

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:

\*\*\*\*\* 2013 Night-time Astronomical Calendar for VATT \*\*\*\*\*

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.

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 -0.3 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 2013, at VATT

Times and dates are given in local time, zone = 7 hr West.  
They are generally better than +/- 2 minutes.

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

NEW		1ST		FULL		LAST	
Dec 13	1 42	Dec 19	22 20	Dec 28	3 23	Jan 04	20 59
Jan 11	12 45	Jan 18	16 46	Jan 26	21 40	Feb 03	6 58
Feb 10	0 23	Feb 17	13 31	Feb 25	13 29	Mar 04	14 55
Mar 11	12 54	Mar 19	10 28	Mar 27	2 30	Apr 02	21 39
Apr 10	2 39	Apr 18	5 33	Apr 25	13 00	May 02	4 17
May 09	17 32	May 17	21 36	May 24	21 27	May 31	12 00
Jun 08	8 59	Jun 16	10 25	Jun 23	4 34	Jun 29	21 55
Jul 08	0 16	Jul 15	20 20	Jul 22	11 17	Jul 29	10 45
Aug 06	14 52	Aug 14	3 58	Aug 20	18 45	Aug 28	2 36
Sep 05	4 36	Sep 12	10 10	Sep 19	4 13	Sep 26	20 56
Oct 04	17 34	Oct 11	16 04	Oct 18	16 38	Oct 26	16 42
Nov 03	5 50	Nov 09	22 59	Nov 17	8 17	Nov 25	12 30
Dec 02	17 22	Dec 09	8 13	Dec 17	2 29	Dec 25	6 50
Jan 01	4 15	Jan 07	20 40	Jan 15	21 54	Jan 23	22 21

Calendar for VATT, west longitude (h.m.s) = 7 19 34, latitude (d.m) = 32 42.1  
 Rise/set times in Mountain time ( 7 hr W), uncorrected for elevation, in standard time all year.  
 Moon info is for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

\*\*\*\*\* 2013 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	
Tue Jan 01/Wed Jan 02	6 29	17 25	18 53	5 54	7 22	1 21	12 24	21 43	.....	78	10 30.6	3 45	11.0
Wed Jan 02/Thu Jan 03	6 33	17 26	18 53	5 55	7 22	1 25	12 28	22 42	.....	69	11 19.1	- 0 51	11.0
Thu Jan 03/Fri Jan 04	6 37	17 26	18 54	5 55	7 22	1 30	12 32	23 41	.....	59	12 08.6	- 5 30	11.0
Fri Jan 04/Sat Jan 05	6 41	17 27	18 55	5 55	7 23	1 35	12 37	0 43	.....	48	12 59.9	- 9 59	11.0
Sat Jan 05/Sun Jan 06	6 45	17 28	18 56	5 55	7 23	1 39	12 41	1 47	.....	37	13 53.7	-14 05	11.0
Sun Jan 06/Mon Jan 07	6 48	17 29	18 56	5 55	7 23	1 44	12 45	2 53	.....	26	14 50.6	-17 28	11.0
Mon Jan 07/Tue Jan 08	6 52	17 30	18 57	5 55	7 23	1 49	12 49	4 00	.....	17	15 50.5	-19 53	11.0
Tue Jan 08/Wed Jan 09	6 56	17 31	18 58	5 55	7 23	1 53	12 53	5 05	.....	9	16 52.7	-21 02	11.0
Wed Jan 09/Thu Jan 10	7 00	17 31	18 59	5 55	7 23	1 58	12 57	6 06	15 36	3	17 55.9	-20 47	10.9
Thu Jan 10/Fri Jan 11	7 04	17 32	18 59	5 56	7 22	2 03	13 01	7 01	16 43	1	18 58.4	-19 07	10.9
Fri Jan 11/Sat Jan 12	7 08	17 33	19 00	5 56	7 22	2 07	13 05	7 49	17 51	0	19 58.8	-16 12	10.9
Sat Jan 12/Sun Jan 13	7 12	17 34	19 01	5 55	7 22	2 12	13 09	.....	19 00	3	20 56.3	-12 22	10.9
Sun Jan 13/Mon Jan 14	7 16	17 35	19 02	5 55	7 22	2 17	13 12	.....	20 07	8	21 50.6	- 7 55	10.9
Mon Jan 14/Tue Jan 15	7 20	17 36	19 02	5 55	7 22	2 22	13 16	.....	21 10	15	22 42.3	- 3 13	10.9
Tue Jan 15/Wed Jan 16	7 24	17 37	19 03	5 55	7 22	2 26	13 20	.....	22 11	23	23 32.0	1 30	10.9
Wed Jan 16/Thu Jan 17	7 28	17 38	19 04	5 55	7 21	2 31	13 24	.....	23 10	33	0 20.4	6 00	10.9
Thu Jan 17/Fri Jan 18	7 32	17 39	19 05	5 55	7 21	2 36	13 28	.....	0 07	42	1 08.3	10 06	10.8
Fri Jan 18/Sat Jan 19	7 36	17 39	19 06	5 55	7 21	2 41	13 32	.....	1 03	52	1 56.3	13 40	10.8
Sat Jan 19/Sun Jan 20	7 40	17 40	19 06	5 55	7 20	2 45	13 35	.....	1 57	62	2 44.9	16 36	10.8
Sun Jan 20/Mon Jan 21	7 44	17 41	19 07	5 54	7 20	2 50	13 39	.....	2 51	71	3 34.3	18 47	10.8
Mon Jan 21/Tue Jan 22	7 48	17 42	19 08	5 54	7 20	2 55	13 43	.....	3 42	79	4 24.6	20 08	10.8
Tue Jan 22/Wed Jan 23	7 52	17 43	19 09	5 54	7 19	3 00	13 46	.....	4 31	86	5 15.6	20 34	10.7
Wed Jan 23/Thu Jan 24	7 55	17 44	19 10	5 53	7 19	3 04	13 50	.....	5 17	92	6 07.0	20 03	10.7
Thu Jan 24/Fri Jan 25	7 59	17 45	19 10	5 53	7 18	3 09	13 53	15 52	6 00	96	6 58.3	18 36	10.7
Fri Jan 25/Sat Jan 26	8 03	17 46	19 11	5 53	7 18	3 14	13 57	16 46	6 40	99	7 49.2	16 15	10.7
Sat Jan 26/Sun Jan 27	8 07	17 47	19 12	5 52	7 17	3 19	14 01	17 43	7 17	100	8 39.5	13 06	10.7
Sun Jan 27/Mon Jan 28	8 11	17 48	19 13	5 52	7 17	3 23	14 04	18 40	7 52	98	9 29.0	9 18	10.6
Mon Jan 28/Tue Jan 29	8 15	17 49	19 14	5 51	7 16	3 28	14 08	19 38	.....	95	10 18.2	5 00	10.6
Tue Jan 29/Wed Jan 30	8 19	17 50	19 15	5 51	7 15	3 33	14 11	20 36	.....	90	11 07.3	0 25	10.6
Wed Jan 30/Thu Jan 31	8 23	17 51	19 15	5 50	7 15	3 38	14 14	21 36	.....	82	11 57.1	- 4 16	10.6
Thu Jan 31/Fri Feb 01	8 27	17 52	19 16	5 50	7 14	3 42	14 18	22 37	.....	74	12 48.0	- 8 49	10.6

