STELLAR SENTINEL
Grand Traverse Astronomical Society September 2026



The Tunguska Event

By Bob Moler

I'd like to preempt Joe Brooks a bit and his talk on meteorites this month by talking about the one that got away. No collectible fragments of whatever exploded over Siberia near the Tunguska River around 7:17 AM local time (UT+7 hours) on June 30th 1908, was ever found. However microspherules were found in the soil containing chemical and isotopic anomalies compared to the soil found outside the blast area. This includes higher nickel to iron proportions which are found in meteorites.

The area of the blast covers 830 square miles with the shape of a butterfly with a wingspan of 43 miles and body length of 34 miles, which is indicative of an air burst of a body coming in at an angle from space. Trees directly under the blast generally stand upright though their branches have been stripped. Then moving farther out the trees were knocked over in a radial pattern pointing back to the blast center.

Over the years I've heard lots of explanations as to what the Tunguska event was caused by. The obvious ones are either a small asteroid or even a fragment of a comet. On the crazy side, there is an explosion of an alien spacecraft or even a micro sized black hole punching through.

Based on the blast damage and pattern it is thought the blast occurred in a range from four to six miles altitude and equivalent to 3 to five megatons of TNT. Mind you, this was not a nuclear blast. No radioactivity was found. It was simply the kinetic energy of a very large mass hitting the atmosphere traveling at least 7 miles per second, earth's escape velocity.

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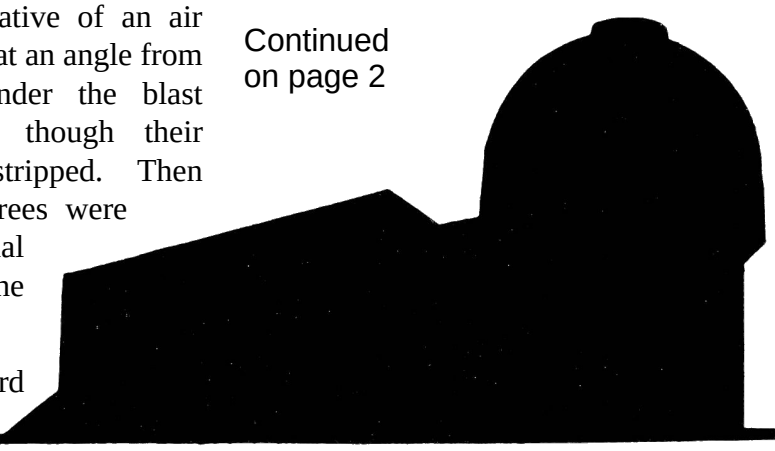
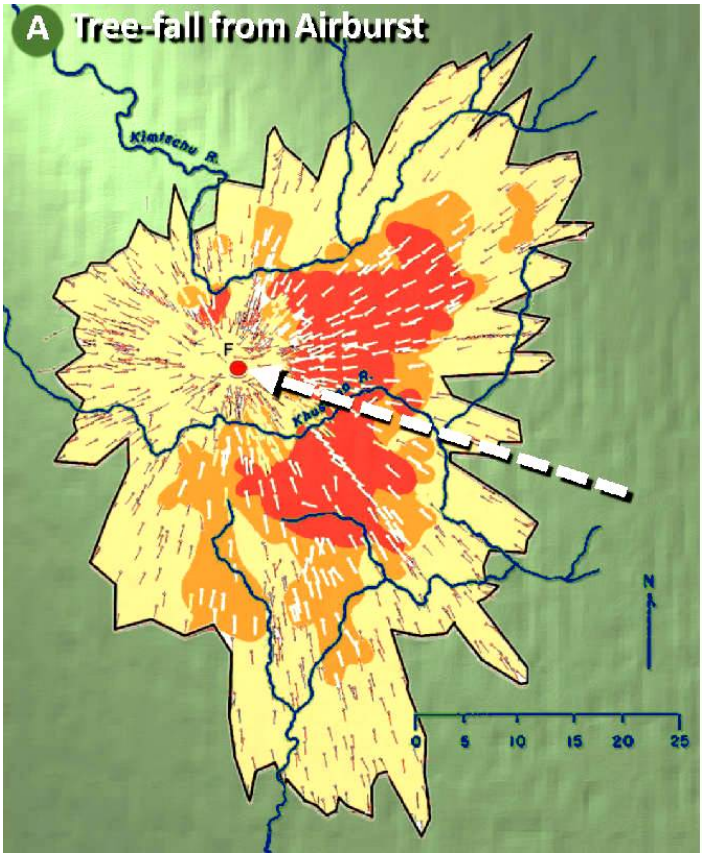


