

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 -; 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:

***** 2020 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 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 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 2020, 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 25 22 16	Jan 02 21 47	Jan 10 12 23	Jan 17 6 01
Jan 24 14 44	Feb 01 18 43	Feb 09 0 35	Feb 15 15 19
Feb 23 8 34	Mar 02 12 59	Mar 09 10 49	Mar 16 2 36
Mar 24 2 30	Apr 01 3 22	Apr 07 19 36	Apr 14 15 57
Apr 22 19 27	Apr 30 13 39	May 07 3 46	May 14 7 03
May 22 10 40	May 29 20 30	Jun 05 12 13	Jun 12 23 25
Jun 20 23 42	Jun 28 1 17	Jul 04 21 45	Jul 12 16 31
Jul 20 10 34	Jul 27 5 34	Aug 03 9 00	Aug 11 9 48
Aug 18 19 42	Aug 25 10 59	Sep 01 22 23	Sep 10 2 28
Sep 17 4 01	Sep 23 18 57	Oct 01 14 07	Oct 09 17 41
Oct 16 12 32	Oct 23 6 24	Oct 31 7 51	Nov 08 6 48
Nov 14 22 09	Nov 21 21 46	Nov 30 2 32	Dec 07 17 38
Dec 14 9 19	Dec 21 16 43	Dec 29 20 30	Jan 06 2 39

***** 2020 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) (2020 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Wed Jan 01/Thu Jan 02	8850.8	6 19 11	17 38	19 00	6 00	7 22	1 18	12 20	.....	23 48	41	0 10.7	- 4 42
Thu Jan 02/Fri Jan 03	8851.8	6 23 07	17 39	19 01	6 00	7 22	1 23	12 24	.....	0 41	50	0 54.3	- 0 03
Fri Jan 03/Sat Jan 04	8852.8	6 27 04	17 40	19 01	6 00	7 22	1 28	12 29	.....	1 35	60	1 38.4	4 38
Sat Jan 04/Sun Jan 05	8853.8	6 31 00	17 40	19 02	6 01	7 22	1 32	12 33	.....	2 30	69	2 23.9	9 13
Sun Jan 05/Mon Jan 06	8854.8	6 34 57	17 41	19 03	6 01	7 23	1 37	12 37	.....	3 27	78	3 11.6	13 32
Mon Jan 06/Tue Jan 07	8855.8	6 38 54	17 42	19 04	6 01	7 23	1 42	12 41	.....	4 26	86	4 02.5	17 21
Tue Jan 07/Wed Jan 08	8856.8	6 42 50	17 43	19 04	6 01	7 23	1 46	12 45	.....	5 28	92	4 57.0	20 24
Wed Jan 08/Thu Jan 09	8857.8	6 46 47	17 43	19 05	6 01	7 23	1 51	12 49	.....	6 29	97	5 55.0	22 24
Thu Jan 09/Fri Jan 10	8858.8	6 50 43	17 44	19 06	6 01	7 23	1 56	12 53	.....	7 29	100	6 55.9	23 04
Fri Jan 10/Sat Jan 11	8859.8	6 54 40	17 45	19 07	6 01	7 23	2 00	12 57	.....	8 29	100	7 58.1	22 15
Sat Jan 11/Sun Jan 12	8860.8	6 58 36	17 46	19 07	6 01	7 23	2 05	13 01	.....	9 29	97	8 59.8	19 55
Sun Jan 12/Mon Jan 13	8861.8	7 02 33	17 47	19 08	6 01	7 23	2 10	13 05	.....	10 29	91	9 59.8	16 16
Mon Jan 13/Tue Jan 14	8862.8	7 06 29	17 48	19 09	6 01	7 22	2 15	13 09	.....	11 29	84	10 57.2	11 36
Tue Jan 14/Wed Jan 15	8863.8	7 10 26	17 49	19 10	6 01	7 22	2 19	13 13	.....	12 29	74	11 52.1	6 17
Wed Jan 15/Thu Jan 16	8864.8	7 14 23	17 49	19 10	6 01	7 22	2 24	13 17	.....	13 29	63	12 45.2	0 41
Thu Jan 16/Fri Jan 17	8865.8	7 18 19	17 50	19 11	6 01	7 22	2 29	13 20	.....	14 29	52	13 37.4	- 4 52
Fri Jan 17/Sat Jan 18	8866.8	7 22 16	17 51	19 12	6 01	7 22	2 33	13 24	.....	15 29	41	14 29.4	-10 05
Sat Jan 18/Sun Jan 19	8867.8	7 26 12	17 52	19 13	6 01	7 21	2 38	13 28	.....	16 29	30	15 22.0	-14 42
Sun Jan 19/Mon Jan 20	8868.8	7 30 09	17 53	19 13	6 01	7 21	2 43	13 32	.....	17 29	21	16 15.7	-18 30
Mon Jan 20/Tue Jan 21	8869.8	7 34 05	17 54	19 14	6 00	7 21	2 48	13 36	.....	18 29	13	17 10.5	-21 18
Tue Jan 21/Wed Jan 22	8870.8	7 38 02	17 55	19 15	6 00	7 20	2 52	13 39	.....	19 29	7	18 06.1	-22 56
Wed Jan 22/Thu Jan 23	8871.8	7 41 58	17 56	19 16	6 00	7 20	2 57	13 43	.....	20 29	3	19 01.6	-23 21
Thu Jan 23/Fri Jan 24	8872.8	7 45 55	17 57	19 17	6 00	7 20	3 02	13 47	.....	21 29	0	19 56.1	-22 35
Fri Jan 24/Sat Jan 25	8873.8	7 49 52	17 58	19 17	5 59	7 19	3 07	13 50	.....	22 29	0	20 48.7	-20 44
Sat Jan 25/Sun Jan 26	8874.8	7 53 48	17 59	19 18	5 59	7 19	3 11	13 54	.....	23 29	2	21 38.9	-17 58
Sun Jan 26/Mon Jan 27	8875.8	7 57 45	17 59	19 19	5 59	7 18	3 16	13 57	.....	24 29	5	22 26.8	-14 28
Mon Jan 27/Tue Jan 28	8876.8	8 01 41	18 00	19 20	5 58	7 18	3 21	14 01	.....	25 29	10	23 12.6	-10 27
Tue Jan 28/Wed Jan 29	8877.8	8 05 38	18 01	19 21	5 58	7 17	3 26	14 04	.....	26 29	17	23 56.8	- 6 04
Wed Jan 29/Thu Jan 30	8878.8	8 09 34	18 02	19 21	5 57	7 17	3 30	14 08	.....	27 29	24	0 40.1	- 1 30
Thu Jan 30/Fri Jan 31	8879.8	8 13 31	18 03	19 22	5 57	7 16	3 35	14 11	.....	28 29	33	1 23.4	3 09
Fri Jan 31/Sat Feb 01	8880.8	8 17 27	18 04	19 23	5 56	7 15	3 40	14 15	.....	29 29	42	2 07.5	7 42

***** 2020 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) (2020 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Sat Feb 01/Sun Feb 02	8881.8	8 21 24	18 05	19 24	5 56	7 15	3 44	14 18	.....	1 14	51	2 53.3	12 02
Sun Feb 02/Mon Feb 03	8882.8	8 25 21	18 06	19 25	5 55	7 14	3 49	14 22	.....	2 11	61	3 41.7	15 58
Mon Feb 03/Tue Feb 04	8883.8	8 29 17	18 07	19 25	5 55	7 13	3 54	14 25	.....	3 10	71	4 33.3	19 17
Tue Feb 04/Wed Feb 05	8884.8	8 33 14	18 08	19 26	5 54	7 13	3 59	14 28	.....	4 11	80	5 28.6	21 42
Wed Feb 05/Thu Feb 06	8885.8	8 37 10	18 09	19 27	5 54	7 12	4 03	14 32	.....	5 11	88	6 27.5	22 58
Thu Feb 06/Fri Feb 07	8886.8	8 41 07	18 09	19 28	5 53	7 11	4 08	14 35	.....	6 08	94	7 29.0	22 49
