



Outdoors

Upstate NY stargazing in December: Geminid and Ursid meteor showers close out the year

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By [Special to nyup.com](#)

A monthly preview of stars you can observe over Upstate NY from Damian Allis, contributing writer

Winter has come again, marking the time when many pack up their equipment and seek indoor lectures over outdoor observing. The situation is even worse for amateur astronomers, as the arrival of the Winter Solstice on the 21st also marks the point at which the days start to get longer - and the observing nights start to get shorter. As for 2017, New York observers saw mixed results in the "with my own eyes" department. The solar eclipse was generally excellent, with random blocks of overcast observing time. Some of the more subtle phenomena, such as lunar occultations and one lunar eclipse, also received mixed reviews for observability. The recent Venus-Jupiter conjunction was a wash for most, and the general consensus for the year was that none of the meteor showers lived up to the attention they received.

Major NASA missions this year did provide focus for many observers and outreach lecturers, with Juno at Jupiter and Cassini at Saturn highlights both in imagery and hard science. The list of major events for 2018 is lengthy, including a number of lunar and solar eclipses. Sadly, New York will only be able to catch a sliver of only one of these - the total lunar eclipse occurring on Jan. 31st. That said, any reason to get outside is a good one - and if you know of any NY astronomy clubs or events that could use some additional promotion, please consider [contacting the author](#) with information.

Lectures And Observing Opportunities In Upstate/Central New York

New York has a number of astronomers, astronomy clubs, and observatories that host public sessions throughout the year. Announced sessions from respondent NY astronomy organizations are provided below for December. As wind and cloud cover are always factors when observing, please check the provided contact information and/or email the groups a day-or-so before an announced session, as some groups will also schedule weather-alternate dates. Also use the contact info for directions and to check on any applicable event or parking fees. And bring one more layer of clothing than you think you are going to need!

Astronomy Events Calendar

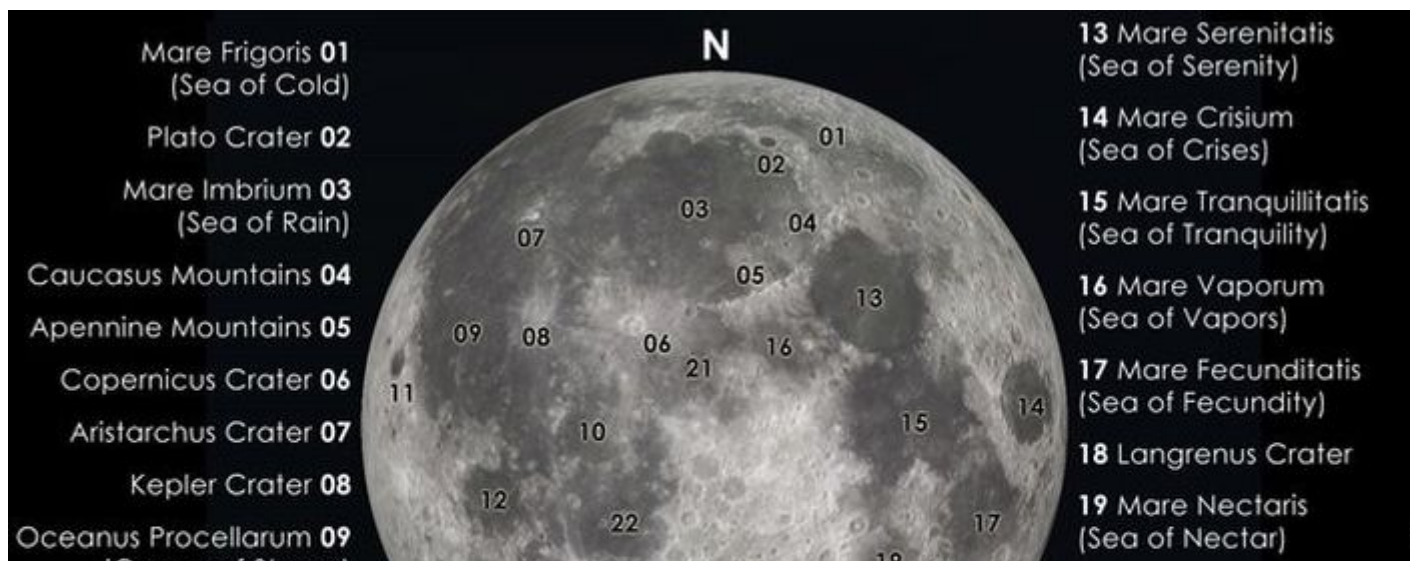
Organizer	Location	Event	Date	Time	Contact Info
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Albany Area Amateur Astronomers & Dudley Observatory	Schenectady	Senior Science Day	Dec. 4	3 - 4 p.m.	email , website
Albany Area Amateur Astronomers & Dudley Observatory	Schenectady	Octagon Barn Star Party	Dec. 15	7 - 9 p.m.	email , website
Albany Area Amateur Astronomers & Dudley Observatory	Schenectady	Night Sky Adventure	Dec. 19	7 - 8:30 p.m.	email , website
Albany Area Amateur Astronomers & Dudley Observatory	Schenectady	AAAA Meeting	Dec. 21	7:30 - 9 p.m.	email , website
Astronomy Section, Rochester Academy of Science	Rochester	Member Meeting	Dec. 1	7 - 10 p.m.	email , website
Astronomy Section, Rochester Academy of Science	Rochester	Telescope Tune-Up Day	Dec. 9	11 a.m. - 4 p.m.	email , website
Baltimore Woods	Marcellus	Geminid Meteor Shower	Dec. 13/14	7 - 10 p.m.	email , website
Kopernik Observatory & Science Center	Vestal	KAS Monthly Meeting	Dec. 13	7 - 9 p.m.	email , website
Mohawk Valley Astronomical Society	Waterville	Public Star Gazing	Dec. 9	7:30 - 10 p.m.	email , website
Mohawk Valley Astronomical Society	Waterville	MVAS Meeting	Dec. 13	7:30 - 9 p.m.	email , website
Syracuse Astronomical Society	Syracuse	Meeting at OCC	Dec. 8	7 - 9 p.m.	email , website

Lunar Phases

Full Moon	Third Quarter	New Moon	First Quarter
Dec. 3, 4:46 p.m.	Dec. 10, 8:51 a.m.	Dec. 18, 7:30 a.m.	Dec. 26, 10:20 a.m.

