

Calendario ed Effemeridi del Sole e della Luna (2009)

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RIASSUNTO: Nel presente lavoro vengono forniti i dati riguardanti l'inizio delle Stagioni, le Eclissi per l'anno 2009, le fasi della Luna, il Tempo siderale di Livorno, le congiunzioni della luna e dei pianeti tra loro e con cinque stelle di prima magnitudine ed infine le Effemeridi del Sole. Inoltre è stata aggiunta qualche informazione che potrebbe risultare utile quale la cronologia, le feste mobili dell'anno e le date di inizio e fine dell'ora legale.

Parole chiave: Calendario 2009, Effemeridi 2009, Livorno.

SUMMARY: *Ephemeris are an useful source of information for the astronomers and persons interested in astronomical observations. Even for this year 2009 we publish, the Ephemeris of the Sun, Moon phases, the lunar and solar Eclipses, and many other information such as chronology, date of non-fixed catholic festivities and the start and the end of daylight.*

Key words: *Calendar 2009, Ephemeris 2009, Livorno.*

Introduzione

Pubblichiamo anche per quest'anno 2009 le effemeridi del Sole e della Luna e le date dei principali fenomeni celesti di interesse pubblico.

I calcoli per le effemeridi sono stati svolti con il programma M.I.C.A., sviluppato dalla U.S. Naval Observatory, pubblicato da Willmann-Bell, Inc. Ricordiamo che ogni calcolo ha sempre delle approssimazioni quindi il lettore non dovrà stupirsi se in alcuni casi si troveranno delle lievi differenze (qualche minuto) con altre effemeridi pubblicate.

Cronologia

Al 1° gennaio 2009, ore 12.00 di T.U., corrisponde il Giorno Giuliano 2.454.833 (Manenti, 2006), mentre il 31 dicembre 2009 sarà il numero 2.455.198. L'anno 2009 corrisponde al 6722° anno del Periodo Giuliano (Manenti, 2007).

Feste

Nell'anno 2009 le feste mobili cadono nei giorni indicati in Tab. A.

Inoltre l'inizio dell'ora legale quest'anno sarà domenica 29 marzo (si aggiunge un'ora all'orologio), e la fine dell'ora legale sarà domenica 25 ottobre (si toglie un'ora dall'orologio).

Sacre ceneri	25-feb
1 ^a Quaresima	01-mar
Palme	05-apr
Pasqua	12-apr
Lunedì dell'Angelo	13-apr
Ascensione	24-mag
Pentecoste	31-mag
Corpus domini	14-giu
1 ^a Dom. Avvento	29-nov

Tab. A - Data in cui cadono le feste mobili nel 2009.

Tab. A - Date of non-fixed catholic festivities in 2009.

1. Museo di Storia Naturale del Mediterraneo Via Roma 234 - 57127 Livorno.

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Entrata del Sole nei segni angolari: inizio delle stagioni

Riportiamo nella Tabella seguente la data e il tempo (espresso in T.M.E.C.) dell'inizio delle stagioni.

Data	Tempo	Evento
20/03/2009	11 ^h 44 ^{min}	Primavera
21/06/2009	5 ^h 46 ^{min}	Estate
22/09/2009	21 ^h 19 ^{min}	Autunno
21/12/2009	17 ^h 47 ^{min}	Inverno

Eclissi 2009

Nel 2009 assisteremo a due eclissi di Sole e quattro eclissi di Luna.

1) 26 gennaio 2009. Eclisse anulare di Sole, non visibile dall'Italia

Il massimo dell'eclisse si verificherà verso le 7h 58min T.U. e sarà visibile dall'Oceano Indiano e dalla parte ovest dell'Indonesia:

2) 9 febbraio 2009. Eclisse lunare parziale di penombra, non visibile dall'Italia

Il massimo dell'eclisse si verificherà verso le 14h 38min T.U. e sarà interamente visibile dall'Alaska, le Hawaii, Australia e Asia dell'est:

3) 7 luglio 2009. Eclisse lunare parziale di penombra, non visibile dall'Italia

Il massimo dell'eclisse si verificherà verso le 9h 39min T.U. L'eclisse sarà visibile da buona parte del Canada, ma visto che la magnitudo è bassa (0.156) non sarà visibile a occhio nudo:

4) 22 luglio 2009. Eclisse totale di Sole, non visibile dall'Italia

Il massimo dell'eclisse si verificherà verso le 2h 35min T.U. e sarà visibile dall'India, Cina, parte delle isole del Giappone e dal Sud dell'Oceano Pacifico

5) 6 agosto 2009. Eclisse lunare parziale di penombra, visibile dall'Italia

	UT	Alt	Az
	d h m	°	°
Moon enters penumbra	5 23:01.1	29.7	174.8
Maximum Eclipse	6 00:39.1	27.6	201.0
Moon exits penumbra	6 02:17.3	18.5	224.1
Penumbral Duration:	3h 16.3min		
Penumbral Magnitude:	0.428		

6) 31 dicembre 2009. Eclisse parziale di Luna, visibile dall'Italia

	UT	Alt	Az
	d h m	°	°
Moon enters penumbra	31 17:15.3	15.1	71.6
Moon enters umbra	31 18:51.7	31.5	86.3
Maximum Eclipse	31 19:22.6	36.9	91.4
Moon exits umbra	31 19:53.7	42.3	96.9
Moon exits penumbra	31 21:30.0	58.2	119.6
Penumbral Duration:	4h 14.7min		
Umbral Duration:	1h 02.1min		
Magnitude:	0.082		

Informazioni più dettagliate sulle eclissi si possono trovare alla pagina:

<http://umbra.gsfc.nasa.gov/eclipse/>

Per passare dal tempo espresso in T.U., cioè Tempo Universale, al tempo T.M.E.C basta aggiungere un'ora.

Fasi lunari 2009

In Tabella 2 vengono riportate le fasi della Luna relative al 2009: Luna nuova (New), Primo Quarto (First Quarter), Luna piena (Full) e Ultimo Quarto (Last Quarter).

Tempo siderale e calendario

Riportiamo in questa sezione il calendario e il tempo siderale per Livorno.

In Tabella 3 riportiamo in colonna 1 la data; in colonna 2 il numero del giorno; in colonna 3 la data giuliana (calcolata alle ore 0:00 di T.U.) e in colonna 4 il Tempo Siderale Locale Medio.

Eventi 2009

In Tabella 1 si presentano le coordinate delle principali località della provincia di Livorno.

Riportiamo in Tabella 4 le congiunzioni tra la Luna con i pianeti ed alcune stelle; mentre in Tabella 5 riportiamo le congiunzioni dei pianeti tra loro, e le congiunzioni dei pianeti con alcune stelle fisse. Le congiunzioni astronomiche sono sempre eventi particolarmente interessanti dal punto di vista della fotografia e della ricerca.

Nelle Tabelle viene riportato il pianeta o la stella con cui avviene la congiunzione in colonna 1; la data con l'orario in colonna 2; in colonna 3 l'A.R. a cui avviene la congiunzione e in colonna

Coordinate	Latitudine	Longitudine	Coordinate	Latitudine	Longitudine
Livorno	43°32'30"N	10°17'48"E	Nibbiaia	43°27'54"N	10°25'12"E
Bibbona	43°14'12"N	10°31'48"E	Nugola	43°34'32"N	10°26'27"E
Campiglia M.ma	43°03'25"N	10°37'40"E	Parrana S. Martino	43°32'12"N	10°26'27"E
Capraia	43°02'20"N	09°48'54"E	Pianosa	42°35'18"N	10°05'50"E
Capoliveri	42°44'45"N	10°22'48"E	Piombino	42°55'24"N	10°31'36"E
Castagneto C.ci	43°09'42"N	10°37'36"E	Porto Azzurro	42°45'48"N	10°24'00"E
Cecina	43°18'00"N	10°29'48"E	Portoferraio	42°48'55"N	10°20'03"E
Collesalveti	43°35'36"N	10°29'48"E	Rio Marina	42°48'54"N	10°25'48"E
Gabbro	43°28'54"N	10°20'42"E	Rio nell'Elba	42°48'48"N	10°24'00"E
Gorgona	43°25'47"N	09°53'48"E	Rosignano Solvay	43°23'12"N	10°26'25"E
Guasticce	43°35'38"N	10°24'12"E	S. Ilario in Campo	42°45'47"N	10°12'54"E
Marcianti	42°47'20"N	10°10'06"E	S. Pietro in Campo	42°45'06"N	10°12'48"E
Marcianti Marina	42°47'36"N	10°11'48"E	S. Vincenzo	43°05'49"N	10°32'30"E
Marina di Campo	42°44'30"N	10°14'24"E	Stagno	43°35'54"N	10°21'18"E
Montecristo	42°20'00"N	10°17'42"E	Suvereto	43°04'43"N	10°41'46"E
Montenero	43°29'36"N	10°21'12"E	Valle Benedetta	43°31'24"N	10°24'54"E

Tab. 1 - Da Ciampini e Romeo (1984): Latitudine e Longitudine delle principali località della provincia di Livorno.

Tab. 1 - Latitude e Longitude of the main localities in the province of Livorno.

4 riportiamo la separazione tra i due in decimi di grado.

Effemeridi del Sole

Chiarimenti sulla Tabella 6 che riporta le effemeridi del Sole:

Colonna 1: mese e giorno dell'anno in corso (tra parentesi, in inglese, il giorno della settimana)

Colonna 2, 3 e 4: Il sorgere (rise), culminare (transit) e tramontare (set) del Sole (in ore e minuti) per la città di Livorno espresso in T.U.

Colonna 5 e 6 : inizio e fine del Crepuscolo Astronomico definito quando il Sole raggiunge i 18° sotto l'orizzonte. Dalla fine del crepuscolo astronomico pomeridiano, fino all'inizio del crepuscolo astronomico del mattino, il Sole non contribuisce all'illuminazione del cielo e quindi è teoricamente possibile vedere tutte le stelle fino alla sesta magnitudine.

Colonna 7 e 8: inizio e fine del Crepuscolo Nautico definito quando il Sole raggiunge i 12°

sotto l'orizzonte. Il crepuscolo nautico definisce il momento (tra i 6° e i 12° del Sole sotto l'orizzonte) in cui i naviganti possono rilevare il punto nave perché sono visibili contemporaneamente sia la linea dell'orizzonte e che le stelle più luminose.

Colonna 9 e 10: inizio e fine del Crepuscolo Civile, definito quando il lembo solare raggiunge i 6° sotto l'orizzonte. Prima dell'inizio del crepuscolo civile al mattino, e dopo la sua fine nel pomeriggio, è il tempo in cui deve essere accesa l'illuminazione artificiale per condurre le normali attività all'aperto.

Colonna 11 e 12: Ascensione Retta e Declinazione apparenti geocentriche riferite a 0h di T.U. (Equatore della data).

Colonna 13: distanza in U.A. del pianeta Terra dal Sole.

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Extended abstract

With the aim to give our readers increasingly detailed information, we decided to reprint the same tables of 2007 and 2008 (Ephemeris of the Sun (Tab. 6), the beginning of the seasons (Tab. 2), solar and lunar Eclipse, etc...) with the addition of some more information: the "Calendar", with Julian date, the civil calendar date, the day of the year and the local "Sidereal Time", an important information that is the direct measure of the diurnal rotation of the Earth (Tab. 5). We have also decided to calculate and print same important events 2008 like Lunar conjunctions (between Earth, Moon and Planets) (Tab. 7), planets conjunctions (between a Planet, Earth, and other Planets) (Tab. 8) and conjunctions of Moon and Planets with five bright stars: Aldebaran, Antares, Pollux, Regulus and Spica.

Phase	Date	Time (UT) h m	Phase	Date	Time (UT) h m
First Quarter	2009 Jan 4	11:56	Last Quarter	2009 Jan 18	2:46
Full	2009 Jan 11	3:27	New	2009 Jan 26	7:55
First Quarter	2009 Feb 2	23:13	Last Quarter	2009 Feb 16	21:37
Full	2009 Feb 9	14:49	New	2009 Feb 25	1:35
First Quarter	2009 Mar 4	7:46	Last Quarter	2009 Mar 18	17:47
Full	2009 Mar 11	2:38	New	2009 Mar 26	16:06
First Quarter	2009 Apr 2	14:34	Last Quarter	2009 Apr 17	13:36
Full	2009 Apr 9	14:56	New	2009 Apr 25	3:23
First Quarter	2009 May 1	20:44	New	2009 May 24	12:11
Full	2009 May 9	4:01	First Quarter	2009 May 31	3:22
Last Quarter	2009 May 17	7:26			
Full	2009 Jun 7	18:12	New	2009 Jun 22	19:35
Last Quarter	2009 Jun 15	22:15	First Quarter	2009 Jun 29	11:28
Full	2009 Jul 7	9:21	New	2009 Jul 22	2:35
Last Quarter	2009 Jul 15	9:53	First Quarter	2009 Jul 28	22:00
Full	2009 Aug 6	0:55	New	2009 Aug 20	10:02
Last Quarter	2009 Aug 13	18:55	First Quarter	2009 Aug 27	11:42
Full	2009 Sep 4	16:03	New	2009 Sep 18	18:44
Last Quarter	2009 Sep 12	2:16	First Quarter	2009 Sep 26	4:50
Full	2009 Oct 4	6:10	New	2009 Oct 18	5:33
Last Quarter	2009 Oct 11	8:56	First Quarter	2009 Oct 26	0:42
Full	2009 Nov 2	19:14	New	2009 Nov 16	19:14
Last Quarter	2009 Nov 9	15:56	First Quarter	2009 Nov 24	21:39
Full	2009 Dec 2	7:30	First Quarter	2009 Dec 24	17:36
Last Quarter	2009 Dec 9	0:13	Full	2009 Dec 31	19:13
New	2009 Dec 16	12:02			

