

July 2018 Astronomy Calendar by Dave Mitsky
Some information supplied and/or added by Tony Donnangelo

All times are Daylight Saving Time (-4 hrs. U.T.).

Events listed are based on a location of 40°N in the Eastern US and may not be visible in all areas.

Concerning moderate and minor meteor shower activity:

Do not have any high expectations. This general information is to account for why you might be seeing a few more than normal meteors during your observing session.

Lunar light rays may occur prior to or after the predicted time. Initial observations might have occurred after the ray's inception or continued after the observer's session. Rays may last a very short time or for many hours. Obtain further information; send reports (including non-occurrences and miss-calculations), photos, and observations of new rays to:

The Robinson Lunar Observatory: <http://www.lunar-occultations.com/rlo/rlondx.htm>.

- 7/1 Crisium, Mare (sunset) lunar light ray predicted to occur at 1:29:36 a.m.
7/1 Comet 110P/Hartley is at opposition at 3.725 A.U.
7/1 Comet 75D/Kohoutek is at opposition at 4.137 A.U.
7/2 Hugh Dryden's 120th birthday (1898).
7/3 French Astronomy Week 2018 being held through the 6th in Bordeaux, France.
7/5 Fernelius (sunset) lunar light ray predicted to occur at 12:35:09 a.m. Moonrise 12:35 a.m.
7/5 SpaceFest IX being held through the 8th in Tucson, Arizona.
7/6 Earth is at aphelion at 1.017 A.U. from the Sun.
7/6 Comet P/2017 Y3 (Leonard) is at closest approach to Earth at 1.492 A.U.
7/6 Comet 101P/Chernykh is at opposition at 3.721 A.U.
7/7 Lecture on Introduction to Astronomy being held in Homolovi State Park, Arizona.
7/7 15th anniversary (2003) of Mars Exploration Rover B (Opportunity) launch.
7/7 George Graham's 345th birthday (1673).
7/8 Bootstrap School 2018 being held through the 14th in Pasadena, California.
7/9 Comet C/2017 S6 (Catalina) is at opposition at 1.354 A.U.
7/9 Comet 94P/Russell is at closest approach to Earth at 2.993 A.U.
7/9 Comet P/2008 Y12 (SOHO) is at opposition at 3.933 A.U.
7/10 Sigma Capricornids meteor shower (minor activity) peaks through the 20th. Duration is from 6/18 to 7/30. Observing and history:
http://meteorshoweronline.com/showers/sigma_capricornids.html
7/11 Green Bank Star Quest XV being held through the 14th in Green Bank, West Virginia.
7/11 Los Alamos Science Fest being held through the 15th in Los Alamos, New Mexico.
7/12 Mercury is at its greatest eastern elongation of 26°.
7/12 Tau Capricornids meteor shower (minor activity) peaks 12/13. Duration is from 6/2 to 7/29.
Observing and history: http://meteorshoweronline.com/showers/tau_capricornids.html
7/14 George Green's 225th birthday (1793).
7/14 AstroWeek 2018 being held through the 22nd in Pasadena, California.
7/14 Alpha Lyrids meteor shower (minor activity) peaks 14/15. Duration is from the 9th to 20th.
Observing and history: http://meteorshoweronline.com/showers/alpha_lyrids.html
7/14 July Phoenicids meteor shower (minor activity) peaks 14/15. Duration is from 9th to 17th.
Observing and history: http://meteorshoweronline.com/showers/july_phoenicids.html
7/15 Jocelyn Bell's 75th birthday (1943).
7/15 Henri Buisson's 145th birthday (1873).
7/16 Comet 49P/Arend-Rigaux is at perihelion at 1.430 A.U.
7/16 Comet C/2017 M4 (ATLAS) is at closest approach to Earth at 3.231 A.U.
7/17 Comet 216P/LINEAR is at opposition at 3.787 A.U.
7/17 Posidonius (sunrise) lunar light ray predicted to occur at 10:54:23 p.m. Moonset 11:55 pm.

7/17 Omicron Draconids meteor shower (minor activity) peaks 17/18. Duration is from 6th to 28th.
Observing and history: http://meteorshowersonline.com/showers/omicron_draconids.html

7/18 Comet C/2016 N6 (PANSTARRS) is at perihelion at 2.669 A.U.

7/18 Comet 94P/Russell is at opposition at 3.006 A.U.

7/18 Comet 233P/La Sagra is at opposition at 3.189 A.U.

