

**OBSERVING HIGHLIGHTS for May 30 to June 13, 2024, a “dark Moon” period
Black Canyon Astronomical Society (BCAS), western Colorado, USA**

SUMMARY. After twilight ends during this “dark Moon period”, the Milky Way is rising in the east, as the constellations of spring descend in the west. The Big Dipper stands high in the northwest. The “Summer Triangle”, consisting of bright stars, Vega in Constellation Lyra, Altair in Aquila, and Deneb in Cygnus, is rising in the east. With a telescope, view eye-catching globular clusters of the summer sky and the galaxies of spring that are still visible in the west. Consider attending night-sky observing events in the BCAS’s region on June 1, 4, 5, 7, 8, and 12 (see details in attached text).

There are no bright planets in the evening sky, but Saturn is easy to spot in the east-southeastern sky from about 3:15 AM MDT until morning twilight brightens the sky. Look for reddish Mars not far above the eastern horizon between about 4:00 and 4:40 AM MDT. Venus, normally the brightest planet, is too close to the Sun to spot during this period. But you may “see” Venus virtually in real time on coronagraphs of the SOHO satellite (for details, see attached text). Jupiter is entering the morning sky, and you might be able to spot the Giant Planet before sunrise on June 13.

The Moon is at last quarter on May 30. On mornings from May 31 to June 5, the crescent Moon wanes. On May 31 between 3:30 and 4:30 AM MDT, look for the 42%-illuminated, crescent Moon about 2 degrees below Saturn. On June 2 at about 4:30 AM MDT, the 20%-illuminated crescent Moon is about 6 degrees above and to the right of reddish Mars. In the predawn of June 3, the waning lunar crescent is near the eastern horizon, below the Red Planet. The Moon is new, and therefore invisible, on June 6. On evenings from June 7 to 12, we can watch a crescent Moon wax. The Moon reaches first quarter on the evening of June 13. Enjoy seeing earthshine on the dark part of the crescent Moon, especially on mornings from June 1 to 4, and evenings from June 7 to 10 (binoculars can provide stunning views of earthshine).

The Sun has been very active recently, especially on the night of May 10-11, when a coronal mass ejection (CME) triggered an extreme geomagnetic storm that produced auroras (aka northern lights) that were photographed from all 50 states. Solar Active Region No. 3664, which caused these events, has now rotated back onto the Earth-facing side of the Sun. So moderate and even extreme solar flares and powerful CMEs are likely during this period. CMEs may trigger more geomagnetic storms and auroras. You can monitor solar activity safely in real time on the internet. You can also find online the likelihood for auroras.

From western Colorado, try to spot evening passes of the bright International Space Station (ISS) on May 29 and 30. Also, look for predawn passes of the almost-as-bright Tiangong (Chinese) Space Station from May 30 to June 3 and evening passes of Tiangong from June 4 to 13.

