

Meteor Activity Outlook for October 16-22, 2021



Mauro Vitolo captured this fireball passing between Jupiter and Saturn at 23:39 CEST (21:39UT) on August 12, 2021, from Cavallino, Veneto, Italy. For more information on this event, visit: https://fireball.amsmeteors.org/members/imo_view/event/2021/4602 ©Mauro Vitolo

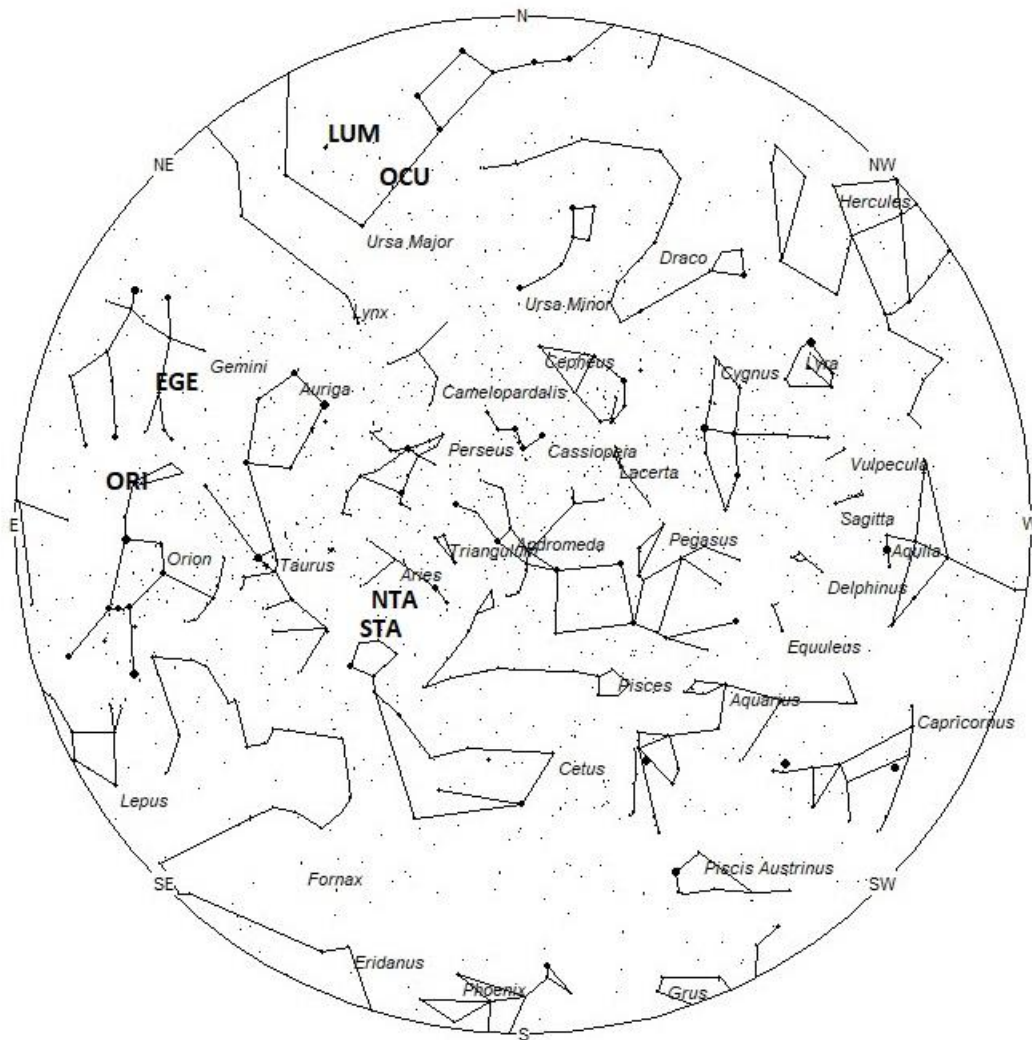
During this period, the moon reaches its full phase on Wednesday October 20th. At that time the moon lies opposite the sun in the sky and remains above the horizon all night long. This weekend the waxing gibbous moon will set during the early morning hours, allowing a small window of opportunity to view under dark conditions between moon set and dawn. The estimated total hourly meteor rates for evening observers this week is near 3 as seen from mid-northern latitudes (45N) and 2 as seen from tropical southern locations (25S). For morning observers, the estimated total hourly rates should be near 19 as seen from mid-northern latitudes (45N) and 14 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 during this period due to moonlight. 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 October 16/17. 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

