

October 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>.

- 10/?? Edward Troughton's 265th birthday (1753).
- 10/1 NASA's 60th birthday (1958).
- 10/1 The Moon is 3.5° south of the bright open cluster M35 in Gemini at 6:00 p.m.
- 10/1 Eta Cetids meteor shower (minor activity) peaks from the 1st through the 5th. Duration is from 9/20 through 11/2. Observing and history: http://meteorshowersonline.com/showers/eta_cetids.html
- 10/2 Comet 26P/Grigg-Skjellerup is at perihelion at 1.082 A.U.
- 10/2 Last Quarter Moon occurs at 5:45 a.m.
- 10/3 Comet 64P/Swift-Gehrels is at opposition at 0.484 A.U.
- 10/3 Alexander Macmillan's 200th birthday (1818).
- 10/3 Pitatus (sunset) lunar light ray predicted to occur at 1:01:13 a.m.
- 10/3 The Curtiss Cross, an X-shaped illumination effect located between the craters Parry and Gambart, is predicted to be visible at 3:00 a.m.
- 10/3 The Moon is 7.5° south of the first-magnitude star Pollux (Beta Geminorum) at 7:00 a.m.
- 10/3 The Moon is at the ascending node (longitude 123.5°) at 11:11 p.m.
- 10/4 World Space Week.
- 10/4 The Moon is 1.2° south of the bright open cluster M44 (the Beehive Cluster or Praesepe) in Cancer at 6:00 a.m.
- 10/4 October Cygnids meteor shower (minor activity) peaks from the 4th through the 9th. Duration is from 9/22 through 10/11. Observing and history: http://meteorshowersonline.com/showers/october_cygnids.html
- 10/5 Comet C/2018 N2 (ASASSN) is at opposition at 4.254 A.U.
- 10/5 95th Anniversary (1923) of Edwin Hubble's discovery of Cepheid variable star V1.
- 10/5** Venus is stationary in right ascension, with retrograde (westward) motion to commence, at 12:00 a.m.
- 10/5 Mercury is 2.0° N-NE of the first-magnitude star Spica (Alpha Virginis) at 2:00 p.m.
- 10/5 Venus is stationary in longitude at 3:00 p.m.
- 10/5 The Moon is at perigee, subtending 32' 37" from a distance of 366,392 kilometers (227,666 miles), at 6:27 p.m.
- 10/5 The Moon is 1.8° N-NE of the first-magnitude star Regulus (Alpha Leonis) at 7:00 p.m.
- 10/5 October Cetids meteor shower (minor activity) peaks on 5/6. Duration is from 9/8 to 10/30. Observing and history: http://meteorshowersonline.com/showers/october_cetids.html
- 10/5 Mercury is at the descending node through the ecliptic at 8:00 p.m.
- 10/6 Comet 26P/Grigg-Skjellerup is at closest approach to Earth at 2.032 A.U.
- 10/6 Comet 163P/NEAT is at closest approach to Earth at 2.093 A.U.
- 10/6 Comet 362P is at opposition at 3.372 A.U.
- 10/6 Homolovi State Park Star Party being held in Homolovi State Park, Arizona.
- 10/6 Mercury (magnitude -0.6) is 2.0° north-northeast of Spica at 5:00 a.m.

10/6 Delta Aurigids meteor shower (minor activity) peaks from the 6th through the 15th. Duration is from 9/22 through 10/23. Observing and history: http://meteorshowersonline.com/showers/delta_aurigids.html

10/7 ESA Open Day being held in Noordwijk, The Netherlands.

10/7 The dwarf planet/asteroid (1) Ceres is in conjunction with the Sun at 6:00 a.m.

10/8 Ejnar Hertzsprung's 145th birthday (1873).

10/8 The peak of the Draconid meteor shower (10 to 30 per hour) occurs at 11:00 a.m.

10/8 Autumn Arietids meteor shower (minor activity) peaks on 8/9. Duration is from 9/7 to 10/27. Observing and history: http://meteorshowersonline.com/showers/autumn_arietids.html

10/8 New Moon occurs (lunation 1185) at 11:47 p.m.

10/9 Draconids Meteor Shower Peak

10/9 Comet P/2018 P3 (PANSTARRS) is at perihelion at 1.757 A.U.

10/9 Comet 298P/Christensen is at opposition at 3.299 A.U.

10/9 Enchanted Skies Star Party (ESSP) being held through the 13th in Magdalena, New Mexico.

10/9 The Moon is 7.0° north-northeast of Spica at 2:00 p.m.

10/9 Draconids meteor shower (minor activity) peaks on 9/10. Duration is from the 6th to 10th. Observing and history: <http://meteorshowersonline.com/showers/draconids.html>

10/10 The Moon is 5.5° north-northeast of Mercury at 12:00 a.m.