The Moon's increasing brightness as Full Moon approaches washes out fainter stars, random meteors, and other celestial objects - this is bad for most observing, but excellent for new observers, as only the brightest stars (those that mark the major constellations) and planets remain visible for your easy identification. If you've never tried it, the Moon is a wonderful binocular object. The labeled image identifies features easily found with low-power binoculars.

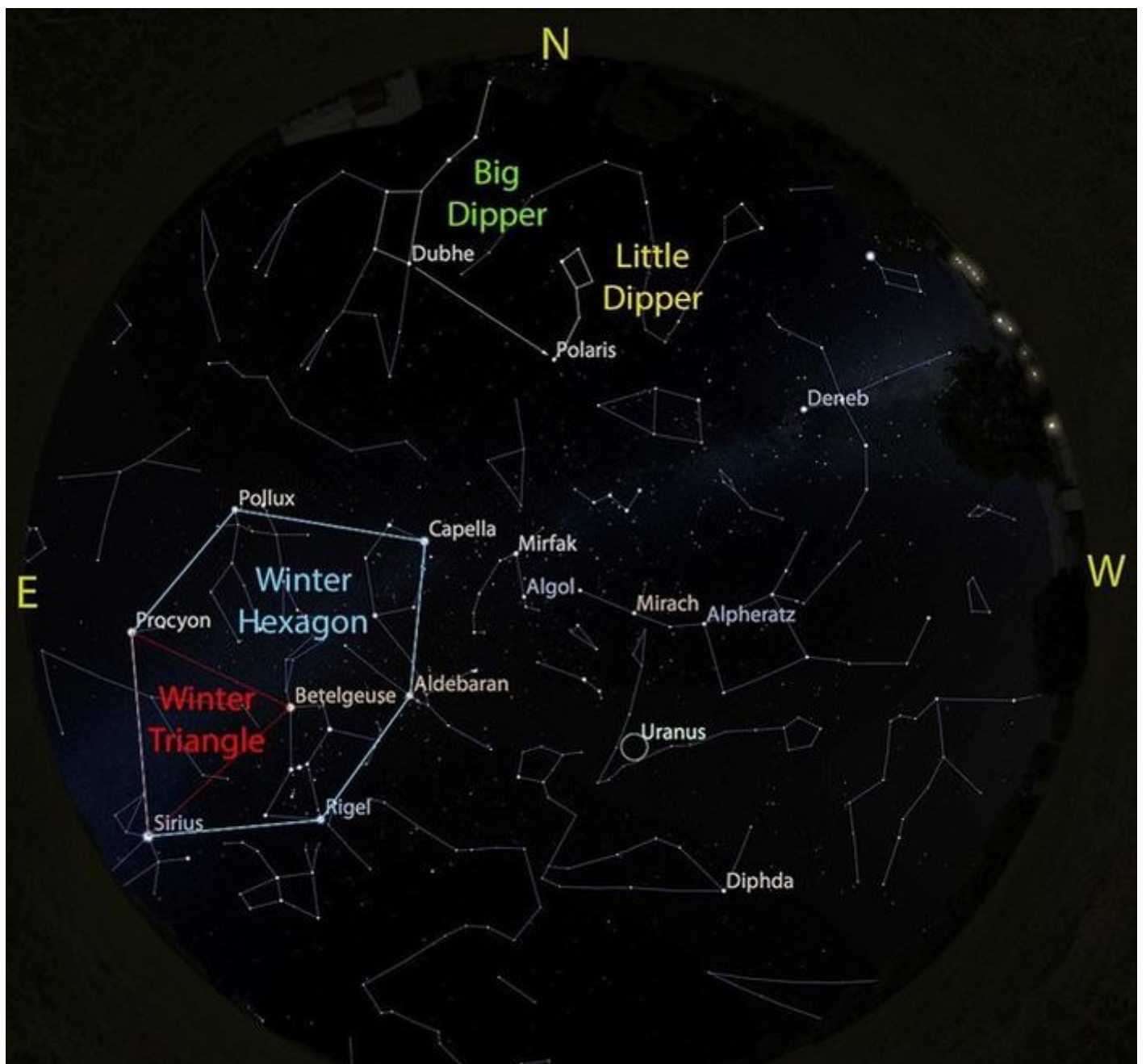




Lunar features prominent in low-power binoculars.

Observing Guides

Items and events listed below assume you're outside and observing most anywhere in New York. The longer you're outside and away from indoor or bright lights, the better your dark adaption will be. If you have to use your smartphone, find a red light app or piece of red acetate, else set your brightness as low as possible.



The sky at 9:00 p.m. on December 15th, accurate all month except for the changing Moon position.

