

Nighttime astronomical calendar program. Select a site: *SELECT SITE* - Enter single-character code: n .. new site (enter all parameters). x .. exit without change (current: Kitt Peak) k .. Kitt Peak s .. Shattuck Observatory c .. Cambridge, MA - Harvard Coll. Obs. h .. Mt. Hopkins, AZ (MMT, FLWO) p .. Palomar Observatory t .. Tololo (Cerro Tololo Interamerican Obs.) r .. Roque de los Muchachos, La Palma, Canary Is. b .. Black Moshannon Obs., Penn State U. d .. Dominion Astrophysical Obs., Victoria, BC m .. Mauna Kea, Hawaii l .. Lick Observatory Any other char .. OTHER (You'll be prompted for params.) Your answer -j The site you've selected is: Kitt Peak. Type 0 for ordinary text, 1 for TeX-style output with one month per page, or 2 for TeX-style output with two months per page: You'll have to edit the TeX output ... look for 'CUT HERE'

This program takes a while to run and produces wide and voluminous output. You probably want to run it in background. See source code or documentation for details of what program will expect. To exit now, give a negative year at the next prompt. Year to print, negative to abort:

***** 2021 Night-time Astronomical Calendar for Kitt Peak *****

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 18.0 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 NAOA 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 hemishpheres. 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 2021, at Kitt Peak

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 14 9 19	Dec 21 16 43	Dec 29 20 30	Jan 06 2 39
Jan 12 22 03	Jan 20 14 04	Jan 28 12 19	Feb 04 10 39
Feb 11 12 08	Feb 19 11 49	Feb 27 1 20	Mar 05 18 32
Mar 13 3 24	Mar 21 7 42	Mar 28 11 50	Apr 04 3 04
Apr 11 19 33	Apr 20 0 00	Apr 26 20 33	May 03 12 52
May 11 12 02	May 19 12 13	May 26 4 15	Jun 02 0 26
Jun 10 3 54	Jun 17 20 55	Jun 24 11 40	Jul 01 14 13
Jul 09 18 18	Jul 17 3 12	Jul 23 19 37	Jul 31 6 18
Aug 08 6 51	Aug 15 8 21	Aug 22 5 02	Aug 30 0 15
Sep 06 17 52	Sep 13 13 41	Sep 20 16 55	Sep 28 18 58
Oct 06 4 06	Oct 12 20 28	Oct 20 7 58	Oct 28 13 07
Nov 04 14 15	Nov 11 5 48	Nov 19 2 00	Nov 27 5 30
Dec 04 0 45	Dec 10 18 38	Dec 18 21 38	Dec 26 19 26
Jan 02 11 36	Jan 09 11 13	Jan 17 16 51	Jan 25 6 43

***** 2021 JANUARY *****

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 24, latitude (d.m) = 31 57.8

Note that each line lists events of one night, spanning two calendar dates. Rise/set times are given in Mountain time (7 hr W), for 900 m above surroundings, in standard time all year.

Moon coords. and illum. are for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

Date (eve/morn) (2021 at start)		JDmid (-2450000)	LMSTmidn	----- Sun: ----- set twi.end twi.beg rise				LST twilight: eve morn		----- Moon: ----- rise set %illum RA Dec		
Fri Jan 01/Sat Jan 02	9216.8	6 22 10	17 39 19 01	6 00 7 22	1 22 12 23	20 09	.....	89	9 37.5	18 53	
Sat Jan 02/Sun Jan 03	9217.8	6 26 07	17 39 19 01	6 00 7 22	1 27 12 28	21 13	.....	81	10 31.3	14 36	
Sun Jan 03/Mon Jan 04	9218.8	6 30 03	17 40 19 02	6 01 7 22	1 31 12 32	22 17	.....	72	11 23.3	9 31	
Mon Jan 04/Tue Jan 05	9219.8	6 34 00	17 41 19 03	6 01 7 23	1 36 12 36	23 20	.....	62	12 14.3	3 54	
Tue Jan 05/Wed Jan 06	9220.8	6 37 56	17 42 19 03	6 01 7 23	1 41 12 40	0 25	.....	50	13 05.0	- 1 57	
Wed Jan 06/Thu Jan 07	9221.8	6 41 53	17 42 19 04	6 01 7 23	1 45 12 44	1 30	.....	39	13 56.4	- 7 45	
Thu Jan 07/Fri Jan 08	9222.8	6 45 49	17 43 19 05	6 01 7 23	1 50 12 48	2 36	.....	28	14 49.6	-13 13	
Fri Jan 08/Sat Jan 09	9223.8	6 49 46	17 44 19 06	6 01 7 23	1 55 12 52	3 45	.....	19	15 45.2	-17 59	
Sat Jan 09/Sun Jan 10	9224.8	6 53 42	17 45 19 06	6 01 7 23	1 59 12 56	4 54	.....	11	16 43.6	-21 43	
Sun Jan 10/Mon Jan 11	9225.8	6 57 39	17 46 19 07	6 01 7 23	2 04 13 00	6 01	.....	5	17 44.3	-24 07	
Mon Jan 11/Tue Jan 12	9226.8	7 01 36	17 47 19 08	6 01 7 23	2 09 13 04	7 04	16 23	1	18 45.9	-24 59		
Tue Jan 12/Wed Jan 13	9227.8	7 05 32	17 48 19 09	6 01 7 22	2 13 13 08	8 00	17 25	0	19 46.8	-24 17		
Wed Jan 13/Thu Jan 14	9228.8	7 09 29	17 48 19 09	6 01 7 22	2 18 13 12	.....	18 29	1	20 45.2	-22 10	
Thu Jan 14/Fri Jan 15	9229.8	7 13 25	17 49 19 10	6 01 7 22	2 23 13 16	.....	19 33	5	21 40.1	-18 54	
Fri Jan 15/Sat Jan 16	9230.8	7 17 22	17 50 19 11	6 01 7 22	2 28 13 20	.....	20 35	11	22 31.4	-14 47	
Sat Jan 16/Sun Jan 17	9231.8	7 21 18	17 51 19 12	6 01 7 22	2 32 13 23	.....	21 35	18	23 19.4	-10 07	
Sun Jan 17/Mon Jan 18	9232.8	7 25 15	17 52 19 13	6 01 7 21	2 37 13 27	.....	22 32	26	0 05.0	- 5 09	
Mon Jan 18/Tue Jan 19	9233.8	7 29 11	17 53 19 13	6 01 7 21	2 42 13 31	.....	23 27	34	0 49.0	- 0 05	
Tue Jan 19/Wed Jan 20	9234.8	7 33 08	17 54 19 14	6 01 7 21	2 46 13 35	.....	0 21	44	1 32.4	4 55	
Wed Jan 20/Thu Jan 21	9235.8	7 37 05	17 55 19 15	6 00 7 20	2 51 13 38	.....	1 15	53	2 16.3	9 43	
Thu Jan 21/Fri Jan 22	9236.8	7 41 01	17 56 19 16	6 00 7 20	2 56 13 42	.....	2 10	63	3 01.4	14 09	
Fri Jan 22/Sat Jan 23	9237.8	7 44 58	17 56 19 16	6 00 7 20	3 01 13 46	.....	3 06	71	3 48.6	18 03	
Sat Jan 23/Sun Jan 24	9238.8	7 48 54	17 57 19 17	5 59 7 19	3 05 13 49	.....	4 03	80	4 38.5	21 15	
Sun Jan 24/Mon Jan 25	9239.8	7 52 51	17 58 19 18	5 59 7 19	3 10 13 53	.....	5 00	87	5 31.2	23 32	
Mon Jan 25/Tue Jan 26	9240.8	7 56 47	17 59 19 19	5 59 7 18	3 15 13 57	.....	5 56	93	6 26.7	24 40	
Tue Jan 26/Wed Jan 27	9241.8	8 00 44	18 00 19 20	5 58 7 18	3 20 14 00	15 54	6 49	97	7 24.0	24 30		
Wed Jan 27/Thu Jan 28	9242.8	8 04 40	18 01 19 20	5 58 7 17	3 24 14 04	16 53	7 37	100	8 21.9	22 56		
Thu Jan 28/Fri Jan 29	9243.8	8 08 37	18 02 19 21	5 58 7 17	3 29 14 07	17 56	.....	100	9 19.1	20 00	
Fri Jan 29/Sat Jan 30	9244.8	8 12 34	18 03 19 22	5 57 7 16	3 34 14 11	19 02	.....	97	10 14.8	15 53	
Sat Jan 30/Sun Jan 31	9245.8	8 16 30	18 04 19 23	5 57 7 15	3 39 14 14	20 07	.....	92	11 08.8	10 51	
Sun Jan 31/Mon Feb 01	9246.8	8 20 27	18 05 19 24	5 56 7 15	3 43 14 17	21 13	.....	85	12 01.3	5 11	

***** 2021 FEBRUARY *****

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 24, latitude (d.m) = 31 57.8

Note that each line lists events of one night, spanning two calendar dates. Rise/set times are given in Mountain time (7 hr W), for 900 m above surroundings, in standard time all year.

