

OCCULTATIONS OF PLANETS AND BRIGHT STARS BY THE MOON

January 27, 2018

The moon, as our nearest neighbor, sometimes blocks the light coming from a planet, a star, or the sun. Occultations are listed below for 2018 through 2021. The name of the planet or star, along with its visual magnitude, is listed along with the percentage of the moon's disk that is illuminated at the time, and the phase of the moon. The date and time (MST) when the geocentric angle between the center of the moon and the center of the planet or star is minimal (mid-point of the occultation), then the angle of separation is also listed.

The date and times (MST) when the occultation first commences, and last ends, for the first and last observations on earth are listed, followed by the latitude and longitude of the location where the line from the object's center through the moon's center strikes the surface of the earth at mid-occultation.

If the occultation is visible, in whole or in part, from the **Hidden Valley Observatory**, the times (MST) of the various stages are listed along with the altitude above the horizon of the object, the moon (with azimuth), and the sun respectively. For occultations, when the moon is above the horizon, but not the sun, this is noted with three asterisks (***) . If, on the other hand, the Moon is visible at HVO when the object in question appears closest to the Moon, but the planet or star is not occulted because of perspective, then the angle between the edge of the Moon and the edge of the object (the miss angle) is listed.

Note: the data listed below depend on estimates of DUT1 and DUTC. Also, a number of other factors are involved in the computation of an occultation, and the results given here can easily be off by a few seconds. In addition, direct visual observation can be uncertain in terms of reaction time, and in establishing the accuracy of the clock you use.

N.B. This edition replaces all previous editions.

Selected stars are magnitude 1.9 or brighter.
Lunar occultations of planets and bright stars.
Dates and times in MST.

when MDT (Summer Time) is required add one hour.

Reference location: **HVO** 44.1082 N., 103.2975 W.

Occultation of Regulus 1.35 by moon 85% illuminated at phase= 225 degrees
01/05/2018 01:12:10.9 Geocentric minimum 0.9 degrees
Global start/end: 01/04/2018 23:40:46.7 and 01/05/2018 02:43:40.1
Mid-occultation observing point (lat., long.) 68.51 -35.758
At HVO the miss angle is 692.6 arc-sec at 01/05/2018 00:11:03.6

Occultation of Aldebaran 0.85 by moon 77% illuminated at phase= 123 degrees
01/27/2018 03:22:04.7 Geocentric minimum 0.7 degrees
Global start/end: 01/27/2018 01:34:37.7 and 01/27/2018 05:09:27.0
Mid-occultation observing point (lat., long.) 57.85 134.044

Occultation of Regulus 1.35 by moon 98% illuminated at phase= 197 degrees
02/01/2018 12:12:52.6 Geocentric minimum 0.9 degrees
Global start/end: 02/01/2018 10:45:58.9 and 02/01/2018 13:39:49.7
Mid-occultation observing point (lat., long.) 71.487 142.171

Eclipse of the Sun by moon 0% illuminated at phase= 360 degrees
02/15/2018 13:51:23.2 Geocentric minimum 1.1 degrees
Global start/end: 02/15/2018 11:55:22.1 and 02/15/2018 15:47:19.4
Mid-occultation observing point (lat., long.) -70.355 3.268

Occultation of Aldebaran 0.85 by moon 54% illuminated at phase= 95 degrees
02/23/2018 10:20:11.1 Geocentric minimum 0.7 degrees
Global start/end: 02/23/2018 08:33:44.0 and 02/23/2018 12:06:35.1
Mid-occultation observing point (lat., long.) 61.064 0.33

Occultation of Regulus 1.35 by moon 99% illuminated at phase= 169 degrees
02/28/2018 22:57:40.6 Geocentric minimum 0.9 degrees
Global start/end: 02/28/2018 21:30:06.8 and 03/01/2018 00:25:15.9
Mid-occultation observing point (lat., long.) 71.126 -47.244
At HVO the miss angle is 630.9 arc-sec at 02/28/2018 22:31:19.7

Occultation of Aldebaran 0.85 by moon 31% illuminated at phase= 68 degrees
03/22/2018 15:42:50.2 Geocentric minimum 0.9 degrees
Global start/end: 03/22/2018 14:09:19.7 and 03/22/2018 17:16:19.8
Mid-occultation observing point (lat., long.) 74.65 -128.306
At HVO the miss angle is 402.0 arc-sec at 03/22/2018 15:28:23.6