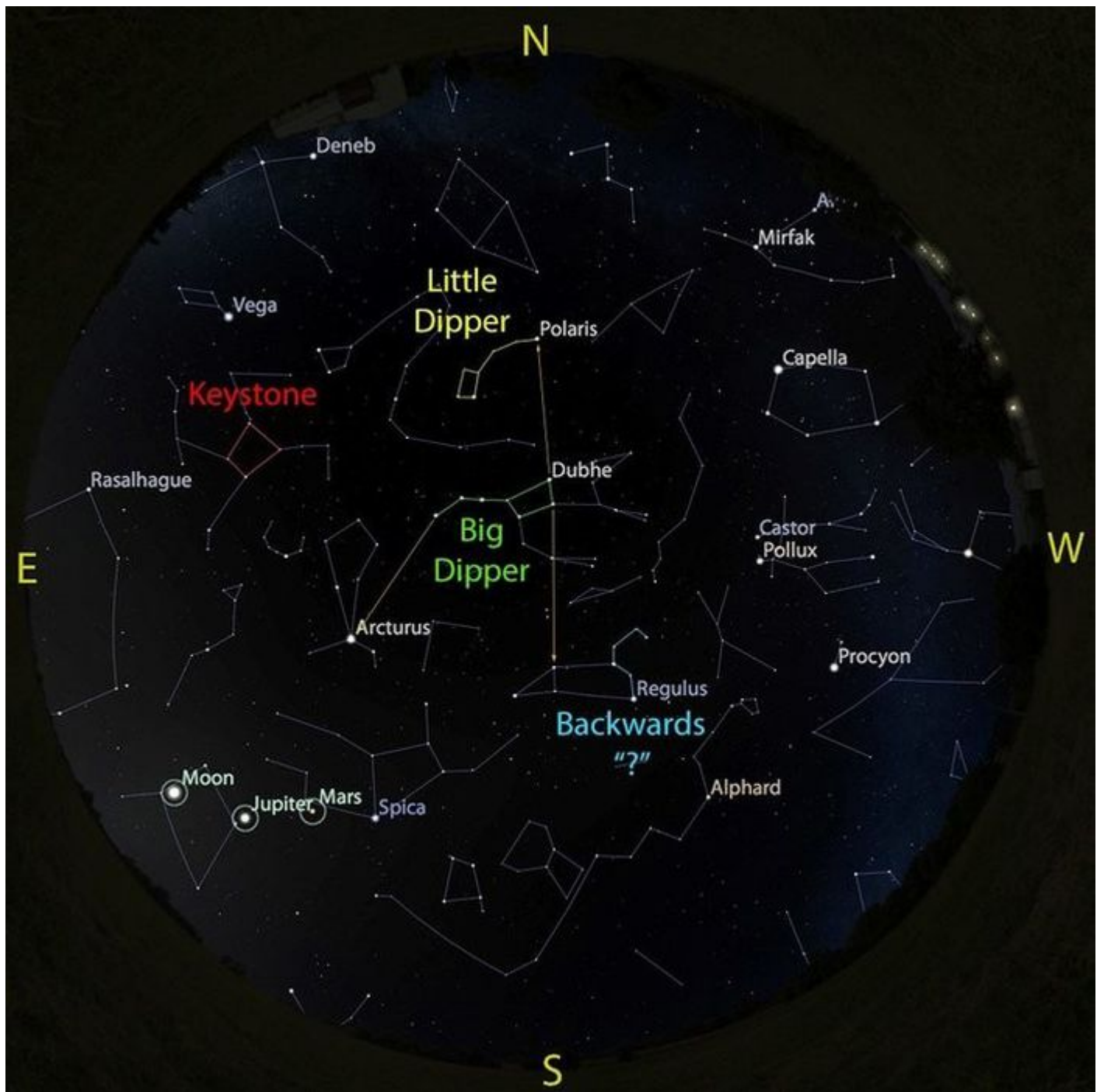
Evening Skies: The Summer Triangle has finally become a Summer Line, with only Deneb and bright Vega visible in the evenings this month. A new triangle takes up the slack, itself engulfed in a much larger geometric shape. The Winter Triangle - Sirius in Canis Major, Procyon in Canis Minor, and Betelgeuse in Orion, shares an edge with the much larger Winter Hexagon - Sirius, Procyon, Pollux in Gemini, Capella in Auriga, Aldebaran in Taurus, and Rigel in Orion.

With Orion and its cohort all above the horizon before midnight, learning eight constellations at once is as easy as following some lines within Orion's bowtie asterism.



Orion can guide you around its neighborhood. Red = belt stars to Sirius and Canis Major; Orange = Rigel and belt center to Castor and Pollux in Gemini; Yellow = Bellatrix and Betelgeuse to Canis Major; Green = Belt stars to Aldebaran and Taurus; Blue = Saiph and Orion's head to Capella in Auriga.

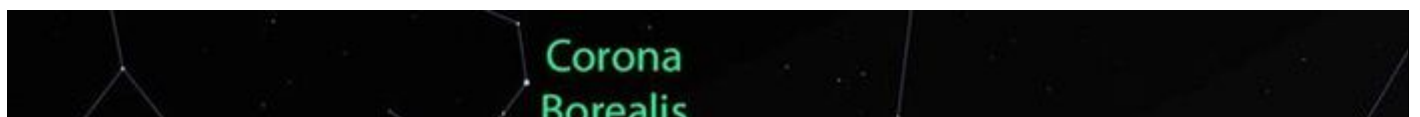
Morning Skies: There are no massive asterisms on the scale of the Winter Hexagon in the morning skies right now, but prominent and familiar shapes do abound. Moving from the Little Dipper to the Big Dipper, continue nearly the same distance to reach the hind end of Leo the Lion - look to the west for the backwards question mark that is its mane. In the same neck of the woods as the two Dippers is the Keystone asterism, marking the torso of the constellation Hercules.

