

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:

\*\*\*\*\* 2023 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 2023, 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 23	5 18	Dec 29	20 23	Jan 06	18 10	Jan 14	21 13
Jan 21	15 56	Jan 28	10 20	Feb 05	13 31	Feb 13	11 03
Feb 20	2 09	Feb 27	3 07	Mar 07	7 43	Mar 14	22 10
Mar 21	13 27	Mar 28	22 33	Apr 06	0 37	Apr 13	5 13
Apr 20	0 16	Apr 27	17 21	May 05	13 37	May 12	10 29
May 19	11 56	May 27	11 24	Jun 03	23 44	Jun 10	15 32
Jun 18	0 39	Jun 26	3 51	Jul 03	7 41	Jul 09	21 49
Jul 17	14 33	Jul 25	18 08	Aug 01	14 33	Aug 08	6 30
Aug 16	5 39	Aug 24	5 58	Aug 30	21 37	Sep 06	18 23
Sep 14	21 40	Sep 22	15 33	Sep 29	5 58	Oct 06	9 49
Oct 14	13 55	Oct 21	23 30	Oct 28	16 24	Nov 05	3 39
Nov 13	4 27	Nov 20	5 51	Nov 27	4 17	Dec 05	0 52
Dec 12	18 32	Dec 19	13 40	Dec 26	19 34	Jan 03	22 33

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.

\*\*\*\*\* 2023 JANUARY \*\*\*\*\*

Date (eve/morn)	LMST midn	----- Sun: ----- set twi.end twi.beg rise	LST twilight: eve morn	----- Moon: ----- rise set %illum RA Dec	Twi-Twi hours
Sun Jan 01/Mon Jan 02	7 06	16 21 18 01 5 28 7 08	1 06 12 34	..... 3 15 80 3 02.2 17 33	11.4
Mon Jan 02/Tue Jan 03	7 09	16 22 18 02 5 28 7 08	1 10 12 38	..... 4 20 87 3 52.4 21 39	11.4
Tue Jan 03/Wed Jan 04	7 13	16 23 18 03 5 28 7 08	1 15 12 43	..... 5 24 93 4 44.4 24 43	11.4
Wed Jan 04/Thu Jan 05	7 17	16 24 18 03 5 28 7 08	1 20 12 47	..... 6 23 97 5 38.1 26 36	11.4
Thu Jan 05/Fri Jan 06	7 21	16 25 18 04 5 28 7 08	1 25 12 51	..... 7 16 99 6 32.4 27 11	11.4
Fri Jan 06/Sat Jan 07	7 25	16 26 18 05 5 28 7 08	1 29 12 55	15 57 8 01 100 7 26.4 26 26	11.4
Sat Jan 07/Sun Jan 08	7 29	16 27 18 06 5 28 7 08	1 34 12 58	16 56 8 38 98 8 18.9 24 27	11.4
Sun Jan 08/Mon Jan 09	7 33	16 28 18 07 5 28 7 07	1 39 13 02	17 57 ..... 95 9 09.3 21 23	11.4
Mon Jan 09/Tue Jan 10	7 37	16 29 18 08 5 28 7 07	1 44 13 06	19 00 ..... 90 9 57.2 17 24	11.3
Tue Jan 10/Wed Jan 11	7 41	16 30 18 09 5 28 7 07	1 49 13 10	20 03 ..... 84 10 43.1 12 42	11.3
Wed Jan 11/Thu Jan 12	7 45	16 31 18 10 5 28 7 07	1 54 13 14	21 05 ..... 77 11 27.6 7 28	11.3
Thu Jan 12/Fri Jan 13	7 49	16 32 18 11 5 28 7 06	1 58 13 18	22 07 ..... 68 12 11.5 1 54	11.3
Fri Jan 13/Sat Jan 14	7 53	16 33 18 12 5 27 7 06	2 03 13 21	23 10 ..... 58 12 55.8 - 3 51	11.3
Sat Jan 14/Sun Jan 15	7 57	16 34 18 12 5 27 7 05	2 08 13 25	0 16 ..... 48 13 41.7 - 9 35	11.2
Sun Jan 15/Mon Jan 16	8 01	16 35 18 13 5 27 7 05	2 13 13 29	1 25 ..... 38 14 30.4 -15 05	11.2
Mon Jan 16/Tue Jan 17	8 05	16 36 18 14 5 27 7 05	2 18 13 32	2 38 ..... 28 15 23.1 -20 03	11.2
Tue Jan 17/Wed Jan 18	8 09	16 38 18 15 5 26 7 04	2 23 13 36	3 54 ..... 18 16 20.6 -24 06	11.2
Wed Jan 18/Thu Jan 19	8 13	16 39 18 16 5 26 7 03	2 28 13 39	5 10 ..... 10 17 23.1 -26 48	11.2
Thu Jan 19/Fri Jan 20	8 17	16 40 18 17 5 25 7 03	2 33 13 43	6 19 ..... 4 18 29.2 -27 45	11.1
Fri Jan 20/Sat Jan 21	8 20	16 41 18 19 5 25 7 02	2 38 13 46	7 17 ..... 1 19 36.4 -26 42	11.1
Sat Jan 21/Sun Jan 22	8 24	16 42 18 20 5 24 7 02	2 43 13 50	8 03 16 21 0 20 41.8 -23 44	11.1
Sun Jan 22/Mon Jan 23	8 28	16 44 18 21 5 24 7 01	2 48 13 53	..... 17 44 3 21 43.3 -19 10	11.1
Mon Jan 23/Tue Jan 24	8 32	16 45 18 22 5 23 7 00	2 53 13 57	..... 19 06 8 22 40.4 -13 30	11.0
Tue Jan 24/Wed Jan 25	8 36	16 46 18 23 5 23 6 59	2 58 14 00	..... 20 24 15 23 33.6 - 7 14	11.0
Wed Jan 25/Thu Jan 26	8 40	16 47 18 24 5 22 6 59	3 03 14 03	..... 21 38 24 0 23.8 - 0 47	11.0
Thu Jan 26/Fri Jan 27	8 44	16 49 18 25 5 22 6 58	3 08 14 07	..... 22 49 34 1 12.5 5 30	10.9
Fri Jan 27/Sat Jan 28	8 48	16 50 18 26 5 21 6 57	3 13 14 10	..... 23 58 45 2 00.6 11 20	10.9
Sat Jan 28/Sun Jan 29	8 52	16 51 18 27 5 20 6 56	3 18 14 13	..... 1 06 55 2 49.2 16 31	10.9
Sun Jan 29/Mon Jan 30	8 56	16 52 18 28 5 19 6 55	3 23 14 16	..... 2 13 65 3 39.2 20 51	10.9
Mon Jan 30/Tue Jan 31	9 00	16 54 18 29 5 19 6 54	3 28 14 19	..... 3 18 74 4 30.7 24 10	10.8
Tue Jan 31/Wed Feb 01	9 04	16 55 18 30 5 18 6 53	3 33 14 22	..... 4 18 82 5 23.7 26 19	10.8