Fri Feb 07/Sat Feb 08	8887.8	8 45 03	18 10	19 29	5 52	7 10	4 13	14 38	16 26	7 02	98	8 31.5	21 07
Sat Feb 08/Sun Feb 09	8888.8	8 49 00	18 11	19 29	5 52	7 09	4 18	14 41	17 35	7 50	100	9 33.6	17 56
Sun Feb 09/Mon Feb 10	8889.8	8 52 56	18 12	19 30	5 51	7 09	4 22	14 45	18 45	.....	98	10 33.8	13 30
Mon Feb 10/Tue Feb 11	8890.8	8 56 53	18 13	19 31	5 50	7 08	4 27	14 48	19 56	.....	94	11 31.8	8 10
Tue Feb 11/Wed Feb 12	8891.8	9 00 50	18 14	19 32	5 49	7 07	4 32	14 51	21 05	.....	87	12 27.7	2 22
Wed Feb 12/Thu Feb 13	8892.8	9 04 46	18 15	19 32	5 48	7 06	4 36	14 54	22 13	.....	78	13 22.1	- 3 28
Thu Feb 13/Fri Feb 14	8893.8	9 08 43	18 16	19 33	5 48	7 05	4 41	14 57	23 20	.....	67	14 15.9	- 9 00
Fri Feb 14/Sat Feb 15	8894.8	9 12 39	18 16	19 34	5 47	7 04	4 46	15 00	0 25	.....	56	15 09.7	-13 55
Sat Feb 15/Sun Feb 16	8895.8	9 16 36	18 17	19 35	5 46	7 03	4 51	15 03	1 29	.....	45	16 04.0	-17 59
Sun Feb 16/Mon Feb 17	8896.8	9 20 32	18 18	19 35	5 45	7 02	4 55	15 07	2 32	.....	35	16 59.0	-21 01
Mon Feb 17/Tue Feb 18	8897.8	9 24 29	18 19	19 36	5 44	7 01	5 00	15 10	3 31	.....	25	17 54.4	-22 52
Tue Feb 18/Wed Feb 19	8898.8	9 28 25	18 20	19 37	5 43	7 00	5 05	15 13	4 26	.....	17	18 49.6	-23 31
Wed Feb 19/Thu Feb 20	8899.8	9 32 22	18 21	19 38	5 42	6 59	5 09	15 16	5 16	.....	10	19 43.7	-22 59
Thu Feb 20/Fri Feb 21	8900.8	9 36 19	18 21	19 38	5 41	6 58	5 14	15 19	6 01	.....	5	20 36.2	-21 22
Fri Feb 21/Sat Feb 22	8901.8	9 40 15	18 22	19 39	5 40	6 57	5 19	15 22	6 40	16 46	2	21 26.6	-18 48
Sat Feb 22/Sun Feb 23	8902.8	9 44 12	18 23	19 40	5 39	6 56	5 23	15 24	7 15	17 42	0	22 14.6	-15 28
Sun Feb 23/Mon Feb 24	8903.8	9 48 08	18 24	19 41	5 38	6 55	5 28	15 27	.....	18 37	1	23 00.6	-11 33
Mon Feb 24/Tue Feb 25	8904.8	9 52 05	18 25	19 41	5 37	6 54	5 33	15 30	.....	19 32	3	23 45.0	- 7 14
Tue Feb 25/Wed Feb 26	8905.8	9 56 01	18 25	19 42	5 36	6 53	5 37	15 33	.....	20 25	6	0 28.3	- 2 41
Wed Feb 26/Thu Feb 27	8906.8	9 59 58	18 26	19 43	5 35	6 52	5 42	15 36	.....	21 18	11	1 11.3	1 57
Thu Feb 27/Fri Feb 28	8907.8	10 03 54	18 27	19 44	5 34	6 51	5 47	15 39	.....	22 11	18	1 54.7	6 32
Fri Feb 28/Sat Feb 29	8908.8	10 07 51	18 28	19 44	5 33	6 49	5 52	15 42	.....	23 06	26	2 39.2	10 54
Sat Feb 29/Sun Mar 01	8909.8	10 11 48	18 28	19 45	5 32	6 48	5 56	15 45	.....	0 01	34	3 25.8	14 54

***** 2020 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) (2020 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Sun Mar 01/Mon Mar 02	8910.8	10 15 44	18 29	19 46	5 31	6 47	6 01	15 47	.....	0 58	44	4 14.9	18 21
Mon Mar 02/Tue Mar 03	8911.8	10 19 41	18 30	19 47	5 30	6 46	6 06	15 50	.....	1 57	54	5 07.3	21 02
Tue Mar 03/Wed Mar 04	8912.8	10 23 37	18 31	19 47	5 28	6 45	6 10	15 53	.....	2 55	64	6 03.0	22 43
Wed Mar 04/Thu Mar 05	8913.8	10 27 34	18 32	19 48	5 27	6 44	6 15	15 56	.....	3 53	74	7 01.6	23 08
Thu Mar 05/Fri Mar 06	8914.8	10 31 30	18 32	19 49	5 26	6 42	6 20	15 58	.....	4 47	83	8 02.2	22 08
Fri Mar 06/Sat Mar 07	8915.8	10 35 27	18 33	19 50	5 25	6 41	6 24	16 01	.....	5 37	91	9 03.6	19 38
Sat Mar 07/Sun Mar 08	8916.8	10 39 23	18 34	19 50	5 24	6 40	6 29	16 04	.....	6 22	97	10 04.5	15 44
Sun Mar 08/Mon Mar 09	8917.8	10 43 20	18 34	19 51	5 22	6 39	6 34	16 06	17 30	7 04	100	11 04.0	10 41
Mon Mar 09/Tue Mar 10	8918.8	10 47 17	18 35	19 52	5 21	6 38	6 38	16 09	18 42	.....	99	12 01.9	4 52
Tue Mar 10/Wed Mar 11	8919.8	10 51 13	18 36	19 52	5 20	6 36	6 43	16 12	19 52	.....	96	12 58.7	- 1 15
Wed Mar 11/Thu Mar 12	8920.8	10 55 10	18 37	19 53	5 18	6 35	6 48	16 15	21 02	.....	90	13 54.8	- 7 14
Thu Mar 12/Fri Mar 13	8921.8	10 59 06	18 37	19 54	5 17	6 34	6 52	16 17	22 11	.....	81	14 50.9	-12 40
Fri Mar 13/Sat Mar 14	8922.8	11 03 03	18 38	19 55	5 16	6 33	6 57	16 20	23 18	.....	72	15 47.4	-17 14
Sat Mar 14/Sun Mar 15	8923.8	11 06 59	18 39	19 55	5 15	6 31	7 02	16 22	0 24	.....	61	16 44.2	-20 41
Sun Mar 15/Mon Mar 16	8924.8	11 10 56	18 39	19 56	5 13	6 30	7 06	16 25	1 26	.....	50	17 41.2	-22 54
Mon Mar 16/Tue Mar 17	8925.8	11 14 52	18 40	19 57	5 12	6 29	7 11	16 28	2 23	.....	40	18 37.6	-23 50
Tue Mar 17/Wed Mar 18	8926.8	11 18 49	18 41	19 58	5 11	6 27	7 16	16 30	3 15	.....	30	19 32.6	-23 31
Wed Mar 18/Thu Mar 19	8927.8	11 22 46	18 42	19 58	5 09	6 26	7 21	16 33	4 01	.....	22	20 25.7	-22 04
Thu Mar 19/Fri Mar 20	8928.8	11 26 42	18 42	19 59	5 08	6 25	7 25	16 35	4 41	.....	14	21 16.3	-19 39
Fri Mar 20/Sat Mar 21	8929.8	11 30 39	18 43	20 00	5 07	6 24	7 30	16 38	5 17	.....	9	22 04.6	-16 26
Sat Mar 21/Sun Mar 22	8930.8	11 34 35	18 44	20 01	5 05	6 22	7 35	16 41	5 50	.....	4	22 50.7	-12 37
Sun Mar 22/Mon Mar 23	8931.8	11 38 32	18 44	20 02	5 04	6 21	7 39	16 43	6 20	17 27	1	23 35.1	- 8 21
Mon Mar 23/Tue Mar 24	8932.8	11 42 28	18 45	20 02	5 02	6 20	7 44	16 46	6 49	18 20	0	0 18.4	- 3 48
Tue Mar 24/Wed Mar 25	8933.8	11 46 25	18 46	20 03	5 01	6 18	7 49	16 48	.....	19 13	1	1 01.3	0 51
Wed Mar 25/Thu Mar 26	8934.8	11 50 21	18 46	20 04	5 00	6 17	7 54	16 51	.....	20 06	3	1 44.4	5 30
