06	23:08:39	5.06092	1.26584	0.902	203	-116	-0.3			Mars
2009/12/15	22:53:46	3.08562	1.16897	1.695	180	-6	-3.9	-5.4		Venus
2009/12/18	07:37:10	1.36188	1.15099	1.013	348	20	-0.4	-7.7		Mercury
2009/12/21	11:33:05	3.82104	1.15142	5.511	336	55	-2.1	-9.8		Jupiter
2009/12/21	11:36:19	3.29469	1.14722	30.582	336	55	7.9	-9.8		Neptune

date in the format year/month/day

Dm = least distance between the centers of the bodies

Dl = parameter limit, if Dm < Dl there is an occultation of the planet

Rl = distance in A.U. of the planet from the Earth

P = angle of position between the bodies, in degrees

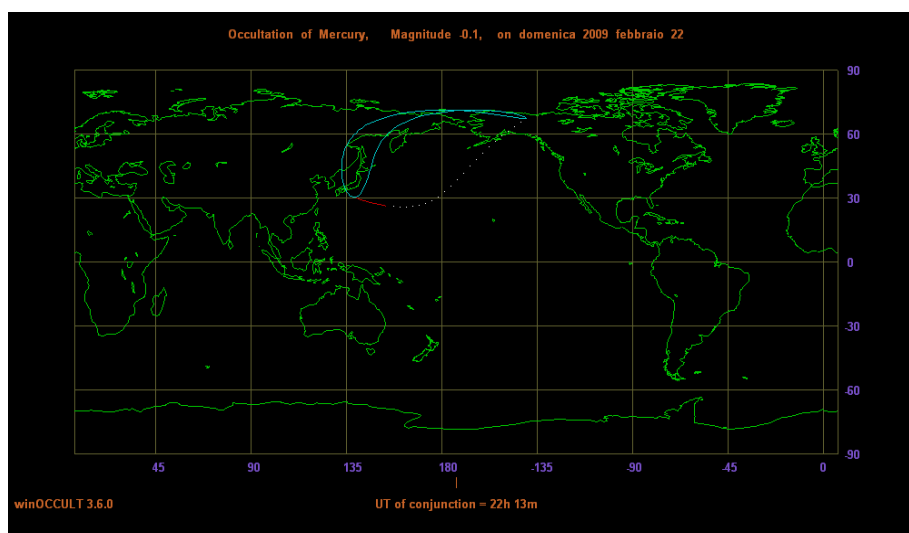
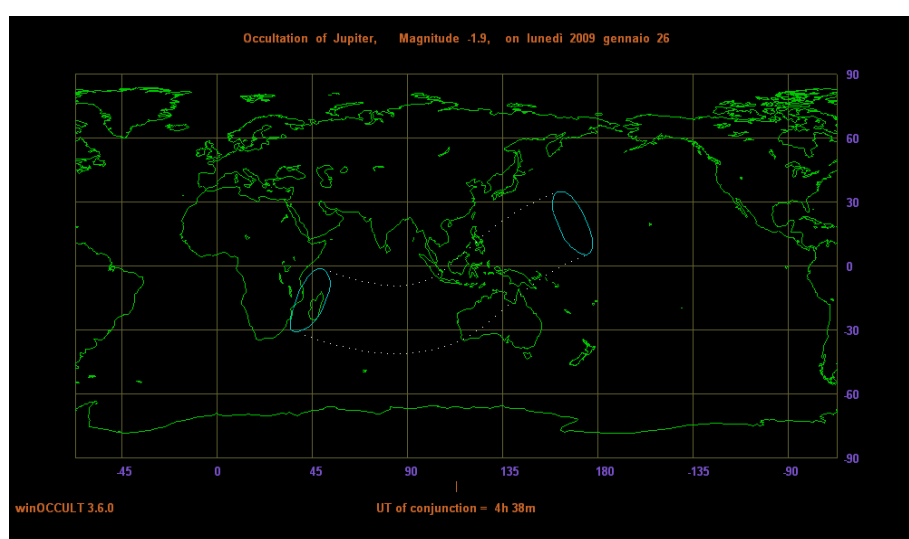
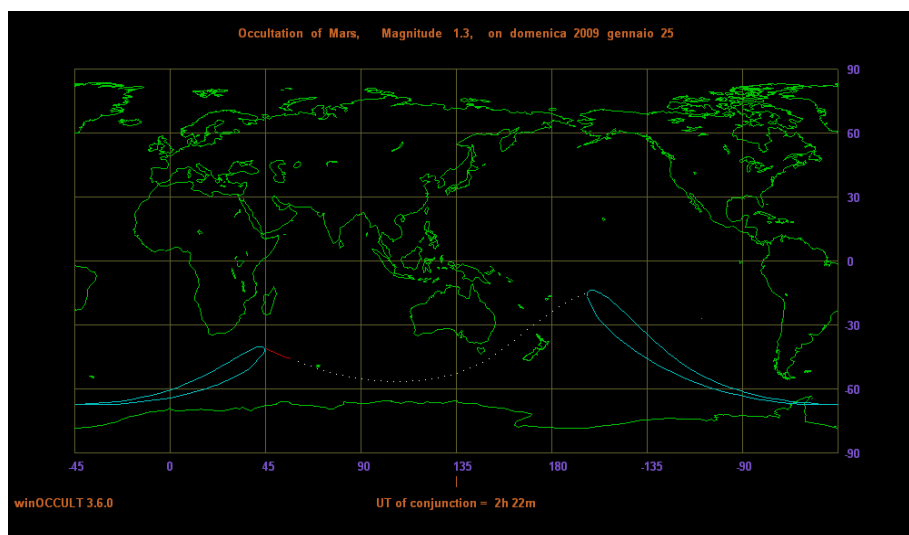
e = elongation, in degree

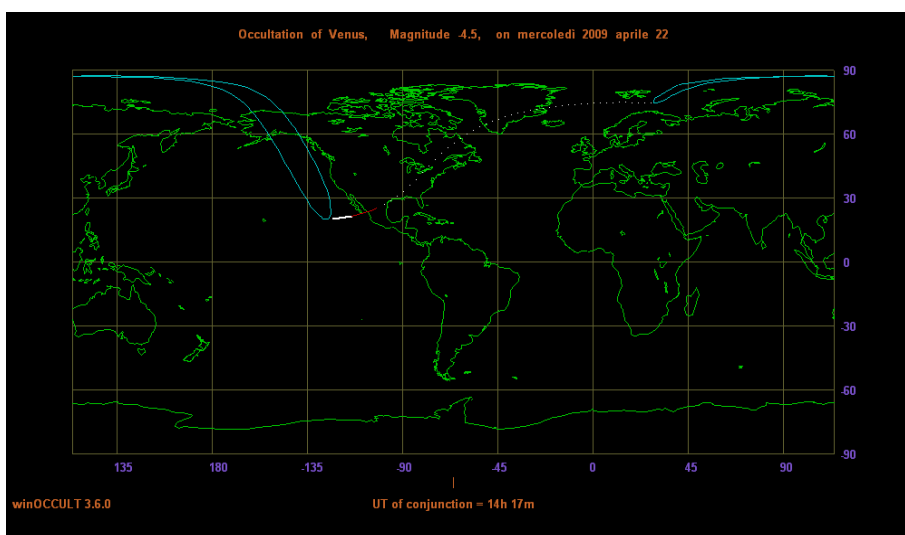
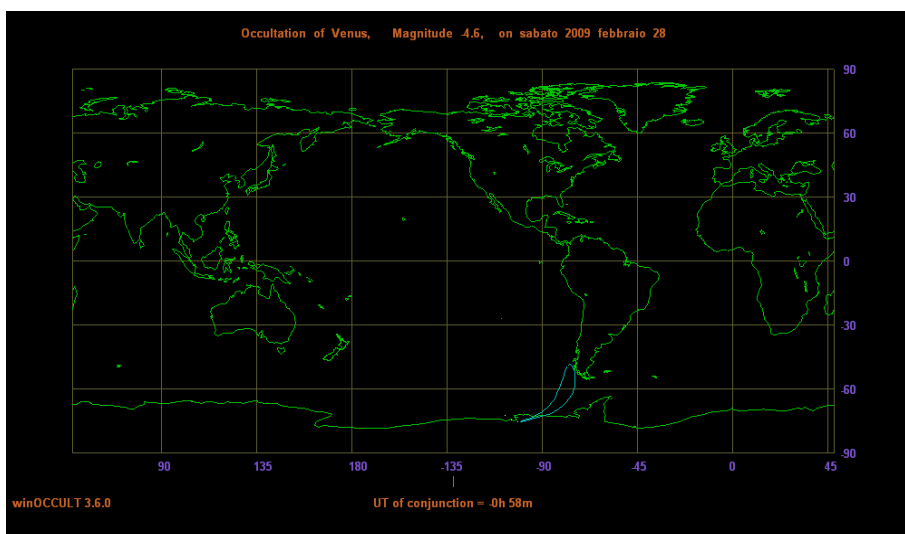
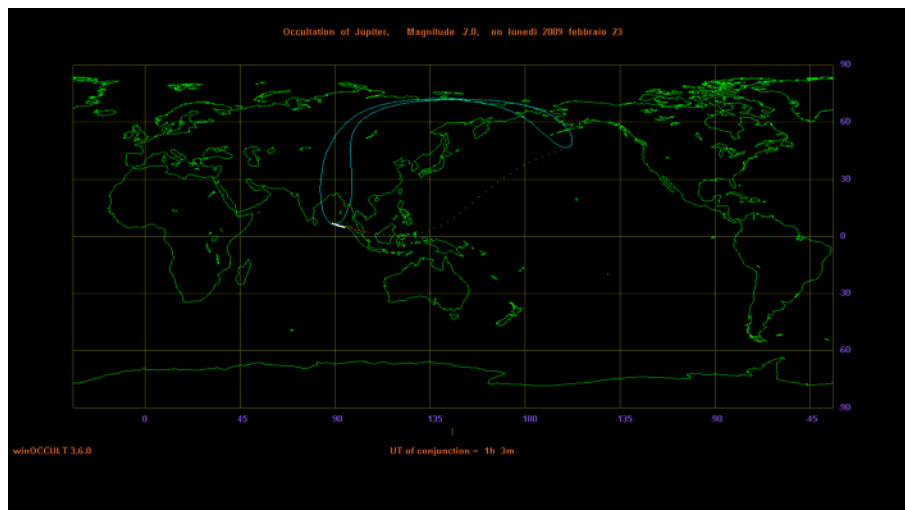
m1 = magnitude of the planet

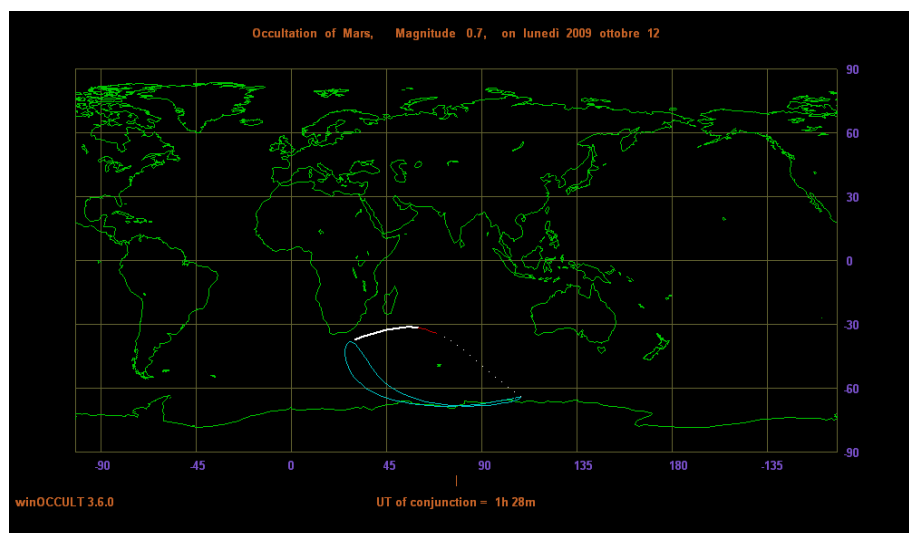
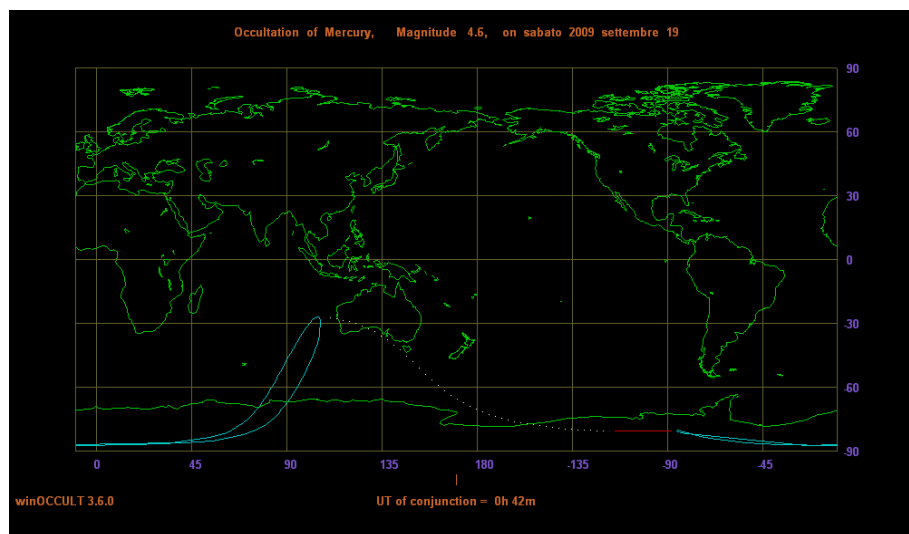
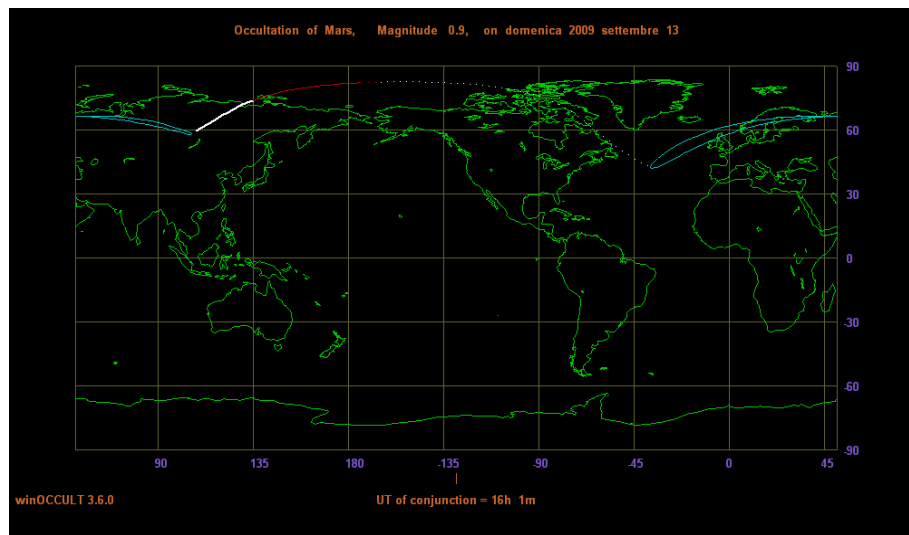
m2 = magnitude of the Moon

tm = if present, the planet is occulted maximum for x seconds

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TOPOCENTRIC CONJUNCTIONS <5° MOON-PLANETS

42°N - 12°E

Date	UT	Dm (°)	Alt.	r1	p (°)	e	m1	m2	tm(s)	
2009/01/02	12:05:09	3.30361	21.61	20.460	327	67	5.9			Uranus
2009/01/27	18:25:56	1.38043	-9.25	30.981	332	15	8.0	-7.1		Neptune
2009/01/30	08:22:34	1.64911	0.64	0.571	333	46	-4.6	-9.5		Venus
2009/02/23	05:54:06	0.68975	6.62	2.289	339	-20	1.1	-7.8		Mars
2009/02/26	05:16:25	3.39896	-14.08	21.057	335	14	5.9	-7.0		Uranus
2009/03/23	13:00:19	1.54089	11.58	30.816	327	-38	8.0	-9.1		Neptune
2009/03/24	09:35:43	3.11415	38.05	2.204	320	-27	1.0	-8.5		Mars
2009/03/25	18:25:11	4.07484	-22.40	21.074	337	-12	5.9	-6.7		Uranus
2009/03/26	04:58:38	4.85652	-1.51	1.354	332	-5	-1.4	-5.2		Mercury
2009/03/26	20:08:00	4.24008	-22.81	0.282	160	-8	-2.0	-4.4		Venus
2009/04/22	03:21:03	3.67902	3.41	20.890	332	-37	5.9	-9.1		Uranus
2009/04/22	15:04:15	0.71796	1.49	0.370	334	-33	-4.5	-8.9		Venus
2009/04/22	15:51:49	4.99200	-8.31	2.118	336	-33	1.0	-8.8		Mars
2009/04/26	17:36:46	1.51801	23.88	0.846	356	20	0.1	-8.0		Mercury
2009/05/17	04:59:04	2.08104	34.04	4.954	324	-91	-2.3			Jupiter
2009/05/17	07:10:09	1.96286	30.01	30.015	323	-90	7.9			Neptune
2009/06/15	23:52:09	4.21234	4.03	20.102	332	-88	5.8			Uranus
2009/07/10	18:53:01	2.49880	-19.88	4.205	341	-143	-2.6			Jupiter
2009/07/10	18:54:58	1.93352	-19.04	29.217	341	-143	7.8			Neptune
2009/07/13	09:20:42	4.93506	1.27	19.656	334	-115	5.8			Uranus
2009/07/18	13:04:09	4.43564	19.47	1.824	1	-52	1.0	-9.8		Mars
2009/07/22	18:55:04	3.58983	3.32	1.315	204	10	-1.2	-6.2		Mercury
2009/08/06	18:45:01	2.27216	-0.63	4.038	338	-171	-2.8			Jupiter
2009/08/06	23:34:27	1.99969	34.22	29.032	324	-169	7.8			Neptune
2009/08/16	01:21:37	2.65078	17.98	1.690	353	-60	0.9			Mars
2009/08/17	20:58:29	0.80952	-26.69	1.244	10	-36	-3.9	-9.1		Venus
2009/08/22	07:27:02	2.86476	6.04	0.957	208	27	0.3	-8.5		Mercury
2009/09/02	18:24:06	2.01980	14.59	4.079	335	159	-2.7			Jupiter
2009/09/05	16:14:17	4.20986	-20.43	19.111	337	-168	5.7			Uranus
2009/09/13	16:40:23	0.18761	-19.75	1.527	11	-69	0.8		2587	Mars
2009/09/16	16:14:27	3.95460	-0.53	1.415	205	-29	-3.8	-8.7		Venus
2009/09/29	22:19:24	2.30861	22.88	4.318	326	131	-2.6			Jupiter
2009/10/02	20:01:37	4.36849	36.97	19.132	323	164	5.7			Uranus
2009/10/11	23:37:39	1.50939	12.28	1.335	190	-81	0.6			Mars
2009/10/27	18:23:36	2.21965	33.95	29.682	325	109	7.9			Neptune
2009/11/09	02:28:46	3.52571	52.09	1.120	204	-96	0.2			Mars
2009/11/17	06:50:15	3.46408	0.31	1.432	199	7	-0.8	-5.8		Mercury
2009/11/23	19:32:14	2.96972	18.74	5.119	327	78	-2.2			Jupiter
2009/11/26	12:03:51	4.39718	-6.20	19.763	335	108	5.8			Uranus
2009/12/18	06:38:51	0.68609	-15.62	1.014	357	20	-0.4	-7.7		Mercury
2009/12/21	10:52:05	2.98815	10.09	5.511	335	55	-2.1	-9.8		Jupiter
2009/12/21	10:56:37	2.46236	11.31	30.582	335	55	7.9	-9.8		Neptune

date in the format year/month/day

Dm = least distance between the centers of the bodies

Alt = height in degrees on the horizon of the event in the central moment

R1 = distance in A.U. of the planet from the Earth

p = angle of position between the bodies, in degrees

e = elongation, in degree

m1 = magnitude of the planet

m2 = magnitude of the Moon

tm = if present, the planet is occulted maximum for x seconds

© (6)

OCCULTATIONS OF PLANETS

This year don't happen occultations of planets visible in Italy

MULTIPLE CONJUNCTIONS PLANETS-MOON

(events with 2 or more planets and the Moon within 5°)

Geocentric

Date	TT	Dmed (°)	Dmax	emin	m2d	mmax			
2009/02/22 23:12:22		1.278	1.520	-25	-1.9	0.1	Mercury	Jupiter	Moon
2009/02/23 02:21:20		3.207	4.283	-25	0.1	1.1	Mercury	Mars	Moon
2009/02/23 03:13:41		2.343	3.053	-23	-1.9	1.1	Mars	Jupiter	Moon
2009/04/19 18:19:28		3.166	3.744	-68	-2.1	7.9	Jupiter	Neptune	Moon
2009/05/17 06:07:21		2.191	2.761	-91	-2.3	7.9	Jupiter	Neptune	Moon
2009/06/13 14:30:22		2.428	3.166	-116	-2.5	7.9	Jupiter	Neptune	Moon
2009/07/10 19:14:34		2.471	3.267	-143	-2.6	7.8	Jupiter	Neptune	Moon
2009/08/06 21:33:20		2.886	3.309	-171	-2.8	7.8	Jupiter	Neptune	Moon
2009/09/02 23:52:43		4.190	5.020	159	-2.7	7.8	Jupiter	Neptune	Moon
2009/11/23 23:15:09		3.809	3.897	78	-2.2	7.9	Jupiter	Neptune	Moon
2009/12/21 11:34:43		2.927	3.818	54	-2.1	7.9	Jupiter	Neptune	Moon
2009/02/23 01:40:01		2.676	4.298	-25	0.1	1.1	Mercury	Mars	Jupiter Moon

Topocentric 42°N - 12°E

Date	UT	Dmed (°)	Dmax	emin	m2d	mmax			
2009/02/23 01:45:18		3.087	4.295	-25	0.1	1.1	Mercury	Mars	Moon
2009/02/23 02:31:49		2.174	3.038	-23	-1.9	1.1	Mars	Jupiter	Moon
2009/04/22 15:26:32		3.820	4.989	-33	-4.5	1.0	Venus	Mars	Moon
2009/05/17 06:02:42		1.748	2.118	-91	-2.3	7.9	Jupiter	Neptune	Moon
2009/07/10 18:54:04		1.853	2.498	-143	-2.6	7.8	Jupiter	Neptune	Moon
2009/08/06 20:56:20		2.375	2.488	-171	-2.8	7.8	Jupiter	Neptune	Moon
2009/09/03 00:09:25		4.007	5.022	159	-2.7	7.8	Jupiter	Neptune	Moon
2009/11/24 00:47:08		3.668	3.874	78	-2.2	7.9	Jupiter	Neptune	Moon
2009/12/21 10:54:25		2.255	2.987	54	-2.1	7.9	Jupiter	Neptune	Moon
2009/02/23 01:08:33		2.593	4.309	-25	0.1	1.1	Mercury	Mars	Jupiter Moon

date in the format year/month/day

Dmed = middle distance between the centers of the bodies, in degrees

Dmax = diameter of the group, in degrees

emin = least elongation, in degrees

m2d = magnitude of the 2nd brightest planet

mmax = least magnitude

MULTIPLE CONJUNCTIONS

LEAST GEOCENTRIC GROUPING PLANETS-MOON

(events with 2 planets and the Moon within 5°)

DATE	TIMES	BODIES			D12	D13	D23	GROUP	EL.	MAG1	MAG2	MAG3	MAGT
22 Feb 2009	15:00	MERCURY	JUPITER	MOON	1.8	3.0	4.7	4.8	25	0.0	-2.0	-6.6	-6.6
22 Feb 2009	16:00	MERCURY	JUPITER	MOON	1.8	2.6	4.2	4.3	25	0.0	-2.0	-6.6	-6.6
22 Feb 2009	17:00	MERCURY	JUPITER	MOON	1.7	2.1	3.7	3.8	25	-0.1	-2.0	-6.5	-6.5
22 Feb 2009	18:00	MERCURY	JUPITER	MOON	1.7	1.8	3.3	3.3	25	-0.1	-2.0	-6.5	-6.5
22 Feb 2009	19:00	MERCURY	JUPITER	MOON	1.6	1.4	2.8	2.8	24	-0.1	-2.0	-6.5	-6.5
22 Feb 2009	20:00	MERCURY	JUPITER	MOON	1.6	1.1	2.3	2.3	24	-0.1	-2.0	-6.4	-6.4
22 Feb 2009	21:00	MERCURY	JUPITER	MOON	1.6	1.0	1.8	1.9	24	-0.1	-2.0	-6.4	-6.4
22 Feb 2009	22:00	MERCURY	JUPITER	MOON	1.5	1.0	1.4	1.6	24	-0.1	-2.0	-6.3	-6.3
22 Feb 2009	23:00	MERCURY	JUPITER	MOON	1.5	1.2	1.0	1.5	24	-0.1	-2.0	-6.3	-6.3
23 Feb 2009	00:00	MERCURY	JUPITER	MOON	1.4	1.5	0.7	1.6	24	-0.1	-2.0	-6.3	-6.3
23 Feb 2009	01:00	MERCURY	JUPITER	MOON	1.4	1.9	0.7	1.9	24	-0.1	-2.0	-6.2	-6.2
23 Feb 2009	02:00	MERCURY	JUPITER	MOON	1.4	2.3	1.0	2.4	23	-0.1	-2.0	-6.2	-6.2
23 Feb 2009	03:00	MERCURY	JUPITER	MOON	1.3	2.7	1.4	2.8	23	-0.1	-2.0	-6.1	-6.1
23 Feb 2009	04:00	MERCURY	JUPITER	MOON	1.3	3.2	1.8	3.2	23	-0.1	-2.0	-6.1	-6.1
23 Feb 2009	05:00	MERCURY	JUPITER	MOON	1.2	3.6	2.3	3.6	23	-0.1	-2.0	-6.0	-6.0
23 Feb 2009	06:00	MERCURY	JUPITER	MOON	1.2	4.0	2.8	4.1	23	-0.1	-2.0	-6.0	-6.0
23 Feb 2009	07:00	MERCURY	JUPITER	MOON	1.2	4.5	3.3	4.5	23	-0.1	-2.0	-6.0	-6.0
23 Feb 2009	08:00	MERCURY	JUPITER	MOON	1.1	4.9	3.8	5.0	23	-0.1	-2.0	-5.9	-5.9
22 Feb 2009	21:00	MARS	JUPITER	MOON	2.9	4.7	1.8	4.8	23	1.2	-2.0	-6.4	-6.4
22 Feb 2009	22:00	MARS	JUPITER	MOON	2.9	4.3	1.4	4.3	23	1.2	-2.0	-6.3	-6.3
22 Feb 2009	23:00	MARS	JUPITER	MOON	2.9	3.8	1.0	3.9	22	1.2	-2.0	-6.3	-6.3
23 Feb 2009	00:00	MARS	JUPITER	MOON	2.9	3.4	0.7	3.5	22	1.2	-2.0	-6.3	-6.3
23 Feb 2009	01:00	MARS	JUPITER	MOON	3.0	3.0	0.7	3.0	22	1.2	-2.0	-6.2	-6.2
23 Feb 2009	02:00	MARS	JUPITER	MOON	3.0	2.6	1.0	3.0	22	1.2	-2.0	-6.2	-6.2
23 Feb 2009	03:00	MARS	JUPITER	MOON	3.0	2.2	1.4	3.0	22	1.2	-2.0	-6.1	-6.1
23 Feb 2009	04:00	MARS	JUPITER	MOON	3.0	1.9	1.8	3.1	22	1.2	-2.0	-6.1	-6.1
23 Feb 2009	05:00	MARS	JUPITER	MOON	3.1	1.7	2.3	3.1	22	1.2	-2.0	-6.0	-6.0
23 Feb 2009	06:00	MARS	JUPITER	MOON	3.1	1.5	2.8	3.1	21	1.2	-2.0	-6.0	-6.0
23 Feb 2009	07:00	MARS	JUPITER	MOON	3.1	1.5	3.3	3.4	21	1.2	-2.0	-6.0	-6.0
23 Feb 2009	08:00	MARS	JUPITER	MOON	3.1	1.7	3.8	3.8	21	1.2	-2.0	-5.9	-5.9
23 Feb 2009	09:00	MARS	JUPITER	MOON	3.1	1.9	4.3	4.3	21	1.2	-2.0	-5.9	-5.9
23 Feb 2009	10:00	MARS	JUPITER	MOON	3.2	2.2	4.8	4.8	21	1.2	-2.0	-5.8	-5.8
22 Feb 2009	21:00	MERCURY	MARS	MOON	4.4	1.0	4.7	4.8	23	-0.1	1.2	-6.4	-6.4
22 Feb 2009	22:00	MERCURY	MARS	MOON	4.3	1.0	4.3	4.4	23	-0.1	1.2	-6.3	-6.3
22 Feb 2009	23:00	MERCURY	MARS	MOON	4.3	1.2	3.8	4.4	23	-0.1	1.2	-6.3	-6.3
23 Feb 2009	00:00	MERCURY	MARS	MOON	4.3	1.5	3.4	4.3	23	-0.1	1.2	-6.3	-6.3
23 Feb 2009	01:00	MERCURY	MARS	MOON	4.3	1.9	3.0	4.3	23	-0.1	1.2	-6.2	-6.2
23 Feb 2009	02:00	MERCURY	MARS	MOON	4.2	2.3	2.6	4.3	23	-0.1	1.2	-6.2	-6.2
23 Feb 2009	03:00	MERCURY	MARS	MOON	4.2	2.7	2.2	4.3	22	-0.1	1.2	-6.1	-6.1
23 Feb 2009	04:00	MERCURY	MARS	MOON	4.2	3.2	1.9	4.2	22	-0.1	1.2	-6.1	-6.1
23 Feb 2009	05:00	MERCURY	MARS	MOON	4.2	3.6	1.7	4.2	22	-0.1	1.2	-6.0	-6.0
23 Feb 2009	06:00	MERCURY	MARS	MOON	4.2	4.0	1.5	4.2	22	-0.1	1.2	-6.0	-6.0
23 Feb 2009	07:00	MERCURY	MARS	MOON	4.1	4.5	1.5	4.5	22	-0.1	1.2	-6.0	-6.0
23 Feb 2009	08:00	MERCURY	MARS	MOON	4.1	4.9	1.7	5.0	22	-0.1	1.2	-5.9	-5.9
19 Apr 2009	13:00	JUPITER	NEPTUNE	MOON	3.7	2.2	5.0	5.0	66	-2.2	7.9	-9.2	-9.2
19 Apr 2009	14:00	JUPITER	NEPTUNE	MOON	3.7	2.1	4.5	4.6	66	-2.2	7.9	-9.2	-9.2
19 Apr 2009	15:00	JUPITER	NEPTUNE	MOON	3.7	2.1	4.1	4.2	66	-2.2	7.9	-9.2	-9.2
19 Apr 2009	16:00	JUPITER	NEPTUNE	MOON	3.7	2.2	3.7	3.9	66	-2.2	7.9	-9.1	-9.1
19 Apr 2009	17:00	JUPITER	NEPTUNE	MOON	3.7	2.4	3.3	3.8	66	-2.2	7.9	-9.1	-9.1
19 Apr 2009	18:00	JUPITER	NEPTUNE	MOON	3.7	2.7	2.9	3.8	66	-2.2	7.9	-9.1	-9.1
19 Apr 2009	19:00	JUPITER	NEPTUNE	MOON	3.7	3.0	2.6	3.8	66	-2.2	7.9	-9.1	-9.1
19 Apr 2009	20:00	JUPITER	NEPTUNE	MOON	3.7	3.4	2.3	3.8	65	-2.2	7.9	-9.0	-9.0
19 Apr 2009	21:00	JUPITER	NEPTUNE	MOON	3.7	3.8	2.2	4.0	65	-2.2	7.9	-9.0	-9.0
19 Apr 2009	22:00	JUPITER	NEPTUNE	MOON	3.7	4.3	2.1	4.3	65	-2.2	7.9	-9.0	-9.0
19 Apr 2009	23:00	JUPITER	NEPTUNE	MOON	3.7	4.7	2.2	4.8	65	-2.2	7.9	-9.0	-9.0
16 May 2009	23:00	JUPITER	NEPTUNE	MOON	0.8	4.1	4.6	4.7	91	-2.3	7.9	-10.3	-10.3
17 May 2009	00:00	JUPITER	NEPTUNE	MOON	0.8	3.8	4.2	4.2	91	-2.3	7.9	-10.3	-10.3
17 May 2009	01:00	JUPITER	NEPTUNE	MOON	0.8	3.4	3.8	3.8	91	-2.3	7.9	-10.2	-10.2
17 May 2009	02:00	JUPITER	NEPTUNE	MOON	0.8	3.2	3.4	3.5	91	-2.3	7.9	-10.2	-10.2
17 May 2009	03:00	JUPITER	NEPTUNE	MOON	0.8	2.9	3.1	3.1	91	-2.3	7.9	-10.2	-10.2
17 May 2009	04:00	JUPITER	NEPTUNE	MOON	0.8	2.8	2.8	2.9	91	-2.3	7.9	-10.2	-10.2
17 May 2009	05:00	JUPITER	NEPTUNE	MOON	0.8	2.7	2.6	2.7	91	-2.3	7.9	-10.2	-10.2
17 May 2009	06:00	JUPITER	NEPTUNE	MOON	0.8	2.7	2.4	2.8	90	-2.3	7.9	-10.2	-10.2
17 May 2009	07:00	JUPITER	NEPTUNE	MOON	0.8	2.8	2.4	2.9	90	-2.3	7.9	-10.1	-10.1
17 May 2009	08:00	JUPITER	NEPTUNE	MOON	0.8	3.0	2.5	3.0	90	-2.3	7.9	-10.1	-10.1
17 May 2009	09:00	JUPITER	NEPTUNE	MOON	0.8	3.3	2.6	3.3	90	-2.3	7.9	-10.1	-10.1
17 May 2009	10:00	JUPITER	NEPTUNE	MOON	0.8	3.6	2.9	3.6	90	-2.3	7.9	-10.1	-10.1
17 May 2009	11:00	JUPITER	NEPTUNE	MOON	0.8	3.9	3.2	3.9	90	-2.3	7.9	-10.1	-10.1

17 May 2009 12:00	JUPITER	NEPTUNE	MOON	0.8	4.3	3.5	4.3	90	-2.3	7.9	-10.1	-10.1
17 May 2009 13:00	JUPITER	NEPTUNE	MOON	0.8	4.7	3.9	4.7	90	-2.3	7.9	-10.0	-10.0
13 Jun 2009 08:00	JUPITER	NEPTUNE	MOON	0.7	4.7	3.9	4.7	117	-2.5	7.9	-11.1	-11.1
13 Jun 2009 09:00	JUPITER	NEPTUNE	MOON	0.7	4.3	3.6	4.4	117	-2.5	7.9	-11.1	-11.1
13 Jun 2009 10:00	JUPITER	NEPTUNE	MOON	0.7	4.0	3.3	4.0	117	-2.5	7.9	-11.1	-11.1
13 Jun 2009 11:00	JUPITER	NEPTUNE	MOON	0.7	3.7	3.0	3.7	117	-2.5	7.9	-11.1	-11.1
13 Jun 2009 12:00	JUPITER	NEPTUNE	MOON	0.7	3.5	2.8	3.5	116	-2.5	7.9	-11.0	-11.0
13 Jun 2009 13:00	JUPITER	NEPTUNE	MOON	0.7	3.3	2.6	3.3	116	-2.5	7.9	-11.0	-11.0
13 Jun 2009 14:00	JUPITER	NEPTUNE	MOON	0.7	3.2	2.6	3.2	116	-2.5	7.9	-11.0	-11.0
13 Jun 2009 15:00	JUPITER	NEPTUNE	MOON	0.7	3.1	2.7	3.2	116	-2.5	7.9	-11.0	-11.0
13 Jun 2009 16:00	JUPITER	NEPTUNE	MOON	0.7	3.1	2.8	3.2	116	-2.5	7.9	-11.0	-11.0
13 Jun 2009 17:00	JUPITER	NEPTUNE	MOON	0.7	3.3	3.0	3.3	116	-2.5	7.9	-10.9	-10.9
13 Jun 2009 18:00	JUPITER	NEPTUNE	MOON	0.7	3.4	3.3	3.5	116	-2.5	7.9	-11.0	-11.0
13 Jun 2009 19:00	JUPITER	NEPTUNE	MOON	0.7	3.7	3.6	3.7	116	-2.5	7.9	-10.9	-10.9
13 Jun 2009 20:00	JUPITER	NEPTUNE	MOON	0.7	4.0	4.0	4.0	115	-2.5	7.9	-10.9	-10.9
13 Jun 2009 21:00	JUPITER	NEPTUNE	MOON	0.7	4.3	4.4	4.4	115	-2.5	7.9	-10.9	-10.9
13 Jun 2009 22:00	JUPITER	NEPTUNE	MOON	0.7	4.7	4.8	4.8	115	-2.5	7.9	-10.9	-10.9
10 Jul 2009 12:00	JUPITER	NEPTUNE	MOON	0.5	4.8	4.5	4.9	144	-2.7	7.8	-11.8	-11.8
10 Jul 2009 13:00	JUPITER	NEPTUNE	MOON	0.5	4.4	4.1	4.5	144	-2.7	7.8	-11.8	-11.8
10 Jul 2009 14:00	JUPITER	NEPTUNE	MOON	0.5	4.1	3.7	4.2	143	-2.7	7.8	-11.8	-11.8
10 Jul 2009 15:00	JUPITER	NEPTUNE	MOON	0.5	3.8	3.4	3.9	143	-2.7	7.8	-11.8	-11.8
10 Jul 2009 16:00	JUPITER	NEPTUNE	MOON	0.5	3.6	3.1	3.6	143	-2.7	7.8	-11.8	-11.8
10 Jul 2009 17:00	JUPITER	NEPTUNE	MOON	0.5	3.4	2.9	3.4	143	-2.7	7.8	-11.8	-11.8
10 Jul 2009 18:00	JUPITER	NEPTUNE	MOON	0.5	3.3	2.7	3.3	143	-2.7	7.8	-11.8	-11.8
10 Jul 2009 19:00	JUPITER	NEPTUNE	MOON	0.5	3.2	2.7	3.3	143	-2.7	7.8	-11.8	-11.8
10 Jul 2009 20:00	JUPITER	NEPTUNE	MOON	0.5	3.3	2.7	3.3	143	-2.7	7.8	-11.7	-11.7
10 Jul 2009 21:00	JUPITER	NEPTUNE	MOON	0.5	3.4	2.8	3.4	142	-2.7	7.8	-11.7	-11.7
10 Jul 2009 22:00	JUPITER	NEPTUNE	MOON	0.5	3.5	3.0	3.6	142	-2.7	7.8	-11.7	-11.7
10 Jul 2009 23:00	JUPITER	NEPTUNE	MOON	0.5	3.8	3.2	3.8	142	-2.7	7.8	-11.7	-11.7
11 Jul 2009 00:00	JUPITER	NEPTUNE	MOON	0.5	4.0	3.5	4.1	142	-2.7	7.8	-11.7	-11.7
11 Jul 2009 01:00	JUPITER	NEPTUNE	MOON	0.5	4.3	3.9	4.4	142	-2.7	7.8	-11.7	-11.7
11 Jul 2009 02:00	JUPITER	NEPTUNE	MOON	0.5	4.7	4.3	4.7	142	-2.7	7.8	-11.7	-11.7
06 Aug 2009 16:00	JUPITER	NEPTUNE	MOON	2.3	3.5	4.7	4.8	171	-2.8	7.8	-12.5	-12.5
06 Aug 2009 17:00	JUPITER	NEPTUNE	MOON	2.3	3.3	4.3	4.4	171	-2.8	7.8	-12.5	-12.5
06 Aug 2009 18:00	JUPITER	NEPTUNE	MOON	2.3	3.1	3.9	4.0	171	-2.8	7.8	-12.5	-12.5
06 Aug 2009 19:00	JUPITER	NEPTUNE	MOON	2.3	3.1	3.6	3.7	171	-2.8	7.8	-12.5	-12.5
06 Aug 2009 20:00	JUPITER	NEPTUNE	MOON	2.3	3.1	3.2	3.5	170	-2.8	7.8	-12.5	-12.5
06 Aug 2009 21:00	JUPITER	NEPTUNE	MOON	2.3	3.2	3.0	3.4	170	-2.8	7.8	-12.5	-12.5
06 Aug 2009 22:00	JUPITER	NEPTUNE	MOON	2.3	3.4	2.8	3.4	170	-2.8	7.8	-12.5	-12.5
06 Aug 2009 23:00	JUPITER	NEPTUNE	MOON	2.3	3.6	2.6	3.6	170	-2.8	7.8	-12.5	-12.5
07 Aug 2009 00:00	JUPITER	NEPTUNE	MOON	2.3	3.9	2.6	3.9	170	-2.8	7.8	-12.4	-12.4
07 Aug 2009 01:00	JUPITER	NEPTUNE	MOON	2.3	4.2	2.7	4.3	170	-2.8	7.8	-12.4	-12.4
07 Aug 2009 02:00	JUPITER	NEPTUNE	MOON	2.3	4.6	2.8	4.6	170	-2.8	7.8	-12.4	-12.4
07 Aug 2009 03:00	JUPITER	NEPTUNE	MOON	2.4	5.0	3.0	5.0	170	-2.8	7.8	-12.4	-12.4
02 Sep 2009 23:00	JUPITER	NEPTUNE	MOON	5.0	3.5	3.9	5.0	161	-2.8	7.8	-12.2	-12.2
03 Sep 2009 00:00	JUPITER	NEPTUNE	MOON	5.0	3.8	3.5	5.0	161	-2.8	7.8	-12.2	-12.2
23 Nov 2009 20:00	JUPITER	NEPTUNE	MOON	3.9	3.3	4.6	4.8	80	-2.3	7.9	-9.7	-9.7
23 Nov 2009 21:00	JUPITER	NEPTUNE	MOON	3.8	3.4	4.3	4.6	80	-2.3	7.9	-9.7	-9.7
23 Nov 2009 22:00	JUPITER	NEPTUNE	MOON	3.8	3.6	4.0	4.4	80	-2.3	7.9	-9.7	-9.7
23 Nov 2009 23:00	JUPITER	NEPTUNE	MOON	3.8	3.8	3.7	4.4	80	-2.3	7.9	-9.7	-9.7
24 Nov 2009 00:00	JUPITER	NEPTUNE	MOON	3.8	4.1	3.4	4.4	80	-2.3	7.9	-9.7	-9.7
24 Nov 2009 01:00	JUPITER	NEPTUNE	MOON	3.8	4.4	3.2	4.5	80	-2.3	7.9	-9.8	-9.8
24 Nov 2009 02:00	JUPITER	NEPTUNE	MOON	3.8	4.7	3.1	4.8	80	-2.3	7.9	-9.8	-9.8
21 Dec 2009 05:00	JUPITER	NEPTUNE	MOON	0.5	4.9	4.6	5.0	54	-2.1	7.9	-8.3	-8.3
21 Dec 2009 06:00	JUPITER	NEPTUNE	MOON	0.5	4.6	4.2	4.7	54	-2.1	7.9	-8.3	-8.3
21 Dec 2009 07:00	JUPITER	NEPTUNE	MOON	0.5	4.4	3.9	4.4	54	-2.1	7.9	-8.3	-8.3
21 Dec 2009 08:00	JUPITER	NEPTUNE	MOON	0.5	4.1	3.7	4.2	54	-2.1	7.9	-8.4	-8.4
21 Dec 2009 09:00	JUPITER	NEPTUNE	MOON	0.5	4.0	3.5	4.0	54	-2.1	7.9	-8.4	-8.4
21 Dec 2009 10:00	JUPITER	NEPTUNE	MOON	0.5	3.8	3.3	3.9	54	-2.1	7.9	-8.4	-8.4
21 Dec 2009 11:00	JUPITER	NEPTUNE	MOON	0.5	3.8	3.3	3.8	54	-2.1	7.9	-8.4	-8.4
21 Dec 2009 12:00	JUPITER	NEPTUNE	MOON	0.5	3.8	3.3	3.8	55	-2.1	7.9	-8.5	-8.5
21 Dec 2009 13:00	JUPITER	NEPTUNE	MOON	0.5	3.8	3.3	3.9	55	-2.1	7.9	-8.5	-8.5
21 Dec 2009 14:00	JUPITER	NEPTUNE	MOON	0.5	4.0	3.5	4.0	55	-2.1	7.9	-8.5	-8.5
21 Dec 2009 15:00	JUPITER	NEPTUNE	MOON	0.5	4.1	3.7	4.2	55	-2.1	7.9	-8.6	-8.6
21 Dec 2009 16:00	JUPITER	NEPTUNE	MOON	0.5	4.3	3.9	4.4	55	-2.1	7.9	-8.6	-8.6
21 Dec 2009 17:00	JUPITER	NEPTUNE	MOON	0.5	4.6	4.2	4.6	55	-2.1	7.9	-8.6	-8.6
21 Dec 2009 18:00	JUPITER	NEPTUNE	MOON	0.5	4.9	4.5	4.9	55	-2.1	7.9	-8.6	-8.6

Dxy = distance between the body x and y, in degrees

GROUP = least group, in degree

EL = elongation from the Sun, in degrees

MAGx = magnitude of body x

MAGT = total magnitude

Times in U.T.

MULTIPLE CONJUNCTIONS

LEAST TOPOCENTRIC GROUPING PLANETS-MOON

(events with 2 planets and the Moon within 5°)
42°N - 12°E

DATE	TIMES	BODIES			D12	D13	D23	GROUP	EL.	MAG1	MAG2	MAG3	MAGT	ALT	AZ
22 Feb 2009	17:00	MERCURY	JUPITER	MOON	1.7	2.8	4.5	4.5	25	-0.1	-2.0	-6.5	-6.5	-25	266
22 Feb 2009	18:00	MERCURY	JUPITER	MOON	1.7	2.3	3.9	3.9	25	-0.1	-2.0	-6.5	-6.5	-36	277
22 Feb 2009	19:00	MERCURY	JUPITER	MOON	1.6	1.7	3.3	3.3	24	-0.1	-2.0	-6.5	-6.5	-47	289
22 Feb 2009	20:00	MERCURY	JUPITER	MOON	1.6	1.2	2.6	2.7	24	-0.1	-2.0	-6.4	-6.4	-57	306
22 Feb 2009	21:00	MERCURY	JUPITER	MOON	1.6	0.8	2.0	2.0	24	-0.1	-2.0	-6.4	-6.4	-64	331
22 Feb 2009	22:00	MERCURY	JUPITER	MOON	1.5	0.6	1.3	1.6	24	-0.1	-2.0	-6.3	-6.3	-66	5
22 Feb 2009	23:00	MERCURY	JUPITER	MOON	1.5	0.9	0.7	1.5	24	-0.1	-2.0	-6.3	-6.3	-62	37
23 Feb 2009	00:00	MERCURY	JUPITER	MOON	1.4	1.4	0.1	1.5	24	-0.1	-2.0	-6.3	-6.3	-54	59
23 Feb 2009	01:00	MERCURY	JUPITER	MOON	1.4	1.9	0.5	2.0	24	-0.1	-2.0	-6.2	-6.2	-44	74
23 Feb 2009	02:00	MERCURY	JUPITER	MOON	1.4	2.5	1.1	2.5	23	-0.1	-2.0	-6.2	-6.2	-33	86
23 Feb 2009	03:00	MERCURY	JUPITER	MOON	1.3	2.9	1.6	3.0	23	-0.1	-2.0	-6.1	-6.1	-22	96
23 Feb 2009	04:00	MERCURY	JUPITER	MOON	1.3	3.4	2.1	3.4	23	-0.1	-2.0	-6.1	-6.1	-11	105
23 Feb 2009	05:00	MERCURY	JUPITER	MOON	1.2	3.8	2.6	3.9	23	-0.1	-2.0	-6.0	-6.0	0	115
23 Feb 2009	06:00	MERCURY	JUPITER	MOON	1.2	4.2	3.0	4.2	23	-0.1	-2.0	-6.0	-6.0	9	125
23 Feb 2009	07:00	MERCURY	JUPITER	MOON	1.2	4.5	3.4	4.6	23	-0.1	-2.0	-6.0	-6.0	18	137
23 Feb 2009	08:00	MERCURY	JUPITER	MOON	1.1	4.9	3.8	4.9	23	-0.1	-2.0	-5.9	-5.9	24	151
22 Feb 2009	21:00	MERCURY	MARS	MOON	4.4	0.8	4.9	4.9	23	-0.1	1.2	-6.4	-6.4	-63	331
22 Feb 2009	22:00	MERCURY	MARS	MOON	4.3	0.6	4.3	4.4	23	-0.1	1.2	-6.3	-6.3	-66	5
22 Feb 2009	23:00	MERCURY	MARS	MOON	4.3	0.9	3.7	4.4	23	-0.1	1.2	-6.3	-6.3	-63	37
23 Feb 2009	00:00	MERCURY	MARS	MOON	4.3	1.4	3.0	4.3	23	-0.1	1.2	-6.3	-6.3	-55	59
23 Feb 2009	01:00	MERCURY	MARS	MOON	4.3	1.9	2.5	4.3	23	-0.1	1.2	-6.2	-6.2	-45	74
23 Feb 2009	02:00	MERCURY	MARS	MOON	4.2	2.5	1.9	4.3	23	-0.1	1.2	-6.2	-6.2	-34	86
23 Feb 2009	03:00	MERCURY	MARS	MOON	4.2	2.9	1.4	4.3	22	-0.1	1.2	-6.1	-6.1	-23	96
23 Feb 2009	04:00	MERCURY	MARS	MOON	4.2	3.4	1.0	4.2	22	-0.1	1.2	-6.1	-6.1	-12	105
23 Feb 2009	05:00	MERCURY	MARS	MOON	4.2	3.8	0.7	4.2	22	-0.1	1.2	-6.0	-6.0	-1	115
23 Feb 2009	06:00	MERCURY	MARS	MOON	4.2	4.2	0.6	4.2	22	-0.1	1.2	-6.0	-6.0	8	125
23 Feb 2009	07:00	MERCURY	MARS	MOON	4.1	4.5	0.8	4.6	22	-0.1	1.2	-6.0	-6.0	17	137
23 Feb 2009	08:00	MERCURY	MARS	MOON	4.1	4.9	1.0	4.9	22	-0.1	1.2	-5.9	-5.9	24	151
22 Feb 2009	21:00	MARS	JUPITER	MOON	2.9	4.9	2.0	4.9	23	1.2	-2.0	-6.4	-6.4	-63	324
22 Feb 2009	22:00	MARS	JUPITER	MOON	2.9	4.3	1.3	4.3	23	1.2	-2.0	-6.3	-6.3	-66	355
22 Feb 2009	23:00	MARS	JUPITER	MOON	2.9	3.7	0.7	3.7	22	1.2	-2.0	-6.3	-6.3	-62	28
23 Feb 2009	00:00	MARS	JUPITER	MOON	2.9	3.0	0.1	3.1	22	1.2	-2.0	-6.3	-6.3	-55	52
23 Feb 2009	01:00	MARS	JUPITER	MOON	3.0	2.5	0.5	3.0	22	1.2	-2.0	-6.2	-6.2	-45	69
23 Feb 2009	02:00	MARS	JUPITER	MOON	3.0	1.9	1.1	3.0	22	1.2	-2.0	-6.2	-6.2	-34	81
23 Feb 2009	03:00	MARS	JUPITER	MOON	3.0	1.4	1.6	3.1	22	1.2	-2.0	-6.1	-6.1	-23	92
23 Feb 2009	04:00	MARS	JUPITER	MOON	3.0	1.0	2.1	3.1	22	1.2	-2.0	-6.1	-6.1	-12	101
23 Feb 2009	05:00	MARS	JUPITER	MOON	3.0	0.7	2.6	3.1	22	1.2	-2.0	-6.0	-6.0	-1	111
23 Feb 2009	06:00	MARS	JUPITER	MOON	3.1	0.6	3.0	3.1	21	1.2	-2.0	-6.0	-6.0	8	121
23 Feb 2009	07:00	MARS	JUPITER	MOON	3.1	0.8	3.4	3.5	21	1.2	-2.0	-6.0	-6.0	17	133
23 Feb 2009	08:00	MARS	JUPITER	MOON	3.1	1.0	3.8	3.8	21	1.2	-2.0	-5.9	-5.9	24	146
23 Feb 2009	09:00	MARS	JUPITER	MOON	3.1	1.3	4.1	4.2	21	1.2	-2.0	-5.9	-5.9	29	161
23 Feb 2009	10:00	MARS	JUPITER	MOON	3.2	1.6	4.4	4.5	21	1.2	-2.0	-5.8	-5.8	31	177
23 Feb 2009	11:00	MARS	JUPITER	MOON	3.2	1.9	4.8	4.8	21	1.2	-2.0	-5.8	-5.8	30	194
19 Apr 2009	15:00	JUPITER	NEPTUNE	MOON	3.7	1.9	4.6	4.7	66	-2.2	7.9	-9.2	-9.2	-31	279
19 Apr 2009	16:00	JUPITER	NEPTUNE	MOON	3.7	1.8	4.1	4.1	66	-2.2	7.9	-9.1	-9.1	-41	291
19 Apr 2009	17:00	JUPITER	NEPTUNE	MOON	3.7	1.9	3.5	3.8	66	-2.2	7.9	-9.1	-9.1	-51	307
19 Apr 2009	18:00	JUPITER	NEPTUNE	MOON	3.7	2.2	2.9	3.7	66	-2.2	7.9	-9.1	-9.1	-58	330
19 Apr 2009	19:00	JUPITER	NEPTUNE	MOON	3.7	2.6	2.4	3.7	66	-2.2	7.9	-9.1	-9.1	-61	0
19 Apr 2009	20:00	JUPITER	NEPTUNE	MOON	3.7	3.1	1.9	3.7	65	-2.2	7.9	-9.0	-9.0	-59	30
19 Apr 2009	21:00	JUPITER	NEPTUNE	MOON	3.7	3.6	1.6	3.8	65	-2.2	7.9	-9.0	-9.0	-52	52
19 Apr 2009	22:00	JUPITER	NEPTUNE	MOON	3.7	4.2	1.5	4.2	65	-2.2	7.9	-9.0	-9.0	-43	68
19 Apr 2009	23:00	JUPITER	NEPTUNE	MOON	3.7	4.7	1.6	4.8	65	-2.2	7.9	-9.0	-9.0	-32	80
22 Apr 2009	14:00	Venus	MARS	MOON	4.2	0.8	5.0	5.0	33	-4.5	1.2	-7.0	-7.1	13	261
22 Apr 2009	15:00	Venus	MARS	MOON	4.2	0.7	5.0	5.0	33	-4.5	1.2	-7.0	-7.1	2	271
22 Apr 2009	16:00	Venus	MARS	MOON	4.2	0.8	4.9	5.0	33	-4.5	1.2	-7.0	-7.1	-9	281
22 Apr 2009	17:00	Venus	MARS	MOON	4.2	1.3	5.0	5.0	32	-4.5	1.2	-6.9	-7.0	-19	292
16 May 2009	21:00	JUPITER	NEPTUNE	MOON	0.8	4.3	4.9	5.0	92	-2.3	7.9	-10.3	-10.3	-35	74
16 May 2009	22:00	JUPITER	NEPTUNE	MOON	0.8	3.8	4.4	4.4	92	-2.3	7.9	-10.3	-10.3	-24	86
16 May 2009	23:00	JUPITER	NEPTUNE	MOON	0.8	3.3	3.9	3.9	91	-2.3	7.9	-10.3	-10.3	-13	96
17 May 2009	00:00	JUPITER	NEPTUNE	MOON	0.8	2.9	3.4	3.5	91	-2.3	7.9	-10.3	-10.3	-2	105
17 May 2009	01:00	JUPITER	NEPTUNE	MOON	0.8	2.6	3.1	3.1	91	-2.3	7.9	-10.2	-10.2	8	116
17 May 2009	02:00	JUPITER	NEPTUNE	MOON	0.8	2.4	2.7	2.8	91	-2.3	7.9	-10.2	-10.2	18	127
17 May 2009	03:00	JUPITER	NEPTUNE	MOON	0.8	2.2	2.4	2.5	91	-2.3	7.9	-10.2	-10.2	26	140
17 May 2009	04:00	JUPITER	NEPTUNE	MOON	0.8	2.1	2.2	2.3	91	-2.3	7.9	-10.2	-10.2	32	155
17 May 2009	05:00	JUPITER	NEPTUNE	MOON	0.8	2.0	2.1	2.1	91	-2.3	7.9	-10.2	-10.2	35	172
17 May 2009	06:00	JUPITER	NEPTUNE	MOON	0.8	2.1	2.0	2.1	90	-2.3	7.9	-10.2	-10.2	35	190
17 May 2009	07:00	JUPITER	NEPTUNE	MOON	0.8	2.2	1.9	2.2	90	-2.3	7.9	-10.1	-10.1	31	207
17 May 2009	08:00	JUPITER	NEPTUNE	MOON	0.8	2.3	1.9	2.4	90	-2.3	7.9	-10.1	-10.1	25	221
17 May 2009	09:00	JUPITER	NEPTUNE	MOON	0.8	2.5	2.0	2.6	90	-2.3	7.9	-10.1	-10.1	16	234
17 May 2009	10:00	JUPITER	NEPTUNE	MOON	0.8	2.8	2.2	2.8	90	-2.3	7.9	-10.1	-10.1	7	245
17 May 2009	11:00	JUPITER	NEPTUNE	MOON	0.8	3.1	2.4	3.2	90	-2.3	7.9	-10.1	-10.1	-4	255
17 May 2009	12:00	JUPITER	NEPTUNE	MOON	0.7	3.5	2.8	3.5	90	-2.3	7.9	-10.1	-10.1	-14	265
17 May 2009	13:00	JUPITER	NEPTUNE	MOON	0.7	3.9	3.1	3.9	90	-2.3	7.9	-10.0	-10.0	-25	275
17 May 2009	14:00	JUPITER	NEPTUNE	MOON	0.7	4.4	3.6	4.4	89	-2.3	7.9	-10.0	-10.0	-36	287
17 May 2009	15:00	JUPITER	NEPTUNE	MOON	0.7	4.9	4.1	4.9	89	-2.3	7.9	-10.0	-10.0	-46	301

13 Jun 2009 09:00	JUPITER	NEPTUNE	MOON	0.7	4.8	4.0	4.8	117	-2.5	7.9	-11.1	-11.1	-2	253
13 Jun 2009 10:00	JUPITER	NEPTUNE	MOON	0.7	4.4	3.6	4.4	117	-2.5	7.9	-11.1	-11.1	-13	262
13 Jun 2009 11:00	JUPITER	NEPTUNE	MOON	0.7	4.0	3.2	4.0	117	-2.5	7.9	-11.1	-11.1	-24	272
13 Jun 2009 12:00	JUPITER	NEPTUNE	MOON	0.7	3.6	2.9	3.7	116	-2.5	7.9	-11.0	-11.0	-35	283
13 Jun 2009 13:00	JUPITER	NEPTUNE	MOON	0.7	3.2	2.5	3.3	116	-2.5	7.9	-11.0	-11.0	-45	297
13 Jun 2009 14:00	JUPITER	NEPTUNE	MOON	0.7	2.9	2.3	3.0	116	-2.5	7.9	-11.0	-11.0	-54	314
13 Jun 2009 15:00	JUPITER	NEPTUNE	MOON	0.7	2.7	2.2	2.8	116	-2.5	7.9	-11.0	-11.0	-59	339
13 Jun 2009 16:00	JUPITER	NEPTUNE	MOON	0.7	2.7	2.3	2.7	116	-2.5	7.9	-11.0	-11.0	-60	9
13 Jun 2009 17:00	JUPITER	NEPTUNE	MOON	0.7	2.8	2.6	2.8	116	-2.5	7.9	-11.0	-11.0	-56	36
13 Jun 2009 18:00	JUPITER	NEPTUNE	MOON	0.7	3.0	2.9	3.0	116	-2.5	7.9	-11.0	-11.0	-48	56
13 Jun 2009 19:00	JUPITER	NEPTUNE	MOON	0.7	3.3	3.4	3.4	116	-2.5	7.9	-10.9	-10.9	-38	71
13 Jun 2009 20:00	JUPITER	NEPTUNE	MOON	0.7	3.6	3.8	3.9	115	-2.5	7.9	-10.9	-10.9	-27	83
13 Jun 2009 21:00	JUPITER	NEPTUNE	MOON	0.7	4.0	4.3	4.3	115	-2.5	7.9	-10.9	-10.9	-16	93
13 Jun 2009 22:00	JUPITER	NEPTUNE	MOON	0.7	4.4	4.7	4.8	115	-2.5	7.9	-10.9	-10.9	-5	103
10 Jul 2009 12:00	JUPITER	NEPTUNE	MOON	0.5	4.9	4.7	5.0	144	-2.7	7.8	-11.8	-11.8	-53	310
10 Jul 2009 13:00	JUPITER	NEPTUNE	MOON	0.5	4.4	4.1	4.4	144	-2.7	7.8	-11.8	-11.8	-59	334
10 Jul 2009 14:00	JUPITER	NEPTUNE	MOON	0.5	3.9	3.5	3.9	143	-2.7	7.8	-11.8	-11.8	-61	4
10 Jul 2009 15:00	JUPITER	NEPTUNE	MOON	0.5	3.4	3.0	3.4	143	-2.7	7.8	-11.8	-11.8	-57	32
10 Jul 2009 16:00	JUPITER	NEPTUNE	MOON	0.5	3.0	2.5	3.0	143	-2.7	7.8	-11.8	-11.8	-49	54
10 Jul 2009 17:00	JUPITER	NEPTUNE	MOON	0.5	2.7	2.2	2.7	143	-2.7	7.8	-11.8	-11.8	-39	69
10 Jul 2009 18:00	JUPITER	NEPTUNE	MOON	0.5	2.5	2.0	2.5	143	-2.7	7.8	-11.8	-11.8	-29	81
10 Jul 2009 19:00	JUPITER	NEPTUNE	MOON	0.5	2.5	1.9	2.5	143	-2.7	7.8	-11.8	-11.8	-18	92
10 Jul 2009 20:00	JUPITER	NEPTUNE	MOON	0.5	2.5	2.0	2.6	143	-2.7	7.8	-11.7	-11.7	-7	101
10 Jul 2009 21:00	JUPITER	NEPTUNE	MOON	0.5	2.7	2.2	2.7	142	-2.7	7.8	-11.7	-11.7	4	111
10 Jul 2009 22:00	JUPITER	NEPTUNE	MOON	0.5	2.9	2.4	3.0	142	-2.7	7.8	-11.7	-11.7	14	122
10 Jul 2009 23:00	JUPITER	NEPTUNE	MOON	0.5	3.2	2.7	3.2	142	-2.7	7.8	-11.7	-11.7	23	134
11 Jul 2009 00:00	JUPITER	NEPTUNE	MOON	0.5	3.4	3.0	3.5	142	-2.7	7.8	-11.7	-11.7	30	149
11 Jul 2009 01:00	JUPITER	NEPTUNE	MOON	0.5	3.7	3.3	3.8	142	-2.7	7.8	-11.7	-11.7	34	165
11 Jul 2009 02:00	JUPITER	NEPTUNE	MOON	0.5	4.0	3.6	4.1	142	-2.7	7.8	-11.7	-11.7	36	183
11 Jul 2009 03:00	JUPITER	NEPTUNE	MOON	0.5	4.4	4.0	4.4	142	-2.7	7.8	-11.7	-11.7	34	200
11 Jul 2009 04:00	JUPITER	NEPTUNE	MOON	0.5	4.7	4.3	4.7	142	-2.7	7.8	-11.6	-11.6	28	215
06 Aug 2009 15:00	JUPITER	NEPTUNE	MOON	2.3	3.0	4.6	4.6	171	-2.8	7.8	-12.6	-12.6	-41	69
06 Aug 2009 16:00	JUPITER	NEPTUNE	MOON	2.3	2.7	4.0	4.1	171	-2.8	7.8	-12.5	-12.5	-30	82
06 Aug 2009 17:00	JUPITER	NEPTUNE	MOON	2.3	2.4	3.5	3.6	171	-2.8	7.8	-12.5	-12.5	-19	92
06 Aug 2009 18:00	JUPITER	NEPTUNE	MOON	2.3	2.3	3.1	3.2	171	-2.8	7.8	-12.5	-12.5	-8	102
06 Aug 2009 19:00	JUPITER	NEPTUNE	MOON	2.3	2.2	2.7	2.9	171	-2.8	7.8	-12.5	-12.5	3	112
06 Aug 2009 20:00	JUPITER	NEPTUNE	MOON	2.3	2.3	2.4	2.8	170	-2.8	7.8	-12.5	-12.5	13	122
06 Aug 2009 21:00	JUPITER	NEPTUNE	MOON	2.3	2.5	2.2	2.7	170	-2.8	7.8	-12.5	-12.5	21	134
06 Aug 2009 22:00	JUPITER	NEPTUNE	MOON	2.3	2.7	2.0	2.8	170	-2.8	7.8	-12.5	-12.5	28	148
06 Aug 2009 23:00	JUPITER	NEPTUNE	MOON	2.3	2.9	2.0	3.0	170	-2.8	7.8	-12.5	-12.5	33	164
07 Aug 2009 00:00	JUPITER	NEPTUNE	MOON	2.3	3.2	2.0	3.2	170	-2.8	7.8	-12.4	-12.4	35	182
07 Aug 2009 01:00	JUPITER	NEPTUNE	MOON	2.3	3.5	2.0	3.5	170	-2.8	7.8	-12.4	-12.4	33	199
07 Aug 2009 02:00	JUPITER	NEPTUNE	MOON	2.3	3.8	2.1	3.8	170	-2.8	7.8	-12.4	-12.4	28	214
07 Aug 2009 03:00	JUPITER	NEPTUNE	MOON	2.3	4.1	2.3	4.2	170	-2.8	7.8	-12.4	-12.4	21	228
07 Aug 2009 04:00	JUPITER	NEPTUNE	MOON	2.4	4.5	2.6	4.5	170	-2.8	7.8	-12.4	-12.4	12	239
07 Aug 2009 05:00	JUPITER	NEPTUNE	MOON	2.4	4.9	2.9	5.0	169	-2.8	7.8	-12.4	-12.4	2	250
02 Sep 2009 21:00	JUPITER	NEPTUNE	MOON	5.0	2.2	4.5	5.0	161	-2.8	7.8	-12.2	-12.2	32	165
02 Sep 2009 22:00	JUPITER	NEPTUNE	MOON	5.0	2.5	4.2	5.0	161	-2.8	7.8	-12.2	-12.2	34	181
02 Sep 2009 23:00	JUPITER	NEPTUNE	MOON	5.0	2.7	3.9	5.0	161	-2.8	7.8	-12.2	-12.2	32	198
03 Sep 2009 00:00	JUPITER	NEPTUNE	MOON	5.0	3.0	3.7	5.0	161	-2.8	7.8	-12.2	-12.2	27	214
03 Sep 2009 01:00	JUPITER	NEPTUNE	MOON	5.0	3.3	3.4	5.0	162	-2.8	7.8	-12.3	-12.3	20	227
03 Sep 2009 02:00	JUPITER	NEPTUNE	MOON	5.0	3.7	3.1	5.0	162	-2.8	7.8	-12.3	-12.3	12	239
03 Sep 2009 03:00	JUPITER	NEPTUNE	MOON	5.0	4.1	2.9	5.0	162	-2.8	7.8	-12.3	-12.3	2	249
23 Nov 2009 20:00	JUPITER	NEPTUNE	MOON	3.9	2.9	5.0	5.0	80	-2.3	7.9	-9.7	-9.7	16	231
23 Nov 2009 21:00	JUPITER	NEPTUNE	MOON	3.8	3.0	4.7	4.7	80	-2.3	7.9	-9.7	-9.7	7	243
23 Nov 2009 22:00	JUPITER	NEPTUNE	MOON	3.8	3.1	4.3	4.5	80	-2.3	7.9	-9.7	-9.7	-3	253
23 Nov 2009 23:00	JUPITER	NEPTUNE	MOON	3.8	3.2	4.0	4.3	80	-2.3	7.9	-9.7	-9.7	-14	262
24 Nov 2009 00:00	JUPITER	NEPTUNE	MOON	3.8	3.4	3.6	4.3	80	-2.3	7.9	-9.7	-9.7	-25	272
24 Nov 2009 01:00	JUPITER	NEPTUNE	MOON	3.8	3.7	3.3	4.3	80	-2.3	7.9	-9.8	-9.8	-36	283
24 Nov 2009 02:00	JUPITER	NEPTUNE	MOON	3.8	4.1	3.0	4.3	80	-2.3	7.9	-9.8	-9.8	-46	297
24 Nov 2009 03:00	JUPITER	NEPTUNE	MOON	3.8	4.5	2.8	4.6	80	-2.3	7.9	-9.8	-9.8	-55	316
24 Nov 2009 04:00	JUPITER	NEPTUNE	MOON	3.8	5.0	2.7	5.0	81	-2.3	7.9	-9.8	-9.8	-61	344
21 Dec 2009 04:00	JUPITER	NEPTUNE	MOON	0.5	4.9	4.6	4.9	54	-2.1	7.9	-8.3	-8.3	-58	29
21 Dec 2009 05:00	JUPITER	NEPTUNE	MOON	0.5	4.4	4.0	4.4	54	-2.1	7.9	-8.3	-8.3	-51	52
21 Dec 2009 06:00	JUPITER	NEPTUNE	MOON	0.5	3.9	3.6	4.0	54	-2.1	7.9	-8.3	-8.3	-41	68
21 Dec 2009 07:00	JUPITER	NEPTUNE	MOON	0.5	3.6	3.2	3.6	54	-2.1	7.9	-8.3	-8.3	-30	80
21 Dec 2009 08:00	JUPITER	NEPTUNE	MOON	0.5	3.3	2.8	3.3	54	-2.1	7.9	-8.4	-8.4	-19	91
21 Dec 2009 09:00	JUPITER	NEPTUNE	MOON	0.5	3.1	2.6	3.1	54	-2.1	7.9	-8.4	-8.4	-8	100
21 Dec 2009 10:00	JUPITER	NEPTUNE	MOON	0.5	3.0	2.5	3.0	54	-2.1	7.9	-8.4	-8.4	3	110
21 Dec 2009 11:00	JUPITER	NEPTUNE	MOON	0.5	2.9	2.4	3.0	54	-2.1	7.9	-8.4	-8.4	13	121
21 Dec 2009 12:00	JUPITER	NEPTUNE	MOON	0.5	3.0	2.5	3.0	55	-2.1	7.9	-8.5	-8.5	21	133
21 Dec 2009 13:00	JUPITER	NEPTUNE	MOON	0.5	3.1	2.6	3.1	55	-2.1	7.9	-8.5	-8.5	29	147
21 Dec 2009 14:00	JUPITER	NEPTUNE	MOON	0.5	3.2	2.7	3.3	55	-2.1	7.9	-8.5	-8.5	33	163
21 Dec 2009 15:00	JUPITER	NEPTUNE	MOON	0.5	3.4	2.9	3.5	55	-2.1	7.9	-8.6	-8.6	35	180
21 Dec 2009 16:00	JUPITER	NEPTUNE	MOON	0.5	3.6	3.2	3.7	55	-2.1	7.9	-8.6	-8.6	33	197
21 Dec 2009 17:00	JUPITER	NEPTUNE	MOON	0.5	3.9	3.4	3.9	55	-2.1	7.9	-8.6	-8.6	29	213
21 Dec 2009 18:00	JUPITER	NEPTUNE	MOON	0.5	4.1	3.7	4.2	55	-2.1	7.9	-8.6	-8.6	21	227
21 Dec 2009 19:00	JUPITER	NEPTUNE	MOON	0.5	4.4	4.0	4.5	55	-2.1	7.9	-8.7	-8.7	12	239
21 Dec 2009 20:00	JUPITER	NEPTUNE	MOON	0.5	4.7	4.4	4.8	56	-2.1	7.9	-8.7	-8.7	3	249

Dxy = distance between the body x and y, in degrees

GROUP = least group, in degree

EL = elongation from the Sun, in degrees

MAGx = magnitude of body x

MAGT = total magnitude

ALT = height on the horizon of the baricenter of the group, in degrees

AZ = azimuth of the baricenter of the group, in degrees from north

Times in U.T.

MULTIPLE CONJUNCTIONS GEOCENTRIC QUARTETS PLANETS-MOON (events with 3 planets and the Moon within 5°)

DATE	TIMES	BODIES				D12	D13	D14	D23	D24	D34	DQM	MAX	EL.	MAG1	MAG2	MAG3	MAG4	MAGT
22 Feb 2009	21:00	MERCURY	MARS	JUPITER	MOON	4.4	1.6	1.0	2.9	4.7	1.8	3.1	4.7	23	-0.1	1.2	-2.0	-6.4	-6.4
22 Feb 2009	22:00	MERCURY	MARS	JUPITER	MOON	4.3	1.5	1.0	2.9	4.3	1.4	2.9	4.3	23	-0.1	1.2	-2.0	-6.3	-6.3
22 Feb 2009	23:00	MERCURY	MARS	JUPITER	MOON	4.3	1.5	1.2	2.9	3.8	1.0	2.8	4.3	23	-0.1	1.2	-2.0	-6.3	-6.3
23 Feb 2009	00:00	MERCURY	MARS	JUPITER	MOON	4.3	1.4	1.5	2.9	3.4	0.7	2.7	4.3	23	-0.1	1.2	-2.0	-6.3	-6.3
23 Feb 2009	01:00	MERCURY	MARS	JUPITER	MOON	4.3	1.4	1.9	3.0	3.0	0.7	2.6	4.3	23	-0.1	1.2	-2.0	-6.2	-6.2
23 Feb 2009	02:00	MERCURY	MARS	JUPITER	MOON	4.2	1.4	2.3	3.0	2.6	1.0	2.6	4.2	23	-0.1	1.2	-2.0	-6.2	-6.2
23 Feb 2009	03:00	MERCURY	MARS	JUPITER	MOON	4.2	1.3	2.7	3.0	2.2	1.4	2.7	4.2	23	-0.1	1.2	-2.0	-6.1	-6.1
23 Feb 2009	04:00	MERCURY	MARS	JUPITER	MOON	4.2	1.3	3.2	3.0	1.9	1.8	2.7	4.2	23	-0.1	1.2	-2.0	-6.1	-6.1
23 Feb 2009	05:00	MERCURY	MARS	JUPITER	MOON	4.2	1.2	3.6	3.1	1.7	2.3	2.9	4.2	23	-0.1	1.2	-2.0	-6.0	-6.0
23 Feb 2009	06:00	MERCURY	MARS	JUPITER	MOON	4.2	1.2	4.0	3.1	1.5	2.8	3.0	4.2	23	-0.1	1.2	-2.0	-6.0	-6.0
23 Feb 2009	07:00	MERCURY	MARS	JUPITER	MOON	4.1	1.2	4.5	3.1	1.5	3.3	3.2	4.5	23	-0.1	1.2	-2.0	-6.0	-6.0
23 Feb 2009	08:00	MERCURY	MARS	JUPITER	MOON	4.1	1.1	4.9	3.1	1.7	3.8	3.4	4.9	23	-0.1	1.2	-2.0	-5.9	-5.9

MULTIPLE CONJUNCTIONS TOPOCENTRIC QUARTETS PLANETS-MOON (events with 3 planets and the Moon within 5° 42°N - 12°E

DATE	TIMES	BODIES				D12	D13	D14	D23	D24	D34	DQM	MAX	EL.	MAG1	MAG2	MAG3	MAG4	MAGT	ALT	AZ
22 Feb 2009	21:00	MERCURY	MARS	JUPITER	MOON	4.4	1.6	0.8	2.9	4.9	2.0	3.1	4.9	23	-0.1	1.2	-2.0	-6.4	-6.4	-63	331
22 Feb 2009	22:00	MERCURY	MARS	JUPITER	MOON	4.3	1.5	0.6	2.9	4.3	1.3	2.9	4.3	23	-0.1	1.2	-2.0	-6.3	-6.3	-66	5
22 Feb 2009	23:00	MERCURY	MARS	JUPITER	MOON	4.3	1.5	0.9	2.9	3.7	0.7	2.7	4.3	23	-0.1	1.2	-2.0	-6.3	-6.3	-63	37
23 Feb 2009	00:00	MERCURY	MARS	JUPITER	MOON	4.3	1.4	1.4	2.9	3.1	0.1	2.6	4.3	23	-0.1	1.2	-2.0	-6.3	-6.3	-55	59
23 Feb 2009	01:00	MERCURY	MARS	JUPITER	MOON	4.3	1.4	2.0	3.0	2.5	0.5	2.5	4.3	23	-0.1	1.2	-2.0	-6.2	-6.2	-45	74
23 Feb 2009	02:00	MERCURY	MARS	JUPITER	MOON	4.2	1.4	2.5	3.0	1.9	1.1	2.6	4.2	23	-0.1	1.2	-2.0	-6.2	-6.2	-34	86
23 Feb 2009	03:00	MERCURY	MARS	JUPITER	MOON	4.2	1.3	3.0	3.0	1.5	1.6	2.6	4.2	23	-0.1	1.2	-2.0	-6.1	-6.1	-23	96
23 Feb 2009	04:00	MERCURY	MARS	JUPITER	MOON	4.2	1.3	3.4	3.0	1.0	2.1	2.8	4.2	23	-0.1	1.2	-2.0	-6.1	-6.1	-12	105
23 Feb 2009	05:00	MERCURY	MARS	JUPITER	MOON	4.2	1.2	3.8	3.1	0.7	2.6	2.9	4.2	23	-0.1	1.2	-2.0	-6.0	-6.0	-1	115
23 Feb 2009	06:00	MERCURY	MARS	JUPITER	MOON	4.2	1.2	4.2	3.1	0.6	3.0	3.0	4.2	23	-0.1	1.2	-2.0	-6.0	-6.0	9	125
23 Feb 2009	07:00	MERCURY	MARS	JUPITER	MOON	4.1	1.2	4.5	3.1	0.8	3.4	3.2	4.5	23	-0.1	1.2	-2.0	-6.0	-6.0	17	137
23 Feb 2009	08:00	MERCURY	MARS	JUPITER	MOON	4.1	1.1	4.9	3.1	1.0	3.8	3.3	4.9	23	-0.1	1.2	-2.0	-5.9	-5.9	24	151

Dxy = distance between the body x and y, in degrees
DQM = middle distance between the 4 bodies, in degrees
MAX = maxima distance between the 4 bodies, in degrees
EL = elongation from the Sun, in degrees
MAGx = magnitude of body x
MAGT = total magnitude
ALT = height on the horizon of the baricenter of the group, in degrees
AZ = azimuth of the baricenter of the group, in degrees from north

Times in U.T.

PLANETS-MOON IN STRAIGHT LINE – GEOCENTRIC

DATE		TIMES	BODIES			C
22 Feb 2009	21:00	MARS	JUPITER	MOON		0.153
22 Feb 2009	22:00	MARS	JUPITER	MOON		0.305
22 Feb 2009	23:00	MARS	JUPITER	MOON		0.457
22 Feb 2009	23:00	MERCURY	JUPITER	MOON		-0.445
23 Feb 2009	00:00	MERCURY	JUPITER	MOON		-0.377
23 Feb 2009	01:00	MERCURY	JUPITER	MOON		-0.307
23 Feb 2009	02:00	MERCURY	JUPITER	MOON		-0.233
23 Feb 2009	03:00	MERCURY	JUPITER	MOON		-0.157
23 Feb 2009	04:00	MERCURY	JUPITER	MOON		-0.077
23 Feb 2009	05:00	MERCURY	JUPITER	MOON		0.001
23 Feb 2009	06:00	MERCURY	JUPITER	MOON		0.092
23 Feb 2009	07:00	MERCURY	JUPITER	MOON		0.181
23 Feb 2009	08:00	MERCURY	JUPITER	MOON		0.273
17 May 2009	09:00	JUPITER	NEPTUNE	MOON		-0.498
17 May 2009	10:00	JUPITER	NEPTUNE	MOON		-0.446
17 May 2009	11:00	JUPITER	NEPTUNE	MOON		-0.395
17 May 2009	12:00	JUPITER	NEPTUNE	MOON		-0.343
17 May 2009	13:00	JUPITER	NEPTUNE	MOON		-0.291
13 Jun 2009	08:00	JUPITER	NEPTUNE	MOON		-0.006
13 Jun 2009	09:00	JUPITER	NEPTUNE	MOON		0.076
13 Jun 2009	10:00	JUPITER	NEPTUNE	MOON		0.158
13 Jun 2009	11:00	JUPITER	NEPTUNE	MOON		0.241
13 Jun 2009	12:00	JUPITER	NEPTUNE	MOON		0.324
13 Jun 2009	13:00	JUPITER	NEPTUNE	MOON		0.407
13 Jun 2009	14:00	JUPITER	NEPTUNE	MOON		0.489
10 Jul 2009	15:00	JUPITER	NEPTUNE	MOON		-0.449
10 Jul 2009	16:00	JUPITER	NEPTUNE	MOON		-0.359
10 Jul 2009	17:00	JUPITER	NEPTUNE	MOON		-0.269
10 Jul 2009	18:00	JUPITER	NEPTUNE	MOON		-0.178
10 Jul 2009	19:00	JUPITER	NEPTUNE	MOON		-0.089
10 Jul 2009	20:00	JUPITER	NEPTUNE	MOON		0.001
10 Jul 2009	21:00	JUPITER	NEPTUNE	MOON		0.090
10 Jul 2009	22:00	JUPITER	NEPTUNE	MOON		0.179
10 Jul 2009	23:00	JUPITER	NEPTUNE	MOON		0.269
11 Jul 2009	00:00	JUPITER	NEPTUNE	MOON		0.358
11 Jul 2009	01:00	JUPITER	NEPTUNE	MOON		0.448
21 Dec 2009	07:00	JUPITER	NEPTUNE	MOON		-0.447
21 Dec 2009	08:00	JUPITER	NEPTUNE	MOON		-0.355
21 Dec 2009	09:00	JUPITER	NEPTUNE	MOON		-0.263
21 Dec 2009	10:00	JUPITER	NEPTUNE	MOON		-0.170
21 Dec 2009	11:00	JUPITER	NEPTUNE	MOON		-0.078
21 Dec 2009	12:00	JUPITER	NEPTUNE	MOON		0.014
21 Dec 2009	13:00	JUPITER	NEPTUNE	MOON		0.106
21 Dec 2009	14:00	JUPITER	NEPTUNE	MOON		0.199
21 Dec 2009	15:00	JUPITER	NEPTUNE	MOON		0.291
21 Dec 2009	16:00	JUPITER	NEPTUNE	MOON		0.384
21 Dec 2009	17:00	JUPITER	NEPTUNE	MOON		0.477

How much anymore the parameter C is next to zero so much the bodies are lined up

Times in U.T.

PLANETS-MOON IN STRAIGHT LINE - TOPOCENTRIC 42°N - 12°E

DATE	TIMES	BODIES			C	ALT	AZ
22 Feb 2009	21:00	MARS	JUPITER	MOON	-0.216	-63	324
22 Feb 2009	22:00	MARS	JUPITER	MOON	-0.076	-66	355
22 Feb 2009	23:00	MARS	JUPITER	MOON	0.048	-62	28
23 Feb 2009	00:00	MARS	JUPITER	MOON	0.160	-55	52
23 Feb 2009	01:00	MARS	JUPITER	MOON	0.261	-45	69
23 Feb 2009	02:00	MARS	JUPITER	MOON	0.355	-34	81
23 Feb 2009	03:00	MARS	JUPITER	MOON	0.446	-23	92
22 Feb 2009	21:00	MERCURY	JUPITER	MOON	-0.433	-64	331
22 Feb 2009	22:00	MERCURY	JUPITER	MOON	-0.328	-66	5
22 Feb 2009	23:00	MERCURY	JUPITER	MOON	-0.215	-62	37
23 Feb 2009	00:00	MERCURY	JUPITER	MOON	-0.098	-54	59
23 Feb 2009	01:00	MERCURY	JUPITER	MOON	0.018	-44	74
23 Feb 2009	02:00	MERCURY	JUPITER	MOON	0.131	-33	86
23 Feb 2009	03:00	MERCURY	JUPITER	MOON	0.237	-22	96
23 Feb 2009	04:00	MERCURY	JUPITER	MOON	0.333	-11	105
23 Feb 2009	05:00	MERCURY	JUPITER	MOON	0.418	0	115
23 Feb 2009	06:00	MERCURY	JUPITER	MOON	0.491	9	125
22 Apr 2009	15:00	VENUS	MARS	MOON	0.001	2	271
17 May 2009	09:00	JUPITER	NEPTUNE	MOON	-0.479	16	234
17 May 2009	10:00	JUPITER	NEPTUNE	MOON	-0.449	7	245
17 May 2009	11:00	JUPITER	NEPTUNE	MOON	-0.412	-4	255
17 May 2009	12:00	JUPITER	NEPTUNE	MOON	-0.366	-14	265
17 May 2009	13:00	JUPITER	NEPTUNE	MOON	-0.311	-25	275
17 May 2009	14:00	JUPITER	NEPTUNE	MOON	-0.247	-36	287
17 May 2009	15:00	JUPITER	NEPTUNE	MOON	-0.176	-46	301
13 Jun 2009	09:00	JUPITER	NEPTUNE	MOON	-0.118	-2	253
13 Jun 2009	10:00	JUPITER	NEPTUNE	MOON	-0.026	-13	262
13 Jun 2009	11:00	JUPITER	NEPTUNE	MOON	0.068	-24	272
13 Jun 2009	12:00	JUPITER	NEPTUNE	MOON	0.164	-35	283
13 Jun 2009	13:00	JUPITER	NEPTUNE	MOON	0.261	-45	297
13 Jun 2009	14:00	JUPITER	NEPTUNE	MOON	0.359	-54	314
13 Jun 2009	15:00	JUPITER	NEPTUNE	MOON	0.455	-59	339
10 Jul 2009	15:00	JUPITER	NEPTUNE	MOON	-0.435	-57	32
10 Jul 2009	16:00	JUPITER	NEPTUNE	MOON	-0.318	-49	54
10 Jul 2009	17:00	JUPITER	NEPTUNE	MOON	-0.207	-39	69
10 Jul 2009	18:00	JUPITER	NEPTUNE	MOON	-0.101	-29	81
10 Jul 2009	19:00	JUPITER	NEPTUNE	MOON	-0.003	-18	92
10 Jul 2009	20:00	JUPITER	NEPTUNE	MOON	0.087	-7	101
10 Jul 2009	21:00	JUPITER	NEPTUNE	MOON	0.171	4	111
10 Jul 2009	22:00	JUPITER	NEPTUNE	MOON	0.247	14	122
10 Jul 2009	23:00	JUPITER	NEPTUNE	MOON	0.316	23	134
11 Jul 2009	00:00	JUPITER	NEPTUNE	MOON	0.380	30	149
11 Jul 2009	01:00	JUPITER	NEPTUNE	MOON	0.441	34	165
21 Dec 2009	06:00	JUPITER	NEPTUNE	MOON	-0.481	-41	68
21 Dec 2009	07:00	JUPITER	NEPTUNE	MOON	-0.376	-30	80
21 Dec 2009	08:00	JUPITER	NEPTUNE	MOON	-0.278	-19	91
21 Dec 2009	09:00	JUPITER	NEPTUNE	MOON	-0.187	-8	100
21 Dec 2009	10:00	JUPITER	NEPTUNE	MOON	-0.103	3	110
21 Dec 2009	11:00	JUPITER	NEPTUNE	MOON	-0.025	13	121
21 Dec 2009	12:00	JUPITER	NEPTUNE	MOON	0.045	21	133
21 Dec 2009	13:00	JUPITER	NEPTUNE	MOON	0.113	29	147
21 Dec 2009	14:00	JUPITER	NEPTUNE	MOON	0.177	33	163
21 Dec 2009	15:00	JUPITER	NEPTUNE	MOON	0.241	35	180
21 Dec 2009	16:00	JUPITER	NEPTUNE	MOON	0.306	33	197
21 Dec 2009	17:00	JUPITER	NEPTUNE	MOON	0.373	29	213
21 Dec 2009	18:00	JUPITER	NEPTUNE	MOON	0.445	21	227

How much anymore the parameter C is next to zero so much the bodies are lined up

ALT = height on the horizon of the baricenter of the group, in degrees
AZ = azimuth of the baricenter of the group, in degrees from north

Times in U.T.

PLANETS-MOON IN STRAIGHT LINE (4) - GEOCENTRIC

DATE	TIMES	BODIES				C
22 Feb 2009	21:00	MERCURY	MARS	JUPITER	MOON	-2.682
22 Feb 2009	22:00	MERCURY	MARS	JUPITER	MOON	-2.560
22 Feb 2009	23:00	MERCURY	MARS	JUPITER	MOON	-2.431
23 Feb 2009	00:00	MERCURY	MARS	JUPITER	MOON	-2.297
23 Feb 2009	01:00	MERCURY	MARS	JUPITER	MOON	-2.155
23 Feb 2009	02:00	MERCURY	MARS	JUPITER	MOON	-2.008
23 Feb 2009	03:00	MERCURY	MARS	JUPITER	MOON	-1.854
23 Feb 2009	04:00	MERCURY	MARS	JUPITER	MOON	-1.694
23 Feb 2009	05:00	MERCURY	MARS	JUPITER	MOON	-1.528
23 Feb 2009	06:00	MERCURY	MARS	JUPITER	MOON	-1.356
23 Feb 2009	07:00	MERCURY	MARS	JUPITER	MOON	-1.177
23 Feb 2009	08:00	MERCURY	MARS	JUPITER	MOON	-0.993

PLANETS-MOON IN STRAIGHT LINE (4) - TOPOCENTRIC

42°N - 12°E

DATE	TIMES	BODIES				C	ALT	AZ
22 Feb 2009	21:00	MERCURY	MARS	JUPITER	MOON	-2.410	-63	331
22 Feb 2009	22:00	MERCURY	MARS	JUPITER	MOON	-2.201	-66	5
22 Feb 2009	23:00	MERCURY	MARS	JUPITER	MOON	-1.975	-63	37
23 Feb 2009	00:00	MERCURY	MARS	JUPITER	MOON	-1.741	-55	59
23 Feb 2009	01:00	MERCURY	MARS	JUPITER	MOON	-1.507	-45	74
23 Feb 2009	02:00	MERCURY	MARS	JUPITER	MOON	-1.281	-34	86
23 Feb 2009	03:00	MERCURY	MARS	JUPITER	MOON	-1.069	-23	96
23 Feb 2009	04:00	MERCURY	MARS	JUPITER	MOON	-0.877	-12	105
23 Feb 2009	05:00	MERCURY	MARS	JUPITER	MOON	-0.708	-1	115
23 Feb 2009	06:00	MERCURY	MARS	JUPITER	MOON	-0.563	9	125
23 Feb 2009	07:00	MERCURY	MARS	JUPITER	MOON	-0.440	17	137
23 Feb 2009	08:00	MERCURY	MARS	JUPITER	MOON	-0.337	24	151

How much anymore the parameter C is next to zero so much the bodies are lined up

ALT = height on the horizon of the baricenter of the group, in degrees

AZ = azimuth of the baricenter of the group, in degrees from north

Times in U.T.

LUNAR SPATIAL GEOMETRIES

EQUILATERAL TRIANGLES

geocentric

DATE	TIMES	BODIES			D12	D13	D23	GROUP	EL.	MAG1	MAG2	MAG3	MAGT
23 Nov 2009	22:00	JUPITER	NEPTUNE	MOON	3.8	3.6	3.9	4.4	80	-2.3	7.9	-9.7	-9.7
23 Nov 2009	23:00	JUPITER	NEPTUNE	MOON	3.8	3.8	3.7	4.4	80	-2.3	7.9	-9.7	-9.7

LUNAR SPATIAL GEOMETRIES

EQUILATERAL TRIANGLES

42°N - 12°E

DATE	TIMES	BODIES			D12	D13	D23	GROUP	EL.	MAG1	MAG2	MAG3	MAGT	ALT	AZ
06 Aug 2009	20:00	JUPITER	NEPTUNE	MOON	2.3	2.3	2.4	2.8	170	-2.8	7.8	-12.5	-12.5	13	122
06 Aug 2009	21:00	JUPITER	NEPTUNE	MOON	2.3	2.5	2.2	2.7	170	-2.8	7.8	-12.5	-12.5	21	134

SPATIAL GEOMETRIES - SQUARES

geocentric

DATE	TIMES	BODIES			D12	D13	D14	D23	D24	D34	DQM	MAX	EL.	MAG1	MAG2	MAG3	MAG4	MAGT
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SPATIAL GEOMETRIES - SQUARES

42°N - 12°E

DATE	TIMES	BODIES			D12	D13	D14	D23	D24	D34	DQM	MAX	EL.	MAG1	MAG2	MAG3	MAG4	MAGT	ALT	AZ
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Dxy = distance between the body x and y, in degrees
DQM = middle distance between the 4 bodies, in degrees
MAX = maxima distance between the 4 bodies, in degrees
EL = elongation from the Sun, in degrees
MAGx = magnitude of body x
MAGT = total magnitude
ALT = height on the horizon of the baricenter of the group, in degrees
AZ = azimuth of the baricenter of the group, in degrees from north

Times in U.T.

I have considered equilateral every triangle in which every cathetus differs from the other for maximum ± 10%.

I have considered square every quadrilateral in which every side differs from the other for maximum ± 10% and with diagonal different less than 15%.

NB: these charts are been created exclusively to the goals of "photo of effect", with three or four equidistant celestial bodies!

GEOCENTRIC CONJUNCTIONS <5° MOON-STARS m<2

Date	TT	Dm (°)	Dl	p (°)	e	m1	m*	tm(s)		
2009/01/09 06:32:52		1.55622	1.29566	0	153		1.7		Beta	TAU Elnath
2009/01/13 18:10:05		2.32344	1.26551	26	-144		1.3		Alpha	LEO Regulus
2009/01/17 18:41:22		3.04028	1.18662	23	-94		1.1		Alpha	VIR Spica
2009/01/21 13:28:26		0.01643	1.14776	186	-52	-9.7	1.0	3588	Alpha	SCO Antares
2009/02/05 15:59:51		1.53470	1.27407	0	126		1.7		Beta	TAU Elnath
2009/02/10 05:16:03		2.32465	1.27022	26	-172		1.3		Alpha	LEO Regulus
2009/02/14 03:30:38		3.03064	1.20131	23	-122		1.1		Alpha	VIR Spica
2009/02/17 20:41:38		0.03948	1.15365	186	-79		1.0	3582	Alpha	SCO Antares
2009/03/04 22:37:47		1.63162	1.25645	0	98		1.7		Beta	TAU Elnath
2009/03/09 15:11:58		2.33071	1.25937	25	160		1.3		Alpha	LEO Regulus
2009/03/13 13:15:34		2.92551	1.20841	23	-149		1.1		Alpha	VIR Spica
2009/03/17 04:52:44		0.19762	1.16028	186	-107		1.0	3508	Alpha	SCO Antares
2009/04/01 03:57:08		1.83675	1.25568	0	71		1.7		Beta	TAU Elnath
2009/04/05 22:38:20		2.44468	1.24421	25	133		1.3		Alpha	LEO Regulus
2009/04/09 22:16:55		2.85046	1.20497	23	-174		1.1		Alpha	VIR Spica
2009/04/13 13:19:24		0.40714	1.16355	186	-134		1.0	3311	Alpha	SCO Antares
2009/04/28 10:20:42		2.04938	1.27005	0	44	-9.6	1.7		Beta	TAU Elnath
2009/05/03 04:11:58		2.66447	1.23851	25	107		1.3		Alpha	LEO Regulus
2009/05/07 05:33:39		2.89124	1.19647	23	157		1.1		Alpha	VIR Spica
2009/05/10 21:07:03		0.54842	1.16206	186	-160		1.0	3106	Alpha	SCO Antares
2009/05/25 19:00:08		2.17031	1.28695	1	18	-7.7	1.7		Beta	TAU Elnath
2009/05/30 09:51:06		2.89973	1.24794	25	81		1.3		Alpha	LEO Regulus
2009/06/03 11:21:58		3.02821	1.19179	22	131		1.1		Alpha	VIR Spica
2009/06/07 03:49:37		0.56873	1.15819	186	172		1.0	3077	Alpha	SCO Antares
2009/06/22 05:22:26		2.18013	1.29360	1	-9	-6.2	1.7		Beta	TAU Elnath
2009/06/26 17:19:28		3.05180	1.26685	25	55	-9.9	1.3		Alpha	LEO Regulus
2009/06/30 16:59:22		3.16531	1.19681	22	105		1.1		Alpha	VIR Spica
2009/07/04 09:44:50		0.51545	1.15608	185	147		1.0	3176	Alpha	SCO Antares
2009/07/19 15:52:26		2.15030	1.28495	1	-35	-9.0	1.7		Beta	TAU Elnath
2009/07/24 02:55:46		3.08835	1.28324	25	28	-8.6	1.3		Alpha	LEO Regulus
2009/07/27 23:50:23		3.20780	1.21058	22	79		1.1		Alpha	VIR Spica
2009/07/31 15:42:00		0.49241	1.15891	185	121		1.0	3219	Alpha	SCO Antares
2009/08/16 00:51:27		2.18480	1.26602	1	-61		1.7		Beta	TAU Elnath
2009/08/20 13:34:22		3.06789	1.28698	25	3	-4.0	1.3		Alpha	LEO Regulus
2009/08/24 08:29:02		3.13220	1.22585	22	53	-9.8	1.1		Alpha	VIR Spica
2009/08/27 22:32:19		0.58171	1.16677	185	95		1.0	3071	Alpha	SCO Antares
2009/09/12 07:35:05		2.33851	1.24895	1	-87		1.7		Beta	TAU Elnath
2009/09/16 23:30:10		3.09662	1.27618	25	-25	-8.3	1.3		Alpha	LEO Regulus
2009/09/20 18:17:13		3.00740	1.23382	22	26	-8.4	1.1		Alpha	VIR Spica
2009/09/24 06:36:04		0.78081	1.17615	185	69		1.0	2625	Alpha	SCO Antares
2009/10/09 12:56:34		2.57253	1.24539	1	-114		1.7		Beta	TAU Elnath
2009/10/14 07:18:51		3.24379	1.25910	25	-51	-9.9	1.3		Alpha	LEO Regulus
2009/10/18 03:48:06		2.94594	1.23019	22	-5	-4.9	1.1		Alpha	VIR Spica
2009/10/21 15:25:16		0.99705	1.18189	185	42	-9.3	1.0	1867	Alpha	SCO Antares
2009/11/05 19:05:15		2.77996	1.25730	1	-141		1.7		Beta	TAU Elnath
2009/11/10 13:02:42		3.47970	1.25010	25	-79		1.3		Alpha	LEO Regulus
2009/11/14 11:39:12		3.01005	1.21907	22	-29	-8.6	1.1		Alpha	VIR Spica
2009/11/17 23:56:47		1.11782	1.18077	185	14	-7.1	1.0	1116	Alpha	SCO Antares
2009/12/03 03:43:46		2.87088	1.27390	1	-168		1.7		Beta	TAU Elnath
2009/12/07 18:37:05		3.69344	1.25901	25	-106		1.3		Alpha	LEO Regulus
2009/12/11 17:36:44		3.14920	1.21162	22	-56		1.1		Alpha	VIR Spica
2009/12/15 07:13:13		1.11287	1.17476	185	-14	-7.0	1.0	1115	Alpha	SCO Antares
2009/12/30 14:36:02		2.85962	1.27974	1	163		1.7		Beta	TAU Elnath

date in the format year/month/day

Dm = least distance between the centers of the bodies

Dl = parameter limit, if Dm < Dl there is an occultation between the bodies

P = angle of position between the bodies, in degrees

e = elongation, in degree

m1 = magnitude of the Moon

m* = magnitude of the star

tm = if present, the star is occulted maximum for x seconds

GEOCENTRIC OCCULTATIONS MOON-STARS $m < 2$

Date	TT	Dm (°)	Dl	p (°)	e	m1	m*	tm(s)		
2009/01/21	13:28:26	0.01643	1.14776	186	-52	-9.7	1.0	3588	Alpha	SCO Antares
2009/02/17	20:41:38	0.03948	1.15365	186	-79		1.0	3582	Alpha	SCO Antares
2009/03/17	04:52:44	0.19762	1.16028	186	-107		1.0	3508	Alpha	SCO Antares
2009/04/13	13:19:24	0.40714	1.16355	186	-134		1.0	3311	Alpha	SCO Antares
2009/05/10	21:07:03	0.54842	1.16206	186	-160		1.0	3106	Alpha	SCO Antares
2009/06/07	03:49:37	0.56873	1.15819	186	172		1.0	3077	Alpha	SCO Antares
2009/07/04	09:44:50	0.51545	1.15608	185	147		1.0	3176	Alpha	SCO Antares
2009/07/31	15:42:00	0.49241	1.15891	185	121		1.0	3219	Alpha	SCO Antares
2009/08/27	22:32:19	0.58171	1.16677	185	95		1.0	3071	Alpha	SCO Antares
2009/09/24	06:36:04	0.78081	1.17615	185	69		1.0	2625	Alpha	SCO Antares
2009/10/21	15:25:16	0.99705	1.18189	185	42	-9.3	1.0	1867	Alpha	SCO Antares
2009/11/17	23:56:47	1.11782	1.18077	185	14	-7.1	1.0	1116	Alpha	SCO Antares
2009/12/15	07:13:13	1.11287	1.17476	185	-14	-7.0	1.0	1115	Alpha	SCO Antares

date in the format year/month/day

Dm = least distance between the centers of the bodies

Dl = parameter limit, if $Dm < Dl$ there is an occultation between the bodies

P = angle of position between the bodies, in degrees

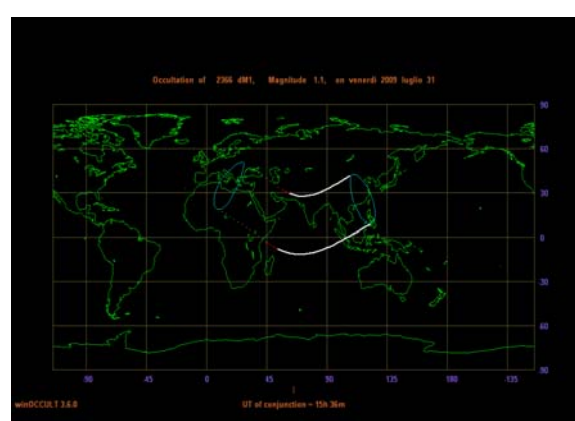
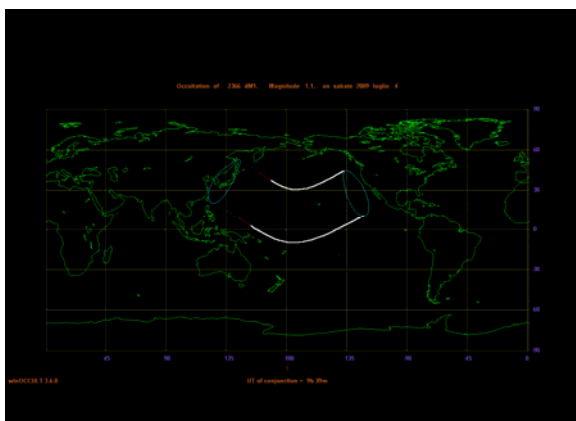
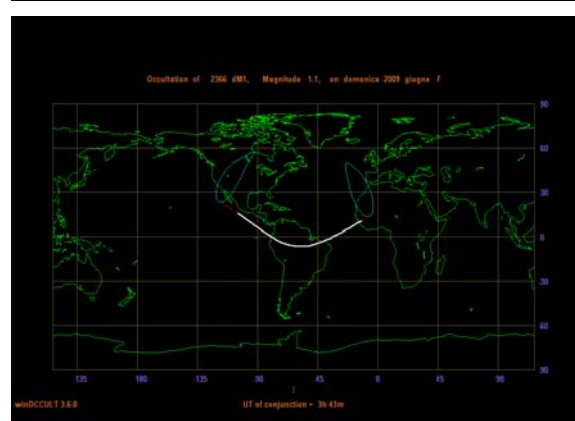
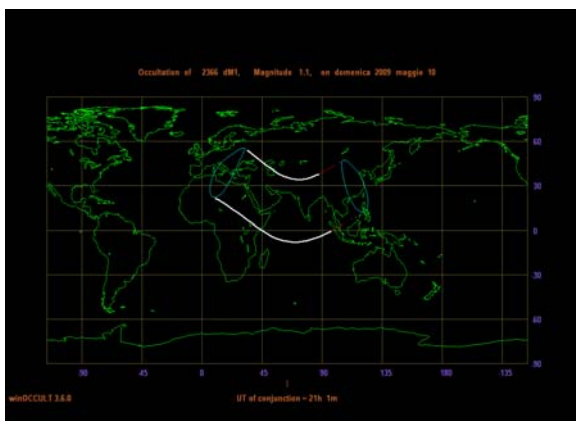
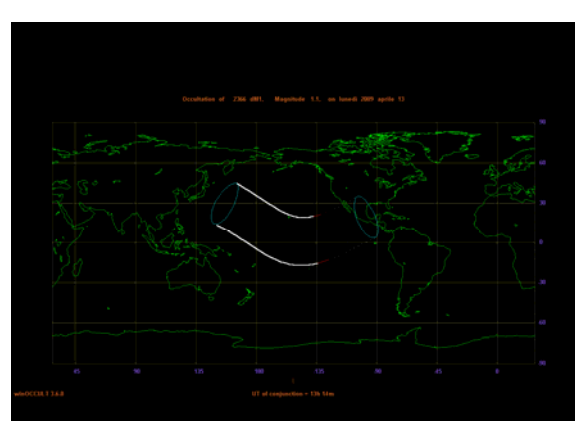
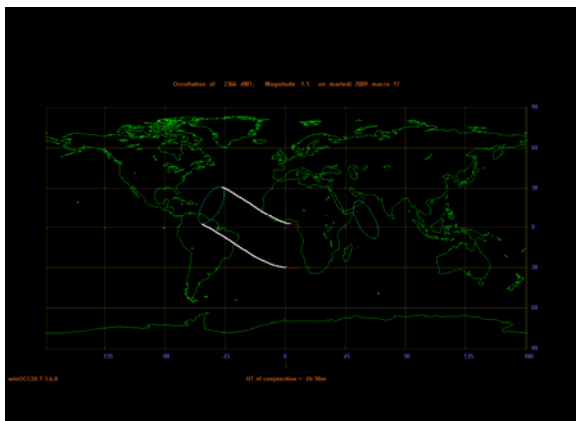
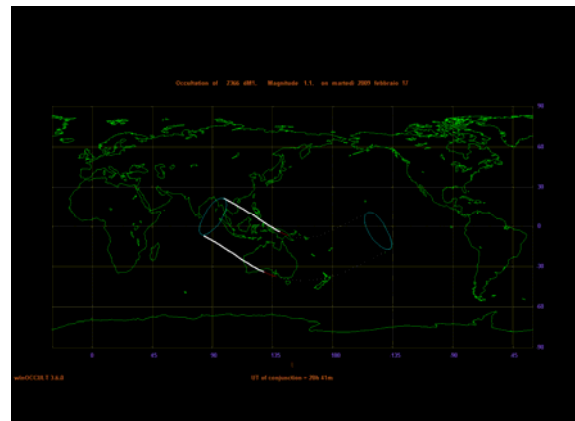
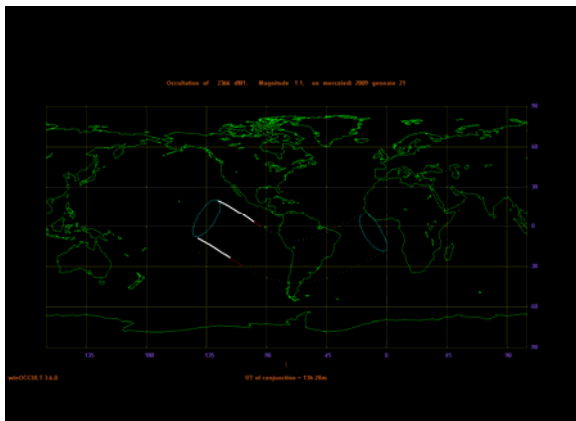
e = elongation, in degree

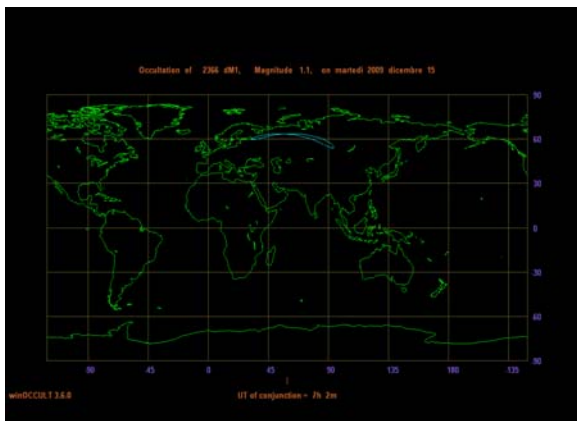
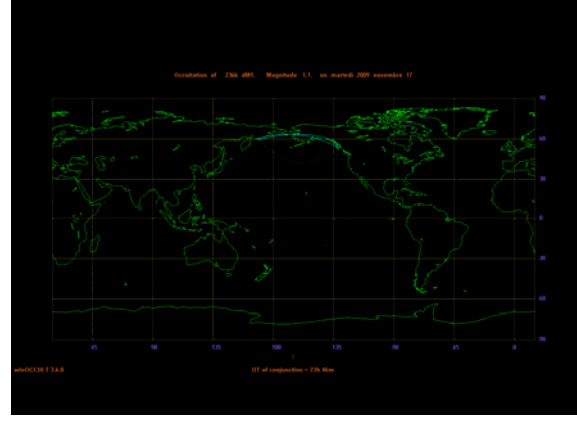
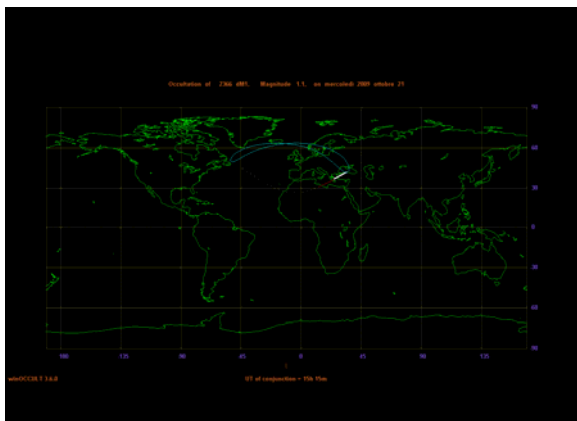
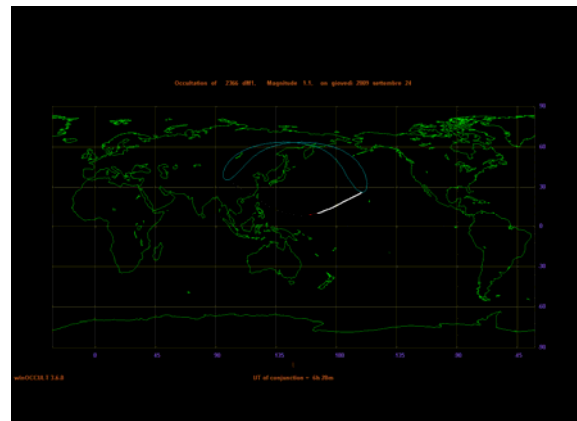
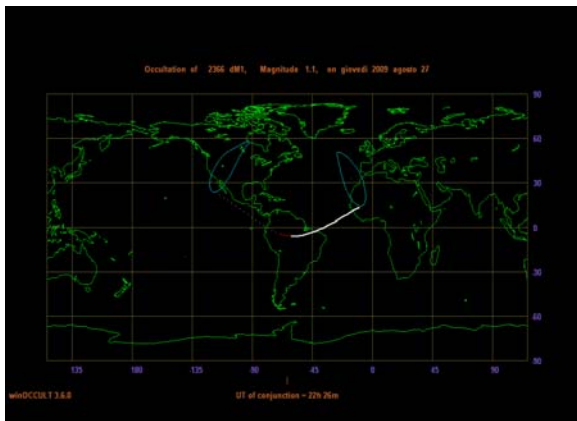
m1 = magnitude of the Moon

m* = magnitude of the star

tm = if present, the star is occulted maximum for x seconds

© (6)





TOPOC. CONJUNCTIONS <5° MOON-STARS m<2

42°N - 12°E

Date	UT	Dm (°)	Alt	p (°)	e	m1	m*	tm(s)		
2009/01/09 06:58:46		2.44244	-14.19	4	153		1.7		Beta	TAU Elnath
2009/01/13 17:13:41		2.74395	-19.78	19	-144		1.3		Alpha	LEO Regulus
2009/02/05 15:21:35		1.99900	36.43	352	126		1.7		Beta	TAU Elnath
2009/02/10 05:36:17		3.23161	9.13	29	-172		1.3		Alpha	LEO Regulus
2009/02/14 00:56:54		3.67131	27.83	35	-122		1.1		Alpha	VIR Spica
2009/03/04 23:17:12		2.20594	22.41	9	98		1.7		Beta	TAU Elnath
2009/03/09 14:08:47		2.71243	-14.73	20	161		1.3		Alpha	LEO Regulus
2009/03/17 05:02:51		0.65539	19.48	6	-107		1.0		Alpha	SCO Antares
2009/04/01 03:56:35		2.74845	-22.13	0	71		1.7		Beta	TAU Elnath
2009/04/05 21:33:27		3.08785	53.28	37	133		1.3		Alpha	LEO Regulus
2009/04/09 19:47:49		3.33437	16.10	32	-174		1.1		Alpha	VIR Spica
2009/04/28 09:48:19		2.53564	34.06	352	45	-9.6	1.7		Beta	TAU Elnath
2009/05/10 19:42:12		0.02628	-4.82	16	-160		1.0	3845	Alpha	SCO Antares
2009/05/25 19:34:28		2.90334	4.91	7	18	-7.6	1.7		Beta	TAU Elnath
2009/05/30 08:51:25		3.27692	-14.17	20	81		1.3		Alpha	LEO Regulus
2009/06/07 05:02:23		0.00591	-21.45	357	172		1.0	3420	Alpha	SCO Antares
2009/06/22 04:44:50		2.79325	18.08	353	-8	-6.0	1.7		Beta	TAU Elnath
2009/06/26 16:04:56		3.71392	53.26	36	54		1.3		Alpha	LEO Regulus
2009/06/30 14:20:53		3.65372	15.29	32	104		1.1		Alpha	VIR Spica
2009/07/19 16:25:42		2.91861	0.61	7	-35	-9.1	1.7		Beta	TAU Elnath
2009/07/31 14:15:14		0.07969	-5.58	15	121		1.0	3852	Alpha	SCO Antares
2009/08/16 00:13:37		2.85961	8.63	353	-60		1.7		Beta	TAU Elnath
2009/08/20 12:21:50		3.72667	53.88	36	3	-4.1	1.3		Alpha	LEO Regulus
2009/08/24 06:52:47		3.39004	-25.92	23	53	-9.8	1.1		Alpha	VIR Spica
2009/08/27 23:45:02		0.01134	-22.34	177	95		1.0	3403	Alpha	SCO Antares
2009/09/12 07:45:55		2.70273	54.57	8	-88		1.7		Beta	TAU Elnath
2009/09/20 19:42:55		3.81705	-22.61	16	27	-8.4	1.1		Alpha	VIR Spica
2009/10/09 13:14:45		3.43451	-16.41	4	-114		1.7		Beta	TAU Elnath
2009/10/14 05:34:18		3.61486	46.62	32	-52	-9.9	1.3		Alpha	LEO Regulus
2009/10/21 15:58:42		0.15838	14.67	180	42	-9.3	1.0	4853	Alpha	SCO Antares
2009/11/05 18:34:28		3.47475	5.43	354	-141		1.7		Beta	TAU Elnath
2009/11/10 13:43:03		4.38123	-14.12	23	-79		1.3		Alpha	LEO Regulus
2009/11/14 11:13:35		3.88441	25.04	26	-29	-8.6	1.1		Alpha	VIR Spica
2009/12/03 03:59:13		3.37451	36.36	10	-169		1.7		Beta	TAU Elnath
2009/12/15 06:06:04		0.46921	2.27	195	-14	-7.0	1.0		Alpha	SCO Antares
2009/12/30 14:06:21		3.62388	-2.70	355	164		1.7		Beta	TAU Elnath

date in the format year/month/day

Dm = least distance between the centers of the bodies

Alt = height in degrees on the horizon of the event in the central moment

P = angle of position between the bodies, in degrees

e = elongation, in degree

m1 = magnitude of the Moon

m* = magnitude of the star

tm = if present, the star is occulted maximum for x seconds

TOPOCENTRIC OCCULTATIONS MOON-STARS $m < 2$

42°N - 12°E

Date	UT	Dm (°)	Alt.	p (°)	e	m1	m*	tm(s)		
2009/05/10	19:42:12	0.02628	-4.82	16	-160		1.0	3845	Alpha	SCO Antares
2009/06/07	05:02:23	0.00591	-21.45	357	172		1.0	3420	Alpha	SCO Antares
2009/07/31	14:15:14	0.07969	-5.58	15	121		1.0	3852	Alpha	SCO Antares
2009/08/27	23:45:02	0.01134	-22.34	177	95		1.0	3403	Alpha	SCO Antares
2009/10/21	15:58:42	0.15838	14.67	180	42	-9.3	1.0	4853	Alpha	SCO Antares

date in the format year/month/day

Dm = least distance between the centers of the bodies

Alt = height in degrees on the horizon of the event in the central moment

P = angle of position between the bodies, in degrees

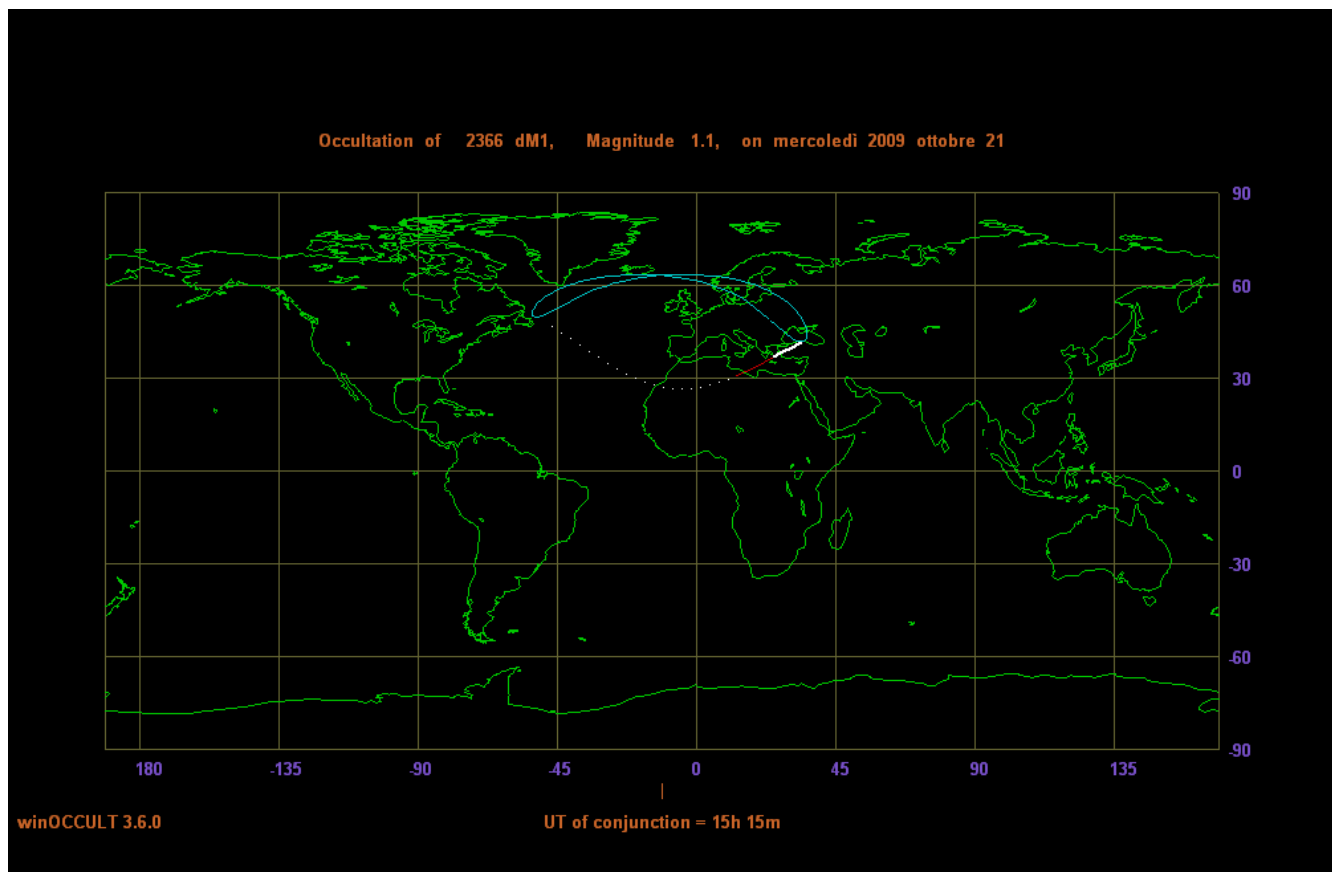
e = elongation, in degree

m1 = magnitude of the Moon

m* = magnitude of the star

tm = if present, the star is occulted maximum for x seconds

© (6)



Start								End							
Location	U.T. Sun			Moon Alt	CA Alt	PA o	PA o	Location	U.T. Sun			Moon Alt	CA Alt	PA o	PA o
	h	m	s						h	m	s				
AGRIGENTO	15	39	31	7	20	53S	141	AGRIGENTO	16	30	17	-3	14	-23S	217
ALESSANDRIA	15	15	34	12	16	70S	124	ALESSANDRIA	16	25	4	0	11	-46S	240
ANCONA	15	26	52	7	16	66S	128	ANCONA	16	30	38	-4	9	-39S	233
AOSTA	15	12	10	13	16	72S	122	AOSTA	16	23	6	1	11	-48S	242
AREZZO	15	23	56	9	16	67S	127	AREZZO	16	29	11	-2	10	-40S	234
ASCOLI PICENO	15	28	14	7	16	65S	129	ASCOLI PICENO	16	30	54	-4	10	-38S	231
ASTI	15	14	48	12	17	70S	123	ASTI	16	24	35	1	11	-46S	240
AVELLINO	15	34	21	6	17	60S	134	AVELLINO	16	32	11	-5	11	-32S	225
BARI	15	38	21	4	16	59S	135	BARI	16	33	27	-6	9	-29S	223
BELLUNO	15	20	48	8	14	71S	123	BELLUNO	16	28	8	-3	8	-45S	239
BENEVENTO	15	33	54	6	17	61S	133	BENEVENTO	16	32	10	-5	10	-32S	226
BERGAMO	15	16	35	10	15	71S	123	BERGAMO	16	25	46	-1	10	-46S	240
BOLOGNA	15	21	25	9	16	69S	125	BOLOGNA	16	28	13	-2	10	-43S	237
BOLZANO	15	18	45	9	14	72S	122	BOLZANO	16	27	4	-2	8	-46S	240
BRESCIA	15	17	52	10	15	71S	123	BRESCIA	16	26	29	-1	10	-46S	239
BRINDISI	15	41	20	3	15	57S	137	BRINDISI	16	33	51	-7	9	-27S	221
CAGLIARI	15	24	58	12	21	61S	133	CAGLIARI	16	27	5	1	15	-34S	228
CALTANISSETTA	15	40	10	7	20	53S	141	CALTANISSETTA	16	30	40	-3	14	-23S	217
CAMPOBASSO	15	32	48	6	16	62S	132	CAMPOBASSO	16	32	2	-5	10	-33S	227
CASERTA	15	33	2	6	17	61S	133	CASERTA	16	31	50	-4	11	-33S	226
CATANIA	15	42	38	5	19	51S	142	CATANIA	16	31	14	-4	13	-22S	215
CATANZARO	15	42	44	4	17	54S	140	CATANZARO	16	32	46	-6	11	-24S	217
CHIETI	15	30	21	7	16	64S	130	CHIETI	16	31	31	-4	10	-36S	229
COMO	15	15	44	11	15	71S	123	COMO	16	25	17	-1	10	-47S	241
COSENZA	15	41	4	4	17	55S	139	COSENZA	16	32	46	-6	11	-25S	219
CREMONA	15	18	0	10	16	70S	124	CREMONA	16	26	30	-1	10	-45S	239
CUNEO	15	14	10	13	17	70S	124	CUNEO	16	24	6	1	12	-46S	240
ENNA	15	40	34	6	19	53S	141	ENNA	16	30	51	-3	14	-23S	217
FERRARA	15	21	23	9	15	69S	125	FERRARA	16	28	16	-2	9	-43S	237
FIRENZE	15	22	16	9	16	68S	126	FIRENZE	16	28	27	-2	10	-42S	235
FOGGIA	15	34	53	5	16	61S	133	FOGGIA	16	32	41	-5	10	-32S	226
FORLI`	15	23	7	9	16	68S	126	FORLI`	16	29	0	-3	10	-42S	235
FROSINONE	15	29	57	7	17	63S	131	FROSINONE	16	30	59	-3	11	-35S	229
GENOVA	15	16	48	11	17	70S	124	GENOVA	16	25	39	0	11	-45S	239
GORIZIA	15	23	39	7	14	70S	124	GORIZIA	16	29	33	-4	8	-43S	237
GROSSETO	15	23	24	10	17	66S	128	GROSSETO	16	28	41	-2	11	-40S	234
IMPERIA	15	15	43	12	18	69S	125	IMPERIA	16	24	53	1	12	-45S	238
ISERNIA	15	32	14	7	17	62S	132	ISERNIA	16	31	43	-4	11	-34S	227
LA SPEZIA	15	18	59	11	17	69S	125	LA SPEZIA	16	26	49	-1	11	-44S	237
L'AQUILA	15	28	45	7	17	64S	130	L'AQUILA	16	30	54	-4	10	-37S	230
LATINA	15	29	20	8	17	63S	131	LATINA	16	30	37	-3	11	-35S	229
LECCE	15	42	52	2	15	56S	138	LECCE	16	33	59	-7	9	-25S	219
LIVORNO	15	20	42	10	17	68S	126	LIVORNO	16	27	35	-1	11	-42S	236
LUCCA	15	20	40	10	17	68S	126	LUCCA	16	27	40	-1	11	-43S	236
MACERATA	15	27	14	7	16	66S	128	MACERATA	16	30	39	-4	10	-39S	232
MANTOVA	15	19	26	10	15	70S	124	MANTOVA	16	27	18	-2	10	-45S	238
MASSA	15	19	42	10	17	69S	125	MASSA	16	27	11	-1	11	-43S	237
MATERA	15	38	47	4	16	58S	136	MATERA	16	33	17	-6	10	-29S	222
MESSINA	15	42	4	5	18	53S	141	MESSINA	16	31	53	-5	12	-23S	217
MILANO	15	16	1	11	16	71S	123	MILANO	16	25	24	0	10	-46S	240
MODENA	15	20	19	10	16	69S	125	MODENA	16	27	40	-2	10	-44S	237
NAPOLI	15	33	19	7	17	61S	133	NAPOLI	16	31	48	-4	11	-32S	226
NOVARA	15	14	58	11	16	71S	123	NOVARA	16	24	46	0	11	-47S	240
NUORO	15	23	34	12	20	63S	131	NUORO	16	27	21	0	14	-37S	230
ORISTANO	15	22	37	13	21	62S	132	ORISTANO	16	26	33	1	15	-37S	230
PADOVA	15	21	9	8	15	70S	124	PADOVA	16	28	14	-3	9	-44S	238
PALERMO	15	36	59	7	20	55S	139	PALERMO	16	30	34	-3	14	-26S	220
PARMA	15	19	2	10	16	70S	124	PARMA	16	27	0	-1	10	-44S	238
PAVIA	15	16	17	11	16	71S	123	PAVIA	16	25	32	0	10	-46S	240
PERUGIA	15	25	27	8	16	66S	128	PERUGIA	16	29	50	-3	10	-39S	233
PESARO	15	25	15	8	16	67S	127	PESARO	16	29	57	-3	9	-40S	234
PESCARA	15	30	15	7	16	64S	130	PESCARA	16	31	31	-4	10	-36S	230
PIACENZA	15	17	28	11	16	70S	124	PIACENZA	16	26	11	-1	10	-45S	239
PISA	15	20	35	10	17	68S	126	PISA	16	27	36	-1	11	-42S	236
PISTOIA	15	21	22	10	16	68S	126	PISTOIA	16	28	3	-2	11	-42S	236
PORDENONE	15	21	49	8	14	70S	124	PORDENONE	16	28	38	-3	8	-44S	238
POTENZA	15	37	3	5	16	59S	135	POTENZA	16	32	51	-5	10	-30S	223
RAGUSA	15	43	15	6	19	50S	144	RAGUSA	16	30	40	-4	14	-20S	214