Occultation of Regulus 1.35 by moon 90% illuminated at phase= 142 degrees
03/28/2018 07:30:03.5 Geocentric minimum 1.0 degrees
Global start/end: 03/28/2018 06:10:07.0 and 03/28/2018 08:50:00.5
Mid-occultation observing point (lat., long.) 73.671 -143.003

Occultation of Aldebaran 0.85 by moon 12% illuminated at phase= 41 degrees
04/18/2018 21:50:49.1 Geocentric minimum 1.0 degrees
Global start/end: 04/18/2018 20:40:13.3 and 04/18/2018 23:01:24.7
Mid-occultation observing point (lat., long.) 69.516 0.564

Occultation of Regulus 1.35 by moon 72% illuminated at phase= 115 degrees
04/24/2018 13:38:29.7 Geocentric minimum 1.2 degrees
Global start/end: 04/24/2018 12:52:53.7 and 04/24/2018 14:24:06.0
Mid-occultation observing point (lat., long.) 69.65 118.682

Occultation of Aldebaran 0.85 by moon 2% illuminated at phase= 14 degrees
05/16/2018 06:06:46.4 Geocentric minimum 1.2 degrees
Global start/end: 05/16/2018 05:15:07.7 and 05/16/2018 06:58:24.8
Mid-occultation observing point (lat., long.) 69.401 -149.899

Occultation of Aldebaran 0.85 by moon 11% illuminated at phase= 322 degrees
07/10/2018 02:33:28.7 Geocentric minimum 1.1 degrees
Global start/end: 07/10/2018 01:29:38.9 and 07/10/2018 03:37:16.2
Mid-occultation observing point (lat., long.) 69.256 -149.943

Eclipse of the Sun by moon 0% illuminated at phase= 0 degrees
07/12/2018 20:01:06.1 Geocentric minimum 1.4 degrees
Global start/end: 07/12/2018 18:47:56.1 and 07/12/2018 21:14:15.7
Mid-occultation observing point (lat., long.) -69.338 126.908

Occultation of Aldebaran 0.85 by moon 29% illuminated at phase= 296 degrees
08/06/2018 11:39:33.5 Geocentric minimum 1.1 degrees
Global start/end: 08/06/2018 10:34:21.9 and 08/06/2018 12:44:42.4
Mid-occultation observing point (lat., long.) 69.263 46.616

Eclipse of the Sun by moon 0% illuminated at phase= 360 degrees
08/11/2018 02:46:17.8 Geocentric minimum 1.2 degrees
Global start/end: 08/11/2018 01:01:44.3 and 08/11/2018 04:30:53.1
Mid-occultation observing point (lat., long.) 69.486 176.804

Occultation of Aldebaran 0.85 by moon 51% illuminated at phase= 269 degrees
09/02/2018 18:37:11.5 Geocentric minimum 1.2 degrees
Global start/end: 09/02/2018 17:57:49.3 and 09/02/2018 19:16:32.8
Mid-occultation observing point (lat., long.) 69.276 -84.657

Occultation of Mars -0.3 by moon 56% illuminated at phase= 96 degrees
11/15/2018 21:52:00.0 Geocentric minimum 1.0 degrees
Global start/end: 11/15/2018 20:28:52.8 and 11/15/2018 23:15:05.7
Mid-occultation observing point (lat., long.) -68.901 -24.801

Occultation of Saturn 0.5 by moon 4% illuminated at phase= 22 degrees
12/08/2018 22:20:10.7 Geocentric minimum 1.1 degrees
Global start/end: 12/08/2018 21:46:02.5 and 12/08/2018 22:54:19.3
Mid-occultation observing point (lat., long.) 68.625 124.689

Eclipse of the Sun by moon 0% illuminated at phase= 0 degrees
01/05/2019 18:41:27.1 Geocentric minimum 1.0 degrees
Global start/end: 01/05/2019 16:33:53.3 and 01/05/2019 20:49:05.0
Mid-occultation observing point (lat., long.) 68.72 153.432

Occultation of Venus -4.3 by moon 15% illuminated at phase= 315 degrees
01/31/2019 10:35:51.6 Geocentric minimum 0.1 degrees
Global start/end: 01/31/2019 08:04:38.5 and 01/31/2019 13:07:05.1
Mid-occultation observing point (lat., long.) -15.275 -127.866
At HVO the miss angle is 1718.7 arc-sec at 01/31/2019 11:22:19.7

