

OBSERVING HIGHLIGHTS for January 28 to February 13, 2023, a “bright Moon” Period.
Black Canyon Astronomical Society (BCAS), western Colorado, USA

SUMMARY. Brilliant Venus, bright Jupiter, and Mars, still bright, but fading, are prominent in the early evening sky during this bright Moon period. For early risers, Mercury is easy to spot in the pre-dawn sky through the first week of February. Comet C/2022 E3 (ZTF) enters the evening sky, as it moves south through constellations Camelopardalis, Auriga, and Taurus. With binoculars watch the Comet pass just 1.5 degrees southwest of the bright star, Capella, on the evening of February 5 and just 1.5 degrees northeast of reddish Mars on the night of February 10-11. The Moon reaches first quarter on the night of January 28. From January 29 to February 4, the gibbous Moon waxes to full on February 5. From Colorado on the evening of January 30 between 9:00 and 11:30 PM MST, the gibbous Moon passes just south of Mars (The Moon occults, or covers up Mars, for folks in Southern California, Arizona, New Mexico, Texas, and parts of the southeastern U.S.). The Moon reaches last quarter on February 13. The Sun has been active recently. Many sunspots have been present, and there have been solar flares and coronal mass ejections of charged particles. You can monitor solar activity safely in real time on the internet. Do not look at the Sun directly without safe, specialized solar filters. Looking at the Sun can be very dangerous unless you take adequate precautions. Severe eye damage and even blindness can result. High solar activity is triggering auroras (aka “northern lights”), and you can view them in real time from Yellowknife, Canada on the [AuroraMax.com/live](https://www.auroramax.com/live) website. And for western Colorado, there are some evening passes of China’s bright Tiangong Space Station from January 28 to 30 and the even brighter International Space Station (ISS) from January 31 to February 7.

WESTERN SLOPE SKIES. Since 2011, the BCAS and KVN Community Radio have been producing Western Slope Skies (WSS), a biweekly astronomy feature. On February 3 and 8, Art Trevena presents “Comets: Icy, Dusty Visitors from Afar.” WSS features are linked here: <https://www.kvnf.org/show/western-slope-skies#stream/0>

Note: The apparent brightness of sky objects is measured in “magnitude” units. Many bright stars are magnitude +1, while the faintest stars easily visible to unaided eyes under dark skies are magnitude +6. Some of the brightest stars are 0 magnitude (e.g., Vega, Arcturus), while the brightest sky objects have negative magnitudes (e.g., Sirius at -1.5, Jupiter at -2 to -3, Venus at -4 to -5, the full Moon at -12 to -13, and the Sun at -26.7 magnitude). Angular distances on the sky are usually cited in degrees of arc. Helpful ways to estimate 1, 5, 10, 15, and 25 degrees of arc can be found here: <https://www.timeanddate.com/astronomy/measuring-the-sky-by-hand.html>

THE MOON. The Moon reaches **first quarter on January 28 (at 8:19 AM MST)**. From January 29 to February 4, watch a gibbous Moon wax. **The Moon is full on February 5** (exactly full at 11:29 AM MST). From February 6 to 12 we can watch a gibbous Moon wane. The Moon reaches **last quarter on February 13** at 9:01 AM MST. You can find a stunning visualization of lunar phases for all of year 2023 here: [Moon Phase and Libration 2023 - Moon: NASA Science](#)
From Colorado on the evening of January 30 between 9:00 and 11:30 PM MST, watch the 74%-illuminated, gibbous Moon pass just south of reddish Mars. For observers south of Colorado (e.g., in Southern California, Arizona, New Mexico, Texas, and parts of the southeastern U.S.), the Moon will occult (move in front of) Mars.

COMET C/2022 E3 (ZTF). Comet C/2022 E3 (ZTF) is closest to Earth on February 1, only 26 million miles away. That’s about as close as any planet gets to Earth! Bright moonlight will interfere with observing

the Comet during much of the night. But there are still some periods when the Moon is below the horizon, when it's worth watching this Comet move across our sky at as much as 6.5 degrees per day (1/4 degree per hour!). The following link contains finder charts, photos, and a table of when it's best to look for the comet without interference from bright moonlight:

[See the Comet ZTF \(C/2022 E3\)! - Sky & Telescope - Sky & Telescope \(skyandtelescope.org\)](https://skyandtelescope.org)

