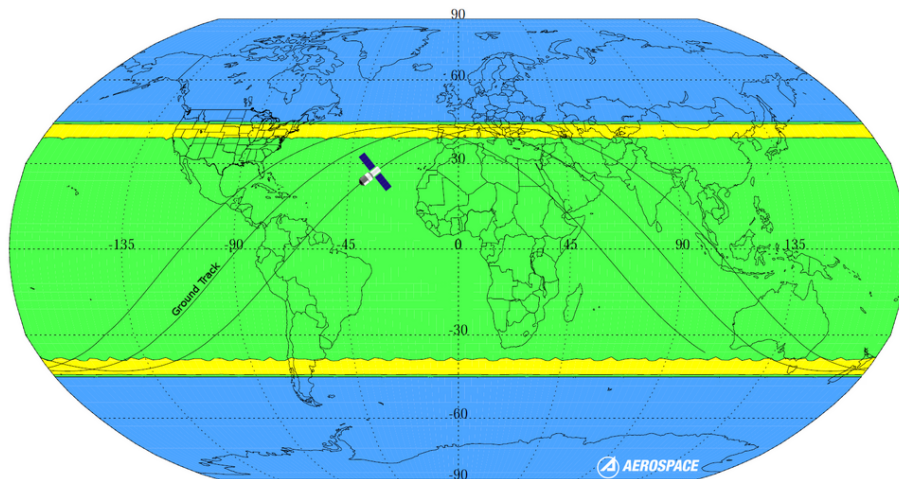


UPSTATE NY OUTDOORS

## Upstate NY Stargazing in February: Morning planets and early notice of a doomed space station

Updated Feb 1;

Posted Feb 1



The "prediction" of where the Tiangong-1 space station will fall back to earth. Yellow region equals highest probability. The statisticians at Aerospace Corp. predict that your chance of winning the Powerball that week is one-million times greater than of your being struck by falling debris. (.)



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**By Damian Allis, [damian@somewhereville.com](mailto:damian@somewhereville.com),**  
Contributing writer

At some point, pretty soon, a Chinese space station is going to crash-land somewhere, likely somewhere half-way up north or down south of the equator - somewhere between the land and water spanned by New York and southern Argentina, Northern Italy and below the Cape of Good Hope, or northern Japan and southern New Zealand. Is that non-specific enough?

The above image, produced by Aerospace Corporation, sums up the uncertainty in location. The timing is equally fuzzy, with estimates for the approach and disintegration of the Chinese Tiangong-1 space station ranging from mid-to-late March. The Tiangong-1 is China's first attempt at their own space station - set for two years of operation when launched in 2011 to test all the core mechanics of bringing up humans and other payload. With two separate launches of three crew members each, the Tiangong-1 served its ultimate purposes and was finally decommissioned in early 2016. It was the amateur satellite tracking community that noticed the Tiangong-1 was not quite following its expected orbit, with the Chinese Space Agency eventually acknowledging that the station was not under their control and would eventually fall back to Earth.





Saudi inspectors  
examining a crash-  
landed PAM-D module in  
2001.

The chances of any parts of the Tiangong-1 hitting a populated area during its return is extremely small. In the eyes of the space science and space mission communities, the fall back to Earth of the Tiangong-1 is far favorable to the other obvious solution - destroying the station in orbit. The Chinese did this in 2007 with a successful anti-satellite missile test on a Fengyun-1C weather satellite, producing a debris cloud that accounts for over half the "space junk" tracked by NASA and other agencies. While space is big, this and other space debris can be moving many miles per second - a threat large enough that even the International Space Station sometimes has to change its orbit slightly to get out of the way of something big enough to do real damage.

