



3rd Indian Space Conclave and India's First Analog Mission

For Prelims: [Indian Space Research Organisation](#), [Chandrayaan-3](#), [Gaganyaan](#), [European Union](#), [New Space India Limited](#), [National Aeronautics and Space Administration](#), Analog Mission

For Mains: [Satellite Communication](#), Space Exploration and Indian Ambitions, Analog Missions and Space Research

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Why in News?

The 3rd **Indian Space Conclave in New Delhi** spotlighted India's expanding space capabilities, with a focus on [Satellite Communication \(Satcom\)](#) and **Indo-European Union Space partnerships**. Key discussions explored Satcom's role in advancing Digital India and India's ambitious space goals.

- In another development, **India's first Mars and Moon analog mission was inaugurated** in Leh, Ladakh, led by [Indian Space Research Organisation \(ISRO\)](#), the mission simulates **extraterrestrial conditions** for space habitat testing.

What are the Key Highlights of the 3rd Indian Space Conclave?

- **Satellite Communication (Satcom):** The Minister of State for Communications and Rural Development, highlighted **Satcom's transformative role in Digital India**.
 - Satcom applications support various sectors such as telecommunications, **disaster management**, agriculture, healthcare, and education, reaching underserved regions.
 - The **SatCom Reform 2022 policy** promotes innovation and public-private partnerships in space technology.
- **India's Rise as a Global Space Leader:** India's achievements, including [Chandrayaan-3](#) and the upcoming [Gaganyaan missions](#), signify its leading role in space exploration .
 - India now serves as a global partner in space, aiming for a robust network that complements terrestrial infrastructure.
- **Indo-EU Space Collaboration:** [European Union](#) ambassador commended India as a dynamic space power, highlighting shared goals in space exploration.
 - Proposed joint initiatives include **Earth observation, training, and space security**.
 - The **2025 EU-India Summit** is expected to further strengthen cooperation in space governance and peaceful use of space.
 - India is set to launch the **EU's Proba-3 satellite**, focused on observing the Sun, marking a milestone in Indo-EU collaboration.
 - This is India's third launch for the EU, following previous **Proba-1 and Proba-2 missions**, strengthening ISRO's reputation as a trusted international partner.
- **Space Startups:** The rise of space-focused startups was acknowledged following the **2020 space sector reforms**, with India now having over 300 space-focused startups contributing to economic growth and innovation.
 - This surge in startups has **curbed brain drain**, attracting Indian talent back from global

agencies like NASA.

- **Ambitions of India's Space Program:** India's long-term objectives highlight the [Gaganyaan human spaceflight mission](#), a [crewed lunar landing by 2040](#), and an [Indian space station by 2035](#). Plans for [space tourism by 2040](#) further highlight India's dedication to innovative and inclusive space exploration.

Space Sector Reforms 2020

- In 2020, India announced **Space Sector Reforms**, a major transformation of the Indian Space Sector with enhanced participation of private players in the Indian space programme and playing key roles to boost India's market share in the Global Space Economy.
 - Setting up of [Indian National Space Promotion and Authorisation Centre \(IN-SPACe\)](#) and enhancing the role [New Space India Limited \(NSIL\)](#) are the two major areas in the reform.
 - **IN-SPACe, an autonomous agency under the Department of Space**, aims to foster industry, academia, and startups, regulate non-governmental space activities, and capture a larger share of the global space economy. Its headquarters are in **Ahmedabad**.
 - **NSIL, headquartered in Bengaluru**, is a wholly owned Government of India company under the [Department of Space \(DOS\)](#), is the **commercial arm of ISRO** responsible for enabling Indian industries to undertake high technology space-related activities and promoting commercial exploitation of the Indian space programme.

Satcom Reforms 2022

- It was introduced by the [Department of Telecommunications \(DoT\)](#), aimed to streamline the **satellite-based communication network** application process and encourage private sector participation.
 - By reducing the processing time from **6-8 months to 6 weeks**, the reforms make it easier for service providers to establish satellite communication systems.
- Reforms aim to enhance [Ease-of-Doing-Business](#) by reducing charges at different stages and boost innovation in the space sector.

What is India's First Mars and Moon Analog Mission?