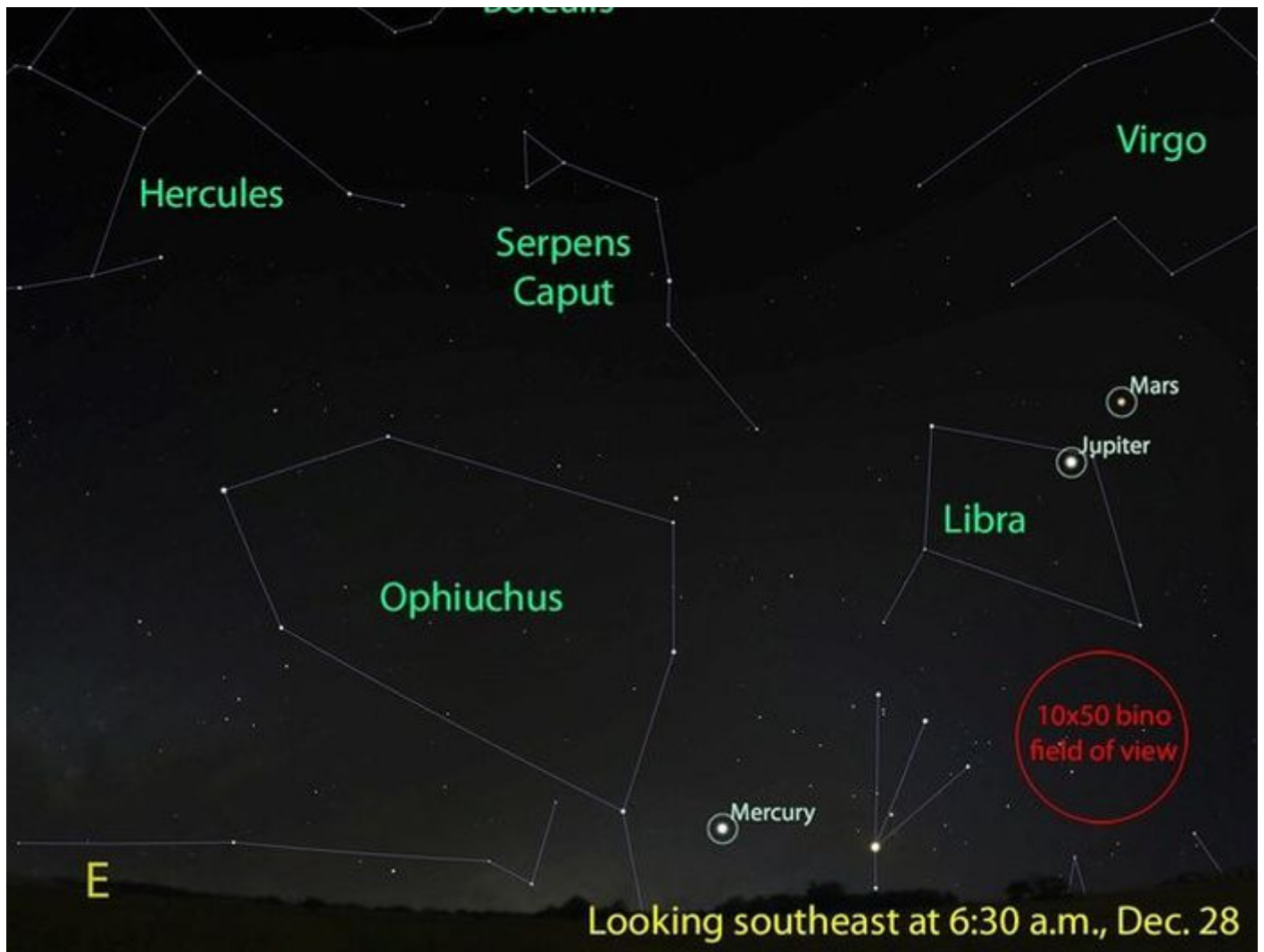


The sky at 5:00 a.m. on December 15th, accurate all month except for the changing Moon position.

Planetary Viewing

Mercury: Mercury will be difficult to catch at the beginning and end of the month, then impossible to see directly for the rest of it. Mercury will slip below the western horizon soon after sunset on the 1st and 2nd, then rise before the morning sun after the 18th. It will be easiest to see Mercury on the 28th, when it rises at its earliest - close to 6 a.m.

