OBSERVING HIGHLIGHTS for October 10 to 24, 2024, a "bright Moon period"
Black Canyon Astronomical Society (BCAS), western Colorado, USA

SUMMARY. Venus shines like a brilliant diamond in the western evening twilight, as Saturn rises in the southeastern sky. Bright Jupiter rises in the east northeast before 10 PM MDT, and reddish Mars follows Jupiter, rising before midnight. During mid to late October, Comet Tsuchinshan-ATLAS (C/2023 A3) may become a striking sight in the western, evening sky, as it moves away from the Sun.

The Moon is at first quarter on October 10. From October 11 to 15, the gibbous Moon waxes. The Moon is full on the night of October 16-17. From October 18-19 to October 23, the gibbous Moon wanes. The Moon reaches last quarter on October 24. On the night of October 13-14, the waxing gibbous Moon is just west of Saturn, and a fatter gibbous Moon is just east of Saturn on the night of October 14-15. On the night of October 20-21, the waning gibbous Moon is about 5 degrees north of Jupiter. On the morning of October 23, look for the waning gibbous Moon about 6 degrees above reddish Mars. Between October 13 and 21, try to locate all 6 Apollo landing sites on the Moon with telescopes or binoculars (as a guide, use the finder chart in the Oct. 10-24 Observing Highlights PDF file). On the evening of October 21, the gibbous Moon rises between the twin stone pillars at Chimney Rock in southwestern Colorado. The Orionid Meteor Shower peaks on the morning of October 21, but the bright, gibbous Moon will likely "washout" all but the brightest meteors.

As of October 9, there are many active regions with large sunspots on the Earth-facing side of the Sun, and X-class (extreme) flares occurred on October 1, 3, 7, and 9. Moderate and even extreme, solar flares are likely, as are coronal mass ejections of charged particles. You can monitor solar activity safely in real time on the internet. This high solar activity is triggering geomagnetic storms, auroras (aka "northern lights"), and airglow. So, keep watch for these phenomena!

From western Colorado, view passes of interesting satellites, including pre-dawn passes of the bright International Space Station (ISS) and the almost-as-bright Tiangong (Chinese) Space Station from October 16 to 24.

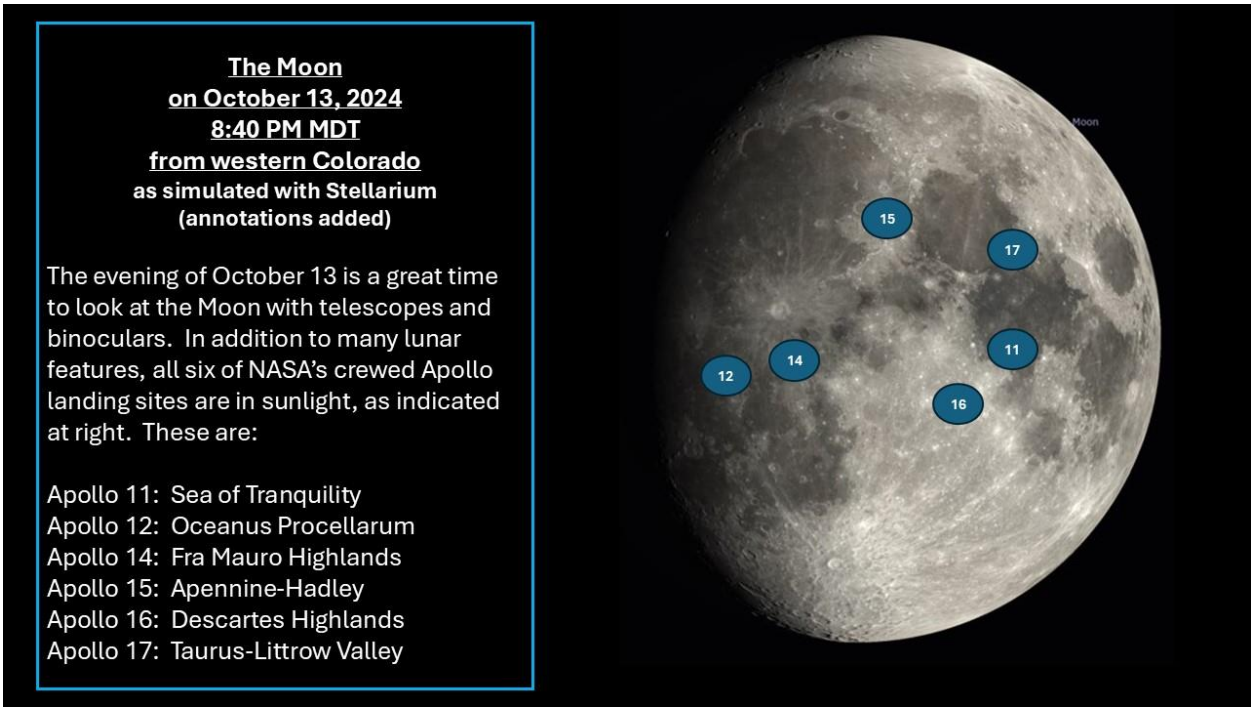
WESTERN SLOPE SKIES. Since 2011, BCAS and KVNF Community Radio have been producing Western Slope Skies (WSS), a biweekly astronomy feature, which airs every two weeks at about 8:10 AM on Fridays and 7:00 PM on following Wednesdays. On October 11 and 16, Aaron Watson will present "Chasing Northern Lights in Colorado."

