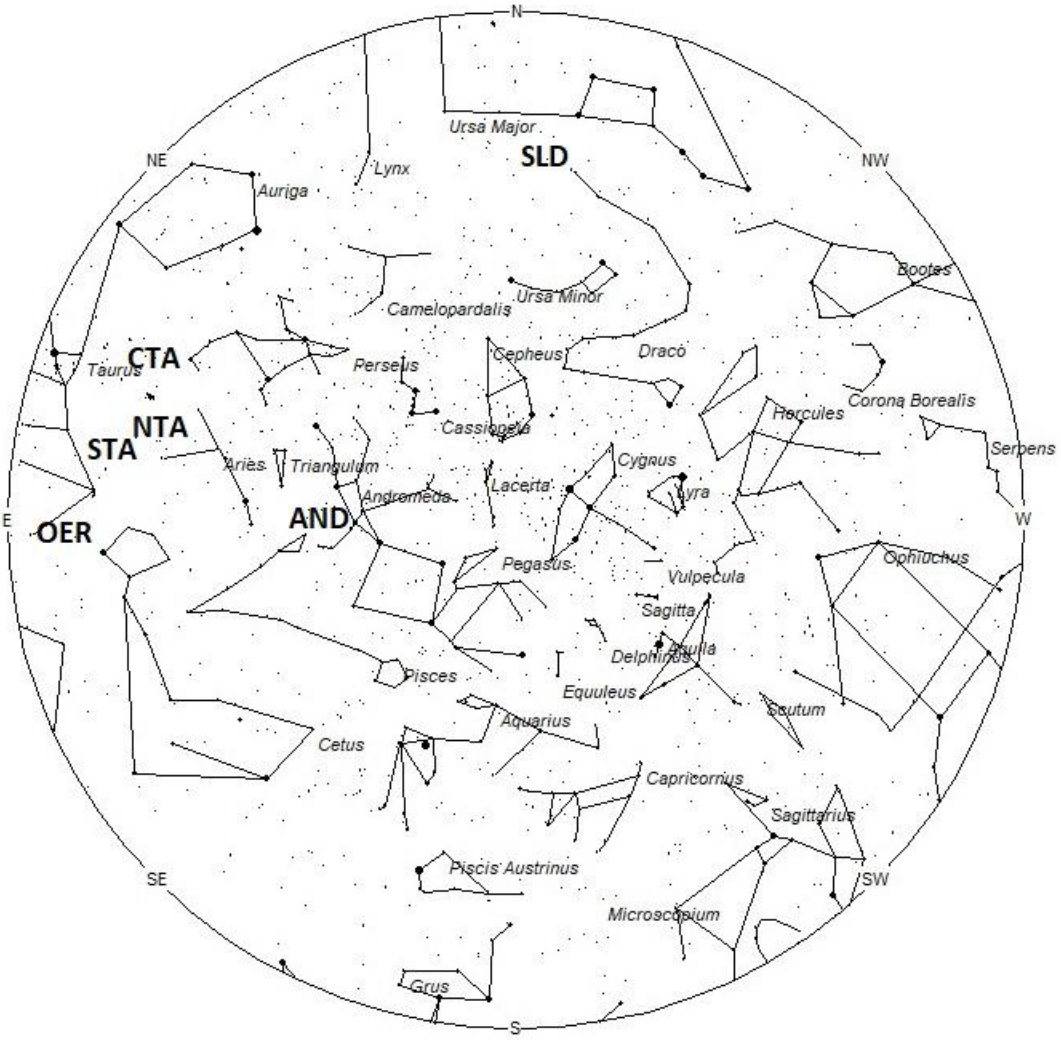
Meteor Activity Outlook for November 2-8, 2024

Louis Demange captured this long, bright meteor on June 4, 2024, at 02:27 CEST (00:27 UT). What is also interesting about this photograph are the faint greenish wisps of airglow. ©Louis Demange

