OBSERVING HIGHLIGHTS for March 22 to April 4, 2025, a "dark Moon period"
Black Canyon Astronomical Society (BCAS), western Colorado, USA

SUMMARY. Late March is our last chance until later in the year to enjoy the bright stars of winter high in a dark sky. As twilight ends, look west to spot reddish Aldebaran and the Pleiades Star Cluster in Constellation Taurus, look southwest to see blue-white Rigel and reddish Betelgeuse in Orion, and look south southwest to spot Sirius, the night sky's brightest star, in Canis Major. As the winter stars set in the west, spring constellations are rising in the east, including Hydra, Leo, Virgo, and Ursa Major with its Big Dipper asterism.

With moonlight absent from the early evening sky from March 21 to 29, look for the faint and elusive zodiacal light from dark locations away from urban light domes to the west.

The Moon is at last quarter on March 22, and from March 23 to 27, we can watch a crescent Moon wane in the morning sky. The Moon is new on March 29, when it moves in front of the Sun for observers in the northeastern U.S., eastern Canada, and parts of Europe and Africa, who experience a partial solar eclipse. If you travel to view the eclipse, don't risk damaging your eyes by viewing the Sun without eye protection. Use specialized, safe solar filters. Watch the crescent Moon wax during evenings from March 30 to April 3. The Moon reaches first quarter on April 4. On the evening of April 1, the 19%- illuminated crescent Moon is a few degrees above the famous Pleiades Star Cluster - a nice view in binoculars – that's no April Fools' Day joke! On April 2, look for the 28%-illuminated crescent Moon just above the bright planet, Jupiter. On the evening of April 4, the first quarter Moon is west of Mars and south of Gemini's brightest stars, Pollux and Castor. Enjoy seeing earthshine faintly illuminate the nightside of the crescent Moon, especially on mornings from March 25 to 27 and on evenings from March 30 to April 2 (binoculars can provide eye-catching views!).

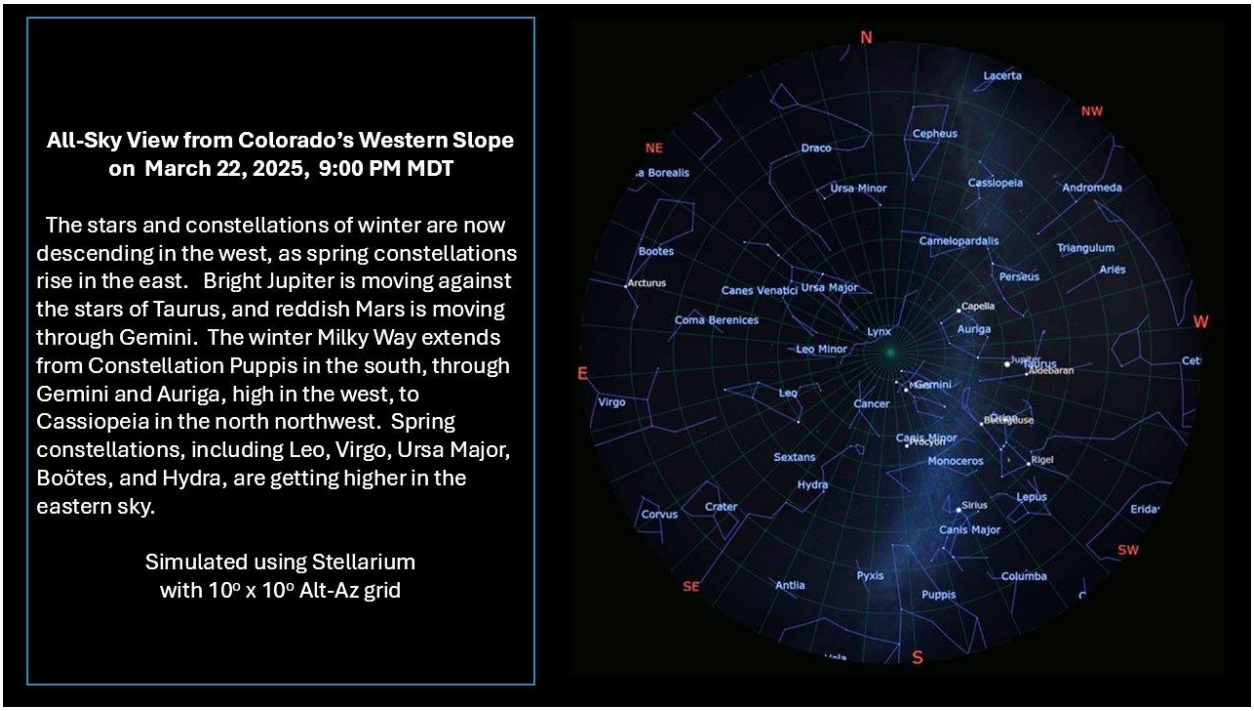
Venus rapidly disappeared from the evening sky by mid-March, passing just north of the Sun on March 22. By the end of March, you may be able to spot "Our Sister Planet" in morning twilight. From the Western Slope, look for Venus between 6:25 AM and 6:35 AM MDT a few degrees above an unobstructed eastern horizon (when the Sun is still below that horizon). By April 4, spotting Venus gets easier, as its angular distance from the Sun increases. Look for Venus before sunrise; never risk your eyesight by viewing the Sun directly. As twilight fades, bright Jupiter is high above the west-southwestern horizon, and the Giant Planet remains visible until after midnight. Reddish (or butterscotch-tinted?) Mars is more than 70 degrees above the southern horizon as twilight fades, and the Red Planet remains visible until it sets in the west northwest after 3 AM MDT.

