



Human Performance Attachment

Astronomical Data

Oakland, IA

HWY18MH003

(15 pages)

Sun and Moon Data for One Day

U.S. Naval Observatory Astronomical Applications Department

Oakland Crash (Longitude W95° 16', Latitude N41° 16')

Tuesday, December 12, 2017

Universal Time - 6h

Sun

Begin civil twilight	07:06
Sunrise	07:38
Sun transit	12:15
Sunset	16:52
End civil twilight	17:23

Moon

Moonrise	02:03
Moon transit	08:07
Moonsset	14:04

Closest Primary Moon Phase: Last Quarter on December 10, 2017 at 01:51

Phase of the Moon on December 12, 2017: Waning Crescent with 26% of the Moon's visible disk illuminated.



[Back to form](#)

Astronomical Applications Dept.
U.S. Naval Observatory
Washington, DC 20392-5420

OAKLAND CRASH

° , ° ,
W 95 16, N41 16

Altitude and Azimuth of the Sun
Dec 12, 2017

Zone: 6h West of Greenwich

	Altitude	Azimuth
		(E of N)
h m	°	°
06:32	-12.0	110.4
06:33	-11.8	110.5
06:34	-11.6	110.7
06:35	-11.4	110.8
06:36	-11.3	111.0
06:37	-11.1	111.1
06:38	-10.9	111.3
06:39	-10.7	111.4
06:40	-10.6	111.6
06:41	-10.4	111.7
06:42	-10.2	111.9
06:43	-10.0	112.0
06:44	-9.9	112.2
06:45	-9.7	112.3
06:46	-9.5	112.5
06:47	-9.3	112.6
06:48	-9.2	112.8
06:49	-9.0	112.9
06:50	-8.8	113.1
06:51	-8.7	113.2
06:52	-8.5	113.4
06:53	-8.3	113.6
06:54	-8.1	113.7
06:55	-8.0	113.9
06:56	-7.8	114.0
06:57	-7.6	114.2
06:58	-7.5	114.3
06:59	-7.3	114.5
07:00	-7.1	114.6
07:01	-6.9	114.8
07:02	-6.8	114.9
07:03	-6.6	115.1
07:04	-6.4	115.3
07:05	-6.3	115.4
07:06	-6.1	115.6
07:07	-5.9	115.7
07:08	-5.7	115.9
07:09	-5.6	116.0
07:10	-5.4	116.2
07:11	-5.2	116.4

07:12	-5.1	116.5
07:13	-4.9	116.7
07:14	-4.7	116.8
07:15	-4.6	117.0
07:16	-4.4	117.1
07:17	-4.2	117.3
07:18	-4.1	117.5
07:19	-3.9	117.6
07:20	-3.7	117.8
07:21	-3.6	117.9
07:22	-3.4	118.1
07:23	-3.2	118.3
07:24	-3.1	118.4
07:25	-2.9	118.6
07:26	-2.7	118.7
07:27	-2.6	118.9
07:28	-2.4	119.1
07:29	-2.3	119.2
07:30	-2.1	119.4
07:31	-1.9	119.5
07:32	-1.8	119.7
07:33	-1.6	119.9
07:34	-1.4	120.0
07:35	-1.3	120.2
07:36	-1.1	120.4
07:37	-1.0	120.5
07:38	-0.8	120.7
07:39	-0.0	120.8
07:40	0.1	121.0
07:41	0.2	121.2
07:42	0.4	121.3
07:43	0.5	121.5
07:44	0.6	121.7
07:45	0.8	121.8
07:46	0.9	122.0
07:47	1.1	122.2
07:48	1.2	122.3
07:49	1.3	122.5
07:50	1.5	122.7
07:51	1.6	122.8
07:52	1.8	123.0
07:53	1.9	123.2
07:54	2.1	123.3
07:55	2.2	123.5
07:56	2.3	123.7
07:57	2.5	123.8
07:58	2.6	124.0
07:59	2.8	124.2
08:00	2.9	124.3
08:01	3.1	124.5
08:02	3.2	124.7
08:03	3.4	124.9
08:04	3.5	125.0
08:05	3.7	125.2
08:06	3.8	125.4
08:07	4.0	125.5
08:08	4.1	125.7
08:09	4.3	125.9
08:10	4.4	126.1
08:11	4.6	126.2

