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Space & Astronomy:

1. Interstellar Comet 3I/ATLAS Visible and Photogenic:

Discovery & Visibility: Comet 3I/ATLAS, an interstellar interloper, is currently visible and an ideal target for astrophotographers. It was discovered on July 1, 2025, by the NASA-funded ATLAS survey telescope in Chile, confirming its interstellar origin.

Optimal Viewing: The New Moon phase on July 24, 2025, provides dark skies, perfect for observing faint objects like 3I/ATLAS. It is located in the constellation Ophiuchus, conveniently close to the second-magnitude star Sabik (Eta Ophiuchi).

Observation Details: While around 17th magnitude, a telescope (at least 6 inches, preferably more) is recommended for photographing this ancient comet, possibly the oldest ever seen. It will move southwest of Sabik over the next few nights.

2. Earliest Signs of Planet Formation Captured Around a Young Star (HOPS-315):

Groundbreaking Discovery: Astronomers have, for the first time, captured the very beginning of planet formation around a star other than our Sun. This unprecedented glimpse into the cosmic process was observed around a baby star named HOPS-315, located about 1,300 light-years away in the Orion constellation.

Observatories Utilized: The observations were made using a combination of the Atacama Large Millimeter/submillimeter Array (ALMA) telescope and NASA's James Webb Space Telescope (JWST).

Key Indicator: Scientists detected silicon monoxide (SiO) gas and solid crystalline minerals in the protoplanetary disk surrounding HOPS-315. This indicates that planet-forming materials are condensing from gas into solid particles, marking the earliest observed phase of planet birth outside our solar system. HOPS-315 is a very young protostar, only 100,000 to 200,000 years old.

3. SpaceX Launch of NASA's TRACERS Mission and Sonic Booms:

Mission Launch: SpaceX launched NASA's TRACERS (Tandem Reconnection and Cusp Electrodynamics Reconnaissance Satellites) mission today aboard a Falcon 9 rocket from Vandenberg Space Force Base, California.

Mission Objective: TRACERS will study magnetic reconnection in Earth's atmosphere, caused by the interaction with solar activity, to better understand and prepare for space weather impacts on satellite communications and Earth's atmosphere.

Sonic Booms: Residents in Southern California (Santa Barbara, San Luis Obispo, and Ventura counties) were warned to expect one or more sonic booms approximately eight minutes after launch. These loud, thunder-like sounds are a routine occurrence as the Falcon 9's reusable first stage returns to Earth and lands vertically, breaking the sound barrier.





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4. Overview of Major Space Missions in 2025 (Ongoing and Upcoming):

Artemis III (NASA): This mission remains a centerpiece of the 2025 space calendar, aiming to return humans to the Moon for the first time since Apollo 17 in 1972.

SpaceX Starship Orbital Flights: Several orbital test flights are planned to refine Starship's systems, including orbital refueling, crucial for long-range missions to the Moon and Mars.

Roscosmos Luna-27: Russia's mission aims to explore the Moon's South Pole for potential water ice deposits, with an advanced drilling system and a partnership with ESA for sample analysis and precise landing.

Blue Origin's New Glenn Debut: Scheduled for October 2025, this heavy-lift rocket aims to compete with SpaceX's Falcon Heavy and Starship, featuring a reusable first stage powered by BE-4 engines.

ESA's Hera Mission: This mission will measure the impact crater, analyze the internal structure, and study the overall composition of the asteroid Dimorphos, following the DART impact.

India's Gaganyaan Mission (ISRO): India's first crewed space mission is slated for late 2025, aiming to send astronauts into low Earth orbit, making India the fourth nation to do so.

China's Tiangong Space Station Expansion: Expansion plans are ongoing, with a new module launch in April 2025, aiming to turn Tiangong into a research powerhouse.

NASA's SPHEREx Mission: This ambitious infrared space telescope will create a detailed map of the entire sky, capturing light in 96 spectral bands to explore the history of the universe.

JUICE (ESA): The Jupiter Icy Moons Explorer spacecraft will perform a gravity assist at Venus on August 31, 2025, en route to charting Jupiter's icy moons for potential life.

Recent Lunar Landings/Attempts: Firefly Aerospace's Blue Ghost Mission 1 successfully landed in Mare Crisium on March 2, 2025. Intuitive Machines' IM-2 landed on March 6, 2025, but tipped over. Hakuto-R Mission 2 attempted a lunar landing on June 5, 2025, but crashed.

5. Other Noteworthy Discoveries/Events:

Parker Solar Probe: Continues its perihelion passes, with the 24th on June 19, 2025, and upcoming passes on September 15 and December 12.