## **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 February. 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

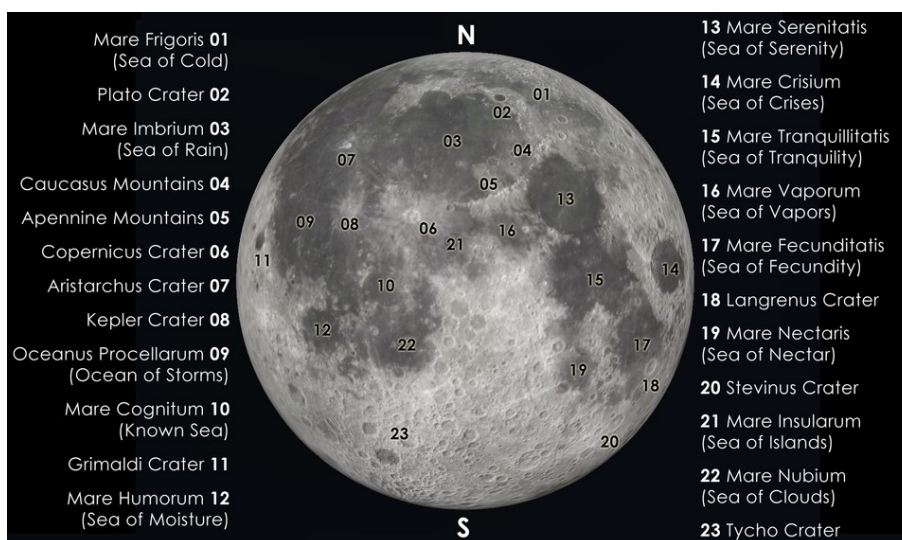
Organizer	Location	Event	Date	Time	Contact Info
Adirondack Public Observatory	Tupper Lake	1st Friday Observing	Feb. 2	7:00 PM	<a href="#">email</a> , <a href="#">website</a>
Adirondack Public Observatory	Tupper Lake	3rd Friday Observing	Feb. 16	7:00 PM	<a href="#">email</a> , <a href="#">website</a>
Albany Area Amateur Astronomers & Dudley Observatory	Schenectady	AAAA Meeting	Feb. 15	7:30 - 9 PM	<a href="#">email</a> , <a href="#">website</a>
Albany Area Amateur Astronomers & Dudley Observatory	Schenectady	Night Sky Adventure	Feb. 20	7 - 8:30 PM	<a href="#">email</a> , <a href="#">website</a>
Astronomy Section, Rochester Academy of Science	Rochester	Member Meeting	Feb. 2	7:30 - 9:30 PM	<a href="#">email</a> , <a href="#">website</a>
Baltimore Woods	Marcellus	Finest Winter Skies	Feb. 16	5:30 - 8 PM	<a href="#">email</a> , <a href="#">website</a>
Baltimore Woods	Marcellus	Solar Viewing Program	Feb. 24	1 - 3 PM	<a href="#">email</a> , <a href="#">website</a>
Kopernik Observatory & Science Center	Vestal	Friday Night Observing	Feb. 2	7 - 9 PM	<a href="#">email</a> , <a href="#">website</a>
Kopernik Observatory & Science Center	Vestal	KAS Monthly Meeting	Feb. 7	7 - 9 PM	<a href="#">email</a> , <a href="#">website</a>
Kopernik Observatory & Science Center	Vestal	Friday Night Observing	Feb. 9	7 - 9 PM	<a href="#">email</a> , <a href="#">website</a>
Kopernik Observatory & Science Center	Vestal	Friday Night Observing	Feb. 16	7 - 9 PM	<a href="#">email</a> , <a href="#">website</a>
Kopernik Observatory & Science Center	Vestal	Winter Star Party	Feb. 17	7 - 9 PM	<a href="#">email</a> , <a href="#">website</a>
Kopernik Observatory & Science Center	Vestal	Friday Night Observing	Feb. 23	7 - 9 PM	<a href="#">email</a> , <a href="#">website</a>
Mohawk Valley Astronomical Society	Waterville	Meeting and Lecture	Feb. 14	7:30 - 9 PM	<a href="#">email</a> , <a href="#">website</a>
Mohawk Valley Astronomical Society	Waterville	Public Star Gazing	Feb. 17	7:30 - 10 PM	<a href="#">email</a> , <a href="#">website</a>
Syracuse Astronomical Society	Syracuse	Lecture @ OCC & Observing	Feb. 16	7 - 9 PM	<a href="#">email</a> , <a href="#">website</a>



## Lunar Phases

Full Moon	Third Quarter	New Moon	First Quarter	Full Moon
Jan. 31, 8:26 am	Feb. 7, 10:53 am	Feb. 15, 4:05 pm	Feb. 23, 3:09 am	Mar. 1, 7:51 pm

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.