Tab. 2: Fasi lunari per l'anno 2009
 Tab. 2: Phases of the moon 2009

Date	Day of the year	Julian date	Mean Local Sidereal Time
	d	d	h m s
Jan 01 (Thu)	1.000000	2454832.50	7 24 21.5878
Jan 02 (Fri)	2.000000	2454833.50	7 28 18.1432
Jan 03 (Sat)	3.000000	2454834.50	7 32 14.6986
Jan 04 (Sun)	4.000000	2454835.50	7 36 11.2539
Jan 05 (Mon)	5.000000	2454836.50	7 40 07.8093
Jan 06 (Tue)	6.000000	2454837.50	7 44 04.3647
Jan 07 (Wed)	7.000000	2454838.50	7 48 00.9200
Jan 08 (Thu)	8.000000	2454839.50	7 51 57.4754
Jan 09 (Fri)	9.000000	2454840.50	7 55 54.0308
Jan 10 (Sat)	10.000000	2454841.50	7 59 50.5861
Jan 11 (Sun)	11.000000	2454842.50	8 03 47.1415
Jan 12 (Mon)	12.000000	2454843.50	8 07 43.6969
Jan 13 (Tue)	13.000000	2454844.50	8 11 40.2523
Jan 14 (Wed)	14.000000	2454845.50	8 15 36.8076
Jan 15 (Thu)	15.000000	2454846.50	8 19 33.3630
Jan 16 (Fri)	16.000000	2454847.50	8 23 29.9184
Jan 17 (Sat)	17.000000	2454848.50	8 27 26.4737
Jan 18 (Sun)	18.000000	2454849.50	8 31 23.0291
Jan 19 (Mon)	19.000000	2454850.50	8 35 19.5845
Jan 20 (Tue)	20.000000	2454851.50	8 39 16.1398
Jan 21 (Wed)	21.000000	2454852.50	8 43 12.6952
Jan 22 (Thu)	22.000000	2454853.50	8 47 09.2506
Jan 23 (Fri)	23.000000	2454854.50	8 51 05.8059
Jan 24 (Sat)	24.000000	2454855.50	8 55 02.3613
Jan 25 (Sun)	25.000000	2454856.50	8 58 58.9167
Jan 26 (Mon)	26.000000	2454857.50	9 02 55.4720
Jan 27 (Tue)	27.000000	2454858.50	9 06 52.0274
Jan 28 (Wed)	28.000000	2454859.50	9 10 48.5828
Jan 29 (Thu)	29.000000	2454860.50	9 14 45.1381
Jan 30 (Fri)	30.000000	2454861.50	9 18 41.6935
Jan 31 (Sat)	31.000000	2454862.50	9 22 38.2489

Date	Day of the year	Julian date	Mean Local Sidereal Time
	d	d	h m s
Feb 01 (Sun)	32.000000	2454863.50	9 26 34.8043
Feb 02 (Mon)	33.000000	2454864.50	9 30 31.3596
Feb 03 (Tue)	34.000000	2454865.50	9 34 27.9150
Feb 04 (Wed)	35.000000	2454866.50	9 38 24.4704
Feb 05 (Thu)	36.000000	2454867.50	9 42 21.0257
Feb 06 (Fri)	37.000000	2454868.50	9 46 17.5811
Feb 07 (Sat)	38.000000	2454869.50	9 50 14.1365
Feb 08 (Sun)	39.000000	2454870.50	9 54 10.6918
Feb 09 (Mon)	40.000000	2454871.50	9 58 07.2472
Feb 10 (Tue)	41.000000	2454872.50	0 02 03.8026
Feb 11 (Wed)	42.000000	2454873.50	0 06 00.3579
Feb 12 (Thu)	43.000000	2454874.50	0 09 56.9133
Feb 13 (Fri)	44.000000	2454875.50	0 13 53.4687
Feb 14 (Sat)	45.000000	2454876.50	0 17 50.0240
Feb 15 (Sun)	46.000000	2454877.50	0 21 46.5794
Feb 16 (Mon)	47.000000	2454878.50	0 25 43.1348
Feb 17 (Tue)	48.000000	2454879.50	0 29 39.6901
Feb 18 (Wed)	49.000000	2454880.50	0 33 36.2455
Feb 19 (Thu)	50.000000	2454881.50	0 37 32.8009
Feb 20 (Fri)	51.000000	2454882.50	0 41 29.3562
Feb 21 (Sat)	52.000000	2454883.50	0 45 25.9116
Feb 22 (Sun)	53.000000	2454884.50	0 49 22.4670
Feb 23 (Mon)	54.000000	2454885.50	0 53 19.0224
Feb 24 (Tue)	55.000000	2454886.50	0 57 15.5777
Feb 25 (Wed)	56.000000	2454887.50	1 01 12.1331
Feb 26 (Thu)	57.000000	2454888.50	1 05 08.6885
Feb 27 (Fri)	58.000000	2454889.50	1 09 05.2438
Feb 28 (Sat)	59.000000	2454890.50	1 13 01.7992

Date	Day of the year	Julian date	Mean Local Sidereal Time
	d	d	h m s
Mar 01 (Sun)	60.000000	2454891.50	1 16 58.3546
Mar 02 (Mon)	61.000000	2454892.50	1 20 54.9099
Mar 03 (Tue)	62.000000	2454893.50	1 24 51.4653
Mar 04 (Wed)	63.000000	2454894.50	1 28 48.0207
Mar 05 (Thu)	64.000000	2454895.50	1 32 44.5760
Mar 06 (Fri)	65.000000	2454896.50	1 36 41.1314
Mar 07 (Sat)	66.000000	2454897.50	1 40 37.6868
Mar 08 (Sun)	67.000000	2454898.50	1 44 34.2421
Mar 09 (Mon)	68.000000	2454899.50	1 48 30.7975
Mar 10 (Tue)	69.000000	2454900.50	1 52 27.3529
Mar 11 (Wed)	70.000000	2454901.50	1 56 23.9082
Mar 12 (Thu)	71.000000	2454902.50	2 00 20.4636
Mar 13 (Fri)	72.000000	2454903.50	2 04 17.0190
Mar 14 (Sat)	73.000000	2454904.50	2 08 13.5744
Mar 15 (Sun)	74.000000	2454905.50	2 12 10.1297
Mar 16 (Mon)	75.000000	2454906.50	2 16 06.6851
Mar 17 (Tue)	76.000000	2454907.50	2 20 03.2405
Mar 18 (Wed)	77.000000	2454908.50	2 23 59.7958
Mar 19 (Thu)	78.000000	2454909.50	2 27 56.3512
Mar 20 (Fri)	79.000000	2454910.50	2 31 52.9066
Mar 21 (Sat)	80.000000	2454911.50	2 35 49.4619
Mar 22 (Sun)	81.000000	2454912.50	2 39 46.0173
Mar 23 (Mon)	82.000000	2454913.50	2 43 42.5727
Mar 24 (Tue)	83.000000	2454914.50	2 47 39.1280
Mar 25 (Wed)	84.000000	2454915.50	2 51 35.6834
Mar 26 (Thu)	85.000000	2454916.50	2 55 32.2388
Mar 27 (Fri)	86.000000	2454917.50	2 59 28.7941
Mar 28 (Sat)	87.000000	2454918.50	3 03 25.3495
Mar 29 (Sun)	88.000000	2454919.50	3 07 21.9049
Mar 30 (Mon)	89.000000	2454920.50	3 11 18.4602
Mar 31 (Tue)	90.000000	2454921.50	3 15 15.0156

Date	Day of the year	Julian date	Mean Local Sidereal Time
	d	d	h m s
Apr 01 (Wed)	91.000000	2454922.50	3 19 11.5710
Apr 02 (Thu)	92.000000	2454923.50	3 23 08.1264
Apr 03 (Fri)	93.000000	2454924.50	3 27 04.6817
Apr 04 (Sat)	94.000000	2454925.50	3 31 01.2371
Apr 05 (Sun)	95.000000	2454926.50	3 34 57.7925
Apr 06 (Mon)	96.000000	2454927.50	3 38 54.3478
Apr 07 (Tue)	97.000000	2454928.50	3 42 50.9032
Apr 08 (Wed)	98.000000	2454929.50	3 46 47.4586
Apr 09 (Thu)	99.000000	2454930.50	3 50 44.0139
Apr 10 (Fri)	100.000000	2454931.50	3 54 40.5693
Apr 11 (Sat)	101.000000	2454932.50	3 58 37.1247
Apr 12 (Sun)	102.000000	2454933.50	4 02 33.6800
Apr 13 (Mon)	103.000000	2454934.50	4 06 30.2354
Apr 14 (Tue)	104.000000	2454935.50	4 10 26.7908
Apr 15 (Wed)	105.000000	2454936.50	4 14 23.3461
Apr 16 (Thu)	106.000000	2454937.50	4 18 19.9015
Apr 17 (Fri)	107.000000	2454938.50	4 22 16.4569
Apr 18 (Sat)	108.000000	2454939.50	4 26 13.0122
Apr 19 (Sun)	109.000000	2454940.50	4 30 09.5676
Apr 20 (Mon)	110.000000	2454941.50	4 34 06.1230
Apr 21 (Tue)	111.000000	2454942.50	4 38 02.6784
Apr 22 (Wed)	112.000000	2454943.50	4 41 59.2337
Apr 23 (Thu)	113.000000	2454944.50	4 45 55.7891
Apr 24 (Fri)	114.000000	2454945.50	4 49 52.3445
Apr 25 (Sat)	115.000000	2454946.50	4 53 48.8998
Apr 26 (Sun)	116.000000	2454947.50	4 57 45.4552
Apr 27 (Mon)	117.000000	2454948.50	5 01 42.0106
Apr 28 (Tue)	118.000000	2454949.50	5 05 38.5659
Apr 29 (Wed)	119.000000	2454950.50	5 09 35.1213
Apr 30 (Thu)	120.000000	2454951.50	5 13 31.6767

Date	Day of the year	Julian date	Mean Local Sidereal Time
	d	d	h m s
May 01 (Fri)	121.000000	2454952.50	5 17 28.2320
May 02 (Sat)	122.000000	2454953.50	5 21 24.7874
May 03 (Sun)	123.000000	2454954.50	5 25 21.3428
May 04 (Mon)	124.000000	2454955.50	5 29 17.8981
May 05 (Tue)	125.000000	2454956.50	5 33 14.4535
May 06 (Wed)	126.000000	2454957.50	5 37 11.0089
May 07 (Thu)	127.000000	2454958.50	5 41 07.5642
May 08 (Fri)	128.000000	2454959.50	5 45 04.1196
May 09 (Sat)	129.000000	2454960.50	5 49 00.6750
May 10 (Sun)	130.000000	2454961.50	5 52 57.2304
May 11 (Mon)	131.000000	2454962.50	5 56 53.7857
May 12 (Tue)	132.000000	2454963.50	6 00 50.3411
May 13 (Wed)	133.000000	2454964.50	6 04 46.8965
May 14 (Thu)	134.000000	2454965.50	6 08 43.4518
May 15 (Fri)	135.000000	2454966.50	6 12 40.0072
May 16 (Sat)	136.000000	2454967.50	6 16 36.5626
May 17 (Sun)	137.000000	2454968.50	6 20 33.1179
May 18 (Mon)	138.000000	2454969.50	6 24 29.6733
May 19 (Tue)	139.000000	2454970.50	6 28 26.2287
May 20 (Wed)	140.000000	2454971.50	6 32 22.7840
May 21 (Thu)	141.000000	2454972.50	6 36 19.3394
May 22 (Fri)	142.000000	2454973.50	6 40 15.8948
May 23 (Sat)	143.000000	2454974.50	6 44 12.4501
May 24 (Sun)	144.000000	2454975.50	6 48 09.0055
May 25 (Mon)	145.000000	2454976.50	6 52 05.5609
May 26 (Tue)	146.000000	2454977.50	6 56 02.1162
May 27 (Wed)	147.000000	2454978.50	6 59 58.6716
May 28 (Thu)	148.000000	2454979.50	7 03 55.2270
May 29 (Fri)	149.000000	2454980.50	7 07 51.7824
May 30 (Sat)	150.000000	2454981.50	7 11 48.3377
May 31 (Sun)	151.000000	2454982.50	7 15 44.8931

Date	Day of the year	Julian date	Mean Local Sidereal Time
	d	d	h m s
Jun 01 (Mon)	152.000000	2454983.50	7 19 41.4485
Jun 02 (Tue)	153.000000	2454984.50	7 23 38.0038
Jun 03 (Wed)	154.000000	2454985.50	7 27 34.5592
Jun 04 (Thu)	155.000000	2454986.50	7 31 31.1146
Jun 05 (Fri)	156.000000	2454987.50	7 35 27.6699
Jun 06 (Sat)	157.000000	2454988.50	7 39 24.2253
Jun 07 (Sun)	158.000000	2454989.50	7 43 20.7807
Jun 08 (Mon)	159.000000	2454990.50	7 47 17.3360
Jun 09 (Tue)	160.000000	2454991.50	7 51 13.8914
Jun 10 (Wed)	161.000000	2454992.50	7 55 10.4468
Jun 11 (Thu)	162.000000	2454993.50	7 59 07.0021
Jun 12 (Fri)	163.000000	2454994.50	8 03 03.5575
Jun 13 (Sat)	164.000000	2454995.50	8 07 00.1129
Jun 14 (Sun)	165.000000	2454996.50	8 10 56.6682
Jun 15 (Mon)	166.000000	2454997.50	8 14 53.2236
Jun 16 (Tue)	167.000000	2454998.50	8 18 49.7790
Jun 17 (Wed)	168.000000	2454999.50	8 22 46.3344
Jun 18 (Thu)	169.000000	2455000.50	8 26 42.8897
Jun 19 (Fri)	170.000000	2455001.50	8 30 39.4451
Jun 20 (Sat)	171.000000	2455002.50	8 34 36.0005
Jun 21 (Sun)	172.000000	2455003.50	8 38 32.5558
Jun 22 (Mon)	173.000000	2455004.50	8 42 29.1112
Jun 23 (Tue)	174.000000	2455005.50	8 46 25.6666
Jun 24 (Wed)	175.000000	2455006.50	8 50 22.2219
Jun 25 (Thu)	176.000000	2455007.50	8 54 18.7773
Jun 26 (Fri)	177.000000	2455008.50	8 58 15.3327
Jun 27 (Sat)	178.000000	2455009.50	9 02 11.8880
Jun 28 (Sun)	179.000000	2455010.50	9 06 08.4434
Jun 29 (Mon)	180.000000	2455011.50	9 10 04.9988
Jun 30 (Tue)	181.000000	2455012.50	9 14 01.5541

Date	Day of the year	Julian date	Mean Local Sidereal Time
	d	d	h m s
Jul 01 (Wed)	182.000000	2455013.50	9 17 58.1095
Jul 02 (Thu)	183.000000	2455014.50	9 21 54.6649
Jul 03 (Fri)	184.000000	2455015.50	9 25 51.2202
Jul 04 (Sat)	185.000000	2455016.50	9 29 47.7756
Jul 05 (Sun)	186.000000	2455017.50	9 33 44.3310
Jul 06 (Mon)	187.000000	2455018.50	9 37 40.8863
Jul 07 (Tue)	188.000000	2455019.50	9 41 37.4417
Jul 08 (Wed)	189.000000	2455020.50	9 45 33.9971
Jul 09 (Thu)	190.000000	2455021.50	9 49 30.5525
Jul 10 (Fri)	191.000000	2455022.50	9 53 27.1078
Jul 11 (Sat)	192.000000	2455023.50	9 57 23.6632
Jul 12 (Sun)	193.000000	2455024.50	0 01 20.2186
Jul 13 (Mon)	194.000000	2455025.50	0 05 16.7739
Jul 14 (Tue)	195.000000	2455026.50	0 09 13.3293
Jul 15 (Wed)	196.000000	2455027.50	0 13 09.8847
Jul 16 (Thu)	197.000000	2455028.50	0 17 06.4400
Jul 17 (Fri)	198.000000	2455029.50	0 21 02.9954
Jul 18 (Sat)	199.000000	2455030.50	0 24 59.5508
Jul 19 (Sun)	200.000000	2455031.50	0 28 56.1061
Jul 20 (Mon)	201.000000	2455032.50	0 32 52.6615
Jul 21 (Tue)	202.000000	2455033.50	0 36 49.2169
Jul 22 (Wed)	203.000000	2455034.50	0 40 45.7722
Jul 23 (Thu)	204.000000	2455035.50	0 44 42.3276
Jul 24 (Fri)	205.000000	2455036.50	0 48 38.8830
Jul 25 (Sat)	206.000000	2455037.50	0 52 35.4383
Jul 26 (Sun)	207.000000	2455038.50	0 56 31.9937
Jul 27 (Mon)	208.000000	2455039.50	1 00 28.5491
Jul 28 (Tue)	209.000000	2455040.50	1 04 25.1045
Jul 29 (Wed)	210.000000	2455041.50	1 08 21.6598
Jul 30 (Thu)	211.000000	2455042.50	1 12 18.2152
Jul 31 (Fri)	212.000000	2455043.50	1 16 14.7706

