

OBSERVING HIGHLIGHTS for September 6 to 22, 2023, a “dark Moon” period.
Black Canyon Astronomical Society (BCAS), western Colorado, USA

SUMMARY. Wow! There’s much to see and do under western Colorado’s skies during this “dark Moon” period! As evening twilight ends, the stunning star clouds of the Milky Way extend from the southwestern horizon, across the zenith to the northeast. Newly discovered Comet Nishimura (C/2023 P1) is brightening in the predawn sky before its close brush with the Sun on September 18. Saturn and Jupiter are visible through most of the night. You can see Venus as a brilliant “morning star”, while Mercury also makes a predawn appearance. With telescopes and/or binoculars, you can challenge yourself to spot the Planet Neptune, which is now visible in our skies all night long. And from September 14 through 16, you can attend AstroFest 2023, which is being hosted by Black Canyon of the Gunnison National Park, Curecanti National Recreation Area, and the Gunnison Gorge National Conservation Area. This is a great opportunity to hear interesting presentations and to view the Sun and wonders of the night sky through telescopes.

The Moon is at last quarter on September 6. On mornings from September 7 to 13, watch the crescent Moon wane. On the morning of September 11, the crescent Moon is about 10 degrees north of brilliant Venus. During morning twilight on September 13, a thin crescent Moon is about 10 degrees above Mercury. The Moon is new (and invisible) on September 14. From September 16 to 21, watch a crescent Moon wax in the evening sky. Enjoy seeing earthshine on the dark part of the crescent Moon, especially on mornings from September 9 to 13 and evenings from September 16 to 19 (try using binoculars). The Moon reaches first quarter on September 22.

Expect continued high solar activity, including powerful solar flares and coronal mass ejections. This activity may trigger auroras (“northern lights”) and air glow, which could be visible from Colorado. From September 11 through 19, we can watch evening passes of the very bright International Space Station (ISS). And early risers can view predawn passes of the ISS from September 6 to 11 and early morning passes of China’s nearly-as-bright, Tiangong Space Station from September 7 to 21.

WESTERN SLOPE SKIES. Since 2011, BCAS and KVNF Community Radio have been producing [Western Slope Skies](#) (WSS), a biweekly astronomy feature. On September 1 and 6, Ranger Adrienne Fitzgerald tells us about AstoFest 2023 (see below), which is being hosted by Black Canyon of the Gunnison National Park, Curecanti National Recreation Area, and Gunnison Gorge National Conservation Area. Then, on September 15 and 20, Bryan Cashion presents “The Universe Got Bigger!”, celebrating the 100-year anniversary of Edwin Hubble’s discovery of a Cepheid Variable Star in the Andromeda Galaxy, an event that increased the size of the known Universe hugely.

ASTROFEST 2023! Black Canyon of the Gunnison National Park (BLCA), Curecanti National Recreation Area (CURE), and Gunnison Gorge National Conservation Area (GGNCA) are celebrating western Colorado’s wonderfully dark nights skies with [AstroFest 2023](#) on September 14, 15, and 16. Come join the National Park Service (BLCA and CURE) and partners, Bureau of Land Management-GGNCA, Black Canyon Astronomical Society, Gunnison Valley Observatory, Dark Sky International, Western National Parks Association, Colorado Canyons Association, and the Western Slope Dark Sky Coalition at the following locations:

