

OCCULTATIONS OF PLANETS AND BRIGHT STARS AND SOLAR ECLIPSES BY THE MOON
May 10, 2021

The moon, as our nearest neighbor, sometimes blocks the light coming from a planet, a star, or the sun. Occultations and solar eclipses are listed below for 2021 through 2024. 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), and the angle of separation are also listed. **NOTE: previous editions of this listing should be discarded.**

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 Journey Museum and Learning Center (JMLC)**, the times (MST) of the various stages are listed along with the altitude above the horizon, and the azimuth, of the object, and the altitude of the sun with respect to the horizon. For occultations of Venus and solar eclipses, when the object is above the horizon, and for other objects when the sun is below the horizon, this is noted with three asterisks (***) . If, on the other hand, the Moon is visible 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. If MDT is required, add one hour to the listed time. For UTC, add 7 hours.

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 for more than a year in the future could be off by a few seconds. In addition, direct visual observation can be uncertain in terms of reaction time, and establishing the accuracy of the clock you use can be problematic.

N.B. This edition replaces all previous editions.

Lunar occultations of planets and bright stars.

Solar eclipses.

Dates and times in MST

When DST (Summer Time) is required add one hour.

Reference location: Journey Museum 44.08657 N., 103.218689 W.

Selected stars are magnitude 2.4 or brighter.

Occultation of Nunki 2.05 by moon 29% illuminated at phase= 295 degrees
03/07/2021 17:49:26.3 Geocentric minimum 1.1 degrees
Global start/end: 03/07/2021 16:58:47.4 and 03/07/2021 18:40:05.9
Mid-occultation observing point (lat., long.) 65.079 103.086

Occultation of Nunki 2.05 by moon 52% illuminated at phase= 268 degrees
04/03/2021 23:19:54.9 Geocentric minimum 0.9 degrees
Global start/end: 04/03/2021 21:48:45.5 and 04/04/2021 00:51:08.0
Mid-occultation observing point (lat., long.) 39.179 -5.07

Occultation of Mars 1.5 by moon 24% illuminated at phase= 59 degrees
04/17/2021 05:09:48.5 Geocentric minimum 0.1 degrees
Global start/end: 04/17/2021 02:44:26.0 and 04/17/2021 07:35:10.9
Mid-occultation observing point (lat., long.) 16.644 58.759

Occultation of Nunki 2.05 by moon 74% illuminated at phase= 241 degrees
05/01/2021 06:37:52.6 Geocentric minimum 0.7 degrees
Global start/end: 05/01/2021 04:51:43.6 and 05/01/2021 08:24:07.3
Mid-occultation observing point (lat., long.) 19.008 -140.933

Occultation of Venus -3.9 by moon 1% illuminated at phase= 12 degrees
05/12/2021 15:29:36.3 Geocentric minimum 0.7 degrees
Global start/end: 05/12/2021 13:24:52.2 and 05/12/2021 17:34:20.1
Mid-occultation observing point (lat., long.) -26.591 -131.924
At Journey Museum the miss angle is 2663.7 arc-sec at 05/12/2021 16:51:19.8

Occultation of Nunki 2.05 by moon 91% illuminated at phase= 215 degrees
05/28/2021 16:08:30.6 Geocentric minimum 0.6 degrees
Global start/end: 05/28/2021 14:19:59.2 and 05/28/2021 17:57:07.1
Mid-occultation observing point (lat., long.) 13.729 49.547

Eclipse of the Sun by moon 0% illuminated at phase= 360 degrees
06/10/2021 03:41:57.2 Geocentric minimum 0.8 degrees
Global start/end: 06/10/2021 01:12:15.2 and 06/10/2021 06:11:35.0
Mid-occultation observing point (lat., long.) 80.821 -66.698

Occultation of Nunki 2.05 by moon 99% illuminated at phase= 189 degrees
06/25/2021 02:41:39.9 Geocentric minimum 0.7 degrees
Global start/end: 06/25/2021 00:54:54.2 and 06/25/2021 04:28:28.8
Mid-occultation observing point (lat., long.) 15.062 -135.829

---For observations at Journey Museum:

06/25/2021 03:09:32.5 Start Total (elev 11 az 215 deg.) -9.3 ***
06/25/2021 03:35:49.2 OCCULTATION MID-POINT (elev 8 az 220 deg.) -5.9 ***
06/25/2021 04:01:14.8 End Total (elev 5 az 225 deg.) -1.7

Occultation of Nunki 2.05 by moon 98% illuminated at phase= 163 degrees
07/22/2021 12:33:51.0 Geocentric minimum 0.7 degrees
Global start/end: 07/22/2021 10:46:18.7 and 07/22/2021 14:21:24.5
Mid-occultation observing point (lat., long.) 14.935 49.024

Occultation of Nunki 2.05 by moon 86% illuminated at phase= 136 degrees
08/18/2021 20:28:54.6 Geocentric minimum 0.5 degrees
Global start/end: 08/18/2021 18:34:09.3 and 08/18/2021 22:23:40.2
Mid-occultation observing point (lat., long.) 7.325 -96.615
At Journey Museum the miss angle is 400.6 arc-sec at 08/18/2021 20:17:31.9

Occultation of Nunki 2.05 by moon 67% illuminated at phase= 110 degrees
09/15/2021 02:24:18.7 Geocentric minimum 0.3 degrees
Global start/end: 09/15/2021 00:20:15.3 and 09/15/2021 04:28:22.9
Mid-occultation observing point (lat., long.) -6.289 147.947

Occultation of Nunki 2.05 by moon 44% illuminated at phase= 83 degrees
10/12/2021 07:49:02.2 Geocentric minimum 0.1 degrees
Global start/end: 10/12/2021 05:41:05.8 and 10/12/2021 09:56:59.9
Mid-occultation observing point (lat., long.) -19.711 40.284

Occultation of Venus -4.6 by moon 16% illuminated at phase= 47 degrees
11/07/2021 22:28:07.2 Geocentric minimum 1.1 degrees
Global start/end: 11/07/2021 21:19:57.7 and 11/07/2021 23:36:18.9
Mid-occultation observing point (lat., long.) 63.971 151.455

Occultation of Nunki 2.05 by moon 22% illuminated at phase= 56 degrees
11/08/2021 14:53:32.6 Geocentric minimum 0.0 degrees
Global start/end: 11/08/2021 12:47:11.4 and 11/08/2021 16:59:54.9
Mid-occultation observing point (lat., long.) -27.178 -92.517
At Journey Museum the miss angle is 2434.6 arc-sec at 11/08/2021 14:32:23.9

Occultation of Mars 1.6 by moon 3% illuminated at phase= 342 degrees
12/02/2021 17:51:34.3 Geocentric minimum 0.7 degrees
Global start/end: 12/02/2021 16:00:01.9 and 12/02/2021 19:43:03.2
Mid-occultation observing point (lat., long.) 19.571 159.056