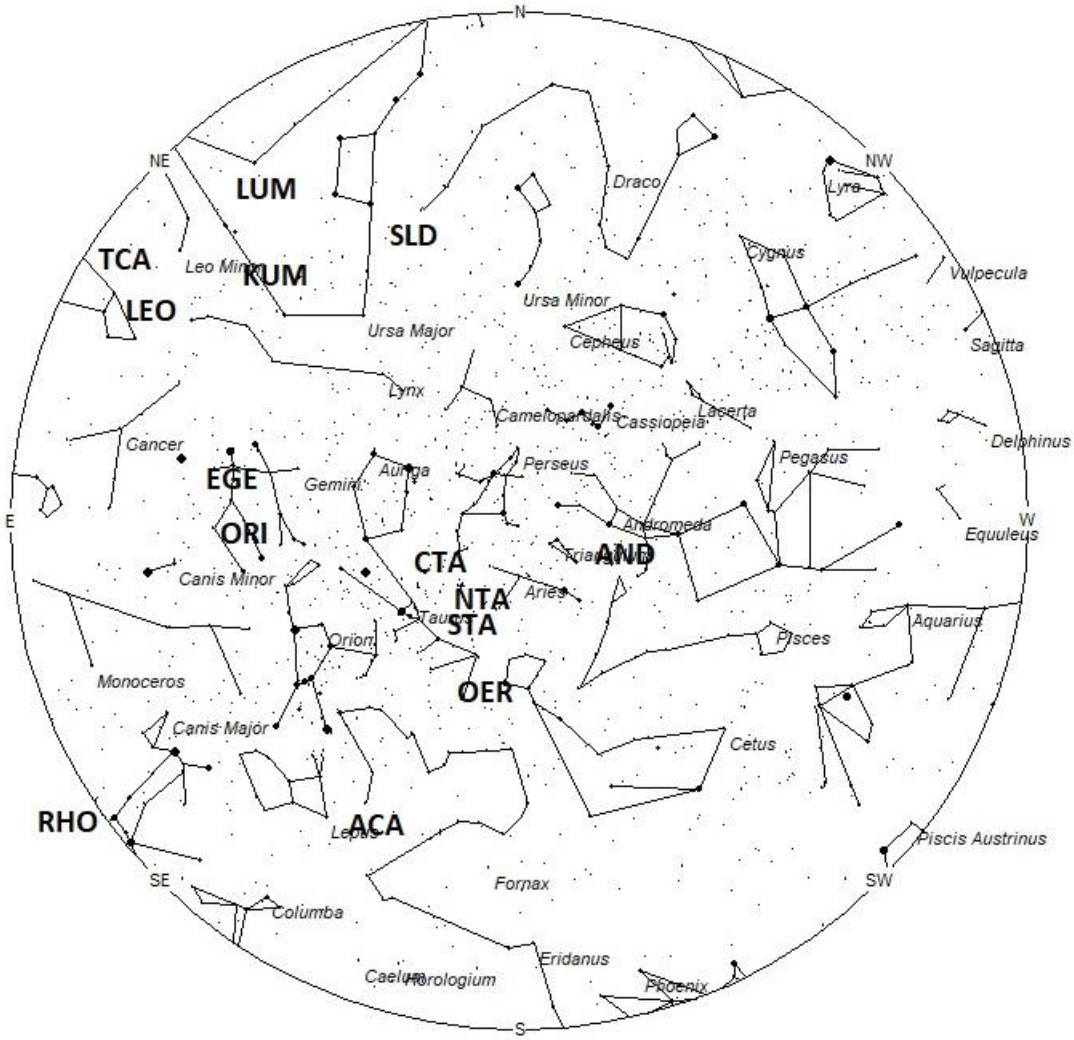
During this period, the moon waxes from a very slim crescent phase to nearly half-illuminated. This weekend the waxing crescent moon will set just after the end of evening twilight and not interfere with meteor observing all night long. With each passing night the moon will set approximately 45 minutes later and will interfere with evening observing late in this period. The estimated total hourly rates for evening observers this weekend 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 20 as seen from mid-northern latitudes (45N) and 15 as seen from tropical southern locations (25S). Rates are slightly reduced during evening hours. The actual rates seen will also depend on factors such as personal light and motion perception, local weather conditions, alertness, and experience in watching meteor activity. 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 November 2/3. These positions do not change greatly day to day so the listed coordinates may be used during this entire period. Most star atlases (available online and at bookstores 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