September 14 - Montrose Public Safety Community Room and Flat Top site - GGNCA

September 15 - Black Canyon of the Gunnison N.P. - South Rim

September 16 - Curecanti N. R. A. – Elk Creek

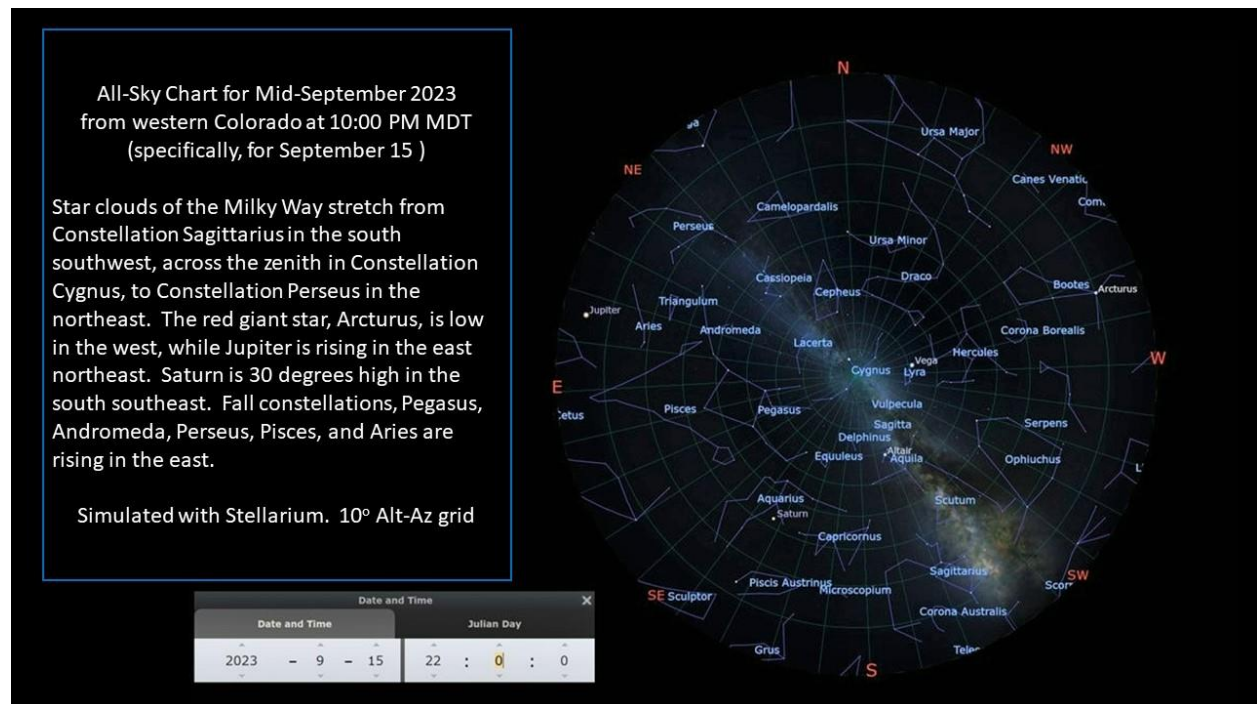
Hear interesting presentations and view the Sun and night sky through telescopes. Find the AstroFest 2023 schedule and other details here:

[Black Canyon Astronomy Festival - Black Canyon Of The Gunnison National Park \(U.S. National Park Service\) \(nps.gov\)](https://www.nps.gov/blackcanyonofthegunnison/)

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>

VIEW OUR GLORIOUS MILKY WAY! We live within a giant spiral galaxy, the Milky Way. In September under the Western Slope’s dark skies, we can enjoy stunning views of our home Galaxy. After darkness falls, the expansive star and dust clouds that comprise the spiral arms of the Milky Way extend from the south-southwestern horizon, across the zenith, to the northeastern horizon. The all-sky chart below (for mid-September at 10:00 PM MDT) may help you navigate. The Milky Way is brightest toward Constellation Sagittarius in the south-southwestern sky, the direction of our Galaxy’s center. That’s where our Galaxy’s stars are most concentrated. The Milky Way is prominent from the southwestern horizon to the zenith in Constellation Cygnus, but it’s fainter toward Constellations Cassiopeia and Perseus in the northeastern sky. When we gaze at Cassiopeia and Perseus, we are looking toward the outer reaches of our Galaxy, where stars are less concentrated. From Scorpius through Cygnus, a dark “Great Rift” appears to separate the Milky Way into eastern and western “streams” (refer to photo below the all-sky chart). Infrared studies show that the Great Rift is not a zone devoid of stars, but a band of dust clouds that absorbs visible light from millions of more distant stars.