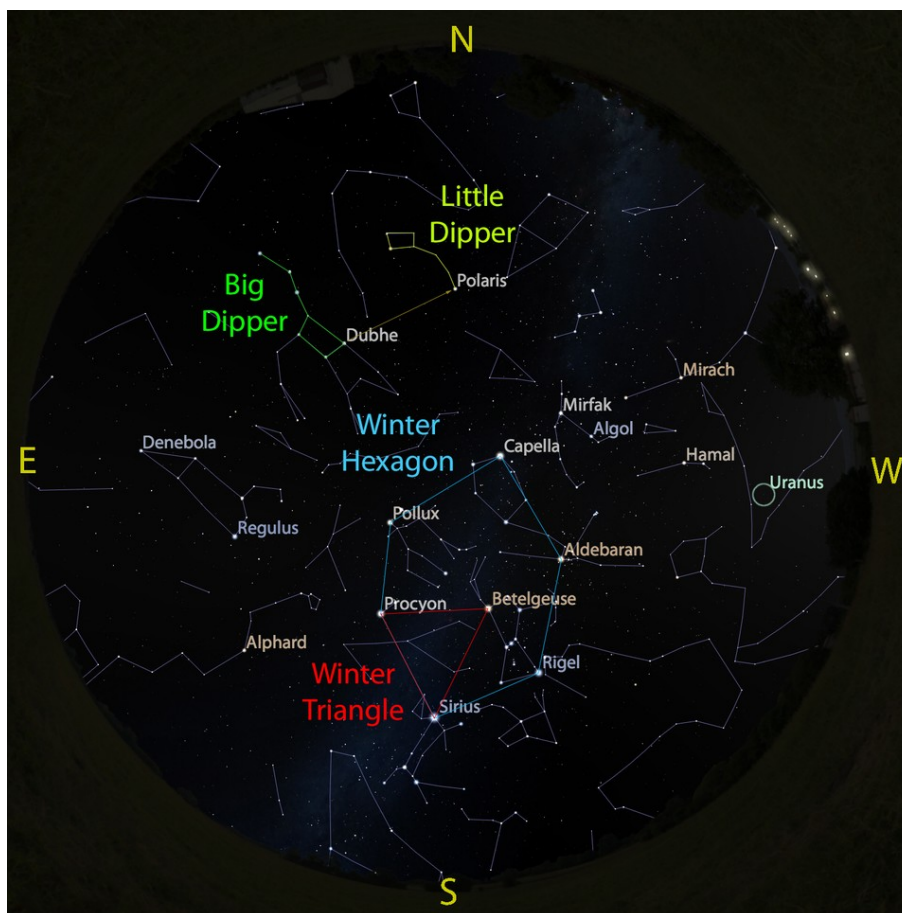
The excitement over two supermoons in January and two not-super-but-still-pleasant full moons in March was bound to come at some price. In our case, we will pass through February without a Full Moon - the first time in 19 years. This is an entirely predictable event, with the Greek astronomer Meton calculating back in the fifth century B.C.E. that the Moon goes through a nearly-19-



year cycle before lining up again with the solar year. February is not without some lunar excitement, as a partial solar eclipse will be had on the 15th. Sadly for us, this will only be visible over the southern region of South America and Antarctica.

## 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 p.m. on Feb. 15, accurate all month except for the changing Moon

position.

**Evening Skies:** 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. Both asterisms are due-south and as high as they will get in the nighttime sky during the early evening, making them both easy finds. Those recovered from last month's comment thread can still find Uranus in the evening sky, although it sets earlier each night, becoming a more difficult binocular object in the process.