\*\*\*\*\* 2023 FEBRUARY \*\*\*\*\*

Date (eve/morn)	LMST midn	----- Sun: ----- set twi.end twi.beg rise	LST twilight: eve morn	----- Moon: ----- rise set %illum RA Dec	Twi-Twi hours
Wed Feb 01/Thu Feb 02	9 08	16 56 18 31 5 17 6 52	3 38 14 26	..... 5 13 89 6 17.6 27 12	10.8
Thu Feb 02/Fri Feb 03	9 12	16 57 18 33 5 16 6 51	3 43 14 29	..... 6 00 94 7 11.5 26 46	10.7
Fri Feb 03/Sat Feb 04	9 16	16 59 18 34 5 15 6 50	3 48 14 32	..... 6 39 98 8 04.3 25 05	10.7
Sat Feb 04/Sun Feb 05	9 20	17 00 18 35 5 14 6 49	3 54 14 35	15 49 7 11 100 8 55.2 22 14	10.7
Sun Feb 05/Mon Feb 06	9 24	17 01 18 36 5 13 6 48	3 59 14 38	16 52 7 38 100 9 44.0 18 25	10.6
Mon Feb 06/Tue Feb 07	9 27	17 03 18 37 5 12 6 47	4 04 14 41	17 55 8 02 98 10 30.6 13 49	10.6
Tue Feb 07/Wed Feb 08	9 31	17 04 18 38 5 11 6 45	4 09 14 43	18 58 ..... 94 11 15.5 8 39	10.6
Wed Feb 08/Thu Feb 09	9 35	17 05 18 39 5 10 6 44	4 14 14 46	20 00 ..... 89 11 59.6 3 05	10.5
Thu Feb 09/Fri Feb 10	9 39	17 06 18 40 5 09 6 43	4 19 14 49	21 03 ..... 82 12 43.7 - 2 40	10.5
Fri Feb 10/Sat Feb 11	9 43	17 08 18 42 5 08 6 42	4 24 14 52	22 07 ..... 74 13 28.7 - 8 24	10.4
Sat Feb 11/Sun Feb 12	9 47	17 09 18 43 5 07 6 40	4 29 14 55	23 13 ..... 64 14 15.9 -13 56	10.4
Sun Feb 12/Mon Feb 13	9 51	17 10 18 44 5 06 6 39	4 34 14 58	0 23 ..... 54 15 06.3 -18 59	10.4
Mon Feb 13/Tue Feb 14	9 55	17 11 18 45 5 04 6 38	4 39 15 00	1 35 ..... 43 16 00.8 -23 14	10.3
Tue Feb 14/Wed Feb 15	9 59	17 13 18 46 5 03 6 36	4 44 15 03	2 49 ..... 33 16 59.9 -26 20	10.3
Wed Feb 15/Thu Feb 16	10 03	17 14 18 47 5 02 6 35	4 49 15 06	3 59 ..... 23 18 02.9 -27 53	10.2
Thu Feb 16/Fri Feb 17	10 07	17 15 18 48 5 01 6 34	4 54 15 08	5 01 ..... 14 19 08.3 -27 37	10.2
Fri Feb 17/Sat Feb 18	10 11	17 16 18 50 4 59 6 32	4 59 15 11	5 52 ..... 7 20 13.5 -25 26	10.2
Sat Feb 18/Sun Feb 19	10 15	17 18 18 51 4 58 6 31	5 05 15 14	6 32 ..... 2 21 16.2 -21 30	10.1
Sun Feb 19/Mon Feb 20	10 19	17 19 18 52 4 57 6 29	5 10 15 16	7 05 16 33 0 22 15.3 -16 12	10.1
Mon Feb 20/Tue Feb 21	10 23	17 20 18 53 4 55 6 28	5 15 15 19	7 32 17 54 1 23 10.7 -10 01	10.0
Tue Feb 21/Wed Feb 22	10 27	17 21 18 54 4 54 6 27	5 20 15 21	7 56 19 12 5 0 03.0 - 3 25	10.0
Wed Feb 22/Thu Feb 23	10 31	17 23 18 55 4 53 6 25	5 25 15 24	..... 20 27 11 0 53.4 3 11	10.0
Thu Feb 23/Fri Feb 24	10 34	17 24 18 56 4 51 6 24	5 30 15 26	..... 21 40 19 1 43.0 9 25	9.9
Fri Feb 24/Sat Feb 25	10 38	17 25 18 58 4 50 6 22	5 35 15 29	..... 22 51 28 2 32.7 15 01	9.9
Sat Feb 25/Sun Feb 26	10 42	17 26 18 59 4 48 6 21	5 40 15 31	..... 0 01 38 3 23.3 19 45	9.8
Sun Feb 26/Mon Feb 27	10 46	17 27 19 00 4 47 6 19	5 45 15 34	..... 1 08 48 4 15.2 23 27	9.8
Mon Feb 27/Tue Feb 28	10 50	17 29 19 01 4 45 6 17	5 50 15 36	..... 2 11 58 5 08.4 25 58	9.7
Tue Feb 28/Wed Mar 01	10 54	17 30 19 02 4 44 6 16	5 56 15 39	..... 3 08 67 6 02.3 27 11	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.