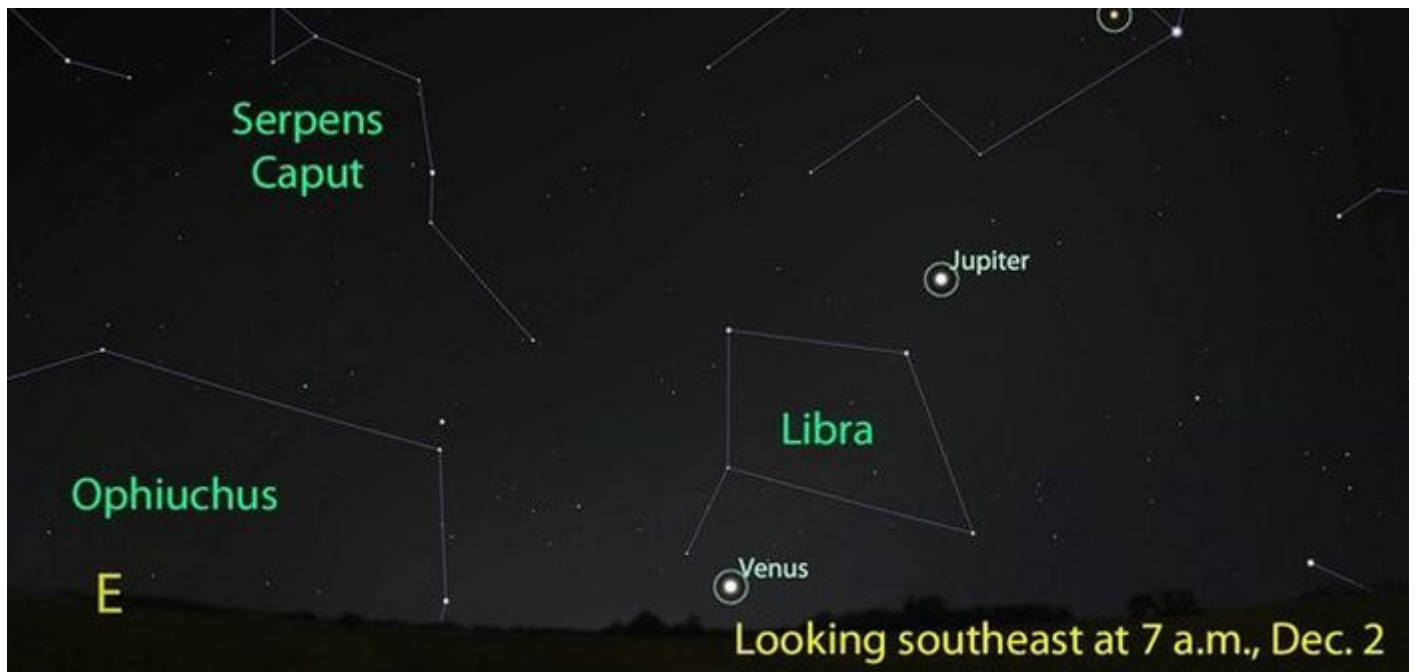




Mercury low on the horizon on Dec. 28, with Jupiter and Mars still easy targets higher above.

Venus: If you want to see Venus before the end of the year, you have the first two mornings in December to do it. Just off of an impressive mid-November conjunction with Jupiter that many in New York couldn't see directly due to cloud cover, Venus is set to rise in the east soon before the morning Sun after Dec. 3. Those with a low horizon will have the 1st and 2nd, but that will end safe and easy Venus observations until 2018, when it becomes an exceptional target in February.





Venus low on the horizon on Dec. 1 and 2, with Jupiter and Mars still easy targets higher above.

Mars: Mars rises around 4 a.m. all month long, making it a quality target for early morning observers. With Jupiter rising earlier each morning, Mars will find itself being out-observed by binocular and telescope users mid-month. This situation will change after the 23rd, when Mars and Jupiter will share the field of view of 10x50 binoculars. Those planning ahead should set an alarm for the mornings of Jan. 6th and 7th, when the two planets will be exceptionally close to one another.

Both the 13th and 14th see the Moon, Mars and Jupiter in close proximity in the morning sky - a pleasant sight to end a long night of Geminid hunting.





Mars, Jupiter, and the Moon on the mornings of the 13th and 14th.

Jupiter: Jupiter is visible in the morning for all of December and will be an observing target at some point in the night until October of next year. Those with even poor-quality binoculars are able to see its four bright satellites - known as the "Galilean Moons" for their first observer - and the appearance of Jupiter as a disc of light instead of a simple pinpoint like all stars. Many websites, including the [Jupiter's Moons](#) webapp at Sky & Telescope, can provide you with the real-time and future positions of the fast-moving moons for any viewing opportunity you get this and every month.

When the weather doesn't cooperate, the [NASA Juno mission](#) ([tw](#), [fb](#)) continues to impress with hard science and beautiful images.

Saturn: You have only a few days at the beginning of the month to observe Saturn low in the western sky, and those sessions must start very soon after sunset to do so. Saturn ends its time as an evening target well before mid-month even to those with very low and clear horizons. Observing Saturn after the first week will be very difficult due to the amount of sunlight still in the sky. Very close to the new year, Saturn will just begin to clear the horizon before the rising sun, likely still too difficult a target until mid-January, when it rises in the morning with time and dark skies to spare.

ISS And Other Bright Satellites

Satellite flyovers are commonplace, with several bright passes easily visible per hour in the nighttime sky, yet a thrill to new observers of all ages. Few flyovers compare in brightness or interest to the International Space Station. The flyovers of the football field-sized craft with its massive solar panel arrays and six current occupants can be predicted to within several seconds and take several minutes to complete.

December is excellent for ISS observing. From the 1st to the 18th, all flyovers are between 5 and 7:30 p.m., with many of them very bright and some of them occurring twice in an evening. Generally speaking, the first of the double flyovers will be

significantly brighter than the second, giving you a 90 minute wait to compare and contrast. The ISS goes off our radar from the 18th to the 24th, after which it becomes a bright morning target into early 2018.