Start								End							
Location	U.T.			Sun Alt	Moon Alt	CA o	PA o	Location	U.T.			Sun Alt	Moon Alt	CA o	PA o
	h	m	s						h	m	s				
RAVENNA	15	23	9	8	15	68S	126	RAVENNA	16	29	4	-3	9	-42S	236
REGGIO CALABRIA	15	42	27	5	18	53S	141	REGGIO CALABRIA	16	31	53	-5	12	-23S	216
REGGIO EMILIA	15	19	45	10	16	69S	125	REGGIO EMILIA	16	27	21	-2	10	-44S	238
RIETI	15	27	32	8	17	65S	129	RIETI	16	30	24	-3	11	-37S	231
ROME	15	27	32	8	17	64S	130	ROME	16	30	9	-3	11	-37S	230
ROVIGO	15	21	27	9	15	69S	125	ROVIGO	16	28	20	-3	9	-44S	237
SALERNO	15	34	42	6	17	60S	134	SALERNO	16	32	7	-5	11	-31S	225
SASSARI	15	21	11	13	20	64S	130	SASSARI	16	26	27	1	14	-38S	232
SAVONA	15	16	6	12	17	70S	124	SAVONA	16	25	13	0	11	-45S	239
SIENA	15	23	2	9	17	67S	127	SIENA	16	28	42	-2	11	-41S	234
SIRACUSA	15	44	21	5	19	50S	144	SIRACUSA	16	31	0	-4	13	-20S	214
SONDRIO	15	16	26	10	15	72S	122	SONDRIO	16	25	43	-1	9	-47S	241
TARANTO	15	40	34	3	16	57S	137	TARANTO	16	33	33	-7	10	-27S	221
TERAMO	15	28	55	7	16	64S	129	TERAMO	16	31	5	-4	10	-37S	231
TERNI	15	26	50	8	17	65S	129	TERNI	16	30	11	-3	11	-38S	232
TORINO	15	13	37	12	17	71S	123	TORINO	16	23	53	1	11	-47S	241
TRAPANI	15	35	10	8	20	55S	138	TRAPANI	16	29	54	-2	14	-27S	221
TRENTO	15	18	53	9	15	71S	123	TRENTO	16	27	7	-2	9	-46S	239
TREVISO	15	21	30	8	14	70S	124	TREVISO	16	28	26	-3	9	-44S	238
TRIESTE	15	24	20	7	14	69S	125	TRIESTE	16	29	51	-4	8	-43S	236
UDINE	15	22	47	7	14	70S	124	UDINE	16	29	8	-4	8	-44S	237
VARESE	15	15	50	11	16	70S	123	VARESE	16	25	14	0	11	-46S	240
VENEZIA	15	21	59	8	15	70S	124	VENEZIA	16	28	40	-3	9	-44S	237
VERCELLI	15	14	44	12	16	71S	123	VERCELLI	16	24	37	0	11	-47S	240
VERONA	15	19	26	9	15	70S	124	VERONA	16	27	20	-2	9	-45S	238
VICENZA	15	20	20	9	15	70S	124	VICENZA	16	27	50	-2	9	-45S	238
VITERBO	15	25	59	9	17	65S	129	VITERBO	16	29	44	-2	11	-38S	232

Sun alt : height of the Sun above the horizon, in degrees

Moon alt : height of the Moon above the horizon, in degrees

Moon az : azimuth of the Moon, in degrees

CA : angle of cuspid, angle of the event along the limb of the Moon, measured by the nearest cuspid;
a negative value means that the phenomenon happens along the bright limb

PA : angle of position , angle of the event along the limb of the Moon, measured from north

LUNAR TOPOCENTRIC OCCULTATIONS m<6

Date	Times	P	StellaSp	Mag	% Elon	Sun	Moon
a m g	h m s		No D	V	ill	Alt	Alt Az
Occultations for ANCONA							
09 01 07 16 17 56	D		536cB7	5.5	83+	132	-6 44 98
09 01 07 16 28 12	D		537SB6	3.7s	83+	132	-8 46 100
09 01 07 16 35 7	D		539SB6	4.3	83+	132	-9 47 101
09 01 07 16 47 15	D		541cB8	3.9	83+	132	-11 49 103
09 01 07 16 57 39	D		542 B8	5.8	83+	132	51 106
09 01 07 17 0 35	r		537SB6	3.7s	83+	132	52 107
09 01 07 17 53 58	r		541cB8	3.9	84+	132	61 122
09 01 12 19 44 44	r		1375 K1	5.4	96-	156	20 88
09 01 14 22 48 13	r		1611DG9	5.6	80-	127	25 113
09 01 24 7 13 18	r		2750SB2	2.1	4-	22	6 12 145
09 02 05 19 35 24	D		844SB9	5.8s	80+	128	73 177
09 02 06 19 59 28	D		1030WA3	3.1s	89+	142	69 151
09 02 06 20 49 21	r		1030WA3	3.1s	89+	142	71 185
09 02 13 5 46 13	r		1800 A0	5.5	84-	133	-4 17 238
09 02 17 2 44 34	R		2263cB1	4.6	47-	87	13 147
09 02 17 7 50 13	r		2287SB1	2.9e	46-	86	17 12 215
09 02 21 4 27 27	r		2834cA4	5.0	13-	43	3 128
09 03 03 23 4 31	D		647WB9	5.4s	45+	84	13 293
09 03 13 0 57 39	r		1852cA2	6.0	95-	155	35 186
09 03 30 11 46 25	d		537SB6	3.7s	18+	49	50 53 109
09 03 30 12 25 37	d		541cB8	3.9	18+	50	47 60 120
09 03 30 13 2 58	D	Pleiade C	3.0	18+	50	43 65 134	
09 03 30 13 40 27	G	552SB7	2.9s	18+	50	38 69 153	
09 03 30 13 47 13	r	Pleiade C	3.0	18+	50	37 69 157	
09 04 08 23 15 40	d	1800 A0	5.5	99+	171	36 194	
09 04 13 1 35 54	R	2298 K3	5.0	88-	139	21 178	
09 05 01 22 43 16	d	1337 F0	5.7	50+	91	18 275	
09 05 01 23 1 9	D	1336 A5	5.2	51+	91	14 277	
09 05 10 20 16 43	r	2366dM1	1.1v	97-	160	128	
09 05 31 20 18 13	D	1623 A0	5.4	58+	99	34 230	
09 06 10 1 54 27	r	2771cK2	5.6	95-	155	20 194	
09 06 16 1 37 18	R	3494 A7	4.5	48-	88	27 116	
09 06 30 21 27 14	D	1931 K1	4.8s	64+	107	14 232	
09 07 03 19 28 15	D	2287SB1	2.9e	89+	141	-6 19 168	
09 07 03 20 4 3	r	2287SB1	2.9e	89+	141	-11 20 177	
09 07 03 22 5 54	D	2298 K3	5.0	89+	141	17 204	
09 07 10 2 20 37	R	3108 M2	5.3	94-	151	-11 29 200	
09 07 16 23 31 8	r	399SA0	5.7	33-	70	7 69	
09 07 18 1 26 53	D	Pleiade C	3.0	22-	56	19 75	
09 07 18 1 34 3	D	552SB7	2.9s	22-	56	20 76	
09 07 18 1 54 31	R	545 B6	4.1v	22-	56	24 79	
09 07 18 2 6 31	d	560cB8	3.6s	22-	55	26 81	
09 07 18 2 8 13	R	Pleiade C	3.0	22-	55	27 81	
09 07 18 2 23 30	R	552SB7	2.9s	22-	55	29 83	
09 07 18 3 5 26	R	560cB8	3.6s	21-	55	-6 37 90	
09 07 18 3 8 58	R	561cB7	5.1v	21-	55	-6 37 91	
09 08 30 19 24 6	d	2771cK2	5.6	80+	126	22 178	
09 09 04 0 56 47	d	3278 B8	5.4	100+	172	29 222	
09 09 05 19 54 23	R	3494 A7	4.5	99-	166	24 111	
09 09 15 4 9 28	R	1259 A9	5.9	17-	48	-7 37 100	
09 10 07 2 52 54	R X	54005DA2	5.6	91-	145	58 235	
09 10 07 2 52 57	R	440SA2	4.7	91-	145	58 235	
09 10 07 21 20 47	R	556cB8	5.4	85-	134	32 87	
09 10 13 1 8 51	R	1337 F0	5.7	31-	67	16 84	
09 10 13 1 14 32	R	1336 A5	5.2	31-	67	17 85	
09 10 21 15 26 52	D	2366dM1	1.1v	13+	42	7 16 206	
09 10 21 16 30 37	R	2366dM1	1.1v	13+	42	-4 9 219	
09 10 26 21 22 11	d	3064 A2	5.9	57+	99	12 234	
09 10 28 17 40 43	d	3285cG6	5.9	75+	119	36 155	
09 10 30 16 13 44	d	3512 K4	5.6	89+	142	-3 22 108	
09 11 05 19 10 59	r	822SB9	5.8	88-	140	16 71	
09 11 07 4 58 26	R	1050 K5	5.7	77-	123	-10 57 243	
09 11 26 18 58 15	D	3482cF6	5.7	68+	111	48 195	
09 11 30 18 3 33	D X	54005DA2	5.6	97+	159	43 101	
09 11 30 18 3 35	D	440SA2	4.7	97+	159	43 101	
09 12 01 19 58 46	d	598SG0	5.5s	100+	173	54 110	
09 12 03 19 42 58	r	936cK0	5.8	97-	159	30 84	
09 12 04 20 51 56	d	1110SF0	3.5	91-	144	29 87	
09 12 04 21 52 49	R	1110SF0	3.5	90-	144	40 97	
09 12 05 1 51 16	R	1129SF5	5.3	90-	142	68 188	
09 12 07 6 0 58	R	1409cK0	5.0	70-	113	-5 45 236	
09 12 19 17 18 28	D	2963WK2	5.3	9+	35	9 233	
09 12 29 2 45 36	d	556cB8	5.4	90+	142	12 291	

	Date	Times	P	Star	Sp	Mag	%	Elon	Sun	Moon				
	a	m	g	h	m	s		ill	Alt	Alt	Az			
Occultaztions for AOSTA														
09	01	07	16	16	33	D		536cB7	5.5	83+	132	-3	39	95
09	01	07	16	18	55	D		537SB6	3.7s	83+	132	-3	40	95
09	01	07	16	36	46	D		539SB6	4.3	83+	132	-6	43	98
09	01	07	16	44	29	D		541cB8	3.9	83+	132	-7	44	100
09	01	07	16	59	33	D		542 B8	5.8	83+	132	-9	47	103
09	01	07	17	7	44	r		537SB6	3.7s	83+	132	-11	48	105
09	01	07	17	51	5	r		541cB8	3.9	84+	132	55	116	
09	01	09	16	29	1	D		900cB1	4.8	97+	160	-4	21	74
09	01	12	19	42	44	r		1375 K1	5.4	96-	156	15	84	
09	01	14	22	43	58	r		1611DG9	5.6	80-	127	19	108	
09	01	24	7	6	7	r		2750SB2	2.1	4-	22	0	7	139
09	02	05	19	29	46	D		844SB9	5.8s	81+	128	70	157	
09	02	06	19	44	45	D		1030WA3	3.1s	89+	142	64	134	
09	02	06	20	40	45	r		1030WA3	3.1s	89+	142	69	163	
09	02	07	3	59	58	d		1070 G5	5.2v	91+	146	11	293	
09	02	13	5	37	18	r		1800 A0	5.5	84-	133	-11	21	230
09	02	17	2	39	57	R		2263cB1	4.6	47-	87	8	141	
09	02	17	5	44	15	R		2276 A3	5.6	47-	86	-9	18	182
09	02	17	7	32	0	r		2287SB1	2.9e	46-	86	9	14	206
09	03	03	23	1	58	D		647WB9	5.4s	45+	84	19	288	
09	03	13	0	48	24	r		1852cA2	6.0	95-	155	33	176	
09	03	30	11	42	39	d		537SB6	3.7s	18+	49	48	48	105
09	03	30	12	25	48	d		541cB8	3.9	18+	50	47	55	115
09	03	30	12	48	15	D	Pleiade C	3.0	18+	50	45	58	122	
09	03	30	13	9	3	D	552SB7	2.9s	18+	50	44	61	129	
09	03	30	13	48	19	r	Pleiade C	3.0	18+	50	39	65	147	
09	03	30	13	56	42	r	552SB7	2.9s	18+	50	38	66	151	
09	04	08	23	4	31	d	1800 A0	5.5	99+	171	35	183		
09	04	13	1	27	53	R	2298 K3	5.0	88-	139	18	170		
09	05	01	22	38	43	D	1337 F0	5.7	51+	91	23	269		
09	05	01	22	59	40	D	1336 A5	5.2	51+	91	19	272		
09	05	31	20	7	46	D	1623 A0	5.4	58+	99	-9	37	219	
09	06	10	1	39	16	r	2771cK2	5.6	95-	155	19	185		
09	06	16	1	38	6	R	3494 A7	4.5	48-	88	22	112		
09	06	30	21	15	36	D	1931 K1	4.8s	64+	107	17	224		
09	07	03	19	24	3	D	2287SB1	2.9e	89+	141	-1	16	162	
09	07	03	19	47	51	r	2287SB1	2.9e	89+	141	-4	17	167	
09	07	03	21	56	0	D	2298 K3	5.0	89+	142	17	196		
09	07	10	2	19	10	R	3108 M2	5.3	94-	151	28	192		
09	07	16	23	40	11	r	399SA0	5.7	33-	70	5	67		
09	07	18	1	36	17	D	Pleiade C	3.0	22-	56	17	73		
09	07	18	1	41	3	D	552SB7	2.9s	22-	56	18	74		
09	07	18	1	55	53	R	545 B6	4.1v	22-	56	21	76		
09	07	18	2	4	34	R	Pleiade C	3.0	22-	56	22	78		
09	07	18	2	9	13	d	560cB8	3.6s	22-	55	22	78		
09	07	18	2	21	49	R	552SB7	2.9s	22-	55	25	80		
09	07	18	3	6	31	R	560cB8	3.6s	21-	55	-8	32	88	
09	07	18	3	8	9	R	561cB7	5.1v	21-	55	-8	33	88	
09	08	14	11	27	36	r	537SB6	3.7s	43-	82	58	20	285	
09	08	14	12	17	36	r	Pleiade C	3.0	43-	82	57	12	293	
09	08	14	12	29	45	r	552SB7	2.9s	43-	81	57	10	294	
09	08	30	19	13	40	d	2771cK2	5.6	80+	126	-11	19	169	
09	09	04	0	45	26	d	3278 B8	5.4	100+	172	31	212		
09	09	05	19	55	45	R	3494 A7	4.5	99-	166	19	108		
09	09	10	22	24	47	r	598SG0	5.5s	62-	104	19	74		
09	09	15	4	13	33	R	1259 A9	5.9	17-	48	-10	33	97	
09	10	07	2	47	42	R X	54005DA2	5.6	91-	145	61	221		
09	10	07	2	47	45	R	440SA2	4.7	91-	145	61	221		
09	10	07	21	30	21	R	556cB8	5.4	85-	134	30	86		
09	10	11	11	12	19	r	1110SF0	3.5	49-	89	37	19	283	
09	10	13	1	2	56	R	1337 F0	5.7	31-	67	11	79		
09	10	13	1	16	5	R	1336 A5	5.2	31-	67	13	82		
09	10	21	15	12	10	D	2366dM1	1.1v	13+	42	13	16	197	
09	10	21	16	23	5	r	2366dM1	1.1v	13+	42	1	11	212	
09	10	26	21	19	9	d	3064 A2	5.9	58+	99	15	228		
09	10	28	17	38	29	d	3285cG6	5.9	75+	120	32	148		
09	11	05	19	34	29	r	822SB9	5.8	88-	140	13	68		
09	11	07	4	47	44	R	1050 K5	5.7	77-	123	61	227		
09	11	26	19	0	28	D	3482cF6	5.7	68+	111	46	186		
09	11	30	18	7	50	d X	54005DA2	5.6	97+	159	39	99		
09	11	30	18	7	52	D	440SA2	4.7	97+	159	39	99		
09	12	01	19	51	32	d	598SG0	5.5s	100+	173	48	105		
09	12	03	19	47	55	r	936cK0	5.8	97-	159	27	82		
09	12	04	20	50	5	d	1110SF0	3.5	91-	144	25	83		
09	12	04	21	50	53	R	1110SF0	3.5	90-	144	35	94		

Date	Times	P	Star	Sp	Mag	%	Elon	Sun	Moon
a m g h m s			No D		V	ill		Alt	Alt Az
09 12 05	1 40 40	R	1129SF5		5.3	90-	142		65 167
09 12 07	5 52 17	R	1409cK0		5.0	70-	113	-11	48 224
09 12 09	3 34 15	R	1623 A0		5.4	48-	88		37 141
09 12 19	17 7 59	D	2963WK2		5.3	9+	35		12 226
09 12 29	2 44 10	d	556cB8		5.4	90+	142		17 286

Occultations for BARI

09 01 07 16 18 54	D		536cB7		5.5	83+	132	-7	47 98
09 01 07 16 33 14	D		539SB6		4.3	83+	132	-10	50 100
09 01 07 16 49 21	D		541cB8		3.9	83+	132		53 104
09 01 07 16 55 37	D		542 B8		5.8	83+	132		54 105
09 01 07 17 52 5	r		541cB8		3.9	84+	132		64 122
09 01 12 19 45 15	r		1375 K1		5.4	96-	156		22 89
09 01 14 22 51 45	R		1611DG9		5.6	80-	127		29 115
09 01 21 2 56 24	r		2312 M2		5.4s	22-	56		2 129
09 01 24 7 12 30	R		2750SB2		2.1	4-	22	9	15 148
09 02 05 19 37 58	D		844SB9		5.8s	80+	128		75 191
09 02 06 20 13 57	D		1030WA3		3.1s	89+	142		74 168
09 02 06 20 50 59	r		1030WA3		3.1s	89+	142		73 198
09 02 17 2 47 42	R		2263cB1		4.6	47-	87		17 150
09 02 17 8 3 8	r		2287SB1		2.9e	46-	86	22	11 221
09 02 21 4 27 25	R		2834cA4		5.0	13-	43		6 130
09 03 03 23 6 35	d		647WB9		5.4s	45+	84		10 296
09 03 13 1 5 6	r		1852cA2		6.0	95-	155		36 193
09 03 30 11 49 19	d		537SB6		3.7s	18+	50	51	57 110
09 03 30 12 24 49	d		541cB8		3.9	18+	50	48	63 120
09 03 30 13 28 6	m	Pleiade C			3.0	18+	50	40	71 151
09 04 08 23 23 53	d		1800 A0		5.5	99+	171		37 201
09 04 13 1 46 2	R		2298 K3		5.0	88-	139		23 184
09 05 01 22 47 21	d		1337 F0		5.7	50+	91		14 278
09 05 01 23 5 39	d		1336 A5		5.2	51+	91		11 281
09 05 10 20 16 41	R		2366dM1		1.1v	97-	160		4 131
09 05 31 20 26 15	D		1623 A0		5.4	58+	99		33 236
09 06 10 2 3 11	r		2771cK2		5.6	95-	155		22 200
09 06 16 1 33 50	R		3494 A7		4.5	48-	88		30 117
09 06 30 21 37 51	D		1931 K1		4.8s	64+	107		11 237
09 07 03 19 35 35	D		2287SB1		2.9e	89+	141	-11	23 173
09 07 03 20 9 42	r		2287SB1		2.9e	89+	141		23 181
09 07 03 22 10 50	D		2298 K3		5.0	89+	141		17 209
09 07 10 2 15 30	R		3108 M2		5.3	94-	151	-12	31 202
09 07 16 23 20 54	r		399SA0		5.7	33-	70		7 69
09 07 18 0 57 19	M		537SB6		3.7s	22-	56		16 72
09 07 18 1 20 9	D	Pleiade C			3.0	22-	56		20 75
09 07 18 1 28 29	D		552SB7		2.9s	22-	56		21 76
09 07 18 1 51 42	R		545 B6		4.1v	22-	56		26 80
09 07 18 2 4 8	d		560cB8		3.6s	22-	55		28 81
09 07 18 2 8 19	R	Pleiade C			3.0	22-	55		29 82
09 07 18 2 22 32	R		552SB7		2.9s	22-	55		31 84
09 07 18 3 1 57	R		560cB8		3.6s	21-	55	-6	38 90
09 07 18 3 7 7	R		561cB7		5.1v	21-	55	-5	39 91
09 08 30 19 30 2	d		2771cK2		5.6	80+	126		24 183
09 09 04 1 6 38	d		3278 B8		5.4	100+	172		28 228
09 09 05 19 50 40	R		3494 A7		4.5	99-	166		26 112
09 10 07 2 50 24	R X	54005DA2			5.6	91-	145		58 242
09 10 07 2 50 28	R		440SA2		4.7	91-	145		58 242
09 10 07 21 40 22	d		560cB8		3.6s	85-	134		39 90
09 10 07 21 57 14	R		560cB8		3.6s	85-	134		42 93
09 10 13 1 11 18	R		1336 A5		5.2	31-	67		19 86
09 10 13 1 11 46	R		1337 F0		5.7	31-	67		19 86
09 10 21 15 38 21	D		2366dM1		1.1v	13+	42	4	16 212
09 10 21 16 33 27	R		2366dM1		1.1v	13+	42	-6	9 222
09 10 26 21 25 2	d		3064 A2		5.9	57+	99		11 237
09 10 28 17 40 46	D		3285cG6		5.9	75+	119		39 158
09 11 05 19 26 50	r		822SB9		5.8	88-	140		17 71
09 11 07 5 6 41	R		1050 K5		5.7	77-	123	-5	55 252
09 11 26 18 57 8	D		3482cF6		5.7	68+	111		49 200
09 11 30 17 59 37	D X	54005DA2			5.6	97+	159		45 100
09 11 30 17 59 39	D		440SA2		4.7	97+	159		45 100
09 12 01 20 6 6	d		598SG0		5.5s	100+	173		58 112
09 12 03 19 34 25	r		936cK0		5.8	97-	159		30 83
09 12 04 20 54 2	d		1110SF0		3.5	91-	144		32 88
09 12 04 21 51 23	R		1110SF0		3.5	90-	144		43 97
09 12 05 1 55 48	R		1129SF5		5.3	90-	142		69 201
09 12 07 6 8 23	r		1409cK0		5.0	70-	113	0	43 243
09 12 09 3 46 33	r		1623 A0		5.4	48-	88		46 155
09 12 19 17 28 43	D		2963WK2		5.3	9+	35		7 238

Occultations for BOLOGNA

09 01 07 16 17 18	D		536cB7		5.5	83+	132	-5	43 97
09 01 07 16 23 53	D		537SB6		3.7s	83+	132	-6	44 98
09 01 07 16 35 39	D		539SB6		4.3	83+	132	-8	46 100
09 01 07 16 46 2	D		541cB8		3.9	83+	132	-9	47 102

	Date	Times	P	Star	Sp	Mag	%	Elon	Sun	Moon
a	m	g	h	m	s					
09	01	07	16	58	12	D				
									-11	50 105
09	01	07	17	4	17	r				
										51 107
09	01	07	17	53	21	r				
										59 120
09	01	12	19	44	2	r				
										18 87
09	01	14	22	46	35	r				
										23 111
09	01	24	7	11	12	r				
									4	10 143
09	02	05	19	33	21	D				
										72 169
09	02	06	19	53	49	D				
										67 144
09	02	06	20	46	27	r				
										71 177
09	02	13	5	42	42	r				
									-7	19 235
09	02	17	2	42	49	R				
										12 145
09	02	17	5	52	54	r				
									-4	19 187
09	02	17	7	43	32	r				
									14	13 212
09	03	03	23	3	38	D				
										15 291
09	03	13	0	54	14	r				
										34 182
09	03	30	11	44	51	d				
									49	51 108
09	03	30	12	25	32	d				
									47	58 118
09	03	30	12	56	42	D	Pleiade C			
									44	62 129
09	03	30	13	22	2	D				
									41	65 140
09	03	30	13	48	38	r	Pleiade C			
									38	68 154
09	03	30	13	53	17	r				
									37	68 156
09	04	08	23	11	30	d				
										36 190
09	04	13	1	32	31	R				
										20 175
09	05	01	22	41	34	D				
										20 273
09	05	01	23	0	19	D				
										16 276
09	05	31	20	14	23	D				
										35 226
09	06	10	1	49	11	r				
										20 191
09	06	16	1	37	50	R				
										25 114
09	06	30	21	22	45	D				
										15 229
09	07	03	19	25	59	D				
									-4	18 166
09	07	03	19	58	57	r				
									-9	19 174
09	07	03	22	2	35	D				
										17 202
09	07	10	2	20	53	R				
									-12	29 197
09	07	16	23	34	47	r				
										7 68
09	07	18	1	30	6	D	Pleiade C			
										19 74
09	07	18	1	36	34	D				
										20 75
09	07	18	1	55	9	R				
										23 78
09	07	18	2	7	15	R	Pleiade C			
										25 80
09	07	18	2	7	28	d				
										25 80
09	07	18	2	23	3	R				
										28 83
09	07	18	3	6	6	R				
									-7	35 89
09	07	18	3	8	54	R				
									-7	36 90
09	08	14	11	29	15	r				
									60	16 288
09	08	30	19	20	21	d				
										21 175
09	09	04	0	52	22	d				
										30 218
09	09	05	19	55	5	R				
										22 110
09	09	10	22	15	7	r				
										19 75
09	09	15	4	11	55	R				
									-8	36 99
09	10	07	2	51	30	R X	54005DA2			
										59 230
09	10	07	2	51	32	R				
										59 230
09	10	07	21	25	8	R				
										32 87
09	10	11	11	14	16	r				
									38	15 286
09	10	13	1	6	57	R				
										14 82
09	10	13	1	15	15	R				
										16 84
09	10	21	15	21	25	D				
									9	16 203
09	10	21	16	28	13	R				
									-2	10 217
09	10	26	21	20	58	d				
										13 232
09	10	28	17	39	56	d				
										35 152
09	11	05	19	32	23	r				
										15 70
09	11	07	4	54	32	R				
									-12	59 238
09	11	26	18	58	37	D				
										47 191
09	11	30	18	5	0	D X	54005DA2			
										41 100
09	11	30	18	5	2	D				
										41 100
09	12	01	19	55	46	d				
										52 108
09	12	03	19	45	12	r				
										29 83
09	12	04	20	51	8	d				
										28 85
09	12	04	21	52	19	R				
										38 96
09	12	05	1	47	33	R				
										67 180
09	12	07	5	57	46	R				
									-7	46 232
09	12	19	17	14	25	D				
										10 230
09	12	29	2	44	52	d				
										14 289

Date Times P Star Sp Mag % Elon Sun Moon													Date Times P Star Sp Mag % Elon Sun Moon															
a	m	g	h	m	s	No	D	V	ill	Alt	Alt	Az	a	m	g	h	m	s	No	D	V	ill	Alt	Alt	Az			
09 07 03 19 44 20	d					2287SB1		2.9e	89+	141		25 175	09 07 18 2 6 20	d						560cB8	3.6s	22-	55		24 79			
09 07 03 20 1 4 r						2287SB1		2.9e	89+	141		25 179	09 07 18 2 6 41 R							Pleiade C	3.0	22-	55		25 80			
09 07 03 22 10 22 D						2298 K3		5.0	89+	141		19 209	09 07 18 2 22 16 R							552SB7	2.9s	22-	55		27 82			
09 07 18 0 50 32 d						537SB6		3.7s	22-	56		14 70	09 07 18 3 4 50 R							560cB8	3.6s	21-	55	-8	35 89			
09 07 18 0 58 10 R						537SB6		3.7s	22-	56		15 71	09 07 18 3 7 48 R							561cB7	5.1V	21-	55	-7	35 89			
09 07 18 1 15 58 D						Pleiade C		3.0	22-	56		18 73	09 08 14 11 30 25 r							537SB6	3.7s	43-	82	60	16 288			
09 07 18 1 24 37 D						552SB7		2.9s	22-	56		20 74	09 08 30 19 19 42 d							2771cK2	5.6	80+	126		21 175			
09 07 18 1 48 25 R						545 B6		4.1v	22-	56		24 78	09 09 04 0 52 45 d							3278 B8	5.4	100+	172		31 218			
09 07 18 2 1 29 d						560cB8		3.6s	22-	55		26 79	09 09 05 19 53 29 R							3494 A7	4.5	99-	166		22 110			
09 07 18 2 5 59 R						Pleiade C		3.0	22-	55		28 80	09 09 10 22 10 57 r							598SG0	5.5s	62-	104		18 74			
09 07 18 2 19 40 R						552SB7		2.9s	22-	55		30 82	09 09 15 4 8 44 R							1259 A9	5.9	17-	48	-9	35 98			
09 07 18 2 57 23 R						560cB8		3.6s	21-	55	-8	37 87	09 10 07 2 49 52 R X							54005DA2	5.6	91-	145		60 231			
09 07 18 3 3 17 R						561cB7		5.1V	21-	55	-7	38 88	09 10 07 2 49 55 R							440SA2	4.7	91-	145		60 231			
09 08 30 19 28 50 D						2771cK2		5.6	80+	126		26 182	09 10 07 21 22 59 R							556cB8	5.4	85-	134		31 86			
09 09 04 1 11 38 d						3278 B8		5.4	100+	172		29 230	09 10 11 11 15 7 r							1110SF0	3.5	49-	89	39	15 286			
09 09 05 19 45 24 R						3494 A7		4.5	99-	166		26 110	09 10 13 1 7 33 R							1337 F0	5.7	31-	67		14 82			
09 09 26 19 58 49 d						2719cB8		5.8	56+	96		16 218	09 10 13 1 14 17 R							1336 A5	5.2	31-	67		16 84			
09 10 07 2 29 44 m						440SA2		4.7	91-	145		62 238	09 10 21 15 22 16 D							2366dM1	1.1v	13+	42	9	16 203			
09 10 07 21 30 11 d						560cB8		3.6s	85-	134		36 87	09 10 21 16 28 27 R							2366dM1	1.1v	13+	42	-2	10 217			
09 10 07 22 0 13 R						560cB8		3.6s	85-	134		42 91	09 10 26 21 20 58 d							3064 A2	5.9	57+	99		14 232			
09 10 13 1 6 52 R						1336 A5		5.2	31-	67		18 84	09 10 28 17 38 24 d							3285cG6	5.9	75+	120		35 152			
09 10 13 1 11 55 R						1337 F0		5.7	31-	67		19 85	09 11 05 19 31 26 r							822SB9	5.8	88-	140		15 69			
09 10 21 15 42 44 D						2366dM1		1.1v	13+	42	4	17 213	09 11 07 4 55 54 R							1050 K5	5.7	77-	123	-12	59 239			
09 10 21 16 32 45 R						2366dM1		1.1v	13+	42	-6	11 222	09 11 26 18 56 53 D							3482cF6	5.7	68+	111		48 191			
09 10 26 21 26 10 d						3064 A2		5.9	57+	99		12 238	09 11 30 18 3 14 D X							54005DA2	5.6	97+	159		41 99			
09 10 28 17 36 36 D						3285cG6		5.9	75+	119		41 156	09 11 30 18 3 16 D							440SA2	4.7	97+	159		41 99			
09 11 05 19 23 24 r						822SB9		5.8	88-	140		15 70	09 12 01 19 55 15 d							598SG0	5.5s	100+	173		52 107			
09 11 07 5 10 39 R						1050 K5		5.7	77-	123	-4	55 256	09 12 03 19 43 27 r							936cK0	5.8	97-	159		28 82			
09 11 23 20 18 6 d						3131wF0		5.5	39+	78		12 243	09 12 04 20 50 35 d							1110SF0	3.5	91-	144		27 85			
09 11 26 18 53 23 D						3482cF6		5.7	68+	111		52 199	09 12 04 21 51 9 R							1110SF0	3.5	90-	144		38 95			
09 11 30 17 55 1 D X						54005DA2		5.6	97+	159		44 97	09 12 05 1 46 12 R							1129SF5	5.3	90-	142		68 179			
09 11 30 17 55 3 D						440SA2		4.7	97+	159		44 97	09 12 07 5 59 16 R							1409cK0	5.0	70-	113	-6	46 233			
09 12 01 20 8 36 d						598SG0		5.5s	100+	173		59 109	09 12 09 3 40 16 R							1623 A0	5.4	48-	88		41 147			
09 12 04 20 54 16 d						1110SF0		3.5	91-	144		32 86	09 12 19 17 15 29 D							2963WK2	5.3	9+	35		10 231			
09 12 04 21 46 18 R						1110SF0		3.5	90-	144		42 94	09 12 29 2 47 5 d							556cB8	5.4	90+	142		14 290			
09 12 05 1 48 10 R						1129SF5		5.3	90-	142		72 197	Occultations for GENOVA															
09 12 09 3 57 24 R						1623 A0		5.4	48-	88		49 157	09 01 07 16 15 27 D							536cB7	5.5	83+	132	-3	41 94			
09 12 19 17 36 52 D						2963WK2		5.3	9+	35		7 239	09 01 07 16 20 8 D							537SB6	3.7s	83+	132	-4	41 95			
09 12 29 2 21 27 m						545 B6		4.1v	89+	142		13 291	09 01 07 16 34 26 D							539SB6	4.3	83+	132	-6	44 98			
Occultations for FIRENZE													09 01 07 16 43 45 D										541cB8	3.9	83+	132	-7	45 100
09 01 07 16 16 8 D						536cB7		5.5	83+	132	-4	42 96	09 01 07 16 56 55 D							542 B8	5.8	83+	132	-10	48 102			
09 01 07 16 23 43 D						537SB6		3.7s	83+	132	-5	44 97	09 01 07 17 4 9 r							537SB6	3.7s	83+	132	-11	49 105			
09 01 07 16 34 6 D						539SB6		4.3	83+	132	-7	46 99	09 01 07 17 50 35 r							541cB8	3.9	84+	132		57 116			
09 01 07 16 45 2 D						541cB8		3.9	83+	132	-9	47 101	09 01 12 19 43 4 r							1375 K1	5.4	96-	156		16 85			
09 01 07 16 56 34 D						542 B8		5.8	83+	132	-11	50 103	09 01 14 22 45 23 r							1611DG9	5.6	80-	127		21 109			
09 01 07 17 1 49 r						537SB6		3.7s	83+	132	-12	50 105	09 01 24 7 4 58 r							2750SB2	2.1	4-	22	1	8 140			
09 01 07 17 51 52 r						541cB8		3.9	84+	132		59 118	09 02 05 19 28 58 D							844SB9	5.8s	81+	128		71 159			
09 01 12 19 43 47 r						1375 K1		5.4	96-	156		18 86	09 02 06 19 50 8 D							1030WA3	3.1s	89+	142		66 137			
09 01 14 22 46 53 r						1611DG9		5.6	80-	127		23 111	09 02 06 20 41 13 r							1030WA3	3.1s	89+	142		70 167			
09 01 24 7 8 22 r						2750SB2		2.1	4-	22	4	10 142	09 02 07 4 1 5 d							1070 G5	5.2v	91+	146		9 295			
09 02 05 19 31 34 D						844SB9		5.8s	81+	128		73 167	09 02 13 5 41 34 r							1800 A0	5.5	84-	133	-9	20 233			
09 02 06 19 55 37 D						1030WA3		3.1s	89+	142		68 144	09 02 17 2 40 39 R							2263cB1	4.6	47-	87		10 143			
09																												

Date	Times	P	Star	Sp	Mag	%	Elon	Sun	Moon			
a m g h m s			No D		V	ill		Alt	Alt	Az		
09 07 18	3 4 59	R	560cB8		3.6s	21-	55	-8	33	88		
09 07 18	3 7 21	R	561cB7		5.1V	21-	55	-8	34	88		
09 08 14	11 29 35	r	537SB6		3.7s	43-	82	60	18	286		
09 08 14	12 18 56	r	Pleiade C		3.0	43-	82	58	10	294		
09 08 30	19 15 40	d	2771cK2		5.6	80+	126			20 171		
09 09 04	0 48 29	d	3278 B8		5.4	100+	172		32	215		
09 09 05	19 53 45	R	3494 A7		4.5	99-	166		20	108		
09 09 10	22 18 56	r	598SG0		5.5s	62-	104		18	74		
09 09 15	4 10 9	R	1259 A9		5.9	17-	48	-10	34	97		
09 10 07	2 47 45	R X	54005DA2		5.6	91-	145		61	225		
09 10 07	2 47 47	R	440SA2		4.7	91-	145		61	225		
09 10 07	21 26 13	R	556cB8		5.4	85-	134		30	86		
09 10 11	11 14 6	r	1110SF0		3.5	49-	89	39	17	284		
09 10 13	1 5 38	R	1337 F0		5.7	31-	67		13	80		
09 10 13	1 14 47	R	1336 A5		5.2	31-	67		14	82		
09 10 21	15 16 48	D	2366dM1		1.1v	13+	42	11	17	199		
09 10 21	16 25 39	R	2366dM1		1.1v	13+	42	0	11	214		
09 10 26	21 19 43	d	3064 A2		5.9	57+	99		15	229		
09 10 28	17 37 18	d	3285cG6		5.9	75+	120		34	149		
09 11 05	19 32 37	r	822SB9		5.8	88-	140		14	68		
09 11 07	4 52 4	R	1050 K5		5.7	77-	123		61	233		
09 11 26	18 57 14	D	3482cF6		5.7	68+	111		48	187		
09 11 30	18 4 31	D X	54005DA2		5.6	97+	159		39	98		
09 11 30	18 4 33	D	440SA2		4.7	97+	159		39	98		
09 12 01	19 52 24	d	598SG0		5.5s	100+	173		49	105		
09 12 03	19 45 7	r	936cK0		5.8	97-	159		27	81		
09 12 04	20 49 44	d	1110SF0		3.5	91-	144		26	84		
09 12 04	21 50 24	R	1110SF0		3.5	90-	144		36	94		
09 12 05	1 41 58	R	1129SF5		5.3	90-	142		67	171		
09 12 07	5 56 12	R	1409cK0		5.0	70-	113	-9	48	229		
09 12 09	3 39 30	R	1623 A0		5.4	48-	88		40	144		
09 12 19	17 11 34	D	2963WK2		5.3	9+	35		12	228		
09 12 29	2 47 4	d	556cB8		5.4	90+	142		15	288		

Occultations for L'AQUILA

09 01 07 16 16 14	D	536cB7	5.5	83+	132	-5	44	96				
09 01 07 16 29 12	D	537SB6	3.7s	83+	132	-7	46	99				
09 01 07 16 32 39	D	539SB6	4.3	83+	132	-8	47	99				
09 01 07 16 45 42	D	541cB8	3.9	83+	132	-10	49	102				
09 01 07 16 54 55	r	537SB6	3.7s	83+	132	-12	51	104				
09 01 07 16 55 1	D	542 B8	5.8	83+	132	-12	51	103				
09 01 07 17 51 23	r	541cB8	3.9	84+	132		61	119				
09 01 12 19 44 11	r	1375 K1	5.4	96-	156		19	87				
09 01 14 22 48 49	r	1611DG9	5.6	80-	127		25	112				
09 01 24 7 8 28	r	2750SB2	2.1	4-	22	6	12	144				
09 02 05 19 32 58	D	844SB9	5.8s	80+	128		74	174				
09 02 06 20 3 39	D	1030WA3	3.1s	89+	142		71	152				
09 02 06 20 45 57	r	1030WA3	3.1s	89+	142		73	183				
09 02 13 5 49 40	r	1800 A0	5.5	84-	133	-4	18	239				
09 02 17 2 44 8	R	2263cB1	4.6	47-	87		14	147				
09 02 17 7 53 6	r	2287SB1	2.9e	46-	86	18	13	216				
09 02 21 4 25 53	R	2834cA4	5.0	13-	43		3	128				
09 03 03 23 5 41	D	647WB9	5.4s	45+	84		13	293				
09 03 13 0 59 23	r	1852cA2	6.0	95-	155		36	186				
09 03 30 11 44 56	d	537SB6	3.7s	18+	49	51	53	107				
09 03 30 12 22 57	d	541cB8	3.9	18+	50	48	60	117				
09 03 30 13 5 16	D	Pleiade C	3.0	18+	50	44	66	133				
09 03 30 13 41 17	r	Pleiade C	3.0	18+	50	39	70	152				
09 04 08 23 16 56	d	1800 A0	5.5	99+	171		37	194				
09 04 13 1 39 10	R	2298 K3	5.0	88-	139		22	179				
09 05 01 22 45 15	d	1337 F0	5.7	50+	91		18	275				
09 05 01 23 4 42	d	1336 A5	5.2	51+	91		14	278				
09 05 10 20 15 48	R	2366dM1	1.1v	97-	160		1	128				
09 05 31 20 20 22	D	1623 A0	5.4	58+	99		35	231				
09 06 10 1 55 6	r	2771cK2	5.6	95-	155		22	195				
09 06 16 1 34 31	R	3494 A7	4.5	48-	88		27	114				
09 06 30 21 30 33	D	1931 K1	4.8s	64+	107		14	232				
09 07 03 19 31 5	D	2287SB1	2.9e	89+	141	-8	21	169				
09 07 03 20 0 47	r	2287SB1	2.9e	89+	141	-12	22	176				
09 07 03 22 5 27	D	2298 K3	5.0	89+	141		18	204				
09 07 10 2 18 22	R	3108 M2	5.3	94-	151		31	199				
09 07 16 23 28 6	r	399SA0	5.7	33-	70		6	68				
09 07 18 1 24 14	D	Pleiade C	3.0	22-	56		18	74				
09 07 18 1 31 38	D	552SB7	2.9s	22-	56		20	75				
09 07 18 1 52 47	R	545 B6	4.1v	22-	56		24	78				
09 07 18 2 4 42	d	560cB8	3.6s	22-	55		25	80				
09 07 18 2 7 7	R	Pleiade C	3.0	22-	55		26	80				
09 07 18 2 22 2	R	552SB7	2.9s	22-	55		29	82				
09 07 18 3 3 6	R	560cB8	3.6s	21-	55	-7	36	89				
09 07 18 3 6 58	R	561cB7	5.1V	21-	55	-7	37	89				
09 08 30 19 23 18	d	2771cK2	5.6	80+	126		23	178				
09 09 04 0 58 6	d	3278 B8	5.4	100+	172		30	222				

Date	Times	P	Star	Sp	Mag	%	Elon	Sun	Moon			
a m g h m s			No D		V	ill		Alt	Alt	Az		
09 09 05 19 51 35	R	3494 A7	4.5	99-	166				24	110		
09 09 15 4 0 14	R	1259 A9	5.9	17-	48	-9	35	97				
09 10 07 2 49 32	R X	54005DA2	5.6	91-	145				59	236		
09 10 07 2 49 35	R	440SA2	4.7	91-	145				59	236		
09 10 07 21 15 57	R	556cB8	5.4	85-	134				31	86		
09 10 13 1 9 30	R	1337 F0	5.7	31-	67				16	83		
09 10 13 1 12 38	R	1336 A5	5.2	31-	67				17	84		
09 10 21 15 28 45	D	2366dM1	1.1v	13+	42	7	17	206				
09 10 21 16 30 54	R	2366dM1	1.1v	13+	42	-4	10	219				
09 10 26 21 22 26	d	3064 A2	5.9	57+	99				13	234		
09 10 28 17 38 17	d	3285cG6	5.9	75+	119				37	154		
09 10 30 16 16 46	m	3512 K4	5.6	89+	142	-3	23	108				
09 11 05 19 29 16	r	822SB9	5.8	88-	140				15	70		
09 11 07 5 0 54	R	1050 K5	5.7	77-	123	-9	58	245				
09 11 26 18 55 44	D	3482cF6	5.7	68+	111				49	194		
09 11 30 18 0 39	D X	54005DA2	5.6	97+	159				42	99		
09 11 30 18 0 41	D	440SA2	4.7	97+	159				42	99		
09 12 01 19 58 24	d	598SG0	5.5s	100+	173				54	108		
09 12 03 19 39 34	r	936cK0	5.8	97-	159				29	82		
09 12 04 20 51 18	d	1110SF0	3.5	91-	144				29	86		
09 12 04 21 50 40	R	1110SF0	3.5	90-	144				40	96		
09 12 05 1 48 56	R	1129SF5	5.3	90-	142				69	187		
09 12 07 6 3 41	R	1409cK0	5.0	70-	113	-4	45	238				
09 12 09 3 45 7	R	1623 A0	5.4	48-	88				44	150		
09 12 19 17 20 47	D	2963WK2	5.3	9+	35				9	234		
09 12 29 2 49 24	d	556cB8	5.4	90+	142				11	292		

Occultations for MILANO

09	01	07	16	17	13	D	536cB7	5.5	83+	132	-4	41	96
09	01	07	16	20	57	D	537SB6	3.7s	83+	132	-4	41	97
09	01	07	16	36	45	D	539SB6	4.3	83+	132	-7	44	99
09	01	07	16	45	31	D	541cB8	3.9	83+	132	-8	46	101
09	01	07	16	59	27	D	542 B8	5.8	83+	132	-11	48	104
09	01	07	17	7	15	r	537SB6	3.7s	83+	132	-12	49	107
09	01	07	17	52	36	r	541cB8	3.9	84+	132		57	118
09	01	12	19	43	22	r	1375 K1	5.4	96-	156		16	85
09	01	14	22	44	57	r	1611DG9	5.6	80-	127		21	109
09	01	24	7	9	27	r	2750SB2	2.1	4-	22	2	8	141
09	02	05	19	32	2	D	844SB9	5.8s	81+	128		71	163
09	02	06	19	48	17	D	1030WA3	3.1s	89+	142		65	138
09	02	06	20	43	52	r	1030WA3	3.1s	89+	142		69	170
09	02	07	4	0	7	d	1070 G5	5.2v	91+	146		10	295
09	02	13	5	38	59	r	1800 A0	5.5	84-	133	-9	20	232
09	02	17	2	41	19	R	2263cB1	4.6	47-	87		10	143
09	02	17	5	48	12	r	2276 A3	5.6	47-	86	-7	18	184
09	02	17	7	36	36	r	2287SB1	2.9e	46-	86	11	13	208
09	03	03	23	2	30	D	647WB9	5.4s	45+	84		17	289
09	03	13	0	50	45	r	1852cA2	6.0	95-	155		33	179
09	03	30	11	43	58	d	537SB6	3.7s	18+	49	48	49	106
09	03	30	12	26	13	d	541cB8	3.9	18+	50	47	56	117
09	03	30	12	51	46	D	Pleiade C	3.0	18+	50	45	60	125
09	03	30	13	13	54	D	552SB7	2.9s	18+	50	43	63	134
09	03	30	13	49	26	r	Pleiade C	3.0	18+	50	38	66	151
09	03	30	13	56	55	r	552SB7	2.9s	18+	50	37	67	154
09	04	08	23	7	23	d	1800 A0	5.5	99+	171		35	186
09	04	13	1	29	16	R	2298 K3	5.0	88-	139		18	172
09	05	01	22	39	34	D	1337 F0	5.7	51+	91		22	270
09	05	01	22	59	7	D	1336 A5	5.2	51+	91		18	274
09	05	31	20	10	19	D	1623 A0	5.4	58+	99	-10	36	222
09	06	10	1	43	40	r	2771cK2	5.6	95-	155		20	188
09	06	16	1	38	33	R	3494 A7	4.5	48-	88		24	113
09	06	30	21	18	11	D	1931 K1	4.8s	64+	107		16	226
09	07	03	19	23	51	D	2287SB1	2.9e	89+	141	-2	17	163
09	07	03	19	53	58	r	2287SB1	2.9e	89+	141	-6	18	170
09	07	03	21	59	15	D	2298 K3	5.0	89+	142		17	199
09	07	10	2	20	28	R	3108 M2	5.3	94-	151	-12	28	195
09	07	16	23	38	23	r	399SA0	5.7	33-	70		6	68
09	07	18	1	34	0	D	Pleiade C	3.0	22-	56		18	74
09	07	18	1	39	33	D	552SB7	2.9s	22-	56		19	74
09	07	18	1	55	54	R	545 B6	4.1v	22-	56		22	77
09	07	18	2	6	1	R	Pleiade C	3.0	22-	56		24	79
09	07	18	2	8	47	d	560cB8	3.6s	22-	55		24	79
09	07	18	2	22	41	R	552SB7	2.9s	22-	55		26	82
09	07	18	3	6	47	R	560cB8	3.6s	21-	55	-7	34	89
09	07	18	3	8	52	R	561cB7	5.1v	21-	55	-7	34	89
09	08	14	11	27	58	r	537SB6	3.7s	43-	82	59	18	286
09	08	14	12	17	30	r	Pleiade C	3.0	43-	82	57	10	294
09	08	30	19	16	53	d	2771cK2	5.6	80+	126		19	172
09	09	04	0	48	18	d	3278 B8	5.4	100+	172		31	214
09	09	05	19	56	2	R	3494 A7	4.5	99-	166		20	109
09	09	10	22	22	4	R	598SG0	5.5s	62-	104		19	75

Date	Times	P	Star	Sp	Mag	%	Elon	Sun	Moon	Date	Times	P	Star	Sp	Mag	%	Elon	Sun	Moon
a m g h m s			No D		V	ill		Alt	Alt Az	a m g h m s			No D		V	ill		Alt	Alt Az
09 09 15	4 13 52	R	1259 A9		5.9	17-	48	-9	34 99	09 10 26	21 23 30	d	3064 A2		5.9	57+	99		13 235
09 10 07	2 49 58	R X	54005DA2		5.6	91-	145		60 225	09 10 28	17 36 39	d	3285cG6		5.9	75+	119		39 154
09 10 07	2 50 0	R	440SA2		4.7	91-	145		60 225	09 10 30	16 14 19	m	3512 K4		5.6	89+	142	-3	23 107
09 10 07	21 28 58	R	556cB8		5.4	85-	134		31 87	09 11 05	19 26 54	r	822SB9		5.8	88-	140		15 70
09 10 11	11 12 56	r	1110SF0		3.5	49-	89	37	17 284	09 11 07	5 4 37	R	1050 K5		5.7	77-	123	-7	57 249
09 10 13	1 4 34	R	1337 F0		5.7	31-	67		13 81	09 11 26	18 53 43	D	3482cF6		5.7	68+	111		50 195
09 10 13	1 16 5	R	1336 A5		5.2	31-	67		15 83	09 11 30	17 57 45	D X	54005DA2		5.6	97+	159		43 98
09 10 21	15 16 2	D	2366dM1		1.1v	13+	42	11	16 199	09 11 30	17 57 46	D	440SA2		4.7	97+	159		43 98
09 10 21	16 25 24	R	2366dM1		1.1v	13+	42	0	10 214	09 12 01	20 0 27	d	598SG0		5.5s	100+	173		56 108
09 10 26	21 19 56	d	3064 A2		5.9	57+	99		14 229	09 12 03	19 34 43	r	936cK0		5.8	97-	159		29 81
09 10 28	17 39 41	d	3285cG6		5.9	75+	120		33 150	09 12 04	20 51 41	d	1110SF0		3.5	91-	144		30 85
09 11 05	19 33 53	r	822SB9		5.8	88-	140		14 69	09 12 04	21 48 38	R	1110SF0		3.5	90-	144		40 95
09 11 07	4 50 20	R	1050 K5		5.7	77-	123		60 232	09 12 05	1 47 42	R	1129SF5		5.3	90-	142		70 189
09 11 26	19 0 3	D	3482cF6		5.7	68+	111		46 188	09 12 07	6 7 28	R	1409cK0		5.0	70-	113	-2	45 241
09 11 30	18 7 7	D X	54005DA2		5.6	97+	159		40 100	09 12 09	3 51 0	R	1623 A0		5.4	48-	88		46 153
09 11 30	18 7 9	D	440SA2		4.7	97+	159		40 100	09 12 19	17 25 25	D	2963WK2		5.3	9+	35		9 235
09 12 01	19 53 36	d	598SG0		5.5s	100+	173		49 107	Occultations for PALERMO									
09 12 03	19 47 22	r	936cK0		5.8	97-	159		28 83	09 01 07	16 11 53	d	536cB7		5.5	83+	132	-2	43 91
09 12 04	20 50 39	d	1110SF0		3.5	91-	144		26 84	09 01 07	16 25 23	D	539SB6		4.3	83+	132	-5	46 93
09 12 04	21 51 55	R	1110SF0		3.5	90-	144		37 95	09 01 07	16 41 55	D	541cB8		3.9	83+	132	-8	49 96
09 12 05	1 44 10	R	1129SF5		5.3	90-	142		66 173	09 01 07	16 47 13	D	542 B8		5.8	83+	132	-9	50 97
09 12 07	5 54 15	R	1409cK0		5.0	70-	113	-9	47 227	09 01 07	17 41 39	r	541cB8		3.9	84+	132		61 109
09 12 19	17 10 28	D	2963WK2		5.3	9+	35		11 228	09 01 12	19 41 41	r	1375 K1		5.4	96-	156		19 85
09 12 29	2 43 41	d	556cB8		5.4	90+	142		16 287	09 01 14	22 49 56	R	1611DG9		5.6	80-	127		27 111
Occultations for NAPOLI										09 02 05	19 27 49	D	844SB9		5.8s	80+	128		78 166
09 01 07	16 15 30	D	536cB7		5.5	83+	132	-5	45 95	09 02 08	17 27 33	d	1310SK0		3.9	99+	169	-10	21 83
09 01 07	16 30 35	D	539SB6		4.3	83+	132	-7	48 98	09 02 17	2 42 56	R	2263cB1		4.6	47-	87		18 146
09 01 07	16 40 10	M	537SB6		3.7s	83+	132	-9	49 100	09 02 17	8 3 21	r	2287SB1		2.9e	46-	86	22	15 218
09 01 07	16 45 24	D	541cB8		3.9	83+	132	-10	50 100	09 02 21	4 20 42	R	2834cA4		5.0	13-	43		5 126
09 01 07	16 52 47	D	542 B8		5.8	83+	132	-11	52 102	09 03 03	23 9 42	d	647WB9		5.4s	45+	84		10 294
09 01 07	17 49 0	r	541cB8		3.9	84+	132		62 117	09 03 13	1 5 23	r	1852cA2		6.0	95-	155		40 189
09 01 12	19 43 49	r	1375 K1		5.4	96-	156		20 87	09 03 30	11 41 28	d	537SB6		3.7s	18+	50	55	54 101
09 01 14	22 50 0	R	1611DG9		5.6	80-	127		27 113	09 03 30	12 15 20	d	541cB8		3.9	18+	50	53	60 108
09 01 24	6 46 42	d	2750SB2		2.1	4-	22	4	11 140	09 04 08	23 22 17	d	1800 A0		5.5	99+	171		41 197
09 01 24	7 3 15	r	2750SB2		2.1	4-	22	6	13 143	09 04 13	1 48 30	R	2298 K3		5.0	88-	139		26 181
09 02 05	19 32 25	D	844SB9		5.8s	80+	128		76 176	09 04 29	14 56 24	D	1030WA3		3.1s	25+	60	34	76 157
09 02 06	20 12 8	D	1030WA3		3.1s	89+	142		73 158	09 04 29	15 37 14	r	1030WA3		3.1s	26+	61	26	76 197
09 02 06	20 42 8	r	1030WA3		3.1s	89+	142		74 183	09 05 01	22 51 58	d	1337 F0		5.7	50+	91		16 278
09 02 13	5 54 26	r	1800 A0		5.5	84-	133	-2	17 241	09 05 10	20 12 30	R	2366dM1		1.1v	97-	160		3 127
09 02 17	2 44 44	R	2263cB1		4.6	47-	87		16 147	09 05 31	20 28 6	D	1623 A0		5.4	58+	99		36 235
09 02 17	7 58 36	r	2287SB1		2.9e	46-	86	20	13 218	09 06 10	1 57 8	r	2771cK2		5.6	95-	155		26 196
09 02 21	4 24 48	R	2834cA4		5.0	13-	43		4 128	09 06 16	1 24 55	R	3494 A7		4.5	48-	88		27 111
09 03 03	23 7 1	D	647WB9		5.4s	45+	84		11 294	09 06 30	21 44 6	D	1931 K1		4.8s	64+	107		14 236
09 03 13	1 2 35	r	1852cA2		6.0	95-	155		37 189	09 07 03	19 46 38	m	2287SB1		2.9e	89+	141		25 172
09 03 30	11 44 51	d	537SB6		3.7s	18+	50	52	54 106	09 07 03	22 4 33	D	2298 K3		5.0	89+	141		22 205
09 03 30	12 21 4	d	541cB8		3.9	18+	50	50	61 115	09 07 10	2 8 22	R	3108 M2		5.3	94-	151		35 197
09 03 30	13 16 41	D	Pleiade C		3.0	18+	50	43	69 137	09 07 18	0 53 49	M	537SB6		3.7s	22-	56		12 69
09 03 30	13 28 29	r	Pleiade C		3.0	18+	50	41	70 144	09 07 18	1 15 48	D	Pleiade C		3.0	22-	56		16 71
09 04 08	23 20 5	d	1800 A0		5.5	99+	171		38 197	09 07 18	1 24 5	D	552SB7		2.9s	22-	56		17 72
09 04 13	1 43 43	R	2298 K3		5.0	88-	139		23 181	09 07 18	1 46 57	R	545 B6		4.1v	22-	56		22 76
09 04 29	15 17 1	M	1030WA3		3.1s	25+	61	29	74 180	09 07 18	1 59 21	d	560cB8		3.6s	22-	55		23 77
09 05 01	22 47 43	d	1337 F0		5.7	50+	91		16 277	09 07 18	2 3 30	R	Pleiade C		3.0	22-	55		25 78
09 05 01	23 8 34	d	1336 A5		5.2	51+	91		12 280	09 07 18	2 17 12	R	552SB7		2.9s	22-	55		27 80
09 05 10	20 15 6	R	2366dM1		1.1v	97-	160		2 129	09 07 18	2 55 8	R	560cB8		3.6s	21-	55	-11	34 85
09 05 31	20 23 59	D	1623 A0		5.4	58+	99		35 233	09 07 18	3 0 27	R	561cB7		5.1V	21-	55	-10	35 85
09 06 10	1 57 51	r	2771cK2		5.6	95-	155		23 196	09 08 30	19 21 11	D	2771cK2		5.6	80+	126		27 177
09 06 16	1 31 41	R	3494 A7		4.5	48-	88		28 114	09 09 04	1 5 12	d	3278 B8		5.4	100+	172		32 226
09 06 30	21 35 52	D	1931 K1		4.8s	64+	107		14 234	09 09 05	19 42 6	R	3494 A7		4.5	99-	166		23 107
09 07 03	19 36 19	D	2287SB1		2.9e	89+	141	-10	23 171	09 09 26	19 59 37	d	2719cB8		5.8	56+	96		18 216
09 07 03	19 59 16	r	2287SB1		2.9e	89+	141		23 176	09 10 07	21 30 57	d	560cB8		3.6s	85-	134		34 84
09 07 03	22 6 35	D	2298 K3		5.0	89+	141		19 206	09 10 07	21 53 8	R	560cB8		3.6s	85-	134		38 88
09 07 10	2 15 22	R	3108 M2		5.3	94-	151		32 200	09 10 13	1 5 0	R	1336 A5		5.2	31-	67		15 82
09 07 16	23 23 14	r	399SA0		5.7	33-	70		5 68	09 10 13	1 10 23	R	1337 F0		5.7	31-	67		16 82
09 07 18	1 20 41	D	Pleiade C		3.0	22-	56		18 73	09 10 21	15 36 59	D	2366dM1		1.1v	13+	42	7	20 209
09 07 18	1 28 36	D	552SB7		2.9s	22-	56		19 74	09 10 21	16 30 34	R	2366dM1		1.1v	13+	42	-3	14 220
09 07 18	1 50 53	R	545 B6		4.1v	22-	56		24 78	09 10 26	21 24 10	d	3064 A2		5.9	57+	99		15 235
09 07 18	2 2 55	d	560cB8		3.6s	22-	55		25 79	09 10 28	17 30 21	D	3285cG6		5.9	75+	119		40 150
09 07 18	2 6 24	R	Pleiade C		3.0	22-	55		26 80	09 11 05	19 23 9	r	822SB9		5.8	88-	140		13 68
09 07 18	2 20 47	R	552SB7		2.9s	22-	55		29 82	09 11 07	5 8 15	R	1050 K5		5.7	77-	123	-6	58 253
09 07 18	3 0 36	R	560cB8		3.6s	21-	55	-8	36 88	09 11 23	20 17 59	d	3131wF0		5.5	39+	78		15 240
09 07 18	3 5 9	R	561cB7		5.1V	21-	55	-8	3										

Date	Times	P	Star	Sp	Mag	%	Elon	Sun	Moon
a m g h m s			No D		V	ill		Alt	Alt Az
09 12 19 17 32 44	D		2963WK2		5.3	9+	35		10 236
09 12 29 2 13 18	D		545 B6	4.1v	89+	142			16 288

Occultations for PERUGIA

09 01 07 16 16 16	D		536cB7	5.5	83+	132	-5	43	96
09 01 07 16 26 4	D		537SB6	3.7s	83+	132	-6	45	98
09 01 07 16 33 26	D		539SB6	4.3	83+	132	-7	46	99
09 01 07 16 45 23	D		541cB8	3.9	83+	132	-9	48	101
09 01 07 16 55 51	D		542 B8	5.8	83+	132	-11	50	104
09 01 07 16 58 58	r		537SB6	3.7s	83+	132	-12	51	105
09 01 07 17 51 48	r		541cB8	3.9	84+	132		60	119
09 01 12 19 44 3	r		1375 K1	5.4	96-	156		19	87
09 01 14 22 47 51	r		1611DG9	5.6	80-	127		24	112
09 01 24 7 8 46	r		2750SB2	2.1	4-		5	11	143
09 02 05 19 32 21	D		844SB9	5.8s	80+	128		74	171
09 02 06 19 59 16	D		1030WA3	3.1s	89+	142		70	148
09 02 06 20 45 34	r		1030WA3	3.1s	89+	142		72	179
09 02 13 5 47 2	r		1800 A0	5.5	84-	133	-5	18	237
09 02 17 2 43 20	R		2263cB1	4.6	47-	87		13	146
09 02 17 5 55 22	r		2276 A3	5.6	47-	86	-3	20	189
09 02 17 7 49 12	r		2287SB1	2.9e	46-	86	16	13	214
09 02 21 4 26 1	r		2834cA4	5.0	13-	43		2	127
09 03 03 23 4 58	D		647WB9	5.4s	45+	84		14	292
09 03 13 0 57 11	r		1852cA2	6.0	95-	155		35	185
09 03 30 11 44 22	d		537SB6	3.7s	18+	49	50	52	107
09 03 30 12 23 26	d		541cB8	3.9	18+	50	48	59	117
09 03 30 13 0 52	D	Pleiade C	3.0	18+	50	44	64	130	
09 03 30 13 37 50	M	552SB7	2.9s	18+	50	40	69	148	
09 03 30 13 44 17	r	Pleiade C	3.0	18+	50	39	69	152	
09 04 08 23 14 31	d		1800 A0	5.5	99+	171		37	192
09 04 13 1 36 30	R		2298 K3	5.0	88-	139		21	177
09 05 01 22 43 56	D		1337 F0	5.7	51+	91		19	274
09 05 01 23 3 21	D		1336 A5	5.2	51+	91		15	277
09 05 31 20 17 56	D		1623 A0	5.4	58+	99		35	229
09 06 10 1 52 18	r		2771cK2	5.6	95-	155		21	193
09 06 16 1 35 31	R		3494 A7	4.5	48-	88		26	114
09 06 30 21 27 25	D		1931 K1	4.8s	64+	107		15	231
09 07 03 19 29 5	D		2287SB1	2.9e	89+	141	-6	20	167
09 07 03 19 59 7	r		2287SB1	2.9e	89+	141	-10	21	174
09 07 03 22 3 55	D		2298 K3	5.0	89+	141		18	203
09 07 10 2 19 19	R		3108 M2	5.3	94-	151		30	198
09 07 16 23 30 51	r		399SA0	5.7	33-	70		6	68
09 07 18 1 26 23	D	Pleiade C	3.0	22-	56	18		74	
09 07 18 1 33 26	D		552SB7	2.9s	22-	56		19	75
09 07 18 1 53 34	R		545 B6	4.1v	22-	56		23	78
09 07 18 2 5 33	d		560cB8	3.6s	22-	55		25	79
09 07 18 2 7 3	R	Pleiade C	3.0	22-	55			26	80
09 07 18 2 22 16	R		552SB7	2.9s	22-	55		28	82
09 07 18 3 4 5	R		560cB8	3.6s	21-	55	-7	36	89
09 07 18 3 7 32	R		561cB7	5.1v	21-	55	-7	36	89
09 08 30 19 21 38	d		2771cK2	5.6	80+	126		22	176
09 09 04 0 55 24	d		3278 B8	5.4	100+	172		30	220
09 09 05 19 52 41	R		3494 A7	4.5	99-	166		23	110
09 09 15 4 5 50	R		1259 A9	5.9	17-	48	-9	36	98
09 10 07 2 50 5	R	X 54005DA2	5.6	91-	145		59	233	
09 10 07 2 50 8	R		440SA2	4.7	91-	145		59	233
09 10 07 21 19 57	R		556cB8	5.4	85-	134		31	86
09 10 11 11 15 55	r		1110SF0	3.5	49-	89	40	14	287
09 10 13 1 8 35	R		1337 F0	5.7	31-	67		15	83
09 10 13 1 13 35	R		1336 A5	5.2	31-	67		16	84
09 10 21 15 25 27	D		2366dM1	1.1v	13+	42	8	16	205
09 10 21 16 29 50	R		2366dM1	1.1v	13+	42	-3	10	218
09 10 26 21 21 41	d		3064 A2	5.9	57+	99		13	233
09 10 28 17 38 27	d		3285cG6	5.9	75+	119		36	153
09 10 30 16 11 28	d		3512 K4	5.6	89+	142	-2	21	106
09 11 05 19 30 24	r		822SB9	5.8	88-	140		15	70
09 11 07 4 58 21	R		1050 K5	5.7	77-	123	-10	58	242
09 11 26 18 56 18	D		3482cF6	5.7	68+	111		49	192
09 11 30 18 2 1	D	X 54005DA2	5.6	97+	159		42	99	
09 11 30 18 2 2	D		440SA2	4.7	97+	159		42	99
09 12 01 19 56 46	d		598SG0	5.5s	100+	173		53	108
09 12 03 19 41 44	r		936cK0	5.8	97-	159		29	82
09 12 04 20 50 56	d		1110SF0	3.5	91-	144		28	85
09 12 04 21 51 4	R		1110SF0	3.5	90-	144		39	96
09 12 05 1 47 47	R		1129SF5	5.3	90-	142		68	183
09 12 07 6 1 24	R		1409cK0	5.0	70-	113	-5	46	235
09 12 09 3 42 24	R		1623 A0	5.4	48-	88		42	149
09 12 19 17 18 3	D		2963WK2	5.3	9+	35		10	232
09 12 29 2 48 5	d		556cB8	5.4	90+	142		12	291

Date	Times	P	Star	Sp	Mag	%	Elon	Sun	Moon
a m g h m s			No D		V	ill		Alt	Alt Az
09 01 07 16 17 7	D		536cB7	5.5	83+	132	-6	46	96
09 01 07 16 31 29	D		539SB6	4.3	83+	132	-9	49	99
09 01 07 16 41 16	M		537SB6	3.7s	83+	132	-10	51	101
09 01 07 16 47 25	D		541cB8	3.9	83+	132	-11	52	102
09 01 07 16 53 46	D		542 B8	5.8	83+	132		53	103
09 01 07 17 49 55	r		541cB8	3.9	84+	132		63	119
09 01 12 19 44 26	r		1375 K1	5.4	96-	156		21	88
09 01 14 22 51 11	R		1611DG9	5.6	80-	127		28	114
09 01 24 6 46 22	d		2750SB2	2.1	4-		5	12	141
09 01 24 7 7 6	R		2750SB2	2.1	4-		8	15	145
09 02 05 19 35 15	D		844SB9	5.8s	80+	128		76	185
09 02 06 20 15 10	D		1030WA3	3.1s	89+	142		74	165
09 02 06 20 45 48	r		1030WA3	3.1s	89+	142		74	191
09 02 17 2 46 24	R		2263cB1	4.6	47-	87		17	149
09 02 17 8 2 13	r		2287SB1	2.9e	46-	86	22	12	220
09 02 21 4 25 53	R		2834cA4	5.0	13-	43		6	129
09 03 03 23 7 6	d		647WB9	5.4s	45+	84		10	295
09 03 13 1 4 43	r		1852cA2	6.0	95-	155		37	191
09 03 30 11 47 12	d		537SB6	3.7s	18+	50	52	56	108
09 03 30 12 22 37	d		541cB8	3.9	18+	50	49	62	117
09 03 30 13 25 28	m	Pleiade C	3.0	18+	50	41	71	145	
09 04 08 23 22 46	d		1800 A0	5.5	99+	171		38	199
09 04 13 1 46 8	R		2298 K3	5.0	88-	139		24	183
09 04 29 15 19 44	M		1030WA3	3.1s	25+	61	27	74	188
09 05 01 22 48 4	d		1337 F0	5.7	50+	91		15	278
09 05 01 23 7 51	d		1336 A5	5.2	51+	91		11	281
09 05 10 20 15 47	R		2366dM1	1.1v	97-	160		4	130
09 05 31 20 26 2	D		1623 A0	5.4	58+	99		34	235
09 06 10 2 1 15	r		2771cK2	5.6	95-	155		22	199
09 06 16 1 32 5	R		3494 A7	4.5	48-	88		29	115
09 06 30 21 38 11	D		1931 K1	4.8s	64+	107		12	236
09 07 03 19 36 27	D		2287SB1	2.9e	89+	141	-11	23	172
09 07 03 20 4 43	r		2287SB1	2.9e	89+	141		23	179
09 07 03 22 9 8	D		2298 K3	5.0	89+	141		18	208
09 07 10 2 14 27	R		3108 M2	5.3	94-	151		32	201
09 07 16 23 20 44	r		399SA0	5.7	33-	70		6	68
09 07 18 0 56 45	M		537SB6	3.7s	22-	56		15	71
09 07 18 1 19 36	D	Pleiade C	3.0	22-	56		19	74	
09 07 18 1 27 50	D		552SB7	2.9s	22-	56		20	75
09 07 18 1 50 48	R		545 B6	4.1v	22-	56		25	79
09 07 18 2 3 6	d		560cB8	3.6s	22-	55		26	80
09 07 18 2 7 9	R	Pleiade C	3.0	22-	55			28	81
09 07 18 2 21 21	R		552SB7	2.9s	22-	55		30	83
09 07 18 3 0 39	R		560cB8	3.6s	21-	55	-7	37	89
09 07 18 3 5 40	R		561cB7	5.1v	21-	55	-7	38	89
09 08 30 19 27 37	d		2771cK2	5.6	80+	126		25	181
09 09 04 1 5 24	d		3278 B8	5.4	100+	172		29	227
09 09 05 19 49 2	R		3494 A7	4.5	99-	166		25	111
09 10 07 2 46 36	R	X 54005DA2	5.6	91-	145		59	240	
09 10 07 2 46 41	R		440SA2	4.7	91-	145		59	240
09 10 07 21 40 2	d		560cB8	3.6s	85-	134		38	89
09 10 07 21 54 42	R		560cB8	3.6s	85-	134		40	91
09 10 13 1 10 12	R		1336 A5	5.2	31-	67		18	85
09 10 13 1 11 17	R		1337 F0	5.7	31-	67		18	85
09 10 21 15 37 3	D		2366dM1	1.1v	13+	42	5	16	210
09 10 21 16 32 50	R		2366dM1	1.1v	13+	42	-5	10	222
09 10 26 21 24 38	d		3064 A2	5.9	57+	99		12	236
09 10 28 17 38 25	D								

Date	Times	P	Star	Sp	Mag	%	Elon	Sun	Moon	Date	Times	P	Star	Sp	Mag	%	Elon	Sun	Moon
a m g h m s			No D		V	ill		Alt	Alt Az	a m g h m s			No D		V	ill		Alt	Alt Az
09 01 12 19 43 35	r		1375 K1		5.4	96-	156		19 86	09 01 24 7 4 25	r		2750SB2		2.1	4-	22	0 7 139	
09 01 14 22 48 26	r		1611DG9		5.6	80-	127		25 111	09 02 05 19 28 34	D		844SB9		5.8S	81+	128	71 156	
09 01 24 6 44 3	d		2750SB2		2.1	4-	22	2	9 139	09 02 06 19 46 39	D		1030WA3		3.1s	89+	142	64 134	
09 01 24 7 3 23	r		2750SB2		2.1	4-	22	5	12 142	09 02 06 20 40 8	r		1030WA3		3.1s	89+	142	69 163	
09 02 05 19 30 28	D		844SB9		5.8S	80+	128		75 169	09 02 07 4 0 34	d		1070 G5		5.2v	91+	146	11 294	
09 02 06 20 4 1	D		1030WA3		3.1s	89+	142		71 149	09 02 13 5 39 12	r		1800 A0		5.5	84-	133	-10 21 231	
09 02 06 20 42 1	r		1030WA3		3.1s	89+	142		73 177	09 02 17 2 39 55	R		2263cB1		4.6	47-	87	9 141	
09 02 13 5 50 21	r		1800 A0		5.5	84-	133	-4	18 238	09 02 17 5 44 59	R		2276 A3		5.6	47-	86	-8 19 182	
09 02 17 2 43 4	R		2263cB1		4.6	47-	87		14 146	09 02 17 7 34 29	r		2287SB1		2.9e	46-	86	10 14 207	
09 02 17 5 55 39	r		2276 A3		5.6	47-	86	-2	21 189	09 03 03 23 2 42	D		647WB9		5.4s	45+	84	18 288	
09 02 17 7 52 13	r		2287SB1		2.9e	46-	86	18	14 215	09 03 13 0 49 31	r		1852cA2		6.0	95-	155	33 177	
09 02 21 4 24 39	R		2834cA4		5.0	13-	43		3 127	09 03 30 11 41 57	d		537SB6		3.7s	18+	49	49 48 104	
09 03 03 23 6 5	D		647WB9		5.4s	45+	84		13 293	09 03 30 12 24 18	d		541cB8		3.9	18+	50	47 55 114	
09 03 13 0 58 50	r		1852cA2		6.0	95-	155		36 185	09 03 30 12 48 53	D	Pleiade C		3.0	18+	50	46 59 122		
09 03 30 11 43 11	d		537SB6		3.7s	18+	49	52	52 105	09 03 30 13 10 44	D		552SB7		2.9s	18+	50	44 62 129	
09 03 30 12 21 5	d		541cB8		3.9	18+	50	49	59 114	09 03 30 13 46 52	r	Pleiade C		3.0	18+	50	40 66 146		
09 03 30 13 3 30	D	Pleiade C			3.0	18+	50	45	65 129	09 03 30 13 54 24	r		552SB7		2.9s	18+	50	39 67 149	
09 03 30 13 38 37	r	Pleiade C			3.0	18+	50	40	70 147	09 04 08 23 5 41	d		1800 A0		5.5	99+	171	35 183	
09 04 08 23 15 57	d		1800 A0		5.5	99+	171		38 193	09 04 13 1 29 17	R		2298 K3		5.0	88-	139	19 171	
09 04 13 1 39 19	R		2298 K3		5.0	88-	139		22 178	09 05 01 22 39 56	D		1337 F0		5.7	51+	91	23 270	
09 05 01 22 45 53	d		1337 F0		5.7	50+	91		18 275	09 05 01 23 1 22	D		1336 A5		5.2	51+	91	19 273	
09 05 01 23 6 52	d		1336 A5		5.2	51+	91		14 278	09 05 31 20 9 17	D		1623 A0		5.4	58+	99	-9 37 220	
09 05 10 20 15 2	r		2366dM1		1.1v	97-	160		1 127	09 06 10 1 40 28	r		2771cK2		5.6	95-	155	20 185	
09 05 31 20 20 5	D		1623 A0		5.4	58+	99		36 230	09 06 16 1 36 54	R		3494 A7		4.5	48-	88	23 111	
09 06 10 1 53 14	r		2771cK2		5.6	95-	155		22 193	09 06 30 21 17 31	D		1931 K1		4.8s	64+	107	17 225	
09 06 16 1 33 1	R		3494 A7		4.5	48-	88		26 113	09 07 03 19 25 55	d		2287SB1		2.9e	89+	141	-2 17 162	
09 06 30 21 30 45	D		1931 K1		4.8s	64+	107		15 232	09 07 03 19 47 2	r		2287SB1		2.9e	89+	141	-5 18 167	
09 07 03 19 33 9	D		2287SB1		2.9e	89+	141	-8	21 168	09 07 03 21 56 16	D		2298 K3		5.0	89+	142	17 197	
09 07 03 19 55 39	r		2287SB1		2.9e	89+	141	-11	22 174	09 07 10 2 18 45	R		3108 M2		5.3	94-	151	29 193	
09 07 03 22 3 40	D		2298 K3		5.0	89+	141		19 203	09 07 16 23 38 38	r		399SA0		5.7	33-	70	5 67	
09 07 10 2 17 15	R		3108 M2		5.3	94-	151		31 198	09 07 18 1 34 15	D	Pleiade C		3.0	22-	56	17 73		
09 07 16 23 27 52	r		399SA0		5.7	33-	70		5 68	09 07 18 1 39 28	D		552SB7		2.9s	22-	56	18 73	
09 07 18 1 23 49	D	Pleiade C			3.0	22-	56		18 73	09 07 18 1 55 9	R		545 B6		4.1v	22-	56	21 76	
09 07 18 1 31 9	D		552SB7		2.9s	22-	56		19 74	09 07 18 2 4 40	R	Pleiade C		3.0	22-	56	22 78		
09 07 18 1 52 2	R		545 B6		4.1v	22-	56		23 77	09 07 18 2 8 9	d		560cB8		3.6s	22-	55	22 78	
09 07 18 2 3 52	d		560cB8		3.6s	22-	55		24 79	09 07 18 2 21 27	R		552SB7		2.9s	22-	55	25 80	
09 07 18 2 6 11	R	Pleiade C			3.0	22-	55		25 79	09 07 18 3 5 36	R		560cB8		3.6s	21-	55	-9 32 87	
09 07 18 2 21 3	R		552SB7		2.9s	22-	55		28 82	09 07 18 3 7 28	R		561cB7		5.1v	21-	55	-8 33 87	
09 07 18 3 1 59	R		560cB8		3.6s	21-	55	-8	35 88	09 08 14 11 28 39	r		537SB6		3.7s	43-	82	59 19 285	
09 07 18 3 5 47	R		561cB7		5.1v	21-	55	-8	36 88	09 08 14 12 18 24	r	Pleiade C		3.0	43-	82	58 11 293		
09 08 30 19 21 6	d		2771cK2		5.6	80+	126		23 176	09 08 14 12 30 29	r		552SB7		2.9s	43-	81	57 9 295	
09 09 04 0 56 51	d		3278 B8		5.4	100+	172		31 221	09 08 30 19 13 47	d		2771cK2		5.6	80+	126	-12 20 170	
09 09 05 19 50 9	R		3494 A7		4.5	99-	166		23 109	09 09 04 0 46 12	d		3278 B8		5.4	100+	172	32 212	
09 09 15 3 53 22	m		1259 A9		5.9	17-	49	-11	34 95	09 09 05 19 54 32	R		3494 A7		4.5	99-	166	19 107	
09 10 07 2 46 47	R X	54005DA2			5.6	91-	145		61 234	09 09 10 22 22 29	r		598SG0		5.5s	62-	104	18 74	
09 10 07 2 46 50	R		440SA2		4.7	91-	145		61 234	09 09 15 4 11 43	R		1259 A9		5.9	17-	48	-11 33 97	
09 10 07 21 15 25	R		556cB8		5.4	85-	134		30 85	09 10 07 2 47 6	R X	54005DA2		5.6	91-	145	61 222		
09 10 13 1 9 13	R		1337 F0		5.7	31-	67		15 83	09 10 07 2 47 8	R		440SA2		4.7	91-	145	61 222	
09 10 13 1 11 48	R		1336 A5		5.2	31-	67		16 83	09 10 07 21 28 28	R		556cB8		5.4	85-	134	30 85	
09 10 21 15 27 32	D		2366dM1		1.1v	13+	42	8	17 205	09 10 11 11 13 10	r		1110SF0		3.5	49-	89	38 18 283	
09 10 21 16 30 9	R		2366dM1		1.1v	13+	42	-3	11 218	09 10 13 1 4 12	R		1337 F0		5.7	31-	67	12 80	
09 10 26 21 21 57	d		3064 A2		5.9	57+	99		14 233	09 10 13 1 15 25	R		1336 A5		5.2	31-	67	13 82	
09 10 28 17 36 17	d		3285cG6		5.9	75+	119		37 152	09 10 21 15 13 37	D		2366dM1		1.1v	13+	42	12 17 198	
09 10 30 16 15 29	m		3512 K4		5.6	89+	142	-2	22 107	09 10 21 16 23 53	r		2366dM1		1.1v	13+	42	1 11 213	
09 11 05 19 28 50	r		822SB9		5.8	88-	140		15 69	09 10 26 21 19 11	d		3064 A2		5.9	57+	99	15 228	
09 11 07 5 0 40	R		1050 K5		5.7	77-	123	-10	58 245	09 10 28 17 37 26	d		3285cG6		5.9	75+	120	33 148	
09 11 26 18 53 57	D		3482cF6		5.7	68+	111		50 192	09 11 05 19 33 37	r		822SB9		5.8	88-	140	13 68	
09 11 30 17 59 21	D X	54005DA2			5.6	97+	159		41 98	09 11 07 4 49 25	R		1050 K5		5.7	77-	123	61 230	
09 11 30 17 59 23	D		440SA2		4.7	97+	159		41 98	09 11 26 18 58 35	D		3482cF6		5.7	68+	111	47 186	
09 12 01 19 56 40	d		598SG0		5.5s	100+	173		53 106	09 11 30 18 6 5	D X	54005DA2		5.6	97+	159	39 98		
09 12 03 19 38 33	r		936cK0		5.8	97-	159		28 81	09 11 30 18 6 7	D		440SA2		4.7	97+	159	39 98	
09 12 04 20 50 30	d		1110SF0		3.5	91-	144		28 85	09 12 01 19 51 23	d		598SG0		5.5s	100+	173	48 104	
09 12 04 21 49 10	R		1110SF0		3.5	90-	144												

Occultations for TORINO

Date	Times	P	Star	Sp	Mag	%	Elon	Sun	Moon
a m g h m s			No D		V	ill		Alt	Alt Az
09 01 07 16 15 41	d		536cB7		5.5	83+	132	-2	40 94
09 01 07 16 18 50	D		537SB6		3.7s	83+	132	-3	40 95
09 01 07 16 35 24	D		539SB6		4.3	83+	132	-6	43 98
09 01 07 16 43 44	D		541cB8		3.9	83+	132	-7	44 99
09 01 07 16 58 0	D		542 B8		5.8	83+	132	-9	47 102
09 01 07 17 5 56	r		537SB6		3.7s	83+	132	-10	48 105
09 01 07 17 50 24	r		541cB8		3.9	84+	132		56 115
09 01 12 19 42 45	r		1375 K1		5.4	96-	156		15 84
09 01 14 22 44 31	r		1611DG9		5.6	80-	127		20 108
09 01 24 6 40 4	d		2750SB2		2.1	4-	22	-4	4 134

Date Times P Star Sp Mag % Elon Sun Moon													Date Times P Star Sp Mag % Elon Sun Moon												
a	m	g	h	m	s		No	D		V	ill		a	m	g	h	m	s		No	D		V	ill	
09	02	17	7	43	10	r	2287	SB1	2.9e	46-	86	14 12 212	09	09	04	0	53	9	d	3278	B8	5.4	100+	172	29 219
09	03	03	23	2	51	D	647	WB9	5.4s	45+	84	15 291	09	09	05	19	57	35	R	3494	A7	4.5	99-	166	23 112
09	03	13	0	53	54	r	1852	cA2	6.0	95-	155	33 183	09	09	10	22	17	41	R	598	SG0	5.5s	62-	104	21 76
09	03	30	11	47	14	d	537	SB6	3.7s	18+	49	48 52 110	09	09	15	4	15	59	R	1259	A9	5.9	17-	48	-7 37 102
09	03	30	12	28	32	d	541	cB8	3.9	18+	50	46 58 122	09	10	07	2	54	34	R X	54005	DA2	5.6	91-	145	57 232
09	03	30	12	58	13	D	Pleiade	C	3.0	18+	50	43 62 133	09	10	07	2	54	36	R	440	SA2	4.7	91-	145	57 232
09	03	30	13	22	13	D	552	SB7	2.9s	18+	50	40 65 143	09	10	07	21	27	32	R	556	cB8	5.4	85-	134	33 89
09	03	30	13	52	40	r	Pleiade	C	3.0	18+	50	36 68 159	09	10	11	11	13	6	r	1110	SF0	3.5	49-	89	37 15 286
09	03	30	13	58	51	r	552	SB7	2.9s	18+	50	35 68 163	09	10	13	1	6	29	R	1337	F0	5.7	31-	67	15 83
09	04	08	23	11	59	d	1800	A0	5.5	99+	171	35 191	09	10	13	1	16	42	R	1336	A5	5.2	31-	67	17 85
09	04	13	1	29	56	R	2298	K3	5.0	88-	139	19 175	09	10	21	15	21	59	D	2366	dM1	1.1v	13+	41	8 15 204
09	05	01	22	40	12	D	1337	F0	5.7	51+	91	19 273	09	10	21	16	28	39	R	2366	dM1	1.1v	13+	42	-3 9 218
09	05	01	22	57	10	D	1336	A5	5.2	51+	91	16 276	09	10	26	21	21	23	d	3064	A2	5.9	57+	99	12 232
09	05	31	20	13	50	D	1623	A0	5.4	58+	99	-12 34 226	09	10	28	17	42	48	d	3285	cG6	5.9	75+	119	34 155
09	06	10	1	50	44	r	2771	cK2	5.6	95-	155	19 192	09	10	30	16	10	24	d	3512	K4	5.6	89+	142	-2 20 107
09	06	16	1	40	26	R	3494	A7	4.5	48-	88	26 116	09	11	05	19	33	32	r	822	SB9	5.8	88-	140	16 71
09	06	30	21	21	28	D	1931	K1	4.8s	64+	107	14 229	09	11	07	4	53	31	R	1050	K5	5.7	77-	123	-12 58 237
09	07	03	19	24	24	D	2287	SB1	2.9e	89+	141	-4 17 166	09	11	26	19	1	24	D	3482	cF6	5.7	68+	111	46 193
09	07	03	20	3	44	r	2287	SB1	2.9e	89+	141	-9 18 176	09	11	30	18	7	30	D X	54005	DA2	5.6	97+	159	42 102
09	07	03	22	4	32	D	2298	K3	5.0	89+	142	15 203	09	11	30	18	7	32	D	440	SA2	4.7	97+	159	42 102
09	07	10	2	22	42	R	3108	M2	5.3	94-	151	-10 28 199	09	12	01	19	57	48	d	598	SG0	5.5s	100+	173	52 111
09	07	16	23	36	6	r	399	SA0	5.7	33-	70	8 69	09	12	03	19	47	26	r	936	cK0	5.8	97-	159	30 85
09	07	18	1	31	41	D	Pleiade	C	3.0	22-	56	20 75	09	12	04	20	52	23	d	1110	SF0	3.5	91-	144	29 87
09	07	18	1	38	5	D	552	SB7	2.9s	22-	56	21 76	09	12	04	21	54	27	R	1110	SF0	3.5	90-	144	39 98
09	07	18	1	56	36	R	545	B6	4.1v	22-	56	24 80	09	12	05	1	50	45	R	1129	SF5	5.3	90-	142	66 184
09	07	18	2	8	37	R	Pleiade	C	3.0	22-	55	26 81	09	12	07	5	56	19	R	1409	cK0	5.0	70-	113	-7 45 232
09	07	18	2	9	4	d	560	cB8	3.6s	22-	55	26 81	09	12	19	17	14	1	D	2963	WK2	5.3	9+	35	9 231
09	07	18	2	24	37	R	552	SB7	2.9s	22-	55	-11 29 84	09	12	29	2	41	38	d	556	cB8	5.4	90+	142	14 289
09	07	18	3	8	7	R	560	cB8	3.6s	21-	55	-5 36 91													
09	07	18	3	10	50	R	561	cB7	5.1v	21-	55	-5 37 92													
09	08	14	11	27	37	r	537	SB6	3.7s	43-	82	59 16 288													
09	08	30	19	22	45	d	2771	cK2	5.6	80+	126	20 176													

date in the format year/month/day, times in T.U.

P : type of phenomenon

D = desapparing
R = reappearing
G = radent

d = desapparing, visibile with difficulty
r = reappearing, visibile with difficulty
g = radent, visibile with difficulty
m = missing

Stella : nnnn = ZC catalogue no.

nnnnn or nnnnnn = SAO catalogue number

Xnnnnn = XZ80 catalogue no.

Pppnnnnn = Hubble catalogue

D : double star (XZ catalogue)

Sp : spectral type

Mag : magnitude

V : variable star : eclipse (e), variable (v), suspect (s)

% : percentage of Moon illumination

Elon : elongation of the Moon, in degrees

Sun alt : height of the Sun, in degrees

Moon alt : height of the Moon, in degrees

Moon az : azimuth of the Moon, in degrees

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MULTIPLE CONJUNCTIONS PLANETS-MOON-STARS

(events with 1 or more planets, the Moon and a star with
mag<2 within 5°)

Geocentric

Date	TT	Dmed (°)	Dmax	emin	m2d	mmax					
2009/09/16	20:16:25	4.061	4.504	-29	-3.8	1.3	Alpha	LEO	Regulus	Venus	Moon

Topocentric 42°N - 12°E

Date	UT	Dmed (°)	Dmax	emin	m2d	mmax
------	----	----------	------	------	-----	------

date in the format year/month/day

Dmed = middle distance between the centers of the bodies, in degrees

Dmax = diameter of the group, in degrees

emin = least elongation, in degrees

m2d = magnitude of the 2nd brightest planet

mmax = least magnitude

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MULTIPLE CONJUNCTIONS LEAST GEOCENTRIC GROUPINGS PLANETS - MOON - STARS

(events with 1 or more planets, the Moon and a star with
mag<2 within 5°)

DATE	TIMES	BODIES				D12	D13	D23	GROUP	EL.	MAG1	MAG2	MAG3	MAGT
16 Sep 2009	18:00	VENUS	MOON	α	LEO	3.2	4.6	4.5	4.9	28	-3.9	-6.6	1.3	-6.7
16 Sep 2009	19:00	VENUS	MOON	α	LEO	3.5	4.5	4.1	4.8	28	-3.9	-6.6	1.3	-6.7
16 Sep 2009	20:00	VENUS	MOON	α	LEO	3.8	4.5	3.7	4.7	28	-3.9	-6.5	1.3	-6.6
16 Sep 2009	21:00	VENUS	MOON	α	LEO	4.2	4.4	3.4	4.8	27	-3.9	-6.5	1.3	-6.6
16 Sep 2009	22:00	VENUS	MOON	α	LEO	4.6	4.4	3.2	4.9	27	-3.9	-6.4	1.3	-6.5

MULTIPLE CONJUNCTIONS LEAST TOPOCENTRIC GROUPINGS PLANETS - MOON - STARS

(events with 1 or more planets, the Moon and a star with
mag<2 within 5°)
42°N - 12°E

GEOC. CONJUNCTIONS <5° MOON-OBJECTS m<4

Date	TT	Dm (°)	Dl	p (°)	e	m1	m*	tm(s)		
2009/01/07	18:17:21	0.82927	1.27743	169	132		1.6	2452		M45
2009/01/12	05:14:38	1.37850	1.28970	20	-165		3.7		NGC2632	M44
2009/02/04	02:20:24	0.86298	1.25486	169	105		1.6	2387		M45
2009/02/08	16:24:30	1.37629	1.28410	20	167		3.7		NGC2632	M44
2009/03/03	08:04:27	0.76339	1.24400	169	77		1.6	2617		M45
2009/03/08	01:27:09	1.42469	1.26640	20	140		3.7		NGC2632	M44
2009/03/30	13:40:29	0.58145	1.25064	169	50	-9.8	1.6	2910		M45
2009/04/04	07:51:27	1.59495	1.25237	20	113		3.7		NGC2632	M44
2009/04/26	21:06:17	0.43274	1.26627	170	24	-8.2	1.6	3043		M45
2009/05/01	13:10:04	1.84569	1.25372	20	86		3.7		NGC2632	M44
2009/05/24	06:38:01	0.39603	1.27723	170	-6	-5.1	1.6	3051		M45
2009/05/28	19:36:27	2.07207	1.26958	20	60		3.7		NGC2632	M44
2009/06/20	17:05:00	0.45323	1.27477	170	-30	-8.7	1.6	3013		M45
2009/06/25	04:18:43	2.19334	1.28875	20	33	-9.0	3.7		NGC2632	M44
2009/07/18	02:46:58	0.50959	1.25955	170	-56		1.6	2993		M45
2009/07/22	14:46:06	2.21325	1.29855	20	7	-5.7	3.7		NGC2632	M44
2009/08/14	10:31:25	0.47062	1.24060	170	-82		1.6	3079		M45
2009/08/19	01:23:21	2.21667	1.29277	20	-19	-7.8	3.7		NGC2632	M44
2009/09/10	16:22:20	0.31515	1.22970	170	-108		1.6	3241		M45
2009/09/15	10:26:58	2.30411	1.27542	20	-46	-9.6	3.7		NGC2632	M44
2009/10/07	21:51:25	0.11351	1.23322	170	-135		1.6	3317		M45
2009/10/12	17:08:20	2.51033	1.25917	20	-72		3.7		NGC2632	M44
2009/11/04	04:57:07	0.02273	1.24662	350	-161		1.6	3285		M45
2009/11/08	22:27:17	2.77096	1.25751	20	-100		3.7		NGC2632	M44
2009/12/01	14:27:51	0.03301	1.25698	351	170		1.6	3258		M45
2009/12/06	04:49:14	2.96980	1.27340	20	-127		3.7		NGC2632	M44
2009/12/29	01:18:08	0.02636	1.25314	171	142		1.6	3280		M45

date in the format year/month/day

Dm = least distance between the centers of the bodies

Dl = parameter limit, if Dm < Dl there is an occultation between the bodies

P = angle of position between the bodies, in degrees

e = elongation, in degree

m1 = magnitude of the Moon

m* = magnitude of the object

tm = if present, the object is occulted maximum for x seconds

GEOCENTRIC OCCULTATIONS MOON-OBJECTS $m < 4$

Date	TT	Dm (°)	Dl	p (°)	e	m1	m*	tm(s)	
2009/01/07	18:17:21	0.82927	1.27743	169	132		1.6	2452	M45
2009/02/04	02:20:24	0.86298	1.25486	169	105		1.6	2387	M45
2009/03/03	08:04:27	0.76339	1.24400	169	77		1.6	2617	M45
2009/03/30	13:40:29	0.58145	1.25064	169	50	-9.8	1.6	2910	M45
2009/04/26	21:06:17	0.43274	1.26627	170	24	-8.2	1.6	3043	M45
2009/05/24	06:38:01	0.39603	1.27723	170	-6	-5.1	1.6	3051	M45
2009/06/20	17:05:00	0.45323	1.27477	170	-30	-8.7	1.6	3013	M45
2009/07/18	02:46:58	0.50959	1.25955	170	-56		1.6	2993	M45
2009/08/14	10:31:25	0.47062	1.24060	170	-82		1.6	3079	M45
2009/09/10	16:22:20	0.31515	1.22970	170	-108		1.6	3241	M45
2009/10/07	21:51:25	0.11351	1.23322	170	-135		1.6	3317	M45
2009/11/04	04:57:07	0.02273	1.24662	350	-161		1.6	3285	M45
2009/12/01	14:27:51	0.03301	1.25698	351	170		1.6	3258	M45
2009/12/29	01:18:08	0.02636	1.25314	171	142		1.6	3280	M45

date in the format year/month/day

Dm = least distance between the centers of the bodies

Dl = parameter limit, if $Dm < Dl$ there is an occultation between the bodies

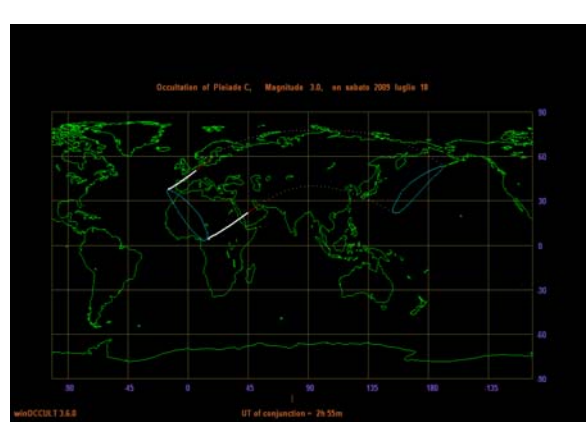
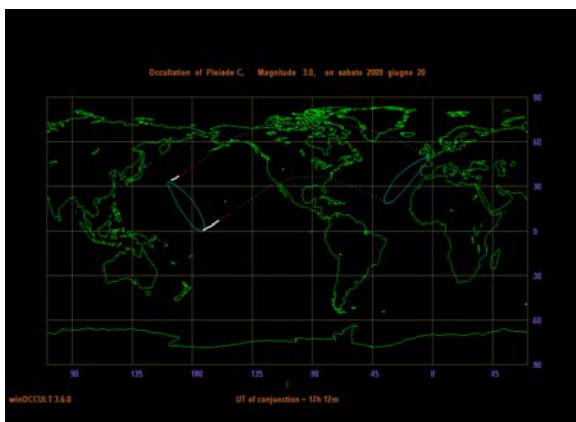
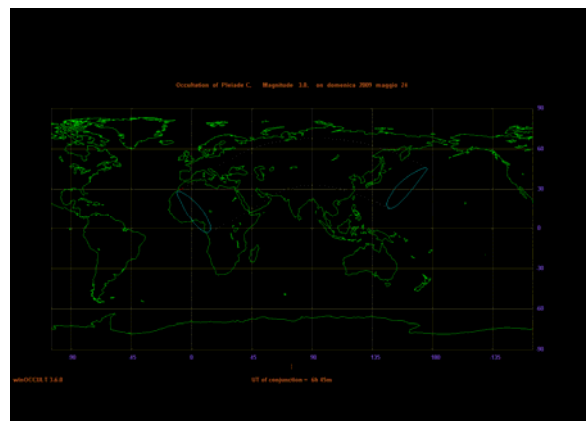
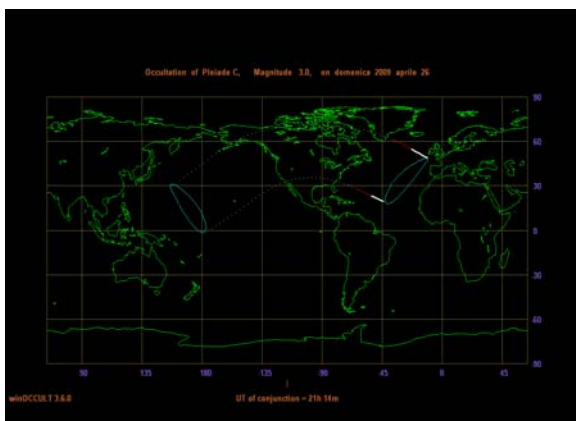
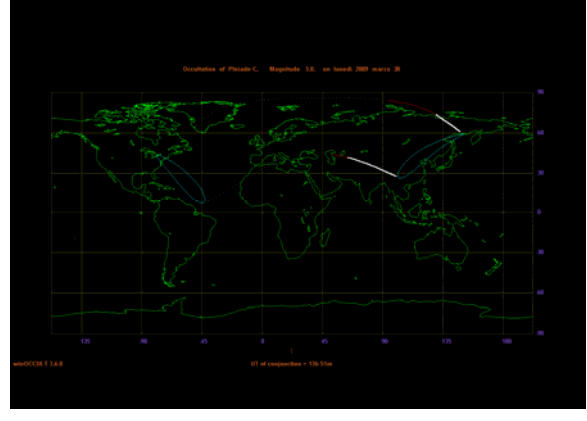
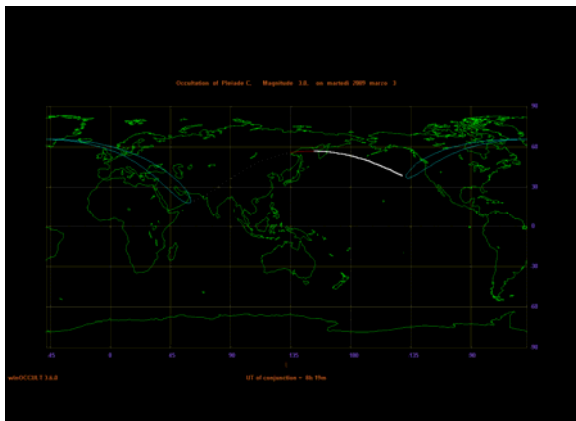
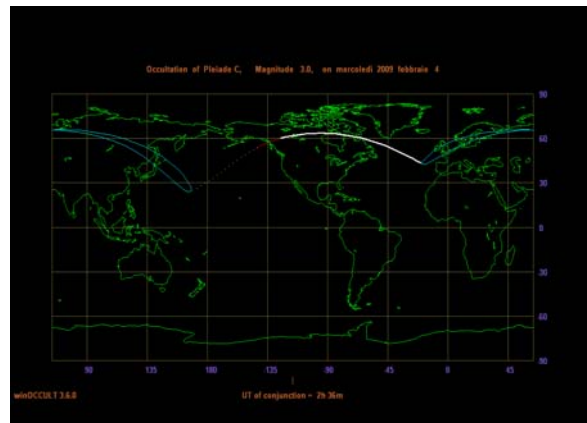
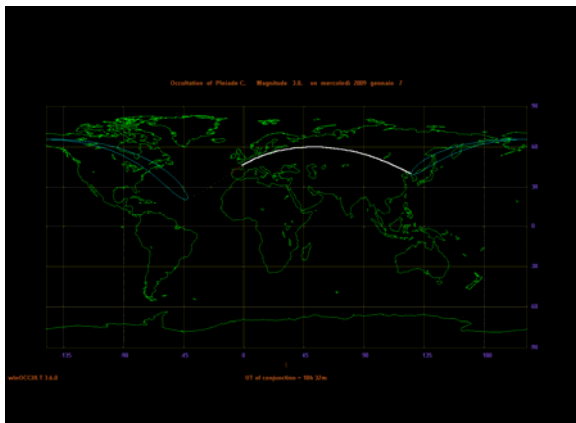
P = angle of position between the bodies, in degrees

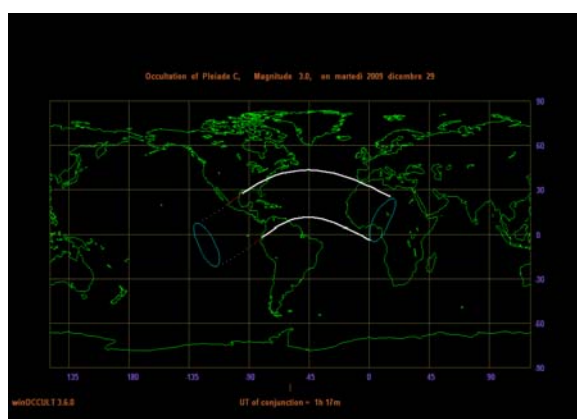
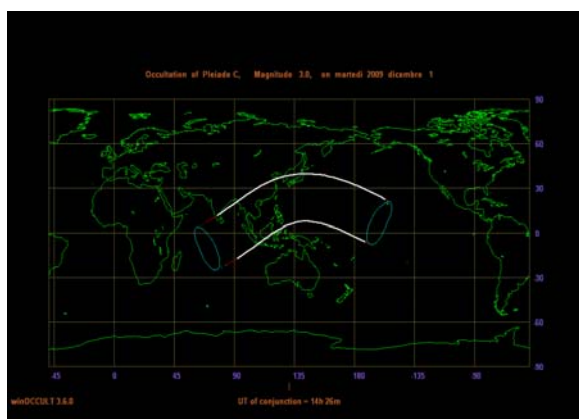
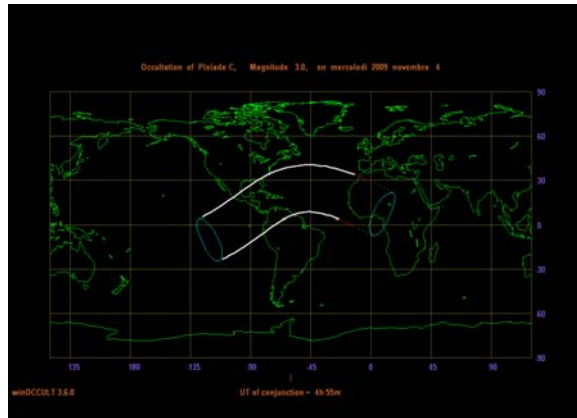
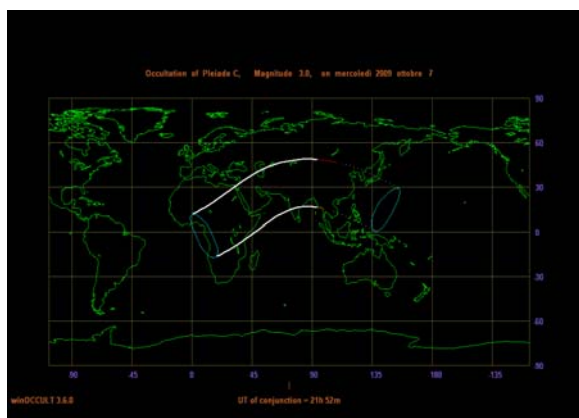
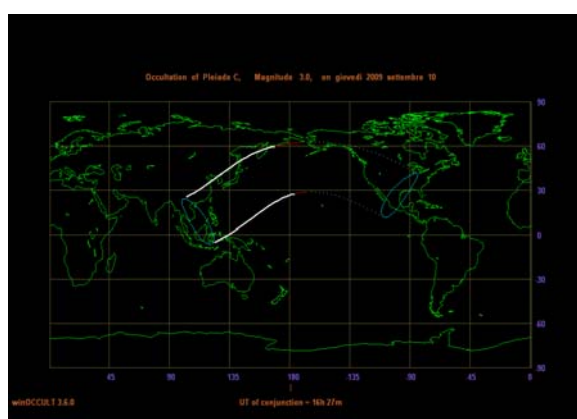
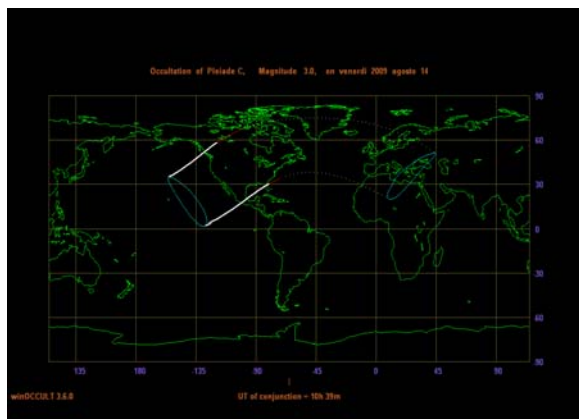
e = elongation, in degree

m1 = magnitude of the Moon

m* = magnitude of the object

tm = if present, the object is occulted maximum for x seconds





TOPOC. CONJUNCTIONS <5° MOON-OBJECTS m<4

42°N - 12°E

Date	UT	Dm (°)	Alt.	p (°)	e	m1	m*	tm(s)		
2009/01/07	17:36:38	0.41615	57.55	160	132		1.6			M45
2009/01/12	05:37:12	2.20553	19.94	27	-165		3.7		NGC2632	M44
2009/02/04	03:23:25	0.13372	-14.29	175	105		1.6	2638		M45
2009/02/08	15:15:49	1.82183	-1.81	13	167		3.7		NGC2632	M44
2009/03/03	07:24:32	0.11718	-10.76	347	77		1.6	2663		M45
2009/03/08	01:46:56	2.22308	22.52	27	139		3.7		NGC2632	M44
2009/03/30	13:20:50	0.24404	67.68	162	50 -9.8		1.6	4575		M45
2009/04/04	07:33:32	2.36316	-29.81	14	113		3.7		NGC2632	M44
2009/04/26	22:02:54	0.30896	-14.87	355	23 -8.2		1.6			M45
2009/05/01	11:57:06	2.15625	20.08	15	86		3.7		NGC2632	M44
2009/05/24	05:39:44	0.27540	24.27	342	-5 -4.9		1.6	3242		M45
2009/05/28	19:40:42	2.83341	30.10	28	59		3.7		NGC2632	M44
2009/06/20	18:05:45	0.27111	-12.40	356	-30 -8.7		1.6			M45
2009/06/25	03:44:45	2.85837	-23.80	14	34 -9.0		3.7		NGC2632	M44
2009/07/18	01:45:16	0.17293	21.04	342	-56		1.6	3272		M45
2009/07/22	14:27:29	2.86980	47.59	30	7 -5.6		3.7		NGC2632	M44
2009/08/14	11:55:26	0.02462	11.00	358	-82		1.6	3243		M45
2009/08/19	00:42:30	2.83534	-19.93	13	-19 -7.8		3.7		NGC2632	M44
2009/09/10	16:22:06	0.56711	-23.72	352	-108		1.6			M45
2009/09/15	09:50:21	2.86746	57.25	30	-46 -9.7		3.7		NGC2632	M44
2009/10/07	20:55:28	0.51644	26.71	342	-135		1.6			M45
2009/10/12	17:19:19	3.37104	-29.47	16	-72		3.7		NGC2632	M44
2009/11/04	06:13:18	0.50527	14.14	358	-162		1.6			M45
2009/11/08	21:30:57	3.20456	1.65	13	-99		3.7		NGC2632	M44
2009/12/01	13:46:42	0.90025	-8.91	347	170		1.6			M45
2009/12/06	03:53:58	3.50328	60.89	30	-128		3.7		NGC2632	M44
2009/12/29	02:34:32	0.45991	14.61	358	142		1.6			M45

date in the format year/month/day

Dm = least distance between the centers of the bodies

Alt = height in degrees on the horizon of the event in the central moment

P = angle of position between the bodies, in degrees

e = elongation, in degree

m1 = magnitude of the Moon

m* = magnitude of the object

tm = if present, the object is occulted maximum for x seconds

TOPOCENTRIC OCCULTATIONS MOON-OBJECTS $m < 2$

42°N - 12°E

Date	UT	Dm (°)	Alt	p (°)	e	m1	m*	tm(s)	
2009/02/04	03:23:25	0.13372	-14.29	175	105		1.6	2638	M45
2009/03/03	07:24:32	0.11718	-10.76	347	77		1.6	2663	M45
2009/03/30	13:20:50	0.24404	67.68	162	50	-9.8	1.6	4575	M45
2009/05/24	05:39:44	0.27540	24.27	342	-5	-4.9	1.6	3242	M45
2009/07/18	01:45:16	0.17293	21.04	342	-56		1.6	3272	M45
2009/08/14	11:55:26	0.02462	11.00	358	-82		1.6	3243	M45

date in the format year/month/day

Dm = least distance between the centers of the bodies

Alt = height in degrees on the horizon of the event in the central moment

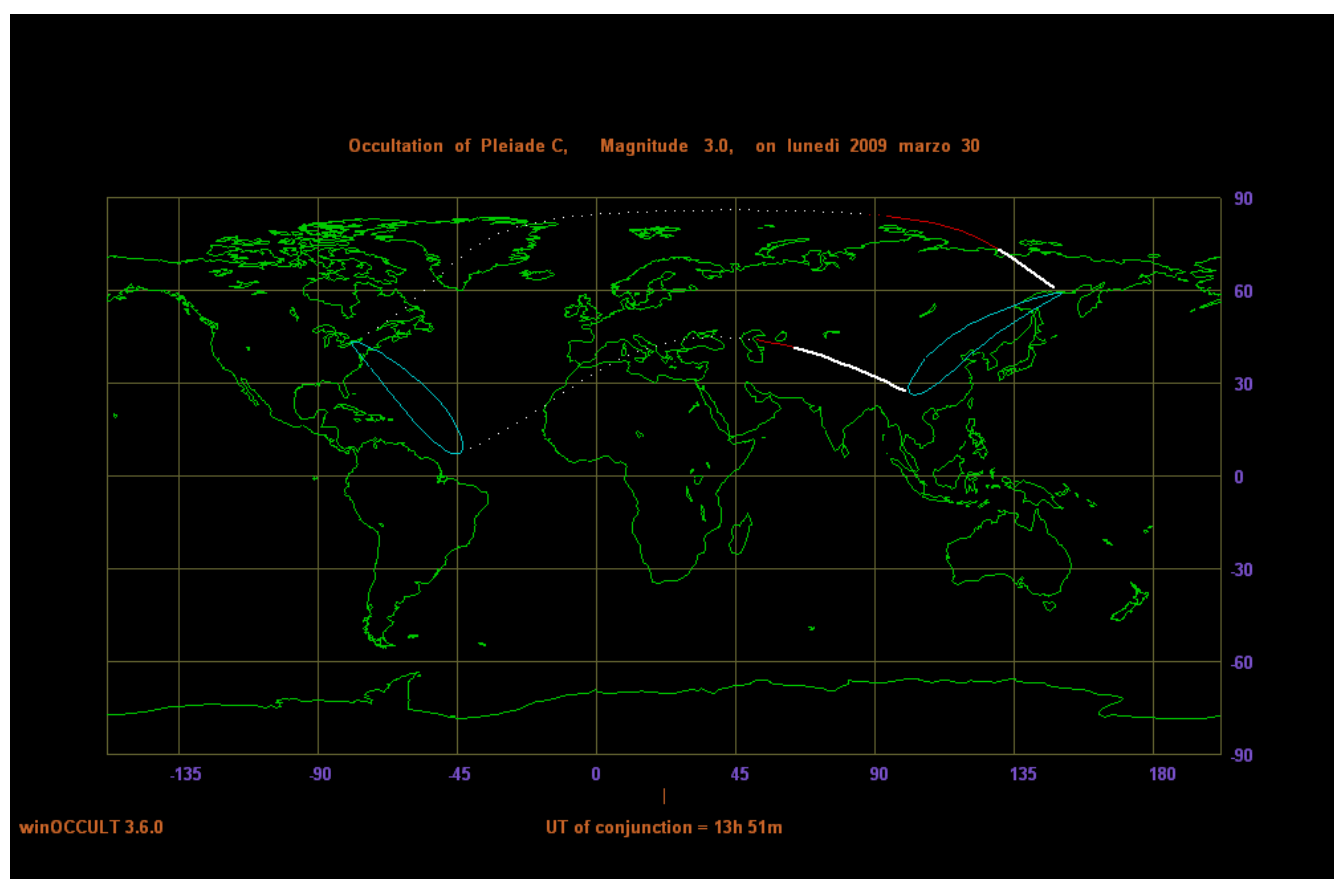
P = angle of position between the bodies, in degrees

e = elongation, in degree

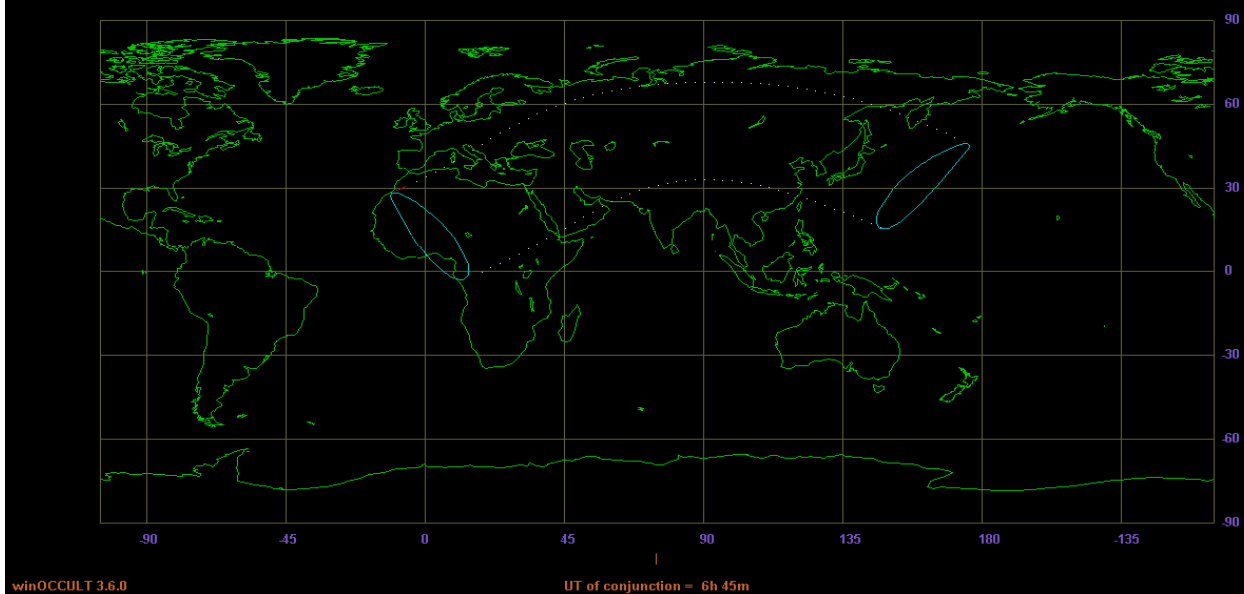
m1 = magnitude of the Moon

m* = magnitude of the object

tm = if present, the object is occulted maximum for x seconds

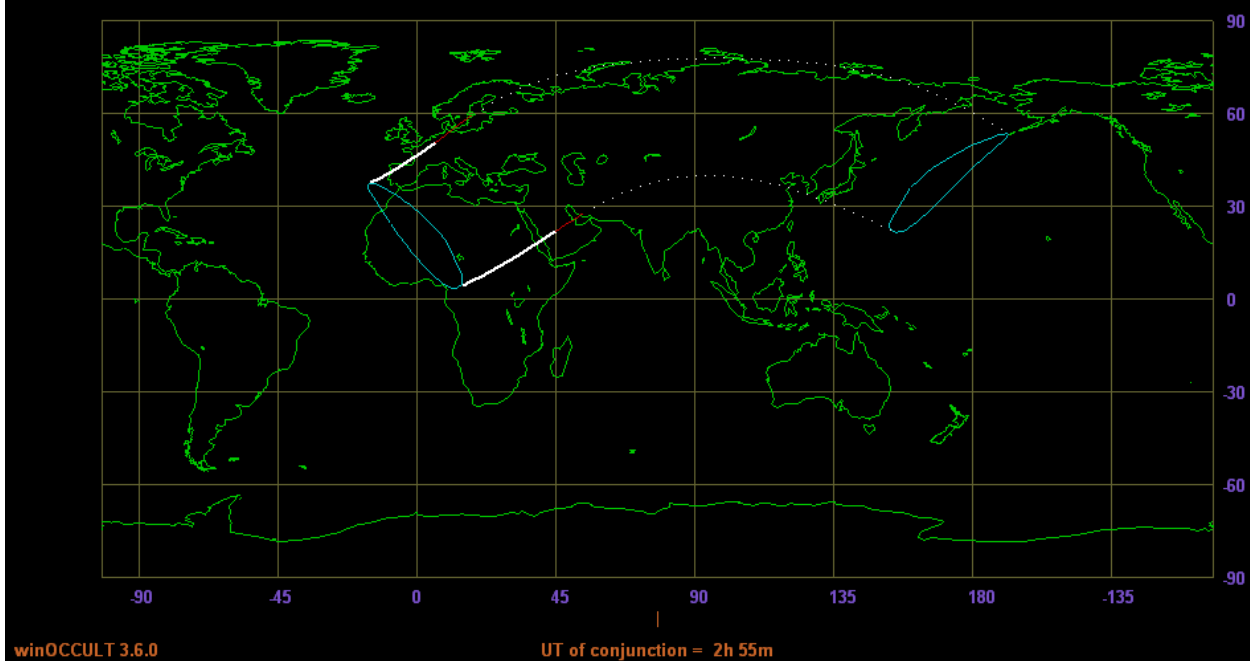


Occultation of Pleiade C, Magnitude 3.0, on domenica 2009 maggio 24

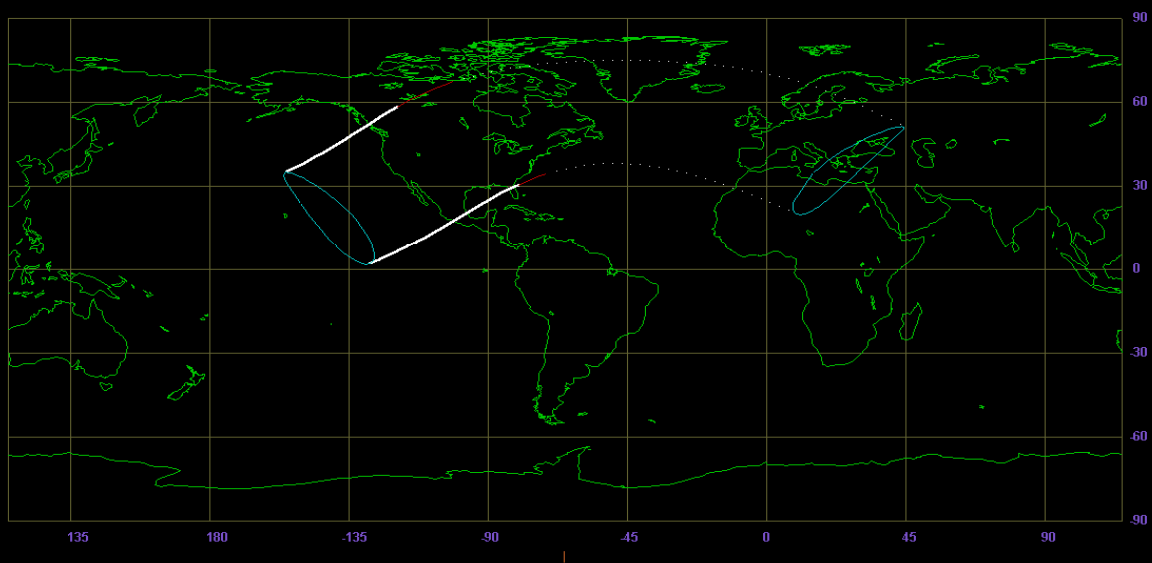


© (8)

Occultation of Pleiade C, Magnitude 3.0, on sabato 2009 luglio 18



Occultation of Pleiade C, Magnitude 3.0, on venerdì 2009 agosto 14



winOCCULT 3.6.0

UT of conjunction = 10h 39m

MULTIPLE CONJUNCTIONS PLANETS-MOON-OBJECTS

(events with 1 planet, the Moon and an object with mag<4 within 5°)

Geocentric

Date	TT	Dmed (°)	Dmax	emin	m2d	mmax		
2009/04/26 18:49:57		2.581	3.391	20	-0.4	1.6		M45 Mercury
2009/07/22 16:07:03		2.541	2.964	8	-1.2	3.7	NGC2632	M44 Mercury
2009/11/09 01:00:19		3.328	3.620	-98	0.2	3.7	NGC2632	M44 Mars

Topocentric 42°N - 12°E

Date	UT	Dmed (°)	Dmax	emin	m2d	mmax		
2009/04/26 20:16:02		2.414	3.342	20	-0.4	1.6		M45 Mercury
2009/07/22 15:59:15		3.091	3.858	8	-1.2	3.7	NGC2632	M44 Mercury
2009/11/08 23:50:12		3.500	3.804	-98	0.2	3.7	NGC2632	M44 Mars

date in the format year/month/day

Dmed = middle distance between the centers of the bodies, in degrees

Dmax = diameter of the group, in degrees

emin = least elongation, in degrees

m2d = magnitude of the 2nd brightest planet

mmax = least magnitude

MULTIPLE CONJUNCTIONS LEAST GEOCENTRIC GROUPINGS PLANETS – MOON – MESSIER OBJECTS

(events with 1 planet, the Moon and an object with mag<4
within 5°)

DATE	TIMES	BODIES			D12	D13	D23	GROUP	EL.	MAG1	MAG2	MAG3	MAGT
26 Apr 2009	13:00	MERCURY	MOON	PLEIADES	2.4	3.4	4.7	4.8	20	0.3	-5.9	1.6	-5.9
26 Apr 2009	14:00	MERCURY	MOON	PLEIADES	2.1	3.4	4.1	4.2	20	0.3	-5.9	1.6	-5.9
26 Apr 2009	15:00	MERCURY	MOON	PLEIADES	1.9	3.4	3.5	3.6	20	0.3	-6.0	1.6	-6.0
26 Apr 2009	16:00	MERCURY	MOON	PLEIADES	1.8	3.3	2.9	3.4	21	0.3	-6.0	1.6	-6.0
26 Apr 2009	17:00	MERCURY	MOON	PLEIADES	2.0	3.3	2.3	3.3	21	0.3	-6.1	1.6	-6.1
26 Apr 2009	18:00	MERCURY	MOON	PLEIADES	2.2	3.2	1.7	3.3	21	0.3	-6.1	1.6	-6.1
26 Apr 2009	19:00	MERCURY	MOON	PLEIADES	2.6	3.2	1.2	3.3	21	0.3	-6.2	1.6	-6.2
26 Apr 2009	20:00	MERCURY	MOON	PLEIADES	3.0	3.2	0.6	3.2	22	0.3	-6.2	1.6	-6.2
26 Apr 2009	21:00	MERCURY	MOON	PLEIADES	3.4	3.1	0.4	3.5	22	0.4	-6.3	1.6	-6.3
26 Apr 2009	22:00	MERCURY	MOON	PLEIADES	3.9	3.1	0.8	4.0	22	0.4	-6.3	1.6	-6.3
26 Apr 2009	23:00	MERCURY	MOON	PLEIADES	4.4	3.1	1.3	4.5	23	0.4	-6.4	1.6	-6.4
27 Apr 2009	00:00	MERCURY	MOON	PLEIADES	4.9	3.0	1.9	5.0	23	0.4	-6.4	1.6	-6.4
22 Jul 2009	11:00	MERCURY	MOON	PRESEPE	4.9	1.8	3.0	4.9	7	-1.2	-4.4	3.7	-4.5
22 Jul 2009	12:00	MERCURY	MOON	PRESEPE	4.4	1.9	2.6	4.4	8	-1.1	-4.5	3.7	-4.5
22 Jul 2009	13:00	MERCURY	MOON	PRESEPE	4.0	2.0	2.2	4.0	8	-1.1	-4.6	3.7	-4.6
22 Jul 2009	14:00	MERCURY	MOON	PRESEPE	3.6	2.0	2.0	3.6	8	-1.1	-4.6	3.7	-4.6
22 Jul 2009	15:00	MERCURY	MOON	PRESEPE	3.2	2.1	1.9	3.3	9	-1.1	-4.7	3.7	-4.7
22 Jul 2009	16:00	MERCURY	MOON	PRESEPE	2.9	2.2	2.0	3.0	9	-1.1	-4.8	3.7	-4.8
22 Jul 2009	17:00	MERCURY	MOON	PRESEPE	2.7	2.3	2.3	2.9	9	-1.1	-4.8	3.7	-4.8
22 Jul 2009	18:00	MERCURY	MOON	PRESEPE	2.6	2.4	2.8	3.1	10	-1.1	-4.9	3.7	-4.9
22 Jul 2009	19:00	MERCURY	MOON	PRESEPE	2.6	2.4	3.2	3.4	10	-1.1	-4.9	3.7	-4.9
22 Jul 2009	20:00	MERCURY	MOON	PRESEPE	2.7	2.5	3.8	3.8	10	-1.1	-5.0	3.7	-5.0
22 Jul 2009	21:00	MERCURY	MOON	PRESEPE	3.0	2.6	4.3	4.4	10	-1.1	-5.1	3.7	-5.1
22 Jul 2009	22:00	MERCURY	MOON	PRESEPE	3.2	2.7	4.9	4.9	11	-1.1	-5.1	3.7	-5.1
08 Nov 2009	22:00	MARS	MOON	PRESEPE	4.6	3.1	2.5	4.7	98	0.3	-10.5	3.7	-10.5
08 Nov 2009	23:00	MARS	MOON	PRESEPE	4.2	3.1	2.5	4.3	98	0.3	-10.5	3.7	-10.5
09 Nov 2009	00:00	MARS	MOON	PRESEPE	3.9	3.2	2.6	3.9	97	0.3	-10.4	3.7	-10.4
09 Nov 2009	01:00	MARS	MOON	PRESEPE	3.6	3.2	2.9	3.8	97	0.3	-10.4	3.7	-10.4
09 Nov 2009	02:00	MARS	MOON	PRESEPE	3.3	3.2	3.2	3.8	97	0.3	-10.4	3.7	-10.4
09 Nov 2009	03:00	MARS	MOON	PRESEPE	3.2	3.2	3.6	3.9	97	0.3	-10.4	3.7	-10.4
09 Nov 2009	04:00	MARS	MOON	PRESEPE	3.2	3.2	4.1	4.2	96	0.3	-10.4	3.7	-10.4
09 Nov 2009	05:00	MARS	MOON	PRESEPE	3.2	3.2	4.5	4.6	96	0.3	-10.4	3.7	-10.4

Dxy = distance between the body x and y, in degrees
GROUP = least group, in degree
EL = elongation from the Sun, in degrees
MAGx = magnitude of body x
MAGT = total magnitude

Times in U.T.