The Sun is still very active. Moderate and even extreme solar flares may occur. There may also be coronal mass ejections (CMEs) that trigger geomagnetic storms and auroras (aka, polar or northern lights).

Try to spot the very bright International Space Station during evening passes from March 22 to April 2. And there are predawn passes of the almost-as-bright Tiangong (Chinese) Space Station from March 22 to April 3.

WONDERS OF A DARK, LATE MARCH - EARLY APRIL SKY. This period is our last chance until late this year to enjoy the bright stars and constellations of winter high in a dark sky. You can use a planetarium app or the all-sky chart below (for 9 PM MDT) to navigate. For more info, NOIRLab's constellation summaries, photos, and maps are hot linked here. As twilight ends, reddish Betelgeuse and blue-white Rigel in Constellation Orion are high in the southwest, Sirius (the sky's brightest star) in Canis Major is in the south southwest, Aldebaran and the Pleiades Star Cluster in Taurus (with bright visitor, Jupiter) are descending in the west, yellowish Capella in Auriga is high in the west northwest, and Constellation Gemini (with reddish visitor, Mars) is high in the South. The star clouds of the winter Milky Way extend from Constellation Puppis in the south, across Gemini and Auriga west of the zenith into Cassiopeia in

the north northwest. In the east, the constellations of spring are rising, including Leo, Virgo, Ursa Major (with its Big Dipper asterism), Boötes, and Hydra, the sky's largest constellation. If you get up before dawn, look to the east and you will see the constellations of summer, including Sagittarius, Aquila, Lyra, and Cygnus, along with the brightest parts of the Milky Way.