Occultation of Saturn 0.6 by moon 6% illuminated at phase= 332 degrees
02/02/2019 00:03:45.5 Geocentric minimum 0.6 degrees
Global start/end: 02/01/2019 22:05:44.4 and 02/02/2019 02:01:47.5
Mid-occultation observing point (lat., long.) 21.33 47.298

Occultation of Saturn 0.6 by moon 20% illuminated at phase= 307 degrees
03/01/2019 11:26:21.3 Geocentric minimum 0.3 degrees
Global start/end: 03/01/2019 09:11:11.1 and 03/01/2019 13:41:31.8
Mid-occultation observing point (lat., long.) -1.746 -147.449

Occultation of Saturn 0.6 by moon 40% illuminated at phase= 281 degrees
03/28/2019 21:59:19.6 Geocentric minimum 0.1 degrees
Global start/end: 03/28/2019 19:39:44.9 and 03/29/2019 00:18:54.3
Mid-occultation observing point (lat., long.) -25.075 30.317

Occultation of Saturn 0.5 by moon 63% illuminated at phase= 255 degrees
04/25/2019 07:29:19.0 Geocentric minimum 0.4 degrees
Global start/end: 04/25/2019 05:18:21.8 and 04/25/2019 09:40:20.2
Mid-occultation observing point (lat., long.) -45.628 -136.506
At HVO the miss angle is 2941.2 arc-sec at 04/25/2019 08:58:39.5

Occultation of Saturn 0.3 by moon 83% illuminated at phase= 229 degrees
05/22/2019 15:17:02.1 Geocentric minimum 0.5 degrees
Global start/end: 05/22/2019 13:14:37.0 and 05/22/2019 17:19:32.2
Mid-occultation observing point (lat., long.) -56.004 80.465

Occultation of Saturn 0.2 by moon 97% illuminated at phase= 201 degrees
06/18/2019 20:48:43.5 Geocentric minimum 0.4 degrees
Global start/end: 06/18/2019 18:43:10.2 and 06/18/2019 22:54:20.8
Mid-occultation observing point (lat., long.) -50.552 -32.128

Eclipse of the Sun by moon 0% illuminated at phase= 0 degrees
07/02/2019 12:22:58.3 Geocentric minimum 0.6 degrees
Global start/end: 07/02/2019 09:55:09.0 and 07/02/2019 14:50:39.6
Mid-occultation observing point (lat., long.) -17.394 -108.985
At HVO the miss angle is 1709.3 arc-sec at 07/02/2019 12:33:22.2

Occultation of Mars 1.8 by moon 3% illuminated at phase= 19 degrees
07/03/2019 22:40:20.1 Geocentric minimum 0.1 degrees
Global start/end: 07/03/2019 20:29:52.7 and 07/04/2019 00:50:47.7
Mid-occultation observing point (lat., long.) 26.087 117.645

Occultation of Saturn 0.1 by moon 100% illuminated at phase= 173 degrees
07/16/2019 00:15:37.5 Geocentric minimum 0.2 degrees
Global start/end: 07/15/2019 22:02:30.6 and 07/16/2019 02:28:45.9
Mid-occultation observing point (lat., long.) -36.247 -114.107
At HVO the miss angle is 2843.3 arc-sec at 07/16/2019 00:57:15.7

Occultation of Saturn 0.2 by moon 91% illuminated at phase= 146 degrees
08/12/2019 02:52:45.9 Geocentric minimum 0.0 degrees
Global start/end: 08/12/2019 00:36:20.1 and 08/12/2019 05:09:10.8
Mid-occultation observing point (lat., long.) -24.908 177.505

Occultation of Saturn 0.4 by moon 74% illuminated at phase= 118 degrees
09/08/2019 06:41:39.5 Geocentric minimum 0.0 degrees
Global start/end: 09/08/2019 04:24:31.5 and 09/08/2019 08:58:46.9
Mid-occultation observing point (lat., long.) -25.149 92.458

Occultation of Saturn 0.5 by moon 52% illuminated at phase= 92 degrees
10/05/2019 13:36:50.0 Geocentric minimum 0.3 degrees
Global start/end: 10/05/2019 11:23:09.3 and 10/05/2019 15:50:33.9
Mid-occultation observing point (lat., long.) -38.684 -37.752