10/11 Heinrich Olbers' 260th birthday (1758).

10/11 The Moon is 3.9° north-northeast of Jupiter at 7:00 p.m.

10/12 Northern Piscids meteor shower (minor activity) peaks on 12/13. Duration is from the 5th through the 16th. Observing and history: <http://meteorshowersonline.com/showers/piscids.html>

10/13 Comet P/2005 J1 (McNaught) is at perihelion at 1.533 A.U.

10/13 Comet 251P/LINEAR is at closest approach to Earth at 2.736 A.U.

10/13 Comet P/2013 EW90 (Tenagra) is at opposition at 3.504 A.U.

10/13 The Moon is 8.6° north of Antares (Alpha Scorpii) at 2:00 a.m.

10/14 Comet P/2001 R6 (LINEAR-Skiff) is at closest approach to Earth at 1.240 A.U.

10/14 Edward Sabine's 230th birthday (1788).

10/14 The Moon 1.8° north of Saturn at 11:00 p.m.

10/15 Comet P/2010 A1 (Hill) is at perihelion at 1.957 A.U.

10/15 Johan Tralles' 255th birthday (1763).

10/15 Evangelista Torricelli's 410th birthday (1608).

10/15 The winter solstice occurs in the northern hemisphere of Mars at 5:00 p.m.

10/15 Venus (magnitude -4.3) is 6.2° south-southwest of Mercury (magnitude -0.3) at 11:00 p.m.

10/16 Mars winter solstice.

10/16 Mercury is at aphelion (0.4667 A.U. from the Sun) at 5:00 a.m.

10/16 Asteroid (3)Juno is stationary at 2:00 p.m.

10/16 First Quarter Moon occurs at 2:01 p.m.

10/16 The Lunar X, also known as the Purbach or Werner Cross, an X-shaped illumination effect involving various rims and ridges between the craters La Caille, Blanchinus, and Purbach, is predicted to be visible at 3:22 p.m.

10/16 Barrow (sunrise) lunar light ray predicted to occur at 8:55:08 p.m.

10/17 Comet P/2001 R6 (LINEAR-Skiff) is at opposition at 1.240 A.U.

10/17 Comet 243P/NEAT is at closest approach to Earth at 1.496 A.U.

10/17 Comet C/2017 K4 (ATLAS) is at opposition at 2.857 A.U.

10/17 Moon at descending node (longitude 302.2°) at 8:08 a.m.

10/17 The Moon is at apogee, subtending 29'34" from a distance of 404,227 kilometers (251,175 miles), at 3:16 p.m.

10/18 Comet 100P/Hartley is at opposition at 3.719 A.U.

10/18 Comet C/2016 Q4 (Kowalski) is at closest approach to Earth at 6.216 A.U.

10/18 The Moon is 1.9° north-northwest of Mars at 8:00 a.m.

10/18 Epsilon Geminids meteor shower (minor activity) peaks on 18/19. Duration is from the 10th through the 27th. Observing and history: http://meteorshowersonline.com/showers/epsilon_geminids.html

10/20 International Observe the Moon Night 2018.

10/20 Comet P/2008 O2 (McNaught) is at perihelion at 3.815 A.U.