\*\*\*\*\* 2023 MARCH \*\*\*\*\*

Date (eve/morn)	LMST midn	----- Sun: ----- set twi.end twi.beg rise	LST twilight: eve morn	----- Moon: ----- rise set %illum RA Dec	Twi-Twi hours
Wed Mar 01/Thu Mar 02	10 58	17 31 19 03 4 42 6 14	6 01 15 41	..... 3 58 76 6 56.3 27 06	9.6
Thu Mar 02/Fri Mar 03	11 02	17 32 19 04 4 41 6 13	6 06 15 43	..... 4 39 83 7 49.3 25 43	9.6
Fri Mar 03/Sat Mar 04	11 06	17 33 19 06 4 39 6 11	6 11 15 46	..... 5 14 90 8 40.6 23 09	9.6
Sat Mar 04/Sun Mar 05	11 10	17 35 19 07 4 37 6 10	6 16 15 48	..... 5 42 95 9 29.8 19 34	9.5
Sun Mar 05/Mon Mar 06	11 14	17 36 19 08 4 36 6 08	6 21 15 50	..... 6 06 98 10 17.0 15 07	9.5
Mon Mar 06/Tue Mar 07	11 18	17 37 19 09 4 34 6 06	6 26 15 53	16 49 6 28 100 11 02.6 10 01	9.4
Tue Mar 07/Wed Mar 08	11 22	17 38 19 10 4 32 6 05	6 31 15 55	17 52 6 48 99 11 47.2 4 27	9.4
Wed Mar 08/Thu Mar 09	11 26	17 39 19 12 4 31 6 03	6 37 15 57	18 55 7 08 97 12 31.6 - 1 23	9.3
Thu Mar 09/Fri Mar 10	11 30	17 40 19 13 4 29 6 01	6 42 16 00	19 59 7 28 93 13 16.8 - 7 15	9.3
Fri Mar 10/Sat Mar 11	11 34	17 41 19 14 4 27 6 00	6 47 16 02	21 05 ..... 87 14 03.7 -12 56	9.2
Sat Mar 11/Sun Mar 12*	11 38	17 43 19 15 5 26 6 58	6 52 16 04	22 14 ..... 79 14 53.4 -18 10	9.2
Sun Mar 12/Mon Mar 13	10 41	18 44 20 16 5 24 6 56	6 57 16 06	0 25 ..... 70 15 44.6 -22 24	9.1
Mon Mar 13/Tue Mar 14	10 45	18 45 20 18 5 22 6 55	7 02 16 08	1 38 ..... 59 16 41.5 -25 50	9.1
Tue Mar 14/Wed Mar 15	10 49	18 46 20 19 5 20 6 53	7 07 16 11	2 48 ..... 49 17 42.1 -27 51	9.0
Wed Mar 15/Thu Mar 16	10 53	18 47 20 20 5 19 6 51	7 13 16 13	3 51 ..... 37 18 45.1 -28 11	9.0
Thu Mar 16/Fri Mar 17	10 57	18 48 20 21 5 17 6 50	7 18 16 15	4 44 ..... 27 19 48.6 -26 43	8.9
Fri Mar 17/Sat Mar 18	11 01	18 49 20 22 5 15 6 48	7 23 16 17	5 27 ..... 17 20 50.5 -23 31	8.9
Sat Mar 18/Sun Mar 19	11 05	18 51 20 24 5 13 6 46	7 28 16 19	6 01 ..... 9 21 49.5 -18 51	8.8
Sun Mar 19/Mon Mar 20	11 09	18 52 20 25 5 11 6 45	7 33 16 21	6 30 ..... 4 22 45.2 -13 05	8.8
Mon Mar 20/Tue Mar 21	11 13	18 53 20 26 5 10 6 43	7 38 16 23	6 55 17 44 1 23 38.3 - 6 39	8.7
Tue Mar 21/Wed Mar 22	11 17	18 54 20 27 5 08 6 41	7 44 16 25	7 19 19 00 0 0 29.4 0 02	8.7
Wed Mar 22/Thu Mar 23	11 21	18 55 20 29 5 06 6 39	7 49 16 27	..... 20 15 3 1 19.7 6 35	8.6
Thu Mar 23/Fri Mar 24	11 25	18 56 20 30 5 04 6 38	7 54 16 30	..... 21 28 7 2 10.0 12 38	8.6
Fri Mar 24/Sat Mar 25	11 29	18 57 20 31 5 02 6 36	7 59 16 32	..... 22 40 14 3 01.3 17 56	8.5
Sat Mar 25/Sun Mar 26	11 33	18 58 20 32 5 00 6 34	8 05 16 34	..... 23 51 22 3 53.8 22 12	8.5
Sun Mar 26/Mon Mar 27	11 37	18 59 20 34 4 58 6 33	8 10 16 36	..... 0 58 31 4 47.7 25 16	8.4
Mon Mar 27/Tue Mar 28	11 40	19 00 20 35 4 56 6 31	8 15 16 38	..... 2 00 40 5 42.4 27 00	8.4
Tue Mar 28/Wed Mar 29	11 44	19 02 20 36 4 54 6 29	8 20 16 40	..... 2 53 50 6 37.1 27 23	8.3
Wed Mar 29/Thu Mar 30	11 48	19 03 20 38 4 53 6 28	8 26 16 42	..... 3 38 60 7 30.9 26 26	8.2
Thu Mar 30/Fri Mar 31	11 52	19 04 20 39 4 51 6 26	8 31 16 44	..... 4 15 69 8 22.9 24 16	8.2
Fri Mar 31/Sat Apr 01	11 56	19 05 20 40 4 49 6 24	8 36 16 46	..... 4 45 77 9 12.7 21 00	8.1