Try to spot the Comet with binoculars. It may be visible to unaided eyes for people with acute vision. Telescopes and time exposure photos may show greenish emission from the Comet's coma (the area surrounding the nucleus). The greenish color is likely due to gaseous, diatomic carbon. During this period, Comet C/2022 E3 (ZTF) enters the evening sky, as it moves south through constellations Camelopardalis, Auriga, and Taurus. With binoculars watch the Comet pass just 1.5 degrees southwest of the bright star, Capella, on the evening of February 5 and 1.5 degrees northeast of reddish Mars on the night of February 10-11. Updates, images, and ephemerides for C/2022 E3 (ZTF) can be found at these links:

<http://www.aerith.net/comet/catalog/2022E3/2022E3.html>

<http://astro.vanbuitenen.nl/comet/2022E3>

<https://www.cobs.si/cobs/comet/2323/>

VENUS: BRILLIANT DURING AND AFTER EVENING TWILIGHT. Brilliant Venus, shining at magnitude -3.9, is prominent in the west southwest during and just after evening twilight. On January 28 at 6:27 PM MST Venus is 10 degrees above the west-southwestern horizon at the end of nautical twilight (when the Sun is 12 degrees below the horizon). You might also see much fainter Saturn about 7 degrees below Venus on January 28 but spotting Saturn could be challenging. By February 12, Venus stands 14 degrees above the west-southwestern horizon at the end of nautical twilight at 6:45 PM MST. Between January 28 and February 13 Venus' apparent diameter increases from 11.0 to 11.6-arc sec wide, as its gibbous disk decreases from 92% to 89% illuminated and its distance from Earth decreases from 141 to 134 million miles. There will be four planetary conjunctions that involve Venus in the evening sky during the next six months. Venus is moving eastward toward conjunctions with Neptune on February 14, Jupiter on March 1, and Uranus on March 30. After early June, our Sister Planet will retrograde (move westward against background stars) toward a conjunction with Mercury in bright, evening twilight on July 26. **Please do your Venus spotting after sunset. NEVER chance looking at the Sun directly; serious eye damage can result.**

JUPITER – STILL BRIGHT IN THE EVENINGS. As the sky darkens, Jupiter shines brightly, about 30 degrees above the west-southwestern horizon, and the Giant Planet remains visible for about two more hours. Jupiter sets in the west at about 10:08 PM MST on January 28 and 9:19 PM MST on February 13. Jupiter, though still bright, fades slightly from magnitude -2.20 to -2.14 between January 28 and February 13, as its distance from Earth increases from 504 to 522 million miles. Using binoculars or a telescope, you can resolve Jupiter's disk, which appears 37 to 35 arc seconds wide. With a telescope you can easily see the dark belts and lighter colored zones in the Giant Planet's atmosphere. At times, you may also see the Great Red Spot, a giant storm in Jupiter's southern hemisphere. You can spot Jupiter's four, bright "Galilean" moons with binoculars and telescopes. Identify these moons by their changing positions near Jupiter, night-by-night, by using various astronomy apps, or the following link:

https://skyandtelescope.org/wp-content/plugins/observing-tools/jupiter_moons/jupiter.html

If you have a telescope, try viewing shadow transits (Jovian solar eclipses!) of Jupiter's moons on the nights listed below. **Ganymede, wider than the planet Mercury, casts the largest shadow of Jupiter's moons, and its shadow is the easiest to spot crossing Jupiter. There's a "prime time" transit of Ganymede's shadow on January 27 (the day of this e-mail message/posting) from 5:56 to 8:30 PM**

MST (Hope for clear skies!). Europa's smaller shadow is more challenging to see. Io's shadow is larger than Europa's but smaller than Callisto's shadow.

January 27, 2023, 5:56 PM MST to 8:30 PM MST, Ganymede's shadow crosses Jupiter (Locally, the Sun sets at 5:29 PM MST).

February 1, 2023, 6:38 PM MST to 8:52 PM MST, Io's shadow crosses Jupiter.

February 8, 2023, 8:34 to 10:48 PM MST, Io's shadow crosses Jupiter (Locally, Jupiter sets at 9:34 PM MST).

February 13, 2023, 5:20 to 7:54 PM MST, Europa's shadow crosses Jupiter (Locally, the Sun sets at 5:48 PM MST).