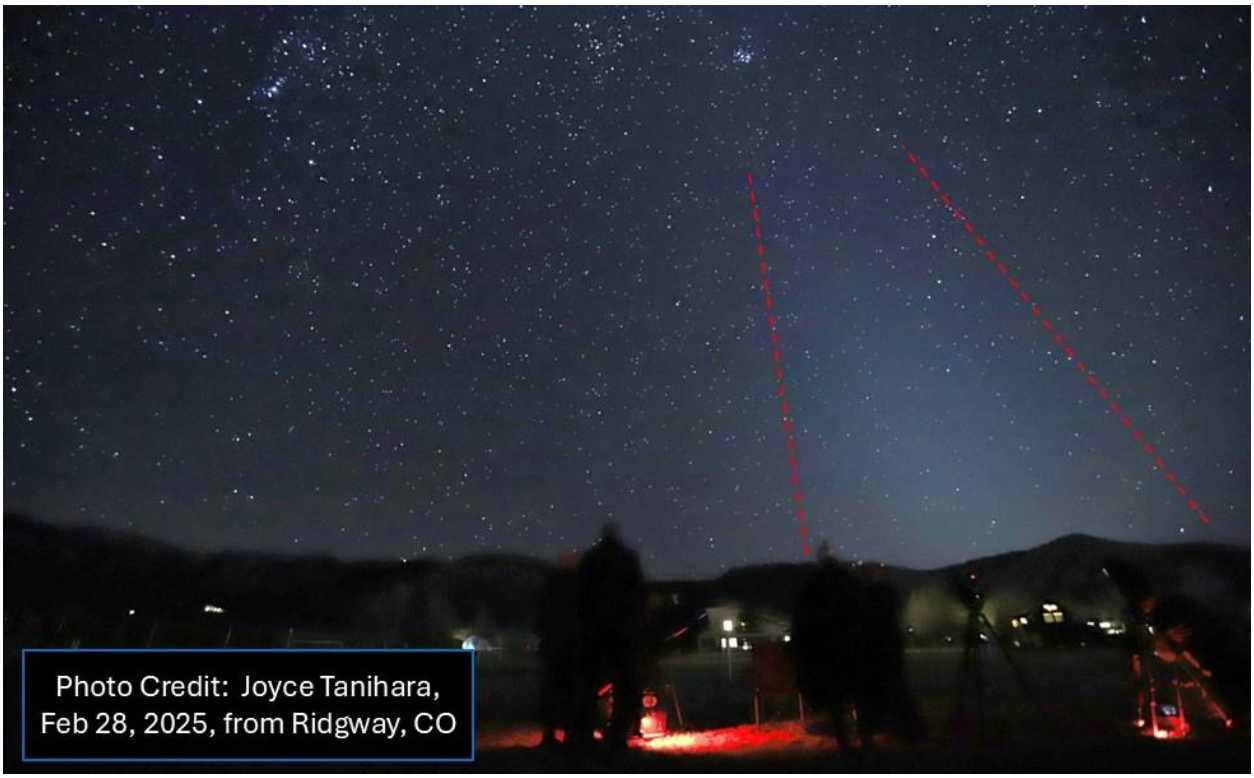


THE MOON. The Moon reaches **last quarter on March 22** (exactly at 5:29 AM MDT), and from March 23 to 27, we can watch a crescent Moon wane in the morning sky. The **Moon is new on March 29** (exactly new at 4:58 AM MDT), when there is a partial solar eclipse for folks in the northeastern U.S., eastern Canada, and parts of Europe and Africa (see item below). Watch the crescent Moon wax during evenings from March 30 to April 3. The **Moon reaches first quarter on April 4** (exactly at 8:15 PM MDT).

In the predawn of March 22, the last quarter Moon is just above the "spout" of the "teapot" asterism in Constellation Sagittarius, about as far south as the Moon can ever get in the sky. On March 27 between 6:15 and 6:35 AM MDT, look for a 5%-illuminated, waning crescent Moon about 20 degrees to the right of brilliant Venus in bright morning twilight; you'll need an unobstructed eastern horizon to see them. On the evening of April 1, a 19%-illuminated, waxing, crescent Moon is a few degrees above the famous Pleiades Star Cluster (aka Seven Sisters or M45) - a nice view for binoculars – that's no April Fools' Day joke! On the evening of April 2, look for the 28%-illuminated crescent Moon just above the bright planet, Jupiter. On April 4, the first quarter Moon is west of Mars and south of Gemini's brightest stars, Pollux and Castor. Enjoy seeing earthshine faintly illuminate the nightside of the crescent Moon, especially on mornings from March 25 to 27 and on evenings from March 30 to April 2 (binoculars can provide eye-catching views!). NASA has published a stunning visualization of lunar phases for year 2025. Another fun site is NASA's daily Moon guide. **Please do your crescent Moon spotting before sunrise and after sunset. NEVER chance looking at the Sun directly; serious eye damage can result.**

