





ASTRONOMICAL DIARY

PREPARED BY ASTRONOMICAL PUBLICATION AND PLANETARIUM UNIT, SPACE SCIENCE AND ASTRONOMY SECTION

ASTRONOMICAL EVENTS, OCTOBER 2024

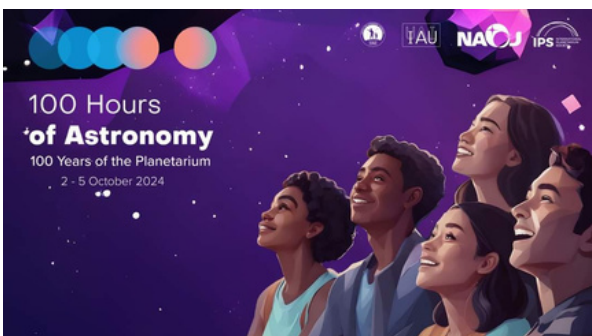
| DATE | EVENT | TIME |
|-------|--|------------|
| 02-05 | 100 Hours of Astronomy | --- |
| 03 | Moon at Apogee (Distance = 406,479.487 km) | 03:39 a.m. |
| 04-10 | World Space Week | --- |
| 06 | Close approach of Waxing Crescent Moon and Venus | 02:00 a.m. |
| 06 | Conjunction of Waxing Crescent Moon and Venus | 04:26 a.m. |
| 10 | Southern Taurid meteor shower (ZHR = 5) | --- |
| 12 | Comet C/2023 A3 (Tsuchinshan-ATLAS) passes perigee | --- |
| 15 | Close approach of the Moon and Saturn | 02:07 a.m. |
| 15 | Conjunction of the Moon and Saturn | 02:13 a.m. |
| 17 | Moon at Perigee (Distance = 357,284.102 km) | 08:51 a.m. |
| 21 | Close approach of the Moon and Jupiter | 03:09 p.m. |
| 21 | Conjunction of the Moon and Jupiter | 04:04 p.m. |
| 22 | Orionid meteor shower (ZHR = 15) | --- |
| 24 | Conjunction of the Waning Gibbous Moon and Mars | 03:55 p.m. |
| 24 | Close approach of the Waning Gibbous Moon and Mars | 05:34 p.m. |
| 30 | Moon at Apogee (Distance = 406,118.064 km) | 06:50 a.m. |

PHASES OF THE MOON

| | |
|---|---|
|  | New Moon Oct 03 02:49 a.m. |
|  | First Quarter Oct 11 02:55 a.m. |
|  | Full Moon Oct 17 07:26 p.m. |
|  | Last Quarter Oct 24 04:03 p.m. |

RISE AND SET TIMES OF PLANETS

| DATE | MERCURY | | VENUS | | MARS | | JUPITER | | SATURN | |
|--------|----------|----------|----------|----------|----------|-----------|----------|-----------|----------|-----------|
| | Rise | Set | Rise | Set | Rise | Set | Rise | Set | Rise | Set |
| Oct 01 | 05:48 am | 05:49 pm | 07:57 am | 07:30 pm | 11:51 pm | 12:48 pm* | 10:08 pm | 11:04 am* | 04:26 pm | 04:15 am* |
| Oct 11 | 06:18 am | 06:03 pm | 08:10 am | 07:34 pm | 11:34 pm | 12:30 pm* | 09:29 pm | 10:25 am* | 03:44 pm | 03:34 am* |
| Oct 21 | 06:45 am | 06:16 pm | 08:25 am | 07:41 pm | 11:14 pm | 12:09 pm* | 08:48 pm | 09:45 am* | 03:03 pm | 02:52 am* |
| Oct 31 | 07:10 am | 06:30 pm | 08:40 am | 07:51 pm | 10:53 pm | 11:47 am* | 08:07 pm | 09:03 am* | 02:23 pm | 02:11 am* |



100 HOURS OF ASTRONOMY 100 Years of the Planetarium

The International Astronomical Union – Office for Astronomy Outreach (IAU-OAO), together with the International Planetarium Society (IPS) have teamed up to celebrate the 100 hours of Astronomy and the 100 Years of the Planetarium on 02-05 October 2024. The project aims to introduce as many people as possible to the sky and the wonders of our celestial surroundings. Nowadays, it is challenging to witness a truly dark sky in many areas due to the rising levels of light pollution. Thus, planetarium visits are encouraged for everyone to explore the beauty of the universe. May people share their passion for astronomy - whether it is beneath the dome or under the skies!