Moon coords. and illum. are for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

Date (eve/morn) (2021 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Mon Feb 01/Tue Feb 02	9247.8	8 24 23	18 06	19 24	5 55	7 14	3 48	14 21	22 18	.....	76	12 52.9	- 0 47
Tue Feb 02/Wed Feb 03	9248.8	8 28 20	18 06	19 25	5 55	7 13	3 53	14 24	23 23	.....	65	13 44.7	- 6 42
Wed Feb 03/Thu Feb 04	9249.8	8 32 16	18 07	19 26	5 54	7 13	3 58	14 28	0 29	.....	54	14 37.4	-12 16
Thu Feb 04/Fri Feb 05	9250.8	8 36 13	18 08	19 27	5 54	7 12	4 02	14 31	1 36	.....	43	15 32.0	-17 10
Fri Feb 05/Sat Feb 06	9251.8	8 40 09	18 09	19 28	5 53	7 11	4 07	14 34	2 43	.....	32	16 28.8	-21 06
Sat Feb 06/Sun Feb 07	9252.8	8 44 06	18 10	19 28	5 52	7 10	4 12	14 37	3 50	.....	22	17 27.8	-23 47
Sun Feb 07/Mon Feb 08	9253.8	8 48 03	18 11	19 29	5 52	7 10	4 16	14 41	4 52	.....	14	18 27.9	-25 02
Mon Feb 08/Tue Feb 09	9254.8	8 51 59	18 12	19 30	5 51	7 09	4 21	14 44	5 49	.....	7	19 27.8	-24 46
Tue Feb 09/Wed Feb 10	9255.8	8 55 56	18 13	19 31	5 50	7 08	4 26	14 47	6 39	16 13	3	20 26.0	-23 05
Wed Feb 10/Thu Feb 11	9256.8	8 59 52	18 14	19 31	5 49	7 07	4 31	14 50	7 22	17 17	0	21 21.4	-20 10
Thu Feb 11/Fri Feb 12	9257.8	9 03 49	18 14	19 32	5 49	7 06	4 35	14 53	.....	18 20	0	22 13.6	-16 18
Fri Feb 12/Sat Feb 13	9258.8	9 07 45	18 15	19 33	5 48	7 05	4 40	14 57	.....	19 21	2	23 02.6	-11 45
Sat Feb 13/Sun Feb 14	9259.8	9 11 42	18 16	19 34	5 47	7 04	4 45	15 00	.....	20 19	6	23 49.0	- 6 49
Sun Feb 14/Mon Feb 15	9260.8	9 15 38	18 17	19 34	5 46	7 03	4 49	15 03	.....	21 15	12	0 33.6	- 1 43
Mon Feb 15/Tue Feb 16	9261.8	9 19 35	18 18	19 35	5 45	7 03	4 54	15 06	.....	22 10	19	1 17.3	3 22
Tue Feb 16/Wed Feb 17	9262.8	9 23 32	18 19	19 36	5 44	7 02	4 59	15 09	.....	23 05	27	2 01.0	8 16
Wed Feb 17/Thu Feb 18	9263.8	9 27 28	18 20	19 37	5 43	7 01	5 04	15 12	.....	23 59	35	2 45.4	12 50
Thu Feb 18/Fri Feb 19	9264.8	9 31 25	18 20	19 38	5 43	7 00	5 08	15 15	.....	0 55	45	3 31.4	16 54
Fri Feb 19/Sat Feb 20	9265.8	9 35 21	18 21	19 38	5 42	6 59	5 13	15 18	.....	1 51	54	4 19.7	20 20
Sat Feb 20/Sun Feb 21	9266.8	9 39 18	18 22	19 39	5 41	6 57	5 18	15 21	.....	2 48	64	5 10.6	22 55
Sun Feb 21/Mon Feb 22	9267.8	9 43 14	18 23	19 40	5 40	6 56	5 22	15 24	.....	3 44	73	6 04.3	24 28
Mon Feb 22/Tue Feb 23	9268.8	9 47 11	18 24	19 41	5 39	6 55	5 27	15 27	.....	4 37	81	7 00.2	24 48
Tue Feb 23/Wed Feb 24	9269.8	9 51 07	18 24	19 41	5 38	6 54	5 32	15 30	.....	5 28	89	7 57.5	23 47
Wed Feb 24/Thu Feb 25	9270.8	9 55 04	18 25	19 42	5 36	6 53	5 36	15 32	.....	6 13	95	8 55.1	21 22
Thu Feb 25/Fri Feb 26	9271.8	9 59 01	18 26	19 43	5 35	6 52	5 41	15 35	16 43	6 55	98	9 52.0	17 37
Fri Feb 26/Sat Feb 27	9272.8	10 02 57	18 27	19 43	5 34	6 51	5 46	15 38	17 50	7 33	100	10 47.7	12 46
Sat Feb 27/Sun Feb 28	9273.8	10 06 54	18 28	19 44	5 33	6 50	5 50	15 41	18 58	.....	99	11 42.0	7 05
Sun Feb 28/Mon Mar 01	9274.8	10 10 50	18 28	19 45	5 32	6 49	5 55	15 44	20 05	.....	94	12 35.5	0 57

***** 2021 MARCH *****

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 24, latitude (d.m) = 31 57.8

Note that each line lists events of one night, spanning two calendar dates. Rise/set times are given in Mountain time (7 hr W), for 900 m above surroundings, in standard time all year.

Moon coords. and illum. are for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

Date (eve/morn) (2021 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Mon Mar 01/Tue Mar 02	9275.8	10 14 47	18 29	19 46	5 31	6 47	6 00	15 47	21 12	.....	88	13 29.0	- 5 17
Tue Mar 02/Wed Mar 03	9276.8	10 18 43	18 30	19 46	5 30	6 46	6 04	15 49	22 20	.....	79	14 23.1	-11 12
Wed Mar 03/Thu Mar 04	9277.8	10 22 40	18 31	19 47	5 29	6 45	6 09	15 52	23 28	.....	69	15 18.7	-16 27
Thu Mar 04/Fri Mar 05	9278.8	10 26 36	18 31	19 48	5 27	6 44	6 14	15 55	0 36	.....	58	16 16.0	-20 43
Fri Mar 05/Sat Mar 06	9279.8	10 30 33	18 32	19 49	5 26	6 43	6 18	15 58	1 43	.....	47	17 15.1	-23 41
Sat Mar 06/Sun Mar 07	9280.8	10 34 30	18 33	19 49	5 25	6 41	6 23	16 00	2 47	.....	36	18 15.1	-25 14
Sun Mar 07/Mon Mar 08	9281.8	10 38 26	18 34	19 50	5 24	6 40	6 28	16 03	3 45	.....	26	19 14.6	-25 16
Mon Mar 08/Tue Mar 09	9282.8	10 42 23	18 34	19 51	5 23	6 39	6 33	16 06	4 36	.....	17	20 12.5	-23 52
Tue Mar 09/Wed Mar 10	9283.8	10 46 19	18 35	19 52	5 21	6 38	6 37	16 09	5 20	.....	10	21 07.8	-21 13
Wed Mar 10/Thu Mar 11	9284.8	10 50 16	18 36	19 52	5 20	6 37	6 42	16 11	5 58	.....	5	21 59.8	-17 35
Thu Mar 11/Fri Mar 12	9285.8	10 54 12	18 36	19 53	5 19	6 35	6 47	16 14	6 32	17 10	2	22 48.9	-13 13
Fri Mar 12/Sat Mar 13	9286.8	10 58 09	18 37	19 54	5 18	6 34	6 51	16 17	7 02	18 08	0	23 35.5	- 8 22
Sat Mar 13/Sun Mar 14	9287.8	11 02 05	18 38	19 55	5 16	6 33	6 56	16 19	.....	19 05	1	0 20.2	- 3 17
Sun Mar 14/Mon Mar 15	9288.8	11 06 02	18 39	19 55	5 15	6 32	7 01	16 22	.....	20 01	3	1 03.9	1 51
Mon Mar 15/Tue Mar 16	9289.8	11 09 59	18 39	19 56	5 14	6 30	7 05	16 24	.....	20 55	7	1 47.4	6 52
Tue Mar 16/Wed Mar 17	9290.8	11 13 55	18 40	19 57	5 12	6 29	7 10	16 27	.....	21 50	13	2 31.4	11 34
Wed Mar 17/Thu Mar 18	9291.8	11 17 52	18 41	19 58	5 11	6 28	7 15	16 30	.....	22 46	20	3 16.7	15 49
Thu Mar 18/Fri Mar 19	9292.8	11 21 48	18 41	19 58	5 10	6 26	7 19	16 32	.....	23 41	28	4 03.8	19 27
Fri Mar 19/Sat Mar 20	9293.8	11 25 45	18 42	19 59	5 08	6 25	7 24	16 35	.....	0 38	37	4 53.1	22 18
Sat Mar 20/Sun Mar 21	9294.8	11 29 41	18 43	20 00	5 07	6 24	7 29	16 37	.....	1 33	46	5 44.9	24 12
Sun Mar 21/Mon Mar 22	9295.8	11 33 38	18 43	20 01	5 06	6 23	7 34	16 40	.....	2 27	56	6 38.8	24 58
Mon Mar 22/Tue Mar 23	9296.8	11 37 34	18 44	20 01	5 04	6 21	7 38	16 43	.....	3 18	66	7 34.4	24 28
Tue Mar 23/Wed Mar 24	9297.8	11 41 31	18 45	20 02	5 03	6 20	7 43	16 45	.....	4 05	75	8 30.6	22 37
Wed Mar 24/Thu Mar 25	9298.8	11 45 28	18 45	20 03	5 01	6 19	7 48	16 48	.....	4 47	84	9 26.8	19 27
Thu Mar 25/Fri Mar 26	9299.8	11 49 24	18 46	20 04	5 00	6 17	7 52	16 50	.....	5 26	91	10 22.4	15 03
Fri Mar 26/Sat Mar 27	9300.8	11 53 21	18 47	20 05	4 59	6 16	7 57	16 53	.....	6 02	97	11 17.2	9 39
Sat Mar 27/Sun Mar 28	9301.8	11 57 17	18 48	20 05	4 57	6 15	8 02	16 55	17 43	6 37	100	12 11.6	3 32
Sun Mar 28/Mon Mar 29	9302.8	12 01 14	18 48	20 06	4 56	6 14	8 07	16 58	18 52	7 12	99	13 06.1	- 2 55
Mon Mar 29/Tue Mar 30	9303.8	12 05 10	18 49	20 07	4 54	6 12	8 11	17 00	20 02	.....	96	14 01.6	- 9 16
Tue Mar 30/Wed Mar 31	9304.8	12 09 07	18 50	20 08	4 53	6 11	8 16	17 03	21 12	.....	91	14 58.7	-15 04
Wed Mar 31/Thu Apr 01	9305.8	12 13 03	18 50	20 09	4 52	6 10	8 21	17 05	22 24	.....	82	15 57.8	-19 55