MULTIPLE CONJUNCTIONS LEAST TOPOCENTRIC GROUPINGS PLANETS – MOON – MESSIER OBJECTS

(events with 1 planet, the Moon and an object with mag<4
within 5°)
42°N – 12°E

	DATE	TIMES	BODIES			D12	D13	D23	GROUP	EL.	MAG1	MAG2	MAG3	MAGT	ALT	AZ
	26 Apr 2009	13:00	MERCURY	MOON	PLEIADES	2.3	3.4	4.9	4.9	20	0.3	-5.9	1.6	-5.9	69	201
	26 Apr 2009	14:00	MERCURY	MOON	PLEIADES	2.1	3.4	4.5	4.5	20	0.3	-5.9	1.6	-5.9	62	231
	26 Apr 2009	15:00	MERCURY	MOON	PLEIADES	1.9	3.4	4.0	4.1	20	0.3	-6.0	1.6	-6.0	53	249
	26 Apr 2009	16:00	MERCURY	MOON	PLEIADES	1.6	3.3	3.6	3.6	21	0.3	-6.0	1.6	-6.0	42	262
	26 Apr 2009	17:00	MERCURY	MOON	PLEIADES	1.5	3.3	3.1	3.4	21	0.3	-6.1	1.6	-6.1	31	273
	26 Apr 2009	18:00	MERCURY	MOON	PLEIADES	1.5	3.3	2.5	3.3	21	0.3	-6.1	1.6	-6.1	20	282
	26 Apr 2009	19:00	MERCURY	MOON	PLEIADES	1.6	3.2	1.9	3.3	21	0.3	-6.2	1.6	-6.2	10	291
	26 Apr 2009	20:00	MERCURY	MOON	PLEIADES	2.0	3.2	1.3	3.2	22	0.3	-6.2	1.6	-6.2	0	301
	26 Apr 2009	21:00	MERCURY	MOON	PLEIADES	2.5	3.1	0.6	3.2	22	0.4	-6.3	1.6	-6.3	-9	312
	26 Apr 2009	22:00	MERCURY	MOON	PLEIADES	3.0	3.1	0.3	3.2	22	0.4	-6.3	1.6	-6.3	-16	324
	26 Apr 2009	23:00	MERCURY	MOON	PLEIADES	3.7	3.1	0.8	3.7	23	0.4	-6.4	1.6	-6.4	-21	337
	27 Apr 2009	00:00	MERCURY	MOON	PLEIADES	4.4	3.0	1.6	4.4	23	0.4	-6.4	1.6	-6.4	-24	352
	22 Jul 2009	11:00	MERCURY	MOON	PRESEPE	4.8	1.8	3.1	4.9	7	-1.2	-4.4	3.7	-4.5	65	146
	22 Jul 2009	12:00	MERCURY	MOON	PRESEPE	4.6	1.9	2.9	4.6	8	-1.1	-4.5	3.7	-4.5	67	180
	22 Jul 2009	13:00	MERCURY	MOON	PRESEPE	4.4	2.0	2.7	4.4	8	-1.1	-4.6	3.7	-4.6	62	214
	22 Jul 2009	14:00	MERCURY	MOON	PRESEPE	4.2	2.0	2.6	4.2	8	-1.1	-4.6	3.7	-4.6	54	238
	22 Jul 2009	15:00	MERCURY	MOON	PRESEPE	4.0	2.1	2.6	4.0	9	-1.1	-4.7	3.7	-4.7	44	253
	22 Jul 2009	16:00	MERCURY	MOON	PRESEPE	3.8	2.2	2.7	3.9	9	-1.1	-4.8	3.7	-4.8	33	265
	22 Jul 2009	17:00	MERCURY	MOON	PRESEPE	3.7	2.3	2.9	3.7	9	-1.1	-4.8	3.7	-4.8	22	275
	22 Jul 2009	18:00	MERCURY	MOON	PRESEPE	3.6	2.4	3.2	3.7	10	-1.1	-4.9	3.7	-4.9	11	284
	22 Jul 2009	19:00	MERCURY	MOON	PRESEPE	3.5	2.4	3.6	3.8	10	-1.1	-4.9	3.7	-4.9	1	294
	22 Jul 2009	20:00	MERCURY	MOON	PRESEPE	3.6	2.5	4.1	4.2	10	-1.1	-5.0	3.7	-5.0	-9	304
	22 Jul 2009	21:00	MERCURY	MOON	PRESEPE	3.7	2.6	4.6	4.7	10	-1.1	-5.1	3.7	-5.1	-17	316
	08 Nov 2009	21:00	MARS	MOON	PRESEPE	4.7	3.1	2.9	4.8	98	0.3	-10.5	3.7	-10.5	-6	56
	08 Nov 2009	22:00	MARS	MOON	PRESEPE	4.3	3.1	2.9	4.4	98	0.3	-10.5	3.7	-10.5	4	67
	08 Nov 2009	23:00	MARS	MOON	PRESEPE	4.0	3.1	3.0	4.1	98	0.3	-10.5	3.7	-10.5	14	76
	09 Nov 2009	00:00	MARS	MOON	PRESEPE	3.7	3.2	3.2	4.0	97	0.3	-10.4	3.7	-10.4	25	86
	09 Nov 2009	01:00	MARS	MOON	PRESEPE	3.6	3.2	3.5	4.0	97	0.3	-10.4	3.7	-10.4	36	96
	09 Nov 2009	02:00	MARS	MOON	PRESEPE	3.5	3.2	3.8	4.1	97	0.3	-10.4	3.7	-10.4	47	108
	09 Nov 2009	03:00	MARS	MOON	PRESEPE	3.5	3.2	4.2	4.3	97	0.3	-10.4	3.7	-10.4	56	125
	09 Nov 2009	04:00	MARS	MOON	PRESEPE	3.6	3.2	4.5	4.6	96	0.3	-10.4	3.7	-10.4	63	150
	09 Nov 2009	05:00	MARS	MOON	PRESEPE	3.7	3.2	4.9	4.9	96	0.3	-10.4	3.7	-10.4	65	184

Dxy = distance between the body x and y, in degrees
GROUP = least group, in degree
EL = elongation from the Sun, in degrees
MAGx = magnitude of body x
MAGT = total magnitude
ALT = height on the horizon of the baricenter of the group, in degrees
AZ = azimuth of the baricenter of the group, in degrees from north

Times in U.T.

PLANETS-MOON-OBJECTS IN STRAIGHT LINE GEOCENTRIC

DATE	TIMES	BODIES			C
26 Apr 2009	21:00	MERCURY	MOON	PLEIADES	0.450
26 Apr 2009	22:00	MERCURY	MOON	PLEIADES	0.100
26 Apr 2009	23:00	MERCURY	MOON	PLEIADES	0.249

PLANETS-MOON-OBJECTS IN STRAIGHT LINE TOPOCENTRIC

42°N - 12°E

DATE	TIMES	BODIES			C	ALT	AZ
26 Apr 2009	21:00	MERCURY	MOON	PLEIADES	0.130	-9	312
26 Apr 2009	22:00	MERCURY	MOON	PLEIADES	-0.364	-16	324

How much anymore the parameter C is next to zero so much the bodies are lined up

ALT = height on the horizon of the baricenter of the group, in degrees
AZ = azimuth of the baricenter of the group, in degrees from north

Times in U.T.

SPATIAL GEOMETRIES PLANETS-MOON-OBJECTS

EQUILATERAL TRIANGLES

geocentric

DATE	TIMES	BODIES		D12	D13	D23	GROUP	EL.	MAG1	MAG2	MAG3	MAGT
09 Nov 2009	02:00	MARS MOON	PRESEPE	3.3	3.2	3.2	3.8	97	0.3	-10.4	3.7	-10.4

SPATIAL GEOMETRIES PLANETS-MOON-OBJECTS

EQUILATERAL TRIANGLES

42°N - 12°E

DATE	TIMES	BODIES		D12	D13	D23	GROUP	EL.	MAG1	MAG2	MAG3	MAGT	ALT	AZ
------	-------	--------	--	-----	-----	-----	-------	-----	------	------	------	------	-----	----

Dxy = distance between the body x and y, in degrees
DQM = middle distance between the 4 bodies, in degrees
MAX = maxima distance between the 4 bodies, in degrees
EL = elongation from the Sun, in degrees
MAGx = magnitude of body x
MAGT = total magnitude
ALT = height on the horizon of the baricenter of the group, in degrees
AZ = azimuth of the baricenter of the group, in degrees from north

Times in U.T.

I have considered equilateral every triangle in which every cathetus differs from the other for maximum $\pm 10\%$.
I have considered square every quadrilateral in which every side differs from the other for maximum $\pm 10\%$ and with diagonal different less than 15%.

NB: these charts are been created exclusively to the goals of "photo of effect", with three or four equidistant celestial bodies!

LUNAR TOPOCENTRIC CONJUNCTIONS <1° WITH THE PLEIADES 42°N - 12°E

Date	UT	Dm (°)	Alt.	p (°)	e	m1	m*	tm(s)	tw(h)		
2009/01/07	18:36:46	0.63906	66.86	18	133		3.6		2.0		TAU Atlas
2009/01/07	17:49:38	0.46468	59.71	20	132		3.0		2.2	Eta	TAU Alcyone
2009/01/07	16:40:02	0.25023	47.64	21	132		3.8		2.1		TAU Electra
2009/01/07	17:15:44	0.08816	53.96	20	132		3.9	4136	2.3		TAU Maia
2009/02/04	04:02:51	0.23898	-18.03	5	105		3.6	2539	1.4		TAU Atlas
2009/02/04	03:32:21	0.15445	-15.21	5	105		3.0	2618	1.5	Eta	TAU Alcyone
2009/02/04	02:42:54	0.09989	-9.66	4	104		3.8	2737	1.6		TAU Electra
2009/02/04	03:02:50	0.13752	-12.03	184	104		3.9	2682	1.5		TAU Maia
2009/03/03	08:04:07	0.06190	-5.58	14	78		3.6	2759	1.6		TAU Atlas
2009/03/03	07:33:22	0.08017	-9.66	193	77		3.0	2689	1.5	Eta	TAU Alcyone
2009/03/03	06:44:57	0.22161	-15.30	192	77		3.8	2567	1.5		TAU Electra
2009/03/03	07:07:19	0.42233	-12.82	193	77		3.9		1.4		TAU Maia
2009/03/30	14:29:27	0.44914	72.52	15	51 -9.8		3.6		2.5		TAU Atlas
2009/03/30	13:35:41	0.28958	69.41	18	50 -9.8		3.0		2.6	Eta	TAU Alcyone
2009/03/30	12:16:32	0.08572	58.01	20	50 -9.8		3.8	4369	2.5		TAU Electra
2009/03/30	12:56:20	0.08009	64.32	199	50 -9.8		3.9	4558	2.6		TAU Maia
2009/04/26	22:41:56	0.20418	-18.55	185	24 -8.3		3.6	2520	1.4		TAU Atlas
2009/04/26	22:11:44	0.28832	-15.77	185	24 -8.2		3.0		1.4	Eta	TAU Alcyone
2009/04/26	21:22:56	0.34249	-10.32	184	23 -8.2		3.8		1.5		TAU Electra
2009/04/26	21:42:34	0.58002	-12.64	184	24 -8.2		3.9		1.3		TAU Maia
2009/05/24	06:26:15	0.05793	32.60	199	-5 -4.8		3.6	3534	2.0		TAU Atlas
2009/05/24	05:50:01	0.22948	26.10	198	-5 -4.8		3.0	3314	1.8	Eta	TAU Alcyone
2009/05/24	04:53:59	0.42171	16.28	198	-5 -5.0		3.8		1.6		TAU Electra
2009/05/24	05:21:59	0.59744	21.14	198	-5 -4.9		3.9		1.5		TAU Maia
2009/06/20	18:44:56	0.17220	-16.53	184	-29 -8.7		3.6	2552	1.4		TAU Atlas
2009/06/20	18:14:38	0.25175	-13.40	184	-30 -8.7		3.0		1.4	Eta	TAU Alcyone
2009/06/20	17:25:33	0.29917	-7.44	184	-30 -8.7		3.8		1.5		TAU Electra
2009/06/20	17:45:05	0.53930	-9.93	184	-30 -8.7		3.9		1.3		TAU Maia
2009/07/18	02:32:19	0.04165	29.40	18	-55		3.6	3522	2.0		TAU Atlas
2009/07/18	01:55:40	0.12774	22.87	198	-56		3.0	3335	1.9	Eta	TAU Alcyone
2009/07/18	00:59:03	0.31539	13.08	197	-56		3.8		1.7		TAU Electra
2009/07/18	01:27:07	0.49358	17.88	198	-56		3.9		1.6		TAU Maia
2009/08/14	12:43:37	0.05705	3.33	2	-81		3.6	3046	1.8		TAU Atlas
2009/08/14	12:06:28	0.00875	9.20	182	-82		3.0	3198	1.8	Eta	TAU Alcyone
2009/08/14	11:04:32	0.04057	19.58	182	-82		3.8	3488	2.0		TAU Electra
2009/08/14	11:28:49	0.28568	15.44	182	-82		3.9		1.9		TAU Maia
2009/09/10	17:01:21	0.42771	-21.86	189	-108		3.6		1.4		TAU Atlas
2009/09/10	16:30:54	0.53895	-23.39	189	-108		3.0		1.3	Eta	TAU Alcyone
2009/09/10	15:42:35	0.63228	-24.48	188	-109		3.8		1.2		TAU Electra
2009/09/10	16:03:14	0.85425	-24.22	188	-108		3.9		0.9		TAU Maia
2009/10/07	21:47:09	0.29790	36.04	199	-134		3.6		2.1		TAU Atlas
2009/10/07	21:06:52	0.47028	28.75	199	-135		3.0		1.9	Eta	TAU Alcyone
2009/10/07	20:04:58	0.66356	17.79	198	-135		3.8		1.5		TAU Electra
2009/10/07	20:35:53	0.83886	23.22	198	-135		3.9		1.3		TAU Maia
2009/11/04	07:01:59	0.42486	6.16	182	-161		3.6		1.6		TAU Atlas
2009/11/04	06:24:26	0.48959	12.28	182	-162		3.0		1.7	Eta	TAU Alcyone
2009/11/04	05:22:12	0.52112	22.92	183	-162		3.8		1.8		TAU Electra
2009/11/04	06:13:15	0.50520	14.15	182	-162		1.6		1.4		TAU Maia
2009/12/01	14:27:30	0.72711	-3.24	193	170		3.6		1.2		TAU Atlas
2009/12/01	13:55:47	0.86455	-7.70	193	170		3.0		1.0	Eta	TAU Alcyone
2009/12/01	13:06:10	0.99897	-13.93	192	169		3.8		0.6		TAU Electra
2009/12/29	03:23:02	0.38246	6.64	182	143		3.6		1.6		TAU Atlas
2009/12/29	02:45:37	0.44489	12.75	182	142		3.0		1.7	Eta	TAU Alcyone
2009/12/29	01:43:35	0.47276	23.37	182	142		3.8		1.8		TAU Electra
2009/12/29	02:07:41	0.71917	19.19	182	142		3.9		1.5		TAU Maia

date in the format year/month/day

Dm = least distance between the centers of the bodies

Alt = height in degrees on the horizon of the event in the central moment

P = angle of position between the bodies, in degrees

e = elongation, in degree

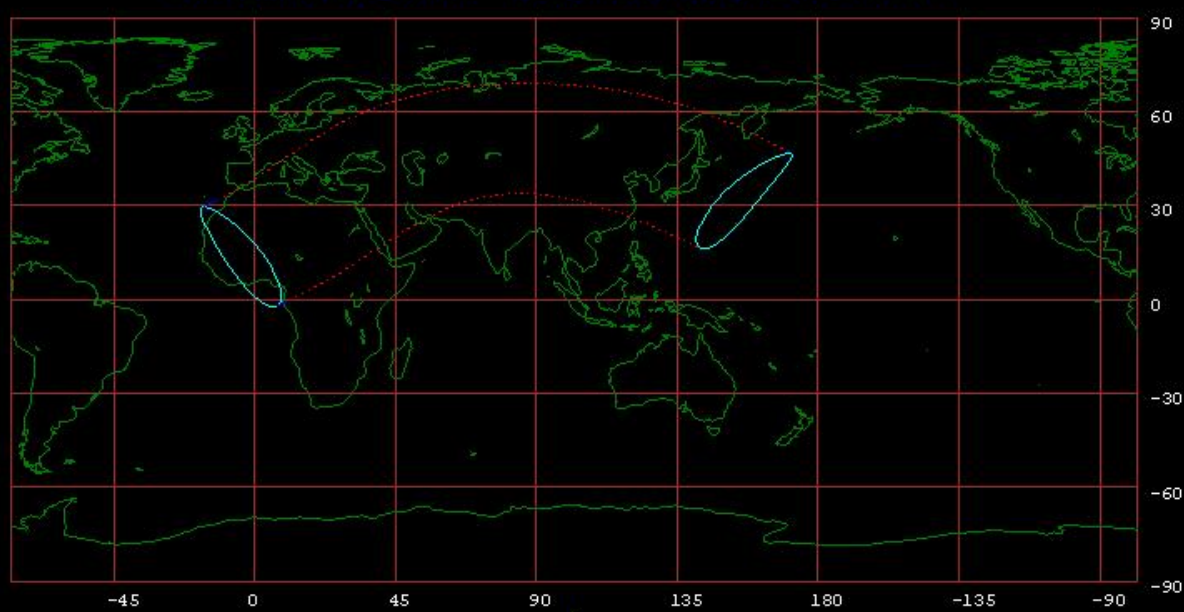
m1 = magnitude of the Moon

m* = magnitude of the star

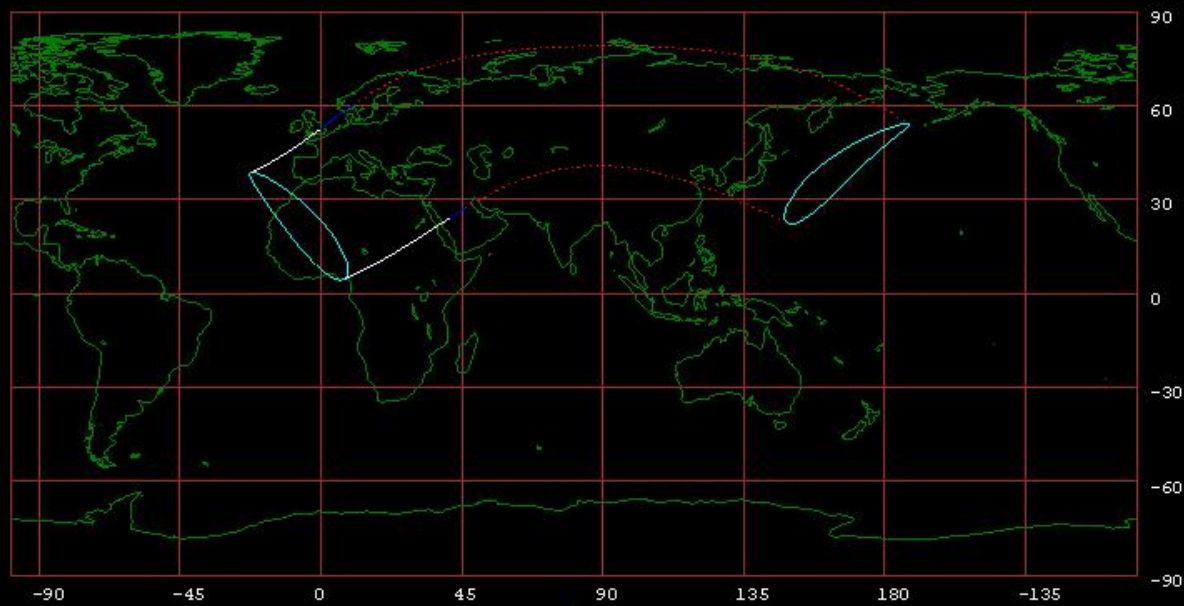
tm = if present, the star is occulted maximum for x seconds

tw = semiperiod in hours in which the two bodies are near less than 1°

Occultation of Pleiadi, Magnitude 1.5, on 2009 May 24



Occultation of Pleiadi, Magnitude 1.5, on 2009 Jul 18



MOON LIKE A BOAT AND LIKE A BRIDGE

ANCONA

GG	MM	AAAA	HH	MM	ZABL	K	ALT	ALT.S.
25/	2/2009		17:30		179.5	1	-0	-8
27/	3/2009		17:45		180.8	2	9	-4
27/	3/2009		18: 0		181.4	2	7	-7
27/	3/2009		18:15		182.1	2	4	-10
27/	3/2009		18:30		183.0	2	2	-12
27/	3/2009		18:45		183.9	2	-0	-15
25/	4/2009		18:30		177.6	1	3	-6
25/	4/2009		18:45		179.2	1	1	-8

AOSTA

GG	MM	AAAA	HH	MM	ZABL	K	ALT	ALT.S.
25/	2/2009		17:45		182.0	1	1	-7
27/	3/2009		18:15		183.4	2	9	-5
27/	3/2009		18:30		184.0	2	6	-7
27/	3/2009		18:45		184.7	2	4	-10
25/	4/2009		19: 0		180.7	1	3	-6
25/	4/2009		19:15		182.3	1	1	-8
25/	4/2009		19:30		184.0	1	-0	-10

BARI

GG	MM	AAAA	HH	MM	ZABL	K	ALT	ALT.S.
25/	2/2009		17:15		176.7	1	0	-8
27/	3/2009		17:30		178.1	2	9	-4
27/	3/2009		17:45		178.7	2	6	-7
27/	3/2009		18: 0		179.5	2	4	-10
27/	3/2009		18:15		180.3	2	1	-13
25/	4/2009		18:30		176.4	1	0	-9

BOLOGNA

GG	MM	AAAA	HH	MM	ZABL	K	ALT	ALT.S.
25/	2/2009		17:30		180.5	1	1	-7
27/	3/2009		18: 0		182.0	2	8	-5
27/	3/2009		18:15		182.7	2	6	-8
27/	3/2009		18:30		183.4	2	3	-10
27/	3/2009		18:45		184.3	2	1	-13
25/	4/2009		18:45		179.3	1	3	-6
25/	4/2009		19: 0		180.9	1	0	-9

CAGLIARI

GG	MM	AAAA	HH	MM	ZABL	K	ALT	ALT.S.
25/	2/2009		17:45		175.4	1	0	-7
26/	2/2009		18:15		184.9	3	6	-13
26/	2/2009		18:30		184.9	3	4	-16
27/	3/2009		18: 0		176.5	2	9	-4
27/	3/2009		18:15		177.1	2	6	-7
27/	3/2009		18:30		177.9	2	4	-10
27/	3/2009		18:45		178.8	2	1	-13
25/	4/2009		19: 0		175.5	1	-0	-10

CAMPOBASSO

GG	MM	AAAA	HH	MM	ZABL	K	ALT	ALT.S.
25/	2/2009		17:15		177.3	1	1	-6
27/	3/2009		17:45		178.9	2	8	-5
27/	3/2009		18: 0		179.5	2	5	-8
27/	3/2009		18:15		180.3	2	3	-11
27/	3/2009		18:30		181.2	2	0	-14
25/	4/2009		18:30		176.1	1	1	-7
25/	4/2009		18:45		177.8	1	-0	-10

CATANZARO

GG	MM	AAAA	HH	MM	ZABL	K	ALT	ALT.S.
26/	2/2009		17:15		184.9	3	12	-7
26/	2/2009		17:30		184.6	3	9	-10
26/	2/2009		17:45		184.5	3	6	-13
26/	2/2009		18: 0		184.5	3	3	-16
26/	2/2009		18:15		184.7	3	1	-19
27/	3/2009		17:30		175.8	2	9	-4
27/	3/2009		17:45		176.5	2	6	-7
27/	3/2009		18: 0		177.3	2	3	-10
27/	3/2009		18:15		178.1	2	1	-13
28/	3/2009		16:15		184.9	5	35	10
28/	3/2009		16:30		184.7	5	33	7
28/	3/2009		16:45		184.6	5	30	4
28/	3/2009		17: 0		184.7	5	27	1
28/	3/2009		17:15		184.9	5	24	-1

FIRENZE

GG	MM	AAAA	HH	MM	ZABL	K	ALT	ALT.S.
25/	2/2009		17:30		179.7	1	1	-7
27/	3/2009		18: 0		181.3	2	8	-5
27/	3/2009		18:15		181.9	2	6	-8
27/	3/2009		18:30		182.7	2	3	-11
27/	3/2009		18:45		183.6	2	1	-13
25/	4/2009		18:45		178.6	1	2	-7
25/	4/2009		19: 0		180.2	1	0	-9

GENOVA

GG	MM	AAAA	HH	MM	ZABL	K	ALT	ALT.S.
25/	2/2009		17:45		180.6	1	0	-8
27/	3/2009		18:15		182.3	2	7	-6
27/	3/2009		18:30		183.0	2	5	-9
27/	3/2009		18:45		183.8	2	2	-11
27/	3/2009		19: 0		184.7	2	0	-14
25/	4/2009		19: 0		180.0	1	2	-7
25/	4/2009		19:15		181.7	1	0	-10

L AQUILA

GG	MM	AAAA	HH	MM	ZABL	K	ALT	ALT.S.
25/	2/2009		17:30		178.2	1	-0	-8
27/	3/2009		17:45		179.5	2	9	-4
27/	3/2009		18: 0		180.2	2	6	-7
27/	3/2009		18:15		180.9	2	4	-10
27/	3/2009		18:30		181.7	2	1	-12
27/	3/2009		18:45		182.7	2	-0	-15
25/	4/2009		18:30		176.4	1	3	-6
25/	4/2009		18:45		178.0	1	0	-9

MILANO

GG	MM	AAAA	HH	MM	ZABL	K	ALT	ALT.S.
25/	2/2009		17:45		181.6	1	0	-8
27/	3/2009		18:15		183.3	2	7	-6
27/	3/2009		18:30		184.0	2	5	-9
27/	3/2009		18:45		184.8	2	3	-11
25/	4/2009		19: 0		181.0	1	2	-7
25/	4/2009		19:15		182.7	1	0	-9

NAPOLI

GG	MM	AAAA	HH	MM	ZABL	K	ALT	ALT.S.
25/	2/2009		17:15		176.7	1	2	-6
25/	2/2009		17:30		176.7	1	-0	-8
27/	3/2009		17:45		178.1	2	8	-5
27/	3/2009		18: 0		178.8	2	6	-8
27/	3/2009		18:15		179.6	2	3	-11
27/	3/2009		18:30		180.5	2	0	-13
25/	4/2009		18:30		175.3	1	1	-7
25/	4/2009		18:45		177.0	1	-0	-10

PALERMO

GG	MM	AAAA	HH	MM	ZABL	K	ALT	ALT.S.
26/	2/	2009	17:15		184.4	3	14	-4
26/	2/	2009	17:30		184.1	3	12	-7
26/	2/	2009	17:45		183.9	3	9	-10
26/	2/	2009	18: 0		183.8	3	6	-13
26/	2/	2009	18:15		183.8	3	3	-16
26/	2/	2009	18:30		184.0	3	0	-19

27/	3/	2009	17:45		175.3	2	8	-5
27/	3/	2009	18: 0		176.0	2	6	-8
27/	3/	2009	18:15		176.8	2	3	-11
27/	3/	2009	18:30		177.7	2	0	-14

28/	3/	2009	16: 0		184.9	5	41	15
28/	3/	2009	16:15		184.4	5	38	12
28/	3/	2009	16:30		184.0	5	35	9
28/	3/	2009	16:45		183.8	5	32	6
28/	3/	2009	17: 0		183.8	5	29	3
28/	3/	2009	17:15		183.9	5	27	0
28/	3/	2009	17:30		184.1	5	24	-2
28/	3/	2009	17:45		184.5	5	21	-5
28/	3/	2009	18: 0		184.9	5	18	-8

PERUGIA

GG	MM	AAAA	HH	MM	ZABL	K	ALT	ALT.S.
25/	2/	2009	17:30		179.0	1	0	-7
27/	3/	2009	18: 0		180.8	2	7	-6
27/	3/	2009	18:15		181.5	2	5	-9
27/	3/	2009	18:30		182.3	2	2	-12
27/	3/	2009	18:45		183.2	2	0	-14

25/	4/	2009	18:45		178.4	1	1	-8
25/	4/	2009	19: 0		180.1	1	-0	-10

POTENZA

GG	MM	AAAA	HH	MM	ZABL	K	ALT	ALT.S.
25/	2/	2009	17:15		176.3	1	0	-7
27/	3/	2009	17:45		178.1	2	7	-6
27/	3/	2009	18: 0		178.8	2	4	-9
27/	3/	2009	18:15		179.7	2	2	-12
27/	3/	2009	18:30		180.6	2	-0	-15

25/	4/	2009	18:30		175.6	1	0	-9
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ROME

GG	MM	AAAA	HH	MM	ZABL	K	ALT	ALT.S.
25/	2/	2009	17:30		177.8	1	0	-7
27/	3/	2009	17:45		179.0	2	10	-4
27/	3/	2009	18: 0		179.6	2	7	-6

27/	3/	2009	18:15		180.3	2	4	-9
27/	3/	2009	18:30		181.1	2	2	-12
27/	3/	2009	18:45		182.1	2	-0	-15

25/	4/	2009	18:30		175.7	1	3	-6
25/	4/	2009	18:45		177.3	1	1	-8

TORINO

GG	MM	AAAA	HH	MM	ZABL	K	ALT	ALT.S.
25/	2/	2009	17:45		181.3	1	1	-7

27/	3/	2009	18:15		182.8	2	8	-5
27/	3/	2009	18:30		183.4	2	6	-8
27/	3/	2009	18:45		184.2	2	3	-10

25/	4/	2009	19: 0		180.2	1	3	-6
25/	4/	2009	19:15		181.9	1	1	-8

TRENTO

GG	MM	AAAA	HH	MM	ZABL	K	ALT	ALT.S.
25/	2/	2009	17:30		182.0	1	1	-7

27/	3/	2009	18: 0		183.6	2	9	-5
27/	3/	2009	18:15		184.2	2	6	-7
27/	3/	2009	18:30		184.9	2	4	-10

25/	4/	2009	19: 0		182.2	1	1	-8
25/	4/	2009	19:15		183.9	1	-0	-10

TRIESTE

GG	MM	AAAA	HH	MM	ZABL	K	ALT	ALT.S.
25/	2/	2009	17:15		181.5	1	1	-6
25/	2/	2009	17:30		181.5	1	-0	-8

27/	3/	2009	17:45		182.9	2	9	-4
27/	3/	2009	18: 0		183.4	2	7	-7
27/	3/	2009	18:15		184.2	2	4	-9

25/	4/	2009	18:45		181.1	1	2	-7
25/	4/	2009	19: 0		182.8	1	-0	-10

VENEZIA

GG	MM	AAAA	HH	MM	ZABL	K	ALT	ALT.S.
25/	2/	2009	17:30		181.3	1	0	-7

27/	3/	2009	18: 0		183.1	2	8	-6
27/	3/	2009	18:15		183.7	2	5	-8
27/	3/	2009	18:30		184.5	2	3	-11

25/	4/	2009	18:45		180.4	1	2	-7
25/	4/	2009	19: 0		182.1	1	0	-9

It is a "small boat Moon" that curious aspect in which the Moon at the sunset or at the dawn appears thin and with the cuspidis turned upward to the same height. The "Moon like a bridge" is the opposite phenomenon, with the Moon with the cuspidis turned downward.

Times in U.T.

ZABL = zenital angle of the bright lunar limb, in °, in a range 355°<ZABL<5° and 175°<ZABL<185°. If the angle ZABL is near 180° the Moon is like a boat, if is near 0° is "like a bridge".

K = percentage of illuminated Moon

ALT = height of the Moon above the horizon, in °

ALT.S. = height of the Sun above the horizon, in °

STANDING MOON

ANCONA

GG	MM	AAAA	HH	MM	ZABL	K	ALT	ALT.S.
20/	9/	2009	16:	0	265.3	5	14	11

AOSTA

GG	MM	AAAA	HH	MM	ZABL	K	ALT	ALT.S.
20/	9/	2009	16:20		267.6	5	14	11
20/	9/	2009	16:30		266.5	5	12	10
20/	9/	2009	16:40		265.5	5	11	8
21/	9/	2009	16:30		266.2	11	15	9
20/10/	2009		15:20		267.7	7	14	11
20/10/	2009		15:30		266.2	7	13	10

BARI

BOLOGNA

GG	MM	AAAA	HH	MM	ZABL	K	ALT	ALT.S.
20/	9/	2009	16: 0		267.0	5	15	12
20/	9/	2009	16:10		265.9	5	14	10
20/10/	2009		15:10		266.1	7	15	11

CAGLIARI

CAMPOBASSO

CATANZARO

FIRENZE

GG	MM	AAAA	HH	MM	ZABL	K	ALT	ALT.S.
20/	9/	2009	16:10		265.3	5	14	11

GENOVA

GG	MM	AAAA	HH	MM	ZABL	K	ALT	ALT.S.
20/	9/	2009	16:10		266.9	5	15	12
20/	9/	2009	16:20		265.8	5	14	10
20/10/	2009		15:20		266.0	7	15	11

L AQUILA

MILANO

GG	MM	AAAA	HH	MM	ZABL	K	ALT	ALT.S.
20/	9/	2009	16:10		267.6	5	14	12
20/	9/	2009	16:20		266.5	5	13	10
20/	9/	2009	16:30		265.5	5	11	8
21/	9/	2009	16:30		265.1	11	14	8
20/10/	2009		15:10		267.9	7	15	12
20/10/	2009		15:20		266.4	7	14	10

NAPOLI

PALERMO

PERUGIA

POTENZA

ROME

TORINO

GG	MM	AAAA	HH	MM	ZABL	K	ALT	ALT.S.
20/	9/	2009	16:20		266.9	5	14	11
20/	9/	2009	16:30		265.8	5	12	9
21/	9/	2009	16:30		265.6	11	15	9
20/10/	2009		15:20		267.1	7	15	11
20/10/	2009		15:30		265.6	7	14	10

TRENTO

GG	MM	AAAA	HH	MM	ZABL	K	ALT	ALT.S.
20/	9/	2009	16: 0		268.4	5	14	12
20/	9/	2009	16:10		267.3	5	13	10
20/	9/	2009	16:20		266.3	5	11	9
20/	9/	2009	16:30		265.3	5	10	7
21/	9/	2009	16:10		267.1	11	15	10
21/	9/	2009	16:20		265.8	11	14	8
22/	9/	2009	16:30		265.7	18	15	6
20/10/	2009		15: 0		268.6	7	14	12
20/10/	2009		15:10		267.1	7	14	10
20/10/	2009		15:20		265.6	7	13	9

TRIESTE

GG	MM	AAAA	HH	MM	ZABL	K	ALT	ALT.S.
20/	9/	2009	15:50		268.0	5	14	12
20/	9/	2009	16: 0		266.9	5	13	10
20/	9/	2009	16:10		265.9	5	11	9
21/	9/	2009	16:10		265.4	11	14	8
20/10/	2009		14:50		268.3	7	15	12
20/10/	2009		15: 0		266.8	7	14	10
20/10/	2009		15:10		265.3	7	13	9

VENEZIA

GG	MM	AAAA	HH	MM	ZABL	K	ALT	ALT.S.
20/	9/	2009	16: 0		267.3	5	14	11
20/	9/	2009	16:10		266.3	5	12	10
20/	9/	2009	16:20		265.3	5	11	8
21/	9/	2009	16:10		266.0	11	15	9
20/10/	2009		15: 0		267.5	7	15	11
20/10/	2009		15:10		266.0	7	14	10

It is "standing Moon" the phenomenon in which the Moon at the setting or at the dawn appears with the cuspidis lined up in vertical in comparison to the horizon of the observer.

Times in U.T.

ZABL = zenital angle of the bright lunar limb, in $^{\circ}$, in a range $85^{\circ} < \text{ZABL} < 95^{\circ}$ and $265^{\circ} < \text{ZABL} < 275^{\circ}$.

K = percentage of illuminated Moon

ALT = height of the Moon above the horizon, in $^{\circ}$

ALT.S. = height of the Sun above the horizon, in $^{\circ}$

NB: are listed only the events when the Moon is standing next to the horizon, or rather with an height inferior to 15°

ASTEROIDS WITH m<9

1 Ceres

Date Year m d	R.A.2000 hh mm.mm	Decl.2000 dd pp.p	Delta U.A	r A.U.	Phase °	Mag V	Elong. °
2009 1 1	11 17.41	+17 59.9	1.950	2.549	20.1	7.9	116.8W
2009 1 2	11 17.85	+18 3.8	1.939	2.549	20.0	7.8	117.7W
2009 1 3	11 18.26	+18 7.9	1.927	2.549	19.8	7.8	118.6W
2009 1 4	11 18.65	+18 12.2	1.916	2.549	19.6	7.8	119.5W
2009 1 5	11 19.01	+18 16.6	1.905	2.549	19.4	7.8	120.5W
2009 1 6	11 19.35	+18 21.2	1.894	2.549	19.2	7.8	121.4W
2009 1 7	11 19.66	+18 26.0	1.883	2.548	19.0	7.8	122.3W
2009 1 8	11 19.94	+18 30.9	1.873	2.548	18.8	7.7	123.3W
2009 1 9	11 20.20	+18 36.0	1.862	2.548	18.6	7.7	124.2W
2009 1 10	11 20.43	+18 41.3	1.852	2.548	18.4	7.7	125.2W
2009 1 11	11 20.63	+18 46.8	1.841	2.548	18.2	7.7	126.1W
2009 1 12	11 20.80	+18 52.4	1.831	2.548	17.9	7.7	127.1W
2009 1 13	11 20.95	+18 58.2	1.821	2.548	17.7	7.6	128.0W
2009 1 14	11 21.07	+19 4.1	1.811	2.548	17.5	7.6	129.0W
2009 1 15	11 21.16	+19 10.2	1.802	2.548	17.2	7.6	130.0W
2009 1 16	11 21.23	+19 16.4	1.792	2.547	17.0	7.6	130.9W
2009 1 17	11 21.26	+19 22.8	1.783	2.547	16.7	7.6	131.9W
2009 1 18	11 21.27	+19 29.4	1.774	2.547	16.4	7.5	132.9W
2009 1 19	11 21.25	+19 36.0	1.764	2.547	16.2	7.5	133.9W
2009 1 20	11 21.20	+19 42.9	1.756	2.547	15.9	7.5	134.9W
2009 1 21	11 21.12	+19 49.8	1.747	2.547	15.6	7.5	135.9W
2009 1 22	11 21.01	+19 56.9	1.738	2.547	15.3	7.4	136.8W
2009 1 23	11 20.87	+20 4.1	1.730	2.547	15.0	7.4	137.8W
2009 1 24	11 20.71	+20 11.4	1.722	2.547	14.7	7.4	138.8W
2009 1 25	11 20.51	+20 18.8	1.714	2.547	14.4	7.4	139.8W
2009 1 26	11 20.29	+20 26.4	1.706	2.547	14.1	7.4	140.8W
2009 1 27	11 20.04	+20 34.0	1.699	2.547	13.8	7.3	141.8W
2009 1 28	11 19.76	+20 41.7	1.692	2.547	13.5	7.3	142.8W
2009 1 29	11 19.45	+20 49.5	1.684	2.547	13.2	7.3	143.8W
2009 1 30	11 19.12	+20 57.4	1.677	2.547	12.9	7.3	144.8W
2009 1 31	11 18.75	+21 5.4	1.671	2.546	12.6	7.3	145.8W
2009 2 1	11 18.36	+21 13.4	1.664	2.546	12.2	7.2	146.8W
2009 2 2	11 17.94	+21 21.5	1.658	2.546	11.9	7.2	147.7W
2009 2 3	11 17.50	+21 29.6	1.652	2.546	11.6	7.2	148.7W
2009 2 4	11 17.03	+21 37.7	1.646	2.546	11.3	7.2	149.7W
2009 2 5	11 16.53	+21 45.9	1.641	2.546	10.9	7.2	150.6W
2009 2 6	11 16.01	+21 54.1	1.635	2.546	10.6	7.1	151.6W
2009 2 7	11 15.47	+22 2.3	1.630	2.546	10.3	7.1	152.5W
2009 2 8	11 14.89	+22 10.5	1.626	2.546	10	7.1	153.4W
2009 2 9	11 14.30	+22 18.7	1.621	2.546	9.7	7.1	154.3W
2009 2 10	11 13.68	+22 26.8	1.617	2.546	9.4	7.1	155.2W
2009 2 11	11 13.04	+22 35.0	1.613	2.546	9.1	7.0	156.1W
2009 2 12	11 12.38	+22 43.0	1.609	2.546	8.8	7.0	156.9W
2009 2 13	11 11.70	+22 51.1	1.605	2.546	8.5	7.0	157.7W
2009 2 14	11 11.00	+22 59.1	1.602	2.546	8.2	7.0	158.4W
2009 2 15	11 10.28	+23 7.0	1.599	2.546	7.9	7.0	159.2W
2009 2 16	11 9.54	+23 14.8	1.596	2.546	7.7	7.0	159.9W
2009 2 17	11 8.78	+23 22.5	1.593	2.546	7.4	6.9	160.5W
2009 2 18	11 8.01	+23 30.2	1.591	2.546	7.2	6.9	161.1W
2009 2 19	11 7.22	+23 37.7	1.589	2.546	7.0	6.9	161.6W
2009 2 20	11 6.41	+23 45.1	1.587	2.546	6.9	6.9	162.1W
2009 2 21	11 5.60	+23 52.4	1.586	2.546	6.7	6.9	162.5W
2009 2 22	11 4.77	+23 59.5	1.585	2.547	6.6	6.9	162.8W
2009 2 23	11 3.93	+24 6.5	1.584	2.547	6.5	6.9	163.0W
2009 2 24	11 3.08	+24 13.3	1.583	2.547	6.5	6.9	163.2W
2009 2 25	11 2.22	+24 20.0	1.583	2.547	6.4	6.9	163.3W
2009 2 26	11 1.36	+24 26.4	1.583	2.547	6.4	6.9	163.3W
2009 2 27	11 0.48	+24 32.7	1.583	2.547	6.5	6.9	163.2W
2009 2 28	10 59.61	+24 38.8	1.583	2.547	6.5	6.9	163.0W
2009 3 1	10 58.73	+24 44.7	1.584	2.547	6.6	6.9	162.7W
2009 3 2	10 57.84	+24 50.4	1.585	2.547	6.8	6.9	162.4W
2009 3 3	10 56.96	+24 55.9	1.586	2.547	6.9	6.9	162.0W
2009 3 4	10 56.07	+25 1.2	1.587	2.547	7.1	6.9	161.5E
2009 3 5	10 55.19	+25 6.2	1.589	2.547	7.3	6.9	160.9E
2009 3 6	10 54.31	+25 11.1	1.591	2.547	7.5	6.9	160.3E
2009 3 7	10 53.43	+25 15.6	1.593	2.547	7.8	7.0	159.7E
2009 3 8	10 52.55	+25 20.0	1.596	2.547	8.0	7.0	159.0E
2009 3 9	10 51.69	+25 24.1	1.599	2.548	8.3	7.0	158.3E
2009 3 10	10 50.83	+25 27.9	1.602	2.548	8.6	7.0	157.5E
2009 3 11	10 49.97	+25 31.5	1.605	2.548	8.9	7.0	156.7E
2009 3 12	10 49.13	+25 34.9	1.608	2.548	9.2	7.0	155.9E
2009 3 13	10 48.30	+25 38.0	1.612	2.548	9.5	7.1	155.0E
2009 3 14	10 47.48	+25 40.8	1.616	2.548	9.8	7.1	154.2E
2009 3 15	10 46.67	+25 43.4	1.620	2.548	10.1	7.1	153.3E

1 Ceres

Date Year m d	R.A.2000 hh mm.mm	Decl.2000 dd pp.p	Delta U.A	r A.U.	Phase °	Mag V	Elong. °
2009 3 15	10 46.67	+25 43.4	1.620	2.548	10.1	7.1	153.3E
2009 3 16	10 45.88	+25 45.7	1.625	2.548	10.4	7.1	152.4E
2009 3 17	10 45.10	+25 47.7	1.630	2.548	10.7	7.1	151.5E
2009 3 18	10 44.34	+25 49.5	1.635	2.549	11.1	7.2	150.5E
2009 3 19	10 43.59	+25 51.0	1.640	2.549	11.4	7.2	149.6E
2009 3 20	10 42.86	+25 52.3	1.645	2.549	11.7	7.2	148.6E
2009 3 21	10 42.15	+25 53.3	1.651	2.549	12.1	7.2	147.7E
2009 3 22	10 41.46	+25 54.0	1.657	2.549	12.4	7.2	146.7E
2009 3 23	10 40.79	+25 54.5	1.663	2.549	12.7	7.3	145.8E
2009 3 24	10 40.14	+25 54.7	1.669	2.549	13.0	7.3	144.8E
2009 3 25	10 39.52	+25 54.7	1.676	2.550	13.3	7.3	143.8E
2009 3 26	10 38.91	+25 54.4	1.682	2.550	13.7	7.3	142.9E
2009 3 27	10 38.33	+25 53.9	1.689	2.550	14.0	7.3	141.9E
2009 3 28	10 37.77	+25 53.1	1.696	2.550	14.3	7.4	140.9E
2009 3 29	10 37.23	+25 52.1	1.704	2.550	14.6	7.4	140.0E
2009 3 30	10 36.72	+25 50.8	1.711	2.550	14.9	7.4	139.0E
2009 3 31	10 36.24	+25 49.3	1.719	2.551	15.2	7.4	138.0E
2009 4 1	10 35.78	+25 47.6	1.727	2.551	15.5	7.4	137.1E
2009 4 2	10 35.34	+25 45.6	1.735	2.551	15.8	7.5	136.1E
2009 4 3	10 34.94	+25 43.4	1.743	2.551	16.0	7.5	135.2E
2009 4 4	10 34.55	+25 41.0	1.751	2.551	16.3	7.5	134.2E
2009 4 5	10 34.20	+25 38.3	1.760	2.551	16.6	7.5	133.2E
2009 4 6	10 33.87	+25 35.5	1.768	2.552	16.9	7.5	132.3E
2009 4 7	10 33.57	+25 32.4	1.777	2.552	17.1	7.6	131.4E
2009 4 8	10 33.29	+25 29.1	1.786	2.552	17.4	7.6	130.4E
2009 4 9	10 33.04	+25 25.6	1.796	2.552	17.6	7.6	129.5E
2009 4 10	10 32.82	+25 21.9	1.805	2.552	17.9	7.6	128.5E
2009 4 11	10 32.63	+25 18.0	1.814	2.553	18.1	7.6	127.6E
2009 4 12	10 32.46	+25 13.9	1.824	2.553	18.3	7.7	126.7E
2009 4 13	10 32.33	+25 9.6	1.834	2.553	18.6	7.7	125.8E
2009 4 14	10 32.22	+25 5.2	1.844	2.553	18.8	7.7	124.9E
2009 4 15	10 32.13	+25 0.5	1.854	2.554	19.0	7.7	124.0E
2009 4 16	10 32.07	+24 55.7	1.864	2.554	19.2	7.7	123.1E
2009 4 17	10 32.05	+24 50.7	1.874	2.554	19.4	7.8	122.2E
2009 4 18	10 32.04	+24 45.6	1.884	2.554	19.6	7.8	121.3E
2009 4 19	10 32.07	+24 40.2	1.895	2.554	19.8	7.8	120.4E
2009 4 20	10 32.12	+24 34.7	1.906	2.555	20.0	7.8	119.5E
2009 4 21	10 32.20	+24 29.1	1.916	2.555	20.2	7.8	118.6E
2009 4 22	10 32.30	+24 23.3	1.927	2.555	20.4	7.9	117.8E
2009 4 23	10 32.43	+24 17.3	1.938	2.555	20.5	7.9	116.9E
2009 4 24	10 32.58	+24 11.2	1.949	2.556	20.7	7.9	116.1E
2009 4 25	10 32.77	+24 5.0	1.960	2.556	20.9	7.9	115.2E
2009 4 26	10 32.97	+23 58.6	1.971	2.556	21.0	7.9	114.4E
2009 4 27	10 33.20	+23 52.1	1.983	2.556	21.2	7.9	113.5E
2009 4 28	10 33.46	+23 45.4	1.994	2.557	21.3	8.0	112.7E
2009 4 29	10 33.74	+23 38.6	2.005	2.557	21.4	8.0	111.8E
2009 4 30	10 34.05	+23 31.7	2.017	2.557	21.6	8.0	111.0E
2009 5 1	10 34.37	+23 24.7	2.028	2.558	21.7	8.0	110.2E
2009 5 2	10 34.73	+23 17.5	2.040	2.558	21.8	8.0	109.4E
2009 5 3	10 35.10	+23 10.2	2.052	2.558	21.9	8.0	108.6E
2009 5 4	10 35.50	+23 2.8	2.064	2.558	22.0	8.1	107.8E
2009 5 5	10 35.92	+22 55.3	2.075	2.559	22.1	8.1	107.0E
2009 5 6	10 36.37	+22 47.7	2.087	2.559	22.2	8.1	106.2E
2009 5 7	10 36.83	+22 40.0	2.099	2.559	22.3	8.1	105.4E
2009 5 8	10 37.32	+22 32.2	2.111	2.560	22.4	8.1	104.6E
2009 5 9	10 37.83	+22 24.2	2.123	2.560	22.5	8.1	103.8E
2009 5 10	10 38.35	+22 16.2	2.136	2.560	22.6	8.2	103.1E
2009 5 11	10 38.90	+22 8.1	2.148	2.561	22.7	8.2	102.3E
2009 5 12	10 39.47	+21 59.8	2.160	2.561	22.7	8.2	101.5E
2009 5 13	10 40.06	+21 51.5	2.172	2.561	22.8	8.2	100.8E
2009 5 14	10 40.67	+21 43.1	2.185	2.562	22.9	8.2	100.0E
2009 5 15	10 41.30	+21 34.6	2.197	2.562	22.9	8.2	99.3E
2009 5 16	10 41.95	+21 26.0	2.209	2.562	23.0	8.2	98.5E
2009 5 17	10 42.62	+21 17.3	2.222	2.563	23.0	8.3	97.8E
2009 5 18	10 43.30	+21 8.5	2.234	2.563	23.1	8.3	97.0E
2009 5 19	10 44.00	+20 59.7	2.247	2.563	23.1	8.3	96.3E
2009 5 20	10 44.72	+20 50.8	2.259	2.564	23.1	8.3	95.6E
2009 5 21	10 45.46	+20 41.8	2.272	2.564	23.2	8.3	94.9E
2009 5 22	10 46.22	+20 32.7	2.284	2.564	23.2	8.3	94.1E
2009 5 23	10 46.99	+20 23.5	2.297	2.565	23.2	8.3	93.4E
2009 5 24	10 47.78	+20 14.3	2.309	2.565	23.2	8.3	92.7E
2009 5 25	10 48.58	+20 5.0	2.322	2.565	23.2	8.4	92.0E
2009 5 26	10 49.40	+19 55.6	2.334	2.566	23.2	8.4	91.3E
2009 5 27	10 50.23	+19 46.2	2.347	2.566	23.3	8.4	90.6E
2009 5 28	10 51.08	+19 36.7	2.359	2.566	23.3	8.4	89.9E
2009 5 29	10 51.95	+19 27.1	2.372	2.567	23.3	8.4	89.2E
2009 5 30	10 52.83	+19 17.5	2.385	2.567	23.3	8.4	88.5E
2009 5 31	10 53.72	+19 7.8	2.397	2.568	23.2	8.4	87.8E
2009 6 1	10 54.63	+18 58.0	2.410	2.568	23.2	8.4	87.2E

1 Ceres

Date Year m d	R.A.2000 hh mm.mm	Decl.2000 dd pp.p	Delta U.A	r A.U.	Phase °	Mag v	Elong. °
2009 6 2	10 55.55	+18 48.2	2.422	2.568	23.2	8.5	86.5E
2009 6 3	10 56.48	+18 38.3	2.435	2.569	23.2	8.5	85.8E
2009 6 4	10 57.43	+18 28.4	2.448	2.569	23.2	8.5	85.1E
2009 6 5	10 58.39	+18 18.4	2.460	2.569	23.1	8.5	84.5E
2009 6 6	10 59.37	+18 8.3	2.473	2.570	23.1	8.5	83.8E
2009 6 7	11 0.35	+17 58.2	2.485	2.570	23.1	8.5	83.2E
2009 6 8	11 1.35	+17 48.1	2.498	2.571	23.0	8.5	82.5E
2009 6 9	11 2.36	+17 37.8	2.511	2.571	23.0	8.5	81.8E
2009 6 10	11 3.38	+17 27.6	2.523	2.571	23.0	8.5	81.2E
2009 6 11	11 4.42	+17 17.3	2.536	2.572	22.9	8.5	80.5E
2009 6 12	11 5.46	+17 6.9	2.548	2.572	22.9	8.6	79.9E
2009 6 13	11 6.52	+16 56.5	2.561	2.573	22.8	8.6	79.3E
2009 6 14	11 7.58	+16 46.0	2.573	2.573	22.8	8.6	78.6E
2009 6 15	11 8.66	+16 35.5	2.585	2.574	22.7	8.6	78.0E
2009 6 16	11 9.75	+16 25.0	2.598	2.574	22.6	8.6	77.4E
2009 6 17	11 10.85	+16 14.4	2.610	2.574	22.6	8.6	76.7E
2009 6 18	11 11.95	+16 3.7	2.623	2.575	22.5	8.6	76.1E
2009 6 19	11 13.07	+15 53.1	2.635	2.575	22.5	8.6	75.5E
2009 6 20	11 14.20	+15 42.3	2.647	2.576	22.4	8.6	74.9E
2009 6 21	11 15.33	+15 31.6	2.659	2.576	22.3	8.6	74.2E
2009 6 22	11 16.48	+15 20.8	2.672	2.577	22.2	8.6	73.6E
2009 6 23	11 17.63	+15 9.9	2.684	2.577	22.2	8.6	73.0E
2009 6 24	11 18.80	+14 59.0	2.696	2.578	22.1	8.7	72.4E
2009 6 25	11 19.97	+14 48.1	2.708	2.578	22.0	8.7	71.8E
2009 6 26	11 21.15	+14 37.2	2.720	2.578	21.9	8.7	71.2E
2009 6 27	11 22.34	+14 26.2	2.732	2.579	21.8	8.7	70.6E
2009 6 28	11 23.53	+14 15.2	2.744	2.579	21.7	8.7	70.0E
2009 6 29	11 24.74	+14 4.1	2.756	2.580	21.6	8.7	69.4E
2009 6 30	11 25.95	+13 53.0	2.768	2.580	21.5	8.7	68.8E
2009 7 1	11 27.17	+13 41.9	2.780	2.581	21.4	8.7	68.2E
2009 7 2	11 28.40	+13 30.7	2.792	2.581	21.3	8.7	67.6E
2009 7 3	11 29.63	+13 19.5	2.804	2.582	21.2	8.7	67.0E
2009 7 4	11 30.88	+13 8.3	2.816	2.582	21.1	8.7	66.4E
2009 7 5	11 32.13	+12 57.1	2.827	2.583	21.0	8.7	65.8E
2009 7 6	11 33.38	+12 45.8	2.839	2.583	20.9	8.7	65.2E
2009 7 7	11 34.64	+12 34.5	2.851	2.584	20.8	8.7	64.6E
2009 7 8	11 35.91	+12 23.2	2.862	2.584	20.7	8.7	64.0E
2009 7 9	11 37.19	+12 11.8	2.874	2.585	20.6	8.8	63.5E
2009 7 10	11 38.47	+12 0.4	2.885	2.585	20.5	8.8	62.9E
2009 7 11	11 39.76	+11 49.0	2.897	2.586	20.4	8.8	62.3E
2009 7 12	11 41.06	+11 37.6	2.908	2.586	20.3	8.8	61.7E
2009 7 13	11 42.36	+11 26.2	2.919	2.587	20.1	8.8	61.1E
2009 7 14	11 43.67	+11 14.7	2.931	2.587	20.0	8.8	60.6E
2009 7 15	11 44.98	+11 3.2	2.942	2.588	19.9	8.8	60.0E
2009 7 16	11 46.30	+10 51.7	2.953	2.588	19.8	8.8	59.4E
2009 7 17	11 47.63	+10 40.1	2.964	2.589	19.6	8.8	58.9E
2009 7 18	11 48.96	+10 28.6	2.975	2.589	19.5	8.8	58.3E
2009 7 19	11 50.30	+10 17.0	2.986	2.590	19.4	8.8	57.7E
2009 7 20	11 51.64	+10 5.4	2.997	2.590	19.2	8.8	57.2E
2009 7 21	11 52.98	+ 9 53.8	3.008	2.591	19.1	8.8	56.6E
2009 7 22	11 54.34	+ 9 42.2	3.018	2.591	19.0	8.8	56.0E
2009 7 23	11 55.69	+ 9 30.5	3.029	2.592	18.8	8.8	55.5E
2009 7 24	11 57.06	+ 9 18.9	3.040	2.592	18.7	8.8	54.9E
2009 7 25	11 58.42	+ 9 7.2	3.050	2.593	18.6	8.8	54.3E
2009 7 26	11 59.80	+ 8 55.5	3.061	2.594	18.4	8.8	53.8E
2009 7 27	12 1.17	+ 8 43.8	3.071	2.594	18.3	8.8	53.2E
2009 7 28	12 2.56	+ 8 32.1	3.082	2.595	18.1	8.8	52.7E
2009 7 29	12 3.94	+ 8 20.4	3.092	2.595	18.0	8.8	52.1E
2009 7 30	12 5.34	+ 8 8.6	3.102	2.596	17.8	8.8	51.6E
2009 7 31	12 6.73	+ 7 56.9	3.112	2.596	17.7	8.8	51.0E
2009 8 1	12 8.13	+ 7 45.1	3.122	2.597	17.5	8.8	50.5E
2009 8 2	12 9.54	+ 7 33.3	3.132	2.597	17.4	8.8	49.9E
2009 8 3	12 10.95	+ 7 21.6	3.142	2.598	17.2	8.8	49.4E
2009 8 4	12 12.36	+ 7 9.8	3.152	2.599	17.1	8.8	48.8E
2009 8 5	12 13.78	+ 6 58.0	3.162	2.599	16.9	8.8	48.3E
2009 8 6	12 15.20	+ 6 46.2	3.172	2.600	16.8	8.9	47.7E
2009 8 7	12 16.63	+ 6 34.4	3.181	2.600	16.6	8.9	47.2E
2009 8 8	12 18.06	+ 6 22.6	3.191	2.601	16.5	8.9	46.6E
2009 8 9	12 19.49	+ 6 10.8	3.200	2.601	16.3	8.9	46.1E
2009 8 10	12 20.93	+ 5 59.0	3.210	2.602	16.1	8.9	45.5E
2009 8 11	12 22.37	+ 5 47.2	3.219	2.603	16.0	8.9	45.0E
2009 8 12	12 23.82	+ 5 35.4	3.228	2.603	15.8	8.9	44.4E
2009 8 13	12 25.27	+ 5 23.5	3.237	2.604	15.7	8.9	43.9E
2009 8 14	12 26.72	+ 5 11.7	3.246	2.604	15.5	8.9	43.4E
2009 8 15	12 28.18	+ 4 59.9	3.255	2.605	15.3	8.9	42.8E
2009 8 16	12 29.64	+ 4 48.1	3.264	2.605	15.2	8.9	42.3E
2009 8 17	12 31.10	+ 4 36.3	3.273	2.606	15.0	8.9	41.7E
2009 8 18	12 32.57	+ 4 24.5	3.282	2.607	14.8	8.9	41.2E
2009 8 19	12 34.04	+ 4 12.7	3.290	2.607	14.7	8.9	40.7E

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Date Year m d	R.A.2000 hh mm.mm	Decl.2000 dd pp.p	Delta U.A	r A.U.	Phase °	Mag V	Elong. °
2009 8 20	12 35.52	+ 4 0.9	3.299	2.608	14.5	8.9	40.1E
2009 8 21	12 37.00	+ 3 49.1	3.307	2.609	14.3	8.9	39.6E
2009 8 22	12 38.48	+ 3 37.3	3.316	2.609	14.1	8.9	39.0E
2009 8 23	12 39.97	+ 3 25.5	3.324	2.610	14.0	8.9	38.5E
2009 8 24	12 41.46	+ 3 13.7	3.332	2.610	13.8	8.9	38.0E
2009 8 25	12 42.95	+ 3 1.9	3.340	2.611	13.6	8.9	37.4E
2009 8 26	12 44.44	+ 2 50.1	3.348	2.612	13.4	8.9	36.9E
2009 8 27	12 45.94	+ 2 38.4	3.356	2.612	13.3	8.9	36.4E
2009 8 28	12 47.45	+ 2 26.6	3.364	2.613	13.1	8.9	35.8E
2009 8 29	12 48.95	+ 2 14.9	3.372	2.613	12.9	8.9	35.3E
2009 8 30	12 50.46	+ 2 3.2	3.379	2.614	12.7	8.9	34.8E
2009 8 31	12 51.97	+ 1 51.4	3.387	2.615	12.5	8.9	34.2E
2009 9 1	12 53.49	+ 1 39.7	3.394	2.615	12.4	8.8	33.7E
2009 9 2	12 55.00	+ 1 28.1	3.402	2.616	12.2	8.8	33.2E
2009 9 3	12 56.53	+ 1 16.4	3.409	2.617	12.0	8.8	32.6E
2009 9 4	12 58.05	+ 1 4.7	3.416	2.617	11.8	8.8	32.1E
2009 9 5	12 59.58	+ 0 53.1	3.423	2.618	11.6	8.8	31.6E
2009 9 6	13 1.11	+ 0 41.4	3.430	2.619	11.4	8.8	31.0E
2009 9 7	13 2.64	+ 0 29.8	3.437	2.619	11.3	8.8	30.5E
2009 9 8	13 4.18	+ 0 18.2	3.444	2.620	11.1	8.8	30.0E
2009 9 9	13 5.72	+ 0 6.6	3.450	2.620	10.9	8.8	29.4E
2009 9 10	13 7.26	- 0 4.9	3.457	2.621	10.7	8.8	28.9E
2009 9 11	13 8.80	- 0 16.5	3.463	2.622	10.5	8.8	28.4E
2009 9 12	13 10.35	- 0 28.0	3.470	2.622	10.3	8.8	27.9E
2009 9 13	13 11.90	- 0 39.5	3.476	2.623	10.1	8.8	27.3E
2009 9 14	13 13.45	- 0 51.0	3.482	2.624	10	8.8	26.8E
2009 9 15	13 15.01	- 1 2.4	3.488	2.624	9.8	8.8	26.3E
2009 9 16	13 16.57	- 1 13.9	3.494	2.625	9.6	8.8	25.7E
2009 9 17	13 18.13	- 1 25.3	3.500	2.626	9.4	8.8	25.2E
2009 9 18	13 19.70	- 1 36.7	3.506	2.626	9.2	8.8	24.7E
2009 9 19	13 21.26	- 1 48.0	3.511	2.627	9.0	8.8	24.2E
2009 9 20	13 22.83	- 1 59.4	3.517	2.628	8.8	8.8	23.6E
2009 9 21	13 24.41	- 2 10.7	3.522	2.628	8.6	8.8	23.1E
2009 9 22	13 25.98	- 2 22.0	3.527	2.629	8.4	8.8	22.6E
2009 9 23	13 27.56	- 2 33.2	3.533	2.630	8.2	8.8	22.1E
2009 9 24	13 29.14	- 2 44.4	3.538	2.630	8.0	8.8	21.5E
2009 9 25	13 30.72	- 2 55.6	3.543	2.631	7.9	8.8	21.0E
2009 9 26	13 32.31	- 3 6.8	3.548	2.632	7.7	8.8	20.5E
2009 9 27	13 33.90	- 3 17.9	3.552	2.633	7.5	8.8	20.0E
2009 9 28	13 35.49	- 3 29.0	3.557	2.633	7.3	8.7	19.4E
2009 9 29	13 37.08	- 3 40.1	3.561	2.634	7.1	8.7	18.9E
2009 9 30	13 38.67	- 3 51.1	3.566	2.635	6.9	8.7	18.4E
2009 10 1	13 40.27	- 4 2.1	3.570	2.635	6.7	8.7	17.9E
2009 10 2	13 41.87	- 4 13.1	3.574	2.636	6.5	8.7	17.4E
2009 10 3	13 43.48	- 4 24.0	3.578	2.637	6.3	8.7	16.8E
2009 10 4	13 45.08	- 4 34.9	3.582	2.637	6.1	8.7	16.3E
2009 10 5	13 46.69	- 4 45.8	3.586	2.638	5.9	8.7	15.8E
2009 10 6	13 48.30	- 4 56.6	3.590	2.639	5.7	8.7	15.3E
2009 10 7	13 49.91	- 5 7.4	3.594	2.639	5.5	8.7	14.8E
2009 10 8	13 51.53	- 5 18.2	3.597	2.640	5.4	8.7	14.3E
2009 10 9	13 53.14	- 5 28.9	3.600	2.641	5.2	8.7	13.8E
2009 10 10	13 54.76	- 5 39.6	3.604	2.642	5.0	8.7	13.3E
2009 10 11	13 56.38	- 5 50.2	3.607	2.642	4.8	8.7	12.8E
2009 10 12	13 58.01	- 6 0.8	3.610	2.643	4.6	8.7	12.3E
2009 10 13	13 59.63	- 6 11.3	3.613	2.644	4.4	8.6	11.8E
2009 10 14	14 1.26	- 6 21.8	3.615	2.644	4.2	8.6	11.3E
2009 10 15	14 2.89	- 6 32.3	3.618	2.645	4.1	8.6	10.8E
2009 10 16	14 4.52	- 6 42.7	3.621	2.646	3.9	8.6	10.3E
2009 10 17	14 6.16	- 6 53.1	3.623	2.647	3.7	8.6	9.9E
2009 10 18	14 7.79	- 7 3.4	3.625	2.647	3.5	8.6	9.4E
2009 10 19	14 9.43	- 7 13.7	3.628	2.648	3.3	8.6	8.9E
2009 10 20	14 11.07	- 7 23.9	3.630	2.649	3.2	8.6	8.5E
2009 10 21	14 12.71	- 7 34.1	3.632	2.650	3.0	8.6	8.1E
2009 10 22	14 14.36	- 7 44.2	3.633	2.650	2.9	8.6	7.6E
2009 10 23	14 16.00	- 7 54.3	3.635	2.651	2.7	8.6	7.3E
2009 10 24	14 17.65	- 8 4.4	3.637	2.652	2.6	8.5	6.9E
2009 10 25	14 19.30	- 8 14.3	3.638	2.652	2.4	8.5	6.5E
2009 10 26	14 20.95	- 8 24.3	3.639	2.653	2.3	8.5	6.2E
2009 10 27	14 22.60	- 8 34.2	3.640	2.654	2.2	8.5	5.9E
2009 10 28	14 24.26	- 8 44.0	3.642	2.655	2.1	8.5	5.7E
2009 10 29	14 25.92	- 8 53.8	3.642	2.655	2.0	8.5	5.5E
2009 10 30	14 27.57	- 9 3.5	3.643	2.656	2.0	8.5	5.3E
2009 10 31	14 29.23	- 9 13.2	3.644	2.657	2.0	8.5	5.2E
2009 11 1	14 30.90	- 9 22.8	3.645	2.658	1.9	8.5	5.2E
2009 11 2	14 32.56	- 9 32.4	3.645	2.658	1.9	8.5	5.2E
2009 11 3	14 34.22	- 9 41.9	3.645	2.659	2.0	8.5	5.3E
2009 11 4	14 35.89	- 9 51.4	3.645	2.660	2.0	8.5	5.4W
2009 11 5	14 37.56	-10 0.7	3.646	2.661	2.1	8.5	5.6W
2009 11 6	14 39.23	-10 10.1	3.645	2.661	2.2	8.5	5.9W

1 Ceres

Date			R.A.2000	Decl.2000	Delta	r	Phase	Mag	Elong.
Year	m	d	hh mm.mm	dd pp.p	U.A	A.U.	°	v	°
2009	11	7	14 40.90	-10 19.4	3.645	2.662	2.3	8.5	6.2W
2009	11	8	14 42.57	-10 28.6	3.645	2.663	2.4	8.6	6.5W
2009	11	9	14 44.24	-10 37.8	3.645	2.664	2.5	8.6	6.8W
2009	11	10	14 45.91	-10 46.9	3.644	2.664	2.7	8.6	7.2W
2009	11	11	14 47.59	-10 55.9	3.643	2.665	2.8	8.6	7.6W
2009	11	12	14 49.27	-11 4.9	3.642	2.666	3.0	8.6	8.0W
2009	11	13	14 50.94	-11 13.8	3.641	2.667	3.1	8.6	8.5W
2009	11	14	14 52.62	-11 22.7	3.640	2.667	3.3	8.6	8.9W
2009	11	15	14 54.30	-11 31.5	3.639	2.668	3.5	8.6	9.4W
2009	11	16	14 55.98	-11 40.2	3.638	2.669	3.7	8.6	9.9W
2009	11	17	14 57.66	-11 48.9	3.636	2.670	3.8	8.6	10.4W
2009	11	18	14 59.34	-11 57.5	3.635	2.670	4.0	8.7	10.9W
2009	11	19	15 1.03	-12 6.0	3.633	2.671	4.2	8.7	11.4W
2009	11	20	15 2.71	-12 14.5	3.631	2.672	4.4	8.7	11.9W
2009	11	21	15 4.39	-12 22.9	3.629	2.673	4.6	8.7	12.4W
2009	11	22	15 6.08	-12 31.3	3.627	2.674	4.7	8.7	12.9W
2009	11	23	15 7.76	-12 39.6	3.625	2.674	4.9	8.7	13.5W
2009	11	24	15 9.45	-12 47.8	3.622	2.675	5.1	8.7	14.0W
2009	11	25	15 11.13	-12 55.9	3.620	2.676	5.3	8.7	14.6W
2009	11	26	15 12.82	-13 4.0	3.617	2.677	5.5	8.7	15.1W
2009	11	27	15 14.51	-13 12.0	3.614	2.677	5.7	8.7	15.6W
2009	11	28	15 16.19	-13 20.0	3.612	2.678	5.9	8.8	16.2W
2009	11	29	15 17.88	-13 27.8	3.609	2.679	6.1	8.8	16.7W
2009	11	30	15 19.57	-13 35.6	3.605	2.680	6.3	8.8	17.3W
2009	12	1	15 21.25	-13 43.4	3.602	2.681	6.5	8.8	17.8W
2009	12	2	15 22.94	-13 51.1	3.599	2.681	6.7	8.8	18.4W
2009	12	3	15 24.63	-13 58.6	3.595	2.682	6.9	8.8	19.0W
2009	12	4	15 26.31	-14 6.2	3.591	2.683	7.1	8.8	19.5W
2009	12	5	15 28.00	-14 13.6	3.588	2.684	7.3	8.8	20.1W
2009	12	6	15 29.68	-14 21.0	3.584	2.684	7.4	8.8	20.7W
2009	12	7	15 31.37	-14 28.3	3.580	2.685	7.6	8.8	21.2W
2009	12	8	15 33.05	-14 35.6	3.576	2.686	7.8	8.8	21.8W
2009	12	9	15 34.74	-14 42.7	3.571	2.687	8.0	8.8	22.4W
2009	12	10	15 36.42	-14 49.8	3.567	2.688	8.2	8.8	23.0W
2009	12	11	15 38.10	-14 56.9	3.562	2.688	8.4	8.8	23.5W
2009	12	12	15 39.78	-15 3.8	3.558	2.689	8.6	8.9	24.1W
2009	12	13	15 41.47	-15 10.7	3.553	2.690	8.8	8.9	24.7W
2009	12	14	15 43.14	-15 17.5	3.548	2.691	9.0	8.9	25.3W
2009	12	15	15 44.82	-15 24.2	3.543	2.692	9.2	8.9	25.9W
2009	12	16	15 46.50	-15 30.9	3.538	2.692	9.4	8.9	26.5W
2009	12	17	15 48.18	-15 37.5	3.532	2.693	9.6	8.9	27.0W
2009	12	18	15 49.85	-15 44.0	3.527	2.694	9.8	8.9	27.6W
2009	12	19	15 51.52	-15 50.4	3.521	2.695	9.9	8.9	28.2W
2009	12	20	15 53.19	-15 56.8	3.516	2.696	10.1	8.9	28.8W
2009	12	21	15 54.86	-16 3.1	3.510	2.696	10.3	8.9	29.4W
2009	12	22	15 56.53	-16 9.3	3.504	2.697	10.5	8.9	30.0W
2009	12	23	15 58.20	-16 15.5	3.498	2.698	10.7	8.9	30.6W
2009	12	24	15 59.86	-16 21.5	3.492	2.699	10.9	8.9	31.2W
2009	12	25	16 1.52	-16 27.5	3.485	2.700	11.1	8.9	31.8W
2009	12	26	16 3.18	-16 33.4	3.479	2.700	11.3	8.9	32.4W
2009	12	27	16 4.84	-16 39.3	3.472	2.701	11.4	8.9	33.0W
2009	12	28	16 6.49	-16 45.1	3.466	2.702	11.6	8.9	33.6W
2009	12	29	16 8.14	-16 50.8	3.459	2.703	11.8	8.9	34.2W
2009	12	30	16 9.79	-16 56.4	3.452	2.704	12.0	8.9	34.8W
2009	12	31	16 11.44	-17 1.9	3.445	2.704	12.2	8.9	35.4W

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Date	R.A.2000	Decl.2000	Delta	r	Phase	Mag	Elong.
Year m d	hh mm.mm	dd pp.p	U.A	A.U.	°	V	°
2009	1 1	4 51.50	-31 38.2	1.584	2.231	22.7	8.0 118.9E
2009	1 2	4 50.90	-31 29.3	1.586	2.230	22.8	8.0 118.5E
2009	1 3	4 50.32	-31 20.0	1.588	2.228	22.9	8.0 118.2E
2009	1 4	4 49.77	-31 10.3	1.591	2.227	23.0	8.0 117.8E
2009	1 5	4 49.25	-31 0.2	1.594	2.225	23.1	8.0 117.4E
2009	1 6	4 48.75	-30 49.7	1.596	2.223	23.2	8.0 117.1E
2009	1 7	4 48.28	-30 38.7	1.599	2.222	23.3	8.0 116.7E
2009	1 8	4 47.84	-30 27.4	1.602	2.220	23.4	8.0 116.3E
2009	1 9	4 47.43	-30 15.7	1.605	2.219	23.5	8.1 115.9E
2009	1 10	4 47.05	-30 3.6	1.608	2.217	23.6	8.1 115.5E
2009	1 11	4 46.70	-29 51.1	1.612	2.216	23.7	8.1 115.1E
2009	1 12	4 46.38	-29 38.3	1.615	2.215	23.8	8.1 114.7E
2009	1 13	4 46.09	-29 25.2	1.619	2.213	23.9	8.1 114.3E
2009	1 14	4 45.84	-29 11.7	1.622	2.212	24.0	8.1 113.9E
2009	1 15	4 45.61	-28 57.9	1.626	2.210	24.1	8.1 113.5E
2009	1 16	4 45.41	-28 43.8	1.630	2.209	24.2	8.1 113.1E
2009	1 17	4 45.25	-28 29.4	1.633	2.207	24.3	8.1 112.6E
2009	1 18	4 45.12	-28 14.7	1.637	2.206	24.4	8.1 112.2E
2009	1 19	4 45.02	-27 59.7	1.641	2.205	24.5	8.1 111.8E
2009	1 20	4 44.96	-27 44.5	1.645	2.203	24.6	8.1 111.3E
2009	1 21	4 44.92	-27 29.0	1.650	2.202	24.7	8.1 110.9E
2009	1 22	4 44.92	-27 13.2	1.654	2.200	24.8	8.1 110.5E
2009	1 23	4 44.95	-26 57.2	1.658	2.199	24.9	8.1 110.0E
2009	1 24	4 45.02	-26 41.0	1.663	2.198	25.0	8.2 109.6E
2009	1 25	4 45.11	-26 24.5	1.667	2.196	25.1	8.2 109.1E
2009	1 26	4 45.24	-26 7.9	1.672	2.195	25.1	8.2 108.7E
2009	1 27	4 45.40	-25 51.0	1.677	2.194	25.2	8.2 108.2E
2009	1 28	4 45.60	-25 34.0	1.681	2.193	25.3	8.2 107.8E
2009	1 29	4 45.82	-25 16.7	1.686	2.191	25.4	8.2 107.3E
2009	1 30	4 46.08	-24 59.3	1.691	2.190	25.5	8.2 106.8E
2009	1 31	4 46.36	-24 41.7	1.696	2.189	25.6	8.2 106.4E
2009	2 1	4 46.68	-24 24.0	1.701	2.188	25.7	8.2 105.9E
2009	2 2	4 47.03	-24 6.2	1.707	2.186	25.8	8.2 105.5E
2009	2 3	4 47.42	-23 48.1	1.712	2.185	25.8	8.2 105.0E
2009	2 4	4 47.83	-23 30.0	1.717	2.184	25.9	8.2 104.5E
2009	2 5	4 48.27	-23 11.7	1.723	2.183	26.0	8.3 104.1E
2009	2 6	4 48.75	-22 53.4	1.728	2.182	26.1	8.3 103.6E
2009	2 7	4 49.25	-22 34.9	1.734	2.180	26.1	8.3 103.1E
2009	2 8	4 49.78	-22 16.3	1.739	2.179	26.2	8.3 102.6E
2009	2 9	4 50.35	-21 57.7	1.745	2.178	26.3	8.3 102.2E
2009	2 10	4 50.94	-21 38.9	1.751	2.177	26.4	8.3 101.7E
2009	2 11	4 51.56	-21 20.1	1.757	2.176	26.4	8.3 101.2E
2009	2 12	4 52.21	-21 1.3	1.763	2.175	26.5	8.3 100.7E
2009	2 13	4 52.88	-20 42.3	1.768	2.174	26.5	8.3 100.3E
2009	2 14	4 53.59	-20 23.4	1.775	2.173	26.6	8.3 99.8E
2009	2 15	4 54.32	-20 4.3	1.781	2.172	26.7	8.3 99.3E
2009	2 16	4 55.08	-19 45.3	1.787	2.171	26.7	8.3 98.8E
2009	2 17	4 55.87	-19 26.2	1.793	2.169	26.8	8.3 98.4E
2009	2 18	4 56.69	-19 7.1	1.799	2.168	26.8	8.4 97.9E
2009	2 19	4 57.53	-18 47.9	1.806	2.167	26.9	8.4 97.4E
2009	2 20	4 58.39	-18 28.8	1.812	2.166	26.9	8.4 96.9E
2009	2 21	4 59.28	-18 9.6	1.819	2.165	27.0	8.4 96.5E
2009	2 22	5 0.20	-17 50.5	1.825	2.165	27.0	8.4 96.0E
2009	2 23	5 1.14	-17 31.4	1.832	2.164	27.1	8.4 95.5E
2009	2 24	5 2.11	-17 12.2	1.838	2.163	27.1	8.4 95.0E
2009	2 25	5 3.10	-16 53.1	1.845	2.162	27.2	8.4 94.5E
2009	2 26	5 4.12	-16 34.0	1.852	2.161	27.2	8.4 94.1E
2009	2 27	5 5.16	-16 15.0	1.859	2.160	27.2	8.4 93.6E
2009	2 28	5 6.22	-15 56.0	1.865	2.159	27.3	8.4 93.1E
2009	3 1	5 7.30	-15 37.0	1.872	2.158	27.3	8.4 92.6E
2009	3 2	5 8.41	-15 18.1	1.879	2.157	27.3	8.5 92.1E
2009	3 3	5 9.54	-14 59.2	1.886	2.156	27.4	8.5 91.7E
2009	3 4	5 10.69	-14 40.4	1.894	2.156	27.4	8.5 91.2E
2009	3 5	5 11.87	-14 21.6	1.901	2.155	27.4	8.5 90.7E
2009	3 6	5 13.06	-14 2.9	1.908	2.154	27.4	8.5 90.2E
2009	3 7	5 14.28	-13 44.3	1.915	2.153	27.4	8.5 89.8E
2009	3 8	5 15.51	-13 25.7	1.922	2.152	27.5	8.5 89.3E
2009	3 9	5 16.77	-13 7.2	1.930	2.152	27.5	8.5 88.8E
2009	3 10	5 18.05	-12 48.8	1.937	2.151	27.5	8.5 88.3E
2009	3 11	5 19.35	-12 30.5	1.945	2.150	27.5	8.5 87.9E
2009	3 12	5 20.66	-12 12.2	1.952	2.149	27.5	8.5 87.4E
2009	3 13	5 22.00	-11 54.1	1.960	2.149	27.5	8.5 86.9E
2009	3 14	5 23.35	-11 36.0	1.967	2.148	27.5	8.6 86.4E
2009	3 15	5 24.72	-11 18.1	1.975	2.147	27.5	8.6 85.9E
2009	3 16	5 26.12	-11 0.3	1.983	2.147	27.5	8.6 85.5E
2009	3 17	5 27.52	-10 42.5	1.990	2.146	27.5	8.6 85.0E
2009	3 18	5 28.95	-10 24.9	1.998	2.145	27.5	8.6 84.5E
2009	3 19	5 30.39	-10 7.4	2.006	2.145	27.5	8.6 84.1E

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Date Year m d	R.A.2000 hh mm.mm	Decl.2000 dd pp.p	Delta U.A	r A.U.	Phase °	Mag v	Elong. °
2009 3 20	5 31.86	- 9 50.0	2.014	2.144	27.5	8.6	83.6E
2009 3 21	5 33.33	- 9 32.7	2.022	2.144	27.5	8.6	83.1E
2009 3 22	5 34.83	- 9 15.5	2.029	2.143	27.5	8.6	82.6E
2009 3 23	5 36.34	- 8 58.5	2.037	2.143	27.4	8.6	82.2E
2009 3 24	5 37.86	- 8 41.6	2.045	2.142	27.4	8.6	81.7E
2009 3 25	5 39.41	- 8 24.8	2.053	2.141	27.4	8.6	81.2E
2009 3 26	5 40.96	- 8 8.1	2.062	2.141	27.4	8.6	80.7E
2009 3 27	5 42.54	- 7 51.6	2.070	2.140	27.4	8.6	80.3E
2009 3 28	5 44.12	- 7 35.3	2.078	2.140	27.3	8.7	79.8E
2009 3 29	5 45.73	- 7 19.0	2.086	2.140	27.3	8.7	79.3E
2009 3 30	5 47.34	- 7 2.9	2.094	2.139	27.3	8.7	78.9E
2009 3 31	5 48.97	- 6 47.0	2.102	2.139	27.2	8.7	78.4E
2009 4 1	5 50.62	- 6 31.2	2.111	2.138	27.2	8.7	77.9E
2009 4 2	5 52.28	- 6 15.5	2.119	2.138	27.2	8.7	77.5E
2009 4 3	5 53.95	- 5 60.0	2.127	2.137	27.1	8.7	77.0E
2009 4 4	5 55.63	- 5 44.6	2.136	2.137	27.1	8.7	76.5E
2009 4 5	5 57.33	- 5 29.4	2.144	2.137	27.0	8.7	76.1E
2009 4 6	5 59.04	- 5 14.4	2.153	2.136	27.0	8.7	75.6E
2009 4 7	6 0.76	- 4 59.5	2.161	2.136	26.9	8.7	75.1E
2009 4 8	6 2.49	- 4 44.8	2.170	2.136	26.9	8.7	74.7E
2009 4 9	6 4.24	- 4 30.2	2.178	2.135	26.8	8.7	74.2E
2009 4 10	6 6.00	- 4 15.8	2.187	2.135	26.8	8.7	73.7E
2009 4 11	6 7.76	- 4 1.5	2.195	2.135	26.7	8.8	73.3E
2009 4 12	6 9.55	- 3 47.5	2.204	2.134	26.7	8.8	72.8E
2009 4 13	6 11.34	- 3 33.5	2.213	2.134	26.6	8.8	72.3E
2009 4 14	6 13.14	- 3 19.8	2.221	2.134	26.5	8.8	71.9E
2009 4 15	6 14.95	- 3 6.2	2.230	2.134	26.5	8.8	71.4E
2009 4 16	6 16.77	- 2 52.8	2.239	2.134	26.4	8.8	70.9E
2009 4 17	6 18.60	- 2 39.6	2.247	2.133	26.3	8.8	70.5E
2009 4 18	6 20.45	- 2 26.5	2.256	2.133	26.3	8.8	70.0E
2009 4 19	6 22.30	- 2 13.6	2.265	2.133	26.2	8.8	69.6E
2009 4 20	6 24.16	- 2 0.9	2.274	2.133	26.1	8.8	69.1E
2009 4 21	6 26.03	- 1 48.3	2.282	2.133	26.0	8.8	68.6E
2009 4 22	6 27.91	- 1 35.9	2.291	2.133	25.9	8.8	68.2E
2009 4 23	6 29.80	- 1 23.7	2.300	2.133	25.9	8.8	67.7E
2009 4 24	6 31.69	- 1 11.7	2.309	2.132	25.8	8.8	67.3E
2009 4 25	6 33.60	- 0 59.8	2.318	2.132	25.7	8.8	66.8E
2009 4 26	6 35.51	- 0 48.2	2.327	2.132	25.6	8.8	66.3E
2009 4 27	6 37.43	- 0 36.7	2.336	2.132	25.5	8.8	65.9E
2009 4 28	6 39.36	- 0 25.4	2.345	2.132	25.4	8.9	65.4E
2009 4 29	6 41.30	- 0 14.2	2.353	2.132	25.3	8.9	65.0E
2009 4 30	6 43.24	- 0 3.2	2.362	2.132	25.2	8.9	64.5E
2009 5 1	6 45.19	+ 0 7.5	2.371	2.132	25.1	8.9	64.0E
2009 5 2	6 47.15	+ 0 18.1	2.380	2.132	25.0	8.9	63.6E
2009 5 3	6 49.12	+ 0 28.6	2.389	2.132	24.9	8.9	63.1E
2009 5 4	6 51.09	+ 0 38.8	2.398	2.132	24.8	8.9	62.7E
2009 5 5	6 53.07	+ 0 48.9	2.407	2.132	24.7	8.9	62.2E
2009 5 6	6 55.05	+ 0 58.8	2.416	2.133	24.6	8.9	61.7E
2009 5 7	6 57.04	+ 1 8.5	2.425	2.133	24.5	8.9	61.3E
2009 5 8	6 59.04	+ 1 18.0	2.434	2.133	24.4	8.9	60.8E
2009 5 9	7 1.04	+ 1 27.4	2.443	2.133	24.3	8.9	60.4E
2009 5 10	7 3.05	+ 1 36.6	2.452	2.133	24.2	8.9	59.9E
2009 5 11	7 5.06	+ 1 45.6	2.461	2.133	24.1	8.9	59.5E
2009 5 12	7 7.08	+ 1 54.4	2.470	2.133	23.9	8.9	59.0E
2009 5 13	7 9.10	+ 2 3.0	2.479	2.134	23.8	8.9	58.5E
2009 5 14	7 11.13	+ 2 11.5	2.488	2.134	23.7	8.9	58.1E
2009 5 15	7 13.16	+ 2 19.8	2.497	2.134	23.6	8.9	57.6E
2009 5 16	7 15.20	+ 2 27.9	2.506	2.134	23.5	8.9	57.2E
2009 5 17	7 17.24	+ 2 35.8	2.515	2.135	23.3	8.9	56.7E
2009 5 18	7 19.28	+ 2 43.5	2.524	2.135	23.2	8.9	56.3E
2009 5 19	7 21.33	+ 2 51.1	2.533	2.135	23.1	8.9	55.8E
2009 5 20	7 23.39	+ 2 58.5	2.542	2.135	22.9	9.0	55.3E
2009 5 21	7 25.44	+ 3 5.7	2.551	2.136	22.8	9.0	54.9E
2009 5 22	7 27.50	+ 3 12.8	2.560	2.136	22.7	9.0	54.4E
2009 5 23	7 29.57	+ 3 19.7	2.569	2.136	22.5	9.0	54.0E
2009 5 24	7 31.64	+ 3 26.4	2.578	2.137	22.4	9.0	53.5E
2009 5 25	7 33.71	+ 3 32.9	2.586	2.137	22.3	9.0	53.1E
2009 5 26	7 35.78	+ 3 39.3	2.595	2.138	22.1	9.0	52.6E
2009 5 27	7 37.86	+ 3 45.5	2.604	2.138	22.0	9.0	52.2E
2009 5 28	7 39.93	+ 3 51.5	2.613	2.138	21.8	9.0	51.7E
2009 5 29	7 42.02	+ 3 57.3	2.622	2.139	21.7	9.0	51.2E
2009 5 30	7 44.10	+ 4 3.0	2.631	2.139	21.5	9.0	50.8E
2009 5 31	7 46.19	+ 4 8.5	2.640	2.140	21.4	9.0	50.3E
2009 6 1	7 48.28	+ 4 13.9	2.648	2.140	21.2	9.0	49.9E
2009 6 2	7 50.37	+ 4 19.1	2.657	2.141	21.1	9.0	49.4E
2009 6 3	7 52.46	+ 4 24.1	2.666	2.141	20.9	9.0	49.0E
2009 6 4	7 54.55	+ 4 29.0	2.675	2.142	20.8	9.0	48.5E
2009 7 24	9 39.36	+ 5 30.3	3.060	2.186	11.5	9.0	25.4E
2009 7 25	9 41.42	+ 5 28.5	3.066	2.187	11.3	9.0	24.9E

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Date Year m d	R.A.2000 hh mm.mm	Decl.2000 dd pp.p	Delta U.A	r A.U.	Phase °	Mag v	Elong. °
2009 7 26	9 43.49	+ 5 26.6	3.072	2.188	11.1	9.0	24.4E
2009 7 27	9 45.55	+ 5 24.7	3.078	2.189	10.9	9.0	24.0E
2009 7 28	9 47.61	+ 5 22.6	3.084	2.191	10.6	9.0	23.5E
2009 7 29	9 49.67	+ 5 20.5	3.090	2.192	10.4	9.0	23.0E
2009 7 30	9 51.72	+ 5 18.3	3.096	2.193	10.2	9.0	22.5E
2009 7 31	9 53.77	+ 5 15.9	3.102	2.195	10.0	9.0	22.1E
2009 8 1	9 55.82	+ 5 13.5	3.108	2.196	9.8	9.0	21.6E
2009 8 2	9 57.87	+ 5 11.1	3.113	2.197	9.6	9.0	21.1E
2009 8 3	9 59.92	+ 5 8.5	3.119	2.199	9.4	9.0	20.6E
2009 8 4	10 1.96	+ 5 5.9	3.124	2.200	9.1	9.0	20.2E
2009 8 5	10 4.01	+ 5 3.2	3.130	2.201	8.9	9.0	19.7E
2009 8 6	10 6.05	+ 5 0.4	3.135	2.203	8.7	9.0	19.2E
2009 8 7	10 8.08	+ 4 57.5	3.140	2.204	8.5	8.9	18.7E
2009 8 8	10 10.12	+ 4 54.6	3.145	2.205	8.3	8.9	18.2E
2009 8 9	10 12.15	+ 4 51.6	3.150	2.207	8.1	8.9	17.8E
2009 8 10	10 14.18	+ 4 48.5	3.155	2.208	7.8	8.9	17.3E
2009 8 11	10 16.21	+ 4 45.4	3.160	2.210	7.6	8.9	16.8E
2009 8 12	10 18.24	+ 4 42.2	3.165	2.211	7.4	8.9	16.3E
2009 8 13	10 20.26	+ 4 39.0	3.170	2.212	7.2	8.9	15.8E
2009 8 14	10 22.28	+ 4 35.6	3.174	2.214	7.0	8.9	15.3E
2009 8 15	10 24.30	+ 4 32.2	3.179	2.215	6.7	8.9	14.9E
2009 8 16	10 26.32	+ 4 28.8	3.183	2.217	6.5	8.9	14.4E
2009 8 17	10 28.33	+ 4 25.3	3.188	2.218	6.3	8.9	13.9E
2009 8 18	10 30.34	+ 4 21.8	3.192	2.220	6.1	8.9	13.4E
2009 8 19	10 32.35	+ 4 18.1	3.196	2.221	5.8	8.9	12.9E
2009 8 20	10 34.36	+ 4 14.5	3.200	2.223	5.6	8.9	12.4E
2009 8 21	10 36.36	+ 4 10.8	3.204	2.224	5.4	8.9	11.9E
2009 8 22	10 38.37	+ 4 7.0	3.208	2.226	5.2	8.9	11.5E
2009 8 23	10 40.37	+ 4 3.2	3.212	2.227	5.0	8.8	11.0E
2009 8 24	10 42.36	+ 3 59.3	3.216	2.229	4.7	8.8	10.5E
2009 8 25	10 44.36	+ 3 55.4	3.219	2.231	4.5	8.8	10E
2009 8 26	10 46.35	+ 3 51.5	3.223	2.232	4.3	8.8	9.5E
2009 8 27	10 48.34	+ 3 47.5	3.226	2.234	4.1	8.8	9.0E
2009 8 28	10 50.33	+ 3 43.5	3.229	2.235	3.8	8.8	8.5E
2009 8 29	10 52.32	+ 3 39.4	3.233	2.237	3.6	8.8	8.0E
2009 8 30	10 54.30	+ 3 35.3	3.236	2.239	3.4	8.8	7.5E
2009 8 31	10 56.28	+ 3 31.2	3.239	2.240	3.2	8.8	7.0E
2009 9 1	10 58.26	+ 3 27.0	3.242	2.242	2.9	8.8	6.6E
2009 9 2	11 0.24	+ 3 22.8	3.244	2.244	2.7	8.7	6.1E
2009 9 3	11 2.21	+ 3 18.6	3.247	2.245	2.5	8.7	5.6E
2009 9 4	11 4.18	+ 3 14.3	3.250	2.247	2.3	8.7	5.1E
2009 9 5	11 6.15	+ 3 10.1	3.252	2.249	2.1	8.7	4.6E
2009 9 6	11 8.12	+ 3 5.7	3.255	2.250	1.8	8.7	4.1E
2009 9 7	11 10.08	+ 3 1.4	3.257	2.252	1.6	8.7	3.7E
2009 9 8	11 12.04	+ 2 57.0	3.259	2.254	1.4	8.7	3.2E
2009 9 9	11 14.00	+ 2 52.7	3.261	2.255	1.2	8.6	2.7E
2009 9 10	11 15.96	+ 2 48.3	3.263	2.257	1.0	8.6	2.3E
2009 9 11	11 17.92	+ 2 43.8	3.265	2.259	0.9	8.6	1.9E
2009 9 12	11 19.87	+ 2 39.4	3.267	2.261	0.7	8.6	1.6W
2009 9 13	11 21.82	+ 2 35.0	3.268	2.262	0.6	8.6	1.4W
2009 9 14	11 23.77	+ 2 30.5	3.270	2.264	0.6	8.6	1.4W
2009 9 15	11 25.72	+ 2 26.0	3.271	2.266	0.7	8.6	1.5W
2009 9 16	11 27.66	+ 2 21.5	3.272	2.268	0.8	8.6	1.8W
2009 9 17	11 29.60	+ 2 17.0	3.274	2.270	1	8.6	2.2W
2009 9 18	11 31.54	+ 2 12.5	3.275	2.271	1.2	8.7	2.6W
2009 9 19	11 33.48	+ 2 8.0	3.276	2.273	1.4	8.7	3.1W
2009 9 20	11 35.41	+ 2 3.5	3.277	2.275	1.6	8.7	3.5W
2009 9 21	11 37.35	+ 1 59.0	3.277	2.277	1.8	8.7	4.0W
2009 9 22	11 39.28	+ 1 54.5	3.278	2.279	2.0	8.7	4.5W
2009 9 23	11 41.20	+ 1 50.0	3.279	2.281	2.2	8.8	5.0W
2009 9 24	11 43.13	+ 1 45.5	3.279	2.282	2.4	8.8	5.5W
2009 9 25	11 45.05	+ 1 41.0	3.279	2.284	2.6	8.8	6.0W
2009 9 26	11 46.98	+ 1 36.5	3.279	2.286	2.9	8.8	6.5W
2009 9 27	11 48.89	+ 1 32.0	3.280	2.288	3.1	8.8	7.1W
2009 9 28	11 50.81	+ 1 27.5	3.279	2.290	3.3	8.8	7.6W
2009 9 29	11 52.73	+ 1 23.0	3.279	2.292	3.5	8.9	8.1W
2009 9 30	11 54.64	+ 1 18.6	3.279	2.294	3.7	8.9	8.6W
2009 10 1	11 56.55	+ 1 14.1	3.279	2.296	4.0	8.9	9.1W
2009 10 2	11 58.46	+ 1 9.7	3.278	2.298	4.2	8.9	9.7W
2009 10 3	12 0.36	+ 1 5.3	3.278	2.300	4.4	8.9	10.2W
2009 10 4	12 2.27	+ 1 0.9	3.277	2.301	4.6	8.9	10.7W
2009 10 5	12 4.17	+ 0 56.5	3.276	2.303	4.9	9.0	11.2W
2009 10 6	12 6.07	+ 0 52.2	3.275	2.305	5.1	9.0	11.8W
2009 10 7	12 7.96	+ 0 47.8	3.274	2.307	5.3	9.0	12.3W
2009 10 8	12 9.86	+ 0 43.5	3.273	2.309	5.5	9.0	12.8W

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Date Year m d	R.A.2000 hh mm.mm	Decl.2000 dd pp.p	Delta U.A	r A.U.	Phase °	Mag v	Elong. °
2009 8 3	0 13.31	+ 3 43.1	1.581	2.329	20.6	9.0	126.1W
2009 8 4	0 13.62	+ 3 39.8	1.569	2.326	20.4	9.0	127.0W
2009 8 5	0 13.91	+ 3 36.3	1.557	2.323	20.1	8.9	127.9W
2009 8 6	0 14.17	+ 3 32.5	1.545	2.320	19.9	8.9	128.9W
2009 8 7	0 14.41	+ 3 28.4	1.534	2.318	19.6	8.9	129.8W
2009 8 8	0 14.63	+ 3 24.1	1.522	2.315	19.4	8.8	130.7W
2009 8 9	0 14.82	+ 3 19.6	1.511	2.312	19.1	8.8	131.7W
2009 8 10	0 14.99	+ 3 14.8	1.499	2.310	18.8	8.8	132.6W
2009 8 11	0 15.13	+ 3 9.7	1.488	2.307	18.6	8.8	133.6W
2009 8 12	0 15.25	+ 3 4.3	1.477	2.304	18.3	8.7	134.6W
2009 8 13	0 15.35	+ 2 58.7	1.466	2.302	18.0	8.7	135.5W
2009 8 14	0 15.42	+ 2 52.9	1.456	2.299	17.6	8.7	136.5W
2009 8 15	0 15.46	+ 2 46.7	1.445	2.296	17.3	8.7	137.5W
2009 8 16	0 15.48	+ 2 40.3	1.435	2.294	17.0	8.6	138.5W
2009 8 17	0 15.47	+ 2 33.7	1.425	2.291	16.7	8.6	139.5W
2009 8 18	0 15.44	+ 2 26.7	1.415	2.288	16.3	8.6	140.5W
2009 8 19	0 15.38	+ 2 19.5	1.405	2.286	16.0	8.6	141.6W
2009 8 20	0 15.29	+ 2 12.1	1.395	2.283	15.6	8.5	142.6W
2009 8 21	0 15.19	+ 2 4.3	1.386	2.281	15.2	8.5	143.6W
2009 8 22	0 15.05	+ 1 56.3	1.376	2.278	14.9	8.5	144.7W
2009 8 23	0 14.89	+ 1 48.1	1.367	2.275	14.5	8.4	145.7W
2009 8 24	0 14.71	+ 1 39.6	1.358	2.273	14.1	8.4	146.8W
2009 8 25	0 14.50	+ 1 30.8	1.350	2.270	13.7	8.4	147.9W
2009 8 26	0 14.26	+ 1 21.8	1.341	2.268	13.3	8.4	149.0W
2009 8 27	0 14.00	+ 1 12.5	1.333	2.265	12.9	8.3	150.0W
2009 8 28	0 13.72	+ 1 2.9	1.325	2.262	12.4	8.3	151.1W
2009 8 29	0 13.41	+ 0 53.2	1.317	2.260	12.0	8.3	152.2W
2009 8 30	0 13.08	+ 0 43.2	1.309	2.257	11.6	8.2	153.3W
2009 8 31	0 12.73	+ 0 32.9	1.301	2.255	11.1	8.2	154.5W
2009 9 1	0 12.35	+ 0 22.4	1.294	2.252	10.7	8.2	155.6W
2009 9 2	0 11.96	+ 0 11.7	1.287	2.250	10.2	8.2	156.7W
2009 9 3	0 11.54	+ 0 0.8	1.280	2.247	9.8	8.1	157.8W
2009 9 4	0 11.09	- 0 10.3	1.274	2.244	9.3	8.1	159.0W
2009 9 5	0 10.63	- 0 21.7	1.267	2.242	8.8	8.1	160.1W
2009 9 6	0 10.15	- 0 33.2	1.261	2.239	8.3	8.0	161.2W
2009 9 7	0 9.65	- 0 44.9	1.255	2.237	7.8	8.0	162.4W
2009 9 8	0 9.13	- 0 56.8	1.250	2.234	7.3	8.0	163.5W
2009 9 9	0 8.59	- 1 8.9	1.244	2.232	6.8	8.0	164.7W
2009 9 10	0 8.04	- 1 21.1	1.239	2.229	6.3	7.9	165.8W
2009 9 11	0 7.46	- 1 33.4	1.234	2.227	5.8	7.9	167.0W
2009 9 12	0 6.88	- 1 45.9	1.230	2.224	5.3	7.9	168.1W
2009 9 13	0 6.28	- 1 58.5	1.225	2.222	4.8	7.8	169.3W
2009 9 14	0 5.66	- 2 11.3	1.221	2.219	4.3	7.8	170.4W
2009 9 15	0 5.04	- 2 24.1	1.217	2.217	3.8	7.8	171.5W
2009 9 16	0 4.40	- 2 37.0	1.214	2.215	3.4	7.7	172.6W
2009 9 17	0 3.75	- 2 50.0	1.210	2.212	2.9	7.7	173.6W
2009 9 18	0 3.09	- 3 3.1	1.207	2.210	2.4	7.7	174.6W
2009 9 19	0 2.42	- 3 16.2	1.204	2.207	2.1	7.6	175.5W
2009 9 20	0 1.75	- 3 29.3	1.202	2.205	1.8	7.6	176.1W
2009 9 21	0 1.07	- 3 42.5	1.199	2.202	1.6	7.6	176.4W
2009 9 22	0 0.39	- 3 55.7	1.197	2.200	1.7	7.6	176.3W
2009 9 23	23 59.70	- 4 8.8	1.195	2.198	1.9	7.6	175.9E
2009 9 24	23 59.01	- 4 22.0	1.194	2.195	2.2	7.6	175.1E
2009 9 25	23 58.32	- 4 35.1	1.193	2.193	2.6	7.6	174.2E
2009 9 26	23 57.63	- 4 48.2	1.192	2.190	3.1	7.7	173.2E
2009 9 27	23 56.94	- 5 1.2	1.191	2.188	3.6	7.7	172.1E
2009 9 28	23 56.25	- 5 14.1	1.190	2.186	4.1	7.7	171.0E
2009 9 29	23 55.57	- 5 26.9	1.190	2.183	4.6	7.7	169.9E
2009 9 30	23 54.89	- 5 39.7	1.190	2.181	5.1	7.7	168.7E
2009 10 1	23 54.22	- 5 52.3	1.190	2.179	5.7	7.8	167.6E
2009 10 2	23 53.56	- 6 4.8	1.191	2.176	6.2	7.8	166.4E
2009 10 3	23 52.90	- 6 17.1	1.191	2.174	6.7	7.8	165.2E
2009 10 4	23 52.26	- 6 29.3	1.192	2.172	7.3	7.8	164.0E
2009 10 5	23 51.63	- 6 41.3	1.194	2.169	7.8	7.8	162.8E
2009 10 6	23 51.01	- 6 53.2	1.195	2.167	8.3	7.9	161.7E
2009 10 7	23 50.40	- 7 4.8	1.197	2.165	8.9	7.9	160.5E
2009 10 8	23 49.81	- 7 16.3	1.199	2.163	9.4	7.9	159.3E
2009 10 9	23 49.23	- 7 27.5	1.201	2.160	9.9	7.9	158.1E
2009 10 10	23 48.67	- 7 38.5	1.203	2.158	10.4	7.9	156.9E
2009 10 11	23 48.13	- 7 49.3	1.206	2.156	11.0	7.9	155.8E
2009 10 12	23 47.60	- 7 59.8	1.209	2.154	11.5	8.0	154.6E
2009 10 13	23 47.10	- 8 10.1	1.212	2.151	12.0	8.0	153.4E
2009 10 14	23 46.62	- 8 20.2	1.215	2.149	12.5	8.0	152.3E
2009 10 15	23 46.15	- 8 30.0	1.219	2.147	13.0	8.0	151.1E
2009 10 16	23 45.71	- 8 39.5	1.223	2.145	13.4	8.0	150.0E
2009 10 17	23 45.30	- 8 48.7	1.227	2.143	13.9	8.1	148.9E
2009 10 18	23 44.91	- 8 57.7	1.231	2.140	14.4	8.1	147.7E
2009 10 19	23 44.54	- 9 6.3	1.235	2.138	14.9	8.1	146.6E
2009 10 20	23 44.20	- 9 14.7	1.240	2.136	15.3	8.1	145.5E

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Date Year m d	R.A.2000 hh mm.mm	Decl.2000 dd pp.p	Delta U.A	r A.U.	Phase °	Mag v	Elong. °
2009 10 21	23 43.88	- 9 22.8	1.244	2.134	15.8	8.1	144.4E
2009 10 22	23 43.59	- 9 30.5	1.249	2.132	16.2	8.2	143.3E
2009 10 23	23 43.33	- 9 38.0	1.255	2.130	16.7	8.2	142.2E
2009 10 24	23 43.09	- 9 45.2	1.260	2.128	17.1	8.2	141.1E
2009 10 25	23 42.88	- 9 52.0	1.265	2.125	17.5	8.2	140.0E
2009 10 26	23 42.71	- 9 58.6	1.271	2.123	17.9	8.2	138.9E
2009 10 27	23 42.55	-10 4.8	1.277	2.121	18.3	8.2	137.9E
2009 10 28	23 42.43	-10 10.7	1.283	2.119	18.7	8.3	136.8E
2009 10 29	23 42.34	-10 16.3	1.289	2.117	19.1	8.3	135.8E
2009 10 30	23 42.28	-10 21.6	1.295	2.115	19.5	8.3	134.7E
2009 10 31	23 42.25	-10 26.6	1.302	2.113	19.9	8.3	133.7E
2009 11 1	23 42.24	-10 31.2	1.308	2.111	20.2	8.3	132.7E
2009 11 2	23 42.27	-10 35.6	1.315	2.109	20.6	8.4	131.6E
2009 11 3	23 42.33	-10 39.6	1.322	2.107	20.9	8.4	130.6E
2009 11 4	23 42.42	-10 43.3	1.329	2.105	21.3	8.4	129.6E
2009 11 5	23 42.54	-10 46.7	1.336	2.103	21.6	8.4	128.7E
2009 11 6	23 42.68	-10 49.8	1.343	2.101	21.9	8.4	127.7E
2009 11 7	23 42.86	-10 52.6	1.351	2.099	22.2	8.5	126.7E
2009 11 8	23 43.07	-10 55.1	1.358	2.097	22.5	8.5	125.7E
2009 11 9	23 43.31	-10 57.3	1.366	2.095	22.8	8.5	124.8E
2009 11 10	23 43.58	-10 59.2	1.374	2.094	23.1	8.5	123.8E
2009 11 11	23 43.88	-11 0.8	1.382	2.092	23.4	8.5	122.9E
2009 11 12	23 44.21	-11 2.1	1.390	2.090	23.7	8.5	122.0E
2009 11 13	23 44.57	-11 3.1	1.398	2.088	24.0	8.6	121.0E
2009 11 14	23 44.96	-11 3.9	1.406	2.086	24.2	8.6	120.1E
2009 11 15	23 45.38	-11 4.3	1.414	2.084	24.5	8.6	119.2E
2009 11 16	23 45.83	-11 4.5	1.422	2.082	24.7	8.6	118.3E
2009 11 17	23 46.30	-11 4.4	1.431	2.081	24.9	8.6	117.4E
2009 11 18	23 46.81	-11 4.0	1.439	2.079	25.2	8.6	116.6E
2009 11 19	23 47.34	-11 3.3	1.448	2.077	25.4	8.7	115.7E
2009 11 20	23 47.90	-11 2.4	1.457	2.075	25.6	8.7	114.8E
2009 11 21	23 48.49	-11 1.3	1.465	2.074	25.8	8.7	114.0E
2009 11 22	23 49.11	-10 59.8	1.474	2.072	26.0	8.7	113.1E
2009 11 23	23 49.75	-10 58.1	1.483	2.070	26.2	8.7	112.3E
2009 11 24	23 50.42	-10 56.2	1.492	2.068	26.4	8.7	111.4E
2009 11 25	23 51.12	-10 54.0	1.501	2.067	26.6	8.8	110.6E
2009 11 26	23 51.84	-10 51.5	1.510	2.065	26.7	8.8	109.8E
2009 11 27	23 52.59	-10 48.9	1.519	2.063	26.9	8.8	109.0E
2009 11 28	23 53.37	-10 46.0	1.529	2.062	27.0	8.8	108.2E
2009 11 29	23 54.17	-10 42.8	1.538	2.060	27.2	8.8	107.4E
2009 11 30	23 54.99	-10 39.4	1.547	2.058	27.3	8.8	106.6E
2009 12 1	23 55.84	-10 35.9	1.556	2.057	27.5	8.8	105.8E
2009 12 2	23 56.72	-10 32.0	1.566	2.055	27.6	8.9	105.0E
2009 12 3	23 57.62	-10 28.0	1.575	2.054	27.7	8.9	104.2E
2009 12 4	23 58.54	-10 23.8	1.585	2.052	27.8	8.9	103.5E
2009 12 5	23 59.48	-10 19.3	1.594	2.050	28.0	8.9	102.7E
2009 12 6	0 0.45	-10 14.7	1.604	2.049	28.1	8.9	102.0E
2009 12 7	0 1.44	-10 9.8	1.613	2.047	28.2	8.9	101.2E
2009 12 8	0 2.45	-10 4.7	1.623	2.046	28.3	8.9	100.5E
2009 12 9	0 3.49	- 9 59.5	1.632	2.044	28.3	9.0	99.7E
2009 12 10	0 4.54	- 9 54.0	1.642	2.043	28.4	9.0	99.0E
2009 12 11	0 5.62	- 9 48.4	1.652	2.041	28.5	9.0	98.3E
2009 12 12	0 6.72	- 9 42.6	1.662	2.040	28.6	9.0	97.6E

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Date Year m d	R.A.2000 hh mm.mm	Decl.2000 dd pp.p	Delta U.A	r A.U.	Phase °	Mag V	Elong. °
2009 1 1	2 2.68	+ 4 58.1	2.050	2.554	21.3	7.6	109.6E
2009 1 2	2 3.01	+ 5 4.1	2.063	2.554	21.4	7.6	108.7E
2009 1 3	2 3.36	+ 5 10.1	2.076	2.554	21.5	7.7	107.8E
2009 1 4	2 3.73	+ 5 16.3	2.089	2.555	21.6	7.7	106.9E
2009 1 5	2 4.13	+ 5 22.6	2.103	2.555	21.7	7.7	106.0E
2009 1 6	2 4.55	+ 5 28.9	2.116	2.555	21.8	7.7	105.1E
2009 1 7	2 4.99	+ 5 35.4	2.129	2.556	21.9	7.7	104.3E
2009 1 8	2 5.46	+ 5 41.9	2.143	2.556	22.0	7.7	103.4E
2009 1 9	2 5.95	+ 5 48.5	2.156	2.557	22.1	7.8	102.5E
2009 1 10	2 6.46	+ 5 55.2	2.169	2.557	22.1	7.8	101.7E
2009 1 11	2 6.99	+ 6 1.9	2.183	2.557	22.2	7.8	100.8E
2009 1 12	2 7.55	+ 6 8.8	2.196	2.558	22.3	7.8	100.0E
2009 1 13	2 8.12	+ 6 15.7	2.210	2.558	22.3	7.8	99.2E
2009 1 14	2 8.72	+ 6 22.7	2.223	2.558	22.4	7.8	98.3E
2009 1 15	2 9.33	+ 6 29.7	2.237	2.559	22.4	7.9	97.5E
2009 1 16	2 9.97	+ 6 36.8	2.251	2.559	22.4	7.9	96.7E
2009 1 17	2 10.63	+ 6 44.0	2.264	2.559	22.5	7.9	95.9E
2009 1 18	2 11.30	+ 6 51.2	2.278	2.560	22.5	7.9	95.0E
2009 1 19	2 12.00	+ 6 58.5	2.292	2.560	22.5	7.9	94.2E
2009 1 20	2 12.71	+ 7 5.9	2.305	2.560	22.6	7.9	93.4E
2009 1 21	2 13.45	+ 7 13.3	2.319	2.561	22.6	7.9	92.6E
2009 1 22	2 14.20	+ 7 20.7	2.333	2.561	22.6	7.9	91.8E
2009 1 23	2 14.97	+ 7 28.2	2.346	2.561	22.6	8.0	91.1E
2009 1 24	2 15.76	+ 7 35.8	2.360	2.561	22.6	8.0	90.3E
2009 1 25	2 16.57	+ 7 43.4	2.374	2.562	22.6	8.0	89.5E
2009 1 26	2 17.39	+ 7 51.0	2.388	2.562	22.6	8.0	88.7E
2009 1 27	2 18.23	+ 7 58.7	2.401	2.562	22.6	8.0	87.9E
2009 1 28	2 19.09	+ 8 6.4	2.415	2.563	22.6	8.0	87.2E
2009 1 29	2 19.97	+ 8 14.2	2.429	2.563	22.6	8.0	86.4E
2009 1 30	2 20.86	+ 8 22.0	2.442	2.563	22.5	8.0	85.6E
2009 1 31	2 21.77	+ 8 29.8	2.456	2.563	22.5	8.1	84.9E
2009 2 1	2 22.69	+ 8 37.7	2.470	2.564	22.5	8.1	84.1E
2009 2 2	2 23.63	+ 8 45.6	2.483	2.564	22.4	8.1	83.4E
2009 2 3	2 24.59	+ 8 53.5	2.497	2.564	22.4	8.1	82.6E
2009 2 4	2 25.56	+ 9 1.5	2.510	2.564	22.4	8.1	81.9E
2009 2 5	2 26.54	+ 9 9.5	2.524	2.565	22.3	8.1	81.2E
2009 2 6	2 27.55	+ 9 17.5	2.538	2.565	22.3	8.1	80.4E
2009 2 7	2 28.56	+ 9 25.5	2.551	2.565	22.2	8.1	79.7E
2009 2 8	2 29.59	+ 9 33.5	2.564	2.565	22.2	8.1	79.0E
2009 2 9	2 30.64	+ 9 41.6	2.578	2.566	22.1	8.2	78.2E
2009 2 10	2 31.70	+ 9 49.6	2.591	2.566	22.1	8.2	77.5E
2009 2 11	2 32.77	+ 9 57.7	2.605	2.566	22.0	8.2	76.8E
2009 2 12	2 33.85	+10 5.8	2.618	2.566	21.9	8.2	76.1E
2009 2 13	2 34.95	+10 13.9	2.631	2.567	21.9	8.2	75.4E
2009 2 14	2 36.07	+10 22.1	2.644	2.567	21.8	8.2	74.7E
2009 2 15	2 37.19	+10 30.2	2.658	2.567	21.7	8.2	74.0E
2009 2 16	2 38.33	+10 38.3	2.671	2.567	21.6	8.2	73.3E
2009 2 17	2 39.48	+10 46.5	2.684	2.567	21.5	8.2	72.6E
2009 2 18	2 40.65	+10 54.6	2.697	2.568	21.5	8.2	71.9E
2009 2 19	2 41.82	+11 2.7	2.710	2.568	21.4	8.2	71.2E
2009 2 20	2 43.01	+11 10.9	2.723	2.568	21.3	8.3	70.5E
2009 2 21	2 44.21	+11 19.0	2.736	2.568	21.2	8.3	69.8E
2009 2 22	2 45.43	+11 27.2	2.748	2.568	21.1	8.3	69.2E
2009 2 23	2 46.65	+11 35.3	2.761	2.569	21.0	8.3	68.5E
2009 2 24	2 47.89	+11 43.5	2.774	2.569	20.9	8.3	67.8E
2009 2 25	2 49.13	+11 51.6	2.786	2.569	20.8	8.3	67.1E
2009 2 26	2 50.39	+11 59.7	2.799	2.569	20.7	8.3	66.5E
2009 2 27	2 51.66	+12 7.8	2.811	2.569	20.6	8.3	65.8E
2009 2 28	2 52.94	+12 15.9	2.824	2.569	20.5	8.3	65.1E
2009 3 1	2 54.23	+12 24.0	2.836	2.570	20.4	8.3	64.5E
2009 3 2	2 55.53	+12 32.1	2.848	2.570	20.2	8.3	63.8E
2009 3 3	2 56.84	+12 40.1	2.861	2.570	20.1	8.3	63.1E
2009 3 4	2 58.17	+12 48.2	2.873	2.570	20.0	8.3	62.5E
2009 3 5	2 59.50	+12 56.2	2.885	2.570	19.9	8.3	61.8E
2009 3 6	3 0.84	+13 4.2	2.897	2.570	19.8	8.4	61.2E
2009 3 7	3 2.19	+13 12.2	2.909	2.570	19.6	8.4	60.5E
2009 3 8	3 3.56	+13 20.1	2.921	2.571	19.5	8.4	59.9E
2009 3 9	3 4.93	+13 28.1	2.932	2.571	19.4	8.4	59.3E
2009 3 10	3 6.31	+13 36.0	2.944	2.571	19.3	8.4	58.6E
2009 3 11	3 7.70	+13 43.9	2.956	2.571	19.1	8.4	58.0E
2009 3 12	3 9.10	+13 51.7	2.967	2.571	19.0	8.4	57.3E
2009 3 13	3 10.51	+13 59.6	2.979	2.571	18.9	8.4	56.7E
2009 3 14	3 11.93	+14 7.4	2.990	2.571	18.7	8.4	56.1E
2009 3 15	3 13.35	+14 15.2	3.001	2.571	18.6	8.4	55.5E
2009 3 16	3 14.79	+14 22.9	3.012	2.571	18.4	8.4	54.8E
2009 3 17	3 16.23	+14 30.6	3.023	2.572	18.3	8.4	54.2E
2009 3 18	3 17.69	+14 38.3	3.034	2.572	18.1	8.4	53.6E
2009 3 19	3 19.15	+14 46.0	3.045	2.572	18.0	8.4	53.0E
2009 3 20	3 20.62	+14 53.6	3.056	2.572	17.9	8.4	52.4E

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Date Year m d	R.A.2000 hh mm.mm	Decl.2000 dd pp.p	Delta U.A	r A.U.	Phase °	Mag v	Elong. °
2009 3 21	3 22.09	+15 1.2	3.067	2.572	17.7	8.4	51.7E
2009 3 22	3 23.58	+15 8.7	3.078	2.572	17.6	8.4	51.1E
2009 3 23	3 25.07	+15 16.2	3.088	2.572	17.4	8.4	50.5E
2009 3 24	3 26.58	+15 23.7	3.099	2.572	17.2	8.4	49.9E
2009 3 25	3 28.09	+15 31.1	3.109	2.572	17.1	8.4	49.3E
2009 3 26	3 29.60	+15 38.5	3.119	2.572	16.9	8.4	48.7E
2009 3 27	3 31.13	+15 45.8	3.129	2.572	16.8	8.4	48.1E
2009 3 28	3 32.66	+15 53.1	3.139	2.572	16.6	8.4	47.5E
2009 3 29	3 34.20	+16 0.4	3.149	2.572	16.5	8.4	46.9E
2009 3 30	3 35.75	+16 7.6	3.159	2.572	16.3	8.5	46.3E
2009 3 31	3 37.30	+16 14.8	3.169	2.572	16.1	8.5	45.7E
2009 4 1	3 38.86	+16 21.9	3.179	2.572	16.0	8.5	45.1E
2009 4 2	3 40.43	+16 29.0	3.188	2.573	15.8	8.5	44.5E
2009 4 3	3 42.01	+16 36.0	3.198	2.573	15.6	8.5	43.9E
2009 4 4	3 43.59	+16 42.9	3.207	2.573	15.5	8.5	43.3E
2009 4 5	3 45.18	+16 49.9	3.216	2.573	15.3	8.5	42.7E
2009 4 6	3 46.78	+16 56.7	3.225	2.573	15.1	8.5	42.1E
2009 4 7	3 48.38	+17 3.5	3.234	2.573	15.0	8.5	41.6E
2009 4 8	3 49.99	+17 10.3	3.243	2.573	14.8	8.5	41.0E
2009 4 9	3 51.60	+17 17.0	3.252	2.573	14.6	8.5	40.4E
2009 4 10	3 53.22	+17 23.7	3.261	2.573	14.4	8.5	39.8E
2009 4 11	3 54.85	+17 30.3	3.269	2.573	14.3	8.5	39.2E
2009 4 12	3 56.49	+17 36.8	3.278	2.573	14.1	8.5	38.7E
2009 4 13	3 58.13	+17 43.3	3.286	2.573	13.9	8.5	38.1E
2009 4 14	3 59.77	+17 49.7	3.295	2.573	13.7	8.5	37.5E
2009 4 15	4 1.43	+17 56.1	3.303	2.573	13.6	8.5	36.9E
2009 4 16	4 3.08	+18 2.4	3.311	2.573	13.4	8.5	36.4E
2009 4 17	4 4.75	+18 8.6	3.319	2.572	13.2	8.5	35.8E
2009 4 18	4 6.42	+18 14.8	3.327	2.572	13.0	8.5	35.2E
2009 4 19	4 8.09	+18 20.9	3.334	2.572	12.8	8.5	34.7E
2009 4 20	4 9.78	+18 26.9	3.342	2.572	12.6	8.5	34.1E
2009 4 21	4 11.46	+18 32.9	3.349	2.572	12.5	8.5	33.5E
2009 4 22	4 13.15	+18 38.9	3.357	2.572	12.3	8.5	33.0E
2009 4 23	4 14.85	+18 44.7	3.364	2.572	12.1	8.5	32.4E
2009 4 24	4 16.55	+18 50.5	3.371	2.572	11.9	8.5	31.9E
2009 4 25	4 18.26	+18 56.2	3.378	2.572	11.7	8.5	31.3E
2009 4 26	4 19.97	+19 1.9	3.385	2.572	11.5	8.5	30.7E
2009 4 27	4 21.69	+19 7.5	3.392	2.572	11.3	8.5	30.2E
2009 4 28	4 23.41	+19 13.0	3.398	2.572	11.2	8.5	29.6E
2009 4 29	4 25.14	+19 18.5	3.405	2.572	11.0	8.5	29.1E
2009 4 30	4 26.87	+19 23.9	3.411	2.572	10.8	8.5	28.5E
2009 5 1	4 28.61	+19 29.2	3.418	2.572	10.6	8.5	28.0E
2009 5 2	4 30.35	+19 34.4	3.424	2.572	10.4	8.5	27.4E
2009 5 3	4 32.10	+19 39.6	3.430	2.571	10.2	8.4	26.9E
2009 5 4	4 33.85	+19 44.7	3.436	2.571	10.0	8.4	26.3E
2009 5 5	4 35.60	+19 49.7	3.442	2.571	9.8	8.4	25.8E
2009 5 6	4 37.36	+19 54.7	3.448	2.571	9.6	8.4	25.2E
2009 5 7	4 39.12	+19 59.5	3.453	2.571	9.4	8.4	24.7E
2009 5 8	4 40.89	+20 4.3	3.459	2.571	9.2	8.4	24.1E
2009 5 9	4 42.66	+20 9.1	3.464	2.571	9.0	8.4	23.6E
2009 5 10	4 44.44	+20 13.7	3.469	2.571	8.8	8.4	23.0E
2009 5 11	4 46.22	+20 18.3	3.474	2.571	8.6	8.4	22.5E
2009 5 12	4 48.00	+20 22.8	3.479	2.570	8.4	8.4	22.0E
2009 5 13	4 49.79	+20 27.2	3.484	2.570	8.3	8.4	21.4E
2009 5 14	4 51.58	+20 31.6	3.489	2.570	8.1	8.4	20.9E
2009 5 15	4 53.38	+20 35.8	3.494	2.570	7.9	8.4	20.3E
2009 5 16	4 55.17	+20 40.0	3.498	2.570	7.7	8.4	19.8E
2009 5 17	4 56.98	+20 44.1	3.503	2.570	7.5	8.4	19.3E
2009 5 18	4 58.78	+20 48.2	3.507	2.570	7.3	8.4	18.7E
2009 5 19	5 0.59	+20 52.1	3.511	2.569	7.1	8.4	18.2E
2009 5 20	5 2.40	+20 56.0	3.515	2.569	6.9	8.4	17.7E
2009 5 21	5 4.22	+20 59.8	3.519	2.569	6.7	8.4	17.1E
2009 5 22	5 6.03	+21 3.5	3.523	2.569	6.5	8.4	16.6E
2009 5 23	5 7.86	+21 7.1	3.526	2.569	6.3	8.4	16.1E
2009 5 24	5 9.68	+21 10.7	3.530	2.569	6.1	8.4	15.5E
2009 5 25	5 11.51	+21 14.1	3.533	2.568	5.9	8.4	15.0E
2009 5 26	5 13.34	+21 17.5	3.537	2.568	5.7	8.4	14.5E
2009 5 27	5 15.17	+21 20.8	3.540	2.568	5.5	8.3	13.9E
2009 5 28	5 17.01	+21 24.0	3.543	2.568	5.3	8.3	13.4E
2009 5 29	5 18.84	+21 27.1	3.546	2.568	5.1	8.3	12.9E
2009 5 30	5 20.68	+21 30.2	3.548	2.567	4.8	8.3	12.4E
2009 5 31	5 22.53	+21 33.2	3.551	2.567	4.6	8.3	11.8E
2009 6 1	5 24.37	+21 36.0	3.554	2.567	4.4	8.3	11.3E
2009 6 2	5 26.22	+21 38.8	3.556	2.567	4.2	8.3	10.8E
2009 6 3	5 28.07	+21 41.5	3.558	2.567	4.0	8.3	10.3E
2009 6 4	5 29.92	+21 44.2	3.560	2.566	3.8	8.3	9.7E
2009 6 5	5 31.78	+21 46.7	3.562	2.566	3.6	8.3	9.2E
2009 6 6	5 33.63	+21 49.2	3.564	2.566	3.4	8.3	8.7E
2009 6 7	5 35.49	+21 51.5	3.566	2.566	3.2	8.3	8.2E