\*\*\*\*\* 2013 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	
Fri Feb 01/Sat Feb 02	8 31	17 53	19 17	5 49	7 13	3 47	14 21	23 39	.....	63	13 40.9	-12 59	10.5
Sat Feb 02/Sun Feb 03	8 35	17 54	19 18	5 49	7 13	3 52	14 25	0 43	.....	52	14 36.0	-16 32	10.5
Sun Feb 03/Mon Feb 04	8 39	17 55	19 19	5 48	7 12	3 57	14 28	1 47	.....	41	15 33.6	-19 11	10.5
Mon Feb 04/Tue Feb 05	8 43	17 55	19 19	5 47	7 11	4 01	14 31	2 50	.....	30	16 33.4	-20 43	10.5
Tue Feb 05/Wed Feb 06	8 47	17 56	19 20	5 47	7 10	4 06	14 34	3 51	.....	20	17 34.5	-20 57	10.4
Wed Feb 06/Thu Feb 07	8 51	17 57	19 21	5 46	7 10	4 11	14 38	4 47	.....	12	18 35.6	-19 51	10.4
Thu Feb 07/Fri Feb 08	8 55	17 58	19 22	5 45	7 09	4 16	14 41	5 37	.....	6	19 35.5	-17 31	10.4
Fri Feb 08/Sat Feb 09	8 59	17 59	19 23	5 45	7 08	4 20	14 44	6 23	16 38	2	20 33.3	-14 07	10.4
Sat Feb 09/Sun Feb 10	9 03	18 00	19 23	5 44	7 07	4 25	14 47	7 03	17 44	0	21 28.7	- 9 58	10.3
Sun Feb 10/Mon Feb 11	9 06	18 01	19 24	5 43	7 06	4 30	14 50	7 41	18 50	1	22 21.6	- 5 22	10.3
Mon Feb 11/Tue Feb 12	9 10	18 02	19 25	5 42	7 05	4 35	14 54	.....	19 53	5	23 12.6	- 0 38	10.3
Tue Feb 12/Wed Feb 13	9 14	18 03	19 26	5 41	7 04	4 39	14 57	.....	20 54	10	0 02.3	4 00	10.3
Wed Feb 13/Thu Feb 14	9 18	18 04	19 27	5 40	7 03	4 44	15 00	.....	21 53	17	0 51.1	8 19	10.2
Thu Feb 14/Fri Feb 15	9 22	18 05	19 27	5 40	7 02	4 49	15 03	.....	22 51	26	1 39.8	12 08	10.2
Fri Feb 15/Sat Feb 16	9 26	18 05	19 28	5 39	7 01	4 54	15 06	.....	23 47	35	2 28.6	15 20	10.2
Sat Feb 16/Sun Feb 17	9 30	18 06	19 29	5 38	7 00	4 58	15 09	.....	0 41	44	3 18.0	17 47	10.1
Sun Feb 17/Mon Feb 18	9 34	18 07	19 30	5 37	6 59	5 03	15 12	.....	1 34	53	4 07.9	19 26	10.1
Mon Feb 18/Tue Feb 19	9 38	18 08	19 31	5 36	6 58	5 08	15 15	.....	2 24	63	4 58.4	20 11	10.1
Tue Feb 19/Wed Feb 20	9 42	18 09	19 31	5 35	6 57	5 13	15 18	.....	3 11	72	5 49.3	20 01	10.1
Wed Feb 20/Thu Feb 21	9 46	18 10	19 32	5 34	6 56	5 17	15 21	.....	3 55	80	6 40.3	18 56	10.0
Thu Feb 21/Fri Feb 22	9 50	18 11	19 33	5 33	6 55	5 22	15 24	.....	4 36	87	7 31.1	16 57	10.0
Fri Feb 22/Sat Feb 23	9 54	18 11	19 34	5 32	6 54	5 27	15 27	.....	5 15	93	8 21.5	14 07	10.0
Sat Feb 23/Sun Feb 24	9 58	18 12	19 34	5 31	6 53	5 31	15 29	16 29	5 51	97	9 11.7	10 33	9.9
Sun Feb 24/Mon Feb 25	10 02	18 13	19 35	5 30	6 52	5 36	15 32	17 27	6 26	99	10 01.6	6 24	9.9
Mon Feb 25/Tue Feb 26	10 06	18 14	19 36	5 29	6 50	5 41	15 35	18 27	7 01	100	10 51.7	1 51	9.9
Tue Feb 26/Wed Feb 27	10 10	18 15	19 37	5 27	6 49	5 46	15 38	19 27	7 36	97	11 42.4	- 2 53	9.8
Wed Feb 27/Thu Feb 28	10 13	18 16	19 37	5 26	6 48	5 50	15 41	20 29	.....	93	12 34.3	- 7 34	9.8
Thu Feb 28/Fri Mar 01	10 17	18 16	19 38	5 25	6 47	5 55	15 44	21 32	.....	86	13 27.8	-11 55	9.8

Calendar for VATT, west longitude (h.m.s) = 7 19 34, latitude (d.m) = 32 42.1  
 Rise/set times in Mountain time ( 7 hr W), uncorrected for elevation, in standard time all year.  
 Moon info is for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

\*\*\*\*\* 2013 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	
Fri Mar 01/Sat Mar 02	10 21	18 17	19 39	5 24	6 46	6 00	15 46	22 36	.....	77	14 23.3	-15 40	9.8
Sat Mar 02/Sun Mar 03	10 25	18 18	19 40	5 23	6 45	6 04	15 49	23 40	.....	67	15 20.8	-18 33	9.7
Sun Mar 03/Mon Mar 04	10 29	18 19	19 41	5 22	6 43	6 09	15 52	0 43	.....	56	16 20.0	-20 20	9.7
Mon Mar 04/Tue Mar 05	10 33	18 19	19 41	5 20	6 42	6 14	15 55	1 44	.....	45	17 20.1	-20 53	9.7
Tue Mar 05/Wed Mar 06	10 37	18 20	19 42	5 19	6 41	6 18	15 57	2 40	.....	34	18 20.1	-20 10	9.6
Wed Mar 06/Thu Mar 07	10 41	18 21	19 43	5 18	6 40	6 23	16 00	3 31	.....	24	19 19.0	-18 13	9.6
Thu Mar 07/Fri Mar 08	10 45	18 22	19 44	5 17	6 38	6 28	16 03	4 17	.....	15	20 16.0	-15 14	9.6
Fri Mar 08/Sat Mar 09	10 49	18 23	19 44	5 15	6 37	6 33	16 05	4 58	.....	8	21 10.8	-11 26	9.5
Sat Mar 09/Sun Mar 10	10 53	18 23	19 45	5 14	6 36	6 37	16 08	5 36	16 33	3	22 03.5	- 7 06	9.5
Sun Mar 10/Mon Mar 11	10 57	18 24	19 46	5 13	6 35	6 42	16 11	6 12	17 36	0	22 54.6	- 2 30	9.4
Mon Mar 11/Tue Mar 12	11 01	18 25	19 47	5 12	6 33	6 47	16 13	6 48	18 37	0	23 44.4	2 08	9.4
Tue Mar 12/Wed Mar 13	11 05	18 26	19 47	5 10	6 32	6 51	16 16	7 23	19 37	2	0 33.6	6 32	9.4
Wed Mar 13/Thu Mar 14	11 09	18 26	19 48	5 09	6 31	6 56	16 18	.....	20 36	6	1 22.5	10 32	9.3
Thu Mar 14/Fri Mar 15	11 13	18 27	19 49	5 08	6 29	7 01	16 21	.....	21 34	12	2 11.6	13 57	9.3
Fri Mar 15/Sat Mar 16	11 17	18 28	19 50	5 06	6 28	7 06	16 24	.....	22 30	19	3 01.1	16 40	9.3
Sat Mar 16/Sun Mar 17	11 21	18 28	19 51	5 05	6 27	7 10	16 26	.....	23 23	27	3 51.0	18 36	9.2
Sun Mar 17/Mon Mar 18	11 24	18 29	19 51	5 04	6 26	7 15	16 29	.....	0 15	36	4 41.3	19 40	9.2
Mon Mar 18/Tue Mar 19	11 28	18 30	19 52	5 02	6 24	7 20	16 31	.....	1 03	45	5 31.7	19 49	9.2
Tue Mar 19/Wed Mar 20	11 32	18 31	19 53	5 01	6 23	7 25	16 34	.....	1 48	55	6 22.1	19 04	9.1
Wed Mar 20/Thu Mar 21	11 36	18 31	19 54	4 59	6 22	7 29	16 36	.....	2 30	64	7 12.3	17 27	9.1
Thu Mar 21/Fri Mar 22	11 40	18 32	19 55	4 58	6 20	7 34	16 39	.....	3 10	73	8 02.1	14 59	9.1
Fri Mar 22/Sat Mar 23	11 44	18 33	19 55	4 57	6 19	7 39	16 42	.....	3 47	82	8 51.8	11 45	9.0
Sat Mar 23/Sun Mar 24	11 48	18 34	19 56	4 55	6 18	7 44	16 44	.....	4 22	89	9 41.4	7 53	9.0
Sun Mar 24/Mon Mar 25	11 52	18 34	19 57	4 54	6 16	7 48	16 47	.....	4 57	95	10 31.5	3 31	8.9
Mon Mar 25/Tue Mar 26	11 56	18 35	19 58	4 52	6 15	7 53	16 49	17 12	5 33	98	11 22.4	- 1 10	8.9
Tue Mar 26/Wed Mar 27	12 00	18 36	19 59	4 51	6 14	7 58	16 52	18 14	6 10	100	12 14.7	- 5 57	8.9
Wed Mar 27/Thu Mar 28	12 04	18 36	19 59	4 49	6 12	8 03	16 54	19 18	6 49	99	13 09.0	-10 31	8.8
Thu Mar 28/Fri Mar 29	12 08	18 37	20 00	4 48	6 11	8 07	16 57	20 24	.....	95	14 05.5	-14 34	8.8
Fri Mar 29/Sat Mar 30	12 12	18 38	20 01	4 47	6 10	8 12	16 59	21 30	.....	89	15 04.3	-17 48	8.8
Sat Mar 30/Sun Mar 31	12 16	18 38	20 02	4 45	6 09	8 17	17 02	22 35	.....	81	16 04.8	-19 57	8.7
Sun Mar 31/Mon Apr 01	12 20	18 39	20 03	4 44	6 07	8 22	17 04	23 38	.....	71	17 06.2	-20 49	8.7