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

A BRIGHT COMET IN THE EVENING SKY! During mid to late October, Comet **Tsuchinshan-ATLAS (C/2023 A3)** may become an amazing sight in our evening sky as it moves away from the Sun! From October 7 to 10, C/2023 A3 is striking in images from the C3 Coronagraph of the SOHO satellite. As twilight fades, you might spot this Comet, and/or its tail(s), as early as October 10 very low over an unobstructed western horizon. On the following evenings, C/2023 A3 will gain altitude in the west, and it may get easier to spot. Forward scattering of sunlight by the Comet's dust from about October 10 to 15 may make it brighter than predicted, possibly rivaling the brightest stars and planets (though, its low altitude will require an unobstructed western horizon)! After mid-October, the Comet likely will be

fading, but it still may be a pleasing sight in binoculars until the end of the month. Moonlight brightens the early evening sky until after October 19, which may render the Comet less than truly spectacular. But C/2023 A3 may be very interesting during October, especially for viewing with binoculars and for photography. Let's hope for some clear skies and little or no smoke from wildfires! You can find updates, images, brightness info, finder charts, and an ephemeris for C/2023 A3 at these links…
http://astro.vanbuitenen.nl/comet/2023A3
http://www.aerith.net/comet/catalog/2023A3/2023A3.html
https://skyandtelescope.org/astronomy-news/get-ready-for-comet-tsuchinshan-atlas-the-best-is-yet-to-come/
https://www.skyatnightmagazine.com/space-science/beginners-guide-comet-c-2023-a3
https://www.skyatnightmagazine.com/news/astronauts-photograph-comet-c-2023-a3-from-space-station
Please do your C/2023 A3 spotting after sunset. NEVER chance looking at the Sun directly; serious eye damage can result.

THE MOON. The Moon is at **first quarter on October 10** (exactly at 12:55 PM MDT). From October 11 to 15, watch a gibbous Moon wax. **The Moon is full on the night of October 16-17** (full Moon occurs exactly at 5:26 AM MDT on October 17). From October 18-19 to October 23, we can watch a gibbous Moon wane. The Moon reaches **last quarter on October 24** (exactly at 2:55 AM MDT). On the night of October 13-14, the waxing gibbous Moon is west of Saturn, and a "fatter" gibbous Moon is just east of Saturn on the night of October 14-15. On the night of October 20-21, the waning gibbous Moon is about 5 degrees north of Jupiter. On the morning of October 23, look for the waning gibbous Moon about 6 degrees above reddish Mars. On the morning of October 24, the Moon (at last quarter) is east of Mars. NASA has published a stunning visualization of lunar phases for year 2024. Another fun site is NASA's daily Moon guide.