10/20 Saturn is at greatest declination south (-22.8°) at 4:00 p.m.
 10/20 The Moon is 3.0° south of Neptune at 6:00 p.m.
 10/21 The peak of the Orionid meteor shower (15 per hour) occurs at 5:00 p.m.
 10/21 Orionids meteor shower (15 per hour - major activity) peaks at 2:00 p.m. Duration is from 15th to 29th. Observing and history: <http://meteorshowersonline.com/orionids.html>
 10/22 Comet 243P/NEAT is at opposition at 1.498 A.U.
 10/22 Comet C/2016 Q4 (Kowalski) is at opposition at 6.218 A.U.
 10/22 Ernst Opik's 125th birthday (1893).
 10/23 Uranus is at opposition.
 10/23 Comet 267P/LONEOS is at closest approach to Earth at 0.811 A.U.
 10/23 Comet P/2015 M2 (PANSTARRS) is at opposition at 5.732 A.U.
 10/23 Ilya Frank's 110th birthday (1908).
 10/24 Comet P/2005 R1 (NEAT) is at closest approach to Earth at 1.145 A.U.
 10/24 Comet 197P/LINEAR is at opposition at 1.954 A.U.
 10/24 Uranus is at opposition (magnitude +5.7, apparent size 3.7") at 1:00; the Moon is 4.4° south-southeast of Uranus at 12:00 p.m.
 10/24 Full Moon, known as the Blood or Sanguine Moon and this year's Harvest Moon, occurs at 12:45 p.m.
 10/25 Richard Byrd's 130th birthday (1888).
 10/25 Pluto is at the descending node through the ecliptic plane at 4:00 p.m.
 10/26 James Cook's 290th birthday (1728).
 10/26 Lamé (sunset) lunar light ray predicted to occur at 1:56:19 a.m.
 10/26 Venus is in inferior conjunction with the Sun (0.272 a.u. from the Earth and 6.26° south of the Sun) at 14:00; the Moon is 8.4° south-southeast of the bright open cluster M45 (the Pleiades or Subaru) in Taurus at 5:00 p.m.
 10/27 Comet C/2018 B1 (Lemmon) is at closest approach to Earth at 4.431 A.U.
 10/27 The Moon is 1.6° north of Aldebaran (**Alpha Tauri**) at 11:00 a.m.
 10/28 European summer time ends set clock back one hour (European Union).
 10/28 Comet 64P/Swift-Gehrels is at closest approach to Earth at 0.445 A.U.
 10/28 Comet P/2008 CL94 (Lemmon) is at closest approach to Earth at 4.976 A.U.
 10/29 Comet 71P/Clark is at closest approach to Earth at 2.759 A.U.
 10/29 Comet C/2017 F1 (Lemmon) is at closest approach to Earth at 4.433 A.U.
 10/29 The Moon 3.3° south of M35 at 12:00 a.m.
 10/29 Mercury (magnitude -0.2) is 3.1° south-southwest of Jupiter (magnitude -1.7) at 3:00 a.m.
 10/30 Mercury passes 3.3° from Jupiter.
 10/30 Maurolycus (sunset) lunar light ray predicted to occur at 12:27:29 a.m.
 10/30 Julius Caesar (sunset) lunar light ray predicted to occur at 5:10:09 a.m.
 10/30 Curtius (sunset) lunar light ray predicted to occur at 5:27:52 a.m.
 10/30 The Moon is 7.3° south of Pollux at 1:00 p.m.
 10/31 The Moon at ascending node (longitude 120.6°) at 3:46; the Sun enters Libra (longitude 217.80° on the ecliptic) at 3:00 a.m.
 10/31 The Moon is 0.68 degree south of M44 (the Beehive Cluster or Praesepe) at 12:00 p.m.
 10/31 Last Quarter Moon occurs at 12:41 p.m.
 10/31 The Moon is at perigee, subtending 32' 17" from a distance of 370,204 kilometers (230,034 miles), at 4:23 p.m.

Ejnar Hertzsprung and Henry Norris Russell were born this month.

The first recorded solar eclipse took place on October 22, 2136 BCE. Supernova SN 1604 (Kepler's Supernova) became visible to the naked-eye on October 9, 1604. Giovanni Cassini discovered Saturn's odd satellite Iapetus on October 25, 1671. M51a (the Whirlpool Galaxy) was discovered by Charles Messier on October 13, 1773. William Lassell discovered Triton, Neptune's brightest satellite, on October 10, 1846. Marie Mitchell discovered Comet C/1847 T1 (Miss Mitchell's Comet) on October 1, 1847. Asteroid 8 Flora was discovered by John Russell Hind on October 18, 1847. Two of the satellites of Uranus, Ariel and Umbriel, were discovered by William Lassell on October 24, 1851. Edwin Hubble discovered Cepheid variable stars in M31 (the Andromeda Galaxy) on October 5, 1923.

Charles Kowal discovered 2060 Chiron, the first Centaur asteroid, on October 18, 1977. Michel Mayor and Didier Queloz announced the discovery of the exoplanet 51 Pegasi b (Dimidium) on October 6, 1995.

The Draconid (formerly the Giacobinid) meteor shower peaks on the night of October 8th/9th. The Draconids are quite variable and have produced meteor storms in 1933 and 1946. Comet 21P/Giacobini-Zimmer is the parent comet of the Draconids. Since this periodic comet reached perihelion in September, an outburst may be possible. Consult <http://earthsky.org/astronomy-essentials/everything-you-need-to-know-draconid-meteor-shower> for additional information on the Draconid meteor shower. The Southern Taurid shower, debris from Comet 2P/Encke, may produce five meteors per hour when it peaks on October 10th. The Orionid meteor shower peaks on the night of October 21st but is compromised by a 91%-illuminated waxing gibbous Moon. However, there will be a two-hour window of darkness before morning twilight begins. Orionid meteors are fragments of Comet 1P/Halley. Browse <http://www.timeanddate.com/astronomy/meteor-shower/orionid.html> or <http://earthsky.org/astronomy-essentials/everything-you-need-to-know-orionid-meteor-shower> for more on the Orionids.