Thu Mar 26/Fri Mar 27	8935.8	11 54 18	18 47	20 05	4 58	6 16	7 58	16 53	.....	21 00	7	2 28.4	9 57
Fri Mar 27/Sat Mar 28	8936.8	11 58 15	18 48	20 05	4 57	6 15	8 03	16 56	.....	21 55	13	3 14.0	14 04
Sat Mar 28/Sun Mar 29	8937.8	12 02 11	18 48	20 06	4 55	6 13	8 08	16 58	.....	22 52	20	4 01.9	17 39
Sun Mar 29/Mon Mar 30	8938.8	12 06 08	18 49	20 07	4 54	6 12	8 13	17 01	.....	23 49	28	4 52.4	20 31
Mon Mar 30/Tue Mar 31	8939.8	12 10 04	18 50	20 08	4 53	6 11	8 17	17 04	.....	0 47	38	5 45.8	22 28
Tue Mar 31/Wed Apr 01	8940.8	12 14 01	18 50	20 09	4 51	6 09	8 22	17 06	.....	1 43	48	6 41.7	23 17

***** 2020 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) (2020 at start)	JDmid (-2450000)	LMSTmid	Sun: -----				LST twilight:		Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Wed Apr 01/Thu Apr 02	8941.8	12 17 57	18 51	20 10	4 50	6 08	8 27	17 09	.....	2 37	59	7 39.7	22 48
Thu Apr 02/Fri Apr 03	8942.8	12 21 54	18 52	20 10	4 48	6 07	8 32	17 11	.....	3 27	69	8 38.6	20 55
Fri Apr 03/Sat Apr 04	8943.8	12 25 50	18 52	20 11	4 47	6 06	8 36	17 14	.....	4 12	79	9 37.7	17 39
Sat Apr 04/Sun Apr 05	8944.8	12 29 47	18 53	20 12	4 46	6 04	8 41	17 16	.....	4 54	88	10 36.1	13 09
Sun Apr 05/Mon Apr 06	8945.8	12 33 44	18 54	20 13	4 44	6 03	8 46	17 19	.....	5 34	95	11 33.7	7 41
Mon Apr 06/Tue Apr 07	8946.8	12 37 40	18 55	20 14	4 43	6 02	8 51	17 21	17 26	6 12	99	12 30.6	1 37
Tue Apr 07/Wed Apr 08	8947.8	12 41 37	18 55	20 15	4 41	6 01	8 56	17 24	18 36	6 49	100	13 27.5	- 4 37
Wed Apr 08/Thu Apr 09	8948.8	12 45 33	18 56	20 15	4 40	5 59	9 00	17 26	19 47	.....	98	14 24.8	-10 33
Thu Apr 09/Fri Apr 10	8949.8	12 49 30	18 57	20 16	4 39	5 58	9 05	17 29	20 57	.....	93	15 22.9	-15 45
Fri Apr 10/Sat Apr 11	8950.8	12 53 26	18 57	20 17	4 37	5 57	9 10	17 31	22 07	.....	85	16 21.9	-19 53
Sat Apr 11/Sun Apr 12	8951.8	12 57 23	18 58	20 18	4 36	5 56	9 15	17 34	23 13	.....	76	17 21.4	-22 42
Sun Apr 12/Mon Apr 13	8952.8	13 01 19	18 59	20 19	4 34	5 55	9 20	17 36	0 15	.....	66	18 20.4	-24 06
Mon Apr 13/Tue Apr 14	8953.8	13 05 16	18 59	20 20	4 33	5 53	9 25	17 39	1 11	.....	56	19 17.8	-24 08
Tue Apr 14/Wed Apr 15	8954.8	13 09 13	19 00	20 21	4 32	5 52	9 29	17 41	2 00	.....	46	20 12.9	-22 55
Wed Apr 15/Thu Apr 16	8955.8	13 13 09	19 01	20 22	4 30	5 51	9 34	17 44	2 42	.....	36	21 05.0	-20 39
Thu Apr 16/Fri Apr 17	8956.8	13 17 06	19 01	20 23	4 29	5 50	9 39	17 47	3 20	.....	27	21 54.3	-17 33
Fri Apr 17/Sat Apr 18	8957.8	13 21 02	19 02	20 24	4 27	5 49	9 44	17 49	3 53	.....	19	22 41.0	-13 48
Sat Apr 18/Sun Apr 19	8958.8	13 24 59	19 03	20 25	4 26	5 48	9 49	17 52	4 23	.....	13	23 25.7	- 9 34
Sun Apr 19/Mon Apr 20	8959.8	13 28 55	19 04	20 25	4 25	5 47	9 54	17 54	4 52	.....	7	0 09.1	- 5 03
Mon Apr 20/Tue Apr 21	8960.8	13 32 52	19 04	20 26	4 23	5 45	9 59	17 57	5 20	.....	3	0 51.9	- 0 21
Tue Apr 21/Wed Apr 22	8961.8	13 36 48	19 05	20 27	4 22	5 44	10 04	18 00	5 48	18 02	1	1 34.8	4 21
Wed Apr 22/Thu Apr 23	8962.8	13 40 45	19 06	20 28	4 21	5 43	10 08	18 02	6 18	18 56	0	2 18.6	8 55
Thu Apr 23/Fri Apr 24	8963.8	13 44 42	19 06	20 29	4 19	5 42	10 13	18 05	.....	19 51	1	3 03.9	13 10
Fri Apr 24/Sat Apr 25	8964.8	13 48 38	19 07	20 30	4 18	5 41	10 18	18 07	.....	20 47	4	3 51.3	16 56
Sat Apr 25/Sun Apr 26	8965.8	13 52 35	19 08	20 31	4 17	5 40	10 23	18 10	.....	21 44	9	4 41.1	20 00
Sun Apr 26/Mon Apr 27	8966.8	13 56 31	19 09	20 32	4 15	5 39	10 28	18 13	.....	22 42	16	5 33.5	22 11
Mon Apr 27/Tue Apr 28	8967.8	14 00 28	19 09	20 33	4 14	5 38	10 33	18 15	.....	23 39	24	6 28.1	23 17
Tue Apr 28/Wed Apr 29	8968.8	14 04 24	19 10	20 34	4 13	5 37	10 38	18 18	.....	0 33	33	7 24.5	23 09
Wed Apr 29/Thu Apr 30	8969.8	14 08 21	19 11	20 35	4 12	5 36	10 43	18 21	.....	1 23	43	8 21.6	21 42
Thu Apr 30/Fri May 01	8970.8	14 12 17	19 11	20 36	4 10	5 35	10 48	18 23	.....	2 08	54	9 18.7	18 56

***** 2020 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) (2020 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: ----- set twi.end twi.beg rise				LST twilight: eve morn		----- Moon: ----- rise set %illum RA Dec				
Fri May 01/Sat May 02	8971.8	14 16 14	19 12	20 37	4 09	5 34	10 53	18 26	.....	2 50	65	10 15.1	14 58
Sat May 02/Sun May 03	8972.8	14 20 11	19 13	20 38	4 08	5 33	10 58	18 29	.....	3 29	76	11 10.8	9 59
Sun May 03/Mon May 04	8973.8	14 24 07	19 14	20 39	4 07	5 32	11 03	18 32	.....	4 05	85	12 05.9	4 16
Mon May 04/Tue May 05	8974.8	14 28 04	19 14	20 40	4 06	5 32	11 08	18 34	.....	4 42	93	13 01.2	- 1 50
Tue May 05/Wed May 06	8975.8	14 32 00	19 15	20 41	4 05	5 31	11 13	18 37	.....	5 19	98	13 57.3	- 7 56
Wed May 06/Thu May 07	8976.8	14 35 57	19 16	20 42	4 03	5 30	11 18	18 40	18 32	6 00	100	14 54.8	-13 35
Thu May 07/Fri May 08	8977.8	14 39 53	19 16	20 43	4 02	5 29	11 22	18 43	19 43	.....	99	15 54.1	-18 22
Fri May 08/Sat May 09	8978.8	14 43 50	19 17	20 44	4 01	5 28	11 27	18 46	20 52	.....	95	16 54.8	-21 55
Sat May 09/Sun May 10	8979.8	14 47 46	19 18	20 45	4 00	5 27	11 32	18 49	21 59	.....	89	17 56.0	-24 01