ISS Flyovers

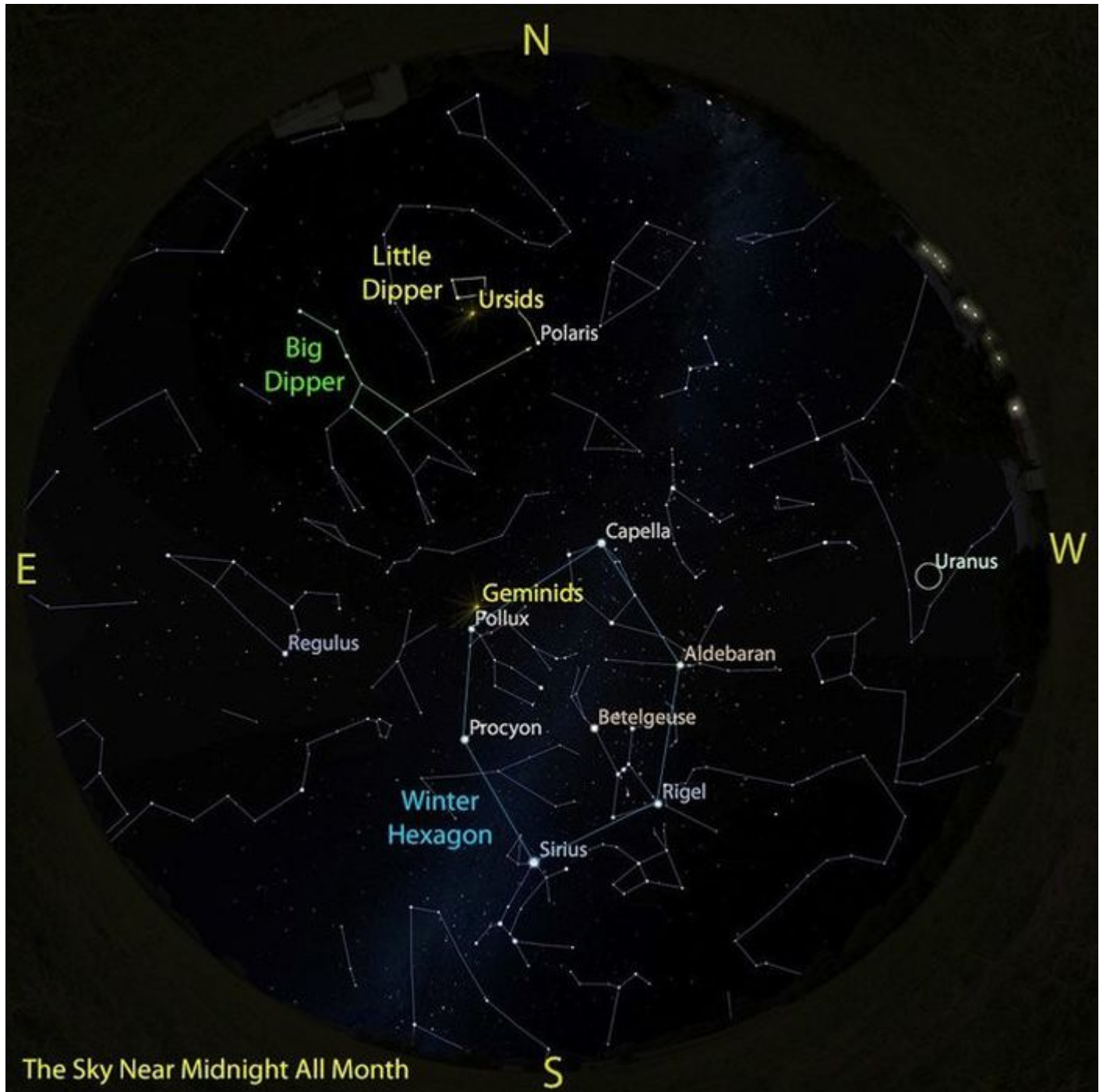
Date	Brightness	Approx. Start	Start Direct.	Approx. End	End Direct.
12/1	extremely	5:24 PM	W/SW	5:30 PM	NE
12/1	somewhat	7:02 PM	W/NW	7:03 PM	NW
12/2	very	6:09 PM	W	6:13 PM	N
12/3	very	5:16 PM	W	5:22 PM	NE
12/3	somewhat	6:54 PM	NW	6:55 PM	NW
12/4	moderately	6:01 PM	W/NW	6:05 PM	N
12/5	moderately	5:09 PM	W/NW	5:14 PM	NE
12/5	somewhat	6:46 PM	NW	6:47 PM	N/NW
12/6	moderately	5:54 PM	NW	5:57 PM	N/NE
12/7	moderately	5:01 PM	W/NW	5:06 PM	NE
12/7	moderately	6:38 PM	NW	6:39 PM	N/NW
12/8	moderately	5:45 PM	NW	5:49 PM	N/NE
12/9	moderately	6:29 PM	NW	6:31 PM	N/NW
12/10	very	5:37 PM	NW	5:41 PM	NE
12/10	somewhat	7:13 PM	NW	7:13 PM	NW
12/11	very	6:21 PM	NW	6:23 PM	N/NW
12/12	very	5:28 PM	NW	5:33 PM	E/NE
12/12	somewhat	7:05 PM	W/NW	7:06 PM	W/NW
12/13	extremely	6:12 PM	W/NW	6:16 PM	SE
12/14	extremely	5:20 PM	NW	5:26 PM	E/SE
12/14	somewhat	6:57 PM	W	6:59 PM	SW
12/15	very	6:04 PM	W/NW	6:10 PM	S/SE
12/16	extremely	5:11 PM	W/NW	5:17 PM	SE
12/17	somewhat	5:56 PM	W	6:00 PM	S
12/18	moderately	5:02 PM	W/NW	5:08 PM	S/SE

Predictions courtesy of heavens-above.com. Times later in the month are subject to shifts - for accurate daily predictions, visit spotthestation.nasa.gov.

Meteor Showers: Geminids, Peaking On The 13th/14th, and the Ursids, Peaking On The 21st/22nd

Meteor showers are the result of the Earth passing through the debris field of a comet or asteroid. As these objects approach the warming sun in their orbits, they leave tiny bits behind, usually no larger than grains of sand. The Earth plows through the swarm

of these tiny particles at up-to 12 miles-per-second. High in the upper atmosphere, these particles burn up due to friction and ionize the air around them, producing the long light trails we see. We can predict the peak observing nights for a meteor shower because we know when and where in Earth's orbit we'll pass through the same part of the Solar System - this yearly periodicity is what let us identify and name meteor showers well before we ever had evidence of what caused them.