Notes:

[1] All times displayed are in Philippine Standard Time (PhST)

[2] *following day

“tracking the sky...helping the country”

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Stars and Constellations

October is the best month to observe the northern constellations **Cepheus**, **Lacerta**, and **Pegasus** and the southern constellations **Aquarius**, **Piscis Austrinus**, and **Grus**. The prominent constellations are positioned directly overhead at 09:00 p.m. on 15 October 2024 as shown in Figure 1. [1,2]

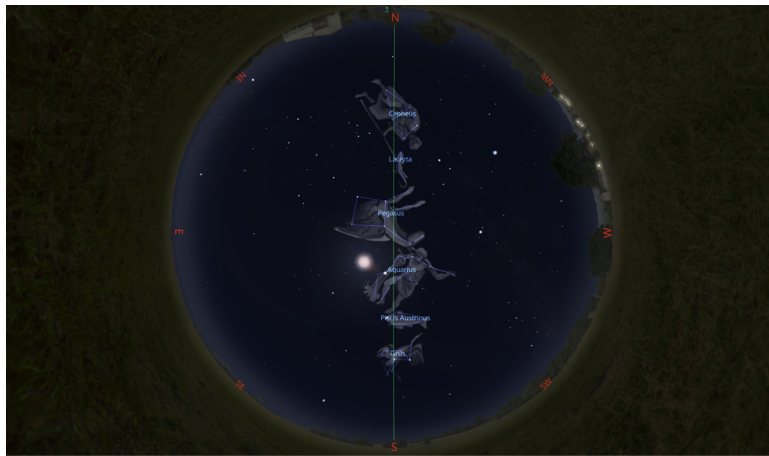


Figure 1: The view of the night sky featuring the prominent October constellations at 09:00 p.m. on 15 October 2024 using the Stellarium software

Pegasus, the Winged Horse, is the seventh largest constellation in the sky. Its brightest star, Enif (Epsilon Pegasi), represents the horse’s muzzle. Three of the constellation’s brightest stars - Markab, Scheat, and Algenib - along with Alpheratz from the constellation Andromeda, form the most notable feature of Pegasus, the “Great Square of Pegasus”. Aside from the remarkable stars located in Pegasus, the constellation also hosts fascinating deep-sky objects, including, NGC 7331 [Figure 2a], a spiral galaxy frequently compared to the Milky Way galaxy due to its structural similarities; an unbarred spiral galaxy, NGC 7217 [Figure 2b]; and Stephan’s Quintet, a tight visual grouping of five galaxies, four of which are the first compact galaxy group ever found. [2,3]

The constellation **Lacerta**, the Lizard, is a relatively small and faint constellation with no stars brighter than magnitude 3.0. Alpha Lacertae, Lacerta’s brightest star, is situated about 102 light years away from Earth and is approximately 31 times brighter than the Sun. Lacerta has a few deep-sky objects of interest, such as the planetary nebula IC 5217 [Figure 2c] and the open cluster NGC 7243. [2,4]



