

I slightly modified Thorstensen's code to print out the time between evening twilight and morning twilight. For Okie-Tex site (site code = o) near Kenton OK I used same time zone as for Oklahoma City.

W. Romanishin- August 2013 - email: wromanishin at ou.edu - Here is stuff from John T. intro:

\*\*\*\*\* 2016 Night-time Astronomical Calendar for Cape Cod Schmidt Observatory \*\*\*\*\*

By John Thorstensen, Dartmouth College

This calendar is designed to provide information useful for the planning of nighttime observations. The format should minimize confusion; each line gives the phenomena for a single (local!) night, and each line is labeled with both evening and morning (local) day and date. Note that all times given are LOCAL CIVIL (zone) times. DAYLIGHT SAVINGS time is used using conventions for the USA; for 2007+, 2nd Sunday in March to first Sunday in November.

The rise/set times printed are the times at which the center of the object is 50 arcminutes below the geometrical horizon. At the given twilight, the center of the sun is -0.0 degrees below the geometrical horizon.

The moon positions (and rise/set times) are generated by an implementation of the Low-Precision formulae in the Astronomical Almanac. The Almanac states that the error seldom exceeds 0.3 degrees. Topocentric corrections are included. Comparisons with tables for Kitt Peak in the NOAO Newsletter indicate that the rise-set times are good to +/- 2 min or so. The moon's RA, Dec, and illuminated fraction are given for local midnight, regardless of whether the moon is actually up at that time. Note that the moonrise and moonset times are not printed if they occur near mid-day.

The LST at evening and morning twilight are tabulated. This gives an accurate idea of the range of RA's accessible during the night.

The JD is given (severely rounded off) for local midnight. Again, this avoids any ambiguity.

Some credits: The sidereal time and Julian date routines were originally coded in PL/I by Steve Maker of Dartmouth College. The algorithms originated in the old American Ephemeris. The routine to convert JD back to calendar date is adapted from Numerical Recipes in C, by Press et al.

CAUTIONS: I believe that the program which generates these tables is reasonably accurate. However, it has not been exhaustively tested, so you should be sure to run 'sanity checks' on the results. Also, in view of the approximations used, the results should not be used when high precision is needed. Extension to dates far from the present (1990) should be done with great caution. The code has not been tested for the eastern or southern hemispheres. Rise/set times are slightly inaccurate and rather confusing at circumpolar latitudes, where the concept of a 'night' is blurry.

The daylight savings time conventions (if used) are quite specific (to U. S., post-1986) and subject to change. I know that the code has many infelicities; if you should find actual errors, please notify  
John.Thorstensen@dartmouth.edu

[This output comes from a (hopefully) portable, completely self-contained program in the c language. It is available from the author and may be used freely for scientific or educational purposes. If you use it for profit, please contact the author to arrange a (modest!) fee.  
Source code is copyright John Thorstensen, 1990.]

MOON PHASES FOR 2016, at Cape Cod Schmidt Observatory

Times and dates are given in local time, zone = 5 hr West.  
 They are generally better than +/- 2 minutes.  
 Daylight savings time used.

The end of the previous year and the beginning of the next  
 are included for continuity.

NEW		1ST		FULL		LAST	
Dec 11	5 30	Dec 18	10 15	Dec 25	6 12	Jan 02	0 32
Jan 09	20 31	Jan 16	18 27	Jan 23	20 46	Jan 31	22 29
Feb 08	9 40	Feb 15	2 48	Feb 22	13 21	Mar 01	18 13
Mar 08	20 56	Mar 15	13 04	Mar 23	8 02	Mar 31	11 19
Apr 07	7 25	Apr 14	0 01	Apr 22	1 25	Apr 29	23 30
May 06	15 31	May 13	13 03	May 21	17 17	May 29	8 14
Jun 04	23 02	Jun 12	4 11	Jun 20	7 05	Jun 27	14 21
Jul 04	7 03	Jul 11	20 53	Jul 19	19 00	Jul 26	19 03
Aug 02	16 47	Aug 10	14 22	Aug 18	5 30	Aug 24	23 44
Sep 01	5 05	Sep 09	7 51	Sep 16	15 08	Sep 23	5 59
Sep 30	20 13	Oct 09	0 35	Oct 16	0 25	Oct 22	15 16
Oct 30	13 40	Nov 07	14 53	Nov 14	8 54	Nov 21	3 35
Nov 29	7 20	Dec 07	4 04	Dec 13	19 07	Dec 20	20 57
Dec 29	1 54	Jan 05	14 48	Jan 12	6 35	Jan 19	17 14

Calendar for Cape Cod Schmidt Observatory, west longitude (h.m.s) = 4 40 47, latitude (d.m) = 41 40.7  
 Rise/set times in Eastern time ( 5 hr W), uncorrected for elevation, DAYLIGHT time used, \* shows clock reset.  
 Moon info is for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

\*\*\*\*\* 2016 JANUARY \*\*\*\*\*

Date (eve/morn)	LMST midn	----- Sun: -----			LST twilight:		----- Moon: -----					Twi-Twi hours	
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	
Fri Jan 01/Sat Jan 02	7 04	16 21	18 01	5 28	7 08	1 04	12 33	23 49	.....	49	12 45.3	- 3 39	11.5
Sat Jan 02/Sun Jan 03	7 08	16 22	18 02	5 28	7 08	1 09	12 37	0 46	.....	40	13 30.6	- 7 14	11.4
Sun Jan 03/Mon Jan 04	7 12	16 22	18 02	5 28	7 08	1 14	12 41	1 42	.....	31	14 16.7	-10 34	11.4
Mon Jan 04/Tue Jan 05	7 16	16 23	18 03	5 28	7 08	1 18	12 45	2 40	.....	23	15 04.2	-13 31	11.4
Tue Jan 05/Wed Jan 06	7 20	16 24	18 04	5 28	7 08	1 23	12 49	3 37	.....	15	15 53.5	-15 57	11.4
Wed Jan 06/Thu Jan 07	7 24	16 25	18 05	5 28	7 08	1 28	12 53	4 34	.....	9	16 44.8	-17 43	11.4
Thu Jan 07/Fri Jan 08	7 28	16 26	18 06	5 28	7 08	1 33	12 57	5 30	.....	4	17 38.2	-18 40	11.4
Fri Jan 08/Sat Jan 09	7 32	16 27	18 07	5 28	7 08	1 38	13 01	6 23	15 32	1	18 33.1	-18 42	11.4
Sat Jan 09/Sun Jan 10	7 36	16 28	18 07	5 28	7 07	1 42	13 05	7 12	16 29	0	19 28.9	-17 43	11.3
Sun Jan 10/Mon Jan 11	7 40	16 29	18 08	5 28	7 07	1 47	13 09	7 57	17 32	2	20 24.9	-15 45	11.3
Mon Jan 11/Tue Jan 12	7 44	16 30	18 09	5 28	7 07	1 52	13 13	8 38	18 38	6	21 20.5	-12 53	11.3
Tue Jan 12/Wed Jan 13	7 48	16 31	18 10	5 28	7 06	1 57	13 16	.....	19 46	12	22 15.4	- 9 17	11.3
Wed Jan 13/Thu Jan 14	7 52	16 33	18 11	5 28	7 06	2 02	13 20	.....	20 55	20	23 09.6	- 5 10	11.3
Thu Jan 14/Fri Jan 15	7 56	16 34	18 12	5 27	7 06	2 07	13 24	.....	22 04	30	0 03.2	- 0 46	11.3
Fri Jan 15/Sat Jan 16	8 00	16 35	18 13	5 27	7 05	2 12	13 27	.....	23 13	40	0 57.0	3 39	11.2
Sat Jan 16/Sun Jan 17	8 03	16 36	18 14	5 27	7 05	2 17	13 31	.....	0 21	52	1 51.2	7 50	11.2
Sun Jan 17/Mon Jan 18	8 07	16 37	18 15	5 26	7 04	2 22	13 35	.....	1 29	63	2 46.3	11 33	11.2
Mon Jan 18/Tue Jan 19	8 11	16 38	18 16	5 26	7 04	2 27	13 38	.....	2 36	74	3 42.7	14 35	11.2
Tue Jan 19/Wed Jan 20	8 15	16 40	18 17	5 26	7 03	2 32	13 42	.....	3 39	83	4 40.0	16 43	11.1
Wed Jan 20/Thu Jan 21	8 19	16 41	18 18	5 25	7 02	2 37	13 45	.....	4 39	90	5 37.8	17 49	11.1
Thu Jan 21/Fri Jan 22	8 23	16 42	18 19	5 25	7 02	2 42	13 49	.....	5 33	96	6 35.4	17 50	11.1
Fri Jan 22/Sat Jan 23	8 27	16 43	18 20	5 24	7 01	2 47	13 52	15 43	6 21	99	7 31.9	16 49	11.1
Sat Jan 23/Sun Jan 24	8 31	16 44	18 21	5 24	7 00	2 52	13 56	16 42	7 03	100	8 26.5	14 52	11.0
Sun Jan 24/Mon Jan 25	8 35	16 46	18 22	5 23	7 00	2 57	13 59	17 43	7 40	98	9 19.0	12 10	11.0
Mon Jan 25/Tue Jan 26	8 39	16 47	18 24	5 22	6 59	3 02	14 02	18 43	8 14	95	10 09.1	8 56	11.0
Tue Jan 26/Wed Jan 27	8 43	16 48	18 25	5 22	6 58	3 07	14 06	19 42	.....	90	10 57.3	5 21	11.0
Wed Jan 27/Thu Jan 28	8 47	16 49	18 26	5 21	6 57	3 12	14 09	20 40	.....	83	11 44.0	- 1 36	10.9
Thu Jan 28/Fri Jan 29	8 51	16 51	18 27	5 20	6 56	3 17	14 12	21 37	.....	76	12 29.8	- 2 11	10.9
Fri Jan 29/Sat Jan 30	8 55	16 52	18 28	5 20	6 55	3 22	14 15	22 34	.....	67	13 15.2	- 5 51	10.9
Sat Jan 30/Sun Jan 31	8 59	16 53	18 29	5 19	6 54	3 27	14 18	23 30	.....	58	14 01.0	- 9 17	10.8
Sun Jan 31/Mon Feb 01	9 03	16 54	18 30	5 18	6 53	3 32	14 22	0 27	.....	49	14 47.7	-12 23	10.8