Information on Iridium flares and passes of the ISS, the Tiangong-2, the USAF's X-37B, the HST, and other satellites can be found at <http://www.heavens-above.com/>

The zodiacal light may be visible in the pre-dawn eastern sky from a dark site, assuming that there is no moonlight present. Articles on the zodiacal light appear at <http://www.atoptics.co.uk/highsky/zod1.htm> and <http://earthsky.org/astronomy-essentials/everything-you-need-to-know-zodiacal-light-or-false-dawn>

The Moon is 21.1 days old, subtends 31.5 arc minutes, is illuminated 67.5%, and is located in Pisces on October 1st at 0:00 UT. The Moon reaches its greatest northern declination (+21.3 degrees) on October 30th and its greatest southern declination (-20.9 degrees) on October 15th. Longitudinal libration is at a maximum of +6.1 degrees on October 12th and a minimum of -4.8 degrees on October 24th. Latitudinal libration is at a maximum of +6.6 degrees on October 25th and a minimum of -6.5 degrees on October 10th. New Moon occurs on October 9th. The Moon is at apogee (a distance of 63.38 Earth-radii) on October 17th and at perigee (a distance of 57.45 Earth-radii) on October 5th and again (a distance of 58.05 Earth-radii) on October 31st. Consult <http://www.lunar-occultations.com/iota/planets/planets.htm> and <http://www.lunar-occultations.com/iota/bstar/bstar.htm> for further information on lunar occultation events. Visit <http://saberdoesthestars.wordpress.com/2011/07/05/saber-does-the-stars/> for tips on spotting extreme crescent Moons and <http://www.curtrenz.com/moon06.html> for Full Moon data. Times and dates for the lunar light rays predicted to occur in October are available at <http://www.lunar-occultations.com/rlo/rays/rays.htm>

The Sun is located in Virgo on October 1st at 0:00 UT. It enters Libra at 0:00 UT on October 31st.

Brightness, apparent size, illumination, distance from the Earth in astronomical units, and location data for the planets and Pluto on October 1st: Mercury (magnitude -0.9, 4.8", 98%, 1.41 a.u., Virgo), Venus (magnitude -4.8, 46.2", 17%, 0.36 a.u., Virgo), Mars (magnitude -1.3, 15.8", 88%, 0.59 a.u., Capricornus), Jupiter (magnitude -1.8, 32.6", 100%, 6.05 a.u., Libra), Saturn (magnitude +0.5, 16.5", 100%, 10.10 a.u., Sagittarius), Uranus (magnitude +5.7, 3.7", 100%, 18.88 a.u. on October 16th, Aries), Neptune (magnitude +7.8, 2.3", 100%, 29.15 a.u. on October 16th, Aquarius), and Pluto (magnitude +14.2, 0.1", 100%, 33.72 a.u. on October 16th, Sagittarius).

This month Mercury, Venus, Jupiter, and Saturn are located in the southwest, Mars in the south, and Uranus in the east, and Neptune in the southeast during the evening. At midnight, Mars, Uranus, and Neptune can be found in the south. Uranus is in the west in the morning sky.

Mercury reenters the evening sky low in the southwest in late October. Southern hemisphere observers are favored. Mercury is at the descending node on October 6th and reaches aphelion on October 16th.

At 40 degrees north latitude, Venus is just two degrees high 30 minutes after the Sun sets. Venus is stationary on October 5th and retrogrades sunward afterwards. The brightest planet passes six degrees south of the Sun when it achieves inferior conjunction on October 26th. Just prior to that Venus will appear as an extremely thin crescent and will subtend more one arc minute. Venus enters the morning sky in early November.

Mars fades from magnitude -1.3 to magnitude -0.6 and decreases in apparent size from 15.8 to 12.0 arc seconds this month. This is about half of its angular diameter when it achieved opposition in late July. Mars reaches culmination around 9:00 p.m. local daylight time at the start of the month. Mare Cimmerium is the most prominent albedo feature as October begins, followed by Mare Sirenum at the end of the first week. In mid-October, look for Solis Lacus (the Eye of Mars). Sinus Meridian and Sinus Sabaeus stand out a week later. During the final week of October, the bright Hellas basin and Syrtis Major make an appearance. The waxing gibbous Moon passes 1.9 degrees north of the Red Planet on October 18th. The eastward motion of Mars carries it from southwestern to northeastern Capricornus by the end of October. Martian surface feature simulators are available at <https://is.gd/marsprofiler> and <https://www.calsky.com/cs.cgi/Planets/5/1>

On October 1st, Jupiter is ten degrees above the horizon one hour after the Sun sets. It loses approximately three degrees of altitude each week. The waxing crescent Moon passes four degrees south of Mars on October 11th.