7/18 Hendrik Lorentz's 165th birthday (1853).

7/19 Comet 364P/PANSTARRS is at closest approach to Earth at 0.236 A.U.

7/19 Comet C/2017 T3 (ATLAS) is at perihelion at 0.825 A.U.

7/19-22 BlueDot Festival, Jodrell Bank, United Kingdom

7/20 Maginus (sunrise) lunar light ray predicted to occur at 9:54:19 p.m.

7/22 Comet P/2007 T2 (Kowalski) is at perihelion at 0.656 A.U.

7/22 Comet 267P/LONEOS is at perihelion at 1.241 A.U.

7/22 Comet 366P/Spacewatch is at perihelion at 2.278 A.U.

7/22 Cichus A (sunrise) lunar light ray predicted to occur at 1:30:09 a.m. Moonset at 2:01 a.m.

7/22 Reinhold (sunrise) lunar light ray predicted to occur at 1:33:24 a.m. Moonset 2:01 a.m.

7/22 81st Annual Meeting of The Meteoritical Society being held through the 27th in Moscow, Russia.

7/22 Sinus Iridum (sunrise) lunar light ray predicted to occur at 10:06:48 p.m.

7/23 Comet 349P/Lemmon is at closest approach to Earth at 2.097 A.U.

7/23 Vera Rubin's 90th birthday (1928).

7/23 Scheiner (sunrise) lunar light ray predicted to occur at 12:23:56 a.m.

7/24 Asteroid 253 Mathilde is at closest approach to Earth at 1.068 A.U.

7/26 Comet 49P/Arend-Rigaux is at closest approach to Earth at 2.401 A.U.

7/26 Comet 150P/LONEOS is at opposition at 3.979 A.U.

7/26 Phocylides (sunrise) lunar light ray predicted to occur at 11:38:02 p.m.

7/27 Mars is at opposition.

7/27 Comet 138P/Shoemaker-Levy is at opposition at 1.894 A.U.

7/27 Comet 114P/Wiseman-Skiff is at opposition at 3.197 A.U.

7/28 73rd Annual General Meeting of the British Interplanetary Society, Waltham Abbey, United Kingdom.

7/28 Albert Wilson's 100th birthday (1918).

7/28 Theodor Wulf's 150th birthday (1868).

7/28 Southern Delta Aquarids meteor shower (moderate activity - 20/hr.) peaks 28/29. Duration is from 7/14 to 8/18. Observing and history:
http://meteorshowersonline.com/showers/delta_aquarids.html

7/29 South Delta-Aquarids Meteor Shower Peak

7/29 Comet 200P/Larsen is at opposition at 2.821 A.U.

7/30 80th Anniversary (1938) of Seth Nicholson's discovery of Jupiter's moon, Carme.

7/30 Alpha Pisces Australids meteor shower (minor activity) peaks 30/31. Duration is from 7/16 to 8/13. Observing and history:
http://meteorshowersonline.com/showers/alpha_pisces_australids.html

7/31 Comet 3D/Biela is at closest approach to Earth at 1.717 A.U.

7/31 Comet 3D/Biela is at opposition at 1.717 A.U.

7/31 Comet 76P/West-Kohoutek-Ikemura is at opposition at 2.868 A.U.

7/31 Asteroid (55) Pandora is at closest approach to Earth at 1.588 AU)

7/31 Richard Oldham's 160th birthday (1858).

7/31 John Canton's 300th birthday (1718).

7/31 Maskelyne F (sunset) lunar light ray predicted to occur at 10:10:57 p.m. Moonrise 10:38 pm.

7/31 Stiborius (sunset) lunar light ray predicted to occur at 11:15:54 p.m. Moonrise 10:38 p.m.

Comet information for: July 13, 2017 (New Moon).

	Constellation	Rises	Transits	Sets
48P/Johnson	Aquarius	11:19 p.m.	4:17 a.m.	9:16 a.m.
64P/Swift-Gehrels	Pisces	10:56 p.m.	5:13 a.m.	11:29 a.m.
39P/Stephen-Oterma	Cetus	2:30 a.m.	8:45 a.m.	2:39 p.m.
C/2017 M4 (ATLAS)	Hercules	1:46 p.m.	10:49 p.m.	7:50 a.m.
21P/Giacobini-Zinner	Cepheus	circumpolar	3:50 a.m.	
C/2017 S3 (PannSTARRS)	Camelopardalis	circumpolar	10:00 a.m.	
66/P du Toit	cetus	2:04 a.m.	6:59 a.m.	1:52 p.m.
29/P Schwassmann-Wachmann 1	Pisces	10:55 p.m.	5:05 a.m.	11:15 a.m.
37P/Forbes	Pisces	11:15 p.m.	5:21 a.m.	11:26 p.m.
C/2015 O1 (PannSTARRS)	Ursa Major	7:24 a.m.	5:27 p.m.	3:28 a.m.
C/2016 R2 (PannSTARRS)	Lynx	circumpolar	2:05 p.m.	