\*\*\*\*\* 2016 FEBRUARY \*\*\*\*\*

Date (eve/morn)	LMST midn	----- Sun: -----			LST twilight:		----- Moon: -----					Twi-Twi hours	
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	
Mon Feb 01/Tue Feb 02	9 07	16 56	18 31	5 17	6 52	3 37	14 25	1 23	.....	39	15 35.9	-15 00	10.8
Tue Feb 02/Wed Feb 03	9 11	16 57	18 32	5 16	6 51	3 42	14 28	2 20	.....	30	16 26.0	-17 02	10.7
Wed Feb 03/Thu Feb 04	9 14	16 58	18 33	5 15	6 50	3 47	14 31	3 15	.....	21	17 18.0	-18 19	10.7
Thu Feb 04/Fri Feb 05	9 18	17 00	18 34	5 14	6 49	3 52	14 34	4 09	.....	14	18 12.0	-18 45	10.7
Fri Feb 05/Sat Feb 06	9 22	17 01	18 36	5 14	6 48	3 57	14 37	5 01	.....	7	19 07.4	-18 12	10.6
Sat Feb 06/Sun Feb 07	9 26	17 02	18 37	5 13	6 47	4 02	14 40	5 48	.....	3	20 03.8	-16 38	10.6
Sun Feb 07/Mon Feb 08	9 30	17 03	18 38	5 12	6 46	4 07	14 43	6 32	16 18	0	21 00.5	-14 06	10.6
Mon Feb 08/Tue Feb 09	9 34	17 05	18 39	5 10	6 45	4 12	14 45	7 12	17 27	0	21 56.9	-10 43	10.5
Tue Feb 09/Wed Feb 10	9 38	17 06	18 40	5 09	6 43	4 17	14 48	7 50	18 38	3	22 52.8	- 6 40	10.5
Wed Feb 10/Thu Feb 11	9 42	17 07	18 41	5 08	6 42	4 22	14 51	.....	19 49	9	23 48.2	- 2 15	10.5
Thu Feb 11/Fri Feb 12	9 46	17 08	18 42	5 07	6 41	4 27	14 54	.....	21 01	17	0 43.3	2 17	10.4
Fri Feb 12/Sat Feb 13	9 50	17 10	18 43	5 06	6 40	4 33	14 57	.....	22 11	26	1 38.4	6 37	10.4
Sat Feb 13/Sun Feb 14	9 54	17 11	18 45	5 05	6 38	4 38	15 00	.....	23 21	37	2 33.9	10 31	10.3
Sun Feb 14/Mon Feb 15	9 58	17 12	18 46	5 04	6 37	4 43	15 02	.....	0 28	48	3 30.0	13 43	10.3
Mon Feb 15/Tue Feb 16	10 02	17 14	18 47	5 02	6 36	4 48	15 05	.....	1 33	59	4 26.6	16 04	10.3
Tue Feb 16/Wed Feb 17	10 06	17 15	18 48	5 01	6 34	4 53	15 08	.....	2 33	70	5 23.4	17 25	10.2
Wed Feb 17/Thu Feb 18	10 10	17 16	18 49	5 00	6 33	4 58	15 10	.....	3 27	79	6 19.9	17 45	10.2
Thu Feb 18/Fri Feb 19	10 14	17 17	18 50	4 59	6 31	5 03	15 13	.....	4 17	87	7 15.4	17 03	10.1
Fri Feb 19/Sat Feb 20	10 18	17 19	18 51	4 57	6 30	5 08	15 16	.....	5 00	93	8 09.5	15 26	10.1
Sat Feb 20/Sun Feb 21	10 21	17 20	18 53	4 56	6 28	5 13	15 18	.....	5 39	97	9 01.8	13 03	10.1
Sun Feb 21/Mon Feb 22	10 25	17 21	18 54	4 54	6 27	5 18	15 21	16 32	6 13	100	9 52.2	10 02	10.0
Mon Feb 22/Tue Feb 23	10 29	17 22	18 55	4 53	6 26	5 23	15 23	17 31	6 45	100	10 40.8	6 35	10.0
Tue Feb 23/Wed Feb 24	10 33	17 23	18 56	4 52	6 24	5 29	15 26	18 29	7 15	98	11 28.0	2 53	9.9
Wed Feb 24/Thu Feb 25	10 37	17 25	18 57	4 50	6 23	5 34	15 28	19 27	7 44	94	12 14.3	- 0 54	9.9
Thu Feb 25/Fri Feb 26	10 41	17 26	18 58	4 49	6 21	5 39	15 31	20 24	.....	89	13 00.1	- 4 38	9.8
Fri Feb 26/Sat Feb 27	10 45	17 27	18 59	4 47	6 19	5 44	15 33	21 20	.....	82	13 46.0	- 8 10	9.8
Sat Feb 27/Sun Feb 28	10 49	17 28	19 01	4 46	6 18	5 49	15 36	22 16	.....	75	14 32.4	-11 23	9.8
Sun Feb 28/Mon Feb 29	10 53	17 29	19 02	4 44	6 16	5 54	15 38	23 12	.....	66	15 19.9	-14 10	9.7
Mon Feb 29/Tue Mar 01	10 57	17 31	19 03	4 43	6 15	5 59	15 40	0 08	.....	57	16 08.8	-16 23	9.7

Calendar for Cape Cod Schmidt Observatory, west longitude (h.m.s) = 4 40 47, latitude (d.m) = 41 40.7  
 Rise/set times in Eastern time ( 5 hr W), uncorrected for elevation, DAYLIGHT time used, \* shows clock reset.  
 Moon info is for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