Date	Day of the year	Julian date	Mean Local Sidereal Time
	d	d	h m s
Aug 01 (Sat)	213.000000	2455044.50	1 20 11.3259
Aug 02 (Sun)	214.000000	2455045.50	1 24 07.8813
Aug 03 (Mon)	215.000000	2455046.50	1 28 04.4367
Aug 04 (Tue)	216.000000	2455047.50	1 32 00.9920
Aug 05 (Wed)	217.000000	2455048.50	1 35 57.5474
Aug 06 (Thu)	218.000000	2455049.50	1 39 54.1028
Aug 07 (Fri)	219.000000	2455050.50	1 43 50.6581
Aug 08 (Sat)	220.000000	2455051.50	1 47 47.2135
Aug 09 (Sun)	221.000000	2455052.50	1 51 43.7689
Aug 10 (Mon)	222.000000	2455053.50	1 55 40.3242
Aug 11 (Tue)	223.000000	2455054.50	1 59 36.8796
Aug 12 (Wed)	224.000000	2455055.50	2 03 33.4350
Aug 13 (Thu)	225.000000	2455056.50	2 07 29.9903
Aug 14 (Fri)	226.000000	2455057.50	2 11 26.5457
Aug 15 (Sat)	227.000000	2455058.50	2 15 23.1011
Aug 16 (Sun)	228.000000	2455059.50	2 19 19.6565
Aug 17 (Mon)	229.000000	2455060.50	2 23 16.2118
Aug 18 (Tue)	230.000000	2455061.50	2 27 12.7672
Aug 19 (Wed)	231.000000	2455062.50	2 31 09.3226
Aug 20 (Thu)	232.000000	2455063.50	2 35 05.8779
Aug 21 (Fri)	233.000000	2455064.50	2 39 02.4333
Aug 22 (Sat)	234.000000	2455065.50	2 42 58.9887
Aug 23 (Sun)	235.000000	2455066.50	2 46 55.5440
Aug 24 (Mon)	236.000000	2455067.50	2 50 52.0994
Aug 25 (Tue)	237.000000	2455068.50	2 54 48.6548
Aug 26 (Wed)	238.000000	2455069.50	2 58 45.2101
Aug 27 (Thu)	239.000000	2455070.50	3 02 41.7655
Aug 28 (Fri)	240.000000	2455071.50	3 06 38.3209
Aug 29 (Sat)	241.000000	2455072.50	3 10 34.8762
Aug 30 (Sun)	242.000000	2455073.50	3 14 31.4316
Aug 31 (Mon)	243.000000	2455074.50	3 18 27.9870

Date	Day of the year	Julian date	Mean Local Sidereal Time
	d	d	h m s
Sep 01 (Tue)	244.000000	2455075.50	3 22 24.5423
Sep 02 (Wed)	245.000000	2455076.50	3 26 21.0977
Sep 03 (Thu)	246.000000	2455077.50	3 30 17.6531
Sep 04 (Fri)	247.000000	2455078.50	3 34 14.2085
Sep 05 (Sat)	248.000000	2455079.50	3 38 10.7638
Sep 06 (Sun)	249.000000	2455080.50	3 42 07.3192
Sep 07 (Mon)	250.000000	2455081.50	3 46 03.8746
Sep 08 (Tue)	251.000000	2455082.50	3 50 00.4299
Sep 09 (Wed)	252.000000	2455083.50	3 53 56.9853
Sep 10 (Thu)	253.000000	2455084.50	3 57 53.5407
Sep 11 (Fri)	254.000000	2455085.50	0 01 50.0960
Sep 12 (Sat)	255.000000	2455086.50	0 05 46.6514
Sep 13 (Sun)	256.000000	2455087.50	0 09 43.2068
Sep 14 (Mon)	257.000000	2455088.50	0 13 39.7621
Sep 15 (Tue)	258.000000	2455089.50	0 17 36.3175
Sep 16 (Wed)	259.000000	2455090.50	0 21 32.8729
Sep 17 (Thu)	260.000000	2455091.50	0 25 29.4282
Sep 18 (Fri)	261.000000	2455092.50	0 29 25.9836
Sep 19 (Sat)	262.000000	2455093.50	0 33 22.5390
Sep 20 (Sun)	263.000000	2455094.50	0 37 19.0943
Sep 21 (Mon)	264.000000	2455095.50	0 41 15.6497
Sep 22 (Tue)	265.000000	2455096.50	0 45 12.2051
Sep 23 (Wed)	266.000000	2455097.50	0 49 08.7605
Sep 24 (Thu)	267.000000	2455098.50	0 53 05.3158
Sep 25 (Fri)	268.000000	2455099.50	0 57 01.8712
Sep 26 (Sat)	269.000000	2455100.50	1 00 58.4266
Sep 27 (Sun)	270.000000	2455101.50	1 04 54.9819
Sep 28 (Mon)	271.000000	2455102.50	1 08 51.5373
Sep 29 (Tue)	272.000000	2455103.50	1 12 48.0927
Sep 30 (Wed)	273.000000	2455104.50	1 16 44.6480

Date	Day of the year	Julian date	Mean Local Sidereal Time
	d	d	h m s
Oct 01 (Thu)	274.000000	2455105.50	1 20 41.2034
Oct 02 (Fri)	275.000000	2455106.50	1 24 37.7588
Oct 03 (Sat)	276.000000	2455107.50	1 28 34.3141
Oct 04 (Sun)	277.000000	2455108.50	1 32 30.8695
Oct 05 (Mon)	278.000000	2455109.50	1 36 27.4249
Oct 06 (Tue)	279.000000	2455110.50	1 40 23.9802
Oct 07 (Wed)	280.000000	2455111.50	1 44 20.5356
Oct 08 (Thu)	281.000000	2455112.50	1 48 17.0910
Oct 09 (Fri)	282.000000	2455113.50	1 52 13.6463
Oct 10 (Sat)	283.000000	2455114.50	1 56 10.2017
Oct 11 (Sun)	284.000000	2455115.50	2 00 06.7571
Oct 12 (Mon)	285.000000	2455116.50	2 04 03.3125
Oct 13 (Tue)	286.000000	2455117.50	2 07 59.8678
Oct 14 (Wed)	287.000000	2455118.50	2 11 56.4232
Oct 15 (Thu)	288.000000	2455119.50	2 15 52.9786
Oct 16 (Fri)	289.000000	2455120.50	2 19 49.5339
Oct 17 (Sat)	290.000000	2455121.50	2 23 46.0893
Oct 18 (Sun)	291.000000	2455122.50	2 27 42.6447
Oct 19 (Mon)	292.000000	2455123.50	2 31 39.2000
Oct 20 (Tue)	293.000000	2455124.50	2 35 35.7554
Oct 21 (Wed)	294.000000	2455125.50	2 39 32.3108
Oct 22 (Thu)	295.000000	2455126.50	2 43 28.8661
Oct 23 (Fri)	296.000000	2455127.50	2 47 25.4215
Oct 24 (Sat)	297.000000	2455128.50	2 51 21.9769
Oct 25 (Sun)	298.000000	2455129.50	2 55 18.5322
Oct 26 (Mon)	299.000000	2455130.50	2 59 15.0876
Oct 27 (Tue)	300.000000	2455131.50	3 03 11.6430
Oct 28 (Wed)	301.000000	2455132.50	3 07 08.1983
Oct 29 (Thu)	302.000000	2455133.50	3 11 04.7537
Oct 30 (Fri)	303.000000	2455134.50	3 15 01.3091
Oct 31 (Sat)	304.000000	2455135.50	3 18 57.8645

Date	Day of the year	Julian date	Mean Local Sidereal Time
	d	d	h m s
Nov 01 (Sun)	305.000000	2455136.50	3 22 54.4198
Nov 02 (Mon)	306.000000	2455137.50	3 26 50.9752
Nov 03 (Tue)	307.000000	2455138.50	3 30 47.5306
Nov 04 (Wed)	308.000000	2455139.50	3 34 44.0859
Nov 05 (Thu)	309.000000	2455140.50	3 38 40.6413
Nov 06 (Fri)	310.000000	2455141.50	3 42 37.1967
Nov 07 (Sat)	311.000000	2455142.50	3 46 33.7520
Nov 08 (Sun)	312.000000	2455143.50	3 50 30.3074
Nov 09 (Mon)	313.000000	2455144.50	3 54 26.8628
Nov 10 (Tue)	314.000000	2455145.50	3 58 23.4181
Nov 11 (Wed)	315.000000	2455146.50	4 02 19.9735
Nov 12 (Thu)	316.000000	2455147.50	4 06 16.5289
Nov 13 (Fri)	317.000000	2455148.50	4 10 13.0842
Nov 14 (Sat)	318.000000	2455149.50	4 14 09.6396
Nov 15 (Sun)	319.000000	2455150.50	4 18 06.1950
Nov 16 (Mon)	320.000000	2455151.50	4 22 02.7503
Nov 17 (Tue)	321.000000	2455152.50	4 25 59.3057
Nov 18 (Wed)	322.000000	2455153.50	4 29 55.8611
Nov 19 (Thu)	323.000000	2455154.50	4 33 52.4165
Nov 20 (Fri)	324.000000	2455155.50	4 37 48.9718
Nov 21 (Sat)	325.000000	2455156.50	4 41 45.5272
Nov 22 (Sun)	326.000000	2455157.50	4 45 42.0826
Nov 23 (Mon)	327.000000	2455158.50	4 49 38.6379
Nov 24 (Tue)	328.000000	2455159.50	4 53 35.1933
Nov 25 (Wed)	329.000000	2455160.50	4 57 31.7487
Nov 26 (Thu)	330.000000	2455161.50	5 01 28.3040
Nov 27 (Fri)	331.000000	2455162.50	5 05 24.8594
Nov 28 (Sat)	332.000000	2455163.50	5 09 21.4148
Nov 29 (Sun)	333.000000	2455164.50	5 13 17.9701
Nov 30 (Mon)	334.000000	2455165.50	5 17 14.5255

Date	Day of the year	Julian date	Mean Local Sidereal Time
	d	d	h m s
Dec 01 (Tue)	335.000000	2455166.50	5 21 11.0809
Dec 02 (Wed)	336.000000	2455167.50	5 25 07.6362
Dec 03 (Thu)	337.000000	2455168.50	5 29 04.1916
Dec 04 (Fri)	338.000000	2455169.50	5 33 00.7470
Dec 05 (Sat)	339.000000	2455170.50	5 36 57.3023
Dec 06 (Sun)	340.000000	2455171.50	5 40 53.8577
Dec 07 (Mon)	341.000000	2455172.50	5 44 50.4131
Dec 08 (Tue)	342.000000	2455173.50	5 48 46.9685
Dec 09 (Wed)	343.000000	2455174.50	5 52 43.5238
Dec 10 (Thu)	344.000000	2455175.50	5 56 40.0792
Dec 11 (Fri)	345.000000	2455176.50	6 00 36.6346
Dec 12 (Sat)	346.000000	2455177.50	6 04 33.1899
Dec 13 (Sun)	347.000000	2455178.50	6 08 29.7453
Dec 14 (Mon)	348.000000	2455179.50	6 12 26.3007
Dec 15 (Tue)	349.000000	2455180.50	6 16 22.8560
Dec 16 (Wed)	350.000000	2455181.50	6 20 19.4114
Dec 17 (Thu)	351.000000	2455182.50	6 24 15.9668
Dec 18 (Fri)	352.000000	2455183.50	6 28 12.5221
Dec 19 (Sat)	353.000000	2455184.50	6 32 09.0775
Dec 20 (Sun)	354.000000	2455185.50	6 36 05.6329
Dec 21 (Mon)	355.000000	2455186.50	6 40 02.1882
Dec 22 (Tue)	356.000000	2455187.50	6 43 58.7436
Dec 23 (Wed)	357.000000	2455188.50	6 47 55.2990
Dec 24 (Thu)	358.000000	2455189.50	6 51 51.8543
Dec 25 (Fri)	359.000000	2455190.50	6 55 48.4097
Dec 26 (Sat)	360.000000	2455191.50	6 59 44.9651
Dec 27 (Sun)	361.000000	2455192.50	7 03 41.5205
Dec 28 (Mon)	362.000000	2455193.50	7 07 38.0758
Dec 29 (Tue)	363.000000	2455194.50	7 11 34.6312
Dec 30 (Wed)	364.000000	2455195.50	7 15 31.1866
Dec 31 (Thu)	365.000000	2455196.50	7 19 27.7419

Tab. 3: Calendario e Tempo Siderale per la città di Livorno

Tab. 3: Calendar and Sidereal Time for Livorno

Congiunzioni della Luna

Object	Date		Right Ascension	Separation
	d	h m	h m s	°
Uranus	Jan 2	17:08	23 21 48	4.61 South
Aldebaran	Jan 8	12:34	4 36 28	10.03 South
Pollux	Jan 11	8:38	7 45 55	5.41 North
Regulus	Jan 13	20:00	10 08 53	2.57 North
Saturn	Jan 15	11:57	11 32 22	6.36 North
Spica	Jan 17	21:09	13 25 41	3.31 North
Antares	Jan 21	13:27	16 29 58	0.02 South
Pluto	Jan 23	10:10	18 08 30	8.90 North
Mercury	Jan 25	7:29	19 45 51	4.98 North
Mars	Jan 25	2:20	19 35 04	0.72 North
Jupiter	Jan 26	4:37	20 29 10	0.03 South
Neptune	Jan 27	18:22	21 43 11	1.80 South
Uranus	Jan 30	0:47	23 25 41	4.73 South
Venus	Jan 30	11:39	23 46 16	2.81 South
Aldebaran	Feb 4	21:20	4 36 28	10.06 South
Pollux	Feb 7	19:32	7 45 55	5.40 North
Regulus	Feb 10	7:05	10 08 54	2.58 North
Saturn	Feb 11	20:00	11 27 42	6.37 North
Spica	Feb 14	5:54	13 25 42	3.29 North
Antares	Feb 17	20:40	16 29 59	0.04 South
Pluto	Feb 19	18:44	18 11 40	8.84 North
Mercury	Feb 22	22:12	20 50 06	1.07 South
Mars	Feb 23	7:50	21 09 11	1.67 South
Jupiter	Feb 23	1:02	20 55 44	0.73 South
Neptune	Feb 24	3:22	21 47 12	1.90 South
Uranus	Feb 26	9:41	23 30 56	4.78 South
Venus	Feb 27	23:01	0 44 19	1.28 North
Aldebaran	Mar 4	3:26	4 36 28	9.96 South
Pollux	Mar 7	3:56	7 45 55	5.47 North
Regulus	Mar 9	17:02	10 08 54	2.58 North
Saturn	Mar 11	2:36	11 20 10	6.22 North
Spica	Mar 13	15:31	13 25 43	3.18 North