***** 2021 APRIL *****

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 24, latitude (d.m) = 31 57.8

Note that each line lists events of one night, spanning two calendar dates. Rise/set times are given in Mountain time (7 hr W), for 900 m above surroundings, in standard time all year.

Moon coords. and illum. are for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

Date (eve/morn) (2021 at start)	JDmid (-2450000)	LMSTmidn	Sun: -----				LST twilight:		Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Thu Apr 01/Fri Apr 02	9306.8	12 17 00	18 51	20 09	4 50	6 09	8 26	17 08	23 34	.....	73	16 58.8	-23 26
Fri Apr 02/Sat Apr 03	9307.8	12 20 57	18 52	20 10	4 49	6 07	8 30	17 10	0 41	.....	62	18 00.6	-25 25
Sat Apr 03/Sun Apr 04	9308.8	12 24 53	18 52	20 11	4 47	6 06	8 35	17 13	1 42	.....	51	19 01.8	-25 47
Sun Apr 04/Mon Apr 05	9309.8	12 28 50	18 53	20 12	4 46	6 05	8 40	17 16	2 35	.....	40	20 01.0	-24 39
Mon Apr 05/Tue Apr 06	9310.8	12 32 46	18 54	20 13	4 45	6 03	8 45	17 18	3 21	.....	30	20 57.0	-22 12
Tue Apr 06/Wed Apr 07	9311.8	12 36 43	18 54	20 14	4 43	6 02	8 50	17 21	4 00	.....	21	21 49.5	-18 43
Wed Apr 07/Thu Apr 08	9312.8	12 40 39	18 55	20 14	4 42	6 01	8 54	17 23	4 35	.....	14	22 38.7	-14 29
Thu Apr 08/Fri Apr 09	9313.8	12 44 36	18 56	20 15	4 40	6 00	8 59	17 26	5 05	.....	8	23 25.2	- 9 44
Fri Apr 09/Sat Apr 10	9314.8	12 48 32	18 56	20 16	4 39	5 59	9 04	17 28	5 34	.....	3	0 09.8	- 4 41
Sat Apr 10/Sun Apr 11	9315.8	12 52 29	18 57	20 17	4 37	5 57	9 09	17 31	6 01	17 54	1	0 53.2	0 27
Sun Apr 11/Mon Apr 12	9316.8	12 56 26	18 58	20 18	4 36	5 56	9 14	17 33	6 28	18 48	0	1 36.4	5 31
Mon Apr 12/Tue Apr 13	9317.8	13 00 22	18 58	20 19	4 35	5 55	9 19	17 36	6 57	19 43	1	2 19.9	10 20
Tue Apr 13/Wed Apr 14	9318.8	13 04 19	18 59	20 20	4 33	5 54	9 23	17 38	.....	20 38	4	3 04.6	14 45
Wed Apr 14/Thu Apr 15	9319.8	13 08 15	19 00	20 21	4 32	5 53	9 28	17 41	.....	21 34	9	3 51.0	18 34
Thu Apr 15/Fri Apr 16	9320.8	13 12 12	19 01	20 22	4 30	5 51	9 33	17 43	.....	22 30	15	4 39.3	21 40
Fri Apr 16/Sat Apr 17	9321.8	13 16 08	19 01	20 22	4 29	5 50	9 38	17 46	.....	23 26	22	5 29.9	23 50
Sat Apr 17/Sun Apr 18	9322.8	13 20 05	19 02	20 23	4 28	5 49	9 43	17 49	.....	0 20	30	6 22.4	24 56
Sun Apr 18/Mon Apr 19	9323.8	13 24 01	19 03	20 24	4 26	5 48	9 48	17 51	.....	1 11	39	7 16.3	24 51
Mon Apr 19/Tue Apr 20	9324.8	13 27 58	19 03	20 25	4 25	5 47	9 53	17 54	.....	1 59	49	8 10.8	23 29
Tue Apr 20/Wed Apr 21	9325.8	13 31 55	19 04	20 26	4 24	5 46	9 57	17 56	.....	2 42	60	9 05.4	20 52
Wed Apr 21/Thu Apr 22	9326.8	13 35 51	19 05	20 27	4 22	5 45	10 02	17 59	.....	3 21	70	9 59.4	17 02
Thu Apr 22/Fri Apr 23	9327.8	13 39 48	19 06	20 28	4 21	5 44	10 07	18 02	.....	3 57	80	10 52.9	12 08
Fri Apr 23/Sat Apr 24	9328.8	13 43 44	19 06	20 29	4 20	5 42	10 12	18 04	.....	4 31	88	11 46.2	6 23
Sat Apr 24/Sun Apr 25	9329.8	13 47 41	19 07	20 30	4 18	5 41	10 17	18 07	.....	5 05	95	12 39.8	0 04
Sun Apr 25/Mon Apr 26	9330.8	13 51 37	19 08	20 31	4 17	5 40	10 22	18 09	17 36	5 41	99	13 34.8	- 6 27
Mon Apr 26/Tue Apr 27	9331.8	13 55 34	19 08	20 32	4 16	5 39	10 27	18 12	18 47	6 19	100	14 31.8	-12 42
Tue Apr 27/Wed Apr 28	9332.8	13 59 30	19 09	20 33	4 15	5 38	10 32	18 15	20 00	.....	98	15 31.6	-18 13
Wed Apr 28/Thu Apr 29	9333.8	14 03 27	19 10	20 34	4 13	5 37	10 37	18 17	21 14	.....	93	16 34.0	-22 31
Thu Apr 29/Fri Apr 30	9334.8	14 07 24	19 11	20 35	4 12	5 36	10 42	18 20	22 25	.....	85	17 38.3	-25 14
Fri Apr 30/Sat May 01	9335.8	14 11 20	19 11	20 36	4 11	5 35	10 47	18 23	23 32	.....	76	18 42.6	-26 12

***** 2021 MAY *****

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 24, latitude (d.m) = 31 57.8
 Note that each line lists events of one night, spanning two calendar dates. Rise/set times are given
 in Mountain time (7 hr W), for 900 m above surroundings, in standard time all year.
 Moon coords. and illum. are for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