\*\*\*\*\* 2016 MARCH \*\*\*\*\*

Date (eve/morn)	LMST midn	----- Sun: -----				LST twilight:		----- Moon: -----				Twi-Twi hours	
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	
Tue Mar 01/Wed Mar 02	11 01	17 32	19 04	4 41	6 13	6 04	15 43	1 03	.....	47	16 59.4	-17 56	9.6
Wed Mar 02/Thu Mar 03	11 05	17 33	19 05	4 40	6 12	6 09	15 45	1 57	.....	37	17 51.7	-18 41	9.6
Thu Mar 03/Fri Mar 04	11 09	17 34	19 06	4 38	6 10	6 14	15 47	2 48	.....	28	18 45.6	-18 32	9.5
Fri Mar 04/Sat Mar 05	11 13	17 35	19 08	4 36	6 08	6 20	15 50	3 36	.....	19	19 40.8	-17 25	9.5
Sat Mar 05/Sun Mar 06	11 17	17 37	19 09	4 35	6 07	6 25	15 52	4 21	.....	11	20 36.8	-15 20	9.4
Sun Mar 06/Mon Mar 07	11 21	17 38	19 10	4 33	6 05	6 30	15 54	5 03	.....	5	21 33.2	-12 18	9.4
Mon Mar 07/Tue Mar 08	11 25	17 39	19 11	4 31	6 04	6 35	15 57	5 43	.....	1	22 29.8	- 8 31	9.3
Tue Mar 08/Wed Mar 09	11 28	17 40	19 12	4 30	6 02	6 40	15 59	6 21	17 25	0	23 26.3	- 4 10	9.3
Wed Mar 09/Thu Mar 10	11 32	17 41	19 14	4 28	6 00	6 45	16 01	6 59	18 38	2	0 22.8	0 27	9.2
Thu Mar 10/Fri Mar 11	11 36	17 42	19 15	4 26	5 59	6 50	16 03	7 37	19 52	6	1 19.6	5 01	9.2
Fri Mar 11/Sat Mar 12	11 40	17 43	19 16	4 24	5 57	6 56	16 06	.....	21 05	14	2 16.7	9 12	9.1
Sat Mar 12/Sun Mar 13*	11 44	17 45	19 17	5 23	6 55	7 01	16 08	.....	22 16	23	3 14.3	12 44	9.1
Sun Mar 13/Mon Mar 14	10 48	18 46	20 18	5 21	6 54	7 06	16 10	.....	0 24	32	4 09.4	15 21	9.0
Mon Mar 14/Tue Mar 15	10 52	18 47	20 20	5 19	6 52	7 11	16 12	.....	1 27	43	5 07.2	17 02	9.0
Tue Mar 15/Wed Mar 16	10 56	18 48	20 21	5 17	6 50	7 16	16 14	.....	2 24	54	6 04.3	17 40	8.9
Wed Mar 16/Thu Mar 17	11 00	18 49	20 22	5 16	6 48	7 21	16 16	.....	3 15	65	7 00.2	17 16	8.9
Thu Mar 17/Fri Mar 18	11 04	18 50	20 23	5 14	6 47	7 27	16 18	.....	4 00	75	7 54.3	15 55	8.8
Fri Mar 18/Sat Mar 19	11 08	18 51	20 25	5 12	6 45	7 32	16 21	.....	4 39	83	8 46.6	13 45	8.8
Sat Mar 19/Sun Mar 20	11 12	18 52	20 26	5 10	6 43	7 37	16 23	.....	5 15	90	9 36.9	10 57	8.7
Sun Mar 20/Mon Mar 21	11 16	18 54	20 27	5 08	6 42	7 42	16 25	.....	5 47	95	10 25.5	7 40	8.7
Mon Mar 21/Tue Mar 22	11 20	18 55	20 28	5 06	6 40	7 47	16 27	17 22	6 17	98	11 12.7	4 04	8.6
Tue Mar 22/Wed Mar 23	11 24	18 56	20 30	5 05	6 38	7 52	16 29	18 19	6 46	100	11 59.0	0 19	8.6
Wed Mar 23/Thu Mar 24	11 27	18 57	20 31	5 03	6 37	7 58	16 31	19 16	7 15	100	12 44.8	- 3 27	8.5
Thu Mar 24/Fri Mar 25	11 31	18 58	20 32	5 01	6 35	8 03	16 33	20 13	.....	97	13 30.7	- 7 04	8.5
Fri Mar 25/Sat Mar 26	11 35	18 59	20 33	4 59	6 33	8 08	16 35	21 09	.....	93	14 17.0	-10 25	8.4
Sat Mar 26/Sun Mar 27	11 39	19 00	20 35	4 57	6 31	8 13	16 37	22 05	.....	88	15 04.1	-13 22	8.4
Sun Mar 27/Mon Mar 28	11 43	19 01	20 36	4 55	6 30	8 19	16 39	23 01	.....	81	15 52.4	-15 47	8.3
Mon Mar 28/Tue Mar 29	11 47	19 02	20 37	4 53	6 28	8 24	16 41	23 55	.....	73	16 42.1	-17 34	8.3
Tue Mar 29/Wed Mar 30	11 51	19 03	20 39	4 51	6 26	8 29	16 43	0 49	.....	64	17 33.1	-18 35	8.2
Wed Mar 30/Thu Mar 31	11 55	19 05	20 40	4 49	6 25	8 34	16 45	1 40	.....	54	18 25.4	-18 46	8.2
Thu Mar 31/Fri Apr 01	11 59	19 06	20 41	4 47	6 23	8 40	16 47	2 28	.....	44	19 18.8	-18 03	8.1

\*\*\*\*\* 2016 APRIL \*\*\*\*\*

Date (eve/morn)	LMST midn	----- Sun: -----				LST twilight:		----- Moon: -----				Twi-Twi hours	
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	
Fri Apr 01/Sat Apr 02	12 03	19 07	20 43	4 45	6 21	8 45	16 49	3 13	.....	34	20 13.1	-16 24	8.0
Sat Apr 02/Sun Apr 03	12 07	19 08	20 44	4 43	6 20	8 50	16 51	3 55	.....	24	21 07.8	-13 51	8.0
Sun Apr 03/Mon Apr 04	12 11	19 09	20 45	4 42	6 18	8 56	16 53	4 35	.....	15	22 03.1	-10 27	7.9
Mon Apr 04/Tue Apr 05	12 15	19 10	20 47	4 40	6 16	9 01	16 55	5 13	.....	8	22 58.7	- 6 24	7.9
Tue Apr 05/Wed Apr 06	12 19	19 11	20 48	4 38	6 15	9 06	16 57	5 50	17 11	3	23 54.9	- 1 53	7.8
Wed Apr 06/Thu Apr 07	12 23	19 12	20 50	4 36	6 13	9 12	16 59	6 28	18 25	0	0 51.9	2 47	7.8
Thu Apr 07/Fri Apr 08	12 27	19 13	20 51	4 34	6 11	9 17	17 01	.....	19 39	1	1 49.8	7 16	7.7
Fri Apr 08/Sat Apr 09	12 31	19 14	20 52	4 32	6 10	9 22	17 03	.....	20 54	4	2 48.7	11 15	7.7
Sat Apr 09/Sun Apr 10	12 34	19 15	20 54	4 30	6 08	9 28	17 05	.....	22 06	10	3 48.3	14 25	7.6
Sun Apr 10/Mon Apr 11	12 38	19 17	20 55	4 28	6 06	9 33	17 07	.....	23 14	19	4 48.0	16 33	7.5
Mon Apr 11/Tue Apr 12	12 42	19 18	20 57	4 26	6 05	9 39	17 09	.....	0 16	28	5 47.0	17 33	7.5
Tue Apr 12/Wed Apr 13	12 46	19 19	20 58	4 24	6 03	9 44	17 11	.....	1 10	39	6 44.6	17 27	7.4
Wed Apr 13/Thu Apr 14	12 50	19 20	21 00	4 22	6 02	9 49	17 13	.....	1 58	49	7 40.1	16 20	7.4
Thu Apr 14/Fri Apr 15	12 54	19 21	21 01	4 20	6 00	9 55	17 15	.....	2 40	60	8 33.3	14 21	7.3
Fri Apr 15/Sat Apr 16	12 58	19 22	21 03	4 18	5 59	10 00	17 17	.....	3 17	70	9 24.2	11 42	7.3
Sat Apr 16/Sun Apr 17	13 02	19 23	21 04	4 16	5 57	10 06	17 19	.....	3 50	78	10 13.0	8 31	7.2
Sun Apr 17/Mon Apr 18	13 06	19 24	21 06	4 14	5 55	10 11	17 21	.....	4 20	86	11 00.2	5 00	7.1
Mon Apr 18/Tue Apr 19	13 10	19 25	21 07	4 12	5 54	10 17	17 23	.....	4 49	92	11 46.3	1 17	7.1
Tue Apr 19/Wed Apr 20	13 14	19 26	21 09	4 10	5 52	10 22	17 25	.....	5 18	96	12 32.0	- 2 30	7.0
Wed Apr 20/Thu Apr 21	13 18	19 28	21 10	4 08	5 51	10 28	17 27	18 07	5 47	99	13 17.7	- 6 11	7.0
Thu Apr 21/Fri Apr 22	13 22	19 29	21 12	4 06	5 49	10 33	17 29	19 03	6 17	100	14 03.9	- 9 39	6.9
Fri Apr 22/Sat Apr 23	13 26	19 30	21 13	4 04	5 48	10 39	17 31	19 59	.....	99	14 50.9	-12 45	6.8
Sat Apr 23/Sun Apr 24	13 30	19 31	21 15	4 02	5 46	10 44	17 33	20 55	.....	96	15 39.2	-15 22	6.8
Sun Apr 24/Mon Apr 25	13 34	19 32	21 17	4 00	5 45	10 50	17 35	21 51	.....	92	16 28.8	-17 22	6.7
Mon Apr 25/Tue Apr 26	13 38	19 33	21 18	3 59	5 44	10 55	17 37	22 44	.....	86	17 19.6	-18 37	6.7
Tue Apr 26/Wed Apr 27	13 42	19 34	21 20	3 57	5 42	11 01	17 39	23 36	.....	78	18 11.6	-19 03	6.6
Wed Apr 27/Thu Apr 28	13 45	19 35	21 21	3 55	5 41	11 06	17 41	0 24	.....	70	19 04.3	-18 36	6.6
Thu Apr 28/Fri Apr 29	13 49	19 36	21 23	3 53	5 40	11 12	17 43	1 10	.....	60	19 57.5	-17 14	6.5
Fri Apr 29/Sat Apr 30	13 53	19 37	21 25	3 51	5 38	11 17	17 45	1 51	.....	49	20 51.0	-14 59	6.4
Sat Apr 30/Sun May 01	13 57	19 38	21 26	3 49	5 37	11 23	17 47	2 31	.....	39	21 44.6	-11 55	6.4