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

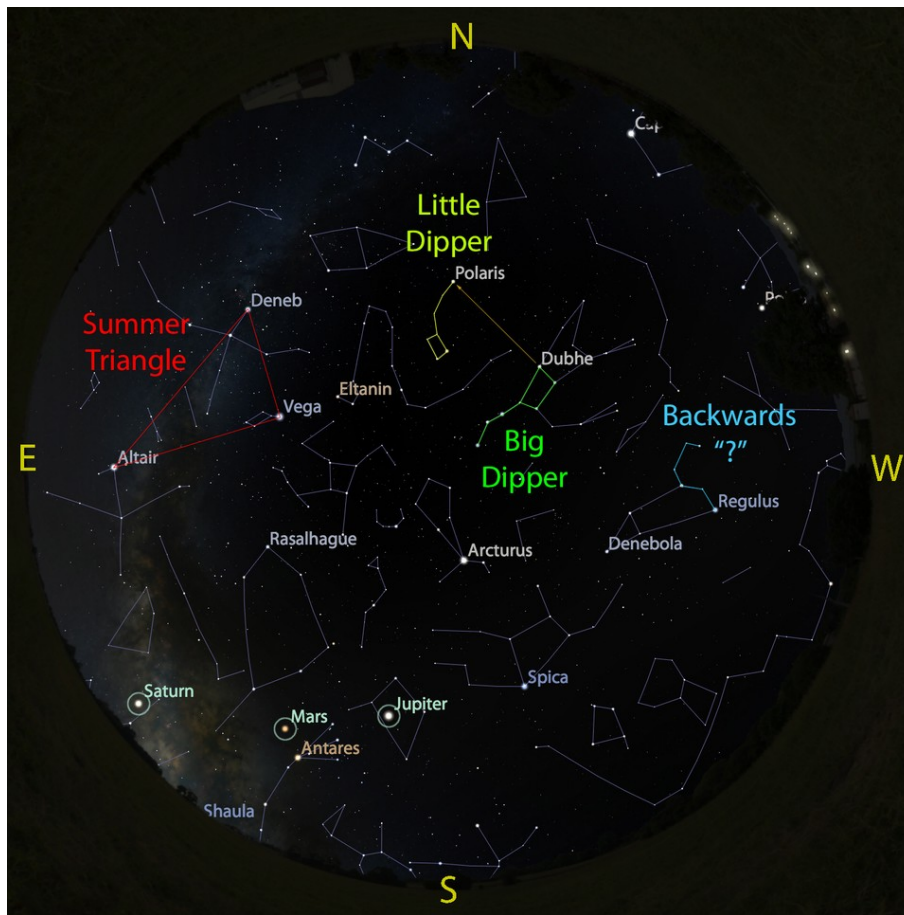


Major; Orange = Rigel and belt center to Castor and Pollux in Gemini; Yellow = Bellatrix and Betelgeuse to Canis Major; Green = Belt stars to Aldebaran and Taurus; Blue = Saiph and Orion's head to Capella in Auriga. [Click for a larger view.](#)

**Morning Skies:** Early risers are treated to a welcome sight for many - the Summer Triangle fully clears the eastern horizon before sunrise. Over the next several months, it will rise earlier each night until mid-Summer, when it sits high in the sky above us during late-evening observing hours. The one thing you might not see for several more weeks is the band of the Milky Way Galaxy, which runs through the body of Cygnus the Swan. A little more distance between Cygnus-rise and sunrise is needed to keep dawn from washing out the galactic nebulosity.

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.





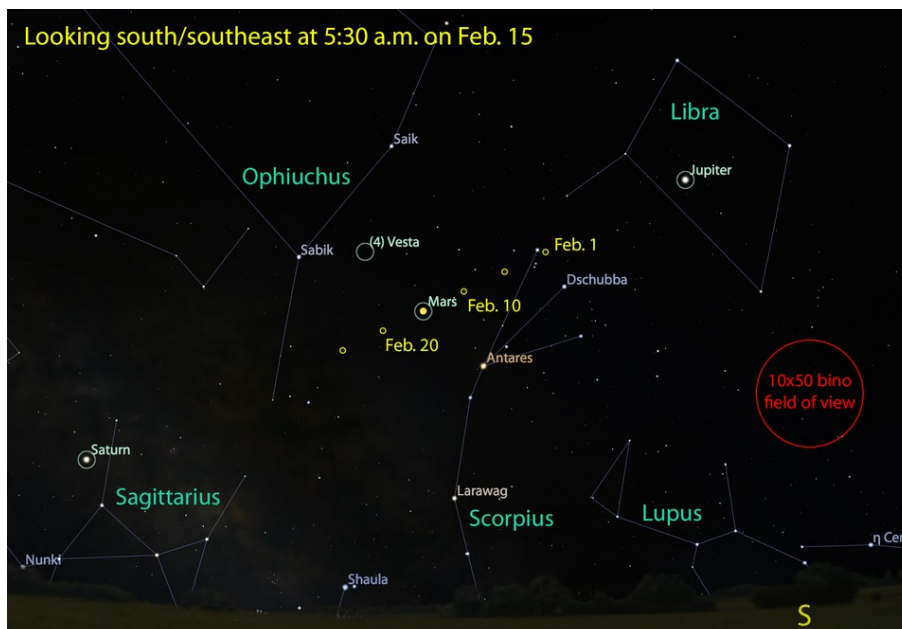
The sky at 5 a.m. on Feb. 15, accurate all month except for the changing Moon position.