Eclipse of the Sun by moon 0% illuminated at phase= 360 degrees
12/04/2021 00:33:27.9 Geocentric minimum 1.0 degrees
Global start/end: 12/03/2021 22:29:12.6 and 12/04/2021 02:37:42.9
Mid-occultation observing point (lat., long.) -76.772 -46.282

Occultation of Nunki 2.05 by moon 6% illuminated at phase= 28 degrees
12/06/2021 00:41:26.0 Geocentric minimum 0.0 degrees
Global start/end: 12/05/2021 22:37:25.9 and 12/06/2021 02:45:27.3
Mid-occultation observing point (lat., long.) -27.37 93.501

Occultation of Mars 1.5 by moon 6% illuminated at phase= 333 degrees
12/31/2021 12:52:17.7 Geocentric minimum 0.9 degrees
Global start/end: 12/31/2021 11:21:42.6 and 12/31/2021 14:22:50.4
Mid-occultation observing point (lat., long.) -78.506 132.578
At Journey Museum the miss angle is 5648.0 arc-sec at 12/31/2021 13:52:47.7

Occultation of Nunki 2.05 by moon 6% illuminated at phase= 332 degrees
01/29/2022 22:42:50.3 Geocentric minimum 0.0 degrees
Global start/end: 01/29/2022 20:38:19.9 and 01/30/2022 00:47:19.7
Mid-occultation observing point (lat., long.) -28.201 69.062

Occultation of Uranus 5.8 by moon 43% illuminated at phase= 82 degrees
02/07/2022 13:32:55.7 Geocentric minimum 1.1 degrees
Global start/end: 02/07/2022 12:40:54.4 and 02/07/2022 14:24:58.2
Mid-occultation observing point (lat., long.) -63.788 13.57
At Journey Museum the miss angle is 5620.3 arc-sec at 02/07/2022 13:29:46.8

Occultation of Nunki 2.05 by moon 21% illuminated at phase= 305 degrees
02/26/2022 06:41:59.1 Geocentric minimum 0.2 degrees
Global start/end: 02/26/2022 04:36:53.9 and 02/26/2022 08:47:03.0
Mid-occultation observing point (lat., long.) -38.539 -77.158
At Journey Museum the miss angle is 2970.5 arc-sec at 02/26/2022 05:48:31.6

Occultation of Uranus 5.8 by moon 21% illuminated at phase= 55 degrees
03/06/2022 23:45:38.4 Geocentric minimum 0.8 degrees
Global start/end: 03/06/2022 22:02:17.4 and 03/07/2022 01:29:04.0
Mid-occultation observing point (lat., long.) -37.346 157.079

Occultation of Dschubba 2.29 by moon 75% illuminated at phase= 241 degrees
03/22/2022 17:02:59.8 Geocentric minimum 1.2 degrees
Global start/end: 03/22/2022 16:13:51.0 and 03/22/2022 17:52:08.6
Mid-occultation observing point (lat., long.) 63.445 98.123

Occultation of Nunki 2.05 by moon 44% illuminated at phase= 278 degrees
03/25/2022 12:24:14.5 Geocentric minimum 0.4 degrees
Global start/end: 03/25/2022 10:23:58.6 and 03/25/2022 14:24:30.9
Mid-occultation observing point (lat., long.) -52.358 171.439

Occultation of Uranus 5.9 by moon 6% illuminated at phase= 29 degrees
04/03/2022 10:52:03.2 Geocentric minimum 0.5 degrees
Global start/end: 04/03/2022 08:49:54.2 and 04/03/2022 12:54:16.9
Mid-occultation observing point (lat., long.) -16.813 -46.157
At Journey Museum the miss angle is 3366.4 arc-sec at 04/03/2022 10:48:37.9

Occultation of Dschubba 2.29 by moon 92% illuminated at phase= 214 degrees
04/19/2022 00:11:14.0 Geocentric minimum 1.0 degrees
Global start/end: 04/18/2022 22:59:19.0 and 04/19/2022 01:23:09.2
Mid-occultation observing point (lat., long.) 63.403 -35.649
At Journey Museum the miss angle is 428.1 arc-sec at 04/18/2022 23:06:38.8

Occultation of Nunki 2.05 by moon 67% illuminated at phase= 251 degrees
04/21/2022 17:59:34.7 Geocentric minimum 0.6 degrees
Global start/end: 04/21/2022 16:06:45.4 and 04/21/2022 19:52:26.6
Mid-occultation observing point (lat., long.) -62.392 61.954

Eclipse of the Sun by moon 0% illuminated at phase= 0 degrees
04/30/2022 13:41:25.9 Geocentric minimum 1.1 degrees
Global start/end: 04/30/2022 11:44:49.7 and 04/30/2022 15:38:07.5
Mid-occultation observing point (lat., long.) -62.907 -69.278
At Journey Museum the miss angle is 3047.1 arc-sec at 04/30/2022 15:13:11.7

Occultation of Dschubba 2.29 by moon 100% illuminated at phase= 187 degrees
05/16/2022 09:38:35.6 Geocentric minimum 1.0 degrees
Global start/end: 05/16/2022 08:24:15.7 and 05/16/2022 10:52:54.6
Mid-occultation observing point (lat., long.) 63.384 155.628

Occultation of Nunki 2.05 by moon 86% illuminated at phase= 224 degrees
05/19/2022 01:28:26.6 Geocentric minimum 0.6 degrees
Global start/end: 05/18/2022 23:38:36.3 and 05/19/2022 03:18:20.0
Mid-occultation observing point (lat., long.) -63.812 -76.955
At Journey Museum the miss angle is 4491.3 arc-sec at 05/19/2022 00:34:42.0

Occultation of Venus -4.0 by moon 11% illuminated at phase= 322 degrees
05/26/2022 20:02:33.6 Geocentric minimum 0.2 degrees
Global start/end: 05/26/2022 17:34:33.8 and 05/26/2022 22:30:35.2
Mid-occultation observing point (lat., long.) -1.226 101.631

Occultation of Uranus 5.9 by moon 3% illuminated at phase= 339 degrees
05/28/2022 06:52:46.7 Geocentric minimum 0.2 degrees
Global start/end: 05/28/2022 04:37:52.5 and 05/28/2022 09:07:41.7
Mid-occultation observing point (lat., long.) 2.556 -45.048
At Journey Museum the miss angle is 2459.6 arc-sec at 05/28/2022 06:31:36.7

Occultation of Dschubba 2.29 by moon 97% illuminated at phase= 161 degrees
06/12/2022 20:19:35.7 Geocentric minimum 1.0 degrees
Global start/end: 06/12/2022 19:04:15.9 and 06/12/2022 21:34:53.3
Mid-occultation observing point (lat., long.) 63.412 -31.756
At Journey Museum the miss angle is 410.7 arc-sec at 06/12/2022 19:12:17.9