Sun May 10/Mon May 11	8980.8	14 51 43	19 19	20 46	3 59	5 27	11 37	18 51	22 59	.....	81	18 56.3	-24 38
Mon May 11/Tue May 12	8981.8	14 55 40	19 19	20 47	3 58	5 26	11 42	18 54	23 53	.....	72	19 54.4	-23 49
Tue May 12/Wed May 13	8982.8	14 59 36	19 20	20 48	3 57	5 25	11 47	18 57	0 39	.....	62	20 49.3	-21 49
Wed May 13/Thu May 14	8983.8	15 03 33	19 21	20 49	3 56	5 24	11 52	19 00	1 20	.....	52	21 40.8	-18 51
Thu May 14/Fri May 15	8984.8	15 07 29	19 21	20 50	3 55	5 24	11 57	19 03	1 55	.....	43	22 29.0	-15 11
Fri May 15/Sat May 16	8985.8	15 11 26	19 22	20 51	3 54	5 23	12 02	19 06	2 26	.....	33	23 14.7	-10 59
Sat May 16/Sun May 17	8986.8	15 15 22	19 23	20 52	3 53	5 23	12 07	19 09	2 55	.....	25	23 58.7	- 6 28
Sun May 17/Mon May 18	8987.8	15 19 19	19 24	20 53	3 52	5 22	12 12	19 12	3 23	.....	17	0 41.6	- 1 46
Mon May 18/Tue May 19	8988.8	15 23 15	19 24	20 54	3 52	5 21	12 17	19 15	3 51	.....	11	1 24.5	2 59
Tue May 19/Wed May 20	8989.8	15 27 12	19 25	20 55	3 51	5 21	12 22	19 19	4 20	.....	6	2 08.0	7 39
Wed May 20/Thu May 21	8990.8	15 31 09	19 26	20 56	3 50	5 20	12 27	19 22	4 51	17 44	2	2 53.0	12 02
Thu May 21/Fri May 22	8991.8	15 35 05	19 26	20 57	3 49	5 20	12 31	19 25	5 25	18 40	0	3 40.0	15 59
Fri May 22/Sat May 23	8992.8	15 39 02	19 27	20 58	3 48	5 19	12 36	19 28	6 04	19 38	0	4 29.5	19 18
Sat May 23/Sun May 24	8993.8	15 42 58	19 28	20 59	3 48	5 19	12 41	19 31	.....	20 37	2	5 21.7	21 44
Sun May 24/Mon May 25	8994.8	15 46 55	19 28	21 00	3 47	5 18	12 46	19 34	.....	21 34	6	6 16.2	23 08
Mon May 25/Tue May 26	8995.8	15 50 51	19 29	21 00	3 46	5 18	12 51	19 38	.....	22 30	12	7 12.3	23 17
Tue May 26/Wed May 27	8996.8	15 54 48	19 29	21 01	3 46	5 18	12 56	19 41	.....	23 21	20	8 09.1	22 09
Wed May 27/Thu May 28	8997.8	15 58 44	19 30	21 02	3 45	5 17	13 00	19 44	.....	0 08	29	9 05.6	19 42
Thu May 28/Fri May 29	8998.8	16 02 41	19 31	21 03	3 45	5 17	13 05	19 48	.....	0 50	40	10 01.0	16 06
Fri May 29/Sat May 30	8999.8	16 06 38	19 31	21 04	3 44	5 17	13 10	19 51	.....	1 28	51	10 55.2	11 29
Sat May 30/Sun May 31	9000.8	16 10 34	19 32	21 05	3 43	5 16	13 15	19 55	.....	2 04	63	11 48.6	6 08
Sun May 31/Mon Jun 01	9001.8	16 14 31	19 32	21 05	3 43	5 16	13 19	19 58	.....	2 39	74	12 41.7	0 19

***** 2020 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) (2020 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Mon Jun 01/Tue Jun 02	9002.8	16 18 27	19 33	21 06	3 43	5 16	13 24	20 02	.....	3 15	83	13 35.4	- 5 38
Tue Jun 02/Wed Jun 03	9003.8	16 22 24	19 34	21 07	3 42	5 16	13 29	20 05	.....	3 53	91	14 30.5	-11 23
Wed Jun 03/Thu Jun 04	9004.8	16 26 20	19 34	21 08	3 42	5 15	13 34	20 09	.....	4 34	97	15 27.8	-16 30
Thu Jun 04/Fri Jun 05	9005.8	16 30 17	19 35	21 08	3 41	5 15	13 38	20 12	18 30	5 19	100	16 27.3	-20 37
Fri Jun 05/Sat Jun 06	9006.8	16 34 13	19 35	21 09	3 41	5 15	13 43	20 16	19 38	6 11	100	17 28.6	-23 26
Sat Jun 06/Sun Jun 07	9007.8	16 38 10	19 36	21 10	3 41	5 15	13 47	20 20	20 42	.....	97	18 30.2	-24 44
Sun Jun 07/Mon Jun 08	9008.8	16 42 07	19 36	21 10	3 41	5 15	13 52	20 23	21 41	.....	92	19 30.6	-24 31
Mon Jun 08/Tue Jun 09	9009.8	16 46 03	19 37	21 11	3 40	5 15	13 56	20 27	22 31	.....	85	20 28.4	-22 56
Tue Jun 09/Wed Jun 10	9010.8	16 50 00	19 37	21 11	3 40	5 15	14 01	20 31	23 15	.....	77	21 22.6	-20 14
Wed Jun 10/Thu Jun 11	9011.8	16 53 56	19 37	21 12	3 40	5 15	14 05	20 35	23 53	.....	68	22 13.2	-16 42
Thu Jun 11/Fri Jun 12	9012.8	16 57 53	19 38	21 13	3 40	5 15	14 10	20 39	0 27	.....	59	23 00.7	-12 34
Fri Jun 12/Sat Jun 13	9013.8	17 01 49	19 38	21 13	3 40	5 15	14 14	20 42	0 57	.....	49	23 45.8	- 8 03
Sat Jun 13/Sun Jun 14	9014.8	17 05 46	19 39	21 13	3 40	5 15	14 19	20 46	1 25	.....	40	0 29.3	- 3 19
Sun Jun 14/Mon Jun 15	9015.8	17 09 42	19 39	21 14	3 40	5 15	14 23	20 50	1 53	.....	31	1 12.4	1 28
Mon Jun 15/Tue Jun 16	9016.8	17 13 39	19 39	21 14	3 40	5 15	14 27	20 54	2 21	.....	23	1 55.7	6 12
Tue Jun 16/Wed Jun 17	9017.8	17 17 36	19 40	21 15	3 40	5 15	14 32	20 58	2 51	.....	15	2 40.2	10 42
Wed Jun 17/Thu Jun 18	9018.8	17 21 32	19 40	21 15	3 40	5 15	14 36	21 02	3 24	.....	9	3 26.6	14 49
Thu Jun 18/Fri Jun 19	9019.8	17 25 29	19 40	21 15	3 40	5 15	14 40	21 06	4 01	.....	4	4 15.6	18 21
Fri Jun 19/Sat Jun 20	9020.8	17 29 25	19 40	21 16	3 41	5 16	14 44	21 11	4 44	18 27	1	5 07.4	21 05
Sat Jun 20/Sun Jun 21	9021.8	17 33 22	19 41	21 16	3 41	5 16	14 49	21 15	5 33	19 26	0	6 01.9	22 48
Sun Jun 21/Mon Jun 22	9022.8	17 37 18	19 41	21 16	3 41	5 16	14 53	21 19	6 28	20 23	1	6 58.4	23 18
Mon Jun 22/Tue Jun 23	9023.8	17 41 15	19 41	21 16	3 41	5 16	14 57	21 23	.....	21 17	4	7 55.8	22 28
Tue Jun 23/Wed Jun 24	9024.8	17 45 11	19 41	21 16	3 42	5 17	15 01	21 27	.....	22 07	10	8 53.0	20 19
Wed Jun 24/Thu Jun 25	9025.8	17 49 08	19 41	21 16	3 42	5 17	15 05	21 32	.....	22 51	18	9 49.0	16 56
Thu Jun 25/Fri Jun 26	9026.8	17 53 05	19 41	21 16	3 42	5 17	15 09	21 36	.....	23 30	27	10 43.3	12 32
Fri Jun 26/Sat Jun 27	9027.8	17 57 01	19 41	21 16	3 43	5 18	15 13	21 40	.....	0 07	38	11 36.2	7 23