Calendar for Cape Cod Schmidt Observatory, west longitude (h.m.s) = 4 40 47, latitude (d.m) = 41 40.7  
 Rise/set times in Eastern time ( 5 hr W), uncorrected for elevation, DAYLIGHT time used, \* shows clock reset.  
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\*\*\*\*\* 2016 MAY \*\*\*\*\*

Date (eve/morn)	LMST midn	----- Sun: -----				LST twilight:		----- Moon: -----				Twi-Twi hours	
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	
Sun May 01/Mon May 02	14 01	19 39	21 28	3 47	5 36	11 29	17 49	3 08	.....	28	22 38.5	- 8 10	6.3
Mon May 02/Tue May 03	14 05	19 41	21 29	3 45	5 34	11 34	17 51	3 44	.....	18	23 32.9	- 3 54	6.3
Tue May 03/Wed May 04	14 09	19 42	21 31	3 44	5 33	11 40	17 53	4 21	.....	10	0 28.2	0 40	6.2
Wed May 04/Thu May 05	14 13	19 43	21 33	3 42	5 32	11 45	17 56	4 59	.....	4	1 24.8	5 15	6.2
Thu May 05/Fri May 06	14 17	19 44	21 34	3 40	5 31	11 51	17 58	5 40	18 26	1	2 23.0	9 31	6.1
Fri May 06/Sat May 07	14 21	19 45	21 36	3 38	5 29	11 56	18 00	6 25	19 40	0	3 22.6	13 07	6.0
Sat May 07/Sun May 08	14 25	19 46	21 38	3 37	5 28	12 02	18 02	.....	20 52	3	4 23.2	15 47	6.0
Sun May 08/Mon May 09	14 29	19 47	21 39	3 35	5 27	12 08	18 04	.....	21 59	8	5 24.0	17 20	5.9
Mon May 09/Tue May 10	14 33	19 48	21 41	3 33	5 26	12 13	18 06	.....	22 59	15	6 23.8	17 41	5.9
Tue May 10/Wed May 11	14 37	19 49	21 43	3 31	5 25	12 19	18 09	.....	23 52	24	7 21.7	16 54	5.8
Wed May 11/Thu May 12	14 41	19 50	21 44	3 30	5 24	12 24	18 11	.....	0 38	34	8 17.0	15 09	5.8
Thu May 12/Fri May 13	14 45	19 51	21 46	3 28	5 23	12 30	18 13	.....	1 17	44	9 09.5	12 38	5.7
Fri May 13/Sat May 14	14 49	19 52	21 47	3 26	5 22	12 36	18 16	.....	1 52	54	9 59.5	9 33	5.7
Sat May 14/Sun May 15	14 52	19 53	21 49	3 25	5 21	12 41	18 18	.....	2 24	64	10 47.4	6 05	5.6
Sun May 15/Mon May 16	14 56	19 54	21 51	3 23	5 20	12 47	18 20	.....	2 53	73	11 33.8	2 23	5.5
Mon May 16/Tue May 17	15 00	19 55	21 52	3 22	5 19	12 52	18 23	.....	3 21	81	12 19.4	- 1 24	5.5
Tue May 17/Wed May 18	15 04	19 56	21 54	3 20	5 18	12 58	18 25	.....	3 50	88	13 04.8	- 5 09	5.4
Wed May 18/Thu May 19	15 08	19 57	21 55	3 19	5 17	13 03	18 28	.....	4 19	93	13 50.7	- 8 43	5.4
Thu May 19/Fri May 20	15 12	19 58	21 57	3 17	5 16	13 09	18 30	17 53	4 51	97	14 37.4	-11 59	5.3
Fri May 20/Sat May 21	15 16	19 59	21 59	3 16	5 15	13 14	18 33	18 50	5 25	99	15 25.5	-14 49	5.3
Sat May 21/Sun May 22	15 20	20 00	22 00	3 15	5 15	13 20	18 35	19 46	6 03	100	16 15.1	-17 03	5.2
Sun May 22/Mon May 23	15 24	20 01	22 02	3 13	5 14	13 25	18 38	20 41	.....	98	17 06.1	-18 34	5.2
Mon May 23/Tue May 24	15 28	20 02	22 03	3 12	5 13	13 31	18 40	21 33	.....	95	17 58.4	-19 15	5.1
Tue May 24/Wed May 25	15 32	20 03	22 05	3 11	5 12	13 36	18 43	22 23	.....	89	18 51.4	-19 03	5.1
Wed May 25/Thu May 26	15 36	20 04	22 06	3 09	5 12	13 42	18 46	23 10	.....	82	19 44.9	-17 55	5.1
Thu May 26/Fri May 27	15 40	20 04	22 07	3 08	5 11	13 47	18 48	23 52	.....	74	20 38.2	-15 54	5.0
Fri May 27/Sat May 28	15 44	20 05	22 09	3 07	5 11	13 52	18 51	0 32	.....	64	21 31.4	-13 04	5.0
Sat May 28/Sun May 29	15 48	20 06	22 10	3 06	5 10	13 58	18 54	1 08	.....	53	22 24.2	- 9 32	4.9
Sun May 29/Mon May 30	15 52	20 07	22 12	3 05	5 10	14 03	18 57	1 43	.....	42	23 17.2	- 5 29	4.9
Mon May 30/Tue May 31	15 56	20 08	22 13	3 04	5 09	14 08	19 00	2 18	.....	31	0 10.5	- 1 04	4.8
Tue May 31/Wed Jun 01	16 00	20 08	22 14	3 03	5 09	14 13	19 03	2 54	.....	21	1 05.0	3 26	4.8

\*\*\*\*\* 2016 JUNE \*\*\*\*\*

Date (eve/morn)	LMST midn	----- Sun: -----				LST twilight:		----- Moon: -----				Twi-Twi hours	
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	
Wed Jun 01/Thu Jun 02	16 03	20 09	22 15	3 02	5 08	14 19	19 06	3 32	.....	12	2 00.9	7 47	4.8
Thu Jun 02/Fri Jun 03	16 07	20 10	22 17	3 01	5 08	14 24	19 09	4 13	.....	6	2 58.7	11 39	4.7
Fri Jun 03/Sat Jun 04	16 11	20 11	22 18	3 00	5 07	14 29	19 12	5 00	18 27	2	3 58.1	14 45	4.7
Sat Jun 04/Sun Jun 05	16 15	20 11	22 19	3 00	5 07	14 34	19 15	5 52	19 37	0	4 58.7	16 49	4.7
Sun Jun 05/Mon Jun 06	16 19	20 12	22 20	2 59	5 07	14 39	19 19	.....	20 42	2	5 59.5	17 43	4.6
Mon Jun 06/Tue Jun 07	16 23	20 13	22 21	2 58	5 07	14 44	19 22	.....	21 40	6	6 59.1	17 25	4.6
Tue Jun 07/Wed Jun 08	16 27	20 13	22 22	2 58	5 06	14 49	19 25	.....	22 31	12	7 56.5	16 03	4.6
Wed Jun 08/Thu Jun 09	16 31	20 14	22 23	2 57	5 06	14 54	19 29	.....	23 14	20	8 51.3	13 46	4.6
Thu Jun 09/Fri Jun 10	16 35	20 14	22 24	2 57	5 06	14 59	19 32	.....	23 52	29	9 43.1	10 49	4.5
Fri Jun 10/Sat Jun 11	16 39	20 15	22 25	2 56	5 06	15 03	19 36	.....	0 25	38	10 32.4	7 24	4.5
Sat Jun 11/Sun Jun 12	16 43	20 15	22 25	2 56	5 06	15 08	19 39	.....	0 56	48	11 19.8	3 43	4.5
Sun Jun 12/Mon Jun 13	16 47	20 16	22 26	2 55	5 06	15 13	19 43	.....	1 25	58	12 05.8	- 0 05	4.5
Mon Jun 13/Tue Jun 14	16 51	20 16	22 27	2 55	5 06	15 17	19 47	.....	1 53	67	12 51.3	- 3 53	4.5
Tue Jun 14/Wed Jun 15	16 55	20 17	22 27	2 55	5 06	15 22	19 50	.....	2 22	75	13 36.8	- 7 32	4.5
Wed Jun 15/Thu Jun 16	16 59	20 17	22 28	2 55	5 06	15 26	19 54	.....	2 52	83	14 23.1	-10 56	4.4
Thu Jun 16/Fri Jun 17	17 03	20 18	22 29	2 55	5 06	15 31	19 58	.....	3 25	90	15 10.6	-13 57	4.4
Fri Jun 17/Sat Jun 18	17 07	20 18	22 29	2 55	5 06	15 35	20 02	17 38	4 02	95	15 59.7	-16 25	4.4
Sat Jun 18/Sun Jun 19	17 10	20 18	22 29	2 55	5 06	15 40	20 06	18 34	4 43	98	16 50.5	-18 14	4.4
Sun Jun 19/Mon Jun 20	17 14	20 18	22 30	2 55	5 06	15 44	20 10	19 28	5 29	100	17 43.0	-19 14	4.4
Mon Jun 20/Tue Jun 21	17 18	20 19	22 30	2 55	5 07	15 48	20 14	20 20	6 21	99	18 36.6	-19 21	4.4
Tue Jun 21/Wed Jun 22	17 22	20 19	22 30	2 56	5 07	15 52	20 18	21 08	.....	97	19 30.9	-18 30	4.4
Wed Jun 22/Thu Jun 23	17 26	20 19	22 30	2 56	5 07	15 56	20 23	21 53	.....	92	20 25.2	-16 42	4.4
Thu Jun 23/Fri Jun 24	17 30	20 19	22 30	2 56	5 07	16 00	20 27	22 34	.....	86	21 19.2	-14 03	4.4
Fri Jun 24/Sat Jun 25	17 34	20 19	22 30	2 57	5 08	16 04	20 31	23 11	.....	77	22 12.5	-10 40	4.4
Sat Jun 25/Sun Jun 26	17 38	20 19	22 30	2 57	5 08	16 08	20 36	23 47	.....	67	23 05.3	- 6 43	4.5
Sun Jun 26/Mon Jun 27	17 42	20 19	22 30	2 58	5 09	16 12	20 40	0 21	.....	56	23 58.1	- 2 25	4.5
Mon Jun 27/Tue Jun 28	17 46	20 19	22 30	2 59	5 09	16 15	20 45	0 55	.....	45	0 51.2	2 02	4.5
Tue Jun 28/Wed Jun 29	17 50	20 19	22 29	2 59	5 09	16 19	20 50	1 31	.....	34	1 45.4	6 22	4.5
Wed Jun 29/Thu Jun 30	17 54	20 19	22 29	3 00	5 10	16 23	20 54	2 09	.....	23	2 41.0	10 21	4.5
Thu Jun 30/Fri Jul 01	17 58	20 19	22 29	3 01	5 10	16 26	20 59	2 52	.....	14	3 38.3	13 40	4.5