Date (eve/morn) (2021 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: ----- set twi.end twi.beg rise				LST twilight: eve morn		----- Moon: ----- rise set %illum RA Dec				
Sat May 01/Sun May 02	9336.8	14 15 17	19 12	20 37	4 10	5 34	10 52	18 26	0 30	.....	66	19 44.9	-25 27
Sun May 02/Mon May 03	9337.8	14 19 13	19 13	20 38	4 08	5 34	10 57	18 28	1 20	.....	55	20 43.6	-23 16
Mon May 03/Tue May 04	9338.8	14 23 10	19 13	20 39	4 07	5 33	11 01	18 31	2 02	.....	45	21 38.2	-19 55
Tue May 04/Wed May 05	9339.8	14 27 06	19 14	20 40	4 06	5 32	11 06	18 34	2 38	.....	35	22 28.8	-15 45
Wed May 05/Thu May 06	9340.8	14 31 03	19 15	20 41	4 05	5 31	11 11	18 37	3 09	.....	25	23 16.0	-11 02
Thu May 06/Fri May 07	9341.8	14 34 59	19 16	20 42	4 04	5 30	11 16	18 39	3 38	.....	17	0 00.9	- 6 00
Fri May 07/Sat May 08	9342.8	14 38 56	19 16	20 43	4 03	5 29	11 21	18 42	4 05	.....	11	0 44.3	- 0 52
Sat May 08/Sun May 09	9343.8	14 42 53	19 17	20 44	4 01	5 28	11 26	18 45	4 32	.....	6	1 27.1	4 14
Sun May 09/Mon May 10	9344.8	14 46 49	19 18	20 45	4 00	5 28	11 31	18 48	5 00	17 38	2	2 10.3	9 08
Mon May 10/Tue May 11	9345.8	14 50 46	19 18	20 46	3 59	5 27	11 36	18 51	5 30	18 33	0	2 54.4	13 39
Tue May 11/Wed May 12	9346.8	14 54 42	19 19	20 47	3 58	5 26	11 41	18 54	6 02	19 28	0	3 40.2	17 39
Wed May 12/Thu May 13	9347.8	14 58 39	19 20	20 48	3 57	5 25	11 46	18 57	.....	20 25	2	4 28.0	20 57
Thu May 13/Fri May 14	9348.8	15 02 35	19 21	20 49	3 56	5 25	11 51	19 00	.....	21 21	5	5 17.9	23 21
Fri May 14/Sat May 15	9349.8	15 06 32	19 21	20 50	3 55	5 24	11 56	19 03	.....	22 16	10	6 09.7	24 44
Sat May 15/Sun May 16	9350.8	15 10 28	19 22	20 51	3 54	5 23	12 01	19 06	.....	23 08	17	7 02.8	24 57
Sun May 16/Mon May 17	9351.8	15 14 25	19 23	20 52	3 54	5 23	12 06	19 09	.....	23 56	25	7 56.4	23 57
Mon May 17/Tue May 18	9352.8	15 18 22	19 23	20 53	3 53	5 22	12 11	19 12	.....	0 39	34	8 49.7	21 43
Tue May 18/Wed May 19	9353.8	15 22 18	19 24	20 54	3 52	5 21	12 16	19 15	.....	1 19	44	9 42.4	18 21
Wed May 19/Thu May 20	9354.8	15 26 15	19 25	20 55	3 51	5 21	12 20	19 18	.....	1 55	55	10 34.2	13 56
Thu May 20/Fri May 21	9355.8	15 30 11	19 25	20 56	3 50	5 20	12 25	19 21	.....	2 28	66	11 25.5	8 39
Fri May 21/Sat May 22	9356.8	15 34 08	19 26	20 57	3 49	5 20	12 30	19 24	.....	3 01	76	12 17.0	2 43
Sat May 22/Sun May 23	9357.8	15 38 04	19 27	20 58	3 49	5 19	12 35	19 27	.....	3 35	85	13 09.6	- 3 36
Sun May 23/Mon May 24	9358.8	15 42 01	19 27	20 58	3 48	5 19	12 40	19 30	.....	4 10	93	14 04.3	- 9 55
Mon May 24/Tue May 25	9359.8	15 45 57	19 28	20 59	3 47	5 18	12 45	19 34	17 33	4 50	98	15 02.2	-15 49
Tue May 25/Wed May 26	9360.8	15 49 54	19 29	21 00	3 46	5 18	12 50	19 37	18 47	5 36	100	16 03.6	-20 48
Wed May 26/Thu May 27	9361.8	15 53 51	19 29	21 01	3 46	5 18	12 54	19 40	20 01	6 29	99	17 08.4	-24 22
Thu May 27/Fri May 28	9362.8	15 57 47	19 30	21 02	3 45	5 17	12 59	19 44	21 12	.....	95	18 14.8	-26 12
Fri May 28/Sat May 29	9363.8	16 01 44	19 31	21 03	3 45	5 17	13 04	19 47	22 16	.....	88	19 20.5	-26 09
Sat May 29/Sun May 30	9364.8	16 05 40	19 31	21 04	3 44	5 17	13 09	19 50	23 12	.....	80	20 23.1	-24 25
Sun May 30/Mon May 31	9365.8	16 09 37	19 32	21 04	3 44	5 16	13 14	19 54	23 59	.....	70	21 21.3	-21 18
Mon May 31/Tue Jun 01	9366.8	16 13 33	19 32	21 05	3 43	5 16	13 18	19 57	0 38	.....	60	22 14.8	-17 12

***** 2021 JUNE *****

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 24, latitude (d.m) = 31 57.8

Note that each line lists events of one night, spanning two calendar dates. Rise/set times are given in Mountain time (7 hr W), for 900 m above surroundings, in standard time all year.

Moon coords. and illum. are for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

Date (eve/morn) (2021 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Tue Jun 01/Wed Jun 02	9367.8	16 17 30	19 33	21 06	3 43	5 16	13 23	20 01	1 11	.....	50	23 04.2	-12 29
Wed Jun 02/Thu Jun 03	9368.8	16 21 26	19 33	21 07	3 42	5 16	13 28	20 04	1 41	.....	40	23 50.4	- 7 25
Thu Jun 03/Fri Jun 04	9369.8	16 25 23	19 34	21 07	3 42	5 15	13 32	20 08	2 09	.....	30	0 34.6	- 2 12
Fri Jun 04/Sat Jun 05	9370.8	16 29 20	19 35	21 08	3 42	5 15	13 37	20 11	2 36	.....	22	1 17.7	2 57
Sat Jun 05/Sun Jun 06	9371.8	16 33 16	19 35	21 09	3 41	5 15	13 42	20 15	3 03	.....	15	2 00.7	7 56
Sun Jun 06/Mon Jun 07	9372.8	16 37 13	19 36	21 10	3 41	5 15	13 46	20 19	3 32	.....	9	2 44.6	12 33
Mon Jun 07/Tue Jun 08	9373.8	16 41 09	19 36	21 10	3 41	5 15	13 51	20 22	4 04	.....	4	3 29.9	16 42
Tue Jun 08/Wed Jun 09	9374.8	16 45 06	19 36	21 11	3 40	5 15	13 55	20 26	4 39	18 19	1	4 17.2	20 10
Wed Jun 09/Thu Jun 10	9375.8	16 49 02	19 37	21 11	3 40	5 15	14 00	20 30	5 19	19 15	0	5 06.7	22 48
Thu Jun 10/Fri Jun 11	9376.8	16 52 59	19 37	21 12	3 40	5 15	14 04	20 34	6 05	20 11	1	5 58.2	24 25
Fri Jun 11/Sat Jun 12	9377.8	16 56 55	19 38	21 12	3 40	5 15	14 09	20 38	.....	21 04	3	6 51.2	24 54
Sat Jun 12/Sun Jun 13	9378.8	17 00 52	19 38	21 13	3 40	5 15	14 13	20 41	.....	21 54	7	7 44.7	24 10
Sun Jun 13/Mon Jun 14	9379.8	17 04 49	19 39	21 13	3 40	5 15	14 18	20 45	.....	22 39	13	8 37.8	22 14
Mon Jun 14/Tue Jun 15	9380.8	17 08 45	19 39	21 14	3 40	5 15	14 22	20 49	.....	23 19	21	9 30.1	19 08
Tue Jun 15/Wed Jun 16	9381.8	17 12 42	19 39	21 14	3 40	5 15	14 26	20 53	.....	23 56	30	10 21.1	15 02
Wed Jun 16/Thu Jun 17	9382.8	17 16 38	19 40	21 15	3 40	5 15	14 31	20 57	.....	0 29	40	11 11.1	10 06
Thu Jun 17/Fri Jun 18	9383.8	17 20 35	19 40	21 15	3 40	5 15	14 35	21 01	.....	1 01	51	12 00.8	4 31
Fri Jun 18/Sat Jun 19	9384.8	17 24 31	19 40	21 15	3 40	5 15	14 39	21 05	.....	1 33	62	12 51.0	- 1 28
Sat Jun 19/Sun Jun 20	9385.8	17 28 28	19 40	21 15	3 41	5 16	14 43	21 10	.....	2 06	73	13 42.8	- 7 36
Sun Jun 20/Mon Jun 21	9386.8	17 32 24	19 41	21 16	3 41	5 16	14 48	21 14	.....	2 43	83	14 37.3	-13 31
Mon Jun 21/Tue Jun 22	9387.8	17 36 21	19 41	21 16	3 41	5 16	14 52	21 18	.....	3 24	91	15 35.5	-18 48
Tue Jun 22/Wed Jun 23	9388.8	17 40 18	19 41	21 16	3 41	5 16	14 56	21 22	17 35	4 12	97	16 37.8	-23 00
Wed Jun 23/Thu Jun 24	9389.8	17 44 14	19 41	21 16	3 42	5 17	15 00	21 26	18 47	5 09	100	17 43.4	-25 39
Thu Jun 24/Fri Jun 25	9390.8	17 48 11	19 41	21 16	3 42	5 17	15 04	21 31	19 56	6 12	100	18 50.2	-26 28
Fri Jun 25/Sat Jun 26	9391.8	17 52 07	19 41	21 16	3 42	5 17	15 08	21 35	20 57	.....	97	19 55.7	-25 26
Sat Jun 26/Sun Jun 27	9392.8	17 56 04	19 41	21 16	3 43	5 18	15 12	21 39	21 49	.....	91	20 57.6	-22 47
Sun Jun 27/Mon Jun 28	9393.8	18 00 00	19 42	21 16	3 43	5 18	15 16	21 44	22 33	.....	84	21 54.7	-18 55
Mon Jun 28/Tue Jun 29	9394.8	18 03 57	19 42	21 16	3 44	5 18	15 20	21 48	23 10	.....	75	22 47.2	-14 13
Tue Jun 29/Wed Jun 30	9395.8	18 07 53	19 42	21 16	3 44	5 19	15 24	21 53	23 42	.....	65	23 35.8	- 9 05
Wed Jun 30/Thu Jul 01	9396.8	18 11 50	19 42	21 16	3 45	5 19	15 27	21 57	0 11	.....	55	0 21.6	- 3 45