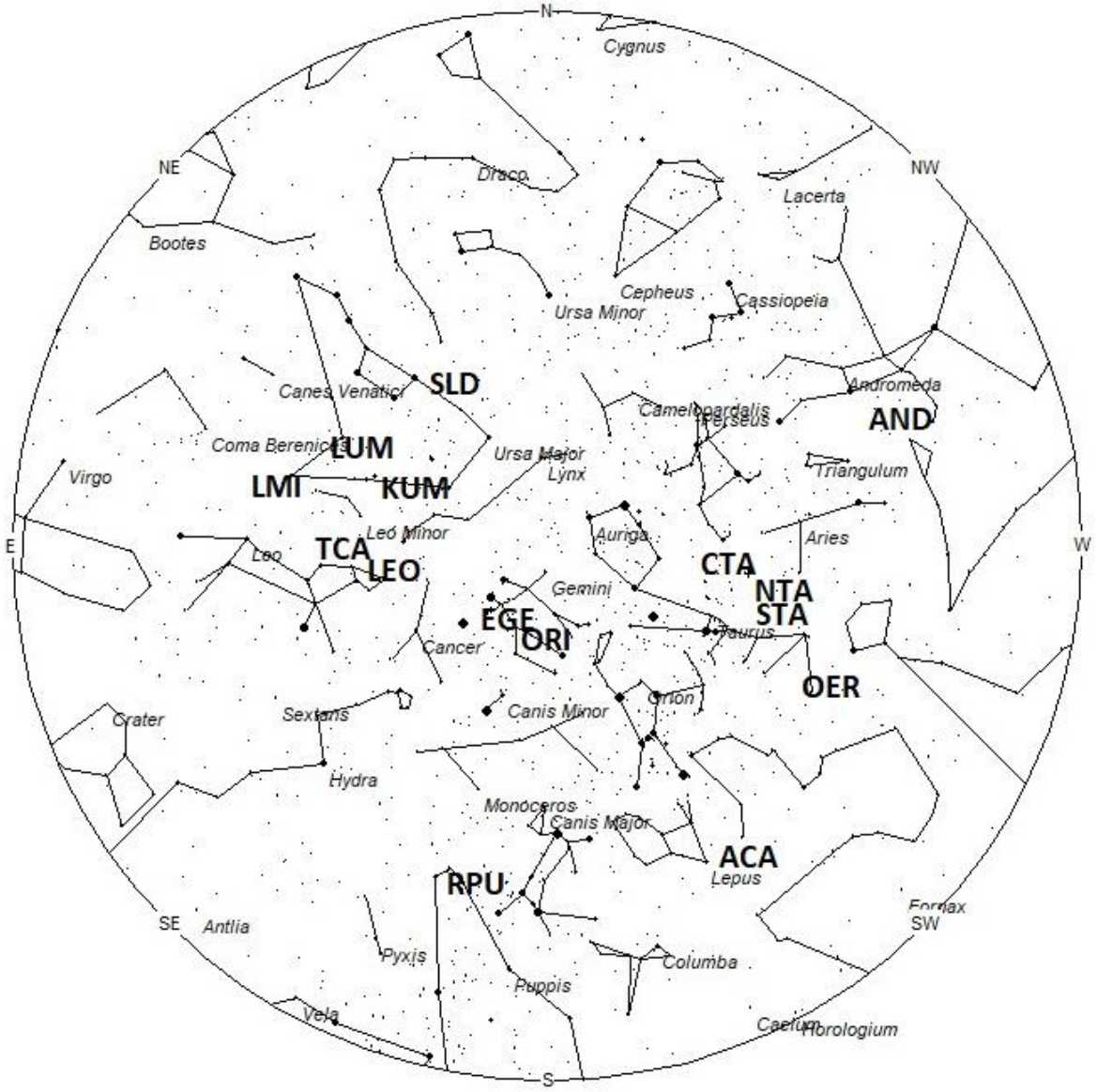
the meridian, depending on your latitude. Radiants that rise after midnight will not reach their highest point in the sky until daylight. For these radiants, it is best to view them during the last few hours before dawn. It must be remembered that meteor activity is rarely seen at its radiant position. Rather they shoot outwards from the radiant, so it is best to center your field of view so that the radiant lies toward 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 12am Local Standard Time



