

Meteor Activity Outlook for December 10-16, 2022

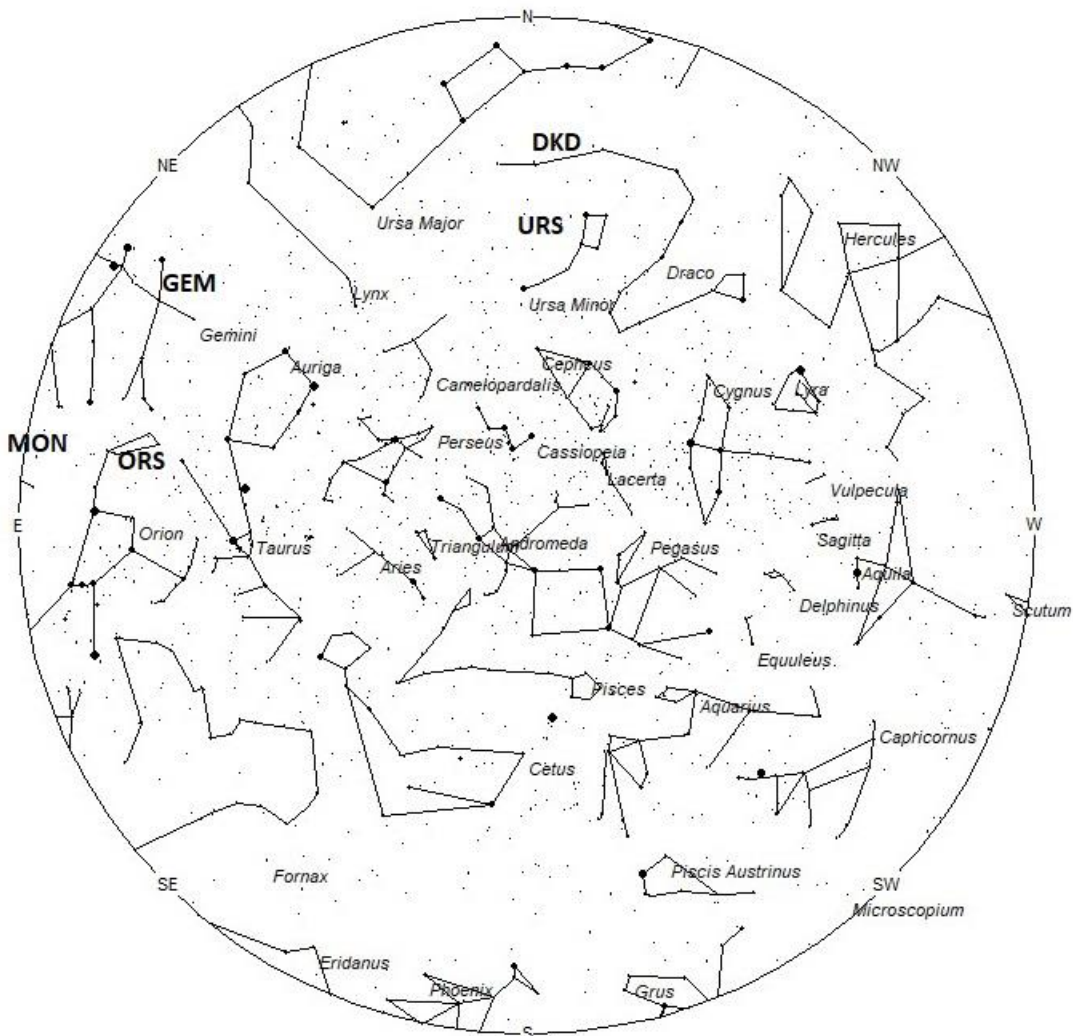


Nicolas Rossetto captured this multi-bursting fireball at 02:00 UT on July 30, 2022 (3:02 CDT), from Jouhe, Bourgogne-Franche-Comté, France. ©Nicolas Rossetto