Calendar for Cape Cod Schmidt Observatory, west longitude (h.m.s) = 4 40 47, latitude (d.m) = 41 40.7  
 Rise/set times in Eastern time ( 5 hr W), uncorrected for elevation, DAYLIGHT time used, \* shows clock reset.  
 Moon info is for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

\*\*\*\*\* 2016 JULY \*\*\*\*\*

Date (eve/morn)	LMST midn	----- Sun: -----				LST twilight:		----- Moon: -----				Twi-Twi hours	
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	
Fri Jul 01/Sat Jul 02	18 02	20 19	22 28	3 02	5 11	16 30	21 04	3 40	.....	7	4 37.1	16 07	4.6
Sat Jul 02/Sun Jul 03	18 06	20 19	22 28	3 03	5 11	16 33	21 09	4 33	18 24	2	5 36.9	17 29	4.6
Sun Jul 03/Mon Jul 04	18 10	20 19	22 27	3 03	5 12	16 37	21 14	5 32	19 25	0	6 36.4	17 42	4.6
Mon Jul 04/Tue Jul 05	18 14	20 18	22 27	3 04	5 13	16 40	21 19	.....	20 20	1	7 34.7	16 46	4.6
Tue Jul 05/Wed Jul 06	18 17	20 18	22 26	3 06	5 13	16 43	21 24	.....	21 07	4	8 30.9	14 50	4.7
Wed Jul 06/Thu Jul 07	18 21	20 18	22 25	3 07	5 14	16 46	21 29	.....	21 48	9	9 24.4	12 08	4.7
Thu Jul 07/Fri Jul 08	18 25	20 17	22 24	3 08	5 15	16 49	21 34	.....	22 24	15	10 15.3	8 51	4.7
Fri Jul 08/Sat Jul 09	18 29	20 17	22 23	3 09	5 15	16 53	21 39	.....	22 56	23	11 03.9	5 13	4.8
Sat Jul 09/Sun Jul 10	18 33	20 17	22 23	3 10	5 16	16 56	21 44	.....	23 26	32	11 50.8	1 24	4.8
Sun Jul 10/Mon Jul 11	18 37	20 16	22 22	3 11	5 17	16 59	21 49	.....	23 55	41	12 36.6	- 2 26	4.8
Mon Jul 11/Tue Jul 12	18 41	20 16	22 21	3 13	5 18	17 01	21 54	.....	0 24	51	13 22.1	- 6 09	4.9
Tue Jul 12/Wed Jul 13	18 45	20 15	22 20	3 14	5 18	17 04	21 59	.....	0 54	60	14 07.9	- 9 39	4.9
Wed Jul 13/Thu Jul 14	18 49	20 15	22 18	3 15	5 19	17 07	22 05	.....	1 25	69	14 54.7	-12 49	4.9
Thu Jul 14/Fri Jul 15	18 53	20 14	22 17	3 17	5 20	17 10	22 10	.....	2 00	78	15 42.9	-15 30	5.0
Fri Jul 15/Sat Jul 16	18 57	20 13	22 16	3 18	5 21	17 13	22 15	.....	2 39	85	16 32.9	-17 34	5.0
Sat Jul 16/Sun Jul 17	19 01	20 13	22 15	3 19	5 22	17 15	22 21	.....	3 23	92	17 24.7	-18 55	5.1
Sun Jul 17/Mon Jul 18	19 05	20 12	22 14	3 21	5 22	17 18	22 26	18 12	4 13	96	18 18.2	-19 23	5.1
Mon Jul 18/Tue Jul 19	19 09	20 11	22 12	3 22	5 23	17 21	22 32	19 03	5 08	99	19 12.9	-18 54	5.2
Tue Jul 19/Wed Jul 20	19 13	20 10	22 11	3 24	5 24	17 23	22 37	19 50	6 07	100	20 08.2	-17 26	5.2
Wed Jul 20/Thu Jul 21	19 17	20 10	22 10	3 25	5 25	17 26	22 42	20 33	.....	98	21 03.4	-15 01	5.3
Thu Jul 21/Fri Jul 22	19 21	20 09	22 08	3 27	5 26	17 28	22 48	21 12	.....	94	21 58.2	-11 47	5.3
Fri Jul 22/Sat Jul 23	19 25	20 08	22 07	3 28	5 27	17 31	22 53	21 49	.....	88	22 52.4	- 7 54	5.4
Sat Jul 23/Sun Jul 24	19 28	20 07	22 05	3 30	5 28	17 33	22 59	22 24	.....	80	23 46.1	- 3 37	5.4
Sun Jul 24/Mon Jul 25	19 32	20 06	22 04	3 31	5 29	17 36	23 04	22 58	.....	70	0 39.6	0 52	5.5
Mon Jul 25/Tue Jul 26	19 36	20 05	22 02	3 33	5 30	17 38	23 10	23 33	.....	59	1 33.6	5 15	5.5
Tue Jul 26/Wed Jul 27	19 40	20 04	22 01	3 34	5 31	17 41	23 15	0 10	.....	47	2 28.4	9 19	5.6
Wed Jul 27/Thu Jul 28	19 44	20 03	21 59	3 36	5 32	17 43	23 21	0 50	.....	36	3 24.4	12 47	5.6
Thu Jul 28/Fri Jul 29	19 48	20 02	21 57	3 38	5 33	17 45	23 26	1 35	.....	25	4 21.6	15 27	5.7
Fri Jul 29/Sat Jul 30	19 52	20 01	21 56	3 39	5 34	17 48	23 32	2 25	.....	16	5 19.7	17 08	5.7
Sat Jul 30/Sun Jul 31	19 56	20 00	21 54	3 41	5 35	17 50	23 37	3 20	.....	9	6 18.1	17 43	5.8
Sun Jul 31/Mon Aug 01	20 00	19 59	21 52	3 42	5 36	17 52	23 43	4 19	18 10	4	7 15.8	17 11	5.8