For location (40°16'N 76°45'W) Hummelstown, PA, USA:

July 1:

Event	Time	Altitude	Azimuth
Minimum altitude:	01:11	-26.6°	0°
Astronomical twilight begins:	03:38	-18.0°	35°
Nautical twilight begins:	04:26	-12.0°	45°
Civil twilight begins:	05:08	-6.0°	53°
Sunrise:	05:41	-0.8°	58°
Maximum altitude:	13:11	72.8°	180°
Sunset:	20:41	-0.8°	302°
Civil twilight ends:	21:13	-6.0°	307°
Nautical twilight ends:	21:55	-12.0°	315°
Astronomical twilight ends:	22:44	-18.0°	325°

August 1:

Event	Time	Altitude	Azimuth
Minimum altitude:	01:14	-31.7°	0°
Astronomical twilight begins:	04:15	-18.0°	46°
Nautical twilight begins:	04:57	-12.0°	54°
Civil twilight begins:	05:34	-6.0°	60°
Sunrise:	06:05	-0.8°	65°
Maximum altitude:	13:13	67.6°	180°

Event	Time	Altitude	Azimuth
Sunset:	20:21	-0.8°	294°
Civil twilight ends:	20:52	-6.0°	299°
Nautical twilight ends:	21:29	-12.0°	306°
Astronomical twilight ends:	22:10	-18.0°	314°

For location (40°16'N 76°45'W) Hummelstown, PA, USA:
July 1:

	Mercury	Venus	Mars	Jupiter	Saturn	Uranus	Neptune	Pluto
Right ascension	8 ^h 22 ^m 14. _{4^s}	9 ^h 31 ^m 35. _{0^s}	20 ^h 50 ^m 46. _{0^s}	14 ^h 44 ^m 26.1 _s	18 ^h 23 ^m 0.5 ^s	1 ^h 59 ^m 6.1 _s	23 ^h 10 ^m 41.6 _s	19 ^h 26 ^m 33. _{8^s}
Declination	20° 46' 58"	16° 31' 45"	-22° 53' 58"	-14° 45' 17"	-22° 29' 2"	11° 34' 47"	-6° 20' 20"	-21° 45' 34"
Range (AU)	1.017	1.057	0.447	4.764	9.051	20.250	29.529	32.594
Elongation from Sun	23.7°	40.7°	150.0°	124.0°	176.0°	67.5°	113.0°	169.2°
Brightness	0.0	-3.9	-2.2	-2.2	0.0	5.8	7.9	14.2
Equatorial Diameter	6.62"	15.78"	20.95"	41.39"	18.36"	3.48"	2.31"	0.10"
Phase Angle	78.1°	66.6°	20.9°	9.0°	0.4°	2.7°	1.8°	0.3°
Constellation	Cancer	Leo	Capricornus	Libra	Sagittarius	Aries	Aquarius	Sagittarius
Meridian transit	14:52	16:01	03:21	21:11	00:53	08:28	05:40	01:57
Rises	07:37	09:03	22:41	16:04	20:12	01:49	23:59	21:12
Sets	22:07	22:59	07:56	02:23	05:30	15:07	11:18	06:37
Altitude	-21.1°	-31.0°	21.9°	-31.3°	3.5°	37.7°	42.8°	13.4°
Azimuth	34.4°	19.1°	207.0°	277.2°	236.4°	108.8°	169.4°	225.4°
% illumination	60.6	69.9	96.7	99.4	100	99.9	100	100

August 1:

	Mercury	Venus	Mars	Jupiter	Saturn	Uranus	Neptune	Pluto
Right ascension	9 ^h 28 ^m 35. _{5^s}	11 ^h 40 ^m 13. _{0^s}	20 ^h 24 ^m 54. _{4^s}	14 ^h 46 ^m 40. _{2^s}	18 ^h 14 ^m 4.4 ^s	2 ^h 1 ^m 11.4 _s	23 ^h 9 ^m 3.2 ^s	19 ^h 23 ^m 21. _{3^s}
Declination	9° 59' 5"	2° 6' 39"	-26° 2' 15"	-15° 3' 59"	-22° 36' 34"	11° 45' 21"	-6° 31' 50"	-21° 55' 10"
Range (AU)	0.605	0.810	0.385	5.217	9.228	19.727	29.117	32.659
Elongation from Sun	12.7°	45.2°	170.3°	94.4°	143.8°	97.1°	143.7°	159.8°