08:12	4.7	126.4
08:13	4.9	126.6
08:14	5.0	126.8
08:15	5.1	126.9
08:16	5.3	127.1
08:17	5.4	127.3
08:18	5.6	127.5
08:19	5.7	127.6
08:20	5.9	127.8
08:21	6.0	128.0
08:22	6.2	128.2
08:23	6.3	128.3
08:24	6.5	128.5
08:25	6.6	128.7
08:26	6.7	128.9
08:27	6.9	129.0
08:28	7.0	129.2
08:29	7.2	129.4
08:30	7.3	129.6
08:31	7.5	129.8
08:32	7.6	129.9
08:33	7.7	130.1
08:34	7.9	130.3
08:35	8.0	130.5
08:36	8.2	130.7
08:37	8.3	130.9
08:38	8.4	131.0
08:39	8.6	131.2
08:40	8.7	131.4
08:41	8.9	131.6
08:42	9.0	131.8
08:43	9.1	132.0
08:44	9.3	132.1
08:45	9.4	132.3
08:46	9.6	132.5
08:47	9.7	132.7
08:48	9.8	132.9
08:49	10.0	133.1
08:50	10.1	133.3
08:51	10.2	133.5
08:52	10.4	133.6
08:53	10.5	133.8
08:54	10.6	134.0
08:55	10.8	134.2
08:56	10.9	134.4
08:57	11.0	134.6
08:58	11.2	134.8
08:59	11.3	135.0
09:00	11.4	135.2
09:01	11.6	135.4
09:02	11.7	135.5
09:03	11.8	135.7
09:04	12.0	135.9
09:05	12.1	136.1
09:06	12.2	136.3
09:07	12.3	136.5
09:08	12.5	136.7
09:09	12.6	136.9
09:10	12.7	137.1
09:11	12.9	137.3

09:12	13.0	137.5
09:13	13.1	137.7
09:14	13.2	137.9
09:15	13.4	138.1
09:16	13.5	138.3
09:17	13.6	138.5
09:18	13.7	138.7
09:19	13.9	138.9
09:20	14.0	139.1
09:21	14.1	139.3
09:22	14.2	139.5
09:23	14.3	139.7
09:24	14.5	139.9
09:25	14.6	140.1
09:26	14.7	140.3
09:27	14.8	140.5
09:28	14.9	140.7
09:29	15.1	140.9
09:30	15.2	141.1
09:31	15.3	141.3
09:32	15.4	141.5
09:33	15.5	141.7
09:34	15.6	141.9
09:35	15.8	142.1
09:36	15.9	142.3
09:37	16.0	142.5
09:38	16.1	142.7
09:39	16.2	143.0
09:40	16.3	143.2
09:41	16.4	143.4
09:42	16.6	143.6
09:43	16.7	143.8
09:44	16.8	144.0
09:45	16.9	144.2
09:46	17.0	144.4
09:47	17.1	144.6
09:48	17.2	144.8
09:49	17.3	145.1
09:50	17.4	145.3
09:51	17.5	145.5
09:52	17.6	145.7
09:53	17.7	145.9
09:54	17.8	146.1
09:55	17.9	146.3
09:56	18.1	146.6
09:57	18.2	146.8
09:58	18.3	147.0
09:59	18.4	147.2
10:00	18.5	147.4
10:01	18.6	147.6
10:02	18.7	147.9
10:03	18.8	148.1
10:04	18.9	148.3
10:05	19.0	148.5
10:06	19.1	148.7
10:07	19.2	149.0
10:08	19.2	149.2
10:09	19.3	149.4
10:10	19.4	149.6
10:11	19.5	149.8

10:12	19.6	150.1
10:13	19.7	150.3
10:14	19.8	150.5
10:15	19.9	150.7
10:16	20.0	151.0
10:17	20.1	151.2
10:18	20.2	151.4
10:19	20.3	151.6
10:20	20.4	151.9
10:21	20.4	152.1
10:22	20.5	152.3
10:23	20.6	152.5
10:24	20.7	152.8
10:25	20.8	153.0
10:26	20.9	153.2
10:27	21.0	153.5
10:28	21.0	153.7
10:29	21.1	153.9
10:30	21.2	154.1
10:31	21.3	154.4
10:32	21.4	154.6
10:33	21.4	154.8
10:34	21.5	155.1
10:35	21.6	155.3
10:36	21.7	155.5
10:37	21.8	155.8
10:38	21.8	156.0
10:39	21.9	156.2
10:40	22.0	156.5
10:41	22.1	156.7
10:42	22.1	156.9
10:43	22.2	157.2
10:44	22.3	157.4
10:45	22.4	157.6
10:46	22.4	157.9
10:47	22.5	158.1
10:48	22.6	158.4
10:49	22.6	158.6
10:50	22.7	158.8
10:51	22.8	159.1
10:52	22.8	159.3
10:53	22.9	159.5
10:54	23.0	159.8
10:55	23.0	160.0
10:56	23.1	160.3
10:57	23.2	160.5
10:58	23.2	160.7
10:59	23.3	161.0
11:00	23.3	161.2
11:01	23.4	161.5
11:02	23.5	161.7
11:03	23.5	162.0
11:04	23.6	162.2
11:05	23.6	162.4
11:06	23.7	162.7
11:07	23.7	162.9
11:08	23.8	163.2
11:09	23.9	163.4
11:10	23.9	163.7
11:11	24.0	163.9