The Tunguska Event (Continued from page 1)



The area of destruction of the Tunguska blast. Approximate entry angle is shown as a dashed line. Credit: New Evidence of High-Temperature, High-Pressure Processes at the Site of the 1908 Tunguska Event: Implications for Impact And Airburst Phenomena, Published in Airbursts and Cratering Impacts 2025.

Where did it come from?

In 1978 Slovak astronomer L'ubor Kresák suggested that the Tunguska body was actually a fragment of Encke's Comet. Encke's Comet is actually related to two meteor showers visible in the night sky called Northern Taurids and the Southern Taurids in autumn. It also produces a daytime meteor shower discovered in 1947, at the Jodrell Bank Observatory, called the Beta Taurids which reaches its peak around the end of June. Beta Tauri (Alnaith) is the horn tip star Taurus shares with Auriga. The radiant of the Beta Taurids at that date and time would be just about due east, above the sun, as I have determined using Stellarium, assuming the Tunguska object came from there. The track of the Tunguska object I've seen has it come from the east southeast as in the map under on the left or from the southeast.

The North and South Taurid showers are quite broad in their distribution. The Southern Taurids are active from September 23rd to December 8th. The Northern Taurids are active from October 13th to December 2nd. On their peak dates of November 5th snd 12th respectively, the zenithal hourly rate is only 5 meteors an hour. The daytime Beta Taurids are active from June 5th to July 18th. Its zenithal hourly rate at peak around June 28-29th is 25. I don't think that comparable to the nighttime numbers, since it was observed using radar.

In looking at the Wikipedia entries for the three Taurid showers, The Northern and Beta Taurids are related to an asteroid 2004 TG_{10}, which has nearly the same orbital elements as Encke. This suggests that sometime in thr past Encke's parent body was disrupted. This is not an uncommon occurrence in comets. TG10's diameter is estimated to be up to a kilometer, while Encke's is about 3 kilometers. Odd, TG10 doesn't exhibit cometary qualities like a coma. Perhaps, being a smaller body, it has expended its volatile components. In any case, some planetary scientists suspect there may be relatively large bodies in the Northern/Beta Taurid stream.

June 30th has been proclaimed International Asteroid Day by the United Nations to raise awareness of the potential danger of asteroid and

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Grand Traverse Astronomical Society - Est. June 1982 – 44 years of service

-----Officers-----		*-----Directors-----*	*----------Patrons----------*
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Upcoming Society Events

Events not held at the Joseph H. Rogers Observatory depend on the weather.

Friday, September 4 – Monthly meeting and star party at NMC Rogers Observatory. Also available via **Zoom**. See our website http://www.gtastro.org. for instructions and a link to click.

7 PM – Board of Directors Meeting

8 PM – General Meeting: Joe Brooks will present *Meteorites and Quasicrystals*.

9 PM – Observing, if it is clear.

Saturday, September 12 – Star Party at the Sleeping Bear Dunes, Dune Climb, 9 PM.

Friday, October 2 – Monthly meeting and star party at NMC Rogers Observatory. Also available via **Zoom**. See our website http://www.gtastro.org. for instructions and a link to click.