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Date Year m d	R.A.2000 hh mm.mm	Decl.2000 dd pp.p	Delta U.A	r A.U.	Phase °	Mag v	Elong. °
2009 6 8	5 37.35	+21 53.8	3.568	2.565	3.0	8.3	7.7E
2009 6 9	5 39.21	+21 56.0	3.569	2.565	2.8	8.2	7.1E
2009 6 10	5 41.08	+21 58.2	3.571	2.565	2.6	8.2	6.6E
2009 6 11	5 42.94	+22 0.2	3.572	2.565	2.4	8.2	6.1E
2009 6 12	5 44.81	+22 2.1	3.573	2.564	2.2	8.2	5.6E
2009 6 13	5 46.68	+22 4.0	3.574	2.564	2.0	8.2	5.1E
2009 6 14	5 48.55	+22 5.8	3.575	2.564	1.8	8.2	4.6E
2009 6 15	5 50.42	+22 7.4	3.576	2.564	1.6	8.2	4.1E
2009 6 16	5 52.29	+22 9.0	3.576	2.563	1.4	8.2	3.6E
2009 6 17	5 54.16	+22 10.6	3.577	2.563	1.2	8.2	3.1E
2009 6 18	5 56.04	+22 12.0	3.577	2.563	1.0	8.1	2.6E
2009 6 19	5 57.91	+22 13.3	3.578	2.563	0.9	8.1	2.2E
2009 6 20	5 59.79	+22 14.6	3.578	2.562	0.7	8.1	1.7E
2009 6 21	6 1.67	+22 15.7	3.578	2.562	0.6	8.1	1.4E
2009 6 22	6 3.54	+22 16.8	3.578	2.562	0.5	8.1	1.2E
2009 6 23	6 5.42	+22 17.8	3.578	2.561	0.5	8.1	1.2W
2009 6 24	6 7.30	+22 18.7	3.577	2.561	0.5	8.1	1.4W
2009 6 25	6 9.18	+22 19.6	3.577	2.561	0.7	8.1	1.7W
2009 6 26	6 11.06	+22 20.3	3.576	2.561	0.9	8.1	2.1W
2009 6 27	6 12.94	+22 20.9	3.575	2.560	1.0	8.1	2.6W
2009 6 28	6 14.82	+22 21.5	3.574	2.560	1.2	8.1	3.1W
2009 6 29	6 16.70	+22 22.0	3.573	2.560	1.4	8.2	3.6W
2009 6 30	6 18.59	+22 22.4	3.572	2.559	1.6	8.2	4.1W
2009 7 1	6 20.47	+22 22.7	3.571	2.559	1.8	8.2	4.6W
2009 7 2	6 22.35	+22 22.9	3.570	2.559	2.0	8.2	5.1W
2009 7 3	6 24.23	+22 23.1	3.568	2.558	2.2	8.2	5.6W
2009 7 4	6 26.11	+22 23.1	3.567	2.558	2.4	8.2	6.1W
2009 7 5	6 27.99	+22 23.1	3.565	2.558	2.6	8.2	6.6W
2009 7 6	6 29.88	+22 23.0	3.563	2.557	2.8	8.2	7.1W
2009 7 7	6 31.76	+22 22.8	3.561	2.557	3.0	8.2	7.6W
2009 7 8	6 33.64	+22 22.5	3.559	2.557	3.2	8.2	8.1W
2009 7 9	6 35.52	+22 22.1	3.557	2.556	3.4	8.3	8.6W
2009 7 10	6 37.40	+22 21.7	3.554	2.556	3.6	8.3	9.2W
2009 7 11	6 39.27	+22 21.2	3.552	2.555	3.8	8.3	9.7W
2009 7 12	6 41.15	+22 20.6	3.549	2.555	4.0	8.3	10.2W
2009 7 13	6 43.03	+22 19.9	3.547	2.555	4.2	8.3	10.7W
2009 7 14	6 44.91	+22 19.1	3.544	2.554	4.4	8.3	11.2W
2009 7 15	6 46.78	+22 18.2	3.541	2.554	4.6	8.3	11.7W
2009 7 16	6 48.66	+22 17.3	3.538	2.554	4.8	8.3	12.3W
2009 7 17	6 50.53	+22 16.3	3.535	2.553	5.1	8.3	12.8W
2009 7 18	6 52.40	+22 15.2	3.531	2.553	5.3	8.3	13.3W
2009 7 19	6 54.27	+22 14.0	3.528	2.552	5.5	8.3	13.8W
2009 7 20	6 56.14	+22 12.7	3.524	2.552	5.7	8.3	14.3W
2009 7 21	6 58.01	+22 11.4	3.520	2.552	5.9	8.3	14.9W
2009 7 22	6 59.88	+22 10	3.517	2.551	6.1	8.3	15.4W
2009 7 23	7 1.74	+22 8.5	3.513	2.551	6.3	8.3	15.9W
2009 7 24	7 3.60	+22 6.9	3.509	2.550	6.5	8.4	16.4W
2009 7 25	7 5.47	+22 5.3	3.504	2.550	6.7	8.4	16.9W
2009 7 26	7 7.33	+22 3.5	3.500	2.550	6.9	8.4	17.5W
2009 7 27	7 9.18	+22 1.7	3.496	2.549	7.1	8.4	18.0W
2009 7 28	7 11.04	+21 59.8	3.491	2.549	7.3	8.4	18.5W
2009 7 29	7 12.90	+21 57.9	3.487	2.548	7.5	8.4	19.0W
2009 7 30	7 14.75	+21 55.9	3.482	2.548	7.7	8.4	19.6W
2009 7 31	7 16.60	+21 53.8	3.477	2.547	7.9	8.4	20.1W
2009 8 1	7 18.45	+21 51.6	3.472	2.547	8.1	8.4	20.6W
2009 8 2	7 20.29	+21 49.3	3.467	2.547	8.3	8.4	21.1W
2009 8 3	7 22.14	+21 47.0	3.461	2.546	8.5	8.4	21.7W
2009 8 4	7 23.98	+21 44.6	3.456	2.546	8.7	8.4	22.2W
2009 8 5	7 25.82	+21 42.2	3.451	2.545	8.9	8.4	22.7W
2009 8 6	7 27.65	+21 39.6	3.445	2.545	9.1	8.4	23.3W
2009 8 7	7 29.49	+21 37.0	3.439	2.544	9.3	8.4	23.8W
2009 8 8	7 31.32	+21 34.4	3.433	2.544	9.4	8.4	24.3W
2009 8 9	7 33.15	+21 31.6	3.427	2.543	9.6	8.4	24.8W
2009 8 10	7 34.97	+21 28.8	3.421	2.543	9.8	8.4	25.4W
2009 8 11	7 36.79	+21 26.0	3.415	2.542	10.0	8.4	25.9W
2009 8 12	7 38.61	+21 23.0	3.409	2.542	10.2	8.4	26.4W
2009 8 13	7 40.43	+21 20.0	3.402	2.541	10.4	8.4	27.0W
2009 8 14	7 42.24	+21 17.0	3.396	2.541	10.6	8.4	27.5W
2009 8 15	7 44.05	+21 13.8	3.389	2.540	10.8	8.4	28.1W
2009 8 16	7 45.86	+21 10.6	3.383	2.540	11.0	8.4	28.6W
2009 8 17	7 47.66	+21 7.4	3.376	2.539	11.2	8.4	29.1W
2009 8 18	7 49.47	+21 4.1	3.369	2.539	11.4	8.4	29.7W
2009 8 19	7 51.26	+21 0.7	3.362	2.538	11.6	8.4	30.2W
2009 8 20	7 53.06	+20 57.3	3.354	2.538	11.8	8.4	30.7W
2009 8 21	7 54.85	+20 53.8	3.347	2.537	11.9	8.4	31.3W
2009 8 22	7 56.63	+20 50.2	3.340	2.537	12.1	8.4	31.8W
2009 8 23	7 58.42	+20 46.6	3.332	2.536	12.3	8.4	32.4W
2009 8 24	8 0.19	+20 43.0	3.324	2.536	12.5	8.4	32.9W
2009 8 25	8 1.97	+20 39.2	3.317	2.535	12.7	8.4	33.5W

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Date Year m d	R.A.2000 hh mm.mm	Decl.2000 dd pp.p	Delta U.A	r A.U.	Phase °	Mag V	Elong. °
2009 8 26	8 3.74	+20 35.5	3.309	2.535	12.9	8.4	34.0W
2009 8 27	8 5.51	+20 31.6	3.301	2.534	13.1	8.4	34.6W
2009 8 28	8 7.27	+20 27.8	3.293	2.534	13.3	8.4	35.1W
2009 8 29	8 9.03	+20 23.8	3.285	2.533	13.4	8.4	35.7W
2009 8 30	8 10.79	+20 19.9	3.276	2.533	13.6	8.4	36.2W
2009 8 31	8 12.54	+20 15.9	3.268	2.532	13.8	8.4	36.8W
2009 9 1	8 14.28	+20 11.8	3.259	2.532	14.0	8.4	37.3W
2009 9 2	8 16.02	+20 7.7	3.251	2.531	14.2	8.4	37.9W
2009 9 3	8 17.76	+20 3.5	3.242	2.530	14.3	8.4	38.4W
2009 9 4	8 19.49	+19 59.3	3.233	2.530	14.5	8.4	39.0W
2009 9 5	8 21.22	+19 55.0	3.224	2.529	14.7	8.4	39.5W
2009 9 6	8 22.95	+19 50.8	3.215	2.529	14.9	8.4	40.1W
2009 9 7	8 24.67	+19 46.4	3.206	2.528	15.1	8.4	40.6W
2009 9 8	8 26.38	+19 42.1	3.197	2.528	15.2	8.4	41.2W
2009 9 9	8 28.09	+19 37.6	3.188	2.527	15.4	8.4	41.8W
2009 9 10	8 29.79	+19 33.2	3.178	2.526	15.6	8.4	42.3W
2009 9 11	8 31.49	+19 28.7	3.169	2.526	15.7	8.4	42.9W
2009 9 12	8 33.19	+19 24.2	3.159	2.525	15.9	8.4	43.5W
2009 9 13	8 34.88	+19 19.6	3.149	2.525	16.1	8.4	44.0W
2009 9 14	8 36.56	+19 15.1	3.139	2.524	16.3	8.4	44.6W
2009 9 15	8 38.24	+19 10.4	3.129	2.523	16.4	8.4	45.2W
2009 9 16	8 39.91	+19 5.8	3.119	2.523	16.6	8.4	45.8W
2009 9 17	8 41.58	+19 1.1	3.109	2.522	16.8	8.4	46.3W
2009 9 18	8 43.24	+18 56.4	3.099	2.522	16.9	8.4	46.9W
2009 9 19	8 44.89	+18 51.7	3.089	2.521	17.1	8.4	47.5W
2009 9 20	8 46.54	+18 46.9	3.078	2.520	17.2	8.4	48.1W
2009 9 21	8 48.19	+18 42.2	3.068	2.520	17.4	8.4	48.6W
2009 9 22	8 49.83	+18 37.4	3.057	2.519	17.6	8.4	49.2W
2009 9 23	8 51.46	+18 32.5	3.047	2.519	17.7	8.4	49.8W
2009 9 24	8 53.09	+18 27.7	3.036	2.518	17.9	8.4	50.4W
2009 9 25	8 54.71	+18 22.8	3.025	2.517	18.0	8.4	51.0W
2009 9 26	8 56.32	+18 18.0	3.014	2.517	18.2	8.4	51.6W
2009 9 27	8 57.93	+18 13.1	3.003	2.516	18.3	8.3	52.2W
2009 9 28	8 59.53	+18 8.2	2.992	2.515	18.5	8.3	52.8W
2009 9 29	9 1.12	+18 3.3	2.981	2.515	18.6	8.3	53.4W
2009 9 30	9 2.71	+17 58.3	2.970	2.514	18.8	8.3	54.0W
2009 10 1	9 4.29	+17 53.4	2.958	2.513	18.9	8.3	54.5W
2009 10 2	9 5.87	+17 48.5	2.947	2.513	19.1	8.3	55.2W
2009 10 3	9 7.44	+17 43.5	2.935	2.512	19.2	8.3	55.8W
2009 10 4	9 9.00	+17 38.6	2.924	2.512	19.4	8.3	56.4W
2009 10 5	9 10.55	+17 33.6	2.912	2.511	19.5	8.3	57.0W
2009 10 6	9 12.10	+17 28.7	2.900	2.510	19.6	8.3	57.6W
2009 10 7	9 13.64	+17 23.7	2.888	2.510	19.8	8.3	58.2W
2009 10 8	9 15.17	+17 18.8	2.876	2.509	19.9	8.3	58.8W
2009 10 9	9 16.69	+17 13.8	2.864	2.508	20.1	8.3	59.4W
2009 10 10	9 18.21	+17 8.9	2.852	2.507	20.2	8.3	60.0W
2009 10 11	9 19.72	+17 3.9	2.840	2.507	20.3	8.3	60.7W
2009 10 12	9 21.22	+16 59.0	2.828	2.506	20.4	8.3	61.3W
2009 10 13	9 22.71	+16 54.1	2.816	2.505	20.6	8.3	61.9W
2009 10 14	9 24.20	+16 49.2	2.803	2.505	20.7	8.3	62.5W
2009 10 15	9 25.67	+16 44.3	2.791	2.504	20.8	8.2	63.2W
2009 10 16	9 27.14	+16 39.5	2.778	2.503	20.9	8.2	63.8W
2009 10 17	9 28.60	+16 34.6	2.766	2.503	21.1	8.2	64.4W
2009 10 18	9 30.06	+16 29.8	2.753	2.502	21.2	8.2	65.1W
2009 10 19	9 31.50	+16 25.0	2.741	2.501	21.3	8.2	65.7W
2009 10 20	9 32.93	+16 20.2	2.728	2.501	21.4	8.2	66.3W
2009 10 21	9 34.36	+16 15.4	2.715	2.500	21.5	8.2	67.0W
2009 10 22	9 35.77	+16 10.7	2.702	2.499	21.6	8.2	67.6W
2009 10 23	9 37.18	+16 6.0	2.689	2.498	21.7	8.2	68.3W
2009 10 24	9 38.58	+16 1.3	2.676	2.498	21.8	8.2	68.9W
2009 10 25	9 39.97	+15 56.7	2.663	2.497	21.9	8.2	69.6W
2009 10 26	9 41.35	+15 52.1	2.650	2.496	22.0	8.2	70.2W
2009 10 27	9 42.71	+15 47.6	2.637	2.495	22.1	8.1	70.9W
2009 10 28	9 44.07	+15 43.0	2.624	2.495	22.2	8.1	71.6W
2009 10 29	9 45.42	+15 38.6	2.611	2.494	22.3	8.1	72.2W
2009 10 30	9 46.76	+15 34.1	2.597	2.493	22.4	8.1	72.9W
2009 10 31	9 48.09	+15 29.8	2.584	2.493	22.5	8.1	73.6W
2009 11 1	9 49.41	+15 25.4	2.571	2.492	22.5	8.1	74.3W
2009 11 2	9 50.71	+15 21.1	2.557	2.491	22.6	8.1	74.9W
2009 11 3	9 52.01	+15 16.9	2.544	2.490	22.7	8.1	75.6W
2009 11 4	9 53.29	+15 12.7	2.530	2.490	22.8	8.1	76.3W
2009 11 5	9 54.57	+15 8.6	2.517	2.489	22.8	8.1	77.0W
2009 11 6	9 55.83	+15 4.6	2.503	2.488	22.9	8.0	77.7W
2009 11 7	9 57.08	+15 0.6	2.489	2.487	23.0	8.0	78.4W
2009 11 8	9 58.32	+14 56.6	2.476	2.486	23.0	8.0	79.1W
2009 11 9	9 59.55	+14 52.8	2.462	2.486	23.1	8.0	79.8W
2009 11 10	10 0.76	+14 49.0	2.448	2.485	23.1	8.0	80.5W
2009 11 11	10 1.96	+14 45.3	2.435	2.484	23.2	8.0	81.2W
2009 11 12	10 3.15	+14 41.6	2.421	2.483	23.2	8.0	81.9W

4 Vesta

Date Year m d	R.A.2000 hh mm.mm	Decl.2000 dd pp.p	Delta U.A	r A.U.	Phase °	Mag V	Elong. °
2009 11 13	10 4.33	+14 38.0	2.407	2.483	23.3	8.0	82.6W
2009 11 14	10 5.49	+14 34.6	2.393	2.482	23.3	8.0	83.4W
2009 11 15	10 6.64	+14 31.2	2.380	2.481	23.4	7.9	84.1W
2009 11 16	10 7.78	+14 27.8	2.366	2.480	23.4	7.9	84.8W
2009 11 17	10 8.90	+14 24.6	2.352	2.479	23.4	7.9	85.5W
2009 11 18	10 10.01	+14 21.4	2.338	2.479	23.5	7.9	86.3W
2009 11 19	10 11.11	+14 18.4	2.324	2.478	23.5	7.9	87.0W
2009 11 20	10 12.19	+14 15.4	2.310	2.477	23.5	7.9	87.8W
2009 11 21	10 13.25	+14 12.6	2.296	2.476	23.5	7.9	88.5W
2009 11 22	10 14.30	+14 9.8	2.282	2.476	23.5	7.9	89.3W
2009 11 23	10 15.34	+14 7.2	2.269	2.475	23.5	7.8	90.0W
2009 11 24	10 16.36	+14 4.6	2.255	2.474	23.5	7.8	90.8W
2009 11 25	10 17.37	+14 2.2	2.241	2.473	23.5	7.8	91.6W
2009 11 26	10 18.35	+13 59.8	2.227	2.472	23.5	7.8	92.3W
2009 11 27	10 19.33	+13 57.6	2.213	2.471	23.5	7.8	93.1W
2009 11 28	10 20.28	+13 55.5	2.199	2.471	23.5	7.8	93.9W
2009 11 29	10 21.22	+13 53.5	2.185	2.470	23.5	7.8	94.7W
2009 11 30	10 22.14	+13 51.7	2.171	2.469	23.4	7.7	95.5W
2009 12 1	10 23.05	+13 49.9	2.158	2.468	23.4	7.7	96.3W
2009 12 2	10 23.94	+13 48.3	2.144	2.467	23.4	7.7	97.1W
2009 12 3	10 24.80	+13 46.9	2.130	2.467	23.3	7.7	97.9W
2009 12 4	10 25.65	+13 45.5	2.116	2.466	23.3	7.7	98.7W
2009 12 5	10 26.49	+13 44.3	2.102	2.465	23.2	7.7	99.5W
2009 12 6	10 27.30	+13 43.2	2.089	2.464	23.2	7.6	100.3W
2009 12 7	10 28.09	+13 42.3	2.075	2.463	23.1	7.6	101.2W
2009 12 8	10 28.87	+13 41.5	2.061	2.462	23.0	7.6	102.0W
2009 12 9	10 29.62	+13 40.9	2.048	2.461	23.0	7.6	102.8W
2009 12 10	10 30.36	+13 40.4	2.034	2.461	22.9	7.6	103.7W
2009 12 11	10 31.07	+13 40.1	2.021	2.460	22.8	7.6	104.5W
2009 12 12	10 31.76	+13 39.9	2.007	2.459	22.7	7.5	105.4W
2009 12 13	10 32.44	+13 39.8	1.994	2.458	22.6	7.5	106.2W
2009 12 14	10 33.09	+13 40.0	1.981	2.457	22.5	7.5	107.1W
2009 12 15	10 33.72	+13 40.3	1.967	2.456	22.4	7.5	108.0W
2009 12 16	10 34.32	+13 40.7	1.954	2.456	22.3	7.5	108.9W
2009 12 17	10 34.91	+13 41.4	1.941	2.455	22.2	7.4	109.7W
2009 12 18	10 35.47	+13 42.2	1.928	2.454	22.0	7.4	110.6W
2009 12 19	10 36.00	+13 43.1	1.915	2.453	21.9	7.4	111.5W
2009 12 20	10 36.52	+13 44.3	1.902	2.452	21.8	7.4	112.4W
2009 12 21	10 37.01	+13 45.6	1.889	2.451	21.6	7.4	113.3W
2009 12 22	10 37.47	+13 47.1	1.876	2.450	21.5	7.4	114.3W
2009 12 23	10 37.92	+13 48.8	1.864	2.449	21.3	7.3	115.2W
2009 12 24	10 38.33	+13 50.6	1.851	2.449	21.1	7.3	116.1W
2009 12 25	10 38.72	+13 52.7	1.838	2.448	21.0	7.3	117.0W
2009 12 26	10 39.09	+13 54.9	1.826	2.447	20.8	7.3	118.0W
2009 12 27	10 39.43	+13 57.3	1.814	2.446	20.6	7.3	118.9W
2009 12 28	10 39.74	+13 59.9	1.802	2.445	20.4	7.2	119.9W
2009 12 29	10 40.03	+14 2.7	1.789	2.444	20.2	7.2	120.9W
2009 12 30	10 40.29	+14 5.7	1.777	2.443	20.0	7.2	121.8W
2009 12 31	10 40.52	+14 8.9	1.766	2.442	19.8	7.2	122.8W

7 Iris

Date	R.A.2000	Decl.2000	Delta	r	Phase	Mag	Elong.
Year m d	hh mm.mm	dd pp.p	U.A	A.U.	°	V	°
2009 6 25	19 2.05	-19 29.1	1.596	2.600	4.5	9.0	168.4W
2009 6 26	19 1.04	-19 28.3	1.592	2.598	4.1	9.0	169.5W
2009 6 27	19 0.01	-19 27.5	1.587	2.596	3.7	8.9	170.6W
2009 6 28	18 58.97	-19 26.7	1.583	2.593	3.2	8.9	171.7W
2009 6 29	18 57.92	-19 26.0	1.579	2.591	2.8	8.9	172.8W
2009 6 30	18 56.86	-19 25.2	1.576	2.589	2.4	8.8	173.8W
2009 7 1	18 55.79	-19 24.5	1.573	2.587	2.1	8.8	174.8W
2009 7 2	18 54.72	-19 23.8	1.570	2.585	1.7	8.8	175.6W
2009 7 3	18 53.64	-19 23.0	1.567	2.582	1.5	8.7	176.2W
2009 7 4	18 52.55	-19 22.3	1.565	2.580	1.4	8.7	176.5W
2009 7 5	18 51.47	-19 21.7	1.562	2.578	1.4	8.7	176.4E
2009 7 6	18 50.38	-19 21.0	1.561	2.576	1.6	8.7	175.9E
2009 7 7	18 49.29	-19 20.3	1.559	2.573	1.9	8.8	175.1E
2009 7 8	18 48.20	-19 19.6	1.558	2.571	2.3	8.8	174.2E
2009 7 9	18 47.11	-19 19.0	1.557	2.569	2.7	8.8	173.2E
2009 7 10	18 46.03	-19 18.3	1.556	2.567	3.1	8.8	172.2E
2009 7 11	18 44.95	-19 17.7	1.555	2.564	3.5	8.9	171.1E
2009 7 12	18 43.88	-19 17.0	1.555	2.562	4.0	8.9	170.0E
2009 7 13	18 42.81	-19 16.4	1.555	2.560	4.4	8.9	168.8E
2009 7 14	18 41.75	-19 15.8	1.555	2.558	4.9	8.9	167.7E
2009 7 15	18 40.70	-19 15.2	1.556	2.555	5.3	8.9	166.5E
2009 7 16	18 39.66	-19 14.6	1.557	2.553	5.8	9.0	165.4E
2009 7 17	18 38.64	-19 14.0	1.558	2.551	6.2	9.0	164.2E

14 Irene

Date	R.A.2000	Decl.2000	Delta	r	Phase	Mag	Elong.
Year m d	hh mm.mm	dd pp.p	U.A	A.U.	°	V	°
2009 4 10	14 23.27	+ 0 50.2	1.208	2.179	8.7	9.0	160.7W
2009 4 11	14 22.46	+ 0 53.3	1.206	2.180	8.4	9.0	161.5W
2009 4 12	14 21.64	+ 0 56.2	1.204	2.181	8.0	9.0	162.3W
2009 4 13	14 20.79	+ 0 59.0	1.203	2.181	7.7	8.9	163.0W
2009 4 14	14 19.94	+ 1 1.7	1.202	2.182	7.4	8.9	163.6W
2009 4 15	14 19.07	+ 1 4.2	1.200	2.183	7.2	8.9	164.2W
2009 4 16	14 18.19	+ 1 6.6	1.200	2.184	6.9	8.9	164.8W
2009 4 17	14 17.30	+ 1 8.9	1.199	2.185	6.7	8.9	165.2W
2009 4 18	14 16.40	+ 1 11.0	1.199	2.185	6.6	8.9	165.6W
2009 4 19	14 15.49	+ 1 12.9	1.199	2.186	6.4	8.9	165.9W
2009 4 20	14 14.58	+ 1 14.7	1.199	2.187	6.4	8.9	166.1W
2009 4 21	14 13.66	+ 1 16.3	1.199	2.188	6.3	8.9	166.1W
2009 4 22	14 12.74	+ 1 17.8	1.200	2.189	6.3	8.9	166.1W
2009 4 23	14 11.82	+ 1 19.0	1.200	2.190	6.4	8.9	166.0W
2009 4 24	14 10.89	+ 1 20.1	1.202	2.191	6.5	8.9	165.8W
2009 4 25	14 9.97	+ 1 21.0	1.203	2.191	6.6	8.9	165.5E
2009 4 26	14 9.05	+ 1 21.7	1.204	2.192	6.8	8.9	165.1E
2009 4 27	14 8.13	+ 1 22.2	1.206	2.193	7.0	8.9	164.7E
2009 4 28	14 7.22	+ 1 22.5	1.208	2.194	7.2	8.9	164.1E
2009 4 29	14 6.32	+ 1 22.6	1.211	2.195	7.5	9.0	163.5E
2009 4 30	14 5.42	+ 1 22.6	1.213	2.196	7.8	9.0	162.9E
2009 5 1	14 4.53	+ 1 22.2	1.216	2.197	8.1	9.0	162.2E

18 Melpomene

Date Year m d	R.A.2000 hh mm.mm	Decl.2000 dd pp.p	Delta U.A	r A.U.	Phase °	Mag v	Elong. °
2009 8 19	1 29.03	+ 1 41.2	1.046	1.821	27.3	9.0	124.5W
2009 8 20	1 29.87	+ 1 34.8	1.038	1.820	27.0	9.0	125.3W
2009 8 21	1 30.69	+ 1 28.2	1.030	1.819	26.7	8.9	126.1W
2009 8 22	1 31.48	+ 1 21.2	1.022	1.818	26.4	8.9	126.9W
2009 8 23	1 32.24	+ 1 14.0	1.014	1.817	26.1	8.9	127.7W
2009 8 24	1 32.97	+ 1 6.4	1.006	1.816	25.8	8.9	128.5W
2009 8 25	1 33.67	+ 0 58.6	0.998	1.815	25.5	8.8	129.3W
2009 8 26	1 34.33	+ 0 50.5	0.991	1.815	25.2	8.8	130.1W
2009 8 27	1 34.97	+ 0 42.1	0.983	1.814	24.9	8.8	130.9W
2009 8 28	1 35.58	+ 0 33.4	0.976	1.813	24.6	8.8	131.8W
2009 8 29	1 36.15	+ 0 24.4	0.969	1.812	24.2	8.7	132.6W
2009 8 30	1 36.69	+ 0 15.2	0.962	1.811	23.9	8.7	133.5W
2009 8 31	1 37.20	+ 0 5.7	0.955	1.810	23.5	8.7	134.3W
2009 9 1	1 37.67	- 0 4.1	0.948	1.809	23.2	8.6	135.2W
2009 9 2	1 38.11	- 0 14.2	0.941	1.809	22.8	8.6	136.0W
2009 9 3	1 38.52	- 0 24.5	0.935	1.808	22.4	8.6	136.9W
2009 9 4	1 38.89	- 0 35.1	0.928	1.807	22.0	8.6	137.8W
2009 9 5	1 39.23	- 0 45.9	0.922	1.806	21.6	8.5	138.7W
2009 9 6	1 39.54	- 0 56.9	0.916	1.806	21.2	8.5	139.5W
2009 9 7	1 39.80	- 1 8.3	0.910	1.805	20.8	8.5	140.4W
2009 9 8	1 40.04	- 1 19.8	0.904	1.804	20.4	8.5	141.3W
2009 9 9	1 40.24	- 1 31.5	0.898	1.804	20.0	8.4	142.2W
2009 9 10	1 40.40	- 1 43.5	0.893	1.803	19.6	8.4	143.1W
2009 9 11	1 40.53	- 1 55.7	0.888	1.802	19.1	8.4	144.0W
2009 9 12	1 40.63	- 2 8.1	0.882	1.802	18.7	8.4	144.9W
2009 9 13	1 40.68	- 2 20.6	0.877	1.801	18.3	8.3	145.9W
2009 9 14	1 40.71	- 2 33.4	0.873	1.801	17.8	8.3	146.8W
2009 9 15	1 40.70	- 2 46.3	0.868	1.800	17.4	8.3	147.7W
2009 9 16	1 40.65	- 2 59.3	0.863	1.799	16.9	8.3	148.6W
2009 9 17	1 40.57	- 3 12.5	0.859	1.799	16.5	8.2	149.5W
2009 9 18	1 40.46	- 3 25.8	0.855	1.798	16.0	8.2	150.4W
2009 9 19	1 40.32	- 3 39.2	0.851	1.798	15.6	8.2	151.3W
2009 9 20	1 40.14	- 3 52.7	0.847	1.798	15.1	8.2	152.1W
2009 9 21	1 39.93	- 4 6.3	0.844	1.797	14.7	8.1	153.0W
2009 9 22	1 39.68	- 4 20.0	0.840	1.797	14.2	8.1	153.9W
2009 9 23	1 39.41	- 4 33.7	0.837	1.796	13.8	8.1	154.7W
2009 9 24	1 39.10	- 4 47.4	0.834	1.796	13.4	8.1	155.6W
2009 9 25	1 38.77	- 5 1.1	0.831	1.796	12.9	8.0	156.4W
2009 9 26	1 38.41	- 5 14.9	0.829	1.795	12.5	8.0	157.2W
2009 9 27	1 38.01	- 5 28.6	0.826	1.795	12.1	8.0	157.9W
2009 9 28	1 37.60	- 5 42.3	0.824	1.795	11.7	8.0	158.7W
2009 9 29	1 37.15	- 5 55.9	0.822	1.794	11.3	8.0	159.4W
2009 9 30	1 36.69	- 6 9.4	0.820	1.794	11.0	7.9	160.1W
2009 10 1	1 36.19	- 6 22.9	0.818	1.794	10.6	7.9	160.7W
2009 10 2	1 35.68	- 6 36.2	0.817	1.794	10.3	7.9	161.2W
2009 10 3	1 35.15	- 6 49.4	0.816	1.794	10.1	7.9	161.8W
2009 10 4	1 34.59	- 7 2.4	0.815	1.793	9.8	7.9	162.2W
2009 10 5	1 34.02	- 7 15.3	0.814	1.793	9.6	7.9	162.6W
2009 10 6	1 33.43	- 7 28.0	0.813	1.793	9.4	7.9	162.9W
2009 10 7	1 32.82	- 7 40.5	0.813	1.793	9.3	7.9	163.2W
2009 10 8	1 32.21	- 7 52.7	0.813	1.793	9.2	7.9	163.4W
2009 10 9	1 31.58	- 8 4.7	0.813	1.793	9.1	7.9	163.4W
2009 10 10	1 30.93	- 8 16.4	0.813	1.793	9.1	7.9	163.5W
2009 10 11	1 30.28	- 8 27.9	0.813	1.793	9.2	7.9	163.4W
2009 10 12	1 29.63	- 8 39.1	0.814	1.793	9.2	7.9	163.2W
2009 10 13	1 28.96	- 8 49.9	0.815	1.793	9.4	7.9	163.0W
2009 10 14	1 28.30	- 9 0.4	0.816	1.793	9.5	7.9	162.7W
2009 10 15	1 27.63	- 9 10.6	0.817	1.793	9.7	7.9	162.3W
2009 10 16	1 26.96	- 9 20.5	0.819	1.793	10	7.9	161.8W
2009 10 17	1 26.29	- 9 30.0	0.820	1.793	10.2	7.9	161.3E
2009 10 18	1 25.62	- 9 39.1	0.822	1.793	10.5	7.9	160.8E
2009 10 19	1 24.96	- 9 47.8	0.824	1.793	10.9	8.0	160.2E
2009 10 20	1 24.30	- 9 56.1	0.826	1.793	11.2	8.0	159.5E
2009 10 21	1 23.65	-10 4.0	0.829	1.794	11.6	8.0	158.8E
2009 10 22	1 23.01	-10 11.5	0.832	1.794	12.0	8.0	158.1E
2009 10 23	1 22.38	-10 18.6	0.835	1.794	12.4	8.0	157.3E
2009 10 24	1 21.77	-10 25.2	0.838	1.794	12.8	8.1	156.5E
2009 10 25	1 21.16	-10 31.4	0.841	1.795	13.2	8.1	155.7E
2009 10 26	1 20.57	-10 37.2	0.844	1.795	13.6	8.1	154.9E
2009 10 27	1 20.00	-10 42.5	0.848	1.795	14.0	8.1	154.0E
2009 10 28	1 19.45	-10 47.4	0.852	1.795	14.5	8.1	153.2E
2009 10 29	1 18.91	-10 51.9	0.856	1.796	14.9	8.2	152.3E
2009 10 30	1 18.40	-10 55.8	0.860	1.796	15.3	8.2	151.4E
2009 10 31	1 17.91	-10 59.4	0.864	1.796	15.8	8.2	150.5E
2009 11 1	1 17.43	-11 2.5	0.869	1.797	16.2	8.2	149.6E
2009 11 2	1 16.99	-11 5.1	0.874	1.797	16.7	8.3	148.7E
2009 11 3	1 16.56	-11 7.3	0.879	1.798	17.1	8.3	147.8E
2009 11 4	1 16.17	-11 9.0	0.884	1.798	17.5	8.3	146.9E
2009 11 5	1 15.80	-11 10.3	0.889	1.799	18.0	8.3	146.0E

18 Melpomene

Date	R.A.2000	Decl.2000	Delta	r	Phase	Mag	Elong.
Year m d	hh mm.mm	dd pp.p	U.A	A.U.	°	v	°
2009 11 6	1 15.45	-11 11.2	0.894	1.799	18.4	8.4	145.1E
2009 11 7	1 15.14	-11 11.6	0.900	1.800	18.8	8.4	144.2E
2009 11 8	1 14.85	-11 11.6	0.906	1.800	19.2	8.4	143.3E
2009 11 9	1 14.59	-11 11.2	0.912	1.801	19.6	8.5	142.4E
2009 11 10	1 14.36	-11 10.3	0.918	1.801	20.0	8.5	141.5E
2009 11 11	1 14.17	-11 9.1	0.924	1.802	20.4	8.5	140.6E
2009 11 12	1 14.00	-11 7.4	0.930	1.802	20.8	8.5	139.7E
2009 11 13	1 13.86	-11 5.3	0.937	1.803	21.2	8.6	138.8E
2009 11 14	1 13.76	-11 2.9	0.943	1.804	21.6	8.6	137.9E
2009 11 15	1 13.68	-11 0.0	0.950	1.804	22.0	8.6	137.0E
2009 11 16	1 13.64	-10 56.8	0.957	1.805	22.3	8.6	136.1E
2009 11 17	1 13.63	-10 53.2	0.964	1.806	22.7	8.7	135.2E
2009 11 18	1 13.66	-10 49.2	0.971	1.807	23.0	8.7	134.4E
2009 11 19	1 13.71	-10 44.9	0.979	1.807	23.4	8.7	133.5E
2009 11 20	1 13.80	-10 40.2	0.986	1.808	23.7	8.7	132.7E
2009 11 21	1 13.92	-10 35.2	0.994	1.809	24.0	8.8	131.8E
2009 11 22	1 14.07	-10 29.8	1.001	1.810	24.3	8.8	131.0E
2009 11 23	1 14.25	-10 24.1	1.009	1.810	24.7	8.8	130.1E
2009 11 24	1 14.47	-10 18.2	1.017	1.811	25.0	8.9	129.3E
2009 11 25	1 14.72	-10 11.8	1.025	1.812	25.2	8.9	128.5E
2009 11 26	1 15.00	-10 5.2	1.033	1.813	25.5	8.9	127.6E
2009 11 27	1 15.31	- 9 58.3	1.041	1.814	25.8	8.9	126.8E
2009 11 28	1 15.65	- 9 51.2	1.050	1.815	26.1	9.0	126.0E
2009 11 29	1 16.03	- 9 43.7	1.058	1.816	26.3	9.0	125.2E

27 Euterpe

Date	R.A.2000	Decl.2000	Delta	r	Phase	Mag	Elong.
Year m d	hh mm.mm	dd pp.p	U.A	A.U.	°	v	°
2009 1 28	9 20.80	+17 29.9	1.036	2.014	4.5	9.0	170.7W
2009 1 29	9 19.83	+17 35.5	1.035	2.015	3.9	9.0	172.0W
2009 1 30	9 18.85	+17 41.0	1.035	2.017	3.3	8.9	173.2W
2009 1 31	9 17.86	+17 46.6	1.035	2.018	2.7	8.9	174.4W
2009 2 1	9 16.86	+17 52.1	1.036	2.019	2.2	8.9	175.5W
2009 2 2	9 15.85	+17 57.6	1.036	2.021	1.6	8.8	176.6W
2009 2 3	9 14.85	+18 3.0	1.037	2.022	1.2	8.8	177.5W
2009 2 4	9 13.84	+18 8.4	1.038	2.023	1	8.8	178.0W
2009 2 5	9 12.83	+18 13.7	1.039	2.025	1.1	8.8	177.7E
2009 2 6	9 11.82	+18 19.0	1.041	2.026	1.5	8.8	176.9E
2009 2 7	9 10.82	+18 24.2	1.043	2.027	2.0	8.9	175.9E
2009 2 8	9 9.83	+18 29.3	1.045	2.029	2.6	8.9	174.7E
2009 2 9	9 8.84	+18 34.3	1.047	2.030	3.1	9.0	173.5E
2009 2 10	9 7.86	+18 39.2	1.049	2.032	3.7	9.0	172.3E

CONJUNCTIONS <1° PLANETS - ASTEROIDS m<9

Date	TT	Dm (°)	Dl	r1	r2	p (°)	e	m1	m2	tm(s)	tw(h)		
2009/08/25	16:41:13	0.48834	0.00297	1.29	3.31	171	-34	-3.8	8.3		27.2	Venus	Vesta
2009/10/13	03:48:49	0.29933	0.00221	1.15	3.27	151	-16	-0.9	8.9		20.8	Mercury	Pallas

MULTIPLE CONJUNCTIONS PLANETS - ASTEROIDS (events with 2 or more planets and a bright asteroid within 5°)

Date	TT	Dmed (°)	Dmax	emin	m2d	mmax			
2009/09/23	10:34:39	2.987	4.218	-6	2.4	8.9	Mercury	Saturn	Pallas

CONJUNCTIONS <1° ASTEROIDS m<9 - MESSIER OBJECTS m<9

Date	TT	Dm (°)	Dl	r1	p (°)	e	m1	m*	tm(s)	tw(h)			
2009/06/06	11:20:46	0.17251	0.00071	3.564	355	8	8.4	8.4		54.6	Vesta	NGC1952	M1
2009/07/24	12:52:43	0.09779	0.00158	1.572	182	156	8.9	4.6		113.0	Iris		M25
2009/09/15	13:29:13	0.87631	0.00081	3.123	11	-45	8.2	3.7		28.7	Vesta	NGC2632	M44

date in the format year/month/day

Dm = least distance between the centers of the bodies

Dl = parameter limit, if Dm < Dl there is an occultation between the bodies

R1 = distance in A.U. of body 1 from the Earth

R2 = distance in A.U. of body 2 from the Earth

P = angle of position between the bodies, in degrees

e = elongation, in degree

m1 = magnitude of the first body

m2 = magnitude of the second body

m* = magnitude of the object

tm = if present, an object is occulted maximum for x seconds

tw = semiperiod in hours in which the two bodies are near less than 1°

date in the format year/month/day

Dmed = middle distance between the centers of the bodies, in degrees

Dmax = diameter of the group, in degrees

emin = least elongation, in degrees

m2d = magnitude of the 2nd brightest object

mmax = least magnitude

MULTIPLE CONJUNCTIONS PLANETS - ASTEROIDS - STARS

(events with 1 planet, a star with mag<2 and a bright asteroid within 5°)

Date	TT	Dmed (°)	Dmax	emin	m2d	mmax					
2009/07/14 09:44:15		2.322	3.074	-42	1.2	11.4	Parthenop	Alpha	TAU	Aldebaran	Venus

MULTIPLE CONJUNCTIONS PLANETS - ASTEROIDS - MESSIER OBJECTS

(events with 1 planet, an object with mag<2 and a bright asteroid within 5°)

Date	TT	Dmed (°)	Dmax	emin	m2d	mmax					
2009/07/21 08:49:05		1.657	2.199	8	1.7	10.9	Mercury	NGC2632	M44	Metis	

CONJUNCTIONS <1° BETWEEN ASTEROIDS m<9

Date	TT	Dm (°)	Dl	r1	r2	p (°)	e	m1	m2	tm(s)	tw(h)
------	----	--------	----	----	----	-------	---	----	----	-------	-------

This year they aren't conjunctions within 1° between bright asteroids

date in the format year/month/day

Dm = least distance between the centers of the bodies

Dl = parameter limit, if Dm < Dl there is an occultation between the bodies

R1 = distance in A.U. of body 1 from the Earth

R2 = distance in A.U. of body 2 from the Earth

P = angle of position between the bodies, in degrees

e = elongation, in degree

m1 = magnitude of the first body

m2 = magnitude of the second body

m* = magnitude of the object

tm = if present, an object is occulted maximum for x seconds

tw = semiperiod in hours in which the two bodies are near less than 1°

date in the format year/month/day

Dmed = middle distance between the centers of the bodies, in degrees

Dmax = diameter of the group, in degrees

emin = least elongation, in degrees

m2d = magnitude of the 2nd brightest object

mmax = least magnitude

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CONJUNCTIONS <1° MOON-ASTEROIDS m<9

Geocentric

Date	TT	Dm (°)	Dl	r1	p (°)	e	m1	m2	tm(s)	
2009/08/18 07:06:49		0.38086	1.28977	3.366	16	-30	8.3	-8.7	3132	Vesta
2009/08/21 05:15:53		0.93870	1.27974	3.206	27	12	8.8	-6.7	2252	Pallas

Topocentric 42°N - 12°E

Date	UT	Dm (°)	Alt.	r1	p (°)	e	m1	m2	tm(s)	
2009/08/18 05:58:39		0.10558	43.85	3.366	14	-30	8.3	-8.8	4234	Vesta
2009/08/21 03:41:14		0.59736	-20.42	3.206	22	12	8.8	-6.7		Pallas

MULTIPLE CONJUNCTIONS PLANETS-MOON-ASTEROIDS

(events with 1 planet, the Moon and an asteroid within 5°)

Geocentric

Date	TT	Dmed (°)	Dmax	emin	m2d	mmax
------	----	----------	------	------	-----	------

Topocentric 42°N - 12°E

Date	UT	Dmed (°)	Dmax	emin	mmax
------	----	----------	------	------	------

date in the format year/month/day

Dm = least distance between the centers of the bodies

Dl = parameter limit, if Dm < Dl there is an occultation between the bodies

Alt = height in degrees on the horizon of the event in the central moment

R1 = distance in A.U. of the asteroid from the Earth

P = angle of position between the bodies, in degrees

e = elongation, in degree

m1 = magnitude of the asteroid

m2 = magnitude of the Moon

m* = magnitude of the object

tm = if present, the asteroid is occulted maximum for x seconds

date in the format year/month/day

Dmed = middle distance between the centers of the bodies, in degrees

Dmax = diameter of the group, in degrees

emin = least elongation, in degrees

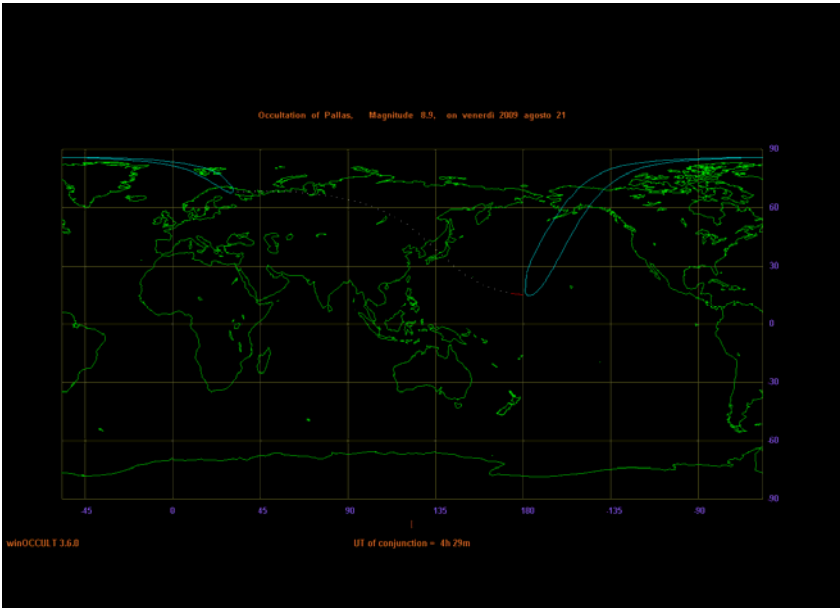
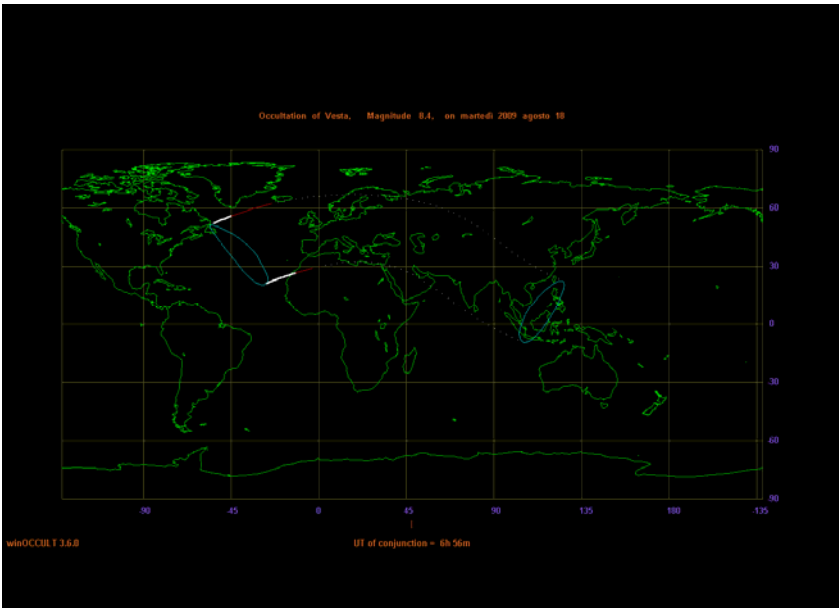
m2d = magnitude of the 2nd brightest object

mmax = least magnitude

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GEOCENTRIC OCCULTATIONS MOON-ASTEROIDS $m < 9$

Date	TT	Dm (°)	Dl	r1	p (°)	e	m1	m2	tm(s)	
2009/08/18	07:06:49	0.38086	1.28977	3.366	16	-30	8.3	-8.7	3132	Vesta
2009/08/21	05:15:53	0.93870	1.27974	3.206	27	12	8.8	-6.7	2252	Pallas



date in the format year/month/day

Dm = least distance between the centers of the bodies
Dl = parameter limit, if $Dm < Dl$ there is an occultation between the bodies
Rl = distance in A.U. of the asteroid from the Earth
P = angle of position between the bodies, in degrees
e = elongation, in degree
m1 = magnitude of the asteroid
m2 = magnitude of the Moon
tm = if present, the asteroid is occulted maximum for x seconds
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TOPOCENTR. OCCULTATIONS MOON-ASTEROIDS $m < 9$

42°N - 12°E

Date	UT	Dm (°)	Alt.	r1	p (°)	e	m1	m2	tm(s)	
2009/08/18	05:58:39	0.10558	43.85	3.366	14	-30	8.3	-8.8	4234	Vesta
2009/08/21	03:41:14	0.59736	-20.42	3.206	22	12	8.8	-6.7		Pallas

date in the format year/month/day

Dm = least distance between the centers of the bodies

Dl = parameter limit, if $Dm < Dl$ there is an occultation between the bodies

Alt = height in degrees on the horizon of the event in the central moment

R1 = distance in A.U. of the asteroid from the Earth

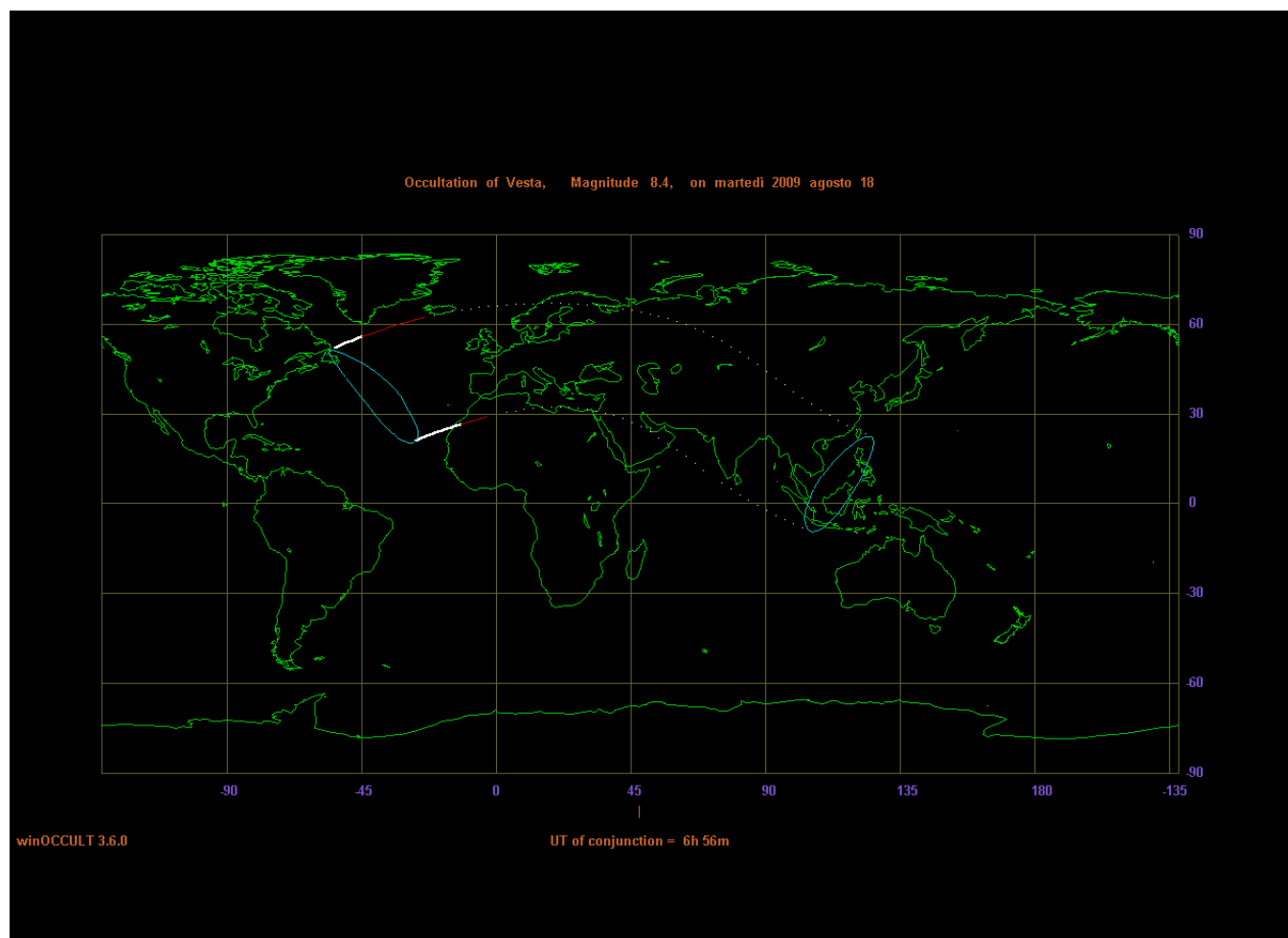
P = angle of position between the bodies, in degrees

e = elongation, in degree

m1 = magnitude of the asteroid

m2 = magnitude of the Moon

tm = if present, the asteroid is occulted maximum for x seconds



CONJUNCTIONS $<0,5^{\circ}$ ASTEROIDS $m<9$ -STARS $m<6$

Date	TDT	Dm (°)	Dl	AR (°)	Dec	r1	p (°)	e	m1	m*	tm(s)	tw(h)			
2009/03/03	19:36:30	0.28433	0.00164	164.155	24.961	1.59	337	162	6.8	4.5		105.4	Ceres		LEO
2009/03/08	16:13:13	0.43391	0.00132	79.210	-13.202	1.93	45	89	7.9	5.6		49.7	Pallas		
2009/03/09	14:47:16	0.39274	0.00086	46.581	13.590	2.94	21	59	8.1	5.8		61.1	Vesta		
2009/03/11	12:41:04	0.03553	0.00130	80.130	-12.331	1.95	223	88	7.9	5.3		54.2	Pallas	Nu	LEP
2009/03/19	22:38:55	0.45339	0.00158	160.829	25.826	1.65	173	149	6.9	5.5		131.1	Ceres		LMI
2009/04/01	12:58:34	0.48851	0.00202	217.401	0.332	1.23	158	-153	8.9	6.0		126.1	Irene		
2009/04/09	21:27:40	0.06248	0.00078	58.411	17.416	3.26	16	40	8.3	6.0		59.4	Vesta		
2009/04/10	07:55:07	0.01614	0.00116	91.772	-4.180	2.19	28	74	8.1	5.4		47.9	Pallas		
2009/04/13	22:49:50	0.45375	0.00114	93.390	-3.338	2.22	27	72	8.2	6.0		42.4	Pallas		
2009/04/14	19:00:27	0.28705	0.00077	60.419	17.944	3.30	195	37	8.3	5.9		56.4	Vesta		
2009/04/17	08:35:26	0.40749	0.00113	94.944	-2.579	2.25	25	70	8.2	5.1		43.1	Pallas		
2009/04/19	04:46:56	0.01897	0.00112	95.795	-2.183	2.27	25	69	8.2	6.0		47.0	Pallas		
2009/04/21	11:57:59	0.20727	0.00111	96.869	-1.702	2.29	204	68	8.2	5.9		45.8	Pallas		
2009/04/24	20:01:43	0.21113	0.00110	98.449	-1.031	2.32	22	67	8.2	5.1		45.5	Pallas		
2009/04/30	19:35:47	0.30135	0.00074	67.227	19.497	3.42	12	28	8.4	3.7		54.6	Vesta	Epsilon	TAU
2009/05/04	00:19:20	0.18858	0.00203	210.550	1.310	1.23	185	160	8.9	4.3		111.0	Irene	Tau	VIR
2009/05/10	18:10:50	0.10871	0.00198	209.215	1.109	1.26	13	154	9.0	5.9		127.5	Irene		VIR
2009/05/18	00:54:31	0.00667	0.00101	109.971	2.717	2.52	194	56	8.4	6.0		45.6	Pallas		
2009/05/24	15:41:45	0.22943	0.00098	113.378	3.495	2.58	12	53	8.4	5.6		44.2	Pallas	Delta2	CMI
2009/05/25	04:21:47	0.20439	0.00098	113.652	3.551	2.59	12	53	8.4	5.8		44.5	Pallas	Delta3	CMI
2009/05/28	16:13:26	0.30855	0.00097	115.468	3.906	2.62	11	51	8.5	6.0		43.2	Pallas		
2009/06/02	18:40:03	0.25140	0.00071	82.082	21.696	3.56	186	10	8.4	4.9		53.7	Vesta		TAU
2009/06/07	05:11:25	0.15369	0.00094	120.457	4.701	2.70	188	47	8.5	5.7		44.9	Pallas		
2009/06/20	13:33:25	0.22046	0.00098	168.814	15.561	2.66	327	74	8.1	3.3		71.6	Ceres	Theta	LEO
2009/06/24	11:51:24	0.12966	0.00089	129.550	5.541	2.85	183	39	8.6	4.1		45.3	Pallas	Delta	HYA
2009/06/27	23:25:07	0.14529	0.00071	93.870	22.359	3.57	181	-3	8.4	3.7		54.5	Vesta	Eta	GEM
2009/06/29	14:38:16	0.14971	0.00088	132.242	5.653	2.89	182	37	8.6	4.3		45.3	Pallas	Rho	HYA
2009/07/02	06:21:03	0.12760	0.00071	95.889	22.381	3.57	180	-5	8.4	3.2		54.7	Vesta	Mu	GEM
2009/07/02	22:05:58	0.21425	0.00087	133.982	5.694	2.91	181	35	8.6	3.2		44.9	Pallas	Zeta	HYA
2009/07/26	05:41:02	0.40921	0.00157	277.677	-19.132	1.58	178	154	8.9	5.8		108.0	Iris		
2009/07/29	06:22:01	0.49860	0.00084	181.179	8.245	3.10	150	52	8.4	4.2		52.6	Ceres	Omicron	VIR
2009/08/01	19:05:40	0.15296	0.00073	110.163	21.812	3.47	175	-21	8.4	3.5		55.1	Vesta	Delta	GEM
2009/08/06	00:21:06	0.21553	0.00074	112.105	21.640	3.44	354	-23	8.3	5.3		54.7	Vesta		GEM
2009/08/07	19:14:08	0.19031	0.00151	275.483	-19.046	1.64	178	140	9.0	5.9		189.6	Iris		
2009/08/09	09:02:31	0.22926	0.00081	153.354	4.794	3.15	354	18	8.8	5.9		46.0	Pallas		SEX
2009/09/02	02:38:32	0.24575	0.00078	165.234	3.321	3.25	172	6	8.8	5.0		46.8	Pallas		LEO
2009/09/17	12:03:36	0.08753	0.00204	0.654	-3.025	1.22	233	-174	7.9	5.1		87.6	Juno		PSC
2009/09/20	18:39:06	0.38603	0.00206	0.101	-3.738	1.21	232	-176	7.8	5.0		79.8	Juno		PSC
2009/09/27	20:57:21	0.29792	0.00077	177.759	1.414	3.28	171	-8	8.9	3.7		47.3	Pallas	Beta	VIR
2009/10/04	07:24:44	0.15225	0.00303	23.683	-7.058	0.82	237	-162	7.8	5.8		92.4	Melpomene		
2009/10/09	16:47:40	0.47746	0.00212	4.688	32.043	1.17	11	153	9.0	5.9		92.1	Julia		
2009/10/22	11:57:18	0.32149	0.00094	144.325	16.080	2.70	167	-68	7.9	5.9		65.4	Vesta		LEO
2009/11/15	10:24:16	0.34912	0.00072	223.853	-11.611	3.64	341	-10	8.7	5.9		51.5	Ceres	Xi1	LIB
2009/11/16	07:47:07	0.30634	0.00072	224.227	-11.740	3.64	161	-10	8.7	5.6		52.4	Ceres	Xi2	LIB
2009/11/18	11:02:08	0.35297	0.00081	201.655	-1.598	3.12	176	-36	9.0	6.0		50.4	Pallas		
2009/11/24	04:50:35	0.32149	0.00112	154.362	13.995	2.25	350	-91	7.5	5.6		91.4	Vesta		LEO
2009/12/04	20:15:16	0.30335	0.00084	208.807	-1.857	3.01	180	-46	9.0	5.3		53.5	Pallas		VIR
2009/12/09	14:28:39	0.02519	0.00073	234.033	-14.800	3.57	344	-23	8.7	4.0		56.7	Ceres	Gamma	LIB
2009/12/11	07:11:24	0.42734	0.00211	20.840	-7.818	1.17	43	116	8.9	3.7		86.2	Melpomene	Theta	CET
2009/12/14	18:03:55	0.46120	0.00205	21.521	-7.208	1.21	221	113	9.0	6.0		77.4	Melpomene		
2009/12/14	21:05:20	0.31216	0.00074	236.249	-15.405	3.54	345	-26	8.7	5.5		54.4	Ceres	Eta	LIB
2009/12/23	00:49:04	0.35005	0.00139	4.858	-8.441	1.79	21	90	8.8	3.7		64.5	Juno	Iota	CET
2009/12/24	11:50:50	0.14865	0.00075	240.264	-16.420	3.49	346	-32	8.7	5.5		57.8	Ceres		LIB

date in the format year/month/day

Dm = least distance between the centers of the bodies

Dl = parameter limit, if Dm < Dl there is an occultation between the bodies

A.R. e Dec = apparent coordinates of the star

R1 = distance in A.U. of the asteroid from the Earth

P = angle of position between the bodies, in degrees

e = elongation, in degree

m1 = magnitude of the asteroid

m* = magnitude of the star

tm = if present, the star is occulted maximum for x seconds

tw = semiperiod in hours in which the two bodies are near less than 0.5°

GEOCENTRIC ASTEROIDAL OCCULTATIONS OF STARS m<9

Date			U.T.	Diameter	Durn	Star	Mag-Drop	Elon	%	Star	Planet	Min	R.A. (J2000)			Dec.		
y	m	d	h	m	sec/m	mag	V	R	I	No.	Name	D	Error	h	m	s	o	"
2009	Jan	1	19	11.1	12 0.009	1.1s	8.4	7.8	8.3	164	HIP 26832	2963	Chen Jiageng	0.39	0.04	5 41 52.380	26 15 31.29	
2009	Jan	2	3 20.8	39 0.019	2.3s	7.2	6.9	6.9	171	HIP 36249	537	Pauly	1.16	0.06	7 27 50.856	19 2 40.64		
2009	Jan	2	7 14.0	16 0.009	6.7s	7.4	9.3	9.3	119	HIP 53486	5339	1992 CD	1.17	0.05	10 56 30.642	7 23 17.81		
2009	Jan	2	7 58.7	70 0.025	1.6s	9.0	6.6	6.3	23	TYC 6244-00141-1	1243	Pamela	0.21	0.10	17 10 43.916	-22 0 16.74		
2009	Jan	2	8 37.6	25 0.014	1.7s	8.8	8.6	8.9	170	TYC 1919-00387-1	11232	1999 JA77	0.16	0.06	7 33 17.082	26 27 35.46		
2009	Jan	2	12 58.2	16 0.010	2.0s	8.8	7.6	7.5	139	HIP 47515	7113	Ostapbender	0.93	0.05	9 41 11.564	11 33 23.59		
2009	Jan	3	2 57.1	54 0.021	1.3s	7.9	7.9	7.9	40	HIP 105302	1520	Imatra	0.05	0.08	21 19 42.352	-2 52 43.02		
2009	Jan	3	7 22.7	15 0.012	1.3s	5.7	9.5	10.0	173	HIP 33715	2560	Siegma	0.55	0.04	7 0 15.824	16 4 44.37		
2009	Jan	3	9 55.8	16 0.011	2.0s	7.4	8.7	8.5	145	HIP 20712	2953	Vysheslavlia	1.15	0.05	4 26 18.568	21 28 13.24		
2009	Jan	3	15 23.4	13 0.009	1.1s	8.8	8.0	8.1	137	TYC 3433-01439-1	51989	2001 ST286	0.22	0.05	9 56 49.616	47 28 50.07		
2009	Jan	3	18 32.7	15 0.008	1.2s	8.1	8.9	9.2	103	HIP 5746	9936	Al-Biruni	1.01	0.06	1 13 47.927	27 7 58.65		
2009	Jan	3	20 7.8	35 0.014	2.2s	8.9	9.8	9.6	88	HIP 3270	26761	Stromboli	0.08	0.08	0 41 40.354	5 34 25.14		
2009	Jan	3	24 1.5	67 0.033	4.1s	8.4	6.4	6.9	170	TYC 1360-01601-1	834	Burnhamia	0.89	0.07	7 31 4.143	16 37 2.12		
2009	Jan	4	6 33.0	28 0.023	2.1s	8.1	5.8	6.1	173	TYC 1905-00354-1	29943	1999 JZ78	0.44	0.04	6 48 17.444	29 10 54.08		
2009	Jan	4	18 40.8	33 0.012	1.7s	7.7	9.0	8.7	79	HIP 65463	1255	Schilowa	0.89	0.09	13 25 3.699	-15 37 56.49		
2009	Jan	4	19 26.9	28 0.016	1.9s	8.5	8.1	7.7	158	TYC 0139-01971-1	4609	Pizarro	1.01	0.06	6 8 15.503	4 54 49.27		
2009	Jan	4	23 39.8	13 0.008	1.2s	6.3	10.5	10.1	155	HIP 24512	4013	Ogiria	0.29	0.05	5 15 27.647	22 17 5.43		
2009	Jan	5	1 1.2	73 0.035	8.7s	8.6	7.1	6.9	105	HIP 58191	664	Judith	0.61	0.07	11 56 1.262	-1 26 32.28		
2009	Jan	5	9 34.3	17 0.013	1.2s	8.6	7.8	7.6	102	HIP 59150	1909	Alekhin	0.15	0.04	12 7 49.119	-3 7 50.08		
2009	Jan	5	19 24.3	44 0.014	1.3s	8.3	9.6	9.4	50	HIP 111061	7394	Xanthomalitia	0.76	0.10	22 29 55.839	-8 25 8.49		
2009	Jan	6	6 27.1	13 0.010	1.6s	8.9	7.4	7.3	110	HIP 11616	4528	Berg	0.23	0.04	2 29 50.017	3 9 19.77		
2009	Jan	6	9 37.1	89 0.041	1.7s	7.9	5.6	5.7	18	HIP 100533	335	Roberta	0.16	0.07	20 23 7.797	-18 20 33.31		
2009	Jan	6	16 21.1	11 0.014	1.3s	8.8	5.6	5.2	174	TYC 1918-01713-1	2678	Aavasaksa	0.63	0.03	7 24 41.805	27 21 18.92		
2009	Jan	7	4 2.2	12 0.007	1.0s	8.8	8.5	8.1	148	TYC 0105-02172-1	28904	2000 ML	0.22	0.06	5 28 30.331	3 40 28.20		
2009	Jan	7	4 55.1	75 0.032	1.7s	8.8	6.2	6.0	36	HIP 81334	795	Finii	1.37	0.07	16 36 40.989	-32 6 33.33		
2009	Jan	7	15 20.0	12 0.010	1.3s	8.5	7.6	7.4	152	HIP 44956	7857	Lagerros	0.83	0.04	9 9 31.027	13 21 24.96		
2009	Jan	7	23 26.2	92 0.040	2.2s	8.6	5.7	5.5	43	TYC 5806-01515-1	379	Huenna	0.39	0.08	22 11 34.597	-11 1 40.08		
2009	Jan	8	19 51.7	35 0.021	3.4s	8.9	5.8	5.4	113	HIP 58179	183	Istria	0.64	0.05	11 55 56.646	9 50 49.57		
2009	Jan	9	7 51.2	11 0.010	1.4s	8.9	7.0	7.1	125	TYC 2348-01523-1	2993	Wendy	0.05	0.04	3 17 37.908	34 7 10.94		
2009	Jan	9	11 6.5	45 0.037	2.5s	8.3	6.5	6.2	101	HIP 64220	1963	Bezovec	0.39	0.04	13 9 42.684	20 8 2.30		
2009	Jan	9	11 59.9	35 0.014	1.1s	7.5	10.7	10.6	60	HIP 75038	7875	1991 ES1	1.06	0.08	15 20 0.149	-8 39 43.96		
2009	Jan	9	14 29.5	11 0.007	1.0s	8.4	8.6	9.0	149	TYC 4870-00190-1	27222	1999 FR34	0.67	0.05	8 34 46.757	-4 9 12.63		
2009	Jan	9	22 31.3	27 0.016	2.2s	7.5	7.4	8.0	155	HIP 26599	274	Philagoria	0.74	0.05	5 39 14.826	23 19 24.04		
2009	Jan	9	22 33.5	67 0.027	1.7s	7.8	7.8	7.9	43	HIP 110278	1171	Rusthawelia	0.83	0.08	22 20 16.335	-12 13 17.72		
2009	Jan	10	4 34.0	12 0.016	1.7s	8.7	5.7	5.3	161	TYC 2434-00612-1	1518	Rovaniemi	0.89	0.02	6 28 10.262	36 3 0.57		
2009	Jan	10	13 24.3	22 0.019	2.8s	8.5	7.2	7.2	148	TYC 2389-01208-1	1970	Sumeria	0.49	0.04	5 11 4.719	30 18 8.96		
2009	Jan	10	18 10.2	101 0.052	2.4s	7.0	6.6	6.7	41	HIP 109369	626	Notburga	0.44	0.06	22 9 26.919	-8 11 8.19		
2009	Jan	11	4 29.6	111 0.070	3.9s	7.7	5.6	5.7	75	HIP 3126	751	Faina	0.96	0.05	0 39 44.533	-8 0 21.99		
2009	Jan	11	14 56.1	58 0.028	1.2s	8.3	4.5	4.1	28	TYC 5781-00161-1	67	Asia	0.10	0.07	21 24 40.889	-11 46 44.57		
2009	Jan	11	23 26.9	19 0.017	1.7s	7.9	6.4	6.5	158	TYC 2491-01015-1	1158	Luda	0.96	0.04	8 55 25.316	35 7 10.64		
2009	Jan	12	3 22.4	18 0.015	1.5s	8.5	7.7	7.6	161	HIP 43670	2880	Nihondaira	0.63	0.04	8 53 49.945	26 54 47.61		
2009	Jan	12	7 15.1	12 0.007	1.5s	8.7	8.8	8.6	113	TYC 0056-00542-1	6775	Giorgini	1.09	0.06	3 15 58.787	0 45 52.70		
2009	Jan	12	14 7.1	44 0.021	3.2s	7.9	8.7	8.8	150	HIP 46400	1456	Saldanha	0.66	0.07	9 27 43.379	7 22 3.78		
2009	Jan	12	17 45.4	93 0.050	2.0s	7.8	6.0	5.9	40	HIP 81767	326	Tamara	0.77	0.06	16 42 7.335	-29 7 30.89		
2009	Jan	12	18 55.2	48 0.012	1.6s	8.2	8.9	9.3	56	HIP 78593	34746	2001 QE91	0.80	0.13	16 2 48.237	-2 28 12.66		
2009	Jan	13	1 48.3	15 0.010	1.7s	7.2	9.4	9.1	117	HIP 54782	36772	2000 RF99	1.09	0.05	11 12 56.569	-12 47 7.20		
2009	Jan	13	1 54.7	15 0.011	2.1s	7.4	8.7	8.7	144	HIP 23550	2626	Belinka	0.36	0.04	5 3 52.051	24 58 21.07		
2009	Jan	13	4 32.3	15 0.012	1.3s	8.8	6.6	7.0	167	TYC 1331-00501-1	2560	Siegma	0.95	0.04	6 51 1.028	16 36 25.52		
2009	Jan	13	4 56.9	17 0.009	1.5s	8.4	8.5	8.3	144	HIP 50059	6677	Renoir	0.42	0.06	10 13 15.093	31 22 40.39		
2009	Jan	13	9 59.6	40 0.033	4.3s	8.7	6.1	6.4	148	TYC 1859-00432-1	657	Gunlod	1.04	0.04	5 23 33.967	29 40 8.94		
2009	Jan	13	11 2.8	22 0.011	1.3s	7.9	11.2	11.1	84	HIP 5073	8861	Jenskandler	1.08	0.06	1 4 50.526	7 2 44.48		
2009	Jan	13	20 58.4	50 0.030	8.0s	8.3	7.4	7.0	142	HIP 23253	3134	Kostinsky	1.20	0.05	5 0 13.884	20 55 39.85		
2009	Jan	14	0 19.1	11 0.007	1.0s	8.7	8.8	8.6	143	TYC 4895-00897-1	13441	2098 P-L	0.59	0.06	9 46 38.458	-0 36 42.04		
2009	Jan	14	17 0.9	18 0.016	1.6s	9.0	6.5	6.3	168	TYC 2473-01358-1u	3445	Pinson	0.20	0.04	8 6 39.941	32 9 54.55		
2009	Jan	14	20 43.5	55 0.032	2.7s	8.6	6.5	6.3	86	HIP 6630	307	Nike	0.24	0.05	1 25 4.128	3 4 14.10		
2009	Jan	15	0 53.7	25 0.013	1.4s	8.9	7.1	7.3	87	TYC 5546-00216-1	272	Antonia	0.00	0.07	13 46 21.844	-8 26 18.17		
2009	Jan	15	11 58.5	43 0.011	2.1s	8.2	10.1	9.9	78	HIP 5220	5259	Epeigeus	1.13	0.12	1 6 45.523	-4 39 2.04		
2009	Jan	15	13 38.0	45 0.030	3.4s	9.0	6.1	6.4	171	TYC 1913-00243-1	2043	Ortutay	0.59	0.05	7 16 6.304	24 40 9.66		
2009	Jan	15	13 59.3	17 0.009	1.8s	6.7	10.2	10.6	105	HIP 61685	3308	Ferreri	0.80	0.06	12 38 43.032	-4 22 24.79		
2009	Jan	15	19 52.3	12 0.008	1.0s	8.7	7.9	7.6	156	HIP 43876	30534	2001 OA5	1.27	0.05	8 56 18.413	3 34 5.64		
2009	Jan	16	0 47.0	44 0.020	1.2s	7.9	7.8	7.5	53	HIP 78956	799	Gudula	1.20	0.07	16 7 4.668	-16 56 35.92		
2009	Jan	16	7 24.6	21 0.009	2.7s	7.7	10.5	10.3	102	HIP 63099	2986	Mrinalini	0.70	0.08	12 55 40.845	-3 33 2.24		
2009	Jan	16	7 30.4	95 0.033	2.1s	6.2	8.3	8.6	14	HIP 102780	62	Erato	0.71	0.09	20 49 20.542	-18 2 9.38		
2009	Jan	16	8 25.9	12 0.009	1.0s	8.9	8.9	8.7	107	TYC 5529-01400-1	13552	1992 GA	1.15	0.05	12 21 32.284	-11 46 54.40		
2009	Jan	16	10 0.6	15 0.010	1.1s	8.8	7.1	7.2	177	HIP 38603	7260	Hermrod	0.18	0.05	7 54 14.297	23 30 13.93		
2009	Jan	17	0 7.9	22 0.021	1.5s	5.7	9.1	9.5	133	HIP 46511	2105	Gudy	0.66	0.03	9 29 12.630	-20 44 56.80		
2009	Jan	17	0 42.0	77 0.027	1.9s	8.5	7.4	7.2	37	HIP 109141	439	Ohio	1.15	0.09	22 6 30.034	-1 17 35.06		
2009	Jan	17	22 21.4	69 0.032	1.6s	8.3	6.0	5.8	41	HIP 83301	578	Happelia	0.97	0.07	17 1 27.415	-25 17 15.28		
2009	Jan	18	0 8.0	32 0.020	2.2s	7.3	7.8	7.5	171									

Date	U.T.	Diameter	Durn	Star	Mag-Drop	Elon	%	Star	Planet	Min	Error	R.A. (J2000)	Dec.	"
y m d	h m	km	sec/m	mag	V	R	l	No.	No Name	D		h m s	o ' "	
2009 Jan 27	13 41.8	62 0.028	2.0s	8.6	5.2	5.3	64	HIP 78708	849 Ara	0.80	0.07	16 4	2.643	-21 55 41.42
2009 Jan 27	15 38.4	65 0.033	1.3s	8.4	4.8	4.8	33	TYC 6394-00562-1	599 Luisa	0.20	0.07	22 58 51.831	-16 32	42.99
2009 Jan 27	20 38.4	79 0.032	3.2s	6.9	8.8	8.6	71	HIP 76714	551 Ortrud	1.23	0.08	15 39 54.513	-19 46	9.12
2009 Jan 27	20 40.4	79 0.032	3.2s	7.6	8.1	7.9	71	TYC 6193-01523-1s	551 Ortrud	0.59	0.09	15 39 54.621	-19 46	7.81
2009 Jan 28	5 57.4	12 0.006	1.4s	5.9	11.8	11.9	138	HIP 55249	42259 2001 OD81	1.04	0.06	11 18 54.936	1 39	0.91
2009 Jan 28	10 47.7	15 0.010	1.2s	8.6	7.7	7.3	156	TYC 0182-01790-1	29931 1999 JL44	0.41	0.05	7 31 10.775	2 51	50.87
2009 Jan 28	14 24.4	14 0.011	1.4s	9.0	8.4	8.3	158	TYC 1909-00517-1	13741 1998 SH10	0.59	0.04	7 15 27.835	23 30	13.94
2009 Jan 28	22 11.2	11 0.007	1.2s	9.0	8.1	7.7	146	TYC 0736-00611-1	11078 1992 WH2	0.53	0.05	6 28 17.585	10 20	51.16
2009 Jan 29	15 26.4	208 0.192	24.9s	8.7	1.6	1.5	145	HIP 54491	13 Egeria	0.88	0.03	11 8 55.908	34 18	11.12
2009 Jan 29	22 40.1	13 0.008	1.3s	8.4	8.4	8.4	141	HIP 29242	21558 Alisonliu	0.72	0.05	6 9 56.491	34 8	4.72
2009 Jan 30	11 13.8	12 0.009	1.0s	8.6	7.8	8.0	167	TYC 0788-01143-1	27789 Astrakhan	0.69	0.05	8 1 41.251	12 46	31.22
2009 Jan 30	23 8.3	48 0.033	2.5s	9.0	5.4	5.8	91	HIP 69636	1197 Rhodesia	0.82	0.05	14 15 7.481	-27 13	48.00
2009 Jan 31	6 50.0	123 0.039	2.8s	7.8	7.1	7.0	21	HIP 97557	328 Gudrun	0.69	0.10	19 49 44.137	-32 45	50.87
2009 Jan 31	17 42.7	11 0.010	2.3s	8.8	7.5	7.1	133	HIP 27945	3714 Kenrussell	1.16	0.03	5 54 48.510	45 20	39.67
2009 Jan 31	20 11.5	50 0.028	2.3s	8.6	5.3	4.9	82	HIP 73867	186 Celuta	0.96	0.06	15 5 48.722	-20 24	54.96
2009 Jan 31	21 16.2	17 0.010	1.6s	8.4	8.1	8.1	149	TYC 0255-00041-1	2907 Nekrasov	1.20	0.06	10 50 7.302	2 28	17.04
2009 Jan 31	21 41.0	26 0.012	2.4s	8.7	7.9	7.7	100	HIP 68518	2217 Eltigen	0.24	0.07	14 1 38.310	- 9 56	24.31
2009 Jan 31	21 55.7	106 0.044	2.6s	8.0	6.5	6.3	44	HIP 87282	769 Tatjana	0.85	0.08	17 50 5.488	-26 48	38.73
2009 Feb 1	1 40.3	28 0.015	3.2s	6.9	10.1	10.2	133	HIP 27751	4609 Pizarro	1.08	0.06	5 52 26.875	6 12	33.77
2009 Feb 1	6 40.9	11 0.006	5.0s	7.8	10.2	10.2	119	HIP 61649	4665 Muinonen	1.07	0.06	12 38 17.185	-12 23	7.70
2009 Feb 1	8 7.3	25 0.021	2.2s	7.5	8.3	8.4	168	HIP 48060	4292 Aoba	0.93	0.04	9 47 50.871	13 28	39.76
2009 Feb 1	9 56.7	59 0.027	1.7s	8.4	7.8	7.6	62	HIP 81671	921 Jovita	0.31	0.07	16 41 3.042	-15 21	25.96
2009 Feb 1	10 52.9	12 0.008	1.4s	7.6	9.2	9.3	144	HIP 30774	9423 Abt	1.10	0.05	6 27 58.850	23 40	6.07
2009 Feb 1	12 27.8	16 0.009	4.3s	7.1	9.6	9.5	114	TYC 1276-00360-1	2953 Vysheslavlia	0.23	0.06	4 21 35.067	21 11	18.77
2009 Feb 1	12 36.0	15 0.010	3.0s	8.4	8.0	7.6	125	HIP 24989	4569 Baerbel	0.11	0.05	5 21 3.253	4 28	41.01
2009 Feb 1	24 0.4	21 0.022	2.2s	8.6	7.0	7.0	168	HIP 47644	2154 Underhill	0.71	0.03	9 42 49.553	23 36	6.96
2009 Feb 2	1 40.0	79 0.031	1.6s	8.5	6.5	6.6	16	TYC 5167-00729-1	978 Aidamina	0.36	0.09	20 27 5.003	- 2 57	10.12
2009 Feb 2	21 46.0	11 0.008	1.0s	8.6	8.1	7.9	160	TYC 0783-00636-1	51814 2001 OZ8	0.74	0.05	7 48 40.255	9 28	25.59
2009 Feb 2	23 29.8	33 0.019	3.0s	8.8	7.2	7.5	147	TYC 0752-01910-1	1286 Banachiewiczza	1.18	0.06	6 54 31.600	9 29	11.53
2009 Feb 3	18 54.4	12 0.005	1.1s	8.8	10.0	10.1	144	TYC 0264-01008-1	13897 Vesuvius	0.14	0.09	11 26 2.712	2 27	29.90
2009 Feb 3	20 5.5	13 0.007	1.5s	7.9	9.5	9.2	141	HIP 30698	7278 Shtokolov	0.70	0.06	6 27 0.110	23 44	1.86
2009 Feb 4	4 4.5	42 0.016	2.5s	8.6	8.4	8.5	88	HIP 73517	5603 Rausudake	0.88	0.08	15 1 34.074	-15 56	3.07
2009 Feb 4	5 46.1	79 0.017	2.1s	4.2	12.9	13.3	32	HIP 114724	4060 Deiplyos	0.43	0.15	23 14 19.388	- 6 2	58.19
2009 Feb 4	9 5.3	22 0.011	1.4s	8.8	9.2	9.6	146	TYC 5420-00251-1	6613 Williamcarl	0.87	0.07	8 1 41.198	-12 43	49.94
2009 Feb 4	11 10.5	17 0.004	1.0s	8.3	11.0	10.9	81	HIP 76484	23694 1997 KZ3	1.29	0.12	15 37 15.503	-13 22	25.24
2009 Feb 4	20 55.1	81 0.029	2.0s	6.5	8.8	8.5	38	HIP 91132	976 Benjamina	0.68	0.09	18 35 21.349	-20 50	25.60
2009 Feb 5	3 49.0	12 0.008	1.2s	7.5	9.5	9.2	143	HIP 33513	38631 2000 KA31	1.02	0.05	6 57 57.814	2 17	31.85
2009 Feb 5	23 46.2	12 0.008	1.2s	8.8	8.3	8.6	102	TYC 5562-00248-1	1133 Lugduna	0.77	0.05	14 18 56.988	- 9 9	38.59
2009 Feb 6	12 9.5	47 0.017	1.0s	7.9	7.5	7.8	19	HIP 98676	803 Picka	0.56	0.09	20 2 33.193	-15 52	27.47
2009 Feb 6	13 11.4	100 0.093	9.3s	7.7	3.1	2.9	165	HIP 50539	30 Urania	1.01	0.03	10 19 21.997	9 12	46.49
2009 Feb 6	13 41.2	12 0.007	1.0s	7.8	9.8	9.7	100	HIP 71462	17994 1999 JF70	0.26	0.06	14 36 53.471	- 4 16	44.29
2009 Feb 6	14 13.3	30 0.016	3.1s	8.8	8.0	7.8	113	TYC 0308-00264-1	3222 Lillier	1.06	0.06	13 47 47.553	1 12	20.26
2009 Feb 7	7 43.9	15 0.010	1.2s	8.1	8.0	8.1	161	HIP 39708	6424 Ando	0.22	0.05	8 6 58.869	15 9	19.13
2009 Feb 7	17 37.2	24 0.012	4.6s	8.5	8.6	9.1	107	TYC 1268-00698-1	2426 Simonov	1.17	0.07	4 21 39.855	17 6	34.12
2009 Feb 8	0 20.1	13 0.008	1.1s	9.0	7.7	7.4	137	TYC 3401-00521-1	34726 2001 QA25	0.20	0.05	7 28 41.769	50 22	56.89
2009 Feb 8	10 23.1	13 0.008	1.9s	8.9	8.2	8.3	111	HIP 68505	10885 Horimasato	0.61	0.05	14 1 25.154	1 0	8.72
2009 Feb 8	20 41.8	86 0.057	16.3s	7.6	5.1	5.2	127	TYC 1862-02075-1	980 Anacostia	1.04	0.05	5 49 20.445	24 13	21.49
2009 Feb 9	1 32.7	33 0.021	2.4s	9.0	6.6	6.5	169	TYC 0232-01548-1	1408 Trusanda	0.41	0.05	9 4 58.875	5 22	21.56
2009 Feb 9	7 35.5	32 0.019	2.4s	7.7	7.6	7.7	162	HIP 40832	1604 Tombaugh	1.29	0.05	8 20 0.084	19 51	3.43
2009 Feb 10	5 51.4	127 0.055	3.8s	8.8	5.3	4.9	58	TYC 7884-02145-1	426 Hippo	0.69	0.08	17 35 35.076	-38 50	35.31
2009 Feb 10	9 7.9	11 0.009	1.2s	8.1	8.1	7.7	150	TYC 1372-01235-1	6245 Ikufumi	0.81	0.04	7 32 22.762	21 6	14.99
2009 Feb 11	22 9.5	25 0.017	1.8s	8.9	5.8	5.6	172	TYC 0819-00928-1	2111 Tselina	0.61	0.05	9 19 30.134	8 16	35.98
2009 Feb 12	0 18.2	55 0.017	1.2s	8.9	8.1	8.5	17	HIP 101994	1202 Marina	0.35	0.10	20 40 10.572	-20 57	38.02
2009 Feb 12	4 51.3	19 0.018	1.7s	8.9	6.8	7.3	153	TYC 4847-01060-1	7949 1992 SU	0.11	0.04	8 12 14.348	- 1 0	26.60
2009 Feb 12	5 53.9	18 0.013	1.7s	8.2	7.3	6.9	152	HIP 38252	3162 Nostalgia	0.28	0.04	7 50 10.470	19 24	32.85
2009 Feb 12	8 6.8	12 0.008	1.0s	8.9	9.5	9.3	154	HIP 55231	2484 Parenago	0.21	0.05	11 18 37.659	3 8	19.32
2009 Feb 12	17 52.5	97 0.057	3.7s	7.8	5.5	5.2	80	HIP 79124	393 Lampetia	1.12	0.05	16 9 2.595	-18 59	44.25
2009 Feb 12	19 41.9	32 0.012	1.0s	8.5	8.8	8.4	53	TYC 6842-00932-1	3278 Behounek	1.23	0.09	18 3 37.979	-23 8	17.52
2009 Feb 13	9 3.6	21 0.012	2.6s	8.5	8.9	8.6	133	TYC 0155-00195-1	6905 Susumu	0.17	0.06	6 39 54.619	4 11	18.70
2009 Feb 13	22 47.6	54 0.049	4.1s	8.9	2.8	2.8	163	TYC 4897-01973-lu	925 Alphonsina	1.24	0.04	9 37 46.825	- 3 11	15.23
2009 Feb 13	23 58.4	127 0.062	2.3s	8.3	3.9	3.7	12	HIP 108742	344 Desiderata	0.31	0.06	22 1 40.789	-24 51	56.45
2009 Feb 14	7 39.4	11 0.005	1.1s	8.6	9.7	9.8	106	HIP 21111	7911 Carlpilcher	0.31	0.07	4 31 27.815	38 44	11.37
2009 Feb 14	23 58.4	39 0.014	1.2s	8.4	8.3	8.1	58	HIP 87725	1008 La Paz	0.46	0.08	17 55 8.755	-29 48	41.01
2009 Feb 15	0 44.4	16 0.010	4.5s	6.8	9.6	9.2	133	HIP 32055	4925 1981 XH2	0.94	0.05	6 41 50.628	14 12	59.84
2009 Feb 15	1 56.0	35 0.026	2.3s	8.5	6.0	6.3	100	TYC 1815-00799-1	1294 Antwerpia	1.24	0.05	4 16 51.402	23 20	22.06
2009 Feb 15	8 43.5	175 0.077	3.6s	8.4	3.1	2.6	21	HIP 101849	89 Julia	1.07	0.07	20 38 20.925	-21 25	27.20
2009 Feb 15	19 10.8	43 0.019	1.0s	9.0	5.6	5.4	39	TYC 5721-01118-1	397 Vienna	0.41	0.08	19 18 39.894	-14 48	15.80
2009 Feb 15	19 32.8	11 0.006	1.3s	8.7	8.8	8.5	139	HIP 61245	2819 Ensor	0.41	0.06	12 33 2.878	- 2 17	26.81
2009 Feb 15	20 50.5	45 0.043	3.9s	8.4	6.0	5.8	126	HIP 66890	1963 Bezovec	0.75	0.03	13 42 28.066	28 12	8.38
2009 Feb 16	23 51.4	11 0.011	1.6s	8.2	7.8	7.9	130	TYC 2955-00773-1	6729 Emiko	0.53	0.04	7 1 36.385	43 52	32.60
2009 Feb 17	1 13.9	17 0.013	1.4s	8.0	7.3	7.1	168	HIP 52438	1433 Geraminta	0.73	0.04	10 43 9.621	4 40	3.66
2009 Feb 17	5 5.0	52 0.020	1.4s	8.2	8.0	7.8	46	HIP 5220	1262 Sniadeckia	0.32	0.08	1 6 45.523	- 4 39	2.04
2009 Feb 17	16 12.8	100 0.052	2.3s	8.4	3.8	4.1	44	HIP 93605	42 Isis	1.01	0.06	19 3 43.747	-22 42	43.26
2009 Feb 18	1 53.4	64 0.016	3.9s	8.1	9.8	9.5	81	HIP 80493	22180 2000 YZ	1.21	0.13	16 25 50.652	-26 34	6.50
2009 Feb 18	3													

Date	U.T.	Diameter	Durn	Star	Mag-Drop	Elon	%	Star	Planet	Min	Error	R.A. (J2000)	Dec.	"
y m d	h m	km	sec/m	mag	V	o	til	No.	No Name	D		h m s	o ' "	
2009 Mar 3	15 34.1	108 0.045	2.2s	8.2	5.4	5.6	9	HIP 110471	345 Tercidina	1.29	0.08	22 22 37.428	- 3 44 13.56	
2009 Mar 3	18 56.4	69 0.025	2.0s	8.9	5.8	6.1	49	HIP 8045	174 Phaedra	0.50	0.09	1 43 18.383	21 30 1.16	
2009 Mar 3	19 41.1	49 0.019	1.2s	7.9	8.4	8.2	36	HIP 6017	267 Tirza	0.73	0.08	1 17 20.435	4 39 53.12	
2009 Mar 4	10 16.3	13 0.018	1.0s	8.3	6.6	6.4	156	HIP 58731	1235 Schorria	0.75	0.02	12 2 46.721	24 50 9.91	
2009 Mar 4	15 46.5	10 0.008	1.0s	7.8	8.6	8.7	154	HIP 48696	34715 2001 P012	0.91	0.04	9 55 51.866	26 51 3.94	
2009 Mar 4	18 49.8	69 0.046	13.1s	8.5	5.9	5.8	129	HIP 37788	949 Hel	0.66	0.05	7 44 56.178	24 19 13.63	
2009 Mar 4	23 40.3	21 0.009	1.0s	7.0	10.0	9.7	79	HIP 19529	4542 Mossotti	0.52	0.07	4 11 3.399	16 38 49.17	
2009 Mar 5	13 15.6	90 0.042	2.4s	8.7	5.6	5.4	53	HIP 11217	358 Apollonia	0.85	0.07	2 24 22.606	11 30 6.86	
2009 Mar 6	5 14.1	78 0.029	1.8s	7.9	7.4	7.5	35	HIP 102903	552 Sigelinde	1.22	0.08	20 50 48.843	-14 12 1.40	
2009 Mar 6	7 20.7	31 0.024	2.1s	7.9	7.3	7.0	101	HIP 27203	1655 Comas Sola	1.07	0.04	5 45 58.645	23 44 50.53	
2009 Mar 6	13 19.0	13 0.013	1.1s	8.9	6.2	5.9	171	TYC 0860-00320-1	9659 1996 EJ	0.38	0.04	11 39 35.921	10 19 40.79	
2009 Mar 7	2 46.5	67 0.025	2.1s	6.5	9.4	9.7	55	HIP 12599	638 Moira	0.56	0.08	2 42 0.077	10 32 41.07	
2009 Mar 7	4 37.4	81 0.026	2.3s	8.5	8.1	8.0	50	HIP 97722	319 Leona	0.55	0.10	19 51 33.289	-11 49 17.04	
2009 Mar 7	7 28.3	34 0.014	1.5s	8.8	6.9	6.6	77	HIP 19850	226 Weringia	0.62	0.07	4 15 18.782	8 25 45.19	
2009 Mar 7	21 4.3	153 0.069	3.2s	7.8	3.7	4.0	23	HIP 3296	11 Parthenope	0.19	0.07	0 42 2.290	1 1 24.91	
2009 Mar 8	2 24.4	44 0.012	1.2s	7.5	9.0	8.8	49	HIP 99365	623 Chimaera	0.17	0.07	20 10 6.772	-25 17 2.55	
2009 Mar 8	4 37.5	12 0.008	2.7s	7.9	8.9	9.0	136	TYC 1382-00760-1	3975 Verdi	0.85	0.05	8 23 0.083	17 40 6.39	
2009 Mar 8	6 22.7	39 0.022	1.1s	8.8	5.0	4.7	60	TYC 1776-00776-1	796 Sarita	0.38	0.06	2 46 22.380	27 3 14.46	
2009 Mar 9	2 22.2	34 0.021	2.2s	8.5	7.3	7.1	96	HIP 82298	3089 Oujianquan	0.61	0.05	16 48 57.614	- 9 55 19.60	
2009 Mar 10	1 4.5	47 0.030	1.5s	8.9	4.4	4.0	67	HIP 92650	432 Pythia	0.92	0.05	18 52 42.424	-20 14 20.54	
2009 Mar 10	12 16.8	12 0.006	2.4s	8.6	9.0	9.0	111	HIP 33631	14338 Shibakoukan	0.44	0.06	6 59 11.345	36 46 51.34	
2009 Mar 10	18 21.5	12 0.006	1.1s	8.5	9.3	9.0	100	TYC 2925-01543-1	40429 1999 RL27	0.79	0.07	6 0 54.232	58 2 26.50	
2009 Mar 10	19 16.2	29 0.017	2.0s	7.3	9.1	8.7	96	HIP 27110	2132 Zhukov	1.01	0.05	5 44 55.554	26 20 32.55	
2009 Mar 11	3 56.1	11 0.010	1.0s	8.1	7.3	7.0	158	HIP 50663	722 Frieda	1.32	0.03	10 20 47.760	19 32 20.34	
2009 Mar 11	6 14.4	47 0.030	1.5s	8.1	5.2	4.8	68	TYC 6289-02903-1	432 Pythia	1.18	0.05	18 55 11.729	-20 15 24.90	
2009 Mar 11	9 56.4	23 0.015	1.9s	7.3	10.5	10.6	153	HIP 47411	16447 Vauban	1.07	0.05	9 39 39.592	3 11 43.09	
2009 Mar 12	2 11.0	36 0.016	2.0s	6.4	10.2	9.8	90	HIP 25453	1070 Tunica	1.06	0.07	5 26 38.836	6 52 6.87	
2009 Mar 12	2 57.0	11 0.005	1.8s	8.8	9.5	9.6	130	TYC 1944-02024-1	10623 1997 YP7	0.62	0.07	8 23 3.758	26 47 45.45	
2009 Mar 12	8 52.5	25 0.016	2.6s	8.1	8.9	9.2	112	HIP 33546	16029 1999 DQ6	0.97	0.05	6 58 17.854	7 52 27.88	
2009 Mar 12	18 13.3	44 0.016	1.0s	8.2	8.5	8.3	35	HIP 7706	2483 Guinevere	0.10	0.09	1 39 11.654	12 26 25.62	
2009 Mar 13	0 17.1	13 0.008	1.5s	7.7	9.3	9.3	143	HIP 67855	10064 1988 UO	0.29	0.05	13 53 55.219	- 8 29 4.41	
2009 Mar 13	1 30.5	27 0.011	1.4s	8.7	8.5	8.4	86	TYC 0108-00530-1	6057 Robbia	1.17	0.08	5 16 16.864	5 18 12.03	
2009 Mar 13	21 4.9	66 0.024	1.4s	8.7	6.3	6.1	5	TYC 5259-00212-1	546 Herodias	1.17	0.09	23 50 50.057	- 6 16 4.79	
2009 Mar 14	0 21.9	59 0.023	1.2s	8.9	6.2	6.0	6	TYC 5829-01206-1	1317 Silvretta	0.55	0.09	23 29 39.894	- 8 40 9.27	
2009 Mar 14	0 37.2	11 0.008	1.1s	7.7	9.2	9.0	149	HIP 59629	32442 2000 RS100	0.40	0.04	12 13 40.661	-27 19 15.97	
2009 Mar 14	17 17.0	42 0.020	3.1s	7.8	8.0	8.2	146	HIP 48417	1227 Geranium	0.77	0.07	9 52 14.602	25 6 29.36	
2009 Mar 15	0 47.6	93 0.063	2.6s	8.7	4.8	5.0	67	HIP 95956	326 Tamara	0.71	0.05	19 30 48.998	-38 7 19.20	
2009 Mar 15	14 24.9	12 0.010	1.9s	7.9	8.2	8.2	136	HIP 46954	11424 1999 LZ24	1.18	0.04	9 34 14.719	34 48 40.13	
2009 Mar 16	20 42.9	54 0.020	1.1s	8.6	6.9	7.4	12	HIP 114645	1520 Imatra	0.22	0.09	23 13 29.120	7 10 49.97	
2009 Mar 17	12 12.9	16 0.011	2.3s	8.0	8.3	8.6	144	HIP 47274	4848 Tutenchamun	1.20	0.05	9 38 4.574	17 21 18.90	
2009 Mar 17	12 55.0	22 0.011	2.2s	8.2	9.1	9.0	102	HIP 83005	725 Amada	0.14	0.06	16 57 41.916	-21 46 31.29	
2009 Mar 17	12 57.5	77 0.034	2.0s	8.7	5.6	5.7	49	TYC 6339-01765-1	411 Xanthe	1.06	0.08	20 41 44.327	-19 3 27.64	
2009 Mar 18	0 36.0	13 0.007	1.3s	8.4	9.3	9.3	137	HIP 46325	14705 2000 CG2	0.73	0.06	9 26 43.184	26 21 1.08	
2009 Mar 18	3 56.3	28 0.018	2.1s	8.9	6.5	6.3	100	TYC 5648-00828-1	1341 Edmee	1.06	0.05	17 11 39.313	-10 38 6.90	
2009 Mar 18	4 7.1	15 0.013	1.8s	6.9	9.8	9.7	108	HIP 35265	3872 Akirafujii	0.81	0.04	7 17 9.490	33 5 29.80	
2009 Mar 18	7 55.2	53 0.031	3.1s	7.6	7.6	8.1	86	HIP 26279	232 Russia	1.06	0.05	5 35 44.567	18 45 29.21	
2009 Mar 18	19 52.7	15 0.007	1.7s	8.6	9.0	8.5	102	TYC 1338-02111-1	32536 2001 PD41	0.98	0.07	6 42 14.516	18 47 10.97	
2009 Mar 19	3 43.2	13 0.006	1.4s	7.6	10.1	9.7	101	TYC 0155-01221-1	32125 2000 LZ11	1.31	0.07	6 37 57.782	4 15 30.78	
2009 Mar 19	14 51.6	11 0.008	1.0s	8.8	8.1	7.8	156	TYC 0844-01375-1	15092 Beegees	1.16	0.05	10 32 33.691	12 43 49.76	
2009 Mar 20	1 11.3	13 0.008	1.1s	8.5	8.3	8.4	153	HIP 67091	3184 Raab	0.65	0.05	13 45 4.219	1 31 34.42	
2009 Mar 20	1 42.6	21 0.006	1.3s	8.8	10.0	10.6	84	TYC 6269-00716-1	23549 1994 ES6	1.27	0.13	18 22 30.032	-17 31 59.82	
2009 Mar 20	3 50.4	44 0.022	4.9s	8.3	6.4	6.7	104	TYC 1356-00904-1	507 Laodica	0.62	0.07	6 58 3.816	21 15 10.10	
2009 Mar 20	17 46.6	66 0.033	11.9s	8.2	8.2	8.3	111	HIP 80198	1297 Quadea	0.87	0.06	16 22 21.678	-31 15 4.07	
2009 Mar 21	4 9.1	13 0.012	1.3s	8.9	6.4	6.5	168	HIP 61721	1014 Semphyra	1.15	0.03	12 39 4.369	- 7 55 3.07	
2009 Mar 21	4 39.5	80 0.034	2.0s	4.3	10.5	10.5	43	HIP 105515	559 Nanon	0.04	0.07	21 22 14.816	-16 50 4.30	
2009 Mar 21	5 7.5	105 0.057	2.6s	8.0	5.6	5.3	55	HIP 102324	164 Eva	0.11	0.06	20 43 54.910	-27 54 51.27	
2009 Mar 21	5 56.0	63 0.024	2.2s	7.6	9.0	9.2	61	TYC 1261-00345-1	1436 Salonta	1.24	0.09	3 59 49.458	21 18 28.33	
2009 Mar 21	9 6.0	47 0.021	1.0s	6.8	7.2	7.0	31	HIP 9785	306 Unitas	0.74	0.07	2 5 48.515	7 1 42.37	
2009 Mar 21	13 58.8	38 0.017	2.6s	7.7	7.4	7.3	92	HIP 29844	339 Dorotea	0.16	0.07	6 13 31.827	14 0 57.96	
2009 Mar 21	18 43.5	98 0.034	2.1s	7.6	7.1	7.5	11	HIP 520	404 Arsinooe	1.18	0.09	0 6 16.954	-10 46 42.55	
2009 Mar 21	22 15.3	13 0.007	1.5s	4.5	13.3	13.5	133	HIP 46146	14705 2000 CG2	0.70	0.06	9 24 39.238	26 10 55.92	
2009 Mar 22	8 34.7	34 0.021	5.5s	8.6	6.7	6.5	134	HIP 45454	824 Anastasia	0.97	0.05	9 15 49.733	17 29 39.13	
2009 Mar 22	10 15.8	14 0.008	1.3s	7.3	9.8	9.4	105	TYC 6819-00740-1	12214 Miroshnikov	0.81	0.06	17 1 56.306	-27 56 20.48	
2009 Mar 22	19 15.3	20 0.009	1.7s	7.7	9.6	10.0	133	HIP 74508	2651 Karen	0.45	0.07	15 13 31.944	5 2 38.77	
2009 Mar 22	21 45.0	18 0.017	2.0s	7.9	9.6	9.4	158	HIP 53049	11313 Kugelgen	0.38	0.03	10 51 13.816	9 13 26.11	
2009 Mar 22	23 29.8	11 0.006	1.1s	8.6	11.2	10.8	102	HIP 84605	8181 Rossini	1.02	0.06	17 17 39.526	-26 37 44.70	
2009 Mar 23	7 54.3	10 0.008	1.0s	8.4	8.3	8.7	135	HIP 54270	39969 1998 GT8	0.37	0.04	11 6 7.942	40 55 37.34	
2009 Mar 23	8 26.3	10 0.006	1.6s	8.2	9.3	9.0	113	TYC 7344-01044-1d	5955 Khromchenko	0.99	0.05	16 25 41.184	-31 42 12.54	
2009 Mar 24	12 0.6	42 0.023	1.3s	8.1	7.1	7.0	66	HIP 98599	435 Ella	1.24	0.06	20 1 38.179	-22 6 39.53	
2009 Mar 24	13 36.2	15 0.009	1.1s	9.0	7.7	7.8	96	TYC 6845-00737-1	557 Violetta	0.80	0.06	17 52 35.195	-25 31 32.59	
2009 Mar 25	0 15.5	20 0.008	1.6s	8.3	10.6	10.3	91	HIP 30346	6975 Hiroaki	0.24	0.08	6 22 59.424	25 59 54.27	
2009 Mar 25	5 26.4	17 0.010	1.0s	7.8	8.7	9.1	100	TYC 5958-03117-1	5234 Sechenov	0.32	0.06	6 55 52.541	-19 45 40.17	
2009 Mar 25	6 28.6	79 0.033	1.7s	8.7	6.4	6.7	35	HIP 108561	978 Aidamina	1.24	0.07	21 59 26.291	4 46 34.99	
2009 Mar 25	9 10.1	20 0.009	1.3s	8.3	10.1	10.2	93	HIP 88798	3922 Heather	1.18	0.07	18 7 34.645	-25 34 11.71	
2009 Mar 25	17 24.1	24 0.023	2.3s	6.3	8.0	8.0	165	HIP 680						

Date	U.T.	Diameter	Durn	Star	Mag-Drop	Elon	%	Star	Planet	Min	R.A. (J2000)	Dec.
y m d	h m	km	sec/m	mag	V R	o	til	No.	No Name	D Error	h m s	o ' "
2009 Apr 8	14 24.0	13 0.007	1.3s	7.9	9.4	9.8	103	TYC 1385-01113-1	5532 Ichinohe	1.26 0.06	8 15 24.673	20 14 3.53
2009 Apr 8	15 43.4	98 0.042	2.5s	8.9	4.2	4.4	45	HIP 110396	148 Gallia	0.30 0.07	22 21 41.790	-7 36 30.18
2009 Apr 8	21 52.8	69 0.033	1.4s	8.2	4.1	4.4	22	HIP 12079	79 Eurynome	0.49 0.07	2 35 42.512	13 49 2.43
2009 Apr 8	23 24.5	127 0.061	2.6s	8.2	4.4	4.1	25	HIP 609	344 Desiderata	0.80 0.07	0 7 23.228	-11 36 46.73
2009 Apr 9	7 18.6	30 0.015	1.4s	8.8	6.9	6.5	79	HIP 98899	2448 Sholokhov	1.24 0.06	20 5 0.418	-10 34 52.03
2009 Apr 9	11 36.2	30 0.013	3.0s	6.7	10.6	10.4	99	HIP 91903	2218 Wotho	1.19 0.07	18 44 8.759	-19 19 4.16
2009 Apr 9	22 44.5	20 0.006	1.6s	8.6	10.0	9.9	131	HIP 79464	30708 Echeolos	1.02 0.10	16 12 56.910	-36 6 22.48
2009 Apr 9	23 26.3	15 0.013	1.2s	7.1	8.1	8.0	169	HIP 65352	2292 Seili	0.91 0.04	13 23 39.163	-2 43 25.81
2009 Apr 10	0 45.9	48 0.016	1.2s	8.9	9.1	8.8	36	HIP 16983	2932 Kempchinsky	0.43 0.09	3 38 25.782	17 35 27.43
2009 Apr 10	12 1.2	14 0.013	1.6s	7.9	7.4	7.5	154	TYC 6740-00306-1	1065 Amundsenia	0.14 0.04	14 30 26.299	-28 0 40.58
2009 Apr 11	5 23.3	157 0.065	3.5s	8.7	4.3	4.5	31	HIP 115988	93 Minerva	0.27 0.08	23 29 58.188	-6 15 50.83
2009 Apr 11	9 12.1	15 0.010	2.3s	7.2	9.2	9.0	111	HIP 88541	557 Violetta	0.88 0.05	18 4 48.485	-25 36 20.53
2009 Apr 12	2 41.0	30 0.020	2.3s	2.6	13.2	12.7	162	HIP 59803	3471 Amelin	0.37 0.05	12 15 48.267	-17 32 30.74
2009 Apr 12	11 59.2	12 0.009	1.5s	8.9	7.7	7.7	112	HIP 44373	5692 Shirao	0.69 0.04	9 2 15.270	10 6 20.79
2009 Apr 12	12 24.3	11 0.005	1.0s	7.6	10.9	10.5	96	HIP 38265	18900 2000 LD12	0.22 0.07	7 50 22.721	5 45 54.59
2009 Apr 12	12 43.9	17 0.008	1.2s	8.8	9.5	9.6	157	TYC 5583-00045-1	8891 Irokawa	0.59 0.07	14 58 31.511	-10 58 56.18
2009 Apr 12	15 29.0	14 0.010	1.0s	8.8	7.5	7.5	160	HIP 61263	9083 Ramboehm	0.25 0.05	12 33 19.043	-25 16 3.18
2009 Apr 12	21 58.6	72 0.021	1.6s	8.1	8.2	8.6	9	HIP 8657	1345 Potomac	0.44 0.11	1 51 34.369	2 23 9.99
2009 Apr 13	4 13.9	29 0.013	2.2s	7.3	7.7	7.5	92	HIP 38677	197 Arete	0.82 0.07	7 55 8.252	28 23 2.50
2009 Apr 13	4 59.3	218 0.089	6.3s	8.6	4.8	4.5	54	TYC 1857-00051-1	94 Aurora	0.59 0.08	5 1 45.459	29 39 11.68
2009 Apr 13	13 41.7	140 0.055	2.9s	7.2	5.9	5.9	16	HIP 2166	47 Aglaja	0.18 0.08	0 27 20.253	2 48 50.75
2009 Apr 14	8 43.4	14 0.004	2.0s	8.6	10.6	10.8	131	HIP 82376	56951 2000 SK2	0.07 0.10	16 49 59.495	-23 26 53.19
2009 Apr 15	2 47.2	32 0.025	3.9s	8.7	5.7	5.4	149	TYC 6192-01132-1	180 Garumna	0.03 0.04	15 33 42.361	-20 32 55.29
2009 Apr 15	7 32.2	142 0.052	3.6s	8.7	5.6	5.3	44	HIP 20230	361 Bononia	1.00 0.09	4 20 9.426	30 53 9.70
2009 Apr 15	7 33.2	24 0.012	1.4s	8.8	7.5	7.6	88	TYC 1361-00098-1	1826 Miller	0.46 0.07	7 38 23.813	15 4 19.40
2009 Apr 15	9 23.5	59 0.033	4.4s	7.1	8.3	8.1	157	HIP 59217	1574 Meyer	1.16 0.06	12 8 42.789	-18 26 7.58
2009 Apr 15	10 50.5	44 0.026	1.3s	7.4	6.4	6.0	65	TYC 1864-00564-1	182 Elsa	0.43 0.06	6 1 29.208	23 42 14.12
2009 Apr 15	13 19.9	64 0.022	13.9s	8.8	8.0	7.7	125	TYC 7869-01361-1	16070 1999 RB101	0.86 0.10	17 4 48.369	-38 5 7.52
2009 Apr 15	21 36.5	11 0.007	1.3s	8.1	8.9	8.8	141	HIP 59382	29218 1992 AY	0.81 0.05	12 10 59.910	-22 51 41.85
2009 Apr 16	5 31.8	15 0.007	2.0s	5.0	12.4	12.0	138	HIP 53824	4746 Doi	1.25 0.06	11 0 44.771	6 6 5.01
2009 Apr 17	1 31.3	21 0.009	1.0s	8.5	9.7	9.4	79	HIP 33832	6925 Susumu	0.37 0.07	7 1 23.932	8 37 53.54
2009 Apr 17	7 56.6	12 0.012	2.6s	7.4	8.2	8.2	135	HIP 57198	16955 1998 KU48	1.06 0.03	11 43 47.030	24 0 37.12
2009 Apr 17	9 46.6	14 0.015	1.4s	8.3	7.9	7.7	149	HIP 56817	2064 Thomsen	0.96 0.03	11 38 49.401	-7 36 0.16
2009 Apr 18	4 2.7	120 0.055	2.9s	8.8	4.6	4.5	44	HIP 21615	141 Lumen	1.02 0.07	4 38 25.998	29 23 14.49
2009 Apr 18	8 2.0	60 0.026	1.2s	8.2	4.4	4.1	7	HIP 10415	60 Echo	1.26 0.07	2 14 12.561	12 17 1.94
2009 Apr 18	13 29.9	29 0.015	3.8s	8.7	8.3	8.7	127	HIP 50058	2908 Shimoyama	0.71 0.06	10 13 14.133	-5 13 3.83
2009 Apr 18	20 31.6	13 0.004	1.0s	8.8	10.1	10.4	148	HIP 77854	52567 1997 HN2	0.57 0.09	15 53 52.332	-20 18 53.05
2009 Apr 19	0 31.0	168 0.070	7.0s	8.0	5.7	5.3	73	HIP 32595	194 Prokne	0.51 0.07	6 48 0.019	11 28 58.39
2009 Apr 19	7 19.7	60 0.026	1.7s	7.8	8.4	8.1	54	TYC 1301-01277-1	816 Juliana	0.18 0.08	5 32 2.876	17 31 50.67
2009 Apr 19	20 44.6	12 0.009	1.5s	7.3	8.9	8.7	155	HIP 76209	6732 1992 CG1	0.09 0.04	15 34 3.504	-11 43 46.42
2009 Apr 20	1 45.1	13 0.009	1.5s	9.0	7.5	7.6	149	TYC 6191-00775-1	18365 Shimomoto	0.95 0.05	15 56 2.222	-18 15 34.01
2009 Apr 20	2 52.3	15 0.018	2.8s	9.0	5.4	5.2	151	HIP 77177	1506 Xosa	1.25 0.03	15 45 29.229	-23 30 34.70
2009 Apr 20	10 3.2	16 0.008	1.2s	8.8	8.2	8.4	90	TYC 1936-01014-1	1658 Innes	0.68 0.07	8 17 56.283	26 47 37.66
2009 Apr 20	10 18.6	40 0.024	1.2s	8.4	7.5	7.8	67	TYC 2426-00878-1	155 Scylla	0.94 0.06	6 32 40.492	33 38 55.33
2009 Apr 21	14 22.4	14 0.013	1.4s	6.8	9.0	9.4	161	HIP 61969	3485 Barucci	1.05 0.03	12 41 57.697	-7 30 1.50
2009 Apr 22	23 47.4	86 0.032	1.9s	8.6	6.1	6.0	19	HIP 15038	195 Eurykleia	0.94 0.09	3 13 50.176	-22 15 8.65
2009 Apr 23	4 51.3	23 0.019	1.9s	8.4	5.6	5.3	162	HIP 62991	477 Italia	0.51 0.04	12 54 26.918	-7 36 37.89
2009 Apr 23	4 58.0	86 0.037	3.0s	8.8	5.4	5.9	66	TYC 1329-00180-1	236 Honoria	0.86 0.08	6 37 31.954	16 33 44.85
2009 Apr 24	23 21.5	66 0.025	2.6s	8.0	8.1	8.3	72	HIP 106693	777 Gutemberga	0.54 0.08	21 36 36.669	-9 2 48.95
2009 Apr 25	8 32.5	12 0.017	1.6s	7.9	6.6	6.7	138	HIP 74070	3913 Chemin	0.81 0.02	15 8 13.932	26 42 40.84
2009 Apr 25	16 19.4	26 0.013	2.0s	8.0	8.6	8.7	95	TYC 1396-02190-1	1340 Yvette	0.61 0.07	8 51 29.697	17 45 15.05
2009 Apr 25	23 18.2	70 0.050	5.0s	8.8	4.9	5.2	178	TYC 5560-01023-1	429 Lotis	0.95 0.05	14 4 42.609	-14 8 22.30
2009 Apr 26	3 56.3	18 0.010	1.2s	8.8	9.8	9.7	93	TYC 1953-01360-1	21570 Muralidhar	0.39 0.06	8 56 46.142	25 0 23.63
2009 Apr 26	7 33.3	75 0.018	1.8s	7.7	9.1	9.2	14	HIP 6187	3596 Meriones	0.51 0.13	1 19 24.087	18 8 15.41
2009 Apr 26	15 23.5	140 0.055	3.0s	5.7	7.5	7.5	23	HIP 3765	47 Aglaja	0.46 0.08	0 48 23.450	5 16 39.58
2009 Apr 27	2 55.3	20 0.017	1.7s	8.0	8.1	8.3	172	HIP 67144	2751 Campbell	0.50 0.04	13 45 37.136	-12 23 2.63
2009 Apr 27	7 35.4	29 0.012	1.1s	8.9	7.9	7.7	65	TYC 1894-02272-1	1758 Naantali	1.25 0.08	6 53 54.745	23 55 32.44
2009 Apr 27	18 15.4	15 0.009	1.0s	6.3	10.1	10.3	174	HIP 72194	5138 Gyda	0.60 0.05	14 45 57.731	-15 27 34.33
2009 Apr 28	3 39.7	39 0.014	1.3s	8.6	8.1	8.2	59	HIP 31046	2127 Tanya	0.57 0.08	6 30 50.941	24 9 3.12
2009 Apr 28	3 59.8	21 0.010	1.3s	7.2	8.4	9.1	175	HIP 69403	2237 Malnikov	1.12 0.06	14 12 33.492	-9 54 0.39
2009 Apr 28	5 48.8	11 0.012	1.8s	8.7	6.6	6.5	156	HIP 77531	7808 Bagould	0.74 0.03	15 49 51.259	-27 52 55.68
2009 Apr 28	7 34.6	18 0.010	3.0s	8.1	8.6	8.4	113	HIP 94042	4714 Toyochiro	0.09 0.06	19 8 44.847	-33 47 40.25
2009 Apr 28	8 1.0	16 0.009	7.2s	8.1	11.2	11.3	116	HIP 51120	20293 Sirichelson	1.11 0.05	10 26 39.399	12 29 19.12
2009 Apr 28	8 53.6	25 0.016	8.2s	8.5	7.6	8.0	122	TYC 6278-01487-1	3054 Strugatskia	0.89 0.05	18 24 57.930	-20 46 58.45
2009 Apr 28	11 26.5	10 0.005	1.0s	8.9	9.2	9.0	99	TYC 1405-00430-1	16157 Toastmasters	1.00 0.07	9 25 3.340	18 44 55.94
2009 Apr 28	14 7.6	64 0.023	7.5s	7.8	8.8	8.4	138	TYC 7869-00940-1	16070 1999 RB101	0.03 0.10	17 1 21.858	-38 18 58.97
2009 Apr 28	21 13.2	21 0.010	1.0s	8.7	8.3	8.0	80	TYC 1376-00518-1	2306 Bauschinger	0.52 0.07	8 1 1.786	16 13 59.86
2009 Apr 28	23 34.4	82 0.029	2.5s	7.1	8.4	8.2	49	HIP 27605	231 Vindobona	1.05 0.09	5 50 39.726	-27 30 17.89
2009 Apr 29	1 1.2	16 0.017	1.9s	7.6	7.6	7.9	166	HIP 75330	2728 Yatskiiv	0.10 0.03	15 23 30.895	-16 33 51.02
2009 Apr 29	11 55.6	15 0.005	1.1s	6.4	12.2	11.8	153	HIP 79530	122581 2000 RJ24	0.60 0.09	16 13 45.491	-24 25 19.71
2009 Apr 29	11 57.9	32 0.016	7.2s	8.2	6.6	6.3	109	HIP 48542	984 Gretia	0.18 0.06	9 53 59.782	6 56 58.81
2009 Apr 29	21 4.1	23 0.014	2.4s	8.9	8.8	9.2	150	HIP 81173	2039 Payne-Gaposch	0.50 0.05	16 34 47.556	-19 56 27.32
2009 Apr 30	9 4.0	16 0.007	1.9s	8.0	11.7	11.3	99	HIP 45700	25785 2000 CY45	0.35 0.07	9 18 59.108	10 56 59.63
2009 Apr 30	15 54.4	13 0.013	1.2s	7.8	8.3	8.4	118	HIP 53097	1235 Schorria	0.89 0.03	10 51 45.034	13 33 57.50
2009 Apr 30	16 37.2	50 0.034	3.9s	8.0	6.4	6.1	170	HIP 74299	1071 Brita	0.94 0.05	15 11 11.672	-16 57 52.71
2009 Apr 30	23 39.9	18 0.011	1.6s	8.5	7.5	7.6	157	TYC 6787-01665-1	4223 Shikoku	0.27 0.05	15 55 48.076	-27 57 7.66
2009 May 1	8 16.2	11 0.009	1.2s	8.7	7.7	7.6	152	HIP 80842	2557 Putnam	0.90 0.04	16 30 32.038	-14 32 47.13
2009 May 1	19 14.7	66 0.043	3.0s	9.0	3.7	3.5	85	TYC 6942-00659-1	101 Helena	1.07 0.05	21 26 8.158	-24 22 43.52
2009 May 2	0 45.5	71 0.027	2.3s	8.6	5.8	5.7	59					