EVENING ZODIACAL LIGHT. Moonlight is absent from the early evening sky from March 21 to 29, giving us a chance to spot faint and elusive zodiacal light above the western horizon. Zodiacal light is sunlight that is scattered forward from dust particles orbiting the Sun around the plane of the Solar System.

From the northern hemisphere, evening zodiacal light is best seen for a few weeks around the March equinox, when the ecliptic (the line tracing path of the Sun against background stars) makes a high angle with western horizon. To see zodiacal light from the Western Slope, find a dark location that is free from urban light domes in the west. Then look west from March 21 to 29 (pick a clear night) between 8:50 and 9:15 PM MDT. Evening zodiacal light is a faint, diffuse cone of light that is broadest near the western horizon and tapers to nearly a point 25 to 35 degrees high in the western sky (as depicted between red, dashed lines in photo below, taken during a recent BCAS event).



PARTIAL SOLAR ECLIPSE – MARCH 29, 2025. A partial solar eclipse is visible on March 29 from parts of the northeastern United States, eastern Canada, Greenland, Iceland, Europe, and northwest Africa. This eclipse occurs at sunrise for the northeastern U. S. and eastern Canada, and eclipses at sunrise can be striking sights! A maximum of 94% of the Sun's diameter is covered by the Moon at a location on the eastern shore of Hudson's Bay, Canada (61° 0' N, 77° 10' W). The Sun's dark, umbral shadow misses the Earth completely on March 29, so no total eclipse is visible from our planet. People in Saint John's Newfoundland see the Moon cover 83% of the Sun's diameter. Folks in Boston see about 50% of the Sun's diameter covered by the Moon. If you travel to the northeastern U. S. or eastern Canada to view this eclipse, find a location with an unobstructed eastern horizon and use specialized, safe, solar filters. **NEVER look at the Sun directly; serious eye damage can result.**

VENUS – A "NEW" MORNING STAR! Brilliant Venus rapidly disappeared from the evening sky around the middle of March, and "Our Sister Planet" passes north of the Sun on March 22. But you may be able to spot Venus again before April 1, as Venus rapidly emerges from solar glare before dawn. On March 27 between 6:15 and 6:35 AM MDT from the Western Slope, look eastward to spot Venus about 20 degrees to the left of the 5%-illuminated, crescent Moon in bright morning twilight; you'll need an unobstructed eastern horizon to see them. After April 1, look for Venus between 6:00 AM and 6:25 AM

MDT several degrees above an unobstructed eastern horizon (when the Sun is at least six degrees below that horizon). By April 4, spotting Venus gets easier, as it rises 5 degrees above the horizon by 6:05 AM MDT.

Between March 27 and April 4, Venus brightens from magnitude -4.1 to -4.4, as its crescent phase waxes from only 2% to 6% illuminated. On March 22, Venus is only 26.1 million miles distant, when it's passing north of the Sun and lost in solar glare during inferior solar conjunction. That's closer to Earth than any other planet can get! Venus then speeds ahead of Earth and is 28.3 million miles distant on April 4. Venus' apparent diameter is 59 arc seconds on March 27, decreasing to 55 arc seconds on April 4. That may be large enough for spotting Venus' crescent phase with just binoculars! **Please do your Venus spotting before sunrise. NEVER chance looking at the Sun directly; serious eye damage can result.**