## Planetary Viewing

**Mercury and Venus:** The two inner planets spend this month awash in our daylight and will be just barely visible on the western horizon at sunset on the 28th. Starting in early March, the two will make a close pairing a bit later after sunset, ideal for binocular observing.

**Mars, Jupiter and Saturn:** Mars.

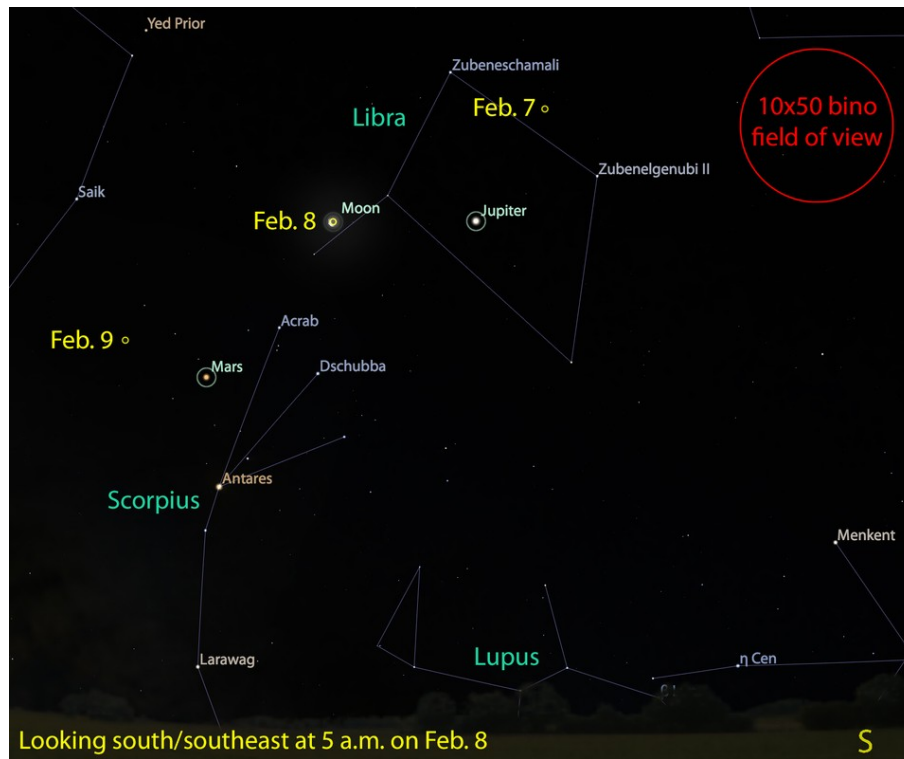




The path of Mars away from Jupiter and towards Saturn this month.

Early risers this past December were treated to a dance involving Venus, Mars, and Jupiter. While bright Venus is on its way to being an evening target right now, we have gained ringed Saturn as a new morning target that will slowly go from a morning-to-midnight-to-evening target over the next nine months. Saturn is just clearing the eastern horizon before sunrise this month and will be a difficult target for the first few weeks, after which it joins Mars and Jupiter as an easy observing target. Jupiter in Libra and Saturn in Sagittarius move so slowly that they appear stationary this month. This leaves Mars as the swift mover, passing from Scorpius to Ophiuchus in early February and remaining there until mid-March, when it joins Saturn in Sagittarius.





The Moon makes for three bright morning groupings with Mars and Jupiter.

Those with even poor-quality binoculars are able to see the four bright satellites of Jupiter - 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.



## ISS And Tiangong-1 Flyovers

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.