Object	Date		Right Ascension	Separation
	d	h m	h m s	°
Antares	Mar 17	4:49	16 29 60	0.20 South
Pluto	Mar 19	3:27	18 13 29	8.68 North
Jupiter	Mar 22	21:27	21 19 50	1.50 South
Neptune	Mar 23	13:30	21 50 57	2.07 South
Mars	Mar 24	14:06	22 38 09	4.09 South
Uranus	Mar 25	20:26	23 36 40	4.88 South
Mercury	Mar 26	12:00	0 07 24	6.40 South
Venus	Mar 26	16:19	0 16 03	4.27 North
Aldebaran	Mar 31	8:48	4 36 27	9.76 South
Pollux	Apr 3	9:55	7 45 54	5.67 North
Regulus	Apr 6	0:36	10 08 54	2.70 North
Saturn	Apr 7	7:19	11 12 47	6.11 North
Spica	Apr 10	0:27	13 25 43	3.09 North
Antares	Apr 13	13:13	16 30 01	0.41 South
Pluto	Apr 15	11:39	18 13 39	8.48 North
Jupiter	Apr 19	16:22	21 39 32	2.29 South
Neptune	Apr 19	23:50	21 53 46	2.37 South
Venus	Apr 22	14:16	23 53 42	1.07 South
Uranus	Apr 22	8:21	23 42 01	5.09 South
Mars	Apr 22	18:39	0 02 25	5.86 South
Mercury	Apr 26	16:30	3 35 18	1.93 South
Aldebaran	Apr 27	15:40	4 36 27	9.57 South
Pollux	Apr 30	15:27	7 45 54	5.93 North
Regulus	May 3	6:22	10 08 53	2.94 North
Saturn	May 4	11:22	11 08 23	6.16 North
Spica	May 7	7:47	13 25 43	3.13 North
Antares	May 10	20:59	16 30 01	0.55 South
Pluto	May 12	18:43	18 12 17	8.31 North
Jupiter	May 17	7:49	21 52 54	3.00 South
Neptune	May 17	9:04	21 55 14	2.69 South
Uranus	May 19	19:54	23 46 10	5.39 South
Venus	May 21	8:15	0 59 33	6.74 South

Congiunzioni della Luna

Object	Date		Right Ascension	Separation
	d	h m	h m s	°
Mars	May 21	19:49	1 24 30	6.53 South
Mercury	May 24	0:34	3 31 18	7.29 South
Aldebaran	May 25	0:49	4 36 27	9.49 South
Pollux	May 27	22:36	7 45 53	6.15 North
Regulus	May 30	12:10	10 08 53	3.20 North
Saturn	May 31	16:59	11 08 26	6.32 North
Spica	Jun 3	13:42	13 25 43	3.28 North
Antares	Jun 7	3:42	16 30 02	0.57 South
Pluto	Jun 9	0:27	18 09 49	8.25 North
Jupiter	Jun 13	17:57	21 58 06	3.47 South
Neptune	Jun 13	16:21	21 55 09	2.91 South
Uranus	Jun 16	5:33	23 48 28	5.65 South
Venus	Jun 19	17:24	2 47 01	8.14 South
Mars	Jun 19	17:20	2 46 52	6.10 South
Mercury	Jun 21	8:39	4 29 11	6.56 South
Aldebaran	Jun 21	11:18	4 36 28	9.52 South
Pollux	Jun 24	7:59	7 45 53	6.24 North
Regulus	Jun 26	19:42	10 08 53	3.37 North
Saturn	Jun 28	1:58	11 13 06	6.51 North
Spica	Jun 30	19:24	13 25 43	3.42 North
Antares	Jul 4	9:38	16 30 02	0.52 South
Pluto	Jul 6	5:16	18 06 55	8.27 North
Jupiter	Jul 10	22:08	21 54 18	3.59 South
Neptune	Jul 10	21:46	21 53 38	2.98 South
Uranus	Jul 13	12:29	23 48 37	5.78 South
Mars	Jul 18	11:39	4 10 19	4.89 South
Aldebaran	Jul 18	21:28	4 36 28	9.56 South
Venus	Jul 19	5:14	4 57 32	5.95 South
Pollux	Jul 21	18:42	7 45 54	6.25 North
Mercury	Jul 22	20:23	8 51 27	2.86 North
Regulus	Jul 24	5:16	10 08 53	3.41 North
Saturn	Jul 25	14:38	11 21 36	6.66 North

Object	Date		Right Ascension	Separation
	d	h m	h m s	°
Spica	Jul 28	2:14	13 25 43	3.47 North
Antares	Jul 31	15:35	16 30 02	0.49 South
Pluto	Aug 2	10:09	18 04 24	8.24 North
Jupiter	Aug 6	22:00	21 43 08	3.40 South
Neptune	Aug 7	2:17	21 51 07	2.91 South
Uranus	Aug 9	17:09	23 46 42	5.74 South
Aldebaran	Aug 15	5:50	4 36 29	9.52 South
Mars	Aug 16	3:11	5 33 03	3.17 South
Venus	Aug 17	20:45	7 24 16	1.73 South
Pollux	Aug 18	5:03	7 45 54	6.27 North
Regulus	Aug 20	15:52	10 08 53	3.39 North
Saturn	Aug 22	5:52	11 32 46	6.77 North
Mercury	Aug 22	11:37	11 45 07	2.86 North
Spica	Aug 24	10:45	13 25 42	3.38 North
Antares	Aug 27	22:25	16 30 01	0.58 South
Pluto	Aug 29	16:05	18 02 56	8.08 North
Jupiter	Sep 2	21:22	21 29 47	3.11 South
Neptune	Sep 3	7:12	21 48 17	2.84 South
Uranus	Sep 5	21:09	23 43 16	5.62 South
Aldebaran	Sep 11	12:02	4 36 30	9.36 South
Mars	Sep 13	16:00	6 51 07	1.12 South
Pollux	Sep 14	13:31	7 45 55	6.39 North
Venus	Sep 16	18:11	9 51 37	3.34 North
Regulus	Sep 17	1:50	10 08 53	3.42 North
Saturn	Sep 18	21:54	11 45 17	6.91 North
Mercury	Sep 19	0:41	11 51 15	1.19 North
Spica	Sep 20	20:25	13 25 42	3.25 North
Antares	Sep 24	6:26	16 30 01	0.78 South
Pluto	Sep 25	23:40	18 02 59	7.75 North
Jupiter	Sep 30	0:16	21 20 58	3.01 South
Neptune	Sep 30	13:29	21 45 55	2.90 South
Uranus	Oct 3	2:13	23 39 19	5.55 South

Congiunzioni della Luna

Object	Date		Right Ascension		Separation "
	d	h m	h m s		
Aldebaran	Oct 8	17:22	4 36 31		9.14 South
Pollux	Oct 11	19:45	7 45 56		6.62 North
Mars	Oct 12	1:27	7 59 48		1.16 North
Regulus	Oct 14	9:49	10 08 54		3.57 North
Saturn	Oct 16	12:48	11 57 44		7.15 North
Venus	Oct 16	18:58	12 10 48		6.75 North
Mercury	Oct 17	11:03	12 45 03		7.41 North
Spica	Oct 18	5:52	13 25 42		3.17 North
Antares	Oct 21	15:14	16 30 00		1.00 South
Pluto	Oct 23	8:44	18 04 39		7.35 North
Jupiter	Oct 27	8:39	21 21 06		3.21 South
Neptune	Oct 27	21:14	21 44 42		3.11 South
Uranus	Oct 30	9:11	23 36 02		5.64 South
Aldebaran	Nov 4	23:57	4 36 31		8.97 South
Pollux	Nov 8	1:13	7 45 57		6.89 North
Mars	Nov 9	6:01	8 54 16		3.46 North
Regulus	Nov 10	15:46	10 08 54		3.83 North
Saturn	Nov 13	1:09	12 08 41		7.50 North
Spica	Nov 14	13:47	13 25 43		3.24 North
Venus	Nov 15	19:43	14 31 07		6.36 North
Mercury	Nov 17	10:35	15 59 35		2.84 North
Antares	Nov 17	23:44	16 30 00		1.12 South
Pluto	Nov 19	18:26	18 07 42		7.00 North
Jupiter	Nov 23	22:08	21 30 43		3.66 South
Neptune	Nov 24	5:52	21 45 02		3.39 South
Uranus	Nov 26	17:36	23 34 28		5.83 South
Aldebaran	Dec 2	9:05	4 36 32		8.92 South
Pollux	Dec 5	8:17	7 45 58		7.07 North
Mars	Dec 7	2:46	9 27 33		5.50 North
Regulus	Dec 7	21:28	10 08 55		4.06 North
Saturn	Dec 10	10:40	12 16 44		7.87 North
Spica	Dec 11	19:51	13 25 43		3.38 North

Object	Date		Right Ascension		Separation "
	d	h m	h m s		
Antares	Dec 15	7:01	16 30 01		1.12 South
Venus	Dec 15	22:54	17 06 25		3.09 North
Pluto	Dec 17	3:44	18 11 38		6.79 North
Mercury	Dec 18	8:15	19 13 38		1.39 South
Jupiter	Dec 21	15:02	21 47 52		4.18 South
Neptune	Dec 21	14:33	21 46 59		3.60 South
Uranus	Dec 24	2:25	23 35 10		5.99 South
Aldebaran	Dec 29	20:02	4 36 32		8.95 South

Tab. 4 - Congiunzioni della Luna con i pianeti e con alcune stelle di prima magnitudine (Aldebaran, Antares, Pollux, Regulus, Spica).
 Tab. 4 - Conjunctions between moon and planets, Aldebaran, Antares, Pollux, Regulus and Spica.

Congiunzioni di Mercurio

Object	Date	Right Ascension	Separation
	d h	h m s	°
Jupiter	Jan 18 06	20 21 25	3.26 South of Mercury
Mars	Jan 26 18	19 40 33	4.42 South of Mercury
Jupiter	Feb 24 03	20 56 44	0.62 North of Mercury
Mars	Mar 1 20	21 29 30	0.61 North of Mercury
Neptune	Mar 5 00	21 48 29	1.65 North of Mercury
Uranus	Mar 21 21	23 35 51	1.40 North of Mercury
Venus	Mar 27 11	0 14 18	10.62 North of Mercury
Aldebaran	Jun 22 14	4 36 28	3.29 South of Mercury
Pollux	Jul 15 06	7 45 54	5.18 North of Mercury
Regulus	Aug 2 19	10 08 53	0.65 South of Mercury
Saturn	Aug 18 21	11 31 19	3.45 North of Mercury
Saturn	Sep 20 12	11 46 01	5.39 North of Mercury
Saturn	Oct 8 09	11 54 08	0.32 North of Mercury
Spica	Oct 24 00	13 25 42	3.82 South of Mercury
Antares	Nov 22 02	16 30 00	3.07 South of Mercury
Pluto	Dec 7 06	18 10 09	7.49 North of Mercury

Congiunzioni di Venere

Object	Date	Right Ascension	Separation
	d h	h m s	°
Uranus	Jan 23 15	23 24 38	1.41 South of Venus
Mars	Apr 18 16	23 50 46	5.61 South of Venus
Mars	Jun 19 14	2 46 29	2.03 North of Venus
Aldebaran	Jul 14 17	4 36 28	3.12 South of Venus
Pollux	Aug 22 03	7 45 54	7.29 North of Venus
Regulus	Sep 20 09	10 08 53	0.48 South of Venus
Saturn	Oct 13 15	11 56 28	0.56 North of Venus
Spica	Nov 2 01	13 25 42	3.82 South of Venus
Antares	Dec 9 04	16 30 01	5.10 South of Venus
Pluto	Dec 28 04	18 13 18	5.39 North of Venus

Congiunzioni di Marte

Object	Date	Right Ascension	Separation
	d h	h m s	°
Jupiter	Feb 17 09	20 50 30	0.58 North of Mars
Neptune	Mar 8 04	21 48 55	0.81 North of Mars
Uranus	Apr 15 03	23 40 43	0.47 North of Mars
Aldebaran	Jul 27 11	4 36 29	5.17 South of Mars
Pollux	Oct 5 22	7 45 56	5.91 North of Mars

Congiunzioni di Giove

Object	Date	Right Ascension	Separation
	d h	h m s	°
Neptune	May 25 12	21 55 22	0.41 North of Jupiter
Neptune	Jul 13 19	21 53 24	0.61 North of Jupiter
Neptune	Dec 20 04	21 46 51	0.56 North of Jupiter

Tab. 5 - Congiunzioni dei pianeti tra loro e con alcune stelle di prima magnitudine (Aldebaran, Antares, Pollux, Regulus, Spica).

Tab. 5 - Conjunctions between planets, and of each planets with Aldebaran, Antares, Pollux, Regulus, Spica.