The central Milky Way from Scorpius and Sagittarius through southern Cygnus, as photographed looking south southwest from the top of Grand Mesa, Colorado at about 11 PM MDT on August 19, 2023, during a BCAS public event. The photo shows the “Great Rift” that divides the Milky Way into eastern and western “streams.” The “Great Rift” is a dark band of dust clouds that blocks visible light from more distant star clouds.

Photo Credit:
Joyce Tanihara



COMET C/2023 P1 (NISHIMURA). Comet C/2023 P1 (Nishimura) is brightening in the east-northeastern, pre-dawn sky, as it nears a close approach to the Sun on September 18 (perihelion distance = 21 million miles, inside Mercury’s orbit!). Hideo Nishimura discovered this Comet from Japan on August 11, 2023, using just a DSLR camera! Some BCAS members have observed Comet Nishimura in telescopes and binoculars. The Comet appeared as a “small fuzzball” in binoculars, and photographs revealed an extended, greenish coma (zone around the nucleus) and a straight ion tail. The greenish color is likely due to emission from diatomic carbon, a phenomenon common to many comets. As of September 5, Comet Nishimura may be faintly visible to the unaided eye (magnitude +5 to +6), but binoculars provide better views. Through mid-September Comet C/2023 P1 descends lower in the predawn sky, just above the east-northeastern horizon, as it moves against morning twilight from Constellation Cancer into Leo. From September 6 through 13, find a place with unobstructed views to the east-northeast and scan above the horizon with binoculars between 5:20 and 6:00 AM MDT. You may be rewarded with a fine sight! Comet Nishimura may be difficult to observe after September 13, especially from the northern hemisphere. If the Comet survives its close brush with the Sun on September 18, it will be easiest to see from the southern hemisphere. Finder charts, photos, and an ephemeris are linked here:

<https://skyandtelescope.org/astronomy-news/new-comet-nishimura-may-become-naked-eye-bright/>
[New comet C/2023 P1 Nishimura to brighten in September \(earthsky.org\)](https://earthsky.org/new-comet-c/2023-p1-nishimura-to-brighten-in-september)

<http://www.aerith.net/comet/catalog/2023P1/2023P1.html>

[Ephemeris for C/2023 P1 \(Nishimura\) - In-The-Sky.org](https://www.in-the-sky.org/ephemeris-for-c/2023-p1-nishimura)
[C/2023 P1 \(Nishimura\) | astro.vanbuitenen.nl](https://astro.vanbuitenen.nl/c/2023-p1-nishimura)

Please do your comet spotting before sunrise or after sunset. NEVER chance looking at the Sun directly; serious eye damage can result.

SEPTEMBER 23 – EQUINOX. The Sun shines directly above Earth’s equator on September 23 at 12:50 AM MDT (just 50 minutes beyond this “dark Moon” period), marking the start of fall for the northern

hemisphere and beginning of spring in the southern hemisphere. In Colorado, our nighttime hours are expanding rapidly, as daylight hours diminish.

THE MOON. The Moon reaches **last quarter on September 6** (at 4:21 PM MDT). On mornings from September 7 to 13, watch the crescent Moon wane. Before dawn on September 11, the crescent Moon (11% illuminated) is about 10 degrees north of brilliant Venus. On September 13 at about 6:12 AM MDT (with the Sun about 8 degrees below the horizon), the 2%-illuminated, crescent Moon is about 10 degrees above and slightly left of Mercury (binoculars may help you see earthshine on the dark part of the lunar crescent and faint Mercury only a few degrees above a flat horizon). **The Moon is new (and invisible) on September 14** (exactly new at 7:40 PM MDT). On evenings from September 16 to 21, we can watch a crescent Moon wax. The Moon reaches **first quarter on September 22** (exactly 1:32 PM MDT). Enjoy seeing earthshine on the dark part of the crescent Moon, especially on mornings from September 9 to 13 and evenings from September 16 to 19 (binoculars will enhance your view). You can find a stunning visualization of lunar phases for all of year 2023 here: [Moon Phase and Libration 2023 - Moon: NASA Science](#). **Please do your crescent Moon spotting before sunrise and after sunset. NEVER chance looking at the Sun directly; serious eye damage can result.**