\*\*\*\*\* 2013 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	
Mon Apr 01/Tue Apr 02	12 24	18 40	20 04	4 42	6 06	8 27	17 07	0 36	.....	60	18 07.1	-20 22	8.6
Tue Apr 02/Wed Apr 03	12 28	18 41	20 04	4 41	6 05	8 31	17 09	1 28	.....	48	19 06.4	-18 40	8.6
Wed Apr 03/Thu Apr 04	12 31	18 41	20 05	4 39	6 03	8 36	17 12	2 15	.....	37	20 03.5	-15 56	8.6
Thu Apr 04/Fri Apr 05	12 35	18 42	20 06	4 38	6 02	8 41	17 14	2 57	.....	27	20 58.1	-12 22	8.5
Fri Apr 05/Sat Apr 06	12 39	18 43	20 07	4 36	6 01	8 46	17 17	3 35	.....	18	21 50.5	- 8 14	8.5
Sat Apr 06/Sun Apr 07	12 43	18 43	20 08	4 35	6 00	8 51	17 19	4 11	.....	10	22 40.9	- 3 48	8.5
Sun Apr 07/Mon Apr 08	12 47	18 44	20 09	4 34	5 58	8 55	17 22	4 46	.....	5	23 30.2	0 44	8.4
Mon Apr 08/Tue Apr 09	12 51	18 45	20 10	4 32	5 57	9 00	17 24	5 21	17 26	1	0 18.9	5 07	8.4
Tue Apr 09/Wed Apr 10	12 55	18 46	20 11	4 31	5 56	9 05	17 27	5 56	18 24	0	1 07.4	9 11	8.3
Wed Apr 10/Thu Apr 11	12 59	18 46	20 12	4 29	5 55	9 10	17 29	6 33	19 22	1	1 56.2	12 45	8.3
Thu Apr 11/Fri Apr 12	13 03	18 47	20 13	4 28	5 53	9 15	17 32	.....	20 19	3	2 45.4	15 41	8.3
Fri Apr 12/Sat Apr 13	13 07	18 48	20 13	4 26	5 52	9 20	17 34	.....	21 13	8	3 35.2	17 51	8.2
Sat Apr 13/Sun Apr 14	13 11	18 48	20 14	4 25	5 51	9 25	17 37	.....	22 06	14	4 25.3	19 10	8.2
Sun Apr 14/Mon Apr 15	13 15	18 49	20 15	4 24	5 50	9 30	17 39	.....	22 56	21	5 15.6	19 36	8.1
Mon Apr 15/Tue Apr 16	13 19	18 50	20 16	4 22	5 49	9 34	17 42	.....	23 42	29	6 05.6	19 09	8.1
Tue Apr 16/Wed Apr 17	13 23	18 51	20 17	4 21	5 47	9 39	17 44	.....	0 25	38	6 55.3	17 50	8.1
Wed Apr 17/Thu Apr 18	13 27	18 51	20 18	4 19	5 46	9 44	17 47	.....	1 05	47	7 44.4	15 41	8.0
Thu Apr 18/Fri Apr 19	13 31	18 52	20 19	4 18	5 45	9 49	17 49	.....	1 42	57	8 33.1	12 48	8.0
Fri Apr 19/Sat Apr 20	13 35	18 53	20 20	4 16	5 44	9 54	17 52	.....	2 18	67	9 21.6	9 15	7.9
Sat Apr 20/Sun Apr 21	13 38	18 53	20 21	4 15	5 43	9 59	17 54	.....	2 52	76	10 10.5	5 10	7.9
Sun Apr 21/Mon Apr 22	13 42	18 54	20 22	4 14	5 42	10 04	17 57	.....	3 27	84	11 00.2	0 41	7.9
Mon Apr 22/Tue Apr 23	13 46	18 55	20 23	4 12	5 41	10 09	17 59	.....	4 03	91	11 51.4	- 4 02	7.8
Tue Apr 23/Wed Apr 24	13 50	18 56	20 24	4 11	5 39	10 14	18 02	.....	4 41	97	12 44.8	- 8 42	7.8
Wed Apr 24/Thu Apr 25	13 54	18 56	20 25	4 10	5 38	10 19	18 05	18 04	5 23	100	13 41.1	-13 03	7.7
Thu Apr 25/Fri Apr 26	13 58	18 57	20 26	4 08	5 37	10 24	18 07	19 12	6 10	100	14 40.3	-16 43	7.7
Fri Apr 26/Sat Apr 27	14 02	18 58	20 27	4 07	5 36	10 29	18 10	20 19	.....	97	15 42.1	-19 22	7.7
Sat Apr 27/Sun Apr 28	14 06	18 59	20 28	4 06	5 35	10 34	18 12	21 25	.....	91	16 45.6	-20 44	7.6
Sun Apr 28/Mon Apr 29	14 10	18 59	20 29	4 04	5 34	10 39	18 15	22 27	.....	83	17 49.0	-20 41	7.6
Mon Apr 29/Tue Apr 30	14 14	19 00	20 30	4 03	5 33	10 44	18 18	23 23	.....	73	18 51.0	-19 16	7.5
Tue Apr 30/Wed May 01	14 18	19 01	20 31	4 02	5 32	10 49	18 20	0 13	.....	63	19 50.2	-16 42	7.5

Calendar for VATT, west longitude (h.m.s) = 7 19 34, latitude (d.m) = 32 42.1  
 Rise/set times in Mountain time ( 7 hr W), uncorrected for elevation, in standard time all year.  
 Moon info is for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