7 PM – Board of Directors Meeting

8 PM – General Meeting: Bob Moler will present The *Andromeda Galaxy and Our Galactic Neighborhood*.

9 PM – Observing, if it is clear.\

Zoom Meeting Link: https://us02web.zoom.us/j/8388913229?omn=88435646093

Tunguska Event Continued from page 2

comet collisions with the earth. It was enacted 3 years after the asteroid explosion over Chelyabinsk, Russia on February 15, 2013, injuring over a thousand people with flying glass from the concussion from the blast.

We began to wake up about the threat in the 1990s when in 1994 the 20 odd pieces of Comet Shoemaker-Levy 9 crashed into Jupiter on a July week in 1994, creating huge blemishes in Jupiter's atmosphere that lasted nearly a year.

In 2022 NASA actually tried to affect the orbit of the tiny moon Dimorphos around the small asteroid Didymos, by crashing a small spacecraft called DART into it. They exceeded beyond what they expected. They were hoping to chang the 12 hour period of Dimorphos' orbit by at least 73 seconds. They achieved a change of over a half an hour. Such leverage would have to be made years before potential impact. It won't make any difference on an asteroid's final approach.

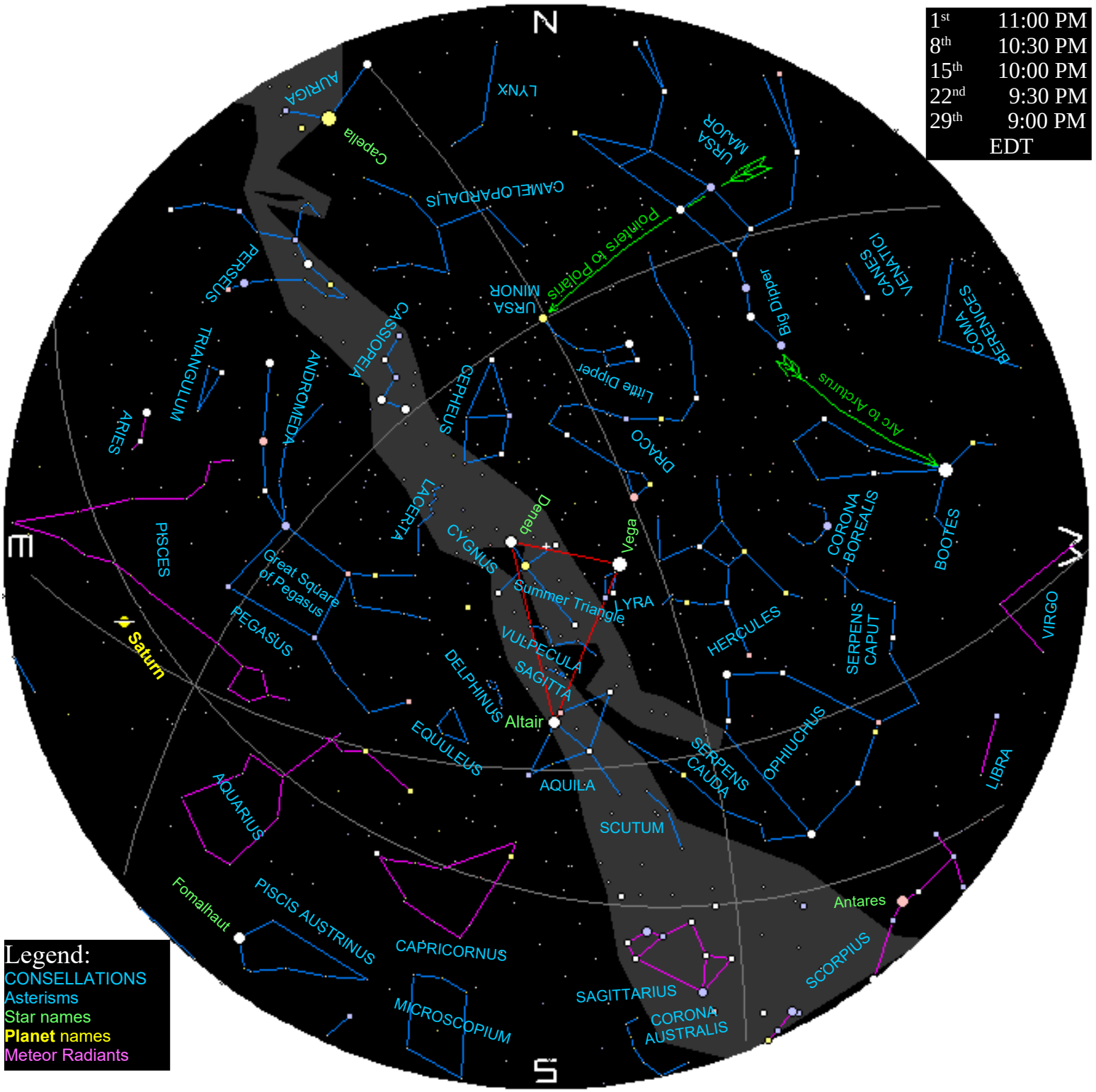
Our latest known threat is asteroid 2024 YR_4, which has, last I've heard, a 4% chance of hitting the moon. Which, if it hits a certain section of the moon may propel ejecta back toward the earth. Beside giving us a great meteor shower, couls destroy a number of the thousands of satellites orbiting the earth.