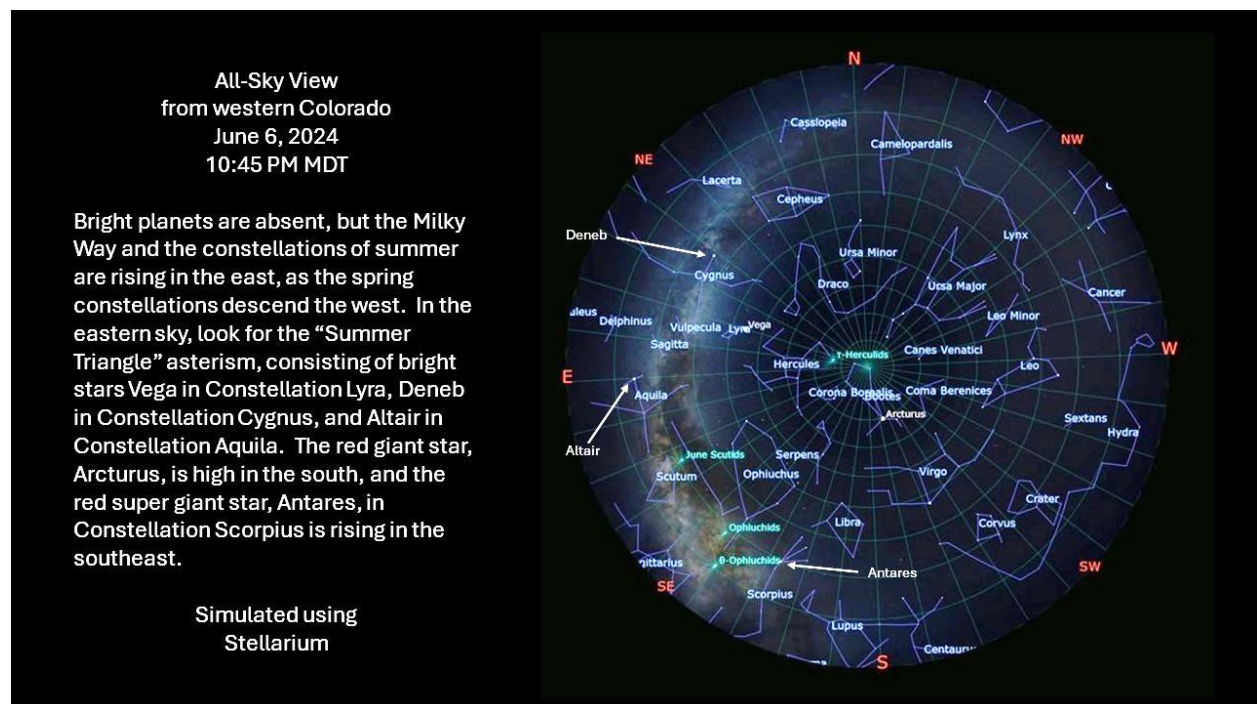
WESTERN SLOPE SKIES. Since 2011, BCAS and KVNF Community Radio have been producing [Western Slope Skies](#) (WSS), a biweekly astronomy feature, which airs every two weeks at about 8:10 AM on Fridays and 7:00 PM on following Wednesdays. On May 29 Yasmin Campos, as astronomy student of Dr. Catherine Whiting at Colorado Mesa University tells us about the beautiful rings of Saturn. Then on June 7 and 12, Carolyn Aldrich, also an astronomy student of Dr. Whiting, presents on “White Dwarfs”, which are dense remnants of stars like the Sun

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 **last quarter on May 30** (exactly at 11:13 AM MDT). On mornings from May 31 to June 5, the crescent Moon wanes. On the morning of May 31 between 3:30 and 4:30 AM MDT, look for the 42%-illuminated, crescent Moon about 2 degrees below Saturn. On June 2 at about 4:30 AM MDT, the 20%-illuminated crescent Moon is about 6 degrees above and to the right of reddish Mars. On June 3, the waning lunar crescent, 12% illuminated, is about 8 degrees left and a bit below Mars. **The Moon is new on June 6** (exactly new at 6:38 AM MDT). On evenings from June 7 to 12, we can watch a crescent Moon wax. The Moon reaches **first quarter on June 13** (at exactly 11:18 PM MDT). Enjoy seeing earthshine on the dark part of the crescent Moon, especially on mornings from June 1 to 4, and evenings from June 7 to 10 (binoculars can provide stunning views of earthshine). NASA has published a [stunning visualization of lunar phases for year 2024](#). **Please do your crescent Moon spotting before sunrise and after sunset. NEVER chance looking at the Sun directly; serious eye damage can result.**

ENJOY A DARK JUNE SKY! Late May and early June are typically dry in western Colorado, so we may have many clear nights during this “dark Moon” period. But our nights are short. Evening “[astronomical twilight](#)” does not end until about 10:25 PM MDT on May 30 and 10:38 PM MDT on June 13. And morning astronomical twilight begins at about 3:56 AM MDT on May 30 and 3:47 AM MDT on June 13. But that still leaves more than 5 hours of “dark time”, and there’s much in our night sky to enjoy! Use a planetarium app or the “all-sky” chart below to help navigate. At 10:45 PM MDT the “Big Dipper” is high in the northwestern sky. The star clouds of the Milky Way are rising in the east, as the spring constellations, Leo, Virgo, and Hydra, descend in the west. In the eastern sky, look for the “Summer Triangle” asterism of three bright stars, Vega in Constellation Lyra, Altair in Aquila, and Deneb in Cygnus. If you can find a telescope, it’s time to start enjoying eye-catching views of summer’s many globular star clusters, including M13 in Hercules and M4 in Scorpius. And we can still see many galaxies in spring constellations high in the western sky.