Occultation of Nunki 2.05 by moon 98% illuminated at phase= 198 degrees
06/15/2022 11:11:49.1 Geocentric minimum 0.6 degrees
Global start/end: 06/15/2022 09:20:55.9 and 06/15/2022 13:02:44.1
Mid-occultation observing point (lat., long.) -60.056 109.716

Occultation of Mars 0.5 by moon 33% illuminated at phase= 290 degrees
06/22/2022 12:06:46.2 Geocentric minimum 0.8 degrees
Global start/end: 06/22/2022 10:25:56.4 and 06/22/2022 13:47:40.2
Mid-occultation observing point (lat., long.) -49.496 -138.87

Occultation of Uranus 5.8 by moon 15% illuminated at phase= 314 degrees
06/24/2022 15:15:00.5 Geocentric minimum 0.0 degrees
Global start/end: 06/24/2022 12:56:46.4 and 06/24/2022 17:33:13.6
Mid-occultation observing point (lat., long.) 14.046 159.443

Occultation of Dschubba 2.29 by moon 85% illuminated at phase= 135 degrees
07/10/2022 06:28:15.1 Geocentric minimum 0.9 degrees
Global start/end: 07/10/2022 05:01:58.5 and 07/10/2022 07:54:27.9
Mid-occultation observing point (lat., long.) 42.695 130.673

Occultation of Nunki 2.05 by moon 100% illuminated at phase= 172 degrees
07/12/2022 21:59:34.7 Geocentric minimum 0.5 degrees
Global start/end: 07/12/2022 20:08:04.0 and 07/12/2022 23:51:04.8
Mid-occultation observing point (lat., long.) -58.73 -79.249
At Journey Museum the miss angle is 4327.2 arc-sec at 07/12/2022 21:13:08.0

Occultation of Mars 0.3 by moon 39% illuminated at phase= 282 degrees
07/21/2022 08:55:04.0 Geocentric minimum 1.0 degrees
Global start/end: 07/21/2022 07:33:43.2 and 07/21/2022 10:16:27.6
Mid-occultation observing point (lat., long.) 62.808 100.464

Occultation of Uranus 5.8 by moon 34% illuminated at phase= 289 degrees
07/21/2022 23:11:20.8 Geocentric minimum 0.2 degrees
Global start/end: 07/21/2022 20:55:45.8 and 07/22/2022 01:26:57.4
Mid-occultation observing point (lat., long.) 30.08 7.527

Occultation of Dschubba 2.29 by moon 66% illuminated at phase= 109 degrees
08/06/2022 14:40:26.7 Geocentric minimum 0.7 degrees
Global start/end: 08/06/2022 12:55:40.9 and 08/06/2022 16:25:07.8
Mid-occultation observing point (lat., long.) 22.749 -27.278

Occultation of Nunki 2.05 by moon 91% illuminated at phase= 146 degrees
08/09/2022 08:06:18.9 Geocentric minimum 0.6 degrees
Global start/end: 08/09/2022 06:18:03.9 and 08/09/2022 09:54:31.7
Mid-occultation observing point (lat., long.) -65.088 103.512

Occultation of Uranus 5.7 by moon 56% illuminated at phase= 263 degrees
08/18/2022 07:14:29.9 Geocentric minimum 0.5 degrees
Global start/end: 08/18/2022 05:11:40.7 and 08/18/2022 09:17:24.0
Mid-occultation observing point (lat., long.) 48.27 -151.503

Occultation of Dschubba 2.29 by moon 44% illuminated at phase= 82 degrees
09/02/2022 20:45:23.5 Geocentric minimum 0.5 degrees
Global start/end: 09/02/2022 18:45:46.3 and 09/02/2022 22:44:58.0
Mid-occultation observing point (lat., long.) 5.323 -150.378

Occultation of Nunki 2.05 by moon 75% illuminated at phase= 119 degrees
09/05/2022 16:09:45.5 Geocentric minimum 0.8 degrees
Global start/end: 09/05/2022 14:32:43.9 and 09/05/2022 17:46:44.8
Mid-occultation observing point (lat., long.) -80.929 -33.305

Occultation of Uranus 5.7 by moon 78% illuminated at phase= 237 degrees
09/14/2022 15:26:23.0 Geocentric minimum 0.7 degrees
Global start/end: 09/14/2022 13:40:23.7 and 09/14/2022 17:12:27.7
Mid-occultation observing point (lat., long.) 62.335 38.361

Occultation of Dschubba 2.29 by moon 22% illuminated at phase= 56 degrees
09/30/2022 02:06:01.8 Geocentric minimum 0.3 degrees
Global start/end: 09/30/2022 00:00:36.2 and 09/30/2022 04:11:27.0
Mid-occultation observing point (lat., long.) -6.248 99.564

Occultation of Nunki 2.05 by moon 53% illuminated at phase= 93 degrees
10/02/2022 22:05:43.0 Geocentric minimum 1.0 degrees
Global start/end: 10/02/2022 20:48:16.6 and 10/02/2022 23:23:08.9
Mid-occultation observing point (lat., long.) -62.491 9.555

Occultation of Uranus 5.7 by moon 94% illuminated at phase= 209 degrees
10/11/2022 23:11:40.0 Geocentric minimum 0.8 degrees
Global start/end: 10/11/2022 21:31:17.6 and 10/12/2022 00:52:07.0
Mid-occultation observing point (lat., long.) 65.205 -114.9

---For observations at Journey Museum:

10/11/2022 22:14:25.3 Start Partial (elev 40 az 107 deg.) -48.9 ***
10/11/2022 22:14:36.6 Start Total (elev 40 az 107 deg.) -48.9 ***
10/11/2022 22:39:29.4 OCCULTATION MID-POINT (elev 45 az 113 deg.) -51.1 ***
10/11/2022 23:05:09.6 End Total (elev 49 az 120 deg.) -52.6 ***
10/11/2022 23:05:21.6 End Partial (elev 49 az 120 deg.) -52.6 ***

Eclipse of the Sun by moon 0% illuminated at phase= 0 degrees
10/25/2022 04:00:11.0 Geocentric minimum 1.0 degrees
Global start/end: 10/25/2022 01:57:54.8 and 10/25/2022 06:02:19.7
Mid-occultation observing point (lat., long.) 62.327 79.789

Occultation of Dschubba 2.29 by moon 6% illuminated at phase= 29 degrees
10/27/2022 08:49:03.3 Geocentric minimum 0.2 degrees
Global start/end: 10/27/2022 06:43:56.7 and 10/27/2022 10:54:09.9
Mid-occultation observing point (lat., long.) -10.298 -29.168

Occultation of Nunki 2.05 by moon 30% illuminated at phase= 66 degrees
10/30/2022 03:32:31.9 Geocentric minimum 1.1 degrees
Global start/end: 10/30/2022 02:28:36.2 and 10/30/2022 04:36:28.2
Mid-occultation observing point (lat., long.) -62.488 -98.931