***** 2021 JULY *****

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 24, latitude (d.m) = 31 57.8
 Note that each line lists events of one night, spanning two calendar dates. Rise/set times are given
 in Mountain time (7 hr W), for 900 m above surroundings, in standard time all year.
 Moon coords. and illum. are for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

Date (eve/morn)		JDmid	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----				
(2021 at start)		(-2450000)		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Thu Jul 01/Fri Jul 02	9397.8	18 15 47	19 42	21 16	3 45	5 20	15 31	22 02	0 38	.....	46	1 05.8	1 33
Fri Jul 02/Sat Jul 03	9398.8	18 19 43	19 41	21 16	3 46	5 20	15 35	22 06	1 06	.....	36	1 49.4	6 39
Sat Jul 03/Sun Jul 04	9399.8	18 23 40	19 41	21 16	3 46	5 20	15 39	22 11	1 34	.....	27	2 33.3	11 25
Sun Jul 04/Mon Jul 05	9400.8	18 27 36	19 41	21 15	3 47	5 21	15 42	22 15	2 05	.....	19	3 18.4	15 43
Mon Jul 05/Tue Jul 06	9401.8	18 31 33	19 41	21 15	3 48	5 21	15 46	22 20	2 39	.....	12	4 05.3	19 22
Tue Jul 06/Wed Jul 07	9402.8	18 35 29	19 41	21 15	3 48	5 22	15 50	22 24	3 17	.....	7	4 54.4	22 13
Wed Jul 07/Thu Jul 08	9403.8	18 39 26	19 41	21 14	3 49	5 22	15 53	22 29	4 01	18 04	3	5 45.7	24 06	
Thu Jul 08/Fri Jul 09	9404.8	18 43 22	19 41	21 14	3 50	5 23	15 57	22 34	4 51	18 59	1	6 38.6	24 51	
Fri Jul 09/Sat Jul 10	9405.8	18 47 19	19 40	21 13	3 50	5 23	16 00	22 38	5 46	19 50	0	7 32.4	24 23	
Sat Jul 10/Sun Jul 11	9406.8	18 51 16	19 40	21 13	3 51	5 24	16 04	22 43	.....	20 37	2	8 26.0	22 40
Sun Jul 11/Mon Jul 12	9407.8	18 55 12	19 40	21 12	3 52	5 25	16 07	22 48	.....	21 20	5	9 18.8	19 47
Mon Jul 12/Tue Jul 13	9408.8	18 59 09	19 39	21 12	3 53	5 25	16 11	22 52	.....	21 57	11	10 10.1	15 52
Tue Jul 13/Wed Jul 14	9409.8	19 03 05	19 39	21 11	3 53	5 26	16 14	22 57	.....	22 32	18	11 00.1	11 07
Wed Jul 14/Thu Jul 15	9410.8	19 07 02	19 39	21 11	3 54	5 26	16 17	23 02	.....	23 04	27	11 49.2	5 42
Thu Jul 15/Fri Jul 16	9411.8	19 10 58	19 38	21 10	3 55	5 27	16 21	23 07	.....	23 35	37	12 38.3	- 0 06
Fri Jul 16/Sat Jul 17	9412.8	19 14 55	19 38	21 09	3 56	5 27	16 24	23 12	.....	0 07	48	13 28.2	- 6 03
Sat Jul 17/Sun Jul 18	9413.8	19 18 51	19 37	21 09	3 57	5 28	16 27	23 16	.....	0 41	59	14 20.1	-11 52
Sun Jul 18/Mon Jul 19	9414.8	19 22 48	19 37	21 08	3 58	5 29	16 30	23 21	.....	1 19	70	15 15.1	-17 12
Mon Jul 19/Tue Jul 20	9415.8	19 26 45	19 36	21 07	3 59	5 29	16 33	23 26	.....	2 02	81	16 13.8	-21 40
Tue Jul 20/Wed Jul 21	9416.8	19 30 41	19 36	21 06	4 00	5 30	16 37	23 31	.....	2 54	89	17 16.3	-24 50
Wed Jul 21/Thu Jul 22	9417.8	19 34 38	19 35	21 06	4 00	5 31	16 40	23 36	17 36	3 53	95	18 21.5	-26 22	
Thu Jul 22/Fri Jul 23	9418.8	19 38 34	19 35	21 05	4 01	5 31	16 43	23 41	18 40	4 58	99	19 27.0	-26 06	
Fri Jul 23/Sat Jul 24	9419.8	19 42 31	19 34	21 04	4 02	5 32	16 46	23 45	19 36	6 06	100	20 30.6	-24 06	
Sat Jul 24/Sun Jul 25	9420.8	19 46 27	19 34	21 03	4 03	5 33	16 49	23 50	20 24	.....	98	21 30.3	-20 38
Sun Jul 25/Mon Jul 26	9421.8	19 50 24	19 33	21 02	4 04	5 33	16 52	23 55	21 04	.....	94	22 25.6	-16 09
Mon Jul 26/Tue Jul 27	9422.8	19 54 20	19 32	21 01	4 05	5 34	16 55	0 00	21 39	.....	87	23 16.8	-11 01
Tue Jul 27/Wed Jul 28	9423.8	19 58 17	19 32	21 00	4 06	5 35	16 58	0 05	22 10	.....	80	0 04.7	- 5 34
Wed Jul 28/Thu Jul 29	9424.8	20 02 14	19 31	20 59	4 07	5 35	17 01	0 10	22 39	.....	71	0 50.5	- 0 06
Thu Jul 29/Fri Jul 30	9425.8	20 06 10	19 30	20 58	4 08	5 36	17 04	0 15	23 06	.....	62	1 35.1	5 13
Fri Jul 30/Sat Jul 31	9426.8	20 10 07	19 29	20 57	4 09	5 37	17 07	0 20	23 35	.....	52	2 19.6	10 12
Sat Jul 31/Sun Aug 01	9427.8	20 14 03	19 29	20 56	4 10	5 37	17 10	0 24	0 04	.....	42	3 04.8	14 42

***** 2021 AUGUST *****

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 24, latitude (d.m) = 31 57.8
 Note that each line lists events of one night, spanning two calendar dates. Rise/set times are given
 in Mountain time (7 hr W), for 900 m above surroundings, in standard time all year.
 Moon coords. and illum. are for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