SATURN – NEARLY ALL NIGHT LONG! As evening twilight fades, Saturn is well up in the southeastern sky and remains visible nearly all night long, setting in the southwest at about 5:56 AM MDT on September 6 and 4:47 AM MDT on September 22. Between September 6 and 22 Saturn fades somewhat from magnitude +0.49 to +0.55, as the [opposition surge](#) effect from ring particles is ending. Between September 6 and 22, Saturn's distance from Earth increases from 816 to 824 million miles. Telescopes of any size will reveal Saturn's stunning rings. Saturn's disk appears about 19 arc seconds wide, and its rings span 44 arc seconds. With a telescope or high-magnification binoculars, it's possible to spot Titan, Saturn's largest moon. Telescopes with apertures 6 inches or larger may reveal several other moons of the Ringed Planet. From Earth's perspective during 2023, Saturn's rings are less inclined than they have been during the past several years, so they may appear less impressive in telescopes. These thin rings will appear nearly edge-on and almost disappear during 2025, so view Saturn telescopically this year! Because Saturn's rings appear less inclined, and therefore 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/>

JUPITER – BRIGHT AND RISING IN THE EVENING! Bright Jupiter rises in the east northeast at about 10:09 PM MDT on September 6 and 9:04 PM MDT on September 22 and remains visible for the rest of the night. Between September 6 and 22, Jupiter's brightness increases from magnitude -2.64 to -2.75, as its distance decreases from 409 to 391 million miles. Through telescopes or binoculars, the Giant Planet's apparent equatorial diameter increases from 44.8 to 46.8 arc seconds during this period. Use a telescope or binoculars to spot Jupiter's four bright 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> If you have a telescope, try viewing shadow transits (Jovian solar eclipses!) of Jupiter's moons on the mornings listed below. Ganymede casts the largest shadow of Jupiter's moons, and its shadow is the easiest to spot crossing the Giant Planet. Ganymede's shadow will transit Jupiter's southern hemisphere at high latitudes on the night of September 6-7 and the morning of September 14 (see details, below). Europa's small shadow can be challenging to spot. Io's shadow is larger than Europa's but smaller than Ganymede's shadow. Callisto's shadow does not cross Jupiter this year.

September 6-7, 2023, 11:44 PM to 1:44 AM MDT, Ganymede's shadow crosses Jupiter's southern hemisphere at high latitudes.

September 7-8, 2023, 10:22 PM to 12:52 AM MDT, Europa's shadow crosses Jupiter (Locally, Jupiter rises at 10:05 PM MDT).

September 11, 2023, 1:08 to 3:22 AM MDT, Io's shadow crosses Jupiter.

September 12, 2023, 7:38 to 9:50 PM MDT, Io's shadow crosses Jupiter (Locally, Jupiter rises at 9:44 PM MDT).

September 14, 2023, 3:44 to 5:44 AM MDT, Ganymede's shadow crosses Jupiter's southern hemisphere at high latitudes.

September 15, 2023, 12:58 AM to 3:28 AM MDT, Europa's shadow crosses Jupiter.

September 18, 2023, 3:04 AM to 5:16 AM MDT, Io's shadow crosses Jupiter.

September 19, 2023, 9:32 PM to 11:44 PM MDT, Io's shadow crosses Jupiter (Locally, Jupiter rises at 9:16 PM MDT).

September 22, 2023, 3:36 AM to 6:04 AM MDT, Europa's shadow crosses Jupiter (Locally the Sun rises at 7:01 AM MDT).