Occultation of Uranus 5.6 by moon 100% illuminated at phase= 181 degrees
11/08/2022 05:39:47.0 Geocentric minimum 0.7 degrees
Global start/end: 11/08/2022 03:51:33.2 and 11/08/2022 07:28:04.1
Mid-occultation observing point (lat., long.) 58.86 134.757

Occultation of Nunki 2.05 by moon 11% illuminated at phase= 38 degrees
11/26/2022 10:48:39.2 Geocentric minimum 1.1 degrees
Global start/end: 11/26/2022 09:38:35.2 and 11/26/2022 11:58:44.0
Mid-occultation observing point (lat., long.) -62.467 125.075

Occultation of Uranus 5.7 by moon 94% illuminated at phase= 152 degrees
12/05/2022 10:31:31.2 Geocentric minimum 0.6 degrees
Global start/end: 12/05/2022 08:35:44.0 and 12/05/2022 12:27:20.7
Mid-occultation observing point (lat., long.) 52.479 42.674

Occultation of Mars -1.9 by moon 100% illuminated at phase= 180 degrees
12/07/2022 21:14:11.6 Geocentric minimum 0.5 degrees
Global start/end: 12/07/2022 19:16:27.7 and 12/07/2022 23:11:57.6
Mid-occultation observing point (lat., long.) 60.338 -77.825

---For observations at Journey Museum:

12/07/2022 19:51:29.9 Start Partial (elev 40 az 92 deg.) -38.1 ***
12/07/2022 19:52:08.4 Start Total (elev 40 az 92 deg.) -38.2 ***
12/07/2022 20:24:33.4 OCCULTATION MID-POINT (elev 46 az 98 deg.) -44.0 ***
12/07/2022 20:58:31.7 End Total (elev 52 az 106 deg.) -49.9 ***
12/07/2022 20:59:13.9 End Partial (elev 52 az 106 deg.) -50.0 ***

Occultation of Dschubba 2.29 by moon 5% illuminated at phase= 333 degrees
12/21/2022 05:01:06.0 Geocentric minimum 0.2 degrees
Global start/end: 12/21/2022 02:56:47.6 and 12/21/2022 07:05:21.2
Mid-occultation observing point (lat., long.) -11.832 -26.683

Occultation of Uranus 5.7 by moon 78% illuminated at phase= 124 degrees
01/01/2023 14:45:37.8 Geocentric minimum 0.7 degrees
Global start/end: 01/01/2023 12:52:42.4 and 01/01/2023 16:38:36.1
Mid-occultation observing point (lat., long.) 55.715 -52.934

Occultation of Mars -1.1 by moon 91% illuminated at phase= 146 degrees
01/03/2023 12:52:00.3 Geocentric minimum 0.5 degrees
Global start/end: 01/03/2023 10:50:40.6 and 01/03/2023 14:53:22.1
Mid-occultation observing point (lat., long.) -9.764 33.145

Occultation of Dschubba 2.29 by moon 21% illuminated at phase= 305 degrees
01/17/2023 15:28:48.8 Geocentric minimum 0.0 degrees
Global start/end: 01/17/2023 13:20:59.1 and 01/17/2023 17:36:36.9
Mid-occultation observing point (lat., long.) -21.103 146.659

Occultation of Nunki 2.05 by moon 2% illuminated at phase= 342 degrees
01/20/2023 08:18:57.2 Geocentric minimum 1.0 degrees
Global start/end: 01/20/2023 07:01:18.9 and 01/20/2023 09:36:33.8
Mid-occultation observing point (lat., long.) -71.306 104.323

Occultation of Uranus 5.7 by moon 55% illuminated at phase= 96 degrees
01/28/2023 20:27:58.2 Geocentric minimum 0.9 degrees
Global start/end: 01/28/2023 18:56:45.5 and 01/28/2023 21:59:14.8
Mid-occultation observing point (lat., long.) 68.801 145.271
At Journey Museum the miss angle is 1281.6 arc-sec at 01/28/2023 21:47:09.2

Occultation of Mars -0.3 by moon 74% illuminated at phase= 119 degrees
01/30/2023 21:27:44.3 Geocentric minimum 0.1 degrees
Global start/end: 01/30/2023 19:08:05.8 and 01/30/2023 23:47:23.3
Mid-occultation observing point (lat., long.) 18.462 -127.516
At Journey Museum the miss angle is 410.8 arc-sec at 01/30/2023 22:25:37.0

Occultation of Dschubba 2.29 by moon 43% illuminated at phase= 278 degrees
02/13/2023 23:35:54.9 Geocentric minimum 0.2 degrees
Global start/end: 02/13/2023 21:27:49.3 and 02/14/2023 01:43:57.0
Mid-occultation observing point (lat., long.) -35.922 -7.121

Occultation of Nunki 2.05 by moon 15% illuminated at phase= 315 degrees
02/16/2023 18:46:26.1 Geocentric minimum 1.2 degrees
Global start/end: 02/16/2023 17:51:49.1 and 02/16/2023 19:41:01.7
Mid-occultation observing point (lat., long.) -62.393 -76.965

Occultation of Jupiter -2.1 by moon 10% illuminated at phase= 37 degrees
02/22/2023 15:56:52.1 Geocentric minimum 1.1 degrees
Global start/end: 02/22/2023 14:45:10.4 and 02/22/2023 17:08:37.3
Mid-occultation observing point (lat., long.) -62.493 -39.964

Occultation of Uranus 5.8 by moon 32% illuminated at phase= 69 degrees
02/25/2023 05:12:46.7 Geocentric minimum 1.2 degrees
Global start/end: 02/25/2023 04:42:56.4 and 02/25/2023 05:42:37.7
Mid-occultation observing point (lat., long.) 62.348 -61.791

Occultation of Mars 0.4 by moon 58% illuminated at phase= 99 degrees
02/27/2023 21:11:32.9 Geocentric minimum 1.1 degrees
Global start/end: 02/27/2023 20:11:34.7 and 02/27/2023 22:11:32.6
Mid-occultation observing point (lat., long.) 62.264 56.23

Occultation of Dschubba 2.29 by moon 67% illuminated at phase= 250 degrees
03/13/2023 05:28:58.2 Geocentric minimum 0.5 degrees
Global start/end: 03/13/2023 03:27:01.7 and 03/13/2023 07:30:51.9
Mid-occultation observing point (lat., long.) -49.692 -129.187
At Journey Museum the miss angle is 3862.7 arc-sec at 03/13/2023 04:54:39.2

Occultation of Jupiter -2.1 by moon 2% illuminated at phase= 15 degrees
03/22/2023 13:21:10.2 Geocentric minimum 0.5 degrees
Global start/end: 03/22/2023 11:20:57.9 and 03/22/2023 15:21:27.4
Mid-occultation observing point (lat., long.) -19.847 -95.746
At Journey Museum the miss angle is 2278.7 arc-sec at 03/22/2023 14:32:26.9