Sat Jun 27/Sun Jun 28	9028.8	18 00 58	19 42	21 16	3 43	5 18	15 17	21 45	.....	0 41	49	12 28.3	1 46
Sun Jun 28/Mon Jun 29	9029.8	18 04 54	19 42	21 16	3 44	5 18	15 21	21 49	.....	1 15	60	13 20.3	- 4 02
Mon Jun 29/Tue Jun 30	9030.8	18 08 51	19 42	21 16	3 44	5 19	15 25	21 54	.....	1 51	71	14 13.3	- 9 42
Tue Jun 30/Wed Jul 01	9031.8	18 12 47	19 42	21 16	3 45	5 19	15 28	21 58	.....	2 29	81	15 08.1	-14 54

***** 2020 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) (2020 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Wed Jul 01/Thu Jul 02	9032.8	18 16 44	19 42	21 16	3 45	5 20	15 32	22 03	.....	3 12	89	16 05.2	-19 17
Thu Jul 02/Fri Jul 03	9033.8	18 20 40	19 41	21 16	3 46	5 20	15 36	22 07	.....	4 00	95	17 04.5	-22 33
Fri Jul 03/Sat Jul 04	9034.8	18 24 37	19 41	21 15	3 46	5 21	15 40	22 12	18 26	4 53	99	18 05.2	-24 26
Sat Jul 04/Sun Jul 05	9035.8	18 28 34	19 41	21 15	3 47	5 21	15 43	22 16	19 27	5 51	100	19 06.0	-24 50
Sun Jul 05/Mon Jul 06	9036.8	18 32 30	19 41	21 15	3 48	5 22	15 47	22 21	20 21	.....	98	20 05.2	-23 47
Mon Jul 06/Tue Jul 07	9037.8	18 36 27	19 41	21 15	3 48	5 22	15 51	22 25	21 08	.....	95	21 01.4	-21 28
Tue Jul 07/Wed Jul 08	9038.8	18 40 23	19 41	21 14	3 49	5 23	15 54	22 30	21 49	.....	89	21 54.2	-18 10
Wed Jul 08/Thu Jul 09	9039.8	18 44 20	19 41	21 14	3 50	5 23	15 58	22 35	22 25	.....	82	22 43.7	-14 09
Thu Jul 09/Fri Jul 10	9040.8	18 48 16	19 40	21 13	3 51	5 24	16 01	22 39	22 57	.....	74	23 30.3	- 9 40
Fri Jul 10/Sat Jul 11	9041.8	18 52 13	19 40	21 13	3 51	5 24	16 05	22 44	23 26	.....	65	0 14.9	- 4 55
Sat Jul 11/Sun Jul 12	9042.8	18 56 09	19 40	21 12	3 52	5 25	16 08	22 49	23 54	.....	56	0 58.4	- 0 05
Sun Jul 12/Mon Jul 13	9043.8	19 00 06	19 39	21 12	3 53	5 25	16 11	22 54	0 22	.....	47	1 41.8	4 43
Mon Jul 13/Tue Jul 14	9044.8	19 04 03	19 39	21 11	3 54	5 26	16 15	22 58	0 51	.....	37	2 25.8	9 18
Tue Jul 14/Wed Jul 15	9045.8	19 07 59	19 39	21 11	3 55	5 26	16 18	23 03	1 22	.....	28	3 11.5	13 33
Wed Jul 15/Thu Jul 16	9046.8	19 11 56	19 38	21 10	3 55	5 27	16 21	23 08	1 57	.....	20	3 59.5	17 17
Thu Jul 16/Fri Jul 17	9047.8	19 15 52	19 38	21 09	3 56	5 28	16 25	23 13	2 37	.....	13	4 50.3	20 18
Fri Jul 17/Sat Jul 18	9048.8	19 19 49	19 37	21 09	3 57	5 28	16 28	23 18	3 23	.....	7	5 44.1	22 22
Sat Jul 18/Sun Jul 19	9049.8	19 23 45	19 37	21 08	3 58	5 29	16 31	23 22	4 16	18 12	2	6 40.4	23 16
Sun Jul 19/Mon Jul 20	9050.8	19 27 42	19 36	21 07	3 59	5 29	16 34	23 27	5 16	19 08	0	7 38.3	22 50
Mon Jul 20/Tue Jul 21	9051.8	19 31 38	19 36	21 06	4 00	5 30	16 37	23 32	6 20	20 00	0	8 36.6	21 01
Tue Jul 21/Wed Jul 22	9052.8	19 35 35	19 35	21 05	4 01	5 31	16 41	23 37	.....	20 47	3	9 34.0	17 54
Wed Jul 22/Thu Jul 23	9053.8	19 39 32	19 35	21 05	4 02	5 31	16 44	23 42	.....	21 29	8	10 29.7	13 39
Thu Jul 23/Fri Jul 24	9054.8	19 43 28	19 34	21 04	4 02	5 32	16 47	23 47	.....	22 07	16	11 23.7	8 35
Fri Jul 24/Sat Jul 25	9055.8	19 47 25	19 33	21 03	4 03	5 33	16 50	23 51	.....	22 43	25	12 16.4	2 59
Sat Jul 25/Sun Jul 26	9056.8	19 51 21	19 33	21 02	4 04	5 33	16 53	23 56	.....	23 17	35	13 08.4	- 2 48
Sun Jul 26/Mon Jul 27	9057.8	19 55 18	19 32	21 01	4 05	5 34	16 56	0 01	.....	23 52	47	14 00.7	- 8 29
Mon Jul 27/Tue Jul 28	9058.8	19 59 14	19 31	21 00	4 06	5 35	16 59	0 06	.....	0 29	58	14 54.2	-13 44
Tue Jul 28/Wed Jul 29	9059.8	20 03 11	19 31	20 59	4 07	5 35	17 02	0 11	.....	1 10	69	15 49.4	-18 15
Wed Jul 29/Thu Jul 30	9060.8	20 07 07	19 30	20 58	4 08	5 36	17 05	0 16	.....	1 55	79	16 46.7	-21 46
Thu Jul 30/Fri Jul 31	9061.8	20 11 04	19 29	20 57	4 09	5 37	17 07	0 21	.....	2 45	87	17 45.7	-24 01
Fri Jul 31/Sat Aug 01	9062.8	20 15 01	19 28	20 56	4 10	5 37	17 10	0 26	.....	3 40	94	18 45.4	-24 52

***** 2020 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) (2020 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Sat Aug 01/Sun Aug 02	9063.8	20 18 57	19 28	20 55	4 11	5 38	17 13	0 31	18 12	4 38	98	19 44.3	-24 17
Sun Aug 02/Mon Aug 03	9064.8	20 22 54	19 27	20 54	4 12	5 39	17 16	0 35	19 02	5 39	100	20 41.1	-22 24
Mon Aug 03/Tue Aug 04	9065.8	20 26 50	19 26	20 52	4 13	5 39	17 19	0 40	19 45	.....	99	21 35.0	-19 24
Tue Aug 04/Wed Aug 05	9066.8	20 30 47	19 25	20 51	4 14	5 40	17 22	0 45	20 22	.....	97	22 25.8	-15 35
Wed Aug 05/Thu Aug 06	9067.8	20 34 43	19 24	20 50	4 15	5 41	17 24	0 50	20 56	.....	93	23 13.7	-11 11
Thu Aug 06/Fri Aug 07	9068.8	20 38 40	19 23	20 49	4 16	5 41	17 27	0 55	21 26	.....	87	23 59.4	- 6 27
Fri Aug 07/Sat Aug 08	9069.8	20 42 36	19 22	20 48	4 17	5 42	17 30	1 00	21 54	.....	80	0 43.6	- 1 33
Sat Aug 08/Sun Aug 09	9070.8	20 46 33	19 21	20 47	4 18	5 43	17 33	1 05	22 22	.....	72	1 27.2	3 19
Sun Aug 09/Mon Aug 10	9071.8	20 50 30	19 20	20 45	4 19	5 43	17 35	1 10	22 51	.....	63	2 11.0	8 01
Mon Aug 10/Tue Aug 11	9072.8	20 54 26	19 19	20 44	4 19	5 44	17 38	1 15	23 20	.....	53	2 56.0	12 24
Tue Aug 11/Wed Aug 12	9073.8	20 58 23	19 18	20 43	4 20	5 45	17 41	1 19	23 53	.....	44	3 42.9	16 18