- **About:** Analog missions are **field tests conducted in locations that resemble extreme space environments**. They are crucial for solving problems related to spaceflight research.
 - India's first Mars and Moon Analog Mission, led by the ISRO in collaboration with AAKA Space Studio, the University of Ladakh, and supported by the [Ladakh Autonomous Hill Development Council](#).
- **Objective:** This mission simulates life in an **interplanetary habitat to tackle challenges of establishing a sustainable base beyond Earth**, supporting India's space ambitions.
 - It focuses on **Mars and Moon habitat conditions**, studying sustainability, life support systems, and psychological well-being in isolation to understand human adaptation to harsh environments.
- **Ladakh, Ideal for Space Testing:** Ladakh was chosen for its unique environmental characteristics that closely mirror those of Mars and the Moon. The region's **high altitude, dry climate, and extreme temperature** fluctuations make it an ideal location for testing space habitat technologies.
 - With temperatures ranging from **15°C to -10°C**, the mission simulates the thermal challenges of extraterrestrial environments.
 - Additionally, the oxygen levels in Ladakh are only **40% of those at sea level**, providing a perfect opportunity to test life support systems designed for low-pressure conditions similar to those on Mars.
 - The region's rocky, sandy soil also resembles **Martian and lunar regolith**, making it ideal

for research on rover mobility and in-situ resource utilisation.

- **Technological Testing:** Researchers will test advanced technologies to support space habitats, including:
 - **Circadian Lighting:** Simulates daylight cycles to maintain sleep patterns and well-being.
 - **Hydroponics:** A system for sustainable food growth in space, ensuring astronaut nutrition.
 - **Standalone Solar Power System:** Provides [renewable energy](#) for habitat independence.
- **Significance of Analog Mission:** It helps scientists observe the **physical, mental, and operational conditions** of space while remaining on Earth.
 - Analog missions prepare astronauts for near-term and future exploration to asteroids, Mars, and the Moon.

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Quest for Glory

Ladakh's rugged landscape offers an excellent venue, simulating extravehicular activities and low-gravity operations

The mission will simulate extreme conditions of extraterrestrial environments

It will also help devising future missions such as the Bharatiya Antariksh Station

The research will provide critical insights for ensuring the safety and performance of astronauts during long-duration spaceflight

The findings will directly support India's Gaganyaan mission, slated to send Indian astronauts into space by 2026

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Analog Missions Worldwide

- **Desert Research and Technology Studies (Desert RATS):** Led by [National Aeronautics and Space Administration \(NASA\)](#), it is primarily conducted in the deserts of Arizona, USA.
 - Desert RATS is a field campaign that tests mission rover and extravehicular activity in challenging environments to simulate conditions on the Moon and Mars.
- **NASA Extreme Environment Mission Operations (NEEMO):** Astronauts live in Aquarius, the world's only undersea research station.
- **Hawai'i Space Exploration Analog and Simulation (HI-SEAS):** It is a Mars and Moon exploration analog research station, currently operated by the International MoonBase Alliance(IMA).
 - The IMA is a non-profit organisation that gathers leading scientists, educators, and entrepreneurs to promote lunar exploration.

Drishti Mains Question:

How does India's Mars and Moon analog mission contribute to the country's space exploration goals?

UPSC Civil Services Examination, Previous Year Question (PYQ)

Prelims

Q. Consider the following statements: (2016)

The Mangalyaan launched by ISRO

1. is also called the Mars Orbiter Mission
2. made India the second country to have a spacecraft orbit the Mars after USA
3. made India the only country to be successful in making its spacecraft orbit the Mars in its very first attempt

Which of the statements given above is/are correct?

(a) 1 only

(b) 2 and 3 only

(c) 1 and 3 only

(d) 1, 2 and 3

Ans: (c)

Mains

Q.1 What is India's plan to have its own space station and how will it benefit our space programme? **(2019)**

Q.3 What is the main task of India's third moon mission which could not be achieved in its earlier mission? List the countries that have achieved this task. Introduce the subsystems in the spacecraft launched and explain the role of the 'Virtual Launch Control Centre' at the Vikram Sarabhai Space Centre which contributed to the successful launch from Sriharikota. **(2023)**