Radiant Positions at 4am Local Standard Time

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

The **Andromedids (AND)** are the annual debris encountered from the remains of comet 3D/Biela. These meteors should not be mistaken for the great meteor storms of the 19th century as those meteors are in a slightly different orbit and irregularly encountered in early December. They are known as the December phi Cassiopeiids (DPC). It is interesting that during November, this radiant moves northward toward the area of the DPC's but ends before reaching the DPC radiant. The radiant currently is located near 01:20 (020) +26. This position lies in northeastern Pisces, 2 degrees north of the faint star known as phi Piscium. This part of the sky is best placed near 23:00 local standard time (LST), when the radiant lies highest above the horizon. Face toward the north near this time to best see these meteors. Current rates would most likely be less than 1 per hour no matter your location. With an entry velocity of 19 km/sec., the average Andromedid meteor would be of very slow velocity.

The **omicron Eridanids (OER)** was discovered by the Japanese video meteor network SonotaCo from video data obtained during 2007-2008. These meteors are active from October 23 through December 2nd. Maximum activity is ill-defined and may occur anytime from October 28 to November 17. The date listed in the table represents the midpoint of the activity curve and not the actual date of maximum activity. The radiant is currently located at 03:26 (52) +00, which is located in northwestern Taurus, 2 degrees west of the faint star known as 10 Tauri. This radiant is best placed near 0100 LST, when it lies on the meridian and is located highest in the southern sky. Face toward the south at this time to best see these meteors. Rates at this time should be less than 1 per hour no matter your location. With an entry velocity of 29 km/sec., the average OER meteor would be of medium-slow velocity.

The **Northern Taurids (NTA)** are active from a radiant located at 03:27 (052) +21. This area of the sky is located on the Aries/Taurus border, 4 degrees southwest of the naked eye star cluster known as the Pleiades. To best see these meteors, one should face northward near 01:00 LST. Note that this radiant is only 6 degrees north of the STA radiant so care must be taken to separate these two showers. Maximum activity is not until November 8th so rates at this time should be near 2 per hour no matter your location. With an entry velocity of 29 km/sec., the average NTA meteor would be of medium-slow velocity.

The **Southern Taurids (STA)** are active from a wide radiant centered near 03:30 (053) +14. This position lies in southwestern Taurus, 1 degree north of the 4th magnitude star known as 5 Tauri. These meteors are best seen near 01:00 LST when the radiant lies highest in the northern sky. Rates are expected to be near 3 per hour no matter your location. With an entry velocity of 28 km/sec., the average STA meteor would be of medium-slow velocity.

The **chi Taurids (CTA)** were discovered by Dr. Peter Brown during his 7-year survey using the Canadian Meteor Orbit Radar (CMOR). This source is active from October 24 through November 13 with a maximum occurring near November 5th. The radiant is currently located at 04:12 (063) +27 which places it in northwestern Taurus, 5 degrees northeast of the naked eye open cluster known as the Pleiades. These meteors may be seen all night long but the radiant is best placed near 0200 LST when it lies on the meridian and is located highest in the northern sky. Current rates

should be less than 1 per hour no matter your location. With an entry velocity of 40 km/sec., the average chi Taurid meteor would be of medium velocity.

The **alpha Canis Majorids (ACA)** were also discovered by Dr. Peter Brown during his 7-year survey using the Canadian Meteor Orbit Radar (CMOR2). This source is active from November 2 through December 11 with a maximum occurring near November 21st. The radiant is currently located at 04:26 (082) -22 which places it in western Eridanus, 2 degrees southwest of the faint star known as 54 Eridani. These meteors may be seen all night long but the radiant is best placed near 0200 LST when it lies on the meridian and is located highest in the northern sky. Current rates should be less than 1 per hour no matter your location. With an entry velocity of 44 km/sec., the average ACA meteor would be of medium velocity.