Something to think about next Asteroid Day.

The Stars and Planets for September 2026

By Bob Moler

Planets are plotted for mid month. The star positions are correct for:

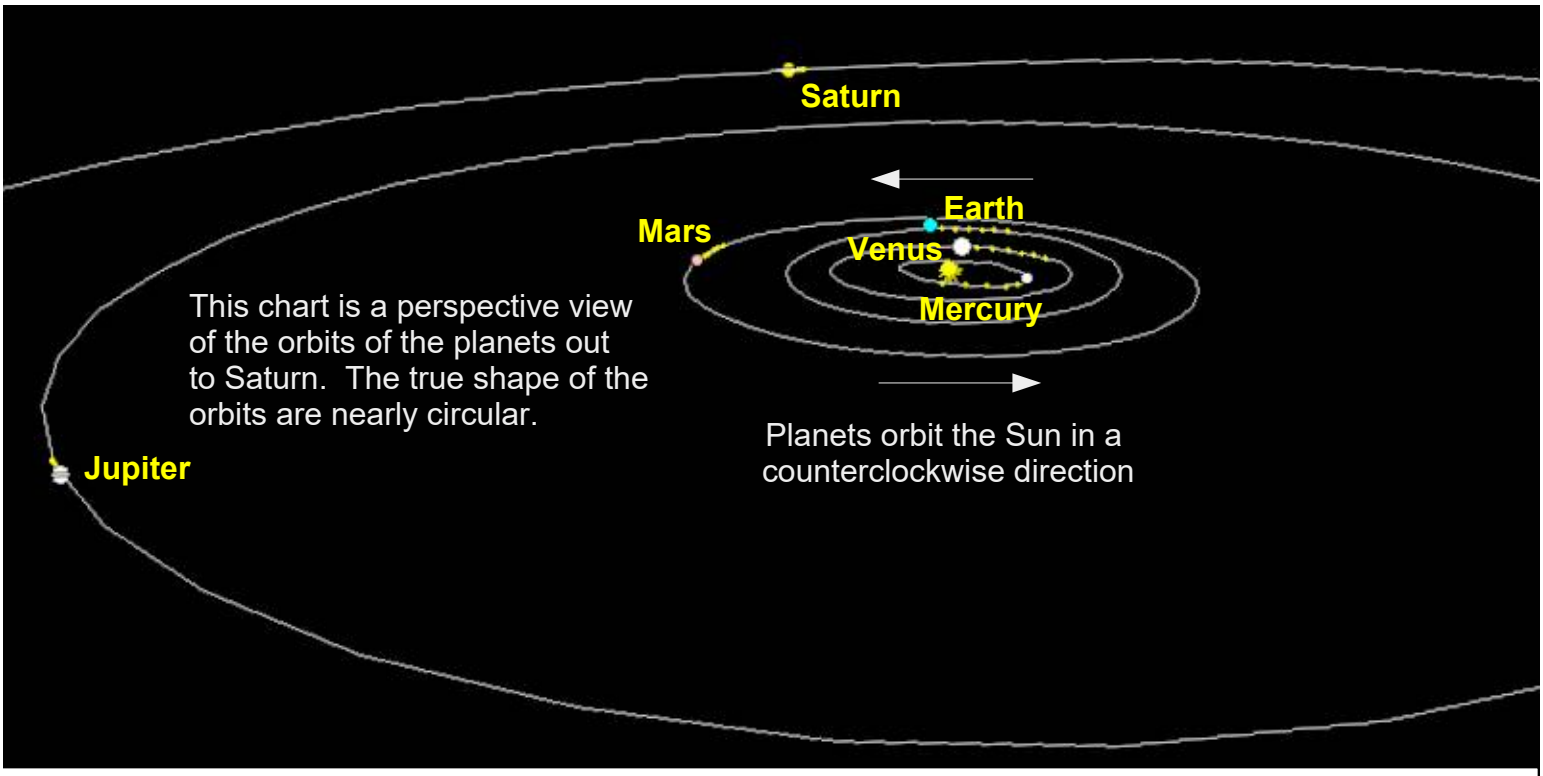


September is second only to August as the greatest month to view the stars, in my humble opinion. That's because the summer Milky Way extends to the south-southwestern horizon showing us, still, the great star fields in Sagittarius. A pair of binoculars are all that is necessary to scan the milky band for deep sky wonders such as star clusters and nebulae, both bright and dark, from Sagittarius to Perseus. Chart time at mid month is 10 p.m. in tune with the sunset and twilight end times which are decreasing. This will soon give us colder weather, but for now it gives us darker skies at a reasonable hour. At chart time Venus has set, and Saturn is in the east southeastern sky.

More information on the planets is posted each Wednesday at https://bobmoler.blog