VENUS, A BRILLIANT "MORNING STAR"! Venus is a beacon in the predawn sky, rising before morning twilight by about 4:25 AM MDT on September 6 and 3:44 AM MDT on September 22. Venus shines brilliantly at magnitude -4.7 to -4.8. That's as bright as any planet can appear in Earth's skies! As seen through telescopes (and even with higher-magnification binoculars!), Venus' crescent phase waxes from 16% to 30% illuminated between September 6 and 22, as its apparent diameter decreases from 46 to 36 arc seconds. Our Sister Planet's distance from Earth increases from 34 to 43 million miles during this "dark Moon" period, but that's much closer than any other planet during this "dark Moon" period. Venus' crescent is a stunning sight in telescopes. If you observe with binoculars, try viewing Venus during morning twilight, when glare from our Sister Planet is not so overwhelming to your eyes. **Please do your Venus spotting before sunrise. NEVER chance looking at the Sun directly; serious eye damage can result.**

MERCURY AS A "MORNING STAR" (AGAIN!). Mercury rapidly emerges from its September 6 (inferior) solar conjunction, becoming easily visible before dawn by September 22, when it attains its maximum angular separation from the Sun. This is the third morning appearance of the "Speedster Planet" for 2023. On September 13 at about 6:12 AM MDT (with the sun about 8 degrees below the horizon), try spotting faint Mercury (magnitude +1.95) about 3 degrees above an unobstructed eastern horizon and about 10 degrees below and to the right of the thin, crescent Moon (this may be challenging, and binoculars may help). From September 13 to 22 Mercury gets progressively easier to spot, as the Innermost Planet brightens rapidly from magnitude +1.95 to -0.36, while its crescent phase (as seen through telescopes) waxes from 11% to 49% illuminated. When near the Sun in our sky on September 6 (and lost in solar glare), Mercury is only 59 million miles distant. Between September 13 and 22, Mercury's distance from Earth increases from 67 to 82 million miles. **Please do your Mercury spotting before sunrise. NEVER chance looking at the Sun directly; serious eye damage can result.**

NEPTUNE! With telescopes or binoculars, you can spot the Planet Neptune throughout the night. [Neptune is moving slowly through southwestern Pisces](#) and is opposite the Sun in our skies on September 19. Using a telescope at high magnifications, can you resolve Neptune's bluish disk, which appears only 2.36 arcseconds across? On September 19 Neptune shines at magnitude +7.7 and is 2.69 billion miles distant.

THE SUN. The Sun has been impressively active this year. M-class ("moderate") solar flares have been occurring several times per week, and there were X-class ("extreme") flares on January 5, 9, 10, February 11, 17, March 3, 29, June 20, July 2, and August 5 and 7, 2023. There also have been coronal mass ejections ("CMEs") of charged particles that have triggered auroras recently. [Airglow](#) also results from [high solar activity](#), and this phenomenon has been photographed and observed from Colorado. As of September 5, there are several active regions with sunspots on the side of the Sun that faces Earth. M- and even X-class solar flares, some with associated CMEs, are likely. 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://halph.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 in recent months auroras were photographed and seen from Colorado and even farther south in Arizona! 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/>

Starting sometime in September, we usually can watch aurora in real-time from Yellowknife in the Northwest Territories on the [Canadian Space Agency's AuroraMax](#) website. Unfortunately, the start of AuroraMax has been postponed by recent wildfires in the Yellowknife region.

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](#)).

September 6, 2023. International Space Station (ISS). 1st AM Pass of September 6. 4:33 to 4:34 to 4:36 AM MDT. N to NNE to NE, appears from Earth's shadow 10 deg above N, max altitude 12 deg above NNE, max magnitude -0.7 (Passing through Draco, Ursa Major-Big Dipper, and Leo Minor). **Predictions for the ISS are subject to change due to orbital adjustments. Check for updated predictions.**

September 6, 2023. International Space Station (ISS). 2nd AM Pass of September 6. 6:09 to 6:12 to 6:15 AM MDT. NW to NE to ESE, max altitude 49 deg above NE, max magnitude -2.8 (Passing through

Cygnus, Cepheus/Ursa Minor, Camelopardalis, Lynx, Gemini/Cancer, and Canis Minor/Hydra).
Predictions for the ISS are subject to change due to orbital adjustments. Check for updated predictions.