\*\*\*\*\* 2023 APRIL \*\*\*\*\*

Date (eve/morn)	LMST midn	----- Sun: ----- set twi.end twi.beg rise	LST twilight: eve morn	----- Moon: ----- rise set %illum RA Dec	Twi-Twi hours
Sat Apr 01/Sun Apr 02	12 00	19 06 20 42 4 47 6 22	8 41 16 48	..... 5 10 85 10 00.5 16 49	8.1
Sun Apr 02/Mon Apr 03	12 04	19 07 20 43 4 45 6 21	8 47 16 50	..... 5 33 91 10 46.5 11 54	8.0
Mon Apr 03/Tue Apr 04	12 08	19 08 20 44 4 43 6 19	8 52 16 52	..... 5 53 96 11 31.4 6 26	8.0
Tue Apr 04/Wed Apr 05	12 12	19 09 20 46 4 41 6 17	8 57 16 54	17 44 6 13 99 12 16.1 0 36	7.9
Wed Apr 05/Thu Apr 06	12 16	19 10 20 47 4 39 6 16	9 03 16 56	18 49 6 33 100 13 01.4 - 5 23	7.9
Thu Apr 06/Fri Apr 07	12 20	19 11 20 49 4 37 6 14	9 08 16 58	19 55 6 55 99 13 48.3 -11 17	7.8
Fri Apr 07/Sat Apr 08	12 24	19 13 20 50 4 35 6 12	9 13 17 00	21 04 ..... 96 14 37.9 -16 48	7.8
Sat Apr 08/Sun Apr 09	12 28	19 14 20 51 4 33 6 11	9 19 17 02	22 16 ..... 90 15 30.9 -21 37	7.7
Sun Apr 09/Mon Apr 10	12 32	19 15 20 53 4 31 6 09	9 24 17 04	23 29 ..... 83 16 27.7 -25 24	7.6
Mon Apr 10/Tue Apr 11	12 36	19 16 20 54 4 29 6 08	9 29 17 06	0 41 ..... 73 17 28.1 -27 48	7.6
Tue Apr 11/Wed Apr 12	12 40	19 17 20 56 4 27 6 06	9 35 17 08	1 46 ..... 63 18 30.7 -28 32	7.5
Wed Apr 12/Thu Apr 13	12 44	19 18 20 57 4 25 6 04	9 40 17 10	2 41 ..... 52 19 33.7 -27 30	7.5
Thu Apr 13/Fri Apr 14	12 48	19 19 20 59 4 23 6 03	9 46 17 12	3 26 ..... 41 20 35.1 -24 45	7.4
Fri Apr 14/Sat Apr 15	12 51	19 20 21 00 4 21 6 01	9 51 17 13	4 02 ..... 30 21 33.5 -20 31	7.4
Sat Apr 15/Sun Apr 16	12 55	19 21 21 02 4 19 6 00	9 57 17 15	4 31 ..... 20 22 28.6 -15 10	7.3
Sun Apr 16/Mon Apr 17	12 59	19 22 21 03 4 17 5 58	10 02 17 17	4 57 ..... 11 23 20.9 - 9 03	7.2
Mon Apr 17/Tue Apr 18	13 03	19 23 21 05 4 15 5 56	10 07 17 19	5 20 ..... 5 0 11.4 - 2 33	7.2
Tue Apr 18/Wed Apr 19	13 07	19 25 21 06 4 13 5 55	10 13 17 21	5 43 17 52 1 1 00.9 4 00	7.1
Wed Apr 19/Thu Apr 20	13 11	19 26 21 08 4 12 5 53	10 18 17 23	6 07 19 05 0 1 50.6 10 14	7.1
Thu Apr 20/Fri Apr 21	13 15	19 27 21 09 4 10 5 52	10 24 17 25	6 34 20 18 1 2 41.4 15 52	7.0
Fri Apr 21/Sat Apr 22	13 19	19 28 21 11 4 08 5 50	10 29 17 27	..... 21 30 4 3 33.6 20 35	6.9
Sat Apr 22/Sun Apr 23	13 23	19 29 21 12 4 06 5 49	10 35 17 29	..... 22 40 10 4 27.5 24 10	6.9
Sun Apr 23/Mon Apr 24	13 27	19 30 21 14 4 04 5 48	10 40 17 31	..... 23 46 17 5 22.6 26 26	6.8
Mon Apr 24/Tue Apr 25	13 31	19 31 21 15 4 02 5 46	10 46 17 33	..... 0 44 25 6 18.0 27 19	6.8
Tue Apr 25/Wed Apr 26	13 35	19 32 21 17 4 00 5 45	10 51 17 35	..... 1 33 33 7 12.5 26 49	6.7
Wed Apr 26/Thu Apr 27	13 39	19 33 21 19 3 58 5 43	10 57 17 37	..... 2 13 43 8 05.3 25 02	6.7
Thu Apr 27/Fri Apr 28	13 43	19 34 21 20 3 56 5 42	11 02 17 39	..... 2 46 52 8 55.8 22 08	6.6
Fri Apr 28/Sat Apr 29	13 47	19 35 21 22 3 54 5 40	11 08 17 42	..... 3 13 62 9 44.0 18 16	6.5
Sat Apr 29/Sun Apr 30	13 51	19 37 21 23 3 52 5 39	11 14 17 44	..... 3 36 71 10 30.2 13 37	6.5
Sun Apr 30/Mon May 01	13 55	19 38 21 25 3 50 5 38	11 19 17 46	..... 3 57 79 11 15.0 8 21	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.  
Moon info is for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