Date	U.T.	Diameter	Durn	Star	Mag-Drop	Elon	%	Star	Planet	Min		R.A. (J2000)	Dec.	"
y m d	h m	km	sec/m	mag	V R	o	til	No.	No Name	D	Error	h m s	o ' "	
2009 May 12	2 32.9	23 0.017	5.5s	8.7	8.2 8.5	119		HIP 96022	16035 Sasandford	0.48	0.04	19 31 25.125	-13 58 41.28	
2009 May 12	6 18.4	25 0.017	1.1s	8.5	7.6 7.3	85		HIP 107154	1994 Shane	0.21	0.05	21 42 19.178	- 4 20 24.34	
2009 May 12	10 56.8	12 0.007	1.8s	8.5	8.7 8.5	141		HIP 88072	24030 1999 RT206	1.19	0.05	17 59 15.523	-31 26 31.41	
2009 May 13	5 7.4	14 0.015	1.4s	7.6	7.3 7.5	158		HIP 67834	1065 Amundsenia	0.01	0.03	13 53 42.121	-26 42 26.62	
2009 May 13	9 56.0	21 0.015	11.3s	8.9	7.6 8.1	126		TYC 6875-03056-1	750 Oskar	0.26	0.05	19 15 55.576	-24 5 3.63	
2009 May 13	11 19.6	17 0.009	2.0s	5.0	12.0 12.1	140		HIP 89153	1761 Edmondson	0.21	0.06	18 11 43.338	-23 42 4.71	
2009 May 13	11 38.1	77 0.029	2.0s	8.2	6.0 5.6	37		TYC 1864-01010-1	779 Nina	0.15	0.09	6 1 31.500	-23 44 19.38	
2009 May 13	14 10.7	26 0.014	4.1s	7.8	8.8 9.4	137		HIP 90130	2659 Willis	0.07	0.06	18 23 34.932	-21 39 50.34	
2009 May 13	17 59.6	67 0.025	1.5s	8.2	7.3 7.4	31		HIP 5473	1306 Scythia	0.82	0.08	1 10 4.379	19 50 16.74	
2009 May 14	3 26.5	14 0.014	4.5s	8.7	6.4 6.6	139		TYC 6269-00232-1	821 Fanny	0.98	0.03	18 17 16.770	-16 55 43.07	
2009 May 14	7 23.3	21 0.014	2.0s	8.0	8.3 8.0	152		TYC 6721-00868-1	18219 6260 P-L	1.07	0.05	13 29 30.593	-27 23 20.92	
2009 May 14	10 8.3	29 0.016	3.4s	8.5	7.8 7.5	140		TYC 6109-01207-1	6137 Johnfletcher	0.05	0.06	12 34 57.637	-21 12 55.71	
2009 May 14	16 47.7	96 0.042	2.7s	8.3	6.4 6.5	54		HIP 117804	773 Irmintraud	0.72	0.07	23 53 32.214	4 48 46.54	
2009 May 14	19 31.0	15 0.013	1.3s	7.2	8.0 7.7	166		HIP 78124	29769 1999 CE28	0.71	0.04	15 57 8.629	- 6 17 47.90	
2009 May 15	1 5.5	40 0.020	2.6s	8.5	7.7 7.7	96		HIP 106353	2219 Mannucci	0.13	0.06	21 32 23.324	-20 57 27.89	
2009 May 15	11 48.9	44 0.017	1.8s	8.9	7.6 7.7	70		HIP 41710	1332 Marconia	1.27	0.08	8 30 20.318	20 51 27.99	
2009 May 15	13 6.5	73 0.045	5.9s	8.6	5.7 5.8	155		HIP 73658	1266 Tone	1.04	0.05	15 3 26.012	-43 5 21.10	
2009 May 15	13 15.0	13 0.008	1.0s	8.8	8.4 8.5	100		TYC 1421-00207-1	52692 1998 FO8	0.59	0.06	10 37 33.302	15 8 56.03	
2009 May 15	17 32.1	21 0.018	2.6s	8.4	6.2 6.4	153		TYC 0317-00199-1	716 Berkeley	0.14	0.04	14 12 50.976	0 20 38.82	
2009 May 16	5 40.1	65 0.033	20.1s	8.3	5.4 5.6	116		TYC 6909-00570-1	108 Hecuba	0.57	0.07	20 10 27.288	-24 55 27.38	
2009 May 16	7 14.5	34 0.027	4.1s	8.9	5.1 4.8	140		HIP 88442	619 Triberga	0.88	0.04	18 3 23.398	- 3 43 38.20	
2009 May 16	9 47.5	12 0.008	1.0s	9.0	7.5 7.7	161		TYC 5002-00596-1u	19501 1998 KC50	0.84	0.05	15 16 17.184	- 0 10 9.64	
2009 May 16	11 20.2	48 0.040	4.1s	8.9	4.1 4.3	164		HIP 78398	695 Bella	1.17	0.04	16 0 18.520	-33 36 8.84	
2009 May 16	12 8.3	14 0.006	1.1s	9.0	9.9 9.7	149		HIP 86001	21792 1999 ST7	1.02	0.07	17 34 38.144	-33 39 50.08	
2009 May 16	18 44.0	41 0.018	1.8s	8.0	8.5 8.2	74		HIP 43043	688 Melanie	0.56	0.07	8 46 11.467	14 3 43.36	
2009 May 17	5 8.6	23 0.012	3.6s	8.9	7.9 7.7	133		HIP 61322	1786 Raabe	0.85	0.06	12 33 48.459	- 5 14 32.13	
2009 May 17	9 26.6	19 0.020	1.8s	8.0	7.4 7.2	165		HIP 76174	4315 Pronik	0.57	0.03	15 33 32.428	-34 21 34.78	
2009 May 17	15 1.4	13 0.006	1.0s	6.4	11.7 11.4	91		HIP 49445	2344 Xizang	1.12	0.07	10 5 40.868	15 45 26.95	
2009 May 17	20 45.6	20 0.014	2.0s	7.9	7.6 7.3	157		HIP 84190	1588 Descamisada	0.77	0.05	17 12 35.018	-15 9 48.99	
2009 May 17	22 39.7	30 0.026	3.0s	8.9	7.6 7.5	154		HIP 67248	1273 Helma	0.82	0.04	13 46 57.820	-19 56 27.60	
2009 May 18	4 22.8	38 0.019	2.1s	8.5	7.2 7.7	90		TYC 1119-01471-1	1101 Clematis	0.13	0.07	21 28 28.497	8 29 20.07	
2009 May 18	21 24.9	32 0.022	2.6s	7.7	8.0 8.3	167		HIP 81098	3312 Pedersen	1.26	0.05	16 33 51.051	-14 28 0.07	
2009 May 19	9 49.9	12 0.005	1.2s	6.7	12.1 11.7	142		HIP 89133	177655 2005 AF32	1.14	0.08	18 11 26.939	- 5 12 18.03	
2009 May 19	12 29.5	18 0.011	2.1s	7.8	8.6 8.2	143		HIP 89399	833 Monica	0.79	0.05	18 14 38.764	-36 53 56.23	
2009 May 20	18 56.4	15 0.011	2.0s	8.9	8.6 8.4	109		HIP 55231	16216 2000 DR4	0.83	0.04	11 18 37.659	3 8 19.31	
2009 May 21	17 56.2	15 0.014	2.6s	8.1	7.7 7.4	135		HIP 62912	3909 Gladys	0.88	0.03	12 53 36.708	- 7 50 21.00	
2009 May 22	0 60.0	39 0.013	1.1s	8.1	8.9 8.5	43		HIP 33782	2127 Tanya	0.14	0.09	7 0 52.873	24 28 50.63	
2009 May 22	15 44.8	106 0.043	2.3s	8.6	5.9 5.5	27		HIP 27504	365 Corduba	1.02	0.08	5 49 25.705	13 55 18.18	
2009 May 22	19 13.6	92 0.023	2.7s	8.3	9.0 9.2	47		HIP 3457	2456 Palamedes	0.24	0.13	0 44 13.247	13 18 25.85	
2009 May 22	23 14.5	66 0.044	9.4s	8.9	5.1 4.9	141		TYC 5098-00464-1	781 Kartvella	0.22	0.05	18 18 56.283	- 0 40 1.18	
2009 May 23	0 55.9	23 0.012	2.2s	7.5	9.2 9.6	109		TYC 7477-00064-1	2255 Qlnghai	0.51	0.06	21 20 16.393	-32 30 46.89	
2009 May 23	7 31.2	15 0.008	1.2s	8.1	9.0 8.6	98		HIP 107714	5785 Fulton	0.15	0.06	11 49 12.629	-15 7 14.14	
2009 May 23	13 24.0	29 0.019	1.5s	8.9	5.9 5.7	91		HIP 110537	706 Hiramdo	0.97	0.05	22 23 32.984	-15 57 58.56	
2009 May 24	6 50.1	18 0.014	2.2s	9.0	6.9 7.0	110		TYC 4926-00139-1	2474 Ruby	1.03	0.04	11 25 29.363	- 3 13 35.20	
2009 May 24	14 45.0	25 0.013	1.4s	7.2	10.0 10.2	90		HIP 110338	2051 Chang	0.92	0.06	22 20 51.363	- 8 45 56.15	
2009 May 24	21 11.6	17 0.014	2.4s	7.9	8.1 8.3	150		HIP 89425	5176 Yoichi	0.41	0.04	18 15 2.188	-20 52 16.35	
2009 May 24	21 20.8	12 0.007	1.0s	8.1	9.3 9.1	152		HIP 69094	8498 Ufa	0.72	0.05	14 8 33.833	-26 39 11.45	
2009 May 24	22 36.5	20 0.008	2.5s	8.1	10.0 9.8	98		HIP 52327	18153 2000 OC61	0.03	0.07	10 41 35.410	- 0 16 21.04	
2009 May 25	0 8.7	22 0.017	4.1s	8.0	7.8 8.2	138		HIP 65447	1544 Vinterhanseni	0.34	0.04	13 24 48.252	- 6 50 25.21	
2009 May 25	11 59.8	21 0.031	3.3s	6.6	7.8 7.4	170		HIP 81939	2259 Sofievka	0.12	0.02	16 44 17.389	-27 27 22.57	
2009 May 25	14 8.7	35 0.021	5.0s	8.5	8.0 7.8	109		HIP 56307	1201 Strenua	0.36	0.05	11 32 36.347	1 20 24.37	
2009 May 25	19 56.4	44 0.038	4.5s	8.7	5.3 5.1	160		HIP 85679	799 Gudula	1.05	0.04	17 30 32.139	-14 46 21.24	
2009 May 26	0 43.9	30 0.025	3.8s	8.3	8.4 8.8	145		TYC 6130-00030-1	1273 Helma	0.11	0.04	13 41 44.029	-19 8 11.25	
2009 May 26	10 45.9	59 0.014	1.4s	7.9	9.6 9.7	28		HIP 15594	5285 Krethon	0.61	0.13	3 20 49.885	- 3 6 29.78	
2009 May 26	22 5.6	10 0.009	1.0s	8.5	7.5 7.6	162		HIP 75171	4647 Suyu	0.74	0.03	15 21 40.025	- 8 39 23.58	
2009 May 27	3 3.2	15 0.008	1.1s	8.0	9.5 9.3	162		HIP 73181	6150 Neukum	0.82	0.06	14 57 24.873	-22 9 13.43	
2009 May 27	19 0.9	11 0.007	1.3s	8.2	8.9 8.7	145		HIP 68819	3450 Dommanget	0.12	0.05	14 5 22.795	- 7 59 48.88	
2009 May 27	21 26.0	38 0.019	2.9s	6.3	10.1 9.7	97		HIP 110746	1540 Kevola	0.33	0.06	22 26 10.712	-23 40 56.83	
2009 May 27	21 37.8	12 0.010	1.5s	7.7	8.5 8.5	143		HIP 67855	1619 Ueta	0.76	0.04	13 53 55.220	- 8 29 4.43	
2009 May 28	1 7.5	10 0.011	1.4s	8.7	6.7 6.5	161		HIP 83434	13918 1984 QB	0.67	0.03	17 3 9.825	-38 30 44.09	
2009 May 28	4 26.1	42 0.010	1.0s	7.5	10.7 10.4	16		HIP 14715	11351 1997 TS25	1.04	0.13	3 10 6.565	21 44 49.64	
2009 May 28	4 54.6	40 0.028	3.4s	8.8	4.6 4.2	170		TYC 6244-00724-1	701 Oriola	0.01	0.05	17 4 15.625	-21 2 33.70	
2009 May 28	18 35.4	14 0.018	2.0s	8.6	7.1 7.2	116		HIP 55612	3552 Don Quixote	1.01	0.02	11 23 36.139	-50 23 3.17	
2009 May 30	5 44.3	166 0.072	4.2s	6.6	6.2 5.7	41		HIP 8210	51 Nemausa	0.10	0.07	1 45 42.535	8 33 33.03	
2009 May 30	20 50.8	12 0.010	2.7s	8.5	7.8 7.6	131		HIP 65148	1133 Lugduna	0.38	0.04	13 21 0.594	- 5 39 56.28	
2009 May 31	0 35.3	37 0.029	3.1s	8.7	6.6 7.0	157		HIP 73387	249 Ilse	0.36	0.04	14 59 51.600	-32 38 45.27	
2009 May 31	9 25.6	22 0.017	1.7s	8.5	6.3 6.1	159		TYC 6773-00862-1	879 Ricarda	0.60	0.04	15 8 6.272	-29 12 9.50	
2009 May 31	10 43.8	43 0.021	2.9s	7.4	8.7 8.4	169		HIP 81812	1579 Herrick	1.12	0.06	16 42 35.389	-11 10 28.93	
2009 May 31	16 45.5	70 0.026	2.2s	8.6	7.1 7.3	55		HIP 41727	1085 Amaryllis	0.40	0.08	8 30 31.007	18 56 34.61	
2009 May 31	17 17.6	18 0.011	1.6s	7.6	8.5 8.8	155		HIP 88662	833 Monica	0.65	0.05	18 6 4.640	-37 25 59.27	
2009 Jun 1	7 39.4	11 0.009	2.9s	7.7	8.3 8.0	130		HIP 100286	1675 Simonida	1.09	0.04	20 20 26.547	-29 11 27.57	
2009 Jun 1	11 29.2	160 0.052	3.7s	7.5	7.0 6.8	20		HIP 28469	209 Dido	0.58	0.10	6 0 37.000	29 0 18.39	
2009 Jun 1	19 54.6	40 0.014	1.0s	8.4	8.7 8.5	38		HIP 35962	4460 Bihore	0.57	0.09	7 24 47.758	32 35 20.52	
2009 Jun 1	21 29.2	25 0.011	1.0s	7.1	12.0 12.1	72		HIP 47706	17798 1998 FC63	0.55	0.07	9 43 36.460	13 26 30.72	
2009 Jun 1	23 57.7	128 0.075	33.6s	8.8	4.6 4.8									

Date	U.T.	Diameter	Durn	Star	Mag-Drop	Elon	%	Star	Planet	Min	R.A. (J2000)	Dec.	"
y m d	h m	km	sec/m	mag	V R	o	til	No.	No Name	D Error	h m s	o ' "	
2009 Jun 13	19 10.7	20 0.012	1.0s	8.5	7.3 7.2	85		TYC 0592-01604-1	1728 Goethe Link	0.08 0.06	23 41 10.796	6 15 55.05	
2009 Jun 14	6 56.6	11 0.007	1.6s	7.0	10.4 10.2	111		HIP 110518	5013 Suzhouhanszhon	0.49 0.05	22 23 20.402	-14 57 6.38	
2009 Jun 14	9 11.3	148 0.050	4.3s	7.1	7.4 7.0	49		HIP 43666	168 Sibylla	0.25 0.09	8 53 45.718	13 49 49.39	
2009 Jun 15	15 11.8	11 0.013	1.8s	8.7	5.4 5.1	113		TYC 1654-00927-1	434 Hungaria	1.28 0.03	21 14 44.624	17 49 7.45	
2009 Jun 15	15 44.9	25 0.019	2.3s	9.0	6.7 6.3	152		TYC 5035-00114-1	4424 Arkhipova	0.73 0.05	16 28 31.197	-0 48 9.08	
2009 Jun 15	19 41.8	28 0.018	5.7s	6.8	8.9 9.2	123		HIP 68050	1300 Marcelle	0.35 0.05	13 56 0.378	-3 39 43.23	
2009 Jun 16	1 24.4	13 0.008	1.8s	8.3	8.7 8.6	113		HIP 67120	5803 Otzi	0.66 0.05	13 45 22.973	11 28 45.33	
2009 Jun 16	14 36.5	62 0.025	1.3s	8.8	3.8 3.7	14		TYC 1830-01132-1	64 Angelina	1.09 0.09	4 39 59.101	23 0 52.44	
2009 Jun 16	18 30.0	60 0.043	5.7s	8.7	5.5 5.2	138		TYC 0485-03236-1	1712 Angola	0.83 0.05	19 56 50.644	1 55 13.64	
2009 Jun 16	22 49.3	14 0.010	1.3s	8.1	8.0 8.6	163		HIP 84668	12949 4290 T-1	0.98 0.04	17 18 33.190	-39 32 30.17	
2009 Jun 18	6 30.5	15 0.013	1.6s	8.5	8.4 8.1	123		TYC 0528-01053-1	1441 Bolyai	0.45 0.04	21 21 12.705	0 14 12.53	
2009 Jun 18	15 48.3	23 0.021	2.6s	8.9	7.0 6.6	156		TYC 5707-00503-1	3815 Konig	1.28 0.04	19 5 29.977	-8 23 42.12	
2009 Jun 18	22 35.1	34 0.030	3.1s	9.0	4.5 4.3	158		HIP 86320	619 Triberga	0.69 0.04	17 38 15.057	-1 8 58.61	
2009 Jun 19	9 44.9	19 0.010	2.7s	7.9	10.3 10.0	126		HIP 103804	21555 Levary	0.67 0.06	21 2 2.061	3 45 57.70	
2009 Jun 20	6 3.2	13 0.008	1.0s	8.1	8.2 8.7	177		HIP 87235	3208 Lunn	1.26 0.05	17 49 27.223	-20 49 51.37	
2009 Jun 20	7 49.2	11 0.016	2.0s	8.6	5.7 5.4	160		TYC 6879-02182-1	1601 Patry	0.48 0.02	19 21 54.277	-26 10 36.98	
2009 Jun 20	22 9.6	26 0.019	2.6s	7.3	7.5 7.9	158		HIP 96021	3237 Victorplatt	0.88 0.04	19 31 24.600	-21 2 24.63	
2009 Jun 21	5 52.7	11 0.014	3.3s	8.7	6.4 6.8	144		HIP 75378	1729 Beryl	1.02 0.03	15 24 11.329	-22 43 26.70	
2009 Jun 21	9 23.5	16 0.011	1.4s	5.6	11.2 11.0	161		HIP 81754	1570 Brunonia	1.06 0.05	16 41 53.710	-19 55 27.36	
2009 Jun 21	10 18.0	94 0.049	12.1s	8.3	6.2 6.6	122		TYC 0911-00711-1	780 Armenia	0.95 0.07	14 44 42.198	9 21 24.78	
2009 Jun 21	18 54.0	64 0.029	4.3s	9.0	6.7 6.5	167		HIP 84718	1746 Brouwer	0.35 0.07	17 19 2.428	-32 40 23.15	
2009 Jun 21	23 30.6	11 0.010	1.0s	8.9	6.9 6.9	163		TYC 7906-00097-1	43208 2000 AW98	0.38 0.04	18 30 54.296	-39 34 19.08	
2009 Jun 22	12 0.9	27 0.018	1.8s	7.8	7.5 7.6	177		TYC 6277-00877-1	1901 Moravia	0.30 0.05	18 17 57.008	-22 20 36.28	
2009 Jun 22	13 24.2	13 0.008	1.0s	7.2	9.2 9.0	175		HIP 87068	3208 Lunn	0.98 0.05	17 47 31.397	-20 50 14.54	
2009 Jun 23	20 32.0	11 0.008	1.0s	7.6	9.0 8.8	105		HIP 62872	29665 1998 WB24	0.06 0.04	12 53 9.519	-14 57 55.86	
2009 Jun 23	21 45.4	50 0.016	1.1s	8.9	8.1 7.6	18		TYC 1351-00838-1	3134 Kostinsky	0.77 0.11	7 26 26.777	18 9 50.71	
2009 Jun 23	23 53.1	115 0.055	3.0s	8.2	5.8 5.9	50		HIP 12740	53 Kalypso	0.19 0.07	2 43 48.238	12 1 47.04	
2009 Jun 24	16 42.1	40 0.018	1.1s	8.5	8.2 8.1	58		HIP 12376	6362 Tunis	0.66 0.07	2 39 18.624	-1 54 3.62	
2009 Jun 24	23 45.3	37 0.018	1.2s	8.0	6.9 6.7	64		HIP 9035	384 Burdigala	0.95 0.06	1 56 22.451	8 30 33.11	
2009 Jun 25	5 37.7	11 0.010	1.7s	7.9	8.2 7.9	148		HIP 100800	4535 Adamcarolla	0.50 0.04	20 26 17.300	-13 51 47.05	
2009 Jun 25	19 19.9	15 0.013	1.3s	8.1	8.6 8.2	164		HIP 84326	10299 1988 VS3	1.05 0.04	17 14 21.667	-17 27 58.07	
2009 Jun 25	20 18.4	46 0.015	3.7s	8.1	8.4 8.9	142		HIP 76449	4715 1989 TS1	0.98 0.10	15 36 48.264	-40 41 30.75	
2009 Jun 26	2 50.5	17 0.013	3.0s	9.0	7.7 7.6	128		HIP 73465	3082 Dzhailil	0.20 0.04	15 0 53.081	-4 27 19.77	
2009 Jun 26	22 27.6	20 0.011	1.4s	7.2	9.4 9.6	174		HIP 92429	2439 Ulugbek	1.16 0.06	18 50 12.013	-22 50 53.53	
2009 Jun 27	2 38.2	55 0.021	1.1s	8.9	6.2 6.2	6		TYC 1324-01693-1	307 Nike	0.31 0.09	5 57 14.005	-22 21 47.00	
2009 Jun 27	3 8.1	12 0.013	1.3s	8.6	6.5 6.6	159		HIP 82606	27139 1998 XX46	0.69 0.03	16 53 15.029	-29 58 53.14	
2009 Jun 27	4 59.7	90 0.050	5.1s	8.3	5.9 5.7	88		HIP 59621	362 Havnia	1.11 0.06	12 13 36.141	-1 14 13.51	
2009 Jun 27	9 38.6	70 0.008	2.2s	5.7	14.4 14.0	37		HIP 18805	32532 Thereus	0.13 0.28	4 1 46.140	9 59 52.87	
2009 Jun 28	8 33.6	31 0.020	2.3s	8.9	5.1 4.9	174		HIP 89992	655 Briseis	0.18 0.05	18 21 43.112	-17 53 51.35	
2009 Jun 29	10 20.7	25 0.014	1.0s	8.1	8.8 8.5	73		HIP 7352	1960 Guisan	0.37 0.06	1 34 46.130	6 35 10.97	
2009 Jun 29	23 23.0	73 0.023	1.6s	8.9	6.8 6.5	3		TYC 1893-00310-1	465 Alekto	0.13 0.11	6 46 59.445	24 10 57.06	
2009 Jun 30	12 39.3	76 0.027	1.6s	7.5	7.7 8.0	17		TYC 0749-02317-1	892 Seeliger	0.32 0.10	7 5 44.750	7 50 37.53	
2009 Jul 1	5 41.9	106 0.062	7.8s	8.2	5.4 5.1	146		TYC 8330-04843-1	36 Atalante	0.47 0.06	16 47 35.826	-48 20 55.58	
2009 Jul 1	17 36.0	15 0.010	1.2s	8.4	7.5 7.1	177		TYC 6278-02686-1	6733 1992 EF	0.70 0.05	18 30 34.967	-21 45 9.94	
2009 Jul 1	22 51.8	35 0.018	9.3s	8.5	7.6 7.3	121		TYC 6164-00157-1	1838 Ursa	0.59 0.07	14 26 32.295	-21 1 2.27	
2009 Jul 2	-1 57.9	15 0.010	1.6s	8.8	8.9 9.0	111		TYC 5250-00273-1	16878 Tombickler	0.96 0.05	23 21 23.500	-5 57 14.16	
2009 Jul 2	3 9.2	99 0.031	2.2s	8.8	6.5 7.2	8		TYC 1885-01182-1	401 Otilia	1.28 0.11	6 13 31.941	27 10 7.67	
2009 Jul 2	5 42.1	19 0.006	1.1s	8.7	9.9 10.2	173		TYC 6847-01731-1	51364 2000 SU333	0.72 0.12	18 15 57.760	-22 42 39.58	
2009 Jul 2	14 37.2	21 0.018	1.7s	8.9	6.6 6.5	176		HIP 91684	750 Oskar	0.84 0.04	18 41 49.406	-26 17 44.47	
2009 Jul 2	17 15.3	229 0.138	5.5s	7.7	3.4 3.1	50		HIP 14621	324 Bamberg	0.65 0.05	3 8 51.026	25 22 5.24	
2009 Jul 2	20 13.3	33 0.010	3.3s	6.8	10.6 10.2	134		HIP 75436	76867 2000 YM5	0.70 0.10	15 24 41.896	-35 55 1.57	
2009 Jul 2	23 29.7	90 0.036	1.8s	6.8	7.3 7.0	9		HIP 29367	358 Apollonia	0.57 0.08	6 11 23.182	-20 54 19.46	
2009 Jul 3	7 18.9	14 0.015	1.4s	9.0	5.5 5.3	171		TYC 6876-00450-1	18897 2000 HG30	1.23 0.03	19 29 17.903	-24 19 23.73	
2009 Jul 3	14 29.4	26 0.015	1.2s	5.2	12.0 11.7	82		HIP 5737	2835 Ryoma	0.17 0.06	1 13 43.976	7 34 30.75	
2009 Jul 3	15 0.3	26 0.015	1.2s	6.4	10.8 10.6	82		HIP 5743	2835 Ryoma	0.62 0.06	1 13 45.364	7 34 41.29	
2009 Jul 4	3 26.7	49 0.023	1.9s	8.9	7.0 7.4	70		TYC 0629-00145-1	1165 Imprinetta	0.75 0.07	1 56 42.907	14 34 21.21	
2009 Jul 4	19 56.7	119 0.063	3.6s	8.2	5.3 5.1	65		HIP 11027	81 Terpsichore	0.20 0.06	2 22 0.555	15 59 29.37	
2009 Jul 4	22 20.6	16 0.013	1.6s	7.7	7.6 8.0	156		HIP 84366	1926 Middeldaelaer	0.42 0.04	17 14 53.274	-20 58 10.40	
2009 Jul 5	0 16.7	46 0.017	2.3s	7.0	10.4 10.5	78		HIP 73566	1841 Masaryk	1.02 0.09	1 34 52.573	8 16 29.39	
2009 Jul 5	8 21.6	17 0.011	4.2s	8.7	7.6 7.4	118		HIP 71823	3495 Colchagua	0.16 0.05	14 41 32.236	-12 43 13.04	
2009 Jul 5	11 31.7	59 0.031	20.2s	7.1	8.3 8.8	114		HIP 71589	904 Rockefelleria	1.18 0.06	14 38 28.953	-3 36 40.06	
2009 Jul 5	12 24.6	14 0.008	1.0s	8.8	8.2 8.1	94		HIP 3055	1586 Thiele	0.09 0.05	0 38 48.131	0 56 46.34	
2009 Jul 5	15 42.0	19 0.006	1.4s	8.0	10.6 10.7	126		TYC 8284-01658-1	36624 2000 QAL57	1.00 0.11	14 58 13.815	-47 16 31.29	
2009 Jul 6	0 37.1	11 0.007	1.2s	7.5	10.0 9.8	144		HIP 80391	34291 2000 QSL50	0.92 0.05	16 24 32.014	-35 10 31.04	
2009 Jul 6	8 40.8	13 0.011	2.0s	8.9	7.1 6.8	125		TYC 7310-00953-1	1106 Cydonia	1.01 0.04	14 55 2.595	-36 9 56.15	
2009 Jul 6	15 27.0	63 0.021	1.4s	8.6	7.2 6.8	17		TYC 0729-01856-1	256 Walpurga	0.25 0.10	6 5 16.453	13 18 59.49	
2009 Jul 6	16 40.6	36 0.012	2.2s	8.5	8.3 8.2	154		HIP 85583	32496 2000 WX182	0.80 0.09	17 29 20.456	-38 38 45.01	
2009 Jul 6	18 39.3	77 0.059	6.6s	8.4	3.4 3.7	153		TYC 8361-01056-1	61 Danae	0.30 0.05	18 9 37.144	-47 21 10.93	
2009 Jul 7	11 38.0	34 0.012	1.1s	8.9	9.9 9.9	58		TYC 0062-00389-1	12983 1979 OH1	0.85 0.09	3 15 8.105	7 6 3.39	
2009 Jul 8	6 22.0	17 0.007	2.0s	4.9	12.9 12.5	137		HIP 78821	25869 2000 JP70	0.53 0.07	16 5 26.530	-19 48 6.77	
2009 Jul 8	9 42.5	11 0.011	1.0s	6.4	10.3 10.3	175		HIP 93234	3307 Athabasca	1.01 0.03	18 59 26.779	-18 33 59.34	
2009 Jul 9	2 16.5	13 0.008	1.0s	8.5	8.6 8.4	99		TYC 5551-01509-1	5876 1990 DM2	0.94 0.06	13 32 27.895	-12 39 37.27	
2009 Jul 9	13 43.8	14 0.014	2.1s	6.5	8.5 8.1	157		HIP 86060	3563 Canterbury	1.00 0.03	17 35 18.497	-22 2 37.84	
2009 Jul 9	14 13.7	12 0.009	1.1s	8.1	8.1 7.7	161		HIP 89137	6972 Helvetius	0.12 0.04	18 0 9.688	-14 47 25.11	
2009 Jul 9	15 14.9	11 0.013	1.2s	8.5	6.7 6.7	161		HIP 97986	9414 1995 UV4	0.55 0.03	19 54 48.249	-39 24 17.65	
2009 Jul 10	1 35.0	88 0.035	2.7s	8.2	6.9 7.5	57		TYC 0652-00218-1	589 Croatia	0.34			

Date	U.T.	Diameter	Durn	Star	Mag-Drop	Elon	%	Star	Planet	Min	R.A. (J2000)	Dec.	"
y m d	h m s	km	sec/m	mag	V R	o	til	No.	No Name	D Error	h m s	o ' "	"
2009 Jul 19	18 2.5	83 0.029	2.1s	8.8	4.5 4.2	39		TYC 2900-01262-1	71 Niobe	0.99 0.10	5 18 50.088	40 24 42.63	
2009 Jul 19	19 42.8	20 0.011	1.5s	8.4	9.1 8.8	154		TYC 0518-00556-1	3046 Moliere	1.19 0.06	20 32 1.653	4 17 32.30	
2009 Jul 20	17 14.2	20 0.015	2.6s	5.5	9.9 9.5	111		HIP 813	1728 Goethe Link	0.60 0.04	0 10 2.222	11 8 44.94	
2009 Jul 21	6 49.1	67 0.030	2.5s	7.1	8.3 7.9	71		HIP 13047	1306 Scythia	0.57 0.07	2 47 38.602	29 40 42.62	
2009 Jul 21	6 52.7	87 0.044	7.8s	9.0	6.4 6.2	100		TYC 5563-00440-1	424 Gratia	0.42 0.07	14 32 22.458	- 8 28 1.48	
2009 Jul 21	9 58.2	49 0.018	1.7s	5.1	13.0 12.5	58		HIP 17851	14409 1991 RM1	0.64 0.08	3 49 11.229	24 8 11.72	
2009 Jul 21	17 14.2	23 0.017	3.0s	8.5	8.0 8.1	109		TYC 5592-01027-1	1551 Argelander	0.69 0.05	15 7 7.941	-14 37 6.59	
2009 Jul 21	17 49.7	29 0.016	2.3s	8.8	6.6 6.7	159		TYC 6365-00582-1	745 Mauritia	0.36 0.06	21 34 7.143	-17 15 32.35	
2009 Jul 22	3 37.2	23 0.012	1.2s	8.3	9.6 9.9	85		TYC 5550-00430-1	6255 Kuma	0.91 0.07	13 25 10.900	-13 19 2.19	
2009 Jul 22	17 45.9	82 0.030	1.8s	7.3	6.4 6.4	8		HIP 36898	135 Hertha	0.05 0.09	7 35 11.379	23 2 45.14	
2009 Jul 22	17 56.6	51 0.030	1.8s	8.6	5.5 5.9	71		TYC 4949-01034-1	261 Prymno	0.72 0.06	12 43 42.473	- 1 26 19.22	
2009 Jul 23	0 44.0	11 0.008	1.0s	8.7	8.2 8.1	156		HIP 91095	12104 Chesley	1.18 0.05	18 34 54.961	-30 43 46.91	
2009 Jul 23	7 37.6	15 0.011	1.2s	8.2	8.0 7.9	150		TYC 0538-00826-1	27496 2000 GC125	0.06 0.05	21 1 30.163	7 9 56.87	
2009 Jul 23	18 2.3	101 0.051	2.3s	9.0	4.7 5.2	40		TYC 2918-02199-1	626 Notburga	0.19 0.07	5 34 6.123	42 4 10.87	
2009 Jul 23	19 8.0	18 0.009	1.2s	8.7	8.4 8.8	167		TYC 6879-00873-1	1895 Larink	0.76 0.07	19 21 52.459	-24 25 22.07	
2009 Jul 23	20 48.3	11 0.015	1.3s	8.5	6.0 6.4	161		HIP 106415	28610 2000 EM158	0.49 0.02	21 33 12.841	-18 34 4.01	
2009 Jul 24	1 9.0	12 0.011	1.7s	6.2	9.7 9.7	101		HIP 74026	4451 Grieve	0.49 0.03	15 7 40.323	5 29 52.72	
2009 Jul 24	18 8.9	15 0.008	1.5s	8.7	8.3 8.4	146		HIP 87411	2781 Kleczek	1.02 0.06	17 51 49.654	-21 3 31.39	
2009 Jul 24	19 7.7	15 0.010	1.6s	9.0	7.4 7.0	151		TYC 6276-01414-1	6733 1992 EF	0.05 0.05	18 12 40.162	-20 59 15.67	
2009 Jul 25	8 48.9	21 0.020	2.5s	8.2	6.4 6.4	135		HIP 116158	2089 Cetacea	0.76 0.03	23 32 8.006	-21 48 4.65	
2009 Jul 25	15 16.1	13 0.009	1.8s	8.4	8.1 8.2	144		HIP 113183	6931 Kenzaburo	0.31 0.04	22 55 10.541	-23 58 9.17	
2009 Jul 25	15 21.5	26 0.009	1.9s	7.3	10.1 9.7	153		HIP 90369	11554 Asios	1.05 0.09	18 26 23.694	-15 37 48.68	
2009 Jul 26	19 1.5	37 0.018	1.1s	8.3	8.3 8.1	55		HIP 20532	930 Westphalia	0.13 0.07	4 23 59.608	33 50 42.81	
2009 Jul 26	23 12.9	12 0.008	1.9s	8.2	8.9 8.6	109		TYC 6766-00620-1	902 Probitas	1.03 0.05	15 13 56.144	-26 3 4.23	
2009 Jul 27	5 30.2	12 0.007	1.2s	8.7	8.7 8.4	106		TYC 6752-00768-1	8584 1997 AN22	0.97 0.06	15 1 41.721	-25 4 7.26	
2009 Jul 27	16 21.0	19 0.012	10.8s	7.0	11.6 12.0	120		HIP 1325	12095 1998 HE102	0.85 0.05	0 16 39.426	1 51 2.30	
2009 Jul 27	17 49.5	21 0.006	1.3s	6.2	12.5 12.6	87		HIP 12318	23622 1996 RW29	0.21 0.11	2 38 36.826	3 26 35.61	
2009 Jul 29	9 49.2	66 0.036	5.0s	8.5	6.5 6.5	156		HIP 107229	777 Gutemberga	1.18 0.06	21 43 3.572	- 2 1 58.91	
2009 Jul 29	10 11.8	22 0.018	2.4s	8.6	7.1 7.0	158		TYC 6882-01908-1	2996 Bowman	0.72 0.04	19 7 56.168	-26 21 22.58	
2009 Jul 29	12 57.2	47 0.019	2.7s	8.8	8.1 7.9	85		TYC 4979-00060-1	2621 Goto	0.58 0.08	14 11 45.318	- 2 52 34.08	
2009 Jul 29	15 34.6	11 0.007	1.2s	8.6	8.5 8.9	149		TYC 7394-01075-1	12104 Chesley	1.27 0.05	18 30 19.578	-30 57 41.12	
2009 Jul 30	10 45.1	83 0.039	8.1s	7.8	6.1 6.2	103		HIP 4050	683 Lanzia	0.91 0.07	0 51 54.413	27 46 46.23	
2009 Jul 31	4 9.9	33 0.026	3.1s	8.4	8.0 7.8	108		HIP 5117	3522 Becker	1.04 0.04	1 5 34.186	12 28 7.36	
2009 Jul 31	4 15.0	32 0.023	2.5s	7.8	6.2 6.3	107		HIP 7546	727 Nipponia	0.35 0.04	1 37 13.242	- 4 8 34.25	
2009 Jul 31	7 25.8	39 0.026	9.6s	8.8	7.4 7.3	134		HIP 85426	962 Aslog	0.13 0.05	17 27 22.805	-20 31 1.59	
2009 Jul 31	8 9.9	11 0.009	1.4s	8.8	7.8 8.1	115		HIP 78057	14497 1995 DD	0.64 0.04	15 56 12.487	-38 50 38.59	
2009 Jul 31	18 36.2	10 0.010	1.4s	8.9	7.2 7.7	121		TYC 7344-00676-1	13918 1984 QB	0.69 0.03	16 29 57.130	-31 0 53.06	
2009 Aug 1	11 16.7	29 0.015	4.7s	7.7	8.3 8.6	105		TYC 6770-01462-1	459 Signe	0.65 0.07	15 20 35.534	-27 1 23.35	
2009 Aug 1	22 13.5	91 0.035	1.9s	7.6	6.5 6.3	11		HIP 39650	377 Campania	0.98 0.08	8 6 9.038	15 20 48.05	
2009 Aug 2	8 21.1	39 0.037	3.5s	8.9	5.0 5.1	175		TYC 6922-01001-1	302 Clarissa	0.24 0.04	20 51 56.633	-22 42 7.79	
2009 Aug 3	14 24.0	46 0.031	14.7s	7.4	6.9 7.4	132		TYC 7379-00381-1	742 Edisona	0.85 0.05	17 30 15.650	-32 7 18.21	
2009 Aug 3	14 45.4	44 0.015	1.0s	7.7	7.1 6.7	15		HIP 38843	710 Areqquipa	0.71 0.09	7 56 56.839	-11 41 17.90	
2009 Aug 3	15 47.4	17 0.020	3.1s	8.6	6.4 6.0	148		TYC 6292-01684-1	707 Steina	0.83 0.03	18 40 39.437	-21 29 41.02	
2009 Aug 3	16 16.3	15 0.011	1.7s	7.5	8.7 8.4	110		HIP 6416	3844 Lujiaxi	0.93 0.04	1 22 23.431	5 15 4.66	
2009 Aug 3	21 2.1	119 0.080	9.0s	8.3	2.9 2.6	166		HIP 98361	5 Astraea	0.34 0.05	19 59 2.974	-17 57 34.28	
2009 Aug 4	0 55.3	19 0.010	2.0s	8.5	8.0 7.9	141		HIP 89729	2550 Houssay	0.73 0.06	18 18 40.868	-12 6 23.39	
2009 Aug 4	4 9.6	42 0.017	1.1s	8.3	6.7 6.3	44		HIP 27944	542 Susanna	0.53 0.08	5 54 47.096	13 50 46.51	
2009 Aug 4	9 3.3	17 0.010	1.1s	6.0	10.6 10.5	91		HIP 11843	1638 Ruanda	0.91 0.06	2 32 54.130	15 2 4.75	
2009 Aug 4	9 56.8	145 0.046	3.8s	7.6	7.0 7.1	34		TYC 0754-01194-1	137 Meliboea	0.63 0.11	6 39 30.804	12 54 16.30	
2009 Aug 4	15 33.7	26 0.014	3.3s	9.0	8.3 7.8	139		TYC 7391-01427-1	3550 Link	0.00 0.06	18 7 21.593	-30 39 49.50	
2009 Aug 5	8 55.4	13 0.014	2.5s	7.6	7.1 7.5	147		HIP 114829	1089 Tama	* 0.78 0.03	23 15 36.618	-11 37 56.01	
2009 Aug 5	12 52.8	19 0.005	1.0s	8.7	10.3 10.0	78		TYC 0663-00769-1	25910 2001 BM50	0.06 0.13	3 39 14.377	13 43 31.87	
2009 Aug 6	8 50.2	185 0.100	8.2s	8.6	2.9 2.7	77		HIP 68471	8 Flora	0.76 0.06	14 1 5.742	- 7 6 55.38	
2009 Aug 6	9 30.8	89 0.032	2.3s	7.9	7.3 7.5	42		HIP 56295	733 Mocia	0.07 0.09	11 32 23.880	- 5 37 29.32	
2009 Aug 6	10 32.1	20 0.013	2.5s	8.9	8.1 7.9	138		HIP 116655	5010 Amenemhet	1.07 0.05	23 38 25.612	1 56 8.43	
2009 Aug 6	12 32.3	78 0.057	11.3s	8.8	3.7 4.2	145		TYC 6280-00592-1	179 Klytaemnestra	0.02 0.05	18 42 9.928	-15 39 41.99	
2009 Aug 6	16 0.5	37 0.022	9.3s	8.8	7.4 7.7	118		TYC 5642-01499-1	1794 Flnsen	0.48 0.06	16 53 13.737	- 8 19 48.48	
2009 Aug 6	19 11.1	32 0.011	1.0s	8.7	8.7 8.4	14		HIP 61245	991 McDonald	0.05 0.09	12 33 2.878	- 2 17 26.82	
2009 Aug 7	5 51.8	20 0.017	2.5s	6.1	8.1 8.2	114		HIP 5204	839 Valborg	0.51 0.04	1 6 33.636	12 57 22.00	
2009 Aug 7	18 4.6	30 0.012	1.4s	8.1	8.4 8.0	75		HIP 17423	1349 Bechuana	0.13 0.08	3 43 57.957	29 40 58.76	
2009 Aug 7	21 14.8	65 0.091	11.7s	8.0	2.4 2.2	169		HIP 101329	33 Polyhymnia	0.43 0.02	20 32 15.477	-22 9 42.25	
2009 Aug 9	8 43.0	30 0.012	1.0s	8.0	9.1 9.4	65		HIP 21614	1360 Tarka	1.18 0.08	4 38 24.996	42 58 7.74	
2009 Aug 9	16 52.4	21 0.012	2.3s	8.0	8.2 7.8	107		HIP 7603	4493 Naitomitsu	0.89 0.06	1 37 56.147	21 15 39.93	
2009 Aug 9	21 49.1	12 0.012	1.5s	8.3	7.3 7.3	143		HIP 112870	5778 Jurafrance	1.00 0.03	22 51 26.625	13 58 13.88	
2009 Aug 9	21 54.8	51 0.016	1.2s	8.3	8.7 8.7	13		TYC 0833-00847-1	2731 Cucula	0.57 0.11	10 10 41.484	11 49 29.30	
2009 Aug 10	4 2.3	86 0.033	5.6s	7.8	6.8 6.4	88		HIP 73200	758 Mancunia	1.24 0.08	14 57 36.638	-12 38 16.88	
2009 Aug 10	6 47.8	20 0.010	2.8s	7.9	9.3 9.9	137		TYC 6844-00458-1	2439 Ulugbek	1.19 0.07	18 19 54.882	-23 18 54.49	
2009 Aug 10	11 4.4	38 0.020	3.0s	8.5	7.7 7.4	163		TYC 6911-00817-1	2208 Pushkin	0.66 0.07	20 23 3.243	-24 59 16.17	
2009 Aug 10	15 20.1	45 0.019	1.0s	8.8	5.8 5.5	36		TYC 1339-01043-1	931 Whittemora	0.30 0.08	6 53 7.852	19 26 38.94	
2009 Aug 10	19 50.4	33 0.016	3.0s	4.6	11.9 11.4	153		HIP 96465	3655 Eupraksia	0.85 0.06	19 36 42.482	-24 53 1.27	
2009 Aug 11	6 5.1	22 0.015	1.6s	6.7	9.0 9.4	176		HIP 104444	5468 Hamatonbetsu	1.28 0.05	21 9 25.095	-16 36 56.65	
2009 Aug 11	10 27.7	48 0.033	5.8s	8.8	5.4 5.6	144		TYC 7414-00623-1	573 Recha	0.21 0.05	19 4 54.165	-33 10 10.74	
2009 Aug 11	12 29.8	26 0.020	3.0s	7.8	8.1 8.2	140		HIP 93352	1392 Pierre	0.28 0.04	19 0 52.391	-39 4 23.94	
2009 Aug 12	8 57.1	16 0.012	1.7s	6.6	10.8 10.6	104		TYC 1757-01963-1	23977 1999 GW6	1.03 0.05	1 57 57.641	23 36 11.03	
2009 Aug 12	14 4.3	31 0.020	3.4s	7.0	8.1 8.2	149		HIP 112890	1199 Geldonia	0.99 0.05	19 23 10.082	-10 42 11.53	
2009 Aug 12	17 8.7	10 0.012	1.0s	6.6	9.0 9.1	134		HIP 95322	3447 Burckhalter	0.36 0.03	19 23 36.932	-53 56 46.14	

Date	U.T.	Diameter	Durn	Star	Mag-Drop	Elon	%	Star	Planet	Min	R.A. (J2000)	Dec.
y m d	h m	km	sec/m	mag	V R	o	til	No.	No Name	D	h m s	o ' "
2009 Aug 24	0 58.9	15 0.013	1.2s	6.5	8.9 8.5	164		HIP 105819	8180 1992 PY2	0.15 0.04	21 25 51.616	0 32 3.76
2009 Aug 24	1 57.3	26 0.019	6.0s	9.0	7.3 7.1	118		TYC 0630-01179-1	3061 Cook	0.66 0.05	2 9 0.652	8 25 28.18
2009 Aug 24	11 25.7	119 0.083	6.7s	7.5	5.5 5.6	95		TYC 1798-00411-1	81 Terpsichore	1.03 0.05	3 33 51.374	23 49 51.81
2009 Aug 24	22 39.2	69 0.026	2.5s	8.7	6.0 6.5	63		TYC 2414-00942-1	174 Phaedra	0.88 0.09	5 57 59.658	34 1 33.21
2009 Aug 26	12 0.9	44 0.019	11.8s	6.3	11.0 11.4	121		HIP 9809	7394 Xanthomalitia	0.67 0.07	2 6 12.254	8 14 53.10
2009 Aug 26	15 11.3	65 0.023	1.9s	9.0	7.1 7.5	50		TYC 1903-00942-1	718 Erida	1.08 0.10	7 0 49.114	27 21 34.25
2009 Aug 27	0 43.0	19 0.017	1.5s	8.8	7.2 7.6	105		TYC 0654-00174-1	4509 Gorbatskij	1.24 0.04	3 8 21.998	13 32 51.16
2009 Aug 27	3 24.4	341 0.156	13.0s	8.5	3.4 4.0	72		HIP 25372	52 Europa	0.39 0.07	5 25 39.560	16 38 9.69
2009 Aug 27	13 28.8	15 0.010	1.1s	5.9	10.4 10.0	99		HIP 81523	5994 Yakubovich	0.80 0.05	16 39 5.217	-37 13 2.96
2009 Aug 28	23 17.6	12 0.007	1.9s	8.2	9.1 8.9	111		HIP 86992	6972 Helvetius	1.23 0.05	17 46 36.369	-16 0 13.27
2009 Aug 29	1 43.3	12 0.010	1.6s	7.2	8.8 8.9	153		HIP 1018	2852 Declercq	0.94 0.04	0 12 40.386	-1 13 37.91
2009 Aug 29	6 38.2	60 0.033	1.4s	8.9	3.7 4.1	47		HIP 35575	60 Echo	0.16 0.06	7 20 31.001	19 23 49.17
2009 Aug 29	15 41.4	15 0.017	2.4s	9.0	7.0 7.1	148		TYC 0522-01669-1u	1441 Bolyai	0.85 0.03	20 37 27.882	5 58 24.78
2009 Aug 29	19 9.9	62 0.046	5.0s	8.2	5.2 5.0	167		HIP 112936	1735 ITA	0.11 0.04	22 52 23.834	-21 42 29.80
2009 Aug 29	19 15.3	62 0.046	5.0s	9.0	4.4 4.1	167		TYC 6393-00188-2s	1735 ITA	0.18 0.05	22 52 23.617	-21 42 29.61
2009 Aug 30	7 41.6	11 0.010	1.0s	7.2	8.6 8.2	163		HIP 109582	3965 Konopleva	0.33 0.03	22 11 54.674	6 53 46.57
2009 Aug 30	9 7.8	40 0.019	1.2s	7.7	6.9 6.9	51		HIP 67658	219 Thusnelda	0.31 0.07	13 51 43.999	-7 10 22.20
2009 Aug 30	22 24.1	58 0.020	1.4s	8.8	6.1 5.8	30		TYC 1395-00819-1	382 Dodona	0.23 0.10	8 40 15.325	19 59 39.32
2009 Aug 31	9 30.2	31 0.037	3.9s	8.8	6.7 6.9	166		TYC 0580-00205-1	2961 Katsurahama	0.67 0.03	23 15 0.868	2 51 54.38
2009 Aug 31	10 16.6	18 0.013	1.4s	7.4	9.5 9.6	148		HIP 101088	1090 Sumida	0.61 0.04	20 29 30.014	-12 35 29.04
2009 Aug 31	10 45.5	32 0.016	1.8s	7.2	9.7 9.9	87		HIP 79843	3312 Pedersen	1.26 0.06	16 17 49.940	-13 22 21.28
2009 Aug 31	18 40.7	33 0.018	2.4s	7.5	7.4 7.1	170		HIP 115305	642 Clara	0.36 0.06	23 21 12.068	-8 40 26.99
2009 Aug 31	21 49.6	22 0.014	2.2s	6.7	9.6 9.3	152		HIP 103224	5468 Hamatonbetsu	0.46 0.05	20 54 46.997	-18 47 33.90
2009 Sep 1	7 53.9	21 0.006	2.8s	8.3	10.2 9.9	118		TYC 7419-00472-1	31819 1999 RS150	0.15 0.11	18 36 57.250	-37 24 51.85
2009 Sep 1	17 2.0	23 0.014	1.0s	7.7	8.3 9.5	81		TYC 6789-00319-1	2390 Nezarka	1.20 0.06	15 41 37.048	-29 11 14.12
2009 Sep 2	13 27.4	12 0.008	1.5s	8.3	8.7 8.6	134		TYC 5157-02604-1	3242 Bakhchisaraj	1.22 0.05	19 39 55.020	-6 9 8.86
2009 Sep 2	20 31.0	14 0.010	5.5s	8.4	7.9 8.2	124		HIP 93605	2882 Tedesco	1.09 0.04	19 3 43.747	-22 42 43.28
2009 Sep 3	4 48.4	11 0.006	1.3s	7.6	10.2 9.8	106		HIP 87085	19086 1978 VB3	0.74 0.06	17 47 41.807	-35 13 19.84
2009 Sep 3	5 36.9	20 0.010	1.0s	6.5	11.1 10.8	86		HIP 80840	5697 Arrhenius	0.71 0.06	16 30 30.019	-7 30 52.00
2009 Sep 3	10 6.8	100 0.042	2.0s	7.4	5.7 5.4	13		HIP 48911	114 Kassandra	0.94 0.07	9 58 39.367	10 57 37.91
2009 Sep 3	14 28.9	21 0.006	2.3s	8.8	9.9 10.3	98		TYC 6233-01140-1	24456 2000 RO25	0.71 0.12	17 16 53.788	-16 32 57.84
2009 Sep 4	4 32.9	15 0.013	1.5s	7.5	8.0 8.1	151		HIP 107261	5976 Kalatajean	1.09 0.04	21 43 31.836	-31 14 55.91
2009 Sep 5	3 48.1	74 0.030	2.7s	8.4	7.3 7.4	67		TYC 5593-00421-1	957 Camelia	0.33 0.08	15 12 13.813	-14 23 43.49
2009 Sep 5	19 45.3	32 0.025	4.0s	8.6	6.5 6.5	112		TYC 6857-01764-1	2379 Heiskanen	0.67 0.04	18 25 8.465	-22 58 55.53
2009 Sep 6	14 21.7	21 0.012	1.4s	8.0	8.1 8.4	103		HIP 16603	5920 1992 SX17	0.55 0.05	3 33 43.588	37 47 45.27
2009 Sep 6	14 23.0	182 0.084	6.1s	7.9	4.7 4.9	63		HIP 32478	130 Elektra	0.97 0.07	6 46 43.387	4 21 34.76
2009 Sep 7	3 10.9	10 0.005	1.0s	7.8	10.4 10.0	103		HIP 87134	8661 Ratzinger	0.49 0.06	17 48 11.258	-34 34 55.03
2009 Sep 7	4 19.6	113 0.044	3.9s	7.7	6.7 6.5	58		HIP 34426	56 Melete	0.07 0.08	7 8 11.943	15 31 13.00
2009 Sep 7	18 13.0	124 0.048	2.6s	8.3	5.2 5.4	12		HIP 57755	410 Chloris	0.29 0.08	11 50 40.638	9 30 58.60
2009 Sep 7	20 36.7	59 0.041	7.9s	8.6	4.4 4.0	127		TYC 1057-02086-1	480 Hansa	0.60 0.05	19 39 40.273	8 0 41.08
2009 Sep 7	23 12.3	121 0.080	9.0s	9.0	3.6 3.6	163		TYC 580-01648-1	78 Diana	0.60 0.05	22 1 42.265	-11 59 40.53
2009 Sep 8	0 58.8	26 0.007	1.6s	7.5	10.9 10.7	82		HIP 25965	10247 Amphiaros	0.42 0.12	5 32 22.022	19 7 20.15
2009 Sep 8	5 11.4	86 0.038	2.7s	8.6	6.1 6.0	59		HIP 35022	195 Eurykleia	1.29 0.07	7 14 38.816	28 26 29.25
2009 Sep 8	7 5.7	11 0.011	1.0s	7.1	8.5 8.3	166		HIP 109637	1855 Korolev	0.13 0.03	22 12 35.824	-8 0 50.72
2009 Sep 8	10 32.1	28 0.015	1.3s	9.0	7.5 7.6	83		TYC 1308-02143-1	1615 Bardwell	0.86 0.06	5 27 25.444	21 28 54.29
2009 Sep 8	16 28.3	30 0.023	2.5s	8.6	6.6 6.4	168		HIP 112755	1334 Lundmarka	0.16 0.04	22 50 5.821	-16 18 49.83
2009 Sep 8	20 16.2	13 0.011	1.0s	8.3	7.7 8.1	105		HIP 88783	7353 Kazuya	1.01 0.04	18 7 26.261	-29 28 32.98
2009 Sep 8	22 40.1	46 0.021	1.2s	8.8	4.9 4.6	47		HIP 39644	113 Amalthea	0.35 0.07	8 6 4.151	18 44 47.03
2009 Sep 9	5 35.4	136 0.043	3.2s	8.2	6.0 5.7	23		TYC 5529-00819-1	95 Arethusa	0.20 0.11	12 16 35.159	-10 19 28.13
2009 Sep 9	17 37.1	24 0.048	2.6s	7.5	4.4 4.6	160		HIP 109069	433 Eros	0.68 0.02	22 5 41.685	5 57 59.58
2009 Sep 9	21 17.2	33 0.024	2.7s	8.8	5.3 5.1	170		HIP 116660	1157 Arabia	0.76 0.04	23 38 27.145	2 15 1.62
2009 Sep 9	22 26.1	22 0.025	2.9s	8.2	6.2 5.8	163		HIP 1012	2816 Pien	1.10 0.03	0 12 36.780	-13 36 36.50
2009 Sep 10	4 10.3	30 0.037	3.4s	9.0	4.3 4.1	164		HIP 109913	572 Rebekka	1.10 0.03	22 15 39.432	0 58 25.67
2009 Sep 10	6 53.0	74 0.026	2.0s	7.7	8.2 8.2	45		HIP 40452	983 Gunila	0.52 0.09	8 15 33.073	11 25 49.16
2009 Sep 10	7 45.3	12 0.009	1.6s	8.7	8.1 8.3	108		HIP 91060	10565 1994 AT1	0.01 0.04	18 34 30.793	-39 3 40.63
2009 Sep 10	8 17.1	21 0.019	1.1s	7.5	8.8 8.7	92		HIP 84491	2259 Sofievka	1.23 0.03	17 16 23.844	-21 51 30.21
2009 Sep 10	10 22.9	66 0.038	2.2s	7.2	7.5 7.1	68		HIP 76071	207 Hedda	0.87 0.05	15 32 10.328	-21 58 0.77
2009 Sep 10	10 45.6	40 0.014	1.0s	8.2	8.8 10.0	39		TYC 0801-00272-1	2976 Lautaro	0.68 0.10	8 38 57.225	10 8 44.59
2009 Sep 10	13 26.3	11 0.005	2.5s	8.1	10.1 10.6	130		HIP 98599	9410 1995 BJ1	1.04 0.07	20 1 38.179	-22 6 39.55
2009 Sep 10	13 48.7	17 0.015	1.9s	8.9	5.8 6.1	147		TYC 0618-01466-1	955 Algtede	0.17 0.04	1 10 0.697	12 40 20.87
2009 Sep 11	14 52.6	15 0.009	3.3s	8.3	8.4 8.7	116		HIP 93699	6532 Scarfe	0.25 0.05	19 4 48.901	-24 48 57.03
2009 Sep 11	19 59.0	39 0.016	1.1s	8.5	6.6 6.4	52		HIP 71926	653 Berenike	0.77 0.08	14 42 39.934	-5 57 51.78
2009 Sep 12	0 25.8	113 0.045	4.1s	8.9	5.5 5.6	62		HIP 34918	56 Melete	1.17 0.08	7 13 28.567	15 13 13.29
2009 Sep 12	8 11.4	22 0.019	2.1s	8.3	6.0 5.7	173		HIP 114204	1725 CrAO	0.25 0.04	23 7 42.090	-9 40 2.39
2009 Sep 12	10 48.8	32 0.014	1.3s	8.9	8.3 8.6	71		TYC 6789-01031-1	1187 Afra	0.79 0.08	15 42 33.544	-29 24 12.62
2009 Sep 12	12 29.2	13 0.007	1.8s	8.8	8.7 8.3	111		TYC 7421-00430-1	8901 1995 UJ4	0.16 0.06	18 56 20.277	-35 52 19.64
2009 Sep 12	21 3.3	12 0.011	1.0s	8.0	7.8 7.8	161		HIP 1565	31148 1997 UO8	1.10 0.04	0 19 28.899	-17 40 43.40
2009 Sep 12	21 23.1	55 0.025	1.6s	7.7	7.8 8.2	58		HIP 37575	293 Brasilia	0.89 0.07	7 42 40.296	25 50 1.70
2009 Sep 12	21 30.7	19 0.009	1.1s	9.0	8.5 8.2	88		TYC 6233-00024-1	4874 Burke	1.03 0.07	17 12 50.760	-18 22 22.06
2009 Sep 13	1 35.5	12 0.012	1.8s	8.6	7.1 6.8	142		TYC 0521-00344-1	8397 Chiakitanaka	0.01 0.04	20 58 11.387	4 47 15.71
2009 Sep 13	7 29.5	10 0.011	1.0s	9.0	6.3 6.1	172		HIP 114983	4263 Abashiri	1.15 0.03	23 17 18.750	4 27 6.32
2009 Sep 13	15 11.6	52 0.024	2.8s	8.4	7.6 7.3	84		TYC 0723-00884-1	1262 Sniadeckia	0.27 0.07	5 47 58.297	12 3 55.81
2009 Sep 13	17 10.1	10 0.005	1.0s	8.3	10.0 10.4	100		TYC 7399-00053-1	17863 1998 KN30	0.93 0.07	18 7 24.909	-34 59 21.53
2009 Sep 14	9 15.4	80 0.063	7.4s	6.4	6.9 7.3	162		HIP 113080	559 Nanon	0.43 0.04	22 54 5.705	-19 10 30.58
2009 Sep 14	12 20.4	23 0.012	1.2s	8.3	7.8 7.7	87		HIP 84181	761 Brendelia	0.85 0.06	17 12 31.259	-25 13 38.28
2009 Sep 14	14 58.6	21 0.015	1.7s	7.3	7.8 8.1	170		HIP 717	681 Gorgo	1.03 0.04	0 8 52.246	0 41 32.86
2009 Sep 14	23 11.0	73 0.029	2.5s	8.6	6.9 7.5	69		TYC 7335-00040-1	1266 Tono	0.84 0.09	15 38 9.688	-34 17 0.71
2009 Sep 15	19 21.9	12 0.004	1.2s	5.8	13.7 13.7	139		HIP 8544	2002 CJ228	1.24 0.10	1 50 8.561	22 16 31.14
2009 Sep 15	23 13.											

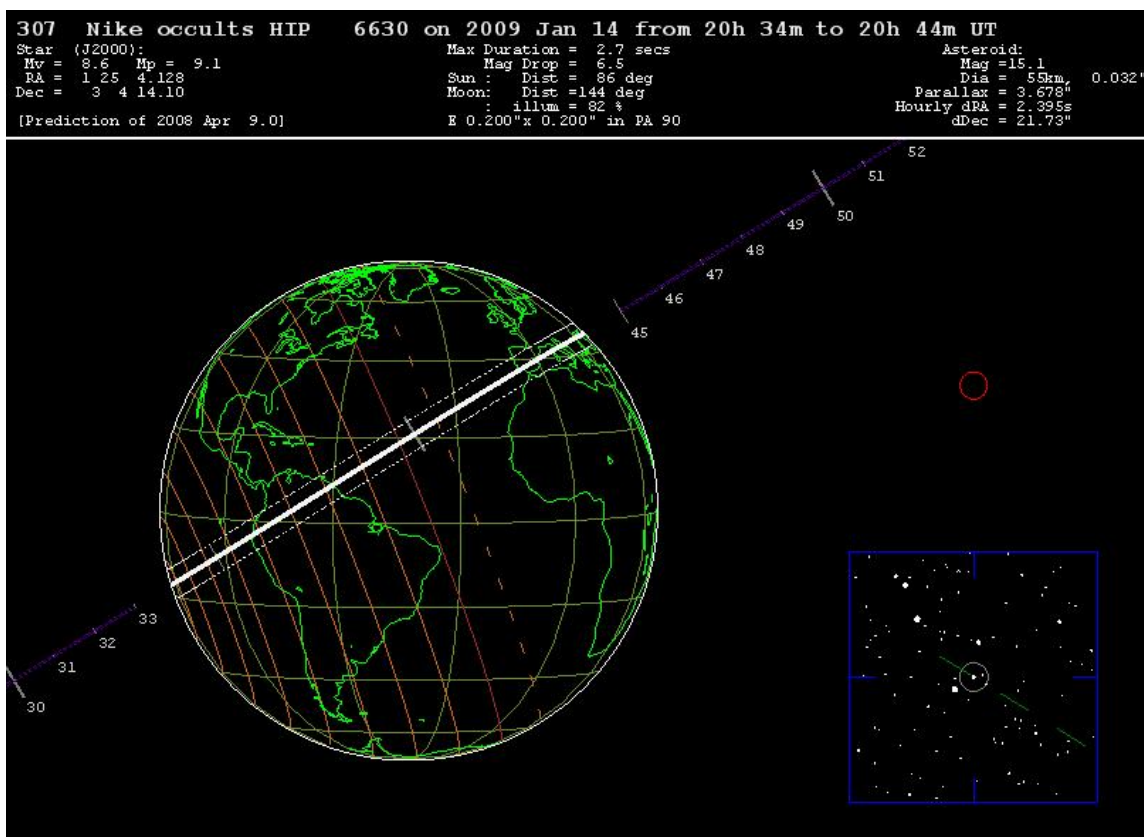
Date	U.T.	Diameter	Durn	Star	Mag-Drop	Elon	%	Star	Planet	Min	R.A. (J2000)	Dec.	"
y m d	h m	km	sec/m	mag	V R	o lll		No.	No Name	D Error	h m s	o ' "	
2009 Sep 25	9 13.3	13 0.008	1.0s	8.4	8.6 8.7	106		HIP 94402	4880 Tovstonogov	0.46 0.05	19 12 47.315	3 33 26.65	
2009 Sep 25	11 46.2	61 0.024	1.3s	6.9	8.7 8.4	19		HIP 64834	342 Endymion	0.51 0.08	13 17 27.270	-10 32 46.48	
2009 Sep 25	11 53.0	28 0.015	1.3s	8.9	6.4 7.1	86		TYC 0744-01125-1	968 Petunia	0.54 0.06	6 27 43.986	14 31 22.50	
2009 Sep 25	16 41.6	33 0.019	2.6s	8.0	8.4 8.5	149		TYC 6989-00488-1	23099 1999 XA160	0.21 0.06	0 5 54.742	-30 21 39.10	
2009 Sep 25	20 8.2	20 0.015	1.0s	8.9	7.4 7.1	98		TYC 4766-01411-1	2696 Magion	0.45 0.05	5 37 23.228	-0 41 50.88	
2009 Sep 26	19 49.0	11 0.007	3.0s	8.0	9.6 9.4	120		HIP 101904	77895 2001 SH324	0.04 0.05	20 39 2.694	-28 25 31.44	
2009 Sep 27	4 15.7	18 0.009	1.0s	8.7	9.0 9.2	84		HIP 32266	4597 Consolmagno	1.14 0.06	6 44 12.486	23 53 7.85	
2009 Sep 27	16 29.7	54 0.037	3.9s	4.6	9.6 9.2	96		HIP 27830	539 Famina	1.10 0.05	5 53 19.649	27 36 44.05	
2009 Sep 27	18 25.2	19 0.010	2.6s	8.9	7.7 7.9	137		TYC 0654-00437-1	2587 Gardner	0.41 0.06	3 5 7.711	14 35 14.09	
2009 Sep 28	0 17.1	13 0.007	1.1s	8.6	8.5 8.6	99		TYC 6286-00905-1	3947 Swedenborg	0.80 0.06	18 58 49.824	-17 56 22.38	
2009 Sep 28	16 38.6	18 0.011	1.4s	6.4	10.3 10.4	101		HIP 94372	4790 Petrpravce	0.09 0.05	19 12 28.061	-21 39 30.39	
2009 Sep 28	22 1.6	60 0.037	1.7s	8.8	3.7 3.8	61		HIP 41492	60 Echo	0.57 0.05	8 27 43.707	15 53 17.15	
2009 Sep 29	1 0.7	12 0.008	2.4s	7.9	9.3 9.1	123		HIP 19347	13386 1998 XG80	0.14 0.05	4 8 41.907	0 46 58.20	
2009 Sep 29	6 29.3	24 0.011	1.2s	8.9	7.8 7.9	83		TYC 1335-00791-1	3318 Blixen	0.01 0.07	6 54 2.941	17 37 40.43	
2009 Sep 29	14 23.6	39 0.022	3.1s	7.9	8.2 8.6	170		HIP 117641	5711 Eneev	0.13 0.06	23 51 28.888	-3 24 13.74	
2009 Sep 30	0 29.2	11 0.007	1.1s	8.1	9.4 9.0	102		HIP 94839	5599 1991 SG1	0.37 0.05	19 17 50.794	-16 55 17.08	
2009 Sep 30	1 53.5	22 0.010	1.5s	7.0	10.8 10.4	88		HIP 89960	5534 1941 UN	0.27 0.07	18 21 16.449	-30 56 29.52	
2009 Sep 30	2 23.6	33 0.013	1.2s	8.4	8.7 8.5	66		HIP 82116	637 Chrysothemis	0.75 0.08	16 46 29.164	-22 37 42.29	
2009 Sep 30	7 43.2	86 0.067	6.7s	6.9	6.3 6.4	174		HIP 1684	449 Hamburga	0.46 0.04	0 21 4.336	-2 54 34.51	
2009 Sep 30	8 11.6	48 0.021	1.3s	7.3	8.3 8.0	55		HIP 78628	1197 Rhodesia	0.35 0.07	16 3 7.053	-19 50 26.62	
2009 Sep 30	8 22.3	98 0.027	5.1s	9.0	7.7 7.5	79		TYC 6261-02761-1	2674 Pandarus	0.91 0.13	17 46 11.242	-21 35 48.32	
2009 Sep 30	14 3.4	185 0.082	4.8s	8.2	3.5 3.1	43		HIP 74680	8 Flora	0.44 0.07	15 15 45.256	-14 41 34.83	
2009 Sep 30	15 44.2	73 0.028	2.2s	8.5	7.3 7.6	56		HIP 43846	465 Alekto	0.46 0.08	8 55 50.618	17 39 53.78	
2009 Oct 1	5 33.1	26 0.021	3.7s	8.5	5.6 5.7	148		HIP 111364	327 Columbia	0.48 0.04	22 33 41.105	-10 31 15.82	
2009 Oct 1	7 8.3	27 0.022	2.4s	8.7	5.7 5.5	159		HIP 557	862 Franzia	0.91 0.04	0 6 47.032	23 29 37.79	
2009 Oct 1	10 30.7	20 0.007	1.2s	8.0	9.9 9.9	167		HIP 6130	18062 1999 XY187	0.63 0.09	1 18 41.380	-0 52 5.68	
2009 Oct 2	1 23.0	174 0.061	3.7s	8.3	5.0 4.7	7		HIP 59005	120 Lachesis	0.65 0.09	12 5 54.624	-2 27 47.88	
2009 Oct 2	2 34.4	18 0.006	1.4s	8.5	9.7 9.4	153		HIP 10549	13230 1997 VGI	0.41 0.09	2 15 52.728	11 21 34.35	
2009 Oct 2	4 41.1	166 0.006	8.3s	8.2	14.6 14.8	146		TYC 5814-00554-1	2002 FV170	1.25 1.03	22 30 53.187	-10 37 31.99	
2009 Oct 2	6 48.2	66 0.035	1.8s	8.4	6.4 6.1	56		HIP 79392	207 Hedda	1.28 0.06	16 12 9.885	-23 55 17.66	
2009 Oct 2	10 46.0	89 0.047	6.5s	8.5	5.8 5.6	154		HIP 9820	784 Pickeringia	0.82 0.06	2 6 22.167	16 52 25.91	
2009 Oct 2	12 9.0	33 0.013	1.1s	8.0	8.6 8.7	54		HIP 44497	1403 Idelsonia	1.11 0.08	9 3 57.853	11 9 9.29	
2009 Oct 2	23 57.4	11 0.011	4.5s	8.1	7.3 7.6	125		TYC 6359-00442-1	1219 Britta	1.09 0.04	21 18 52.257	-22 2 13.45	
2009 Oct 3	4 47.6	11 0.006	1.1s	6.6	11.5 11.1	116		HIP 22774	45591 2000 CQ103	0.93 0.06	4 53 55.810	1 34 9.65	
2009 Oct 3	9 0.3	54 0.040	3.3s	8.8	5.0 5.2	94		TYC 0744-01509-1	479 Caprera	0.63 0.05	6 26 42.131	13 56 4.99	
2009 Oct 3	9 59.1	16 0.015	1.2s	9.0	7.4 7.4	157		HIP 9228	23977 1999 GW6	1.27 0.03	1 58 36.019	16 32 16.19	
2009 Oct 3	15 14.2	33 0.018	1.1s	8.8	6.1 6.5	64		HIP 43111	932 Hooveria	0.48 0.06	8 46 48.963	25 28 25.20	
2009 Oct 4	0 8.2	13 0.009	1.0s	9.0	7.1 7.4	178		TYC 0014-00038-1	6166 Univsima	0.85 0.05	0 44 33.257	2 36 16.25	
2009 Oct 4	1 35.4	17 0.013	7.8s	7.8	8.0 7.6	132		HIP 17552	1835 Gajdariya	0.99 0.04	3 45 32.001	21 14 47.63	
2009 Oct 4	5 20.9	19 0.005	1.0s	6.7	12.2 12.3	83		HIP 89617	30704 Phegus	0.32 0.11	18 17 17.742	-38 10 39.79	
2009 Oct 4	4 12.9	44 0.028	2.9s	7.8	5.9 6.2	89		HIP 32822	234 Barbara	0.12 0.05	6 50 31.790	7 11 19.14	
2009 Oct 5	10 34.2	108 0.061	10.1s	9.0	3.4 3.6	99		TYC 6893-00827-1	537 Fides	0.64 0.06	19 35 26.098	-24 32 21.10	
2009 Oct 5	18 9.4	117 0.097	9.7s	7.3	5.5 5.1	124		TYC 8447-01616-1	1093 Freda	0.05 0.04	22 59 14.843	-45 11 21.13	
2009 Oct 5	18 18.8	13 0.006	1.1s	8.6	9.6 9.9	96		TYC 0732-00588-1	7082 La Serena	1.08 0.08	6 25 48.868	8 4 24.31	
2009 Oct 5	18 32.0	20 0.011	5.3s	8.8	7.5 7.2	125		TYC 1277-00738-1	2425 Shenzhen	1.02 0.06	4 24 0.962	21 32 26.14	
2009 Oct 5	22 35.6	39 0.018	2.4s	7.5	7.7 7.3	91		HIP 32487	1102 Pepita	0.61 0.07	6 46 47.226	10 44 4.54	
2009 Oct 6	9 40.0	108 0.064	3.4s	7.7	5.8 5.9	64		TYC 1396-00794-1	505 Cava	0.85 0.06	8 47 26.694	19 55 19.16	
2009 Oct 6	21 17.9	59 0.034	3.8s	8.5	5.3 5.5	92		TYC 6886-00551-1	337 Devosa	0.62 0.06	19 10 52.608	-28 51 35.72	
2009 Oct 7	4 24.9	12 0.010	1.4s	8.9	7.3 7.4	108		HIP 26748	4382 Stravinsky	0.63 0.04	5 40 59.704	16 2 39.63	
2009 Oct 7	23 16.9	28 0.022	2.0s	8.1	7.5 7.1	101		HIP 29563	1384 Kniertje	0.65 0.04	6 13 42.177	8 42 44.57	
2009 Oct 8	5 6.1	15 0.019	2.0s	7.9	6.3 6.3	164		HIP 503	4324 1981 YAl	0.52 0.03	0 6 1.061	16 27 7.47	
2009 Oct 8	5 48.2	36 0.018	1.3s	7.9	6.8 6.5	68		TYC 1395-02003-1	178 Belisana	0.05 0.07	8 40 23.442	19 50 5.78	
2009 Oct 8	22 32.5	12 0.010	1.4s	8.1	8.0 7.9	141		HIP 16374	5256 Farquhar	0.34 0.04	3 30 56.191	18 47 57.21	
2009 Oct 8	22 54.9	40 0.030	3.4s	8.5	5.0 4.7	170		HIP 5185	297 Caecilia	1.14 0.04	1 6 22.508	16 18 50.92	
2009 Oct 9	7 33.5	149 0.085	10.4s	9.0	4.3 4.4	97		TYC 0737-01129-1	238 Hypatia	0.04 0.06	6 34 44.927	9 45 43.42	
2009 Oct 9	23 20.1	123 0.098	12.1s	8.2	4.5 4.2	110		HIP 26803	134 Sophrosyne	0.19 0.04	5 41 31.093	38 11 17.92	
2009 Oct 10	0 36.7	10 0.011	1.0s	7.8	8.0 8.1	172		HIP 2264	3685 Derdenye	0.60 0.03	0 28 51.148	8 23 1.83	
2009 Oct 10	0 47.8	13 0.016	1.0s	8.6	5.2 5.1	146		TYC 1790-00021-1	4103 Chahine	0.28 0.03	2 58 15.515	27 20 10.59	
2009 Oct 10	9 44.2	11 0.011	1.1s	3.6	11.9 12.0	164		HIP 6587	3995 Sakano	0.11 0.03	1 24 1.353	-8 11 1.75	
2009 Oct 10	9 45.1	40 0.013	1.0s	8.1	9.1 9.6	28		HIP 55460	1691 Oort	0.09 0.09	11 21 29.259	3 56 14.91	
2009 Oct 10	15 16.0	31 0.019	3.7s	6.6	9.4 9.5	138		HIP 17856	4930 Rephiltim	0.80 0.05	3 49 19.167	-1 27 12.11	
2009 Oct 11	1 25.4	26 0.022	2.7s	7.6	7.8 7.3	168		HIP 8951	3061 Cook	0.63 0.04	1 55 18.347	6 26 13.60	
2009 Oct 11	17 15.3	75 0.039	1.7s	5.2	7.1 6.6	36		HIP 76243	25 Phocaea	1.35 0.06	15 34 26.492	-9 11 0.56	
2009 Oct 12	0 45.2	15 0.013	1.0s	8.3	8.2 8.2	94		TYC 1352-00220-1	3478 Fanale	0.40 0.04	7 0 54.846	18 54 56.19	
2009 Oct 12	1 28.7	15 0.009	2.5s	8.4	8.1 7.9	134		TYC 1822-02103-1	3406 Omsk	1.01 0.06	4 5 28.816	27 52 46.18	
2009 Oct 12	10 23.0	36 0.019	2.2s	8.3	7.9 8.0	90		HIP 95215	1312 Vassar	0.67 0.06	19 22 15.576	-22 4 25.72	
2009 Oct 12	16 0.0	11 0.010	1.1s	8.0	7.7 7.9	160		HIP 2774	11151 Oodaigahara	0.84 0.03	0 35 24.779	25 6 13.09	
2009 Oct 12	20 0.5	13 0.010	1.1s	8.6	7.1 7.2	172		HIP 5332	4593 Reipurth	0.65 0.04	1 8 11.733	15 7 33.15	
2009 Oct 12	20 39.5	10 0.005	1.2s	8.8	9.2 9.0	104		TYC 1886-00005-1	6530 Adry	1.24 0.06	6 23 36.402	26 46 46.81	
2009 Oct 12	21 38.4	23 0.013	1.0s	8.8	8.5 8.2	80		HIP 40157	6038 1989 EQ	0.71 0.06	8 12 4.319	25 10 48.78	
2009 Oct 12	22 12.6	10 0.007	1.2s	8.2	9.2 9.4	109		HIP 104363	17845 1998 HY112	0.32 0.05	21 8 32.199	-33 31 57.32	
2009 Oct 13	17 33.6	28 0.019	4.2s	8.9	6.6 6.8	130		TYC 0545-00556-1	565 Marbachia	0.89 0.05	21 55 46.443	1 10 6.27	
2009 Oct 14	18 6.3	17 0.006	1.0s	8.0	10.3 10.0	171		HIP 8754	22041 1999 XK192	1.21 0.09	1 52 37.123	12 26 34.41	
2009 Oct 14	18 14.1	13 0.010	1.3s	8.7	7.5 7.3	122		HIP 108985	12713 1991 FY3	1.19 0.04	22 4 44.247	-25 7 14.06	
2009 Oct 15	1 9.4	12 0.010	1.4s	5.6	10.4 10.5	154		HIP 14439	7772 1992 EQ15	0.31 0.04	3 6 23.683	13 11 13.49	
2009 Oct 15	4 59.2	32 0.016	1.8s	8.9	7.7 8.0	86		HIP 38332	2271 Kiso	0.90 0.06	7 51 6.834	18 40 11.70	
2009 Oct 15	6 43.4	13 0.014	2.6s	8.6	4.9 5.2	139							

Date	U.T.	Diameter	Durn	Star	Mag-Drop	Elon	%	Star	Planet	Min	Error	R.A. (J2000)	Dec.	"
y m d	h m	km	sec/m	mag	V R	o	l11	No.	No Name	D		h m s	o ' "	
2009 Oct 28	5 48.0	33.0 0.13	1.0s	8.7	7.0 7.5	58		TYC 6272-01647-1	808 Merxia	0.64	0.09	18 11 19.325	-19 26 19.25	
2009 Oct 28	15 27.9	63.0 0.27	1.9s	8.0	7.2 7.0	59		HIP 51032	607 Jenny	0.93	0.07	10 25 33.675	4 34 19.37	
2009 Oct 29	2 58.7	82.0 0.33	3.1s	8.5	6.7 6.5	69		HIP 49168	231 Vindobona	0.99	0.08	10 2 3.139	15 21 37.62	
2009 Oct 29	10 2.7	12.0 0.09	1.1s	8.4	7.8 7.7	161		HIP 4423	13561 1992 SB1	0.55	0.04	0 56 40.284	17 57 35.05	
2009 Oct 29	11 19.8	51.0 0.12	1.3s	8.7	9.9 10.3	36		TYC 6221-00798-1	16560 1991 VZ5	1.01	0.14	16 42 18.338	-17 1 37.61	
2009 Oct 29	17 9.6	35.0 0.24	2.8s	8.2	7.6 8.0	100		TYC 5775-01432-1	1203 Nanna	0.91	0.05	21 9 37.033	-9 40 28.85	
2009 Oct 29	18 4.4	26.0 0.14	1.6s	7.5	9.1 8.9	88		HIP 42023	2251 Tikhov	0.24	0.06	8 33 58.021	10 35 9.94	
2009 Oct 30	17 32.4	65.0 0.60	3.5s	6.2	5.7 5.3	97		HIP 104297	33 Polyhymnia	1.10	0.03	21 7 44.715	-17 27 21.70	
2009 Oct 30	18 28.8	40.0 0.32	4.4s	8.9	6.3 6.1	148		TYC 4728-00591-1	6362 Tunis	0.77	0.04	4 5 12.763	-4 6 29.36	
2009 Oct 31	5 17.6	27.0 0.12	1.0s	9.0	7.1 6.9	72		TYC 6876-00450-1	975 Perseverantia	0.71	0.08	19 29 17.904	-24 19 23.72	
2009 Oct 31	20 37.7	95.0 0.50	3.6s	7.2	6.9 7.3	73		HIP 96044	407 Arachne	0.85	0.06	19 31 42.595	-19 23 11.40	
2009 Nov 1	12 9.2	25.0 0.22	2.5s	8.7	6.7 7.1	114		HIP 109091	1994 Shane	0.46	0.04	22 5 54.037	2 15 57.14	
2009 Nov 1	13 4.9	14.0 0.08	1.0s	8.2	8.5 8.6	160		HIP 11568	3420 Standish	0.03	0.05	2 29 3.790	-5 26 47.00	
2009 Nov 1	21 20.6	60.0 0.43	2.3s	7.9	4.3 4.0	78		HIP 46812	60 Echo	1.11	0.04	9 32 20.312	10 46 35.51	
2009 Nov 2	3 45.3	14.0 0.09	1.1s	5.9	10.7 10.4	96		HIP 41117	749 Malzovia	1.22	0.05	8 23 21.802	18 19 55.59	
2009 Nov 2	5 25.0	11.0 0.10	1.0s	8.8	7.3 7.5	105		TYC 1929-01002-1	1829 Dawson	0.37	0.04	7 49 30.852	25 5 30.52	
2009 Nov 2	13 21.0	54.0 0.16	1.7s	8.9	7.9 7.5	50		TYC 7890-00860-1	965 Angelica	1.08	0.11	17 52 53.259	-39 35 52.11	
2009 Nov 2	14 15.0	76.0 0.22	1.8s	8.4	7.6 7.5	11		TYC 6127-00708-1	972 Cohnia	1.11	0.12	13 47 2.156	-17 49 39.40	
2009 Nov 2	19 49.2	82.0 0.33	1.9s	7.5	7.1 7.0	33		HIP 60019	583 Klotilde	0.14	0.08	12 18 32.101	-8 54 16.67	
2009 Nov 2	20 49.6	11.0 0.09	1.1s	8.0	7.7 7.9	177		HIP 10895	7024 1992 PA4	0.38	0.04	2 20 13.617	14 17 51.73	
2009 Nov 2	22 43.4	15.0 0.11	1.5s	8.0	7.9 8.0	151		HIP 5384	5563 1991 VZ1	0.80	0.04	1 8 53.033	-4 43 21.72	
2009 Nov 3	1 31.0	15.0 0.06	1.1s	6.1	11.9 12.1	92		HIP 103703	3766 Junepatterson	0.60	0.08	21 0 51.744	-17 31 51.40	
2009 Nov 3	5 12.5	82.0 0.27	1.8s	8.3	5.7 5.6	21		HIP 78551	122 Gerda	0.59	0.09	16 2 15.171	-19 27 7.65	
2009 Nov 3	19 43.3	33.0 0.14	1.0s	8.4	8.6 8.4	56		HIP 54423	2310 Olshaniya	1.00	0.07	11 8 13.516	-6 34 24.45	
2009 Nov 3	22 18.0	108.0 0.46	3.4s	8.6	5.7 6.1	61		TYC 6285-03554-ls	739 Mandeville	1.04	0.08	18 51 37.031	-17 18 36.57	
2009 Nov 4	5 48.7	33.0 0.21	2.9s	8.6	6.3 6.8	158		HIP 18996	1481 Tubingia	0.98	0.05	4 4 11.944	25 23 56.11	
2009 Nov 5	3 45.3	21.0 0.13	1.4s	8.9	8.0 8.1	143		HIP 4313	7965 Katsuhiko	0.35	0.05	0 55 12.397	44 59 33.72	
2009 Nov 5	17 50.1	18.0 0.08	1.0s	8.5	8.7 8.5	87		TYC 5755-01275-1	2606 Odessa	0.64	0.08	20 39 23.358	-8 20 22.88	
2009 Nov 5	19 7.8	33.0 0.13	1.5s	8.6	8.6 8.9	77		HIP 100292	5262 Brucegoldberg	1.22	0.08	20 20 29.515	-30 59 59.04	
2009 Nov 6	0 27.3	30.0 0.17	4.2s	8.9	7.6 7.4	110		HIP 111477	1334 Lundmarka	0.90	0.05	22 35 9.623	-18 24 58.67	
2009 Nov 6	9 25.3	23.0 0.20	4.0s	8.4	8.1 8.2	117		TYC 5234-00319-1	8067 Helfenstein	0.54	0.04	22 40 36.339	-0 4 19.97	
2009 Nov 6	12 24.9	18.0 0.07	1.8s	8.6	10.8 10.5	98		HIP 42247	14651 1998 YE5	0.25	0.08	8 36 47.978	18 52 58.01	
2009 Nov 6	22 52.3	64.0 0.56	6.1s	6.9	5.0 5.4	158		HIP 7632	485 Genua	0.90	0.04	1 38 19.932	2 35 9.82	
2009 Nov 7	10 37.7	11.0 0.12	1.4s	8.3	7.5 7.6	113		HIP 37144	2341 Aoluta	0.35	0.03	7 37 56.921	23 50 10.07	
2009 Nov 7	11 5.5	14.0 0.09	1.1s	5.8	10.7 10.7	156		HIP 20268	5347 1985 DX2	1.30	0.05	4 20 41.237	6 7 50.43	
2009 Nov 7	14 44.2	18.0 0.09	1.4s	8.8	9.8 10.0	150		TYC 0610-00444-1	18053 1999 RU208	1.19	0.07	0 46 55.516	12 31 47.85	
2009 Nov 8	2 36.9	15.0 0.10	1.2s	8.4	8.1 8.2	94		TYC 0813-01818-1	809 Lundia	0.19	0.05	8 48 18.003	11 35 2.43	
2009 Nov 8	3 59.5	53.0 0.18	1.4s	8.7	6.0 6.4	38		TYC 5529-01230-1	509 Iolanda	0.78	0.10	12 19 49.086	-10 58 46.83	
2009 Nov 8	6 38.6	12.0 0.09	1.0s	8.2	8.1 8.2	167		HIP 10171	2924 Mitake-mura	0.40	0.04	2 10 49.318	8 22 7.04	
2009 Nov 8	7 9.4	46.0 0.20	1.3s	8.8	6.4 6.3	57		HIP 92976	742 Edisona	0.86	0.07	18 56 30.644	-30 53 42.02	
2009 Nov 8	20 52.8	108.0 0.12	10.4s	7.5	3.6 3.3	175		HIP 12975	345 Teracidina	0.01	0.03	2 46 52.930	12 15 38.12	
2009 Nov 9	0 19.1	67.0 0.45	4.4s	7.6	4.8 5.0	97		HIP 107590	55 Pandora	0.14	0.05	21 47 28.771	-16 45 44.87	
2009 Nov 9	6 0.3	13.0 0.07	2.2s	8.4	10.4 10.1	116		TYC 1919-01387-1	18377 1991 SH1	0.15	0.06	7 32 47.497	27 39 0.17	
2009 Nov 9	6 15.8	17.0 0.09	1.7s	8.8	9.7 9.5	99		TYC 2485-00751-1	18666 1998 FT53	0.56	0.06	8 54 12.784	30 7 24.16	
2009 Nov 9	7 54.2	35.0 0.23	3.3s	6.6	7.4 7.5	152		HIP 22743	278 Paulina	0.38	0.05	4 53 34.104	23 18 56.42	
2009 Nov 9	15 29.2	17.0 0.06	1.1s	9.0	8.7 8.4	176		HIP 15098	15094 1999 WB2	0.29	0.08	3 14 46.058	18 1 43.07	
2009 Nov 9	17 42.9	19.0 0.18	1.8s	8.9	6.0 5.7	159		TYC 2354-00337-1	2108 Otto Schmidt	0.90	0.04	3 29 55.928	37 24 53.88	
2009 Nov 10	1 26.9	23.0 0.10	1.0s	8.4	8.6 8.3	74		TYC 6919-01679-1	1801 Titicaca	0.57	0.08	20 25 8.163	-28 51 44.91	
2009 Nov 10	4 24.4	70.0 0.41	4.9s	8.2	6.8 6.6	151		HIP 18994	746 Marlu	1.33	0.05	4 4 10.250	42 31 40.42	
2009 Nov 10	4 57.7	13.0 0.08	1.0s	4.3	12.4 12.3	161		HIP 16852	7585 1991 PK8	0.19	0.05	3 36 52.230	0 24 1.23	
2009 Nov 11	2 16.9	15.0 0.11	3.8s	7.9	8.1 8.2	138		HIP 1894	6839 Ozenua	0.26	0.04	0 23 57.021	3 45 39.52	
2009 Nov 11	3 32.8	19.0 0.06	1.1s	8.2	9.9 9.5	166		HIP 11808	13463 Antiphos	1.10	0.09	2 32 16.919	28 33 59.62	
2009 Nov 11	9 33.0	11.0 0.11	1.1s	7.2	10.8 10.6	157		HIP 21672	16386 1981 ET34	1.25	0.03	4 39 8.612	13 0 10.11	
2009 Nov 11	13 29.6	35.0 0.23	3.1s	8.8	5.1 4.8	155		HIP 22610	278 Paulina	0.16	0.05	4 51 52.035	23 21 16.75	
2009 Nov 11	18 28.7	14.0 0.07	1.6s	8.6	8.8 8.8	105		HIP 41999	7191 1993 MA1	0.47	0.06	8 33 38.062	27 20 41.71	
2009 Nov 12	0 38.4	38.0 0.17	1.1s	8.9	7.5 7.6	57		TYC 6874-00611-1	1017 Jacqueline	0.56	0.08	19 14 7.004	-23 4 0.59	
2009 Nov 12	8 37.7	15.0 0.12	1.3s	7.9	7.6 7.4	167		HIP 19148	1907 Rudneva	1.02	0.04	4 6 16.209	-41 51 53.04	
2009 Nov 12	9 44.3	74.0 0.26	1.6s	7.3	6.5 6.6	12		HIP 69998	338 Dvorska	0.87	0.09	14 19 25.758	-18 31 25.16	
2009 Nov 12	11 44.4	16.0 0.07	1.6s	8.7	9.0 9.4	100		TYC 5230-01403-1	3735 Trebon	0.74	0.08	22 2 50.249	-7 26 24.07	
2009 Nov 12	13 57.8	10.0 0.07	1.2s	7.3	9.8 10.1	147		HIP 25668	12766 Paschen	0.94	0.05	5 28 58.028	20 26 30.28	
2009 Nov 12	16 3.9	11.0 0.09	1.3s	8.9	7.3 7.4	159		TYC 0623-00121-1	3705 Hotellasilla	1.17	0.04	1 54 10.513	9 36 0.32	
2009 Nov 12	16 12.1	44.0 0.15	1.0s	8.0	9.4 9.3	24		HIP 82388	6869 Funada	1.06	0.09	16 50 5.113	-12 23 15.89	
2009 Nov 14	0 37.6	13.0 0.06	1.0s	8.2	9.5 9.3	106		HIP 109703	12395 Richnelson	1.01	0.06	22 13 17.143	10 50 54.27	
2009 Nov 14	2 27.2	35.0 0.24	2.9s	8.5	5.4 5.3	158		HIP 22446	278 Paulina	0.48	0.05	4 49 48.061	23 23 44.25	
2009 Nov 14	13 4.4	66.0 0.27	1.8s	7.8	7.4 7.2	52		HIP 93319	781 Kartvelia	0.55	0.08	19 0 25.703	-17 29 3.79	
2009 Nov 14	17 30.1	209.0 1.27	20.1s	8.8	3.4 3.2	152		HIP 24668	121 Hermione	0.56	0.05	5 17 32.432	-22 49 45.18	
2009 Nov 14	19 21.1	28.0 0.13	1.2s	7.8	7.8 8.1	78		TYC 6348-00670-1	243 Ida	0.41	0.07	20 51 30.409	-17 30 24.94	
2009 Nov 14	21 60.0	40.0 0.15	1.0s	8.8	6.4 6.2	41		TYC 6272-01512-1	701 Oriola	1.13	0.09	18 15 37.729	-19 28 45.35	
2009 Nov 15	13 12.2	79.0 0.26	1.8s	8.7	7.1 7.0	25		HIP 83875	551 Ortrud	0.94	0.10	17 8 33.238	-23 13 38.79	
2009 Nov 15	17 57.1	135.0 1.21	42.4s	7.8	3.9 4.1	138		TYC 1890-00359-1	111 Ate	0.17	0.04	6 22 28.069	28 54 43.20	
2009 Nov 15	22 29.8	17.0 0.10	1.4s	8.4	8.0 8.4	149		TYC 24856	5372 Bikki	0.32	0.05	5 19 42.033	36 55 59.77	
2009 Nov 16	21 59.9	19.0 0.09	1.0s	8.8	9.2 8.8	87		TYC 5460-00083-1	14962 1996 TL15	0.45	0.08	9 31 36.719	-8 10 10.23	
2009 Nov 16	22 11.4	14.0 0.09	4.6s	8.5	8.4 8.2	118		HIP 116854	3380 Awaji	0.76	0.05	23 41 10.091	-6 28 41.15	
2009 Nov 17	5 44.4	49.0 0.22	1.0s	8.5	5.8 5.4	22		TYC 6815-00435-1	785 Zwetana	1.01	0.08	17 2 2.221	-25 3 32.	

Date	U.T.	Diameter	Durn	Star	Mag-Drop	Elon	%	Star	Planet	Min	R.A. (J2000)	Dec.
y m d	h m	km	sec/m	mag	V R	o lll		No.	No Name	D	h m s	o ' "
2009 Nov 28	1 30.3	13 0.009	1.4s	8.8	7.5 7.7	146		HIP 11283	22015 1999 XM100	0.43 0.04	2 25 21.779	1 22 26.54
2009 Nov 28	15 56.1	33 0.024	4.8s	8.8	5.2 5.2	145		TYC 0630-00360-1	534 Nassovia	0.90 0.05	2 4 6.614	8 39 21.79
2009 Nov 28	16 47.5	14 0.009	2.1s	8.2	8.3 8.6	143		HIP 33656	2342 Lebedev	1.05 0.05	6 59 31.505	22 14 47.43
2009 Nov 28	17 15.0	29 0.027	4.0s	8.6	6.8 6.5	151		HIP 30428	2244 Tesla	1.06 0.03	6 23 51.521	18 27 25.19
2009 Nov 28	18 53.2	12 0.007	1.2s	7.0	10.6 10.3	101		HIP 48014	5607 1993 EN	0.43 0.06	9 47 16.479	8 34 13.45
2009 Nov 29	3 26.0	13 0.011	1.1s	7.8	7.9 7.7	165		HIP 18555	2771 Polzunov	1.02 0.04	3 58 15.476	7 36 19.00
2009 Nov 29	6 51.1	52 0.020	1.2s	8.9	6.7 7.0	33		TYC 6145-00117-1	3259 Brownlee	0.36 0.09	14 0 10.107	-20 25 2.71
2009 Nov 29	12 7.3	124 0.054	2.7s	7.8	5.7 6.3	28		HIP 90130	46 Hestia	0.97 0.07	18 23 34.932	-21 39 50.34
2009 Nov 30	2 31.5	170 0.083	12.9s	8.6	5.1 5.2	108		TYC 1716-01888-1	790 Pretoria	1.11 0.07	23 18 21.507	17 42 32.51
2009 Nov 30	21 36.8	17 0.015	1.7s	8.4	7.6 7.6	153		TYC 2421-00642-1	9090 Chirottenmonda	0.43 0.04	6 21 39.486	30 23 23.49
2009 Dec 1	2 56.8	12 0.016	1.6s	8.5	6.1 6.4	160		TYC 0102-00370-1	15967 Clairearmstro	1.07 0.02	5 1 25.944	3 29 57.14
2009 Dec 1	6 33.1	12 0.013	2.7s	8.8	7.5 7.6	143		TYC 1904-00906-1	6348 1995 CH1	0.40 0.03	7 13 45.926	27 57 57.70
2009 Dec 1	13 12.9	60 0.025	1.2s	9.0	4.6 4.9	11		TYC 5631-00336-1	246 Asporina	1.12 0.08	16 30 41.860	-10 38 47.52
2009 Dec 1	18 4.4	17 0.009	1.8s	7.7	9.3 9.2	101		HIP 48025	3250 Martebo	0.30 0.06	9 47 22.954	2 18 54.75
2009 Dec 1	22 33.4	11 0.008	2.4s	6.9	9.6 9.7	143		HIP 9517	7024 1992 PA4	0.17 0.04	2 2 25.057	12 41 5.93
2009 Dec 2	2 39.7	28 0.013	1.8s	8.7	7.5 7.2	146		HIP 31684	3300 McGlasson	1.23 0.07	6 37 44.593	45 8 47.19
2009 Dec 2	2 47.7	22 0.012	1.4s	7.2	8.9 8.7	95		TYC 0841-01181-1d	2293 Guernica	1.15 0.06	10 29 11.365	10 9 19.68
2009 Dec 2	10 12.4	13 0.008	1.1s	8.5	8.2 8.0	146		TYC 0159-00102-1	6670 Wallach	1.01 0.05	6 42 3.223	7 28 25.63
2009 Dec 2	14 2.4	12 0.012	1.0s	8.0	7.6 7.5	169		HIP 18163	5484 Inoda	0.22 0.03	3 52 59.432	26 40 41.53
2009 Dec 2	19 6.9	19 0.011	1.3s	6.7	10.6 10.7	170		HIP 18059	13295 1998 RE	0.91 0.05	3 51 36.634	22 1 52.57
2009 Dec 3	1 21.4	121 0.050	6.4s	7.8	6.9 6.6	81		HIP 56234	86 Semele	0.96 0.08	11 31 39.875	7 51 48.70
2009 Dec 4	17 40.6	44 0.021	1.6s	8.9	5.5 5.5	69		HIP 59733	73 Klytia	0.35 0.07	12 15 0.316	-0 39 39.62
2009 Dec 5	10 4.6	38 0.021	2.5s	8.0	7.4 7.1	160		HIP 24852	2829 Bobhope	0.18 0.06	5 19 40.714	41 13 12.75
2009 Dec 5	16 33.1	19 0.009	1.6s	8.1	9.7 10.1	102		HIP 47423	14962 1996 TL15	1.14 0.06	9 39 45.838	-10 42 43.85
2009 Dec 6	1 26.6	15 0.008	1.2s	7.4	9.7 9.5	103		HIP 116431	5371 1987 VGI	0.01 0.06	23 35 36.198	8 22 57.02
2009 Dec 6	13 13.3	12 0.006	1.2s	7.6	10.0 10.1	146		HIP 12252	14227 1999 XW85	1.23 0.06	2 37 45.283	12 16 10.63
2009 Dec 6	18 4.1	16 0.009	3.5s	6.0	10.7 10.4	133		HIP 7447	7046 Reshetnev	0.89 0.05	1 35 54.860	17 26 2.04
2009 Dec 6	18 53.6	101 0.042	2.3s	8.4	5.3 5.5	33		HIP 95040	175 Andromache	0.96 0.08	19 20 17.481	-24 37 54.26
2009 Dec 6	19 18.8	27 0.013	1.9s	4.9	11.9 12.3	92		HIP 114939	1674 Groeneveld	0.17 0.07	23 16 50.927	-7 43 35.57
2009 Dec 7	12 45.2	16 0.013	3.5s	6.9	9.9 10.1	140		HIP 38135	2279 Barto	0.45 0.04	7 48 53.691	18 11 24.55
2009 Dec 8	0 51.3	19 0.019	5.8s	8.0	7.6 7.3	142		TYC 0048-00443-1	4509 Gorbatskij	0.34 0.03	2 51 17.509	1 42 9.01
2009 Dec 8	1 51.3	40 0.031	3.5s	8.7	6.6 6.7	147		HIP 16582	6362 Tunis	0.97 0.04	3 33 29.874	-2 32 34.90
2009 Dec 8	2 13.0	56 0.043	4.4s	8.8	5.6 5.4	171		TYC 1861-01414-1	1149 Volga	0.32 0.04	5 39 9.209	23 17 17.23
2009 Dec 8	7 58.9	86 0.033	2.0s	8.3	6.4 6.0	34		TYC 6884-00149-1	494 Virtus	1.08 0.09	19 29 50.536	-27 26 6.73
2009 Dec 9	2 15.0	83 0.040	2.2s	8.6	5.3 5.1	55		HIP 103712	213 Lilaea	1.16 0.07	21 0 54.392	-19 55 3.66
2009 Dec 9	14 13.9	13 0.013	1.8s	8.5	6.8 6.9	152		HIP 17206	4905 Hiromi	0.23 0.03	3 41 9.861	4 11 8.88
2009 Dec 9	21 32.1	17 0.011	1.4s	7.6	8.4 8.6	157		TYC 0072-00192-1	5403 Takachiho	1.00 0.05	3 58 23.384	7 28 25.57
2009 Dec 10	3 1.4	13 0.007	2.7s	8.7	8.7 8.4	118		TYC 4876-00977-1	15488 1999 CB75	1.23 0.06	8 52 20.756	-6 18 44.41
2009 Dec 10	11 0.4	21 0.014	1.0s	6.4	9.0 9.1	85		HIP 115709	2089 Cetacea	0.89 0.05	23 26 35.516	-21 44 27.03
2009 Dec 10	11 22.3	48 0.017	1.3s	8.8	7.3 7.7	47		HIP 101405	316 Goberta	0.81 0.09	20 33 3.022	-19 18 18.96
2009 Dec 10	22 56.7	88 0.032	2.8s	7.1	8.9 8.6	58		HIP 105168	223 Rosa	0.76 0.09	21 18 15.687	-17 27 44.13
2009 Dec 11	7 45.2	25 0.016	1.9s	7.7	9.6 10.0	153		TYC 0155-00414-1	15457 1998 YN6	0.89 0.06	6 38 50.917	5 11 27.67
2009 Dec 11	14 43.7	29 0.019	2.0s	9.0	6.8 6.9	163		TYC 0716-00143-1	4617 Zadunaisky	0.32 0.05	5 55 42.945	8 58 57.81
2009 Dec 11	14 59.3	36 0.026	2.5s	8.8	5.3 5.2	103		HIP 53538	323 Brucia	1.08 0.04	10 57 10.709	25 16 18.84
2009 Dec 11	17 21.5	11 0.004	1.0s	8.5	10.4 10.4	99		HIP 157	29574 1998 FM45	1.30 0.08	0 2 0.128	-5 12 49.84
2009 Dec 11	17 44.2	99 0.025	2.3s	7.9	8.2 8.1	19		HIP 91524	884 Priamus	0.34 0.12	18 39 52.280	-25 30 16.76
2009 Dec 12	0 22.9	216 0.082	4.6s	8.5	3.0 2.6	18		TYC 6270-01486-1	39 Laetitia	0.83 0.09	18 28 32.970	-16 58 39.76
2009 Dec 12	10 43.4	175 0.150	16.0s	8.2	2.3 2.7	112		TYC 1733-00767-1	89 Julia	0.79 0.04	0 14 2.192	25 40 51.64
2009 Dec 12	16 57.6	15 0.008	1.0s	8.2	8.4 8.0	170		TYC 1864-01010-1	26220 1997 WB37	0.28 0.06	6 1 31.500	23 44 19.38
2009 Dec 12	22 19.9	25 0.017	1.7s	8.9	5.1 4.7	172		TYC 2403-00624-1	544 Jetta	1.15 0.05	5 25 38.097	30 41 14.11
2009 Dec 13	5 29.3	12 0.009	2.0s	5.5	11.0 10.5	144		HIP 13327	7754 Gopalan	0.24 0.04	2 51 29.608	15 4 55.22
2009 Dec 13	20 55.8	17 0.010	1.3s	7.9	8.7 8.8	153		HIP 16132	4521 Akimov	1.17 0.06	3 27 49.582	24 10 57.73
2009 Dec 14	6 6.9	11 0.010	1.3s	8.6	7.2 7.6	157		TYC 1348-01198-1	3993 Sorm	0.34 0.04	7 2 56.195	17 52 26.86
2009 Dec 14	8 3.9	77 0.040	13.7s	8.6	6.4 6.8	132		TYC 1950-00768-1	1118 Hanskya	0.01 0.07	8 58 6.551	24 5 56.28
2009 Dec 14	18 3.0	76 0.028	1.7s	6.6	8.6 8.3	27		HIP 94823	893 Leopoldina	1.24 0.08	19 17 39.973	-15 58 1.88
2009 Dec 14	19 40.0	13 0.009	1.7s	8.8	7.6 7.4	143		HIP 14298	4046 Swain	0.17 0.04	3 4 20.227	11 8 9.60
2009 Dec 15	11 0.0	150 0.088	6.6s	7.6	5.1 5.5	82		HIP 113727	49 Pales	0.42 0.05	23 1 55.407	-2 41 9.93
2009 Dec 15	21 37.4	13 0.010	1.3s	6.7	9.3 9.8	159		HIP 34351	1745 Ferguson	0.13 0.04	7 7 16.931	24 10 6.15
2009 Dec 16	12 29.2	13 0.009	1.1s	8.8	7.3 7.5	165		TYC 2426-00023-1	8029 1991 RK30	0.60 0.05	6 29 51.067	32 26 25.50
2009 Dec 16	18 41.6	33 0.024	3.2s	9.0	6.2 6.5	153		HIP 18145	2813 Zappala	0.08 0.04	3 52 47.129	13 56 48.59
2009 Dec 17	6 45.5	13 0.015	1.3s	7.2	7.2 6.6	160		TYC 0750-01719-1	989 Schwassmannia	0.84 0.03	6 41 9.602	9 27 57.53
2009 Dec 17	10 18.0	15 0.010	1.5s	8.6	7.6 7.4	146		TYC 2473-00226-1	7067 Kiyose	0.98 0.05	8 11 10.551	33 30 9.04
2009 Dec 17	13 14.1	18 0.015	1.5s	7.4	8.4 8.2	175		HIP 28513	2190 Coubertin	0.30 0.04	6 1 7.654	23 18 17.47
2009 Dec 18	3 28.2	66 0.029	1.3s	8.3	6.4 6.9	17		HIP 93041	207 Hedda	0.09 0.07	18 57 9.436	-25 27 54.51
2009 Dec 18	11 19.8	11 0.010	1.4s	8.6	9.8 9.6	152		TYC 0666-00545-1	16386 1981 ET34	0.86 0.04	4 5 37.407	9 12 7.97
2009 Dec 19	10 59.1	13 0.008	1.8s	7.5	9.2 9.0	138		HIP 13035	44525 1998 YE4	0.57 0.05	2 47 30.321	23 38 12.18
2009 Dec 20	14 37.3	15 0.013	1.2s	8.8	6.5 6.1	158		TYC 0105-01422-1	5294 Onnetoh	0.33 0.04	5 25 14.751	2 45 13.28
2009 Dec 20	14 55.1	121 0.052	4.4s	8.7	5.3 5.1	65		TYC 5804-01232-1	78 Diana	1.21 0.08	22 19 9.267	-7 47 53.51
2009 Dec 20	16 44.4	56 0.029	2.4s	8.5	7.0 7.1	77		TYC 0572-00532-1	2892 Filipenko	0.97 0.07	22 51 22.482	4 47 11.65
2009 Dec 20	23 24.4	13 0.015	1.5s	8.3	6.3 6.0	169		TYC 0738-00911-1	2834 Christy Carol	0.18 0.03	6 15 9.327	13 2 46.44
2009 Dec 20	23 39.7	83 0.055	5.8s	4.9	6.8 6.4	155		HIP 33485	71 Niobe	1.15 0.05	6 57 37.087	45 5 38.71
2009 Dec 21	17 8.5	30 0.017	2.2s	8.9	6.8 6.7	165		TYC 1895-01726-1	1939 Loretta	1.09 0.06	7 5 11.436	23 42 10.26
2009 Dec 21	18 43.8	39 0.023	2.7s	7.3	7.0 6.8	159		HIP 31197	1102 Pepita	0.47 0.05	6 32 42.702	3 48 52.21
2009 Dec 21	19 43.1	24 0.028	1.2s	6.4	7.0 6.6	79		HIP 113465	433 Eros	1.17 0.03	22 58 42.606	7 20 23.59
2009 Dec 21	22 36.2	51 0.020	2.4s	8.9	7.7 7.5	77		TYC 5528-01183-1	1049 Gotho	0.04 0.09	12 43 4.959	-8 36 36.75
2009 Dec 22	8 56.1	85 0.033	2.1s	7.8	5.5 5.9	34		HIP 76034	115 Thyra	1.08 0.08	15 31 43.990	-28 24 25.87
2009 Dec 22	16 58.4	74 0.051	5.9s	7.6	6.3 6.3	163		HIP 29891	859 Bouzareah	0.69 0.05	6 17 39.121	40 18 35.63
2009 Dec 22	21 23.6	25 0.019	2.1s	7.8	8.1 7.9	177		HIP 28084	3584 Aisha	0.32 0.04	5 56 12.875	25 19 47.55

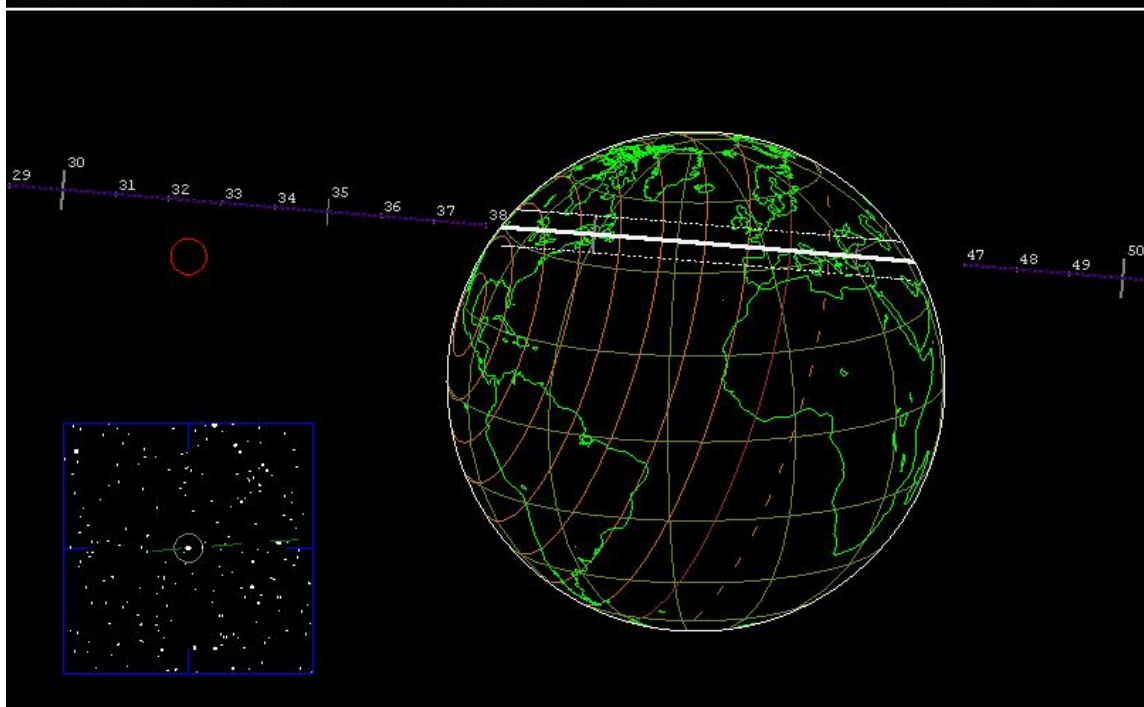
Date = date in the format year/month/day
 U.T. = times
 Diameter = diameter in km and in " of the asteroid
 Durn = duration of the event, in minutes or seconds
 Star Mag = star magnitude - visual
 Mag V = magnitude drop at occultation - based on visual magnitude
 Drop R = magnitude drop at occultation - based on the star's red magnitude, and an asteroid color (B-V) of 0.83. This may be a better guide for CCD observers
 Elon = elongation, in degree
 % ill = null
 Min D = the minimum distance of the center of the occultation path from the center of the Earth
 Error = the uncertainty in the location of the path, in Earth radii

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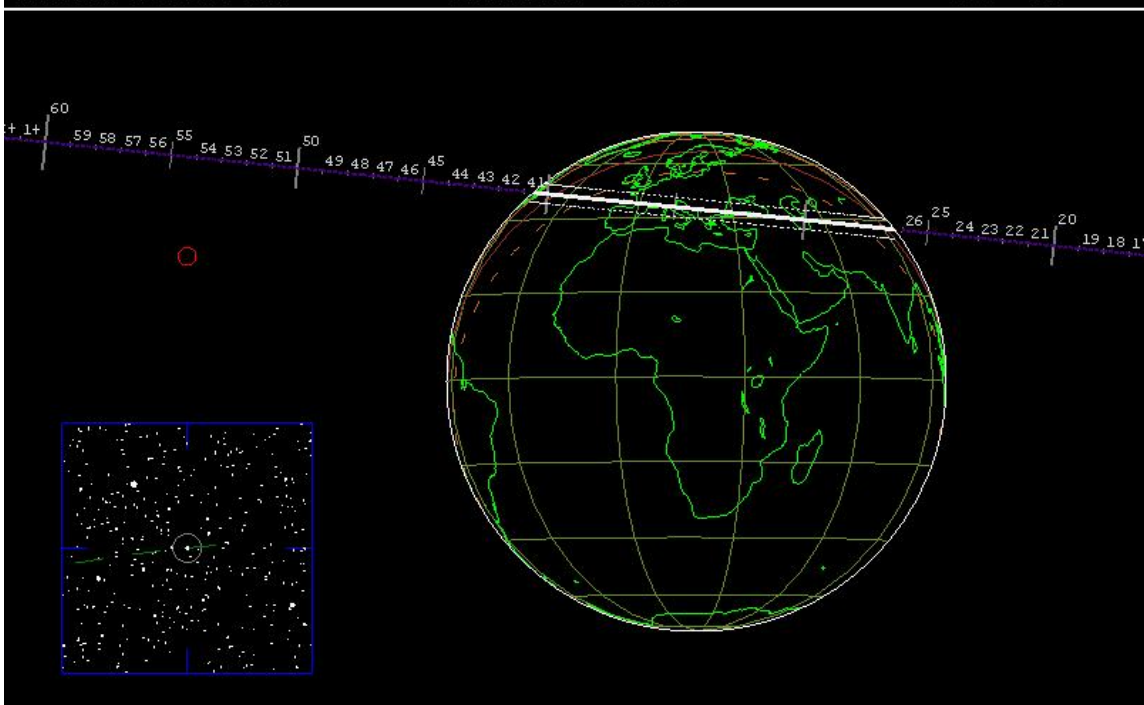
688 Melanie occults HIP 43043 on 2009 May 16 from 18h 38m to 18h 46m UT

Star (J2000):	Max Duration = 1.8 secs	Asteroid:
Mv = 8.0 Mp = 8.3	Mag Drop = 8.5	Mag = 16.5
RA = 8 46 11.467	Sun : Dist = 74 deg	Dia = 41km, 0.018"
Dec = 14 3 43.36	Moon: Dist = 170 deg	Parallax = 2.786"
	: illum = 55 %	Hourly dPA = 2.445s
[Prediction of 2008 Apr 9.0]	E 0.200"x 0.200" in PA 90	dDec = -2.96"



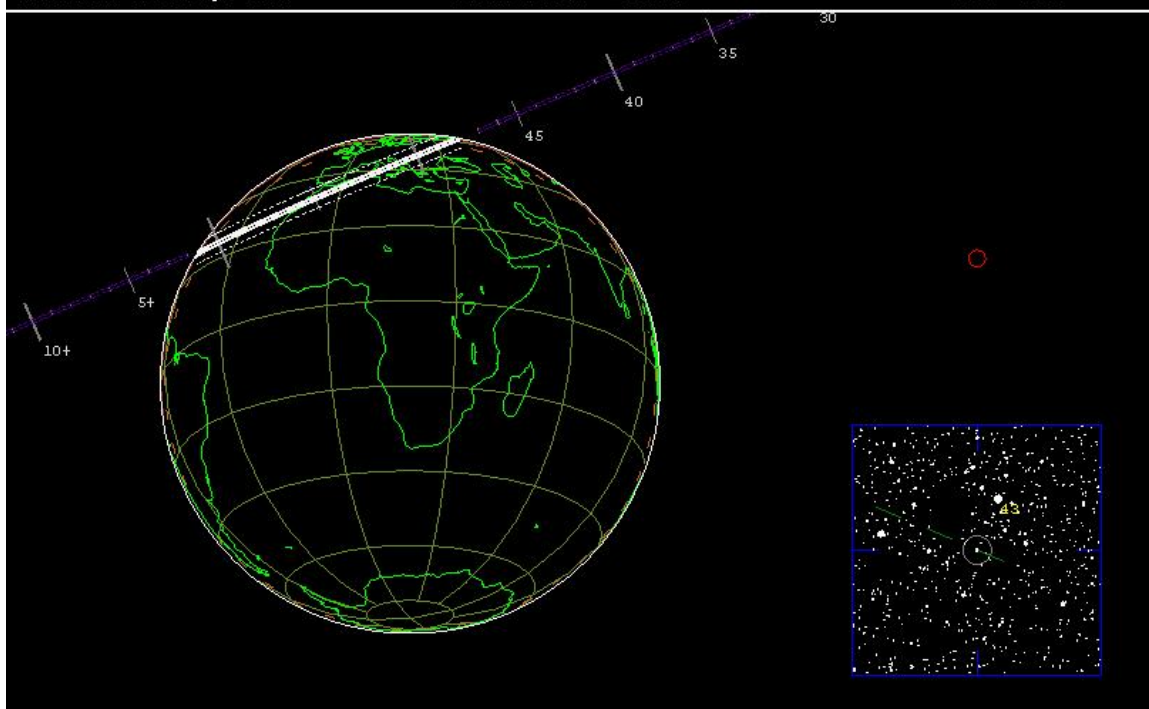
619 Triberga occults HIP 86320 on 2009 Jun 18 from 22h 26m to 22h 41m UT

Star (J2000):	Max Duration = 3.1 secs	Asteroid:
Mv = 9.0 Mp = 9.5	Mag Drop = 4.5	Mag = 13.5
RA = 17 38 15.057	Sun : Dist = 158 deg	Dia = 34km, 0.030"
Dec = -1 8 58.61	Moon: Dist = 124 deg	Parallax = 5.605"
	: illum = 20 %	Hourly dPA = -2.263s
[Prediction of 2008 Apr 9.0]	E 0.200"x 0.200" in PA 90	dDec = 3.48"



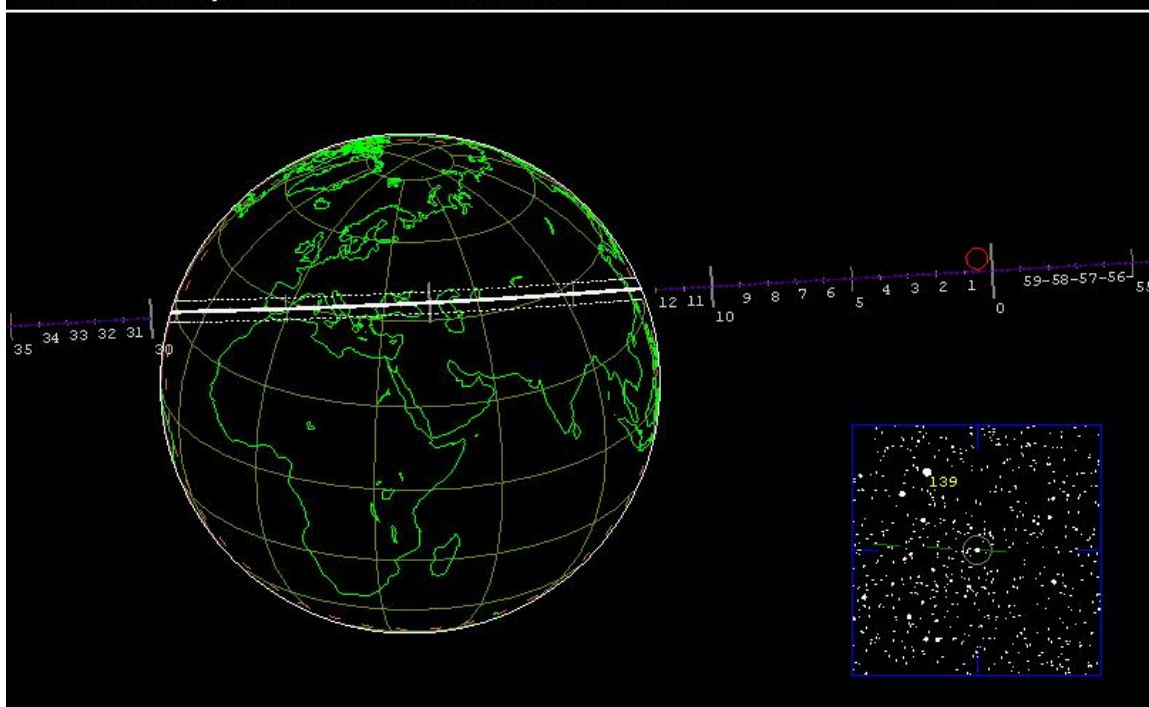
213 Lilaea occults TYC 6304-01595-1 on 2009 Jul 10 from 22h 48m to 23h 2m UT

Star (J2000):	Max Duration = 9.2 secs	Asteroid:
Mv = 8.1 Mp = 9.7	Mag Drop = 3.3	Mag = 11.3
RA = 19 18 20.614	Sun : Dist = 177 deg	Dia = 83km, 0.086"
Dec = -19 21 39.77	Moon: Dist = 39 deg	Parallax = 6.572"
	: illum = 89 %	Hourly dPA = -2.163s
[Prediction of 2008 Apr 9.0]	E 0.219"x 0.219" in PA 90	dDec = -13.10"

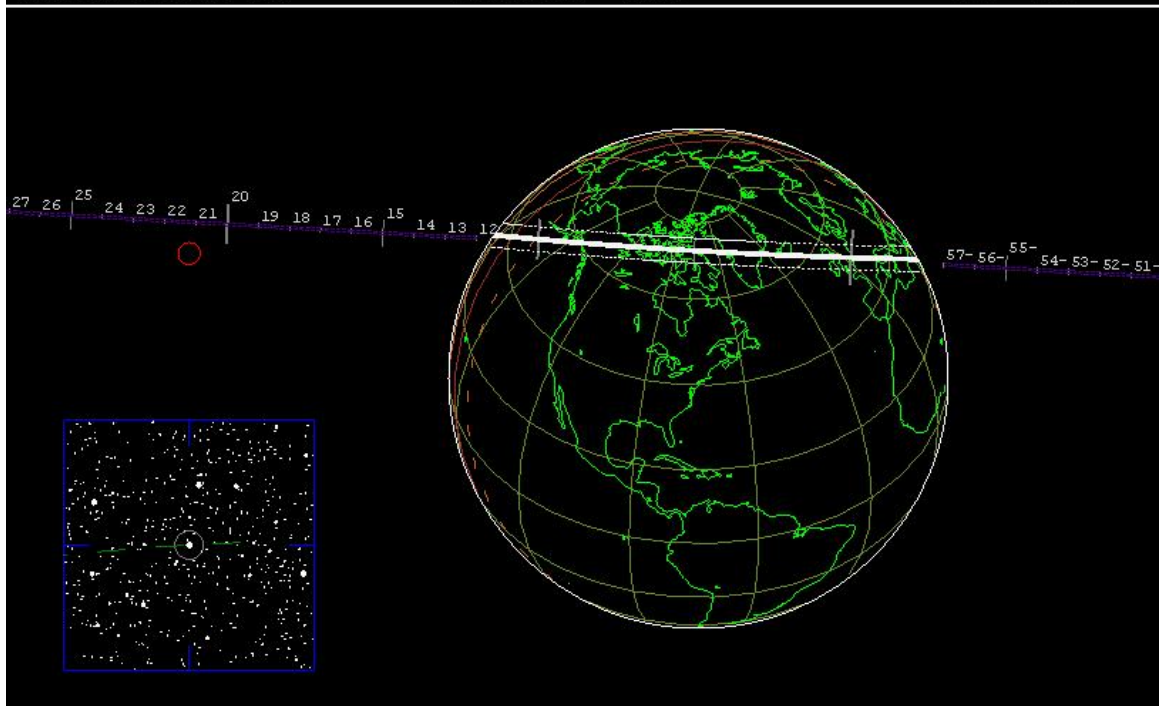


3584 Aisha occults HIP 28084 on 2009 Dec 22 from 21h 12m to 21h 29m UT

Star (J2000):	Max Duration = 2.1 secs	Asteroid:
Mv = 7.8 Mp = 8.2	Mag Drop = 3.1	Mag = 15.9
RA = 5 56 12.875	Sun : Dist = 177 deg	Dia = 25km, 0.019"
Dec = 25 19 47.55	Moon: Dist = 108 deg	Parallax = 4.731"
	: illum = 33 %	Hourly dPA = -2.349s
[Prediction of 2008 Apr 9.0]	E 0.200"x 0.200" in PA 90	dDec = -1.81"



599 Luisa occults HIP 26592 on 2009 Dec 29 from 3h 58m to 4h 12m UT
 Star (J2000): Max Duration = 4.9 secs Asteroid:
 Mv = 6.4 Mp = 7.4 Mag Drop = 6.6 Mag = 13.0
 RA = 5 39 8.669 Sun : Dist = 159 deg Dia = 65km, 0.046"
 Dec = 41 21 29.63 Moon: Dist = 28 deg Parallax = 4.552"
 Hourly dPA = -3.024s
 dDec = 1.92"
 [Prediction of 2008 Apr 9.0] E 0.200"x 0.200" in PA 90



MULTIPLE CONJUNCTIONS MOON-ASTEROIDS-STARS

(events with the Moon, 1 asteroid with mag<9 and 1 star with mag<2 within 5°)

Geocentric

Date	TT	Dmed (°)	Dmax	emin	m2d	mmax

Topocentric 42°N - 12°E

Date	UT	Dmed (°)	Dmax	emin	m2d	mmax

MULTIPLE CONJUNCTIONS MOON-ASTEROIDS-OBJECTS

(events with the Moon, 1 asteroid with mag<9 and 1 object with mag<2 within 5°)

Geocentric

Date	TT	Dmed (°)	Dmax	emin	m2d	mmax

Topocentric 42°N - 12°E

Date	UT	Dmed (°)	Dmax	emin	m2d	mmax

date in the format year/month/day
Dmed = middle distance between the centers of the bodies, in degrees
Dmax = diameter of the group, in degrees
emin = least elongation, in degrees
m2d = magnitude of the 2nd brightest object
mmax = least magnitude

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NEAR ASTEROIDS $\Delta < 0.01$ A.U.

Object	Date of approach (TDB)			Nominal distance A.U.	Minima distance A.U.	V relative (km/s)	H (Mag)
	AAAA-mm-DD	HH:MM \pm	D HH:MM				
2002 AO11	2009-Jan-15	10:04 \pm	05:25	0.0197	0.0034	7.84	22.8
2001 SG286	2009-May-17	10:29 \pm	22:12	0.0295	0.0059	10.56	20.9

APPROACHES ASTEROIDS-PLANETS $\Delta < 10^6$ KM

Date	TDT	Dm (Gm)	V(km/s)	Err(Gm)	r1 (AU)	r2
------	-----	---------	---------	---------	---------	----

This year they aren't narrow approaches between asteroids and planets

APPROACHES BETWEEN ASTEROIDS

Date	TT	Dist	V(km/s)	Err	r1	r2		
2009/04/12	12:49:07	822	3.8801	276	2.8282	2.8282	2000GO80	2003RO5
2009/05/05	06:18:07	6969	5.5757	396	2.7559	2.7558	1995WP1	2003HC15
2009/05/23	14:02:54	7408	2.1970	417	2.7941	2.7941	2003UK234	2004VJ81
2009/06/10	23:52:41	8662	2.8328	268	2.9282	2.9283	2002TL195	2000OH44
2009/06/25	21:14:32	2250	5.7470	243	2.9915	2.9915	1999JB113	1999SH1
2009/07/16	03:58:34	9040	2.9864	322	2.9562	2.9562	1998SF42	2003SF163
2009/10/06	16:19:47	6042	6.8330	486	2.4600	2.4600	2000QP77	2001CW38
2009/10/26	19:10:09	4006	6.3284	514	2.4428	2.4427	2001BW72	1999XQ110
2009/11/09	12:09:51	8050	5.0636	360	2.6169	2.6169	2000WJ7	2005GY64
2009/11/23	17:28:33	8676	5.1411	202	2.2152	2.2152	1999FV51	1999CM99
2009/11/25	20:34:31	7056	1.2578	553	2.9605	2.9604	1998VZ16	2003UH217

date in the format year/month/day

Dist = Least distance in km

V = relative velocity

Err = uncertainty of the calculation in km

R1 = distance in A.U. of body 1 from the Earth

R2 = distance in A.U. of body 2 from the Earth

Last 2 columns : names

PLANETARY TRANSITS OF ASTEROIDS

Date	TT	Dm(°)	r1	r2	p (°)	e	m1	m2	tm(s)
------	----	-------	----	----	-------	---	----	----	-------

This year they aren't visible transits of asteroids on the planets

NB: I HAVE CONSIDERED ONLY THE ASTEROIDS THAT COULD OVERCOME 1" OF DIAMETER TO THE OPPOSITION. TO SEE THE FOLLOWING CHART.

SOLAR TRANSITS OF ASTEROIDS

Date	TT	Dm(°)	r1	r2	p (°)	e	m1	m2	tm(s)
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This year they aren't visible transits of asteroids on the Sun

NB: I HAVE CONSIDERED ONLY THE ASTEROIDS THAT COULD OVERCOME 1" OF DIAMETER TO THE OPPOSITION. TO SEE THE FOLLOWING CHART.