Date (eve/morn) (2021 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: ----- set twi.end twi.beg rise				LST twilight: eve morn		----- Moon: ----- rise set %illum RA Dec				
Sun Aug 01/Mon Aug 02	9428.8	20 18 00	19 28	20 55	4 11	5 38	17 12	0 29	0 37	.....	33	3 51.5	18 34
Mon Aug 02/Tue Aug 03	9429.8	20 21 56	19 27	20 54	4 12	5 39	17 15	0 34	1 13	.....	25	4 40.1	21 40
Tue Aug 03/Wed Aug 04	9430.8	20 25 53	19 26	20 53	4 13	5 39	17 18	0 39	1 55	.....	17	5 30.9	23 49
Wed Aug 04/Thu Aug 05	9431.8	20 29 49	19 25	20 52	4 14	5 40	17 21	0 44	2 43	.....	10	6 23.6	24 52
Thu Aug 05/Fri Aug 06	9432.8	20 33 46	19 24	20 50	4 15	5 41	17 24	0 49	3 37	17 44	5	7 17.4	24 43
Fri Aug 06/Sat Aug 07	9433.8	20 37 43	19 23	20 49	4 15	5 41	17 26	0 54	4 35	18 33	2	8 11.6	23 18
Sat Aug 07/Sun Aug 08	9434.8	20 41 39	19 23	20 48	4 16	5 42	17 29	0 59	5 37	19 17	0	9 05.1	20 39
Sun Aug 08/Mon Aug 09	9435.8	20 45 36	19 22	20 47	4 17	5 43	17 32	1 04	6 40	19 57	1	9 57.5	16 54
Mon Aug 09/Tue Aug 10	9436.8	20 49 32	19 21	20 46	4 18	5 43	17 35	1 09	.....	20 33	3	10 48.3	12 14
Tue Aug 10/Wed Aug 11	9437.8	20 53 29	19 20	20 44	4 19	5 44	17 37	1 13	.....	21 06	8	11 38.1	6 52
Wed Aug 11/Thu Aug 12	9438.8	20 57 25	19 19	20 43	4 20	5 45	17 40	1 18	.....	21 37	15	12 27.3	1 04
Thu Aug 12/Fri Aug 13	9439.8	21 01 22	19 18	20 42	4 21	5 45	17 43	1 23	.....	22 09	24	13 16.9	- 4 53
Fri Aug 13/Sat Aug 14	9440.8	21 05 18	19 17	20 40	4 22	5 46	17 45	1 28	.....	22 42	34	14 07.9	-10 43
Sat Aug 14/Sun Aug 15	9441.8	21 09 15	19 16	20 39	4 23	5 47	17 48	1 33	.....	23 18	45	15 01.2	-16 06
Sun Aug 15/Mon Aug 16	9442.8	21 13 12	19 15	20 38	4 24	5 47	17 50	1 38	.....	23 59	57	15 57.6	-20 42
Mon Aug 16/Tue Aug 17	9443.8	21 17 08	19 13	20 37	4 25	5 48	17 53	1 43	.....	0 46	68	16 57.3	-24 08
Tue Aug 17/Wed Aug 18	9444.8	21 21 05	19 12	20 35	4 26	5 48	17 56	1 47	.....	1 41	78	17 59.9	-26 07
Wed Aug 18/Thu Aug 19	9445.8	21 25 01	19 11	20 34	4 27	5 49	17 58	1 52	.....	2 42	87	19 03.6	-26 25
Thu Aug 19/Fri Aug 20	9446.8	21 28 58	19 10	20 32	4 27	5 50	18 01	1 57	17 26	3 48	94	20 06.6	-25 01
Fri Aug 20/Sat Aug 21	9447.8	21 32 54	19 09	20 31	4 28	5 50	18 03	2 02	18 16	4 55	98	21 06.8	-22 06
Sat Aug 21/Sun Aug 22	9448.8	21 36 51	19 08	20 30	4 29	5 51	18 06	2 07	18 59	6 01	100	22 03.3	-17 57
Sun Aug 22/Mon Aug 23	9449.8	21 40 47	19 07	20 28	4 30	5 52	18 09	2 12	19 35	.....	99	22 56.1	-12 59
Mon Aug 23/Tue Aug 24	9450.8	21 44 44	19 06	20 27	4 31	5 52	18 11	2 16	20 08	.....	96	23 45.5	- 7 33
Tue Aug 24/Wed Aug 25	9451.8	21 48 41	19 04	20 26	4 32	5 53	18 14	2 21	20 37	.....	91	0 32.6	- 1 57
Wed Aug 25/Thu Aug 26	9452.8	21 52 37	19 03	20 24	4 33	5 54	18 16	2 26	21 06	.....	85	1 18.3	3 34
Thu Aug 26/Fri Aug 27	9453.8	21 56 34	19 02	20 23	4 34	5 54	18 19	2 31	21 34	.....	77	2 03.5	8 48
Fri Aug 27/Sat Aug 28	9454.8	22 00 30	19 01	20 21	4 34	5 55	18 21	2 36	22 03	.....	68	2 49.0	13 34
Sat Aug 28/Sun Aug 29	9455.8	22 04 27	19 00	20 20	4 35	5 56	18 24	2 40	22 34	.....	59	3 35.7	17 43
Sun Aug 29/Mon Aug 30	9456.8	22 08 23	18 58	20 18	4 36	5 56	18 26	2 45	23 09	.....	49	4 24.1	21 06
Mon Aug 30/Tue Aug 31	9457.8	22 12 20	18 57	20 17	4 37	5 57	18 29	2 50	23 49	.....	40	5 14.4	23 34
Tue Aug 31/Wed Sep 01	9458.8	22 16 16	18 56	20 16	4 38	5 57	18 31	2 55	0 34	.....	31	6 06.5	24 58

***** 2021 SEPTEMBER *****

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 24, latitude (d.m) = 31 57.8
 Note that each line lists events of one night, spanning two calendar dates. Rise/set times are given
 in Mountain time (7 hr W), for 900 m above surroundings, in standard time all year.
 Moon coords. and illum. are for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

Date (eve/morn) (2021 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Wed Sep 01/Thu Sep 02	9459.8	22 20 13	18 55	20 14	4 38	5 58	18 34	2 59	1 25	.....	22	7 00.1	25 10
Thu Sep 02/Fri Sep 03	9460.8	22 24 10	18 53	20 13	4 39	5 59	18 36	3 04	2 22	.....	15	7 54.2	24 08
Fri Sep 03/Sat Sep 04	9461.8	22 28 06	18 52	20 11	4 40	5 59	18 39	3 09	3 22	17 11	8	8 48.1	21 50
Sat Sep 04/Sun Sep 05	9462.8	22 32 03	18 51	20 10	4 41	6 00	18 41	3 14	4 25	17 53	4	9 41.1	18 21
Sun Sep 05/Mon Sep 06	9463.8	22 35 59	18 49	20 08	4 42	6 00	18 44	3 18	5 30	18 30	1	10 32.9	13 51
Mon Sep 06/Tue Sep 07	9464.8	22 39 56	18 48	20 07	4 42	6 01	18 46	3 23	6 34	19 05	0	11 23.6	8 33
Tue Sep 07/Wed Sep 08	9465.8	22 43 52	18 47	20 05	4 43	6 02	18 49	3 28	.....	19 37	2	12 13.7	2 42
Wed Sep 08/Thu Sep 09	9466.8	22 47 49	18 46	20 04	4 44	6 02	18 51	3 32	.....	20 10	6	13 04.0	- 3 24
Thu Sep 09/Fri Sep 10	9467.8	22 51 45	18 44	20 02	4 45	6 03	18 54	3 37	.....	20 43	13	13 55.3	- 9 25
Fri Sep 10/Sat Sep 11	9468.8	22 55 42	18 43	20 01	4 45	6 04	18 56	3 42	.....	21 18	22	14 48.6	-15 02
Sat Sep 11/Sun Sep 12	9469.8	22 59 39	18 42	20 00	4 46	6 04	18 59	3 47	.....	21 58	32	15 44.5	-19 52
Sun Sep 12/Mon Sep 13	9470.8	23 03 35	18 40	19 58	4 47	6 05	19 01	3 51	.....	22 43	43	16 43.3	-23 35
Mon Sep 13/Tue Sep 14	9471.8	23 07 32	18 39	19 57	4 48	6 05	19 04	3 56	.....	23 35	54	17 44.6	-25 53
Tue Sep 14/Wed Sep 15	9472.8	23 11 28	18 38	19 55	4 48	6 06	19 06	4 01	.....	0 34	65	18 47.0	-26 35
Wed Sep 15/Thu Sep 16	9473.8	23 15 25	18 36	19 54	4 49	6 07	19 09	4 05	.....	1 37	76	19 48.8	-25 37
Thu Sep 16/Fri Sep 17	9474.8	23 19 21	18 35	19 52	4 50	6 07	19 11	4 10	.....	2 43	84	20 48.4	-23 08
Fri Sep 17/Sat Sep 18	9475.8	23 23 18	18 34	19 51	4 50	6 08	19 14	4 15	16 56	3 48	91	21 44.8	-19 23
Sat Sep 18/Sun Sep 19	9476.8	23 27 14	18 32	19 50	4 51	6 08	19 16	4 19	17 34	4 52	96	22 37.7	-14 42
Sun Sep 19/Mon Sep 20	9477.8	23 31 11	18 31	19 48	4 52	6 09	19 19	4 24	18 07	5 52	99	23 27.6	- 9 25
Mon Sep 20/Tue Sep 21	9478.8	23 35 08	18 30	19 47	4 53	6 10	19 21	4 28	18 37	6 51	100	0 15.1	- 3 49
Tue Sep 21/Wed Sep 22	9479.8	23 39 04	18 28	19 45	4 53	6 10	19 24	4 33	19 06	.....	98	1 01.2	1 48
Wed Sep 22/Thu Sep 23	9480.8	23 43 01	18 27	19 44	4 54	6 11	19 26	4 38	19 34	.....	95	1 46.7	7 14
Thu Sep 23/Fri Sep 24	9481.8	23 46 57	18 26	19 43	4 55	6 12	19 29	4 42	20 02	.....	89	2 32.5	12 16
Fri Sep 24/Sat Sep 25	9482.8	23 50 54	18 24	19 41	4 55	6 12	19 31	4 47	20 33	.....	83	3 19.2	16 44
Sat Sep 25/Sun Sep 26	9483.8	23 54 50	18 23	19 40	4 56	6 13	19 34	4 52	21 06	.....	75	4 07.4	20 26
Sun Sep 26/Mon Sep 27	9484.8	23 58 47	18 22	19 38	4 57	6 13	19 36	4 56	21 44	.....	66	4 57.4	23 15
Mon Sep 27/Tue Sep 28	9485.8	0 02 43	18 20	19 37	4 57	6 14	19 39	5 01	22 26	.....	57	5 49.0	25 01
Tue Sep 28/Wed Sep 29	9486.8	0 06 40	18 19	19 36	4 58	6 15	19 42	5 06	23 14	.....	47	6 42.0	25 38
Wed Sep 29/Thu Sep 30	9487.8	0 10 37	18 18	19 34	4 59	6 15	19 44	5 10	0 08	.....	38	7 35.7	25 00
Thu Sep 30/Fri Oct 01	9488.8	0 14 33	18 17	19 33	4 59	6 16	19 47	5 15	1 06	.....	28	8 29.3	23 07

***** 2021 OCTOBER *****

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 24, latitude (d.m) = 31 57.8

Note that each line lists events of one night, spanning two calendar dates. Rise/set times are given in Mountain time (7 hr W), for 900 m above surroundings, in standard time all year.