All six of NASA's Apollo landing sites are in sunlight from October 13 to 21. We can't see or image the descent stages, flags, and other Apollo hardware that was left on the Moon with any earth-bound

telescope. But NASA's Lunar Reconnaissance Orbiter has imaged many of these items (and/or their shadows)! You can find close-up photos and info about the Apollo landing sites here… https://www.lroc.asu.edu/featured_sites

MOONRISE AT CHIMNEY ROCK: OCTOBER 21. On October 21, the gibbous Moon, at its northernmost position in our sky, rises between the twin stone pillars, Chimney Rock and Companion Rock, at Chimney Rock National Monument during the current Major Lunar Standstill. If you travel to Chimney Rock National Monument in southwestern Colorado, you can participate in this October 21 event! Thanks to Dr. Erica Ellingson of the University of Colorado for informing us of this opportunity. See details here… https://www.chimneyrockco.org/puebloan-resources/lunar-standstill/

ORIONID METEORS IN BRIGHT MOONLIGHT: OCTOBER 21. The Orionid Meteor Shower peaks on the morning of October 21. However, only the brightest Orionids may be visible, because the sky will be awash with light from the bright gibbous Moon.

VENUS IN EVENING TWILIGHT. On October 10 at about 7:15 PM MDT, Venus stands 8 degrees above an unobstructed, west-southwestern horizon in nautical twilight (with the Sun 8 degrees below the horizon). Venus' southeastward movement is making our Sister Planet prominent in a darker sky for southern-hemisphere viewers, while it's immersed in twilight for us northerners. By October 24 at 7:00 PM MDT, you'll find Venus in twilight about 10 degrees above the southwestern horizon, when the Sun is 8 degrees below the horizon. Venus is still on the opposite side of the Sun from our perspective, 121 million miles distant on October 10, and 113 million miles distant on October 24. Through telescopes, Venus' gibbous phase wanes from 83% to 79% illuminated, as its apparent diameter increases from 12.8 to 13.7 arc seconds during this period. From western Colorado, Venus will get easier to spot very gradually through the fall, as, evening-by-evening, our Sister Planet appears farther from the Sun. **Please do your Venus spotting after sunset. NEVER chance looking at the Sun directly; serious eye damage can result.**

SATURN – THROUGH MOST OF THE NIGHT. As twilight fades, Saturn becomes prominent about 20 to 30 degrees above the east-southeastern horizon. The Ringed Planet is highest in the southern sky (at about 40 degrees altitude) at about 10 to 11 PM MDT and sets in the west at 4:32 AM MDT on October 10 and 3:28 AM MDT on October 24. Saturn is 819 million miles distant on October 10 and 833 miles distant on October 24. Saturn fades from magnitude +0.70 to +0.76 during this period.

Through telescopes, the Ringed Planet appears 19 arc seconds wide, and its rings span 43 arc seconds. With a telescope or high-magnification binoculars, it's possible to spot Titan, Saturn's largest moon. Telescopes with apertures 5 inches or larger may reveal several other moons of the Ringed Planet. Saturn's rings now appear nearly "edge-on", so they may seem less impressive in telescopes than they did during the past several years. These thin rings will nearly disappear from our perspective during 2025. Because Saturn's rings now appear less inclined, and dimmer, than in past years, it may be easier to spot some of Saturn's mid-sized moons through telescopes. You can follow the changing positions of Saturn's moons by referring to various planetarium apps and/or this site: https://skyandtelescope.org/observing/interactive-sky-watching-tools/saturns-moons-javascript-utility/ For more info on the appearance of Saturn's rings in 2024 and 2025 and phenomena associated with Saturn's moons, see this article… https://skyandtelescope.org/astronomy-news/observing-news/see-mutual-events-close-approaches-of-saturns-moons/

JUPITER: RISING EARLIER. Bright Jupiter rises in the east northeast at about 9:52 PM MDT on October 10 and 8:57 PM MDT on October 24. The Giant Planet is prominent from shortly after it rises into moderate morning twilight. During this period Jupiter brightens from magnitude -2.54 to -2.64, as its distance from Earth decreases from 421 to 404 million miles. Through telescopes or binoculars, the Giant Planet's apparent equatorial diameter increases from 43.6 to 45.3 arc seconds from October 10 to 24.

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 shadow transits (total solar eclipses on Jupiter!) 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. Unfortunately, there are no locally visible transits of Ganymede's shadow during this period. Io's shadow is larger than Europa's but smaller than Ganymede's shadow. Callisto's shadow does not cross Jupiter during this period. Because Jupiter will be visible through most of the night in the following weeks, many more of these Jovian solar eclipses will be visible.

October 10, 2024, 12:22 AM to 2:56 AM MDT. Europa's shadow crosses Jupiter.

October 13, 2024, 6:44 to 8:56 AM MDT, Io's shadow crosses Jupiter (Locally, the Sun rises at about 7:17 AM MDT. This event begins in bright twilight and ends after sunrise).