11:12	24.0	164.2
11:13	24.1	164.4
11:14	24.1	164.6
11:15	24.2	164.9
11:16	24.2	165.1
11:17	24.3	165.4
11:18	24.3	165.6
11:19	24.3	165.9
11:20	24.4	166.1
11:21	24.4	166.4
11:22	24.5	166.6
11:23	24.5	166.9
11:24	24.6	167.1
11:25	24.6	167.4
11:26	24.6	167.6
11:27	24.7	167.9
11:28	24.7	168.1
11:29	24.8	168.4
11:30	24.8	168.6
11:31	24.8	168.9
11:32	24.9	169.1
11:33	24.9	169.4
11:34	24.9	169.6
11:35	25.0	169.9
11:36	25.0	170.1
11:37	25.0	170.4
11:38	25.1	170.6
11:39	25.1	170.9
11:40	25.1	171.1
11:41	25.2	171.4
11:42	25.2	171.6
11:43	25.2	171.9
11:44	25.2	172.1
11:45	25.3	172.4
11:46	25.3	172.6
11:47	25.3	172.9
11:48	25.3	173.1
11:49	25.4	173.4
11:50	25.4	173.6
11:51	25.4	173.9
11:52	25.4	174.1
11:53	25.4	174.4
11:54	25.5	174.7
11:55	25.5	174.9
11:56	25.5	175.2
11:57	25.5	175.4
11:58	25.5	175.7
11:59	25.5	175.9
12:00	25.5	176.2
12:01	25.6	176.4
12:02	25.6	176.7
12:03	25.6	176.9
12:04	25.6	177.2
12:05	25.6	177.5
12:06	25.6	177.7
12:07	25.6	178.0
12:08	25.6	178.2
12:09	25.6	178.5
12:10	25.6	178.7
12:11	25.6	179.0

12:12	25.6	179.2
12:13	25.6	179.5
12:14	25.6	179.7
12:15	25.6	180.0
12:16	25.6	180.3
12:17	25.6	180.5
12:18	25.6	180.8
12:19	25.6	181.0
12:20	25.6	181.3
12:21	25.6	181.5
12:22	25.6	181.8
12:23	25.6	182.0
12:24	25.6	182.3
12:25	25.6	182.5
12:26	25.6	182.8
12:27	25.6	183.1
12:28	25.6	183.3
12:29	25.6	183.6
12:30	25.5	183.8
12:31	25.5	184.1
12:32	25.5	184.3
12:33	25.5	184.6
12:34	25.5	184.8
12:35	25.5	185.1
12:36	25.5	185.3
12:37	25.4	185.6
12:38	25.4	185.9
12:39	25.4	186.1
12:40	25.4	186.4
12:41	25.4	186.6
12:42	25.3	186.9
12:43	25.3	187.1
12:44	25.3	187.4
12:45	25.3	187.6
12:46	25.2	187.9
12:47	25.2	188.1
12:48	25.2	188.4
12:49	25.2	188.6
12:50	25.1	188.9
12:51	25.1	189.1
12:52	25.1	189.4
12:53	25.0	189.6
12:54	25.0	189.9
12:55	25.0	190.1
12:56	24.9	190.4
12:57	24.9	190.6
12:58	24.9	190.9
12:59	24.8	191.1
13:00	24.8	191.4
13:01	24.8	191.6
13:02	24.7	191.9
13:03	24.7	192.1
13:04	24.6	192.4
13:05	24.6	192.6
13:06	24.6	192.9
13:07	24.5	193.1
13:08	24.5	193.4
13:09	24.4	193.6
13:10	24.4	193.9
13:11	24.3	194.1