GENNAIO

Date	Rise h m	Transit h m	Set h m	Twilight						A.R. h m	Decl. ° ' "	Dist. AU
				Astronomical		Nautical		Civil				
				Begin h m	End h m	Begin h m	End h m	Begin h m	End h m			
Jan 01 (Thu)	06:52	11:22	15:53	05:09	17:36	05:43	17:02	06:19	16:26	18:46	-23 00	0.983344587
Jan 02 (Fri)	06:52	11:23	15:54	05:09	17:37	05:43	17:02	06:19	16:26	18:50	-22 55	0.983329709
Jan 03 (Sat)	06:52	11:23	15:55	05:09	17:38	05:44	17:03	06:20	16:27	18:55	-22 49	0.983319295
Jan 04 (Sun)	06:52	11:24	15:56	05:09	17:39	05:44	17:04	06:20	16:28	18:59	-22 43	0.983313578
Jan 05 (Mon)	06:52	11:24	15:57	05:09	17:40	05:44	17:05	06:19	16:29	19:04	-22 37	0.983312823
Jan 06 (Tue)	06:52	11:25	15:58	05:09	17:41	05:44	17:06	06:19	16:30	19:08	-22 30	0.983317332
Jan 07 (Wed)	06:52	11:25	15:59	05:09	17:42	05:44	17:07	06:19	16:31	19:12	-22 22	0.983327425
Jan 08 (Thu)	06:51	11:26	16:00	05:09	17:42	05:43	17:08	06:19	16:32	19:17	-22 15	0.983343432
Jan 09 (Fri)	06:51	11:26	16:01	05:09	17:43	05:43	17:09	06:19	16:33	19:21	-22 06	0.983365658
Jan 10 (Sat)	06:51	11:26	16:02	05:09	17:44	05:43	17:10	06:19	16:34	19:26	-21 58	0.983394359
Jan 11 (Sun)	06:51	11:27	16:03	05:08	17:45	05:43	17:11	06:19	16:35	19:30	-21 49	0.983429899
Jan 12 (Mon)	06:50	11:27	16:04	05:08	17:46	05:43	17:12	06:18	16:36	19:34	-21 39	0.983471732
Jan 13 (Tue)	06:50	11:28	16:06	05:08	17:47	05:42	17:13	06:18	16:37	19:39	-21 29	0.983520389
Jan 14 (Wed)	06:49	11:28	16:07	05:08	17:48	05:42	17:14	06:17	16:39	19:43	-21 19	0.983575495
Jan 15 (Thu)	06:49	11:28	16:08	05:07	17:49	05:42	17:15	06:17	16:40	19:47	-21 08	0.983636798
Jan 16 (Fri)	06:48	11:29	16:09	05:07	17:50	05:41	17:16	06:17	16:41	19:51	-20 57	0.983703995
Jan 17 (Sat)	06:48	11:29	16:10	05:07	17:52	05:41	17:17	06:16	16:42	19:56	-20 45	0.983776770
Jan 18 (Sun)	06:47	11:29	16:12	05:06	17:53	05:40	17:18	06:16	16:43	20:00	-20 33	0.983854807
Jan 19 (Mon)	06:47	11:30	16:13	05:06	17:54	05:40	17:19	06:15	16:44	20:04	-20 21	0.983937809
Jan 20 (Tue)	06:46	11:30	16:14	05:05	17:55	05:39	17:21	06:14	16:46	20:08	-20 08	0.984025497
Jan 21 (Wed)	06:45	11:30	16:15	05:05	17:56	05:39	17:22	06:14	16:47	20:13	-19 55	0.984117618
Jan 22 (Thu)	06:44	11:30	16:17	05:04	17:57	05:38	17:23	06:13	16:48	20:17	-19 41	0.984213941
Jan 23 (Fri)	06:44	11:31	16:18	05:04	17:58	05:38	17:24	06:12	16:49	20:21	-19 27	0.984314260
Jan 24 (Sat)	06:43	11:31	16:19	05:03	17:59	05:37	17:25	06:12	16:50	20:25	-19 13	0.984418394
Jan 25 (Sun)	06:42	11:31	16:21	05:02	18:00	05:36	17:26	06:11	16:52	20:29	-18 58	0.984526190
Jan 26 (Mon)	06:41	11:31	16:22	05:02	18:01	05:36	17:28	06:10	16:53	20:34	-18 44	0.984637525
Jan 27 (Tue)	06:40	11:32	16:23	05:01	18:03	05:35	17:29	06:09	16:54	20:38	-18 28	0.984752314
Jan 28 (Wed)	06:39	11:32	16:25	05:00	18:04	05:34	17:30	06:08	16:55	20:42	-18 13	0.984870511
Jan 29 (Thu)	06:38	11:32	16:26	04:59	18:05	05:33	17:31	06:08	16:57	20:46	-17 57	0.984992111
Jan 30 (Fri)	06:37	11:32	16:27	04:59	18:06	05:32	17:32	06:07	16:58	20:50	-17 40	0.985117161
Jan 31 (Sat)	06:36	11:32	16:29	04:58	18:07	05:31	17:34	06:06	16:59	20:54	-17 24	0.985245753

Tab. 6: Effemeridi del Sole per l'anno 2009

Tab. 6: *Sun Ephemeris 2009*

FEBBRAIO

Twilight												
Date	Rise	Transit	Set	Astronomical		Nautical		Civil		A.R.	Decl.	Dist.
				Begin	End	Begin	End	Begin	End			
	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	°	AU
Feb 01 (Sun)	06:35	11:32	16:30	04:57	18:08	05:30	17:35	06:05	17:01	20:58	- 17 07	0.985378025
Feb 02 (Mon)	06:34	11:32	16:32	04:56	18:10	05:29	17:36	06:04	17:02	21:02	- 16 50	0.985514166
Feb 03 (Tue)	06:33	11:33	16:33	04:55	18:11	05:28	17:37	06:03	17:03	21:07	- 16 32	0.985654405
Feb 04 (Wed)	06:32	11:33	16:34	04:54	18:12	05:27	17:39	06:02	17:04	21:11	- 16 14	0.985799005
Feb 05 (Thu)	06:30	11:33	16:36	04:53	18:13	05:26	17:40	06:00	17:06	21:15	- 15 56	0.985948254
Feb 06 (Fri)	06:29	11:33	16:37	04:52	18:14	05:25	17:41	05:59	17:07	21:19	- 15 38	0.986102445
Feb 07 (Sat)	06:28	11:33	16:38	04:51	18:16	05:24	17:42	05:58	17:08	21:23	- 15 19	0.986261849
Feb 08 (Sun)	06:27	11:33	16:40	04:50	18:17	05:23	17:43	05:57	17:10	21:27	- 15 01	0.986426684
Feb 09 (Mon)	06:25	11:33	16:41	04:49	18:18	05:22	17:45	05:56	17:11	21:31	- 14 41	0.986597090
Feb 10 (Tue)	06:24	11:33	16:42	04:47	18:19	05:21	17:46	05:54	17:12	21:35	- 14 22	0.986773102
Feb 11 (Wed)	06:23	11:33	16:44	04:46	18:20	05:19	17:47	05:53	17:13	21:38	- 14 03	0.986954647
Feb 12 (Thu)	06:21	11:33	16:45	04:45	18:22	05:18	17:48	05:52	17:15	21:42	- 13 43	0.987141556
Feb 13 (Fri)	06:20	11:33	16:46	04:44	18:23	05:17	17:50	05:51	17:16	21:46	- 13 23	0.987333579
Feb 14 (Sat)	06:19	11:33	16:48	04:42	18:24	05:16	17:51	05:49	17:17	21:50	- 13 02	0.987530421
Feb 15 (Sun)	06:17	11:33	16:49	04:41	18:25	05:14	17:52	05:48	17:19	21:54	- 12 42	0.987731758
Feb 16 (Mon)	06:16	11:33	16:51	04:40	18:27	05:13	17:53	05:46	17:20	21:58	- 12 21	0.987937261
Feb 17 (Tue)	06:14	11:33	16:52	04:38	18:28	05:12	17:55	05:45	17:21	22:02	- 12 00	0.988146606
Feb 18 (Wed)	06:13	11:33	16:53	04:37	18:29	05:10	17:56	05:44	17:22	22:06	- 11 39	0.988359479
Feb 19 (Thu)	06:11	11:33	16:55	04:36	18:30	05:09	17:57	05:42	17:24	22:10	- 11 18	0.988575581
Feb 20 (Fri)	06:10	11:32	16:56	04:34	18:31	05:07	17:58	05:41	17:25	22:14	- 10 56	0.988794627
Feb 21 (Sat)	06:08	11:32	16:57	04:33	18:33	05:06	18:00	05:39	17:26	22:17	- 10 35	0.989016347
Feb 22 (Sun)	06:07	11:32	16:58	04:31	18:34	05:04	18:01	05:38	17:27	22:21	- 10 13	0.989240487
Feb 23 (Mon)	06:05	11:32	17:00	04:30	18:35	05:03	18:02	05:36	17:29	22:25	- 9 51	0.989466817
Feb 24 (Tue)	06:03	11:32	17:01	04:28	18:36	05:01	18:03	05:35	17:30	22:29	- 9 29	0.989695133
Feb 25 (Wed)	06:02	11:32	17:02	04:27	18:38	05:00	18:04	05:33	17:31	22:33	- 9 07	0.989925264
Feb 26 (Thu)	06:00	11:32	17:04	04:25	18:39	04:58	18:06	05:31	17:33	22:36	- 8 44	0.990157084
Feb 27 (Fri)	05:59	11:31	17:05	04:24	18:40	04:57	18:07	05:30	17:34	22:40	- 8 22	0.990390518
Feb 28 (Sat)	05:57	11:31	17:06	04:22	18:41	04:55	18:08	05:28	17:35	22:44	- 7 59	0.990625549

MARZO

Date	Rise h m	Transit h m	Set h m	Twilight				A.R. h m	Decl. ° '	Dist. AU		
				Astronomical		Nautical					Civil	
				Begin h m	End h m	Begin h m	End h m				Begin h m	End h m
Mar 01 (Sun)	05:55	11:31	17:08	04:20	18:43	04:54	18:09	05:27	17:36	22 48	- 7 37	0.990862219
Mar 02 (Mon)	05:54	11:31	17:09	04:19	18:44	04:52	18:11	05:25	17:38	22 51	- 7 14	0.991100635
Mar 03 (Tue)	05:52	11:31	17:10	04:17	18:45	04:50	18:12	05:23	17:39	22 55	- 6 51	0.991340957
Mar 04 (Wed)	05:50	11:30	17:11	04:15	18:47	04:49	18:13	05:22	17:40	22 59	- 6 28	0.991583395
Mar 05 (Thu)	05:49	11:30	17:13	04:14	18:48	04:47	18:14	05:20	17:41	23 03	- 6 05	0.991828195
Mar 06 (Fri)	05:47	11:30	17:14	04:12	18:49	04:45	18:16	05:18	17:43	23 06	- 5 41	0.992075621
Mar 07 (Sat)	05:45	11:30	17:15	04:10	18:50	04:43	18:17	05:17	17:44	23 10	- 5 18	0.992325938
Mar 08 (Sun)	05:43	11:30	17:16	04:08	18:52	04:42	18:18	05:15	17:45	23 14	- 4 55	0.992579382
Mar 09 (Mon)	05:42	11:29	17:18	04:07	18:53	04:40	18:19	05:13	17:46	23 17	- 4 31	0.992836141
Mar 10 (Tue)	05:40	11:29	17:19	04:05	18:54	04:38	18:21	05:11	17:47	23 21	- 4 08	0.993096329
Mar 11 (Wed)	05:38	11:29	17:20	04:03	18:56	04:36	18:22	05:10	17:49	23 25	- 3 44	0.993359974
Mar 12 (Thu)	05:36	11:28	17:21	04:01	18:57	04:35	18:23	05:08	17:50	23 28	- 3 21	0.993627011
Mar 13 (Fri)	05:35	11:28	17:23	03:59	18:58	04:33	18:24	05:06	17:51	23 32	- 2 57	0.993897293
Mar 14 (Sat)	05:33	11:28	17:24	03:57	18:59	04:31	18:26	05:04	17:52	23 36	- 2 33	0.994170600
Mar 15 (Sun)	05:31	11:28	17:25	03:56	19:01	04:29	18:27	05:03	17:54	23 39	- 2 10	0.994446665
Mar 16 (Mon)	05:29	11:27	17:26	03:54	19:02	04:27	18:28	05:01	17:55	23 43	- 1 46	0.994725189
Mar 17 (Tue)	05:27	11:27	17:27	03:52	19:03	04:26	18:29	04:59	17:56	23 47	- 1 22	0.995005856
Mar 18 (Wed)	05:26	11:27	17:29	03:50	19:05	04:24	18:31	04:57	17:57	23 50	- 0 59	0.995288344
Mar 19 (Thu)	05:24	11:26	17:30	03:48	19:06	04:22	18:32	04:55	17:58	23 54	- 0 35	0.995572331
Mar 20 (Fri)	05:22	11:26	17:31	03:46	19:07	04:20	18:33	04:54	18:00	23 58	- 0 11	0.995857497
Mar 21 (Sat)	05:20	11:26	17:32	03:44	19:09	04:18	18:34	04:52	18:01	0 01	+ 0 12	0.996143529
Mar 22 (Sun)	05:18	11:26	17:33	03:42	19:10	04:16	18:36	04:50	18:02	0 05	+ 0 35	0.996430115
Mar 23 (Mon)	05:17	11:25	17:35	03:40	19:12	04:14	18:37	04:48	18:03	0 09	+ 0 59	0.996716956
Mar 24 (Tue)	05:15	11:25	17:36	03:38	19:13	04:13	18:38	04:46	18:05	0 12	+ 1 23	0.997003764
Mar 25 (Wed)	05:13	11:25	17:37	03:36	19:14	04:11	18:40	04:44	18:06	0 16	+ 1 46	0.997290271
Mar 26 (Thu)	05:11	11:24	17:38	03:34	19:16	04:09	18:41	04:43	18:07	0 20	+ 2 10	0.997576245
Mar 27 (Fri)	05:09	11:24	17:39	03:32	19:17	04:07	18:42	04:41	18:08	0 23	+ 2 33	0.997861496
Mar 28 (Sat)	05:08	11:24	17:41	03:30	19:19	04:05	18:44	04:39	18:09	0 27	+ 2 57	0.998145896
Mar 29 (Sun)	05:06	11:23	17:42	03:28	19:20	04:03	18:45	04:37	18:11	0 31	+ 3 20	0.998429387
Mar 30 (Mon)	05:04	11:23	17:43	03:26	19:22	04:01	18:46	04:35	18:12	0 34	+ 3 44	0.998711989
Mar 31 (Tue)	05:02	11:23	17:44	03:24	19:23	03:59	18:48	04:33	18:13	0 38	+ 4 07	0.998993797