Occultation of Venus -4.0 by moon 9% illuminated at phase= 35 degrees
03/24/2023 03:31:53.8 Geocentric minimum 0.1 degrees
Global start/end: 03/24/2023 01:09:34.7 and 03/24/2023 05:54:18.7
Mid-occultation observing point (lat., long.) 9.628 59.271

Occultation of Dschubba 2.29 by moon 86% illuminated at phase= 223 degrees
04/09/2023 11:01:07.5 Geocentric minimum 0.6 degrees
Global start/end: 04/09/2023 09:04:55.3 and 04/09/2023 12:57:18.1
Mid-occultation observing point (lat., long.) -56.151 115.935

Eclipse of the Sun by moon 0% illuminated at phase= 0 degrees
04/19/2023 21:16:44.2 Geocentric minimum 0.4 degrees
Global start/end: 04/19/2023 18:34:15.0 and 04/19/2023 23:59:22.7
Mid-occultation observing point (lat., long.) -9.607 125.772

Occultation of Dschubba 2.29 by moon 98% illuminated at phase= 197 degrees
05/06/2023 18:02:05.3 Geocentric minimum 0.6 degrees
Global start/end: 05/06/2023 16:06:51.5 and 05/06/2023 19:57:16.8
Mid-occultation observing point (lat., long.) -55.595 -15.701

Occultation of Jupiter -2.1 by moon 5% illuminated at phase= 334 degrees
05/17/2023 05:40:01.1 Geocentric minimum 0.7 degrees
Global start/end: 05/17/2023 03:52:05.0 and 05/17/2023 07:27:59.4
Mid-occultation observing point (lat., long.) 51.673 -68.006

Occultation of Dschubba 2.29 by moon 99% illuminated at phase= 170 degrees
06/03/2023 02:57:57.5 Geocentric minimum 0.5 degrees
Global start/end: 06/03/2023 01:02:48.7 and 06/03/2023 04:53:02.1
Mid-occultation observing point (lat., long.) -54.755 -175.794

Occultation of Dschubba 2.29 by moon 91% illuminated at phase= 144 degrees
06/30/2023 12:55:29.7 Geocentric minimum 0.6 degrees
Global start/end: 06/30/2023 11:04:20.0 and 06/30/2023 14:46:33.3
Mid-occultation observing point (lat., long.) -60.158 2.795

Occultation of Dschubba 2.29 by moon 74% illuminated at phase= 118 degrees
07/27/2023 22:26:06.2 Geocentric minimum 0.8 degrees
Global start/end: 07/27/2023 20:48:39.7 and 07/28/2023 00:03:27.0
Mid-occultation observing point (lat., long.) -73.61 160.668
At Journey Museum the miss angle is 5249.4 arc-sec at 07/27/2023 23:16:02.5

Occultation of Dschubba 2.29 by moon 52% illuminated at phase= 92 degrees
08/24/2023 06:16:41.9 Geocentric minimum 1.1 degrees
Global start/end: 08/24/2023 05:10:46.6 and 08/24/2023 07:22:34.7
Mid-occultation observing point (lat., long.) -61.957 -77.217

Occultation of Antares 1.06 by moon 58% illuminated at phase= 98 degrees
08/24/2023 19:30:03.0 Geocentric minimum 1.0 degrees
Global start/end: 08/24/2023 18:19:31.9 and 08/24/2023 20:40:31.0
Mid-occultation observing point (lat., long.) 62.19 -95.46

---For observations at Journey Museum:

08/24/2023 18:59:37.9 Start Total (elev 19 az 191 deg.) -3.4 ***
08/24/2023 19:35:59.3 OCCULTATION MID-POINT (elev 17 az 200 deg.) -9.8 ***
08/24/2023 20:11:41.4 End Total (elev 14 az 208 deg.) -15.4 ***

Occultation of Elnath 1.65 by moon 43% illuminated at phase= 278 degrees
09/07/2023 08:19:55.4 Geocentric minimum 1.0 degrees
Global start/end: 09/07/2023 07:15:33.7 and 09/07/2023 09:24:19.0
Mid-occultation observing point (lat., long.) -62.128 -121.751
At Journey Museum the miss angle is 3897.1 arc-sec at 09/07/2023 08:58:51.3

Occultation of Mars 1.7 by moon 3% illuminated at phase= 19 degrees
09/16/2023 12:59:28.0 Geocentric minimum 0.6 degrees
Global start/end: 09/16/2023 10:54:04.6 and 09/16/2023 15:04:49.0
Mid-occultation observing point (lat., long.) 30.158 -82.57

Occultation of Antares 1.06 by moon 35% illuminated at phase= 72 degrees
09/21/2023 01:47:40.5 Geocentric minimum 0.9 degrees
Global start/end: 09/21/2023 00:14:33.5 and 09/21/2023 03:20:44.3
Mid-occultation observing point (lat., long.) 37.529 130.097

Occultation of Elnath 1.65 by moon 66% illuminated at phase= 251 degrees
10/04/2023 16:08:56.9 Geocentric minimum 0.9 degrees
Global start/end: 10/04/2023 14:41:57.8 and 10/04/2023 17:36:00.3
Mid-occultation observing point (lat., long.) -48.239 89.993

Eclipse of the Sun by moon 0% illuminated at phase= 0 degrees

10/14/2023 10:59:31.9 Geocentric minimum 0.3 degrees
Global start/end: 10/14/2023 08:03:37.4 and 10/14/2023 13:55:18.1
Mid-occultation observing point (lat., long.) 11.359 -83.104

---For observations at Journey Museum:

10/14/2023 08:17:03.7 Start Partial (elev 21 az 125 deg.) 20.7 ***
10/14/2023 09:36:33.3 OCCULTATION MID-POINT (64.3%) (elev 31 az 144 deg.) 30.9

10/14/2023 11:02:32.3 End Partial (elev 37 az 169 deg.) 37.0 ***

Occultation of Antares 1.06 by moon 15% illuminated at phase= 45 degrees
10/18/2023 07:12:42.7 Geocentric minimum 0.8 degrees
Global start/end: 10/18/2023 05:34:55.0 and 10/18/2023 08:50:28.4
Mid-occultation observing point (lat., long.) 31.549 20.258

Occultation of Elnath 1.65 by moon 86% illuminated at phase= 224 degrees
11/01/2023 01:25:01.3 Geocentric minimum 0.9 degrees
Global start/end: 10/31/2023 23:58:14.9 and 11/01/2023 02:51:52.2
Mid-occultation observing point (lat., long.) -46.458 -76.387
At Journey Museum the miss angle is 3491.1 arc-sec at 11/01/2023 01:18:34.4

Occultation of Venus -4.4 by moon 15% illuminated at phase= 314 degrees
11/09/2023 03:34:23.5 Geocentric minimum 0.9 degrees
Global start/end: 11/09/2023 01:56:30.1 and 11/09/2023 05:12:13.1
Mid-occultation observing point (lat., long.) 59.096 41.693