13:12	24.3	194.4
13:13	24.2	194.6
13:14	24.2	194.9
13:15	24.2	195.1
13:16	24.1	195.4
13:17	24.1	195.6
13:18	24.0	195.8
13:19	24.0	196.1
13:20	23.9	196.3
13:21	23.8	196.6
13:22	23.8	196.8
13:23	23.7	197.1
13:24	23.7	197.3
13:25	23.6	197.6
13:26	23.6	197.8
13:27	23.5	198.0
13:28	23.5	198.3
13:29	23.4	198.5
13:30	23.3	198.8
13:31	23.3	199.0
13:32	23.2	199.3
13:33	23.1	199.5
13:34	23.1	199.7
13:35	23.0	200.0
13:36	23.0	200.2
13:37	22.9	200.4
13:38	22.8	200.7
13:39	22.8	200.9
13:40	22.7	201.2
13:41	22.6	201.4
13:42	22.6	201.6
13:43	22.5	201.9
13:44	22.4	202.1
13:45	22.3	202.4
13:46	22.3	202.6
13:47	22.2	202.8
13:48	22.1	203.1
13:49	22.1	203.3
13:50	22.0	203.5
13:51	21.9	203.8
13:52	21.8	204.0
13:53	21.8	204.2
13:54	21.7	204.5
13:55	21.6	204.7
13:56	21.5	204.9
13:57	21.4	205.2
13:58	21.4	205.4
13:59	21.3	205.6
14:00	21.2	205.8
14:01	21.1	206.1
14:02	21.0	206.3
14:03	20.9	206.5
14:04	20.9	206.8
14:05	20.8	207.0
14:06	20.7	207.2
14:07	20.6	207.5
14:08	20.5	207.7
14:09	20.4	207.9
14:10	20.3	208.1
14:11	20.3	208.4

14:12	20.2	208.6
14:13	20.1	208.8
14:14	20.0	209.0
14:15	19.9	209.3
14:16	19.8	209.5
14:17	19.7	209.7
14:18	19.6	209.9
14:19	19.5	210.1
14:20	19.4	210.4
14:21	19.3	210.6
14:22	19.2	210.8
14:23	19.1	211.0
14:24	19.0	211.3
14:25	18.9	211.5
14:26	18.8	211.7
14:27	18.7	211.9
14:28	18.6	212.1
14:29	18.5	212.3
14:30	18.4	212.6
14:31	18.3	212.8
14:32	18.2	213.0
14:33	18.1	213.2
14:34	18.0	213.4
14:35	17.9	213.6
14:36	17.8	213.9
14:37	17.7	214.1
14:38	17.6	214.3
14:39	17.5	214.5
14:40	17.4	214.7
14:41	17.3	214.9
14:42	17.2	215.1
14:43	17.1	215.4
14:44	17.0	215.6
14:45	16.9	215.8
14:46	16.8	216.0
14:47	16.7	216.2
14:48	16.5	216.4
14:49	16.4	216.6
14:50	16.3	216.8
14:51	16.2	217.0
14:52	16.1	217.2
14:53	16.0	217.5
14:54	15.9	217.7
14:55	15.7	217.9
14:56	15.6	218.1
14:57	15.5	218.3
14:58	15.4	218.5
14:59	15.3	218.7
15:00	15.2	218.9
15:01	15.0	219.1
15:02	14.9	219.3
15:03	14.8	219.5
15:04	14.7	219.7
15:05	14.6	219.9
15:06	14.5	220.1
15:07	14.3	220.3
15:08	14.2	220.5
15:09	14.1	220.7
15:10	14.0	220.9
15:11	13.8	221.1