APRILE

Date	Rise h m	Transit h m	Set h m	Twilight								
				Astronomical		Nautical		Civil				
				Begin h m	End h m	Begin h m	End h m	Begin h m	End h m			
Apr 01 (Wed)	05:01	11:23	17:45	03:22	19:25	03:57	18:49	04:32	18:14	0 41	+ 4 30	0.999274975
Apr 02 (Thu)	04:59	11:22	17:47	03:20	19:26	03:55	18:50	04:30	18:16	0 45	+ 4 53	0.999555740
Apr 03 (Fri)	04:57	11:22	17:48	03:18	19:28	03:54	18:52	04:28	18:17	0 49	+ 5 16	0.999836340
Apr 04 (Sat)	04:55	11:22	17:49	03:16	19:29	03:52	18:53	04:26	18:18	0 52	+ 5 39	1.000117039
Apr 05 (Sun)	04:53	11:21	17:50	03:13	19:31	03:50	18:54	04:24	18:19	0 56	+ 6 02	1.000398087
Apr 06 (Mon)	04:52	11:21	17:51	03:11	19:32	03:48	18:56	04:23	18:21	1 00	+ 6 25	1.000679706
Apr 07 (Tue)	04:50	11:21	17:53	03:09	19:34	03:46	18:57	04:21	18:22	1 03	+ 6 47	1.000962067
Apr 08 (Wed)	04:48	11:21	17:54	03:07	19:35	03:44	18:58	04:19	18:23	1 07	+ 7 10	1.001245279
Apr 09 (Thu)	04:47	11:20	17:55	03:06	19:37	03:42	19:00	04:17	18:24	1 11	+ 7 32	1.001529377
Apr 10 (Fri)	04:45	11:20	17:56	03:03	19:38	03:40	19:01	04:15	18:26	1 14	+ 7 54	1.001814323
Apr 11 (Sat)	04:43	11:20	17:57	03:01	19:40	03:38	19:02	04:14	18:27	1 18	+ 8 17	1.002100010
Apr 12 (Sun)	04:41	11:20	17:58	02:59	19:42	03:36	19:04	04:12	18:28	1 22	+ 8 39	1.002386270
Apr 13 (Mon)	04:40	11:19	18:00	02:57	19:43	03:34	19:05	04:10	18:29	1 25	+ 9 00	1.002672888
Apr 14 (Tue)	04:38	11:19	18:01	02:55	19:45	03:32	19:07	04:08	18:31	1 29	+ 9 22	1.002959614
Apr 15 (Wed)	04:36	11:19	18:02	02:52	19:46	03:31	19:08	04:06	18:32	1 33	+ 9 44	1.003246174
Apr 16 (Thu)	04:35	11:19	18:03	02:50	19:48	03:29	19:09	04:05	18:33	1 36	+ 10 05	1.003532277
Apr 17 (Fri)	04:33	11:18	18:04	02:48	19:50	03:27	19:11	04:03	18:34	1 40	+ 10 26	1.003817624
Apr 18 (Sat)	04:31	11:18	18:06	02:46	19:51	03:25	19:12	04:01	18:36	1 44	+ 10 47	1.004101905
Apr 19 (Sun)	04:30	11:18	18:07	02:44	19:53	03:23	19:14	04:00	18:37	1 48	+ 11 08	1.004384806
Apr 20 (Mon)	04:28	11:18	18:08	02:42	19:55	03:21	19:15	03:58	18:38	1 51	+ 11 29	1.004666005
Apr 21 (Tue)	04:27	11:17	18:09	02:40	19:56	03:19	19:17	03:56	18:40	1 55	+ 11 49	1.004945180
Apr 22 (Wed)	04:25	11:17	18:10	02:38	19:58	03:18	19:18	03:55	18:41	1 59	+ 12 10	1.005222014
Apr 23 (Thu)	04:23	11:17	18:11	02:36	20:00	03:16	19:19	03:53	18:42	2 03	+ 12 30	1.005496199
Apr 24 (Fri)	04:22	11:17	18:13	02:33	20:02	03:14	19:21	03:51	18:43	2 06	+ 12 50	1.005767459
Apr 25 (Sat)	04:20	11:17	18:14	02:31	20:03	03:12	19:22	03:50	18:45	2 10	+ 13 09	1.006035565
Apr 26 (Sun)	04:19	11:17	18:15	02:29	20:05	03:10	19:24	03:48	18:46	2 14	+ 13 29	1.006300355
Apr 27 (Mon)	04:17	11:16	18:16	02:27	20:07	03:08	19:25	03:46	18:47	2 18	+ 13 48	1.006561751
Apr 28 (Tue)	04:16	11:16	18:17	02:25	20:09	03:07	19:27	03:45	18:49	2 21	+ 14 07	1.006819773
Apr 29 (Wed)	04:14	11:16	18:19	02:23	20:10	03:05	19:28	03:43	18:50	2 25	+ 14 26	1.007074529
Apr 30 (Thu)	04:13	11:16	18:20	02:21	20:12	03:03	19:30	03:42	18:51	2 29	+ 14 44	1.007326207

MAGGIO

Twilight												
Date	Rise h m	Transit h m	Set h m	Astronomical		Nautical		Civil		A.R. h m	Decl. ° '	Dist. AU
				Begin h m	End h m	Begin h m	End h m	Begin h m	End h m			
May 01 (Fri)	04:11	11:16	18:21	02:19	20:14	03:02	19:31	03:40	18:52	2 33	+ 15 03	1.007575048
May 02 (Sat)	04:10	11:16	18:22	02:17	20:16	03:00	19:33	03:39	18:54	2 37	+ 15 21	1.007821324
May 03 (Sun)	04:09	11:16	18:23	02:15	20:18	02:58	19:34	03:37	18:55	2 41	+ 15 38	1.008065310
May 04 (Mon)	04:07	11:16	18:24	02:13	20:20	02:56	19:36	03:36	18:56	2 44	+ 15 56	1.008307263
May 05 (Tue)	04:06	11:15	18:26	02:11	20:21	02:55	19:37	03:34	18:58	2 48	+ 16 13	1.008547404
May 06 (Wed)	04:05	11:15	18:27	02:09	20:23	02:53	19:39	03:33	18:59	2 52	+ 16 30	1.008785911
May 07 (Thu)	04:03	11:15	18:28	02:07	20:25	02:52	19:40	03:31	19:00	2 56	+ 16 47	1.009022903
May 08 (Fri)	04:02	11:15	18:29	02:05	20:27	02:50	19:42	03:30	19:01	3 00	+ 17 03	1.009258443
May 09 (Sat)	04:01	11:15	18:30	02:03	20:29	02:48	19:43	03:29	19:03	3 04	+ 17 20	1.009492533
May 10 (Sun)	04:00	11:15	18:31	02:01	20:31	02:47	19:45	03:27	19:04	3 08	+ 17 35	1.009725120
May 11 (Mon)	03:59	11:15	18:32	01:59	20:32	02:45	19:46	03:26	19:05	3 12	+ 17 51	1.009956098
May 12 (Tue)	03:57	11:15	18:33	01:57	20:34	02:44	19:47	03:25	19:06	3 15	+ 18 06	1.010185319
May 13 (Wed)	03:56	11:15	18:35	01:56	20:36	02:42	19:49	03:23	19:07	3 19	+ 18 21	1.010412597
May 14 (Thu)	03:55	11:15	18:36	01:54	20:38	02:41	19:50	03:22	19:09	3 23	+ 18 36	1.010637719
May 15 (Fri)	03:54	11:15	18:37	01:52	20:40	02:40	19:52	03:21	19:10	3 27	+ 18 50	1.010860444
May 16 (Sat)	03:53	11:15	18:38	01:50	20:42	02:38	19:53	03:20	19:11	3 31	+ 19 04	1.011080514
May 17 (Sun)	03:52	11:15	18:39	01:48	20:43	02:37	19:54	03:19	19:12	3 35	+ 19 18	1.011297653
May 18 (Mon)	03:51	11:15	18:40	01:47	20:45	02:35	19:56	03:18	19:13	3 39	+ 19 31	1.011511568
May 19 (Tue)	03:50	11:15	18:41	01:45	20:47	02:34	19:57	03:17	19:15	3 43	+ 19 44	1.011721949
May 20 (Wed)	03:49	11:15	18:42	01:43	20:49	02:33	19:59	03:15	19:16	3 47	+ 19 57	1.011928475
May 21 (Thu)	03:48	11:15	18:43	01:42	20:51	02:32	20:00	03:14	19:17	3 51	+ 20 09	1.012130816
May 22 (Fri)	03:47	11:15	18:44	01:40	20:52	02:30	20:01	03:13	19:18	3 55	+ 20 22	1.012328649
May 23 (Sat)	03:47	11:15	18:45	01:38	20:54	02:29	20:03	03:13	19:19	3 59	+ 20 33	1.012521674
May 24 (Sun)	03:46	11:16	18:46	01:37	20:56	02:28	20:04	03:12	19:20	4 03	+ 20 45	1.012709639
May 25 (Mon)	03:45	11:16	18:47	01:35	20:57	02:27	20:05	03:11	19:21	4 07	+ 20 56	1.012892366
May 26 (Tue)	03:44	11:16	18:48	01:34	20:59	02:26	20:06	03:10	19:22	4 11	+ 21 06	1.013069777
May 27 (Wed)	03:44	11:16	18:49	01:32	21:01	02:25	20:08	03:09	19:23	4 15	+ 21 16	1.013241906
May 28 (Thu)	03:43	11:16	18:50	01:31	21:02	02:24	20:09	03:08	19:24	4 19	+ 21 26	1.013408887
May 29 (Fri)	03:42	11:16	18:51	01:30	21:04	02:23	20:10	03:08	19:25	4 23	+ 21 36	1.013570943
May 30 (Sat)	03:42	11:16	18:51	01:28	21:05	02:22	20:11	03:07	19:26	4 28	+ 21 45	1.013728349
May 31 (Sun)	03:41	11:16	18:52	01:27	21:07	02:21	20:12	03:06	19:27	4 32	+ 21 54	1.013881404

GIUGNO

Twilight													
Date	Rise	Transit		Set	Astronomical		Nautical		Civil		A.R.	Decl.	Dist.
		h	m		h	m	h	m	h	m			
Jun 01 (Mon)	03:41	11:17	18:53	01:26	21:08	02:21	20:13	03:06	19:28	4 36	+ 22 02	1.014030407	
Jun 02 (Tue)	03:40	11:17	18:54	01:25	21:10	02:20	20:14	03:05	19:29	4 40	+ 22 10	1.014175631	
Jun 03 (Wed)	03:40	11:17	18:55	01:24	21:11	02:19	20:15	03:05	19:30	4 44	+ 22 18	1.014317315	
Jun 04 (Thu)	03:39	11:17	18:55	01:23	21:12	02:18	20:16	03:04	19:31	4 48	+ 22 25	1.014455656	
Jun 05 (Fri)	03:39	11:17	18:56	01:22	21:14	02:18	20:17	03:04	19:31	4 52	+ 22 32	1.014590806	
Jun 06 (Sat)	03:39	11:17	18:57	01:21	21:15	02:17	20:18	03:03	19:32	4 56	+ 22 38	1.014722866	
Jun 07 (Sun)	03:38	11:18	18:57	01:20	21:16	02:17	20:19	03:03	19:33	5 00	+ 22 44	1.014851892	
Jun 08 (Mon)	03:38	11:18	18:58	01:19	21:17	02:16	20:20	03:02	19:34	5 05	+ 22 50	1.014977892	
Jun 09 (Tue)	03:38	11:18	18:59	01:18	21:18	02:16	20:21	03:02	19:34	5 09	+ 22 55	1.015100831	
Jun 10 (Wed)	03:37	11:18	18:59	01:18	21:19	02:16	20:21	03:02	19:35	5 13	+ 23 00	1.015220632	
Jun 11 (Thu)	03:37	11:18	19:00	01:17	21:20	02:15	20:22	03:02	19:35	5 17	+ 23 04	1.015337182	
Jun 12 (Fri)	03:37	11:19	19:00	01:17	21:21	02:15	20:23	03:01	19:36	5 21	+ 23 08	1.015450333	
Jun 13 (Sat)	03:37	11:19	19:01	01:16	21:22	02:15	20:23	03:01	19:37	5 25	+ 23 12	1.015559909	
Jun 14 (Sun)	03:37	11:19	19:01	01:16	21:22	02:15	20:24	03:01	19:37	5 29	+ 23 15	1.015665704	
Jun 15 (Mon)	03:37	11:19	19:02	01:16	21:23	02:14	20:24	03:01	19:37	5 34	+ 23 18	1.015767485	
Jun 16 (Tue)	03:37	11:19	19:02	01:15	21:24	02:14	20:25	03:01	19:38	5 38	+ 23 20	1.015864995	
Jun 17 (Wed)	03:37	11:20	19:02	01:15	21:24	02:14	20:25	03:01	19:38	5 42	+ 23 22	1.015957949	
Jun 18 (Thu)	03:37	11:20	19:03	01:15	21:25	02:14	20:26	03:01	19:39	5 46	+ 23 24	1.016046041	
Jun 19 (Fri)	03:37	11:20	19:03	01:15	21:25	02:14	20:26	03:01	19:39	5 50	+ 23 25	1.016128949	
Jun 20 (Sat)	03:38	11:20	19:03	01:15	21:25	02:15	20:26	03:02	19:39	5 54	+ 23 25	1.016206347	
Jun 21 (Sun)	03:38	11:21	19:03	01:16	21:25	02:15	20:26	03:02	19:39	5 59	+ 23 26	1.016277931	
Jun 22 (Mon)	03:38	11:21	19:04	01:16	21:26	02:15	20:26	03:02	19:40	6 03	+ 23 26	1.016343443	
Jun 23 (Tue)	03:38	11:21	19:04	01:16	21:26	02:15	20:27	03:02	19:40	6 07	+ 23 25	1.016402708	
Jun 24 (Wed)	03:39	11:21	19:04	01:16	21:26	02:16	20:27	03:03	19:40	6 11	+ 23 24	1.016455662	
Jun 25 (Thu)	03:39	11:21	19:04	01:17	21:26	02:16	20:27	03:03	19:40	6 15	+ 23 23	1.016502356	
Jun 26 (Fri)	03:39	11:22	19:04	01:18	21:25	02:16	20:27	03:03	19:40	6 19	+ 23 21	1.016542958	
Jun 27 (Sat)	03:40	11:22	19:04	01:18	21:25	02:17	20:27	03:04	19:40	6 23	+ 23 19	1.016577720	
Jun 28 (Sun)	03:40	11:22	19:04	01:19	21:25	02:17	20:26	03:04	19:40	6 28	+ 23 16	1.016606947	
Jun 29 (Mon)	03:41	11:22	19:04	01:20	21:24	02:18	20:26	03:05	19:40	6 32	+ 23 13	1.016630967	
Jun 30 (Tue)	03:41	11:22	19:04	01:20	21:24	02:19	20:26	03:05	19:39	6 36	+ 23 10	1.016650099	