MARS IN THE EVENING. After a close approach last November 30, we on Earth are now speeding away from Mars. As the sky darkens, the Red Planet shines 70 degrees high in the south at magnitude -0.4 on January 28, but it fades to magnitude +0.1 on February 13, as its distance from Earth increases from 79 to 92 million miles. Mars sets in the northwest at about 3:35 AM MST on January 28 and at 2:58 AM MST on February 13. During this period, Mars' apparent diameter decreases from 11.1 to 9.5 arc seconds, and it's getting more challenging to see Mars' surface features with telescopes.

MERCURY IN THE PRE-DAWN SKY. Mercury is a "morning star" in the predawn sky throughout this "bright Moon" period. On January 28 at 6:30 AM MST, Mercury is bright and easy to spot, shining at magnitude -0.03 about 6 degrees above the east-southeastern horizon in moderate twilight with the Sun 11 degrees below the horizon. Mercury reaches its greatest angular separation from the Sun on January 30. After January 30, Mercury continues to brighten, but the "Speedster Planet" descends rapidly into the glaring twilight and becomes harder to spot after about February 7. Mercury's gibbous disk appears to wax from 59% illuminated on January 28 to 81% illuminated on February 13, as the Innermost Planet's distance from Earth increases from 90 to 112 million miles. **Please do your Mercury spotting before sunrise. NEVER chance looking at the Sun directly; serious eye damage can result.**

THE SUN. Solar activity has been increasing during the past two years, and it can be interesting to monitor the Sun. M-class ("moderate") solar flares have been occurring frequently, and there were X-class ("extreme") flares on January 5, 9, and 10, 2023. There also have been coronal mass ejections ("CMEs") of charged particles that have triggered auroras recently. As of January 27, the huge sunspot that was visible last week has rotated to the far side of the Sun. However, there are other visible active regions, and more active regions are now rotating onto the Sun's visible face. So, keep watch for sunspots and solar flares with associated CMEs. You can monitor sunspots, solar flares, CMEs, and other solar activity safely and in "real time" at the following sites:

<https://sdo.gsfc.nasa.gov/data/>

<https://stereo.gsfc.nasa.gov/beacon/>

<http://halphi.nso.edu/>

<https://www.swpc.noaa.gov/>

<https://sohowww.nascom.nasa.gov/data/realtime-images.html>

<http://www.sidc.be/silso/ssngraphics>

Do not look at the Sun directly without safe, specialized solar filters. Looking at the Sun can be very dangerous unless you take adequate precautions. Severe eye damage and even blindness can result.

AURORAS (aka “polar lights” or “northern lights”). Although it can be challenging to spot auroras from Colorado’s mid-northern latitudes, “northern lights” have been seen from our region in the past year. Solar magnetic storms, when directed toward Earth, can cause auroras. With current, high solar activity, chances for auroras are good. You can get predictions for auroras, their intensity, and geographic extent from NOAA’s Space Weather Prediction Center: <https://www.swpc.noaa.gov/> You may also view auroras online in “real time” via the Canadian Space Agency’s “AuroraMax” all-sky camera at Yellowknife: <https://auroramax.com/live>

EARTH SATELLITE HIGHLIGHTS. The following predictions are for western Colorado, specifically **Montrose, in Mountain Standard Time (MST).** Numerous Earth satellites are visible every clear night. Brighter satellites have smaller magnitude numbers, and the brightest (e.g., the International and Tiangong Space Stations) may have negative magnitudes. These predictions are for selected passes of some bright and/or interesting satellites (as summarized from Heavens-Above.com).

January 27, 2023. Tiangong (Chinese Space Station). 5:56 to 5:58 to 6:02 PM MST, WNW to N to E, max altitude 54 deg above N, disappears into Earth’s shadow at 8 deg above E, max magnitude -1.9 (Passing through Vulpecula, Cygnus, Cepheus, Camelopardalis, Gemini, and Canis Minor). **Tiangong’s orbit may change frequently. Check for updates.**

January 28, 2023. Tiangong (Chinese Space Station). 6:32 to 6:36 to 6:38 PM MST, WNW to SSW to ESE, max altitude 75 deg above SSW, disappears into Earth’s shadow 21 deg above ESE, max magnitude -2.1 (Passing through Pegasus, Andromeda, Ares/Triangulum, Taurus, and Orion). **Tiangong’s orbit may change frequently. Check for updates.**