Moon coords. and illum. are for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

Date (eve/morn) (2021 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Fri Oct 01/Sat Oct 02	9489.8	0 18 30	18 15	19 32	5 00	6 17	19 50	5 19	2 08	.....	20	9 22.2	20 03
Sat Oct 02/Sun Oct 03	9490.8	0 22 26	18 14	19 30	5 01	6 17	19 52	5 24	3 11	.....	12	10 14.1	15 53
Sun Oct 03/Mon Oct 04	9491.8	0 26 23	18 13	19 29	5 01	6 18	19 55	5 29	4 16	17 01	6	11 05.1	10 49
Mon Oct 04/Tue Oct 05	9492.8	0 30 19	18 11	19 28	5 02	6 19	19 57	5 33	5 21	17 34	2	11 55.7	5 03
Tue Oct 05/Wed Oct 06	9493.8	0 34 16	18 10	19 27	5 03	6 19	20 00	5 38	6 27	18 07	0	12 46.4	- 1 08
Wed Oct 06/Thu Oct 07	9494.8	0 38 12	18 09	19 25	5 03	6 20	20 03	5 42	7 35	18 40	1	13 38.2	- 7 23
Thu Oct 07/Fri Oct 08	9495.8	0 42 09	18 08	19 24	5 04	6 21	20 06	5 47	.....	19 15	5	14 32.0	-13 21
Fri Oct 08/Sat Oct 09	9496.8	0 46 06	18 06	19 23	5 05	6 21	20 08	5 52	.....	19 54	11	15 28.5	-18 37
Sat Oct 09/Sun Oct 10	9497.8	0 50 02	18 05	19 22	5 05	6 22	20 11	5 56	.....	20 39	19	16 27.8	-22 47
Sun Oct 10/Mon Oct 11	9498.8	0 53 59	18 04	19 21	5 06	6 23	20 14	6 01	.....	21 30	29	17 29.6	-25 32
Mon Oct 11/Tue Oct 12	9499.8	0 57 55	18 03	19 19	5 07	6 23	20 17	6 05	.....	22 27	40	18 32.5	-26 37
Tue Oct 12/Wed Oct 13	9500.8	1 01 52	18 02	19 18	5 07	6 24	20 19	6 10	.....	23 30	51	19 34.6	-26 02
Wed Oct 13/Thu Oct 14	9501.8	1 05 48	18 00	19 17	5 08	6 25	20 22	6 15	.....	0 35	62	20 34.4	-23 53
Thu Oct 14/Fri Oct 15	9502.8	1 09 45	17 59	19 16	5 09	6 26	20 25	6 19	.....	1 40	72	21 30.7	-20 27
Fri Oct 15/Sat Oct 16	9503.8	1 13 41	17 58	19 15	5 09	6 26	20 28	6 24	.....	2 43	81	22 23.5	-16 02
Sat Oct 16/Sun Oct 17	9504.8	1 17 38	17 57	19 14	5 10	6 27	20 31	6 29	.....	3 44	89	23 13.1	-10 56
Sun Oct 17/Mon Oct 18	9505.8	1 21 35	17 56	19 13	5 11	6 28	20 33	6 33	16 39	4 43	94	0 00.4	- 5 28
Mon Oct 18/Tue Oct 19	9506.8	1 25 31	17 55	19 12	5 11	6 28	20 36	6 38	17 08	5 40	98	0 46.2	0 09
Tue Oct 19/Wed Oct 20	9507.8	1 29 28	17 54	19 11	5 12	6 29	20 39	6 42	17 35	6 36	100	1 31.4	5 39
Wed Oct 20/Thu Oct 21	9508.8	1 33 24	17 53	19 10	5 13	6 30	20 42	6 47	18 03	7 33	100	2 16.9	10 52
Thu Oct 21/Fri Oct 22	9509.8	1 37 21	17 52	19 09	5 14	6 31	20 45	6 52	18 33	.....	97	3 03.3	15 35
Fri Oct 22/Sat Oct 23	9510.8	1 41 17	17 50	19 08	5 14	6 31	20 48	6 56	19 05	.....	93	3 51.3	19 36
Sat Oct 23/Sun Oct 24	9511.8	1 45 14	17 49	19 07	5 15	6 32	20 51	7 01	19 41	.....	88	4 41.0	22 46
Sun Oct 24/Mon Oct 25	9512.8	1 49 10	17 48	19 06	5 16	6 33	20 54	7 06	20 21	.....	81	5 32.4	24 54
Mon Oct 25/Tue Oct 26	9513.8	1 53 07	17 47	19 05	5 16	6 34	20 57	7 10	21 07	.....	73	6 25.1	25 54
Tue Oct 26/Wed Oct 27	9514.8	1 57 04	17 46	19 04	5 17	6 35	21 00	7 15	21 58	.....	64	7 18.5	25 41
Wed Oct 27/Thu Oct 28	9515.8	2 01 00	17 45	19 03	5 18	6 35	21 03	7 20	22 53	.....	55	8 11.6	24 14
Thu Oct 28/Fri Oct 29	9516.8	2 04 57	17 45	19 02	5 18	6 36	21 06	7 24	23 52	.....	45	9 04.1	21 35
Fri Oct 29/Sat Oct 30	9517.8	2 08 53	17 44	19 01	5 19	6 37	21 09	7 29	0 53	.....	35	9 55.4	17 51
Sat Oct 30/Sun Oct 31	9518.8	2 12 50	17 43	19 01	5 20	6 38	21 13	7 34	1 56	.....	25	10 45.7	13 10
Sun Oct 31/Mon Nov 01	9519.8	2 16 46	17 42	19 00	5 21	6 39	21 16	7 38	3 00	.....	16	11 35.6	7 42

***** 2021 NOVEMBER *****

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 24, latitude (d.m) = 31 57.8

Note that each line lists events of one night, spanning two calendar dates. Rise/set times are given in Mountain time (7 hr W), for 900 m above surroundings, in standard time all year.

Moon coords. and illum. are for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