NIGHT-SKY OBSERVING EVENTS IN THE BCAS REGION (open to the public)

June 1, after 8:00 PM, Crawford State Park (CPW&BCAS)

June 4, 8:30 to 10:00 PM, Memorial Park, Silverton CO. "Silverton Under the Stars"

June 5, after 8:30 PM, Black Canyon of the Gunnison N.P., South Rim, near campground (NPS&BCAS)

June 7 and 8, Lake City StarFest, Lake City CO area, <https://www.lakecitystarfest.com/>

June 12, after 8:30 PM, Black Canyon of the Gunnison N.P., South Rim, near campground (NPS&BCAS)

SATURN IN THE MORNING. Saturn rises just south of east at around 2:16 AM MDT on May 30 and 1:24 AM MDT on June 13. The Ringed Planet is easy to spot in the east-southeastern sky from about 3:15 AM MDT until morning twilight brightens the sky. Saturn is still on the far side of the Sun from our perspective, but it's drawing nearer, from 911 million miles distant on May 30 to 890 million miles distant on June 13. Saturn brightens slightly from magnitude +1.02 on May 30 to magnitude +0.98 on June 13. Through telescopes, the Ringed Planet appears 17 arc seconds wide, and its rings span 40 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 2024, 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 soon. Because Saturn's rings now 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/>

MARS BEFORE DAWN. Reddish Mars rises in the east at about 3:36 AM MDT on May 30 and 3:07 AM MDT on June 13. Look for Mars low in the eastern sky between 4:00 and 4:40 AM MDT. Mars shines at magnitude +1.1. The Red Planet is 173 million miles distant on May 30 and 168 million miles distant on June 13. Between May 30 and June 13, Mars is still on the far side of the Sun from our perspective, and its disk appears tiny, less than 5.2 arc seconds wide. **Please do your Mars spotting before sunrise.**

NEVER chance looking at the Sun directly; serious eye damage can result.

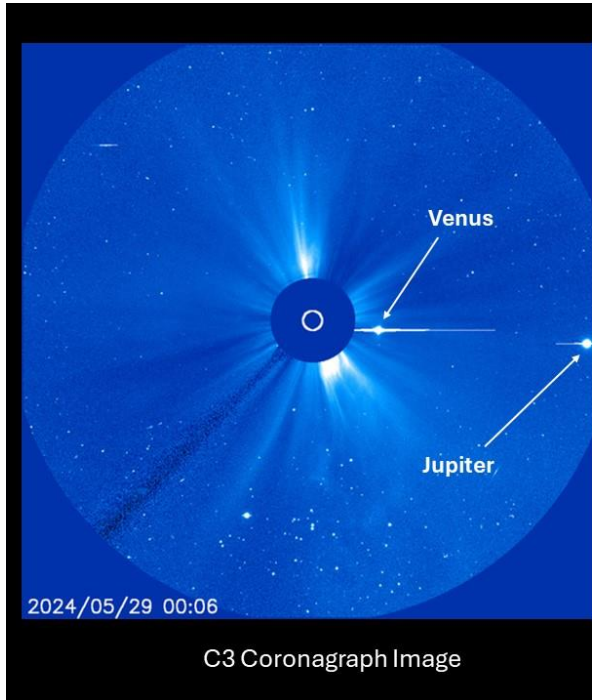
AN EVENING COMET FOR TELESCOPES. When it enters the inner Solar System next fall, Comet Tsuchinshan-ATLAS (C/2023 A3) may become a spectacular sight, especially during evenings in mid-to-late October. It's not super bright now, but C/2023 A3 is well placed for viewing in the evenings with a telescope. It's about magnitude +10 in brightness, and it's growing a tail! If you have a telescope, this Comet may be worth a look. Search for C/2023 A3 after evening twilight ends, but before the waxing Moon brightens the evening sky after June 10. You can find images, brightness info, finder charts, and an ephemeris for C/2023 A3 at these links...

<http://astro.vanbuitenen.nl/comet/2023A3>

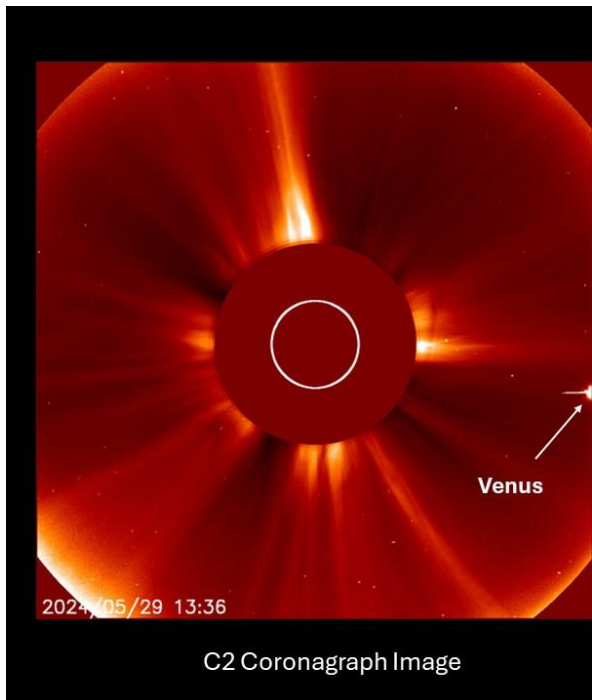
<http://www.aerith.net/comet/catalog/2023A3/2023A3.html>