\*\*\*\*\* 2023 MAY \*\*\*\*\*

Date (eve/morn)	LMST midn	----- Sun: -----				LST twilight:		----- Moon: -----				Twilight	
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	hours
Mon May 01/Tue May 02	13 58	19 39	21 27	3 49	5 36	11 25	17 48	.....	4 17	87	11 59.4	2 39	6.4
Tue May 02/Wed May 03	14 02	19 40	21 28	3 47	5 35	11 30	17 50	.....	4 37	93	12 44.3	- 3 18	6.3
Wed May 03/Thu May 04	14 06	19 41	21 30	3 45	5 34	11 36	17 52	17 39	4 58	97	13 30.8	- 9 18	6.3
Thu May 04/Fri May 05	14 10	19 42	21 32	3 43	5 33	11 41	17 54	18 48	5 22	100	14 20.0	-15 04	6.2
Fri May 05/Sat May 06	14 14	19 43	21 33	3 41	5 31	11 47	17 56	20 00	5 51	100	15 12.7	-20 17	6.1
Sat May 06/Sun May 07	14 18	19 44	21 35	3 40	5 30	11 53	17 58	21 15	6 28	97	16 09.8	-24 32	6.1
Sun May 07/Mon May 08	14 22	19 45	21 36	3 38	5 29	11 58	18 01	22 29	.....	92	17 10.8	-27 27	6.0
Mon May 08/Tue May 09	14 26	19 46	21 38	3 36	5 28	12 04	18 03	23 38	.....	85	18 14.7	-28 40	6.0
Tue May 09/Wed May 10	14 30	19 47	21 40	3 34	5 27	12 09	18 05	0 38	.....	76	19 19.1	-28 03	5.9
Wed May 10/Thu May 11	14 34	19 48	21 41	3 33	5 26	12 15	18 07	1 26	.....	66	20 21.8	-25 38	5.9
Thu May 11/Fri May 12	14 38	19 49	21 43	3 31	5 25	12 21	18 09	2 04	.....	55	21 21.1	-21 41	5.8
Fri May 12/Sat May 13	14 42	19 50	21 45	3 29	5 23	12 26	18 12	2 35	.....	43	22 16.6	-16 35	5.7
Sat May 13/Sun May 14	14 46	19 51	21 46	3 28	5 22	12 32	18 14	3 01	.....	32	23 08.8	-10 41	5.7
Sun May 14/Mon May 15	14 50	19 52	21 48	3 26	5 21	12 37	18 16	3 24	.....	22	23 58.6	- 4 22	5.6
Mon May 15/Tue May 16	14 54	19 53	21 50	3 24	5 20	12 43	18 19	3 46	.....	14	0 47.2	2 04	5.6
Tue May 16/Wed May 17	14 58	19 54	21 51	3 23	5 20	12 48	18 21	4 09	.....	7	1 35.7	8 17	5.5
Wed May 17/Thu May 18	15 02	19 55	21 53	3 21	5 19	12 54	18 23	4 34	18 00	3	2 25.2	14 01	5.5
Thu May 18/Fri May 19	15 06	19 56	21 54	3 20	5 18	13 00	18 26	5 03	19 11	0	3 16.2	18 59	5.4
Fri May 19/Sat May 20	15 09	19 57	21 56	3 18	5 17	13 05	18 28	5 37	20 22	0	4 09.2	22 56	5.4
Sat May 20/Sun May 21	15 13	19 58	21 57	3 17	5 16	13 11	18 31	6 18	21 30	2	5 03.8	25 39	5.3
Sun May 21/Mon May 22	15 17	19 59	21 59	3 15	5 15	13 16	18 33	.....	22 32	6	5 59.2	27 00	5.3
Mon May 22/Tue May 23	15 21	20 00	22 01	3 14	5 14	13 22	18 36	.....	23 25	12	6 54.3	26 57	5.2
Tue May 23/Wed May 24	15 25	20 01	22 02	3 13	5 14	13 27	18 39	.....	0 09	19	7 47.9	25 35	5.2
Wed May 24/Thu May 25	15 29	20 02	22 04	3 11	5 13	13 32	18 41	.....	0 45	27	8 39.1	23 01	5.1
Thu May 25/Fri May 26	15 33	20 03	22 05	3 10	5 12	13 38	18 44	.....	1 14	36	9 27.8	19 28	5.1
Fri May 26/Sat May 27	15 37	20 04	22 07	3 09	5 12	13 43	18 47	.....	1 39	45	10 14.1	15 06	5.0
Sat May 27/Sun May 28	15 41	20 05	22 08	3 08	5 11	13 49	18 49	.....	2 00	55	10 58.8	10 06	5.0
Sun May 28/Mon May 29	15 45	20 06	22 09	3 07	5 10	13 54	18 52	.....	2 20	64	11 42.6	4 38	5.0
Mon May 29/Tue May 30	15 49	20 06	22 11	3 06	5 10	13 59	18 55	.....	2 39	73	12 26.5	- 1 09	4.9
Tue May 30/Wed May 31	15 53	20 07	22 12	3 05	5 09	14 05	18 58	.....	3 00	82	13 11.7	- 7 05	4.9
Wed May 31/Thu Jun 01	15 57	20 08	22 13	3 04	5 09	14 10	19 01	.....	3 22	89	13 59.3	-12 55	4.8