15:12	13.7	221.3
15:13	13.6	221.5
15:14	13.5	221.7
15:15	13.3	221.9
15:16	13.2	222.1
15:17	13.1	222.3
15:18	13.0	222.5
15:19	12.8	222.7
15:20	12.7	222.9
15:21	12.6	223.1
15:22	12.5	223.3
15:23	12.3	223.5
15:24	12.2	223.7
15:25	12.1	223.9
15:26	11.9	224.1
15:27	11.8	224.3
15:28	11.7	224.4
15:29	11.6	224.6
15:30	11.4	224.8
15:31	11.3	225.0
15:32	11.2	225.2
15:33	11.0	225.4
15:34	10.9	225.6
15:35	10.8	225.8
15:36	10.6	226.0
15:37	10.5	226.2
15:38	10.4	226.3
15:39	10.2	226.5
15:40	10.1	226.7
15:41	10.0	226.9
15:42	9.8	227.1
15:43	9.7	227.3
15:44	9.5	227.5
15:45	9.4	227.7
15:46	9.3	227.8
15:47	9.1	228.0
15:48	9.0	228.2
15:49	8.9	228.4
15:50	8.7	228.6
15:51	8.6	228.8
15:52	8.4	228.9
15:53	8.3	229.1
15:54	8.2	229.3
15:55	8.0	229.5
15:56	7.9	229.7
15:57	7.7	229.9
15:58	7.6	230.0
15:59	7.4	230.2
16:00	7.3	230.4
16:01	7.2	230.6
16:02	7.0	230.8
16:03	6.9	230.9
16:04	6.7	231.1
16:05	6.6	231.3
16:06	6.4	231.5
16:07	6.3	231.6
16:08	6.1	231.8
16:09	6.0	232.0
16:10	5.9	232.2
16:11	5.7	232.4

16:12	5.6	232.5
16:13	5.4	232.7
16:14	5.3	232.9
16:15	5.1	233.1
16:16	5.0	233.2
16:17	4.8	233.4
16:18	4.7	233.6
16:19	4.5	233.8
16:20	4.4	233.9
16:21	4.2	234.1
16:22	4.1	234.3
16:23	4.0	234.4
16:24	3.8	234.6
16:25	3.7	234.8
16:26	3.5	235.0
16:27	3.4	235.1
16:28	3.2	235.3
16:29	3.1	235.5
16:30	2.9	235.6
16:31	2.8	235.8
16:32	2.6	236.0
16:33	2.5	236.1
16:34	2.3	236.3
16:35	2.2	236.5
16:36	2.0	236.7
16:37	1.9	236.8
16:38	1.8	237.0
16:39	1.6	237.2
16:40	1.5	237.3
16:41	1.3	237.5
16:42	1.2	237.7
16:43	1.0	237.8
16:44	0.9	238.0
16:45	0.8	238.2
16:46	0.6	238.3
16:47	0.5	238.5
16:48	0.3	238.6
16:49	0.2	238.8
16:50	0.1	239.0
16:51	-0.1	239.1
16:52	-0.8	239.3
16:53	-1.0	239.5
16:54	-1.1	239.6
16:55	-1.3	239.8
16:56	-1.5	240.0
16:57	-1.6	240.1
16:58	-1.8	240.3
16:59	-1.9	240.4
17:00	-2.1	240.6
17:01	-2.3	240.8
17:02	-2.4	240.9
17:03	-2.6	241.1
17:04	-2.8	241.2
17:05	-2.9	241.4
17:06	-3.1	241.6
17:07	-3.3	241.7
17:08	-3.4	241.9
17:09	-3.6	242.0
17:10	-3.8	242.2
17:11	-3.9	242.4

17:12	-4.1	242.5
17:13	-4.3	242.7
17:14	-4.4	242.8
17:15	-4.6	243.0
17:16	-4.8	243.2
17:17	-4.9	243.3
17:18	-5.1	243.5
17:19	-5.3	243.6
17:20	-5.4	243.8
17:21	-5.6	243.9
17:22	-5.8	244.1
17:23	-5.9	244.3
17:24	-6.1	244.4
17:25	-6.3	244.6
17:26	-6.4	244.7
17:27	-6.6	244.9
17:28	-6.8	245.0
17:29	-7.0	245.2
17:30	-7.1	245.3
17:31	-7.3	245.5
17:32	-7.5	245.7
17:33	-7.6	245.8
17:34	-7.8	246.0
17:35	-8.0	246.1
17:36	-8.2	246.3
17:37	-8.3	246.4
17:38	-8.5	246.6
17:39	-8.7	246.7
17:40	-8.8	246.9
17:41	-9.0	247.0
17:42	-9.2	247.2
17:43	-9.4	247.3
17:44	-9.5	247.5
17:45	-9.7	247.7
17:46	-9.9	247.8
17:47	-10.1	248.0
17:48	-10.2	248.1
17:49	-10.4	248.3
17:50	-10.6	248.4
17:51	-10.8	248.6
17:52	-10.9	248.7
17:53	-11.1	248.9
17:54	-11.3	249.0
17:55	-11.5	249.2
17:56	-11.6	249.3
17:57	-11.8	249.5
17:58	-12.0	249.6

[Back to form](#)