

## SMALL SATELLITE LAUNCH VEHICLE – SCIENCE & TECHNOLOGY

NEWS: **Hindustan Aeronautics Limited (HAL)** was announced as the winner of a key bid to commercialise and manufacture **ISRO's Small Satellite Launch Vehicle (SSLV)** after **technology transfer**.

### WHAT'S IN THE NEWS?

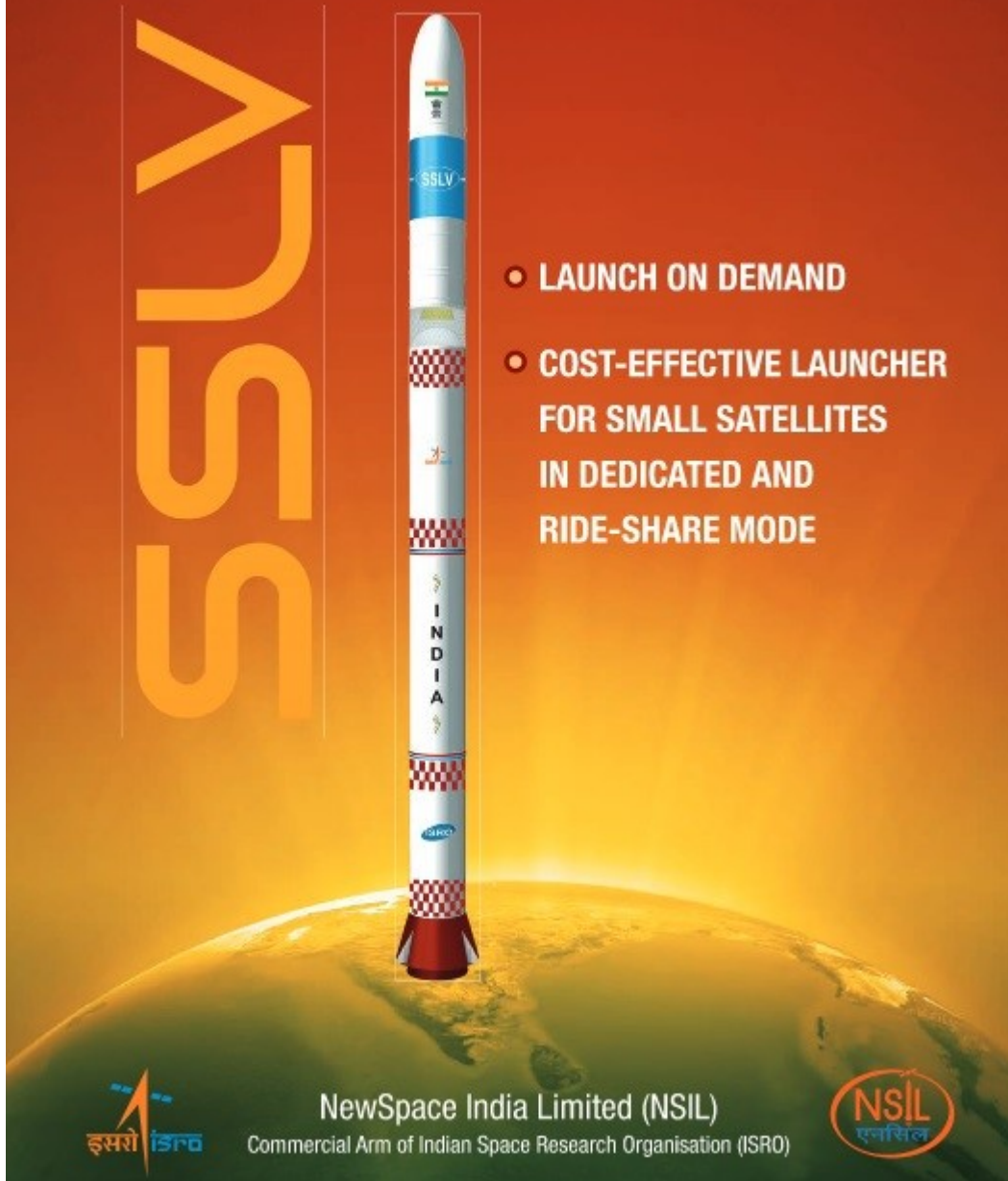
#### SSLV

- **SSLV (Small Satellite Launch Vehicle)** is a three-stage **solid propulsion rocket** developed by ISRO, specifically designed for launching small and nano satellites into Low Earth Orbit (LEO).
- It has successfully completed **three development flights**, demonstrating its reliability and opening doors for commercial adoption.
- SSLV is built for **rapid assembly, cost-effectiveness, and minimal ground infrastructure**, making it ideal for **on-demand and flexible launches**.
- It has a payload capacity of **up to 500 kg to LEO** and supports **multiple satellite deployments** in a single mission.