BRIGHT JUPITER AND ITS MOONS IN THE EVENING. As twilight fades, bright Jupiter is more than 50 degrees above the west-southwestern horizon. Jupiter is moving against the stars of Taurus, north of the red giant star, Aldebaran, and the Hyades Star Cluster. The Giant Planet sets in the west northwest at about 1:25 AM MDT on March 22 and 12:39 AM MDT on April 4. During this period Jupiter fades slightly from magnitude -2.16 to -2.08, but it's still bright. Jupiter is 495 million miles distant on March 22 and 513 million miles distant on April 4. Through telescopes or binoculars, the Giant Planet's apparent equatorial diameter decreases from 37 to 36 arc seconds.

Use a telescope or binoculars to spot Jupiter's four bright "Galilean" moons. You can identify them by their changing positions and referring to various planetarium apps or this website: https://skyandtelescope.org/wp-content/plugins/observing-tools/jupiter_moons/jupiter.html
Use a telescope to view Jupiter's cloud belts and zones and shadow transits (total solar eclipses on Jupiter!) caused by Jupiter's large moons (see details below). Ganymede, the largest moon in the Solar System, casts the largest shadow of Jupiter's moons, and its shadow is usually the easiest to spot crossing the Giant Planet. Io's shadow is larger than Europa's, but smaller than Ganymede's shadow. Two shadow transits, both of Io's shadow, are visible from the Western Slope during this period.

March 26, 2025, 9:20 PM to 11:36 PM MDT, Io's shadow crosses Jupiter (Locally, this event begins with Jupiter 42 degrees high in the western sky and ends with Jupiter 16 degrees above the west-northwestern horizon).

April 2 to 3, 2025, 11:16 PM to 1:32 AM MDT, Io's shadow crosses Jupiter (Locally, this event begins with Jupiter 16 degrees high in the west-northwestern sky and ends after Jupiter sets at 12:45 AM MDT).

MARS IN THE EVENING. Reddish (or butterscotch-tinted?) Mars is more than 70 degrees above the southern horizon in Constellation Gemini from the end of twilight until after 9 PM MDT. Mars is visible through much of the night, setting in the northwest at about 4:13 AM MDT on March 22 and 3:35 AM MDT on April 4.

After Earth's close approach to Mars on January 12, the Red Planet continues to fade, from magnitude +0.2 on March 22 to magnitude +0.4 on April 4, as its distance from Earth increases from 97.5 million miles to 108.8 million miles. Mars still appears brighter than Gemini's brightest stars, Pollux and Castor. Note the diverse colors of Mars, Pollux, and Castor. Through telescopes Mars' apparent diameter decreases from 8.9 to 8.0 arc seconds through this period. That still may be large enough for spotting features on the Red Planet. When Mars rises high in our sky, as is the case recently, we see it through a relatively thin cross section of Earth's turbulent atmosphere. This may allow for viewing Martian surface features such as Syrtis Major, Mare Acidalium, and the north polar ice cap and/or clouds of the "north

polar hood." You can identify Martian surface features for any date and time by using the interactive chart at the following link…
https://skyandtelescope.org/wp-content/plugins/observing-tools/mars_profiler/mars.html
Find more info on observing Mars here:
https://www.alpo-astronomy.org/jbeish/2025_MARS.htm