\*\*\*\*\* 2013 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	
Wed May 01/Thu May 02	14 22	19 01	20 32	4 01	5 31	10 53	18 23	0 57	.....	51	20 46.4	-13 14	7.5
Thu May 02/Fri May 03	14 26	19 02	20 33	3 59	5 30	10 58	18 26	1 36	.....	40	21 39.6	- 9 11	7.4
Fri May 03/Sat May 04	14 30	19 03	20 34	3 58	5 29	11 03	18 28	2 13	.....	30	22 30.4	- 4 47	7.4
Sat May 04/Sun May 05	14 34	19 04	20 35	3 57	5 29	11 08	18 31	2 47	.....	21	23 19.6	- 0 18	7.4
Sun May 05/Mon May 06	14 38	19 04	20 36	3 56	5 28	11 13	18 34	3 21	.....	13	0 07.8	4 05	7.3
Mon May 06/Tue May 07	14 42	19 05	20 37	3 55	5 27	11 18	18 37	3 56	.....	7	0 55.7	8 10	7.3
Tue May 07/Wed May 08	14 46	19 06	20 38	3 53	5 26	11 23	18 40	4 32	.....	3	1 43.8	11 50	7.2
Wed May 08/Thu May 09	14 49	19 07	20 39	3 52	5 25	11 28	18 42	5 10	18 11	1	2 32.5	14 54	7.2
Thu May 09/Fri May 10	14 53	19 07	20 40	3 51	5 24	11 33	18 45	5 51	19 06	0	3 21.8	17 15	7.2
Fri May 10/Sat May 11	14 57	19 08	20 42	3 50	5 24	11 38	18 48	6 35	19 59	1	4 11.7	18 48	7.1
Sat May 11/Sun May 12	15 01	19 09	20 43	3 49	5 23	11 43	18 51	.....	20 50	5	5 01.7	19 28	7.1
Sun May 12/Mon May 13	15 05	19 09	20 44	3 48	5 22	11 48	18 54	.....	21 38	9	5 51.7	19 16	7.1
Mon May 13/Tue May 14	15 09	19 10	20 45	3 47	5 21	11 53	18 57	.....	22 22	15	6 41.2	18 11	7.0
Tue May 14/Wed May 15	15 13	19 11	20 46	3 46	5 21	11 58	19 00	.....	23 03	23	7 29.9	16 18	7.0
Wed May 15/Thu May 16	15 17	19 12	20 47	3 45	5 20	12 03	19 03	.....	23 40	31	8 18.0	13 41	7.0
Thu May 16/Fri May 17	15 21	19 12	20 48	3 44	5 19	12 08	19 06	.....	0 16	41	9 05.5	10 24	6.9
Fri May 17/Sat May 18	15 25	19 13	20 49	3 43	5 19	12 13	19 09	.....	0 50	51	9 52.9	6 36	6.9
Sat May 18/Sun May 19	15 29	19 14	20 50	3 42	5 18	12 18	19 12	.....	1 24	61	10 40.8	2 22	6.9
Sun May 19/Mon May 20	15 33	19 14	20 51	3 41	5 18	12 23	19 15	.....	1 58	71	11 29.9	- 2 09	6.8
Mon May 20/Tue May 21	15 37	19 15	20 52	3 40	5 17	12 28	19 18	.....	2 34	80	12 21.0	- 6 45	6.8
Tue May 21/Wed May 22	15 41	19 16	20 53	3 40	5 16	12 33	19 21	.....	3 13	88	13 14.9	-11 12	6.8
Wed May 22/Thu May 23	15 45	19 16	20 54	3 39	5 16	12 38	19 24	.....	3 57	95	14 12.3	-15 12	6.8
Thu May 23/Fri May 24	15 49	19 17	20 55	3 38	5 15	12 43	19 27	17 57	4 47	99	15 13.2	-18 23	6.7
Fri May 24/Sat May 25	15 53	19 18	20 55	3 37	5 15	12 47	19 30	19 05	5 44	100	16 17.1	-20 23	6.7
Sat May 25/Sun May 26	15 56	19 18	20 56	3 37	5 15	12 52	19 34	20 11	.....	98	17 22.5	-20 59	6.7
Sun May 26/Mon May 27	16 00	19 19	20 57	3 36	5 14	12 57	19 37	21 11	.....	93	18 27.5	-20 04	6.6
Mon May 27/Tue May 28	16 04	19 20	20 58	3 35	5 14	13 02	19 40	22 06	.....	86	19 30.2	-17 49	6.6
Tue May 28/Wed May 29	16 08	19 20	20 59	3 35	5 13	13 07	19 44	22 54	.....	76	20 29.7	-14 29	6.6
Wed May 29/Thu May 30	16 12	19 21	21 00	3 34	5 13	13 12	19 47	23 36	.....	66	21 25.6	-10 26	6.6
Thu May 30/Fri May 31	16 16	19 22	21 01	3 34	5 13	13 16	19 50	0 14	.....	55	22 18.4	- 5 59	6.5
Fri May 31/Sat Jun 01	16 20	19 22	21 02	3 33	5 13	13 21	19 54	0 50	.....	44	23 08.9	- 1 24	6.5

\*\*\*\*\* 2013 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	
Sat Jun 01/Sun Jun 02	16 24	19 23	21 02	3 33	5 12	13 26	19 57	1 24	.....	34	23 57.7	3 04	6.5
Sun Jun 02/Mon Jun 03	16 28	19 23	21 03	3 32	5 12	13 31	20 01	1 58	.....	25	0 45.8	7 16	6.5
Mon Jun 03/Tue Jun 04	16 32	19 24	21 04	3 32	5 12	13 35	20 04	2 33	.....	17	1 33.7	11 01	6.5
Tue Jun 04/Wed Jun 05	16 36	19 24	21 05	3 31	5 12	13 40	20 08	3 10	.....	10	2 22.0	14 13	6.4
Wed Jun 05/Thu Jun 06	16 40	19 25	21 05	3 31	5 12	13 45	20 12	3 50	.....	5	3 10.8	16 44	6.4
Thu Jun 06/Fri Jun 07	16 44	19 25	21 06	3 31	5 11	13 49	20 15	4 33	17 54	2	4 00.2	18 29	6.4
Fri Jun 07/Sat Jun 08	16 48	19 26	21 07	3 31	5 11	13 54	20 19	5 18	18 46	0	4 50.0	19 23	6.4
Sat Jun 08/Sun Jun 09	16 52	19 26	21 07	3 30	5 11	13 58	20 23	6 07	19 35	0	5 39.9	19 24	6.4
Sun Jun 09/Mon Jun 10	16 56	19 27	21 08	3 30	5 11	14 03	20 26	.....	20 20	2	6 29.4	18 32	6.4
Mon Jun 10/Tue Jun 11	17 00	19 27	21 08	3 30	5 11	14 07	20 30	.....	21 02	6	7 18.2	16 52	6.4
Tue Jun 11/Wed Jun 12	17 04	19 28	21 09	3 30	5 11	14 12	20 34	.....	21 41	11	8 06.2	14 27	6.3
Wed Jun 12/Thu Jun 13	17 07	19 28	21 09	3 30	5 11	14 16	20 38	.....	22 17	18	8 53.3	11 23	6.3
Thu Jun 13/Fri Jun 14	17 11	19 28	21 10	3 30	5 11	14 21	20 42	.....	22 51	26	9 40.0	7 47	6.3
Fri Jun 14/Sat Jun 15	17 15	19 29	21 10	3 30	5 11	14 25	20 46	.....	23 24	35	10 26.6	3 45	6.3
Sat Jun 15/Sun Jun 16	17 19	19 29	21 11	3 30	5 11	14 30	20 50	.....	23 57	45	11 13.9	- 0 33	6.3
Sun Jun 16/Mon Jun 17	17 23	19 29	21 11	3 30	5 12	14 34	20 54	.....	0 31	55	12 02.6	- 5 00	6.3
Mon Jun 17/Tue Jun 18	17 27	19 30	21 11	3 30	5 12	14 38	20 58	.....	1 08	66	12 53.5	- 9 24	6.3
Tue Jun 18/Wed Jun 19	17 31	19 30	21 12	3 30	5 12	14 42	21 02	.....	1 48	76	13 47.6	-13 30	6.3
Wed Jun 19/Thu Jun 20	17 35	19 30	21 12	3 30	5 12	14 47	21 06	.....	2 33	85	14 45.3	-17 00	6.3
Thu Jun 20/Fri Jun 21	17 39	19 30	21 12	3 30	5 12	14 51	21 10	.....	3 26	93	15 46.7	-19 35	6.3
Fri Jun 21/Sat Jun 22	17 43	19 31	21 12	3 31	5 13	14 55	21 14	17 48	4 25	98	16 51.2	-20 53	6.3
Sat Jun 22/Sun Jun 23	17 47	19 31	21 13	3 31	5 13	14 59	21 18	18 52	5 30	100	17 57.1	-20 43	6.3
Sun Jun 23/Mon Jun 24	17 51	19 31	21 13	3 31	5 13	15 03	21 23	19 51	.....	99	19 02.3	-19 04	6.3
Mon Jun 24/Tue Jun 25	17 55	19 31	21 13	3 32	5 13	15 07	21 27	20 44	.....	95	20 05.2	-16 07	6.3
Tue Jun 25/Wed Jun 26	17 59	19 31	21 13	3 32	5 14	15 11	21 31	21 30	.....	88	21 04.7	-12 11	6.3
Wed Jun 26/Thu Jun 27	18 03	19 31	21 13	3 32	5 14	15 15	21 36	22 11	.....	79	22 00.8	- 7 42	6.3
Thu Jun 27/Fri Jun 28	18 07	19 31	21 13	3 33	5 14	15 19	21 40	22 49	.....	70	22 53.8	- 2 58	6.3
Fri Jun 28/Sat Jun 29	18 11	19 31	21 13	3 33	5 15	15 23	21 44	23 25	.....	59	23 44.7	1 42	6.3
Sat Jun 29/Sun Jun 30	18 14	19 31	21 13	3 34	5 15	15 27	21 49	24 00	.....	49	0 34.1	6 06	6.4
Sun Jun 30/Mon Jul 01	18 18	19 31	21 13	3 34	5 16	15 31	21 53	0 35	.....	39	1 22.8	10 03	6.4

