



NASA's Artemis Program

For Prelims: National Aeronautics and Space Administration (NASA), Artemis I, moon mission, Chandrayaan project, History of Moon Exploration

For Mains: Space Exploration, Moon mission, Sending Human on Moon and Mars

Why in News?

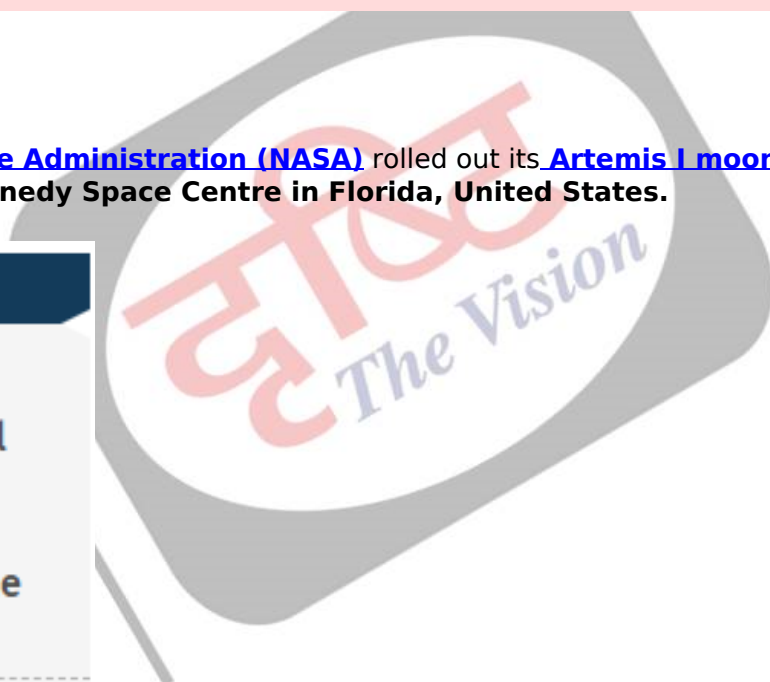
Recently, the [National Aeronautics and Space Administration \(NASA\)](#) rolled out its [Artemis I moon mission](#) to the launchpad for testing at the **Kennedy Space Centre in Florida, United States.**

THE GIST

Artemis I is an uncrewed space mission where the spacecraft will launch on SLS – the most powerful rocket in the world – and travel 2,80,000 miles from the earth for over four to six weeks.

NASA will a gateway in the lunar orbit to aid exploration by robots and astronauts. It is touted as a critical component of NASA's sustainable lunar operations and will serve as a multi-purpose outpost orbiting the moon.

The learnings from the Artemis programme will be utilised to send the first astronauts to Mars.