\*\*\*\*\* 2023 JUNE \*\*\*\*\*

Date (eve/morn)	LMST midn	----- Sun: -----				LST twilight:		----- Moon: -----				Twilight	
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	hours
Thu Jun 01/Fri Jun 02	16 01	20 09	22 15	3 03	5 08	14 15	19 04	17 39	3 49	95	14 50.6	-18 23	4.8
Fri Jun 02/Sat Jun 03	16 05	20 09	22 16	3 02	5 08	14 20	19 07	18 53	4 22	99	15 46.4	-23 06	4.8
Sat Jun 03/Sun Jun 04	16 09	20 10	22 17	3 01	5 08	14 25	19 10	20 09	5 05	100	16 47.1	-26 37	4.7
Sun Jun 04/Mon Jun 05	16 13	20 11	22 18	3 00	5 07	14 30	19 13	21 23	6 00	98	17 51.9	-28 31	4.7
Mon Jun 05/Tue Jun 06	16 16	20 12	22 19	2 59	5 07	14 35	19 16	22 28	.....	94	18 58.4	-28 30	4.7
Tue Jun 06/Wed Jun 07	16 20	20 12	22 20	2 59	5 07	14 40	19 20	23 22	.....	87	20 03.9	-26 31	4.6
Wed Jun 07/Thu Jun 08	16 24	20 13	22 21	2 58	5 07	14 45	19 23	0 05	.....	78	21 06.1	-22 51	4.6
Thu Jun 08/Fri Jun 09	16 28	20 13	22 22	2 57	5 06	14 50	19 26	0 38	.....	68	22 03.8	-17 51	4.6
Fri Jun 09/Sat Jun 10	16 32	20 14	22 23	2 57	5 06	14 55	19 30	1 06	.....	57	22 57.5	-12 00	4.6
Sat Jun 10/Sun Jun 11	16 36	20 15	22 24	2 56	5 06	15 00	19 33	1 29	.....	46	23 48.1	- 5 42	4.5
Sun Jun 11/Mon Jun 12	16 40	20 15	22 25	2 56	5 06	15 05	19 37	1 52	.....	35	0 36.8	0 42	4.5
Mon Jun 12/Tue Jun 13	16 44	20 16	22 26	2 56	5 06	15 10	19 40	2 14	.....	25	1 24.8	6 56	4.5
Tue Jun 13/Wed Jun 14	16 48	20 16	22 26	2 55	5 06	15 14	19 44	2 38	.....	16	2 13.3	12 43	4.5
Wed Jun 14/Thu Jun 15	16 52	20 17	22 27	2 55	5 06	15 19	19 48	3 05	.....	9	3 03.2	17 47	4.5
Thu Jun 15/Fri Jun 16	16 56	20 17	22 28	2 55	5 06	15 23	19 51	3 36	18 09	4	3 54.9	21 56	4.5
Fri Jun 16/Sat Jun 17	17 00	20 17	22 28	2 55	5 06	15 28	19 55	4 14	19 17	1	4 48.5	24 56	4.4
Sat Jun 17/Sun Jun 18	17 04	20 18	22 29	2 55	5 06	15 32	19 59	5 00	20 21	0	5 43.3	26 38	4.4
Sun Jun 18/Mon Jun 19	17 08	20 18	22 29	2 55	5 06	15 37	20 03	5 54	21 17	1	6 38.3	26 57	4.4
Mon Jun 19/Tue Jun 20	17 12	20 18	22 29	2 55	5 06	15 41	20 07	.....	22 05	4	7 32.2	25 56	4.4
Tue Jun 20/Wed Jun 21	17 16	20 19	22 30	2 55	5 06	15 45	20 11	.....	22 44	8	8 24.0	23 41	4.4
Wed Jun 21/Thu Jun 22	17 20	20 19	22 30	2 56	5 07	15 49	20 16	.....	23 15	14	9 13.2	20 24	4.4
Thu Jun 22/Fri Jun 23	17 24	20 19	22 30	2 56	5 07	15 53	20 20	.....	23 41	21	9 59.8	16 17	4.4
Fri Jun 23/Sat Jun 24	17 27	20 19	22 30	2 56	5 07	15 57	20 24	.....	0 03	30	10 44.4	11 31	4.4
Sat Jun 24/Sun Jun 25	17 31	20 19	22 30	2 57	5 08	16 01	20 28	.....	0 24	39	11 27.7	6 15	4.4
Sun Jun 25/Mon Jun 26	17 35	20 19	22 30	2 57	5 08	16 05	20 33	.....	0 43	48	12 10.6	0 40	4.4
Mon Jun 26/Tue Jun 27	17 39	20 19	22 30	2 58	5 08	16 09	20 37	.....	1 02	58	12 54.2	- 5 05	4.5
Tue Jun 27/Wed Jun 28	17 43	20 19	22 30	2 58	5 09	16 13	20 42	.....	1 23	68	13 39.8	-10 51	4.5
Wed Jun 28/Thu Jun 29	17 47	20 19	22 30	2 59	5 09	16 17	20 46	.....	1 47	77	14 28.4	-16 22	4.5
Thu Jun 29/Fri Jun 30	17 51	20 19	22 29	3 00	5 10	16 20	20 51	.....	2 17	86	15 21.5	-21 20	4.5
Fri Jun 30/Sat Jul 01	17 55	20 19	22 29	3 00	5 10	16 24	20 56	17 44	2 54	92	16 19.7	-25 22	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.