LUGLIO

Date	Rise h m	Transit h m	Set h m	Twilight						A.R. h m	Ded. ° "	Dist. AU
				Astronomical		Nautical		Civil				
				Begin h m	End h m	Begin h m	End h m	Begin h m	End h m			
Jul 01 (Wed)	03:42	11:23	19:04	01:21	21:23	02:19	20:26	03:06	19:39	6 40	+ 23 06	1.016664641
Jul 02 (Thu)	03:42	11:23	19:03	01:22	21:23	02:20	20:25	03:06	19:39	6 44	+ 23 02	1.016674860
Jul 03 (Fri)	03:43	11:23	19:03	01:23	21:22	02:21	20:25	03:07	19:39	6 48	+ 22 57	1.016680983
Jul 04 (Sat)	03:43	11:23	19:03	01:24	21:21	02:22	20:24	03:08	19:38	6 52	+ 22 52	1.016683204
Jul 05 (Sun)	03:44	11:23	19:03	01:25	21:20	02:22	20:24	03:08	19:38	6 57	+ 22 47	1.016681674
Jul 06 (Mon)	03:45	11:24	19:02	01:27	21:20	02:23	20:23	03:09	19:38	7 01	+ 22 41	1.016676508
Jul 07 (Tue)	03:45	11:24	19:02	01:28	21:19	02:24	20:23	03:10	19:37	7 05	+ 22 35	1.016667780
Jul 08 (Wed)	03:46	11:24	19:01	01:29	21:18	02:25	20:22	03:11	19:37	7 09	+ 22 28	1.016655527
Jul 09 (Thu)	03:47	11:24	19:01	01:30	21:17	02:26	20:21	03:11	19:36	7 13	+ 22 21	1.016639746
Jul 10 (Fri)	03:47	11:24	19:01	01:32	21:15	02:27	20:21	03:12	19:36	7 17	+ 22 14	1.016620397
Jul 11 (Sat)	03:48	11:24	19:00	01:33	21:14	02:28	20:20	03:13	19:35	7 21	+ 22 06	1.016597401
Jul 12 (Sun)	03:49	11:24	18:59	01:35	21:13	02:29	20:19	03:14	19:34	7 25	+ 21 58	1.016570644
Jul 13 (Mon)	03:50	11:25	18:59	01:36	21:12	02:30	20:18	03:15	19:34	7 29	+ 21 50	1.016539977
Jul 14 (Tue)	03:51	11:25	18:58	01:38	21:10	02:31	20:17	03:16	19:33	7 33	+ 21 41	1.016505213
Jul 15 (Wed)	03:51	11:25	18:58	01:39	21:09	02:32	20:16	03:17	19:32	7 37	+ 21 32	1.016466133
Jul 16 (Thu)	03:52	11:25	18:57	01:41	21:08	02:34	20:15	03:18	19:31	7 41	+ 21 22	1.016422483
Jul 17 (Fri)	03:53	11:25	18:56	01:42	21:06	02:35	20:14	03:19	19:30	7 45	+ 21 12	1.016373978
Jul 18 (Sat)	03:54	11:25	18:55	01:44	21:05	02:36	20:13	03:20	19:30	7 49	+ 21 02	1.016320311
Jul 19 (Sun)	03:55	11:25	18:55	01:46	21:03	02:37	20:12	03:21	19:29	7 53	+ 20 51	1.016261171
Jul 20 (Mon)	03:56	11:25	18:54	01:47	21:02	02:39	20:11	03:22	19:28	7 57	+ 20 40	1.016196262
Jul 21 (Tue)	03:57	11:25	18:53	01:49	21:00	02:40	20:10	03:23	19:27	8 01	+ 20 28	1.016123340
Jul 22 (Wed)	03:58	11:25	18:52	01:51	20:58	02:41	20:08	03:24	19:26	8 05	+ 20 17	1.016048246
Jul 23 (Thu)	03:59	11:25	18:51	01:52	20:57	02:42	20:07	03:25	19:25	8 09	+ 20 06	1.015964933
Jul 24 (Fri)	04:00	11:25	18:50	01:54	20:55	02:44	20:06	03:26	19:24	8 13	+ 19 52	1.015875475
Jul 25 (Sat)	04:01	11:25	18:49	01:56	20:53	02:45	20:05	03:27	19:22	8 17	+ 19 39	1.015780059
Jul 26 (Sun)	04:02	11:25	18:48	01:58	20:52	02:46	20:03	03:29	19:21	8 21	+ 19 26	1.015676956
Jul 27 (Mon)	04:03	11:25	18:47	01:59	20:50	02:48	20:02	03:30	19:20	8 25	+ 19 13	1.015572490
Jul 28 (Tue)	04:04	11:25	18:46	02:01	20:48	02:49	20:00	03:31	19:19	8 29	+ 18 59	1.015461002
Jul 29 (Wed)	04:05	11:25	18:45	02:03	20:46	02:51	19:59	03:32	19:18	8 33	+ 18 45	1.015344832
Jul 30 (Thu)	04:06	11:25	18:44	02:05	20:44	02:52	19:57	03:33	19:16	8 37	+ 18 31	1.015224299
Jul 31 (Fri)	04:07	11:25	18:43	02:06	20:42	02:53	19:56	03:34	19:15	8 41	+ 18 16	1.015099699

AGOSTO

Twilight												
Date	Rise h m	Transit h m	Set h m	Astronomical		Nautical		Civil		A.R. h m	Decl. ° '	Dist. AU
				Begin h m	End h m	Begin h m	End h m	Begin h m	End h m			
Aug 01 (Sat)	04:08	11:25	18:41	02:08	20:41	02:55	19:54	03:36	19:14	8 45	+ 18 01	1.014971296
Aug 02 (Sun)	04:09	11:25	18:40	02:10	20:39	02:56	19:53	03:37	19:12	8 49	+ 17 46	1.014839329
Aug 03 (Mon)	04:10	11:25	18:39	02:12	20:37	02:57	19:51	03:38	19:11	8 53	+ 17 31	1.014704002
Aug 04 (Tue)	04:11	11:25	18:38	02:14	20:35	02:59	19:50	03:39	19:10	8 56	+ 17 15	1.014565490
Aug 05 (Wed)	04:12	11:25	18:36	02:15	20:33	03:00	19:48	03:40	19:08	9 00	+ 16 59	1.014423935
Aug 06 (Thu)	04:14	11:25	18:35	02:17	20:31	03:02	19:47	03:42	19:07	9 04	+ 16 42	1.014279446
Aug 07 (Fri)	04:15	11:25	18:34	02:19	20:29	03:03	19:45	03:43	19:05	9 08	+ 16 26	1.014132091
Aug 08 (Sat)	04:16	11:24	18:32	02:21	20:27	03:05	19:43	03:44	19:04	9 12	+ 16 09	1.013981900
Aug 09 (Sun)	04:17	11:24	18:31	02:22	20:25	03:06	19:41	03:45	19:02	9 16	+ 15 52	1.013828863
Aug 10 (Mon)	04:18	11:24	18:29	02:24	20:23	03:07	19:40	03:46	19:01	9 19	+ 15 34	1.013672922
Aug 11 (Tue)	04:19	11:24	18:28	02:26	20:20	03:09	19:38	03:48	18:59	9 23	+ 15 17	1.013513980
Aug 12 (Wed)	04:20	11:24	18:27	02:28	20:18	03:10	19:36	03:49	18:58	9 27	+ 14 59	1.013351891
Aug 13 (Thu)	04:21	11:24	18:25	02:29	20:16	03:12	19:34	03:50	18:56	9 31	+ 14 41	1.013186470
Aug 14 (Fri)	04:22	11:23	18:24	02:31	20:14	03:13	19:33	03:51	18:55	9 34	+ 14 22	1.013017488
Aug 15 (Sat)	04:24	11:23	18:22	02:33	20:12	03:14	19:31	03:52	18:53	9 38	+ 14 04	1.012844684
Aug 16 (Sun)	04:25	11:23	18:21	02:35	20:10	03:16	19:29	03:54	18:51	9 42	+ 13 45	1.012667772
Aug 17 (Mon)	04:26	11:23	18:19	02:36	20:08	03:17	19:27	03:55	18:50	9 46	+ 13 26	1.012486458
Aug 18 (Tue)	04:27	11:23	18:17	02:38	20:06	03:19	19:25	03:56	18:48	9 49	+ 13 07	1.012300471
Aug 19 (Wed)	04:28	11:22	18:16	02:40	20:04	03:20	19:24	03:57	18:46	9 53	+ 12 47	1.012109591
Aug 20 (Thu)	04:29	11:22	18:14	02:41	20:02	03:21	19:22	03:59	18:45	9 57	+ 12 28	1.011913683
Aug 21 (Fri)	04:30	11:22	18:13	02:43	19:59	03:23	19:20	04:00	18:43	10 01	+ 12 08	1.011712718
Aug 22 (Sat)	04:31	11:22	18:11	02:45	19:57	03:24	19:18	04:01	18:41	10 04	+ 11 48	1.011506785
Aug 23 (Sun)	04:32	11:21	18:09	02:46	19:55	03:26	19:16	04:02	18:40	10 08	+ 11 27	1.011296073
Aug 24 (Mon)	04:34	11:21	18:08	02:48	19:53	03:27	19:14	04:03	18:38	10 12	+ 11 07	1.011080853
Aug 25 (Tue)	04:35	11:21	18:06	02:49	19:51	03:28	19:12	04:05	18:36	10 15	+ 10 46	1.010861446
Aug 26 (Wed)	04:36	11:21	18:04	02:51	19:49	03:30	19:10	04:06	18:34	10 19	+ 10 26	1.010638195
Aug 27 (Thu)	04:37	11:20	18:03	02:53	19:47	03:31	19:08	04:07	18:33	10 23	+ 10 05	1.010411446
Aug 28 (Fri)	04:38	11:20	18:01	02:54	19:45	03:32	19:07	04:08	18:31	10 26	+ 9 44	1.010181533
Aug 29 (Sat)	04:39	11:20	17:59	02:56	19:42	03:34	19:05	04:09	18:29	10 30	+ 9 22	1.009948774
Aug 30 (Sun)	04:40	11:19	17:58	02:57	19:40	03:35	19:03	04:11	18:27	10 34	+ 9 01	1.009713469
Aug 31 (Mon)	04:41	11:19	17:56	02:59	19:38	03:36	19:01	04:12	18:25	10 37	+ 8 39	1.009475895

SETTEMBRE

Date	Rise h m	Transit h m	Set h m	Twilight				A.R. h m	Decl. ° '	Dist. AU		
				Astronomical		Nautical					Civil	
				Begin h m	End h m	Begin h m	End h m				Begin h m	End h m
Sep 01 (Tue)	04:43	11:19	17:54	03:00	19:36	03:38	18:59	04:13	18:24	10:41	+ 8 18	1.009236308
Sep 02 (Wed)	04:44	11:18	17:52	03:02	19:34	03:39	18:57	04:14	18:22	10:44	+ 7 56	1.008994940
Sep 03 (Thu)	04:45	11:18	17:51	03:03	19:32	03:40	18:55	04:15	18:20	10:48	+ 7 34	1.008751999
Sep 04 (Fri)	04:46	11:18	17:49	03:05	19:30	03:41	18:53	04:17	18:18	10:52	+ 7 12	1.008507658
Sep 05 (Sat)	04:47	11:17	17:47	03:06	19:27	03:43	18:51	04:18	18:16	10:55	+ 6 50	1.008262058
Sep 06 (Sun)	04:48	11:17	17:45	03:08	19:25	03:44	18:49	04:19	18:14	10:59	+ 6 28	1.008015293
Sep 07 (Mon)	04:49	11:17	17:44	03:09	19:23	03:45	18:47	04:20	18:13	11:02	+ 6 05	1.007767412
Sep 08 (Tue)	04:50	11:16	17:42	03:10	19:21	03:47	18:45	04:21	18:11	11:06	+ 5 43	1.007518410
Sep 09 (Wed)	04:51	11:16	17:40	03:12	19:19	03:48	18:43	04:22	18:09	11:10	+ 5 20	1.007268228
Sep 10 (Thu)	04:53	11:16	17:38	03:13	19:17	03:49	18:41	04:24	18:07	11:13	+ 4 57	1.007016752
Sep 11 (Fri)	04:54	11:15	17:36	03:15	19:15	03:50	18:39	04:25	18:05	11:17	+ 4 35	1.006763818
Sep 12 (Sat)	04:55	11:15	17:34	03:16	19:13	03:52	18:37	04:26	18:03	11:20	+ 4 12	1.006509213
Sep 13 (Sun)	04:56	11:15	17:33	03:17	19:11	03:53	18:35	04:27	18:01	11:24	+ 3 49	1.006252691
Sep 14 (Mon)	04:57	11:14	17:31	03:19	19:09	03:54	18:34	04:28	18:00	11:28	+ 3 26	1.005993983
Sep 15 (Tue)	04:58	11:14	17:29	03:20	19:07	03:55	18:32	04:29	17:58	11:31	+ 3 03	1.005732820
Sep 16 (Wed)	04:59	11:14	17:27	03:21	19:04	03:57	18:30	04:30	17:56	11:35	+ 2 40	1.005468957
Sep 17 (Thu)	05:00	11:13	17:25	03:23	19:02	03:58	18:28	04:32	17:54	11:38	+ 2 17	1.005202202
Sep 18 (Fri)	05:01	11:13	17:23	03:24	19:00	03:59	18:26	04:33	17:52	11:42	+ 1 53	1.004932441
Sep 19 (Sat)	05:03	11:12	17:22	03:25	18:58	04:00	18:24	04:34	17:50	11:46	+ 1 30	1.004659659
Sep 20 (Sun)	05:04	11:12	17:20	03:27	18:56	04:01	18:22	04:35	17:48	11:49	+ 1 07	1.004383939
Sep 21 (Mon)	05:05	11:12	17:18	03:28	18:54	04:03	18:20	04:36	17:47	11:53	+ 0 43	1.004105457
Sep 22 (Tue)	05:06	11:11	17:16	03:29	18:52	04:04	18:18	04:37	17:45	11:56	+ 0 20	1.003824459
Sep 23 (Wed)	05:07	11:11	17:14	03:31	18:50	04:05	18:16	04:39	17:43	12:00	- 0 02	1.003541242
Sep 24 (Thu)	05:08	11:11	17:13	03:32	18:48	04:06	18:14	04:40	17:41	12:03	- 0 26	1.003256129
Sep 25 (Fri)	05:09	11:10	17:11	03:33	18:47	04:07	18:13	04:41	17:39	12:07	- 0 49	1.002969456
Sep 26 (Sat)	05:10	11:10	17:09	03:35	18:45	04:09	18:11	04:42	17:37	12:11	- 1 12	1.002681556
Sep 27 (Sun)	05:12	11:10	17:07	03:36	18:43	04:10	18:09	04:43	17:36	12:14	- 1 36	1.002392756
Sep 28 (Mon)	05:13	11:09	17:05	03:37	18:41	04:11	18:07	04:44	17:34	12:18	- 1 59	1.002103373
Sep 29 (Tue)	05:14	11:09	17:03	03:38	18:39	04:12	18:05	04:45	17:32	12:22	- 2 22	1.001813716
Sep 30 (Wed)	05:15	11:09	17:02	03:40	18:37	04:13	18:03	04:47	17:30	12:25	- 2 46	1.001524078