September 7, 2023. International Space Station (ISS). 5:20 to 5:23 to 5:26 AM MDT. NNW to NNE to E, appears from Earth's shadow 8 deg above NNW, max altitude 30 deg above NNE, max magnitude -1.9 (Passing through Draco, Ursa Minor, Ursa Major, Lynx/Leo Minor, and Cancer). **Predictions for the ISS are subject to change due to orbital adjustments. Check for updated predictions.**

September 7, 2023. Tiangong (Chinese Space Station). 5:36 to 5:38 to 5:40 AM MDT, S to SE to ESE, appears from Earth's shadow 10 deg above S, max altitude 17 deg above SE, max magnitude +0.2 (Passing through Eridanus, Lepus/Columba, Canis Major-near Sirius). **Tiangong's orbit may change frequently. Check for updates.**

September 8, 2023. International Space Station (ISS). 1st AM Pass of September 8. 4:33 to 4:34 to 4:37 AM MDT. N to NNE to ENE, appears from Earth's shadow 19 deg above N, max altitude 21 deg above NNE, max magnitude -1.3 (Passing through Draco, Ursa Major, Lynx/Leo Minor, and Cancer). **Predictions for the ISS are subject to change due to orbital adjustments. Check for updated predictions.**

September 8, 2023. International Space Station (ISS). 2nd AM Pass of September 8. 6:08 to 6:11 to 6:14 AM MDT. WNW to SW to SE, max altitude 53 deg above SW, max magnitude -3.6 (Passing through Cygnus, Pegasus, Aries/Pisces, Cetus, Eridanus, Lepus, and Canis Major). **Predictions for the ISS are subject to change due to orbital adjustments. Check for updated predictions.**

September 8, 2023. Tiangong (Chinese Space Station). 6:11 to 6:14 to 6:17 AM MDT, SW to SSE to E, appears from Earth's shadow 9 deg above SW, max altitude 50 deg above SSE, max magnitude -1.6 (Passing through Cetus, Eridanus, Orion, Gemini/Canis Minor, Cancer-near Venus, and /Leo). **Tiangong's orbit may change frequently. Check for updates.**

September 9, 2023. Tiangong (Chinese Space Station). 5:13 to 5:16 AM MDT, SSE to E, appears from Earth's shadow near maximum altitude of 28 deg above SSE, max magnitude -0.8 (Passing through Eridanus, Orion/Lepus, Monoceros, Canis Minor, and Cancer-near Venus). **Tiangong's orbit may change frequently. Check for updates.**

September 9, 2023. International Space Station (ISS). 5:21 to 5:23 to 5:26 AM MDT. NW to NE to SE, max altitude 80 deg above NE, max magnitude -3.8 (Passing through Cygnus, Cepheus, Cassiopeia, Perseus, Auriga/Taurus, Orion, and Monoceros/Canis Major). **Predictions for the ISS are subject to change due to orbital adjustments. Check for updated predictions.**

September 10, 2023. Tiangong (Chinese Space Station). 5:47 to 5:49 to 5:52 AM MDT, WSW to SSE to ENE, appears from Earth's shadow 23 deg above WSW, max altitude 83 deg above SSE, max magnitude -2.2 (Passing through Pisces, Aries, Perseus, Auriga, Gemini, Cancer, and Leo). **Tiangong's orbit may change frequently. Check for updates.**

September 10, 2023. International Space Station (ISS). 6:08 to 6:10 to 6:13 AM MDT. W to SW to S, appears from Earth's shadow 11 deg above W, max altitude 17 deg above SW, max magnitude -2.1