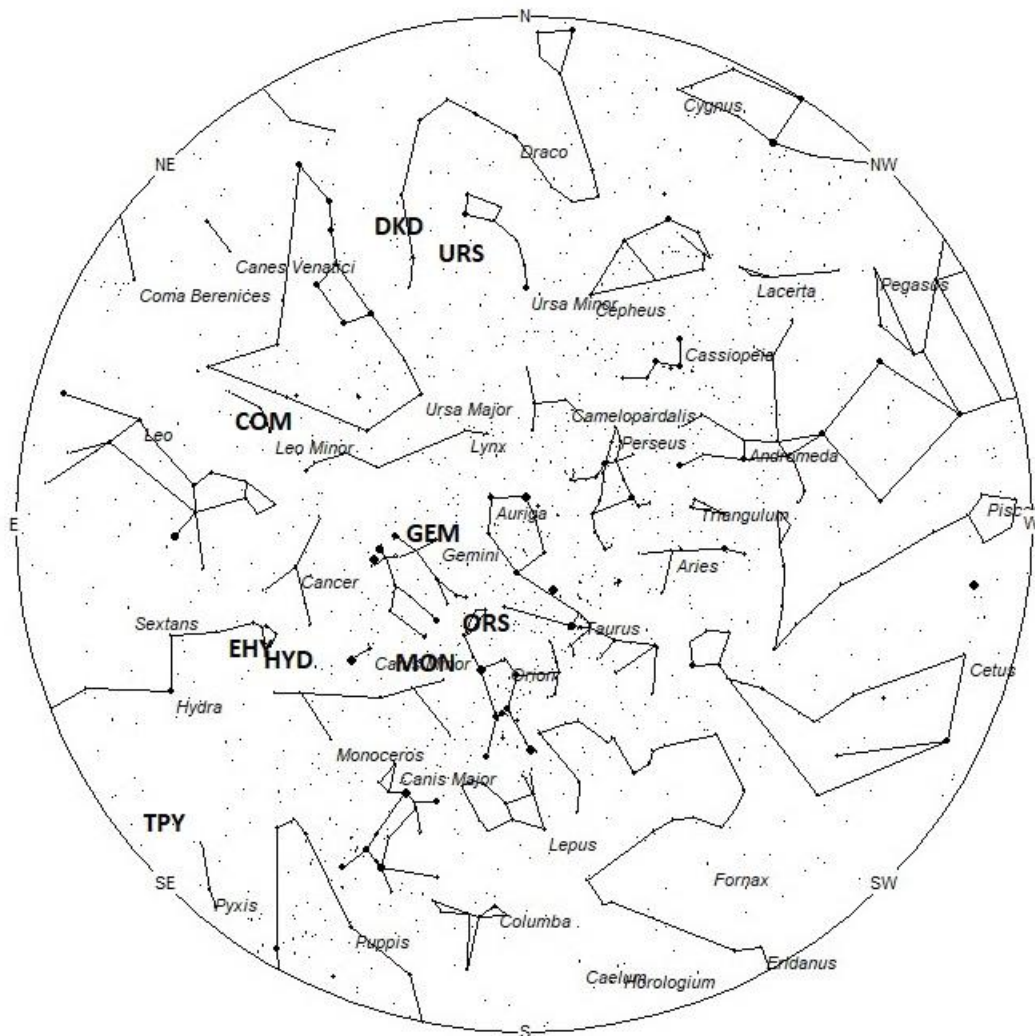
During this period, the moon reaches its last quarter phase on Friday December 16th. At that time the moon will lie 90 degrees west of the sun and will rise near midnight local standard time (LST). This weekend the waning gibbous moon will rise during the late evening hours, allowing a short window of opportunity to view under dark sky conditions between moonrise and dusk. The estimated total hourly rates for evening observers this week should be near 4 as seen from mid-northern latitudes (45N) and 3 as seen from tropical southern locations (25S) For morning observers, the estimated total hourly rates should be near 16 as seen from mid-northern latitudes (45N) and 10 as seen from tropical southern locations (25S). The actual rates will also depend on factors such as personal light and motion perception, local weather conditions, alertness, and experience in watching meteor activity. Rates are reduced due to moonlight during this period. Note that the hourly rates listed below are estimates as viewed from dark sky sites away from urban light sources. Observers viewing from urban areas will see less activity as only the brighter meteors will be visible from such locations.