Calendar for VATT, west longitude (h.m.s) = 7 19 34, latitude (d.m) = 32 42.1  
 Rise/set times in Mountain time ( 7 hr W), uncorrected for elevation, in standard time all year.  
 Moon info is for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

\*\*\*\*\* 2013 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	
Mon Jul 01/Tue Jul 02	18 22	19 31	21 12	3 35	5 16	15 34	21 58	1 12	.....	29	2 11.4	13 27	6.4
Tue Jul 02/Wed Jul 03	18 26	19 31	21 12	3 35	5 16	15 38	22 02	1 50	.....	21	3 00.3	16 09	6.4
Wed Jul 03/Thu Jul 04	18 30	19 31	21 12	3 36	5 17	15 42	22 07	2 32	.....	14	3 49.6	18 06	6.4
Thu Jul 04/Fri Jul 05	18 34	19 31	21 12	3 37	5 17	15 45	22 12	3 16	.....	8	4 39.2	19 13	6.4
Fri Jul 05/Sat Jul 06	18 38	19 31	21 11	3 37	5 18	15 49	22 16	4 04	17 32	4	5 29.0	19 27	6.4
Sat Jul 06/Sun Jul 07	18 42	19 31	21 11	3 38	5 18	15 53	22 21	4 54	18 18	1	6 18.6	18 50	6.5
Sun Jul 07/Mon Jul 08	18 46	19 31	21 11	3 39	5 19	15 56	22 25	5 46	19 02	0	7 07.6	17 22	6.5
Mon Jul 08/Tue Jul 09	18 50	19 30	21 10	3 40	5 19	16 00	22 30	.....	19 42	1	7 55.9	15 08	6.5
Tue Jul 09/Wed Jul 10	18 54	19 30	21 10	3 40	5 20	16 03	22 35	.....	20 19	4	8 43.3	12 14	6.5
Wed Jul 10/Thu Jul 11	18 58	19 30	21 09	3 41	5 20	16 07	22 40	.....	20 54	8	9 29.9	8 47	6.5
Thu Jul 11/Fri Jul 12	19 02	19 30	21 09	3 42	5 21	16 10	22 44	.....	21 27	14	10 16.2	4 54	6.6
Fri Jul 12/Sat Jul 13	19 06	19 29	21 08	3 43	5 22	16 13	22 49	.....	22 00	22	11 02.7	0 43	6.6
Sat Jul 13/Sun Jul 14	19 10	19 29	21 08	3 43	5 22	16 17	22 54	.....	22 33	31	11 50.0	- 3 36	6.6
Sun Jul 14/Mon Jul 15	19 14	19 29	21 07	3 44	5 23	16 20	22 59	.....	23 07	41	12 38.9	- 7 54	6.6
Mon Jul 15/Tue Jul 16	19 18	19 28	21 06	3 45	5 23	16 23	23 03	.....	23 45	51	13 30.1	-11 59	6.6
Tue Jul 16/Wed Jul 17	19 22	19 28	21 06	3 46	5 24	16 27	23 08	.....	0 27	62	14 24.4	-15 36	6.7
Wed Jul 17/Thu Jul 18	19 25	19 27	21 05	3 47	5 25	16 30	23 13	.....	1 14	73	15 22.2	-18 29	6.7
Thu Jul 18/Fri Jul 19	19 29	19 27	21 04	3 48	5 25	16 33	23 18	.....	2 08	83	16 23.4	-20 19	6.7
Fri Jul 19/Sat Jul 20	19 33	19 26	21 03	3 49	5 26	16 36	23 23	.....	3 08	91	17 27.1	-20 51	6.8
Sat Jul 20/Sun Jul 21	19 37	19 26	21 03	3 50	5 26	16 39	23 28	17 33	4 15	97	18 31.8	-19 56	6.8
Sun Jul 21/Mon Jul 22	19 41	19 25	21 02	3 51	5 27	16 42	23 32	18 29	5 24	100	19 35.8	-17 38	6.8
Mon Jul 22/Tue Jul 23	19 45	19 25	21 01	3 52	5 28	16 46	23 37	19 19	.....	99	20 37.6	-14 08	6.8
Tue Jul 23/Wed Jul 24	19 49	19 24	21 00	3 53	5 28	16 49	23 42	20 04	.....	96	21 36.5	- 9 49	6.9
Wed Jul 24/Thu Jul 25	19 53	19 23	20 59	3 53	5 29	16 52	23 47	20 44	.....	91	22 32.5	- 5 03	6.9
Thu Jul 25/Fri Jul 26	19 57	19 23	20 58	3 54	5 30	16 55	23 52	21 22	.....	83	23 26.0	- 0 11	6.9
Fri Jul 26/Sat Jul 27	20 01	19 22	20 57	3 55	5 30	16 58	23 57	21 59	.....	74	0 17.6	4 28	7.0
Sat Jul 27/Sun Jul 28	20 05	19 21	20 56	3 56	5 31	17 00	0 02	22 35	.....	64	1 08.1	8 43	7.0
Sun Jul 28/Mon Jul 29	20 09	19 21	20 55	3 57	5 32	17 03	0 07	23 11	.....	54	1 57.9	12 23	7.0
Mon Jul 29/Tue Jul 30	20 13	19 20	20 54	3 58	5 32	17 06	0 12	23 50	.....	44	2 47.7	15 21	7.1
Tue Jul 30/Wed Jul 31	20 17	19 19	20 53	3 59	5 33	17 09	0 17	0 31	.....	35	3 37.5	17 33	7.1
Wed Jul 31/Thu Aug 01	20 21	19 18	20 52	4 00	5 34	17 12	0 22	1 14	.....	26	4 27.4	18 54	7.1