OCCULTAZIONS BETWEEN ASTEROIDS

Date	TT	Dm (°)	Dl	Err	r1	r2	p (°)	e	m1	m2	tm(s)		
2009/02/04 10:00:06		0.00031	0.00108	0.00001	3.528	1.380	182	60	14.3	16.1	1.0	Armor	Tezcatlip
2009/02/05 06:15:30		0.00027	0.00035	0.00003	3.920	2.518	161	-34	15.0	18.3	1.0	Kapteynia	1999XK142
2009/02/05 13:21:09		0.00249	0.00726	0.00003	2.111	0.290	169	-145	12.7	16.8	1.3	Ampella	1991DB
2009/03/08 22:43:50		0.00008	0.00012	0.00004	3.651	3.135	16	6	14.4	17.8	5.1	Melusina	Matsuura
2009/03/25 14:39:33		0.00015	0.00018	0.00004	3.222	2.607	169	-58	14.7	16.7	5.8	Maja	Schaumass
2009/04/30 10:13:04		0.00009	0.00028	0.00005	3.668	2.581	155	-22	14.8	18.3	2.3	Bathseba	2001QL59
2009/06/06 04:01:06		0.00112	0.00406	0.00007	2.599	0.489	337	-78	11.2	20.1	1.0	Massalia	2003EE16
2009/06/11 12:04:48		0.00039	0.00130	0.00003	1.802	0.924	166	-105	12.5	18.1	11.0	Freda	2001CV26
2009/06/25 17:27:20		0.00023	0.00028	0.00001	4.128	2.828	186	54	14.6	16.2	4.4	Marianna	Mora
2009/08/13 01:48:18		0.00011	0.00020	0.00002	3.682	2.862	235	25	13.7	17.9	6.8	Polyxo	Mueller
2009/11/03 15:00:59		0.00007	0.00023	0.00003	4.187	3.032	220	-49	14.7	17.7	4.4	Seppina	Jean-Loup
2009/11/07 16:19:13		0.00010	0.00041	0.00002	3.844	2.342	190	50	14.5	17.8	3.9	Carlova	Jewitt
2009/11/30 21:10:56		0.00050	0.00073	0.00002	3.096	1.616	192	-36	11.8	19.2	1.9	Harmonia	1993VA
2009/12/03 10:16:36		0.00005	0.00070	0.00003	2.386	1.424	324	-131	14.6	16.3	20.4	Erida	Crommelin
2009/12/31 09:41:37		0.00133	0.00284	0.00016	2.861	0.663	99	-144	14.6	15.1	1.7	Luscinia	2001YZ3

date in the format year/month/day

Dm = least distance between the centers of the bodies

Dl = parameter limit, if Dm < Dl there is an occultation between the bodies

Err = uncertainty of the calculation in km

R1 = distance in A.U. of body 1 from the Earth

R2 = distance in A.U. of body 2 from the Earth

P = angle of position between the bodies, in degrees

e = elongation, in degree

m1 = magnitude of the first body

m2 = magnitude of the second body

tm = if present, the asteroid is occulted maximum for x seconds

NB: I HAVE CONSIDERED ONLY THE EVENTS OF DURATION GREATER THAN 1 SECOND AND IN WHICH THE HIDDEN HAS MAG<15

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ASTERIODS WITH THEORETICAL LEAST mag. <9

Asteroid	Mag.	min.	H									
(1) Ceres	6.4	3.3		(39572)	1993	DQ1	8.8	16.5	1997	GL3	5.6	19.5
(2) Pallas	6.3	4.1		(52768)	1998	OR2	9.0	16.2	1997	US2	8.6	19.8
(3) Juno	7.0	5.3		(53319)	1999	JM8	8.9	15.3	1997	XR2	-5.3	20.8
(4) Vesta	5.1	3.2		(54509)	YORP		5.6	22.7	1998	HH49	8.6	21.3
(5) Astraea	8.6	6.8		(66146)	1998	TU3	9.0	14.5	1998	KM3	7.2	19.7
(6) Hebe	7.1	5.7		(66391)	1999	KW4	7.2	16.5	1998	QA1	7.4	19.0
(7) Iris	6.5	5.5		(68216)	2001	CV26	8.4	16.4	1998	QK28	8.1	19.4
(8) Flora	7.6	6.5		(68372)	2001	PM9	6.8	18.9	1998	SC15	-0.7	19.4
(9) Metis	8.1	6.3		(68950)	2002	QF15	5.4	16.4	1999	RM45	6.2	19.4
(10) Hygiea	8.9	5.4		(69230)	Hermes		5.4	17.5	1999	XS35	3.7	17.2
(11) Parthenope	8.6	6.6		(85182)	1991	AQ	8.4	17.1	1999	XLI36	7.1	19.8
(12) Victoria	8.1	7.2		(85236)	1993	KH	4.3	18.9	1999	YR14	8.0	18.9
(14) Irene	8.3	6.3		(85640)	1998	OX4	6.6	21.2	2000	EJ26	8.5	19.1
(15) Eunomia	7.4	5.3		(85713)	1998	SS49	3.2	15.7	2000	EK26	2.8	18.0
(16) Psyche	8.8	5.9		(86039)	1999	NC43	8.0	16.0	2000	GV147	6.3	19.2
(18) Melpomene	7.3	6.5		(86819)	2000	GK137	8.5	17.4	2000	KA	7.0	21.6
(19) Fortuna	8.8	7.1		(88254)	2001	FM129	7.3	17.3	2000	QK130	3.1	20.9
(20) Massalia	8.3	6.5		(89830)	2002	CE	6.9	14.7	2000	RS11	8.7	19.1
(21) Lutetia	9.0	7.3		(89958)	2002	LY45	3.1	16.9	2000	TU28	6.2	21.0
(23) Thalia	8.6	6.9		(89959)	2002	NT7	1.2	16.5	2000	YG29	8.5	18.8
(27) Euterpe	8.4	7.0		(90075)	2002	VU94	8.0	15.7	2001	BF10	7.3	22.6
(29) Amphitrite	8.4	5.8		(90416)	2003	YK118	3.6	18.7	2001	EC	5.6	18.6
(39) Laetitia	8.9	6.1		(99942)	Apophis		0.4	19.2	2001	FO32	6.4	17.7
(40) Harmonia	9.0	7.0		(100085)	1992	UY4	8.6	17.8	2001	HA4	8.7	17.6
(41) Daphne	8.8	7.1		(101869)	1999	MM	5.7	19.3	2001	TX44	8.9	19.2
(42) Isis	8.7	7.5		(101955)	1999	RQ36	8.3	20.9	2001	VK5	0.1	17.8
(43) Ariadne	8.8	7.9		(111253)	2001	XU10	7.7	15.3	2001	WS1	6.0	17.0
(44) Nysa	8.8	7.0		(136617)	1994	CC	8.9	17.8	2001	WV1	8.9	22.5
(80) Sappho	8.9	8.0		(136618)	1994	CN2	7.4	16.9	2001	XU	4.0	19.2
(89) Julia	8.4	6.6		(137108)	1999	AN10	1.4	17.9	2001	XP1	8.7	17.9
(115) Thyra	8.9	7.5		(137427)	1999	TF211	7.3	15.0	2001	YN2	8.8	25.4
(192) Nausikaa	8.0	7.1		(138127)	2000	EE14	9.0	17.1	2001	YB5	8.9	20.9
(324) Bamberga	7.6	6.8		(139622)	2001	QQ142	8.7	18.4	2002	AJ129	7.6	18.5
(344) Desiderata	9.0	8.1		(140288)	2001	SN289	7.5	16.4	2002	CY9	8.2	19.5
(433) Eros	7.3	11.2		(141495)	2002	EZ11	3.6	18.2	2002	EY2	3.0	19.0
(471) Papagena	9.0	6.7		(143404)	2003	BD44	8.0	16.7	2002	EM7	-0.9	24.4
(532) Herculina	8.3	5.8		(143487)	2003	CR20	2.6	18.8	2002	GM2	8.6	18.5
(887) Alinda	8.8	13.8		(143649)	2003	QQ47	4.5	17.4	2002	JZ8	7.4	21.1
(1036) Ganymed	7.8	9.4		(143651)	2003	QO104	4.1	16.0	2002	JB9	8.5	15.9
(1620) Geographos	8.1	15.6		(143992)	2004	AF	8.8	16.1	2002	LV	6.5	16.5
(1627) Ivar	8.7	13.2		(144332)	2004	DV24	5.6	16.6	2002	MN	7.9	23.6
(1685) Toro	7.9	14.2		(144898)	2004	VD17	4.9	18.9	2002	NY40	3.9	19.0
(1862) Apollo	8.4	16.3		(152664)	1998	FW4	8.9	19.6	2002	SZ	6.5	20.4
(1866) Sisyphus	8.3	13.0		(152680)	1998	KJ9	7.9	19.4	2002	SQ41	6.7	20.1
(1917) Cuyo	8.5	13.9		(153201)	2000	WO107	6.9	19.3	2002	TR190	7.5	19.0
(1981) Midas	3.2	15.5		(153220)	2000	YN29	8.4	17.5	2003	DZ15	4.2	22.2
(2135) Aristaeus	7.9	17.9		(153249)	2001	BW15	8.9	15.0	2003	EP4	8.6	23.9
(2201) Oljato	1.2	15.3		(153814)	2001	WN5	4.6	18.3	2003	HF2	7.2	19.6
(2340) Hathor	8.4	19.2		(154276)	2002	SY50	4.6	17.6	2003	KO2	6.0	20.2
(3122) Florence	7.5	14.2		(159857)	2004	LJ1	7.1	15.5	2003	LN6	8.6	24.7
(3200) Phaethon	6.2	14.6		(161989)	Cacus		8.1	17.1	2003	MH4	6.9	20.0
(3362) Khufu	9.0	18.3		(162162)	1999	DB7	6.4	19.9	2003	MK4	7.1	20.9
(3671) Dionysus	7.8	16.3		(162173)	1999	JU3	3.0	19.2	2003	QC10	3.2	18.0
(4179) Toutatis	4.2	15.3		(162416)	2000	EH26	6.6	21.7	2003	RN10	5.8	15.9
(4183) Cuno	7.0	14.4		(162474)	2000	LB16	6.7	18.5	2003	UV11	8.5	19.3
(4581) Asclepius	8.0	20.4		(162825)	2001	BO61	8.5	17.9	2003	WP7	7.5	24.2
(4660) Nereus	5.8	18.2		(163132)	2002	CU11	2.9	18.3	2003	YH118	7.6	17.1
(4769) Castalia	8.5	16.9		(163243)	2002	FB3	4.2	16.3	2003	YH136	8.9	19.4
(4953) 1990 MU	6.4	14.1		(163373)	2002	PZ39	6.4	19.0	2004	BE68	8.6	18.5
(5143) Heracles	8.1	14.0		(163899)	2003	SD220	8.2	16.8	2004	BL86	8.5	18.9
(5693) 1993 EA	5.7	17.0		(164121)	2003	YT1	3.8	16.2	2004	DC	7.8	18.1
(7335) 1989 JA	8.7	17.0		(164207)	2004	GU9	6.4	21.2	2004	FH	1.9	25.7
(7482) 1994 PC1	0.3	16.8		(164216)	2004	OT11	8.0	17.3	2004	FU4	5.6	18.5
(7753) 1988 XB	7.8	18.6		(170086)	2002	XR14	8.3	18.1	2004	FU162	8.8	28.7
(8566) 1996 EN	8.3	16.5		(171576)	1999	VP11	5.0	18.7	2004	HE	1.3	26.8
(12538) 1998 OH	8.5	16.1		(172678)	2003	YM137	6.8	18.7	2004	HW	6.9	17.2
(12923) Zephyr	7.9	16.1		(177049)	2003	EE16	0.2	19.8	2004	HZ	5.6	22.6
(13651) 1997 BR	8.4	17.6		(177614)	2004	HK33	7.6	17.6	2004	HE12	7.2	17.5
(16960) 1998 QS52	4.8	14.2		(186844)	2004	GA1	8.4	17.5	2004	LV3	8.9	18.7
(20425) 1998 VD35	7.6	20.4		1990 HA			7.3	16.3	2004	MX2	6.5	19.3
(20826) 2000 UV13	7.6	13.5		1990 SM			8.3	16.1	2004	QY2	8.2	14.7
(23187) 2000 PN9	7.1	16.1		1994 AW1			9.0	17.5	2004	QT24	7.5	18.3
(27002) 1998 DV9	5.0	18.2		1994 WR12			8.2	22.0	2004	RQ252	4.6	22.5
(31669) 1999 JT6	3.9	16.0		1995 SA			9.0	17.4	2004	ST26	7.4	26.3
(33342) 1998 WT24	7.9	17.9		1996 AJ1			8.6	20.2	2004	TN1	7.3	21.8
(35107) 1991 VH	9.0	16.9		1996 JA1			8.6	21.0	2004	TL10	9.0	21.4
(35396) 1997 XF11	1.0	16.9		1996 RG3			5.8	18.5	2004	UE	5.5	21.2
(37638) 1993 VB	1.6	19.4		1996 SK			4.7	16.9	2004	VC17	5.7	18.8

2004 XN14	7.6	20.0	2006 DU62	5.8	18.0	2007 TB23	7.7	18.7
2004 XP14	5.7	19.4	2006 FX	6.3	20.0	2007 TU24	5.9	20.3
2004 XM29	8.3	22.9	2006 GY2	7.9	18.8	2007 TH72	3.7	24.2
2004 XL35	8.6	19.4	2006 JF42	6.3	19.0	2007 UW1	8.6	22.7
2004 XB45	8.0	26.2	2006 KV86	4.6	18.7	2007 UT3	7.9	25.9
2004 XN50	8.3	18.8	2006 QV89	1.9	25.3	2007 UO6	8.1	27.3
2005 AD13	8.8	17.9	2006 RJ1	8.0	22.2	2007 VD184	7.9	23.1
2005 BS1	7.1	27.5	2006 SC	5.8	25.2	2007 VK184	6.1	22.0
2005 CC37	8.7	22.7	2006 SU49	-1.2	19.6	2007 VE191	7.7	23.6
2005 EU2	7.5	23.1	2006 VV2	7.8	16.8	2007 VN243	8.7	22.4
2005 GY8	8.8	21.8	2006 WT1	7.5	20.1	2008 AF4	6.5	19.7
2005 GC120	8.7	19.7	2007 AG	8.0	20.1	2008 CF22	7.2	26.0
2005 LW3	6.2	21.7	2007 AB12	6.0	18.9	2008 CK70	7.6	25.4
2005 NZ6	7.2	17.6	2007 AE12	8.7	19.7	2008 CC71	8.9	24.9
2005 NB7	7.5	18.7	2007 CS5	8.8	24.6	2008 DE	8.3	19.6
2005 QK76	8.9	25.1	2007 CA19	2.0	17.6	2008 DJ	4.7	20.5
2005 QZ151	8.1	20.0	2007 CN26	7.8	21.1	2008 EX5	8.7	23.8
2005 SQ	8.8	20.3	2007 DX40	8.6	24.6	2008 ER7	5.7	20.0
2005 SE71	5.4	18.2	2007 EZ25	8.5	25.5	2008 EM68	8.1	27.5
2005 TS15	8.8	20.9	2007 FP3	8.8	28.4	2008 GD110	7.2	24.5
2005 VC	8.6	17.2	2007 GU1	7.0	25.0	2008 HB38	8.8	21.1
2005 VL1	1.1	27.0	2007 JD	7.7	23.1	2008 KO	2.5	24.4
2005 VN5	8.5	27.0	2007 JY2	4.3	21.7	2008 KZ5	7.2	20.0
2005 WK4	7.9	20.1	2007 LF	8.0	20.5	2008 KN11	8.2	23.2
2005 WY55	8.9	20.7	2007 LB15	8.5	19.4	2008 LA	8.7	23.1
2005 XJ8	8.1	17.0	2007 LQ19	0.5	17.3	2008 LV16	8.4	20.2
2005 YU55	7.0	21.9	2007 PA8	8.1	16.1	2008 MP1	8.0	21.9
2006 BC10	8.5	19.4	2007 PV27	0.8	20.2	2008 OB9	6.2	17.4
2006 BM55	8.2	23.0	2007 RU9	5.5	20.7	2008 PK3	4.9	22.0
2006 CT	8.3	22.3	2007 RY19	8.8	22.5	2008 QT3	8.3	18.4

The least theoretical magnitude would be that that the asteroid would have if it were to its MOID (minimum orbital intersection distance).

Absolute magnitude (H)	Diameter
3	670 km - 1490 km
3.5	530 km - 1190 km
4	420 km - 940 km
4.5	330 km - 750 km
5	270 km - 590 km
5.5	210 km - 470 km
6	170 km - 380 km
6.5	130 km - 300 km
7	110 km - 240 km
7.5	85 km - 190 km
8	65 km - 150 km

8.5	50 km - 120 km
9	40 km - 90 km
9.5	35 km - 75 km
10	25 km - 60 km
11	15 km - 40 km
12	11 km - 24 km
13	7 km - 15 km
14	4 km - 9 km
15	3 km - 6 km
16	2 km - 4 km
17	1 km - 2 km
18	670 m - 1500 m
19	420 m - 940 m

20	270 m - 590 m
21	170 m - 380 m
22	110 m - 240 m
23	65 m - 150 m
24	40 m - 95 m
25	25 m - 60 m
26	17 m - 37 m
27	11 m - 24 m
28	7 m - 15 m
29	4 m - 9 m
30	3 m - 6 m

ASTEROIDS THAT AT THE OPPOSITION THEY COULD OVERCOME 1" OF DIAMETER

(1) Ceres		1.1	2007 CR13	5.2	11.6
(4) Vesta		1.6	2007 DS4	2.3	5.2
(1981) Midas		1.9	2007 EL38	3.4	7.5
(2201) Oljato	2.1	4.7	2007 EN53	3.4	7.6
(4179) Toutatis		1.2	2007 EO53	2	4.6
(7482) 1994 PC1	3.3	7.3	2007 EP56	2.9	6.5
(31669) 1999 JT6		1.4	2007 JG39	2	4.5
(35396) 1997 XF11	2.3	5.1	2007 JH39	2.6	5.9
(37638) 1993 VB	1.7	3.9	2007 JJ39	3.1	6.8
(85236) 1993 KH		1.1	2007 JK39	2.2	4.8
(85713) 1998 SS49		1.9	2007 JL39	4.1	9.1
(89958) 2002 LY45		1.9	2007 JG40	5.3	11.8
(89959) 2002 NT7	2.1	4.8	2007 KL	4.5	10
(90416) 2003 YK118		1.5	2007 KM	2.3	5.1
(99942) Apophis	3	6.7	2007 KG1	3.3	7.4
(137108) 1999 AN10	2	4.4	2007 KM1	2.8	6.2
(141495) 2002 EZ11		1.6	2007 XS23	3.4	7.6
(143487) 2003 CR20	1.1	2.5	2008 AS69	2.8	6.3
(143649) 2003 QQ47		1	2008 DN1	3.5	7.9
(143651) 2003 QO104		1.2	2008 EX80	2.7	6
(162173) 1999 JU3		2	2008 FR17	4.6	10.3
(163132) 2002 CU11		2.2	2008 FX24	2.1	4.8
(163243) 2002 FB3		1.2	2008 FY24	2.2	4.9
(164121) 2003 YT1		1.4	2008 FB25	3.4	7.7
(177049) 2003 EE16	3.4	7.6	2008 FH25	2.3	5.2
1997 XR2	41.5	92.9	2008 FR27	2.7	6
1998 SC15	5	11.3	2008 FS27	2.1	4.8
1999 XS35		1.5	2008 FH50	2.3	5.2
2000 EK26		2.2	2008 FL50	3.7	8.3
2000 QK130		2	2008 FM55	2.6	5.8
2001 VK5	3.6	7.9	2008 FA56	3.6	8.1
2001 XU		1.3	2008 FX58	1.8	3.9
2002 EY2		2	2008 FA59	4	8.9
2002 EM7	5.7	12.6	2008 GU2	3.4	7.6
2002 NY40		1.4	2008 GB13	3.3	7.3
2003 DZ15		1.2	2008 GG13	4.9	11
2003 QC10		1.9	2008 GC20	3	6.7
2004 FH	1.5	3.4	2008 JW30	2.4	5.5
2004 HE	2	4.6	2008 KQ5	3.9	8.7
2004 RQ252		1	2008 MH2	1.7	3.8
2005 VL1	2.2	4.9	2008 MN2	3.3	7.4
2006 QV89	1.6	3.5	2008 MR2	2	4.6
2006 SU49	6.5	14.4	2008 MS2	2.6	5.8
2007 CA19	1.5	3.3	2008 MA3	4.9	11
2007 JY2		1.2	2008 MK3	4.2	9.3
2007 LQ19	2.9	6.5	2008 QR5	4.2	9.3
2007 PV27	2.5	5.6	2008 RJ69	2.4	5.3
2007 TH72		1.5	2008 RD70	3.5	7.9
2008 KO	1.1	2.6	2008 RE70		2.2
2006 YO14	2.9	6.4	2008 RZ92	2	4.5

The two values refer to the diameter in " that the asteroid can reach in base to an albedo equal to 0.05 or 0.025

COMETS AT PERIHELIMUM

Comet	T	q	P	N	H ₁	K ₁	Peak Mag
P/LINEAR (2002 CW ₁₃₄)	21/1	1.8	6.85	1	13	10	16
P/Christensen (2003 K2)	8.9/1	0.5	5.71	1	14	10	9
Lulin (2007 N3)	10.7/1	1.2			6.5	10	6
P/Hill (2006 W4)	20.2/1	4.4	16.5	0	8.5	10	18
68P/Klemola	21/1	1.8	10.8	4	6.8	15	13
P/LINEAR (2002 JN ₁₆)	25.1/1	1.8	6.49	1	15	10	19
144P/Kushida	26.9/1	1.4	7.6	2	10	15	11
P/LINEAR (2003 O3)	30/1	1.3	5.47	1	18	10	21
47P/Ashbrook-Jackson	1/2	2.8	8.34	8	5	15	14
P/Scotti (2001 X2)	7.1/2	2.5	7.34	1	14	10	19
14P/Wolf	1/2	2.7	8.74	15	10	15	19
67P/Churyumov-Gerasimenko	1/2	1.3	6.45	6	9.5	10	12
59P/Kearns-Kwee	1/3	2.4	9.51	5	7.5	15	15
P/Van Ness (2002 Q1)	28/2	1.6	6.71	1	13	10	17
145P/Shoemaker-Levy	1/3	1.9	8.39	2	13	10	18
P/Shoemaker (1994 J3)	1/4	2.9	14.6	1	10	10	16
P/LINEAR (2004 CB)	1/4	0.9	5.03	1	17	5	14
18D/Perrine-Mrkos	1/4	1.6	7.83	5	12	20	??
137P/Shoemaker-Levy	13.6/5	1.9	9.55	2	15	10	19
22P/Kopff	25.4/5	1.6	6.44	15	6.6	13	9
143P/Kowal-Mrkos	12.2/6	2.5	8.92	2	14	5	17
64P/Swift-Gehrels	14.3/6	1.4	9.34	5	9	20	13
P/LINEAR (2003 A1)	16/6	1.9	7.5	2?	6	15	12
P/LINEAR (2003 H4)	22.4/6	1.7	6.1	1	16	10	18
Christensen (2006 W3)	6.5/7	3.1			5	10	12
77P/Longmore	7.8/7	2.3	6.83	5	7	20	15
116P/Wild	19/7	2.2	6.49	3	1.2	25	11
P/LINEAR (1999 XB ₆₉)	25.9/7	1.7	9.47	1	18	5	21
74P/Smirnova-Chernykh	30.3/7	3.6	8.53	5	5	15	15
24P/Schaumasse	9.6/8	1.2	8.29	10	7.6	24	11
89P/Russell	17.2/8	2.3	7.4	4	10	15	16
P/LINEAR (2002 T1)	25.5/8	1.3	6.96	1	18	10	19
P/LINEAR (2004 X1)	3.3/9	0.8	4.84	1	18	10	13
P/LINEAR (2001 MD ₇)	9/9	1.2	7.83	1	12	10	12
88P/Howell	12.5/10	1.4	5.49	6	4.7	25	9
Siding Spring (2007 Q3)	19.2/10	2.3			4.5	10	10
127P/Holt-Olmstead	21.4/10	2.2	6.39	3	14	10	18
54P/de Vico-Swift-NEAT	1/11	2.2	7.37	4	10	15	16
169P/NEAT	1/11	0.6	4.21	4	16	5	12
100P/Hartley	6.1/12	2	6.3	4	8.9	15	16
P/McNaught (2004 K2)	15.5/12	1.6	5.5	1	15	10	19
P/Catalina (2005 JQ ₅)	28.8/12	0.8	4.42	1	18	10	18

T = epoch of perihelium
 q = perihelium
 P = period
 N = number of return since discovery
 H,K = parameters of brightness
 Peak = max magnitude

COMETS WITH mag<9

85P/Boethin

Epoch 2008 Nov. 30.0 TT = JDT 2454800.5

T 2008 Dec. 16.3648 TT

q	1.147474	(2000.0)	P	Q
n	0.0854166	Peri. 53.5814	+0.7976724	-0.6027272
a	5.106319	Node 343.4512	+0.5271172	+0.7136402
e	0.775283	Incl. 4.2171	+0.2930295	+0.3569840
P	11.5			

MPC

Date	TT	R. A. (2000)	Decl.	Delta	r	Elong.	Phase	m1	m2
2008 10 26		20 10.93	-19 33.1	0.953	1.351	87.8	47.3	9.0	19.8
2008 10 27		20 12.88	-19 22.2	0.952	1.344	87.3	47.6	9.0	19.8
2008 10 28		20 14.87	-19 11.1	0.951	1.337	86.8	47.9	8.9	19.8
2008 10 29		20 16.90	-18 59.7	0.950	1.330	86.3	48.2	8.9	19.8
2008 10 30		20 18.98	-18 48.0	0.949	1.323	85.8	48.5	8.8	19.8
2008 10 31		20 21.10	-18 36.1	0.948	1.316	85.4	48.7	8.8	19.8
2008 11 01		20 23.27	-18 23.9	0.947	1.310	84.9	49.0	8.7	19.8
2008 11 02		20 25.48	-18 11.5	0.946	1.303	84.5	49.3	8.7	19.8
2008 11 03		20 27.72	-17 58.8	0.945	1.297	84.0	49.5	8.6	19.8
2008 11 04		20 30.01	-17 45.8	0.944	1.291	83.6	49.8	8.6	19.8
2008 11 05		20 32.35	-17 32.5	0.942	1.285	83.2	50.0	8.5	19.8
2008 11 06		20 34.72	-17 18.9	0.941	1.278	82.8	50.3	8.5	19.8
2008 11 07		20 37.13	-17 05.1	0.939	1.273	82.4	50.5	8.5	19.8
2008 11 08		20 39.58	-16 50.9	0.938	1.267	82.1	50.8	8.4	19.8
2008 11 09		20 42.07	-16 36.5	0.937	1.261	81.7	51.0	8.4	19.8
2008 11 10		20 44.61	-16 21.7	0.935	1.255	81.3	51.2	8.3	19.7
2008 11 11		20 47.18	-16 06.6	0.933	1.250	81.0	51.5	8.3	19.7
2008 11 12		20 49.79	-15 51.2	0.932	1.244	80.7	51.7	8.2	19.7
2008 11 13		20 52.43	-15 35.5	0.930	1.239	80.3	51.9	8.2	19.7
2008 11 14		20 55.12	-15 19.5	0.928	1.234	80.0	52.1	8.2	19.7
2008 11 15		20 57.84	-15 03.1	0.927	1.229	79.7	52.4	8.1	19.7
2008 11 16		21 00.61	-14 46.4	0.925	1.224	79.4	52.6	8.1	19.7
2008 11 17		21 03.40	-14 29.4	0.923	1.219	79.2	52.8	8.0	19.7
2008 11 18		21 06.24	-14 12.0	0.921	1.215	78.9	53.0	8.0	19.7
2008 11 19		21 09.11	-13 54.3	0.920	1.210	78.6	53.2	8.0	19.7
2008 11 20		21 12.03	-13 36.2	0.918	1.206	78.4	53.4	7.9	19.7
2008 11 21		21 14.97	-13 17.8	0.916	1.202	78.2	53.6	7.9	19.7
2008 11 22		21 17.96	-12 59.0	0.914	1.198	78.0	53.8	7.9	19.7
2008 11 23		21 20.98	-12 39.8	0.912	1.194	77.7	53.9	7.8	19.7
2008 11 24		21 24.04	-12 20.3	0.911	1.190	77.5	54.1	7.8	19.7
2008 11 25		21 27.13	-12 00.5	0.909	1.186	77.4	54.3	7.8	19.6
2008 11 26		21 30.26	-11 40.2	0.907	1.183	77.2	54.4	7.7	19.6
2008 11 27		21 33.42	-11 19.6	0.905	1.180	77.0	54.6	7.7	19.6
2008 11 28		21 36.62	-10 58.6	0.903	1.176	76.9	54.8	7.7	19.6
2008 11 29		21 39.86	-10 37.3	0.901	1.173	76.7	54.9	7.7	19.6
2008 11 30		21 43.13	-10 15.6	0.900	1.170	76.6	55.0	7.6	19.6
2008 12 01		21 46.44	-09 53.5	0.898	1.168	76.5	55.2	7.6	19.6
2008 12 02		21 49.78	-09 31.0	0.896	1.165	76.3	55.3	7.6	19.6
2008 12 03		21 53.15	-09 08.2	0.894	1.163	76.3	55.4	7.6	19.6
2008 12 04		21 56.56	-08 45.0	0.893	1.161	76.2	55.5	7.5	19.6
2008 12 05		22 00.00	-08 21.5	0.891	1.159	76.1	55.6	7.5	19.6
2008 12 06		22 03.47	-07 57.6	0.889	1.157	76.0	55.7	7.5	19.6
2008 12 07		22 06.98	-07 33.3	0.888	1.155	76.0	55.8	7.5	19.6
2008 12 08		22 10.52	-07 08.7	0.886	1.154	75.9	55.9	7.5	19.6
2008 12 09		22 14.10	-06 43.8	0.885	1.152	75.9	56.0	7.5	19.6
2008 12 10		22 17.70	-06 18.5	0.883	1.151	75.9	56.1	7.5	19.6
2008 12 11		22 21.34	-05 52.9	0.882	1.150	75.8	56.1	7.4	19.6
2008 12 12		22 25.01	-05 26.9	0.881	1.149	75.8	56.2	7.4	19.6
2008 12 13		22 28.71	-05 00.7	0.880	1.148	75.8	56.2	7.4	19.6
2008 12 14		22 32.43	-04 34.1	0.878	1.148	75.9	56.2	7.4	19.6
2008 12 15		22 36.20	-04 07.2	0.877	1.148	75.9	56.3	7.4	19.6
2008 12 16		22 39.99	-03 40.1	0.876	1.147	75.9	56.3	7.4	19.6
2008 12 17		22 43.81	-03 12.6	0.876	1.148	76.0	56.3	7.4	19.6
2008 12 18		22 47.66	-02 44.9	0.875	1.148	76.0	56.3	7.4	19.5
2008 12 19		22 51.53	-02 16.9	0.874	1.148	76.1	56.3	7.4	19.5
2008 12 20		22 55.44	-01 48.7	0.874	1.149	76.1	56.3	7.4	19.5
2008 12 21		22 59.38	-01 20.3	0.873	1.149	76.2	56.2	7.4	19.5
2008 12 22		23 03.34	-00 51.6	0.873	1.150	76.3	56.2	7.4	19.5
2008 12 23		23 07.34	-00 22.7	0.873	1.151	76.4	56.1	7.4	19.5
2008 12 24		23 11.36	+00 06.4	0.873	1.153	76.5	56.1	7.4	19.5
2008 12 25		23 15.40	+00 35.7	0.873	1.154	76.6	56.0	7.4	19.5
2008 12 26		23 19.48	+01 05.1	0.873	1.156	76.7	55.9	7.5	19.5
2008 12 27		23 23.58	+01 34.6	0.874	1.157	76.8	55.8	7.5	19.6
2008 12 28		23 27.70	+02 04.3	0.874	1.159	77.0	55.7	7.5	19.6
2008 12 29		23 31.85	+02 34.1	0.875	1.161	77.1	55.6	7.5	19.6
2008 12 30		23 36.02	+03 04.0	0.876	1.163	77.2	55.5	7.5	19.6
2008 12 31		23 40.21	+03 34.0	0.877	1.166	77.4	55.4	7.5	19.6
2009 01 01		23 44.43	+04 03.9	0.878	1.168	77.5	55.3	7.6	19.6
2009 01 02		23 48.67	+04 34.0	0.880	1.171	77.7	55.1	7.6	19.6

Date	TT	R. A. (2000)	Decl.	Delta	r	Elong.	Phase	m1	m2
2009 01 03		23 52.93	+05 04.0	0.881	1.174	77.8	55.0	7.6	19.6
2009 01 04		23 57.20	+05 34.0	0.883	1.177	78.0	54.8	7.6	19.6
2009 01 05		00 01.50	+06 04.0	0.885	1.180	78.2	54.6	7.7	19.6
2009 01 06		00 05.82	+06 33.9	0.887	1.184	78.3	54.4	7.7	19.6
2009 01 07		00 10.15	+07 03.7	0.890	1.187	78.5	54.3	7.7	19.6
2009 01 08		00 14.50	+07 33.4	0.892	1.191	78.7	54.1	7.8	19.6
2009 01 09		00 18.86	+08 03.0	0.895	1.195	78.8	53.9	7.8	19.6
2009 01 10		00 23.23	+08 32.4	0.898	1.199	79.0	53.6	7.8	19.6
2009 01 11		00 27.62	+09 01.7	0.901	1.203	79.2	53.4	7.9	19.6
2009 01 12		00 32.03	+09 30.8	0.904	1.207	79.4	53.2	7.9	19.6
2009 01 13		00 36.44	+09 59.6	0.908	1.211	79.6	53.0	8.0	19.7
2009 01 14		00 40.86	+10 28.2	0.912	1.216	79.7	52.7	8.0	19.7
2009 01 15		00 45.29	+10 56.6	0.916	1.221	79.9	52.5	8.0	19.7
2009 01 16		00 49.73	+11 24.7	0.920	1.225	80.1	52.3	8.1	19.7
2009 01 17		00 54.17	+11 52.5	0.924	1.230	80.2	52.0	8.1	19.7
2009 01 18		00 58.62	+12 20.0	0.929	1.235	80.4	51.7	8.2	19.7
2009 01 19		01 03.07	+12 47.1	0.934	1.241	80.6	51.5	8.2	19.7
2009 01 20		01 07.53	+13 13.9	0.939	1.246	80.7	51.2	8.3	19.7
2009 01 21		01 11.99	+13 40.4	0.944	1.251	80.9	50.9	8.3	19.7
2009 01 22		01 16.45	+14 06.5	0.950	1.257	81.0	50.7	8.4	19.8
2009 01 23		01 20.91	+14 32.1	0.955	1.262	81.2	50.4	8.4	19.8
2009 01 24		01 25.37	+14 57.4	0.962	1.268	81.3	50.1	8.5	19.8
2009 01 25		01 29.83	+15 22.3	0.968	1.274	81.5	49.8	8.5	19.8
2009 01 26		01 34.28	+15 46.7	0.974	1.280	81.6	49.5	8.6	19.8
2009 01 27		01 38.73	+16 10.7	0.981	1.286	81.7	49.3	8.6	19.8
2009 01 28		01 43.17	+16 34.2	0.988	1.292	81.9	49.0	8.7	19.9
2009 01 29		01 47.60	+16 57.3	0.995	1.299	82.0	48.7	8.8	19.9
2009 01 30		01 52.03	+17 19.9	1.002	1.305	82.1	48.4	8.8	19.9
2009 01 31		01 56.45	+17 42.0	1.010	1.312	82.2	48.1	8.9	19.9
2009 02 01		02 00.85	+18 03.6	1.018	1.318	82.3	47.8	8.9	19.9
2009 02 02		02 05.25	+18 24.7	1.026	1.325	82.4	47.5	9.0	20.0

Year	MM	DD	Rise	Culm.	Set.	IC ->	Alt Azi	FC ->	Alt Azi	MoSo	MoTr	F.L.
2008 10 26	14:	1	18:36	23:12	5: 2		18:49 +23.7 183	4: 4	15:42	0.09		
2008 10 27	13:57	18:34	23:11	5: 3		18:47 +24.0 183	5:13	16: 1	0.04			
2008 10 28	13:54	18:32	23:11	5: 4		18:46 +24.2 183	6:21	16:22	0.01			
2008 10 29	13:51	18:31	23:11	5: 5		18:44 +24.5 184	7:29	16:46	0.00			
2008 10 30	13:48	18:29	23:10	5: 7		18:43 +24.8 184	8:36	17:16	0.01			
2008 10 31	13:45	18:27	23:10	5: 8		18:42 +25.1 184	9:39	17:53	0.04			
2008 11 1	13:42	18:25	23:10	5: 9		18:40 +25.4 184	10:37	18:37	0.09			
2008 11 2	13:39	18:24	23:10	5:10		18:39 +25.7 184	11:27	19:31	0.15			
2008 11 3	13:36	18:22	23:10	5:12		18:38 +26.0 184	12: 9	20:31	0.22			
2008 11 4	13:33	18:21	23:10	5:13		18:37 +26.3 184	12:43	21:35	0.30			
2008 11 5	13:30	18:19	23:10	5:14		18:35 +26.7 184	13:10	22:42	0.39			
2008 11 6	13:27	18:18	23:10	5:15		18:34 +27.0 184	13:33	23:50	0.48			
2008 11 7	13:24	18:17	23:10	5:17		18:33 +27.3 184	13:53s	1: 0	0.58			
2008 11 8	13:21	18:15	23:11	5:18		18:32 +27.7 185	14:12		0.68			
2008 11 9	13:18	18:14	23:11	5:19		18:31 +28.0 185	14:31	2:11	0.77			
2008 11 10	13:15	18:13	23:12	5:20		18:30 +28.4 185	14:52	3:25	0.86			
2008 11 11	13:12	18:12	23:12	5:22		18:29 +28.8 185	15:15	4:44	0.93			
2008 11 12	13: 9	18:11	23:13	5:23		18:28 +29.1 185	15:44	6: 7	0.98			
2008 11 13	13: 6	18:10	23:14	5:24		18:27 +29.5 185	16:23	7:32	1.00			
2008 11 14	13: 4	18: 9	23:14	5:25		18:26 +29.9 185	17:13	8:56	0.99			
2008 11 15	13: 1	18: 8	23:15	5:26		18:25 +30.3 185	18:19	10:10	0.95			
2008 11 16	12:58	18: 7	23:16	5:28		18:25 +30.7 185	19:36	11: 9	0.89			
2008 11 17	12:55	18: 6	23:17	5:29		18:24 +31.1 185	20:58	11:53	0.81			
2008 11 18	12:53	18: 5	23:18	5:30		18:23 +31.5 185	22:18	12:26	0.71			
2008 11 19	12:50	18: 4	23:19	5:31		18:22 +32.0 185	23:35	12:51	0.60			
2008 11 20	12:47	18: 3	23:20	5:32		18:22 +32.4 185s	0:47	13:12	0.49			
2008 11 21	12:45	18: 3	23:22	5:33		18:21 +32.8 185s	1:57	13:31	0.38			
2008 11 22	12:42	18: 2	23:23	5:34		18:21 +33.3 185		13:49	0.29			
2008 11 23	12:39	18: 1	23:24	5:36		18:20 +33.8 186	3: 5	14: 7	0.20			
2008 11 24	12:37	18: 1	23:26	5:37		18:20 +34.2 186	4:13	14:27	0.13			
2008 11 25	12:34	18: 0	23:27	5:38		18:19 +34.7 186	5:20	14:51	0.07			
2008 11 26	12:32	18: 0	23:29	5:39		18:19 +35.2 186	6:27	15:19	0.03			
2008 11 27	12:29	17:59	23:31	5:40		18:18 +35.7 186	7:31	15:53	0.01			
2008 11 28	12:26	17:59	23:32	5:41		18:18 +36.1 186	8:31	16:35	0.00			
2008 11 29	12:24	17:58	23:34	5:42		18:18 +36.6 186	9:23	17:26	0.02			
2008 11 30	12:21	17:58	23:36	5:43		18:17 +37.2 186	10: 7	18:24	0.05			
2008 12 1	12:19	17:58	23:38	5:44		18:17 +37.7 186	10:43	19:27	0.09			
2008 12 2	12:17	17:58	23:40	5:45		18:17 +38.2 186	11:12	20:32	0.16			
2008 12 3	12:14	17:57	23:42	5:46		18:17 +38.7 186	11:36	21:39	0.23			
2008 12 4	12:12	17:57	23:44	5:47		18:17 +39.3 186	11:57	22:46	0.32			
2008 12 5	12: 9	17:57	23:46	5:48		18:16 +39.8 186	12:15	23:53	0.41			
2008 12 6	12: 7	17:57	23:48	5:49		18:16 +40.3 186	12:33s	1: 3	0.51			
2008 12 7	12: 4	17:57	23:50	5:50		18:16 +40.9 186	12:52		0.62			
2008 12 8	12: 2	17:57	23:52	5:51		18:16 +41.4 187	13:13	2:16	0.72			
2008 12 9	12: 0	17:57	23:55	5:51		18:16 +42.0 187	13:38	3:34	0.81			

Year	MM	DD	Rise	Culm.	Set.	IC ->	Alt	Azi	FC ->	Alt	Azi	MoSo	MoTr	F.L.
2008	12	10	11:57	17:57	23:57	5:52			18:17	+42.6	187	14:11	4:57	0.89
2008	12	11	11:55	17:57s	0: 0	5:53			18:17	+43.1	187	14:54	6:21	0.96
2008	12	12	11:53	17:57s	0: 2	5:54			18:17	+43.7	187	15:52	7:41	0.99
2008	12	13	11:51	17:57s	0: 5	5:54			18:17	+44.3	187	17: 6	8:50	1.00
2008	12	14	11:48	17:57s	0: 7	5:55			18:17	+44.8	187	18:29	9:43	0.97
2008	12	15	11:46	17:57s	0:10	5:56			18:18	+45.4	187	19:55	10:22	0.92
2008	12	16	11:44	17:58s	0:12	5:57			18:18	+46.0	187	21:17	10:52	0.85
2008	12	17	11:42	17:58s	0:15	5:57			18:18	+46.6	187	22:34	11:16	0.75
2008	12	18	11:39	17:58s	0:18	5:58			18:19	+47.2	188	23:47	11:36	0.65
2008	12	19	11:37	17:58s	0:21	5:58			18:19	+47.7	188s	0:57	11:54	0.55
2008	12	20	11:35	17:59s	0:23	5:59			18:20	+48.3	188s	2: 5	12:13	0.44
2008	12	21	11:33	17:59s	0:26	5:59			18:20	+48.9	188		12:33	0.34
2008	12	22	11:31	17:59s	0:29	6: 0			18:21	+49.5	188	3:13	12:55	0.25
2008	12	23	11:29	18: 0s	0:32	6: 0			18:21	+50.1	188	4:20	13:21	0.17
2008	12	24	11:27	18: 0s	0:35	6: 1			18:22	+50.6	188	5:25	13:54	0.11
2008	12	25	11:25	18: 0s	0:38	6: 1			18:22	+51.2	189	6:26	14:34	0.06
2008	12	26	11:23	18: 1s	0:41	6: 2			18:23	+51.8	189	7:21	15:22	0.02
2008	12	27	11:21	18: 1s	0:44	6: 2			18:24	+52.3	189	8: 8	16:19	0.00
2008	12	28	11:19	18: 2s	0:46	6: 2			18:24	+52.9	189	8:46	17:20	0.00
2008	12	29	11:17	18: 2s	0:49	6: 3			18:25	+53.4	189	9:16	18:25	0.02
2008	12	30	11:15	18: 3s	0:52	6: 3			18:26	+54.0	190	9:41	19:32	0.05
2008	12	31	11:13	18: 3s	0:55	6: 3			18:27	+54.5	190	10: 3	20:38	0.11
2009	1	1	11:11	18: 4s	0:58	6: 3			18:27	+55.1	190	10:21	21:44	0.17
2009	1	2	11: 9	18: 4s	1: 1	6: 3			18:28	+55.6	190	10:39	22:51	0.25
2009	1	3	11: 7	18: 5	1: 1	6: 3			18:29	+56.1	191	10:57s	0: 1	0.35
2009	1	4	11: 5	18: 6	1: 4	6: 3			18:30	+56.7	191	11:16s	1:13	0.45
2009	1	5	11: 3	18: 6	1: 7	6: 3			18:31	+57.2	191	11:38		0.56
2009	1	6	11: 1	18: 7	1:10	6: 3			18:32	+57.7	191	12: 5	2:30	0.66
2009	1	7	11: 0	18: 7	1:13	6: 3			18:33	+58.1	192	12:41	3:50	0.77
2009	1	8	10:58	18: 8	1:16	6: 3			18:34	+58.6	192	13:30	5:10	0.86
2009	1	9	10:56	18: 8	1:19	6: 3			18:35	+59.1	192	14:34	6:24	0.93
2009	1	10	10:54	18: 9	1:22	6: 3			18:36	+59.5	193	15:52	7:25	0.98
2009	1	11	10:53	18: 9	1:25	6: 3			18:37	+60.0	193	17:19	8:12	1.00
2009	1	12	10:51	18:10	1:27	6: 2			18:38	+60.4	194	18:45	8:47	0.99
2009	1	13	10:49	18:10	1:30	6: 2			18:39	+60.9	194	20: 8	9:14	0.95
2009	1	14	10:48	18:11	1:33	6: 2			18:40	+61.3	194	21:26	9:37	0.89
2009	1	15	10:46	18:11	1:36	6: 1			18:41	+61.7	195	22:40	9:57	0.81
2009	1	16	10:44	18:12	1:38	6: 1			18:42	+62.1	195	23:52	10:16	0.71
2009	1	17	10:43	18:12	1:41	6: 0			18:43	+62.4	196s	1: 2	10:36	0.61
2009	1	18	10:41	18:13	1:43	6: 0			18:44	+62.8	196		10:58	0.51
2009	1	19	10:40	18:13	1:46	5:59			18:46	+63.1	197	2:11	11:23	0.41
2009	1	20	10:38	18:14	1:48	5:59			18:47	+63.5	198	3:18	11:54	0.32
2009	1	21	10:37	18:14	1:51	5:58			18:48	+63.8	198	4:21	12:32	0.24
2009	1	22	10:35	18:15	1:53	5:58			18:49	+64.1	199	5:18	13:18	0.16
2009	1	23	10:34	18:15	1:56	5:57			18:50	+64.4	199	6: 7	14:12	0.10
2009	1	24	10:32	18:15	1:58	5:56			18:52	+64.7	200	6:48	15:12	0.05
2009	1	25	10:31	18:16	2: 0	5:56			18:53	+65.0	201	7:21	16:17	0.02
2009	1	26	10:29	18:16	2: 2	5:55			18:54	+65.2	201	7:47	17:24	0.00
2009	1	27	10:28	18:16	2: 4	5:54			18:55	+65.5	202	8:10	18:31	0.00
2009	1	28	10:26	18:17	2: 6	5:53			18:57	+65.7	203	8:29	19:37	0.03
2009	1	29	10:25	18:17	2: 8	5:52			18:58	+65.9	203	8:47	20:44	0.07
2009	1	30	10:24	18:17	2:10	5:51			18:59	+66.1	204	9: 4	21:52	0.13
2009	1	31	10:22	18:17	2:12	5:50			19: 0	+66.3	205	9:23	23: 3	0.20
2009	2	1	10:21	18:18	2:14	5:49			19: 2	+66.4	206	9:43s	0:16	0.29
2009	2	2	10:20	18:18	2:15	5:48			19: 3	+66.6	207	10: 7s	1:32	0.40

IC = Beginning of astronomical twilight, in U.T.+1

Alz = height of the comet at IC or at FC

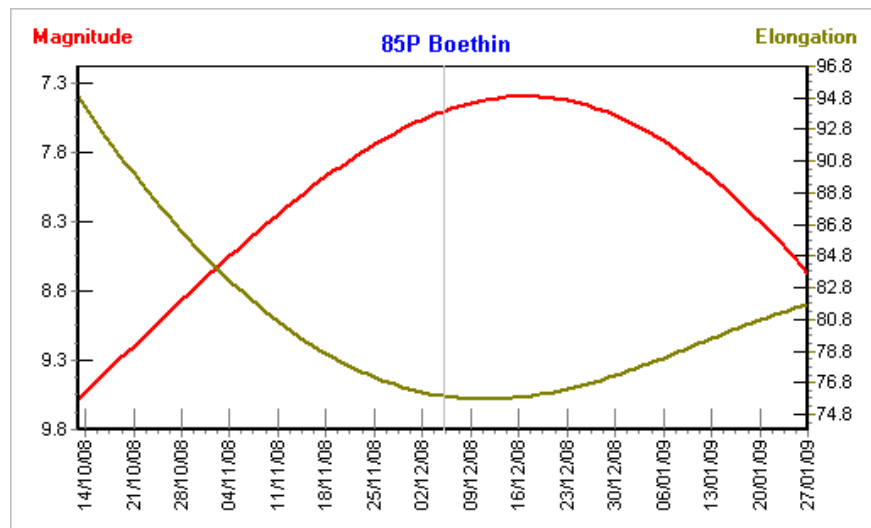
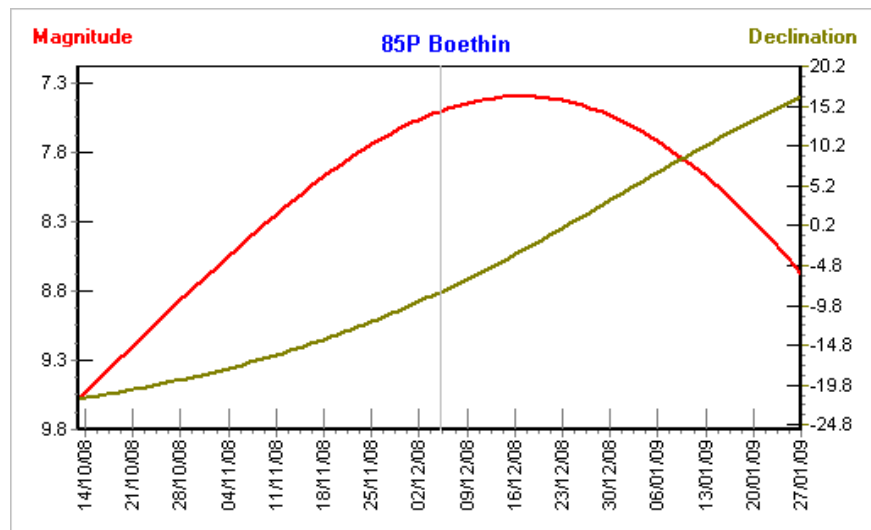
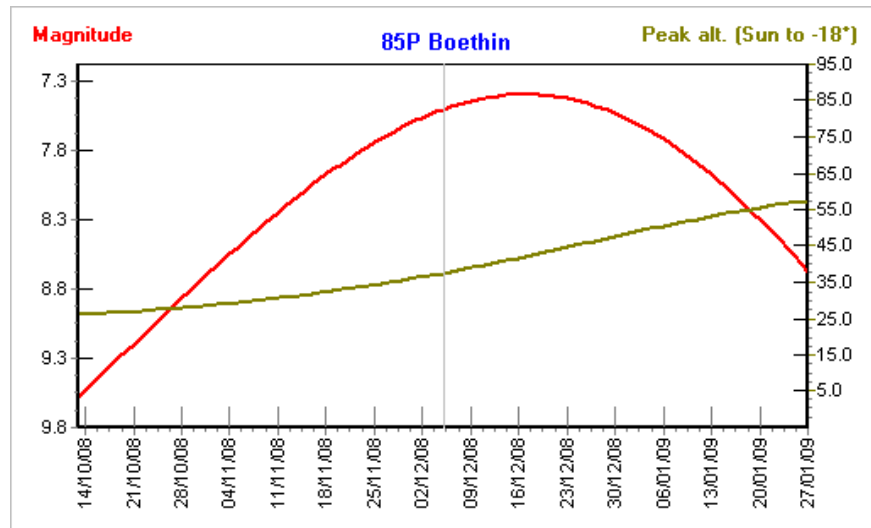
Azi = azimuth of the comet at IC or at FC

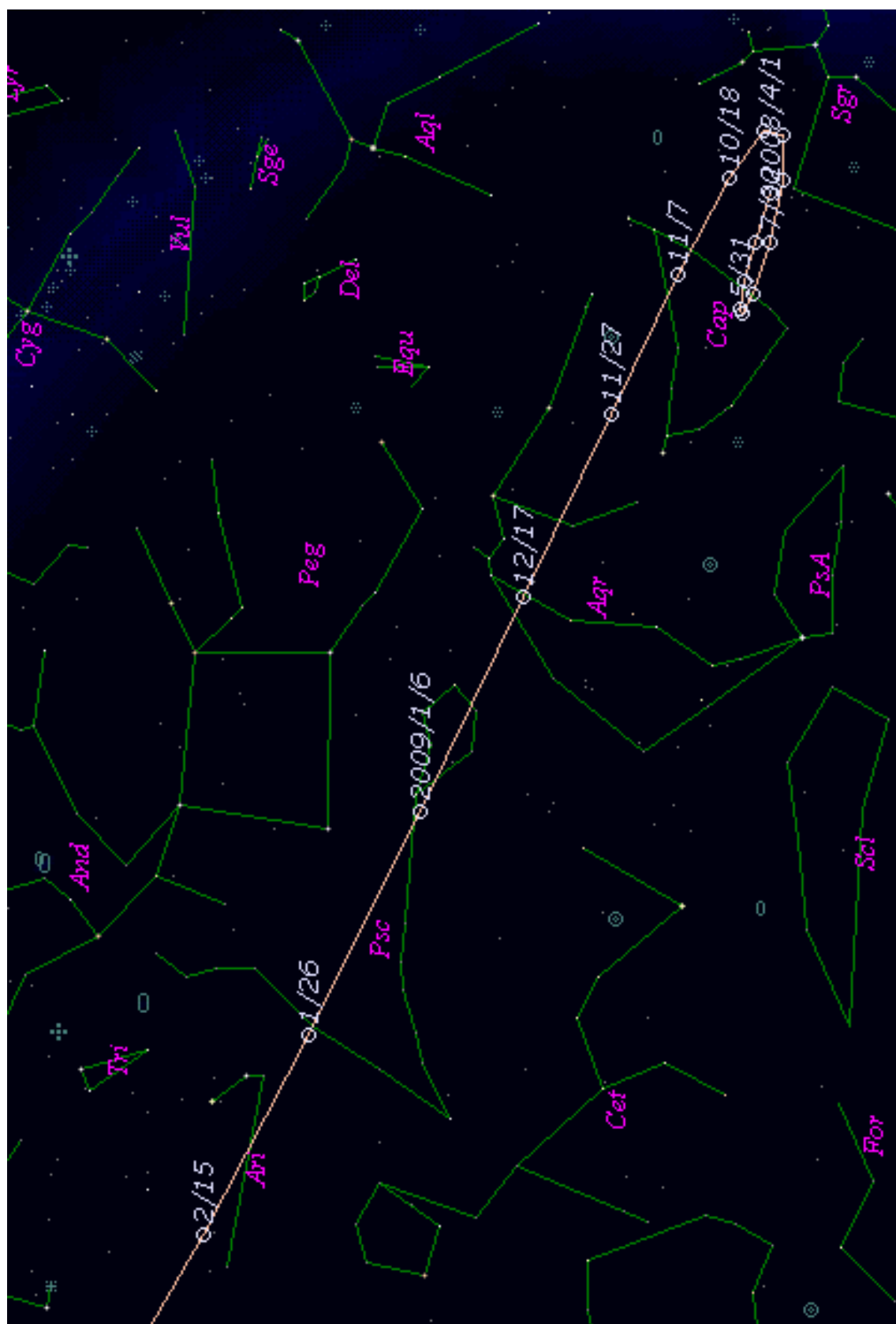
FC = Ending of astronomical twilight, in U.T.+1

MoSo = Rising of the Moon

MoTr = Setting of the Moon

F.L. = Illumination of the Moon, 0 new Moon, 1 full Moon





C/2007 N3 (Lulin)
Epoch 2009 Jan. 9.0 TT = JDT 2454840.5
T 2009 Jan. 10.6529 TT
q 1.210723 (2000.0) P Q
z +0.000332 Peri. 136.9139 -0.9295624 -0.3685183
+/-0.000141 Node 338.5315 -0.3454920 +0.8609487
e 0.999598 Incl. 178.3725 -0.1286431 +0.3506588

Date	TT	R. A. (2000)	Decl.	Delta	r	Elong.	Phase	m1	m2
2008 12 22		16 04.56	-19 53.0	2.039	1.251	27.4	21.2	9.0	
2008 12 23		16 04.19	-19 52.1	2.020	1.247	28.5	22.1	9.0	
2008 12 24		16 03.80	-19 51.1	2.000	1.243	29.6	23.0	9.0	
2008 12 25		16 03.39	-19 50.1	1.979	1.240	30.7	23.9	8.9	
2008 12 26		16 02.97	-19 49.1	1.958	1.237	31.8	24.8	8.9	
2008 12 27		16 02.53	-19 47.9	1.937	1.234	33.0	25.7	8.8	
2008 12 28		16 02.07	-19 46.7	1.915	1.231	34.1	26.6	8.8	
2008 12 29		16 01.58	-19 45.5	1.893	1.229	35.2	27.5	8.8	
2008 12 30		16 01.08	-19 44.2	1.870	1.226	36.4	28.4	8.7	
2008 12 31		16 00.55	-19 42.8	1.847	1.224	37.5	29.3	8.7	
2009 01 01		15 59.99	-19 41.3	1.824	1.222	38.7	30.2	8.7	
2009 01 02		15 59.41	-19 39.7	1.800	1.220	39.8	31.1	8.6	
2009 01 03		15 58.80	-19 38.1	1.776	1.218	41.0	32.0	8.6	
2009 01 04		15 58.16	-19 36.3	1.751	1.217	42.2	32.8	8.6	
2009 01 05		15 57.49	-19 34.5	1.726	1.216	43.4	33.7	8.5	
2009 01 06		15 56.78	-19 32.5	1.701	1.215	44.5	34.6	8.5	
2009 01 07		15 56.04	-19 30.4	1.675	1.214	45.7	35.5	8.5	
2009 01 08		15 55.26	-19 28.2	1.649	1.213	46.9	36.3	8.4	
2009 01 09		15 54.44	-19 25.9	1.623	1.213	48.2	37.2	8.4	
2009 01 10		15 53.58	-19 23.4	1.596	1.213	49.4	38.0	8.4	
2009 01 11		15 52.68	-19 20.8	1.569	1.213	50.6	38.8	8.3	
2009 01 12		15 51.72	-19 18.0	1.541	1.213	51.9	39.6	8.3	
2009 01 13		15 50.71	-19 15.0	1.513	1.213	53.1	40.4	8.2	
2009 01 14		15 49.65	-19 11.9	1.485	1.214	54.4	41.2	8.2	
2009 01 15		15 48.53	-19 08.5	1.457	1.214	55.7	42.0	8.2	
2009 01 16		15 47.35	-19 04.9	1.428	1.215	57.0	42.7	8.1	
2009 01 17		15 46.10	-19 01.1	1.399	1.217	58.3	43.5	8.1	
2009 01 18		15 44.77	-18 57.0	1.370	1.218	59.7	44.2	8.0	
2009 01 19		15 43.37	-18 52.6	1.341	1.220	61.0	44.9	8.0	
2009 01 20		15 41.88	-18 47.8	1.311	1.221	62.4	45.6	8.0	
2009 01 21		15 40.30	-18 42.8	1.281	1.223	63.8	46.2	7.9	
2009 01 22		15 38.62	-18 37.3	1.251	1.225	65.2	46.8	7.9	
2009 01 23		15 36.84	-18 31.5	1.221	1.228	66.7	47.4	7.8	
2009 01 24		15 34.94	-18 25.1	1.190	1.230	68.1	48.0	7.8	
2009 01 25		15 32.91	-18 18.3	1.160	1.233	69.7	48.5	7.7	
2009 01 26		15 30.74	-18 10.9	1.129	1.236	71.2	49.0	7.7	
2009 01 27		15 28.43	-18 02.8	1.098	1.239	72.8	49.4	7.6	
2009 01 28		15 25.96	-17 54.1	1.067	1.242	74.4	49.8	7.6	
2009 01 29		15 23.30	-17 44.6	1.036	1.246	76.1	50.1	7.5	
2009 01 30		15 20.46	-17 34.2	1.004	1.249	77.8	50.4	7.5	
2009 01 31		15 17.40	-17 22.8	0.973	1.253	79.6	50.6	7.4	
2009 02 01		15 14.10	-17 10.4	0.942	1.257	81.4	50.8	7.4	
2009 02 02		15 10.55	-16 56.7	0.911	1.261	83.3	50.9	7.3	
2009 02 03		15 06.72	-16 41.6	0.880	1.266	85.3	50.9	7.2	
2009 02 04		15 02.57	-16 25.0	0.849	1.270	87.3	50.8	7.2	
2009 02 05		14 58.08	-16 06.6	0.818	1.275	89.4	50.6	7.1	
2009 02 06		14 53.21	-15 46.1	0.788	1.280	91.7	50.4	7.1	
2009 02 07		14 47.92	-15 23.3	0.757	1.285	94.0	50.0	7.0	
2009 02 08		14 42.16	-14 57.9	0.728	1.290	96.5	49.4	6.9	
2009 02 09		14 35.88	-14 29.4	0.698	1.295	99.1	48.8	6.8	
2009 02 10		14 29.03	-13 57.5	0.669	1.301	101.8	47.9	6.8	
2009 02 11		14 21.54	-13 21.6	0.641	1.306	104.8	46.9	6.7	
2009 02 12		14 13.36	-12 41.3	0.613	1.312	107.9	45.7	6.6	
2009 02 13		14 04.40	-11 55.8	0.586	1.318	111.2	44.3	6.5	
2009 02 14		13 54.61	-11 04.5	0.561	1.324	114.8	42.6	6.5	
2009 02 15		13 43.89	-10 06.6	0.536	1.330	118.6	40.7	6.4	
2009 02 16		13 32.20	-09 01.6	0.513	1.337	122.7	38.5	6.3	
2009 02 17		13 19.46	-07 48.8	0.492	1.343	127.0	36.0	6.2	
2009 02 18		13 05.64	-06 27.7	0.473	1.350	131.7	33.1	6.2	
2009 02 19		12 50.73	-04 58.1	0.455	1.357	136.7	30.0	6.1	
2009 02 20		12 34.74	-03 20.2	0.441	1.363	142.1	26.5	6.1	
2009 02 21		12 17.75	-01 34.7	0.429	1.370	147.7	22.7	6.0	
2009 02 22		11 59.89	+00 16.9	0.420	1.378	153.5	18.7	6.0	
2009 02 23		11 41.35	+02 12.6	0.414	1.385	159.5	14.5	6.0	
2009 02 24		11 22.35	+04 10.0	0.412	1.392	165.7	10.1	6.0	
2009 02 25		11 03.17	+06 06.1	0.413	1.400	171.8	5.8	6.0	
2009 02 26		10 44.11	+07 58.2	0.417	1.407	177.9	1.5	6.1	
2009 02 27		10 25.45	+09 43.9	0.425	1.415	176.1	2.7	6.2	
2009 02 28		10 07.42	+11 21.3	0.436	1.423	170.4	6.7	6.2	
2009 03 01		09 50.24	+12 49.5	0.450	1.431	165.0	10.4	6.3	
2009 03 02		09 34.04	+14 07.8	0.467	1.439	159.8	13.8	6.4	
2009 03 03		09 18.92	+15 16.6	0.486	1.447	155.0	16.8	6.5	
2009 03 04		09 04.89	+16 16.3	0.508	1.455	150.5	19.6	6.7	
2009 03 05		08 51.97	+17 07.8	0.531	1.463	146.2	22.1	6.8	

Date	TT	R. A. (2000)	Decl.	Delta	r	Elong.	Phase	m1	m2
2009 03 06		08 40.11	+17 51.9	0.556	1.471	142.3	24.3	6.9	
2009 03 07		08 29.26	+18 29.6	0.582	1.480	138.7	26.3	7.0	
2009 03 08		08 19.36	+19 01.8	0.609	1.488	135.3	28.0	7.2	
2009 03 09		08 10.32	+19 29.3	0.638	1.497	132.1	29.5	7.3	
2009 03 10		08 02.09	+19 52.7	0.667	1.506	129.1	30.8	7.4	
2009 03 11		07 54.58	+20 12.7	0.698	1.515	126.3	31.9	7.5	
2009 03 12		07 47.73	+20 29.9	0.728	1.523	123.7	32.9	7.6	
2009 03 13		07 41.49	+20 44.6	0.760	1.532	121.2	33.7	7.8	
2009 03 14		07 35.78	+20 57.3	0.792	1.541	118.9	34.4	7.9	
2009 03 15		07 30.56	+21 08.3	0.825	1.550	116.6	35.0	8.0	
2009 03 16		07 25.78	+21 17.7	0.857	1.560	114.5	35.5	8.1	
2009 03 17		07 21.41	+21 25.9	0.891	1.569	112.5	35.9	8.2	
2009 03 18		07 17.40	+21 33.0	0.924	1.578	110.6	36.2	8.3	
2009 03 19		07 13.71	+21 39.3	0.958	1.587	108.7	36.4	8.4	
2009 03 20		07 10.33	+21 44.7	0.992	1.597	106.9	36.6	8.5	
2009 03 21		07 07.22	+21 49.5	1.026	1.606	105.2	36.8	8.6	
2009 03 22		07 04.35	+21 53.6	1.060	1.616	103.5	36.8	8.7	
2009 03 23		07 01.72	+21 57.3	1.095	1.625	101.9	36.9	8.8	
2009 03 24		06 59.29	+22 00.5	1.129	1.635	100.4	36.9	8.9	
2009 03 25		06 57.05	+22 03.4	1.164	1.645	98.9	36.8	9.0	

Year	MM	DD	Rise	Culm.	Set.	IC ->	Alt	Azi	FC ->	Alt	Azi	MoSo	MoTr	F.L.
2008 12 22			5:34	10:11	14:48	6: 0	+3.2	123	18:21			3:13	12:55	0.25
2008 12 23			5:30	10: 7	14:44	6: 0	+3.9	124	18:21			4:20	13:21	0.17
2008 12 24			5:26	10: 3	14:40	6: 1	+4.5	125	18:22			5:25	13:54	0.11
2008 12 25			5:21	9:58	14:35	6: 1	+5.2	126	18:22			6:26	14:34	0.06
2008 12 26			5:17	9:54	14:31	6: 2	+5.9	127	18:23			7:21	15:22	0.02
2008 12 27			5:12	9:50	14:27	6: 2	+6.5	127	18:24			8: 8	16:19	0.00
2008 12 28			5: 8	9:45	14:23	6: 2	+7.2	128	18:24			8:46	17:20	0.00
2008 12 29			5: 3	9:41	14:18	6: 3	+7.8	129	18:25			9:16	18:25	0.02
2008 12 30			4:59	9:36	14:14	6: 3	+8.5	130	18:26			9:41	19:32	0.05
2008 12 31			4:54	9:32	14:10	6: 3	+9.1	131	18:27			10: 3	20:38	0.11
2009 1 1			4:49	9:27	14: 5	6: 3	+9.7	132	18:27			10:21	21:44	0.17
2009 1 2			4:45	9:23	14: 1	6: 3	+10.3	133	18:28			10:39	22:51	0.25
2009 1 3			4:40	9:18	13:56	6: 3	+10.9	134	18:29			10:57s	0: 1	0.35
2009 1 4			4:35	9:14	13:52	6: 3	+11.5	135	18:30			11:16s	1:13	0.45
2009 1 5			4:31	9: 9	13:48	6: 3	+12.1	136	18:31			11:38		0.56
2009 1 6			4:26	9: 4	13:43	6: 3	+12.7	137	18:32			12: 5	2:30	0.66
2009 1 7			4:21	9: 0	13:39	6: 3	+13.3	137	18:33			12:41	3:50	0.77
2009 1 8			4:16	8:55	13:34	6: 3	+13.8	138	18:34			13:30	5:10	0.86
2009 1 9			4:11	8:50	13:29	6: 3	+14.4	139	18:35			14:34	6:24	0.93
2009 1 10			4: 6	8:45	13:25	6: 3	+14.9	140	18:36			15:52	7:25	0.98
2009 1 11			4: 1	8:41	13:20	6: 3	+15.5	141	18:37			17:19	8:12	1.00
2009 1 12			3:56	8:36	13:15	6: 2	+16.0	142	18:38			18:45	8:47	0.99
2009 1 13			3:51	8:31	13:11	6: 2	+16.6	143	18:39			20: 8	9:14	0.95
2009 1 14			3:46	8:26	13: 6	6: 2	+17.1	144	18:40			21:26	9:37	0.89
2009 1 15			3:40	8:21	13: 1	6: 1	+17.6	145	18:41			22:40	9:57	0.81
2009 1 16			3:35	8:16	12:56	6: 1	+18.1	146	18:42			23:52	10:16	0.71
2009 1 17			3:29	8:10	12:51	6: 0	+18.6	147	18:43		s 1: 2	10:36	0.61	
2009 1 18			3:24	8: 5	12:47	6: 0	+19.1	149	18:44			10:58	0.51	
2009 1 19			3:18	8: 0	12:42	5:59	+19.6	150	18:46			2:11	11:23	0.41
2009 1 20			3:12	7:54	12:36	5:59	+20.1	151	18:47			3:18	11:54	0.32
2009 1 21			3: 6	7:49	12:31	5:58	+20.6	152	18:48			4:21	12:32	0.24
2009 1 22			3: 0	7:43	12:26	5:58	+21.1	153	18:49			5:18	13:18	0.16
2009 1 23			2:54	7:37	12:21	5:57	+21.6	154	18:50			6: 7	14:12	0.10
2009 1 24			2:48	7:32	12:16	5:56	+22.1	155	18:52			6:48	15:12	0.05
2009 1 25			2:41	7:26	12:10	5:56	+22.5	157	18:53			7:21	16:17	0.02
2009 1 26			2:35	7:19	12: 5	5:55	+23.0	158	18:54			7:47	17:24	0.00
2009 1 27			2:28	7:13	11:59	5:54	+23.5	159	18:55			8:10	18:31	0.00
2009 1 28			2:21	7: 7	11:53	5:53	+24.0	161	18:57			8:29	19:37	0.03
2009 1 29			2:13	7: 0	11:47	5:52	+24.4	162	18:58			8:47	20:44	0.07
2009 1 30			2: 6	6:53	11:41	5:51	+24.9	164	18:59			9: 4	21:52	0.13
2009 1 31			1:58	6:46	11:35	5:50	+25.4	165	19: 0			9:23	23: 3	0.20
2009 2 1			1:50	6:39	11:29	5:49	+25.9	167	19: 2			9:43s	0:16	0.29
2009 2 2			1:41	6:32	11:22	5:48	+26.3	168	19: 3			10: 7s	1:32	0.40
2009 2 3			1:32	6:24	11:16	5:47	+26.8	170	19: 4			10:39		0.51
2009 2 4			1:23	6:16	11: 9	5:46	+27.3	172	19: 5			11:20	2:49	0.62
2009 2 5			1:13	6: 7	11: 2	5:45	+27.7	174	19: 7			12:14	4: 3	0.72
2009 2 6			1: 3	5:58	10:54	5:44	+28.2	176	19: 8			13:23	5: 8	0.82
2009 2 7s			0:40	5:49	10:47	5:43	+28.7	178	19: 9			14:43	6: 0	0.90
2009 2 8s			0:28	5:39	10:39	5:41	+29.1	181	19:11			16: 9	6:40	0.96
2009 2 9s			0:15	5:29	10:31	5:40	+29.5	183	19:12			17:34	7:11	0.99
2009 2 10s			0: 1	5:18	10:22	5:39	+30.0	186	19:13			18:55	7:36	1.00
2009 2 11			23:46	5: 7	10:14	5:38	+30.3	189	19:15			20:14	7:57	0.97
2009 2 12			23:30	4:54	10: 4	5:36	+30.7	192	19:16			21:29	8:18	0.92
2009 2 13			23:13	4:42	9:55	5:35	+31.0	195	19:17			22:43	8:38	0.86
2009 2 14			22:54	4:28	9:44	5:34	+31.2	199	19:19			23:54	8:59	0.78
2009 2 15			22:34	4:13	9:34	5:32	+31.3	203	19:20		s 1: 4	9:24	0.68	
2009 2 16			22:13	3:57	9:23	5:31	+31.3	208	19:21			9:53	0.59	
2009 2 17			21:50	3:41	9:11	5:29	+31.1	212	19:23			2:11	10:28	0.49
2009 2 18			21:25	3:23	8:59	5:28	+30.7	217	19:24			3:11	11:12	0.40
2009 2 19			20:59	3: 4	8:46	5:26	+30.1	223	19:25			4: 4	12: 3	0.31
2009 2 20			20:32	2:44	8:33	5:25	+29.3	228	19:27			4:47	13: 2	0.22

Year	MM	DD	Rise	Culm.	Set.	IC ->	Alt	Azi	FC ->	Alt	Azi	MoSo	MoTr	F.L.
2009	2	21	20: 3	2:24	8:19	5:23	+28.2	234	19:28			5:23	14: 6	0.15
2009	2	22	19:33	2: 2	8: 5	5:21	+26.7	240	19:29			5:52	15:12	0.09
2009	2	23	19: 3	1:40	7:51	5:20	+25.0	246	19:31	+4.3	89	6:15	16:20	0.04
2009	2	24	18:32	1:17	7:36	5:18	+23.0	252	19:32	+9.9	92	6:36	17:27	0.01
2009	2	25	18: 1s	0:32	7:21	5:16	+20.9	257	19:34	+15.4	95	6:55	18:35	0.00
2009	2	26	17:32s	0: 9	7: 6	5:15	+18.6	263	19:35	+20.9	98	7:12	19:44	0.01
2009	2	27	17: 3	23:48	6:51	5:13	+16.2	268	19:36	+26.1	101	7:31	20:54	0.04
2009	2	28	16:35	23:27	6:37	5:11	+13.9	273	19:38	+31.0	105	7:51	22: 7	0.09
2009	3	1	16: 9	23: 7	6:22	5: 9	+11.6	277	19:39	+35.6	108	8:14	23:22	0.16
2009	3	2	15:44	22:48	6: 8	5: 8	+9.4	281	19:41	+39.9	112	8:43s	0:38	0.25
2009	3	3	15:21	22:30	5:55	5: 6	+7.4	285	19:42	+43.7	116	9:20s	1:51	0.35
2009	3	4	15: 0	22:13	5:42	5: 4	+5.4	288	19:43	+47.3	120	10: 8		0.46
2009	3	5	14:40	21:58	5:29	5: 2	+3.7	291	19:45	+50.4	124	11: 9	2:57	0.58
2009	3	6	14:22	21:43	5:17	5: 0	+2.1	294	19:46	+53.2	129	12:23	3:51	0.69
2009	3	7	14: 5	21:29	5: 6	4:58	+0.7	297	19:48	+55.7	134	13:43	4:34	0.79
2009	3	8	13:49	21:16	4:55	4:56	-0.4	299	19:49	+57.9	138	15: 5	5: 8	0.88
2009	3	9	13:35	21: 4	4:45	4:54			19:51	+59.7	144	16:27	5:35	0.94
2009	3	10	13:21	20:53	4:35	4:53			19:52	+61.3	149	17:45	5:58	0.98
2009	3	11	13: 9	20:42	4:25	4:51			19:54	+62.6	155	19: 2	6:18	1.00
2009	3	12	12:57	20:32	4:16	4:49			19:55	+63.6	160	20:17	6:38	0.99
2009	3	13	12:46	20:22	4: 7	4:47			19:56	+64.4	166	21:31	7: 0	0.96
2009	3	14	12:36	20:13	3:59	4:45			19:58	+64.9	172	22:44	7:23	0.90
2009	3	15	12:26	20: 4	3:50	4:42			19:59	+65.3	177	23:54	7:51	0.83
2009	3	16	12:17	19:56	3:43	4:40			20: 1	+65.4	183s	0:58	8:24	0.75
2009	3	17	12: 8	19:48	3:35	4:38			20: 2	+65.4	188s	1:55	9: 5	0.66
2009	3	18	12: 0	19:40	3:28	4:36			20: 4	+65.2	193		9:54	0.57
2009	3	19	11:52	19:33	3:21	4:34			20: 5	+64.8	198	2:43	10:50	0.48
2009	3	20	11:44	19:26	3:14	4:32			20: 7	+64.4	203	3:22	11:53	0.38
2009	3	21	11:37	19:19	3: 8	4:30			20: 9	+63.8	207	3:53	12:58	0.29
2009	3	22	11:30	19:12	3: 1	4:28			20:10	+63.2	211	4:19	14: 5	0.21
2009	3	23	11:23	19: 6	2:55	4:26			20:12	+62.5	215	4:41	15:13	0.14
2009	3	24	11:17	19: 0	2:49	4:23			20:13	+61.7	218	5: 0	16:20	0.08
2009	3	25	11:10	18:54	2:43	4:21			20:15	+60.9	222	5:19	17:29	0.03

IC = Beginning of astronomical twilight, in U.T.+1

Alt = height of the comet at IC or at FC

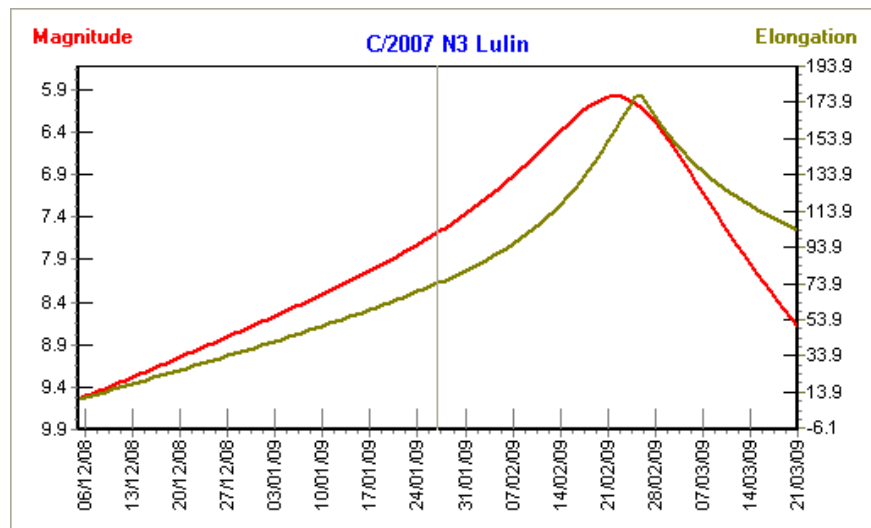
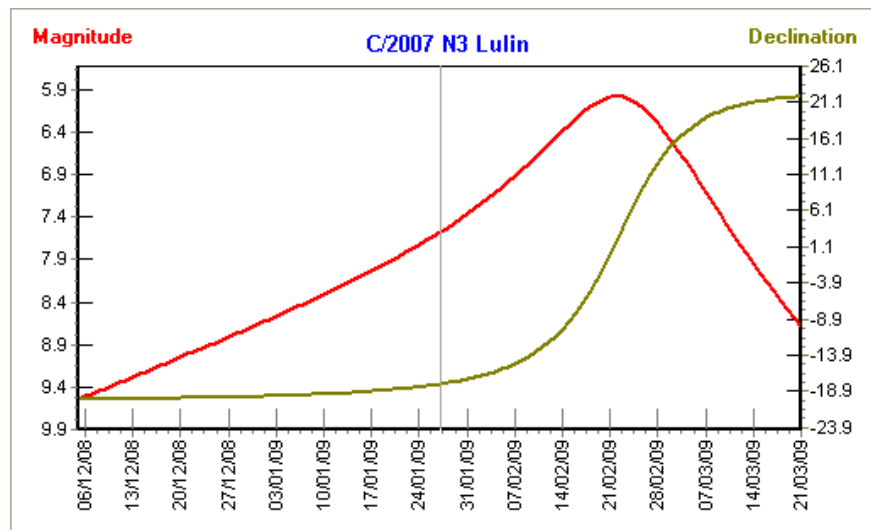
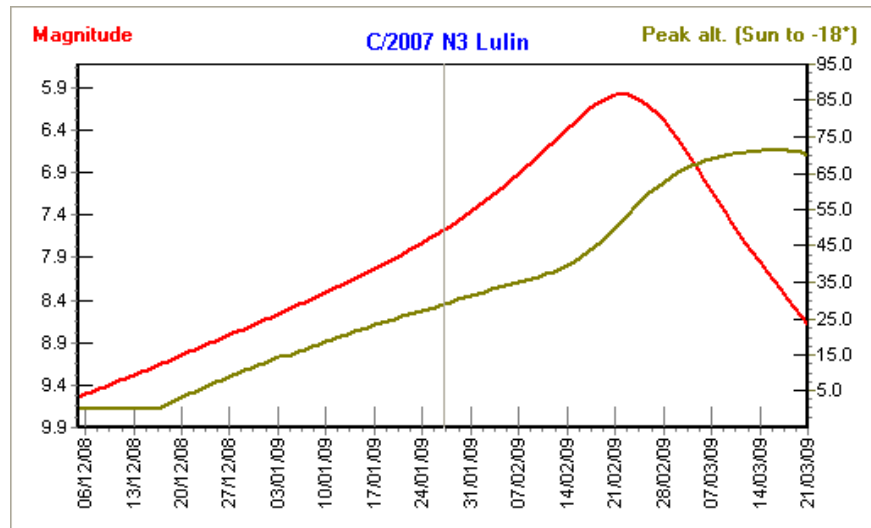
Azi = azimuth of the comet at IC or at FC

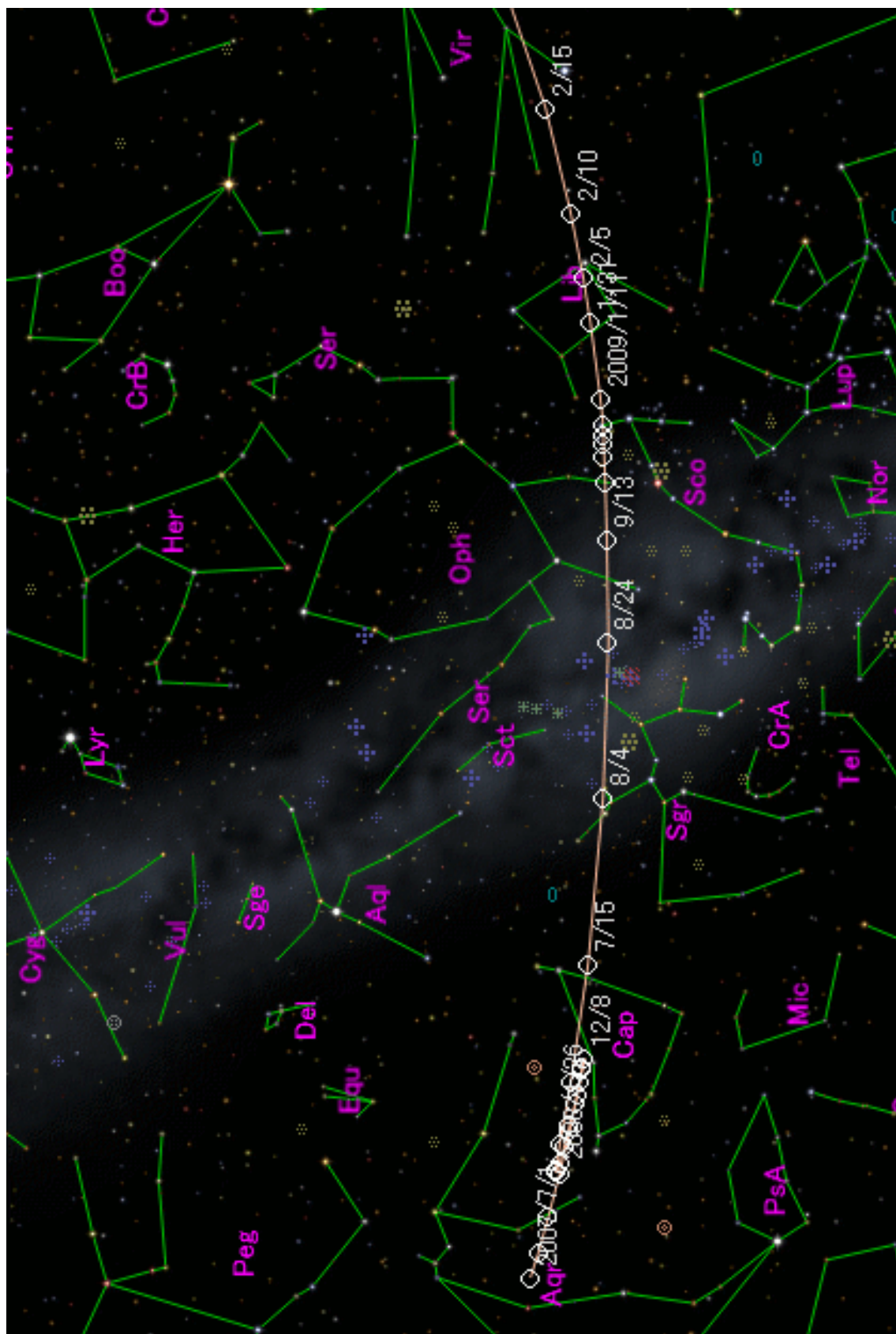
FC = Ending of astronomical twilight, in U.T.+1

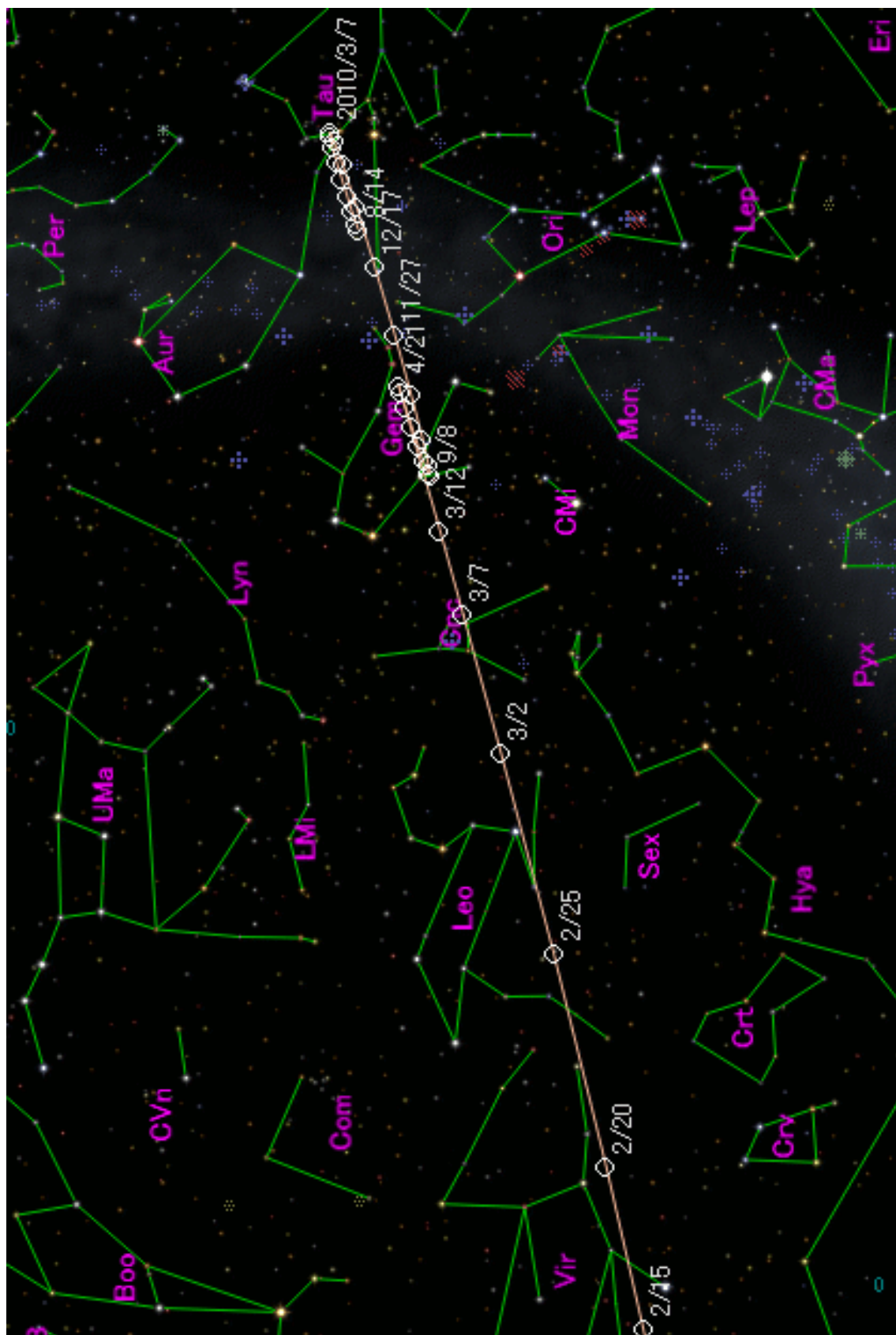
MoSo = Rising of the Moon

MoTr = Setting of the Moon

F.L. = Illumination of the Moon, 0 new Moon, 1 full Moon







22P/Kopff

Epoch 2009 May 9.0 TT = JDT 2454960.5

T 2009 May 25.4020 TT

		(2000.0)	P	Q
q	1.577587			
n	0.1529943	Peri. 162.8161	+0.2379474	+0.9687039
a	3.462203	Node 120.8985	-0.9005287	+0.2472897
e	0.544340	Incl. 4.7239	-0.3639081	+0.0214590
P	6.44			

MPC

Date	TT	R. A. (2000)	Decl.	Delta	r	Elong.	Phase	m1	m2
2009 04 18		20 02.99	-16 34.6	1.299	1.622	88.6	38.2	9.0	19.7
2009 04 19		20 05.72	-16 27.9	1.290	1.620	88.9	38.3	9.0	19.6
2009 04 20		20 08.45	-16 21.2	1.282	1.617	89.2	38.4	9.0	19.6
2009 04 21		20 11.17	-16 14.3	1.273	1.615	89.5	38.5	8.9	19.6
2009 04 22		20 13.89	-16 07.4	1.265	1.613	89.8	38.5	8.9	19.6
2009 04 23		20 16.59	-16 00.4	1.257	1.611	90.1	38.6	8.9	19.6
2009 04 24		20 19.29	-15 53.3	1.248	1.609	90.4	38.7	8.9	19.6
2009 04 25		20 21.98	-15 46.1	1.240	1.607	90.8	38.8	8.8	19.5
2009 04 26		20 24.66	-15 38.9	1.232	1.605	91.1	38.8	8.8	19.5
2009 04 27		20 27.32	-15 31.5	1.224	1.603	91.4	38.9	8.8	19.5
2009 04 28		20 29.98	-15 24.2	1.216	1.602	91.7	38.9	8.7	19.5
2009 04 29		20 32.63	-15 16.7	1.208	1.600	92.0	39.0	8.7	19.5
2009 04 30		20 35.27	-15 09.2	1.200	1.598	92.4	39.0	8.7	19.5
2009 05 01		20 37.90	-15 01.6	1.193	1.597	92.7	39.1	8.7	19.5
2009 05 02		20 40.51	-14 54.0	1.185	1.595	93.0	39.1	8.6	19.4
2009 05 03		20 43.11	-14 46.4	1.177	1.594	93.3	39.2	8.6	19.4
2009 05 04		20 45.71	-14 38.7	1.170	1.592	93.7	39.2	8.6	19.4
2009 05 05		20 48.29	-14 30.9	1.162	1.591	94.0	39.2	8.6	19.4
2009 05 06		20 50.85	-14 23.2	1.155	1.590	94.3	39.3	8.5	19.4
2009 05 07		20 53.41	-14 15.4	1.148	1.588	94.7	39.3	8.5	19.4
2009 05 08		20 55.95	-14 07.6	1.140	1.587	95.0	39.3	8.5	19.4
2009 05 09		20 58.48	-13 59.8	1.133	1.586	95.3	39.3	8.5	19.3
2009 05 10		21 00.99	-13 51.9	1.126	1.585	95.7	39.3	8.5	19.3
2009 05 11		21 03.49	-13 44.1	1.119	1.584	96.0	39.3	8.4	19.3
2009 05 12		21 05.98	-13 36.2	1.112	1.583	96.4	39.3	8.4	19.3
2009 05 13		21 08.45	-13 28.4	1.105	1.583	96.7	39.4	8.4	19.3
2009 05 14		21 10.91	-13 20.5	1.099	1.582	97.1	39.3	8.4	19.3
2009 05 15		21 13.34	-13 12.7	1.092	1.581	97.4	39.3	8.4	19.2
2009 05 16		21 15.77	-13 04.9	1.085	1.580	97.8	39.3	8.3	19.2
2009 05 17		21 18.17	-12 57.1	1.079	1.580	98.2	39.3	8.3	19.2
2009 05 18		21 20.56	-12 49.4	1.072	1.579	98.5	39.3	8.3	19.2
2009 05 19		21 22.94	-12 41.6	1.066	1.579	98.9	39.3	8.3	19.2
2009 05 20		21 25.29	-12 34.0	1.059	1.579	99.3	39.2	8.3	19.2
2009 05 21		21 27.62	-12 26.4	1.053	1.578	99.7	39.2	8.3	19.2
2009 05 22		21 29.94	-12 18.8	1.047	1.578	100.1	39.2	8.2	19.1
2009 05 23		21 32.24	-12 11.3	1.040	1.578	100.4	39.1	8.2	19.1
2009 05 24		21 34.51	-12 03.9	1.034	1.578	100.8	39.1	8.2	19.1
2009 05 25		21 36.77	-11 56.5	1.028	1.578	101.2	39.0	8.2	19.1
2009 05 26		21 39.01	-11 49.2	1.022	1.578	101.6	39.0	8.2	19.1
2009 05 27		21 41.22	-11 42.0	1.016	1.578	102.0	38.9	8.2	19.1
2009 05 28		21 43.42	-11 34.9	1.010	1.578	102.5	38.8	8.2	19.1
2009 05 29		21 45.59	-11 27.9	1.004	1.578	102.9	38.8	8.2	19.0
2009 05 30		21 47.74	-11 21.0	0.999	1.578	103.3	38.7	8.1	19.0
2009 05 31		21 49.86	-11 14.2	0.993	1.579	103.7	38.6	8.1	19.0
2009 06 01		21 51.97	-11 07.5	0.987	1.579	104.2	38.5	8.1	19.0
2009 06 02		21 54.05	-11 00.9	0.982	1.579	104.6	38.4	8.1	19.0
2009 06 03		21 56.11	-10 54.4	0.976	1.580	105.1	38.3	8.1	19.0
2009 06 04		21 58.14	-10 48.1	0.971	1.581	105.5	38.2	8.1	19.0
2009 06 05		22 00.15	-10 41.9	0.965	1.581	106.0	38.1	8.1	18.9
2009 06 06		22 02.13	-10 35.8	0.960	1.582	106.4	38.0	8.1	18.9
2009 06 07		22 04.09	-10 29.9	0.955	1.583	106.9	37.8	8.1	18.9
2009 06 08		22 06.03	-10 24.1	0.950	1.584	107.4	37.7	8.1	18.9
2009 06 09		22 07.93	-10 18.5	0.944	1.584	107.9	37.6	8.1	18.9
2009 06 10		22 09.81	-10 13.0	0.939	1.585	108.4	37.4	8.1	18.9
2009 06 11		22 11.67	-10 07.7	0.934	1.586	108.9	37.3	8.1	18.9
2009 06 12		22 13.49	-10 02.6	0.929	1.588	109.4	37.1	8.1	18.8
2009 06 13		22 15.29	-09 57.6	0.924	1.589	109.9	37.0	8.1	18.8
2009 06 14		22 17.06	-09 52.8	0.920	1.590	110.4	36.8	8.1	18.8
2009 06 15		22 18.80	-09 48.2	0.915	1.591	110.9	36.6	8.1	18.8
2009 06 16		22 20.51	-09 43.8	0.910	1.593	111.5	36.4	8.0	18.8
2009 06 17		22 22.19	-09 39.6	0.905	1.594	112.0	36.2	8.0	18.8
2009 06 18		22 23.83	-09 35.6	0.901	1.595	112.6	36.0	8.0	18.8

Year	MM	DD	Rise	Culm.	Set.	IC ->	Alt	Azi	FC ->	Alt	Azi	MoSo	MoTr	F.L.
2009	4	18	1:35	6:29	11:22	3:26	+15.1	135	20:57			2:20	11:50	0.46
2009	4	19	1:33	6:27	11:22	3:24	+15.1	134	20:59			2:43	12:56	0.37
2009	4	20	1:32	6:26	11:21	3:21	+15.0	134	21: 1			3: 4	14: 3	0.27
2009	4	21	1:30	6:25	11:20	3:19	+15.0	134	21: 3			3:23	15:11	0.19
2009	4	22	1:28	6:24	11:19	3:17	+15.0	134	21: 5			3:41	16:21	0.12
2009	4	23	1:26	6:22	11:19	3:14	+14.9	133	21: 7			4: 1	17:33	0.06
2009	4	24	1:24	6:21	11:18	3:12	+14.9	133	21: 9			4:22	18:49	0.02
2009	4	25	1:23	6:20	11:17	3: 9	+14.8	133	21:11			4:49	20: 7	0.00
2009	4	26	1:21	6:19	11:17	3: 7	+14.8	132	21:13			5:22	21:25	0.01
2009	4	27	1:19	6:17	11:16	3: 5	+14.7	132	21:15			6: 4	22:38	0.05
2009	4	28	1:17	6:16	11:15	3: 2	+14.7	132	21:17			6:59	23:40	0.11
2009	4	29	1:15	6:15	11:14	3: 0	+14.7	131	21:20			8: 6s	0:30	0.19
2009	4	30	1:13	6:13	11:14	2:57	+14.6	131	21:22			9:22s	1: 9	0.29
2009	5	1	1:11	6:12	11:13	2:55	+14.6	131	21:24			10:40		0.40
2009	5	2	1:10	6:11	11:12	2:53	+14.6	131	21:26			11:58	1:39	0.52
2009	5	3	1: 8	6: 9	11:11	2:50	+14.5	130	21:28			13:14	2: 4	0.63
2009	5	4	1: 6	6: 8	11:10	2:48	+14.5	130	21:30			14:28	2:25	0.73
2009	5	5	1: 4	6: 7	11:10	2:46	+14.5	130	21:33			15:41	2:45	0.82
2009	5	6	1: 2	6: 5	11: 9	2:43	+14.5	129	21:35			16:53	3: 5	0.89
2009	5	7	1: 0	6: 4	11: 8	2:41	+14.5	129	21:37			18: 5	3:26	0.95
2009	5	8s	0:56	6: 2	11: 7	2:39	+14.4	129	21:39			19:16	3:50	0.98
2009	5	9s	0:54	6: 1	11: 6	2:36	+14.4	129	21:41			20:26	4:19	1.00
2009	5	10s	0:52	6: 0	11: 6	2:34	+14.4	128	21:44			21:30	4:54	0.99
2009	5	11s	0:50	5:58	11: 5	2:32	+14.4	128	21:46			22:26	5:37	0.97
2009	5	12s	0:48	5:57	11: 4	2:29	+14.4	128	21:48			23:13	6:28	0.92
2009	5	13s	0:46	5:55	11: 3	2:27	+14.4	128	21:50			23:50	7:27	0.87
2009	5	14s	0:43	5:54	11: 2	2:25	+14.4	127	21:53			s 0:21	8:30	0.80
2009	5	15s	0:41	5:52	11: 1	2:23	+14.4	127	21:55			s 0:45	9:36	0.71
2009	5	16s	0:39	5:51	11: 0	2:20	+14.4	127	21:57			s 1: 7	10:42	0.63
2009	5	17s	0:37	5:49	10:59	2:18	+14.4	127	21:59				11:48	0.53
2009	5	18s	0:35	5:47	10:58	2:16	+14.4	127	22: 2			1:26	12:54	0.43
2009	5	19s	0:33	5:46	10:57	2:14	+14.5	126	22: 4			1:44	14: 2	0.34
2009	5	20s	0:31	5:44	10:56	2:12	+14.5	126	22: 6			2: 3	15:12	0.24
2009	5	21s	0:28	5:43	10:55	2:10	+14.5	126	22: 8			2:23	16:26	0.16
2009	5	22s	0:26	5:41	10:54	2: 8	+14.6	126	22:11			2:47	17:42	0.09
2009	5	23s	0:24	5:39	10:53	2: 5	+14.6	126	22:13			3:17	19: 1	0.03
2009	5	24s	0:22	5:38	10:52	2: 3	+14.7	126	22:15			3:56	20:18	0.01
2009	5	25s	0:20	5:36	10:50	2: 1	+14.7	125	22:17			4:47	21:27	0.00
2009	5	26s	0:17	5:34	10:49	1:59	+14.8	125	22:19			5:51	22:23	0.03
2009	5	27s	0:15	5:32	10:48	1:58	+14.8	125	22:22			7: 6	23: 7	0.09
2009	5	28s	0:13	5:31	10:47	1:56	+14.9	125	22:24			8:27	23:41	0.17
2009	5	29s	0:10	5:29	10:45	1:54	+15.0	125	22:26			9:47s	0: 7	0.27
2009	5	30s	0: 8	5:27	10:44	1:52	+15.1	125	22:28			11: 5s	0:30	0.37
2009	5	31s	0: 6	5:25	10:43	1:50	+15.2	125	22:30			12:19s	0:50	0.49
2009	6	1s	0: 3	5:23	10:41	1:49	+15.3	125	22:32			13:32s	1:10	0.60
2009	6	2s	0: 1	5:22	10:40	1:47	+15.4	125	22:34			14:43		0.70
2009	6	3	23:59	5:20	10:38	1:45	+15.6	125	22:35			15:54	1:30	0.79
2009	6	4	23:56	5:18	10:37	1:44	+15.7	125	22:37			17: 4	1:53	0.87
2009	6	5	23:54	5:16	10:35	1:42	+15.9	125	22:39			18:13	2:20	0.93
2009	6	6	23:52	5:14	10:34	1:41	+16.0	125	22:41			19:19	2:52	0.97
2009	6	7	23:49	5:12	10:32	1:40	+16.2	125	22:42			20:18	3:32	0.99
2009	6	8	23:47	5:10	10:31	1:39	+16.4	125	22:44			21: 8	4:20	1.00
2009	6	9	23:44	5: 8	10:29	1:37	+16.6	125	22:45			21:49	5:17	0.99
2009	6	10	23:42	5: 6	10:27	1:36	+16.8	125	22:47			22:21	6:19	0.95
2009	6	11	23:39	5: 4	10:26	1:35	+17.0	126	22:48			22:48	7:24	0.91
2009	6	12	23:37	5: 1	10:24	1:35	+17.3	126	22:49			23:10	8:30	0.85
2009	6	13	23:34	4:59	10:22	1:34	+17.6	126	22:50			23:30	9:36	0.77
2009	6	14	23:32	4:57	10:20	1:33	+17.8	126	22:51			23:48	10:41	0.69
2009	6	15	23:29	4:55	10:18	1:33	+18.1	127	22:52			s 0: 6	11:47	0.59
2009	6	16	23:27	4:53	10:16	1:32	+18.4	127	22:53			s 0:25	12:55	0.49
2009	6	17	23:24	4:50	10:14	1:32	+18.8	127	22:54			s 0:47	14: 5	0.39
2009	6	18	23:21	4:48	10:12	1:32	+19.1	128	22:54				15:19	0.29

IC = Beginning of astronomical twilight, in U.T.+1

Alz = height of the comet at IC or at FC

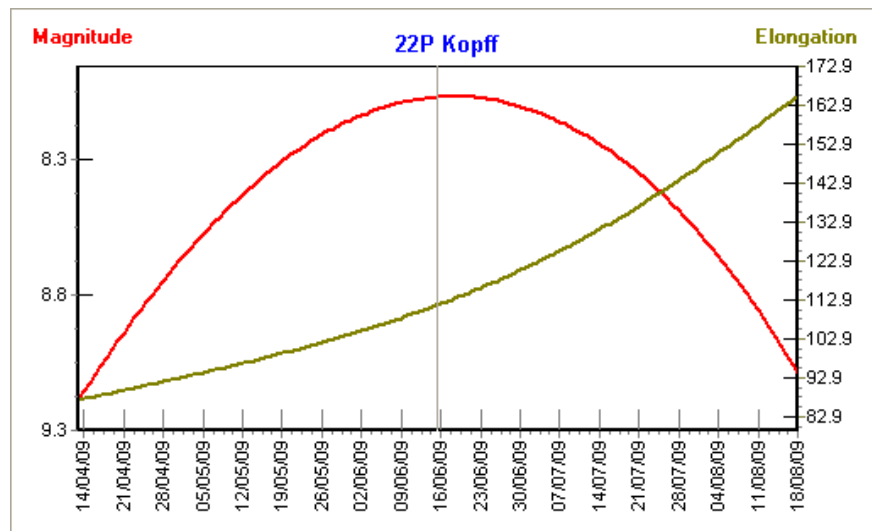
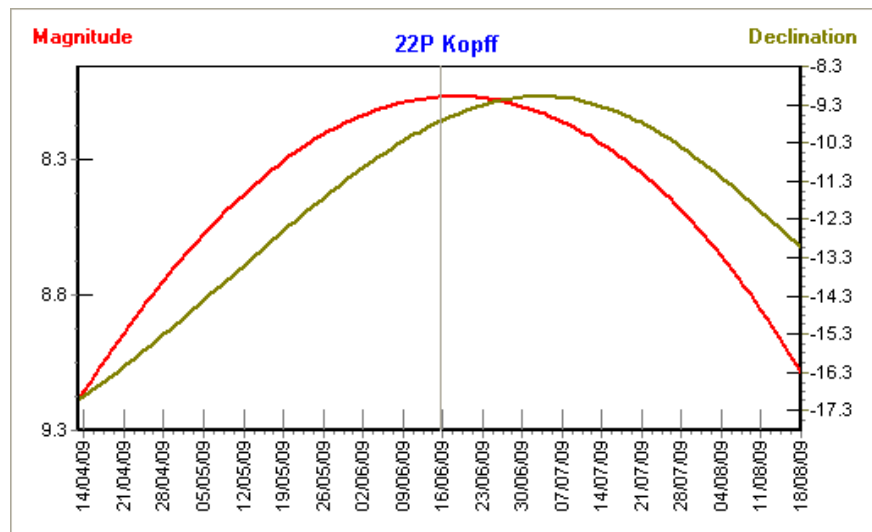
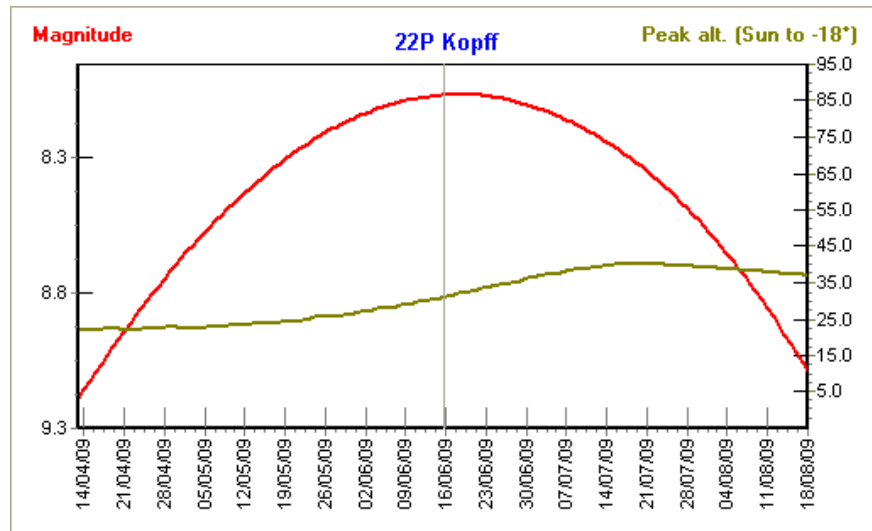
Azi = azimuth of the comet at IC or at FC

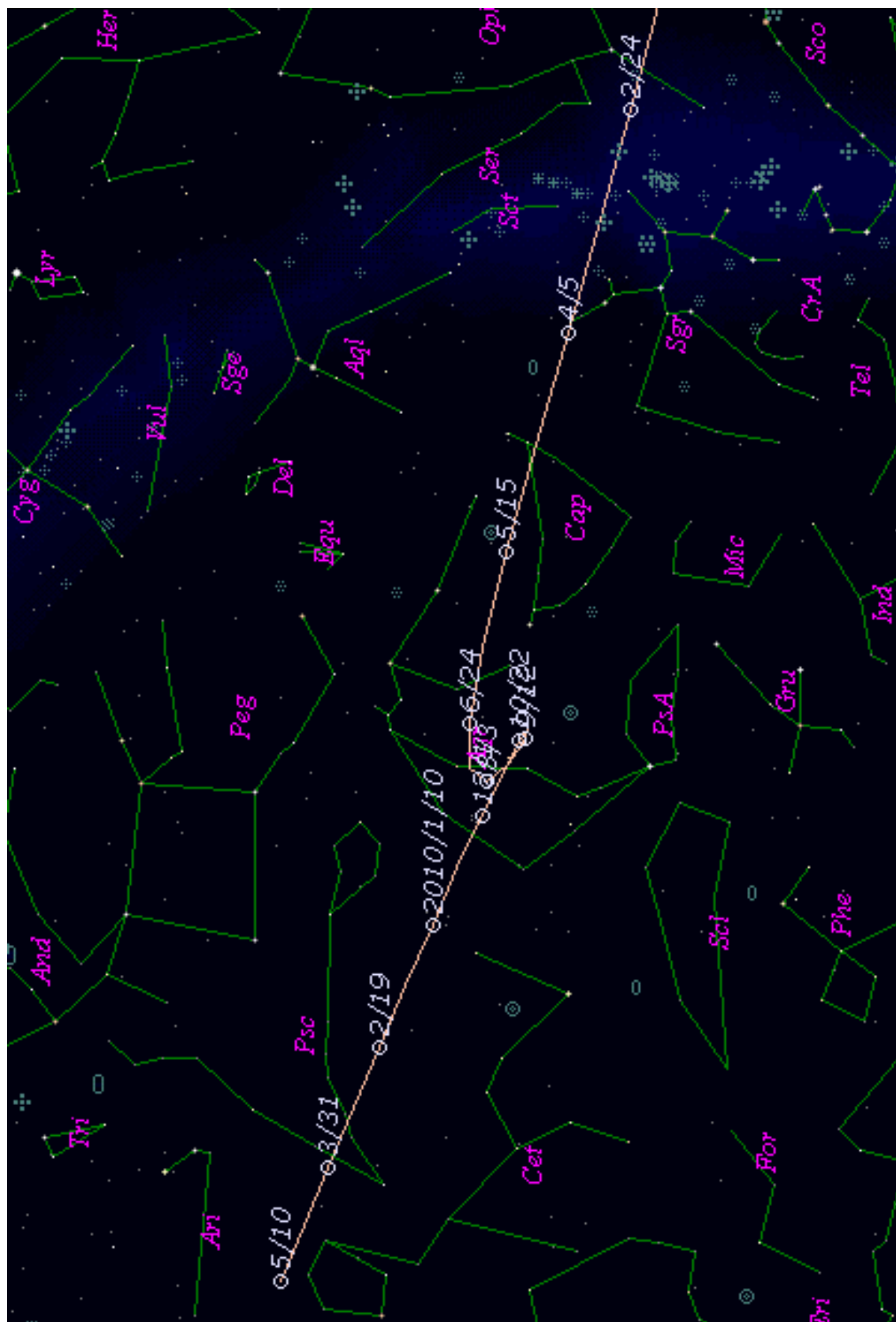
FC = Ending of astronomical twilight, in U.T.+1

MoSo = Rising of the Moon

MoTr = Setting of the Moon

F.L. = Illumination of the Moon, 0 new Moon, 1 full Moon





C/2008 T2 (Cardinal)
T 2009 June 16.292 TT
q 1.22108

(2000.0)

P

MPC

Q

Peri.	214.987	-0.777226	+0.028871
Node	310.793	+0.566866	-0.401441
Incl.	56.124	-0.273099	-0.915430

Date	TT	R. A. (2000)	Decl.	Delta	r	Elong.	Phase	m1
2009 04 19		05 41.00	+35 12.7	1.783	1.511	57.9	34.3	9.0
2009 04 20		05 43.38	+34 41.1	1.784	1.502	57.3	34.3	9.0
2009 04 21		05 45.76	+34 09.5	1.785	1.494	56.8	34.3	9.0
2009 04 22		05 48.13	+33 37.8	1.786	1.485	56.2	34.2	9.0
2009 04 23		05 50.50	+33 06.0	1.788	1.477	55.7	34.2	9.0
2009 04 24		05 52.86	+32 34.2	1.789	1.468	55.2	34.2	8.9
2009 04 25		05 55.21	+32 02.2	1.790	1.460	54.6	34.2	8.9
2009 04 26		05 57.55	+31 30.2	1.792	1.452	54.1	34.2	8.9
2009 04 27		05 59.89	+30 58.1	1.793	1.444	53.6	34.1	8.9
2009 04 28		06 02.23	+30 25.9	1.794	1.436	53.1	34.1	8.8
2009 04 29		06 04.55	+29 53.7	1.795	1.428	52.6	34.1	8.8
2009 04 30		06 06.87	+29 21.3	1.797	1.421	52.1	34.0	8.8
2009 05 01		06 09.19	+28 48.9	1.798	1.413	51.6	34.0	8.8
2009 05 02		06 11.49	+28 16.4	1.799	1.406	51.1	33.9	8.8
2009 05 03		06 13.80	+27 43.8	1.801	1.398	50.6	33.9	8.7
2009 05 04		06 16.09	+27 11.1	1.802	1.391	50.1	33.8	8.7
2009 05 05		06 18.38	+26 38.3	1.803	1.384	49.7	33.8	8.7
2009 05 06		06 20.66	+26 05.5	1.804	1.377	49.2	33.7	8.7
2009 05 07		06 22.94	+25 32.5	1.806	1.370	48.8	33.6	8.7
2009 05 08		06 25.21	+24 59.5	1.807	1.363	48.3	33.6	8.6
2009 05 09		06 27.48	+24 26.4	1.808	1.356	47.9	33.5	8.6
2009 05 10		06 29.74	+23 53.2	1.809	1.350	47.4	33.4	8.6
2009 05 11		06 31.99	+23 19.9	1.811	1.344	47.0	33.4	8.6
2009 05 12		06 34.24	+22 46.5	1.812	1.337	46.6	33.3	8.6
2009 05 13		06 36.49	+22 13.0	1.813	1.331	46.2	33.2	8.5
2009 05 14		06 38.73	+21 39.4	1.814	1.325	45.8	33.1	8.5
2009 05 15		06 40.96	+21 05.8	1.815	1.319	45.4	33.1	8.5
2009 05 16		06 43.20	+20 32.0	1.816	1.314	45.0	33.0	8.5
2009 05 17		06 45.42	+19 58.2	1.817	1.308	44.7	32.9	8.5
2009 05 18		06 47.65	+19 24.3	1.818	1.303	44.3	32.8	8.4
2009 05 19		06 49.87	+18 50.3	1.819	1.297	43.9	32.8	8.4
2009 05 20		06 52.08	+18 16.1	1.821	1.292	43.6	32.7	8.4
2009 05 21		06 54.30	+17 41.9	1.822	1.287	43.3	32.6	8.4
2009 05 22		06 56.51	+17 07.6	1.822	1.283	42.9	32.5	8.4
2009 05 23		06 58.71	+16 33.3	1.823	1.278	42.6	32.4	8.4
2009 05 24		07 00.92	+15 58.8	1.824	1.273	42.3	32.4	8.4
2009 05 25		07 03.12	+15 24.2	1.825	1.269	42.0	32.3	8.3
2009 05 26		07 05.32	+14 49.5	1.826	1.265	41.7	32.2	8.3
2009 05 27		07 07.52	+14 14.8	1.827	1.261	41.5	32.1	8.3
2009 05 28		07 09.72	+13 39.9	1.828	1.257	41.2	32.1	8.3
2009 05 29		07 11.91	+13 05.0	1.828	1.254	41.0	32.0	8.3
2009 05 30		07 14.10	+12 29.9	1.829	1.250	40.7	31.9	8.3
2009 05 31		07 16.30	+11 54.8	1.830	1.247	40.5	31.9	8.3
2009 06 01		07 18.49	+11 19.6	1.831	1.244	40.3	31.8	8.3
2009 06 02		07 20.68	+10 44.2	1.831	1.241	40.1	31.8	8.3
2009 06 03		07 22.87	+10 08.8	1.832	1.238	39.9	31.7	8.2
2009 06 04		07 25.06	+09 33.3	1.832	1.236	39.7	31.6	8.2
2009 06 05		07 27.25	+08 57.8	1.833	1.234	39.6	31.6	8.2
2009 06 06		07 29.44	+08 22.1	1.834	1.232	39.4	31.5	8.2
2009 06 07		07 31.64	+07 46.3	1.834	1.230	39.3	31.5	8.2
2009 06 08		07 33.83	+07 10.4	1.835	1.228	39.2	31.5	8.2
2009 06 09		07 36.03	+06 34.5	1.835	1.226	39.0	31.4	8.2
2009 06 10		07 38.22	+05 58.5	1.835	1.225	38.9	31.4	8.2
2009 06 11		07 40.42	+05 22.3	1.836	1.224	38.8	31.4	8.2
2009 06 12		07 42.63	+04 46.1	1.836	1.223	38.8	31.3	8.2
2009 06 13		07 44.83	+04 09.8	1.837	1.222	38.7	31.3	8.2
2009 06 14		07 47.05	+03 33.5	1.837	1.222	38.7	31.3	8.2
2009 06 15		07 49.26	+02 57.0	1.837	1.221	38.6	31.3	8.2
2009 06 16		07 51.48	+02 20.5	1.838	1.221	38.6	31.3	8.2
2009 06 17		07 53.71	+01 43.8	1.838	1.221	38.6	31.3	8.2
2009 06 18		07 55.94	+01 07.1	1.838	1.221	38.6	31.3	8.2
2009 06 19		07 58.17	+00 30.3	1.839	1.222	38.6	31.3	8.2
2009 06 20		08 00.42	-00 06.6	1.839	1.222	38.6	31.3	8.2
2009 06 21		08 02.67	-00 43.5	1.839	1.223	38.7	31.3	8.2
2009 06 22		08 04.92	-01 20.5	1.839	1.224	38.7	31.3	8.2
2009 06 23		08 07.19	-01 57.7	1.840	1.226	38.8	31.3	8.2
2009 06 24		08 09.46	-02 34.8	1.840	1.227	38.8	31.3	8.2
2009 06 25		08 11.74	-03 12.1	1.840	1.229	38.9	31.3	8.2
2009 06 26		08 14.03	-03 49.4	1.841	1.230	39.0	31.3	8.2
2009 06 27		08 16.33	-04 26.8	1.841	1.232	39.1	31.4	8.2
2009 06 28		08 18.64	-05 04.3	1.841	1.235	39.2	31.4	8.2
2009 06 29		08 20.96	-05 41.9	1.842	1.237	39.4	31.4	8.2
2009 06 30		08 23.29	-06 19.5	1.842	1.240	39.5	31.4	8.3
2009 07 01		08 25.63	-06 57.1	1.842	1.242	39.6	31.5	8.3
2009 07 02		08 27.99	-07 34.8	1.843	1.245	39.8	31.5	8.3

Date	TT	R. A. (2000)	Decl.	Delta	r	Elong.	Phase	m1
2009 07 03		08 30.35	-08 12.6	1.843	1.248	40.0	31.5	8.3
2009 07 04		08 32.73	-08 50.4	1.844	1.252	40.1	31.6	8.3
2009 07 05		08 35.12	-09 28.3	1.844	1.255	40.3	31.6	8.3
2009 07 06		08 37.53	-10 06.2	1.845	1.259	40.5	31.6	8.3
2009 07 07		08 39.95	-10 44.2	1.845	1.263	40.7	31.7	8.3
2009 07 08		08 42.38	-11 22.2	1.846	1.267	40.9	31.7	8.4
2009 07 09		08 44.83	-12 00.2	1.847	1.271	41.1	31.7	8.4
2009 07 10		08 47.30	-12 38.3	1.848	1.275	41.3	31.8	8.4
2009 07 11		08 49.78	-13 16.4	1.848	1.280	41.6	31.8	8.4
2009 07 12		08 52.28	-13 54.5	1.849	1.284	41.8	31.8	8.4
2009 07 13		08 54.80	-14 32.6	1.850	1.289	42.0	31.9	8.4
2009 07 14		08 57.34	-15 10.8	1.851	1.294	42.3	31.9	8.5
2009 07 15		08 59.89	-15 48.9	1.852	1.299	42.5	31.9	8.5
2009 07 16		09 02.46	-16 27.1	1.854	1.305	42.8	31.9	8.5
2009 07 17		09 05.06	-17 05.2	1.855	1.310	43.0	31.9	8.5
2009 07 18		09 07.67	-17 43.4	1.856	1.316	43.3	32.0	8.5
2009 07 19		09 10.31	-18 21.5	1.858	1.322	43.5	32.0	8.6
2009 07 20		09 12.96	-18 59.6	1.859	1.327	43.8	32.0	8.6
2009 07 21		09 15.64	-19 37.7	1.861	1.334	44.1	32.0	8.6
2009 07 22		09 18.34	-20 15.7	1.863	1.340	44.3	32.0	8.6
2009 07 23		09 21.07	-20 53.7	1.865	1.346	44.6	32.0	8.6
2009 07 24		09 23.82	-21 31.7	1.867	1.352	44.9	32.0	8.7
2009 07 25		09 26.59	-22 09.6	1.869	1.359	45.1	32.0	8.7
2009 07 26		09 29.38	-22 47.4	1.871	1.366	45.4	32.0	8.7
2009 07 27		09 32.21	-23 25.2	1.874	1.373	45.7	32.0	8.7
2009 07 28		09 35.05	-24 02.9	1.876	1.380	46.0	32.0	8.8
2009 07 29		09 37.93	-24 40.5	1.879	1.387	46.3	31.9	8.8
2009 07 30		09 40.83	-25 17.9	1.882	1.394	46.5	31.9	8.8
2009 07 31		09 43.75	-25 55.3	1.885	1.401	46.8	31.9	8.8
2009 08 01		09 46.71	-26 32.6	1.888	1.409	47.1	31.8	8.9
2009 08 02		09 49.69	-27 09.7	1.891	1.416	47.3	31.8	8.9
2009 08 03		09 52.70	-27 46.7	1.894	1.424	47.6	31.8	8.9
2009 08 04		09 55.74	-28 23.5	1.898	1.432	47.9	31.7	8.9
2009 08 05		09 58.81	-29 00.1	1.902	1.439	48.2	31.7	9.0
2009 08 06		10 01.91	-29 36.6	1.906	1.447	48.4	31.6	9.0
2009 08 07		10 05.04	-30 12.9	1.910	1.455	48.7	31.6	9.0

Year	MM	DD	Rise	Culm.	Set.	IC ->	Alt Azi	FC ->	Alt Azi	MoSo	MoTr	F.L.
2009	4	19	7:19	16: 3s	0:44	3:41		20:42	+36.4 287	2:34	13: 5	0.37
2009	4	20	7:21	16: 2s	0:39	3:39		20:43	+35.6 287	2:58	14: 9	0.27
2009	4	21	7:24	16: 0s	0:34	3:37		20:45	+34.7 287	3:20	15:13	0.19
2009	4	22	7:26	15:59s	0:29	3:35		20:47	+33.9 286	3:41	16:19	0.12
2009	4	23	7:28	15:57s	0:24	3:33		20:48	+33.0 286	4: 4	17:28	0.06
2009	4	24	7:29	15:55s	0:19	3:31		20:50	+32.2 286	4:29	18:40	0.02
2009	4	25	7:31	15:54s	0:14	3:29		20:52	+31.3 286	4:59	19:55	0.00
2009	4	26	7:33	15:52s	0: 9	3:27		20:53	+30.4 286	5:35	21: 9	0.01
2009	4	27	7:34	15:51s	0: 4	3:25		20:55	+29.6 286	6:20	22:20	0.05
2009	4	28	7:36	15:49s	0: 0	3:23		20:56	+28.7 286	7:17	23:23	0.11
2009	4	29	7:38	15:47	23:55	3:21		20:58	+27.8 286	8:23s	0:15	0.19
2009	4	30	7:39	15:46	23:50	3:19		21: 0	+26.9 286	9:36s	0:56	0.29
2009	5	1	7:40	15:44	23:46	3:17		21: 1	+26.0 286	10:51s	1:30	0.40
2009	5	2	7:42	15:42	23:41	3:15		21: 3	+25.1 286	12: 6		0.52
2009	5	3	7:43	15:41	23:37	3:13		21: 5	+24.2 286	13:18	1:58	0.63
2009	5	4	7:44	15:39	23:32	3:11		21: 7	+23.2 286	14:28	2:23	0.73
2009	5	5	7:45	15:37	23:28	3:10		21: 8	+22.3 286	15:37	2:46	0.82
2009	5	6	7:47	15:36	23:23	3: 8		21:10	+21.4 286	16:46	3: 9	0.89
2009	5	7	7:48	15:34	23:19	3: 6		21:12	+20.4 286	17:54	3:34	0.95
2009	5	8	7:49	15:32	23:14	3: 4		21:13	+19.5 286	19: 3	4: 1	0.98
2009	5	9	7:50	15:31	23:10	3: 2		21:15	+18.5 286	20: 9	4:33	1.00
2009	5	10	7:51	15:29	23: 6	3: 0		21:17	+17.6 286	21:11	5:11	0.99
2009	5	11	7:52	15:27	23: 1	2:59		21:18	+16.6 286	22: 7	5:55	0.97
2009	5	12	7:53	15:26	22:57	2:57		21:20	+15.7 286	22:55	6:47	0.92
2009	5	13	7:53	15:24	22:53	2:55		21:22	+14.7 286	23:34	7:45	0.87
2009	5	14	7:54	15:22	22:49	2:54		21:23	+13.8 286s	0: 7	8:46	0.80
2009	5	15	7:55	15:21	22:45	2:52		21:25	+12.8 286s	0:35	9:49	0.71
2009	5	16	7:56	15:19	22:40	2:50		21:27	+11.8 286s	0:59	10:52	0.63
2009	5	17	7:57	15:17	22:36	2:49		21:28	+10.9 287s	1:22	11:54	0.53
2009	5	18	7:57	15:15	22:32	2:47		21:30	+9.9 287		12:58	0.43
2009	5	19	7:58	15:14	22:28	2:45		21:32	+8.9 287	1:43	14: 2	0.34
2009	5	20	7:59	15:12	22:24	2:44		21:33	+8.0 287	2: 5	15: 9	0.24
2009	5	21	7:59	15:10	22:20	2:42		21:35	+7.0 287	2:29	16:18	0.16
2009	5	22	8: 0	15: 9	22:15	2:41		21:37	+6.1 287	2:56	17:32	0.09
2009	5	23	8: 1	15: 7	22:11	2:40		21:38	+5.1 287	3:30	18:47	0.03
2009	5	24	8: 1	15: 5	22: 7	2:38		21:40	+4.1 287	4:11	20: 2	0.01
2009	5	25	8: 2	15: 3	22: 3	2:37		21:41	+3.2 287	5: 4	21:10	0.00
2009	5	26	8: 3	15: 2	21:59	2:35		21:43	+2.3 288	6: 8	22: 7	0.03
2009	5	27	8: 3	15: 0	21:55	2:34		21:44	+1.4 288	7:22	22:54	0.09
2009	5	28	8: 4	14:58	21:51	2:33		21:46	+0.5 288	8:39	23:31	0.17
2009	5	29	8: 4	14:56	21:47	2:32		21:47	-0.3 288	9:55s	0: 1	0.27
2009	5	30	8: 5	14:55	21:43	2:31		21:48		11: 9s	0:27	0.37