The radiant (the area of the sky where meteors appear to shoot from) positions and rates listed below are exact for Saturday night/Sunday morning December 10/11. These positions do not change greatly day to day so the listed coordinates may be used during this entire period. Most star atlases (available at science stores and planetariums) will provide maps with grid lines of the celestial coordinates so that you may find out exactly where these positions are located in the sky. I have also included charts of the sky that display the radiant positions for evening, midnight, and

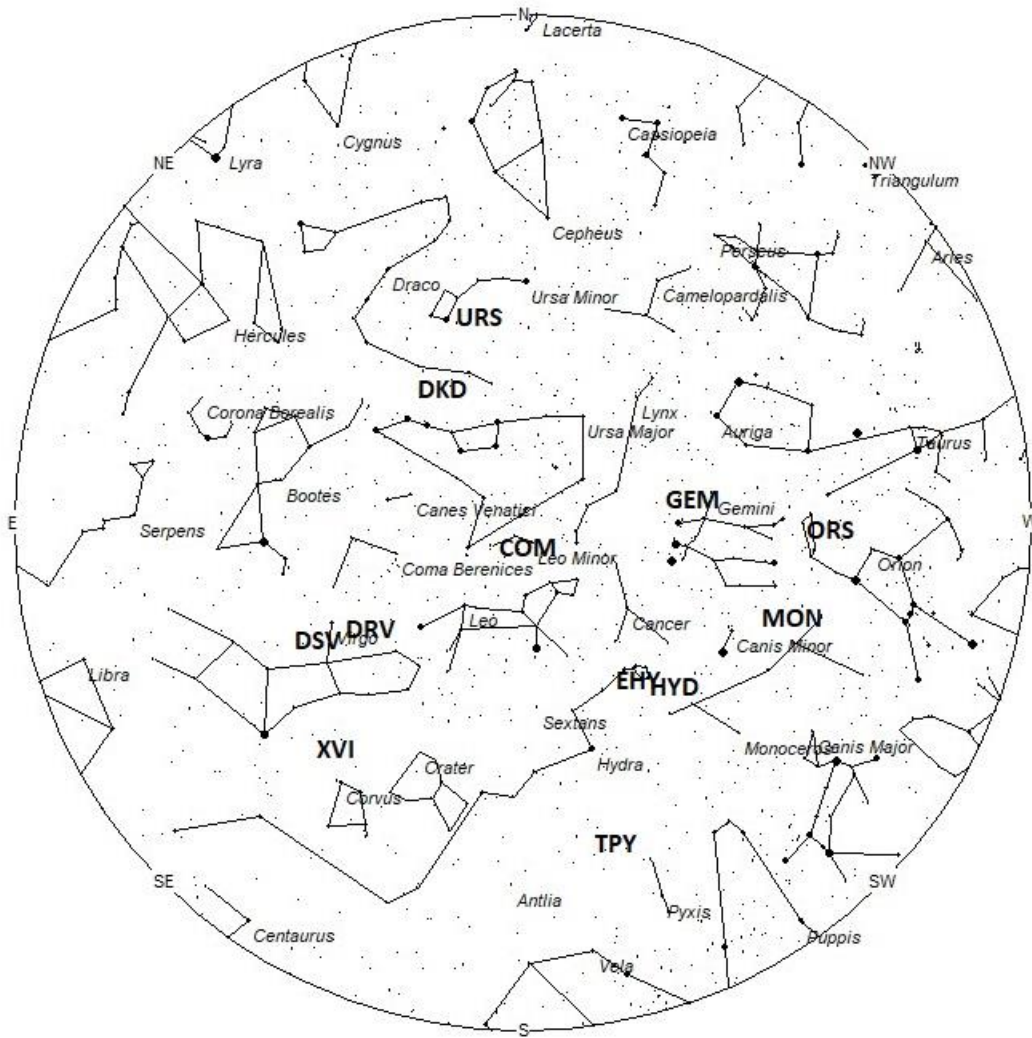
morning. The center of each chart is the sky directly overhead at the appropriate hour. These charts are oriented for facing south but can be used for any direction by rotating the charts to the desired direction. A planisphere or computer planetarium program is also useful in showing the sky at any time of night on any date of the year. Activity from each radiant is best seen when it is positioned highest in the sky, either due north or south along the meridian, depending on your latitude. It must be remembered that meteor activity is rarely seen at the radiant position. Rather they shoot outwards from the radiant, so it is best to center your field of view so that the radiant lies at the edge and not the center. Viewing there will allow you to easily trace the path of each meteor back to the radiant (if it is a shower member) or in another direction if it is sporadic. Meteor activity is not seen from radiants that are located far below the horizon. The positions below are listed in a west to east manner in order of right ascension (celestial longitude). The positions listed first are located further west therefore are accessible earlier in the night while those listed further down the list rise later in the night.