January 29, 2023. Tiangong (Chinese Space Station). 7:10 to 7:13 to 7:14 PM MST, W to SSW to S, max altitude 25 deg above SSW, disappears into Earth’s shadow 22 deg above S, max magnitude -0.2 (Passing through Pegasus, Aquarius/Cetus, Fornax, and Eridanus). **Tiangong’s orbit may change frequently. Check for updates.**

January 30, 2023. Tiangong (Chinese Space Station). 6:10 to 6:13 to 6:16 PM MST, W to SSW to SE, max altitude 44 deg above SSW, max magnitude -1.0 (Passing through Pegasus, Pisces-near Jupiter, Cetus, Eridanus, Lepus, and Canis Major). **Tiangong’s orbit may change frequently. Check for updates.**

January 31, 2023. International Space Station (ISS). 7:05 to 7:08 PM MST, NW to N, disappears into Earth’s shadow at maximum altitude 39 deg above N, max magnitude -3.0 (Passing through Cygnus, Draco, and Ursa Minor). **Predictions for the ISS are subject to change due to orbital adjustments. Check for updated predictions.**

February 1, 2023. International Space Station (ISS). 6:17 to 6:20 to 6:22 PM MST, NNW to NNE to E, maximum altitude 26 deg above NNE, disappears into Earth’s shadow 14 deg above E, max magnitude -2.6 (Passing through Draco, Ursa Minor, Camelopardalis, Lynx, and Cancer). **Predictions for the ISS are subject to change due to orbital adjustments. Check for updated predictions.**

February 2, 2023. International Space Station (ISS). 7:04 to 7:08 to 7:09 PM MST, NW to SW to SSE, maximum altitude 67 deg above SW, disappears into Earth’s shadow 38 deg above SSE, max magnitude -3.5 (Passing through Cygnus, Lacerta, Andromeda, Triangulum, Aries, Taurus, and Eridanus, and Orion-near Rigel). **Predictions for the ISS are subject to change due to orbital adjustments. Check for updated predictions.**

February 3, 2023. International Space Station (ISS). 6:15 to 6:19 to 6:22 PM MST, NW to NE to ESE, maximum altitude 65 deg above NE, max magnitude -3.5 (Passing through Cygnus, Cepheus, Camelopardalis, Auriga, Gemini, and Monoceros). Predictions for the ISS are subject to change due to orbital adjustments. Check for updated predictions.

February 4, 2023. International Space Station (ISS). 7:04 to 7:06 to 7:09 PM MST, W to SW to S, maximum altitude 22 deg above SW, max magnitude -1.3 (Passing through Pegasus, Pisces, Cetus, Fornax, and Eridanus). Predictions for the ISS are subject to change due to orbital adjustments. Check for updated predictions.

February 5, 2023. International Space Station (ISS). 6:14 to 6:17 to 6:20 PM MST, WNW to SW to SSE, maximum altitude 39 deg above SW, max magnitude -2.3 (Passing through Pegasus, Pisces-near Jupiter, Cetus, Eridanus, and Columba). Predictions for the ISS are subject to change due to orbital adjustments. Check for updated predictions.

February 7, 2023. International Space Station (ISS). 6:14 to 6:16 to 6:18 PM MST, W to SW to SSW, maximum altitude 14 deg above SW, max magnitude -0.5 (Passing through Equuleus, Aquarius-near Venus, Sculptor, and Eridanus). Predictions for the ISS are subject to change due to orbital adjustments. Check for updated predictions.

February 12, 2023. SJ 16-02. Chinese reconnaissance satellite, launched in 2016. 7:09 to 7:14 to 7:18 PM MST, SSW to ESE to NNE, max altitude 84 deg above ESE, max magnitude +1.2 (passing through Eridanus, Taurus-near Mars, Auriga-near Capella, Camelopardalis, and Draco).

February 13, 2023. Tiangong (Chinese Space Station). 5:49 to 5:53 to 5:55 AM MST, SSW to SSE to E, max altitude 19 deg above SSE, max magnitude +0.4 (Passing through Lupus, Scorpius, Sagittarius, Scutum, and Aquila). Tiangong's orbit may change frequently. Check for updates.

Satellite orbits can change. **These predictions for satellite passes may be inaccurate by up to several minutes, especially after February 1.** For more accurate predictions of these and other satellites, check Heavens-Above.com or other satellite prediction sites for updates on the nights you wish to observe. Be sure to set application(s) for your location and time zone.

HAPPY OBSERVING!