DON'T GIVE UP - KEEP WATCHING THE NORTHERN CROWN! Better late than never? Will there soon be a bright "new" star in Constellation Corona Borealis ("The Northern Crown"), at least briefly? During this period, Corona Borealis rises in the east northeast by 9 PM MDT and remains visible through the rest of the night. T Coronae Borealis (T CrB) is a recurrent nova that (based on its past behavior) may rapidly increase in brightness 1500-fold (to second magnitude) to become the brightest star (or 2nd brightest star) in Corona Borealis between now and sometime in 2025 or 2026. Then this "new star" may fade rapidly below naked-eye visibility in about a week. As of early on March 21, T CrB had not yet exploded. For more about T CrB, read the article, "Get Ready for a Nova's Bright Return", by astrophysicist Brad Schaefer in the March 2024 issue of Sky & Telescopes Magazine, p. 34-40. You can find additional info at these sites…
https://blogs.nasa.gov/Watch_the_Skies/2024/02/27/view-nova-explosion-new-star-in-northern-crown/
https://skyandtelescope.org/astronomy-news/is-the-blaze-star-about-to-blow-you-may-be-the-first-to-know/
https://en.wikipedia.org/wiki/T_Coronae_Borealis
https://ui.adsabs.harvard.edu/abs/2023ATel16107....1S/abstract
https://www.aanda.org/articles/aa/full_html/2023/12/aa48372-23/aa48372-23.html

THE SUN. The Sun has been very interesting over the past year, when solar active regions have unleashed numerous flares and coronal mass ejections (CMEs) of charged particles. There have been M-class (moderate) solar flares each week for the past year, and there have been many X-class (extreme) solar flares, including X-class flares on January 3 and 4, and February 23. There also have been CMEs that have triggered geomagnetic storms that caused auroras. As of March 21, there are several active regions with sunspots on the Earth-facing side of the Sun. So, we may experience more M- and possibly X-class flares and powerful CMEs. Airglow and SAR arcs also result from high solar activity, and these phenomena have been photographed and/or observed from Colorado. 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://halpha.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"). It can be challenging to spot auroras from Colorado's mid-northern latitudes. But on the nights of May 10-11 and October 10-11 in 2024, many people were able to see and/or photograph some amazing auroras from Colorado! Coronal mass ejections (CMEs) from the Sun were aimed at our planet. Charged particles from CMEs were captured by Earth's magnetic field, energizing the ionosphere, thereby triggering geomagnetic storms and widespread auroras. With continuing high solar activity, geomagnetic storms may occur, and we may be

able to spot auroras. You can get predictions and updates for auroras, their intensity, and geographic extent from NOAA's Space Weather Prediction Center: https://www.swpc.noaa.gov/products/aurora-viewline-tonight-and-tomorrow-night-experimental Auroras are most frequently seen from high latitudes, e.g., from Canada, Alaska, Iceland, northernmost Europe, southern New Zealand and Antarctica. We can watch auroras in real-time from Yellowknife, Northwest Territories on an all-sky camera at the Canadian Space Agency's AuroraMax website. Like Colorado, Yellowknife is in the Mountain Time Zone. An aurora webcam at the University of Alaska-Fairbanks is two hours behind the Mountain Time Zone… https://www.youtube.com/watch?v=O52zDyxg5QI

EARTH SATELLITE HIGHLIGHTS. The following predictions are for western Colorado, specifically Montrose. 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). Satellite orbits change and these predictions may be inaccurate. This is especially true for the International Space Station (ISS) and the Chinese Space Station, Tiangong, because they undergo frequent orbital changes. We no longer show satellite predictions more than 5 days beyond the distribution date of the current "BCAS Observing Highlights" edition. For accurate predictions of the ISS, Tiangong, 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.

March 22, 2025. Tiangong (Chinese Space Station). 6:32 to 6:35 to 6:38 AM MDT. W to NNW to ENE. Appears from Earth's shadow 12 deg above W, maximum altitude 61 deg above NNW, max magnitude -1.9 (Passing through Coma Berenices, Canes Venatici, Ursa Major, Draco, Cepheus, Lacerta, and Pegasus). **Predictions for Tiangong are subject to change due to orbital adjustments. Check for updated predictions.**

March 22, 2025. International Space Station (ISS). 9:04 to 9:05 PM MDT. N to NNE. Disappears into Earth's shadow at maximum altitude 11 degrees above NNE, max magnitude -1.1 (Passing through Lacerta, Cepheus, and Draco). **Predictions for the ISS are subject to change due to orbital adjustments. Check for updated predictions.**