Occultation of Antares 1.06 by moon 2% illuminated at phase= 18 degrees
11/14/2023 13:38:07.7 Geocentric minimum 0.9 degrees
Global start/end: 11/14/2023 12:05:03.1 and 11/14/2023 15:11:10.1
Mid-occultation observing point (lat., long.) 35.882 -101.806

Occultation of Elnath 1.65 by moon 98% illuminated at phase= 197 degrees
11/28/2023 10:55:32.8 Geocentric minimum 1.0 degrees
Global start/end: 11/28/2023 09:39:32.4 and 11/28/2023 12:11:35.9
Mid-occultation observing point (lat., long.) -62.177 118.161

Occultation of Elnath 1.65 by moon 99% illuminated at phase= 169 degrees
12/25/2023 19:10:04.4 Geocentric minimum 1.0 degrees
Global start/end: 12/25/2023 17:57:48.1 and 12/25/2023 20:22:22.4
Mid-occultation observing point (lat., long.) -62.207 -32.848
At Journey Museum the miss angle is 4636.6 arc-sec at 12/25/2023 18:34:37.8

Occultation of Antares 1.06 by moon 10% illuminated at phase= 322 degrees

01/08/2024 08:16:41.1 Geocentric minimum 0.8 degrees
Global start/end: 01/08/2024 06:34:27.4 and 01/08/2024 09:58:48.9
Mid-occultation observing point (lat., long.) 24.886 -78.672

---For observations at Journey Museum:

01/08/2024 06:47:12.8 Start Total (elev 12 az 147 deg.) -7.3 ***
01/08/2024 07:23:47.9 OCCULTATION MID-POINT (elev 15 az 155 deg.) -0.8
01/08/2024 08:01:53.1 End Total (elev 18 az 163 deg.) 4.5

Occultation of Elnath 1.65 by moon 89% illuminated at phase= 141 degrees
01/22/2024 01:32:16.0 Geocentric minimum 0.9 degrees
Global start/end: 01/22/2024 00:03:12.8 and 01/22/2024 03:01:21.1
Mid-occultation observing point (lat., long.) -43.99 -160.181
At Journey Museum the miss angle is 3950.9 arc-sec at 01/22/2024 02:28:23.4

Occultation of Antares 1.06 by moon 29% illuminated at phase= 294 degrees
02/04/2024 18:04:14.1 Geocentric minimum 0.5 degrees
Global start/end: 02/04/2024 16:05:51.9 and 02/04/2024 20:02:29.4
Mid-occultation observing point (lat., long.) 7.687 103.776

Occultation of Elnath 1.65 by moon 70% illuminated at phase= 114 degrees
02/18/2024 07:01:56.4 Geocentric minimum 0.7 degrees
Global start/end: 02/18/2024 05:12:05.0 and 02/18/2024 08:51:51.4
Mid-occultation observing point (lat., long.) -19.008 87.513

Occultation of Antares 1.06 by moon 53% illuminated at phase= 267 degrees
03/03/2024 02:01:55.5 Geocentric minimum 0.3 degrees
Global start/end: 03/02/2024 23:53:04.5 and 03/03/2024 04:10:42.3
Mid-occultation observing point (lat., long.) -5.682 -45.109

Occultation of Elnath 1.65 by moon 47% illuminated at phase= 86 degrees
03/16/2024 13:30:43.5 Geocentric minimum 0.5 degrees
Global start/end: 03/16/2024 11:30:52.7 and 03/16/2024 15:30:39.9
Mid-occultation observing point (lat., long.) -5.701 -37.712
At Journey Museum the miss angle is 3039.0 arc-sec at 03/16/2024 12:43:26.9

Occultation of Antares 1.06 by moon 75% illuminated at phase= 240 degrees
03/30/2024 08:09:11.4 Geocentric minimum 0.3 degrees
Global start/end: 03/30/2024 05:57:21.4 and 03/30/2024 10:20:59.9
Mid-occultation observing point (lat., long.) -10.759 -164.751

Occultation of Saturn 1.1 by moon 8% illuminated at phase= 327 degrees
04/06/2024 03:18:38.9 Geocentric minimum 1.1 degrees
Global start/end: 04/06/2024 02:10:24.3 and 04/06/2024 04:26:52.1
Mid-occultation observing point (lat., long.) -61.456 103.475

Occultation of Venus -3.8 by moon 2% illuminated at phase= 345 degrees
04/07/2024 09:18:09.8 Geocentric minimum 0.3 degrees
Global start/end: 04/07/2024 07:08:44.0 and 04/07/2024 11:27:34.8
Mid-occultation observing point (lat., long.) 17.183 -87.418
At Journey Museum the miss angle is 461.9 arc-sec at 04/07/2024 09:38:53.3

Eclipse of the Sun by moon 0% illuminated at phase= 360 degrees

04/08/2024 11:17:18.7 Geocentric minimum 0.3 degrees
Global start/end: 04/08/2024 08:42:11.7 and 04/08/2024 13:52:29.7
Mid-occultation observing point (lat., long.) 25.281 -104.145

---For observations at Journey Museum:

04/08/2024 10:38:50.4 Start Partial (elev 50 az 150 deg.) 50.0 ***
04/08/2024 11:48:27.0 OCCULTATION MID-POINT (57.9%) (elev 54 az 177 deg.) 53.5 ***
04/08/2024 12:58:47.9 End Partial (elev 51 az 206 deg.) 50.9 ***

Occultation of Elnath 1.65 by moon 25% illuminated at phase= 59 degrees
04/12/2024 21:57:38.4 Geocentric minimum 0.5 degrees
Global start/end: 04/12/2024 19:57:54.8 and 04/12/2024 23:57:28.6
Mid-occultation observing point (lat., long.) -3.161 168.39
At Journey Museum the miss angle is 3134.5 arc-sec at 04/12/2024 22:58:24.3

Occultation of Antares 1.06 by moon 92% illuminated at phase= 213 degrees
04/26/2024 13:46:15.0 Geocentric minimum 0.3 degrees
Global start/end: 04/26/2024 11:36:06.3 and 04/26/2024 15:56:22.6
Mid-occultation observing point (lat., long.) -8.494 84.56

Occultation of Saturn 1.2 by moon 23% illuminated at phase= 303 degrees
05/03/2024 16:10:35.9 Geocentric minimum 0.7 degrees
Global start/end: 05/03/2024 14:27:31.0 and 05/03/2024 17:53:38.1
Mid-occultation observing point (lat., long.) -47.565 169.414

Occultation of Mars 1.1 by moon 13% illuminated at phase= 318 degrees
05/04/2024 19:15:48.1 Geocentric minimum 0.2 degrees
Global start/end: 05/04/2024 17:04:57.3 and 05/04/2024 21:26:36.8
Mid-occultation observing point (lat., long.) 8.861 101.476