Radiant Positions at 7pm Local Standard Time



Radiant Positions at Midnight Local Standard Time



Radiant Positions at 5am Local Standard Time

These sources of meteoric activity are expected to be active this week.

Details of each source will return next week when viewing conditions are more favorable.

You can keep track of the activity of these meteor showers as well as those beyond the limits of visual observing by visiting the NASA Meteor Shower Portal available at: <https://meteorshowers.seti.org/> You can move the sky globe to see different areas of the sky. Colored dots indicate shower meteors while white dots indicate sporadic (random) activity. The large orange disk indicates the position of the sun so little activity will be seen in that area of the sky.

The list below offers the information in tabular form of the showers that I feel are within reach of the visual observer to discern. Hourly rates are often less than 1 but noting parameters such as the radiant distance and the elevation of each meteor, one can compute the probability of shower association. Most showers discovered by video means have rates less than 1 per **night** away from maximum, so the showers listed in these outlooks are not as weak as they seem. Rates and positions are exact for Saturday night/Sunday morning except where noted in the shower descriptions.

SHOWER	DATE OF MAXIMUM ACTIVITY	CELESTIAL POSITION	ENTRY VELOCITY	CULMINATION	HOURLY RATE	CLASS
		RA (RA in Deg.) DEC	Km/Sec	Local Standard Time	North-South	
Southern chi Orionids (ORS)	Dec 02	05:45 (086) +18	26	00:00	2 - 1	IV
Monocerotids (MON)	Dec 11	06:44 (101) +08	41	01:00	1 - 1	II
Geminids (GEM)	Dec 14	07:22 (110) +33	34	02:00	5 - 3	I
Puppilid-Velids (PUP)	Dec 07	08:22 (125) -45	40	03:00	<1 - <1	II
sigma Hydrids (HYD)	Dec 07	08:30 (128) +02	59	03:00	1 - 1	II
eta Hydrids (EHY)	Dec 12	08:58 (135) +02	62	04:00	<1 - <1	IV
theta Pyxidids (TPY)	Dec 18	09:21 (147) -23	62	04:00	<1 - <1	IV

Comae Berenicids (COM)	Dec 16	10:12 (153) +34	63	05:00	1 - <1	II
Ursids (URS)	Dec 22	12:32 (188) +77	37	07:00	<1 - <1	I
December chi Virginids (XVI)	Dec 12	12:36 (189) -09	68	07:00	<1 - <1	IV
December rho Virginids (DRV)	Dec 05	12:42 (191) +12	68	07:00	<1 - <1	IV
December kappa Draconids (DKD)	Dec 03	13:12 (198) +67	43	08:00	1 - <1	IV
December sigma Virginids (DSV)	Dec 21	13:12 (198) +07	66	08:00	<1 - <1	IV

Class Explanation: A scale to group meteor showers by their intensity:

- **Class I:** the strongest annual showers with Zenith Hourly Rates normally ten or better.
- **Class II:** reliable minor showers with ZHR's normally two to ten.
- **Class III:** showers that do not provide annual activity. These showers are rarely active yet have the potential to produce a major display on occasion.
- **Class IV:** weak minor showers with ZHR's rarely exceeding two. The study of these showers is best left to experienced observers who use plotting and angular velocity estimates to determine shower association. These weak showers are also good targets for video and photographic work. Observers with less experience are urged to limit their shower associations to showers with a rating of I to III.