Wed Aug 12/Thu Aug 13	9074.8	21 02 19	19 17	20 41	4 21	5 45	17 43	1 24	0 30	.....	34	4 32.4	19 33
Thu Aug 13/Fri Aug 14	9075.8	21 06 16	19 16	20 40	4 22	5 46	17 46	1 29	1 13	.....	25	5 24.7	21 56
Fri Aug 14/Sat Aug 15	9076.8	21 10 12	19 15	20 39	4 23	5 47	17 49	1 34	2 03	.....	17	6 19.9	23 15
Sat Aug 15/Sun Aug 16	9077.8	21 14 09	19 14	20 38	4 24	5 47	17 51	1 39	2 59	.....	10	7 17.2	23 17
Sun Aug 16/Mon Aug 17	9078.8	21 18 05	19 13	20 36	4 25	5 48	17 54	1 44	4 02	17 49	4	8 15.6	21 55
Mon Aug 17/Tue Aug 18	9079.8	21 22 02	19 12	20 35	4 26	5 49	17 56	1 49	5 09	18 38	1	9 13.9	19 11
Tue Aug 18/Wed Aug 19	9080.8	21 25 59	19 11	20 34	4 27	5 49	17 59	1 53	6 18	19 23	0	10 11.1	15 13
Wed Aug 19/Thu Aug 20	9081.8	21 29 55	19 10	20 32	4 28	5 50	18 01	1 58	.....	20 03	2	11 06.7	10 14
Thu Aug 20/Fri Aug 21	9082.8	21 33 52	19 09	20 31	4 29	5 51	18 04	2 03	.....	20 41	7	12 00.9	4 37
Fri Aug 21/Sat Aug 22	9083.8	21 37 48	19 08	20 29	4 29	5 51	18 07	2 08	.....	21 17	14	12 54.2	- 1 19
Sat Aug 22/Sun Aug 23	9084.8	21 41 45	19 06	20 28	4 30	5 52	18 09	2 13	.....	21 52	23	13 47.4	- 7 11
Sun Aug 23/Mon Aug 24	9085.8	21 45 41	19 05	20 27	4 31	5 53	18 12	2 18	.....	22 29	33	14 41.2	-12 39
Mon Aug 24/Tue Aug 25	9086.8	21 49 38	19 04	20 25	4 32	5 53	18 14	2 22	.....	23 09	44	15 36.3	-17 24
Tue Aug 25/Wed Aug 26	9087.8	21 53 34	19 03	20 24	4 33	5 54	18 17	2 27	.....	23 53	55	16 32.9	-21 08
Wed Aug 26/Thu Aug 27	9088.8	21 57 31	19 02	20 22	4 34	5 54	18 19	2 32	.....	0 41	66	17 31.0	-23 40
Thu Aug 27/Fri Aug 28	9089.8	22 01 28	19 00	20 21	4 35	5 55	18 22	2 37	.....	1 34	76	18 29.7	-24 50
Fri Aug 28/Sat Aug 29	9090.8	22 05 24	18 59	20 19	4 35	5 56	18 24	2 42	.....	2 31	84	19 27.9	-24 36
Sat Aug 29/Sun Aug 30	9091.8	22 09 21	18 58	20 18	4 36	5 56	18 27	2 46	.....	3 30	91	20 24.4	-23 03
Sun Aug 30/Mon Aug 31	9092.8	22 13 17	18 57	20 17	4 37	5 57	18 29	2 51	17 43	4 30	96	21 18.4	-20 23
Mon Aug 31/Tue Sep 01	9093.8	22 17 14	18 55	20 15	4 38	5 58	18 32	2 56	18 21	5 28	99	22 09.6	-16 47

***** 2020 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) (2020 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Tue Sep 01/Wed Sep 02	9094.8	22 21 10	18 54	20 14	4 39	5 58	18 34	3 01	18 56	6 25	100	22 58.1	-12 32
Wed Sep 02/Thu Sep 03	9095.8	22 25 07	18 53	20 12	4 39	5 59	18 37	3 05	19 27	.....	99	23 44.3	- 7 50
Thu Sep 03/Fri Sep 04	9096.8	22 29 03	18 52	20 11	4 40	5 59	18 39	3 10	19 56	.....	96	0 29.0	- 2 55
Fri Sep 04/Sat Sep 05	9097.8	22 33 00	18 50	20 09	4 41	6 00	18 42	3 15	20 23	.....	91	1 12.9	2 02
Sat Sep 05/Sun Sep 06	9098.8	22 36 57	18 49	20 08	4 42	6 01	18 44	3 19	20 51	.....	85	1 56.7	6 51
Sun Sep 06/Mon Sep 07	9099.8	22 40 53	18 48	20 06	4 43	6 01	18 47	3 24	21 20	.....	78	2 41.4	11 23
Mon Sep 07/Tue Sep 08	9100.8	22 44 50	18 47	20 05	4 43	6 02	18 49	3 29	21 52	.....	69	3 27.6	15 28
Tue Sep 08/Wed Sep 09	9101.8	22 48 46	18 45	20 04	4 44	6 02	18 52	3 34	22 26	.....	60	4 15.9	18 56
Wed Sep 09/Thu Sep 10	9102.8	22 52 43	18 44	20 02	4 45	6 03	18 54	3 38	23 06	.....	50	5 06.7	21 36
Thu Sep 10/Fri Sep 11	9103.8	22 56 39	18 43	20 01	4 46	6 04	18 57	3 43	23 51	.....	40	6 00.2	23 16
Fri Sep 11/Sat Sep 12	9104.8	23 00 36	18 41	19 59	4 46	6 04	18 59	3 48	0 44	.....	31	6 56.0	23 45
Sat Sep 12/Sun Sep 13	9105.8	23 04 32	18 40	19 58	4 47	6 05	19 02	3 52	1 43	.....	21	7 53.3	22 54
Sun Sep 13/Mon Sep 14	9106.8	23 08 29	18 39	19 56	4 48	6 06	19 04	3 57	2 47	.....	13	8 51.1	20 41
Mon Sep 14/Tue Sep 15	9107.8	23 12 26	18 37	19 55	4 48	6 06	19 07	4 02	3 55	17 13	7	9 48.5	17 08
Tue Sep 15/Wed Sep 16	9108.8	23 16 22	18 36	19 53	4 49	6 07	19 09	4 06	5 05	17 56	2	10 44.8	12 28
Wed Sep 16/Thu Sep 17	9109.8	23 20 19	18 35	19 52	4 50	6 07	19 12	4 11	6 15	18 35	0	11 40.1	6 56
Thu Sep 17/Fri Sep 18	9110.8	23 24 15	18 33	19 51	4 51	6 08	19 14	4 16	.....	19 12	1	12 34.7	0 54
Fri Sep 18/Sat Sep 19	9111.8	23 28 12	18 32	19 49	4 51	6 09	19 17	4 20	.....	19 48	5	13 29.0	- 5 14
Sat Sep 19/Sun Sep 20	9112.8	23 32 08	18 31	19 48	4 52	6 09	19 19	4 25	.....	20 25	12	14 24.0	-11 04
Sun Sep 20/Mon Sep 21	9113.8	23 36 05	18 29	19 46	4 53	6 10	19 22	4 30	.....	21 05	20	15 20.1	-16 13
Mon Sep 21/Tue Sep 22	9114.8	23 40 01	18 28	19 45	4 53	6 10	19 24	4 34	.....	21 49	30	16 17.6	-20 22
Tue Sep 22/Wed Sep 23	9115.8	23 43 58	18 27	19 44	4 54	6 11	19 27	4 39	.....	22 37	41	17 16.3	-23 16
Wed Sep 23/Thu Sep 24	9116.8	23 47 55	18 25	19 42	4 55	6 12	19 29	4 44	.....	23 29	52	18 15.5	-24 47
Thu Sep 24/Fri Sep 25	9117.8	23 51 51	18 24	19 41	4 55	6 12	19 32	4 48	.....	0 25	62	19 13.9	-24 52
Fri Sep 25/Sat Sep 26	9118.8	23 55 48	18 23	19 39	4 56	6 13	19 35	4 53	.....	1 24	72	20 10.6	-23 37
Sat Sep 26/Sun Sep 27	9119.8	23 59 44	18 21	19 38	4 57	6 14	19 37	4 57	.....	2 23	81	21 04.7	-21 11
Sun Sep 27/Mon Sep 28	9120.8	0 03 41	18 20	19 37	4 58	6 14	19 40	5 02	.....	3 22	88	21 56.0	-17 49
Mon Sep 28/Tue Sep 29	9121.8	0 07 37	18 19	19 35	4 58	6 15	19 42	5 07	16 58	4 19	93	22 44.5	-13 43