The **Orionids (ORI)** are active from September 26 through November 22, with maximum activity occurring on October 22nd. The radiant is currently located at 07:00 (105) +16, which places it in central Gemini, 4 degrees east of the 2nd magnitude star known as Alhena (gamma Geminorum). This area of the sky is best placed for observing during the last dark hour prior to dawn, when it lies highest in the northern sky. Current rates are expected to be near 3 per hour as seen from the northern hemisphere and near 2 as seen from south of the equator. With an entry velocity of 65 km/sec., the average ORI meteor would be of swift velocity.

The **epsilon Geminids (EGE)** are active from September 27 through November 8 with maximum activity occurring on October 19th. The radiant is currently located at 07:37 (114) +26. This area of the sky lies in eastern Gemini, 3 degrees southwest of the 1st magnitude star known as Pollux (beta Geminorum). To best see these meteors face toward the northeast during the last dark hour prior to dawn. Rates at this time should be less than 1 no matter your location. With an entry velocity of 67 km/sec., the average EGE meteor would be of swift velocity.

The **rho Puppids (RPU)** 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 28 through November 22 with maximum activity occurring on November 8th. The radiant is currently located at 07:52 (118) -25. This area of the sky lies in central Puppis, 1 degree east of the 2nd magnitude star known as Azmidi (xi Puppis). To best see these meteors face ay direction during the last dark hour prior to dawn. Rates at this time should be less than 1 per hour no matter your location. With an entry velocity of 57 km/sec., the average RPU meteor would be of medium-swift velocity.

The **kappa Ursae Majorids (KUM)** were discovered by cameras of the SonotaCo network in Japan during an outburst of activity on November 5, 2009. This radiant is active from October 28-November 17, with maximum activity occurring on the 6th. The radiant is currently located at 09:28 (142) +46. This position lies in southwestern Ursa Majoris, 6 degrees south of the 3rd magnitude star known as theta Ursae Majoris. Rates are expected to less than 1 no matter your location. These meteors are best seen during the last hour before dawn when the radiant lies highest above the northern horizon in a dark sky. With an entry velocity of 65 km/sec., the average Kappa Ursae Majorid meteor would be of swift velocity. Due to the high northern location of this radiant, these meteors are not well seen from the southern hemisphere.

The **Leonids (LEO)** are active from October 27 to December 7 with maximum activity occurring on November 17th. The radiant is currently located at 09:40 (145) +28. This position lies in northwestern Leo, 3 degrees northwest of the 4th magnitude star known as Rasalas (mu Leonis). The Leonid radiant is best placed in the eastern sky during the last hour before morning twilight when the radiant lies highest in a dark sky. Leonids may be seen from the southern hemisphere, but the viewing conditions are not quite as favorable as those north of the equator. Current rates are expected to be near than 1 per hour as seen from the northern hemisphere and less than 1 per hours as seen from the southern hemisphere. With an entry velocity of 69 km/sec., most activity from this radiant would be of swift speed with numerous persistent trains on the brighter meteors.

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 21st. The radiant currently lies at 09:59 (150) +29, which places it in northwestern Leo, 3 degrees northeast of the 4th magnitude star known as Rasalas (mu Leonis). To best see these meteors face eastward during the last two hours of the morning prior to dawn. Expected hourly rates are less than 1 no matter your location. With an entry velocity of 67 km/sec., the average TCA meteor would be of swift velocity.

The **Southern lambda Draconids (SLD)** 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 29-November 8 with maximum activity occurring on November 4th. The radiant is currently located at: 10:46 (162) +68. This area of the sky is currently located in northern Ursa Major, 4 degrees west of the 4th magnitude star known as Giausar (lambda Draconis). This area of the sky is best placed in the sky during the last hour before dawn, when it lies highest above the northern horizon in a dark sky. Current rates should be less than 1 per hour no matter your location. With an entry velocity of 49km/sec., most activity from this radiant would be of medium speed. Due to the high northern location, these meteors are poorly seen from the southern hemisphere.

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 10:58 (165) +47. This area of the sky lies in central Ursa Major, 4 degrees northwest of the 3rd magnitude star known as Merak (psi 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 northeastern horizon in a dark sky. Current rates should be less than 1 per hour no matter your location. Due to the high northern location of this radiant, these meteors are difficult to see from the southern hemisphere. With an entry velocity of 61km/sec., most activity from this radiant would be of swift speed.