(Passing through Pegasus, Pisces, Cetus, Fornax, and Eridanus). **Predictions for the ISS are subject to change due to orbital adjustments. Check for updated predictions.**

September 11, 2023. International Space Station (ISS). 5:23 to 5:25 AM MDT. S to SSE, appears from Earth's shadow at max altitude 22 deg above S, max magnitude -2.2 (Passing through Eridanus, Caelum, and Columba). **Predictions for the ISS are subject to change due to orbital adjustments. Check for updated predictions.**

September 11, 2023. International Space Station (ISS). 8:24 to 8:26 PM MDT. S to SE, disappears into Earth's shadow at max altitude 17 deg above SE, max magnitude -2.1 (Passing through Corona Australis, Sagittarius, and Capricornus). **Predictions for the ISS are subject to change due to orbital adjustments. Check for updated predictions.**

September 12, 2023. Tiangong (Chinese Space Station). 5:24 to 5:25 to 5:28 AM MDT, WNW to NNW to ENE, appears from Earth's shadow 53 deg above WNW, max altitude 68 deg above NNW, max magnitude -2.1 (Passing through Andromeda, Perseus/Camelopardalis/Lynx, and Leo). **Tiangong's orbit may change frequently. Check for updates.**

September 12, 2023. International Space Station (ISS). 9:11 to 9:14 PM MDT. SW to WSW, disappears into Earth's shadow at max altitude 55 deg above WSW, max magnitude -3.3 (Passing through Libra/Scorpius, Ophiuchus, and Hercules). **Predictions for the ISS are subject to change due to orbital adjustments. Check for updated predictions.**

September 13, 2023. Tiangong (Chinese Space Station). 5:58 to 6:01 to 6:04 AM MDT, WNW to N to ENE, appears from Earth's shadow 15 deg above WNW, max altitude 46 deg above N, max magnitude -1.4 (Passing through Pegasus, Lacerta, Cepheus, Camelopardalis, Leo Minor, and Leo). **Tiangong's orbit may change frequently. Check for updates.**

September 13, 2023. International Space Station (ISS). 8:22 to 8:25 to 8:28 PM MDT. SW to SE to ENE, disappears into Earth's shadow 18 deg above ENE, max magnitude -3.7 (Passing through Scorpius-near Antares, Ophiuchus, Scutum, Aquila, Delphinus, Pegasus, and Andromeda). **Predictions for the ISS are subject to change due to orbital adjustments. Check for updated predictions.**

September 14, 2023. Tiangong (Chinese Space Station). 5:00 to 5:03 AM MDT, NE to ENE, appears from Earth's shadow at max altitude 43 deg above NE, max magnitude -1.1 (Passing through Camelopardalis/Lynx, and Leo Minor). **Tiangong's orbit may change frequently. Check for updates.**

September 14, 2023. International Space Station (ISS). 9:10 to 9:13 to 9:14 PM MDT. W to NNW to N, disappears into Earth's shadow 25 deg above N, max magnitude -2.0 (Passing through Boötes-near Arcturus, Ursa Major-Big Dipper, Draco, and Camelopardalis). **Predictions for the ISS are subject to change due to orbital adjustments. Check for updated predictions.**

September 15, 2023. Tiangong (Chinese Space Station). 5:35 to 5:36 to 5:39 AM MDT, NW to N to ENE, appears from Earth's shadow at 28 deg above NW, max altitude 45 deg above N, max magnitude -1.4 (Passing through Cepheus, Camelopardalis, Ursa Major, Leo Minor, and Leo). **Tiangong's orbit may change frequently. Check for updates.**

September 15, 2023. International Space Station (ISS). 8:21 to 8:24 to 8:28 PM MDT. WSW to NW to NE, disappears into Earth's shadow 8 deg above NE, max magnitude -3.0 (Passing through Boötes, Draco, Ursa Minor, Cepheus, Cassiopeia, and Perseus/Andromeda). **Predictions for the ISS are subject to change due to orbital adjustments. Check for updated predictions.**