Year	MM	DD	Rise	Culm.	Set.	IC ->	Alt	Azi	FC ->	Alt	Azi	MoSo	MoTr	F.L.
2009	5	31	8: 5	14:53	21:39	2:30			21:50			12:20s	0:50	0.49
2009	6	1	8: 6	14:51	21:35	2:29			21:51			13:29s	1:13	0.60
2009	6	2	8: 6	14:49	21:31	2:28			21:52			14:37		0.70
2009	6	3	8: 7	14:48	21:27	2:27			21:54			15:44	1:37	0.79
2009	6	4	8: 7	14:46	21:23	2:26			21:55			16:52	2: 3	0.87
2009	6	5	8: 8	14:44	21:19	2:25			21:56			17:58	2:33	0.93
2009	6	6	8: 8	14:42	21:15	2:24			21:57			19: 1	3: 8	0.97
2009	6	7	8: 9	14:41	21:11	2:23			21:58			19:59	3:50	0.99
2009	6	8	8: 9	14:39	21: 7	2:23			21:59			20:49	4:39	1.00
2009	6	9	8:10	14:37	21: 3	2:22			22: 0			21:32	5:35	0.99
2009	6	10	8:10	14:35	20:59	2:22			22: 1			22: 7	6:35	0.95
2009	6	11	8:11	14:34	20:55	2:21			22: 2			22:37	7:38	0.91
2009	6	12	8:11	14:32	20:51	2:21			22: 3			23: 2	8:41	0.85
2009	6	13	8:11	14:30	20:48	2:20			22: 3			23:24	9:43	0.77
2009	6	14	8:12	14:28	20:44	2:20			22: 4			23:46	10:46	0.69
2009	6	15	8:12	14:27	20:40	2:20			22: 5			s 0: 7	11:48	0.59
2009	6	16	8:13	14:25	20:36	2:20			22: 5			s 0:29	12:53	0.49
2009	6	17	8:13	14:23	20:32	2:19			22: 6			s 0:54	13:59	0.39
2009	6	18	8:14	14:21	20:28	2:19			22: 6				15:10	0.29
2009	6	19	8:14	14:20	20:24	2:20			22: 6			1:24	16:23	0.20
2009	6	20	8:15	14:18	20:20	2:20			22: 7			2: 1	17:38	0.11
2009	6	21	8:15	14:16	20:16	2:20			22: 7			2:48	18:50	0.05
2009	6	22	8:16	14:15	20:12	2:20			22: 7			3:48	19:53	0.01
2009	6	23	8:17	14:13	20: 8	2:20			22: 7			4:59	20:46	0.00
2009	6	24	8:17	14:11	20: 5	2:21			22: 7			6:17	21:27	0.02
2009	6	25	8:18	14:10	20: 1	2:21			22: 7			7:36	22: 1	0.07
2009	6	26	8:18	14: 8	19:57	2:22			22: 7			8:54	22:29	0.15
2009	6	27	8:19	14: 6	19:53	2:22			22: 7			10: 8	22:54	0.24
2009	6	28	8:20	14: 5	19:49	2:23			22: 6			11:19	23:18	0.34
2009	6	29	8:20	14: 3	19:45	2:24			22: 6			12:28	23:42	0.45
2009	6	30	8:21	14: 2	19:41	2:24			22: 6			13:36s	0: 7	0.56
2009	7	1	8:22	14: 0	19:37	2:25			22: 5			14:43s	0:35	0.66
2009	7	2	8:22	13:58	19:33	2:26			22: 5			15:49s	1: 8	0.75
2009	7	3	8:23	13:57	19:30	2:27			22: 4			16:53		0.83
2009	7	4	8:24	13:55	19:26	2:28			22: 3			17:52	1:47	0.90
2009	7	5	8:25	13:54	19:22	2:29			22: 3			18:45	2:34	0.95
2009	7	6	8:25	13:52	19:18	2:30			22: 2			19:30	3:27	0.98
2009	7	7	8:26	13:51	19:14	2:31			22: 1			20: 7	4:26	1.00
2009	7	8	8:27	13:49	19:10	2:32			22: 0			20:38	5:28	1.00
2009	7	9	8:28	13:48	19: 6	2:33			21:59			21: 5	6:31	0.98
2009	7	10	8:29	13:46	19: 2	2:34			21:58			21:28	7:34	0.94
2009	7	11	8:30	13:45	18:58	2:36			21:57			21:50	8:36	0.89
2009	7	12	8:31	13:43	18:55	2:37			21:56			22:11	9:39	0.82
2009	7	13	8:32	13:42	18:51	2:38			21:55			22:32	10:42	0.74
2009	7	14	8:33	13:41	18:47	2:40			21:54			22:55	11:46	0.65
2009	7	15	8:34	13:39	18:43	2:41			21:53				12:54	0.54
2009	7	16	8:36	13:38	18:39	2:43			21:52			p23:22	14: 4	0.44
2009	7	17	8:37	13:36	18:35	2:44			21:50			p23:55	15:17	0.33
2009	7	18	8:38	13:35	18:31	2:46			21:49			0:36	16:29	0.23
2009	7	19	8:39	13:34	18:27	2:47			21:47			1:29	17:36	0.14
2009	7	20	8:41	13:33	18:23	2:49			21:46			2:34	18:33	0.07
2009	7	21	8:42	13:31	18:19	2:50			21:45			3:49	19:20	0.02
2009	7	22	8:44	13:30	18:15	2:52			21:43			5: 9	19:58	0.00
2009	7	23	8:45	13:29	18:12	2:53			21:42			6:29	20:29	0.01
2009	7	24	8:47	13:28	18: 8	2:55			21:40			7:47	20:56	0.05
2009	7	25	8:48	13:27	18: 4	2:56			21:38			9: 1	21:21	0.12
2009	7	26	8:50	13:25	18: 0	2:58			21:37			10:13	21:45	0.21
2009	7	27	8:52	13:24	17:56	3: 0			21:35			11:23	22:10	0.30
2009	7	28	8:54	13:23	17:52	3: 1			21:34			12:32	22:38	0.41
2009	7	29	8:56	13:22	17:48	3: 3			21:32			13:39	23: 9	0.51
2009	7	30	8:58	13:21	17:44	3: 5			21:30			14:44	23:47	0.61
2009	7	31	9: 0	13:20	17:40	3: 6			21:28			15:45s	0:30	0.70
2009	8	1	9: 2	13:19	17:36	3: 8			21:27			16:39s	1:21	0.79
2009	8	2	9: 4	13:18	17:32	3: 9			21:25			17:27		0.86
2009	8	3	9: 6	13:17	17:28	3:11			21:23			18: 7	2:18	0.92
2009	8	4	9: 8	13:16	17:24	3:13			21:21			18:40	3:19	0.96
2009	8	5	9:11	13:16	17:19	3:14			21:19			19: 8	4:21	0.99
2009	8	6	9:13	13:15	17:15	3:16			21:17			19:33	5:25	1.00
2009	8	7	9:16	13:14	17:11	3:18			21:16			19:55	6:28	0.99

IC = Beginning of astronomical twilight, in U.T.+1

Alz = height of the comet at IC or at FC

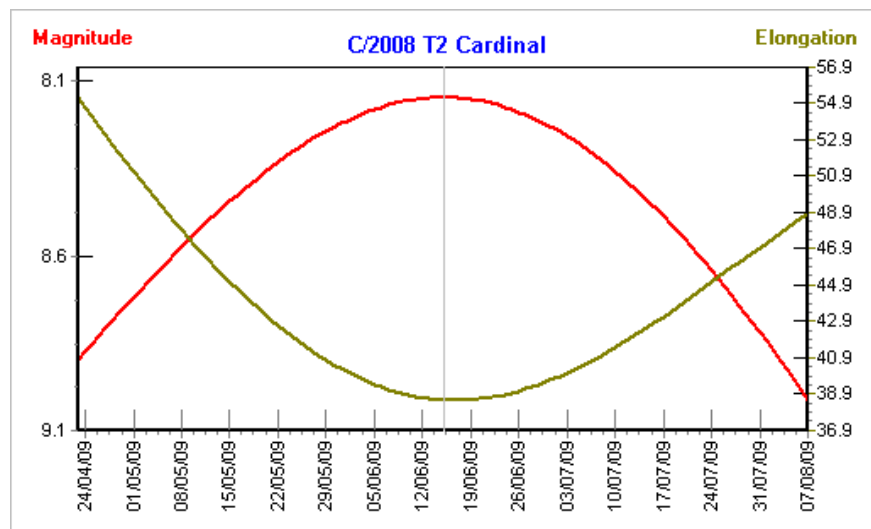
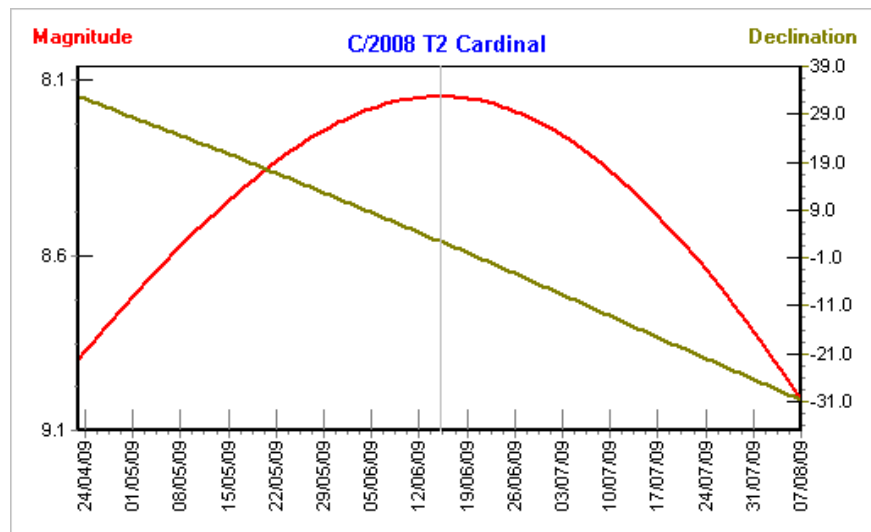
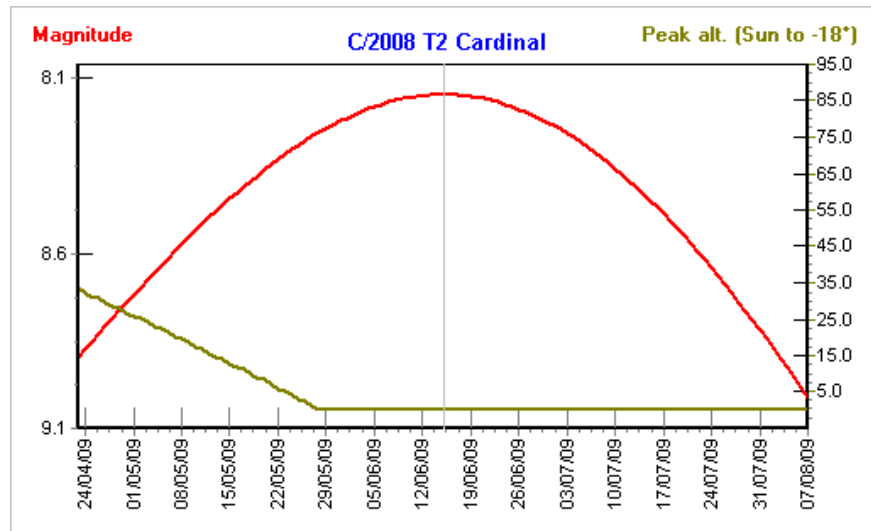
Azi = azimuth of the comet at IC or at FC

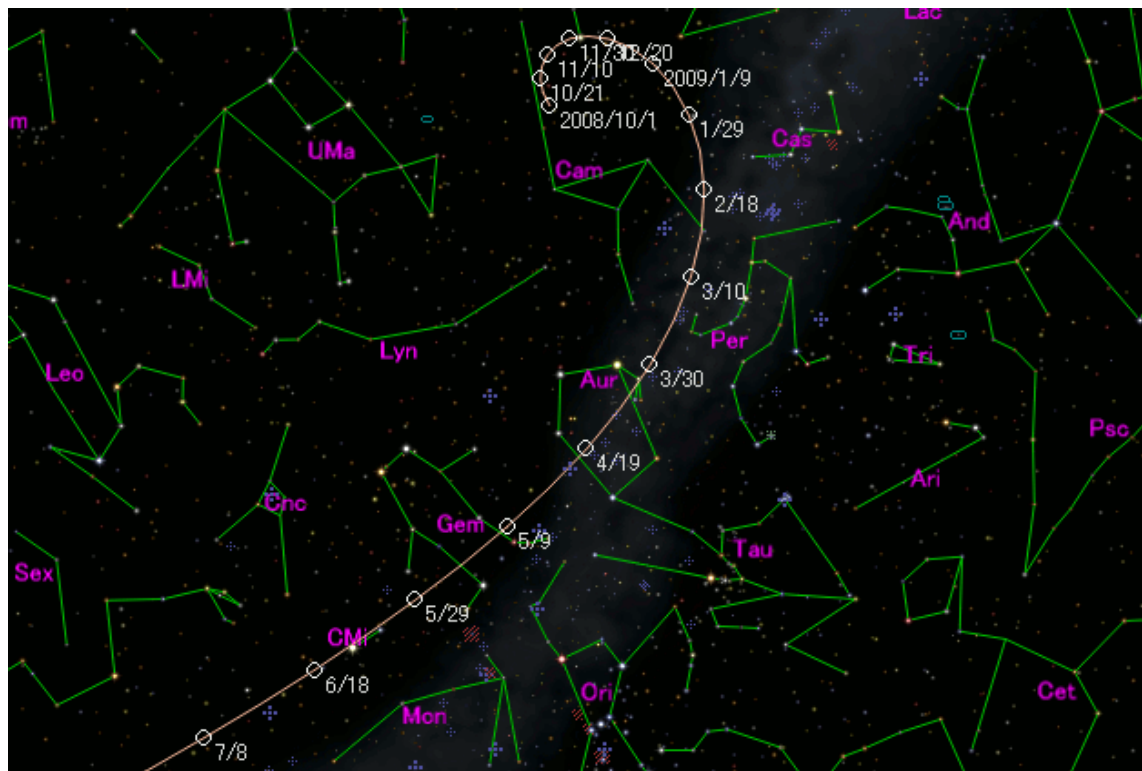
FC = Ending of astronomical twilight, in U.T.+1

MoSo = Rising of the Moon

MoTr = Setting of the Moon

F.L. = Illumination of the Moon, 0 new Moon, 1 full Moon





CONJUNCTIONS <5° PLANETS - COMETS

Date	TT	Dm (°)	Dl	r1	r2	p (°)	e	m1	m2	tm(s)		
2009/02/24 01:26:07		2.15560	0.03739	8.420	0.411	202	-166	0.2	6.2		Saturn	C/2007 N3
2009/07/10 23:43:47		2.13056	0.00506	1.316	3.824	183	-4	-1.9	14.1		Mercury	C/2007 N3
2009/07/30 13:15:13		0.63547	0.00517	1.249	3.865	203	17	-0.5	18.4		Mercury	85P
2009/08/16 18:23:38		0.35719	0.00625	1.236	3.976	185	-36	-3.9	14.8		Venus	C/2007 N3
2009/09/24 06:03:30		2.04950	0.00509	1.459	3.773	185	-73	0.7	15.2		Mars	C/2007 N3
2009/10/03 12:40:00		1.04622	0.00538	1.495	4.331	201	-25	-3.9	19.3		Venus	85P

MULTIPLE CONJUNCTIONS PLANETS - COMETS (events with 2 or more planets and 1 comet within 5°)

Date TT Dmed (°) Dmax emin m2d mmax

CONJUNCTIONS <5° BETWEEN COMETS

Date	TT	Dm (°)	Dl	r1	r2	p (°)	e	m1	m2	tm(s)		
2009/02/17 00:48:05		4.32602	0.03438	1.897	0.491	201	-127	18.0	6.4	88P		C/2007 N3
2009/04/21 10:51:38		3.17830	0.01129	2.168	2.089	186	67	15.5	11.1	85P		C/2007 N3

date in the format year/month/day
Dm = least distance between the centers of the bodies
Dl = parameter limit, if Dm < Dl there is an occultation between the bodies
R1 = distance in A.U. of body 1 from the Earth
R2 = distance in A.U. of body 2 from the Earth
P = angle of position between the bodies, in degrees
e = elongation, in degree
m1 = magnitude of the first body
m2 = magnitude of the second body
tm = if present, an object is occulted maximum for x seconds

Dmed = middle distance between the centers of the bodies, in degrees
Dmax = diameter of the group, in degrees
emin = least elongation, in degrees
m2d = magnitude of the 2nd brightest object
mmax = least magnitude

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CONJUNCTIONS <1° MOON - COMETS

Geocentric

Date	TT	Dm (°)	Dl	r1	r2	p (°)	e	m1	m2	tm(s)	
2009/02/02 08:51:15		0.07952	1.23972	1.029	0.003	160	82	12.1		3803	85P
2009/03/03 15:52:23		0.50090	1.25388	1.357	0.002	351	81	13.4		3336	85P
2009/04/01 09:46:31		0.31138	1.26141	1.809	0.002	2	74	14.7		3417	85P
2009/04/29 20:14:53		0.34229	1.26997	2.324	0.002	190	63	15.8		3319	85P
2009/10/22 19:12:10		0.63081	1.17384	1.674	0.003	358	55	14.9	-9.8	3292	88P

Topocentric 42°N - 12°E

Date	UT	Dm (°)	Alt.	r1	r2	p (°)	e	m1	m2	tm(s)	
2009/02/02 08:15:57		0.97329	-9.92	1.028	0.003	159	82	12.1			85P
2009/03/03 15:32:57		0.19028	69.12	1.356	0.002	344	81	13.4		5304	85P
2009/03/07 18:11:28		0.77183	52.42	0.603	0.002	19	136	7.3			C/2007 N3
2009/04/01 08:36:35		0.39037	1.21	1.808	0.002	175	74	14.6			85P
2009/10/22 20:37:41		0.10853	-16.83	1.675	0.003	348	55	14.9	-9.8	3830	88P

MULTIPLE CONJUNCTIONS PLANETS-MOON-COMETS (events with 1 or more planets, the Moon and 1 comet within 5°)

Geocentric

Date	TT	Dmed (°)	Dmax	emin	m2d	mmax			
2009/08/17 20:21:26		1.831	2.276	-37	-3.9	14.8	Venus	Moon	C/2007 N3

Topocentric 42°N - 12°E

Date	UT	Dmed (°)	Dmax	emin	m2d	mmax			
2009/08/17 20:09:10		1.238	1.394	-37	-3.9	14.8	Venus	Moon	C/2007 N3

date in the format year/month/day

Dm = least distance between the centers of the bodies

Dl = parameter limit, if Dm < Dl there is an occultation between the bodies

Alt = height in degrees on the horizon of the comet, in degrees

R1 = distance in A.U. of the comet from the Earth

R2 = distance in A.U. of the Moon from the Earth

p = angle of position between the bodies, in degrees

e = elongation, in degree

m1 = magnitude of the comet

m2 = magnitude of the Moon

tm = if present, the comet is occulted maximum for x seconds

Dmed = middle distance between the centers of the bodies, in degrees

Dmax = diameter of the group, in degrees

emin = least elongation, in degrees

m2d = magnitude of the 2nd brightest object

mmax = least magnitude

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CONJUNCTIONS $<1^\circ$ ASTEROIDS $m < 9$ - COMETS

Date	TT	Dm ($^\circ$)	Dl	r1	r2	p ($^\circ$)	e	m1	m2	tm(s)		
2009/07/28	17:59:33	0.63677	0.00314	3.487	3.947	183	-19	8.4	14.4		Vesta	C/2007 N3

MULTIPLE CONJUNCTIONS ASTEROIDS $m < 9$ -COMETS (events with 2 comets and 1 asteroid or viceversa within 5°)

Date	TT	Dmed ($^\circ$)	Dmax	emin	m2d	mmax

MULTIPLE CONJUNCT. PLANETS-COMETS-ASTEROIDS (events with 1 planet, 1 comet and 1 asteroid within 5°)

Date	TT	Dmed ($^\circ$)	Dmax	emin	m2d	mmax

date in the format year/month/day

Dm = least distance between the centers of the bodies

Dl = parameter limit, if $Dm < Dl$ there is an occultation between the bodies

R1 = distance in A.U. of the asteroid from the Earth

R2 = distance in A.U. of the comet from the Earth

p = angle of position between the bodies, in degrees

e = elongation, in degree

m1 = magnitude of the asteroid

m2 = magnitude of the comet

tm = if present, an object is occulted maximum for x seconds

Dmed = middle distance between the centers of the bodies, in degrees

Dmax = diameter of the group, in degrees

emin = least elongation, in degrees

m2d = magnitude of the 2nd brightest object

mmax = least magnitude

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CONJUNCTIONS <5° COMETS - STARS m<2

Date	TT	Dm (°)	Dl	r1	p (°)	e	m1	m*	tm(s)			
2009/02/16 05:40:31		2.60820	0.02839	0.508	201	-124	6.5	1.1		C/2007 N3	Alpha	VIR Spica
2009/02/27 23:17:50		0.65566	0.03305	0.436	20	170	6.4	1.3		C/2007 N3	Alpha	LEO Regulus
2009/03/27 07:54:37		2.18487	0.00837	1.722	360	76	14.4	1.7		85P	Beta	TAU Elnath
2009/05/19 10:20:36		4.96694	0.00536	2.691	13	55	16.5	1.2		85P	Beta	GEM Pollux
2009/08/02 03:02:55		1.59882	0.00959	1.502	206	74	15.2	1.1		88P	Alpha	VIR Spica
2009/08/15 07:11:13		0.15095	0.00356	4.043	202	7	18.6	1.3		85P	Alpha	LEO Regulus
2009/10/06 03:37:56		1.70479	0.00888	1.623	191	57	14.8	1.0		88P	Alpha	SCO Antares
2009/11/08 06:40:13		4.90543	0.00423	3.406	182	-127	15.5	2.0		C/2007 N3	Gamma	GEM Alhena

CONJUNCTIONS <5° COMETS-MESSIER OBJECTS m<9

Date	TT	Dm (°)	Dl	r1	p (°)	e	m1	m*	tm(s)			
2009/02/26 11:01:21		0.33042	0.01120	1.287	170	82	13.1	1.6		85P		M45
2009/03/06 03:44:52		2.05525	0.02574	0.560	14	142	7.1	3.7		C/2007 N3	NGC2632	M44
2009/03/30 02:27:12		4.40144	0.00814	1.769	181	75	14.6	8.4		85P	NGC1952	M1
2009/04/11 05:46:22		1.77920	0.00727	1.982	184	71	15.1	5.3		85P	NGC2168	M35
2009/06/19 01:19:45		0.34852	0.00444	3.242	17	39	17.4	3.7		85P	NGC2632	M44
2009/10/02 00:49:40		1.13919	0.00894	1.613	12	58	14.8	7.3		88P	NGC6093	M80
2009/10/04 15:26:05		2.04262	0.00890	1.619	191	57	14.8	7.1		88P	NGC6121	M4
2009/10/14 18:49:03		0.40031	0.00875	1.647	187	56	14.8	7.0		88P	NGC6273	M19
2009/10/14 23:30:32		4.25351	0.00875	1.648	187	56	14.8	6.5		88P	NGC6266	M62
2009/10/30 03:25:25		3.78033	0.00845	1.705	0	54	14.9	9.0		88P	NGC6514	M20
2009/10/30 10:56:11		2.37874	0.00845	1.706	0	54	15.0	6.0		88P	NGC6523	M8
2009/10/30 16:18:38		4.25652	0.00844	1.707	0	54	15.0	6.5		88P	NGC6531	M21
2009/11/04 20:10:57		1.82145	0.00832	1.732	358	53	15.0	6.8		88P	NGC6626	M28
2009/11/07 23:01:41		2.66585	0.00825	1.748	357	53	15.1	5.1		88P	NGC6656	M22
2009/11/12 02:54:54		4.19604	0.00814	1.771	175	52	15.1	7.6		88P	NGC6715	M54
2009/11/27 11:40:45		2.87696	0.00428	3.367	0	-153	15.6	5.3		C/2007 N3	NGC2168	M35
2009/12/01 20:18:19		1.77285	0.00756	1.905	347	49	15.5	8.5		88P	NGC6864	M75
2009/12/17 15:47:43		0.71091	0.00413	3.487	358	177	15.9	8.4		C/2007 N3	NGC1952	M1

date in the format year/month/day

Dm = least distance between the centers of the bodies

Dl = parameter limit, if Dm < Dl there is an occultation between the bodies

R1 = distance in A.U. of the comet from the Earth

p = angle of position between the bodies, in degrees

e = elongation, in degree

m1 = magnitude of the comet

m* = magnitude of the second body

tm = if present, an object is occulted maximum for x seconds

MULTIPLE CONJUNCTIONS PLANETS-COMET-STARs

(events with 1 planet,1 comet and 1 star with mag<2 within 5°)

Date	TT	Dmed (°)	Dmax	emin	m2d	mmax				
2009/08/02	01:24:45	3.550	4.856	15	1.3	18.4	Mercury	Alpha	LEO Regulus	85P

MULTIPLE CONJUNCTIONS PLANETS - COMETS- OBJECTS

(events with 1 planet,1 comet and 1 object with mag<2 within 5°)

Date	TT	Dmed (°)	Dmax	emin	m2d	mmax

MULTIPLE CONJUNCTIONS MOON-COMET-STARs

(events with the Moon, 1 comet and 1 star with mag<2 within 5°)

Geocentric

Date	TT	Dmed (°)	Dmax	emin	m2d	mmax				
2009/04/01	06:35:26	2.879	3.972	72	1.7	14.6	Beta	TAU Elnath		85P
2009/08/20	15:01:53	2.931	3.462	4	1.3	18.7	Alpha	LEO Regulus		85P

Topocentric 42°N - 12°E

Date	UT	Dmed (°)	Dmax	emin	m2d	mmax				
2009/04/01	06:07:23	3.100	3.963	73	1.7	14.6	Beta	TAU Elnath		85P
2009/08/20	14:25:21	3.535	4.380	4	1.3	18.7	Alpha	LEO Regulus		85P

date in the format year/month/day

Dmed = middle distance between the centers of the bodies, in degrees

Dmax = diameter of the group, in degrees

emin = least elongation, in degrees

m2d = magnitude of the 2nd brightest object

mmax = least magnitude

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MULTIPLE CONJUNCTIONS MOON-COMET-S-OBJECTS

(events with the Moon, 1 comet and 1 object with mag<2 within 5°)

Geocentric

Date	TT	Dmed (°)	Dmax	emin	m2d	mmax			
2009/03/03	11:29:24	3.136	4.368	79	1.6	13.4		M45	85P Moon

Topocentric 42°N - 12°E

Date	UT	Dmed (°)	Dmax	emin	m2d	mmax			
2009/03/03	10:24:21	3.068	4.331	79	1.6	13.4		M45	85P Moon

MULTIPLE CONJUNCTIONS STARS - COMETS - ASTEROIDS

(events with 1 star with mag<2, 1 comet and 1 asteroid with mag<9 within 5°)

Date	TT	Dmed (°)	Dmax	emin	m2d	mmax
------	----	----------	------	------	-----	------

MULTIPLE CONJUNCTIONS OBJECTS - COMETS - ASTEROIDS

(events with 1 object with mag<2, 1 comet and 1 asteroid with mag<9 within 5°)

Date	TT	Dmed (°)	Dmax	emin	m2d	mmax			
2009/03/05	17:33:34	2.631	2.930	143	7.1	9.4	C/2007 N3 NGC2632	M44	Euterpe

date in the format year/month/day

Dmed = middle distance between the centers of the bodies, in degrees
Dmax = diameter of the group, in degrees
emin = least elongation, in degrees
m2d = magnitude of the 2nd brightest object
mmax = least magnitude

SOLAR AND LUNAR ECLIPSES

Annular Solar Eclipse of 2009 Jan 26

Geocentric Conjunction = 07:46:24.8 UT J.D. = 2454857.823898

Greatest Eclipse = 07:58:39.0 UT J.D. = 2454857.832395

Eclipse Magnitude = 0.9282 Gamma = -0.2819

Saros Series = 131 Member = 51 of 71

Sun at Greatest Eclipse (Geocentric Coordinates)

R.A. = 20h35m32.7s

Dec. = $-18^{\circ}38'55.2''$

S.D. = 00°16'14.6"

H.P. = 00°00'08.9"

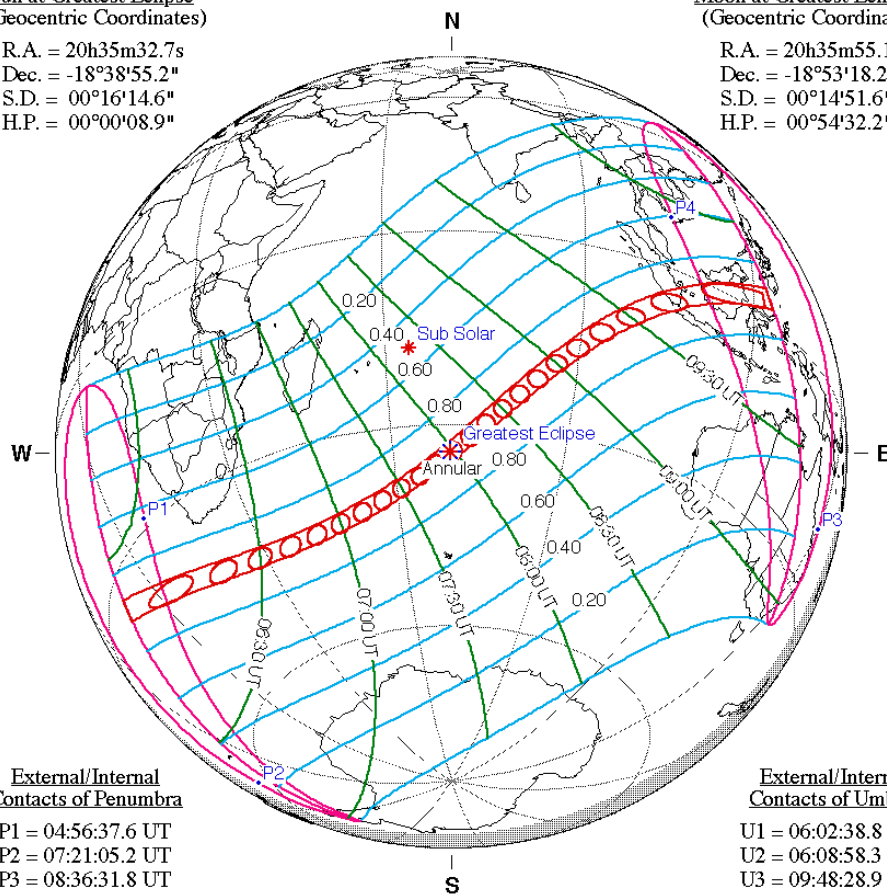
Moon at Greatest Eclipse (Geocentric Coordinates)

R.A. = 20h35m55.1s

Dec. = $-18^{\circ}53'18.2''$

S.D. = 00°14'51.6"

H.P. = 00°54'32.2"



External/Internal Contacts of Penumbra

P1 = 04:56:37.6 UT

P2 = 07:21:05.2 UT

P3 = 08:36:31.8 UT

P4 = 11:00:40.9 UT

External/Internal Contacts of Umbra

U1 = 06:02:38.8 UT

U2 = 06:08:58.3 UT

U3 = 09:48:28.9 UT

U4 = 09:54:44.1 UT

Local Circumstances at Greatest Eclipse

Lat. = 34°04.2'S Sun Alt. = 73.4°

Long. = 070°14.0'E Sun Azm. = 337.0°

Path Width = 280.3 km Duration = 07m53.7s

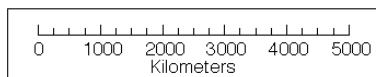
Ephemeris & Constants

$$\text{Eph.} = \text{Newcomb}/\text{ILE}$$
$$\Delta T = 65.7 \text{ s}$$
$$k_1 = 0.2724880$$
$$k_2 = 0.2722810$$
$$\Delta b = 0.0'' \quad \Delta l = 0.0''$$

Geocentric Libration (Optical + Physical)

$$1 = -2.99^\circ$$
$$b = 0.36^\circ$$
$$c = -12.94^\circ$$

Brown Lun. No. = 1065



F. Espenak, NASA's GSFC - Fri, Jul 2.

sunearth.gsfc.nasa.gov/eclipse/eclipse.html

Eclipse map/figure/table/predictions courtesy of Fred Espenak, NASA/Goddard Space Flight Center

GENERAL CIRCUMSTANCES

	Date	Ist.(T.U.)	Long.	Lat.	Magnit.	Duration
First contact	26/01/2009	04h56m37s	008°11'32" E	28°56'01" S		
Central phase	26/01/2009	07h58m39s	070°17'21" E	34°05'30" S	0.928	07m54s
Last contact	26/01/2009	11h00m41s	104°49'39" E	09°27'33" N		

P1, first contact : point of the Earth in which the eclipse begins as partial at sunrise
P2, second contact : point of the Earth in which the eclipse ends as partial at sunrise
P3, Terzo contatto : point of the Earth in which the eclipse begins as partial at sunset
P4, Quarto contatto : point of the Earth in which the eclipse ends as partial at sunset

U1, first contact : point of the Earth in which the eclipse begins as total at sunrise
U2, second contact : point of the Earth in which the eclipse ends as total at sunrise
U3, third contact : point of the Earth in which the eclipse begins as total at sunset
U4, fourth contact : point of the Earth in which the eclipse ends as total at sunset

Eclipse visible in south Africa, Antartide, south-east Asia, Australia; the annularity is visible in the south Indian Ocean, Sumatra, Borneo

Longitude		Line of centrality				Limits of totality				Limits of partiality			
		U.T.		Durn.	Mag	Alt	Center	North	South	North	South	North	South
°	'	h	m	s		°	°	'	°	'	°	°	'
- 70	0.0	..	..	..	.....	..	...	...	...	...	...	...	-69 19
- 65	0.0	..	..	..	.....	..	...	...	...	...	...	...	-72 22
- 60	0.0	..	..	..	.....	..	...	...	...	...	...	...	-75 7
- 55	0.0	..	..	..	.....	..	...	...	...	...	...	...	-77 27
- 50	0.0	..	..	..	.....	..	...	...	...	...	...	...	-79 20
- 45	0.0	..	..	..	.....	..	...	...	...	...	...	...	-80 50
- 40	0.0	..	..	..	.....	..	...	...	...	...	...	...	-82 0
- 35	0.0	..	..	..	.....	..	...	...	...	...	...	...	-82 54
- 30	0.0	..	..	..	.....	..	...	...	...	...	...	...	-83 37
- 25	0.0	..	..	..	.....	..	...	...	...	...	...	...	-84 11
- 20	0.0	..	..	..	.....	..	...	...	...	...	...	...	-84 38
- 15	0.0	..	..	..	.....	..	...	...	...	...	...	...	-84 59
- 10	0.0	6	5	51	346.1A	0.915	2	-35 9.77	-33 24.50	-36 55.69	...	...	-85 16
- 5	0.0	6	6	29	353.7A	0.916	6	-36 48.84	-35 6.27	-38 31.98	...	...	-85 30
0	0.0	6	7	53	361.9A	0.917	11	-38 20.21	-36 40.57	-40 0.36	...	...	-85 41
5	0.0	6	10	2	370.6A	0.918	15	-39 42.67	-38 6.11	-41 19.69	- 4 14	...	-85 49
10	0.0	6	12	56	379.9A	0.919	20	-40 55.07	-39 21.66	-42 28.93	- 5 52	...	-85 55
15	0.0	6	16	33	389.5A	0.920	24	-41 56.37	-40 26.06	-43 27.14	- 7 21	...	-86 0
20	0.0	6	20	55	399.6A	0.921	29	-42 45.58	-41 18.20	-44 13.44	- 8 38	...	-86 2
25	0.0	6	26	1	409.9A	0.922	33	-43 21.73	-41 57.02	-44 46.98	- 9 41	...	-86 3
30	0.0	6	31	52	420.5A	0.923	38	-43 43.82	-42 21.39	-45 6.83	-10 23	...	-86 2
35	0.0	6	38	30	431.1A	0.924	42	-43 50.67	-42 30.03	-45 11.95	-10 39	...	-85 59
40	0.0	6	46	1	441.5A	0.925	47	-43 40.85	-42 21.37	-45 1.00	-10 18	...	-85 55
45	0.0	6	54	30	451.6A	0.926	52	-43 12.49	-41 53.42	-44 32.27	- 9 6	...	-85 49
50	0.0	7	4	6	460.7A	0.927	57	-42 23.12	-41 3.50	-43 43.43	- 6 47	...	-85 40
55	0.0	7	14	59	468.5A	0.927	62	-41 9.43	-39 48.05	-42 31.42	- 3 10	...	-85 29
60	0.0	7	27	25	474.0A	0.928	67	-39 27.05	-38 2.41	-40 52.16	1 27	...	-85 15
65	0.0	7	41	38	476.3A	0.928	71	-37 10.52	-35 40.76	-38 40.50	6 26	...	-84 58
70	0.0	7	57	50	474.0A	0.929	73	-34 13.92	-32 37.05	-35 50.70	11 16	...	-84 36
75	0.0	8	15	55	466.4A	0.929	71	-30 33.34	-28 48.01	-32 18.44	15 40	...	-84 8
80	0.0	8	35	10	453.4A	0.928	65	-26 12.35	-24 19.21	-28 5.52	19 34	...	-83 33
85	0.0	8	54	1	436.7A	0.927	57	-21 27.25	-19 29.70	-23 25.55	23 0	...	-82 48
90	0.0	9	10	42	418.8A	0.926	48	-16 43.10	-14 45.35	-18 42.24	26 1	...	-81 48
95	0.0	9	24	11	402.0A	0.924	39	-12 20.50	-10 25.25	-14 17.45	28 41	...	-80 30
100	0.0	9	34	22	387.2A	0.922	31	- 8 28.68	- 6 36.73	-10 22.32	31 2	...	-78 44
105	0.0	9	41	40	374.4A	0.921	23	- 5 8.37	- 3 19.52	- 6 58.79	33 6	...	-76 18
110	0.0	9	46	37	363.4A	0.919	16	- 2 16.69	- 0 30.37	- 4 4.41	...	...	-72 57
115	0.0	9	49	41	354.0A	0.918	10	0 10.11	1 54.49	- 1 35.53	...	...	-68 28
120	0.0	9	51	14	345.9A	0.916	4	2 15.51	3 58.47	0 31.42	...	...	-62 53
125	0.0	..	..	..	.....	..	...	...	...	...	...	...	-56 51
130	0.0	..	..	..	.....	..	...	...	...	...	...	...	-51 15
135	0.0	..	..	..	.....	..	...	...	...	...	...	...	-46 33
140	0.0	..	..	..	.....	..	...	...	...	...	...	...	-42 47
145	0.0	..	..	..	.....	..	...	...	...	...	...	...	-39 49
150	0.0	..	..	..	.....	..	...	...	...	...	...	...	-37 30

Penumbral Lunar Eclipse of 2009 Feb 09

Geocentric Conjunction = 15:28:39.1 UT J.D. = 2454872.14490

Greatest Eclipse = 14:38:16.5 UT J.D. = 2454872.10991

Penumbral Magnitude = 0.9244 P. Radius = 1.3004° Gamma = -1.0641
 Umbral Magnitude = -0.0830 U. Radius = 0.7493° Axis = 1.0682°

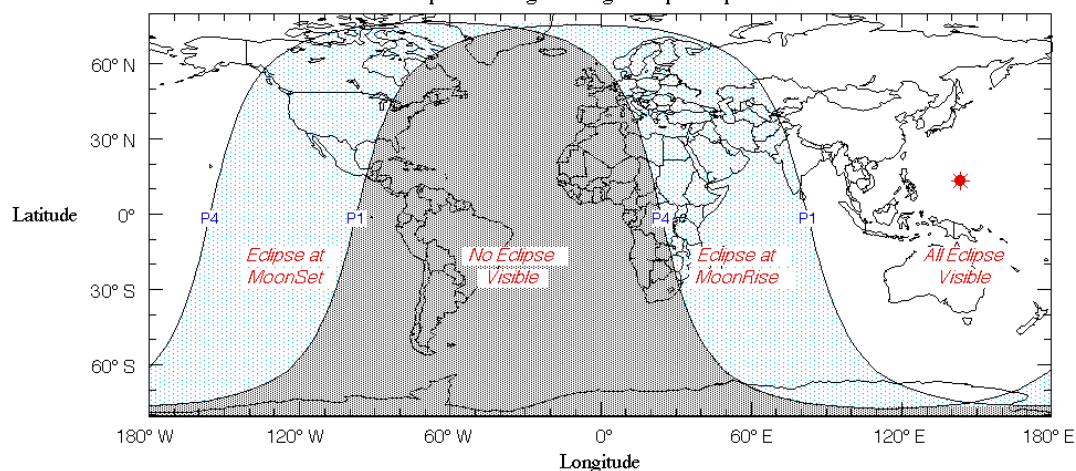
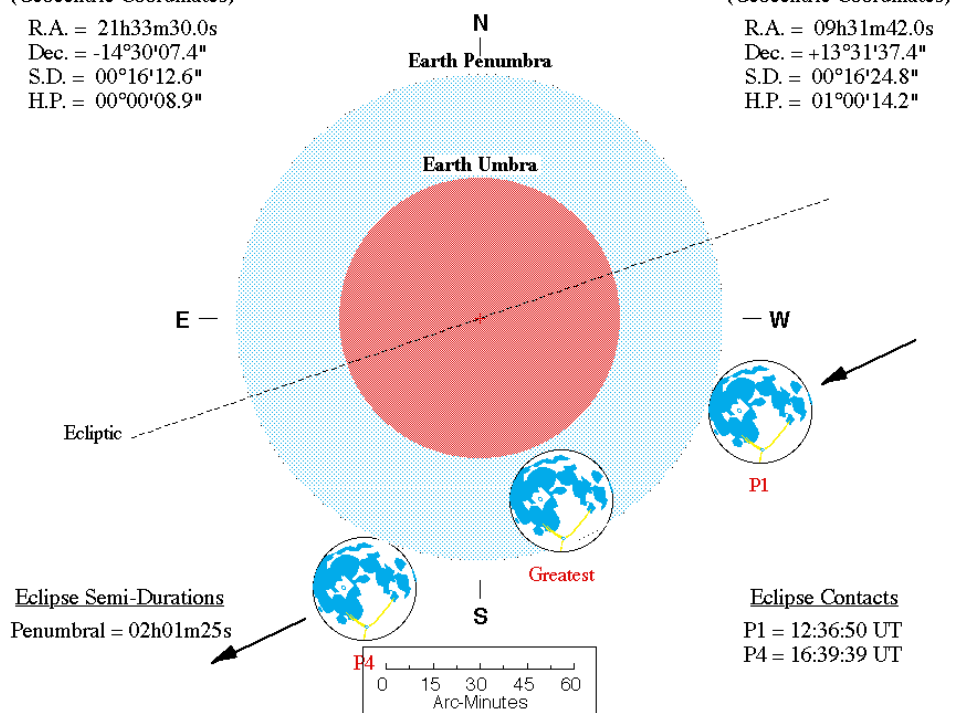
Saros Series = 143 Member = 18 of 73

Sun at Greatest Eclipse (Geocentric Coordinates)

R.A. = 21h33m30.0s
 Dec. = -14°30'07.4"
 S.D. = 00°16'12.6"
 H.P. = 00°00'08.9"

Moon at Greatest Eclipse (Geocentric Coordinates)

R.A. = 09h31m42.0s
 Dec. = +13°31'37.4"
 S.D. = 00°16'24.8"
 H.P. = 01°00'14.2"



Eclipse map/figure/table/predictions courtesy of Fred Espenak, NASA/Goddard Space Flight Center

GENERAL CIRCUMSTANCES

	Date	Ist. (T.U.)	Magnit.	Duration
Begins penumbral phase	09/02/2009	12h36m50s		
Max	09/02/2009	14h38m16s	0.924	04h03m
Ends penumbral phase	09/02/2009	16h39m21s		



At Zenit					
Longit.	Latit.				
143°35'36" E	13°31'35" N				
At sunrise or sunset					
Longit.	Latit.				
179°41'06" W	72°16'42" S	067°48'54" E	43°07'45" S	059°41'06" W	76°13'11" N
177°48'54" E	72°47'28" S	065°18'54" E	37°28'51" S	062°11'06" W	75°57'16" N
175°18'54" E	73°14'48" S	062°48'54" E	30°43'43" S	064°41'06" W	75°39'09" N
172°48'54" E	73°39'01" S	060°18'54" E	22°46'01" S	067°11'06" W	75°18'36" N
170°18'54" E	74°00'26" S	057°48'54" E	13°38'07" S	069°41'06" W	74°55'25" N
167°48'54" E	74°19'17" S	055°18'54" E	03°36'43" S	072°11'06" W	74°29'17" N
165°18'54" E	74°35'46" S	052°48'54" E	06°45'37" N	074°41'06" W	73°59'51" N
162°48'54" E	74°50'04" S	050°18'54" E	16°48'36" N	077°11'06" W	73°26'43" N
160°18'54" E	75°02'20" S	047°48'54" E	25°58'11" N	079°41'06" W	72°49'23" N
157°48'54" E	75°12'40" S	045°18'54" E	33°55'59" N	082°11'06" W	72°07'16" N
155°18'54" E	75°21'12" S	042°48'54" E	40°39'01" N	084°41'06" W	71°19'38" N
152°48'54" E	75°27'59" S	040°18'54" E	46°13'47" N	087°11'06" W	70°25'37" N
150°18'54" E	75°33'05" S	037°48'54" E	50°50'31" N	089°41'06" W	69°24'07" N
147°48'54" E	75°36'34" S	035°18'54" E	54°39'40" N	092°11'06" W	68°13'49" N
145°18'54" E	75°38'27" S	032°48'54" E	57°50'27" N	094°41'06" W	66°53'03" N
142°48'54" E	75°38'45" S	030°18'54" E	60°30'26" N	097°11'06" W	65°19'43" N
140°18'54" E	75°37'28" S	027°48'54" E	62°45'37" N	099°41'06" W	63°31'11" N
137°48'54" E	75°34'36" S	025°18'54" E	64°40'44" N	102°11'06" W	61°24'04" N
135°18'54" E	75°30'06" S	022°48'54" E	66°19'27" N	104°41'06" W	58°54'04" N
132°48'54" E	75°23'57" S	020°18'54" E	67°44'41" N	107°11'06" W	55°55'42" N
130°18'54" E	75°16'06" S	017°48'54" E	68°58'43" N	109°41'06" W	52°22'00" N
127°48'54" E	75°06'27" S	015°18'54" E	70°03'22" N	112°11'06" W	48°04'24" N
125°18'54" E	74°54'55" S	012°48'54" E	71°00'04" N	114°41'06" W	42°52'48" N
122°48'54" E	74°41'24" S	010°18'54" E	71°49'59" N	117°11'06" W	36°36'35" N
120°18'54" E	74°25'46" S	007°48'54" E	72°34'06" N	119°41'06" W	29°07'17" N
117°48'54" E	74°07'50" S	005°18'54" E	73°13'09" N	122°11'06" W	20°23'33" N
115°18'54" E	73°47'25" S	002°48'54" E	73°47'48" N	124°41'06" W	10°37'27" N
112°48'54" E	73°24'17" S	000°18'54" E	74°18'35" N	127°11'06" W	00°17'43" N
110°18'54" E	72°58'10" S	002°11'06" W	74°45'55" N	129°41'06" W	09°56'06" S
107°48'54" E	72°28'44" S	004°41'06" W	75°10'11" N	132°11'06" W	19°27'03" S
105°18'54" E	71°55'37" S	007°11'06" W	75°31'41" N	134°41'06" W	27°52'10" S
102°48'54" E	71°18'20" S	009°41'06" W	75°50'42" N	137°11'06" W	35°04'16" S
100°18'54" E	70°36'21" S	012°11'06" W	76°07'25" N	139°41'06" W	41°07'07" S
097°48'54" E	69°49'01" S	014°41'06" W	76°22'03" N	142°11'06" W	46°09'34" S
095°18'54" E	68°55'30" S	017°11'06" W	76°34'45" N	144°41'06" W	50°21'37" S
092°48'54" E	67°54'51" S	019°41'06" W	76°45'37" N	147°11'06" W	53°52'29" S
090°18'54" E	66°45'52" S	022°11'06" W	76°54'48" N	149°41'06" W	56°49'58" S
087°48'54" E	65°27'04" S	024°41'06" W	77°02'22" N	152°11'06" W	59°20'23" S
085°18'54" E	63°56'39" S	027°11'06" W	77°08'23" N	154°41'06" W	61°28'46" S
082°48'54" E	62°12'18" S	029°41'06" W	77°12'55" N	157°11'06" W	63°19'04" S
080°18'54" E	60°11'10" S	032°11'06" W	77°16'00" N	159°41'06" W	64°54'27" S
077°48'54" E	57°49'36" S	034°41'06" W	77°17'40" N	162°11'06" W	66°17'23" S
075°18'54" E	55°02'59" S	037°11'06" W	77°17'56" N	164°41'06" W	67°29'53" S
072°48'54" E	51°45'33" S	039°41'06" W	77°16'47" N	167°11'06" W	68°33'31" S
070°18'54" E	47°50'02" S	042°11'06" W	77°14'15" N	169°41'06" W	69°29'36" S
		044°41'06" W	77°10'16" N	172°11'06" W	70°19'10" S
		047°11'06" W	77°04'49" N	174°41'06" W	71°03'05" S
		049°41'06" W	76°57'50" N	177°11'06" W	71°42'04" S
		052°11'06" W	76°49'17" N	179°41'06" W	72°16'42" S
		054°41'06" W	76°39'03" N		
		057°11'06" W	76°27'04" N		

Penumbral Lunar Eclipse of 2009 Jul 07

Geocentric Conjunction = 09:00:36.7 UT J.D. = 2455019.87542

Greatest Eclipse = 09:38:38.4 UT J.D. = 2455019.90183

Penumbral Magnitude = 0.1824 P. Radius = 1.1862° Gamma = -1.4915
 Umbral Magnitude = -0.9084 U. Radius = 0.6513° Axis = 1.3419°

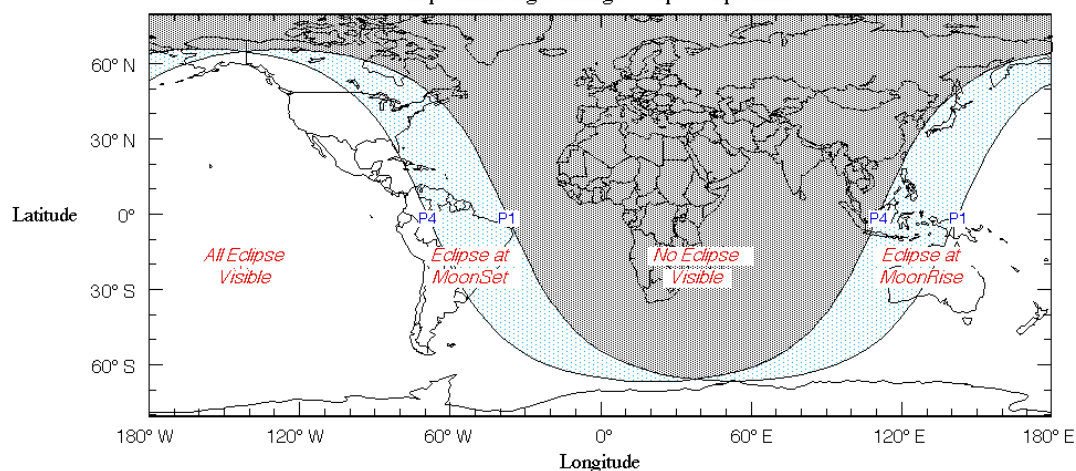
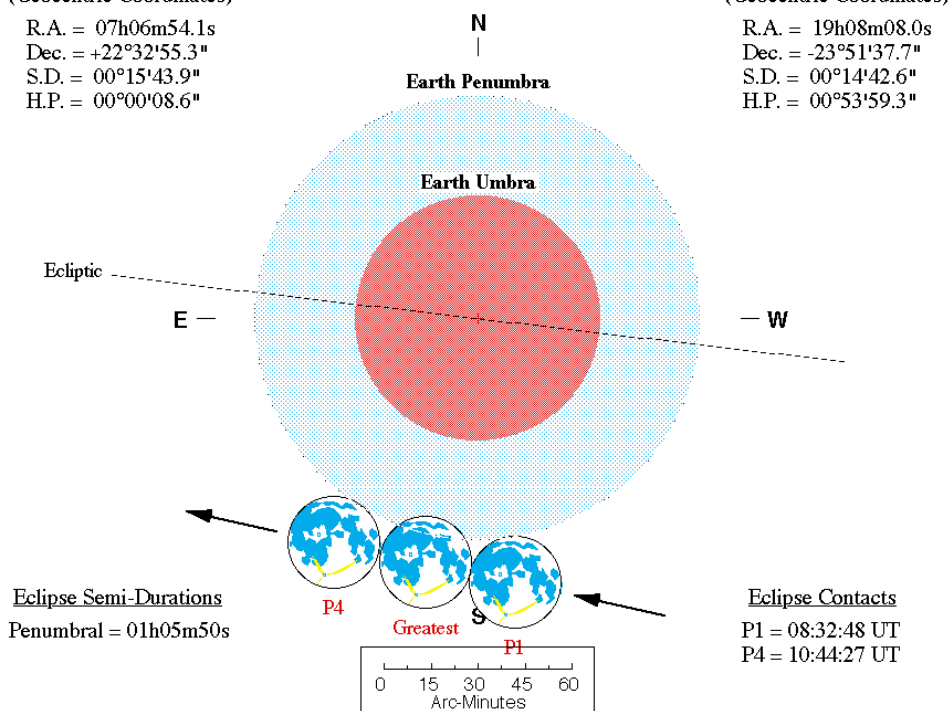
Saros Series = 110 Member = 71 of 72

Sun at Greatest Eclipse (Geocentric Coordinates)

R.A. = 07h06m54.1s
 Dec. = +22°32'55.3"
 S.D. = 00°15'43.9"
 H.P. = 00°00'08.6"

Moon at Greatest Eclipse (Geocentric Coordinates)

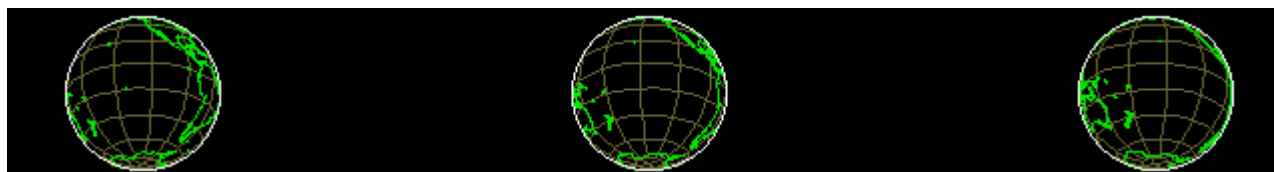
R.A. = 19h08m08.0s
 Dec. = -23°51'37.7"
 S.D. = 00°14'42.6"
 H.P. = 00°53'59.3"



Eclipse map/figure/table/predictions courtesy of Fred Espenak, NASA/Goddard Space Flight Center

GENERAL CIRCUMSTANCES

	Date	Ist. (T.U.)	Magnit.	Duration
Begins penumbral phase	07/07/2009	08h32m48s		
Max	07/07/2009	09h38m38s	0.182	02h12m
Ends penumbral phase	07/07/2009	10h44m27s		



At Zenit		067°48'54" E	63°36'30" S	059°41'06" W	12°41'16" N
Longit.	Latit.	065°18'54" E	64°10'00" S	062°11'06" W	17°50'54" N
143°05'38" W	23°51'38" S	062°48'54" E	64°39'46" S	064°41'06" W	22°40'52" N
		060°18'54" E	65°06'04" S	067°11'06" W	27°08'48" N
At sunrise or sunset		057°48'54" E	65°29'06" S	069°41'06" W	31°13'49" N
Longit.	Latit.	055°18'54" E	65°49'06" S	072°11'06" W	34°56'11" N
179°41'06" W	60°13'22" N	052°48'54" E	66°06'14" S	074°41'06" W	38°16'53" N
177°48'54" E	59°22'13" N	050°18'54" E	66°20'37" S	077°11'06" W	41°17'25" N
175°18'54" E	58°25'17" N	047°48'54" E	66°32'24" S	079°41'06" W	43°59'28" N
172°48'54" E	57°21'58" N	045°18'54" E	66°41'38" S	082°11'06" W	46°24'47" N
170°18'54" E	56°11'33" N	042°48'54" E	66°48'26" S	084°41'06" W	48°35'04" N
167°48'54" E	54°53'16" N	040°18'54" E	66°52'50" S	087°11'06" W	50°31'54" N
165°18'54" E	53°26'11" N	037°48'54" E	66°54'51" S	089°41'06" W	52°16'45" N
162°48'54" E	51°49'14" N	035°18'54" E	66°54'32" S	092°11'06" W	53°50'53" N
160°18'54" E	50°01'15" N	032°48'54" E	66°51'52" S	094°41'06" W	55°15'28" N
157°48'54" E	48°00'54" N	030°18'54" E	66°46'49" S	097°11'06" W	56°31'31" N
155°18'54" E	45°46'40" N	027°48'54" E	66°39'22" S	099°41'06" W	57°39'55" N
152°48'54" E	43°16'57" N	025°18'54" E	66°29'26" S	102°11'06" W	58°41'26" N
150°18'54" E	40°30'02" N	022°48'54" E	66°16'57" S	104°41'06" W	59°36'44" N
147°48'54" E	37°24'10" N	020°18'54" E	66°01'50" S	107°11'06" W	60°26'24" N
145°18'54" E	33°57'41" N	017°48'54" E	65°43'56" S	109°41'06" W	61°10'57" N
142°48'54" E	30°09'12" N	015°18'54" E	65°23'08" S	112°11'06" W	61°50'50" N
140°18'54" E	25°57'55" N	012°48'54" E	64°59'13" S	114°41'06" W	62°26'24" N
137°48'54" E	21°23'49" N	010°18'54" E	64°32'00" S	117°11'06" W	62°58'01" N
135°18'54" E	16°28'12" N	007°48'54" E	64°01'15" S	119°41'06" W	63°25'56" N
132°48'54" E	11°13'49" N	005°18'54" E	63°26'39" S	122°11'06" W	63°50'25" N
130°18'54" E	05°45'06" N	002°48'54" E	62°47'55" S	124°41'06" W	64°11'40" N
127°48'54" E	00°07'59" N	000°18'54" E	62°04'38" S	127°11'06" W	64°29'52" N
125°18'54" E	05°30'37" S	002°11'06" W	61°16'24" S	129°41'06" W	64°45'10" N
122°48'54" E	11°03'36" S	004°41'06" W	60°22'40" S	132°11'06" W	64°57'41" N
120°18'54" E	16°24'29" S	007°11'06" W	59°22'53" S	134°41'06" W	65°07'31" N
117°48'54" E	21°28'04" S	009°41'06" W	58°16'22" S	137°11'06" W	65°14'44" N
115°18'54" E	26°10'49" S	012°11'06" W	57°02'21" S	139°41'06" W	65°19'24" N
112°48'54" E	30°30'49" S	014°41'06" W	55°39'55" S	142°11'06" W	65°21'34" N
110°18'54" E	34°27'33" S	017°11'06" W	54°08'05" S	144°41'06" W	65°21'13" N
107°48'54" E	38°01'36" S	019°41'06" W	52°25'41" S	147°11'06" W	65°18'23" N
105°18'54" E	41°14'10" S	022°11'06" W	50°31'22" S	149°41'06" W	65°13'01" N
102°48'54" E	44°06'53" S	024°41'06" W	48°23'41" S	152°11'06" W	65°05'05" N
100°18'54" E	46°41'33" S	027°11'06" W	46°01'01" S	154°41'06" W	64°54'32" N
097°48'54" E	48°59'58" S	029°41'06" W	43°21'36" S	157°11'06" W	64°41'16" N
095°18'54" E	51°03'50" S	032°11'06" W	40°23'38" S	159°41'06" W	64°25'12" N
092°48'54" E	52°54'45" S	034°41'06" W	37°05'21" S	162°11'06" W	64°06'11" N
090°18'54" E	54°34'09" S	037°11'06" W	33°25'13" S	164°41'06" W	63°44'04" N
087°48'54" E	56°03'19" S	039°41'06" W	29°22'09" S	167°11'06" W	63°18'40" N
085°18'54" E	57°23'21" S	042°11'06" W	24°55'50" S	169°41'06" W	62°49'46" N
082°48'54" E	58°35'14" S	044°41'06" W	20°07'09" S	172°11'06" W	62°17'06" N
080°18'54" E	59°39'51" S	047°11'06" W	14°58'25" S	174°41'06" W	61°40'23" N
077°48'54" E	60°37'55" S	049°41'06" W	09°33'39" S	177°11'06" W	60°59'16" N
075°18'54" E	61°30'05" S	052°11'06" W	03°58'27" S	179°41'06" W	60°13'22" N
072°48'54" E	62°16'56" S	054°41'06" W	01°40'28" N		
070°18'54" E	62°58'55" S	057°11'06" W	07°15'56" N		

Total Solar Eclipse of 2009 Jul 22

Geocentric Conjunction = 02:33:04.4 UT J.D. = 2455034.606301
 Greatest Eclipse = 02:35:21.1 UT J.D. = 2455034.607884

Eclipse Magnitude = 1.0799 Gamma = 0.0696

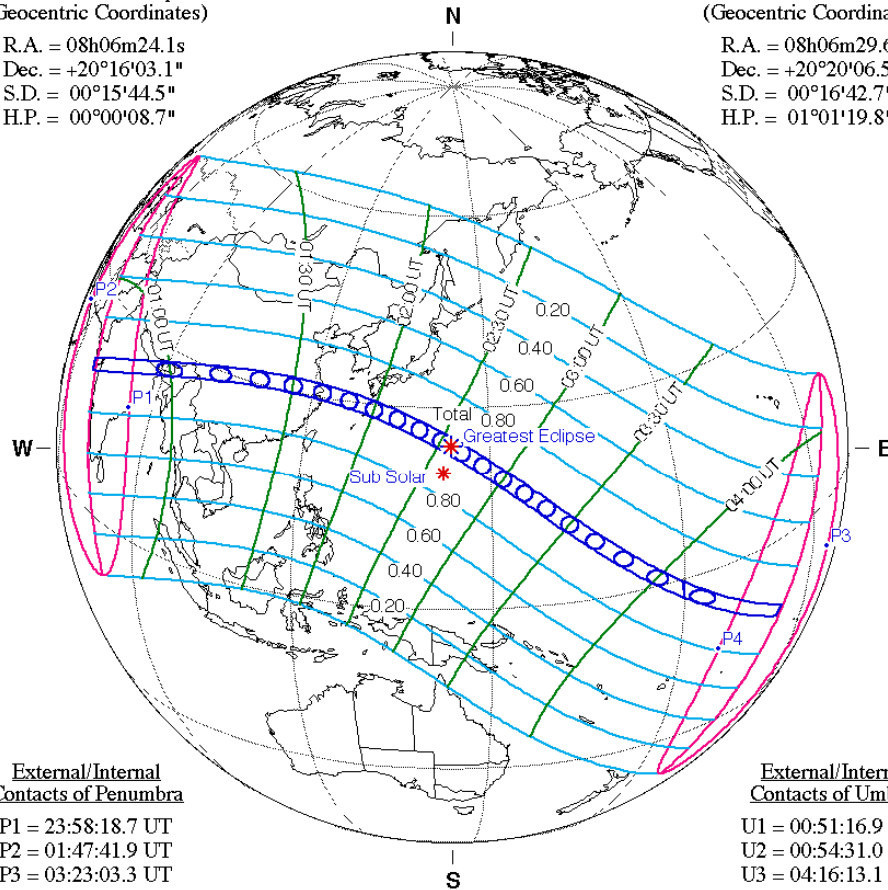
Saros Series = 136 Member = 37 of 71

Sun at Greatest Eclipse (Geocentric Coordinates)

R.A. = 08h06m24.1s
 Dec. = +20°16'03.1"
 S.D. = 00°15'44.5"
 H.P. = 00°00'08.7"

Moon at Greatest Eclipse (Geocentric Coordinates)

R.A. = 08h06m29.6s
 Dec. = +20°20'06.5"
 S.D. = 00°16'42.7"
 H.P. = 01°01'19.8"



External/Internal Contacts of Penumbra

P1 = 23:58:18.7 UT
 P2 = 01:47:41.9 UT
 P3 = 03:23:03.3 UT
 P4 = 05:12:25.1 UT

External/Internal Contacts of Umbra

U1 = 00:51:16.9 UT
 U2 = 00:54:31.0 UT
 U3 = 04:16:13.1 UT
 U4 = 04:19:26.5 UT

Local Circumstances at Greatest Eclipse

Lat. = 24°12.6'N Sun Alt. = 85.9°
 Long. = 144°06.4'E Sun Azm. = 197.6°
 Path Width = 258.4 km Duration = 06m38.8s

Ephemeris & Constants

Eph. = Newcomb/ILE
 $\Delta T = 66.2$ s
 $k_1 = 0.2724880$
 $k_2 = 0.2722810$
 $\Delta b = 0.0''$ $\Delta l = 0.0''$

Geocentric Libration (Optical + Physical)

$l = 0.66^\circ$
 $b = -0.09^\circ$
 $c = 10.53^\circ$

Brown Lun. No. = 1071



F. Espenak, NASA's GSFC - Fri, Jul 2,
sunearth.gsfc.nasa.gov/eclipse/eclipse.html

Eclipse map/figure/table/predictions courtesy of Fred Espenak, NASA/Goddard Space Flight Center

GENERAL CIRCUMSTANCES

	Date	Ist.(T.U.)	Long.	Lat.	Magnit.	Duration
First contact	21/07/2009	23h58m19s	084°44'12" E	19°03'40" N		
Central phase	22/07/2009	02h35m21s	144°10'36" E	24°13'55" N	1.080	06m39s
Last contact	22/07/2009	05h12m25s	171°46'10" W	14°13'11" S		

P1, first contact : point of the Earth in which the eclipse begins as partial at sunrising
P2, second contact : point of the Earth in which the eclipse ends as partial at sunrising
P3, Terzo contatto : point of the Earth in which the eclipse begins as partial at sunseting
P4, Quarto contatto : point of the Earth in which the eclipse ends as partial at sunseting

U1, first contact : point of the Earth in which the eclipse begins as total at sunrising
U2, second contact : point of the Earth in which the eclipse ends as total at sunrising
U3, third contact : point of the Earth in which the eclipse begins as total at sunseting
U4, fourth contact : point of the Earth in which the eclipse ends as total at sunseting

Longitude ° ' "		Line of centrality				Limits of totality				Limits of partiality			
		U.T.	Durn.	Mag	Alt	Center	North	South		North	South		
		h m s	s		°	° ' "	° ' "	° ' "		° ' "	° ' "		
-180	0.0	4 6 20	257.3T	1.071	27	- 1 49.78	- 0 33.67	- 3 4.81		43 22	-37 40		
-175	0.0	4 11 21	238.3T	1.069	20	- 4 50.80	- 3 39.12	- 6 1.53		39 30	-39 56		
-170	0.0	4 14 45	221.6T	1.067	14	- 7 32.03	- 6 24.37	- 8 38.88		35 34	... ..	
-165	0.0	4 16 46	207.0T	1.065	8	- 9 54.98	- 8 50.89	-10 58.39		31 47	... ..	
-160	0.0	4 17 41	194.1T	1.063	2	-12 1.32	-11 0.37	-13 1.70		28 17	... ..	
-155	0.0	.. .. .	.....	.....	..	... ..	... ..	... ..		25 10	... ..	
-150	0.0	.. .. .	.....	.....	..	... ..	... ..	... ..		22 26	... ..	
-145	0.0	.. .. .	.....	.....	..	... ..	... ..	... ..		20 4	... ..	
-140	0.0	.. .. .	.....	.....	..	... ..	... ..	... ..		18 3	... ..	
50	0.0	.. .. .	.....	.....	..	... ..	... ..	... ..		51 29	... ..	
55	0.0	.. .. .	.....	.....	..	... ..	... ..	... ..		53 21	... ..	
60	0.0	.. .. .	.....	.....	..	... ..	... ..	... ..		55 5	... ..	
65	0.0	.. .. .	.....	.....	..	... ..	... ..	... ..		56 40	... ..	
70	0.0	.. .. .	.....	.....	..	... ..	... ..	... ..		58 4	... ..	
75	0.0	0 53 11	200.1T	1.064	5	22 0.54	23 1.72	20 59.84		59 19	... ..	
80	0.0	0 54 20	213.2T	1.066	10	23 44.97	24 47.14	22 43.26		60 24	... ..	
85	0.0	0 56 22	227.5T	1.067	15	25 21.74	26 24.73	24 19.17		61 18	- 7 22		
90	0.0	0 59 17	242.8T	1.069	20	26 49.21	27 52.85	25 45.93		62 4	- 5 38		
95	0.0	1 3 7	259.2T	1.071	26	28 5.72	29 9.88	27 1.86		62 40	- 4 3		
100	0.0	1 7 52	276.5T	1.072	31	29 9.59	30 14.19	28 5.24		63 7	- 2 41		
105	0.0	1 13 34	294.5T	1.074	37	29 59.15	31 4.17	28 54.31		63 25	- 1 35		
110	0.0	1 20 14	313.1T	1.075	43	30 32.64	31 38.16	29 27.25		63 34	- 0 51		
115	0.0	1 27 53	331.7T	1.077	49	30 48.21	31 54.43	29 42.07		63 35	- 0 35		
120	0.0	1 36 36	349.9T	1.078	55	30 43.78	31 51.01	29 36.57		63 27	- 0 55		
125	0.0	1 46 24	366.9T	1.079	61	30 16.96	31 25.66	29 8.20		63 9	- 1 59		
130	0.0	1 57 25	381.7T	1.080	68	29 24.91	30 35.70	28 13.99		62 42	- 3 56		
135	0.0	2 9 40	392.9T	1.081	75	28 4.38	29 17.99	26 50.55		62 3	- 6 46		
140	0.0	2 23 13	398.9T	1.081	82	26 11.92	27 29.14	24 54.42		61 13	-10 19		
145	0.0	2 37 59	398.3T	1.081	85	23 44.67	25 6.09	22 22.95		60 9	-14 16		
150	0.0	2 53 40	389.9T	1.081	79	20 42.00	22 7.66	19 16.18		58 50	-18 19		
155	0.0	3 9 36	374.0T	1.080	70	17 7.90	18 36.79	15 39.18		57 13	-22 15		
160	0.0	3 24 54	352.3T	1.079	61	13 12.39	14 42.40	11 43.00		55 16	-25 55		
165	0.0	3 38 38	327.6T	1.077	52	9 9.62	10 38.22	7 42.01		52 56	-29 18		
170	0.0	3 50 11	302.4T	1.075	43	5 13.06	6 38.25	3 49.03		50 10	-32 22		
175	0.0	3 59 22	278.7T	1.073	35	1 31.82	2 52.59	0 12.23		46 58	-35 9		
180	0.0	4 6 20	257.3T	1.071	27	- 1 49.78	- 0 33.67	- 3 4.81		43 22	-37 40		

Penumbral Lunar Eclipse of 2009 Aug 06

Geocentric Conjunction = 01:44:58.4 UT J.D. = 2455049.57290

Greatest Eclipse = 00:39:10.9 UT J.D. = 2455049.52721

Penumbral Magnitude = 0.4276 P. Radius = 1.1902° Gamma = 1.3574

Umbral Magnitude = -0.6617 U. Radius = 0.6541° Axis = 1.2259°

Saros Series = 148 Member = 3 of 71

Sun at Greatest Eclipse
(Geocentric Coordinates)

R.A. = 09h04m41.9s

Dec. = +16°42'39.0"

S.D. = 00°15'46.1"

H.P. = 00°00'08.7"

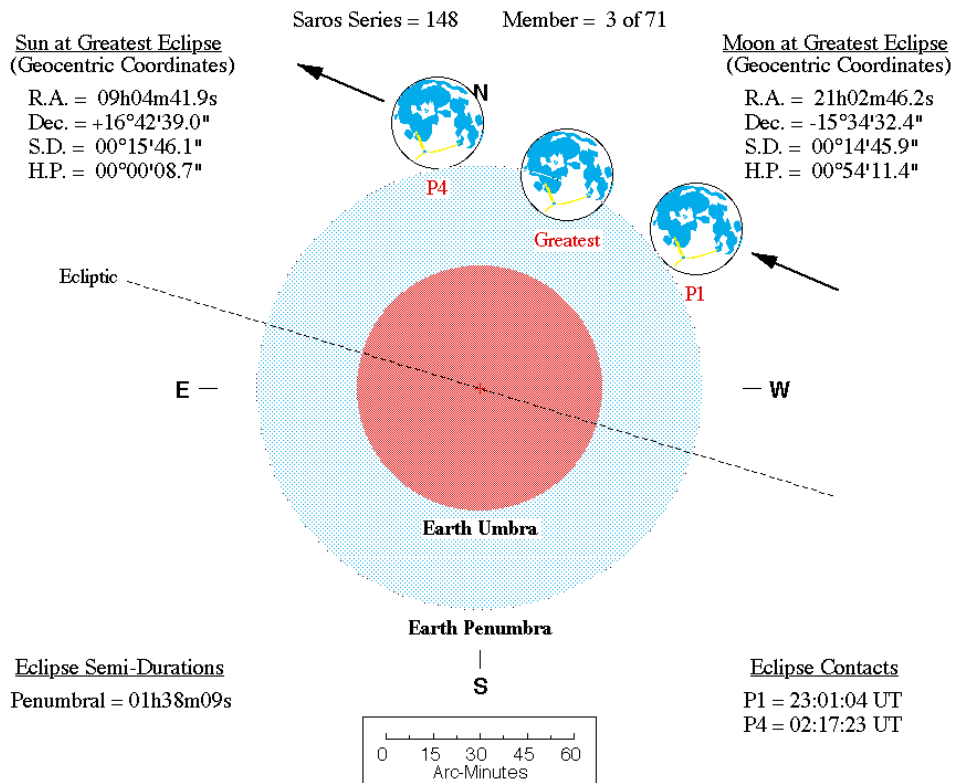
Moon at Greatest Eclipse
(Geocentric Coordinates)

R.A. = 21h02m46.2s

Dec. = -15°34'32.4"

S.D. = 00°14'45.9"

H.P. = 00°54'11.4"

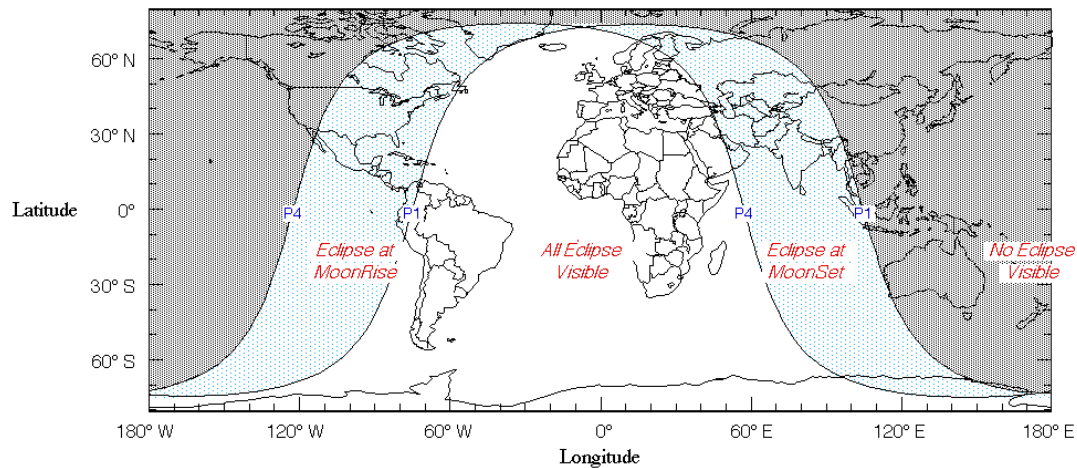


Eph. = Newcomb/ILE

$\Delta T = 66.2$ s

F. Espenak, NASA's GSFC - 2004 Jul 07

<http://sunearth.gsfc.nasa.gov/eclipse/eclipse.html>



Eclipse map/figure/table/predictions courtesy of Fred Espenak, NASA/Goddard Space Flight Center

GENERAL CIRCUMSTANCES

	Date	Ist. (T.U.)	Magnit.	Duration
Begins penumbral phase	05/08/2009	23h01m04s		
Max	06/08/2009	00h39m10s	0.429	03h16m
Ends penumbral phase	06/08/2009	02h17m23s		



At Zenit		067°48'54" E	37°29'35" N	059°41'06" W	64°53'59" N
Longit.	Latit.	065°18'54" E	42°24'45" N	062°11'06" W	63°37'32" N
008°44'19" W	15°34'34" S	062°48'54" E	46°36'18" N	064°41'06" W	62°10'35" N
		060°18'54" E	50°10'47" N	067°11'06" W	60°31'20" N
At sunrise or sunset		057°48'54" E	53°14'09" N	069°41'06" W	58°37'32" N
Longit.	Latit.	055°18'54" E	55°51'35" N	072°11'06" W	56°26'24" N
179°41'06" W	75°03'55" S	052°48'54" E	58°07'24" N	074°41'06" W	53°54'35" N
177°48'54" E	75°09'01" S	050°18'54" E	60°05'08" N	077°11'06" W	50°57'57" N
175°18'54" E	75°12'26" S	047°48'54" E	61°47'42" N	079°41'06" W	47°31'33" N
172°48'54" E	75°14'15" S	045°18'54" E	63°17'27" N	082°11'06" W	43°29'34" N
170°18'54" E	75°14'26" S	042°48'54" E	64°36'18" N	084°41'06" W	38°45'36" N
167°48'54" E	75°13'02" S	040°18'54" E	65°45'50" N	087°11'06" W	33°13'13" N
165°18'54" E	75°10'00" S	037°48'54" E	66°47'20" N	089°41'06" W	26°47'20" N
162°48'54" E	75°05'19" S	035°18'54" E	67°41'52" N	092°11'06" W	19°26'37" N
160°18'54" E	74°58'56" S	032°48'54" E	68°30'18" N	094°41'06" W	11°16'25" N
157°48'54" E	74°50'49" S	030°18'54" E	69°13'24" N	097°11'06" W	02°31'11" N
155°18'54" E	74°40'53" S	027°48'54" E	69°51'46" N	099°41'06" W	06°26'07" S
152°48'54" E	74°29'02" S	025°18'54" E	70°25'55" N	102°11'06" W	15°09'03" S
150°18'54" E	74°15'10" S	022°48'54" E	70°56'17" N	104°41'06" W	23°14'45" S
147°48'54" E	73°59'07" S	020°18'54" E	71°23'13" N	107°11'06" W	30°29'02" S
145°18'54" E	73°40'45" S	017°48'54" E	71°47'03" N	109°41'06" W	36°47'00" S
142°48'54" E	73°19'52" S	015°18'54" E	72°08'03" N	112°11'06" W	42°10'34" S
140°18'54" E	72°56'13" S	012°48'54" E	72°26'25" N	114°41'06" W	46°45'21" S
137°48'54" E	72°29'34" S	010°18'54" E	72°42'21" N	117°11'06" W	50°38'11" S
135°18'54" E	71°59'33" S	007°48'54" E	72°56'01" N	119°41'06" W	53°55'47" S
132°48'54" E	71°25'50" S	005°18'54" E	73°07'32" N	122°11'06" W	56°44'07" S
130°18'54" E	70°47'56" S	002°48'54" E	73°17'00" N	124°41'06" W	59°08'12" S
127°48'54" E	70°05'18" S	000°18'54" E	73°24'31" N	127°11'06" W	61°12'13" S
125°18'54" E	69°17'20" S	002°11'06" W	73°30'09" N	129°41'06" W	62°59'31" S
122°48'54" E	68°23'13" S	004°41'06" W	73°33'57" N	132°11'06" W	64°32'51" S
120°18'54" E	67°22'02" S	007°11'06" W	73°35'57" N	134°41'06" W	65°54'24" S
117°48'54" E	66°12'39" S	009°41'06" W	73°36'10" N	137°11'06" W	67°05'59" S
115°18'54" E	64°53'39" S	012°11'06" W	73°34'36" N	139°41'06" W	68°09'03" S
112°48'54" E	63°23'22" S	014°41'06" W	73°31'15" N	142°11'06" W	69°04'47" S
110°18'54" E	61°39'41" S	017°11'06" W	73°26'04" N	144°41'06" W	69°54'11" S
107°48'54" E	59°40'01" S	019°41'06" W	73°19'00" N	147°11'06" W	70°38'02" S
105°18'54" E	57°21'09" S	022°11'06" W	73°10'01" N	149°41'06" W	71°17'02" S
102°48'54" E	54°39'08" S	024°41'06" W	72°59'00" N	152°11'06" W	71°51'44" S
100°18'54" E	51°29'09" S	027°11'06" W	72°45'52" N	154°41'06" W	72°22'36" S
097°48'54" E	47°45'28" S	029°41'06" W	72°30'30" N	157°11'06" W	72°50'02" S
095°18'54" E	43°21'31" S	032°11'06" W	72°12'45" N	159°41'06" W	73°14'23" S
092°48'54" E	38°10'23" S	034°41'06" W	71°52'24" N	162°11'06" W	73°35'55" S
090°18'54" E	32°05'59" S	037°11'06" W	71°29'17" N	164°41'06" W	73°54'53" S
087°48'54" E	25°05'14" S	039°41'06" W	71°03'07" N	167°11'06" W	74°11'28" S
085°18'54" E	17°11'06" S	042°11'06" W	70°33'37" N	169°41'06" W	74°25'52" S
082°48'54" E	08°35'23" S	044°41'06" W	70°00'26" N	172°11'06" W	74°38'11" S
080°18'54" E	00°20'51" N	047°11'06" W	69°23'08" N	174°41'06" W	74°48'35" S
077°48'54" E	09°11'22" N	049°41'06" W	68°41'14" N	177°11'06" W	74°57'08" S
075°18'54" E	17°31'46" N	052°11'06" W	67°54'09" N	179°41'06" W	75°03'55" S
072°48'54" E	25°05'19" N	054°41'06" W	67°01'10" N		
070°18'54" E	31°44'35" N	057°11'06" W	66°01'27" N		

Partial Lunar Eclipse of 2009 Dec 31

Geocentric Conjunction = 19:04:48.2 UT J.D. = 2455197.29500

Greatest Eclipse = 19:22:41.4 UT J.D. = 2455197.30742

Penumbral Magnitude = 1.0808 P. Radius = 1.3136° Gamma = 0.9766
Umbral Magnitude = 0.0820 U. Radius = 0.7606° Axis = 0.9921°

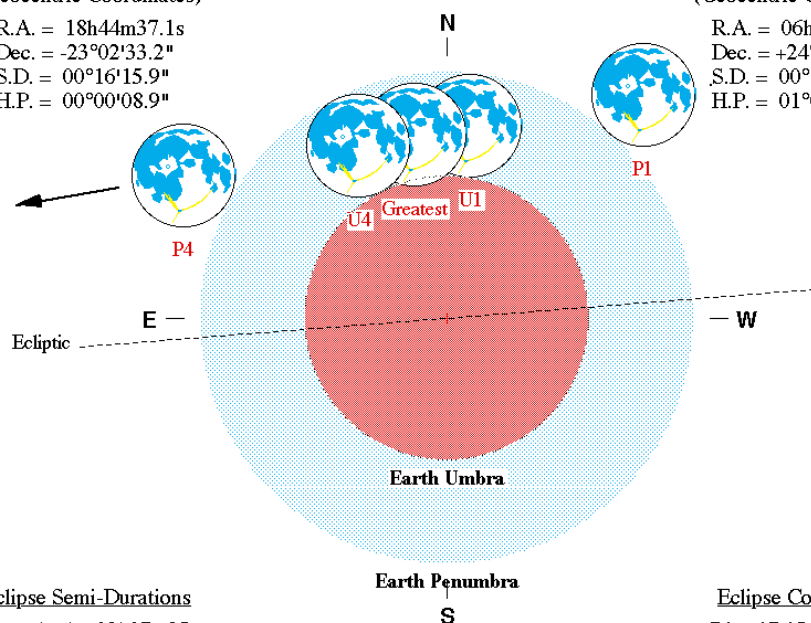
Saros Series = 115 Member = 57 of 72

Sun at Greatest Eclipse (Geocentric Coordinates)

R.A. = 18h44m37.1s
Dec. = -23°02'33.2"
S.D. = 00°16'15.9"
H.P. = 00°00'08.9"

Moon at Greatest Eclipse (Geocentric Coordinates)

R.A. = 06h45m22.3s
Dec. = +24°01'10.3"
S.D. = 00°16'36.6"
H.P. = 01°00'57.6"



Eclipse Semi-Durations

Penumbral = 02h07m25s
Umbral = 00h31m06s

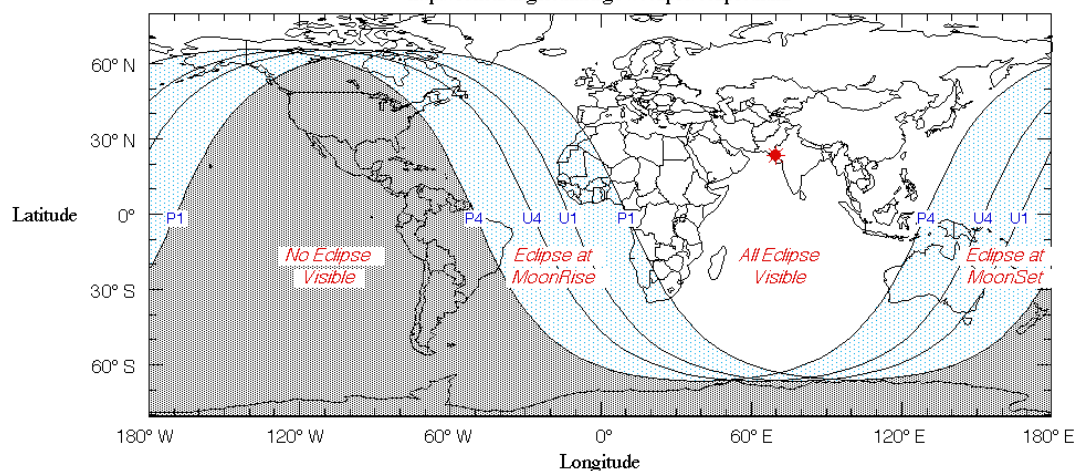
Eclipse Contacts

P1 = 17:15:18 UT
U1 = 18:51:38 UT
U4 = 19:53:51 UT
P4 = 21:30:07 UT

Eph. = Newcomb/ILE
ΔT = 66.6 s

F. Espenak, NASA's GSFC - 2004 Jul 07

<http://sunearth.gsfc.nasa.gov/eclipse/eclipse.html>



Eclipse map/figure/table/predictions courtesy of Fred Espenak, NASA/Goddard Space Flight Center

GENERAL CIRCUMSTANCES

	Date	Ist. (T.U.)	Magnit.	Duration
Begins penumbral phase	31/12/2009	17h15m18s		
Begins partial phase	31/12/2009	18h51m38s		
Max	31/12/2009	19h22m41s	0.082	01h02m
Ends partial phase	31/12/2009	19h53m51s		
Ends penumbral phase	31/12/2009	21h30m07s		



Begin of partial eclipse	055°18'54" E	63°22'56" S	089°41'06" W	66°11'35" N
At Zenit	052°48'54" E	62°56'17" S	092°11'06" W	66°22'36" N
Longit.	050°18'54" E	62°26'02" S	094°41'06" W	66°31'07" N
Latit.	047°48'54" E	61°51'55" S	097°11'06" W	66°37'11" N
077°42'22" E	045°18'54" E	61°13'37" S	099°41'06" W	66°40'51" N
At sunrise and sunset	042°48'54" E	60°30'48" S	102°11'06" W	66°42'08" N
Longit.	040°18'54" E	59°43'02" S	104°41'06" W	66°41'03" N
Latit.	037°48'54" E	58°49'50" S	107°11'06" W	66°37'36" N
179°41'06" W	035°18'54" E	57°50'40" S	109°41'06" W	66°31'45" N
177°48'54" E	032°48'54" E	56°44'53" S	112°11'06" W	66°23'27" N
175°18'54" E	030°18'54" E	55°31'46" S	114°41'06" W	66°12'38" N
172°48'54" E	027°48'54" E	54°10'30" S	117°11'06" W	65°59'14" N
170°18'54" E	025°18'54" E	52°40'06" S	119°41'06" W	65°43'08" N
167°48'54" E	022°48'54" E	50°59'31" S	122°11'06" W	65°24'11" N
165°18'54" E	020°18'54" E	49°07'31" S	124°41'06" W	65°02'15" N
162°48'54" E	017°48'54" E	47°02'44" S	127°11'06" W	64°37'09" N
160°18'54" E	015°18'54" E	44°43'41" S	129°41'06" W	64°08'39" N
157°48'54" E	012°48'54" E	42°08'42" S	132°11'06" W	63°36'30" N
155°18'54" E	010°18'54" E	39°16'08" S	134°41'06" W	63°00'24" N
152°48'54" E	007°48'54" E	36°04'17" S	137°11'06" W	62°20'00" N
150°18'54" E	005°18'54" E	32°31'37" S	139°41'06" W	61°34'56" N
147°48'54" E	002°48'54" E	28°36'59" S	142°11'06" W	60°44'43" N
145°18'54" E	000°18'54" E	24°19'50" S	144°41'06" W	59°48'50" N
142°48'54" E	002°11'06" W	19°40'36" S	147°11'06" W	58°46'40" N
140°18'54" E	004°41'06" W	14°41'01" S	149°41'06" W	57°37'31" N
137°48'54" E	007°11'06" W	09°24'21" S	152°11'06" W	56°20'36" N
135°18'54" E	009°41'06" W	03°55'27" S	154°41'06" W	54°54'58" N
132°48'54" E	012°11'06" W	01°39'33" N	157°11'06" W	53°19'34" N
130°18'54" E	014°41'06" W	07°13'47" N	159°41'06" W	51°33'14" N
127°48'54" E	017°11'06" W	12°40'25" N	162°11'06" W	49°34'35" N
125°18'54" E	019°41'06" W	17°53'30" N	164°41'06" W	47°22'08" N
122°48'54" E	022°11'06" W	22°48'25" N	167°11'06" W	44°54'15" N
120°18'54" E	024°41'06" W	27°22'12" N	169°41'06" W	42°09'11" N
117°48'54" E	027°11'06" W	31°33'24" N	172°11'06" W	39°05'13" N
115°18'54" E	029°41'06" W	35°21'51" N	174°41'06" W	35°40'39" N
112°48'54" E	032°11'06" W	38°48'16" N	177°11'06" W	31°54'10" N
110°18'54" E	034°41'06" W	41°53'58" N	179°41'06" W	27°44'57" N
107°48'54" E	037°11'06" W	44°40'36" N		
105°18'54" E	039°41'06" W	47°09'54" N		
102°48'54" E	042°11'06" W	49°23'38" N		
100°18'54" E	044°41'06" W	51°23'25" N		
097°48'54" E	047°11'06" W	53°10'47" N		
095°18'54" E	049°41'06" W	54°47'04" N		
092°48'54" E	052°11'06" W	56°13'30" N		
090°18'54" E	054°41'06" W	57°31'09" N		
087°48'54" E	057°11'06" W	58°40'56" N		
085°18'54" E	059°41'06" W	59°43'41" N		
082°48'54" E	062°11'06" W	60°40'05" N		
080°18'54" E	064°41'06" W	61°30'47" N		
077°48'54" E	067°11'06" W	62°16'17" N		
075°18'54" E	069°41'06" W	62°57'03" N		
072°48'54" E	072°11'06" W	63°33'31" N		
070°18'54" E	074°41'06" W	64°06'00" N		
067°48'54" E	077°11'06" W	64°34'49" N		
065°18'54" E	079°41'06" W	65°00'12" N		
062°48'54" E	082°11'06" W	65°22'24" N		
060°18'54" E	084°41'06" W	65°41'36" N		
057°48'54" E	087°11'06" W	65°57'56" N		

End of partial eclipse			007°48'54" E	50°57'42" S	Max eclipse	007°48'54" E	44°41'42" S
			005°18'54" E	49°04'39" S		005°18'54" E	42°06'00" S
At Zenit			002°48'54" E	46°58'39" S	At Zenit	002°48'54" E	39°12'35" S
Longit.	Latit.		000°18'54" E	44°38'10" S	Longit.	Latit.	000°18'54" E
062°56'41" E	23°57'55" N		002°11'06" W	42°01'33" S	070°18'44" E	24°01'12" N	002°11'06" W
			004°41'06" W	39°07'05" S			
At sunrise and sunset			007°11'06" W	35°53'04" S	At sunrise and sunset		
Longit.	Latit.		009°41'06" W	32°17'58" S	Longit.	Latit.	009°41'06" W
179°41'06" W	47°17'40" N		012°11'06" W	28°20'37" S	179°41'06" W	39°01'19" N	012°11'06" W
177°48'54" E	44°48'14" N		014°41'06" W	24°00'33" S	177°48'54" E	35°35'43" N	014°41'06" W
175°18'54" E	42°01'23" N		017°11'06" W	19°18'16" S	175°18'54" E	31°48'02" N	017°11'06" W
172°48'54" E	38°55'21" N		019°41'06" W	14°15'38" S	172°48'54" E	27°37'31" N	019°41'06" W
170°18'54" E	35°28'27" N		022°11'06" W	08°56'06" S	170°18'54" E	23°04'16" N	022°11'06" W
167°48'54" E	31°39'21" N		024°41'06" W	03°24'41" S	167°48'54" E	18°09'40" N	024°41'06" W
165°18'54" E	27°27'16" N		027°11'06" W	02°12'15" N	165°18'54" E	12°56'37" N	027°11'06" W
162°48'54" E	22°52'22" N		029°41'06" W	07°47'43" N	162°48'54" E	07°29'41" N	029°41'06" W
160°18'54" E	17°56'06" N		032°11'06" W	13°14'52" N	160°18'54" E	01°54'49" N	032°11'06" W
157°48'54" E	12°41'29" N		034°41'06" W	18°27'46" N	157°48'54" E	03°41'09" S	034°41'06" W
155°18'54" E	07°13'10" N		037°11'06" W	23°21'56" N	155°18'54" E	09°11'16" S	037°11'06" W
152°48'54" E	01°37'13" N		039°41'06" W	27°54'30" N	152°48'54" E	14°29'20" S	039°41'06" W
150°18'54" E	03°59'28" S		042°11'06" W	32°04'11" N	150°18'54" E	19°30'22" S	042°11'06" W
147°48'54" E	09°29'55" S		044°41'06" W	35°50'56" N	147°48'54" E	24°11'03" S	044°41'06" W
145°18'54" E	14°47'54" S		047°11'06" W	39°15'36" N	145°18'54" E	28°29'35" S	047°11'06" W
142°48'54" E	19°48'33" S		049°41'06" W	42°19'34" N	142°48'54" E	32°25'30" S	049°41'06" W
140°18'54" E	24°28'35" S		052°11'06" W	45°04'31" N	140°18'54" E	35°59'18" S	052°11'06" W
137°48'54" E	28°46'18" S		054°41'06" W	47°32'15" N	137°48'54" E	39°12'10" S	054°41'06" W
135°18'54" E	32°41'18" S		057°11'06" W	49°44'30" N	135°18'54" E	42°05'38" S	057°11'06" W
132°48'54" E	36°14'10" S		059°41'06" W	51°42'55" N	132°48'54" E	44°41'22" S	059°41'06" W
130°18'54" E	39°26'04" S		062°11'06" W	53°29'02" N	130°18'54" E	47°01'05" S	062°11'06" W
127°48'54" E	42°18'36" S		064°41'06" W	55°04'11" N	127°48'54" E	49°06'26" S	064°41'06" W
125°18'54" E	44°53'28" S		067°11'06" W	56°29'35" N	125°18'54" E	50°58'56" S	067°11'06" W
122°48'54" E	47°12'22" S		069°41'06" W	57°46'16" N	122°48'54" E	52°39'56" S	069°41'06" W
120°18'54" E	49°16'58" S		072°11'06" W	58°55'12" N	120°18'54" E	54°10'41" S	072°11'06" W
117°48'54" E	51°08'45" S		074°41'06" W	59°57'09" N	117°48'54" E	55°32'17" S	074°41'06" W
115°18'54" E	52°49'07" S		077°11'06" W	60°52'50" N	115°18'54" E	56°45'40" S	077°11'06" W
112°48'54" E	54°19'18" S		079°41'06" W	61°42'52" N	112°48'54" E	57°51'41" S	079°41'06" W
110°18'54" E	55°40'22" S		082°11'06" W	62°27'46" N	110°18'54" E	58°51'04" S	082°11'06" W
107°48'54" E	56°53'16" S		084°41'06" W	63°08'00" N	107°48'54" E	59°44'28" S	084°41'06" W
105°18'54" E	57°58'51" S		087°11'06" W	63°43'57" N	105°18'54" E	60°32'24" S	087°11'06" W
102°48'54" E	58°57'50" S		089°41'06" W	64°15'59" N	102°48'54" E	61°15'23" S	089°41'06" W
100°18'54" E	59°50'51" S		092°11'06" W	64°44'21" N	100°18'54" E	61°53'49" S	092°11'06" W
097°48'54" E	60°38'28" S		094°41'06" W	65°09'21" N	097°48'54" E	62°28'03" S	094°41'06" W
095°18'54" E	61°21'08" S		097°11'06" W	65°31'11" N	095°18'54" E	62°58'26" S	097°11'06" W
092°48'54" E	61°59'17" S		099°41'06" W	65°50'02" N	092°48'54" E	63°25'12" S	099°41'06" W
090°18'54" E	62°33'16" S		102°11'06" W	66°06'04" N	090°18'54" E	63°48'35" S	102°11'06" W
087°48'54" E	63°03'24" S		104°41'06" W	66°19'24" N	087°48'54" E	64°08'49" S	104°41'06" W
085°18'54" E	63°29'56" S		107°11'06" W	66°30'09" N	085°18'54" E	64°26'01" S	107°11'06" W
082°48'54" E	63°53'08" S		109°41'06" W	66°38'23" N	082°48'54" E	64°40'22" S	109°41'06" W
080°18'54" E	64°13'09" S		112°11'06" W	66°44'12" N	080°18'54" E	64°51'57" S	112°11'06" W
077°48'54" E	64°30'11" S		114°41'06" W	66°47'37" N	077°48'54" E	65°00'52" S	114°41'06" W
075°18'54" E	64°44'21" S		117°11'06" W	66°48'41" N	075°18'54" E	65°07'11" S	117°11'06" W
072°48'54" E	64°55'46" S		119°41'06" W	66°47'23" N	072°48'54" E	65°10'58" S	119°41'06" W
070°18'54" E	65°04'32" S		122°11'06" W	66°43'43" N	070°18'54" E	65°12'13" S	122°11'06" W
067°48'54" E	65°10'43" S		124°41'06" W	66°37'39" N	067°48'54" E	65°10'58" S	124°41'06" W
065°18'54" E	65°14'21" S		127°11'06" W	66°29'09" N	065°18'54" E	65°07'12" S	127°11'06" W
062°48'54" E	65°15'28" S		129°41'06" W	66°18'08" N	062°48'54" E	65°00'53" S	129°41'06" W
060°18'54" E	65°14'05" S		132°11'06" W	66°04'31" N	060°18'54" E	64°51'58" S	132°11'06" W
057°48'54" E	65°10'12" S		134°41'06" W	65°48'13" N	057°48'54" E	64°40'23" S	134°41'06" W
055°18'54" E	65°03'45" S		137°11'06" W	65°29'03" N	055°18'54" E	64°26'03" S	137°11'06" W
052°48'54" E	64°54'43" S		139°41'06" W	65°06'54" N	052°48'54" E	64°08'51" S	139°41'06" W
050°18'54" E	64°43'00" S		142°11'06" W	64°41'34" N	050°18'54" E	63°48'38" S	142°11'06" W
047°48'54" E	64°28'33" S		144°41'06" W	64°12'50" N	047°48'54" E	63°25'15" S	144°41'06" W
045°18'54" E	64°11'13" S		147°11'06" W	63°40'25" N	045°18'54" E	62°58'30" S	147°11'06" W
042°48'54" E	63°50'52" S		149°41'06" W	63°04'02" N	042°48'54" E	62°28'08" S	149°41'06" W
040°18'54" E	63°27'21" S		152°11'06" W	62°23'20" N	040°18'54" E	61°53'54" S	152°11'06" W
037°48'54" E	63°00'26" S		154°41'06" W	61°37'56" N	037°48'54" E	61°15'28" S	154°41'06" W
035°18'54" E	62°29'55" S		157°11'06" W	60°47'20" N	035°18'54" E	60°32'30" S	157°11'06" W
032°48'54" E	61°55'31" S		159°41'06" W	59°51'01" N	032°48'54" E	59°44'34" S	159°41'06" W
030°18'54" E	61°16'55" S		162°11'06" W	58°48'23" N	030°18'54" E	58°51'12" S	162°11'06" W
027°48'54" E	60°33'46" S		164°41'06" W	57°38'41" N	027°48'54" E	57°51'50" S	164°41'06" W
025°18'54" E	59°45'37" S		167°11'06" W	56°21'08" N	025°18'54" E	56°45'49" S	167°11'06" W
022°48'54" E	58°52'00" S		169°41'06" W	54°54'47" N	022°48'54" E	55°32'27" S	169°41'06" W
020°18'54" E	57°52'22" S		172°11'06" W	53°18'33" N	020°18'54" E	54°10'53" S	172°11'06" W
017°48'54" E	56°46'03" S		174°41'06" W	51°31'14" N	017°48'54" E	52°40'09" S	174°41'06" W
015°18'54" E	55°32'21" S		177°11'06" W	49°31'27" N	015°18'54" E	50°59'10" S	177°11'06" W
012°48'54" E	54°10'23" S		179°41'06" W	47°17'40" N	012°48'54" E	49°06'42" S	179°41'06" W
010°18'54" E	52°39'12" S				010°18'54" E	47°01'23" S	

METEOR SHOWERS

Shower	Activity	Max	λ_{sol}	α	δ	v_{inf}	r	ZHR
Antihelion Source (ANT)	Nov 26 – Sep 24					30	3.0	3
Quadrantids (QUA)	Jan 01 – Jan 05	Jan 04	283°16	230°	+49°	41	2.1	120
α -Centaurids (ACE)	Jan 28 – Feb 21	Feb 08	319°2	211°	-59°	56	2.0	5
δ -Leonids (DLE)	Feb 15 – Mar 10	Feb 25	336°	168°	+16°	23	3.0	2
γ -Normids (GNO)	Feb 25 – Mar 22	Mar 13	353°	239°	-50°	56	2.4	4
Lyrids (LYR)	Apr 16 – Apr 25	Apr 22	32°32	271°	+34°	49	2.1	18
π -Puppids (PPU)	Apr 15 – Apr 28	Apr 23	33°5	110°	-45°	18	2.0	Var
η -Aquarids (ETA)	Apr 19 – May 28	May 05	45°5	338°	-01°	66	2.4	70+*
η -Lyrids (ELY)	May 03 – May 12	May 08	48°4	287°	+44°	44	3.0	3
June Bootids (JBO)	Jun 22 – Jul 02	Jun 27	95°7	224°	+48°	18	2.2	Var
Piscis Austrinids (PAU)	Jul 15 – Aug 10	Jul 27	125°	341°	-30°	35	3.2	5
South. δ -Aquarids (SDA)	Jul 12 – Aug 19	Jul 27	125°	339°	-16°	41	3.2	20
α -Capricornids (CAP)	Jul 03 – Aug 15	Jul 29	127°	307°	-10°	23	2.5	4
Perseids (PER)*	Jul 17 – Aug 24	Aug 12	140°0	46°	+58°	59	2.6	100
κ -Cygnids (KCG)	Aug 03 – Aug 25	Aug 17	145°	286°	+59°	25	3.0	3
α -Aurigids (AUR)	Aug 25 – Sep 08	Aug 31	158°6	84°	+42°	66	2.6	7
September Perseids (SPE)	Sep 05 – Sep 17	Sep 09	166°7	60°	+47°	64	2.9	5
δ -Aurigids (DAU)	Sep 18 – Oct 10	Oct 03	191°	88°	+49°	64	2.9	3
Draconids (GIA)	Oct 06 – Oct 10	Oct 08	195°4	262°	+54°	20	2.6	Var
ϵ -Geminids (EGE)	Oct 14 – Oct 27	Oct 18	205°	102°	+27°	70	3.0	2
Orionids (ORI)	Oct 02 – Nov 07	Oct 21	208°	95°	+16°	66	2.5	30*
Leo Minorids (LMI)	Oct 19 – Oct 27	Oct 24	211°	162°	+37°	62	3.0	2
Southern Taurids (STA)	Sep 25 – Nov 25	Nov 05	223°	52°	+15°	27	2.3	5
Northern Taurids (NTA)	Sep 25 – Nov 25	Nov 12	230°	58°	+22°	29	2.3	5
Leonids (LEO)	Nov 10 – Nov 23	Nov 17	235°27	153°	+22°	71	2.5	20+*
α -Monocerotids (AMO)	Nov 15 – Nov 25	Nov 21	239°32	117°	+01°	65	2.4	Var
Dec Phoenicids (PHO)	Nov 28 – Dec 09	Dec 06	254°25	18°	-53°	18	2.8	Var
Puppids/Velids (PUP)	Dec 01 – Dec 15	Dec 06	255°	123°	-45°	40	2.9	10
Monocerotids (MON)	Nov 27 – Dec 17	Dec 08	257°	100°	+08°	42	3.0	2
σ -Hydrids (HYD)	Dec 03 – Dec 15	Dec 11	260°	127°	+02°	58	3.0	3
Geminids (GEM)	Dec 07 – Dec 17	Dec 13	262°2	112°	+33°	35	2.6	120
Coma Berenicids (COM)	Dec 12 – Jan 23	Dec 20	268°	177°	+25°	65	3.0	5
Ursids (URS)	Dec 17 – Dec 26	Dec 22	270°7	217°	+76°	33	3.0	10

An asterisk '*' in the 'Shower' column indicates that source may have additional peak

VISIBILITY OF THE SHOWERS

Rome : 42 N, 12 E (UT)

Quadrantidi

Date	Times	Alt	Az	Sun	Moon
2009:01:04	16:00	12.2	327.5	Civil t.	Up
2009:01:04	17:00	6.9	336.0	Astr. t.	Up
2009:01:04	18:00	3.1	345.1	Night	Up
2009:01:04	19:00	1.2	354.8	Night	Up
2009:01:04	20:00	1.1	4.6	Night	Up
2009:01:04	21:00	2.9	14.3	Night	Up
2009:01:04	22:00	6.6	23.5	Night	Up
2009:01:04	23:00	11.8	32.0	Night	Up
2009:01:05	00:00	18.3	39.6	Night	Up
2009:01:05	01:00	26.0	46.3	Night	Down
2009:01:05	02:00	34.5	52.1	Night	Down
2009:01:05	03:00	43.6	56.9	Night	Down
2009:01:05	04:00	53.2	60.4	Night	Down
2009:01:05	05:00	63.0	61.8	Astr. t.	Down
2009:01:05	06:00	72.7	58.0	Nautic.t.	Down
2009:01:05	07:00	81.2	33.8	Day	Down

Liridi

Date	Times	Alt	Az	Sun	Moon
2009:04:22	16:00	-13.1	11.3	Day	Down
2009:04:22	17:00	-9.8	23.6	Day	Down
2009:04:22	18:00	-4.3	34.9	Civil t.	Down
2009:04:22	19:00	2.9	45.0	Nautic.t.	Down
2009:04:22	20:00	11.4	54.2	Night	Down
2009:04:22	21:00	21.0	62.6	Night	Down
2009:04:22	22:00	31.2	70.4	Night	Down
2009:04:22	23:00	42.0	78.3	Night	Down
2009:04:23	00:00	53.1	86.7	Night	Down
2009:04:23	01:00	64.3	97.5	Night	Down
2009:04:23	02:00	75.0	116.4	Night	Down
2009:04:23	03:00	82.1	172.7	Astr. t.	Up
2009:04:23	04:00	76.6	238.6	Civil t.	Up
2009:04:23	05:00	66.0	260.3	Day	Up
2009:04:23	06:00	54.9	271.8	Day	Up
2009:04:23	07:00	43.8	280.4	Day	Up

Perseidi

Date	Times	Alt	Az	Sun	Moon
2009:08:12	16:00	10.3	354.0	Day	Down
2009:08:12	17:00	9.9	2.0	Day	Down
2009:08:12	18:00	11.1	10.0	Day	Down
2009:08:12	19:00	13.8	17.7	Nautic.t.	Down
2009:08:12	20:00	17.9	24.8	Astr. t.	Down
2009:08:12	21:00	23.1	31.2	Night	Up

2009:08:12	22:00	29.4	36.7	Night	Up
2009:08:12	23:00	36.4	41.1	Night	Up
2009:08:13	00:00	44.0	44.2	Night	Up
2009:08:13	01:00	51.9	45.4	Night	Up
2009:08:13	02:00	59.8	43.6	Night	Up
2009:08:13	03:00	67.1	36.4	Astr. t.	Up
2009:08:13	04:00	72.5	19.2	Civil t.	Up
2009:08:13	05:00	73.7	351.9	Day	Up
2009:08:13	06:00	69.8	329.5	Day	Up
2009:08:13	07:00	63.1	318.6	Day	Up

Leonidi

Date	Times	Alt	Az	Sun	Moon
2009:11:17	16:00	-23.3	339.1	Civil t.	Down
2009:11:17	17:00	-25.9	354.2	Astr. t.	Down
2009:11:17	18:00	-25.5	9.7	Night	Down
2009:11:17	19:00	-22.2	24.5	Night	Down
2009:11:17	20:00	-16.4	37.9	Night	Down
2009:11:17	21:00	-8.6	49.8	Night	Down
2009:11:17	22:00	0.5	60.3	Night	Down
2009:11:17	23:00	10.7	70.0	Night	Down
2009:11:18	00:00	21.5	79.2	Night	Down
2009:11:18	01:00	32.6	88.6	Night	Down
2009:11:18	02:00	43.7	99.3	Night	Down
2009:11:18	03:00	54.5	113.0	Night	Down
2009:11:18	04:00	63.9	133.4	Night	Down
2009:11:18	05:00	69.7	166.2	Nautic.t.	Down
2009:11:18	06:00	68.4	205.8	Civil t.	Down
2009:11:18	07:00	61.2	234.2	Day	Down

Geminidi

Date	Times	Alt	Az	Sun	Moon
2009:12:13	16:00	-5.6	34.7	Civil t.	Down
2009:12:13	17:00	1.6	45.0	Astr. t.	Down
2009:12:13	18:00	10.2	54.4	Night	Down
2009:12:13	19:00	19.7	62.9	Night	Down
2009:12:13	20:00	30.0	70.9	Night	Down
2009:12:13	21:00	40.8	78.9	Night	Down
2009:12:13	22:00	51.9	87.6	Night	Down
2009:12:13	23:00	63.1	98.6	Night	Down
2009:12:14	00:00	73.8	117.5	Night	Down
2009:12:14	01:00	81.0	168.4	Night	Down
2009:12:14	02:00	76.5	233.1	Night	Down
2009:12:14	03:00	66.3	257.2	Night	Down
2009:12:14	04:00	55.1	269.6	Night	Down
2009:12:14	05:00	44.0	278.7	Astr. t.	Up
2009:12:14	06:00	33.1	286.8	Civil t.	Up
2009:12:14	07:00	22.6	294.8	Day	Up

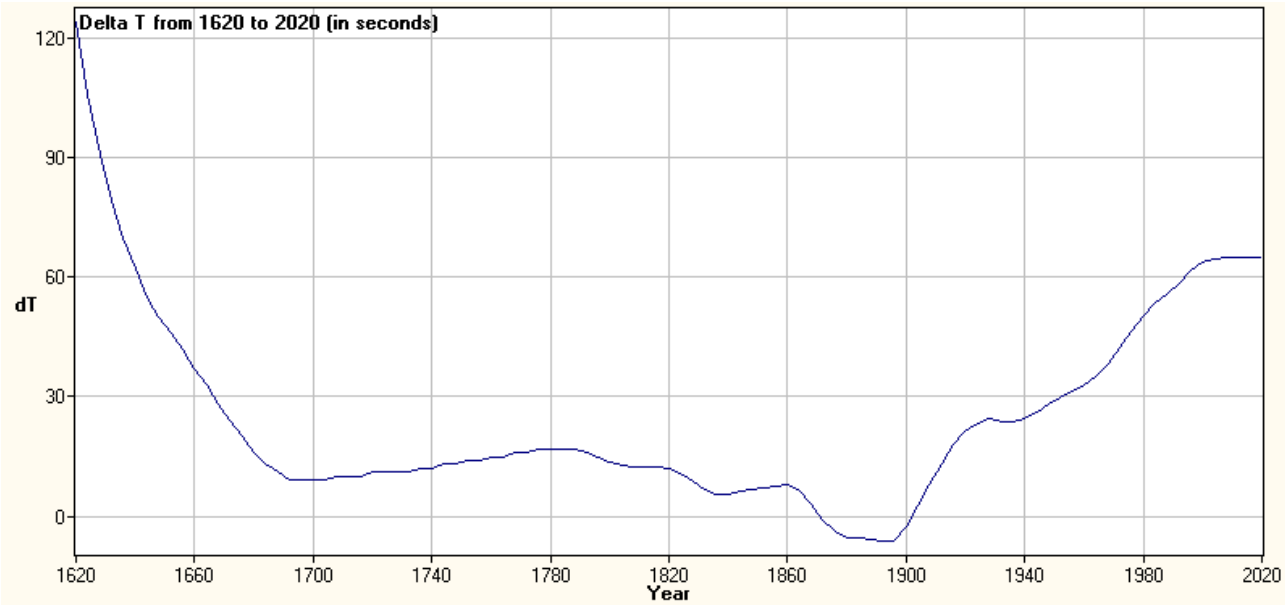
Date, tims, height and azimuth of some radiants; position of the Sun (day, civil twilight, nautical twilight, astronomical twilight, night); Moon (up or down the horizon)

TABLE OF CONVERSION OF ABSOLUTE MAGNITUDE

UA-H	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
0,001	918,09	579,28	365,50	230,62	145,51	91,81	57,93	36,55	23,06	14,55	9,18	5,79	3,66	2,31	1,46	0,92	0,58	0,37
0,005	183,62	115,86	73,10	46,12	29,10	18,36	11,59	7,31	4,61	2,91	1,84	1,16	0,73	0,46	0,29	0,18	0,12	0,07
0,01	91,81	57,93	36,55	23,06	14,55	9,18	5,79	3,66	2,31	1,46	0,92	0,58	0,37	0,23	0,15	0,09	0,06	0,04
0,05	18,36	11,59	7,31	4,61	2,91	1,84	1,16	0,73	0,46	0,29	0,18	0,12	0,07	0,05	0,03	0,02	0,01	0,01
0,1	9,18	5,79	3,66	2,31	1,46	0,92	0,58	0,37	0,23	0,15	0,09	0,06	0,04	0,02	0,01	0,01	0,01	0,00
0,2	4,59	2,90	1,83	1,15	0,73	0,46	0,29	0,18	0,12	0,07	0,05	0,03	0,02	0,01	0,01	0,00	0,00	0,00
0,3	3,06	1,93	1,22	0,77	0,49	0,31	0,19	0,12	0,08	0,05	0,03	0,02	0,01	0,01	0,00	0,00	0,00	0,00
0,4	2,30	1,45	0,91	0,58	0,36	0,23	0,14	0,09	0,06	0,04	0,02	0,01	0,01	0,01	0,00	0,00	0,00	0,00
0,5	1,84	1,16	0,73	0,46	0,29	0,18	0,12	0,07	0,05	0,03	0,02	0,01	0,01	0,00	0,00	0,00	0,00	0,00
0,6	1,53	0,97	0,61	0,38	0,24	0,15	0,10	0,06	0,04	0,02	0,02	0,01	0,01	0,00	0,00	0,00	0,00	0,00
0,7	1,31	0,83	0,52	0,33	0,21	0,13	0,08	0,05	0,03	0,02	0,01	0,01	0,01	0,00	0,00	0,00	0,00	0,00
0,8	1,15	0,72	0,46	0,29	0,18	0,11	0,07	0,05	0,03	0,02	0,01	0,01	0,00	0,00	0,00	0,00	0,00	0,00
0,9	1,02	0,64	0,41	0,26	0,16	0,10	0,06	0,04	0,03	0,02	0,01	0,01	0,00	0,00	0,00	0,00	0,00	0,00
1	0,92	0,58	0,37	0,23	0,15	0,09	0,06	0,04	0,02	0,01	0,01	0,01	0,00	0,00	0,00	0,00	0,00	0,00
1,5	0,61	0,39	0,24	0,15	0,10	0,06	0,04	0,02	0,02	0,01	0,01	0,00	0,00	0,00	0,00	0,00	0,00	0,00
2	0,46	0,29	0,18	0,12	0,07	0,05	0,03	0,02	0,01	0,01	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

How to use: knowing the absolute magnitude of an asteroid (H) and its distance from the Earth (UA) the chart furnishes the least diameter of the body in seconds of arc.

ΔT DIFFERENCE TDT-UT



Difference in second between Terrestrial Dynamical Time and the Universal Time, useful with the purpose to calculate the instants of the geocentric and topocentric celestial phenomena

CORRECTION OF RISING AND SETTING OF THE SUN, THE MOON AND THE PLANETS FOR LATITUDE DIFFERENT FROM 42°

	36	37	38	39	40	41	42	43	44	45	46	47	48
30	29	25	20	15	10	5	0	-5	-10	-16	-22	-28	-34
29	27	23	19	14	10	5	0	-5	-10	-15	-21	-27	-33
28	25	21	17	13	9	4	0	-5	-10	-15	-20	-25	-31
27	24	20	16	12	8	4	0	-5	-9	-14	-19	-24	-29
26	22	19	15	11	7	4	0	-5	-9	-13	-18	-23	-28
25	21	18	14	11	7	3	0	-4	-8	-13	-17	-21	-26
24	20	17	13	10	7	3	0	-4	-8	-12	-16	-20	-25
23	19	16	13	10	6	3	0	-4	-7	-11	-15	-19	-23
22	18	15	12	9	6	3	0	-3	-7	-10	-14	-18	-22
21	17	14	11	9	6	3	0	-3	-6	-10	-13	-17	-20
20	16	13	11	8	6	3	0	-3	-6	-9	-12	-15	-19
19	15	13	11	8	6	3	0	-2	-5	-8	-11	-14	-17
18	14	11	9	7	5	2	0	-3	-5	-8	-11	-14	-17
17	13	11	9	7	5	2	0	-2	-5	-7	-10	-13	-16
16	12	10	9	7	5	2	0	-2	-4	-7	-9	-12	-14
15	11	9	7	5	4	2	0	-2	-5	-7	-9	-11	-14
14	10	9	7	5	4	2	0	-2	-4	-6	-8	-10	-12
13	10	8	7	5	4	2	0	-1	-3	-5	-7	-9	-11
12	9	7	6	4	3	1	0	-2	-4	-5	-7	-9	-11
11	8	7	6	4	3	2	0	-1	-3	-4	-6	-8	-9
10	7	6	4	3	2	1	0	-2	-3	-5	-6	-8	-9
9	6	5	4	3	2	1	0	-1	-2	-4	-5	-6	-8
8	6	5	4	3	2	1	0	-1	-2	-3	-4	-5	-6
7	5	4	3	2	2	1	0	-1	-2	-3	-4	-5	-6
6	5	4	3	2	2	1	0	-1	-1	-2	-3	-4	-5
5	3	3	2	2	1	0	0	-1	-2	-2	-3	-4	-5
4	3	3	2	2	1	1	0	0	-1	-1	-2	-3	-3
3	2	1	1	1	0	0	0	-1	-1	-2	-2	-2	-3
2	1	1	1	1	1	0	0	0	0	-1	-1	-1	-2
1	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1
0	0	0	0	0	0	0	0	0	0	0	0	0	0
-1	0	0	0	0	0	0	0	1	1	1	1	1	1
-2	-1	-1	-1	-1	-1	0	0	0	0	1	1	1	2
-3	-2	-1	-1	-1	0	0	0	1	1	2	2	2	3
-4	-3	-3	-2	-2	-1	-1	0	0	1	1	2	3	3
-5	-3	-3	-2	-2	-1	0	0	1	2	2	3	4	5
-6	-5	-4	-3	-2	-2	-1	0	1	1	2	3	4	5
-7	-5	-4	-3	-2	-2	-1	0	1	2	3	4	5	6
-8	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6
-9	-6	-5	-4	-3	-2	-1	0	1	2	4	5	6	8
-10	-7	-6	-4	-3	-2	-1	0	2	3	5	6	8	9
-11	-8	-7	-6	-4	-3	-2	0	1	3	4	6	8	9
-12	-9	-7	-6	-4	-3	-1	0	2	4	5	7	9	11
-13	-10	-8	-7	-5	-4	-2	0	1	3	5	7	9	11
-14	-10	-9	-7	-5	-4	-2	0	2	4	6	8	10	12
-15	-11	-9	-7	-5	-4	-2	0	2	5	7	9	11	14
-16	-12	-10	-9	-7	-5	-2	0	2	4	7	9	12	14
-17	-13	-11	-9	-7	-5	-2	0	2	5	7	10	13	16
-18	-14	-11	-9	-7	-5	-2	0	3	5	8	11	14	17
-19	-15	-13	-11	-8	-6	-3	0	2	5	8	11	14	17
-20	-16	-13	-11	-8	-6	-3	0	3	6	9	12	15	19
-21	-17	-14	-11	-9	-6	-3	0	3	6	10	13	17	20
-22	-18	-15	-12	-9	-6	-3	0	3	7	10	14	18	22
-23	-19	-16	-13	-10	-6	-3	0	4	7	11	15	19	23
-24	-20	-17	-13	-10	-7	-3	0	4	8	12	16	20	25
-25	-21	-18	-14	-11	-7	-3	0	4	8	13	17	21	26
-26	-22	-19	-15	-11	-7	-4	0	5	9	13	18	23	28
-27	-24	-20	-16	-12	-8	-4	0	5	9	14	19	24	29
-28	-25	-21	-17	-13	-9	-4	0	5	10	15	20	25	31
-29	-27	-23	-19	-14	-10	-5	0	5	10	15	21	27	33
-30	-29	-25	-20	-15	-10	-5	0	5	10	16	22	28	34

The values are express in minutes of time and must be taken with the suitable sign for rising, and with the opposite sign for the sunsetting. Aloft are suitable the values of the latitude, to the left the values of the declination. They must also be added 4 minutes every degree of longitude toward west in comparison to the 12° of all the charts of the almanac. Subtracted if toward east.