Gemini resides inside the Winter Hexagon, standing on Orion's Club. Once you've found the Little Dipper, you've found the Ursid radiant.

December features two showers active enough to mention. The first and most significant is the Geminids, a shower that originates from asteroid 3200 Phaethon - a rarity among the major showers, which largely originate from comets. The Geminids

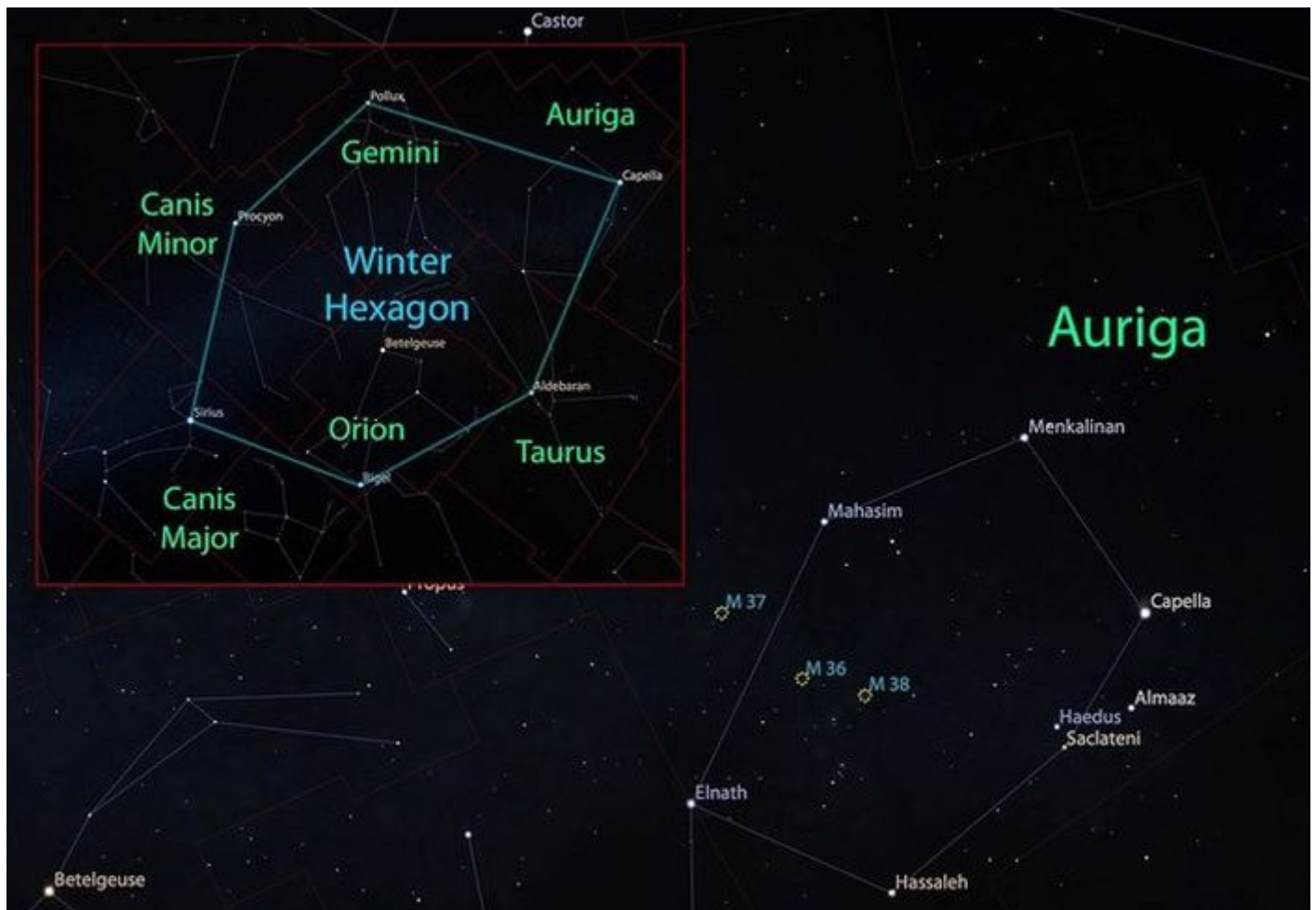
peak this year on the 13th/14th within a window that spans the 9th to the 16th. The Geminids benefit from a late-arriving waning crescent Moon at the peak, meaning observers should have plenty of dark sky for their searches. Statistically speaking, the shower may produce 120 meteors/hour at its peak. Those who've kept diligent watch of meteor showers from New York this year may take this value with an asteroid-sized grain of salt, as none of the major showers have lived up to their potentials.

The second, and much less prominent, meteor shower this December is the Ursids, originating from Comet 8P/Tuttle. The peak comes just a week after the Geminid peak, has only one-tenth the usual activity, and peaks when most are still frantically trying to get shopping done - all factors which make the Ursids an often overlooked conclusion to the year's meteor shower festivities.

How to observe: To optimize your experience, lie flat on the ground with your feet pointed towards the radiant and your head elevated - meteors will then appear to fly right over and around you.

Those interested in seeing a full list should check out the [American Meteor Society meteor shower calendar](#).