\*\*\*\*\* 2016 AUGUST \*\*\*\*\*

Date (eve/morn)	LMST midn	----- Sun: -----				LST twilight:		----- Moon: -----				Twi-Twi hours	
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	
Mon Aug 01/Tue Aug 02	20 04	19 58	21 51	3 44	5 37	17 54	23 48	5 21	18 59	1	8 12.0	15 38	5.9
Tue Aug 02/Wed Aug 03	20 08	19 57	21 49	3 45	5 38	17 56	23 54	6 24	19 43	0	9 06.1	13 14	5.9
Wed Aug 03/Thu Aug 04	20 12	19 56	21 47	3 47	5 39	17 59	24 00	.....	20 21	2	9 57.9	10 10	6.0
Thu Aug 04/Fri Aug 05	20 16	19 54	21 45	3 49	5 40	18 01	0 05	.....	20 55	6	10 47.4	6 39	6.1
Fri Aug 05/Sat Aug 06	20 20	19 53	21 44	3 50	5 41	18 03	0 11	.....	21 26	11	11 35.1	2 53	6.1
Sat Aug 06/Sun Aug 07	20 24	19 52	21 42	3 52	5 42	18 05	0 16	.....	21 56	18	12 21.5	- 0 58	6.2
Sun Aug 07/Mon Aug 08	20 28	19 51	21 40	3 53	5 43	18 07	0 22	.....	22 25	26	13 07.2	- 4 45	6.2
Mon Aug 08/Tue Aug 09	20 32	19 49	21 38	3 55	5 44	18 09	0 27	.....	22 54	35	13 52.8	- 8 19	6.3
Tue Aug 09/Wed Aug 10	20 35	19 48	21 36	3 57	5 45	18 11	0 33	.....	23 25	44	14 38.9	-11 35	6.3
Wed Aug 10/Thu Aug 11	20 39	19 47	21 34	3 58	5 46	18 13	0 38	.....	23 58	53	15 26.1	-14 26	6.4
Thu Aug 11/Fri Aug 12	20 43	19 45	21 32	4 00	5 47	18 15	0 44	.....	0 35	63	16 14.8	-16 43	6.5
Fri Aug 12/Sat Aug 13	20 47	19 44	21 31	4 01	5 48	18 17	0 49	.....	1 16	72	17 05.3	-18 20	6.5
Sat Aug 13/Sun Aug 14	20 51	19 43	21 29	4 03	5 49	18 19	0 55	.....	2 03	80	17 57.6	-19 10	6.6
Sun Aug 14/Mon Aug 15	20 55	19 41	21 27	4 04	5 50	18 21	1 00	.....	2 55	88	18 51.5	-19 05	6.6
Mon Aug 15/Tue Aug 16	20 59	19 40	21 25	4 06	5 51	18 24	1 06	17 41	3 53	94	19 46.6	-18 02	6.7
Tue Aug 16/Wed Aug 17	21 03	19 38	21 23	4 07	5 52	18 26	1 11	18 26	4 56	98	20 42.4	-15 59	6.7
Wed Aug 17/Thu Aug 18	21 07	19 37	21 21	4 09	5 53	18 27	1 17	19 08	6 02	100	21 38.3	-13 02	6.8
Thu Aug 18/Fri Aug 19	21 11	19 35	21 19	4 10	5 54	18 29	1 22	19 47	.....	99	22 33.9	- 9 18	6.9
Fri Aug 19/Sat Aug 20	21 15	19 34	21 17	4 12	5 55	18 31	1 27	20 24	.....	96	23 29.3	- 5 01	6.9
Sat Aug 20/Sun Aug 21	21 19	19 32	21 15	4 13	5 56	18 33	1 33	20 59	.....	90	0 24.5	- 0 27	7.0
Sun Aug 21/Mon Aug 22	21 23	19 31	21 13	4 15	5 57	18 35	1 38	21 35	.....	82	1 19.8	4 06	7.0
Mon Aug 22/Tue Aug 23	21 27	19 29	21 11	4 16	5 58	18 37	1 44	22 12	.....	72	2 15.5	8 21	7.1
Tue Aug 23/Wed Aug 24	21 31	19 28	21 09	4 18	5 59	18 39	1 49	22 51	.....	61	3 12.0	12 02	7.1
Wed Aug 24/Thu Aug 25	21 35	19 26	21 07	4 19	6 00	18 41	1 54	23 34	.....	49	4 09.2	14 55	7.2
Thu Aug 25/Fri Aug 26	21 39	19 25	21 05	4 20	6 01	18 43	2 00	0 22	.....	38	5 07.0	16 49	7.3
Fri Aug 26/Sat Aug 27	21 43	19 23	21 03	4 22	6 02	18 45	2 05	1 14	.....	28	6 04.7	17 40	7.3
Sat Aug 27/Sun Aug 28	21 46	19 21	21 01	4 23	6 03	18 47	2 10	2 11	.....	18	7 01.7	17 26	7.4
Sun Aug 28/Mon Aug 29	21 50	19 20	20 59	4 25	6 04	18 49	2 16	3 11	.....	11	7 57.3	16 10	7.4
Mon Aug 29/Tue Aug 30	21 54	19 18	20 57	4 26	6 05	18 51	2 21	4 13	17 39	5	8 51.1	14 02	7.5
Tue Aug 30/Wed Aug 31	21 58	19 17	20 55	4 27	6 06	18 53	2 26	5 15	18 19	2	9 42.8	11 11	7.5
Wed Aug 31/Thu Sep 01	22 02	19 15	20 53	4 29	6 07	18 55	2 32	6 16	18 54	0	10 32.5	7 50	7.6

Calendar for Cape Cod Schmidt Observatory, west longitude (h.m.s) = 4 40 47, latitude (d.m) = 41 40.7  
 Rise/set times in Eastern time ( 5 hr W), uncorrected for elevation, DAYLIGHT time used, \* shows clock reset.  
 Moon info is for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

\*\*\*\*\* 2016 SEPTEMBER \*\*\*\*\*

Date (eve/morn)	LMST midn	----- Sun: -----				LST twilight:		----- Moon: -----				Twi-Twi hours	
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA		Dec
Thu Sep 01/Fri Sep 02	22 06	19 13	20 51	4 30	6 08	18 57	2 37	.....	19 26	1	11 20.5	4 09	7.7
Fri Sep 02/Sat Sep 03	22 10	19 12	20 49	4 32	6 09	18 59	2 42	.....	19 56	3	12 07.1	0 20	7.7
Sat Sep 03/Sun Sep 04	22 14	19 10	20 47	4 33	6 10	19 01	2 48	.....	20 26	7	12 53.0	- 3 28	7.8
Sun Sep 04/Mon Sep 05	22 18	19 08	20 45	4 34	6 11	19 03	2 53	.....	20 55	13	13 38.5	- 7 07	7.8
Mon Sep 05/Tue Sep 06	22 22	19 06	20 43	4 36	6 12	19 05	2 58	.....	21 25	20	14 24.3	-10 28	7.9
Tue Sep 06/Wed Sep 07	22 26	19 05	20 41	4 37	6 13	19 07	3 03	.....	21 57	28	15 10.8	-13 26	7.9
Wed Sep 07/Thu Sep 08	22 30	19 03	20 39	4 38	6 14	19 09	3 09	.....	22 32	37	15 58.4	-15 54	8.0
Thu Sep 08/Fri Sep 09	22 34	19 01	20 37	4 39	6 15	19 10	3 14	.....	23 11	46	16 47.4	-17 44	8.0
Fri Sep 09/Sat Sep 10	22 38	19 00	20 35	4 41	6 16	19 12	3 19	.....	23 54	56	17 38.1	-18 50	8.1
Sat Sep 10/Sun Sep 11	22 42	18 58	20 33	4 42	6 17	19 14	3 24	.....	0 43	66	18 30.3	-19 07	8.1
Sun Sep 11/Mon Sep 12	22 46	18 56	20 31	4 43	6 18	19 16	3 30	.....	1 37	75	19 23.9	-18 28	8.2
Mon Sep 12/Tue Sep 13	22 50	18 54	20 29	4 44	6 19	19 18	3 35	.....	2 37	84	20 18.5	-16 52	8.3
Tue Sep 13/Wed Sep 14	22 53	18 53	20 27	4 46	6 20	19 20	3 40	17 00	3 41	91	21 14.0	-14 19	8.3
Wed Sep 14/Thu Sep 15	22 57	18 51	20 26	4 47	6 22	19 22	3 45	17 40	4 49	96	22 09.8	-10 54	8.4
Thu Sep 15/Fri Sep 16	23 01	18 49	20 24	4 48	6 23	19 24	3 50	18 18	5 59	99	23 05.9	- 6 47	8.4
Fri Sep 16/Sat Sep 17	23 05	18 48	20 22	4 49	6 24	19 26	3 55	18 55	7 11	100	0 02.4	- 2 12	8.5
Sat Sep 17/Sun Sep 18	23 09	18 46	20 20	4 51	6 25	19 28	4 01	19 32	.....	97	0 59.3	2 32	8.5
Sun Sep 18/Mon Sep 19	23 13	18 44	20 18	4 52	6 26	19 30	4 06	20 09	.....	92	1 56.8	7 05	8.6
Mon Sep 19/Tue Sep 20	23 17	18 42	20 16	4 53	6 27	19 32	4 11	20 49	.....	84	2 55.1	11 06	8.6
Tue Sep 20/Wed Sep 21	23 21	18 41	20 14	4 54	6 28	19 34	4 16	21 32	.....	74	3 54.0	14 20	8.7
Wed Sep 21/Thu Sep 22	23 25	18 39	20 12	4 55	6 29	19 37	4 21	22 19	.....	63	4 53.2	16 34	8.7
Thu Sep 22/Fri Sep 23	23 29	18 37	20 10	4 56	6 30	19 39	4 26	23 10	.....	52	5 52.0	17 41	8.8
Fri Sep 23/Sat Sep 24	23 33	18 35	20 08	4 58	6 31	19 41	4 31	0 06	.....	41	6 49.7	17 41	8.8
Sat Sep 24/Sun Sep 25	23 37	18 34	20 07	4 59	6 32	19 43	4 36	1 05	.....	31	7 45.7	16 38	8.9
Sun Sep 25/Mon Sep 26	23 41	18 32	20 05	5 00	6 33	19 45	4 42	2 06	.....	21	8 39.5	14 41	8.9
Mon Sep 26/Tue Sep 27	23 45	18 30	20 03	5 01	6 34	19 47	4 47	3 07	.....	14	9 31.2	12 00	9.0
Tue Sep 27/Wed Sep 28	23 49	18 29	20 01	5 02	6 35	19 49	4 52	4 07	16 55	7	10 20.7	8 47	9.0
Wed Sep 28/Thu Sep 29	23 53	18 27	19 59	5 03	6 36	19 51	4 57	5 07	17 28	3	11 08.5	5 12	9.1
Thu Sep 29/Fri Sep 30	23 57	18 25	19 58	5 04	6 37	19 53	5 02	6 06	17 58	1	11 55.0	1 26	9.1
Fri Sep 30/Sat Oct 01	0 01	18 23	19 56	5 06	6 38	19 56	5 07	7 04	18 27	0	12 40.7	- 2 22	9.2