Occultation of Saturn 0.6 by moon 30% illuminated at phase= 66 degrees
11/02/2019 00:22:28.5 Geocentric minimum 0.6 degrees
Global start/end: 11/01/2019 22:24:35.1 and 11/02/2019 02:20:28.4
Mid-occultation observing point (lat., long.) -61.912 136.852

Occultation of Jupiter -1.8 by moon 4% illuminated at phase= 23 degrees
11/28/2019 03:56:48.0 Geocentric minimum 0.7 degrees
Global start/end: 11/28/2019 02:09:12.8 and 11/28/2019 05:44:28.8
Mid-occultation observing point (lat., long.) 25.726 42.355

Occultation of Saturn 0.6 by moon 12% illuminated at phase= 40 degrees
11/29/2019 14:07:05.5 Geocentric minimum 0.9 degrees
Global start/end: 11/29/2019 12:41:30.1 and 11/29/2019 15:32:45.2
Mid-occultation observing point (lat., long.) -76.502 74.318
At HVO the miss angle is 5534.5 arc-sec at 11/29/2019 13:53:52.3

Eclipse of the Sun by moon 0% illuminated at phase= 0 degrees
12/25/2019 22:17:40.0 Geocentric minimum 0.4 degrees
Global start/end: 12/25/2019 19:29:48.1 and 12/26/2019 01:05:42.3
Mid-occultation observing point (lat., long.) 1.006 102.246

Occultation of Venus -3.9 by moon 8% illuminated at phase= 34 degrees
12/28/2019 18:55:40.0 Geocentric minimum 1.0 degrees
Global start/end: 12/28/2019 17:32:40.8 and 12/28/2019 20:18:42.9
Mid-occultation observing point (lat., long.) -67.007 -21.297

Occultation of Jupiter -1.9 by moon 3% illuminated at phase= 339 degrees
01/22/2020 19:40:53.9 Geocentric minimum 0.4 degrees
Global start/end: 01/22/2020 17:30:50.4 and 01/22/2020 21:50:59.3
Mid-occultation observing point (lat., long.) -45.558 120.402

Occultation of Mars 1.2 by moon 24% illuminated at phase= 302 degrees
02/18/2020 06:24:19.4 Geocentric minimum 0.8 degrees
Global start/end: 02/18/2020 04:34:17.9 and 02/18/2020 08:14:24.7
Mid-occultation observing point (lat., long.) 29.428 -73.249

---For observations at HVO:

02/18/2020 04:45:20.1 Start Partial 8.07 8.25 (az135) -22.8 ***
02/18/2020 04:45:33.0 Start Total 8.1 8.27 (az135) -22.8 ***
02/18/2020 05:24:29.9 OCCULTATION MID-POINT 12.71 12.7 (az142) -15.8 ***
02/18/2020 06:05:43.5 End Total 16.77 16.61 (az151) -8.5 ***
02/18/2020 06:05:57.9 End Partial 16.79 16.63 (az151) -8.4 ***

Occultation of Jupiter -1.9 by moon 14% illuminated at phase= 317 degrees
02/19/2020 12:40:01.2 Geocentric minimum 0.9 degrees
Global start/end: 02/19/2020 11:14:01.8 and 02/19/2020 14:06:02.4
Mid-occultation observing point (lat., long.) -66.582 19.051

Occultation of Mars 0.9 by moon 31% illuminated at phase= 293 degrees
03/18/2020 01:24:29.1 Geocentric minimum 0.7 degrees
Global start/end: 03/17/2020 23:32:15.9 and 03/18/2020 03:16:46.9
Mid-occultation observing point (lat., long.) -75.028 2.821

Occultation of Venus -4.4 by moon 4% illuminated at phase= 337 degrees
06/19/2020 01:31:59.9 Geocentric minimum 0.7 degrees
Global start/end: 06/18/2020 23:46:05.0 and 06/19/2020 03:17:52.5
Mid-occultation observing point (lat., long.) 65.865 -1.209

Eclipse of the Sun by moon 0% illuminated at phase= 360 degrees
06/20/2020 23:40:05.1 Geocentric minimum 0.1 degrees
Global start/end: 06/20/2020 20:45:59.6 and 06/21/2020 02:34:02.7
Mid-occultation observing point (lat., long.) 30.516 79.677