\*\*\*\*\* 2023 JULY \*\*\*\*\*

Date (eve/morn)	LMST midn	----- Sun: -----	----- Sun: -----	LST twilight:	----- Moon: -----	Twi-Twi hours
		set twi.end twi.beg rise	set twi.end twi.beg rise	eve morn	rise set %illum RA Dec	hours
Sat Jul 01/Sun Jul 02	17 59	20 19 22 29	3 01 5 11	16 27 21 01	18 59 3 44 97 17 23.1 -27 59	4.5
Sun Jul 02/Mon Jul 03	18 03	20 19 22 28	3 02 5 11	16 31 21 05	20 10 4 46 100 18 30.1 -28 47	4.6
Mon Jul 03/Tue Jul 04	18 07	20 19 22 28	3 03 5 12	16 34 21 10	21 11 6 01 99 19 37.9 -27 31	4.6
Tue Jul 04/Wed Jul 05	18 11	20 19 22 27	3 04 5 12	16 38 21 15	21 59 ..... 95 20 43.4 -24 19	4.6
Wed Jul 05/Thu Jul 06	18 15	20 18 22 26	3 05 5 13	16 41 21 20	22 37 ..... 89 21 44.9 -19 32	4.6
Thu Jul 06/Fri Jul 07	18 19	20 18 22 26	3 06 5 14	16 44 21 25	23 08 ..... 81 22 41.8 -13 41	4.7
Fri Jul 07/Sat Jul 08	18 23	20 18 22 25	3 07 5 14	16 47 21 30	23 33 ..... 71 23 34.7 -7 15	4.7
Sat Jul 08/Sun Jul 09	18 27	20 17 22 24	3 08 5 15	16 50 21 35	23 56 ..... 60 0 25.1 -0 39	4.7
Sun Jul 09/Mon Jul 10	18 31	20 17 22 23	3 09 5 16	16 53 21 40	0 19 ..... 49 1 14.0 5 46	4.8
Mon Jul 10/Tue Jul 11	18 34	20 16 22 22	3 10 5 16	16 56 21 45	0 42 ..... 38 2 02.8 11 42	4.8
Tue Jul 11/Wed Jul 12	18 38	20 16 22 21	3 12 5 17	16 59 21 51	1 08 ..... 28 2 52.5 16 57	4.8
Wed Jul 12/Thu Jul 13	18 42	20 15 22 20	3 13 5 18	17 02 21 56	1 38 ..... 19 3 43.7 21 16	4.9
Thu Jul 13/Fri Jul 14	18 46	20 15 22 19	3 14 5 19	17 05 22 01	2 13 ..... 12 4 36.5 24 28	4.9
Fri Jul 14/Sat Jul 15	18 50	20 14 22 18	3 16 5 19	17 08 22 06	2 56 18 14 6 5 30.6 26 25	5.0
Sat Jul 15/Sun Jul 16	18 54	20 14 22 17	3 17 5 20	17 11 22 12	3 47 19 12 2 6 25.2 27 01	5.0
Sun Jul 16/Mon Jul 17	18 58	20 13 22 16	3 18 5 21	17 14 22 17	4 45 20 02 0 7 19.0 26 16	5.0
Mon Jul 17/Tue Jul 18	19 02	20 12 22 15	3 20 5 22	17 16 22 22	5 46 20 43 0 8 11.1 24 17	5.1
Tue Jul 18/Wed Jul 19	19 06	20 12 22 13	3 21 5 23	17 19 22 28	..... 21 17 2 9 00.7 21 13	5.1
Wed Jul 19/Thu Jul 20	19 10	20 11 22 12	3 23 5 24	17 22 22 33	..... 21 44 5 9 47.8 17 16	5.2
Thu Jul 20/Fri Jul 21	19 14	20 10 22 11	3 24 5 24	17 24 22 39	..... 22 07 10 10 32.6 12 39	5.2
Fri Jul 21/Sat Jul 22	19 18	20 09 22 09	3 26 5 25	17 27 22 44	..... 22 28 16 11 15.7 7 32	5.3
Sat Jul 22/Sun Jul 23	19 22	20 09 22 08	3 27 5 26	17 29 22 50	..... 22 47 24 11 58.0 2 05	5.3
Sun Jul 23/Mon Jul 24	19 26	20 08 22 06	3 29 5 27	17 32 22 55	..... 23 06 33 12 40.5 -3 33	5.4
Mon Jul 24/Tue Jul 25	19 30	20 07 22 05	3 30 5 28	17 34 23 00	..... 23 25 42 13 24.2 -9 11	5.4
Tue Jul 25/Wed Jul 26	19 34	20 06 22 03	3 32 5 29	17 37 23 06	..... 23 47 52 14 10.4 -14 39	5.5
Wed Jul 26/Thu Jul 27	19 38	20 05 22 02	3 33 5 30	17 39 23 11	..... 0 14 62 15 00.2 -19 42	5.5
Thu Jul 27/Fri Jul 28	19 41	20 04 22 00	3 35 5 31	17 41 23 17	..... 0 46 72 15 54.8 -24 00	5.6
Fri Jul 28/Sat Jul 29	19 45	20 03 21 59	3 36 5 32	17 44 23 22	..... 1 29 82 16 54.6 -27 10	5.6
Sat Jul 29/Sun Jul 30	19 49	20 02 21 57	3 38 5 33	17 46 23 28	17 48 2 24 90 17 59.2 -28 44	5.7
Sun Jul 30/Mon Jul 31	19 53	20 01 21 55	3 40 5 34	17 48 23 34	18 53 3 33 96 19 06.5 -28 23	5.7
Mon Jul 31/Tue Aug 01	19 57	20 00 21 54	3 41 5 35	17 50 23 39	19 48 4 53 99 20 13.8 -25 58	5.8