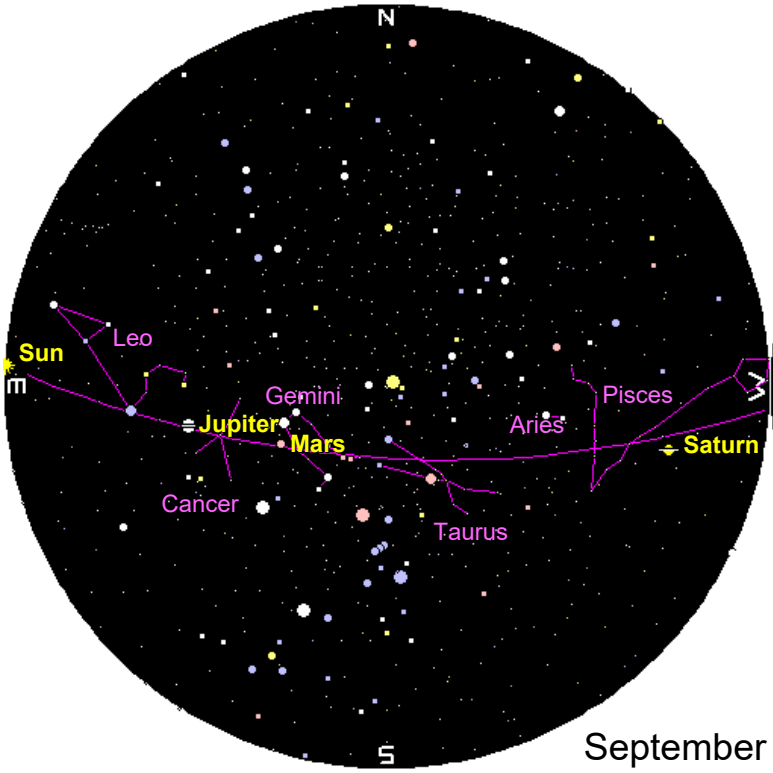
The Naked Eye Planets

September 1st, 6th, 11th, 16th, 21st, 26th, & October 1st

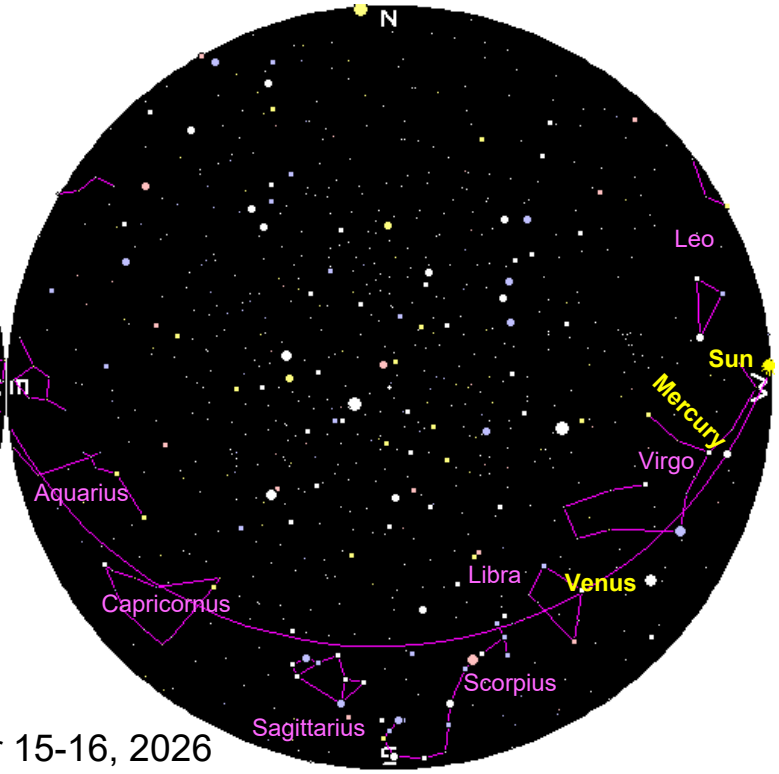


The Planets as Seen From Northern Michigan

Sunrise



Sunset



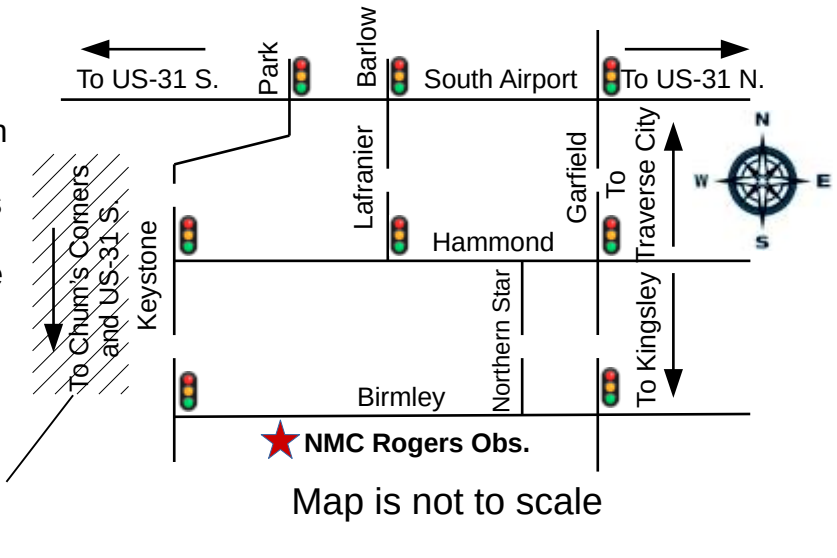
September 15-16, 2026

CELESTIAL CALENDAR

	Date		Time	Event
Sep	1	Tu		Venus: 44.6° E
	1	Tu	9:27 AM	Venus-Spica: 1.4° S
	3	Th	8:03 AM	Moon-Pleiades: 1.2° S
	4	Fr	3:51 AM	Last Quarter
	5	Sa	2:12 AM	Moon North Dec.: 28.1° N
	6	Su	2:24 PM	Moon-Mars: 3° S
	6	Su	4:26 PM	Moon Perigee: 368,300 km
	8	Tu	12:43 AM	Moon-Beehive: 0.5° S
	8	Tu	2:13 PM	Moon-Jupiter: 0.8° S
	9	We	3:17 PM	Moon Descending Node
	10	Th	11:27 PM	New Moon
	13	Su	4:53 PM	Moon-Spica: 2.6° N
	14	Mo	7:10 AM	Moon-Venus: 0.6° S
	16	We	9:42 PM	Mars-Pollux: 5.9° S
	17	Th	8:18 AM	Moon-Antares: 0.6° N
	18	Fr	2:54 PM	Moon South Dec.: 28.1° S
	18	Fr	4:44 PM	First Quarter
	18	Fr	11:00 PM	Moon Apogee: 404,200 km
	22	**Tu**	**8:06 PM**	**Autumnal Equinox**
	23	We	10:40 PM	Moon Ascending Node
	25	Fr	8:13 PM	Neptune Opposition
	25	Fr	9:49 PM	Mercury-Spica: 0.9° N
	26	**Sa**	**12:49 PM**	**Full Moon (Harvest Moon)**
	30	We	1:39 PM	Moon-Pleiades: 1.1° S
Oct	1	Th		Venus: 30.8° E

Sky Events Calendar by Fred Espenak and Sumit Dutta (NASA's GSFC), http://eclipse.gsfc.nasa.gov/SKYCAL/SKYCAL.html to make your own for any year. Some additions and clarifications were made by the editor.

The Grand Traverse Astronomical Society meets on the 1st Friday of each month except August at the Northwestern Michigan College Rogers Observatory. The public is invited to all society functions as our guests. We are a non-profit group dedicated to the study of astronomy. If you'd like more information about us, our meeting and outreach schedule, see our website: www.gtastro.org.



Map is not to scale

Sun, Moon, and Twilight for NMC Observatory (Traverse City)