October 17, 2024, 2:58 AM to 5:32 AM MDT. Europa's shadow crosses Jupiter.

October 22, 2024, 3:06 AM to 5:18 AM MDT, Io's shadow crosses Jupiter.

October 23, 2024, 9:34 PM to 11:48 PM MDT, Io's shadow crosses Jupiter (Locally, this event begins with Jupiter only 6 degrees above the east-northeastern horizon and ends with Jupiter 30 degrees high).

October 24, 2024, 5:34 AM to 8:08 AM MDT. Europa's shadow crosses Jupiter (Locally this event begins with Jupiter high in the sky before morning twilight begins, but it ends after the Sun rises at 7:33 AM MDT).

MARS: RISING BEFORE MIDNIGHT. Reddish Mars rises in the east northeast at about 11:55 PM MDT on October 10 and 11:30 PM MDT on October 24. Mars is prominent in the eastern sky after about 12:30 AM MDT until morning twilight starts interfering. Between October 10 and 24, Mars brightens from magnitude +0.35 to +0.12, as its distance from Earth decreases from 109 to 99 million miles. Through telescopes Mars' 88%-illuminated, gibbous disk appears 8.0 to 8.8 arc seconds wide. Earth is getting closer to Mars. From late fall through next February, some dark albedo features on Mars, like Syrtis Major, may become visible in amateur telescopes.

A BRIGHT, NEW SUN-GRAZING COMET? On September 27, the ATLAS survey in Hawaii discovered a sun-grazing Comet, C/2024 S1 ATLAS (its preliminary designation was A11bP7I). This Comet may become brilliant in Colorado's skies during latest October and early November. But that's only if it survives a very close brush with the Sun on October 28 (perihelion distance of 0.74 million miles, less than one solar diameter!). You can find updated info here…
http://astro.vanbuitenen.nl/comet/2024S1
http://www.aerith.net/comet/catalog/2024S1/2024S1.html

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? Corona Borealis is getting low in the west-northwestern sky as evening twilight fades. So, try to find "The Northern Crown" shortly after dark. 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 sometime between now and early 2025. Then this "new star" may fade rapidly below naked-eye visibility in about a week. As of early on October 9, 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 active over the past year, and intensely so in the past several months, 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 July 14, 16, and 29, August 5, 8, and 14, September 12 and 14, and October 1, 3, 7, and 9. There also have been CMEs that have triggered geomagnetic storms that caused auroras. Many folks in Colorado and elsewhere viewed and/or photographed auroras during the night of May 10-11. As of October 9, there are many active regions containing large sunspots on the Earth-facing side of the Sun. So, we may experience more M- and possibly even X-class flares and powerful CMEs. Airglow and "SARs" also result from high solar activity, and these phenomena also 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 night of May 10-11, many of us were able to see and/or photograph some amazing auroras from Colorado! A coronal mass ejection (CME) from the Sun was aimed toward our planet. Charged particles from the CME were captured by Earth's magnetic field, energizing the ionosphere, thereby triggering a geomagnetic storm and a widespread aurora. As of October 9, there are many large active regions on the Earth-facing side of the Sun, so chances for geomagnetic storms are good and spotting auroras may be possible. 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, and Antarctica. We can watch aurora 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, in Mountain Daylight Time (MDT). 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 can change. <u>These predictions for satellite passes may be inaccurate by up to 40 minutes, especially after October 12.</u> 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.

October 16, 2024. Tiangong (Chinese Space Station). 5:51 to 5:52 to 5:53 AM MDT. S to SE to ESE. Appears from Earth's shadow 7 deg above S, max altitude 12 deg above SE, max magnitude +0.9 (Passing through Puppis, Pyxis, and Hydra). **Predictions for Tiangong are subject to change due to orbital adjustments. Check for updated predictions.**

October 16, 2024. International Space Station (ISS). 6:06 to 6:09 to 6:11 AM MDT. SSW to SE to ENE. Appears from Earth's shadow 4 deg above SSW, max altitude 24 deg above SE, max magnitude -1.5 (Passing through Coumba, Puppis, Hydra, Sextans, Leo, and Coma Berenices). **Predictions for the ISS are subject to change due to orbital adjustments. Check for updated predictions.**