\*\*\*\*\* 2013 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	
Thu Aug 01/Fri Aug 02	20 25	19 18	20 51	4 01	5 34	17 15	0 27	2 01	.....	18	5 17.3	19 24	7.2
Fri Aug 02/Sat Aug 03	20 29	19 17	20 50	4 02	5 35	17 18	0 31	2 50	.....	11	6 07.1	19 01	7.2
Sat Aug 03/Sun Aug 04	20 32	19 16	20 48	4 03	5 36	17 20	0 36	3 41	.....	6	6 56.4	17 47	7.2
Sun Aug 04/Mon Aug 05	20 36	19 15	20 47	4 04	5 37	17 23	0 41	4 34	17 41	3	7 44.9	15 46	7.3
Mon Aug 05/Tue Aug 06	20 40	19 14	20 46	4 05	5 37	17 26	0 46	5 29	18 19	1	8 32.8	13 02	7.3
Tue Aug 06/Wed Aug 07	20 44	19 13	20 45	4 06	5 38	17 29	0 51	6 24	18 55	0	9 19.9	9 43	7.4
Wed Aug 07/Thu Aug 08	20 48	19 12	20 44	4 07	5 39	17 31	0 56	.....	19 30	2	10 06.6	5 57	7.4
Thu Aug 08/Fri Aug 09	20 52	19 11	20 42	4 08	5 39	17 34	1 01	.....	20 03	6	10 53.2	1 51	7.4
Fri Aug 09/Sat Aug 10	20 56	19 10	20 41	4 09	5 40	17 37	1 06	.....	20 36	11	11 40.3	- 2 25	7.5
Sat Aug 10/Sun Aug 11	21 00	19 09	20 40	4 10	5 41	17 39	1 11	.....	21 10	18	12 28.5	- 6 41	7.5
Sun Aug 11/Mon Aug 12	21 04	19 08	20 38	4 11	5 41	17 42	1 16	.....	21 47	27	13 18.5	-10 45	7.5
Mon Aug 12/Tue Aug 13	21 08	19 07	20 37	4 12	5 42	17 45	1 21	.....	22 26	37	14 10.8	-14 24	7.6
Tue Aug 13/Wed Aug 14	21 12	19 06	20 36	4 13	5 43	17 47	1 26	.....	23 10	48	15 05.8	-17 25	7.6
Wed Aug 14/Thu Aug 15	21 16	19 05	20 34	4 14	5 43	17 50	1 31	.....	24 00	59	16 03.9	-19 31	7.7
Thu Aug 15/Fri Aug 16	21 20	19 04	20 33	4 15	5 44	17 52	1 35	.....	0 55	70	17 04.4	-20 30	7.7
Fri Aug 16/Sat Aug 17	21 24	19 03	20 32	4 16	5 45	17 55	1 40	.....	1 57	80	18 06.5	-20 12	7.7
Sat Aug 17/Sun Aug 18	21 28	19 02	20 30	4 17	5 45	17 57	1 45	.....	3 03	89	19 08.9	-18 33	7.8
Sun Aug 18/Mon Aug 19	21 32	19 01	20 29	4 18	5 46	18 00	1 50	.....	4 11	95	20 10.4	-15 39	7.8
Mon Aug 19/Tue Aug 20	21 36	19 00	20 28	4 19	5 47	18 03	1 55	17 54	5 20	99	21 10.0	-11 46	7.9
Tue Aug 20/Wed Aug 21	21 39	18 58	20 26	4 20	5 47	18 05	2 00	18 36	6 27	100	22 07.3	- 7 13	7.9
Wed Aug 21/Thu Aug 22	21 43	18 57	20 25	4 21	5 48	18 08	2 05	19 16	.....	98	23 02.6	- 2 22	7.9
Thu Aug 22/Fri Aug 23	21 47	18 56	20 23	4 21	5 49	18 10	2 10	19 54	.....	93	23 56.1	2 28	8.0
Fri Aug 23/Sat Aug 24	21 51	18 55	20 22	4 22	5 49	18 13	2 14	20 31	.....	87	0 48.4	6 59	8.0
Sat Aug 24/Sun Aug 25	21 55	18 54	20 20	4 23	5 50	18 15	2 19	21 08	.....	79	1 39.9	10 58	8.0
Sun Aug 25/Mon Aug 26	21 59	18 53	20 19	4 24	5 51	18 18	2 24	21 47	.....	70	2 31.0	14 16	8.1
Mon Aug 26/Tue Aug 27	22 03	18 51	20 18	4 25	5 51	18 20	2 29	22 28	.....	60	3 21.9	16 47	8.1
Tue Aug 27/Wed Aug 28	22 07	18 50	20 16	4 26	5 52	18 23	2 34	23 10	.....	50	4 12.7	18 27	8.2
Wed Aug 28/Thu Aug 29	22 11	18 49	20 15	4 27	5 53	18 25	2 39	23 56	.....	41	5 03.3	19 13	8.2
Thu Aug 29/Fri Aug 30	22 15	18 48	20 13	4 28	5 53	18 28	2 43	0 44	.....	32	5 53.4	19 06	8.2
Fri Aug 30/Sat Aug 31	22 19	18 46	20 12	4 28	5 54	18 30	2 48	1 35	.....	23	6 43.0	18 07	8.3
Sat Aug 31/Sun Sep 01	22 23	18 45	20 10	4 29	5 55	18 32	2 53	2 27	.....	16	7 31.9	16 20	8.3

Calendar for VATT, west longitude (h.m.s) = 7 19 34, latitude (d.m) = 32 42.1  
 Rise/set times in Mountain time ( 7 hr W), uncorrected for elevation, in standard time all year.  
 Moon info is for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

\*\*\*\*\* 2013 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	
Sun Sep 01/Mon Sep 02	22 27	18 44	20 09	4 30	5 55	18 35	2 58	3 21	.....	10	8 20.1	13 50	8.4
Mon Sep 02/Tue Sep 03	22 31	18 42	20 07	4 31	5 56	18 37	3 02	4 16	16 55	5	9 07.6	10 42	8.4
Tue Sep 03/Wed Sep 04	22 35	18 41	20 06	4 32	5 56	18 40	3 07	5 12	17 30	2	9 54.8	7 03	8.4
Wed Sep 04/Thu Sep 05	22 39	18 40	20 04	4 33	5 57	18 42	3 12	6 09	18 04	0	10 41.9	3 01	8.5
Thu Sep 05/Fri Sep 06	22 43	18 39	20 03	4 33	5 58	18 45	3 17	7 06	18 38	1	11 29.4	- 1 13	8.5
Fri Sep 06/Sat Sep 07	22 47	18 37	20 01	4 34	5 58	18 47	3 21	.....	19 12	4	12 17.9	- 5 30	8.5
Sat Sep 07/Sun Sep 08	22 50	18 36	20 00	4 35	5 59	18 50	3 26	.....	19 48	8	13 07.9	- 9 37	8.6
Sun Sep 08/Mon Sep 09	22 54	18 35	19 58	4 36	6 00	18 52	3 31	.....	20 27	15	13 59.8	-13 22	8.6
Mon Sep 09/Tue Sep 10	22 58	18 33	19 57	4 37	6 00	18 55	3 36	.....	21 10	24	14 54.0	-16 30	8.7
Tue Sep 10/Wed Sep 11	23 02	18 32	19 55	4 37	6 01	18 57	3 40	.....	21 58	34	15 50.6	-18 47	8.7
Wed Sep 11/Thu Sep 12	23 06	18 31	19 54	4 38	6 02	18 59	3 45	.....	22 50	45	16 49.2	-20 01	8.7
Thu Sep 12/Fri Sep 13	23 10	18 29	19 52	4 39	6 02	19 02	3 50	.....	23 49	56	17 49.2	-20 04	8.8
Fri Sep 13/Sat Sep 14	23 14	18 28	19 51	4 40	6 03	19 04	3 55	.....	0 51	67	18 49.5	-18 52	8.8
Sat Sep 14/Sun Sep 15	23 18	18 27	19 50	4 40	6 03	19 07	3 59	.....	1 56	78	19 49.1	-16 29	8.8
Sun Sep 15/Mon Sep 16	23 22	18 25	19 48	4 41	6 04	19 09	4 04	.....	3 02	87	20 47.5	-13 05	8.9
Mon Sep 16/Tue Sep 17	23 26	18 24	19 47	4 42	6 05	19 12	4 09	.....	4 08	93	21 44.2	- 8 56	8.9
Tue Sep 17/Wed Sep 18	23 30	18 23	19 45	4 43	6 05	19 14	4 13	17 10	5 13	98	22 39.3	- 4 18	9.0
Wed Sep 18/Thu Sep 19	23 34	18 21	19 44	4 43	6 06	19 17	4 18	17 48	6 17	100	23 33.1	0 29	9.0
Thu Sep 19/Fri Sep 20	23 38	18 20	19 42	4 44	6 07	19 19	4 23	18 25	7 19	99	0 26.1	5 08	9.0
Fri Sep 20/Sat Sep 21	23 42	18 18	19 41	4 45	6 07	19 22	4 27	19 03	.....	96	1 18.5	9 22	9.1
Sat Sep 21/Sun Sep 22	23 46	18 17	19 39	4 46	6 08	19 24	4 32	19 42	.....	91	2 10.6	13 00	9.1
Sun Sep 22/Mon Sep 23	23 50	18 16	19 38	4 46	6 09	19 27	4 37	20 22	.....	84	3 02.7	15 52	9.1
Mon Sep 23/Tue Sep 24	23 54	18 14	19 36	4 47	6 09	19 29	4 41	21 05	.....	76	3 54.6	17 52	9.2
Tue Sep 24/Wed Sep 25	23 57	18 13	19 35	4 48	6 10	19 32	4 46	21 50	.....	67	4 46.2	18 58	9.2
Wed Sep 25/Thu Sep 26	0 01	18 12	19 34	4 49	6 11	19 34	4 51	22 37	.....	58	5 37.2	19 09	9.2
Thu Sep 26/Fri Sep 27	0 05	18 10	19 32	4 49	6 11	19 37	4 55	23 27	.....	48	6 27.4	18 26	9.3
Fri Sep 27/Sat Sep 28	0 09	18 09	19 31	4 50	6 12	19 39	5 00	0 19	.....	39	7 16.7	16 55	9.3
Sat Sep 28/Sun Sep 29	0 13	18 08	19 30	4 51	6 13	19 42	5 05	1 12	.....	30	8 05.1	14 39	9.4
Sun Sep 29/Mon Sep 30	0 17	18 06	19 28	4 51	6 13	19 45	5 09	2 06	.....	21	8 52.8	11 44	9.4
Mon Sep 30/Tue Oct 01	0 21	18 05	19 27	4 52	6 14	19 47	5 14	3 01	.....	14	9 40.0	8 16	9.4

