



# ISRO Space Analog Mission 'HOPE'

[Source: ISRO](#)

## Why in News?

[Indian Space Research Organisation \(ISRO\)](#) has inaugurated the **Himalayan Outpost for Planetary Exploration (HOPE)** space analog mission at [Tso Kar Valley](#) (Ladakh) to simulate and study challenges linked to **long-duration space missions**.

## What is the HOPE Mission?

- **About:** It is part of **ISRO's Indian Human Spaceflight Programme**, aimed at **simulating space-like conditions** to test technologies and human health protocols for future **interplanetary missions**, particularly those involving the **Moon and Mars**.
- **Objective:** To study critical **physiological, psychological, and operational challenges** and improve **mission planning** and **preparedness** for **human space exploration** in human spaceflight.
  - It focuses on **epigenetic, genomic analysis, health monitoring protocols, and microbial sample techniques**.
- **Site Selection:** **Tso Kar Valley, Ladakh** was selected for its **Mars-like environment**-high **UV radiation**, low **air pressure**, salty frozen ground, and cold temperatures (15°C to -10°C).
  - Oxygen levels are only **40% of sea level**, and the rocky, sandy soil resembles **Martian soil**.
  - It enables **testing of life support systems, habitat technology, and rover movement**, while supporting research on using **In-situ resource utilization (ISRU)** and **astrobiology**.
- **Significance:** The mission plays a crucial role in preparing for future crewed missions to [Low Earth Orbit \(LEO\)](#) including [Gaganyaan](#), and an **Indian lunar landing by 2040**.
  - It generates **vital data**, strengthens **technological readiness** and **health protocols**, and promotes **Atmanirbhar** space research through **public-private-academic collaboration**.

### Note:

- **Tso Kar Wetland Complex** in **Ladakh** is a [Ramsar site](#), a conservation status conferred by [International Ramsar Convention on Wetlands](#).

## Earlier Analog Missions in Space Research

- **India:**
  - **Ladakh Human Analog Mission (LHAM), Leh (2024):** [ISRO's first Mars and Moon analog mission](#) began to test **space habitat technologies** under simulated space conditions.
  - **Anugami (July 2025):** A 10-day analog experiment under **Gaganyaan Analog Experiment (GANEX)** to advance **human spaceflight readiness**.
- **Worldwide**

- **Desert RATS (NASA)**: Conducted in Arizona deserts to test **rovers** and **extravehicular activity (EVA)** for Moon and Mars missions.
- **NEEMO (NASA)**: Astronauts live in **Aquarius**, the world's only **undersea research station**, simulating space mission conditions.
- **HI-SEAS**: A **Mars and Moon analog station** in Hawai'i, run by the **International MoonBase Alliance (IMA)** to support **lunar exploration** and research.

## UPSC Civil Services Examination, Previous Year Question (PYQ)

### Prelims

**Q. Consider the following statements: (2016)**

1. The Mangalyaan launched by ISRO
2. is also called the Mars Orbiter Mission
3. made India the second country to have a spacecraft orbit the Mars after USA
4. 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)**