October 17, 2024. International Space Station (ISS). 5:20 to 5:21 to 5:23 AM MDT. SSE to SE to E. Appears from Earth's shadow 12 deg above SSE, max altitude 13 deg above SE, max magnitude -0.8 (Passing through Puppis, Pyxis, Hydra, and Leo). **Predictions for the ISS are subject to change due to orbital adjustments. Check for updated predictions.**

October 17, 2024. Tiangong (Chinese Space Station). 6:22 to 6:25 to 6:28 AM MDT. SW to SSE to E. Appears from Earth's shadow 11 deg above SW, max altitude 34 deg above SSE, max magnitude -0.8 (Passing through Eridanus, Canis Major, Puppis, Hydra, and Leo/Virgo). **Predictions for Tiangong are subject to change due to orbital adjustments. Check for updated predictions.**

October 18, 2024. Tiangong (Chinese Space Station). 5:22 to 5:24 AM MDT. 1st AM Tiangong pass of October 18. SE to E. Appears from Earth's shadow at max altitude 17 deg above SE, max magnitude +0.4 (Passing through Hydra and Leo/Virgo). **Predictions for Tiangong are subject to change due to orbital adjustments. Check for updated predictions.**

October 18, 2024. International Space Station (ISS). 6:07 to 6:09 to 6:13 AM MDT. SW to SE to NE. Appears from Earth's shadow 26 deg above SW, max altitude 79 deg above SE, max magnitude -3.8

(Passing through Eridanus, Orion, Gemini, Lynx, Ursa Major, and Canes Venatici). **Predictions for the ISS are subject to change due to orbital adjustments. Check for updated predictions.**

October 18, 2024. Tiangong (Chinese Space Station). 6:55 to 6:58 to 7:01 AM MDT. 2nd AM Tiangong pass of October 18. WSW to NNW to ENE. Appears from Earth's shadow 6 deg above WSW, max altitude 89 deg above NNW, max magnitude -2.2 (Passing through Taurus, Auriga/Gemini, Lynx, Leo Minor, and Ursa Major/Canes Venatici/Coma Berenices). **Predictions for Tiangong are subject to change due to orbital adjustments. Check for updated predictions.**

October 19, 2024. International Space Station (ISS). 5:22 to 5:25 AM MDT. 1st AM ISS pass of October 19. E to ENE. Appears from Earth's shadow at max altitude 34 deg above E, max magnitude -2.1 (Passing through Leo and Coma Berenices). **Predictions for the ISS are subject to change due to orbital adjustments. Check for updated predictions.**

October 19, 2024. Tiangong (Chinese Space Station). 5:54 to 5:57 AM MDT. S to SSE to ENE. Appears from Earth's shadow 48 deg above S, max altitude 52 deg above SSE, max magnitude -1.8 (Passing through Monoceros, Canis Minor, Hydra, Leo, and Coma Berenices). **Predictions for Tiangong are subject to change due to orbital adjustments. Check for updated predictions.**

October 19, 2024. International Space Station (ISS). 6:55 to 6:58 to 7:01 AM MDT. 2nd AM ISS pass of October 19. W to NNW to NNE. Appears from Earth's shadow 8 deg above W, max magnitude -2.4 (Passing through Aries, Triangulum, Andromeda, Cassiopeia, Cepheus, and Draco). **Predictions for the ISS are subject to change due to orbital adjustments. Check for updated predictions.**

October 20, 2024. International Space Station (ISS). 6:09 to 6:10 to 6:13 AM MDT. NW to NNW to NE. Appears from Earth's shadow 33 deg above NW, max altitude 35 deg above NNW, max magnitude -3.0 (Passing through Andromeda, Cassiopeia, Cepheus, Ursa Minor, and Draco). **Predictions for the ISS are subject to change due to orbital adjustments. Check for updated predictions.**

October 20, 2024. Tiangong (Chinese Space Station). 6:25 to 6:27 to 6:30 AM MDT. W to NNW to ENE. Appears from Earth's shadow 24 deg above W, max altitude 67 deg above NNW, max magnitude -2.2 (Passing through Perseus, Camelopardalis/Auriga, Ursa Major, and Canes Venatici). **Predictions for Tiangong are subject to change due to orbital adjustments. Check for updated predictions.**

October 21, 2024. International Space Station (ISS). 5:23 to 5:25 AM MDT. 1st AM ISS pass of October 21. In NE. Appears from Earth's shadow at max altitude 24 deg above NE, max magnitude -1.7 (Passing through Ursa Major). **Predictions for the ISS are subject to change due to orbital adjustments. Check for updated predictions.**