\*\*\*\*\* 2013 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	
Tue Oct 01/Wed Oct 02	0 25	18 04	19 25	4 53	6 15	19 50	5 19	3 57	.....	8	10 27.2	4 22	9.5
Wed Oct 02/Thu Oct 03	0 29	18 02	19 24	4 53	6 15	19 52	5 23	4 55	16 36	3	11 14.9	0 11	9.5
Thu Oct 03/Fri Oct 04	0 33	18 01	19 23	4 54	6 16	19 55	5 28	5 54	17 10	1	12 03.6	- 4 08	9.5
Fri Oct 04/Sat Oct 05	0 37	18 00	19 22	4 55	6 17	19 58	5 33	6 55	17 47	0	12 53.9	- 8 21	9.6
Sat Oct 05/Sun Oct 06	0 41	17 59	19 20	4 56	6 17	20 00	5 37	.....	18 25	2	13 46.2	-12 15	9.6
Sun Oct 06/Mon Oct 07	0 45	17 57	19 19	4 56	6 18	20 03	5 42	.....	19 08	6	14 40.8	-15 35	9.6
Mon Oct 07/Tue Oct 08	0 49	17 56	19 18	4 57	6 19	20 06	5 46	.....	19 55	12	15 37.6	-18 06	9.7
Tue Oct 08/Wed Oct 09	0 53	17 55	19 16	4 58	6 19	20 08	5 51	.....	20 47	21	16 36.3	-19 35	9.7
Wed Oct 09/Thu Oct 10	0 57	17 53	19 15	4 58	6 20	20 11	5 56	.....	21 44	31	17 35.9	-19 53	9.7
Thu Oct 10/Fri Oct 11	1 01	17 52	19 14	4 59	6 21	20 14	6 00	.....	22 45	42	18 35.6	-18 59	9.8
Fri Oct 11/Sat Oct 12	1 05	17 51	19 13	5 00	6 22	20 16	6 05	.....	23 49	53	19 34.4	-16 55	9.8
Sat Oct 12/Sun Oct 13	1 08	17 50	19 12	5 00	6 22	20 19	6 10	.....	0 53	64	20 31.6	-13 51	9.8
Sun Oct 13/Mon Oct 14	1 12	17 49	19 10	5 01	6 23	20 22	6 14	.....	1 57	75	21 27.1	-10 01	9.8
Mon Oct 14/Tue Oct 15	1 16	17 47	19 09	5 02	6 24	20 25	6 19	.....	3 01	84	22 21.0	- 5 39	9.9
Tue Oct 15/Wed Oct 16	1 20	17 46	19 08	5 03	6 25	20 28	6 24	.....	4 03	91	23 13.8	- 1 03	9.9
Wed Oct 16/Thu Oct 17	1 24	17 45	19 07	5 03	6 25	20 30	6 28	16 22	5 05	97	0 06.0	3 33	9.9
Thu Oct 17/Fri Oct 18	1 28	17 44	19 06	5 04	6 26	20 33	6 33	16 59	6 06	99	0 57.9	7 53	10.0
Fri Oct 18/Sat Oct 19	1 32	17 43	19 05	5 05	6 27	20 36	6 38	17 36	7 05	100	1 49.9	11 44	10.0
Sat Oct 19/Sun Oct 20	1 36	17 42	19 04	5 05	6 28	20 39	6 42	18 16	.....	98	2 42.2	14 54	10.0
Sun Oct 20/Mon Oct 21	1 40	17 40	19 03	5 06	6 28	20 42	6 47	18 58	.....	94	3 34.7	17 15	10.1
Mon Oct 21/Tue Oct 22	1 44	17 39	19 02	5 07	6 29	20 45	6 52	19 42	.....	89	4 27.1	18 42	10.1
Tue Oct 22/Wed Oct 23	1 48	17 38	19 01	5 07	6 30	20 48	6 56	20 30	.....	82	5 19.0	19 12	10.1
Wed Oct 23/Thu Oct 24	1 52	17 37	19 00	5 08	6 31	20 51	7 01	21 19	.....	74	6 10.1	18 48	10.1
Thu Oct 24/Fri Oct 25	1 56	17 36	18 59	5 09	6 32	20 54	7 06	22 10	.....	65	7 00.0	17 32	10.2
Fri Oct 25/Sat Oct 26	2 00	17 35	18 58	5 10	6 32	20 57	7 10	23 02	.....	56	7 48.9	15 31	10.2
Sat Oct 26/Sun Oct 27	2 04	17 34	18 57	5 10	6 33	21 00	7 15	23 55	.....	46	8 36.7	12 49	10.2
Sun Oct 27/Mon Oct 28	2 08	17 33	18 56	5 11	6 34	21 03	7 20	0 49	.....	37	9 23.7	9 33	10.3
Mon Oct 28/Tue Oct 29	2 12	17 32	18 55	5 12	6 35	21 06	7 24	1 44	.....	28	10 10.5	5 49	10.3
Tue Oct 29/Wed Oct 30	2 15	17 31	18 54	5 13	6 36	21 09	7 29	2 41	.....	19	10 57.7	1 46	10.3
Wed Oct 30/Thu Oct 31	2 19	17 30	18 53	5 13	6 37	21 12	7 34	3 39	.....	12	11 45.8	- 2 29	10.3
Thu Oct 31/Fri Nov 01	2 23	17 29	18 53	5 14	6 37	21 15	7 38	4 39	.....	6	12 35.5	- 6 45	10.4

Calendar for VATT, west longitude (h.m.s) = 7 19 34, latitude (d.m) = 32 42.1  
 Rise/set times in Mountain time ( 7 hr W), uncorrected for elevation, in standard time all year.  
 Moon info is for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