Figure 2: The Northern Constellations

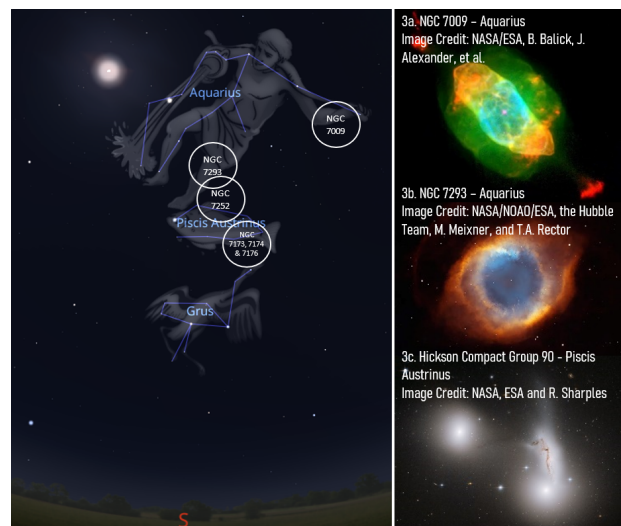


Figure 3: The Southern Constellations

Known as the “Water Bearer,” **Aquarius** is one of the oldest identified constellations in the sky. It is an equatorial constellation making it observable from most locations on Earth. Aquarius has only two stars above magnitude 3.0, Sadalsuud and Sadalmelik. The constellation is a wealth of captivating deep-sky objects. The Saturn Nebula (NGC 7009) [Figure 3a], a planetary nebula named after the planet Saturn due to their resemblance in appearance, the Helix Nebula (NGC 7293) [Figure 3b], and the Atoms for Peace Galaxy (NGC 7252), which results from the collision of two galaxies, are all located in the constellation Aquarius. [2,5]

Piscis Austrinus, the Southern Fish, is a small constellation depicted as a fish drinking the water flowing from the jar Aquarius is holding. It is home to the eighteenth (18th) brightest star in the night sky, Fomalhaut, also known as Alpha Piscis Austrini. The constellation houses noteworthy deep-sky objects. These include the Hickson Compact Group 90 [Figure 3c], a group of three interacting galaxies – NGC 7173, NGC 7174, and NGC 7176 – that are engaged in a gradual process of merging. [2,6]

Planetary Location

Jupiter and **Mars** can be spotted in the late evening as they rise on the eastern horizon while **Saturn** will be exhibiting its presence for most of the night. Moreover, **Venus** can be viewed about an hour after sunset in the western sky. On the other hand, **Mercury** will not be visible due to its proximity to the Sun.[1,7]



Figure 4: The view of the western sky showing the close pairing of the Waxing Crescent Moon and Venus on 05 October at 06:15 p.m. using Stellarium.

The **Waxing Crescent Moon** and **Venus** will make a close approach on 06 October at 02:00 a.m., passing within $2^{\circ}48'$ of each other. The two objects will share the same right ascension at 04:26 a.m. of the same day, with the Moon passing $3^{\circ}00'$ to the south of Venus. The exact events will not be viewable as the Moon and Venus are still below the horizon. However, the best time to observe the pair is at 06:15 p.m. on 05 October before they sink on the western horizon [Figure 4]. [1,7,8,9]

On 15 October at 02:07 a.m., the **Moon** and **Saturn** will approach closely, passing within 6.0 arcminutes of each other. At about the same time, the two objects will be in conjunction, separated by $6'$. The exact timing of these events can be seen above the western horizon as shown in Figure 5. [1,7,10,11]



Figure 5: The view of the eastern sky showing the a) close approach at 06:07 p.m. and b) conjunction at 06:22 p.m. of the Waxing Gibbous Moon and Saturn on 17 September using Stellarium.

A close approach of the **Moon** and **Jupiter** will occur on 21 October at 03:09 p.m., passing within $5^{\circ}47'$ of each other. At 04:04 p.m., the Moon will pass $5^{\circ}48'$ to the north of Jupiter as they share the same right ascension. Both objects lie behind the background stars of Taurus. Unfortunately, the two objects are still below the horizon during the exact timing, but the pair can be viewed from 10:00 p.m. of the same day until sunrise [Figure 6]. [1,7,12,13]

The **Waning Gibbous Moon** and **Mars** will be in conjunction at 03:55 p.m. on 24 October, separated by $3^{\circ}54'$. At 05:34 p.m., they will be in close pairing, passing within $3^{\circ}49'$ of each other. The exact occurrence of these events will not be observable since the Moon and Mars are below the horizon, however, their close pairing can be witnessed from midnight as they rise in the eastern horizon until they get lost in the glare of the Sun [Figure 7]. [1,7,14,15]



Figure 6: The view of the eastern sky showing the close pairing of the Moon and Jupiter on 21 October at 10:00 p.m. using Stellarium.



Figure 7: The view of the eastern sky showing the Waning Gibbous Moon and Mars on 24 October at 12:00 a.m. using Stellarium.

All the conjunctions and near approaches mentioned between the planet and the moon, or planet to planet, will be visible enough to fit within the field of view of a telescope and can also be viewed with the naked eye or using a pair of binoculars.