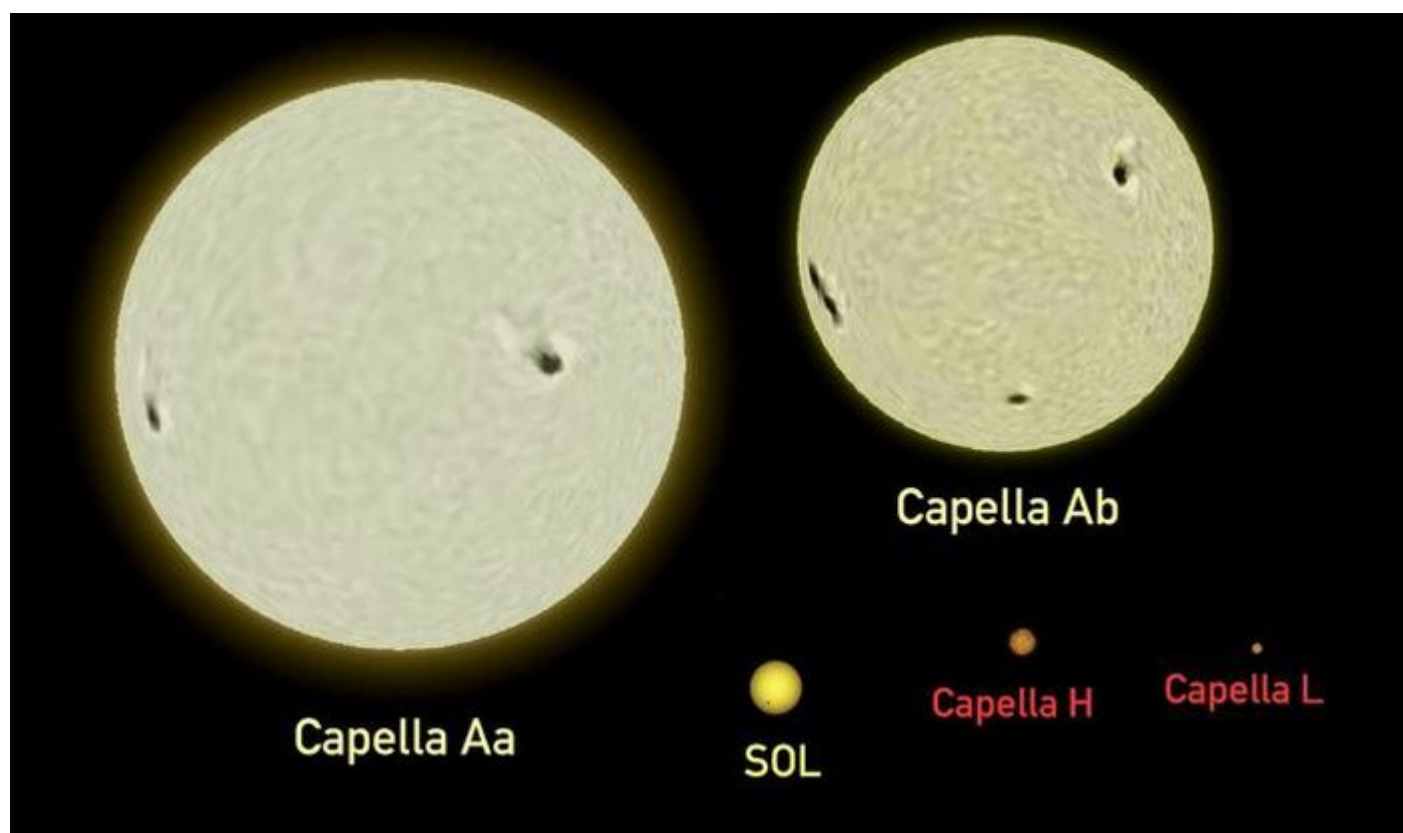
Learn A Constellation: Auriga





Auriga and its Messiers, with nearest neighbors shown in the inset.

Auriga is one of the surviving 48 constellations from antiquity that fits right into modern times. Specifically, it is one of the few constellations to undergo a significant change in its professional career - not quite fast enough for the modern gig economy, but certainly changing with the times. Auriga, or its brightest star Capella, goes back in the written record to Mesopotamia, where the arrangement of stars was seen as a shepherd's stick, or crook. Other groups of the time associated Auriga with goats and herding, a theme that made its way to ancient Greek times before Auriga took on a second career as a charioteer. Many of the representations of Auriga beyond the Roman Empire and into modern times even show Auriga with chariot reins in one hand and two small goats in another - a reminder to perspective hires to always have one's resume in hand.



The stars of Capella, with the Sun (Sol) for size comparison. Image from wikipedia.

While Auriga itself may be diminished in significance by its proximity to Orion and Taurus, its bright Capella is prominent enough to explain the shepherd association. This shepherd star is not working alone, however - this bright pinpoint is the combined light of four stars in total. Two of the stars, Aa and aB, are both massive and in close proximity - their separation is only 75% that of the Sun-Earth distance - while a more

proximity – their separation is only 75% that of the Sun-Earth distance – while a more distant pair of dimmer stars orbit these two much farther out.

Generally speaking, Auriga is represented as a lopsided hexagon. If your star chart differs from that, it is likely due to the inclusion of stars in the small triangle next to Capella in the overall shape. The triangle of Almaaz, Haedus, and Saclateni is prominent by itself, but is made more so by being so close to Capella. Some of the flock refuse to stray.

Binocular observers are treated to three identifiable open star clusters that resolve reasonably well in telescopes at low magnification. M36, M37, and M38 all sit about 4,000 light years away and contain fewer than 150 stars. They are made easy to find because the region of the Milky Way in the direction of the Winter skies is away from the galactic center. There's enough material to make finding galaxies more difficult, but not enough to obstruct the views of close objects in our neighborhood - a perfect vantage point for keeping track of such a distinguished herd.

Dr. Damian Allis is the director of CNY Observers and a NASA Solar System Ambassador.

Which of the following issues do you feel is the most important for the federal government to take action to resolve:

- Environment
- Education
- Infrastructure – roads and bridges
- Prescription drug prices

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