September, 2026 Local time zone: EDT

DATE	SUN RISE	SUN SET	DAYLIGHT HOURS	TWILIGHT* END	TWILIGHT* START	MOON PHASE	MOON RISE OR SET**	TIME	ILLUM FRACTN
Tue 1	07:05a	08:18p	13:13	09:24p	05:58a		Rise	10:00p	75%
Wed 2	07:06a	08:17p	13:10	09:22p	06:00a		Rise	10:33p	65%
Thu 3	07:07a	08:15p	13:07	09:20p	06:01a		Rise	11:16p	54%
Fri 4	07:08a	08:13p	13:04	09:18p	06:02a	L Qtr	Rise	12:11a	42%
Sat 5	07:09a	08:11p	13:01	09:16p	06:04a		Rise	01:19a	31%
Sun 6	07:10a	08:09p	12:58	09:14p	06:05a		Rise	02:37a	21%
Mon 7	07:12a	08:07p	12:55	09:12p	06:06a		Rise	03:58a	12%
Tue 8	07:13a	08:06p	12:52	09:10p	06:08a		Rise	05:18a	6%
Wed 9	07:14a	08:04p	12:49	09:08p	06:09a		Rise	06:35a	2%
Thu 10	07:15a	08:02p	12:46	09:06p	06:10a	New	Set	07:44p	0%
Fri 11	07:16a	08:00p	12:43	09:04p	06:12a		Set	08:04p	1%
Sat 12	07:17a	07:58p	12:40	09:02p	06:13a		Set	08:23p	4%
Sun 13	07:19a	07:56p	12:37	09:00p	06:14a		Set	08:43p	9%
Mon 14	07:20a	07:54p	12:34	08:58p	06:16a		Set	09:07p	16%
Tue 15	07:21a	07:52p	12:31	08:56p	06:17a		Set	09:34p	24%
Wed 16	07:22a	07:51p	12:28	08:54p	06:18a		Set	10:08p	33%
Thu 17	07:23a	07:49p	12:25	08:52p	06:20a		Set	10:50p	42%
Fri 18	07:24a	07:47p	12:22	08:50p	06:21a	F Qtr	Set	11:40p	51%
Sat 19	07:26a	07:45p	12:19	08:48p	06:22a		Set	12:38a	61%
Sun 20	07:27a	07:43p	12:16	08:46p	06:23a		Set	01:42a	70%
Mon 21	07:28a	07:41p	12:13	08:44p	06:25a		Set	02:49a	78%
Tue 22	07:29a	07:39p	12:09	08:42p	06:26a		Set	03:58a	86%
Wed 23	07:30a	07:37p	12:06	08:40p	06:27a		Set	05:07a	92%
Thu 24	07:32a	07:35p	12:03	08:38p	06:28a		Set	06:17a	97%
Fri 25	07:33a	07:34p	12:00	08:37p	06:30a		Set	07:29a	99%
Sat 26	07:34a	07:32p	11:57	08:35p	06:31a	Full	Rise	07:18p	100%
Sun 27	07:35a	07:30p	11:54	08:33p	06:32a		Rise	07:39p	98%
Mon 28	07:36a	07:28p	11:51	08:31p	06:33a		Rise	08:04p	93%
Tue 29	07:38a	07:26p	11:48	08:29p	06:35a		Rise	08:35p	87%
Wed 30	07:39a	07:24p	11:45	08:27p	06:36a		Rise	09:15p	78%

* Nautical Twilight

** Moonrise or moonset, whichever occurs between sunset and sunrise

Grand Traverse Astronomical Society

Membership Application / Renewal for 2026

For renewing members, all we need is your name and email or street address to identify you, plus any information that has changed.

___ I am interested, please send me more information about the next GTAS meeting. (Also see www.gtastro.org)

___ I'll join, payment enclosed

___ Membership renewal

Membership term runs from January to December

Email Address:_____

Newsletter Delivery: ___ Email ___ Mail (Postcard only)

Interests: _____

Name(s): _____ Home Phone: _____ Cell:_____

Address: _____ __

(Street, City, State ZIP)

Dues: ___ Single Membership $25.00/yr

___ Family.....….....$30.00/yr

___ Student (up to 18 years age)....$15.00/yr

___ Patron (Donation)……..……..$_____

Mail check to: G.T.A.S.

Gary Carlisle, Treasurer

1473 Birmley Road

Traverse City, MI 49696-8808

For new members just joining mid-year, pro rate the dues thus: Annual Dues x months remaining in the year / 12.
Example: Single Joining in June: $25.00 X 6 (Jul-Dec) / 12 = $12.50

Eileen Carlisle
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WANTED: Astronomers interested in working with Project ASTRO POLARIS.
Willingness to work with K-12 students and teachers. Visiting classrooms and conducting experiments, discussing astronomy interests and events. Sharing your love of astronomy with others. Will provide; training, materials, instuctionals and support.
Please contact: Jerry Dobek Site Coordinator Project ASTRO POLARIS NMC Science & Math 1701 East Front Street Traverse City, MI 49686 email jdobek@nmc.edu phone 946-1787 obsv. 223-4545 home