### ISS Flyovers

Date	Brightness	Approx. Start	Start Direct.	Approx. End	End Direct.
2/1	moderately	6:41 PM	W/NW	6:44 PM	N/NE
2/2	very	5:48 PM	W/NW	5:53 PM	NE
2/2	moderately	7:25 PM	NW	7:26 PM	N/NW
2/3	moderately	6:33 PM	NW	6:36 PM	N/NE
2/4	moderately	7:17 PM	NW	7:19 PM	N/NW
2/5	moderately	6:25 PM	NW	6:28 PM	NE
2/5	somewhat	8:01 PM	NW	8:01 PM	NW
2/6	very	7:09 PM	NW	7:11 PM	N
2/7	very	6:16 PM	NW	6:21 PM	E/NE
2/7	moderately	7:52 PM	W/NW	7:53 PM	W/NW
2/8	extremely	7:00 PM	NW	7:03 PM	NE
2/9	extremely	6:08 PM	NW	6:13 PM	E
2/9	moderately	7:44 PM	W/NW	7:46 PM	W
2/10	extremely	6:51 PM	W/NW	6:56 PM	SE
2/11	extremely	5:59 PM	NW	6:05 PM	E/SE
2/11	moderately	7:36 PM	W	7:39 PM	S/SW
2/12	moderately	6:43 PM	W/NW	6:49 PM	S/SE
2/14	somewhat	6:36 PM	W	6:39 PM	S/SW

For February and March, we're including flyover predictions for Tiangong-1, expected to fall back to Earth sometime in March. While not nearly as bright as the ISS - until it hits atmosphere - we will have several flyovers in the next few weeks, after which predictions become increasingly less accurate.



### Tiangong-1 Flyovers

Date	Brightness	Approx. Start	Start Direct.	Approx. End	End Direct.
2/6	very dim	6:31 AM	S	6:33 AM	E/SE
2/7	dim	6:27 AM	S/SW	6:31 AM	E
2/8	dim	6:24 AM	SW	6:28 AM	E
2/9	dim	6:20 AM	W/SW	6:25 AM	E
2/10	somewhat	6:17 AM	W/SW	6:21 AM	E
2/11	somewhat	6:14 AM	W	6:18 AM	E
2/12	somewhat	6:11 AM	W	6:14 AM	E

Predictions courtesy of [heavens-above.com](http://heavens-above.com). Times later in the month are subject to shifts - for accurate daily predictions, visit [spotthestation.nasa.gov](http://spotthestation.nasa.gov).

While we can only speculate as to the reason why, the removal of CNY native Jeanette Epps from the next ISS Expedition crew has not gone unnoticed in the local and global media, and certainly not to the local astronomy community. Many of us await details about expedition rescheduling in hopes for news of a future launch to the ISS that is both heroic and historic.

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## No Major Meteor Showers This Month

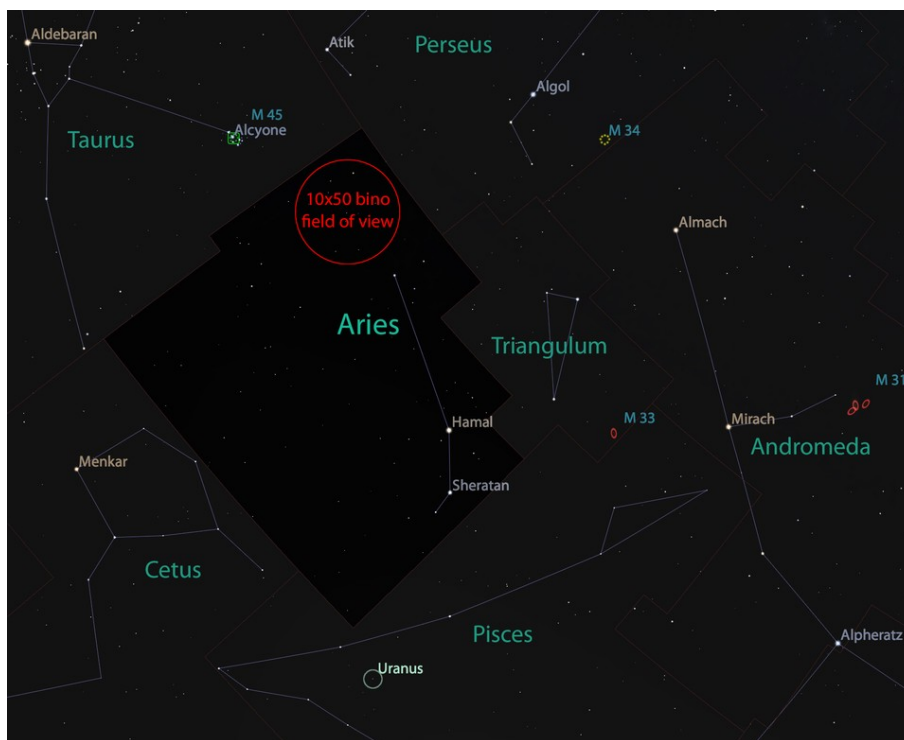
As has been discussed in previous articles, meteor showers are the result of the Earth passing through the debris field of a comet or asteroid. While the orbits of scores of these objects bring them close to Earth's orbit, a limited number produce enough debris to produce significant meteor shower activity. February and March