COMET C/2023 A3 (Tsuchinshan-ATLAS)



Figure 8: The view of the western sky showing Comet C/2023 A3 (Tsuchinshan-ATLAS) on 16 October at 06:20 p.m. using Stellarium.

Comet C/2023 A3 (Tsuchinshan-ATLAS) will approach the Earth at its closest point, at a distance of 0.46 AU, on **12 October** while in the Virgo constellation. The Comet will have an estimated visual magnitude of 2.8. While the Comet will not be observable in Manila during its closest approach, it will be shortly visible from the middle until the end of the month while traversing from the Sextans to the Ophiuchus constellation. Figure 8 displays the Comet C/2023 A3 appearing brightly above the western horizon on 16 October at 06:20 p.m. [2,16]

Meteor Shower

The **Southern Taurid** meteor shower will be active from **10 September to 20 November**, with peak activity on **10 October**. In Manila, the shower will be visible from 06:37 p.m. until dawn breaks around 05:22 a.m., when the constellation Cetus, its radiant point, rises above the eastern horizon. The radiant point is highest in the sky around 01:00 a.m. producing its best view [Figure 9]. The Moon will be in its first quarter phase during the shower's peak but will set at around 11:16 p.m., thus, the moonlight will not interfere with the meteor shower viewing. [17]

Orionids, produced by comet 1P/Halley, is a meteor shower observable from **02 October to 07 November**, producing its peak rate of meteors around **22 October**. The view of the meteor shower may be observed as soon as the constellation Orion, the shower's radiant rises over the horizon around 09:57 p.m. each night. The radiant is highest in the sky at around 4:00 a.m. producing its best display, with up to 15 meteors per hour

[Figure 10]. The value mentioned assumes that the observer is in a clear, dark, moonless sky condition, and the radiant is highest in the sky. The shower will remain active until before sunrise around 05:24 a.m. The presence of the waning gibbous Moon in the constellation Taurus presents a significant interference with the meteor shower observation throughout the night. [18,19]

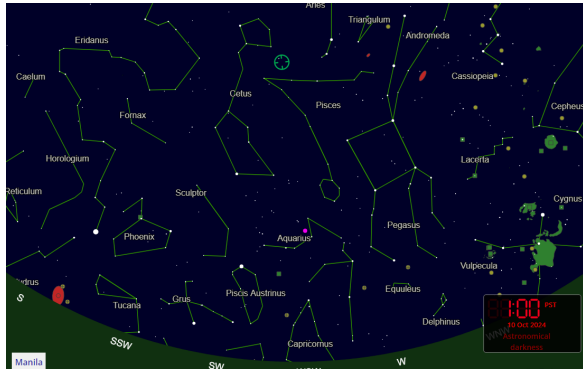


Figure 9: The view of the west southwestern sky during the peak of Southern Taurids on 10 October 2024 at 01:00 a.m. when the shower's radiant is represented by the green solid circle.

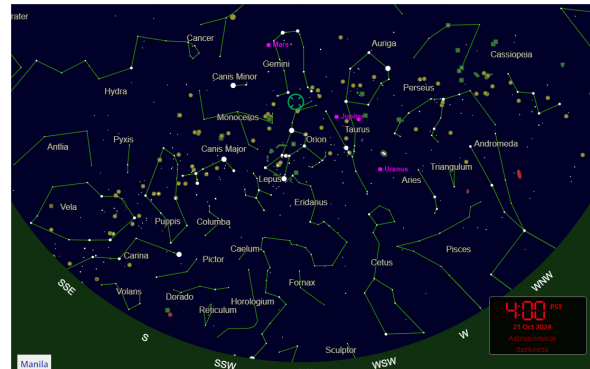


Figure 10: The view of the southwestern sky during the peak of Orionids on 21 October 2024 at 04:00 a.m. when the shower's radiant is represented by the green solid circle.

Meteor showers are observable through the naked eye, and no special equipment such as telescopes or binoculars is needed. Maximize the viewing experience by choosing a dark observation site away from the city lights under clear and moonless sky conditions.

Calendar of Astronomical Events for October 2024

Table 1 shows a summary of the astronomical events for October 2024. All times displayed are in Philippines Standard Time (PhST).

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Original Signed:

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16 September 2024

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