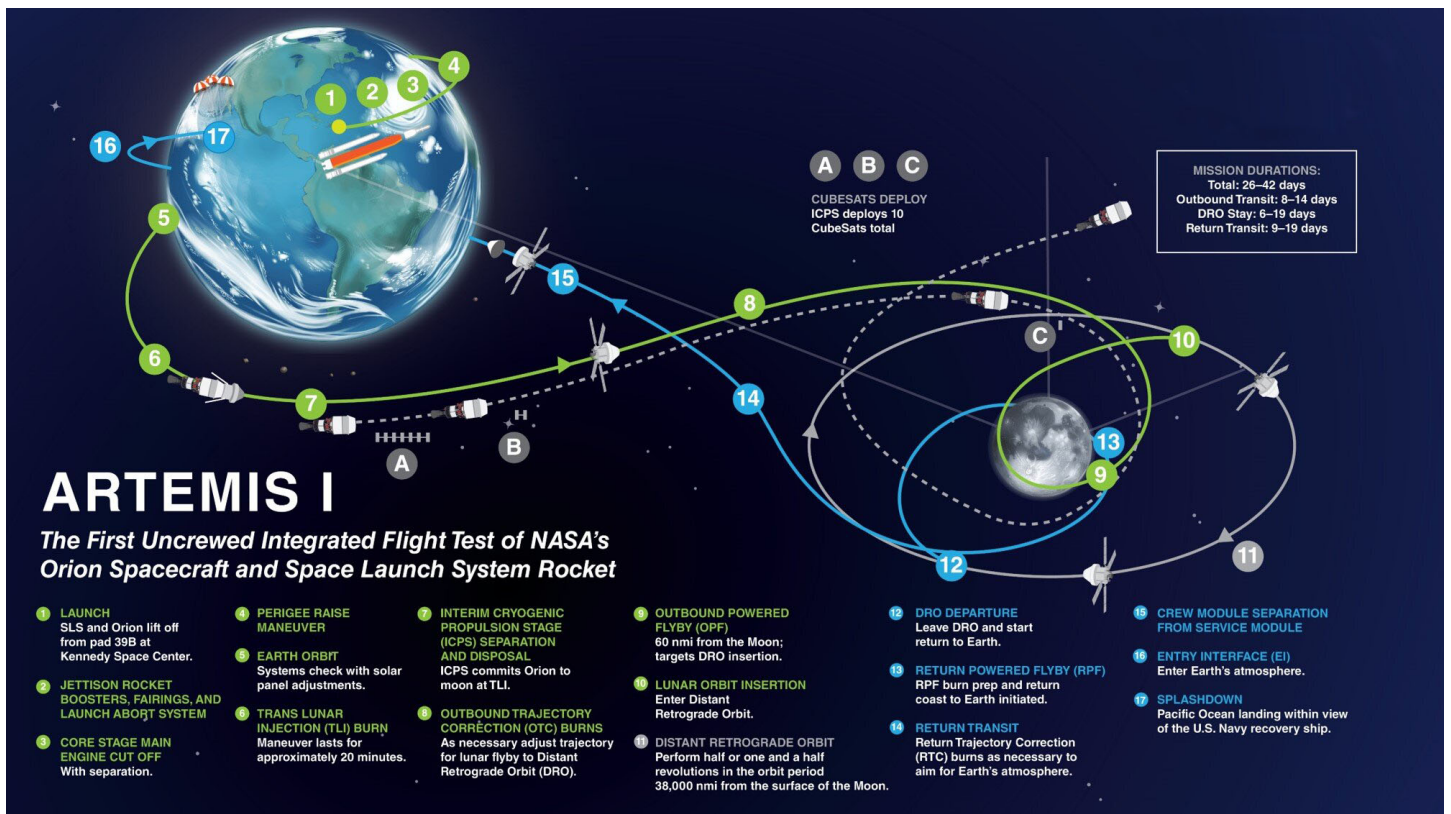


What is Artemis Mission?

- NASA's Artemis mission is touted as the **next generation of lunar exploration**, and is named after the **twin sister of Apollo from Greek mythology**.
 - **Artemis is also the goddess of the moon.**
 - It is the **first in a series of increasingly complex missions** that will enable **human exploration to the Moon and Mars.**
- With the Artemis programme, **NASA aims to land humans on the moon by 2024**, and it also plans to land the **first woman and first person of colour on the moon.**
- NASA will establish an **Artemis Base Camp** on the surface and a **gateway (the lunar outpost around the Moon)** in lunar orbit to aid exploration by robots and astronauts.
 - The gateway is a critical component of **NASA's sustainable lunar operations and will serve as a multi-purpose outpost orbiting the moon.**
- **Other space agencies** are also involved in the Artemis programme.
 - **Canadian Space Agency** has committed to providing **advanced robotics** for the gateway,
 - **The European Space Agency** will provide the International **Habitat and the ESPRIT module**, which will deliver additional communications capabilities among other things.
 - The **Japan Aerospace Exploration Agency** plans to contribute **habitation components and logistics resupply.**

What are Key Points of Artemis I Mission?

- **Artemis I, formerly Exploration Mission-1**, will be the first integrated flight test of NASA's **Deep Space Exploration Systems**:
 - **Orion spacecraft:** Orion spacecraft is going to remain in space without docking to a space station, longer than any ship for astronauts has ever done before.
 - **Space Launch System (SLS) rocket:** It is the most powerful rocket in the world — and travels 2,80,000 miles from the earth for over four to six weeks during the course of the mission.
 - **Newly upgraded Exploration Ground Systems** at Kennedy Space Centre in Cape Canaveral, Florida.
- It is an **uncrewed space mission** where the spacecraft will launch on an SLS rocket.
- The primary operating goal of the mission is to assure a safe crew module entry, descent, splashdown, and recovery.
- **SLS and Orion under Artemis I** will be launched from the Kennedy Space Centre in Florida, U.S. in the summer of 2022.
- The mission will end with the Orion spacecraft's ability to return safely to the earth.