VENUS AND JUPITER ARE NEAR THE SUN IN OUR SKY. Venus, the brightest planet, is now very near the Sun in our sky. Our "Sister Planet" is at "superior" solar conjunction on June 4 and is not observable during this period. A superior conjunction occurs when the interior planets, Venus or Mercury, pass on the far side of the Sun from our perspective. Though not directly visible, you can "see" Venus virtually through much of this period on ["real-time" images from the C3 coronagraph](#) and/or the [C2 coronagraph](#) of the SOHO satellite (see example images, below). Venus will be hidden behind the coronagraphs' occulting disks for several days around June 4 and will become visible in evening twilight in late July.

Jupiter reached solar conjunction on May 18 and is slowly entering our morning sky. If you can find a place with an unobstructed east-northeastern horizon, you may be able to spot Jupiter (at magnitude - 2.0) on June 13 at about 5:10 AM MDT, only 2 degrees above the horizon (with the Sun only 6.5 degrees below the horizon). **Please do your Jupiter spotting before sunrise. NEVER chance looking at the Sun directly; serious eye damage can result.**



Venus and Jupiter, as they appeared on the LASCO C3 coronagraph of the SOHO satellite on May 29, 2024. The Sun (position and size indicated by the white circle) is hidden behind the coronagraph's occulting disk. Jupiter soon leaves the C3's field of view and by mid June becomes visible in predawn twilight. Venus is at solar conjunction on June 4 and is hidden behind the C3's occulting disk for several days around then. Venus will reappear in evening twilight by late July. Coronal streamers of the solar wind are visible, as they are during a total solar eclipse. Stars of the Hyades Star cluster are south of (below) the Sun, much as they appeared during the total solar eclipse of May 29, 1919, exactly 105 years ago. During that eclipse, astronomers measured the bending of light from the Hyades' stars by the Sun's gravity, supporting the General Theory of Relativity. That finding instantly made Albert Einstein world famous. Credit: SOHO/ESA/NASA



Venus, as it appeared on the LASCO C2 coronagraph of the SOHO satellite on May 29, 2024. The Sun (size and position indicated by the white circle) is hidden behind the coronagraph's occulting disk. Venus is at solar conjunction on June 4 and is hidden behind the C2's occulting disk for a day or two on either side of June 4. Venus will reappear in evening twilight by late July. Coronal streamers of the solar wind are visible, as they are during a total solar eclipse. Credit: SOHO/ESA/NASA

KEEP WATCHING THE NORTHERN CROWN! Will there soon be a bright “new” star in Constellation Corona Borealis (the “Northern Crown”), at least briefly? T Coronae Borealis (T CrB) is a recurrent nova that may rapidly increase in brightness 1500-fold (to second magnitude) to become the brightest star in Corona Borealis sometime between now and next September. Then it may fade rapidly below naked-eye visibility in about a week. As of 6 AM MDT on May 29, T CrB had not yet detonated. 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://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
<https://skyandtelescope.org/observing/whats-up-with-t-crb04202016/>

THE SUN. The Sun has been very active over the past year, and intensely so from May 3 to 14, when solar Active Region No. 3664 unleashed numerous flares and coronal mass ejections of charged particles. There have been M-class (moderate) solar flares each week for the past year, and there were 13 X-class (extreme) solar flares between May 3 and 14. There also have been many coronal mass ejections (“CMEs”) of charged particles that have triggered geomagnetic storms that caused auroras. Many folks in Colorado and elsewhere viewed and photographed these in the past two weeks. Active Region (AR) 3664, which was responsible for most of this activity, has again rotated into view on the Earth-facing side of the Sun. AR 3664 produced another X-class flare on May 27. We can expect continuing M- and even X-class flares and powerful CMEs. [Airglow](#) also results from high solar activity, and this phenomenon has been photographed and 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://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”). 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 photograph some amazing auroras from Colorado! A coronal mass ejection (CME) from solar Active Region 3664 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 the widespread aurora of May 10-11. Our nights in Colorado are now short, reducing the time when we may spot auroras. But we have an advantage over far northerly locations, which have even fewer hours between evening and morning twilight (or no dark time at all!). Active Region (AR) 3664 has rotated back onto the Earth-facing side of the Sun. So, chances for more auroras may be good, especially as AR 3664 rotates into alignment with the Earth (from about May 31 to June 6). 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>