\*\*\*\*\* 2016 OCTOBER \*\*\*\*\*

Date (eve/morn)	LMST midn	----- Sun: -----				LST twilight:		----- Moon: -----				Twi-Twi hours	
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA		Dec
Sat Oct 01/Sun Oct 02	0 04	18 22	19 54	5 07	6 39	19 58	5 12	.....	18 56	1	13 26.1	- 6 04	9.2
Sun Oct 02/Mon Oct 03	0 08	18 20	19 52	5 08	6 40	20 00	5 17	.....	19 26	4	14 11.6	- 9 32	9.3
Mon Oct 03/Tue Oct 04	0 12	18 18	19 50	5 09	6 41	20 02	5 22	.....	19 57	9	14 57.7	-12 37	9.3
Tue Oct 04/Wed Oct 05	0 16	18 17	19 49	5 10	6 42	20 04	5 27	.....	20 31	15	15 44.7	-15 13	9.4
Wed Oct 05/Thu Oct 06	0 20	18 15	19 47	5 11	6 44	20 07	5 32	.....	21 08	22	16 32.8	-17 14	9.4
Thu Oct 06/Fri Oct 07	0 24	18 13	19 45	5 12	6 45	20 09	5 37	.....	21 49	30	17 22.1	-18 34	9.4
Fri Oct 07/Sat Oct 08	0 28	18 12	19 44	5 13	6 46	20 11	5 42	.....	22 35	39	18 12.7	-19 06	9.5
Sat Oct 08/Sun Oct 09	0 32	18 10	19 42	5 14	6 47	20 13	5 47	.....	23 26	49	19 04.5	-18 48	9.5
Sun Oct 09/Mon Oct 10	0 36	18 08	19 40	5 16	6 48	20 16	5 52	.....	0 21	59	19 57.3	-17 35	9.6
Mon Oct 10/Tue Oct 11	0 40	18 07	19 39	5 17	6 49	20 18	5 57	.....	1 22	69	20 50.8	-15 28	9.6
Tue Oct 11/Wed Oct 12	0 44	18 05	19 37	5 18	6 50	20 20	6 03	.....	2 26	79	21 45.0	-12 28	9.7
Wed Oct 12/Thu Oct 13	0 48	18 03	19 36	5 19	6 51	20 23	6 08	16 11	3 34	87	22 39.9	- 8 42	9.7
Thu Oct 13/Fri Oct 14	0 52	18 02	19 34	5 20	6 52	20 25	6 13	16 48	4 45	94	23 35.7	- 4 19	9.8
Fri Oct 14/Sat Oct 15	0 56	18 00	19 33	5 21	6 53	20 28	6 18	17 24	5 57	98	0 32.4	0 25	9.8
Sat Oct 15/Sun Oct 16	1 00	17 59	19 31	5 22	6 55	20 30	6 23	18 01	7 11	100	1 30.5	5 12	9.9
Sun Oct 16/Mon Oct 17	1 04	17 57	19 30	5 23	6 56	20 32	6 28	18 41	.....	98	2 30.1	9 38	9.9
Mon Oct 17/Tue Oct 18	1 08	17 56	19 28	5 24	6 57	20 35	6 33	19 23	.....	94	3 30.9	13 23	9.9
Tue Oct 18/Wed Oct 19	1 11	17 54	19 27	5 25	6 58	20 37	6 38	20 10	.....	87	4 32.5	16 08	10.0
Wed Oct 19/Thu Oct 20	1 15	17 53	19 25	5 26	6 59	20 40	6 43	21 02	.....	77	5 34.0	17 41	10.0
Thu Oct 20/Fri Oct 21	1 19	17 51	19 24	5 28	7 00	20 42	6 48	21 58	.....	67	6 34.2	18 02	10.1
Fri Oct 21/Sat Oct 22	1 23	17 50	19 22	5 29	7 02	20 45	6 53	22 58	.....	56	7 32.4	17 13	10.1
Sat Oct 22/Sun Oct 23	1 27	17 48	19 21	5 30	7 03	20 48	6 58	23 59	.....	45	8 27.8	15 26	10.1
Sun Oct 23/Mon Oct 24	1 31	17 47	19 20	5 31	7 04	20 50	7 03	1 00	.....	35	9 20.5	12 51	10.2
Mon Oct 24/Tue Oct 25	1 35	17 45	19 18	5 32	7 05	20 53	7 08	2 01	.....	26	10 10.6	9 43	10.2
Tue Oct 25/Wed Oct 26	1 39	17 44	19 17	5 33	7 06	20 55	7 13	3 01	.....	18	10 58.6	6 11	10.3
Wed Oct 26/Thu Oct 27	1 43	17 43	19 16	5 34	7 07	20 58	7 18	3 59	16 02	11	11 45.0	2 26	10.3
Thu Oct 27/Fri Oct 28	1 47	17 41	19 15	5 35	7 09	21 01	7 23	4 57	16 31	6	12 30.5	- 1 23	10.3
Fri Oct 28/Sat Oct 29	1 51	17 40	19 13	5 36	7 10	21 03	7 28	5 55	16 59	2	13 15.6	- 5 07	10.4
Sat Oct 29/Sun Oct 30	1 55	17 39	19 12	5 37	7 11	21 06	7 33	6 51	17 28	0	14 00.8	- 8 40	10.4
Sun Oct 30/Mon Oct 31	1 59	17 37	19 11	5 38	7 12	21 09	7 38	7 48	17 59	0	14 46.6	-11 53	10.5
Mon Oct 31/Tue Nov 01	2 03	17 36	19 10	5 39	7 13	21 12	7 43	.....	18 31	2	15 33.2	-14 39	10.5

Calendar for Cape Cod Schmidt Observatory, west longitude (h.m.s) = 4 40 47, latitude (d.m) = 41 40.7  
 Rise/set times in Eastern time ( 5 hr W), uncorrected for elevation, DAYLIGHT time used, \* shows clock reset.  
 Moon info is for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