\*\*\*\*\* 2013 NOVEMBER \*\*\*\*\*

Date (eve/morn)	LMST midn	----- Sun: -----				LST twilight:		----- Moon: -----				Twilight	
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	hours
Fri Nov 01/Sat Nov 02	2 27	17 28	18 52	5 15	6 38	21 18	7 43	5 42	16 19	2	13 27.4	-10 49	10.4
Sat Nov 02/Sun Nov 03	2 31	17 28	18 51	5 16	6 39	21 21	7 48	6 46	17 00	0	14 22.0	-14 25	10.4
Sun Nov 03/Mon Nov 04	2 35	17 27	18 50	5 16	6 40	21 25	7 52	7 51	17 46	1	15 19.3	-17 17	10.4
Mon Nov 04/Tue Nov 05	2 39	17 26	18 50	5 17	6 41	21 28	7 57	.....	18 38	4	16 18.9	-19 08	10.5
Tue Nov 05/Wed Nov 06	2 43	17 25	18 49	5 18	6 42	21 31	8 02	.....	19 35	10	17 19.8	-19 48	10.5
Wed Nov 06/Thu Nov 07	2 47	17 24	18 48	5 19	6 43	21 34	8 06	.....	20 37	18	18 20.8	-19 11	10.5
Thu Nov 07/Fri Nov 08	2 51	17 23	18 48	5 19	6 44	21 38	8 11	.....	21 41	28	19 20.7	-17 22	10.5
Fri Nov 08/Sat Nov 09	2 55	17 23	18 47	5 20	6 44	21 41	8 16	.....	22 46	38	20 18.6	-14 30	10.6
Sat Nov 09/Sun Nov 10	2 59	17 22	18 46	5 21	6 45	21 44	8 21	.....	23 51	50	21 14.3	-10 50	10.6
Sun Nov 10/Mon Nov 11	3 03	17 21	18 46	5 22	6 46	21 48	8 25	.....	0 54	61	22 07.9	- 6 38	10.6
Mon Nov 11/Tue Nov 12	3 07	17 21	18 45	5 22	6 47	21 51	8 30	.....	1 56	71	22 59.9	- 2 10	10.6
Tue Nov 12/Wed Nov 13	3 11	17 20	18 45	5 23	6 48	21 55	8 35	.....	2 57	81	23 51.0	2 21	10.6
Wed Nov 13/Thu Nov 14	3 15	17 19	18 44	5 24	6 49	21 58	8 39	.....	3 56	88	0 41.7	6 41	10.7
Thu Nov 14/Fri Nov 15	3 19	17 19	18 44	5 25	6 50	22 02	8 44	.....	4 55	94	1 32.7	10 38	10.7
Fri Nov 15/Sat Nov 16	3 22	17 18	18 43	5 25	6 51	22 05	8 49	.....	5 53	98	2 24.1	13 59	10.7
Sat Nov 16/Sun Nov 17	3 26	17 18	18 43	5 26	6 52	22 09	8 54	.....	6 49	100	3 16.1	16 37	10.7
Sun Nov 17/Mon Nov 18	3 30	17 17	18 43	5 27	6 53	22 12	8 58	.....	7 43	100	4 08.4	18 23	10.7
Mon Nov 18/Tue Nov 19	3 34	17 17	18 42	5 28	6 54	22 16	9 03	.....	8 22	97	5 00.7	19 14	10.8
Tue Nov 19/Wed Nov 20	3 38	17 16	18 42	5 29	6 54	22 19	9 08	.....	9 11	93	5 52.5	19 08	10.8
Wed Nov 20/Thu Nov 21	3 42	17 16	18 42	5 29	6 55	22 23	9 12	.....	20 02	87	6 43.3	18 10	10.8
Thu Nov 21/Fri Nov 22	3 46	17 16	18 41	5 30	6 56	22 27	9 17	.....	20 53	81	7 32.8	16 23	10.8
Fri Nov 22/Sat Nov 23	3 50	17 15	18 41	5 31	6 57	22 30	9 22	.....	21 46	73	8 21.1	13 53	10.8
Sat Nov 23/Sun Nov 24	3 54	17 15	18 41	5 32	6 58	22 34	9 27	.....	22 39	64	9 08.2	10 49	10.8
Sun Nov 24/Mon Nov 25	3 58	17 15	18 41	5 32	6 59	22 38	9 31	.....	23 33	54	9 54.6	7 16	10.9
Mon Nov 25/Tue Nov 26	4 02	17 14	18 41	5 33	7 00	22 42	9 36	.....	0 27	45	10 40.9	3 22	10.9
Tue Nov 26/Wed Nov 27	4 06	17 14	18 41	5 34	7 01	22 46	9 41	.....	1 23	35	11 27.8	- 0 46	10.9
Wed Nov 27/Thu Nov 28	4 10	17 14	18 41	5 35	7 02	22 49	9 45	.....	2 21	25	12 16.0	- 4 59	10.9
Thu Nov 28/Fri Nov 29	4 14	17 14	18 40	5 35	7 02	22 53	9 50	.....	3 22	17	13 06.3	- 9 07	10.9
Fri Nov 29/Sat Nov 30	4 18	17 13	18 40	5 36	7 03	22 57	9 55	.....	4 25	10	13 59.3	-12 55	10.9
Sat Nov 30/Sun Dec 01	4 22	17 13	18 40	5 37	7 04	23 01	10 00	.....	5 30	4	14 55.5	-16 08	10.9

\*\*\*\*\* 2013 DECEMBER \*\*\*\*\*

Date (eve/morn)	LMST midn	----- Sun: -----				LST twilight:		----- Moon: -----				Twilight	
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	hours
Sun Dec 01/Mon Dec 02	4 26	17 13	18 40	5 38	7 05	23 05	10 04	6 36	16 23	1	15 54.7	-18 29	11.0
Mon Dec 02/Tue Dec 03	4 30	17 13	18 40	5 38	7 06	23 09	10 09	7 40	17 18	0	16 56.4	-19 40	11.0
Tue Dec 03/Wed Dec 04	4 33	17 13	18 41	5 39	7 07	23 13	10 14	.....	18 19	2	17 59.1	-19 33	11.0
Wed Dec 04/Thu Dec 05	4 37	17 13	18 41	5 40	7 07	23 17	10 18	.....	19 25	7	19 01.4	-18 07	11.0
Thu Dec 05/Fri Dec 06	4 41	17 13	18 41	5 41	7 08	23 21	10 23	.....	20 33	15	20 01.8	-15 29	11.0
Fri Dec 06/Sat Dec 07	4 45	17 13	18 41	5 41	7 09	23 25	10 27	.....	21 40	24	20 59.6	-11 57	11.0
Sat Dec 07/Sun Dec 08	4 49	17 13	18 41	5 42	7 10	23 29	10 32	.....	22 46	34	21 54.8	- 7 47	11.0
Sun Dec 08/Mon Dec 09	4 53	17 14	18 41	5 43	7 10	23 34	10 37	.....	23 50	45	22 47.7	- 3 19	11.0
Mon Dec 09/Tue Dec 10	4 57	17 14	18 42	5 43	7 11	23 38	10 41	.....	0 51	56	23 39.0	1 14	11.0
Tue Dec 10/Wed Dec 11	5 01	17 14	18 42	5 44	7 12	23 42	10 46	.....	1 51	67	0 29.4	5 36	11.0
Wed Dec 11/Thu Dec 12	5 05	17 14	18 42	5 45	7 13	23 46	10 51	.....	2 49	76	1 19.6	9 37	11.0
Thu Dec 12/Fri Dec 13	5 09	17 14	18 42	5 45	7 13	23 50	10 55	.....	3 47	84	2 10.0	13 07	11.0
Fri Dec 13/Sat Dec 14	5 13	17 15	18 43	5 46	7 14	23 55	11 00	.....	4 43	91	3 01.0	15 56	11.1
Sat Dec 14/Sun Dec 15	5 17	17 15	18 43	5 46	7 15	23 59	11 04	.....	5 37	96	3 52.6	17 58	11.1
Sun Dec 15/Mon Dec 16	5 21	17 15	18 43	5 47	7 15	0 03	11 09	.....	6 29	99	4 44.5	19 06	11.1
Mon Dec 16/Tue Dec 17	5 25	17 16	18 44	5 48	7 16	0 08	11 13	.....	7 18	100	5 36.3	19 20	11.1
Tue Dec 17/Wed Dec 18	5 29	17 16	18 44	5 48	7 16	0 12	11 18	.....	8 03	99	6 27.5	18 40	11.1
Wed Dec 18/Thu Dec 19	5 33	17 16	18 45	5 49	7 17	0 16	11 22	.....	8 47	96	7 17.7	17 08	11.1
Thu Dec 19/Fri Dec 20	5 37	17 17	18 45	5 49	7 17	0 21	11 27	.....	9 39	92	8 06.6	14 52	11.1
Fri Dec 20/Sat Dec 21	5 40	17 17	18 46	5 50	7 18	0 25	11 31	.....	20 32	86	8 54.2	11 58	11.1
Sat Dec 21/Sun Dec 22	5 44	17 18	18 46	5 50	7 18	0 30	11 36	.....	21 25	79	9 40.9	8 34	11.1
Sun Dec 22/Mon Dec 23	5 48	17 18	18 47	5 51	7 19	0 34	11 40	.....	.....	71	10 26.9	4 47	11.1
Mon Dec 23/Tue Dec 24	5 52	17 19	18 47	5 51	7 19	0 39	11 44	.....	23 13	62	11 13.0	0 46	11.1
Tue Dec 24/Wed Dec 25	5 56	17 19	18 48	5 52	7 20	0 43	11 49	.....	0 09	52	11 59.8	- 3 22	11.1
Wed Dec 25/Thu Dec 26	6 00	17 20	18 48	5 52	7 20	0 48	11 53	.....	1 06	42	12 48.1	- 7 28	11.1
Thu Dec 26/Fri Dec 27	6 04	17 21	18 49	5 52	7 21	0 52	11 58	.....	2 06	32	13 38.6	-11 20	11.1
Fri Dec 27/Sat Dec 28	6 08	17 21	18 49	5 53	7 21	0 57	12 02	.....	3 08	22	14 32.1	-14 46	11.1
Sat Dec 28/Sun Dec 29	6 12	17 22	18 50	5 53	7 21	1 01	12 06	.....	4 12	14	15 29.0	-17 29	11.1
Sun Dec 29/Mon Dec 30	6 16	17 23	18 51	5 53	7 21	1 06	12 10	.....	.....	7	16 28.9	-19 14	11.0
Mon Dec 30/Tue Dec 31	6 20	17 23	18 51	5 54	7 22	1 10	12 15	.....	6 20	2	17 31.3	-19 46	11.0
Tue Dec 31/Wed Jan 01	6 24	17 24	18 52	5 54	7 22	1 15	12 19	.....	7 19	0	18 34.6	-18 56	11.0