Occultation of Mars -1.3 by moon 72% illuminated at phase= 244 degrees
08/09/2020 01:38:32.4 Geocentric minimum 0.7 degrees
Global start/end: 08/08/2020 23:43:06.7 and 08/09/2020 03:33:58.8
Mid-occultation observing point (lat., long.) -40.295 -42.389
At HVO the miss angle is 4090.2 arc-sec at 08/09/2020 02:00:17.8

Occultation of Mars -1.9 by moon 86% illuminated at phase= 224 degrees
09/05/2020 21:44:48.0 Geocentric minimum 0.0 degrees
Global start/end: 09/05/2020 19:24:48.5 and 09/06/2020 00:04:48.2
Mid-occultation observing point (lat., long.) 8.281 -29.989
At HVO the miss angle is 1948.8 arc-sec at 09/05/2020 21:07:20.4

Occultation of Mars -2.5 by moon 99% illuminated at phase= 194 degrees
10/02/2020 21:00:08.3 Geocentric minimum 0.7 degrees
Global start/end: 10/02/2020 19:09:27.0 and 10/02/2020 22:50:50.2
Mid-occultation observing point (lat., long.) -37.162 -26.541
At HVO the miss angle is 4244.3 arc-sec at 10/02/2020 20:46:28.2

Occultation of Venus -3.9 by moon 5% illuminated at phase= 335 degrees
12/12/2020 14:06:17.3 Geocentric minimum 0.8 degrees
Global start/end: 12/12/2020 12:16:08.8 and 12/12/2020 15:56:25.2
Mid-occultation observing point (lat., long.) 27.871 -148.556

---For observations at HVO:

12/12/2020 14:24:23.4 Start Partial 4.18 3.95 (az240) 13.8
12/12/2020 14:24:52.9 Start Total 4.11 3.88 (az240) 13.7
12/12/2020 14:52:03.9 OCCULTATION MID-POINT 0.14 0.02 (az245) 10.6
12/12/2020 15:18:11.9 End Total -4.69 -4.72 (az249) 7.4
12/12/2020 15:18:39.2 End Partial -4.77 -4.8 (az249) 7.3

Eclipse of the Sun by moon 0% illuminated at phase= 360 degrees
12/14/2020 09:13:27.4 Geocentric minimum 0.3 degrees
Global start/end: 12/14/2020 06:33:54.0 and 12/14/2020 11:53:07.2
Mid-occultation observing point (lat., long.) -40.338 -67.961

Occultation of Mars 1.5 by moon 24% illuminated at phase= 59 degrees
04/17/2021 05:09:47.6 Geocentric minimum 0.1 degrees
Global start/end: 04/17/2021 02:44:25.2 and 04/17/2021 07:35:10.0
Mid-occultation observing point (lat., long.) 16.644 58.764

Eclipse of the Sun by moon 0% illuminated at phase= 360 degrees
06/10/2021 03:41:56.3 Geocentric minimum 0.8 degrees
Global start/end: 06/10/2021 01:12:15.5 and 06/10/2021 06:11:32.8
Mid-occultation observing point (lat., long.) 80.821 -66.705

Occultation of Mercury -0.9 by moon 2% illuminated at phase= 345 degrees
11/03/2021 12:36:26.9 Geocentric minimum 1.1 degrees
Global start/end: 11/03/2021 11:25:25.7 and 11/03/2021 13:47:25.8
Mid-occultation observing point (lat., long.) 63.624 -56.327

Occultation of Venus -4.6 by moon 16% illuminated at phase= 47 degrees
11/07/2021 22:28:05.2 Geocentric minimum 1.1 degrees
Global start/end: 11/07/2021 21:19:55.8 and 11/07/2021 23:36:17.0
Mid-occultation observing point (lat., long.) 63.971 151.463

Occultation of Mars 1.6 by moon 3% illuminated at phase= 342 degrees
12/02/2021 17:51:32.3 Geocentric minimum 0.7 degrees
Global start/end: 12/02/2021 15:59:59.8 and 12/02/2021 19:43:01.2
Mid-occultation observing point (lat., long.) 19.571 159.064

Eclipse of the Sun by moon 0% illuminated at phase= 360 degrees
12/04/2021 00:33:26.0 Geocentric minimum 1.0 degrees
Global start/end: 12/03/2021 22:29:11.5 and 12/04/2021 02:37:40.1
Mid-occultation observing point (lat., long.) -76.772 -46.272

*** = The Moon is above the horizon, and the Sun is not a factor.
Program LOSP3 version 171111b + gplib version 180120a

Maximum lunar excursion from nominal ecliptic = 7.01