Saturn is low in the south in early evening in early October and sets around 11:00 p.m. local daylight time. By the end of the month, it sets after 9:00 p.m. Saturn lies 1.8 degrees south of the waxing crescent Moon on the evening of October 14th in the Americas. The Ringed Planet's disk is some 16 arc seconds in angular diameter in mid-October. Its rings measure 37 arc seconds and are inclined 27 degrees. Twelfth-magnitude Enceladus reaches greatest eastern elongation on the night of October 1st. An illustration showing its position can be seen on page 42 of the October 2018 issue of *Astronomy*. For further information on Saturn's satellites, browse <http://www.skyandtelescope.com/observing/interactive-sky-watching-tools/>

Uranus reaches opposition on October 24th. At that time, the seventh planet is located at a declination of +11.0 degrees (the highest it has been at opposition since February 1962), shines at magnitude +5.7, and subtends 3.7 arc seconds. The ice giant is located 2.8 degrees northeast of the fourth-magnitude star Omicron Piscium for several nights around the time of opposition. Browse http://www.bluewaterastronomy.info/resources/planets-charts-2018/09uranus_2018_1.pdf for a finder chart.

Neptune is located midway between the fourth-magnitude stars Lambda and Phi Aquarii in early October. The eighth planet's retrograde (westward) motion takes it closer to Lambda over the course of the month. Its position is 2.1 degrees east of that star on October 31st. A finder chart is posted http://www.bluewaterastronomy.info/resources/planets-charts-2018/10neptune_2018_1.pdf

Additional online finder charts for Uranus and Neptune can be found at <http://www.nakedeyeplanets.com/uranus.htm> and <http://www.nakedeyeplanets.com/neptune.htm> and also at https://www.skyandtelescope.com/wp-content/uploads/WEB_UrNep18.pdf and on pages 48 and 49 of the September 2018 issue of *Sky & Telescope*.

Click on <http://www.skyandtelescope.com/observing/interactive-sky-watching-tools/> for JavaScript utilities that will illustrate the positions of the five brightest satellites of Uranus and the position of Triton, Neptune's brightest satellite.

The dwarf planet Pluto is located in northeastern Sagittarius near the Teaspoon asterism. Finder charts for Pluto are available on pages 48 and 49 of the July 2018 issue of *Sky & Telescope* and page 243 of the *RASC Observer's Handbook 2018*. A finder chart is posted online at <http://www.bluewaterastronomy.info/resources/planets-charts-2018/Pluto-mapFeb2018-Mar2019.jpg>

For more on the planets and how to locate them, see <http://www.nakedeyeplanets.com/>

Comet 21P/Giacobini-Zinner should shine at eighth magnitude as it dives southeastward through Monoceros and Puppis this month. The periodic comet passes just north of the open cluster M50 on October 7th. Click on <https://theskylive.com/21p-info> and <http://www.cometwatch.co.uk/comet-21p/> for additional information. Another periodic comet, Comet 38P/Stephan-Oterma, may shine at tenth magnitude as it heads northeastward through northeastern Orion and southeastern Gemini. It passes approximately five degrees north of the first-magnitude star Betelgeuse on the morning of October 1st and just over one degree south of the fourth-magnitude star Xi Orionis on the morning of October 8th. A finder chart appears on page 48 of the October 2018 issue of *Sky & Telescope*. Browse <http://cometchasing.skyhound.com/> and <http://www.aerith.net/comet/future-n.html> for further information on comets visible this month. Other sources of information include <https://theskylive.com/comets> and <http://www.shopplaza.nl/astro/comets/comets.htm> and http://britastro.org/computing/charts_comet.html

Asteroid 4 Vesta shines at eighth magnitude as it travels eastward through Sagittarius this month. It lies 2.1 degrees to the west of Lambda Sagittarii (magnitude +2.8) on October 1st and within one degree of that star from October 5th to October 9th. Vesta passes 20 arc minutes south of Lambda Sagittarii on October 7th. It lies within one degree north of Sigma Sagittarii (magnitude +2.1) from October 21st to October 24th, passing just 40 arc minutes from that star on October 23rd. The second largest of the main belt asteroids glides south of three globular clusters during October. It lies within one degree of M28 and NGC 6638 during the first ten days of the month and within two degrees of M22 during the second week of October. Two asteroids brighter than magnitude +11.0 reach opposition this month, namely 63 Ausonia on October 7th and 346 Hermentaria on October 16th. The main belt asteroid 216 Kleopatra occults the star TYC 765-506-1 (magnitude +11.1) in northern Canis Major on the morning of October 28th. For information on this and other upcoming asteroid occultation events and on the bright asteroids, consult <http://asteroidoccultation.com/> and <http://www.curtrenz.com/asteroids.html> respectively.

