



ISRO Tests Model Rocket in UP

Why in News?

The **Astronautical Society of India (ASI)**, in collaboration with [InSPACe \(Indian National Space Promotion and Authorisation Centre\)](#) and [Indian Space Research Organisation \(ISRO\)](#), successfully conducted rocket launch trials in preparation for a student model rocketry competition set for October 2025.

Key Points

- **Astronautical Society of India (ASI):** The **ASI** was **established in 1990** to promote the growth and development of astronautics in India.
 - It actively supports the interests of developing countries in astronautics through its role in the [International Astronautical Federation \(IAF\)](#), **Paris**, where it serves as a voting member.
- **Student Model Rocketry Competition:** The upcoming IN-SPACE CANSAT and Model Rocketry India Student Competition 2024-25 in Kushinagar offers undergraduates hands-on experience in designing, building, and launching **CANSATs** and model rockets to explore space technology.
 - CANSATs are **miniature satellites that fit inside a soft drink can**. These payloads are launched to a few hundred meters using sounding rockets and descend with parachutes.

Indian National Space Promotion and Authorisation Centre (IN-SPACE)

- **About:** IN-SPACE is a single-window, independent, nodal agency that functions as an autonomous agency in the Department of Space (DOS).
 - It was formed following the space sector reforms in 2020 to enable and facilitate the participation of private players.
- **Key Functions:** IN-SPACE promotes, authorizes, and supervises space activities of non-governmental entities, including building launch vehicles, providing space services, sharing ISRO's infrastructure, and establishing new space facilities.
 - IN-SPACE serves as the interface between ISRO and NGEs, helping streamline private sector engagement in space missions.

Indian Space Research Organisation (ISRO)

- **About:** ISRO, headquartered in Bengaluru, Karnataka, operates under the Department of Space, is India's national space agency focused on advancing space science and technology for national and global benefit.
- **Historical Background:** ISRO **evolved from the Indian National Committee for Space Research (INCOSPAR), established in 1962** under the vision of [Dr. Vikram Sarabhai](#).
 - In **1969, ISRO was formally created**, replacing INCOSPAR and expanding its role in space technology. In 1972, the Department of Space was set up, and ISRO was brought under its administrative control.
- **Core Objectives:** ISRO/DoS aims to develop and apply space technology to meet various national needs, including:
 - Communication and broadcasting

- Meteorological services
- Resource monitoring and management
- Navigation and positioning systems
- **Major Achievements:** ISRO has built key space systems in India for **television, weather forecasting**, and **satellite-based resource mapping**.
 - It has developed indigenous launch vehicles like the **Polar Satellite Launch Vehicle (PSLV)** and **Geosynchronous Satellite Launch Vehicle (GSLV)** to place satellites into desired orbits.

ISRO LAUNCH VEHICLES

BACKGROUND

- First rocket developed by ISRO - SLV (Satellite Launch Vehicle)
- Successor of SLV - Augmented Satellite Launch Vehicle (ASLV)

Polar Satellite Launch Vehicle (PSLV)

- About**
 - The **Workhorse of ISRO**
 - 3rd gen, 4-Stage launch vehicle (1st, 3rd stages - solid fuel; 2nd, 4th stages - liquid fuel)
- Capacity**
 - Delivers **earth-observation/remote-sensing satellites**
 - Used to launch satellites of lower mass (~1400 Kg)
- 4 Variants:**
 - PSLV-CA • PSLV-QL • PSLV-DL • PSLV-XL
- Launches Satellites in**
 - Low inclination LEO • Sub-GTO • GTO
- Important Launches**
 - First successful launch - October 1994
 - Chandrayaan-1 (2008)
 - Mars Orbiter Spacecraft (2013)



PSLV is 1st Indian launch vehicle to be equipped with liquid stages

Geosynchronous Satellite Launch Vehicle (GSLV)

- About**
 - 4th Gen, 3-staged launched vehicle
 - Much more powerful rocket, carries satellites much deeper into space
 - Has an **indigenous Cryogenic Upper Stage**
- Capacity**
 - Delivers **communication-satellites**
 - Carries heavier satellites (~2200 kg to GTO)
 - Carries 10,000-kg satellites to LEO
- Launches Satellites in**
 - Primarily Geosynchronous Transfer Orbit (GTO) (~36000 Km altitude)
- Important Launches:**
 - Chandrayaan-2 • Upcoming Gaganyaan



Launch Vehicle Mark-III

- About**
 - Aka **GSLV Mk-III**
 - 3-stage launch vehicle (2 solid propellant and 1 core stage comprising liquid and cryogenic stages)
- Capacity**
 - 4,000-kg of satellites into **GTO**
 - 8,000 kg of payloads into LEO
- Launches Satellites in**
 - GTO • Medium Earth orbit (MEO)
 - LEO • Missions to moon, sun



Mk-III versions have made ISRO entirely self-sufficient in launching its satellites

Small Satellite Launch Vehicle (SSLV)

- About**
 - Developed specifically for **small and micro-satellites**
- Capacity**
 - Satellites up to 500 kg
- Launch Limit**
 - 500 km planar orbit (LEO) from Satish Dhawan Space Centre





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