mark yearly lulls in major meteor shower activity, with the next prominent shower being the Lryids that occur in April.

The astronomy community recognizes many minor showers that are predictable in their timing and are predictably unimpressive. Those interested in seeing a full list should check out the American Meteor Society [meteor shower calendar](#).

## Learn A Constellation: Aries



Aries, in the western sky after sunset this month.

In last month's article, we used a plate-in-dining room analogy for the Solar System to explain why we see all of the observable planets passing through the twelve Zodiacal constellations. Throughout most of human history, the nighttime sky was divisible into only three



parts - the large Moon and its changing phases, the countless stars that all seemed to move as one, and five bright stars that all moved at different speeds with respect to this backdrop of fixed stars - these five being the planets Mercury, Venus, Mars, Jupiter, and Saturn. The stars of the Zodiac served as markers of the planetary paths and measuring sticks by which to measure the speeds of these five wandering stars.

A question that often comes up in discussions of the Zodiacal constellations is "why 12?" Depending on how much time you spend in search engines and how much credence you give to both astronomical and astrological sources, you may find a wide range of answers. One reason comes from the history of "12" itself and the system of mathematics developed by the Babylonians, from which we still divide our hours into 60 minutes, our minutes into 60 seconds, and our circles into 360 degrees. 12 is divisible by 1, 2, 3, 4, and 6 - making it easy for the ancient temple mathematicians and field workers alike to divide quantities into the most important day-to-day fractions - one-half ( $6/12$ ), one-third ( $4/12$ ), one-quarter ( $3/12$ ). This ease of handling the most significant fractions by dividing a fixed quantity into 12 equal pieces is also a reason why we still have 12 inches to a foot on our rulers.



The Babylonian math system is about as practical a system as one could imagine developing for a society that placed so much focus on the heavens above. If the solar year were only 360 days long instead of 365.25 days long, and the time between New Moons was exactly 30 days long instead of 29.53, one could imagine the Babylonians feeling their understanding of the heavens to be complete. In many ways, we owe these small differences - and the resulting frustration of the temple elders of the time who had to account for these small differences - a debt of gratitude for forcing civilizations to develop new physical models of how the most prominent objects in the sky actually behaved, leading us down the path to where our much more advanced understanding is today.

In fitting with the short month, we next look at the least-impressive of the Zodiacal constellations. As one of the 12 markers for the path of the bright planets, Aries the Ram has existed for nearly as long as humans have been recording the nighttime sky. First recordings of the brightest stars in Aries go back to the Babylonians, then follow the other prominent constellations through the familiar Egyptian, Greek, Roman, and Arab traditions on through to present day. Placed between Taurus in the west and Pisces in the east, Aries is well-placed in the western sky for late-evening observers in February.



Its two most prominent stars are easy catches, but it is probably easiest to find the stars of Aries by first finding the head of Taurus the Bull - the bright star Aldebaran marks one of the corners of the winter Hexagon, and the Winter Triangle even marks the direction you need to look if you use Betelgeuse as the tip of an arrow. The star Hamal is at the very bottom of the list of the 50 brightest stars in the sky, and Hamal and Sheratan easily fit in the same field of view in low-power binoculars. That said, there is little else to see in Aries under low magnification, with many of the most interesting stars and galaxies only visible through good telescopes.

Dr. Damian Allis is the director of CNY Observers and a NASA Solar System Ambassador. If you know of any other NY astronomy events or clubs to promote, please contact the author.

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