Tue Sep 29/Wed Sep 30	9122.8	0 11 34	18 18	19 34	4 59	6 16	19 45	5 11	17 29	5 14	97	23 30.9	- 9 07
Wed Sep 30/Thu Oct 01	9123.8	0 15 30	18 16	19 33	5 00	6 16	19 48	5 16	17 58	6 08	99	0 15.6	- 4 14

***** 2020 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) (2020 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Thu Oct 01/Fri Oct 02	9124.8	0 19 27	18 15	19 31	5 00	6 17	19 50	5 20	18 26	7 02	100	0 59.6	0 46
Fri Oct 02/Sat Oct 03	9125.8	0 23 24	18 14	19 30	5 01	6 17	19 53	5 25	18 54	.....	98	1 43.5	5 42
Sat Oct 03/Sun Oct 04	9126.8	0 27 20	18 12	19 29	5 02	6 18	19 55	5 30	19 22	.....	95	2 28.0	10 24
Sun Oct 04/Mon Oct 05	9127.8	0 31 17	18 11	19 28	5 02	6 19	19 58	5 34	19 52	.....	90	3 13.8	14 41
Mon Oct 05/Tue Oct 06	9128.8	0 35 13	18 10	19 26	5 03	6 19	20 01	5 39	20 25	.....	83	4 01.5	18 23
Tue Oct 06/Wed Oct 07	9129.8	0 39 10	18 09	19 25	5 04	6 20	20 04	5 44	21 03	.....	75	4 51.5	21 19
Wed Oct 07/Thu Oct 08	9130.8	0 43 06	18 07	19 24	5 04	6 21	20 06	5 48	21 45	.....	66	5 43.8	23 17
Thu Oct 08/Fri Oct 09	9131.8	0 47 03	18 06	19 23	5 05	6 21	20 09	5 53	22 34	.....	57	6 38.2	24 09
Fri Oct 09/Sat Oct 10	9132.8	0 50 59	18 05	19 21	5 06	6 22	20 12	5 57	23 28	.....	47	7 34.0	23 44
Sat Oct 10/Sun Oct 11	9133.8	0 54 56	18 04	19 20	5 06	6 23	20 14	6 02	0 29	.....	36	8 30.5	22 01
Sun Oct 11/Mon Oct 12	9134.8	0 58 53	18 03	19 19	5 07	6 24	20 17	6 07	1 33	.....	26	9 26.7	19 00
Mon Oct 12/Tue Oct 13	9135.8	1 02 49	18 01	19 18	5 08	6 24	20 20	6 11	2 41	.....	17	10 22.3	14 48
Tue Oct 13/Wed Oct 14	9136.8	1 06 46	18 00	19 17	5 08	6 25	20 23	6 16	3 50	16 27	9	11 17.1	9 37
Wed Oct 14/Thu Oct 15	9137.8	1 10 42	17 59	19 16	5 09	6 26	20 26	6 20	4 59	17 04	4	12 11.5	3 44
Thu Oct 15/Fri Oct 16	9138.8	1 14 39	17 58	19 15	5 10	6 26	20 28	6 25	6 10	17 40	1	13 05.9	- 2 29
Fri Oct 16/Sat Oct 17	9139.8	1 18 35	17 57	19 13	5 10	6 27	20 31	6 30	7 21	18 17	0	14 01.2	- 8 38
Sat Oct 17/Sun Oct 18	9140.8	1 22 32	17 56	19 12	5 11	6 28	20 34	6 34	.....	18 57	3	14 57.9	-14 16
Sun Oct 18/Mon Oct 19	9141.8	1 26 28	17 55	19 11	5 12	6 29	20 37	6 39	.....	19 39	9	15 56.5	-19 01
Mon Oct 19/Tue Oct 20	9142.8	1 30 25	17 53	19 10	5 12	6 29	20 40	6 44	.....	20 27	17	16 56.6	-22 31
Tue Oct 20/Wed Oct 21	9143.8	1 34 22	17 52	19 09	5 13	6 30	20 43	6 48	.....	21 20	26	17 57.4	-24 34
Wed Oct 21/Thu Oct 22	9144.8	1 38 18	17 51	19 08	5 14	6 31	20 46	6 53	.....	22 17	36	18 57.6	-25 05
Thu Oct 22/Fri Oct 23	9145.8	1 42 15	17 50	19 07	5 14	6 32	20 49	6 57	.....	23 16	46	19 55.8	-24 09
Fri Oct 23/Sat Oct 24	9146.8	1 46 11	17 49	19 06	5 15	6 32	20 52	7 02	.....	0 17	57	20 51.1	-21 59
Sat Oct 24/Sun Oct 25	9147.8	1 50 08	17 48	19 05	5 16	6 33	20 55	7 07	.....	1 16	67	21 43.2	-18 48
Sun Oct 25/Mon Oct 26	9148.8	1 54 04	17 47	19 05	5 16	6 34	20 58	7 11	.....	2 13	76	22 32.2	-14 52
Mon Oct 26/Tue Oct 27	9149.8	1 58 01	17 46	19 04	5 17	6 35	21 01	7 16	.....	3 09	83	23 18.7	-10 22
Tue Oct 27/Wed Oct 28	9150.8	2 01 57	17 45	19 03	5 18	6 36	21 04	7 21	.....	4 03	90	0 03.4	- 5 32
Wed Oct 28/Thu Oct 29	9151.8	2 05 54	17 44	19 02	5 19	6 36	21 07	7 25	16 30	4 57	95	0 47.2	- 0 32
Thu Oct 29/Fri Oct 30	9152.8	2 09 51	17 43	19 01	5 19	6 37	21 10	7 30	16 57	5 51	98	1 30.8	4 28
Fri Oct 30/Sat Oct 31	9153.8	2 13 47	17 42	19 00	5 20	6 38	21 13	7 35	17 25	6 45	100	2 15.1	9 17
Sat Oct 31/Sun Nov 01	9154.8	2 17 44	17 42	19 00	5 21	6 39	21 16	7 39	17 54	7 40	100	3 00.7	13 46

***** 2020 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) (2020 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: ----- set twi.end twi.beg rise				LST twilight: eve morn		----- Moon: ----- rise set %illum RA Dec				
Sun Nov 01/Mon Nov 02	9155.8	2 21 40	17 41	18 59	5 21	6 40	21 20	7 44	18 26	.....	97	3 48.1	17 43
Mon Nov 02/Tue Nov 03	9156.8	2 25 37	17 40	18 58	5 22	6 40	21 23	7 49	19 02	.....	93	4 37.8	20 55
Tue Nov 03/Wed Nov 04	9157.8	2 29 33	17 39	18 57	5 23	6 41	21 26	7 53	19 43	.....	88	5 29.8	23 12
Wed Nov 04/Thu Nov 05	9158.8	2 33 30	17 38	18 57	5 24	6 42	21 29	7 58	20 29	.....	81	6 23.7	24 23
Thu Nov 05/Fri Nov 06	9159.8	2 37 26	17 38	18 56	5 24	6 43	21 33	8 03	21 21	.....	72	7 19.0	24 20
Fri Nov 06/Sat Nov 07	9160.8	2 41 23	17 37	18 55	5 25	6 44	21 36	8 07	22 18	.....	63	8 14.6	23 00
Sat Nov 07/Sun Nov 08	9161.8	2 45 20	17 36	18 55	5 26	6 45	21 39	8 12	23 20	.....	52	9 09.8	20 25
Sun Nov 08/Mon Nov 09	9162.8	2 49 16	17 35	18 54	5 27	6 46	21 43	8 17	0 24	.....	41	10 04.2	16 40
Mon Nov 09/Tue Nov 10	9163.8	2 53 13	17 35	18 54	5 27	6 46	21 46	8 21	1 30	.....	31	10 57.6	11 55
Tue Nov 10/Wed Nov 11	9164.8	2 57 09	17 34	18 53	5 28	6 47	21 49	8 26	2 36	.....	21	11 50.4	6 24
Wed Nov 11/Thu Nov 12	9165.8	3 01 06	17 33	18 53	5 29	6 48	21 53	8 31	3 44	.....	12	12 43.3	0 23
Thu Nov 12/Fri Nov 13	9166.8	3 05 02	17 33	18 52	5 30	6 49	21 56	8 36	4 54	16 10	5	13 37.1	- 5 47
Fri Nov 13/Sat Nov 14	9167.8	3 08 59	17 32	18 52	5 30	6 50	22 00	8 40	6 06	16 47	1	14 32.6	-11 42
Sat Nov 14/Sun Nov 15	9168.8	3 12 55	17 32	18 51	5 31	6 51	22 03	8 45	7 18	17 27	0	15 30.5	-16 57