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. These predictions for satellite passes may be inaccurate by up to several minutes, especially after June 2. 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. During May, June, and July, space above the northern hemisphere is awash in sunlight, and we can see many Earth satellites (visible only from sunlight they reflect) through much of the night, especially in the northern sky.

May 29, 2024. International Space Station (ISS). 10:13 to 10:15 to 10:16 PM MDT. W to SW to SSW. Max altitude 15 deg above SW, disappears into Earth's shadow 14 deg above SSW, max magnitude -1.5 (Passing through Gemini, Canis Minor, and Hydra). **Predictions for the ISS are subject to change due to orbital adjustments. Check for updated predictions.**

May 30, 2024. Tiangong (Chinese Space Station). 3:40 to 3:41 to 3:44 AM MDT. 1st AM Tiangong Pass of May 30. NW to N to ENE. Appears from Earth's shadow 38 deg above NW, max altitude 45 deg above N, max magnitude -1.2 (Passing through Draco, Ursa Minor, Cepheus, Cassiopeia, Andromeda, and Pisces). **Tiangong's orbit may change frequently. Check for updates.**

May 30, 2024. Tiangong (Chinese Space Station). 5:15 to 5:18 to 5:21 AM MDT. 2nd AM Tiangong Pass of May 30. WNW to SSW to ESE. Max altitude 79 deg above SSW, max magnitude -2.3 (Passing through Boötes, Corona Borealis, Hercules, Lyra, Cygnus, Pegasus, Pisces, and Cetus). Cassiopeia, Andromeda, and Pisces). **Tiangong's orbit may change frequently. Check for updates.**

May 30, 2024. International Space Station (ISS). 9:23 to 9:26 to 9:29 PM MDT. WNW to SW to SSE. Max altitude 28 deg above SW, disappears into Earth's shadow 11 deg above SSE, max magnitude -2.2 (Passing through Gemini, Canis Minor/Cancer, Hydra, and Centaurus). **Predictions for the ISS are subject to change due to orbital adjustments. Check for updated predictions.**

May 31, 2024. Tiangong (Chinese Space Station). 4:12 to 4:14 to 4:17 AM MDT. WNW to NNE to E. Appears from Earth's shadow 17 deg above WNW. Max altitude 66 deg above NNE, max magnitude -1.9 (Passing through Boötes, Draco, Cepheus/Cygnus, Lacerta, Pegasus, and Pisces). **Tiangong's orbit may change frequently. Check for updates.**

June 1, 2024. Tiangong (Chinese Space Station). 4:43 to 4:47 to 4:50 AM MDT. WNW to SSW to SE. Appears from Earth's shadow 8 deg above WNW. Max altitude 53 deg above SSW, max magnitude -2.1 (Passing through Boötes, Serpens, Hercules/Ophiuchus, Aquila, Aquarius, and Cetus). **Tiangong's orbit may change frequently. Check for updates.**

June 2, 2024. Tiangong (Chinese Space Station). 3:43 to 3:46 AM MDT. In ESE. Appears from Earth's shadow at max altitude 64 deg above ESE, max magnitude -2.0 (Passing through Cygnus, Pegasus, and Pisces). **Tiangong's orbit may change frequently. Check for updates.**

June 3, 2024. Tiangong (Chinese Space Station). 4:15 to 4:18 AM MDT. S to SE. Appears from Earth's shadow at max altitude 32 deg above S, max magnitude -1.4 (Passing through Sagittarius, Capricornus, and Piscis Austrinus). **Tiangong's orbit may change frequently. Check for updates.**

June 4, 2024. Tiangong (Chinese Space Station). 9:15 to 9:17 to 9:19 PM MDT. SSW to SSE to E. Max altitude 18 deg above SSE, disappears into Earth's shadow 9 deg above E, max magnitude -0.7 (Passing through Antlia, Hydra/Centaurus, Scorpius, and Ophiuchus). **Tiangong's orbit may change frequently. Check for updates.**