REAL HORIZON

It is the distance of the visible horizon from an observer in a perfectly clear day, neglecting the atmospheric refraction.

h (m)	km
0	0,0
1	3,6
2	5,0
3	6,2
4	7,1
5	8,0
6	8,7
7	9,4
8	10,1
9	10,7
10	11,3
20	16,0

30	19,6
40	22,6
50	25,2
60	27,7
70	29,9
80	31,9
90	33,9
100	35,7
200	50,5
300	61,8
400	71,4
500	79,8
600	87,4

700	94,5
800	101,0
900	107,1
1000	112,9
1100	118,4
1200	123,7
1300	128,7
1400	133,6
1500	138,3
1600	142,8
1700	147,2
1800	151,5
1900	155,6

2000	159,7
2100	163,6
2200	167,4
2300	171,2
2400	174,9
2500	178,5
2600	182,0
2700	185,5
2800	188,9
2900	192,3

REFRACTION

Angle in degress	Error in primi	Angle in degress	Error in primi
0	34.5	11	4.9
15'	31.4	12	4.5
30'	28.7	13	4.1
45'	26.4	14	3.8
1.00	24.3	15	3.6
1.15	22.5	16	3.3
1.30	20.9	17	3.1
1.45	19.5	18	2.9
2.00	18.3	19	2.8
2.15	17.2	20	2.6
2.30	16.1	25	2.1
2.45	15.2	30	1.7
3.00	14.4	35	1.4
4.30	10.7	50	0.8
5	9.9	55	0.7
6	8.5	60	0.6
7	7.4	65	0.5
8	6.6	70	0.4
9	5.9	80	0.2
10	5.3	90	0.0

ITALIAN LOCALITIES COORDINATES

Location	Longitude	Latitude	Height	Location	Longitude	Latitude	Height
AGRIGENTO	13 36	37 17	230	MESSINA	15 34	38 11	3
ALESSANDRIA	8 36	44 54	95	MILANO	9 11	45 27	122
ANCONA	13 30	43 37	16	MODENA	10 53	44 38	34
AOSTA	7 19	45 44	583	NAPOLI	14 15	40 51	115
AREZZO	11 53	43 27	296	NOVARA	8 37	45 26	159
ASCOLI PICENO	13 34	42 51	154	NUORO	9 20	40 19	532
ASTI	8 12	44 54	123	ORISTANO	8 36	39 54	3
AVELLINO	14 47	40 54	348	PADOVA	11 52	45 24	38
BARI	16 52	41 07	5	PALERMO	13 22	38 08	23
BELLUNO	12 13	46 08	383	PARMA	10 20	44 48	55
BENEVENTO	14 46	41 07	135	PAVIA	9 09	45 11	77
BERGAMO	9 39	45 42	249	PERUGIA	12 23	43 06	493
BOLOGNA	11 21	44 29	84	PESARO	12 54	43 54	11
BOLZANO	11 21	46 29	262	PESCARA	14 12	42 27	4
BRESCIA	10 13	45 32	149	PIACENZA	9 41	45 03	80
BRINDISI	17 46	40 39	15	PISA	10 23	43 43	4
CAGLIARI	9 07	39 13	4	PISTOIA	10 55	43 55	65
CALTANISSETTA	14 03	37 28	568	PORDENONE	12 38	45 57	0
CAMPOBASSO	14 39	41 33	786	POTENZA	15 48	40 38	820
CASERTA	14 19	41 04	68	RAGUSA	14 45	36 56	502
CATANIA	15 05	37 30	47	RAVENNA	12 12	44 25	4
CATANZARO	16 35	38 54	343	REGGIO CALABRIA	15 38	38 06	15
CHIETI	14 10	42 21	330	REGGIO EMILIA	10 37	44 41	58
COMO	9 15	45 47	201	RIETI	12 51	42 24	406
COSENZA	16 15	39 17	238	ROME	12 27	41 55	143
CREMONA	10 01	45 08	45	ROVERETO	11 03	45 54	220
CUNEO	7 33	44 23	534	ROVIGO	11 47	45 04	7
ENNA	14 17	37 32	931	SALERNO	14 45	40 40	4
FERRARA	11 35	44 50	9	SASSARI	8 33	40 43	225
FIRENZE	11 15	43 45	184	SAVONA	8 29	44 18	4
FOGGIA	15 32	41 27	72	SIENA	11 20	43 19	322
FORLI`	12 02	44 13	34	SIRACUSA	15 18	37 03	17
FROSINONE	13 21	41 38	291	SONDRIO	9 52	46 10	307
GENOVA	8 55	44 25	108	TARANTO	17 13	40 28	15
GORIZIA	13 37	45 56	84	TERAMO	13 44	42 39	398
GROSSETO	11 06	42 45	10	TERNI	12 38	42 33	130
IMPERIA	8 01	43 52	22	TORINO	7 41	45 04	239
ISERNIA	14 15	41 24	0	TRAPANI	12 30	38 01	3
L'AQUILA	13 24	42 21	714	TRENTO	11 07	46 03	194
LA SPEZIA	9 49	44 05	3	TREVISI	12 14	45 39	15
LATINA	12 54	41 27	21	TRIESTE	13 45	45 38	67
LECCE	18 10	40 21	49	UDINE	13 14	46 03	113
LIVORNO	10 18	43 31	3	VARESE	8 48	45 00	000
LUCCA	10 30	43 50	327	VENEZIA	12 20	45 26	1
MACERATA	13 25	43 17	314	VERCELLI	8 25	45 19	130
MANTOVA	10 47	45 09	19	VERONA	10 59	45 26	59
MASSA	10 08	44 01	65	VICENZA	11 32	45 32	39
MATERA	16 36	40 39	399	VITERBO	12 06	42 24	325

Longitude Est Latitude North

RESOLUTION POWER OF THE EYE

mag1	mag2	p"	mag1	mag2	p"
-3.0	-3.0	1910.18	0.0	0.0	480.56
-3.0	-2.0	1558.02	0.0	1.0	391.96
-3.0	-1.0	1335.71	0.0	2.0	336.04
-3.0	0.0	1195.37	0.0	3.0	300.73
-3.0	1.0	1106.77	0.0	4.0	278.44
-3.0	2.0	1050.85	0.0	5.0	264.37
-3.0	3.0	1015.54	0.0	6.0	255.49
-3.0	4.0	993.25			
-3.0	5.0	979.18	1.0	1.0	303.37
-3.0	6.0	970.30	1.0	2.0	247.44
			1.0	3.0	212.13
-2.0	-2.0	1205.86	1.0	4.0	189.85
-2.0	-1.0	983.55	1.0	5.0	175.78
-2.0	0.0	843.21	1.0	6.0	166.89
-2.0	1.0	754.62			
-2.0	2.0	698.69	2.0	2.0	191.51
-2.0	3.0	663.38	2.0	3.0	156.21
-2.0	4.0	641.09	2.0	4.0	133.92
-2.0	5.0	627.02	2.0	5.0	119.85
-2.0	6.0	618.14	2.0	6.0	110.96
-1.0	-1.0	761.24	3.0	3.0	120.90
-1.0	0.0	620.90	3.0	4.0	98.61
-1.0	1.0	532.31	3.0	5.0	84.54
-1.0	2.0	476.38	3.0	6.0	75.66
-1.0	3.0	441.07			
-1.0	4.0	418.78	4.0	4.0	76.32
-1.0	5.0	404.71	4.0	5.0	62.25
-1.0	6.0	395.83	4.0	6.0	53.37
			5.0	5.0	48.18
			5.0	6.0	39.30
			6.0	6.0	30.42

STARS WITH MAGNITUDE < 5

-1.5 Alpha CMA Sirius	2.4 Eta CEN	3.0 Delta CAP Deneb	3.4 Eta ORI Algiebbah
-0.8 Alpha CAR Canopus	2.4 Epsilon CEN	Algedi	3.4 Xi GEM Alzirr
0.0 Alpha1 CEN	2.4 Zeta UMA Mizar	3.0 Beta AQR Sadalsuud	3.4 Xi PUP Asmidiske
RigilKentaaur	2.4 Gamma CEN	3.0 Delta CYG	3.4 CAR
0.1 Alpha LYR Vega	2.5 Alpha CAS Schedar	3.0 Pi SGR Albaldah	3.4 Omega CAR
0.2 Beta ORI Rigel	2.5 Delta ORI Mintaka	3.0 Zeta AQL Dheneb	3.4 CAR q Car
0.2 Alpha AUR Capella	2.5 Gamma UMA Phecda	3.0 Gamma2 SGR Alnasl	3.4 CAR p Car
0.2 Alpha BOO Arcturus	2.5 Epsilon PEG Enif	3.0 Iota1 SCO	3.4 Theta LEO Chertan
0.5 Alpha CMI Procyon	2.5 Epsilon BOO Izar	3.0 Alpha ARA Choo	3.4 Gamma CEP Alrai
0.6 Alpha ERI Achernar	2.6 Alpha LEP Arneb	3.0 Beta DRA Rastaban	3.4 Delta AQR Skat
0.6 Alpha ORI Betelgeuse	2.6 Kappa VEL Markeb	3.0 Zeta HER Rutilculus	3.4 Zeta CYG
0.8 Beta CEN	2.6 Gammal LEO Algieba	3.0 Sigma SCO Alniyat	3.4 Theta AQL
Hadar (Agena)	2.6 Delta LEO Zosma	3.0 Pi SCO	3.4 Delta AQL
0.9 Alpha AQL Altair	2.6 Alpha PEG Markab	3.0 Gamma LUP	3.4 Tau SGR
1.0 Alpha SCO Antares	2.6 Beta PEG Scheat	3.0 Gamma TRA	3.4 Lambda AQL Althalimain
1.1 Alpha TAU Aldebaran	2.6 Alpha CEP Alderamin	3.0 Gamma BOO Seginus	3.4 Eta SER
1.1 Alpha VIR Spica	2.6 Epsilon CYG Gienah	3.0 Epsilon VIR	3.4 Nu OPH
1.2 Beta GEM Pollux	2.6 Eta OPH Sabik	Vindemiatrix	3.4 Theta OPH
1.2 Alpha PSA Fomalhaut	2.6 Zeta OPH Han	3.0 Delta CRV Algoral	3.4 Pi HER
1.3 Alpha LEO Regulus	2.6 Beta LIB	3.0 Delta CRU	3.4 Eta SCO
1.3 Alpha CYG Deneb	Zubeneschamali	3.1 Beta TRI	3.4 Kappa OPH
1.4 Alpha2 CEN	2.6 Alpha LUP Men	3.1 Gamma PER	3.4 Zeta LUP
1.4 Beta CRU Mimosa	2.7 Beta ARI Sheratan	3.1 Delta PER	3.4 Sigma LIB
1.4 Alpha1 CRU Acrux	2.7 Alpha COL Phact	3.1 PUP L2 (v)	3.4 Pi HYA
1.6 Epsilon CMA Adhara	2.7 Theta AUR	3.1 Beta CMI Gomeisa	3.4 Zeta VIR Heze
1.6 Alpha GEM Castor	2.7 Pi PUP	3.1 Iota UMA Talitha	3.4 Delta UMA Megrez
1.6 Lambda SCO Shaula	2.7 Zeta SGR Ascella	3.1 Epsilon LEO Asad Austr.	3.5 Delta AND
1.6 Gamma CRU Gacrux	2.7 Beta1 SCO Graffias	3.1 Psi UMA	3.5 Eta CET
1.7 Gamma ORI Bellatrix	2.7 Beta CRV Kraz	3.1 Eta PEG Matar	3.5 Epsilon AUR
1.7 Epsilon UMA Alioth	2.7 Gamma CRV Minkar	3.1 Gamma GRU	3.5 Delta GEM Wasat
1.8 Beta TAU Elnath	2.8 Beta HYI	3.1 Zeta ARA	3.5 Omicron UMA Muscida
1.8 Epsilon ORI Alnilam	2.8 Gamma CAS Cih	3.1 Mul SCO	3.5 Epsilon HYA
1.8 Gamma2 VEL Regor	2.8 Delta CAS Ruchbah	3.1 Gamma UMI Pherkad	3.5 Lambda UMA Tania Bor.
1.8 Epsilon CAR Avior	2.8 Alpha CET Menkar	3.1 Epsilon CRV	3.5 Beta PAV
1.8 Beta CAR Miaplacidus	2.8 Beta ERI Kursa	3.2 Gamma HYI	3.5 Beta Lyr Sheliak
1.9 Alpha PER Mirfak	2.8 Iota ORI Hatysa	3.2 Epsilon LEP	3.5 Mu HER
1.9 Gamma GEM Alhena	2.8 Tau PUP	3.2 Beta COL Wazn	3.5 Gamma ARA
1.9 Epsilon SGR Kaus	2.8 Rho PUP Turais	3.2 Mu GEM Tejat	3.5 Alpha1 HER Rasalgethi
Austral	2.8 Mu VEL	3.2 Nu PUP	3.5 Tota DRA Edasich
1.9 Alpha TRA Atria	2.8 Gamma AQL Tarazed	3.2 Epsilon GEM Mebsuta	3.5 Delta BOO
1.9 Eta UMA Alkaid	2.8 Lambda SGR Kaus	3.2 Mu UMA Tania	3.5 Nu CEN
2.0 Omicron CET Mira	Boreal.	Austr.	3.6 Eta CAS Achird
2.0 Zeta ORI Alnitak	2.8 Delta SGR Kaus Media	3.2 Nu HYA	3.6 Tau CET
2.0 Beta CMA Mirzam	2.8 Upsilon SCO Lesath	3.2 Lambda CEN	3.6 Alpha TRI
2.0 Delta CMA Wezea	2.8 Beta ARA	3.2 Alpha AQR Sadalmelik	Rasalthothal.
2.0 Delta VEL Koo She	2.8 Tau SCO	3.2 Alpha IND	3.6 Gamma CET
2.0 Alpha UMA Dubhe	2.8 Beta HER Kornephoros	3.2 Beta CAP Dabih	Alkaffaljid.
2.0 Alpha GRU Al Na'ir	2.8 Delta OPH Yed Prior	3.2 Beta1 CYG Albireo	3.6 Delta ERI Rana
2.0 Alpha PAV Peacock	2.8 Alpha SER Unuk-al-hai	3.2 Delta DRA Altais	3.6 Upsilon4 ERI
2.0 Sigma SGR Nunki	2.8 Beta LUP Kekouan	3.2 Phi SGR	3.6 Epsilon TAU Ain
2.0 Theta SCO Sargas	2.8 Alpha2 LIB	3.2 Eta SGR	3.6 Theta2 TAU
2.1 Alpha AND Alpheratz	Zubeneigenubi	3.2 SCO G Sco	3.6 Tau ORI
2.1 Beta CET Diphda	2.8 Zeta CEN	3.2 Delta HER Sarin	3.6 Beta DOR
2.1 Alpha UMI Polaris	2.8 Eta BOO Muphrid	3.2 Zeta DRA Aldibah	3.6 Zeta LEP
2.1 Beta AUR Menkalinan	2.8 Iota CEN	3.2 Epsilon OPH Yed Poster.	3.6 Theta GEM
2.1 Alpha HYA Alhard	2.8 Alpha MUS	3.2 Eta LUP	3.6 Sigma CMA
2.1 Alpha OPH Rasalhague	2.8 Delta CEN	3.2 Epsilon LUP	3.6 Lambda GEM
2.2 Alpha ARI Hamal	2.9 Gamma PEG Algenib	3.2 Kappa CEN	3.6 Chi CAR
2.2 Kappa ORI Saiph	2.9 Beta PER Algol	3.2 Mu CEN	3.6 Omicron VEL
2.2 Lambda VEL Al Suhail	2.9 Zeta PER Atik	3.2 Gamma HYA	3.6 Psi VEL
2.2 Beta LEO Denebola	2.9 Iota AUR Hassaleh	3.3 Pi3 ORI	3.6 Phi VEL
2.2 Beta GRU Al Dhanab	2.9 Beta LEP Nihal	3.3 Eta AUR	3.6 Eta LEO
2.2 Beta UMI Kochab	2.9 Upsilon CAR	3.3 Mu LEP	3.6 Zeta LEO Adhafera
2.2 Theta CEN Menkent	2.9 Theta CAR	3.3 Alpha PIC	3.6 Gamma2 LEO
2.2 Gammal AND Almaak	2.9 Alpha TUC	3.3 Sigma PUP	3.6 Xi HYA
2.3 Zeta PUP Suhail	2.9 Beta OPH Cebalrai	3.3 Zeta HYA	3.6 Omicron AND
Hadar	2.9 Eta DRA Aldibahin	3.3 Alpha LYN	3.6 Epsilon GRU
2.3 Iota CAR Aspidiske	2.9 Beta TRA	3.3 Theta UMA	3.6 Zeta PEG Homam
2.3 Gamma CYG Sadr	2.9 Alpha2 CVN Cor Caroli	3.3 Beta CEP Alfirk	3.6 Zeta CEP
2.3 Alpha CRB Alphecca	2.9 Gamma VIR Arich	3.3 Gamma LYR Sulafat	3.6 Beta IND
2.4 Beta CAS Caph	3.0 Alpha HYI	3.3 Delta LUP	3.6 Eta CEP
2.4 Alpha PHE Ankaa	3.0 Eta TAU Alcyone	3.3 Alpha CIR	3.6 Delta PAV
2.4 Beta AND Mirach	3.0 Epsilon PER	3.3 Beta MUS	3.6 Xi2 SGR
2.4 Eta CMA Aludra	3.0 Gamma ERI Zaurak	3.4 Beta PHE	3.6 Alpha TEL
2.4 Beta UMA Merak	3.0 Zeta TAU Alheka	3.4 Gamma PHE	3.6 Eta PAV
2.4 Gamma DRA Eltanin	3.0 Zeta CMA Furud	3.4 Epsilon CAS Segin	3.6 Xi SER
2.4 Kappa SCO Girtab	3.0 Omicron2 CMA	3.4 Theta1 ERI Acamar	3.6 Mu2 SCO
2.4 Epsilon SCO Wei	3.0 VEL N Vel	3.4 Alpha RET	3.6 Eta HER
2.4 Delta SCO Dschubba		3.4 Alpha DOR	3.6 Mu SER

3.6	Phil	LUP	3.8	Epsilon	SER	4.0	Iota	GRU	4.1	Omega1	SCO
3.6	Beta	BOO Nekkar	3.8	Tau	LIB	4.0	Theta	GRU	Jabh.alAkrab		
3.6	Delta	OCT	3.8	Kappal	LUP	4.0	Delta1	GRU	4.1	Theta	DRA
3.6	Alpha	DRA Thuban	3.8	Alpha	APS	4.0	Delta	CEP	4.1	Epsilon	TRA
3.6	Delta	MUS	3.8		VIR	4.0	Gamma	AQR Sadachbia	4.1	Delta	SER
3.6	Epsilon	CRU	3.8	Rho	BOO	4.0	Iota	PEG	4.1		CEN
3.7	Iota	CET Shemali	3.8	Phi	CEN	4.0	Mu	CEP Granate	4.1	Theta	BOO
3.7	Zeta	CAS	3.9	Epsilon	PHE	Star			4.1	Psi	CEN
3.7	Theta	CET	3.9	Kappa	PHE	4.0	Nu	CYG	4.1	Iota	LUP
3.7	Eta	PSC Alpherq	3.9	Mu	AND	4.0	Epsilon	DEL	4.2	Zeta	TUC
3.7	Chi	ERI	3.9	Omicron	PER Ati	4.0		CYG	4.2	Beta2	TUC
3.7	Phi	ERI	3.9	Nu	PER	4.0	Epsilon	PAV	4.2	Kappa	CAS
3.7	ARI		3.9	Nu	TAU	4.0	Eta	CYG	4.2	Upsilon	AND
3.7	Rho	PER	3.9	Gamma	TAU Hyadum I	4.0	Eta	AQL	4.2	Phi	PER
3.7	Lambda	ORI Meissa	3.9	Delta1	TAU	4.0	Epsilon	DRA Tyl	4.2	Delta	HYI
3.7	Gamma	LEP	3.9	Pi5	ORI	4.0	Alpha	SGR Rukbat	4.2	Epsilon	HYI
3.7	Eta	GEM Propus	3.9	Zeta	AUR Sadatoni	4.0	Rho1	SGR	4.2	Theta	PER
3.7	Kappa	GEM	3.9	Epsilon	COL	4.0	Kappa	CYG	4.2	Tau3	ERI
3.7		PUP	3.9	Beta	PIC	4.0	Beta	CRA	4.2	Iota	PER
3.7	Beta	VOL	3.9	Delta	AUR	4.0	Gamma	CRA	4.2	Tau6	ERI
3.7	Alpha	PYX	3.9	Kappa	CMA	4.0		AQL	4.2	Epsilon	RET
3.7	Kappa	UMA	3.9	Zeta	GEM Mekbuda	4.0	Kappa	PAV	4.2	Delta3	TAU
3.7	Lambda	HYA	3.9	Iota	GEM	4.0	Zeta	PAV	4.2	Beta	CAM
3.7	Nu	UMA Alula Bor.	3.9	Zeta	VOL	4.0	Alpha	SCT	4.2	Gammal	CAE
3.7	Delta	CRT	3.9	Alpha	CHA	4.0	Mu	SGR Polis	4.2	Iota	LEP
3.7	Lambda	MUS	3.9		CAR	4.0		OPH	4.2	Kappa	LEP
3.7	Mu	PEG Sadalbari	3.9	Upsilon	UMA	4.0	Theta	HER	4.2		ORI
3.7	Iota	CEP	3.9	Rho	LEO	4.0	Gamma2	NOR	4.2	Nu	AUR
3.7	Theta	PEG Biham	3.9		VEL	4.0	Nu	SCO Jabbah	4.2	Mu	ORI
3.7	Beta	DEL Rotanev	3.9		LMI Praecipua	4.0	Chi	LUP	4.2	Theta	CMA
3.7	Alpha2	CAP Secunda	3.9		CAR	4.0	Omega	LUP	4.2	Rho	GEM
Gaedi			3.9	Xi	UMA Alula	4.0	Gamma	LIB	4.2	Upsilon	GEM
3.7	Gamma	SGE	Austr.			Zubeneh	hakrahi		4.2		PUP
3.7	Chi	DRA	3.9	Chi	UMA Alkafzah	4.0		LUP	4.2		PUP
3.7		OPH	3.9	Gamma	PSC	4.0	Mu	VIR	4.2		PUP
3.7	Gamma	OPH	3.9	Alpha	LAC	4.0	Rho	LUP	4.2	Zeta	MON
3.7	Delta	ARA	3.9	Xi	CYG	4.0	Upsilon1	CEN	4.2	Delta	HYA
3.7	Beta	SER	3.9	Alpha	DEL Sualocin	4.0		CEN	4.2	Delta	CNC Asellus
3.7	Upsilon	LIB	3.9	Beta	AQL Alshain	4.0		UMA Alcor	Aus.		
3.7	Beta	CRB Nusakan	3.9	Iota2	CYG	4.0	Zeta	UMA	4.2	Iotal	CNC
3.7	Pi	LUP	3.9	Omicron	SGR	4.0		CEN	4.2		CAR
3.7	Delta	VIR Minelauva	3.9	Lambda	PAV	4.0	Tau	CEN	4.2	Alpha	CRT Alkes
3.8		AND	3.9		HER	4.0	Gamma	MUS	4.2	Nu	VIR
3.8	Zeta	CET Baten	3.9	Xi	DRA Juza	4.0	Sigma	CEN	4.2	Zeta	GRU
Kaitos			(Grum.)			4.0	Eta	VIR Zaniah	4.2	Beta	OCT
3.8	Omicron	TAU	3.9	Epsilon	HER	4.0	Rho	CEN	4.2	Epsilon	PSA
3.8	Xi	TAU	3.9	Gamma	APS	4.0	Eta	CRU	4.2	Theta	AQR Ancha
3.8	Epsilon	ERI	3.9	Lambda	OPH Marfik	4.1	Zeta	PHE	4.2		LAC
3.8	Beta	RET	3.9	Tau	HER	4.1	Upsilon	CET	4.2	Epsilon	CEP
3.8		TAU Electra	3.9	Delta	TRA	4.1		CAS	4.2	Rho	CYG
3.8		TAU Atlas	3.9	Gamma	SER	4.1	Gamma	TRI	4.2	Gamma	PAV
3.8	Alpha	HOR	3.9	Gamma	CRB	4.1	Iota	ERI	4.2	Theta	IND
3.8	Upsilon2	ERI Theemini	3.9	Zeta	BOO	4.1	Tau	PER Kerb	4.2	Theta	CAP
3.8	Pi4	ORI	3.9	Kappa	DRA	4.1		ERI	4.2	Omega	CAP
3.8	Sigma	ORI	4.0	Delta	PHE	4.1	Mu	ERI	4.2	Psi	CAP
3.8	Delta	LEP	4.0	Delta	CET	4.1	Gamma	MON	4.2		CYG
3.8	Eta	LEP	4.0	Eta	PER	4.1	Nu	GEM	4.2	Iota	SGR
3.8	Gamma2	VOL	4.0	Eta	ERI Azha	4.1	Nu2	CMA	4.2	Chi	CYG
3.8	Omega	CMA	4.0	Kappa	PER Misam	4.1	Omicron1	CMA	4.2	Betal	SGR Arkab
3.8	Beta	CNC	4.0	Alpha	FOR	4.1	Gamma	CMA Mulifen	4.2	Epsilon	AQL
3.8	Theta	HYA	4.0	Tau4	ERI Angetenar	4.1	Delta	MON	4.2	Phi	DRA
3.8		LYN	4.0		TAU Mala	4.1		PUP	4.2		SCO
3.8		UMA	4.0	Xi	PER Menkib	4.1		VEL	4.2		OPH
3.8	Omicron	LEO Subra	4.0	Lambda	TAU	4.1		VEL	4.2	Xi	OPH
3.8		CAR l Car (v)	4.0	Upsilon	PER Nembus	4.1	Gamma	PYX	4.2	Nu	SER
3.8	Beta	VIR Zavijava	4.0	Omicron1	ERI Beid	4.1	Alpha	VOL	4.2	Beta	APS
3.8		AQR	4.0		ERI	4.1	Iota	HYA	4.2	Phi	OPH
3.8	Lambda	AQR	4.0	Thetal	TAU	4.1	Mu	LEO Rassalas	4.2	Theta	LUP
3.8	Nu	OCT	4.0	Nu	ERI	4.1	Gamma	CHA	4.2	Epsilon	CRB
3.8	Gamma	CAP Nashira	4.0		ERI Sceptrum	4.1	Pi	CEN	4.2	Theta	CRB
3.8	Zeta	CAP	4.0	Eta	COL	4.1	Sigma	LEO	4.2	Beta	CIR
3.8	Tau	CYG	4.0	Delta	COL	4.1	Gamma	CRT	4.2	Lambda	LUP
3.8	Epsilon	AQR Albali	4.0	Delta	VOL	4.1	Lambda	DRA Giansar	4.2	Tau2	LUP
3.8	Delta	SGE	4.0	Alpha	MON	4.1		AQR	4.2	Iota	VIR Syрма
3.8	Zeta	TEL	4.0	Beta	PYX	4.1	Tau2	AQR	4.2	Kappa	VIR
3.8	Omicron	HER	4.0		HYA	4.1	Lambda	PEG	4.2	Upsilon2	CEN
3.8	Theta	ARA	4.0		CAR	4.1	Eta	AQR	4.2	Eta	CRV
3.8	Xi	HER	4.0		CAR	4.1	Alpha	EQU Kitalpha	4.2	Zeta	CRU
3.8	Iota	HER	4.0	Mu	HYA	4.1		CYG	4.2	Epsilon	MUS
3.8	Zeta2	SCO	4.0	Iota	LEO	4.1	Alpha	CRA	4.2	Alpha	CRV Alchiba
3.8	Eta	ARA	4.0	Beta	HYA	4.1	Thetal	SER	4.2	Omicron	VIR
3.8	Gamma	HER	4.0	Omega	PSC	4.1		OPH	4.3		CET
3.8	Xi	SCO	4.0	Lambda	AND	4.1	Epsilon1	ARA	4.3	Betal	TUC
3.8	Rho	SCO	4.0	Gamma	TUC				4.3	Zeta	AND

4.3	Phi	AND		4.4	Kappal	TAU		4.5	Delta	PSC		4.6	Iota	CAS	
4.3	Alpha	PSC	Al-Rischa	4.4	Upsilon	TAU		4.5	Epsilon	PSC		4.6	Epsilon	CET	
4.3	Xi2	CET		4.4		TAU		4.5	Theta	CAS	Marfak	4.6		ARI	
4.3		PER		4.4	Alpha	CAE		4.5	Omicron	PSC		4.6	Tau1	ERI	
4.3		TAU		4.4	Pi2	ORI		4.5	Xi1	CET		4.6		ARI	
4.3	Tau5	ERI		4.4	Alpha	CAM		4.5	Beta	FOR		4.6	Pi	PER	
4.3	Psi	PER		4.4		CAM		4.5	Delta	ARI	Botein	4.6	Epsilon	ARI	
4.3		TAU	Merope	4.4		ORI		4.5	Sigma	PER		4.6		ERI	
4.3	Lambda	PER		4.4	Phi2	ORI		4.5		ERI		4.6		ERI	
4.3	Mu	PER		4.4	Delta	DOR		4.5	Delta	RET		4.6	Pi	ERI	
4.3	Mu	TAU		4.4	Gamma	PIC		4.5		TAU		4.6	Tau9	ERI	
4.3	Upsilon1	ERI		4.4	Gamma	COL		4.5	Omicron2	ERI	Klid	4.6		ERI	
4.3		TAU		4.4	Nu	ORI		4.5		PER		4.6		TAU	
4.3	Tau	TAU		4.4	Xi	ORI		4.5	Omega	ERI		4.6		ERI	
4.3	Omicron2	ORI		4.4	Kappa	COL		4.5	Phil	ORI		4.6		ORI	
4.3	Lambda	ERI		4.4		LYN		4.5	Omega	ORI		4.6	Rho	ORI	
4.3	Lambda	LEP		4.4	Epsilon	MON		4.5		TAU		4.6		ORI	
4.3		ORI		4.4	Lambda	CMA		4.5	Kappa	AUR		4.6	Upsilon	ORI	Thabit
4.3		GEM		4.4	Xi1	CMA		4.5		MON		4.6	Tau	AUR	
4.3	Sigma	GEM		4.4		CAR		4.5	Xi2	CMA		4.6	Lambda	COL	
4.3		PUP		4.4		CAR		4.5		LYN		4.6	Chi1	ORI	
4.3		PUP		4.4	Iota	CMA		4.5	Tau	GEM		4.6	Pi	AUR	
4.3		PUP		4.4	Tau	CMA		4.5		LYN		4.6	Beta	MON	
4.3	Theta	CHA		4.4		PUP		4.5		CMI		4.6	Nu3	CMA	
4.3	Eta	HYA		4.4	Epsilon	VOL		4.5	Sigma	HYA		4.6		GEM	
4.3	Alpha	CNC	Acubens	4.4		PUP		4.5		CAR		4.6	Pi	CMA	
4.3		VEL		4.4		PUP		4.5		CAR		4.6	Gamma	CMI	
4.3	Upsilon1	HYA		4.4		LYN		4.5		UMA		4.6		PUP	
4.3	Kappa	AND		4.4		CAR		4.5		HYA		4.6	Omicron	PUP	
4.3	Iota	PSC		4.4	Rho	HYA		4.5	Lambda	LEO	Alterf	4.6		PUP	
4.3	Iota	AND		4.4	Kappa	PYX		4.5	Tau2	HYA		4.6	Delta	PYX	
4.3	Phi	AQR		4.4	Alpha	ANT		4.5	Phi	UMA		4.6		HYA	
4.3	Delta	PSA		4.4	Beta	LMI		4.5		LMI		4.6	Kappa	LEO	
4.3	Gamma	PSA		4.4		LEO		4.5	Alpha	SEX		4.6	Epsilon	ANT	
4.3	Xi	PEG		4.4		CEN		4.5	Delta2	CHA		4.6		LMI	
4.3	Delta2	GRU		4.4	Beta	SCL		4.5		LEO		4.6		UMA	
4.3	Pi2	CYG		4.4	Gamma	SCL		4.5	Beta	CRT		4.6		UMA	
4.3	Kappa	PEG		4.4	Psil	AQR		4.5	Upsilon	LEO		4.6	Upsilon2	HYA	
4.3		CAP		4.4		AQR		4.5		LEO		4.6		LEO	
4.3	Iota	CAP		4.4	Beta	PSA		4.5	Theta	PSC		4.6		VEL	
4.3		PEG		4.4	Zeta1	AQR		4.5		AQR		4.6	Iota	ANT	
4.3	Sigma	CYG		4.4	Pi2	PEG		4.5		AQR		4.6	Phi	LEO	
4.3		CYG		4.4	Iota	AQR		4.5		LAC		4.6	Mu	MUS	
4.3	Theta	CEP		4.4	Xi	CEP	Kurhah	4.5	Delta	TUC		4.6	Epsilon	TUC	
4.3		CYG		4.4	Iota	PSA		4.5	Delta	IND		4.6	Delta	SCL	
4.3	Iota	AQL		4.4	Upsilon	CYG		4.5	Nu	CEP		4.6	Omega2	AQR	
4.3	Beta2	SGR		4.4	Alphal	CAP	Prima Gaedi	4.5		PEG		4.6	Lambda	PSC	
4.3		LYR		4.4	Kappa	CEP		4.5	Kappa	CAP		4.6	Upsilon	PEG	
4.3		HER		4.4	Thetal	SGR		4.5	Nu	AQR		4.6	Tau	PEG	
4.3	Zeta1	LYR		4.4	Omega	SGR		4.5		AQR		4.6	Psi2	AQR	
4.3	Kappa	LYR		4.4	Alpha	SGE		4.5	Lambda	CYG		4.6	Chi	AQR	
4.3		HER		4.4	Beta	SCT		4.5	Gamma2	DEL		4.6		AND	
4.3	Iota	OPH		4.4		HER		4.5	Delta	DEL		4.6	Pi	CEP	
4.3		SCO		4.4	Xi	PAV		4.5		AQL		4.6	Beta	PSC	
4.3	Sigma	HER		4.4	Pi	PAV		4.5		VUL		4.6		LAC	
4.3	Phi	HER		4.4		OPH		4.5	Beta	SGE		4.6		LAC	
4.3	Iota1	NOR		4.4		HER		4.5	Theta	LYR		4.6	Zeta2	AQR	
4.3	Theta	LIB		4.4		SGR		4.5	Eta	LYR	Aladfar	4.6	Pi	AQR	
4.3	Kappa	SER		4.4	Omicron	SER		4.5	Delta2	LYR		4.6		LAC	
4.3	Zeta	UMI	Alifa	4.4	Mu	OPH		4.5	Zeta	SCT		4.6	Beta	LAC	
4.3	Gamma	CIR		4.4	Delta	UMI	Yildun	4.5	Gamma1	SGR		4.6	Mu	PSA	
4.3	Mu	LUP		4.4		OPH		4.5	Zeta	SER		4.6	Lambda	GRU	
4.3		CEN		4.4	Sigma	OPH		4.5	Nu	HER		4.6	Omicron	AQR	
4.3	Lambda	BOO		4.4	Rho	HER		4.5	Lambda	HER	Maasym	4.6	Epsilon	CAP	
4.3	Tau	VIR		4.4		OPH		4.5	Omega	OPH		4.6	Delta	EQU	
4.3	Upsilon	BOO		4.4	Epsilon	UMI		4.5	Chi	OPH		4.6		CAP	
4.3		CEN		4.4	Upsilon	OPH		4.5	Omega	HER	Cujam	4.6	Eta	IND	
4.3	Beta	COM		4.4	Psi	OPH		4.5	Eta	NOR		4.6	Phil	PAV	
4.3	Mul	CRU		4.4	Omicron	SCO		4.5	Iota	SER		4.6	Rho	CAP	
4.3		CVN	Chara	4.4		SCO		4.5	Mul	BOO	Alkalurops	4.6		CYG	
4.4	Theta	AND		4.4	Lambda	SER		4.5		LIB		4.6		SGR	
4.4	Eta	PHE		4.4	Omicron	LUP		4.5		HYA		4.6		SGR	
4.4	Nu	AND		4.4	Sigma	LUP		4.5	Sigma	BOO		4.6		SGR	
4.4	Alpha	SCL		4.4		UMI		4.5	Chi	CEN		4.6	Theta	CYG	
4.4	Psi	PHE		4.4		CEN		4.5	Tau	BOO		4.6	Mu	AQL	
4.4	Kappa	ERI		4.4		CEN		4.5	Alpha	COM	Diadema	4.6	Alpha	VUL	
4.4	Pi	CET		4.4		VIR		4.6		PSC		4.6	Upsilon	SGR	
4.4	Mu	CET		4.4	Theta	VIR		4.6		CET		4.6	Pi	DRA	
4.4	Theta2	ERI		4.4	Xi2	CEN		4.6		PSC		4.6		VUL	
4.4		TAU		4.4	Beta	CHA		4.6	Mu	PHE		4.6	Tau	DRA	
4.4		TAU	Taygete	4.4	Thetal	CRU		4.6	Phil	CET		4.6	Psi	SGR	
4.4	Tau8	ERI		4.5	Sigma	AND		4.6	Eta	AND		4.6	Delta	CRA	
4.4	Gamma	RET		4.5	Pi	AND		4.6	Phi	PSC		4.6	Nu2	SGR	
4.4	Gamma	DOR		4.5	Epsilon	AND		4.6		CAS		4.6		HER	

4.6	Theta	CRA		4.7	Omicron	BOO		4.8	Sigma	DRA		4.9		CEP	Alphirk
4.6	Nu	PAV		4.7		HYA R Hya (v)		4.8	Epsilon	CRA		4.9		CYG	
4.6		SGR		4.7		VIR		4.8	Omicron	DRA		4.9		CYG	
4.6	Epsilon	TEL		4.7		CVN		4.8		SGR		4.9	Zeta	IND	
4.6	Tau	OPH		4.7		CEN		4.8		OPH		4.9		CYG	
4.6	Sigma	ARA		4.8	Theta	OCT		4.8		SGR		4.9		CYG	
4.6		HER		4.8		CET		4.8	Lambda	ARA		4.9	Omega1	CYG	
4.6	Zeta1	SCO		4.8		CET		4.8		OPH		4.9		CYG	
4.6		OPH		4.8	Lambda1	PHE		4.8	Zeta	APS		4.9	Xi	TEL	
4.6	Omega2	SCO		4.8	Upsilon2	CAS		4.8		HER		4.9		CYG	
4.6	Upsilon	HER		4.8	Kappa	TUC		4.8		OPH		4.9	Xi	AQL	
4.6	Chi	HER		4.8		CET		4.8		DRA		4.9		VUL	
4.6		SCO		4.8	Chi	CET		4.8	Epsilon	NOR		4.9		VUL	
4.6	Psi1	LUP		4.8	Gamma2	ARI Mesartim		4.8	Rho	OPH		4.9		CYG	
4.6	Phi2	LUP		4.8	Gamma1	ARI		4.8	Sigma	SER		4.9	Nu	AQL	
4.6	Iota1	LIB		4.8	Xi	PSC		4.8	Delta1	APS		4.9		CYG	
4.6		VIR		4.8		CET		4.8	Delta	NOR		4.9		VUL	
4.6	Xi	BOO		4.8	Lambda	ARI		4.8	Pi	SER		4.9	Eta	SCT	
4.6		HYA		4.8		AND		4.8		LIB		4.9	Upsilon	DRA	
4.6	Tau1	LUP		4.8	Sigma	CET		4.8	Kappa	CRB		4.9		DRA	
4.6		HYA		4.8	Zeta	HYI		4.8	Kappa	LIB		4.9		OPH	
4.6	Lambda	VIR Khambalia		4.8	Tau2	ERI		4.8	Epsilon	CIR		4.9		OPH	
4.6	Kappa	BOO		4.8	Omega	PER		4.8		BOO		4.9	Psi1	DRA	
4.6		CEN		4.8	Zeta	ERI Zibal		4.8		DRA		4.9	Omega	DRA	
4.6		CVN		4.8	Kappa	RET		4.8		UMA		4.9		HER	
4.6	Iota	CRU		4.8		ERI		4.8		VIR		4.9		OPH	
4.6	Gamma	COM		4.8	Iota	RET		4.8	Lambda	CRU		4.9		HER	
4.6	Kappa	CHA		4.8	Delta	HOR		4.8	Psi	VIR		4.9		HER	
4.6	Pi	VIR		4.8	Omega2	TAU		4.8	Chi	VIR		4.9	Zeta	TRA	
4.7	Omicron	CAS		4.8	Delta2	TAU		4.8		COM		4.9	Gamma1	NOR	
4.7	Tau	PSC		4.8	Rho	TAU		4.8		COM		4.9	Psi	SCO	
4.7	Upsilon	PSC		4.8		ERI		4.9	Chi	PEG		4.9	Tau	CRB	
4.7	Nu	PSC		4.8	Zeta	DOR		4.9	Eta	SCL		4.9	Beta2	SCO	
4.7	Eta2	HYI		4.8	Mu	AUR		4.9	Lambda	CAS		4.9	Iota	CRB	
4.7	Nu	FOR		4.8	Theta	DOR		4.9	Xi	CAS		4.9	Rho	SER	
4.7	Omega	FOR		4.8	Omicron	COL		4.9		CET		4.9		LIB	
4.7	Nu	HYI		4.8		AUR		4.9	Chi	PSC		4.9		BOO	
4.7		PER		4.8		TAU		4.9	Zeta1	PSC		4.9	Omega	BOO	
4.7	Lambda	CET		4.8		ORI		4.9	Nu	PHE		4.9		BOO	
4.7		PER		4.8		MON		4.9	Chi	CAS		4.9	Pi1	BOO	
4.7		CAM		4.8	Delta	PIC		4.9	Tau	AND		4.9	Eta	APS	
4.7	Gamma	CAM		4.8	Eta2	DOR		4.9		AND		4.9	Iota	BOO	
4.7	Pi1	ORI		4.8		CMA		4.9	Rho	CET		4.9		CVN	
4.7	Pi6	ORI		4.8		LYN		4.9		PER		4.9		VIR	
4.7	Iota	TAU		4.8	Pi2	UMA Ta Tsun		4.9		PER		4.9	Eta	MUS	
4.7	Psi1	ORI		4.8		HYA		4.9	Pi	TAU		4.9		COM	
4.7	Psi2	ORI		4.8	Theta	PYX		4.9	Sigma2	TAU		4.9	Xi1	CEN	
4.7		TAU		4.8	Lambda	PYX		4.9	Psi	ERI		4.9		UMA	
4.7	Chi2	ORI		4.8	Tau1	HYA		4.9		ORI		4.9		COM	
4.7	Theta	LEP		4.8		LMI		4.9	Lambda	AUR		4.9		COM	
4.7	Beta	MON		4.8		CAR		4.9	Chi	AUR		5.0	Zeta	SCL	
4.7		MON		4.8		UMA		4.9		TAU		5.0	Pi	CAS	
4.7		MON		4.8		LMI		4.9		TAU		5.0	Lambda	HYI	
4.7		GEM		4.8	Omega	UMA		4.9	Xi	AUR		5.0	Nu	CAS	
4.7		CMA		4.8		UMA		4.9	Xi	COL		5.0	Upsilon1	CAS	
4.7	Gamma	CNC Asellus		4.8	Theta	CRT		4.9		TAU		5.0		PSC	
Bor.				4.8	Omicron	HYA		4.9		LEP		5.0		CET	
4.7	Tau	UMA		4.8	Zeta	CRT		4.9		ORI		5.0	Xi	AND Adhil	
4.7	Chi	LEO		4.8	Psi	PEG		4.9		LYN		5.0	Psi	CAS	
4.7		AQR		4.8	Rho	CAS		4.9	Mu	CMA		5.0	Omega	AND	
4.7		PEG		4.8		AQR		4.9		CMI		5.0	Phi	PHE	
4.7		PEG		4.8	Iota	PHE		4.9	Omicron	GEM		5.0	Omega	CAS	
4.7		LAC		4.8		AQR		4.9		MON		5.0	Chi	PHE	
4.7	Epsilon	IND		4.8	Rho	GRU		4.9		LYN		5.0		PER	
4.7	Mul	CYG		4.8		LAC		4.9	Zeta1	CNC Tegmine		5.0	Nu	CET	
4.7	Gamma	MIC		4.8	Sigma	AQR		4.9	Sigma2	UMA		5.0		PER	
4.7		CYG		4.8	Mul	GRU		4.9		UMA		5.0	Beta	HOR	
4.7	Zeta	DEL		4.8	Upsilon	PSA		4.9	Theta	ANT		5.0		PER	
4.7		VUL		4.8	Pi1	CYG Azelfalage		4.9	Pi	LEO		5.0	Zeta	ARI	
4.7	Rho	DRA		4.8	Xi	AQR		4.9		LEO		5.0	Kappa1	CET	
4.7		VUL		4.8		PEG		4.9	Sigma	CAS		5.0		PER	
4.7	Epsilon1	LYR		4.8	Theta1	MIC		4.9	Kappa	PSC		5.0	Delta	FOR	
4.7	Delta	SCT		4.8	Epsilon	MIC		4.9	Omicron	CEP		5.0		PER	
4.7	Gamma	SCT		4.8	Gamma	EQU		4.9		CAS		5.0		TAU	
4.7		OPH		4.8	Eta	CAP		4.9		AND		5.0		TAU	
4.7		HER		4.8	Mu	AQR		4.9	Eta	GRU		5.0		ERI	
4.7		SCO		4.8		VUL		4.9	Omicron	PEG		5.0	Beta	CAE	
4.7	Xi	CRB		4.8	Alpha	MIC		4.9		LAC		5.0		AUR	
4.7		SCO		4.8		VUL		4.9	Nu	TUC		5.0	Omega	AUR	
4.7	Delta	CRB		4.8	Nu	CAP Alshat		4.9		PEG		5.0	Eta2	PIC	
4.7	Psi2	LUP		4.8		CYG		4.9		PEG		5.0		AUR	
4.7		LUP		4.8		SGR		4.9		PEG		5.0		TAU	
4.7		LIB		4.8	Psi	CYG		4.9	Nu	PEG		5.0		ERI	
4.7	Psi	BOO		4.8	Phi	CYG		4.9		CEP		5.0		ORI	

5.0		ORI	5.0	Beta	SEX	5.0		CYG	5.0		DRA
5.0	Nu2	COL	5.0	Phi3	HYA	5.0	Zeta	SGE	5.0	Eta	UMI Alasco
5.0		TAU	5.0		LMI	5.0		CYG	5.0	Kappa	NOR
5.0		TAU	5.0		LEO	5.0		SGR	5.0	Lambda	LIB
5.0	Upsilon	AUR	5.0		LEO	5.0		CYG	5.0		LIB
5.0		ORI	5.0	Chi1	HYA	5.0	Kappa	AQL	5.0	Nu2	BOO
5.0		MON	5.0	Lambda	CRT	5.0	Iota	TEL	5.0	Epsilon	LIB
5.0	Theta	COL	5.0	Omicron1	CEN	5.0		AQL	5.0	Eta	CRB
5.0		MON	5.0	Epsilon	CHA	5.0	Chi1	SGR	5.0	Nu1	LUP
5.0		AUR	5.0		PSC	5.0		AQL	5.0		LUP
5.0		AUR	5.0		PEG	5.0		SGR	5.0		BOO
5.0		MON	5.0		AND	5.0		LYR	5.0		LIB
5.0	Psi7	AUR	5.0		PEG	5.0	Zeta	CRA	5.0		LIB
5.0		CAM	5.0	Rho	PEG	5.0	Lambda	TEL	5.0		BOO
5.0		MON	5.0		AQR	5.0	Nu1	SGR	5.0	Phi	VIR
5.0		MON	5.0	Tau	PSA	5.0		SGR	5.0		HYA
5.0		CMA	5.0		CEP	5.0		AQL	5.0		BOO
5.0		GEM	5.0		PEG	5.0	Epsilon	SCT	5.0		HYA
5.0		LYN	5.0		PEG	5.0		DRA	5.0		LEO
5.0		PUP	5.0	Theta	PSA	5.0	Delta1	TEL	5.0		UMI
5.0		GEM	5.0		CAP	5.0		DRA	5.0		VIR
5.0	Phi	GEM	5.0		CYG	5.0	Mu	LYR	5.0	Total	MUS
5.0		PUP	5.0	Omicron	PAV	5.0		HER	5.0	Sigma	VIR
5.0		MON	5.0	Iota	IND	5.0		HER	5.0		VIR
5.0	Chi	GEM	5.0		VUL	5.0		DRA	5.0	Psi	HYA
5.0		PUP	5.0	Rho	PAV	5.0		HER	5.0		COM
5.0	Zeta	PYX	5.0		AQL	5.0		DRA	5.0	Rho	VIR
5.0		HYA	5.0		AQL	5.0	Nu2	DRA Kuma	5.0		COM
5.0	Rho	UMA	5.0		CYG	5.0	Nu1	DRA Kuma	5.0		CVN
5.0	Kappa	HYA	5.0	Rho	AQL	5.0		DRA	5.0	Theta2	CRU
5.0	Gamma	SEX	5.0		CYG	5.0	Mu	NOR			
5.0		LEO	5.0		SGR	5.0		HER			

100 BRIGHTEST STARS

Name	HH MM SS	°° ' ' "	magn.	moto proprio	
Bayer	J2000	J2000	vis.	AR	DEC
Alp CMa	06 45 08.9	-16 42 58	-1.46	-0.553	-1.205
Alp Car	06 23 57.1	-52 41 45	-0.72	+0.022	+0.021
Alp Boo	14 15 39.7	+19 10 57	-0.04	-1.093	-1.998
Alp1Cen	14 39 35.9	-60 50 07	-0.01	-3.642	+0.699
Alp Lyr	18 36 56.3	+38 47 01	0.03	+0.202	+0.286
Alp Aur	05 16 41.4	+45 59 53	0.08	+0.076	-0.425
Bet Ori	05 14 32.3	-08 12 06	0.12	0.000	-0.001
Alp CMi	07 39 18.1	+05 13 30	0.38	-0.710	-1.023
Alp Eri	01 37 42.9	-57 14 12	0.46	+0.095	-0.035
Alp Ori	05 55 10.3	+07 24 25	0.50	+0.026	+0.009
Bet Cen	14 03 49.4	-60 22 23	0.61	-0.032	-0.019
Alp Aql	19 50 47.0	+08 52 06	0.77	+0.538	+0.386
Alp Tau	04 35 55.2	+16 30 33	0.85	+0.063	-0.190
Alp Sco	16 29 24.4	-26 25 55	0.96	-0.010	-0.020
Alp Vir	13 25 11.6	-11 09 41	0.98	-0.041	-0.028
Bet Gem	07 45 18.9	+28 01 34	1.14	-0.628	-0.046
Alp PsA	22 57 39.1	-29 37 20	1.16	+0.333	-0.165
Bet Cru	12 47 43.2	-59 41 19	1.25	-0.048	-0.014
Alp Cyg	20 41 25.9	+45 16 49	1.25	+0.003	+0.002
Alp1Cru	12 26 35.9	-63 05 57	1.33	-0.036	-0.012
Alp2Cen	14 39 36.1	-60 50 08	1.33	-3.646	+0.700
Alp Leo	10 08 22.3	+11 58 02	1.35	-0.248	+0.006
Eps CMa	06 58 37.5	-28 58 20	1.50	+0.004	+0.003
Lam Sco	17 33 36.5	-37 06 14	1.63	-0.001	-0.029
Gam Cru	12 31 09.9	-57 06 48	1.63	+0.023	-0.262
Gam Ori	05 25 07.9	+06 20 59	1.64	-0.009	-0.014
Bet Tau	05 26 17.5	+28 36 27	1.65	+0.022	-0.175
Bet Car	09 13 12.0	-69 43 02	1.68	-0.162	+0.108
Eps Ori	05 36 12.8	-01 12 07	1.70	+0.001	-0.002
Alp2Cru	12 26 36.5	-63 05 58	1.73	-0.034	-0.007
Alp Gru	22 08 14.0	-46 57 40	1.74	+0.129	-0.151
Eps UMa	12 54 01.7	+55 57 35	1.77	+0.112	-0.006
Gam2Vel	08 09 32.0	-47 20 12	1.78	-0.004	+0.006
Alp UMa	11 03 43.7	+61 45 03	1.79	-0.119	-0.067
Alp Per	03 24 19.4	+49 51 40	1.79	+0.024	-0.025
Del CMa	07 08 23.5	-26 23 36	1.84	-0.003	+0.004
Eps Sgr	18 24 10.3	-34 23 05	1.85	-0.038	-0.124
Eta UMa	13 47 32.4	+49 18 48	1.86	-0.122	-0.011
Eps Car	08 22 30.8	-59 30 35	1.86	-0.026	+0.014
The Sco	17 37 19.2	-42 59 52	1.87	+0.015	-0.002
Bet Aur	05 59 31.7	+44 56 51	1.90	-0.057	0.000
Alp TrA	16 48 39.9	-69 01 40	1.92	+0.014	-0.034
Gam Gem	06 37 42.7	+16 23 57	1.93	+0.042	-0.042
Alp Pav	20 25 38.9	-56 44 06	1.94	+0.007	-0.089
Del Vel	08 44 42.2	-54 42 30	1.96	+0.023	-0.078
Bet CMa	06 22 42.0	-17 57 21	1.98	-0.006	0.000
Alp Hya	09 27 35.2	-08 39 31	1.98	-0.014	+0.033
Alp Gem	07 34 36.0	+31 53 18	1.98	-0.171	-0.098
	15 59 30.2	+25 55 13	2.0	-0.005	+0.013
Alp Ari	02 07 10.4	+23 27 45	2.00	+0.190	-0.148
Sig Sgr	18 55 15.9	-26 17 48	2.02	+0.013	-0.054
Alp UMi	02 31 48.7	+89 15 51	2.02	+0.038	-0.015
Bet Cet	00 43 35.4	-17 59 12	2.04	+0.234	+0.033
Zet Ori	05 40 45.5	-01 56 34	2.05	+0.003	-0.002
Kap Ori	05 47 45.4	-09 40 11	2.06	+0.002	-0.002
The Cen	14 06 41.0	-36 22 12	2.06	-0.519	-0.519
Bet And	01 09 43.9	+35 37 14	2.06	+0.178	-0.114
Alp And	00 08 23.3	+29 05 26	2.06	+0.136	-0.163
Bet UMi	14 50 42.3	+74 09 20	2.08	-0.031	+0.012
Alp Oph	17 34 56.1	+12 33 36	2.08	+0.120	-0.226
Bet Gru	22 42 40.1	-46 53 05	2.10	+0.137	-0.008
Bet Per	03 08 10.1	+40 57 20	2.12	+0.004	-0.001
Bet Leo	11 49 03.6	+14 34 19	2.14	-0.497	-0.114
Gam Cen	12 41 31.0	-48 57 35	2.17	-0.189	-0.005
Gam Cyg	20 22 13.7	+40 15 24	2.20	+0.004	0.000
Lam Vel	09 07 59.8	-43 25 57	2.21	-0.019	+0.013

Del Ori	05 32 00.4	-00 17 57	2.23	+0.001	-0.002
Alp CrB	15 34 41.3	+26 42 53	2.23	+0.121	-0.089
Gam Dra	17 56 36.4	+51 29 20	2.23	-0.008	-0.019
Alp Cas	00 40 30.5	+56 32 14	2.23	+0.053	-0.032
Zet Pup	08 03 35.1	-40 00 12	2.25	-0.027	+0.012
Iot Car	09 17 05.4	-59 16 31	2.25	-0.020	+0.008
GamlAnd	02 03 54.0	+42 19 47	2.26	+0.045	-0.052
Zet UMa	13 23 55.5	+54 55 31	2.27	+0.122	-0.020
Bet Cas	00 09 10.7	+59 08 59	2.27	+0.525	-0.181
Eps Sco	16 50 09.8	-34 17 36	2.29	-0.611	-0.255
Alp Lup	14 41 55.8	-47 23 18	2.30	-0.021	-0.018
Eps Cen	13 39 53.2	-53 27 59	2.30	-0.028	-0.016
Eta Cen	14 35 30.4	-42 09 28	2.31	-0.035	-0.035
Del Sco	16 00 20.0	-22 37 18	2.32	-0.012	-0.022
Bet UMa	11 01 50.5	+56 22 57	2.37	+0.082	+0.034
Alp Phe	00 26 17.0	-42 18 22	2.39	+0.203	-0.396
Eps Peg	21 44 11.2	+09 52 30	2.39	+0.031	-0.001
Kap Sco	17 42 29.3	-39 01 48	2.41	-0.006	-0.027
Bet Peg	23 03 46.5	+28 04 58	2.42	+0.189	+0.137
Eta Oph	17 10 22.7	-15 43 29	2.43	+0.039	+0.098
Alp Cep	21 18 34.8	+62 35 08	2.44	+0.151	+0.049
Gam UMa	11 53 49.8	+53 41 41	2.44	+0.095	+0.012
Eta CMa	07 24 05.7	-29 18 11	2.45	-0.004	+0.005
Eps Cyg	20 46 12.7	+33 58 13	2.46	+0.356	+0.328
Gam Cas	00 56 42.5	+60 43 00	2.47	+0.026	-0.005
Alp Peg	23 04 45.7	+15 12 19	2.49	+0.063	-0.042
Kap Vel	09 22 06.8	-55 00 39	2.50	-0.008	+0.009
Alp Cet	03 02 16.8	+04 05 23	2.53	-0.009	-0.078
Zet Cen	13 55 32.4	-47 17 18	2.55	-0.057	-0.042
Del Leo	11 14 06.5	+20 31 25	2.56	+0.142	-0.130
Zet Oph	16 37 09.5	-10 34 02	2.56	+0.014	+0.026
Alp Lep	05 32 43.8	-17 49 20	2.58	+0.001	+0.002
Gam Crv	12 10 39.7	-16 59 12	2.59	-0.161	+0.023
Zet Sgr	18 56 15.0	-30 01 23	2.60	-0.015	-0.002

Moto proprio in seconds/year

MESSIER OBJECTS

Number Messier	Number NGC	Common name	Type of object	Distance in thousand of light years	Constellation	App. mag.
M1	NGC 1952	Nebula Granchio	Residual of supernova	6,3	Toro	9,0
M2	NGC 7089		Globular cluster	36	Acquario	7,5
M3	NGC 5272		Globular cluster	31	Cani da Caccia	7,0
M4	NGC 6121		Globular cluster	7	Scorpione	7,5
M5	NGC 5904		Globular cluster	23	Serpente	7,0
M6	NGC 6405	Cluster Farfalla	Open cluster	2	Scorpione	4,5
M7	NGC 6475	Cluster of Tolomeo	Open cluster	1	Scorpione	3,5
M8	NGC 6523	Neb Laguna	Cluster with nebula	6,5	Sagittario	5,0
M9	NGC 6333		Globular cluster	26	Ofiuco	9,0
M10	NGC 6254		Globular cluster	13	Ofiuco	7,5
M11	NGC 6705	Cluster Anitra Selvatica	Open cluster	6	Scudo	7,0
M12	NGC 6218		Globular cluster	18	Ofiuco	8,0
M13	NGC 6205	Globular cluster of Ercole	Globular cluster	22	Ercole	7,0
M14	NGC 6402		Globular cluster	27	Ofiuco	9,5
M15	NGC 7078		Globular cluster	33	Pegaso	7,5
M16	NGC 6611	Cluster Neb Aquila	Cluster with nebula	7	Serpente	6,5
M17	NGC 6618	Neb Omega	Cluster with nebula	5	Sagittario	7,0
M18	NGC 6613		Open cluster	6	Sagittario	8,0
M19	NGC 6273		Globular cluster	27	Ofiuco	8,5
M20	NGC 6514	Neb Trifida	Cluster with nebula	2,2	Sagittario	5,0
M21	NGC 6531		Open cluster	3	Sagittario	7,0
M22	NGC 6656		Globular cluster	10	Sagittario	6,5
M23	NGC 6494		Open cluster	4,5	Sagittario	6,0
M24	Nessuno, contiene NGC 6603		nube Delle Caustiche	10	Sagittario	11,5
M25	Nessuno, IC 4725		Open cluster	2	Sagittario	4,9
M26	NGC 6694		Open cluster	5	Scudo	9,5
M27	NGC 6853	Neb Manubrio	Neb planetaria	1,25	Volpetta	7,5
M28	NGC 6626		Globular cluster	18	Sagittario	8,5
M29	NGC 6913		Open cluster	7,2	Cigno	9,0
M30	NGC 7099		Globular cluster	25	Capricorno	8,5
M31	NGC 224	Galaxy of Andromeda	Galaxy	2200	Andromeda	4,5
M32	NGC 221		Galaxy	2200	Andromeda	10,0
M33	NGC 598	Galaxy of Triangolo	Galaxy	2300	Triangolo	7,0
M34	NGC 1039		Open cluster	1,4	Perseo	6,0
M35	NGC 2168		Open cluster	2,8	Gemelli	5,5
M36	NGC 1960		Open cluster	4,1	Auriga	6,5
M37	NGC 2099		Open cluster	4,6	Auriga	6,0
M38	NGC 1912		Open cluster	4,2	Auriga	7,0
M39	NGC 7092		Open cluster	0,3	Cigno	5,5
M40	Nessuno		Double star WNC4		Orsa Maggiore	9,0
M41	NGC 2287		Open cluster	2,4	Cane Maggiore	5,0
M42	NGC 1976	Neb of Orione	Nebula	1,6	Orione	5,0
M43	NGC 1982	Neb De Mairan (parte della Neb di Orione)	Nebula	1,6	Orione	7,0
M44	NGC 2632	Cluster Alveare	Open cluster	0,5	Cancro	4,0
M45	NGC 1432	Pleiadi	Open cluster	0,4	Toro	1,4
M46	NGC 2437		Open cluster	5,4	Poppa	6,5
M47	NGC 2422		Open cluster	1,6	Poppa	4,5
M48	NGC 2548		Open cluster	1,5	Idra	5,5
M49	NGC 4472		Galaxy	60000	Vergine	10,0
M50	NGC 2323		Open cluster	3	Unicorno	7,0
M51	NGC 5194, NGC 5195	Galaxy vortice	Galaxy	37000	Cani da Caccia	8,0
M52	NGC 7654		Open cluster	7	Cassiopea	8,0
M53	NGC 5024		Globular cluster	56	Chioma di Berenice	8,5
M54	NGC 6715		Globular cluster	83	Sagittario	8,5
M55	NGC 6809		Globular cluster	17	Sagittario	7,0

Number Messier	Number NGC	Common name	Type of object	Distance in thousand of light years	Constellation	App. mag.
M56	NGC 6779		Globular cluster	32	Lira	9,5
M57	NGC 6720	Neb anello	Neb planetaria	4,1	Lira	9,5
M58	NGC 4579		Galaxy	60000	Vergine	11,0
M59	NGC 4621		Galaxy	60000	Vergine	11,5
M60	NGC 4649		Galaxy	60000	Vergine	10,5
M61	NGC 4303		Galaxy	60000	Vergine	10,5
M62	NGC 6266		Globular cluster	22	Ofiuco	8,0
M63	NGC 5055	Galaxy Girasole	Galaxy	37000	Cani da Caccia	8,5
M64	NGC 4826	Galaxy Occhio Nero	Galaxy	12000	Chioma di Berenice	9,0
M65	NGC 3623		Galaxy	35000	Leone	10,5
M66	NGC 3627		Galaxy	35000	Leone	10,0
M67	NGC 2682		Open cluster	2,25	Cancro	7,5
M68	NGC 4590		Globular cluster	32	Idra	9,0
M69	NGC 6637		Globular cluster	25	Sagittario	9,0
M70	NGC 6681		Globular cluster	28	Sagittario	9,0
M71	NGC 6838		Globular cluster	12	Freccia	8,5
M72	NGC 6981		Globular cluster	53	Acquario	10,0
M73	NGC 6994				Acquario	9,0
M74	NGC 628		Galaxy	35000	Pesci	10,5
M75	NGC 6864		Globular cluster	58	Sagittario	9,5
M76	NGC 650, NGC 651	Neb piccola campana muta	Planetary nebula	3,4	Perseo	12,0
M77	NGC 1068		Galaxy	60000	Balena	10,5
M78	NGC 2068		Nebula	1,6	Orione	8,0
M79	NGC 1904		Globular cluster	40	Lepre	8,5
M80	NGC 6093		Globular cluster	27	Scorpione	8,5
M81	NGC 3031	Galaxy of Bode	Galaxy	11000	Orsa Maggiore	8,5
M82	NGC 3034	Galaxy Sigaro	Galaxy	11000	Orsa Maggiore	9,5
M83	NGC 5236	Galaxy girandola del sud	Galaxy	10000	Idra	8,5
M84	NGC 4374		Galaxy	60000	Vergine	11,0
M85	NGC 4382		Galaxy	60000	Chioma di Berenice	10,5
M86	NGC 4406		Galaxy	60000	Vergine	11,0
M87	NGC 4486	Galaxy Virgo A	Galaxy	60000	Vergine	11,0
M88	NGC 4501		Galaxy	60000	Chioma di Berenice	11,0
M89	NGC 4552		Galaxy	60000	Vergine	11,5
M90	NGC 4569		Galaxy	60000	Vergine	11,0
M91	NGC 4548		Galaxy	60000	Chioma di Berenice	11,5
M92	NGC 6341		Globular cluster	26	Ercole	7,5
M93	NGC 2447		Open cluster	4,5	Poppa	6,5
M94	NGC 4736		Galaxy	14500	Cani da Caccia	9,5
M95	NGC 3351		Galaxy	38000	Leone	11,0
M96	NGC 3368		Galaxy	38000	Leone	10,5
M97	NGC 3587	Neb Gufo	Planetary nebula	2,6	Orsa Maggiore	12,0
M98	NGC 4192		Galaxy	60000	Chioma di Berenice	11,0
M99	NGC 4254		Galaxy	60000	Chioma di Berenice	10,5
M100	NGC 4321		Galaxy	60000	Chioma di Berenice	10,5
M101	NGC 5457	Galaxy girandola	Galaxy	24000	Orsa Maggiore	8,5
M102		Galaxy Fuso	Galaxy	40000	Dragone	10,5
M103	NGC 581		Open cluster	8	Cassiopea	7,0
M104	NGC 4594	Galaxy Sombrero	Galaxy	50000	Vergine	9,5
M105	NGC 3379		Galaxy	38000	Leone	11,0
M106	NGC 4258		Galaxy	25000	Cani da Caccia	9,5
M107	NGC 6171		Globular cluster	20	Ofiuco	10,0
M108	NGC 3556		Galaxy	45000	Orsa Maggiore	11,0
M109	NGC 3992		Galaxy	55000	Orsa Maggiore	11,0
M110	NGC 205		Galaxy	2200	Andromeda	10,0

VISIBILITY MESSIER OBJECTS

Catalog Messier	Constellation	Object	Months of visibility
M1	Toro	Nebula	XII-II
M2	Acquario	Ammasso globulare	X-XII
M3	Cani da Caccia	Ammasso globulare	I-IX
M4	Scorpione	Ammasso globulare	VII-VIII
M5	Serpente	Ammasso globulare	VII-X
M6	Scorpione	Ammasso aperto	VII-VIII
M7	Scorpione	Ammasso aperto	VII-VIII
M8	Sagittario	Nebula	VIII-IX
M9	Ofiuco	Ammasso globulare	VII-VIII
M10	Ofiuco	Ammasso globulare	VII-VIII
M11	Scudo	Ammasso aperto	VII-IX
M12	Ofiuco	Globular cluster	VII-VIII
M13	Ercole	Globular cluster	VI-IX
M14	Ofiuco	Globular cluster	VII-VIII
M15	Pegaso	Globular cluster	VIII-X
M16	Serpente	Nebula/cluster	VII-X
M17	Sagittario	Nebula	VIII-IX
M18	Sagittario	Open cluster	VIII-IX
M19	Ofiuco	Globular cluster	VII-VIII
M20	Sagittario	Nebula	VIII-IX
M21	Sagittario	Open cluster	VIII-IX
M22	Sagittario	Globular cluster	VIII-IX
M23	Sagittario	Open cluster	VIII-IX
M24	Sagittario	Open cluster	VIII-IX
M25	Sagittario	Open cluster	VIII-IX
M26	Scudo	Open cluster	VII-IX
M27	Volpetta	Planetary nebula	VIII-X
M28	Sagittario	Globular cluster	VIII-IX
M29	Cigno	Open cluster	VIII-X
M30	Capricorno	Globular cluster	IX-X
M31	Andromeda	Galaxy	X-XII
M32	Andromeda	Galaxy	X-XII
M33	Triangolo	Galaxy	X-XII
M34	Perseo	Open cluster	X-XII
M35	Gemelli	Open cluster	I-III
M36	Auriga	Open cluster	I-III
M37	Auriga	Open cluster	I-III

Catalog Messier	Constellation	Object	Months of visibility
M38	Auriga	Open cluster	I-III
M39	Cigno	Open cluster	VIII-X
M40			
M41	Cane maggiore	Open cluster	XII-III
M42	Orione	Nebula	XII-III
M43	Orione	Nebula	XII-III
M44	Cancro	Open cluster	II-V
M45	Toro	Open cluster	XII-II
M46	Poppa	Open cluster	II-IV
M47	Poppa	Open cluster	II-IV
M48	Idra	Open cluster	IV-VI
M49	Vergine	Galaxy	V-VII
M50	Unicorno	Open cluster	II-IV
M51	Cani da caccia	Galaxy	I-IX
M52	Cassiopea	Open cluster	circumpolare
M53	Chioma Berenice	Globular cluster	VI-VIII
M54	Sagittario	Globular cluster	VIII-IX
M55	Sagittario	Globular cluster	VIII-IX
M56	Lira	Globular cluster	VII-IX
M57	Lira	Planetary nebula	VII-IX
M58	Vergine	Galaxy	V-VII
M59	Vergine	Galaxy	V-VII
M60	Vergine	Galaxy	V-VII
M61	Vergine	Galaxy	V-VII
M62	Ofiuco	Globular cluster	VII-VIII
M63	Cani da caccia	Galaxy	I-IX
M64	Chioma Berenice	Galaxy	IV-VIII
M65	Leone	Galaxy	III-IV
M66	Leone	Galaxy	III-IV
M67	Cancro	Open cluster	II-V
M68	Cancro	Globular cluster	IV-VI
M69	Idra	Globular cluster	VIII-IX
M70	Sagittario	Globular cluster	VIII-IX
M71	Sagittario	Globular cluster	VIII-X
M72	Acquario	Globular cluster	X-XII
M73	Acquario	Open cluster	X-XII
M74	Pesci	Galaxy	X-XII
M75	Sagittario	Globular cluster	VIII-IX
M76	Perseo	Planetary nebula	IX-IV
M77	Balena	Galaxy	XI-I

Catalog Messier	Constellation	Object	Months of visibility
M78	Orione	Nebula	XII-III
M79	Lepre	Globular cluster	XII-III
M80	Scorpione	Globular cluster	VII-VIII
M81	Orsa maggiore	Galaxy	circumpolare
M82	Orsa maggiore	Galaxy	circumpolare
M83	Idra	Galaxy	IV-VI
M84	Vergine	Galaxy	V-VII
M85	Chioma Berenice	Galaxy	VI-VII
M86	Vergine	Galaxy	V-VII
M87	Vergine	Galaxy	V-VII
M88	Chioma Berenice	Galaxy	VI-VII
M89	Vergine	Galaxy	V-VII
M91	Chioma Berenice	Galaxy	VI-VIII
M92	Ercole	Globular cluster	VI-IX
M93	Poppa	Open cluster	II-IV
M94	Cani da Caccia	Galaxy	I-IX
M95	Leone	Galaxy	III-IV
M96	Leone	Galaxy	III-IV
M97	Orsa Maggiore	Planetary nebula	circumpolare
M98	Chioma Berenice	Galaxy	VI-VIII
M99	Chioma Berenice	Galaxy	VI-VIII
M100	Chioma Berenice	Galaxy	VI-VIII
M101	Orsa Maggiore	Galaxy	circumpolare
M102			
M103	Cassiopea	Open cluster	circumpolare
M104	Vergine	Galaxy	V-VII
M105	Leone	Galaxy	III-IV
M106	Cani da Caccia	Galaxy	I-IX
M107	Ofiuco	Globular cluster	VII-VIII
M108	Orsa Maggiore	Galaxy	circumpolare
M109	Orsa Maggiore	Galaxy	circumpolare
M110	Andromeda	Galaxy	X-XII

DOUBLE STARS WITH MAG.<6

COS	NAME	A.R.	DEC.	COMP	OTHER NAME	Mag	Mag2	SEP	PA
AND	56 And	01 56.2	+37 15			5.7	6	190	300
AND	Gamma And	02 03.9	+42 20		Almach	2.3	5.5	9.8	63
AQR	Zeta Aqr	22 28.8	-00 01			4.3	4.5	2.3	183
ARI	Epsilon Ari	02 59.2	+21 20	AB		5.2	5.5	1.5	208
ARI	Gamma Ari	01 53.5	+19 18		Mesarthim	4.8	4.8	7.8	0
BOO	Epsilon Boo	14 45.0	+27 04		Izar	2.5	4.9	2.8	339
BOO	Pi Boo	14 40.7	+16 25			4.9	5.8	5.6	108
BOO	Zeta Boo	14 41.1	+13 44			4.5	4.6	1	307
CAM	32 Cam	12 49.2	+83 25		STF 1694	5.3	5.8	21.6	326
CAP	Alpha1/2 Cap	20 18.1	-12 33		Algedi	3.6	4.2	378	291
CAR	Upsilon Car	09 47.1	-65 04			3.2	6	5	128
CEN	3 Cen	13 51.8	-33 00		K Cen	4.5	6	11.9	112
CEN	Alpha Cen	14 39.7	-60 50			0	1.5	9.4	233
CEN	Beta Cen	14 03.9	-60 23			0.7	3.9	1.3	251
CNC	Zeta Cnc	08 12.2	+17 39	AB		5.6	6	6	72
CRA	Gamma CrA	19 06.4	-37 04		h 5084	4.8	5.1	1.3	54
CRA	h 5014	18 06.8	-43 25			5.8	5.8	1.6	221
CRB	Eta CrB	15 23.2	+30 17	AB		5.6	5.9	0.5	128
CRB	Nu1 CrB	16 22.4	+33 48		2 CrB	5.4	5.3	364.4	165
CRB	Zeta2 CrB	15 39.4	+36 38		STF 1965	5.1	6	6.3	305
CRU	Alpha Cru	12 26.6	-63 06	AB		1.4	1.9	4.1	111
CRU	Alpha Cru	12 26.6	-63 06	AC		1.4	4.9	90.1	202
CRU	Mu Cru	12 54.6	-57 11			4	5.2	34.9	17
CVN	Alpha CVn	12 56.0	+38 19		Cor Caroli	2.9	5.5	19.4	229
CYG	61 Cyg	21 06.9	+38 45			5.2	6	28	144
CYG	Beta Cyg	19 30.7	+27 58		Albireo	3.1	5.1	34.4	54
CYG	Omicron1 Cyg	20 13.6	+46 44	AD	31 Cygni2	4	5	338	338
DEL	Gamma Del	20 46.7	+16 07			4.5	5.5	9.6	268
DRA	Mu Dra	17 05.3	+54 28			5.7	5.7	2.3	10
DRA	Nu Dra	17 32.2	+55 11		Kuma	4.9	4.9	62	312
EQU	Delta Equ	21 14.5	+10 00	AB	STF 535	5.2	5.3		25
EQU	Gamma Equ	21 10.3	+10 08			4.7	5.9	353	153
ERI	Dunlop 16	03 48.6	-37 37		f Eri	4.8	5.3	7.9	212
ERI	Rho Eri	01 39.8	-56 12		p Eri	5.8	5.8	11.4	191
ERI	STF 470	03 54	-02 57			4.5	5.7	6.9	348
ERI	Theta Eri	02 58.3	-40 18		Acamar	3.4	4.5	8.2	88
GEM	Alpha Gem	07 34.6	+31 53		Castor	1.9	2.9	2.2	164
HER	100 Her	18 07.8	+26 06		STF 2280	5.9	6	14.2	183
HER	95 Her	18 01.5	+21 35		STF 2264	5.1	5.2	6.3	258
HER	Alpha Her	17 14.6	+14 23		Ras Algethi	3.5	5.4	4.7	107
HER	Rho Her	17 23.7	+37 09			4.6	5.6	4.1	316
HER	Zeta Her	16 41.3	+31 36			2.9	5.5	1.1	210
HYA	Beta Hya	11 52.9	-33 54			4.7	5.5	0.9	8
HYA	Epsilon Hya	08 46.8	+06 25	AB		3.8	4.7	2.7	113
HYA	N Hya	11 32.3	-29 16		17 Crt; H 96	5.8	5.9	9.2	210
LEO	Gamma Leo	10 20.0	+19 51		Algieba	2.2	3.5	4.4	122
LIB	Alpha Lib	14 50.9	-16 02		Zubenelgenubi	2.8	5.2	231	314
LIB	Sh 179	14 25.5	-19 58			6	6	35	295

LUP	Mu Lup	15 15.0	-47 42			4.8	5.2	1.6	150
LUP	Pi Lup	15 01.7	-46 51		h 4728	4.7	4.8	1.5	78
LUP	Xi Lup	15 56.9	-34 58			5.3	5.8	10.4	49
LYN	12 Lyn	06 46	+59 26	AB	STF 948	5.5	6	1.8	73
LYN	15 Lyn	06 57.3	+58 25	AB		4.8	5.9	0.9	33
LYR	Delta1/2 Lyr	18 54.5	+36 54			5.6	4.5	630	115
LYR	Epsilon2 Lyr	18 44.3	+39 40	CD		5.2	5.5	2.3	94
LYR	Zeta2 Lyr	18 44.8	+37 36			4.3	5.9	43.7	150
MON	Beta Mon	06 28.8	-07 02	AB	11 Mon	4.7	5.2	7.3	132
MUS	Beta Mus	12 46.3	-68 06			3.9	4.2	1.3	4
OPH	36 Oph	17 15.3	-26 36			5.1	5.1	4.8	
OPH	70 Oph	18 05.5	+02 30			4.2	6	5.2	136
OPH	Eta Oph	17 10.4	-15 43		Sabik	3	3.5	1	325
OPH	Lambda Oph	16 30.9	+01 59		Marfik	4.2	5.2	1.6	35
OPH	Rho Oph	16 25.6	-23 27		5 Oph	5.3	6	3.1	344
OPH	Tau Oph	18 03.1	-08 11			5.2	5.9	1.6	286
ORI	42/45 Ori	05 35.4	-04 50			4.7	5.3	252	105
ORI	Eta Ori	05 24.5	-02 24			3.8	4.8	1.5	77
ORI	Lambda Ori	05 35.1	+09 56		Meissa	3.6	5.5	4.4	43
ORI	Lambda Ori	05 35.4	+09 56	AB		4	6	4.4	44
ORI	Sh 49	04 59.2	+14 32	AB		5	6	39.4	305
ORI	Sigma Ori	05 38.7	-02 36	AB		4	6	0.2	
ORI	STF 747	05 35.0	-06 00			4.8	5.7	35.7	223
ORI	Theta1/2 Ori	05 35.4	-05 25			4.9	5	135	314
ORI	Zeta Ori	05 40.8	-01 57	AB	Alnitak	1.9	4	2.4	162
PAV	L 8550	20 51.6	-62 26		RMK 26	5.8	5.8	2.7	93
PHE	Beta Phe	01 06.1	-46 43			4.1	4.2	0.7	307
PSC	Alpha Psc	02 02.0	+02 46		Al Rischa (Alrescha)	4.2	5.1	1.8	267
PSC	Psi1 Psc	01 05.6	+21 28			5.6	5.8	30	159
PUP	Dunlop 67	08 14.0	-36 19			5.1	6	67.4	175
PUP	H N 19	07 34.3	-23 28		South 552	5.8	5.9	9.3	114
PUP	Kappa Pup	07 38.8	-26 48	AB	Markeb	3.8	4	8.8	318
SCO	Alpha Sco	16 29.4	-26 26		Antares	1.2	5.4	2.9	275
SCO	Beta Sco	16 05.4	-19 48		Graffias	2.6	4.9	13.6	21
SCO	Xi Sco	16 04.4	-11 22	AB	STF 1998	4.8	5.1	0.5	358
SER	Delta Ser	15 34.5	+10 32			4.2	5.2	3.9	178
SER	STF 2375	18 45.5	+05 30			5.8	5.8	2.6	119
SER	Theta1/2 Ser	18 56.2	+04 12	AB	Alya	4	5	22	104
TAU	27 Tau	03 49.2	+24 03		Atlas; H N 870	3.7	5	300	180
TAU	Kappa Tau	04 25.4	+22 18			4.4	5.4	340	173
TAU	Theta Tau	04 28.7	+15 52			3.4	3.8	337.4	346
TUC	Beta Tuc	00 31.5	-62 58			4.5	4.5	27.1	170
UMA	Xi UMa	11 18.2	+31 32		Alula Australis	4.3	4.8	1.6	273
UMA	Zeta UMa	13 23.9	+54 56		Mizar/Alcor; STF 1744	2.3	4	14.4	150
VEL	Gamma2 Vel	08 09.6	-47 20	AB	Regor; Dunlop 65	2.2	4.5	41.2	220
VIR	Gamma Vir	12 41.7	-01 27		Porrina; STF 1070	3.5	3.5	0.6	209
VOL	Gamma Vol	07 08.8	-70 30			3.9	5.8	13.7	297
VUL	6/8 Vul	19 28.7	+24 40			4.4	5.8	413.7	28

VARIABLE STARS WITH MAX MAG.<6

GCVS	Cos	A.R. J2000	DEC.J2000	magMax	Period	GCVS	Cos	A.R. J2000	DEC.J2000	magMax	Period
R	And	00 24 01.9	+38 34 37	5.800	409.3300000	V0762	Cas	01 16 11.9	+71 44 38	5.920	
S	And	00 42 43.1	+41 16 05	5.800		T	Cen	13 41 45.6	-33 35 51	5.500	90.4400000
AN	And	23 18 23.3	+41 46 25	6.000	3.2195665	V0716	Cen	14 13 39.8	-54 37 32	5.960	1.4900960
KK	And	01 34 16.6	+37 14 14	5.910	0.6684000	V0763	Cen	11 35 13.3	-47 22 21	5.550	60.0000000
OP	And	01 36 27.2	+48 43 22	5.920		V0767	Cen	13 53 57.2	-47 07 41	5.860	
OU	And	23 49 41.0	+36 25 31	5.900		V0768	Cen	14 48 38.0	-36 38 05	5.930	
PZ	And	02 20 58.2	+50 09 05	5.590		V0788	Cen	12 08 53.8	-44 19 34	5.740	4.9663770
V0340	And	23 34 37.5	+40 14 11	5.590		V0869	Cen	14 09 35.0	-51 30 17	5.920	
V0388	And	23 27 07.4	+42 54 43	5.730		V0893	Cen	14 00 29.3	-62 47 09	5.570	
NO	Aps	17 31 27.5	-80 51 33	5.710		V0914	Cen	11 40 42.5	-53 58 07	5.990	
R	Aqr	23 43 49.5	-15 17 04	5.800	386.9600000	omi 1	Cen	11 31 46.1	-59 26 31	5.800	200.0000000
DV	Aqr	20 58 41.8	-14 28 59	5.890	1.5755310	LZ	Cep	22 02 04.6	+58 00 01	5.560	3.0705100
HI	Aqr	22 53 28.7	-11 36 59	5.800		V0381	Cep	21 19 15.7	+58 37 25	5.510	
R	Aql	19 06 22.3	+08 13 48	5.500	284.2000000	V0388	Cep	23 15 37.7	+70 53 17	5.560	
EL	Aql	18 56 02.0	-03 19 20	5.500		V0414	Cep	20 44 22.1	+56 29 18	5.870	
QS	Aql	19 41 05.5	+13 48 56	5.930	2.5132940	AB	Cet	02 26 00.3	-15 20 28	5.710	2.9978140
V0606	Aql	19 20 24.3	-00 08 02	5.500		BK	Cet	01 52 52.1	-16 55 45	5.730	
V1208	Aql	19 19 39.3	+12 22 29	5.510	0.1496630	EL	Cet	03 12 26.4	+06 39 39	5.660	
V1286	Aql	18 58 46.9	+13 54 24	5.830	6.0500000	DR	Cha	10 41 51.5	-79 47 00	5.940	
V1291	Aql	19 53 18.7	-03 06 52	5.610	224.5000000	AX	Cir	14 52 35.3	-63 48 35	5.650	5.2732680
V1363	Aql	18 51 26.3	-01 03 52	5.800		CO	Cir	14 48 44.6	-66 35 37	5.790	
V1370	Aql	19 23 21.1	+02 29 26	6.000		SW	Col	05 23 24.0	-39 40 42	5.710	
R	Ara	16 39 44.7	-56 59 40	6.000	4.4250700	V0701	CrA	19 03 17.7	-38 15 11	5.690	
V0539	Ara	17 50 28.4	-53 36 45	5.660	3.1691280	V0710	CrA	19 01 50.7	-36 58 10	5.840	
V0854	Ara	17 11 38.7	-48 52 24	5.870		R	CrB	15 48 34.4	+28 09 24	5.710	
V0862	Ara	17 31 23.3	-56 55 15	5.920		S	CrB	15 21 24.0	+31 22 03	5.800	360.2600000
RZ	Ari	02 55 48.5	+18 19 54	5.620	30.0000000	TZ	CrB	16 14 40.9	+33 51 31	5.690	1.1397890
SX	Ari	03 12 14.2	+27 15 25	5.670	0.7278925	DS	Cru	12 51 18.0	-60 19 47	5.790	
VZ	Ari	02 48 45.9	+25 11 17	5.820		U	Cyg	20 19 36.6	+47 53 39	5.900	463.2400000
AV	Ari	02 10 37.6	+19 30 01	5.680		X	Cyg	20 43 24.2	+35 35 16	5.850	16.3863320
WW	Aur	06 32 27.2	+32 27 18	5.790	2.5250192	RT	Cyg	19 43 37.8	+48 46 41	6.000	190.2800000
AE	Aur	05 16 18.1	+34 18 44	5.780		CH	Cyg	19 24 33.1	+50 14 29	5.600	
OX	Aur	06 53 01.4	+38 52 09	5.940	0.1544120	DT	Cyg	21 06 30.2	+31 11 05	5.570	2.4992150
PU	Aur	05 18 15.7	+42 47 32	5.640		V0380	Cyg	19 50 37.3	+40 35 59	5.610	12.4256120
QZ	Aur	05 28 34.1	+33 18 22	6.000		V0389	Cyg	21 08 38.9	+30 12 20	5.550	
V0444	Aur	06 00 58.6	+47 54 07	5.700		V0460	Cyg	21 42 01.1	+35 30 37	5.570	180.0000000
CH	Boo	14 34 39.6	+49 22 06	5.740		V1143	Cyg	19 38 41.2	+54 58 26	5.850	7.6407613
CY	Boo	14 17 28.5	+15 15 48	5.740		V1334	Cyg	21 19 22.2	+38 14 15	5.770	3.3328160
DE	Boo	14 53 23.8	+19 09 10	6.000		V1339	Cyg	21 42 08.4	+45 45 57	5.900	35.0000000
i	Boo	15 03 47.3	+47 39 15	5.800	0.2678159	V1610	Cyg	21 02 18.7	+36 41 41	5.800	
AX	Cam	08 01 42.5	+60 19 28	5.950	8.0278000	V1668	Cyg	21 42 35.3	+44 01 55	6.000	
DL	Cam	04 32 01.8	+53 54 39	5.810		V1679	Cyg	20 14 31.8	+36 39 40	5.990	
X	Cnc	08 55 22.9	+17 13 53	5.600	195.0000000	V1743	Cyg	19 33 41.6	+49 15 44	5.960	40.0000000
BI	Cnc	08 44 45.0	+10 04 54	5.580	4.2359000	V1762	Cyg	19 08 25.8	+52 25 33	5.810	
BL	Cnc	08 06 18.4	+22 38 08	5.970		V1768	Cyg	20 04 36.2	+32 13 07	5.560	
BM	Cnc	08 13 08.9	+29 39 24	5.530	4.1160000	V2015	Cyg	20 33 54.8	+46 41 38	5.620	
BO	Cnc	08 52 28.6	+28 15 33	5.900		V2093	Cyg	19 50 46.9	+37 49 35	6.000	
TU	CVn	12 54 56.5	+47 11 48	5.550	50.0000000	V2119	Cyg	20 23 44.4	+37 28 35	5.740	
AI	CVn	12 23 47.0	+42 32 34	5.890	0.2085000	V2121	Cyg	20 27 02.2	+49 23 00	5.750	
R	CMa	07 19 28.2	-16 23 43	5.700	1.1359405	V2140	Cyg	20 55 49.8	+47 25 04	5.650	
FV	CMa	07 07 22.6	-23 50 27	5.640		V2157	Cyg	21 25 47.0	+36 40 03	5.870	
FY	CMa	07 26 59.5	-23 05 10	5.540		EU	Del	20 37 54.7	+18 16 07	5.790	59.7000000
HZ	CMa	06 50 23.3	-31 42 22	5.690		UX	Dra	19 21 35.5	+76 33 35	5.940	168.0000000
IY	CMa	06 28 39.2	-32 22 17	5.640		VW	Dra	17 16 29.4	+60 40 14	6.000	170.0000000
LS	CMa	07 01 05.9	-25 12 56	5.570		CX	Dra	18 46 43.1	+52 59 17	5.680	
LZ	CMa	07 09 43.0	-25 13 52	5.630		DE	Dra	20 19 36.7	+62 15 27	5.720	5.2980360
MM	CMa	07 12 12.2	-25 56 33	5.840		DQ	Dra	16 24 25.3	+55 12 18	5.740	
MZ	CMa	07 21 04.3	-25 53 30	5.870		EE	Dra	18 58 52.6	+69 31 53	5.840	
NR	CMa	07 27 08.0	-17 51 53	5.670		R	Eri	04 55 18.6	-16 25 04	5.720	
AG	Cap	21 46 16.3	-09 16 33	5.900	25.0000000	DO	Eri	03 55 16.1	-12 05 57	5.970	12.4580000
U	Car	10 57 48.2	-59 43 56	5.720	38.7681000	DX	Eri	04 44 05.3	-08 30 13	5.760	
QY	Car	10 11 46.5	-58 03 38	5.630		DZ	Eri	04 32 37.6	-03 12 34	5.730	1.3740000
V0366	Car	09 54 43.4	-57 18 52	5.700	433.0000000	EH	Eri	04 33 54.7	-06 44 20	5.720	3.8200000
V0372	Car	07 52 29.7	-54 22 02	5.690	0.1160000	EM	Eri	04 20 42.8	-07 35 33	5.840	
V0374	Car	07 58 50.6	-60 49 28	5.720		GW	Eri	04 11 36.2	-20 21 22	5.840	
V0448	Car	06 47 18.7	-55 32 24	5.660		GZ	Eri	04 18 16.1	-20 42 55	5.940	
V0482	Car	09 30 23.4	-58 21 43	5.850		S	For	03 46 13.2	-24 23 28	5.600	
V0514	Car	10 38 02.6	-57 15 23	5.830		AI	For	03 19 34.9	-24 07 22	5.650	
RU	Cas	01 11 41.4	+65 01 08	5.500		R	Gem	07 07 21.3	+22 42 13	6.000	369.9100000
SU	Cas	02 51 58.8	+68 53 19	5.700	1.9493190	BU	Gem	06 12 19.1	+22 54 31	5.740	
YZ	Cas	00 45 39.1	+74 59 17	5.710	4.4672240	NP	Gem	07 02 25.5	+17 45 20	5.890	
V0373	Cas	23 55 33.8	+57 24 44	5.900	13.4192000	NZ	Gem	07 42 03.2	+14 12 31	5.520	
V0557	Cas	01 42 20.5	+68 02 35	5.550	3.1848000	OT	Gem	07 24 27.6	+15 31 02	6.000	
V0567	Cas	00 05 06.1	+61 18 50	5.710	6.4322000	OV	Gem	06 49 49.8	+16 12 10	5.850	
V0638	Cas	23 02 43.9	+55 14 11	5.700	5.3600000	PU	Gem	06 09 44.0	+23 06 48	5.780	
V0640	Cas	00 06 15.8	+58 26 12	5.960		S	Gru	22 26 05.5	-48 26 19	6.000	401.5100000
V0705	Cas	23 41 47.2	+57 31 01	5.800		DL	Gru	23 10 09.7	-40 35 30	5.860	
V0746	Cas	00 24 15.7	+52 01 12	5.540		LQ	Her	16 11 38.0	+23 29 41	5.580	

GCVS	Cos	A.R.	J2000	DEC.J2000	magMax	Period	GCVS	Cos	A.R.	J2000	DEC.J2000	magMax	Period
OP	Her	17 56 48.5		+45 21 03	5.850	120.5000000	V0397	Pup	07 49 14.7		-35 14 36	5.910	
V0636	Her	16 47 19.7		+42 14 20	5.830		V0438	Pup	08 24 57.2		-42 46 11	5.900	
V0640	Her	17 25 54.4		+16 55 03	5.980		V0468	Pup	07 39 58.0		-37 34 46	5.920	
V0819	Her	17 21 43.6		+39 58 29	5.510		XY	Pyx	08 27 59.4		-35 06 50	5.680	
V0839	Her	15 55 30.6		+42 33 58	5.740		RT	Sgr	20 17 43.6		-39 06 46	6.000	306.4600000
TU	Hor	03 30 37.0		-47 22 30	5.900	0.9359710	RU	Sgr	19 58 42.9		-41 50 58	6.000	240.4900000
TW	Hor	03 12 33.2		-57 19 18	5.520	158.0000000	RY	Sgr	19 16 32.8		-33 31 20	5.800	
HV	Hya	08 35 28.2		-07 58 56	5.660	5.5700000	V0732	Sgr	17 56 07.5		-27 22 17	6.000	
LM	Hya	08 26 27.2		-03 59 15	5.800		V3970	Sgr	17 58 30.0		-29 13 08	6.000	350.0000000
V0335	Hya	12 13 12.9		-34 07 31	5.840		V3974	Sgr	17 58 57.0		-28 50 54	5.890	450.0000000
khi 2	Hya	11 05 57.6		-27 17 16	5.650	2.2677010	V3999	Sgr	18 02 19.0		-29 59 15	5.670	470.0000000
BN	Hyi	03 07 32.1		-78 59 21	5.700		V4001	Sgr	18 02 42.0		-30 05 25	5.770	465.0000000
V0360	Lac	22 50 21.8		+41 57 12	5.910	10.0750000	V4037	Sgr	18 02 35.0		-29 59 56	5.740	400.0000000
TX	Leo	10 35 02.2		+08 39 02	5.660	2.4450566	V4089	Sgr	19 34 08.4		-40 02 05	5.870	
VY	Leo	10 56 01.5		+06 11 07	5.690		V4452	Sgr	17 44 29.4		-29 04 59	5.930	
CX	Leo	10 27 39.0		+09 45 45	5.970	7.8970000	V4501	Sgr	17 45 31.5		-28 46 22	5.910	
DE	Leo	10 25 15.2		+08 47 05	5.600		V4530	Sgr	17 45 56.1		-28 55 51	5.570	
DR	Leo	09 41 35.1		+31 16 40	5.840		V4531	Sgr	17 45 55.8		-28 45 18	5.810	
EO	Leo	10 02 49.0		+21 56 57	5.590		V0906	Sco	17 53 54.8		-34 45 10	5.960	2.7858470
RX	LMi	10 42 11.3		+31 41 49	5.980	150.0000000	V0923	Sco	17 03 50.9		-38 09 09	5.860	34.8269000
R	Lep	04 59 36.3		-14 48 23	5.500	427.0700000	V0927	Sco	15 54 39.5		-25 14 37	5.800	1.4593700
S	Lep	06 05 45.5		-24 11 44	6.000	89.0000000	V0929	Sco	16 06 06.4		-23 36 23	5.890	
YY	Lep	06 06 57.5		-21 48 44	5.600		V0957	Sco	17 52 13.7		-34 47 57	5.870	
HR	Lup	15 08 12.1		-40 35 02	5.760		V1003	Sco	16 38 26.3		-43 23 54	5.830	
HZ	Lup	15 06 33.2		-30 55 07	5.960		V1036	Sco	17 34 42.5		-32 34 54	5.710	
RR	Lyn	06 26 25.8		+56 17 06	5.520	9.9450790	V1068	Sco	16 53 42.4		-43 03 03	5.710	
XY	Lyr	18 38 06.5		+39 40 06	5.800		V1075	Sco	17 15 19.2		-33 32 54	5.570	
V0471	Lyr	19 11 46.0		+31 17 00	5.910	1.1608980	S	ScI	00 15 22.3		-32 02 43	5.500	362.5700000
V0473	Lyr	19 15 59.5		+27 55 35	5.990	1.4907800	AI	ScI	01 12 45.4		-37 51 23	5.890	
V0542	Lyr	18 58 01.9		+38 15 58	5.830		BU	ScI	23 59 27.9		-29 29 07	5.700	
WX	Men	05 34 44.8		-73 44 29	5.720		sig	ScI	01 02 26.4		-31 33 07	5.500	
iot	Men	05 35 36.2		-78 49 15	6.000	5.2880000	V0373	Sct	18 55 27.0		-07 43 05	6.000	
T	Mon	06 25 13.0		+07 05 09	5.580	27.0246490	V0432	Sct	18 29 46.8		-14 34 55	5.960	2.1912000
V	Mon	06 22 43.6		-02 11 43	6.000	340.5000000	CT	Ser	15 45 39.1		+14 22 32	6.000	
V0474	Mon	05 59 01.1		-09 22 56	5.930	0.1361260	FL	Ser	15 12 04.3		+18 58 34	5.790	
R	Mus	12 42 05.0		-69 24 27	5.930	7.5102110	LE	Ser	16 08 28.1		+08 32 04	5.680	
S	Mus	12 12 47.0		-70 09 06	5.890	9.6600700	tau 4	Ser	15 36 28.2		+15 06 05	5.890	100.0000000
BO	Mus	12 34 54.4		-67 45 25	5.850		SS	Sex	10 23 27.0		-04 04 27	5.940	4.3700000
LS	Mus	13 03 05.4		-71 28 33	5.900		TU	Tau	05 45 13.7		+24 25 12	5.900	190.0000000
tet	Mus	13 08 07.2		-65 18 22	5.500	18.3410000	XX	Tau	05 19 24.4		+16 43 00	6.000	
V0360	Nor	15 51 06.8		-55 03 20	5.770		HU	Tau	04 38 15.8		+20 41 05	5.850	2.0562997
V0367	Nor	16 13 17.0		-53 40 16	5.940		V0483	Tau	04 19 57.7		+14 02 07	5.550	0.0540000
U	Oph	17 16 31.7		+01 12 38	5.840	1.6773461	V0711	Tau	03 36 47.3		+00 35 16	5.710	2.8406120
X	Oph	18 38 21.1		+08 50 03	5.900	328.8500000	V0731	Tau	05 43 19.5		+23 12 16	5.980	
Y	Oph	17 52 38.7		-06 08 37	5.870	17.1241300	V0775	Tau	04 22 03.5		+14 04 38	5.720	0.0625000
V2052	Oph	17 56 18.4		+00 40 13	5.810	0.1398903	V0809	Tau	05 52 22.3		+14 10 18	5.590	2.6541000
V2347	Oph	18 27 51.0		+07 52 21	5.800		V0892	Tau	04 18 40.6		+28 19 16	5.550	
CK	Ori	05 30 19.9		+04 12 17	5.900	120.0000000	V0960	Tau	05 33 31.6		+18 32 25	5.530	
V0529	Ori	05 58 20.2		+20 15 45	6.000		V1083	Tau	03 43 43.9		+06 55 30	5.990	
V1004	Ori	05 58 24.4		+01 50 14	5.880	0.0611000	V1141	Tau	04 23 32.4		+20 58 55	6.000	
AG	Peg	21 51 02.0		+12 37 32	6.000		V1155	Tau	05 07 55.4		+21 42 17	5.820	
HH	Peg	23 51 21.2		+09 18 48	5.740		V1156	Tau	05 09 45.1		+28 01 50	6.000	
HN	Peg	21 44 31.3		+14 46 19	5.920	24.9000000	PW	Tel	19 33 21.6		+45 16 18	5.610	2.9213000
HV	Peg	23 27 40.4		+25 10 02	5.960	6.9700000	YY	Tri	02 18 06.0		+28 36 45	5.840	
FM	Peg	22 53 02.3		+16 50 28	5.600	24.4400000	S	TrA	16 01 10.7		-63 46 36	5.950	6.3234400
MR	Peg	22 54 12.1		+22 39 35	5.710		LX	TrA	15 27 33.1		-64 31 53	5.810	
NV	Peg	21 28 59.8		+22 10 46	5.660		MX	TrA	16 59 34.0		-69 16 05	5.750	
NZ	Peg	21 39 01.2		+20 15 56	5.830		BQ	Tuc	00 53 37.9		-62 52 17	5.700	
V0342	Peg	23 07 28.7		+21 08 03	6.000		CG	Tuc	23 29 01.0		-63 06 38	5.660	2.3148000
IW	Per	03 33 35.0		+39 53 58	5.790	0.9171877	ST	UMa	11 27 50.4		+45 11 07	6.000	110.0000000
V0376	Per	03 49 08.1		+43 57 47	5.770	0.0993700	VY	UMa	10 45 04.0		+67 24 41	5.870	
V0472	Per	02 08 40.6		+58 25 25	5.640		CO	UMa	11 09 19.1		+36 18 34	5.740	
V0582	Per	04 08 36.6		+38 02 23	5.630		CR	UMa	13 46 35.7		+54 25 58	5.650	1.3799600
BD	Phe	01 50 54.4		-50 12 22	5.900		EN	UMa	10 21 03.3		+68 44 52	5.830	
ksi	Phe	00 41 46.4		-56 30 05	5.680	3.9516000	pi 1	UMa	08 39 11.7		+65 01 15	5.640	
VX	Psc	01 29 52.9		+18 21 20	5.900	0.1310000	RW	UMi	16 47 54.8		+77 02 12	6.000	
WW	Psc	00 59 49.7		+06 29 00	5.970		AH	Vel	08 12 00.0		-46 38 40	5.500	4.2271710
XZ	Psc	23 54 46.6		+00 06 34	5.610		HV	Vel	08 35 52.0		-50 58 11	5.770	2.6674500
AG	Psc	00 36 47.3		+15 13 54	5.810	0.0800000	IU	Vel	09 00 22.3		-43 10 26	5.970	
UU	PsA	22 04 36.8		-26 49 21	5.860		IV	Vel	09 57 10.9		-52 38 20	5.990	0.1608000
VZ	PsA	22 38 51.5		-33 04 53	5.680		IW	Vel	10 57 07.8		-50 45 54	5.900	0.1500000
WX	PsA	22 59 35.8		-29 27 44	5.570		IZ	Vel	09 01 20.9		-41 51 51	5.530	
MY	Pup	07 38 18.2		-48 36 05	5.540	5.6948200	KL	Vel	09 12 30.5		-43 36 48	5.560	
PR	Pup	07 14 46.0		-46 50 59	5.690	1.9347000	LR	Vel	09 18 42.4		-51 33 38	5.820	
PT	Pup	07 36 41.0		-19 42 08	5.720	0.1628400	NN	Vel	08 09 09.5		-48 41 04	5.620	
QS	Pup	07 49 12.9		-46 51 28	5.840	0.1182000	OP	Vel	08 46 30.5		-45 54 45	5.500	
V0336	Pup	08 02 44.8		-41 18 35	5.520		V0335	Vel	09 53 50.1		-51 08 48	5.880	
V0363	Pup	07 12 25.8		-36 32 40	5.890		SS	Vir	12 25 14.0		+00 46 12	6.000	364.1400000
V0378	Pup	07 36 03.9		-14 29 34	5.600		CS	Vir	14 18 38.5		-18 42 56	5.840	9.2954000
V0390	Pup	07 44 34.2		-24 40 27	5.530		FW	Vir	12 38 22.7		+01 51 17	5.630	15.0000000
V0392	Pup	07 46 10.5		-37 56 01	5.820		LN	Vir	13 14 31.3		+11 19 54	5.750	

PLANETS

	MERCURY	VENUS	EARTH	MOON	MARS	JUPITER	SATURN	URANUS	NEPTUNE
Weight (10 ²⁴ kg)	0,33	4,87	5,97	0,073	0,642	1899	568	86,8	102
Diameter (km)	4879	12104	12756	3475	6794	142984	120536	51118	49528
Density (kg/m ³)	5427	5243	5515	3340	3933	1326	687	1270	1638
Gravity (m/s ²)	3,7	8,9	9,8	1,6	3,7	23,1	9	8,7	11
Velocità of escare (km/s)	4,3	10,4	11,2	2,4	5	59,5	35,5	21,3	23,5
Period of rotation (hours)	1407,6	-5832,5	23,9	655,7	24,6	9,9	10,7	-17,2	16,1
Length of the day (hours)	4222,6	2802	24	708,7	24,7	9,9	10,7	17,2	16,1
distance from the Sun (10 ⁶ km)	57,9	108,2	149,6	0,384*	227,9	778,6	1433,5	2872,5	4495,1
Perihelion (10 ⁶ km)	46	107,5	147,1	0,363*	206,6	740,5	1352,6	2741,3	4444,5
Aphelion (10 ⁶ km)	69,8	108,9	152,1	0,406*	249,2	816,6	1514,5	3003,6	4545,7
Orbital period (days)	88	224,7	365,2	27,3	687	4331	10,747	30,589	59,8
Orbital velocity (km/s)	47,9	35	29,8	1	24,1	13,1	9,7	6,8	5,4
Orbital inclination (degrees)	7	3,4	0	5,1	1,9	1,3	2,5	0,8	1,8
Eccentricity	0,205	0,007	0,017	0,055	0,094	0,049	0,057	0,046	0,011
Inclination (gradi)	0,01	177,4	23,5	6,7	25,2	3,1	26,7	97,8	28,3
Temperatur (C)	167	464	15	-20	-65	-110	-140	-195	-200
Pressure (bar)	0	92	1	0	0,01	Sconosciuta	Sconosciuta	Sconosciuta	Sconosciuta
Satellites	0	0	1	0	2	63	60	27	13
Rings	No	No	No	No	No	Yes	Yes	Yes	Yes
Magnetic field	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes

* data referred to the Earth

	Sole	Mercurio	Venere	Terra	Luna	Marte	Giove	Saturno	Urano	Nettuno
Sole	-	4960,5	2654,8	1920,2	1920,2	1260,5	369,0	200,4	100,0	63,9
Mercurio	17,4	-	20,0	11,0	11,0	5,9	1,4	0,7	0,4	0,2
Venere	23,1	49,7	-	60,3	60,3	20,9	3,7	1,9	0,9	0,6
Terra	17,6	28,7	63,6	-	-	33,6	4,2	2,1	1,0	0,6
Luna	4,8	7,8	17,3	-	-	9,2	1,1	0,6	0,3	0,2
Marte	6,2	8,2	11,7	17,9	17,9	-	2,5	1,2	0,5	0,3
Giove	37,9	40,9	44,0	46,9	46,9	53,6	-	45,1	14,1	7,9
Saturno	17,4	18,1	18,8	19,4	19,4	20,6	38,0	-	17,3	8,1
Urano	3,7	3,7	3,8	3,9	3,9	4,0	5,0	7,3	-	6,5
Nettuno	2,3	2,3	2,3	2,4	2,4	2,4	2,8	3,3	6,3	-

Diametri medi in " che i pianeti sottendono visti da un corpo all'altro

SATELLITES OF MARS

Name		Diameter	Weight	Orbital radius	Orbital period	Discovery
Mars I	Fobos	27,0x21,6x18,8 km	10,8x1015 kg	9 377 km	7,66 ore	1877
Mars II	Deimos	10x12x16 km	2x1015 kg	23 460 km	30,35 ore	1877

SATELLITES OF JUPITER

Name		Diameter	Weight	Orbital radius	Orbital period	Discovery	Group
Jupiter XVI	Metide	43 km	120x1015 kg	127 690 km	0,294780 giorni	1979	Group of Amaltea
Jupiter XV	Adrastea	26x20x16 km	7,5x1015 kg	128 694 km	0,29826 giorni	1979	Group of Amaltea
Jupiter V	Amaltea	262x146x134 km	2,1x1018 kg	181 170 km	0,498179 giorni	1892	Group of Amaltea
Jupiter XIV	Tebe	110x90 km	1,5x1018 kg	221 700 km	0,6745 giorni	1979	Group of Amaltea
Jupiter I	Io	3 643 km	89x1021 kg	421 700 km	1,769138 giorni	1610	Satelliti galileiani
Jupiter II	Europa	3 122 km	48x1021 kg	671 034 km	3,551181 giorni	1610	Satelliti galileiani
Jupiter III	Ganimede	5 262 km	150x1021 kg	1 070 412 km	7,154553 giorni	1610	Satelliti galileiani
Jupiter IV	Callisto	4 821 km	110x1021 kg	1 882 709 km	16,689018 giorni	1610	Satelliti galileiani
Jupiter XVIII	Temisto	8 km	0,69x1015 kg	7 391 645 km	129,8276 giorni	1975	
Jupiter XIII	Leda	20 km	11x1015 kg	11 097 245 km	238,8242 giorni	1974	Group of Imalia
Jupiter VI	Imalia	170 km	6,7x1018 kg	11 432 435 km	249,7263 giorni	1904	Group of Imalia
Jupiter X	Lisitea	36 km	63x1015 kg	11 653 225 km	256,9954 giorni	1938	Group of Imalia
Jupiter VII	Elara	86 km	870x1015 kg	11 683 115 km	257,9849 giorni	1905	Group of Imalia
S/2000 J 11		4 km	90x1012 kg	12 570 575 km	287,9310 giorni	2000	Group of Imalia
Jupiter XLVI	Carpo	3 km	45x1012 kg	17 144 875 km	1,2556 anni	2003	
S/2003 J 12		1 km	1,5x1012 kg	17 739 540 km	1,3215 anni	2000	
Jupiter XXXIV	Euporia	2 km	15x1012 kg	19 088 435 km	1,4751 anni	2001	Group of Ananke?
S/2003 J 3		2 km	15x1012 kg	19 621 780 km	1,5374 anni	2003	Group of Ananke
S/2003 J 18		2 km	15x1012 kg	19 812 575 km	1,5598 anni	2003	Group of Ananke
Jupiter XLII	Telsinoe	2 km	15x1012 kg	20 453 755 km	1,6362 anni	2003	Group of Ananke
Jupiter XXXIII	Euante	3 km	45x1012 kg	20 464 855 km	1,6375 anni	2001	Group of Ananke
Jupiter XLV	Elice	4 km	90x1012 kg	20 540 265 km	1,6465 anni	2003	Group of Ananke?
Jupiter XXXV	Ortosia	2 km	15x1012 kg	20 567 970 km	1,6499 anni	2001	Group of Ananke?
Jupiter XXIV	Iocaste	5 km	190x1012 kg	20 722 565 km	1,6685 anni	2000	Group of Ananke
S/2003 J 16		2 km	15x1012 kg	20 743 780 km	1,6711 anni	2003	Group of Ananke
Jupiter XII	Ananke	28 km	30x1015 kg	20 815 225 km	1,6797 anni	1951	Group of Ananke
Jupiter XXVII	Praxidike	7 km	430x1012 kg	20 823 950 km	1,6808 anni	2000	Group of Ananke
Jupiter XXII	Arpalice	4 km	120x1012 kg	21 063 815 km	1,7099 anni	2000	Group of Ananke
Jupiter XXX	Ermippe	4 km	90x1012 kg	21 182 085 km	1,7243 anni	2001	Group of Ananke?
Jupiter XXIX	Tione	4 km	90x1012 kg	21 405 570 km	1,7517 anni	2001	Group of Ananke
Jupiter XL	Mneme	2 km	15x1012 kg	21 427 110 km	1,7543 anni	2003	Group of Ananke
S/2003 J 17		2 km	15x1012 kg	22 134 305 km	1,8419 anni	2003	Group of Carme
Jupiter XXXI	Aitne	3 km	45x1012 kg	22 285 160 km	1,8608 anni	2001	Group of Carme
Jupiter XXXVII	Cale	2 km	15x1012 kg	22 409 210 km	1,8763 anni	2001	Group of Carme
Jupiter XX	Taigete	5 km	160x1012 kg	22 438 650 km	1,8800 anni	2000	Group of Carme
S/2003 J 19		2 km	15x1012 kg	22 709 060 km	1,9141 anni	2003	Group of Carme
Jupiter XXI	Caldene	4 km	75x1012 kg	22 713 445 km	1,9147 anni	2000	Group of Carme
S/2003 J 15		2 km	15x1012 kg	22 721 000 km	1,9156 anni	2003	Group of Ananke?
S/2003 J 10		2 km	15x1012 kg	22 730 815 km	1,9168 anni	2003	Group of Carme?
S/2003 J 23		2 km	15x1012 kg	22 739 655 km	1,9180 anni	2003	Group of Pasife
Jupiter XXV	Erinome	3 km	45x1012 kg	22 986 265 km	1,9493 anni	2000	Group of Carme
Jupiter XLI	Aede	4 km	90x1012 kg	23 044 175 km	1,9566 anni	2003	Group of Pasife
Jupiter XLIV	Callicore	2 km	15x1012 kg	23 111 825 km	1,9652 anni	2003	Group of Carme?
Jupiter XXIII	Calice	5 km	190x1012 kg	23 180 775 km	1,9740 anni	2000	Group of Carme
Jupiter XXXII	Euridome	3 km	45x1012 kg	23 230 860 km	1,9804 anni	2001	Group of Pasife?
S/2003 J 14		2 km	15x1012 kg	23 238 595 km	1,9814 anni	2003	Group of Pasife
Jupiter XXXVIII	Pasitee	2 km	15x1012 kg	23 307 320 km	1,9902 anni	2001	Group of Carme
Jupiter XLVIII	Cillene	2 km	15x1012 kg	23 396 270 km	2,0016 anni	2003	Group of Pasife
Jupiter XLVII	Eukelade	4 km	90x1012 kg	23 483 695 km	2,0129 anni	2003	Group of Carme
S/2003 J 4		2 km	15x1012 kg	23 570 790 km	2,0241 anni	2003	Group of Pasife
Jupiter XXXIX	Egemone	3 km	45x1012 kg	23 702 510 km	2,0411 anni	2003	Group of Pasife
Jupiter XLIII	Arche	3 km	45x1012 kg	23 717 050 km	2,0429 anni	2002	Group of Carme
Jupiter XI	Carme	46 km	0,13x1018 kg	23 734 465 km	2,0452 anni	1938	Group of Carme
Jupiter XXVI	Isonoe	4 km	75x1012 kg	23 832 630 km	2,0579 anni	2000	Group of Carme

S/2003 J 9		1 km	1,5x1012 kg	23 857 810 km	2,0612 anni	2003	Group of Carme
S/2003 J 5		4 km	90x1012 kg	23 973 925 km	2,0762 anni	2003	Group of Carme
Jupiter VIII	Pasife	60 km	300x1015 kg	24 094 770 km	2,0919 anni	1908	Group of Pasife
Jupiter IX	Sinope	38 km	75x1015 kg	24 214 390 km	2,1075 anni	1908	Group of Pasife
Jupiter XXXVI	Sponde	2 km	15x1012 kg	24 252 625 km	2,1125 anni	2001	Group of Pasife
Jupiter XXVIII	Autonoe	4 km	90x1012 kg	24 264 445 km	2,1141 anni	2001	Group of Pasife
Jupiter XVII	Calliroe	9 km	870x1012 kg	24 356 030 km	2,1261 anni	1999	Group of Pasife
Jupiter XIX	Megaclite	5 km	210x1012 kg	24 687 240 km	2,1696 anni	2000	Group of Pasife
S/2003 J 2		2 km	15x1012 kg	30 290 845 km	2,9487 anni	2003	

SATELLITES OF SATURN

Name		Diameter	Weight	Orbital radius	Orbital period	Discovery	Group
Saturn XVIII	Pan	35x35x23 km	2,7x1015 kg	133 583 km	0,575 giorni	1990	
Saturn XXXV	Dafni	7 km	?	136 505 km	0,59537 giorni	2005	
Saturn XV	Atlante	40x20 km	?	137 670 km	0,6019 giorni	1980	
Saturn XVI	Prometeo	145x85x62 km	0,270x1018 kg	139 350 km	0,6130 giorni	1980	
Saturn XVII	Pandora	114x84x62 km	0,220x1018 kg	141 700 km	0,6285 giorni	1980	
Saturn XI	Epimeteo	144x108x98 km	0,560x1018 kg	151 422 km	0,6942 giorni	1980	
Saturn X	Giano	196x192x150 km	2,01x1018 kg	151 472 km	0,6945 giorni	1966	
Saturn I	Mimante	397 km	38,0x1018 kg	185 520 km	0,942422 giorni	1789	
Saturn XXXII	Metone	3 km	?	194 000 km	1,01 giorni	2004	
Saturn XLIX	Antea	2 km	?	197 700 km	1,04 giorni	2007	
Saturn XXXIII	Pallene	4 km	?	211 000 km	1,14 giorni	2004	
Saturn II	Encelado	499 km	73,0x1018 kg	238 020 km	1,370218 giorni	1789	
Saturn XIII	Telesto	34x28x36 km	?	294 660 km	1,887802 giorni	1980	
Saturn III	Teti	1 060 km	0,622x1021 kg	294 660 km	1,887802 giorni	1684	
Saturn XIV	Calipso	34x22x22 km	?	294 660 km	1,887802 giorni	1980	
Saturn XII	Elena	36x32x30 kg	?	377 400 km	2,736915 giorni	1980	
Saturn IV	Dione	1 118 km	1,05x1021 kg	377 400 km	2,736915 giorni	1684	
Saturn XXXIV	PolLight	13 km	?	377 400 km	2,736915 giorni	2004	
Saturn V	Rea	1 528 km	2,49x1021 kg	527 040 km	4,5175 giorni	1672	
Saturn VI	Titano	5 151 km	135x1021 kg	1 221 850 km	15,94542 giorni	1655	
Saturn VII	Iperione	410x260x220 km	17,7x1018 kg	1 481 100 km	21,27661 giorni	1848	
Saturn VIII	Giapeto	1 460 km	1,88x1021 kg	3 561 300 km	79,33018 giorni	1671	
Saturn XXIV	Kiviuq	16 km	3,3x1015 kg	11 365 000 km	1,2298 anni	2000	Gruop Inuit
Saturn XXII	Ijiraq	12 km	?	11 442 000 km	1,2361 anni	2000	Gruop Inuit
Saturn IX	Febe	220 km	4,00x1018 kg	12 944 300 km	-1,5009 anni	1899	Gruop Nordico
Saturn XX	Paaliaq	22 km	?	15 199 000 km	1,8806 anni	2000	Gruop Inuit
Saturn XXVII	Skadi	8 km	?	15 647 000 km	-1,9956 anni	2000	Gruop Nordico
Saturn XXVI	Albiorix	32 km	?	16 404 000 km	2,1451 anni	2000	Gruop Gallico
S/2007 S 2		6		16 560 000 km	-2,171 anni	2007	Gruop Nordico
Saturn XXXVII	Bebhionn	6 km	?	16 950 000 km	2,25 anni	2004	Gruop Inuit
Saturn XLVII	Skoll	6 km		17 610 000 km	-2,3792 anni	2006	
Saturn XXVIII	Erriapo	10 km	?	17 616 000 km	2,3871 anni	2000	Gruop Gallico
S/2007 S 1		7 km	?	17 910 600 km	-2,44 anni	2007	Gruop Inuit
S/2006 S 4		6 km		18 105 000 km	-2,4778 anni	2006	
Saturn XXIX	Siarnaq	40 km	?	18 160 000 km	2,4452 anni	2000	Gruop Inuit
Saturn XLIV	Hyrrokkin	8 km		18 217 125 km	-2,4970 anni	2004	
Saturn XXI	Tarvos	15 km	?	18 247 000 km	2,5342 anni	2000	Gruop Gallico
S/2004 S 13		6 km	?	18 450 000 km	-2,48 anni	2004	Gruop Nordico
S/2006 S 6		6 km		18 600 000 km	-2,5791 anni	2006	
S/2004 S 17		4 km	?	18 600 000 km	-2,70 anni	2004	Gruop Nordico
Saturn XXV	Mundilfari	7 km	?	18 722 000 km	-2,6048 anni	2000	Gruop Nordico
Saturn XXXVIII	Bergelmir	6 km	?	18 750 000 km	-2,76 anni	2004	Gruop Nordico
S/2006 S 1		6 km		18 981 135 km	-2,6558 anni	2006	
Saturn XXXVI	Ægir	6 km	?	19 350 000 km	-2,81 anni	2004	Gruop Nordico
Saturn XXXI	Narvi	7 km	?	19 370 700 km	-2,7558 anni	2003	Gruop Nordico
S/2004 S 12		5 km	?	19 650 000 km	-2,87 anni	2004	Gruop Nordico
Saturn XXXIX	Bestla	7 km	?	19 650 000 km	-2,88 anni	2004	Gruop Nordico
Saturn XXIII	Suttungr	7 km	?	19 666 700 km	-2,8192 anni	2000	Gruop Nordico
Saturn XL	Farbauti	5 km	?	19 800 800 km	-2,95 anni	2004	Gruop Nordico
S/2004 S 7		6 km	?	19 800 000 km	-3,02 anni	2004	Gruop Nordico
Saturn XLIII	Hati	6 km	?	19 950 000 km	-2,96 anni	2004	Gruop Nordico
S/2007 S 3		5 km		20 518 500 km	-3,01 anni	2007	

Saturn XXX	Thrymr	7 km	?	20 810 300 km	-3,07 anni	2000	Gruop Nordico
S/2006 S 3		6 km		21 132 000 km	-3,13 anni	2006	

SATELLITES OF URANUS

Name		Diameter	Weight	Orbital radius	Orbital period	Discovery
Uranus VI	Cordelia	13 ± 2 km	0,8×10 ¹⁸ kg	49 752 km	0,3350338 giorni	1986
Uranus VII	Ofelia	15 ± 8 km	0,8×10 ¹⁸ kg	53 764	0,376400 giorni	1986
Uranus VIII	Bianca	21 ± 4 km	0,8×10 ¹⁸ kg	59 166	0,43457899 giorni	1986
Uranus IX	Cressida	80 ± 4 km	0,343×10 ¹⁸ kg	61 780 km	0,463570 giorni	1986
Uranus X	Desdemona	64 ± 8 km	0,178×10 ¹⁸ kg	62 680 km	0,473650 giorni	1986
Uranus XI	Juliet	94 ± 8 km	0,557×10 ¹⁸ kg	64 350 km	0,493065 giorni	1986
Uranus XII	Porzia	135 ± 8 km	1,68×10 ¹⁸ kg	66 090 km	0,513196 giorni	1986
Uranus XIII	Rosalind	72 ± 12 km	0,254×10 ¹⁸ kg	69 940 km	0,558460 giorni	1986
Uranus XXVII	Cupido	~17,8 km	3,8×10 ¹⁵ kg	74 800 km	0,618 giorni	2003
Uranus XIV	Belinda	81 ± 16 km	0,357×10 ¹⁸ kg	75 260 km	0,623527 giorni	1986
Uranus XXV	Perdita	~26,6 km	13×10 ¹⁵ kg	76 420 km	0,638 giorni	1986
Uranus XV	Puck	162 ± 4 km	2,89 × 10 ¹⁸ kg	86 010 km	0,761833 giorni	1986
Uranus XXVI	Mab	~24,8 km	1,0 × 10 ¹⁶ kg	97 734 km	0,923 giorni	2003
Uranus V	Miranda	471,6 ± 1,4 km	(66 ± 7) × 10 ¹⁸ kg	129 390 km	1,413479 giorni	1948
Uranus I	Ariel	1157,8 ± 1,2 km	(1,35 ± 0,12) × 10 ²¹ kg	191 020 km	2,520379 giorni	1851
Uranus II	Umbriel	1169,4 ± 5,6 km	(1,17 ± 0,13) × 10 ²¹ kg	266 300 km	4,144177 giorni	1851
Uranus III	Titania	1577,8 ± 3,6 km	(3,53 ± 0,09) × 10 ²¹ kg	435 910 km	8,705872 giorni	1787
Uranus IV	Oberon	1522,8 ± 5,2 km	(3,01 ± 0,07) × 10 ²¹ kg	583 520 km	13,463239 giorni	1787
Uranus XXII	Francisco	~12 km	1,3×10 ¹⁵ kg	4 276 000 km	-0,7299 anni	2001
Uranus XVI	Calibano	~98 km	0,73×10 ¹⁸ kg	7 231 000 km	-1,5871 anni	1997
Uranus XX	Stefano	~20 km	6×10 ¹⁵ kg	8 004 000 km	-1,8546 anni	1999
Uranus XXI	Trinculo	~10 km	0,75×10 ¹⁵ kg	8 504 000 km	-2,0780 anni	2001
Uranus XVII	Sicorace	~190 km	5,4×10 ¹⁸ kg	12 179 000 km	-3,5272 anni	1997
Uranus XXIII	Margherita	~11 km	1,3×10 ¹⁵ kg	14 345 000 km	4,6401 anni	2003
Uranus XVIII	Prospero	~30 km	21×10 ¹⁵ kg	16 256 000 km	-5,4136 anni	1999
Uranus XIX	Setebos	~30 km	21×10 ¹⁵ kg	17 418 000 km	-6,1185 anni	1999
Uranus XXIV	Ferdinando	~12 km	1,3×10 ¹⁵ kg	20 901 000 km	-7,7300 anni	2001

SATELLITES OF NEPTUNE

Name		Diameter	Weight	Orbital radius	Orbital period	Discovery
Neptune III	Naiade	58 km	~0,19×10 ¹⁸ kg	48 227 km	0,294 giorni	1989
Neptune IV	Talassa	80 km	~0,37×10 ¹⁸ kg	50 075 km	0,311 giorni	1989
Neptune V	Despina	148 km	~2,10×10 ¹⁸ kg	52 526 km	0,335 giorni	1989
Neptune VI	Galatea	158 km	~3,70×10 ¹⁸ kg	61 593 km	0,429 giorni	1989
Neptune VII	Larissa	208×178 km	~4,90×10 ¹⁸ kg	73 548 km	0,555 giorni	1981
Neptune VIII	Proteo	436×416×402 km	~50×10 ¹⁸ kg	117 647 km	1,122 giorni	1989
Neptune I	Tritone	2700 km	21,4×10 ²¹ kg	354 800 km	-5,877 giorni	1846
Neptune II	Nereide	340 km	~31×10 ¹⁸ kg	5 513 400 km	0,99 anni	1949
Neptune IX	Alimede	60 km	~0,09×10 ¹⁸ kg	15 728 000 km	-5,15 anni	2002
Neptune XI	Sao	38 km	~0,09×10 ¹⁸ kg	22 422 000 km	7,98 anni	2002
Neptune XII	Laomedea	38 km	~0,09×10 ¹⁸ kg	23 571 000 km	8,67 anni	2002
Neptune X	Psamate	28 km	~0,015×10 ¹⁸ kg	46 695 000 km	-24,96 anni	2003
Neptune XIII	Neso	60 km	~0,09×10 ¹⁸ kg	48 387 000 km	-25,67 anni	2002

EXTRATERRESTRIAL EVENTS

In the following charts they are calculated the transits and the eclipses that could observe a hypothetical living being or probe present on the suitable planet.

Mercury

Venus

Mars

Jupiter

Saturn

Uranus

Neptune

Moon

Date	TDT	Dm (°)	Dl	r1	r2	p (°)	e	m1	m2	tm(s)	tw(h)		
2009/01/11	20:02:51	0.29643	1.29832	0.00	6.08	198	10		-1.8	11570	3.2	Earth	Jupiter
2009/01/12	06:11:51	1.09134	1.28975	0.79	0.00	19	16	0.1		6222	2.7	Mercury	Earth
2009/02/08	17:40:32	0.34567	1.28839	0.00	6.06	20	-12		-1.8	11531	3.2	Earth	Jupiter
2009/02/08	09:20:25	0.39365	1.28581	0.00	2.33	19	-17		1.1	11782	3.3	Earth	Mars
2009/02/09	14:39:21	1.06550	1.54624	0.99	0.00	204	-0		-5.4	11657	3.0	Sun	Earth
2009/02/12	21:23:58	1.10394	1.22837	0.48	0.00	206	43	-4.7		5753	3.1	Venus	Earth
2009/03/08	13:11:38	1.01726	1.26994	0.00	5.89	22	-34		-1.9	7275	2.9	Earth	Jupiter
2009/07/07	09:39:42	1.33854	1.40579	1.02	0.00	168	-0		-5.6	5641	3.3	Sun	Earth
2009/08/06	00:40:15	1.22251	1.41067	1.02	0.00	338	-0		-5.4	9171	3.5	Sun	Earth
2009/09/01	18:18:13	0.74491	1.15092	1.34	0.00	339	-32	-3.8		11140	4.2	Venus	Earth
2009/09/06	13:59:02	0.74133	1.18487	0.74	0.00	335	22	0.5		10006	3.6	Mercury	Earth
2009/12/03	10:28:03	0.06472	1.27616	1.30	0.00	184	15	-0.6		13138	3.6	Mercury	Earth
2009/12/31	19:23:43	0.98974	1.56252	0.99	0.00	10	-0		-5.2	12269	3.0	Sun	Earth
2009/12/31	14:44:50	0.83124	1.29228	1.71	0.00	9	-3	-3.9	-7.6	9767	3.2	Venus	Earth

date in the format year/month/day

Dm = least distance between the centers of the bodies

Dl = parameter limit, if Dm < Dl there is an occultation between the bodies

R1 = distance in A.U. of the first body

R2 = distance in A.U. of the second body

P = angle of position between the bodies, in degrees

e = elongation, in degree

m1 = magnitude of the first body

m2 = magnitude of the second body

tm = if present, one of the planets is occulted maximum for x seconds

tw = semiperiod in hours in which the two planets are near less than 1°

EXTRATERRESTRIAL EVENTS

In the following charts they are calculated the phenomena Earth-Moon that could observe a hypothetical living being or probe present on the suitable planet.

Mercury

Date	TT	Dm (°)	Dl	r1	r2	p (°)	e	m1	m2	tm(s)	tw(h)		
2009/01/12	06:18:02	0.00334	0.00394	0.789	0.791	19	-121	-4.0	-0.1	7846	1099.6	Earth	Moon
2009/02/22	21:31:14	0.00239	0.00279	1.114	1.111	22	63	-3.1	0.7	9565	1923.1	Earth	Moon
2009/09/06	14:05:11	0.00264	0.00423	0.735	0.738	335	-117	-4.0	-0.1	12710	1126.0	Earth	Moon
2009/09/18	23:56:24	0.00410	0.00484	0.644	0.641	153	-168	-4.4	-0.7	7488	851.6	Earth	Moon
2009/12/03	10:41:15	0.00013	0.00240	1.294	1.297	184	-37	-2.9	0.9	16694	2034.6	Earth	Moon

Venus

Date	TT	Dm (°)	Dl	r1	r2	p (°)	e	m1	m2	tm(s)	tw(h)		
2009/02/12	21:28:00	0.00591	0.00658	0.474	0.476	206	-110	-4.5	-0.7	7291	739.6	Earth	Moon
2009/02/28	00:04:26	0.00803	0.00833	0.376	0.373	205	-127	-5.2	-1.4	4276	565.3	Earth	Moon
2009/04/22	13:26:18	0.00666	0.00846	0.370	0.367	27	131	-5.2	-1.5	9827	553.7	Earth	Moon
2009/09/01	18:31:51	0.00152	0.00233	1.334	1.337	339	48	-2.5	1.3	14101	2326.4	Earth	Moon
2009/12/31	15:01:42	0.00117	0.00182	1.708	1.710	9	4	-2.4	1.4	12438	2601.6	Earth	Moon

Mars

Date	TT	Dm (°)	Dl	r1	r2	p (°)	e	m1	m2	tm(s)	tw(h)		
2009/01/25	03:07:10	0.00079	0.00131	2.370	2.367	195	9	-1.6	2.2	14192	3951.0	Earth	Moon
2009/02/08	09:41:56	0.00041	0.00133	2.331	2.334	199	12	-1.6	2.2	14969	3448.1	Earth	Moon
2009/09/13	16:35:38	0.00177	0.00204	1.527	1.525	350	39	-1.3	2.5	7813	2279.7	Earth	Moon
2009/09/27	14:38:19	0.00005	0.00216	1.436	1.439	166	39	-1.3	2.5	17635	2381.9	Earth	Moon
2009/10/12	01:04:59	0.00206	0.00233	1.335	1.332	163	40	-1.3	2.5	7463	1990.7	Earth	Moon

Jupiter

Date	TT	Dm (°)	Dl	r1	r2	p (°)	e	m1	m2	tm(s)	tw(h)		
2009/01/11	20:54:59	0.00012	0.00051	6.077	6.079	18	-2	0.4	4.2	14660	8598.4	Earth	Moon
2009/01/26	05:29:29	0.00002	0.00051	6.090	6.087	19	0	0.4	4.2	16845	9644.1	Earth	Moon
2009/02/08	18:32:33	0.00014	0.00051	6.061	6.064	200	2	0.4	4.2	14600	8637.7	Earth	Moon
2009/02/23	01:22:25	0.00030	0.00052	5.990	5.988	21	4	0.6	4.4	13594	9435.3	Earth	Moon
2009/03/08	14:02:03	0.00043	0.00053	5.886	5.889	202	6	0.7	4.6	9186	8514.6	Earth	Moon

Saturn

Uranus

Neptune

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- (2) www.sym454.org
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- (10) <http://www.aerith.net>
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