	Mercury	Venus	Mars	Jupiter	Saturn	Uranus	Neptune	Pluto
Brightness	3.1	-4.1	-2.8	-2.0	0.2	5.8	7.8	14.2
Equatorial Diameter	11.12"	20.59"	24.32"	37.79"	18.01"	3.57"	2.35"	0.10"
Phase Angle	149.9°	82.5°	7.0°	10.8°	3.4°	2.9°	1.2°	0.6°
Constellation	Leo	Virgo	Capricornus	Libra	Sagittarius	Aries	Aquarius	Sagittarius
Meridian transit	13:55	16:05	00:54	19:12	22:38	06:28	03:37	23:48
Rises	07:22	09:57	20:28	14:05	18:02	23:45	21:56	19:08
Sets	20:28	22:12	05:15	00:22	03:19	13:08	09:13	04:31
Altitude	0.2°	20.0°	-0.1°	32.0°	20.0°	-30.9°	-17.0°	12.1°
Azimuth	283.0°	255.2°	125.0°	201.5°	147.6°	35.0°	84.1°	133.0°
% illumination	7.9	56.9	99.7	99.1	99.9	99.9	100	100

The objects listed below are located between 16:00 and 18:00 hours of right ascension.

Forty binary and multiple stars for July: Eta Draconis, 17 & 16 Draconis, Mu Draconis, Struve 2273, Nu-1 & Nu-2 Draconis, Psi Draconis (Draco); Kappa Herculis, Gamma Herculis, Struve 2063, 56 Herculis, Struve 2120, Alpha Herculis (Ras Algethi), Delta Herculis, Rho Herculis, Mu Herculis (Hercules); Rho Ophiuchi, Lambda Ophiuchi, 36 Ophiuchi, Omicron Ophiuchi, Burnham 126 (ADS 10405), Struve 2166, 53 Ophiuchi, 61 Ophiuchi (Ophiuchus); h5003 (Sagittarius); Xi Scorpii, Struve 1999, Beta Scorpii, Nu Scorpii, 12 Scorpii, Sigma Scorpii, Alpha Scorpii (Antares), h4926 (Scorpius); Struve 2007, 49 Serpentis, Struve 2031 (Serpens Caput); 53 Serpentis, Struve 2204, h4995, h2814 (Serpens Cauda); Epsilon Ursae Minoris (Ursa Minor)

Notable carbon star for July: V Ophiuchi (browse http://www.aavso.org/cgi-bin/shrinkwrap.pl?path=/charts/OPH/V_OPH/VOPH-A.GIF for a finder chart)

Sixty-five deep-sky objects for July: NGC 6140, NGC 6236, NGC 6340, NGC 6395, NGC 6412, NGC 6503, NGC 6543 (Draco); IC 4593, M13, M92, NGC 6106, NGC 6166, NGC 6173, NGC 6181, NGC 6207, NGC 6210, NGC 6229, NGC 6482 (Hercules); B61, B62, B63, B64, B72, IC 4634, IC 4665, LDN 42, LDN 1773, M9, M10, M12, M14, M19, M62, M107, NGC 6284, NGC 6287, NGC 6293, NGC 6304, NGC 6309, NGC 6356, NGC 6366, NGC 6369, NGC 6384, NGC 6401, Tr 26 (Ophiuchus); NGC 6440, NGC 6445 (Sagittarius); B50, B55, B56, Cr 316, M4, M6, M7, M80, NGC 6144, NGC 6153, NGC 6192, NGC 6231, NGC 6242, NGC 6302, NGC 6337, NGC 6451 (Scorpius); NGC 6217, NGC 6324 (Ursa Minor)

Top ten binocular deep-sky objects for July: IC 4665, LDN 1773, M4, M6, M7, M10, M12, M13, M92, NGC 6231

Top ten deep-sky objects for July: M4, M6, M7, M10, M12, M13, M92, NGC 6210, NGC 6231, NGC 6543

Challenge deep-sky object for July: NGC 6380 (Scorpius)