Date (eve/morn) (2021 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Mon Nov 01/Tue Nov 02	9520.8	2 20 43	17 41	18 59	5 21	6 39	21 19	7 43	4 05	16 02	9	12 25.6	1 41
Tue Nov 02/Wed Nov 03	9521.8	2 24 39	17 40	18 58	5 22	6 40	21 22	7 48	5 12	16 34	4	13 16.7	- 4 36
Wed Nov 03/Thu Nov 04	9522.8	2 28 36	17 39	18 58	5 23	6 41	21 25	7 52	6 22	17 08	1	14 09.9	-10 49
Thu Nov 04/Fri Nov 05	9523.8	2 32 33	17 39	18 57	5 23	6 42	21 29	7 57	7 34	17 46	0	15 06.2	-16 32
Fri Nov 05/Sat Nov 06	9524.8	2 36 29	17 38	18 56	5 24	6 43	21 32	8 02	.....	18 29	3	16 05.8	-21 19
Sat Nov 06/Sun Nov 07	9525.8	2 40 26	17 37	18 56	5 25	6 44	21 35	8 06	.....	19 18	8	17 08.6	-24 43
Sun Nov 07/Mon Nov 08	9526.8	2 44 22	17 36	18 55	5 26	6 44	21 38	8 11	.....	20 16	16	18 13.2	-26 25
Mon Nov 08/Tue Nov 09	9527.8	2 48 19	17 36	18 54	5 26	6 45	21 42	8 16	.....	21 19	25	19 17.5	-26 20
Tue Nov 09/Wed Nov 10	9528.8	2 52 15	17 35	18 54	5 27	6 46	21 45	8 20	.....	22 26	36	20 19.2	-24 33
Wed Nov 10/Thu Nov 11	9529.8	2 56 12	17 34	18 53	5 28	6 47	21 49	8 25	.....	23 33	47	21 17.2	-21 22
Thu Nov 11/Fri Nov 12	9530.8	3 00 08	17 34	18 53	5 29	6 48	21 52	8 30	.....	0 37	57	22 11.0	-17 08
Fri Nov 12/Sat Nov 13	9531.8	3 04 05	17 33	18 52	5 29	6 49	21 55	8 34	.....	1 38	68	23 01.1	-12 12
Sat Nov 13/Sun Nov 14	9532.8	3 08 02	17 32	18 52	5 30	6 50	21 59	8 39	.....	2 37	77	23 48.3	- 6 50
Sun Nov 14/Mon Nov 15	9533.8	3 11 58	17 32	18 51	5 31	6 51	22 02	8 44	.....	3 34	85	0 33.8	- 1 17
Mon Nov 15/Tue Nov 16	9534.8	3 15 55	17 31	18 51	5 32	6 51	22 06	8 48	.....	4 30	91	1 18.5	4 13
Tue Nov 16/Wed Nov 17	9535.8	3 19 51	17 31	18 51	5 32	6 52	22 10	8 53	16 06	5 26	96	2 03.3	9 30
Wed Nov 17/Thu Nov 18	9536.8	3 23 48	17 30	18 50	5 33	6 53	22 13	8 58	16 35	6 22	99	2 49.1	14 22
Thu Nov 18/Fri Nov 19	9537.8	3 27 44	17 30	18 50	5 34	6 54	22 17	9 03	17 06	7 19	100	3 36.5	18 38
Fri Nov 19/Sat Nov 20	9538.8	3 31 41	17 30	18 50	5 35	6 55	22 20	9 07	17 40	.....	99	4 25.8	22 05
Sat Nov 20/Sun Nov 21	9539.8	3 35 37	17 29	18 49	5 35	6 56	22 24	9 12	18 19	.....	97	5 17.0	24 34
Sun Nov 21/Mon Nov 22	9540.8	3 39 34	17 29	18 49	5 36	6 57	22 28	9 17	19 03	.....	92	6 09.7	25 55
Mon Nov 22/Tue Nov 23	9541.8	3 43 31	17 28	18 49	5 37	6 57	22 32	9 21	19 52	.....	87	7 03.1	26 04
Tue Nov 23/Wed Nov 24	9542.8	3 47 27	17 28	18 49	5 38	6 58	22 35	9 26	20 45	.....	79	7 56.4	24 58
Wed Nov 24/Thu Nov 25	9543.8	3 51 24	17 28	18 49	5 38	6 59	22 39	9 31	21 42	.....	71	8 48.7	22 41
Thu Nov 25/Fri Nov 26	9544.8	3 55 20	17 28	18 48	5 39	7 00	22 43	9 35	22 42	.....	62	9 39.7	19 19
Fri Nov 26/Sat Nov 27	9545.8	3 59 17	17 27	18 48	5 40	7 01	22 47	9 40	23 42	.....	52	10 29.3	15 00
Sat Nov 27/Sun Nov 28	9546.8	4 03 13	17 27	18 48	5 41	7 02	22 51	9 45	0 43	.....	41	11 17.9	9 54
Sun Nov 28/Mon Nov 29	9547.8	4 07 10	17 27	18 48	5 41	7 03	22 54	9 50	1 45	.....	31	12 06.4	4 13
Mon Nov 29/Tue Nov 30	9548.8	4 11 06	17 27	18 48	5 42	7 03	22 58	9 54	2 49	.....	21	12 55.7	- 1 51
Tue Nov 30/Wed Dec 01	9549.8	4 15 03	17 27	18 48	5 43	7 04	23 02	9 59	3 56	.....	13	13 46.8	- 8 01

***** 2021 DECEMBER *****

Calendar for Kitt Peak, west longitude (h.m.s) = 7 26 24, latitude (d.m) = 31 57.8

Note that each line lists events of one night, spanning two calendar dates. Rise/set times are given in Mountain time (7 hr W), for 900 m above surroundings, in standard time all year.

Moon coords. and illum. are for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

Date (eve/morn) (2021 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Wed Dec 01/Thu Dec 02	9550.8	4 19 00	17 27	18 48	5 44	7 05	23 06	10 04	5 06	.....	6	14 40.9	-13 57
Thu Dec 02/Fri Dec 03	9551.8	4 22 56	17 27	18 48	5 44	7 06	23 10	10 08	6 19	16 16	2	15 38.8	-19 12
Fri Dec 03/Sat Dec 04	9552.8	4 26 53	17 27	18 48	5 45	7 07	23 14	10 13	7 34	17 02	0	16 40.9	-23 18
Sat Dec 04/Sun Dec 05	9553.8	4 30 49	17 27	18 48	5 46	7 07	23 18	10 17	.....	17 56	1	17 46.1	-25 48
Sun Dec 05/Mon Dec 06	9554.8	4 34 46	17 27	18 49	5 46	7 08	23 22	10 22	.....	18 59	6	18 52.5	-26 27
Mon Dec 06/Tue Dec 07	9555.8	4 38 42	17 27	18 49	5 47	7 09	23 27	10 27	.....	20 07	12	19 57.4	-25 15
Tue Dec 07/Wed Dec 08	9556.8	4 42 39	17 27	18 49	5 48	7 10	23 31	10 31	.....	21 17	21	20 58.6	-22 26
Wed Dec 08/Thu Dec 09	9557.8	4 46 35	17 27	18 49	5 48	7 10	23 35	10 36	.....	22 25	31	21 55.1	-18 23
Thu Dec 09/Fri Dec 10	9558.8	4 50 32	17 27	18 49	5 49	7 11	23 39	10 41	.....	23 30	41	22 47.3	-13 31
Fri Dec 10/Sat Dec 11	9559.8	4 54 29	17 28	18 50	5 50	7 12	23 43	10 45	.....	0 31	52	23 35.8	- 8 10
Sat Dec 11/Sun Dec 12	9560.8	4 58 25	17 28	18 50	5 50	7 13	23 47	10 50	.....	1 29	62	0 21.9	- 2 38
Sun Dec 12/Mon Dec 13	9561.8	5 02 22	17 28	18 50	5 51	7 13	23 52	10 54	.....	2 25	71	1 06.6	2 54
Mon Dec 13/Tue Dec 14	9562.8	5 06 18	17 28	18 51	5 52	7 14	23 56	10 59	.....	3 21	80	1 51.1	8 13
Tue Dec 14/Wed Dec 15	9563.8	5 10 15	17 29	18 51	5 52	7 15	0 00	11 03	.....	4 16	87	2 36.2	13 11
Wed Dec 15/Thu Dec 16	9564.8	5 14 11	17 29	18 51	5 53	7 15	0 05	11 08	.....	5 13	93	3 22.8	17 35
Thu Dec 16/Fri Dec 17	9565.8	5 18 08	17 29	18 52	5 53	7 16	0 09	11 12	15 41	6 10	97	4 11.3	21 16
Fri Dec 17/Sat Dec 18	9566.8	5 22 04	17 30	18 52	5 54	7 16	0 13	11 17	16 18	7 06	99	5 02.0	24 02
Sat Dec 18/Sun Dec 19	9567.8	5 26 01	17 30	18 53	5 54	7 17	0 18	11 21	17 00	8 01	100	5 54.5	25 43
Sun Dec 19/Mon Dec 20	9568.8	5 29 58	17 31	18 53	5 55	7 17	0 22	11 26	17 48	.....	99	6 48.2	26 11
Mon Dec 20/Tue Dec 21	9569.8	5 33 54	17 31	18 53	5 56	7 18	0 27	11 30	18 40	.....	96	7 42.0	25 25
Tue Dec 21/Wed Dec 22	9570.8	5 37 51	17 32	18 54	5 56	7 18	0 31	11 35	19 37	.....	91	8 35.0	23 24
Wed Dec 22/Thu Dec 23	9571.8	5 41 47	17 32	18 54	5 56	7 19	0 35	11 39	20 35	.....	85	9 26.4	20 17
Thu Dec 23/Fri Dec 24	9572.8	5 45 44	17 33	18 55	5 57	7 19	0 40	11 44	21 34	.....	77	10 16.2	16 13
Fri Dec 24/Sat Dec 25	9573.8	5 49 40	17 33	18 56	5 57	7 20	0 44	11 48	22 34	.....	68	11 04.5	11 22
Sat Dec 25/Sun Dec 26	9574.8	5 53 37	17 34	18 56	5 58	7 20	0 49	11 52	23 34	.....	58	11 52.0	5 56
Sun Dec 26/Mon Dec 27	9575.8	5 57 33	17 34	18 57	5 58	7 20	0 53	11 57	0 35	.....	47	12 39.6	0 07
Mon Dec 27/Tue Dec 28	9576.8	6 01 30	17 35	18 57	5 59	7 21	0 58	12 01	1 38	.....	36	13 28.4	- 5 52
Tue Dec 28/Wed Dec 29	9577.8	6 05 27	17 36	18 58	5 59	7 21	1 03	12 05	2 43	.....	26	14 19.6	-11 44
Wed Dec 29/Thu Dec 30	9578.8	6 09 23	17 36	18 59	5 59	7 21	1 07	12 10	3 53	.....	17	15 14.3	-17 08
Thu Dec 30/Fri Dec 31	9579.8	6 13 20	17 37	18 59	6 00	7 22	1 12	12 14	5 06	.....	9	16 13.3	-21 39
Fri Dec 31/Sat Jan 01	9580.8	6 17 16	17 38	19 00	6 00	7 22	1 16	12 18	6 19	.....	3	17 16.4	-24 51