\*\*\*\*\* 2023 AUGUST \*\*\*\*\*

Date (eve/morn)	LMST midn	----- Sun: -----	----- Sun: -----	LST twilight:	----- Moon: -----	Twi-Twi hours
		set twi.end twi.beg rise	set twi.end twi.beg rise	eve morn	rise set %illum RA Dec	hours
Tue Aug 01/Wed Aug 02	20 01	19 59 21 52	3 43 5 36	17 53 23 45	20 31 6 16 100 21 18.2 -21 43	5.8
Wed Aug 02/Thu Aug 03	20 05	19 58 21 50	3 44 5 37	17 55 23 50	21 05 ..... 97 22 18.5 -16 03	5.9
Thu Aug 03/Fri Aug 04	20 09	19 56 21 48	3 46 5 38	17 57 23 56	21 33 ..... 91 23 14.7 -9 32	6.0
Fri Aug 04/Sat Aug 05	20 13	19 55 21 47	3 48 5 39	17 59 0 01	21 58 ..... 83 0 07.8 -2 39	6.0
Sat Aug 05/Sun Aug 06	20 17	19 54 21 45	3 49 5 40	18 01 0 07	22 21 ..... 74 0 58.9 4 07	6.1
Sun Aug 06/Mon Aug 07	20 21	19 53 21 43	3 51 5 41	18 04 0 12	22 45 ..... 63 1 49.3 10 26	6.1
Mon Aug 07/Tue Aug 08	20 25	19 52 21 41	3 52 5 42	18 06 0 18	23 10 ..... 52 2 40.0 16 01	6.2
Tue Aug 08/Wed Aug 09	20 29	19 50 21 39	3 54 5 43	18 08 0 23	23 39 ..... 42 3 31.7 20 39	6.2
Wed Aug 09/Thu Aug 10	20 33	19 49 21 38	3 55 5 44	18 10 0 29	0 13 ..... 32 4 24.8 24 08	6.3
Thu Aug 10/Fri Aug 11	20 37	19 48 21 36	3 57 5 45	18 12 0 34	0 54 ..... 23 5 19.1 26 20	6.4
Fri Aug 11/Sat Aug 12	20 41	19 46 21 34	3 59 5 46	18 14 0 40	1 42 ..... 15 6 13.6 27 11	6.4
Sat Aug 12/Sun Aug 13	20 45	19 45 21 32	4 00 5 47	18 16 0 45	2 38 18 00 9 7 07.6 26 41	6.5
Sun Aug 13/Mon Aug 14	20 49	19 44 21 30	4 02 5 48	18 18 0 51	3 39 18 44 4 7 59.9 24 56	6.5
Mon Aug 14/Tue Aug 15	20 52	19 42 21 28	4 03 5 49	18 20 0 56	4 42 19 19 1 8 49.9 22 03	6.6
Tue Aug 15/Wed Aug 16	20 56	19 41 21 26	4 05 5 50	18 22 1 02	5 45 19 48 0 9 37.3 18 16	6.6
Wed Aug 16/Thu Aug 17	21 00	19 39 21 24	4 06 5 51	18 24 1 07	..... 20 12 1 10 22.4 13 45	6.7
Thu Aug 17/Fri Aug 18	21 04	19 38 21 22	4 08 5 52	18 26 1 13	..... 20 33 3 11 05.7 8 42	6.8
Fri Aug 18/Sat Aug 19	21 08	19 36 21 20	4 09 5 53	18 28 1 18	..... 20 53 7 11 48.0 3 18	6.8
Sat Aug 19/Sun Aug 20	21 12	19 35 21 18	4 11 5 54	18 30 1 24	..... 21 11 12 12 30.0 -2 17	6.9
Sun Aug 20/Mon Aug 21	21 16	19 33 21 16	4 12 5 55	18 32 1 29	..... 21 30 19 13 12.8 -7 54	6.9
Mon Aug 21/Tue Aug 22	21 20	19 32 21 14	4 14 5 56	18 34 1 34	..... 21 51 27 13 57.4 -13 20	7.0
Tue Aug 22/Wed Aug 23	21 24	19 30 21 12	4 15 5 57	18 36 1 40	..... 22 15 37 14 44.9 -18 25	7.0
Wed Aug 23/Thu Aug 24	21 28	19 29 21 10	4 17 5 58	18 38 1 45	..... 22 44 47 15 36.3 -22 51	7.1
Thu Aug 24/Fri Aug 25	21 32	19 27 21 08	4 18 5 59	18 40 1 51	..... 23 20 58 16 32.4 -26 18	7.2
Fri Aug 25/Sat Aug 26	21 36	19 26 21 07	4 20 6 00	18 42 1 56	..... 0 08 68 17 33.2 -28 25	7.2
Sat Aug 26/Sun Aug 27	21 40	19 24 21 05	4 21 6 01	18 44 2 01	..... 1 09 78 18 37.6 -28 50	7.3
Sun Aug 27/Mon Aug 28	21 44	19 23 21 03	4 22 6 02	18 46 2 07	17 34 2 23 87 19 43.5 -27 19	7.3
Mon Aug 28/Tue Aug 29	21 48	19 21 21 01	4 24 6 03	18 48 2 12	18 22 3 44 94 20 48.3 -23 53	7.4
Tue Aug 29/Wed Aug 30	21 52	19 19 20 59	4 25 6 04	18 50 2 17	19 00 5 08 98 21 50.2 -18 47	7.4
Wed Aug 30/Thu Aug 31	21 56	19 18 20 57	4 27 6 06	18 52 2 23	19 31 6 30 100 22 48.7 -12 30	7.5
Thu Aug 31/Fri Sep 01	21 59	19 16 20 55	4 28 6 07	18 54 2 28	19 57 ..... 98 23 44.1 -5 33	7.6