A wealth of current information on solar system celestial bodies is posted at <http://nineplanets.org/> and <http://www.curtrenz.com/astronomy.html>

Various events taking place within our solar system are discussed at <http://www.bluewaterastronomy.info/styled-4/index.html>

Information on the celestial events transpiring each week can be found at <http://astronomy.com/skythisweek> and <http://www.skyandtelescope.com/observing/sky-at-a-glance/>

The famous eclipsing variable star Algol (Beta Persei) is at a minimum, decreasing in brightness from magnitude +2.1 to magnitude +3.4, on October 1st, 3rd, 6th, 9th, 12th, 15th, 18th, 21st, 23rd, 26th, and 29th. Consult page 49 of the October 2018 issue of *Sky & Telescope* for the minima times. On the night of October 20th, Algol shines at minimum brightness (magnitude +3.4) for approximately two hours on centered at 10:39 p.m. EDT (2:39 UT on October 21st). For more on Algol, see <http://stars.astro.illinois.edu/sow/Algol.html> and <http://www.solstation.com/stars2/algol3.htm>

Free star charts for the month can be downloaded at <http://www.skymaps.com/downloads.html> and <https://www.telescope.com/content.jsp?pageName=Monthly-Star-Chart> and <http://whatsouttonight.com/>

Data on current supernovae can be found at <http://www.rochesterastronomy.org/snimages/>

Finder charts for the Messier objects and other deep-sky objects are posted at <https://freestarcharts.com/messier> and <https://freestarcharts.com/ngc-ic> and http://www.cambridge.org/features/turnleft/seasonal_skies_july-september.htm

Telrad finder charts for the Messier Catalog and the SAC's 110 Best of the NGC are posted at http://www.astro-tom.com/messier/messier_finder_charts/map1.pdf and <http://sao64.free.fr/observations/catalogues/cataloguesac.pdf> respectively.

Information pertaining to observing some of the more prominent Messier galaxies can be found at <http://www.cloudynights.com/topic/358295-how-to-locate-some-of-the-major-messier-galaxies-and-helpful-advice-for-novice-amateur-astronomers/>

Author Phil Harrington offers an excellent freeware planetarium program for binocular observers known as TUBA (Touring the Universe through Binoculars Atlas), which also includes information on purchasing binoculars, at <http://www.philharrington.net/tuba.htm>

Stellarium and Cartes du Ciel are useful freeware planetarium programs that are available at <http://stellarium.org/> and <https://www.ap-i.net/skychart/en/start>

Deep-sky object list generators can be found at <http://www.virtualcolony.com/sac/> and <http://tonightssky.com/MainPage.php> and <https://dso-browser.com/>

Freeware sky atlases can be downloaded at <http://www.deepskywatch.com/files/deepsky-atlas/Deep-Sky-Hunter-atlas-full.pdf> and <http://astro.mxd120.com/free-star-atlases>

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

Event	Time	Altitude	Azimuth
Minimum altitude:	00:57	-52.9°	0°
Astronomical twilight begins:	05:33	-18.0°	79°
Nautical twilight begins:	06:05	-12.0°	84°
Civil twilight begins:	06:36	-6.0°	89°
Sunrise:	07:03	-0.8°	94°
Maximum altitude:	12:56	46.4°	180°
Sunset:	18:49	-0.8°	266°
Civil twilight ends:	19:16	-6.0°	271°
Nautical twilight ends:	19:48	-12.0°	276°
Astronomical twilight ends:	20:20	-18.0°	281°

November 1:

Event	Time	Altitude	Azimuth
Minimum altitude:	00:51	-64.1°	0°
Astronomical twilight begins:	06:05	-18.0°	94°
Nautical twilight begins:	06:36	-12.0°	99°
Civil twilight begins:	07:08	-6.0°	104°
Sunrise:	07:37	-0.8°	108°
Maximum altitude:	12:50	35.2°	180°
Sunset:	18:04	-0.8°	251°
Civil twilight ends:	18:32	-6.0°	256°
Nautical twilight ends:	19:04	-12.0°	261°
Astronomical twilight ends:	19:36	-18.0°	266°

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

October 1:

	Mercury	Venus	Mars	Jupiter	Saturn	Uranus	Neptune	Pluto
Right ascension	12 ^h 59 ^m 10.2 ^s	14 ^h 22 ^m 0.1 ^s	20 ^h 36 ^m 57.7 ^s	15 ^h 18 ^m 43.9 ^s	18 ^h 12 ^m 5.9 ^s	1 ^h 56 ^m 58.9 ^s	23 ^h 3 ^m 17.5 ^s	19 ^h 20 ^m 6.7 ^s
Declination	-5° 44' 42"	-21° 22' 44"	-22° 33' 4"	-17° 30' 11"	-22° 45' 49"	11° 21' 37"	-7° 8' 41"	-22° 7' 26"
Range (AU)	1.405	0.359	0.595	6.050	10.103	18.949	29.021	33.454
Elongation from Sun	8.0°	33.0°	117.9°	44.0°	84.9°	156.7°	156.3°	100.6°
Brightness	-0.8	-4.4	-1.3	-1.7	0.5	5.7	7.8	14.2
Equatorial Diameter	4.79"	46.54"	15.75"	32.58"	16.45"	3.72"	2.35"	0.10"
Phase Angle	18.5°	131.5°	39.8°	7.4°	5.7°	1.1°	0.8°	1.7°
Constellation	Virgo	Virgo	Capricornus	Libra	Sagittarius	Aries	Aquarius	Sagittarius
Meridian transit	13:26	14:47	21:02	15:44	18:37	02:24	23:27	19:44
Rises	07:46	10:06	16:25	10:47	14:01	19:42	17:52	15:06
Sets	19:06	19:29	01:42	20:41	23:13	09:02	05:06	00:27
Altitude	-26.1°	-51.4°	-41.5°	-58.3°	-66.9°	40.3°	-4.2°	-55.5°
Azimuth	74.4°	72.8°	274.5°	51.5°	314.0°	247.6°	264.2°	291.1°
% illumination	97.5	17.1	88.4	99.6	99.8	100	100	100

November 1:

	Mercury	Venus	Mars	Jupiter	Saturn	Uranus	Neptune	Pluto
Right ascension	15 ^h 55 ^m 56.2 ^s	13 ^h 41 ^m 23.7 ^s	21 ^h 37 ^m 56.6 ^s	15 ^h 44 ^m 46.2 ^s	18 ^h 20 ^m 35.3 ^s	1 ^h 52 ^m 11.9 ^s	23 ^h 1 ^m 1.9 ^s	19 ^h 21 ^m 12.8 ^s
Declination	-23° 4' 54"	-15° 49' 44"	-16° 31' 49"	-19° 5' 51"	-22° 46' 31"	10° 55' 31"	-7° 22' 17"	-22° 8' 17"
Range (AU)	1.108	0.276	0.793	6.294	10.588	18.888	29.366	34.004
Elongation from Sun	22.8°	11.0°	102.3°	19.3°	55.7°	170.9°	124.6°	69.7°
Brightness	-0.1	-4.1	-0.6	-1.6	0.6	5.7	7.9	14.3
Equatorial Diameter	6.07"	60.42"	11.80"	31.32"	15.70"	3.73"	2.33"	0.10"
Phase Angle	63.3°	164.8°	44.0°	3.5°	4.7°	0.5°	1.6°	1.6°
Constellation	Scorpius	Virgo	Capricornus	Libra	Sagittarius	Aries	Aquarius	Sagittarius
Meridian transit	14:19	12:05	20:01	14:08	16:43	00:18	21:23	17:44
Rises	09:43	07:02	14:59	09:17	12:07	17:37	15:49	13:05
Sets	18:54	17:08	01:03	18:59	21:19	06:54	03:01	22:22
Altitude	26.5°	24.0°	-4.5°	30.3°	20.1°	-29.5°	-14.2°	13.5°
Azimuth	183.9°	219.8°	107.9°	187.3°	148.3°	40.1°	87.6°	135.4°
% illumination	73.3	1.5	86.0	99.9	99.8	100	100	100

Comet information for: October 8, 2018 (New Moon).

	Constellation	Rises	Transits	Sets
48P/Johnson	Pisces Austrinus	6:07 p.m.	10:23 p.m.	2:39 a.m.
78P/Gehrels 2	Aquarius	3:40 p.m.	9:13 p.m.	2:46 a.m.
46P/Wirtanen	Fornax	9:39 p.m.	1:52 a.m.	6:06 a.m.
64P/Swift-Geherls	Andromeda	4:01 p.m.	12:24 a.m.	8:48 a.m.
C/2018 L2 (ATLAS)	Serpens Caput	9:38 a.m.	3:32 p.m.	9:26 p.m.
C/2016 N6 (PannSTARRS)	Cancer	2:22 a.m.	8:56 a.m.	3:29 p.m.
38P/Stephen-Oterma	Orion	11:23 p.m.	6:12 a.m.	1:02 p.m.
C/2017 M4 (ATLAS)	Hercules	9:46 a.m.	4:16 p.m.	10:45 p.m.
21P/Giacobini-Zinner	Monoceros	1:34 a.m.	7:01 a.m.	12:29 p.m.
29/P Schwassmann-Wachmann 1	Pisces	4:44 p.m.	10:48 p.m.	4:52 a.m.
37P/Forbes	Pisces	4:29 p.m.	10:49 p.m.	5:09 a.m.