\*\*\*\*\* 2016 NOVEMBER \*\*\*\*\*

Date (eve/morn)	LMST midn	----- Sun: -----					LST twilight:		----- Moon: -----					Twi-Twi hours
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec		
Tue Nov 01/Wed Nov 02	2 07	17 35	19 09	5 40	7 15	21 15	7 48	.....	19 07	5	16 20.9	-16 50	10.5	
Wed Nov 02/Thu Nov 03	2 11	17 34	19 08	5 41	7 16	21 18	7 53	.....	19 47	10	17 09.7	-18 22	10.6	
Thu Nov 03/Fri Nov 04	2 15	17 32	19 07	5 43	7 17	21 20	7 58	.....	20 30	16	17 59.6	-19 07	10.6	
Fri Nov 04/Sat Nov 05	2 18	17 31	19 06	5 44	7 18	21 23	8 03	.....	21 19	24	18 50.3	-19 04	10.6	
Sat Nov 05/Sun Nov 06*	2 22	17 30	19 05	4 45	6 20	21 26	8 08	.....	22 12	33	19 41.6	-18 08	10.7	
Sun Nov 06/Mon Nov 07	3 27	16 29	18 04	4 46	6 21	21 29	8 13	.....	22 09	43	20 35.6	-16 13	10.7	
Mon Nov 07/Tue Nov 08	3 30	16 28	18 03	4 47	6 22	21 32	8 18	.....	23 10	53	21 27.6	-13 34	10.7	
Tue Nov 08/Wed Nov 09	3 34	16 27	18 02	4 48	6 23	21 35	8 23	.....	0 14	64	22 20.1	-10 10	10.8	
Wed Nov 09/Thu Nov 10	3 38	16 26	18 01	4 49	6 24	21 38	8 28	.....	1 21	74	23 13.3	-6 08	10.8	
Thu Nov 10/Fri Nov 11	3 42	16 25	18 00	4 50	6 26	21 41	8 33	.....	2 31	83	0 07.8	-1 37	10.8	
Fri Nov 11/Sat Nov 12	3 46	16 24	17 59	4 51	6 27	21 45	8 38	.....	3 43	91	1 03.9	3 07	10.9	
Sat Nov 12/Sun Nov 13	3 50	16 23	17 59	4 52	6 28	21 48	8 43	15 31	4 57	97	2 02.1	7 46	10.9	
Sun Nov 13/Mon Nov 14	3 54	16 22	17 58	4 53	6 29	21 51	8 48	16 11	6 12	100	3 02.6	11 57	10.9	
Mon Nov 14/Tue Nov 15	3 58	16 21	17 57	4 54	6 31	21 54	8 53	16 56	7 25	99	4 05.1	15 17	10.9	
Tue Nov 15/Wed Nov 16	4 02	16 20	17 56	4 55	6 32	21 57	8 58	17 47	8 35	96	5 08.8	17 29	11.0	
Wed Nov 16/Thu Nov 17	4 06	16 19	17 56	4 56	6 33	22 01	9 03	18 43	.....	89	6 12.2	18 22	11.0	
Thu Nov 17/Fri Nov 18	4 10	16 18	17 55	4 57	6 34	22 04	9 08	19 43	.....	81	7 13.9	17 56	11.0	
Fri Nov 18/Sat Nov 19	4 14	16 18	17 55	4 58	6 35	22 07	9 13	20 46	.....	72	8 12.7	16 22	11.1	
Sat Nov 19/Sun Nov 20	4 18	16 17	17 54	4 59	6 36	22 11	9 18	21 50	.....	61	9 08.2	13 54	11.1	
Sun Nov 20/Mon Nov 21	4 22	16 16	17 54	5 00	6 38	22 14	9 23	22 52	.....	51	10 00.5	10 46	11.1	
Mon Nov 21/Tue Nov 22	4 26	16 16	17 53	5 01	6 39	22 18	9 28	23 54	.....	41	10 49.9	7 13	11.1	
Tue Nov 22/Wed Nov 23	4 30	16 15	17 53	5 02	6 40	22 21	9 33	0 53	.....	31	11 37.2	3 25	11.2	
Wed Nov 23/Thu Nov 24	4 34	16 14	17 52	5 03	6 41	22 25	9 38	1 51	.....	23	12 23.0	-0 27	11.2	
Thu Nov 24/Fri Nov 25	4 38	16 14	17 52	5 04	6 42	22 28	9 42	2 49	.....	15	13 08.2	-4 16	11.2	
Fri Nov 25/Sat Nov 26	4 41	16 13	17 51	5 05	6 43	22 32	9 47	3 45	.....	9	13 53.3	-7 53	11.2	
Sat Nov 26/Sun Nov 27	4 45	16 13	17 51	5 06	6 44	22 36	9 52	4 42	.....	5	14 38.8	-11 13	11.2	
Sun Nov 27/Mon Nov 28	4 49	16 12	17 51	5 07	6 46	22 39	9 57	5 38	15 33	2	15 25.2	-14 06	11.3	
Mon Nov 28/Tue Nov 29	4 53	16 12	17 51	5 08	6 47	22 43	10 02	6 33	16 07	0	16 12.7	-16 27	11.3	
Tue Nov 29/Wed Nov 30	4 57	16 12	17 50	5 09	6 48	22 47	10 07	7 27	16 45	1	17 01.4	-18 09	11.3	
Wed Nov 30/Thu Dec 01	5 01	16 11	17 50	5 10	6 49	22 50	10 12	8 18	17 28	3	17 51.2	-19 06	11.3	

\*\*\*\*\* 2016 DECEMBER \*\*\*\*\*

Date (eve/morn)	LMST midn	----- Sun: -----					LST twilight:		----- Moon: -----					Twi-Twi hours
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec		
Thu Dec 01/Fri Dec 02	5 05	16 11	17 50	5 11	6 50	22 54	10 17	.....	18 15	7	18 41.7	-19 13	11.3	
Fri Dec 02/Sat Dec 03	5 09	16 11	17 50	5 12	6 51	22 58	10 21	.....	19 07	12	19 32.7	-18 29	11.4	
Sat Dec 03/Sun Dec 04	5 13	16 11	17 50	5 12	6 52	23 02	10 26	.....	20 02	19	20 23.8	-16 54	11.4	
Sun Dec 04/Mon Dec 05	5 17	16 10	17 50	5 13	6 53	23 06	10 31	.....	21 01	27	21 14.8	-14 30	11.4	
Mon Dec 05/Tue Dec 06	5 21	16 10	17 50	5 14	6 54	23 10	10 36	.....	22 03	37	22 05.8	-11 23	11.4	
Tue Dec 06/Wed Dec 07	5 25	16 10	17 50	5 15	6 55	23 14	10 41	.....	23 07	47	22 56.9	-7 39	11.4	
Wed Dec 07/Thu Dec 08	5 29	16 10	17 50	5 16	6 56	23 18	10 45	.....	0 13	58	23 48.7	-3 25	11.4	
Thu Dec 08/Fri Dec 09	5 33	16 10	17 50	5 16	6 56	23 22	10 50	.....	1 21	69	0 41.8	1 06	11.4	
Fri Dec 09/Sat Dec 10	5 37	16 10	17 50	5 17	6 57	23 26	10 55	.....	2 31	79	1 36.8	5 40	11.4	
Sat Dec 10/Sun Dec 11	5 41	16 10	17 50	5 18	6 58	23 30	10 59	.....	3 44	88	2 34.2	10 01	11.5	
Sun Dec 11/Mon Dec 12	5 45	16 10	17 51	5 19	6 59	23 34	11 04	.....	4 57	95	3 34.4	13 46	11.5	
Mon Dec 12/Tue Dec 13	5 48	16 11	17 51	5 19	7 00	23 38	11 09	15 30	6 09	99	4 37.0	16 36	11.5	
Tue Dec 13/Wed Dec 14	5 52	16 11	17 51	5 20	7 00	23 42	11 13	16 23	7 16	100	5 41.0	18 13	11.5	
Wed Dec 14/Thu Dec 15	5 56	16 11	17 51	5 21	7 01	23 47	11 18	17 22	8 17	98	6 44.9	18 29	11.5	
Thu Dec 15/Fri Dec 16	6 00	16 11	17 52	5 21	7 02	23 51	11 23	18 25	.....	93	7 47.0	17 26	11.5	
Fri Dec 16/Sat Dec 17	6 04	16 12	17 52	5 22	7 02	23 55	11 27	19 31	.....	86	8 46.2	15 16	11.5	
Sat Dec 17/Sun Dec 18	6 08	16 12	17 52	5 23	7 03	24 00	11 32	20 37	.....	77	9 41.8	12 16	11.5	
Sun Dec 18/Mon Dec 19	6 12	16 12	17 53	5 23	7 04	0 04	11 36	21 41	.....	68	10 34.0	8 44	11.5	
Mon Dec 19/Tue Dec 20	6 16	16 13	17 53	5 24	7 04	0 08	11 41	22 42	.....	58	11 23.3	4 52	11.5	
Tue Dec 20/Wed Dec 21	6 20	16 13	17 54	5 24	7 05	0 13	11 45	23 42	.....	48	12 10.6	0 54	11.5	
Wed Dec 21/Thu Dec 22	6 24	16 14	17 54	5 25	7 05	0 17	11 49	0 40	.....	38	12 56.6	-3 01	11.5	
Thu Dec 22/Fri Dec 23	6 28	16 14	17 55	5 25	7 06	0 22	11 54	1 38	.....	29	13 42.0	-6 45	11.5	
Fri Dec 23/Sat Dec 24	6 32	16 15	17 55	5 26	7 06	0 26	11 58	2 34	.....	21	14 27.5	-10 13	11.5	
Sat Dec 24/Sun Dec 25	6 36	16 15	17 56	5 26	7 06	0 31	12 03	3 31	.....	14	15 13.6	-13 17	11.5	
Sun Dec 25/Mon Dec 26	6 40	16 16	17 56	5 26	7 07	0 35	12 07	4 26	.....	8	16 00.9	-15 49	11.5	
Mon Dec 26/Tue Dec 27	6 44	16 17	17 57	5 27	7 07	0 40	12 11	5 21	.....	4	16 49.4	-17 45	11.5	
Tue Dec 27/Wed Dec 28	6 48	16 17	17 58	5 27	7 07	0 44	12 15	6 14	15 25	1	17 39.1	-18 56	11.5	
Wed Dec 28/Thu Dec 29	6 52	16 18	17 58	5 27	7 07	0 49	12 20	7 04	16 11	0	18 29.9	-19 18	11.5	
Thu Dec 29/Fri Dec 30	6 55	16 19	17 59	5 27	7 08	0 54	12 24	7 50	17 01	1	19 21.3	-18 49	11.5	
Fri Dec 30/Sat Dec 31	6 59	16 20	18 00	5 28	7 08	0 58	12 28	8 33	17 56	4	20 12.9	-17 27	11.5	
Sat Dec 31/Sun Jan 01	7 03	16 21	18 01	5 28	7 08	1 03	12 32	.....	18 55	8	21 04.3	-15 14	11.5	