June 5, 2024. Tiangong (Chinese Space Station). 9:46 to 9:49 to 9:52 PM MDT. SW to SSE to E. Max altitude 52 deg above SSE, max magnitude -2.1, disappears into Earth's shadow 14 deg above E (Passing through Hydra, Virgo, Serpens, Ophiuchus/Hercules, and Aquila). **Tiangong's orbit may change frequently. Check for updates.**

June 6, 2024. Tiangong (Chinese Space Station). 10:18 to 10:21 to 10:23 PM MDT. W to NNW to ENE. Max altitude 67 deg above NNW, max magnitude -1.9, disappears into Earth's shadow 24 deg above ENE (Passing through Hydra, Leo, Ursa Major-Big Dipper, Draco, and Cygnus). **Tiangong's orbit may change frequently. Check for updates.**

June 7, 2024. Tiangong (Chinese Space Station). 9:14 to 9:17 to 9:20 PM MDT. 1st PM Tiangong pass of June 7. WSW to SSE to ENE. Max altitude 77 deg above SSE, max magnitude -2.3 (Passing through Hydra, Leo, Coma Berenices, Boötes, Hercules, and Sagitta). This pass may be challenging to see in bright twilight. **Tiangong's orbit may change frequently. Check for updates.**

June 7, 2024. Tiangong (Chinese Space Station). 10:51 to 10:54 PM MDT. 2nd PM Tiangong pass of June 7. WNW to N to NNE. Max altitude 45 deg above N, disappears into Earth shadow 43 deg above NNE, max magnitude -1.3 (Passing through Hydra, Cancer, Ursa Major, Ursa Minor, and Draco). **Tiangong's orbit may change frequently. Check for updates.**

June 8, 2024. Tiangong (Chinese Space Station). 9:46 to 9:49 to 9:53 PM MDT. W to N to ENE. Max altitude 54 deg above N, disappears into Earth shadow 7 deg above ENE, max magnitude -1.5 (Passing through Hydra/Canis Minor, Cancer, Ursa Major, Draco, Ursa Minor, Draco again, and Cygnus). **Tiangong's orbit may change frequently. Check for updates.**

June 9, 2024. Tiangong (Chinese Space Station). 10:19 to 10:22 to 10:23 PM MDT. WNW to N to ENE. Max altitude 44 deg above N, disappears into Earth shadow 21 deg above ENE, max magnitude -1.2 (Passing through Cancer, Ursa Major, Draco/Camelopardalis, Ursa Minor, Draco again, and Cygnus). **Tiangong's orbit may change frequently. Check for updates.**

June 10, 2024. Tiangong (Chinese Space Station). 9:14 to 9:17 to 9:20 PM MDT. 1st PM Tiangong pass of June 10. W to N to ENE. Max altitude 47 deg above N, max magnitude -1.2 (Passing through Canis Minor, Gemini, Lynx, Ursa Major, Draco/Camelopardalis, Ursa Minor, Draco again, and Cygnus). This pass may be difficult to see in bright twilight. **Tiangong's orbit may change frequently. Check for updates.**

June 10, 2024. Tiangong (Chinese Space Station). 10:51 to 10:54 PM MDT. 2nd PM Tiangong pass of June 10. WNW to N. Disappears into Earth's shadow at max altitude 57 deg above N, max magnitude

-1.7 (Passing through Cancer, Ursa Major, and Draco/Ursa Minor). **Tiangong's orbit may change frequently. Check for updates.**

June 11, 2024. Tiangong (Chinese Space Station). 9:46 to 9:49 to 9:52 PM MDT. WNW to N to E. Max altitude 47 deg above N. Disappears into Earth's shadow 12 deg above E, max magnitude -1.3 (Passing through Gemini, Lynx, Ursa Major, Ursa Minor, Draco, and Cygnus). **Tiangong's orbit may change frequently. Check for updates.**

June 12, 2024. Tiangong (Chinese Space Station). 10:19 to 10:21 to 10:22 PM MDT. WNW to NNE to E. Max altitude 75 deg above NNE. Disappears into Earth's shadow 43 deg above E, max magnitude -2.2 (Passing through Cancer, Ursa Major-Big Dipper/Draco, and Hercules). **Tiangong's orbit may change frequently. Check for updates.**

June 13, 2024. Tiangong (Chinese Space Station). 10:51 to 10:53 PM MDT. W to WSW. Disappears into Earth's shadow at max altitude 33 deg above WSW, max magnitude -0.9 (Passing through Cancer and Leo). **Tiangong's orbit may change frequently. Check for updates.**

HAPPY OBSERVING!