C/2015 O1 (PannSTARRS) Ursa Major 3:24 a.m. 11:52 p.m. 8:19 p.m.
C/2016 R2 (PannSTARRS) Canis Venatici 2:24 a.m. 12:40 p.m. 10:54 p.m.
The objects listed below are located between 22:00 and 24:00 hours of right ascension:

Eighty-five binary and multiple stars for October: Struve 2973, Struve 2985, Struve 2992, Struve 3004, Struve 3028, Otto Struve 501, Struve 3034, Otto Struve 513, Struve 3050 (Andromeda); 29 Aquarii, 41 Aquarii, 51 Aquarii, 53 Aquarii, Zeta Aquarii, Struve 2913, Struve 2935, Tau-1 Aquarii, Struve 2944, Struve 2988, Psi-1 Aquarii, 94 Aquarii, 96 Aquarii, h3184, Omega-2 Aquarii, 107 Aquarii (Aquarius); Otto Struve 485, Struve 3037, 6 Cassiopeiae, Otto Struve 512, Sigma Cassiopeiae (Cassiopeia); Xi Cepheii, Struve 2883, Struve 2893, Struve 2903, Krueger 60, Delta Cephei, Struve 2923, Otto Struve 482, Struve 2947, Struve 2948, Struve 2950, Struve 2984, Omicron Cephei, Otto Struve 502 (Cepheus); Otto Struve 459, h1735, Struve 2876, Otto Struve 465, Struve 2886, Struve 2894, h1756, Struve 2902, Struve 2906, 8 Lacertae, Otto Struve 475, 13 Lacertae, h1828, 16 Lacertae (Lacerta); Struve 2857, Struve 2877, 34 Pegasi, Struve 2908, Xi Pegasi, Struve 2958, Struve 2978, 57 Pegasi, Struve 2991, h1859, Struve 3007, Struve 3021, Otto Struve 504, Struve 3044 (Pegasus); Struve 3009, Struve 3019, Struve 3033 (Pisces); Eta Piscis Austrini, Beta Piscis Austrini, Dunlop 241, h5356, Gamma Piscis Austrini, Delta Piscis Austrini, h5371 (Piscis Austrinus); h5417, Delta Sculptoris, h5429 (Sculptor)

Seventy-five deep-sky objects for October: NGC 7640, NGC 7662, NGC 7686 (Andromeda); NGC 7180, NGC 7183, NGC 7184, NGC 7293, NGC 7392, NGC 7585, NGC 7606, NGC 7721, NGC 7723, NGC 7727 (Aquarius); Cz43, K12, M52, NGC 7635, NGC 7788, NGC 7789, NGC 7790, St12 (Cassiopeia); B171, B173-4, IC 1454, IC 1470, K10, Mrk50, NGC 7235, NGC 7261, NGC 7354, NGC 7380, NGC 7419, NGC 7510 (Cepheus); IC 1434, IC 5217, NGC 7209, NGC 7223, NGC 7243, NGC 7245 (Lacerta); NGC 7177, NGC 7217, NGC 7320 (the brightest galaxy in Stephan's Quintet), NGC 7331, NGC 7332, NGC 7339, NGC 7448, NGC 7454, NGC 7479, NGC 7619 (the brightest member of Pegasus I), NGC 7626, NGC 7678, NGC 7742, NGC 7769 (Pegasus); NGC 7541, NGC 7562, NGC 7611 (Pisces); IC 5156, IC 5269, IC 5271, NGC 7172, NGC 7173, NGC 7174, NGC 7176, NGC 7201, NGC 7203, NGC 7214, NGC 7221, NGC 7229, NGC 7314, NGC 7361 (Piscis Austrinus); NGC 7507, NGC 7513, NGC 7713, NGC 7755, NGC 7793 (Sculptor)

Top ten binocular deep-sky objects for October: M52, NGC 7209, NGC 7235, NGC 7243, NGC 7293, NGC 7510, NGC 7686, NGC 7789, NGC 7790, St12

Top ten deep-sky objects for October: K12, M52, NGC 7209, NGC 7293, NGC 7331, NGC 7332, NGC 7339, NGC 7640, NGC 7662, NGC 7789

Challenge deep-sky object for October: Jones 1 (PK104-29.1) (Pegasus)