Scientists Uncover 15,000 Kilometers of Lost Rivers on Mars: (Reported earlier in July) This discovery provides new insights into Mars's past climate.

China's Tianwen-2 (ZhengHe): Launched on May 28, 2025, for an asteroid sample-return and comet probe mission.

BepiColombo: Performed its sixth gravity assist at Mercury on January 8, 2025.





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1. What makes Comet 3I/ATLAS particularly noteworthy for astronomers and astrophotographers?

- a) It is unusually bright and easily visible to the naked eye.
- b) It is the first comet discovered this year.
- c) It is an interstellar comet, meaning it originated from outside our Solar System.
- d) It is expected to collide with Earth in the near future.

Answer: c) It is an interstellar comet, meaning it originated from outside our Solar System. The headline clearly states, "Comet 3I/ATLAS, an interstellar interloper... confirming its interstellar origin."

2. Which constellation is Comet 3I/ATLAS currently located in, making it convenient for observation?

- a) Ursa Major
- b) Orion
- c) Ophiuchus
- d) Andromeda

Answer: c) Ophiuchus

The text specifies, "It is located in the constellation Ophiuchus, conveniently close to the second-magnitude star Sabik (Eta Ophiuchi)."

3. What groundbreaking discovery was made around the young star HOPS-315?

- a) The detection of a fully formed exoplanet.
- b) The earliest signs of planet formation, including condensing solid particles.
- c) Evidence of intelligent life.
- d) A new type of black hole.

Answer: b) The earliest signs of planet formation, including condensing solid particles.

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The headline states, "Astronomers have, for the first time, captured the very beginning of planet formation around a star other than our Sun... Scientists detected silicon monoxide (SiO) gas and solid crystalline minerals in the protoplanetary disk... This indicates that planet-forming materials are condensing from gas into solid particles..."

4. Which two observatories were used in combination to make the observations of HOPS-315?

- a) Hubble Space Telescope and Chandra X-ray Observatory
- b) Kepler Space Telescope and Spitzer Space Telescope
- c) Atacama Large Millimeter/submillimeter Array (ALMA) and NASA's James Webb Space Telescope (JWST)
- d) Arecibo Observatory and Very Large Array

Answer: c) Atacama Large Millimeter/submillimeter Array (ALMA) and NASA's James Webb Space Telescope (JWST)**
The text explicitly states, "The observations were made using a combination of the Atacama Large Millimeter/submillimeter Array (ALMA) telescope and NASA's James Webb Space Telescope (JWST)."

5. What is the primary objective of NASA's TRACERS mission?

- a) To search for exoplanets.
- b) To study magnetic reconnection in Earth's atmosphere to understand space weather.
- c) To collect samples from an asteroid.
- d) To explore Jupiter's icy moons.

Answer: b) To study magnetic reconnection in Earth's atmosphere to understand space weather.
The mission objective is stated as: "TRACERS will study magnetic reconnection in Earth's

atmosphere, caused by the interaction with solar activity, to better understand and prepare for space weather impacts..."

6. What common phenomenon were residents in Southern California warned to expect after the SpaceX launch of TRACERS?

- a) A bright meteor shower.
- b) Unusual light displays in the night sky.
- c) One or more sonic booms.
- d) An earthquake.

Answer: c) One or more sonic booms.

The news mentions, "Residents in Southern California... were warned to expect one or more sonic booms approximately eight minutes after launch."

7. Which major NASA mission is highlighted as a centerpiece of the 2025 space calendar, aiming to return humans to the Moon?

- a) Europa Clipper
- b) Artemis III
- c) Dragonfly
- d) Lucy

Answer: b) Artemis III

The text states, "Artemis III (NASA): This mission remains a centerpiece of the 2025 space calendar, aiming to return humans to the Moon for the first time since Apollo 17 in 1972."

8. When is India's first crewed space mission, Gaganyaan, slated to launch?

- a) Early 2025
- b) Mid-2025
- c) Late 2025
- d) 2026

Answer: c) Late 2025

The overview of major missions mentions, "India's Gaganyaan Mission (ISRO): India's first crewed space mission is slated for late 2025..." Page | 4





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9. What significant past discovery on Mars, reported earlier in July, provides new insights into the planet's past climate?

- a) Evidence of recent volcanic activity.
- b) Uncovering 15,000 kilometers of lost rivers.
- c) Detection of active microbial life.
- d) Finding large underground oceans.

Answer: b) Uncovering 15,000 kilometers of lost rivers.

Under "Other Noteworthy Discoveries/Events," it states, "Scientists Uncover 15,000 Kilometers of Lost Rivers on Mars: (Reported earlier in July) This discovery provides new insights into Mars's past climate."

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