September 16, 2023. Tiangong (Chinese Space Station). 6:09 to 6:12 to 6:15 AM MDT, WNW to NNE to E, appears from Earth's shadow at 11 deg above WNW, max altitude 67 deg above NNE, max magnitude -1.9 (Passing through Pegasus, Cassiopeia, Camelopardalis, Lynx, Cancer, and Hydra). **Tiangong's orbit may change frequently. Check for updates.**

September 16, 2023. International Space Station (ISS). 9:10 to 9:13 to 9:14 PM MDT. WNW to NNW to N, max altitude 16 deg above NNW, disappears into Earth's shadow 13 deg above N, max magnitude -1.1 (Passing through Canes Venatici, Ursa Major-Big Dipper, and Camelopardalis). **Predictions for the ISS are subject to change due to orbital adjustments. Check for updated predictions.**

September 17, 2023. Tiangong (Chinese Space Station). 5:11 to 5:14 AM MDT, NNE to E, appears from Earth's shadow at max altitude 51 deg above NNE, max magnitude -1.5 (Passing through Camelopardalis, Lynx, and Cancer). **Tiangong's orbit may change frequently. Check for updates.**

September 17, 2023. International Space Station (ISS). 8:21 to 8:23 to 8:26 PM MDT. W to NNW to NNE, max altitude 22 deg above NNW, max magnitude -1.5 (Passing through Canes Venatici, Ursa Major-Big Dipper, Camelopardalis, and Perseus). **Predictions for the ISS are subject to change due to orbital adjustments. Check for updated predictions.**

September 18, 2023. Tiangong (Chinese Space Station). 5:45 to 5:47 to 5:50 AM MDT, WNW to SSW to ESE, appears from Earth's shadow 29 deg above WNW, max altitude 86 deg above SSW, max magnitude -2.3 (Passing through Pegasus, Andromeda, Perseus, Auriga/Taurus, Gemini, Canis Minor and Hydra). **Tiangong's orbit may change frequently. Check for updates.**

September 18, 2023. International Space Station (ISS). 9:11 to 9:12 to 9:13 PM MDT. NNW to N, max altitude 11 deg above NNW, disappears into Earth's shadow 9 deg above N, max magnitude -0.8 (Passing through Canes Venatici, Ursa Major, and Camelopardalis). **Predictions for the ISS are subject to change due to orbital adjustments. Check for updated predictions.**

September 19, 2023. Tiangong (Chinese Space Station). 6:20 to 6:22 to 6:25 AM MDT, W to SSW to SE, appears from Earth's shadow 11 deg above W, max altitude 30 deg above SSW, max magnitude -1.1 (Passing through Pisces, Cetus, Eridanus, Lepus, and Canis Major). **Tiangong's orbit may change frequently. Check for updates.**

September 19, 2023. International Space Station (ISS). 8:21 to 8:23 to 8:24 PM MDT. NW to NNW to NNE, max altitude 13 deg above NNW, max magnitude -1.0 (Passing through Ursa Major, Camelopardalis, and Perseus). **Predictions for the ISS are subject to change due to orbital adjustments. Check for updated predictions.**

September 20, 2023. Tiangong (Chinese Space Station). 5:22 to 5:24 AM MDT, SSE to SE, appears from Earth's shadow at max altitude 44 deg above SSE, max magnitude -1.5 (Passing through Orion and Canis Major). **Tiangong's orbit may change frequently. Check for updates.**

September 21, 2023. Tiangong (Chinese Space Station). 5:56 to 5:57 to 5:59 AM MDT, SW to SSW to SSE, appears from Earth's shadow near max altitude 18 deg above SW, max magnitude -0.5 (Passing through Eridanus, Columba, and Puppis). 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 September 9.** For more accurate predictions of these and other satellites, check [Heavens-Above.com](https://www.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!