Occultation of Elnath 1.65 by moon 8% illuminated at phase= 33 degrees
05/10/2024 07:42:21.2 Geocentric minimum 0.6 degrees
Global start/end: 05/10/2024 05:47:48.6 and 05/10/2024 09:36:59.8
Mid-occultation observing point (lat., long.) -8.257 -4.435
At Journey Museum the miss angle is 3866.3 arc-sec at 05/10/2024 06:55:54.3

Occultation of Antares 1.06 by moon 100% illuminated at phase= 187 degrees
05/23/2024 20:18:22.4 Geocentric minimum 0.4 degrees
Global start/end: 05/23/2024 18:11:04.2 and 05/23/2024 22:25:38.1
Mid-occultation observing point (lat., long.) -4.904 -39.728

Occultation of Saturn 1.2 by moon 43% illuminated at phase= 278 degrees
05/31/2024 01:26:37.9 Geocentric minimum 0.3 degrees
Global start/end: 05/30/2024 23:22:59.9 and 05/31/2024 03:30:14.5
Mid-occultation observing point (lat., long.) -23.742 -15.67

Occultation of Spica 0.98 by moon 74% illuminated at phase= 118 degrees
06/16/2024 12:14:27.1 Geocentric minimum 1.1 degrees
Global start/end: 06/16/2024 11:16:58.3 and 06/16/2024 13:11:54.8
Mid-occultation observing point (lat., long.) 61.768 78.437

Occultation of Antares 1.06 by moon 97% illuminated at phase= 161 degrees
06/20/2024 04:18:32.5 Geocentric minimum 0.3 degrees
Global start/end: 06/20/2024 02:10:48.9 and 06/20/2024 06:26:12.1
Mid-occultation observing point (lat., long.) -6.576 172.911

Occultation of Saturn 1.1 by moon 65% illuminated at phase= 253 degrees
06/27/2024 07:56:27.6 Geocentric minimum 0.1 degrees
Global start/end: 06/27/2024 05:48:54.9 and 06/27/2024 10:04:00.9
Mid-occultation observing point (lat., long.) -2.508 -151.121

Occultation of Elnath 1.65 by moon 3% illuminated at phase= 340 degrees
07/04/2024 01:12:26.3 Geocentric minimum 0.6 degrees
Global start/end: 07/03/2024 23:20:19.9 and 07/04/2024 03:04:35.2
Mid-occultation observing point (lat., long.) -12.262 39.173

Occultation of Spica 0.98 by moon 52% illuminated at phase= 92 degrees

07/13/2024 20:19:51.4 Geocentric minimum 0.8 degrees
Global start/end: 07/13/2024 18:40:28.6 and 07/13/2024 21:59:12.2
Mid-occultation observing point (lat., long.) 44.214 -106.962

---For observations at Journey Museum:

07/13/2024 19:44:34.2 Start Total (elev 29 az 213 deg.) -1.8
07/13/2024 20:25:11.9 OCCULTATION MID-POINT (elev 24 az 223 deg.) -8.2 ***
07/13/2024 21:04:24.7 End Total (elev 19 az 231 deg.) -13.2 ***

Occultation of Antares 1.06 by moon 85% illuminated at phase= 134 degrees

07/17/2024 13:19:42.7 Geocentric minimum 0.2 degrees
Global start/end: 07/17/2024 11:07:55.1 and 07/17/2024 15:31:26.4
Mid-occultation observing point (lat., long.) -15.234 8.982

Occultation of Saturn 0.9 by moon 85% illuminated at phase= 226 degrees

07/24/2024 13:28:23.9 Geocentric minimum 0.3 degrees
Global start/end: 07/24/2024 11:27:30.1 and 07/24/2024 15:29:19.2
Mid-occultation observing point (lat., long.) 11.723 90.938

Occultation of Elnath 1.65 by moon 15% illuminated at phase= 314 degrees

07/31/2024 07:26:57.1 Geocentric minimum 0.5 degrees
Global start/end: 07/31/2024 05:26:26.1 and 07/31/2024 09:27:30.2
Mid-occultation observing point (lat., long.) -2.729 -82.122
At Journey Museum the miss angle is 1968.8 arc-sec at 07/31/2024 07:10:45.4

Occultation of Spica 0.98 by moon 30% illuminated at phase= 66 degrees

08/10/2024 03:52:14.6 Geocentric minimum 0.6 degrees
Global start/end: 08/10/2024 01:51:55.7 and 08/10/2024 05:52:32.8
Mid-occultation observing point (lat., long.) 24.877 97.821

Occultation of Antares 1.06 by moon 66% illuminated at phase= 108 degrees

08/13/2024 22:16:57.3 Geocentric minimum 0.0 degrees
Global start/end: 08/13/2024 20:01:54.3 and 08/14/2024 00:31:58.0
Mid-occultation observing point (lat., long.) -26.897 -154.682

Occultation of Saturn 0.7 by moon 97% illuminated at phase= 199 degrees

08/20/2024 19:41:37.2 Geocentric minimum 0.4 degrees
Global start/end: 08/20/2024 17:44:25.7 and 08/20/2024 21:38:49.1
Mid-occultation observing point (lat., long.) 14.016 -32.235

Occultation of Elnath 1.65 by moon 35% illuminated at phase= 288 degrees

08/27/2024 12:52:21.4 Geocentric minimum 0.3 degrees
Global start/end: 08/27/2024 10:44:54.9 and 08/27/2024 14:59:50.7
Mid-occultation observing point (lat., long.) 8.307 168.889
At Journey Museum the miss angle is 2505.2 arc-sec at 08/27/2024 13:55:22.1

Occultation of Venus -3.8 by moon 5% illuminated at phase= 25 degrees

09/05/2024 01:58:26.4 Geocentric minimum 1.0 degrees
Global start/end: 09/05/2024 00:50:47.5 and 09/05/2024 03:06:05.8
Mid-occultation observing point (lat., long.) -61.072 -28.428

Occultation of Spica 0.98 by moon 12% illuminated at phase= 40 degrees

09/06/2024 10:33:03.8 Geocentric minimum 0.5 degrees
Global start/end: 09/06/2024 08:25:31.7 and 09/06/2024 12:40:36.4
Mid-occultation observing point (lat., long.) 16.716 -33.874

Occultation of Antares 1.06 by moon 43% illuminated at phase= 82 degrees
09/10/2024 06:05:15.7 Geocentric minimum 0.1 degrees
Global start/end: 09/10/2024 03:49:37.2 and 09/10/2024 08:20:52.6
Mid-occultation observing point (lat., long.) -35.457 59.268

Occultation of Saturn 0.6 by moon 99% illuminated at phase= 170 degrees
09/17/2024 03:08:24.1 Geocentric minimum 0.3 degrees
Global start/end: 09/17/2024 01:08:13.5 and 09/17/2024 05:08:33.1
Mid-occultation observing point (lat., long.) 5.923 -168.741

---For observations at Journey Museum:

09/17/2024 04:13:15.6 Start Partial (elev 6 az 254 deg.) -15.3 ***
09/17/2024 04:13:47.4 Start Total (elev 5 az 254 deg.) -15.2 ***
09/17/2024 04:40:36.7 OCCULTATION MID-POINT (elev 1 az 258 deg.) -10.6 ***
09/17/2024 05:06:37.8 End Total (elev -4 az 263 deg.) -5.9
09/17/2024 05:07:07.9 End Partial (elev -4 az 263 deg.) -5.9

Occultation of Elnath 1.65 by moon 57% illuminated at phase= 261 degrees
09/23/2024 19:09:07.4 Geocentric minimum 0.2 degrees
Global start/end: 09/23/2024 17:00:25.3 and 09/23/2024 21:17:53.4
Mid-occultation observing point (lat., long.) 14.233 47.406

Eclipse of the Sun by moon 0% illuminated at phase= 360 degrees
10/02/2024 11:45:03.0 Geocentric minimum 0.3 degrees
Global start/end: 10/02/2024 08:42:55.9 and 10/02/2024 14:47:10.4
Mid-occultation observing point (lat., long.) -21.955 -114.516
At Journey Museum the miss angle is 1024.4 arc-sec at 10/02/2024 10:07:09.0

Occultation of Spica 0.98 by moon 1% illuminated at phase= 13 degrees
10/03/2024 16:38:17.0 Geocentric minimum 0.5 degrees
Global start/end: 10/03/2024 14:30:37.4 and 10/03/2024 18:45:56.6
Mid-occultation observing point (lat., long.) 16.068 -152.375
At Journey Museum the miss angle is 565.7 arc-sec at 10/03/2024 17:09:10.9

Occultation of Antares 1.06 by moon 22% illuminated at phase= 55 degrees
10/07/2024 12:24:50.6 Geocentric minimum 0.2 degrees
Global start/end: 10/07/2024 10:08:52.2 and 10/07/2024 14:40:48.8
Mid-occultation observing point (lat., long.) -36.518 -62.785

Occultation of Saturn 0.7 by moon 89% illuminated at phase= 142 degrees
10/14/2024 11:07:59.6 Geocentric minimum 0.1 degrees
Global start/end: 10/14/2024 09:03:49.1 and 10/14/2024 13:12:07.9
Mid-occultation observing point (lat., long.) -3.423 47.269

Occultation of Elnath 1.65 by moon 79% illuminated at phase= 234 degrees
10/21/2024 03:33:32.6 Geocentric minimum 0.3 degrees
Global start/end: 10/21/2024 01:27:50.8 and 10/21/2024 05:39:19.6
Mid-occultation observing point (lat., long.) 12.248 -105.523
At Journey Museum the miss angle is 965.6 arc-sec at 10/21/2024 03:44:14.4

Occultation of Spica 0.98 by moon 1% illuminated at phase= 346 degrees
10/30/2024 22:47:49.5 Geocentric minimum 0.5 degrees
Global start/end: 10/30/2024 20:40:44.3 and 10/31/2024 00:54:53.1
Mid-occultation observing point (lat., long.) 16.597 88.611

Occultation of Antares 1.06 by moon 6% illuminated at phase= 28 degrees
11/03/2024 18:04:08.7 Geocentric minimum 0.1 degrees
Global start/end: 11/03/2024 15:47:50.9 and 11/03/2024 20:20:27.2
Mid-occultation observing point (lat., long.) -31.657 -173.217

Occultation of Saturn 0.8 by moon 70% illuminated at phase= 114 degrees
11/10/2024 18:38:52.9 Geocentric minimum 0.1 degrees
Global start/end: 11/10/2024 16:31:38.0 and 11/10/2024 20:46:05.8
Mid-occultation observing point (lat., long.) -4.707 -92.637
At Journey Museum the miss angle is 1320.2 arc-sec at 11/10/2024 19:27:15.3

Occultation of Elnath 1.65 by moon 95% illuminated at phase= 207 degrees
11/17/2024 13:53:10.6 Geocentric minimum 0.4 degrees
Global start/end: 11/17/2024 11:52:21.9 and 11/17/2024 15:54:04.1
Mid-occultation observing point (lat., long.) 5.444 72.953

Occultation of Spica 0.98 by moon 13% illuminated at phase= 318 degrees
11/27/2024 05:38:32.6 Geocentric minimum 0.4 degrees
Global start/end: 11/27/2024 03:26:51.4 and 11/27/2024 07:50:11.4
Mid-occultation observing point (lat., long.) 10.834 -44.035

---For observations at Journey Museum:

11/27/2024 03:27:09.7 Start Total (elev -1 az 104 deg.) -38.4
11/27/2024 03:56:41.6 OCCULTATION MID-POINT (elev 4 az 109 deg.) -33.1 ***
11/27/2024 04:27:24.7 End Total (elev 9 az 115 deg.) -27.6 ***

Occultation of Saturn 0.9 by moon 47% illuminated at phase= 86 degrees
12/08/2024 01:41:11.7 Geocentric minimum 0.3 degrees
Global start/end: 12/07/2024 23:34:41.3 and 12/08/2024 03:47:40.3
Mid-occultation observing point (lat., long.) 5.883 129.995

Occultation of Elnath 1.65 by moon 100% illuminated at phase= 179 degrees
12/15/2024 00:26:23.7 Geocentric minimum 0.5 degrees
Global start/end: 12/14/2024 22:28:04.2 and 12/15/2024 02:24:46.0
Mid-occultation observing point (lat., long.) 1.233 -112.22
At Journey Museum the miss angle is 1626.0 arc-sec at 12/15/2024 00:45:55.2

Occultation of Mars -0.9 by moon 89% illuminated at phase= 218 degrees
12/18/2024 02:17:38.0 Geocentric minimum 0.9 degrees
Global start/end: 12/18/2024 00:46:44.2 and 12/18/2024 03:48:36.0
Mid-occultation observing point (lat., long.) 74.226 -15.528
At Journey Museum the miss angle is 1108.6 arc-sec at 12/18/2024 02:02:36.6

Occultation of Spica 0.98 by moon 32% illuminated at phase= 291 degrees
12/24/2024 13:20:21.8 Geocentric minimum 0.2 degrees
Global start/end: 12/24/2024 11:01:44.6 and 12/24/2024 15:38:57.6
Mid-occultation observing point (lat., long.) -2.542 167.01

Occultation of Antares 1.06 by moon 6% illuminated at phase= 333 degrees
12/28/2024 08:15:09.7 Geocentric minimum 0.1 degrees
Global start/end: 12/28/2024 06:00:00.6 and 12/28/2024 10:30:16.3
Mid-occultation observing point (lat., long.) -31.908 -79.785
At Journey Museum the miss angle is 1889.0 arc-sec at 12/28/2024 06:47:20.2

***** = The Moon is above the horizon, and the Sun is not a factor.**