Sun Nov 15/Mon Nov 16	9169.8	3 16 52	17 31	18 51	5 32	6 52	22 07	8 50	.....	18 13	2	16 30.8	-21 08
Mon Nov 16/Tue Nov 17	9170.8	3 20 49	17 31	18 50	5 33	6 52	22 10	8 54	.....	19 04	6	17 32.8	-23 53
Tue Nov 17/Wed Nov 18	9171.8	3 24 45	17 30	18 50	5 33	6 53	22 14	8 59	.....	20 01	13	18 35.1	-25 04
Wed Nov 18/Thu Nov 19	9172.8	3 28 42	17 30	18 50	5 34	6 54	22 18	9 04	.....	21 02	21	19 35.8	-24 39
Thu Nov 19/Fri Nov 20	9173.8	3 32 38	17 29	18 50	5 35	6 55	22 21	9 08	.....	22 04	30	20 33.6	-22 51
Fri Nov 20/Sat Nov 21	9174.8	3 36 35	17 29	18 49	5 36	6 56	22 25	9 13	.....	23 06	40	21 27.8	-19 54
Sat Nov 21/Sun Nov 22	9175.8	3 40 31	17 29	18 49	5 36	6 57	22 29	9 18	.....	0 05	50	22 18.3	-16 06
Sun Nov 22/Mon Nov 23	9176.8	3 44 28	17 28	18 49	5 37	6 58	22 32	9 23	.....	1 03	60	23 05.7	-11 42
Mon Nov 23/Tue Nov 24	9177.8	3 48 24	17 28	18 49	5 38	6 59	22 36	9 27	.....	1 58	69	23 50.9	- 6 56
Tue Nov 24/Wed Nov 25	9178.8	3 52 21	17 28	18 48	5 39	6 59	22 40	9 32	.....	2 51	78	0 34.7	- 1 57
Wed Nov 25/Thu Nov 26	9179.8	3 56 18	17 28	18 48	5 39	7 00	22 44	9 37	.....	3 45	85	1 18.0	3 04
Thu Nov 26/Fri Nov 27	9180.8	4 00 14	17 27	18 48	5 40	7 01	22 48	9 41	.....	4 38	91	2 01.9	7 58
Fri Nov 27/Sat Nov 28	9181.8	4 04 11	17 27	18 48	5 41	7 02	22 52	9 46	15 57	5 33	96	2 46.9	12 35
Sat Nov 28/Sun Nov 29	9182.8	4 08 07	17 27	18 48	5 42	7 03	22 55	9 51	16 28	6 29	99	3 33.9	16 44
Sun Nov 29/Mon Nov 30	9183.8	4 12 04	17 27	18 48	5 42	7 04	22 59	9 55	17 02	7 26	100	4 23.3	20 14
Mon Nov 30/Tue Dec 01	9184.8	4 16 00	17 27	18 48	5 43	7 04	23 03	10 00	17 41	.....	99	5 15.2	22 50

***** 2020 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) (2020 at start)	JDmid (-2450000)	LMSTmidn	----- Sun: -----				LST twilight:		----- Moon: -----				
			set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec
Tue Dec 01/Wed Dec 02	9185.8	4 19 57	17 27	18 48	5 44	7 05	23 07	10 05	18 26	.....	96	6 09.4	24 22
Wed Dec 02/Thu Dec 03	9186.8	4 23 53	17 27	18 48	5 44	7 06	23 11	10 09	19 17	.....	92	7 05.1	24 39
Thu Dec 03/Fri Dec 04	9187.8	4 27 50	17 27	18 48	5 45	7 07	23 15	10 14	20 13	.....	85	8 01.1	23 39
Fri Dec 04/Sat Dec 05	9188.8	4 31 47	17 27	18 48	5 46	7 08	23 19	10 19	21 13	.....	77	8 56.6	21 22
Sat Dec 05/Sun Dec 06	9189.8	4 35 43	17 27	18 49	5 47	7 08	23 23	10 23	22 15	.....	68	9 50.8	17 54
Sun Dec 06/Mon Dec 07	9190.8	4 39 40	17 27	18 49	5 47	7 09	23 28	10 28	23 19	.....	57	10 43.6	13 28
Mon Dec 07/Tue Dec 08	9191.8	4 43 36	17 27	18 49	5 48	7 10	23 32	10 33	0 23	.....	46	11 35.2	8 16
Tue Dec 08/Wed Dec 09	9192.8	4 47 33	17 27	18 49	5 49	7 11	23 36	10 37	1 28	.....	35	12 26.4	2 32
Wed Dec 09/Thu Dec 10	9193.8	4 51 29	17 27	18 49	5 49	7 11	23 40	10 42	2 34	.....	25	13 18.0	- 3 26
Thu Dec 10/Fri Dec 11	9194.8	4 55 26	17 28	18 50	5 50	7 12	23 44	10 46	3 42	.....	15	14 11.1	- 9 19
Fri Dec 11/Sat Dec 12	9195.8	4 59 22	17 28	18 50	5 51	7 13	23 48	10 51	4 52	.....	8	15 06.5	-14 46
Sat Dec 12/Sun Dec 13	9196.8	5 03 19	17 28	18 50	5 51	7 13	23 53	10 55	6 04	16 00	3	16 04.8	-19 23
Sun Dec 13/Mon Dec 14	9197.8	5 07 16	17 28	18 51	5 52	7 14	23 57	11 00	7 15	16 47	0	17 05.7	-22 47
Mon Dec 14/Tue Dec 15	9198.8	5 11 12	17 29	18 51	5 52	7 15	0 01	11 05	8 21	17 41	1	18 08.2	-24 40
Tue Dec 15/Wed Dec 16	9199.8	5 15 09	17 29	18 51	5 53	7 15	0 06	11 09	.....	18 41	3	19 10.5	-24 56
Wed Dec 16/Thu Dec 17	9200.8	5 19 05	17 29	18 52	5 54	7 16	0 10	11 14	.....	19 45	9	20 10.8	-23 39
Thu Dec 17/Fri Dec 18	9201.8	5 23 02	17 30	18 52	5 54	7 16	0 14	11 18	.....	20 49	16	21 07.7	-21 04
Fri Dec 18/Sat Dec 19	9202.8	5 26 58	17 30	18 53	5 55	7 17	0 19	11 23	.....	21 52	24	22 00.6	-17 29
Sat Dec 19/Sun Dec 20	9203.8	5 30 55	17 31	18 53	5 55	7 18	0 23	11 27	.....	22 51	33	22 49.9	-13 11
Sun Dec 20/Mon Dec 21	9204.8	5 34 51	17 31	18 54	5 56	7 18	0 28	11 31	.....	23 48	43	23 36.3	- 8 27
Mon Dec 21/Tue Dec 22	9205.8	5 38 48	17 32	18 54	5 56	7 18	0 32	11 36	.....	0 43	52	0 20.7	- 3 30
Tue Dec 22/Wed Dec 23	9206.8	5 42 44	17 32	18 55	5 57	7 19	0 36	11 40	.....	1 37	62	1 04.2	1 32
Wed Dec 23/Thu Dec 24	9207.8	5 46 41	17 33	18 55	5 57	7 19	0 41	11 45	.....	2 31	71	1 47.6	6 28
Thu Dec 24/Fri Dec 25	9208.8	5 50 38	17 33	18 56	5 57	7 20	0 45	11 49	.....	3 25	79	2 32.0	11 11
Fri Dec 25/Sat Dec 26	9209.8	5 54 34	17 34	18 56	5 58	7 20	0 50	11 53	.....	4 20	86	3 18.1	15 29
Sat Dec 26/Sun Dec 27	9210.8	5 58 31	17 35	18 57	5 58	7 21	0 55	11 58	.....	5 17	92	4 06.6	19 13
Sun Dec 27/Mon Dec 28	9211.8	6 02 27	17 35	18 57	5 59	7 21	0 59	12 02	15 39	6 15	97	4 57.9	22 09
Mon Dec 28/Tue Dec 29	9212.8	6 06 24	17 36	18 58	5 59	7 21	1 04	12 06	16 21	7 12	99	5 51.9	24 03
Tue Dec 29/Wed Dec 30	9213.8	6 10 20	17 37	18 59	5 59	7 21	1 08	12 11	17 11	8 06	100	6 48.0	24 45
Wed Dec 30/Thu Dec 31	9214.8	6 14 17	17 37	18 59	6 00	7 22	1 13	12 15	18 06	.....	98	7 45.1	24 06
Thu Dec 31/Fri Jan 01	9215.8	6 18 13	17 38	19 00	6 00	7 22	1 17	12 19	19 06	.....	95	8 42.0	22 07