The **Leonis Minorids (LMI)** are active from October 13th to November 3rd, with maximum activity occurring on October 22nd. The radiant is located at 11:32 (173) +33, which places it in southern Ursa Major, 2 degrees east of the 3rd magnitude star known as Alula Borealis (nu Ursae Majoris). These meteors are best seen by facing toward the east during the last couple of hours prior to dawn. This shower is better for observers situated in the northern hemisphere where the radiant rises far higher into the northeastern sky before the start of morning twilight. Current rates

should be less than 1 per hour no matter your location. At 61km/sec., the average Leonis Minorid is swift. From my personal experience this minor shower produces a high proportion of bright meteors.

Sporadic meteors are those meteors that cannot be associated with any known meteor shower. All meteor showers are evolving and disperse over time to the point where they are no longer recognizable. Away from the peaks of the major annual showers, these sporadic meteors make up the bulk of the activity seen each night. As seen from the mid-northern hemisphere (45N) one would expect to see during this period approximately 10 sporadic meteors per hour during the last hour before dawn as seen from rural observing sites. Evening rates should be near 3 per hour. As seen from the tropical southern latitudes (25S), morning rates would be near 7 per hour as seen from rural observing sites and 2 per hour during the evening hours. Locations between these two extremes would see activity between these listed figures. Evening rates are slightly reduced due to moonlight.

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 one, so these sources are rarely listed as visual targets in most meteor shower lists. If you are like me and wish to associate as many meteors as possible with known sources, then you will appreciate these listings. Before listing meteors from these obscure sources, you should attempt to prove these meteors belong to them and are not chance alignments of sporadic meteors. You can note parameters such as duration, length, radiant distance and the elevation of each meteor to help compute the probability of shower association. It should be remembered that slow meteors can be seen from fast showers, but fast meteors cannot be produced from slow showers. Slower showers are those with velocities less than 35/km per second. Slow meteors can appear from fast showers when they appear close to the radiant or low in the sky. The table located on page 22 of the IMO's 2024 Meteor Shower Calendar is a big help in aiding in the identification of meteors. If you record the length and duration of each meteor, you can use this chart to check the probability of the meteor belonging to a shower of known velocity. If the angular velocity is similar to the figure in the table, then your meteor probably belongs to that shower. Rates and positions are exact for Saturday night/Sunday morning.

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	
Andromedids (AND)	Nov 06	01:20 (020) +26	19	23:00	<1 - <1	III
omicron Eridanids (OER)	Nov 05	03:26 (52) +00	29	01:00	<1 - <1	IV
Northern Taurids (NTA)	Nov 08	03:27 (052) +21	29	01:00	2 - 2	II

Southern Taurids (STA)	Nov 05	03:30 (053) +14	28	01:00	3- 3	II
chi Taurids (CTA)	Nov 04	04:12 (063) +27	40	02:00	<1 - <1	IV
alpha Canis Majorids (ACA)	Nov 21	04:26 (082) - 22	44	02:00	<1 - <1	IV
Orionids (ORI)	Oct 22	07:00 (105) +16	65	04:00	3 - 2	I
epsilon Geminids (EGE)	Oct 16	07:37 (114) +26	67	04:00	<1 - <1	II
rho Puppids (RPU)	Nov 08	07:52 (118) - 25	57	04:00	<1 - <1	IV
kappa Ursae Majorids (KUM)	Nov 06	09:28 (142) +46	65	07:00	<1 - <1	IV
Leonids (LEO)	Nov 17	09:40 (145) +28	69	07:00	1 - <1	I
tau Cancrids (TCA)	Oct 22	09:59 (150) +29	67	07:00	<1 - <1	IV
Southern lambda Draconids (SLD)	Nov 03	10:46 (162) +68	49	07:00	<1 - <1	II
lambda Ursa Majorids (LUM)	Oct 28	10:58 (165) +47	61	07:00	<1 - <1	IV
Leonis Minorids (LMI)	Oct 22	11:32 (173) +33	61	08:00	<1 - <1	II

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. 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.

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.