March 23, 2025. Tiangong (Chinese Space Station). 5:34 to 5:37 AM MDT. N to ENE. Appears from Earth's shadow at maximum altitude 86 deg above N, max magnitude -2.3 (Passing through Hercules, Cygnus, and Pegasus). **Predictions for Tiangong are subject to change due to orbital adjustments. Check for updated predictions.**

March 23, 2025. International Space Station (ISS). 9:51 to 9:52 PM MDT. In NNW. Disappears into Earth's shadow at max altitude 14 deg above NNW, max magnitude -0.8 (Passing through Andromeda and Cassiopeia). **Predictions for the ISS are subject to change due to orbital adjustments. Check for updated predictions.**

March 24, 2025. Tiangong (Chinese Space Station). 6:09 to 6:11 to 6:14 AM MDT. WNW to N to ENE. Appears from Earth's shadow 20 deg above WNW, maximum altitude 49 deg above N, max magnitude -1.6 (Passing through Leo, Canes Venatici, Ursa Major-Big Dipper, Draco, Ursa Minor, Cepheus, Lacerta, and Pegasus). **Predictions for Tiangong are subject to change due to orbital adjustments. Check for updated predictions.**

March 24, 2025. International Space Station (ISS). 9:03 to 9:06 PM MDT. NNW to NNE. Disappears into Earth's shadow at max altitude 17 deg above NNE, max magnitude -1.6 (Passing through Cepheus and Draco). **Predictions for the ISS are subject to change due to orbital adjustments. Check for updated predictions.**

March 25, 2025. Tiangong (Chinese Space Station). 5:11 to 5:13 AM MDT. NE to ENE. Appears from Earth's shadow at max altitude 38 deg above NE, max magnitude -0.8 (Passing through Cygnus/Cepheus and Pegasus). **Predictions for Tiangong are subject to change due to orbital adjustments. Check for updated predictions.**

March 25, 2025. International Space Station (ISS). 8:15 to 8:17 to 8:19 PM MDT. NNW to NNE to NE. Max altitude 13 deg above NNE, disappears into Earth's shadow 8 deg above ENE, max magnitude -1.3 (Passing through Lacerta, Cepheus, Draco, and Boötes). **Predictions for the ISS are subject to change due to orbital adjustments. Check for updated predictions.**

March 26, 2025. Tiangong (Chinese Space Station). 5:45 to 5:46 to 5:49 AM MDT. NW to N to ENE. Appears from Earth's shadow 31 deg above NW, max altitude 45 deg above N, max magnitude -1.4 (Passing through Ursa Major-Big Dipper, Draco, Ursa Minor, Cepheus, Lacerta, and Pegasus). **Predictions for Tiangong are subject to change due to orbital adjustments. Check for updated predictions.**

March 26, 2025. International Space Station (ISS). 9:03 to 9:06 PM MDT. NW to NNE. Disappears into Earth's shadow at max altitude 34 deg above NNE, max magnitude -2.8 (Passing through Lacerta/Andromeda, Cassiopeia, Cepheus, Ursa Minor, and Draco). **Predictions for the ISS are subject to change due to orbital adjustments. Check for updated predictions.**

Additional evening passes for the very bright ISS are predicted from March 27 to April 2. Additional predawn passes for the almost-as-bright Tiangong (Chinese) Space Station (ISS) are predicted for March 27 to April 3. These predictions are subject to change. For updates on times, check heavens-above (or other prediction websites) shortly before you want to observe. Be sure to enter your location and time zone info when using prediction websites.

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

WESTERN SLOPE SKIES. Since 2011, KVNF Community Radio has aired Western Slope Skies (WSS), a biweekly astronomy feature every two weeks on Friday mornings and on the following Wednesday evenings. On March 28 and April 2, Jamie Schultz of the Western Slope Dark Sky Coalition discusses "Circadian Rhythm and Health."

HAPPY OBSERVING!