OTTOBRE

Twilight												
Date	Rise h m	Transit h m	Set h m	Astronomical		Nautical		Civil		A.R.L. h m	Decl. °	Dist. AU
				Begin h m	End h m	Begin h m	End h m	Begin h m	End h m			
Oct 01 (Thu)	05:16	11:08	17:00	03:41	18:35	04:14	18:01	04:48	17:28	12:29	- 3 09	1.001234742
Oct 02 (Fri)	05:17	11:08	16:58	03:42	18:33	04:15	18:00	04:49	17:27	12:32	- 3 32	1.000945967
Oct 03 (Sat)	05:19	11:08	16:56	03:43	18:31	04:17	17:58	04:50	17:25	12:36	- 3 55	1.000657989
Oct 04 (Sun)	05:20	11:07	16:54	03:44	18:30	04:18	17:56	04:51	17:23	12:40	- 4 19	1.000371009
Oct 05 (Mon)	05:21	11:07	16:53	03:46	18:28	04:19	17:54	04:52	17:21	12:43	- 4 42	1.000085179
Oct 06 (Tue)	05:22	11:07	16:51	03:47	18:26	04:20	17:53	04:53	17:19	12:47	- 5 05	0.999800599
Oct 07 (Wed)	05:23	11:07	16:49	03:48	18:24	04:21	17:51	04:55	17:18	12:51	- 5 28	0.999517303
Oct 08 (Thu)	05:24	11:06	16:47	03:49	18:22	04:23	17:49	04:56	17:16	12:54	- 5 51	0.999235256
Oct 09 (Fri)	05:26	11:06	16:45	03:50	18:21	04:24	17:47	04:57	17:14	12:58	- 6 13	0.998954339
Oct 10 (Sat)	05:27	11:06	16:44	03:52	18:19	04:25	17:46	04:58	17:13	13:02	- 6 36	0.998674449
Oct 11 (Sun)	05:28	11:05	16:42	03:53	18:17	04:26	17:44	04:59	17:11	13:05	- 6 59	0.998395315
Oct 12 (Mon)	05:29	11:05	16:41	03:54	18:16	04:27	17:42	05:00	17:09	13:09	- 7 22	0.998116711
Oct 13 (Tue)	05:30	11:05	16:39	03:55	18:14	04:28	17:41	05:02	17:08	13:13	- 7 44	0.997838377
Oct 14 (Wed)	05:32	11:05	16:37	03:56	18:12	04:30	17:39	05:03	17:06	13:16	- 8 06	0.997560058
Oct 15 (Thu)	05:33	11:05	16:36	03:58	18:11	04:31	17:38	05:04	17:04	13:20	- 8 29	0.997281531
Oct 16 (Fri)	05:34	11:04	16:34	03:59	18:09	04:32	17:36	05:05	17:03	13:24	- 8 51	0.997002622
Oct 17 (Sat)	05:35	11:04	16:32	04:00	18:07	04:33	17:34	05:06	17:01	13:27	- 9 13	0.996723229
Oct 18 (Sun)	05:37	11:04	16:31	04:01	18:06	04:34	17:33	05:08	17:00	13:31	- 9 35	0.996443329
Oct 19 (Mon)	05:38	11:04	16:29	04:02	18:04	04:35	17:31	05:09	16:58	13:35	- 9 57	0.996162984
Oct 20 (Tue)	05:39	11:04	16:27	04:03	18:03	04:37	17:30	05:10	16:57	13:39	- 10 18	0.995882330
Oct 21 (Wed)	05:40	11:03	16:26	04:05	18:01	04:38	17:28	05:11	16:55	13:42	- 10 40	0.995601589
Oct 22 (Thu)	05:42	11:03	16:24	04:06	18:00	04:39	17:27	05:12	16:53	13:45	- 11 01	0.995320951
Oct 23 (Fri)	05:43	11:03	16:23	04:07	17:58	04:40	17:25	05:14	16:52	13:50	- 11 22	0.995040755
Oct 24 (Sat)	05:44	11:03	16:21	04:08	17:57	04:41	17:24	05:15	16:51	13:54	- 11 43	0.994761280
Oct 25 (Sun)	05:45	11:03	16:20	04:09	17:56	04:42	17:23	05:16	16:49	13:58	- 12 04	0.994482835
Oct 26 (Mon)	05:47	11:03	16:18	04:10	17:54	04:44	17:21	05:17	16:48	14 02	- 12 24	0.994205734
Oct 27 (Tue)	05:48	11:03	16:17	04:12	17:53	04:45	17:20	05:18	16:46	14 05	- 12 45	0.993930290
Oct 28 (Wed)	05:49	11:03	16:15	04:13	17:52	04:46	17:18	05:20	16:45	14 09	- 13 05	0.993656818
Oct 29 (Thu)	05:50	11:02	16:14	04:14	17:50	04:47	17:17	05:21	16:44	14 13	- 13 25	0.993385630
Oct 30 (Fri)	05:52	11:02	16:13	04:15	17:49	04:48	17:16	05:22	16:42	14 17	- 13 45	0.993117036
Oct 31 (Sat)	05:53	11:02	16:11	04:16	17:48	04:50	17:15	05:23	16:41	14 21	- 14 04	0.992851333

NOVEMBRE

Twilight													
Date	Rise h m	Transit h m	Set h m	Astronomical		Nautical		Civil		A.R. h m	Decl. °	Dist. AU	
				Begin h m	End h m	Begin h m	End h m	Begin h m	End h m				
Nov 01 (Sun)	05:54	11:02	16:10	04:17	17:47	04:51	17:13	05:24	16:40	14 25	- 14 24	0.992588801	
Nov 02 (Mon)	05:56	11:02	16:09	04:18	17:46	04:52	17:12	05:26	16:38	14 29	- 14 43	0.992329888	
Nov 03 (Tue)	05:57	11:02	16:07	04:20	17:44	04:53	17:11	05:27	16:37	14 33	- 15 02	0.992074194	
Nov 04 (Wed)	05:58	11:02	16:06	04:21	17:43	04:54	17:10	05:28	16:36	14 37	- 15 20	0.991822455	
Nov 05 (Thu)	05:59	11:02	16:05	04:22	17:42	04:55	17:09	05:29	16:35	14 41	- 15 39	0.991574526	
Nov 06 (Fri)	06:01	11:02	16:03	04:23	17:41	04:57	17:08	05:31	16:34	14 45	- 15 57	0.991330382	
Nov 07 (Sat)	06:02	11:02	16:02	04:24	17:40	04:58	17:07	05:32	16:33	14 48	- 16 15	0.991089912	
Nov 08 (Sun)	06:03	11:03	16:01	04:25	17:39	04:59	17:06	05:33	16:31	14 52	- 16 32	0.990852936	
Nov 09 (Mon)	06:05	11:03	16:00	04:26	17:38	05:00	17:05	05:34	16:30	14 57	- 16 50	0.990619221	
Nov 10 (Tue)	06:06	11:03	15:59	04:28	17:37	05:01	17:04	05:36	16:29	15 01	- 17 07	0.990388504	
Nov 11 (Wed)	06:07	11:03	15:58	04:29	17:36	05:02	17:03	05:37	16:28	15 05	- 17 23	0.990160516	
Nov 12 (Thu)	06:09	11:03	15:57	04:30	17:36	05:03	17:02	05:38	16:27	15 09	- 17 40	0.989935000	
Nov 13 (Fri)	06:10	11:03	15:56	04:31	17:35	05:05	17:01	05:39	16:26	15 13	- 17 56	0.989711736	
Nov 14 (Sat)	06:11	11:03	15:55	04:32	17:34	05:06	17:00	05:40	16:26	15 17	- 18 12	0.989490548	
Nov 15 (Sun)	06:12	11:03	15:54	04:33	17:33	05:07	16:59	05:42	16:25	15 21	- 18 27	0.989271320	
Nov 16 (Mon)	06:14	11:04	15:53	04:34	17:32	05:08	16:59	05:43	16:24	15 25	- 18 42	0.989054003	
Nov 17 (Tue)	06:15	11:04	15:52	04:35	17:32	05:09	16:58	05:44	16:23	15 29	- 18 57	0.988838612	
Nov 18 (Wed)	06:16	11:04	15:51	04:36	17:31	05:10	16:57	05:45	16:22	15 33	- 19 12	0.988625227	
Nov 19 (Thu)	06:18	11:04	15:50	04:37	17:30	05:11	16:56	05:46	16:22	15 37	- 19 26	0.988413979	
Nov 20 (Fri)	06:19	11:04	15:50	04:39	17:30	05:13	16:56	05:48	16:21	15 42	- 19 40	0.988205049	
Nov 21 (Sat)	06:20	11:05	15:49	04:40	17:29	05:14	16:55	05:49	16:20	15 46	- 19 53	0.987998847	
Nov 22 (Sun)	06:21	11:05	15:48	04:41	17:29	05:15	16:55	05:50	16:20	15 50	- 20 06	0.987795013	
Nov 23 (Mon)	06:23	11:05	15:47	04:42	17:28	05:16	16:54	05:51	16:19	15 54	- 20 19	0.987594402	
Nov 24 (Tue)	06:24	11:05	15:47	04:43	17:28	05:17	16:54	05:52	16:18	15 58	- 20 31	0.987397085	
Nov 25 (Wed)	06:25	11:06	15:46	04:44	17:27	05:18	16:53	05:53	16:18	16 03	- 20 43	0.987203344	
Nov 26 (Thu)	06:26	11:06	15:46	04:45	17:27	05:19	16:53	05:54	16:17	16 07	- 20 55	0.987013472	
Nov 27 (Fri)	06:27	11:06	15:45	04:46	17:27	05:20	16:52	05:56	16:17	16 11	- 21 06	0.986827770	
Nov 28 (Sat)	06:29	11:07	15:45	04:47	17:26	05:21	16:52	05:57	16:17	16 15	- 21 17	0.986646549	
Nov 29 (Sun)	06:30	11:07	15:44	04:48	17:26	05:22	16:52	05:58	16:16	16 20	- 21 27	0.986470118	
Nov 30 (Mon)	06:31	11:07	15:44	04:49	17:26	05:23	16:51	05:59	16:16	16 24	- 21 37	0.986298778	

DICEMBRE

Date	Rise h m	Transit h m	Set h m	Twilight						A.R. h m	Decl. ° ' "	Dist. AU
				Astronomical		Nautical		Civil				
				Begin h m	End h m	Begin h m	End h m	Begin h m	End h m			
Dec 01 (Tue)	06:32	11:08	15:44	04:50	17:26	05:24	16:51	06:00	16:16	16:28	-21 47	0.986132806
Dec 02 (Wed)	06:33	11:08	15:43	04:51	17:26	05:25	16:51	06:01	16:15	16:33	-21 56	0.985972430
Dec 03 (Thu)	06:34	11:09	15:43	04:52	17:25	05:26	16:51	06:02	16:15	16:37	-22 05	0.985817805
Dec 04 (Fri)	06:35	11:09	15:43	04:52	17:25	05:27	16:51	06:03	16:15	16:41	-22 13	0.985668995
Dec 05 (Sat)	06:36	11:09	15:42	04:53	17:25	05:28	16:51	06:04	16:15	16:46	-22 21	0.985525963
Dec 06 (Sun)	06:37	11:10	15:42	04:54	17:25	05:29	16:51	06:05	16:15	16:50	-22 28	0.985388572
Dec 07 (Mon)	06:38	11:10	15:42	04:55	17:25	05:30	16:51	06:06	16:15	16:54	-22 35	0.985258603
Dec 08 (Tue)	06:39	11:11	15:42	04:56	17:25	05:31	16:51	06:07	16:15	16:59	-22 42	0.985129787
Dec 09 (Wed)	06:40	11:11	15:42	04:57	17:25	05:31	16:51	06:07	16:15	17:03	-22 48	0.985007823
Dec 10 (Thu)	06:41	11:12	15:42	04:57	17:26	05:32	16:51	06:08	16:15	17:08	-22 54	0.984890416
Dec 11 (Fri)	06:42	11:12	15:42	04:58	17:26	05:33	16:51	06:09	16:15	17:12	-22 59	0.984777286
Dec 12 (Sat)	06:43	11:13	15:42	04:59	17:26	05:34	16:51	06:10	16:15	17:16	-23 04	0.984668189
Dec 13 (Sun)	06:43	11:13	15:43	05:00	17:26	05:35	16:51	06:11	16:15	17:21	-23 08	0.984562925
Dec 14 (Mon)	06:44	11:13	15:43	05:00	17:26	05:35	16:52	06:11	16:15	17:25	-23 12	0.984461340
Dec 15 (Tue)	06:45	11:14	15:43	05:01	17:27	05:36	16:52	06:12	16:16	17:30	-23 15	0.984363335
Dec 16 (Wed)	06:46	11:14	15:43	05:02	17:27	05:37	16:52	06:13	16:16	17:34	-23 18	0.984268862
Dec 17 (Thu)	06:46	11:15	15:44	05:02	17:27	05:37	16:52	06:14	16:16	17:38	-23 21	0.984177922
Dec 18 (Fri)	06:47	11:15	15:44	05:03	17:28	05:38	16:53	06:14	16:17	17:43	-23 23	0.984090565
Dec 19 (Sat)	06:48	11:16	15:44	05:04	17:28	05:39	16:53	06:15	16:17	17:47	-23 24	0.984008879
Dec 20 (Sun)	06:48	11:16	15:45	05:04	17:29	05:39	16:54	06:15	16:17	17:52	-23 25	0.983926992
Dec 21 (Mon)	06:49	11:17	15:45	05:05	17:29	05:40	16:54	06:16	16:18	17:56	-23 26	0.983851059
Dec 22 (Tue)	06:49	11:17	15:46	05:05	17:30	05:40	16:55	06:16	16:18	18:01	-23 26	0.983779263
Dec 23 (Wed)	06:50	11:18	15:46	05:06	17:30	05:41	16:55	06:17	16:19	18:05	-23 25	0.983711908
Dec 24 (Thu)	06:50	11:18	15:47	05:06	17:31	05:41	16:56	06:17	16:20	18:10	-23 25	0.983648920
Dec 25 (Fri)	06:50	11:19	15:47	05:07	17:31	05:41	16:56	06:18	16:20	18:14	-23 23	0.983590844
Dec 26 (Sat)	06:51	11:19	15:48	05:07	17:32	05:42	16:57	06:18	16:21	18:18	-23 22	0.983537847
Dec 27 (Sun)	06:51	11:20	15:49	05:07	17:33	05:42	16:58	06:18	16:22	18:23	-23 19	0.983490212
Dec 28 (Mon)	06:51	11:20	15:50	05:08	17:33	05:42	16:58	06:19	16:22	18:27	-23 17	0.983448237
Dec 29 (Tue)	06:52	11:21	15:50	05:08	17:34	05:43	16:59	06:19	16:23	18:32	-23 13	0.983412219
Dec 30 (Wed)	06:52	11:21	15:51	05:08	17:35	05:43	17:00	06:19	16:24	18:36	-23 10	0.983382439
Dec 31 (Thu)	06:52	11:22	15:52	05:08	17:35	05:43	17:01	06:19	16:25	18:41	-23 06	0.983359136