#### ISRO–HAL Partnership on SSLV

- Over the next two years, **ISRO will transfer SSLV technology** and mentor **Hindustan Aeronautics Limited (HAL)** for independent production.
- HAL is tasked with building **two SSLVs end-to-end**, mirroring the original development process followed by ISRO.
- From **post-2027**, HAL will gain **complete autonomy to design, manufacture, and market SSLVs** globally, transitioning India's space sector from state-led to enterprise-driven.

# Small Satellite Launch Vehicle



## Strategic Importance of SSLV for India

### a. Commercialisation of Space Technology

- The SSLV program marks a shift where ISRO becomes a **facilitator of private commercial launches**, rather than the sole operator.
- Unlike the **PSLV consortium model**, HAL will act as a **full-service launch provider**, handling end-to-end operations and sales.

### b. Boost to Atmanirbhar Bharat in Space

- SSLV enhances India's **indigenous capability** to provide small satellite launches without foreign dependence.
- It supports India's ambition to be a **global low-cost launch hub**, catering especially to small satellite constellations and commercial clients.

### c. Strengthening the Private Ecosystem

- The SSLV initiative aligns with broader reforms led by **IN-SPACe and NSIL**, enabling **private R&D, manufacturing, and launch services**.
- It complements **industrial clusters in Tamil Nadu**, especially around the **Kulasekharapatnam spaceport**, boosting regional development.

### Economic Significance of India's Space Sector

- India's space economy is currently valued at approximately **USD 8.4 billion**, accounting for about **2% of the global space market**.
- The government envisions expanding this to **USD 44 billion by 2033**, including **USD 11 billion in space-related exports**, targeting **7–8% global market share**.
- SSLV and related commercial ventures will be instrumental in achieving this goal by tapping into the growing demand for **LEO satellite launches**.

### Advancing India's Scientific and Technological Capabilities

- SSLV and related developments contribute to India's growing capabilities in **deep space missions, planetary science, and high-tech satellite technologies**.
- Missions like **Chandrayaan-4, Venus Orbiter**, and **Bharatiya Antariksh Station (BAS)** reflect this long-term vision.
- Collaboration with global partners (e.g. **NISAR with NASA**) boosts scientific exchange and strengthens India's reputation as a reliable space player.

### Enhancing India's Global Standing

- SSLV positions India as a **trusted, low-cost launch partner** for global satellite deployment and **Earth observation missions**.
- India's growing capabilities in **disaster monitoring, space diplomacy, and governance** will amplify its influence in international space forums.
- Hosting foreign clients, start-ups, and enabling access to space infrastructure promotes India as a **democratic and inclusive space power**.

### Vision 2047: India's Roadmap to a Developed Spacefaring Nation

#### a. Major Milestones Targeted

- **2028**: Launch of the first module of the **Bharatiya Antariksh Station (BAS)**.
- **2035**: Full operationalisation of the Indian space station.
- **2040**: Planned **Indian human mission to the Moon**.

#### b. Flagship Missions and Technologies

- **Gaganyaan follow-on missions** to build sustainable human spaceflight capabilities.
- **Chandrayaan-4 (2027)**: A sample return mission from the Moon.
- **Venus Orbiter Mission (2028)**: To study Venus' atmosphere, surface, and solar interactions.

- **Next-Generation Launch Vehicle (NGLV):** A reusable, low-cost vehicle targeted for deployment by **2032**.

## **Space Sector Reforms and Institutional Support**

### **a. Clear Role Division**

- **ISRO:** Focused on research, advanced missions, and space science.
- **NSIL:** Responsible for the **commercial use of ISRO's technologies** and services.
- **IN-SPACe:** Acts as a **facilitator and regulator** for private sector participation across the space ecosystem.

### **b. Indian Space Policy, 2023**

- Provides a **comprehensive policy framework** for private sector participation across the entire value chain.
- Ensures **level playing field** for start-ups, MSMEs, and research institutions.

## **Reformed FDI Policy in the Space Sector (2024)**

- **Up to 100% FDI under automatic route:**
  - For **manufacturing of satellite components and subsystems**, including ground and user segments.
- **Up to 74% FDI under automatic route:**
  - For **satellite manufacturing and operations**, including satellite data and user interfaces.
- **Up to 49% FDI under automatic route:**
  - For **launch vehicles, spaceports, and associated systems**.
  - Beyond these thresholds, FDI requires **government approval**.

## **Start-up Support and Innovation Financing**

- A dedicated **₹1,000 crore Venture Capital Fund** has been announced to support **space start-ups** over the next five years.
- The fund, managed by **IN-SPACe**, aims to support:
  - **Prototype development**
  - **Early-stage R&D**
  - **Commercialisation of innovative technologies**

Source: <https://indianexpress.com/article/india/hal-bid-manufacture-small-satellite-launch-vehicles-10078575/>