October 21, 2024. Tiangong (Chinese Space Station). 5:25 to 5:27 AM MDT. **1st AM Tiangong pass of October 21.** In ENE. Appears from Earth's shadow at max altitude 27 deg above ENE, max magnitude +0.0 (Passing through Leo Minor/Leo, Coma Berenices). **Predictions for Tiangong are subject to change due to orbital adjustments. Check for updated predictions.**

October 21, 2024. International Space Station (ISS). 6:57 to 6:59 to 7:01 AM MDT. 2nd AM ISS pass of October 21. WNW to NNW to NNE. Appears from Earth's shadow 7 deg above WNW, max altitude 13 deg above NNW, max magnitude -1.5 (Passing through Andromeda, Cepheus, and Draco). **Predictions for the ISS are subject to change due to orbital adjustments. Check for updated predictions.**

October 21, 2024. Tiangong (Chinese Space Station). 6:57 to 7:00 to 7:03 AM MDT. 2nd **AM Tiangong pass of October 21.** W to N to ENE. Appears from Earth's shadow 9 deg above W, max altitude 45 deg above N, max magnitude -1.6 (Passing through Aries, Triangulum, Andromeda/Perseus, Camelopardalis, Draco, Ursa Major-Big Dipper, Canes Venatici, Boötes). **Predictions for Tiangong are subject to change due to orbital adjustments. Check for updated predictions.**

October 22, 2024. Tiangong (Chinese Space Station). 5:56 to 5:59 AM MDT. N to ENE. Appears from Earth's shadow at max altitude 53 deg above N, max magnitude -1.9 (Passing through Camelopardalis, Ursa Major-Big Dipper, Canes Venatici, and Coma Berenices). **Predictions for Tiangong are subject to change due to orbital adjustments. Check for updated predictions.**

October 22, 2024. International Space Station (ISS). 6:11 to 6:13 AM MDT. NNW to NNE. Appears from Earth's shadow near max altitude 17 deg above NNW, max magnitude -1.9 (Passing through Cepheus and Draco). **Predictions for the ISS are subject to change due to orbital adjustments. Check for updated predictions.**

October 23, 2024. International Space Station (ISS). 5:24 to 5:25 AM MDT. In NNE. Appears from Earth's shadow at max altitude 14 deg above NNE, max magnitude -1.0 (Passing through Draco and Boötes). **Predictions for the ISS are subject to change due to orbital adjustments. Check for updated predictions.**

October 23, 2024. Tiangong (Chinese Space Station). 6:27 to 6:29 to 6:32 AM MDT. WNW to N to ENE. Appears from Earth's shadow 22 deg above WNW, max altitude 44 deg above N, max magnitude -1.6 (Passing through Andromeda, Cassiopeia, Camelopardalis, Draco, Ursa Major-Big Dipper, Canes Venatici, and Coma Berenices). **Predictions for Tiangong are subject to change due to orbital adjustments. Check for updated predictions.**

October 24, 2024. Tiangong (Chinese Space Station). 5:26 to 5:28 AM MDT. **1st AM Tiangong pass of October 24.** In ENE. Appears from Earth's shadow at max altitude 23 deg above ENE, max magnitude +0.2 (Passing through Coma Berenices). **Predictions for Tiangong are subject to change due to orbital adjustments. Check for updated predictions.**

October 24, 2024. International Space Station (ISS). 6:11 to 6:12 to 6:13 AM MDT. NNW to N to NE. Appears from Earth's shadow near max altitude 11 deg above N, max magnitude -1.3 (Passing through Cepheus, Draco, and Boötes). **Predictions for the ISS are subject to change due to orbital adjustments. Check for updated predictions.**

October 24, 2024. Tiangong (Chinese Space Station). 6:58 to 7:01 to 7:05 AM MDT. **2nd AM Tiangong pass of October 24.** WNW to NNE to E. Appears from Earth's shadow 9 deg above WNW, max altitude 60 deg above N, max magnitude -1.9 (Passing through Triangulum, Perseus, Camelopardalis, Ursa Major-Big Dipper, and Coma Berenices). **Predictions for Tiangong are subject to change due to orbital adjustments. Check for updated predictions.**

HAPPY OBSERVING!