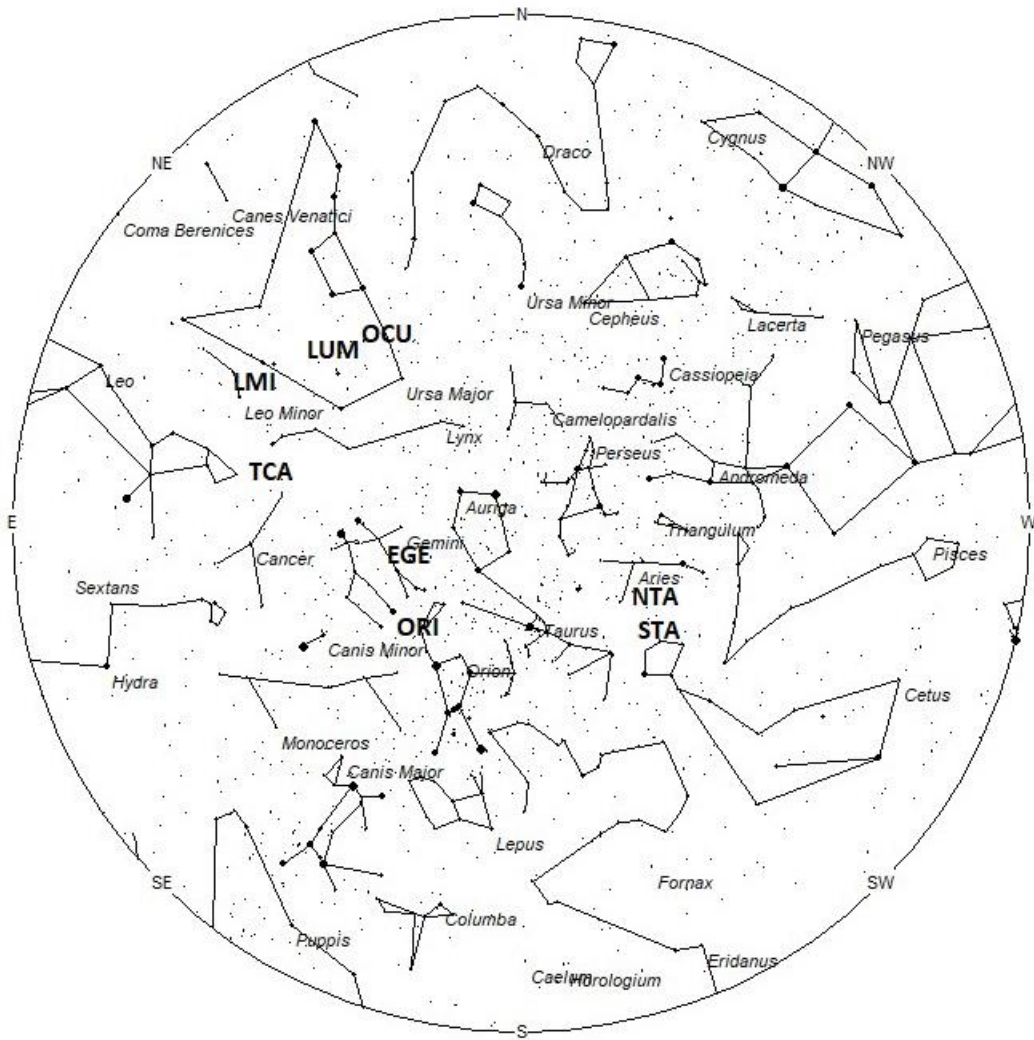
rotating the charts to the desired direction. A planisphere or computer planetarium program is also useful in showing the sky at any time of night on any date of the year. Activity from each radiant is best seen when it is positioned highest in the sky, either due north or south along the meridian, depending 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 8pm Local Daylight Saving Time



Radiant Positions at 12am Local Daylight Saving Time



Radiant Positions at 4am Local Daylight Saving Time

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

The **Northern Taurids (NTA)** are active from a radiant is located at 02:37 (39) +18. This area of the sky is located in a remote area of central Aries, 7 degrees west of the 4th magnitude star known as Botein (delta Arietis). This radiant is best placed near 0200 local Daylight Saving time (LDST), when it lies on the meridian and is located highest in the sky. Maximum activity is not until November 12th so rates at this time should be less than 1 per hour no matter your location. With an entry velocity of 31 km/sec., the average NTA meteor would be of medium-slow velocity.

The **Southern Taurids (STA)** are very complex but recent video investigations have revealed two clearly distinct components. The first component represents the early and regular annual activity of Southern Taurids, and the latter component represents the main source of activity and is periodic. The early STA's are active from September 28 through November 7 and peaks on October 16th. The main component of the STA's is active from October 13 through December 2 and peaks on November 4*. Now that both centers of STA are active, we will list the mean position of the two radiants as it would be extremely difficult to distinguish them visually. This position is currently located at 02:43 (041) +12. This position lies in southern Aries, 2 degrees north of the 4th magnitude star known as mu Ceti. This radiant is best placed near 0200 LDST, when it lies on the meridian and is located highest in the sky. Rates at this time should be near 3 per hour no matter your location. With an entry velocity of 31 km/sec., the average STA meteor would be of medium-slow velocity.