What are the future missions in the Artemis programme?

- The second flight under the programme will **have crew on board and will test Orion's critical systems with humans onboard.**
- Eventually, the learnings from the **Artemis programme will be utilised to send the first astronauts to Mars.**
- NASA plans on using the lunar orbit to gain the necessary experience to extend human exploration of space farther into the solar system.

What is the History of Moon Exploration?

- In 1959, the **Soviet Union's uncrewed Luna 1 and 2** became the first rover to visit the Moon.
- The US began trying to put people in space as early as **1961.**
- Eight years later, on 20th July, 1969, **Neil Armstrong along with Edwin "Buzz" Aldrin became the first human to step on the Moon** as part of the Apollo 11 mission.
 - Before the USA sent the **Apollo 11 mission to the Moon**, it sent three classes of robotic missions between **1961 and 1968.**
- After July 1969, **12 American astronauts walked on the surface of the Moon until 1972.**
- In the 1990s, the USA resumed **lunar exploration with robotic missions Clementine and Lunar Prospector.**
- In 2009, it began a new series of robotic lunar missions with the launch of the **Lunar Reconnaissance Orbiter (LRO) and the Lunar Crater Observation and Sensing Satellite (LCROSS).**
- In 2011, NASA began the ARTEMIS.
- In 2012, the **Gravity Recovery and Interior Laboratory (GRAIL)** spacecraft studied the Moon's gravity.
- Apart from the USA, the European Space Agency, Japan, China, and India have sent missions to explore the Moon.
- China landed two rovers on the surface, which includes the **first-ever landing on the Moon's far side in 2019.**

What are ISRO's Moon Exploration Efforts?

- **Chandrayaan 1:**
 - The [Chandrayaan project](#) began in 2007 with an agreement between **India's space agency ISRO and Russia's ROSCOSMOS for mutual cooperation.**
 - However, the mission was postponed in January 2013 and rescheduled to 2016 as Russia was unable to develop the lander on time.
 - **Findings:** Confirmed presence of lunar water.
 - Evidence of lunar caves formed by an ancient lunar lava flow.
 - Past tectonic activity was found on the lunar surface.
 - The faults and fractures discovered could be features of past interior [tectonic activity](#) coupled with [meteorite](#) impacts.
- [Chandrayaan-2](#) is India's second mission to the moon and comprises a **fully indigenous Orbiter, Lander (Vikram) and Rover (Pragyan).**
 - The Rover Pragyan is housed inside **Vikram lander.**
- The [Indian Space Research Organisation \(ISRO\)](#) recently announced India's third lunar mission [Chandrayaan-3](#), which will comprise a lander and a rover.

UPSC Civil Services Examination, Previous Year Questions (PYQs)

Q. Which of the following pairs is/are correctly matched? (2014)

Spacecraft	Purpose
1. Cassini-Huygens :	Orbiting the Venus and transmitting data to the Earth
2. Messenger :	Mapping and investigating the Mercury
3. Voyager 1 and 2 :	Exploring the outer solar system

Select the correct answer using the code given below:

- (a) 1 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) 1, 2 and 3

Ans: (b)

Q. In the context of space technology, what is "Bhuvan", recently in the news? (2010)

- (a) A mini satellite launched by ISRO for promoting the distance education in India
- (b) The name given to the next Moon Impact Probe, for Chandrayaan-II
- (c) A geoportal of ISRO with 3D imaging capabilities of India
- (d) A space telescope developed by India

Ans: (c)

Q. What is the purpose of the US Space Agency's Themis Mission, which was recently in the news? (2008)

- (a) To study the possibility of life on Mars
- (b) To study the satellites of Saturn
- (c) To study the colourful display of high latitude skies
- (d) To build a space laboratory to study the stellar explosions

Ans: (c)

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