*The activity of meteor showers recorded by SonotaCo Net video observations 2007–2018, Masahiro Koseki, 2021, <https://www.meteornews.net/2021/02/09/february-2021-special-issue-of-emetornews-online/> Page 170

The **Orionids (ORI)** are active from September 26 though November 22, with maximum activity occurring on October 21st. The radiant is currently located at 06:09 (092) +15, which places it in northeastern Orion, 1 degree north of the 4th magnitude star known as (xi Orionis). Current rates are expected to be near 5 per hour, no matter your location. With an entry velocity of 66 km/sec., the average ORI meteor would be of swift velocity.

The **epsilon Geminids (EGE)** are active from a radiant located at 06:40 (100) +28. This area of the sky lies on the Gemini/Auriga border, 3 degrees north of the 3rd magnitude star known as Mabsuta (epsilon Geminorum). This area of the sky is best placed during the last dark hour prior to dawn. These meteors are active from September 27 through November 8, with maximum activity occurring on October 18. Rates at this time should be near 1 per hour as seen from the Northern Hemisphere and less than 1 as seen from south of the equator. With an entry velocity of 69 km/sec., the average EGE meteor would be of swift velocity.

The **tau Cancrids (TCA)** are a weak shower with a long activity period of seven weeks. They are active from September 23 through November 12 with maximum activity occurring on October 22. The radiant currently lies at 08:58 (135) +30, which places it in northern Cancer, 3 degrees northeast of the 4th magnitude star known as Decapoda (iota Cancri A). Expected hourly rates are less than 1 per hour no matter your location. With an entry velocity of 67 km/sec., the average TCA meteor would be of swift velocity.

The **lambda Ursa Majorids (LUM)** were discovered by Željko Andreić and the Croatian Meteor Network team based on studying SonotaCo and CMN observations (SonotaCo 2007-2011, CMN 2007-2010). These meteors are active from October 18 through November 7, with maximum activity occurring on October 28th. The current location of the LUM radiant lies near 09:52 (146) +53. This area of the sky lies in western Ursa Major, 3 degrees northeast of the 3rd magnitude star known as theta Ursae Majoris. This area of the sky is best placed in the sky during the last hour before dawn, when it lies highest above the horizon in a dark sky. Current rates should be less than 1 per hour no matter your location. With an entry velocity of 61km/sec., most activity from this radiant would be of swift speed.

The **October Ursa Majorids (OCU)** are a recent discovery by the Japanese group known as SonotaCo. These meteors are active from October 10-20 with maximum activity occurring on October 15th. The radiant is currently located at 09:54 (149) +63. This position lies in western Ursa Major, 4 degrees north of the 4th magnitude star known as upsilon Ursae Majoris. This area of the sky is best placed in the sky during the last hour before dawn, when it lies highest above the horizon in a dark sky. Current rates should be near 1 per hour as seen from the Northern Hemisphere and less than 1 per hour as seen from south of the equator. With an entry velocity of 55km/sec., most activity from this radiant would be of swift speed.

The **Leonis Minorids (LMI)** are active from a radiant is located at 10:17 (154) +39. This area of the sky lies in northern Leo Minor, 3 degrees south of the pair or 3rd magnitude stars known as mu and lambda Ursae Majoris. The radiant is best placed just before dawn when it lies highest in a dark sky. This shower is better situated for observers situated in the Northern Hemisphere where the radiant rises far higher into the sky before the start of morning twilight. Current rates would be less than 1 no matter your location. At 62km/sec., the average Leonis Minorid is swift. From my personal experience this minor shower produces a high proportion of bright meteors.

As seen from the mid-northern hemisphere (45N) one would expect to see approximately 9 **sporadic** meteors per hour during the last hour before dawn as seen from rural observing sites. Evening rates would be near 2 per hour. As seen from the tropical southern latitudes (25S), morning rates would be near 6 per hour as seen from rural observing sites and 1 per hour during the evening hours. Locations between these two extremes would see activity between the listed figures.

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.

SHOWER	DATE OF MAXIMUM ACTIVITY	CELESTIAL POSITION	ENTRY VELOCITY	CULMINATION	HOURLY RATE	CLASS
		RA (RA in Deg.) DEC	Km/Sec	Local Daylight Saving Time	North- South	
Northern Taurids (NTA)	Nov 12	02:37 (039) +18	31	02:00	<1 - <1	II
Southern Taurids (STA)	Oct 16	02:43 (041) +12	31	02:00	3 - 3	II
Orionids (ORI)	Oct 21	06:09 (092) +15	66	05:00	5 - 4	I
epsilon Geminids (EGE)	Oct 18	06:40 (100) +28	68	06:00	1 - <1	II
tau Cancrids (TCA)	Oct 22	08:58 (135) +30	67	08:00	<1 - <1	IV
lambda Ursa Majorids (LUM)	Oct 28	09:52 (146) +53	61	09:00	<1 - <1	IV
October Ursa Majorids (OCU)	Oct 15	09:54 (149) +63	55	09:00	1 - <1	IV
Leonis Minorids (LMI)	Oct 21	10:17 (154) +39	62	09:00	<1 - <1	II