



Small Satellite Launch Vehicle

For Prelims: Types of Launch Vehicles, Types of Orbits.

For Mains: Significance of small launch vehicles in India's space sector.

Why in News

Recently, the [Indian Space Research Organisation \(ISRO\) chairman](#) has mentioned the launch of an "SSLV-D1 Micro SAT in April 2022".

- The **SSLV (Small Satellite Launch Vehicle)** aims to cater to the market for the launch of small satellites into [Earth's low orbits](#) that has emerged in recent years to cater to the needs of developing countries, universities for small satellites, and private corporations.

Key Points

- **About:**
 - It is the **smallest vehicle weighing only 110-tonne**. It will take only 72 hours to integrate, unlike the 70 days taken now for a launch vehicle.
 - It can **carry satellites weighing up to 500 kg** to a low earth orbit while the tried and tested [Polar Satellite Launch Vehicle \(PSLV\)](#) can launch satellites weighing in the range of 1000 kg.
 - SSLV is a **three-stage all solid vehicle** and has a capability to launch up to 500 kg satellite mass into 500 km Low Earth Orbit (LEO) and 300 kg to Sun Synchronous Orbit (SSO).
 - It is **perfectly suited for launching multiple microsatellites** at a time and supports multiple orbital drop-offs.
 - The key features of SSLV are **low cost, with low turn-around time, flexibility in accommodating multiple satellites, launch on demand feasibility**, minimal launch infrastructure requirements, etc.
 - The Government has sanctioned a total cost of **Rs. 169 Crores for the development project** including the development & qualification of the vehicle systems and the flight demonstration through three development flights (SSLV-D1, SSLV-D2 & SSLV-D3).
 - **ISRO's new chairman Dr Somanath is credited with designing and developing the SSLV** during his tenure as director of the Vikram Sarabhai Space Centre in Thiruvananthapuram since 2018.
 - The maiden flight of the SSLV was scheduled to launch in July 2019 but that has since been delayed due to setbacks from Covid-19 and other issues.
- **Significance of SSLV:**
 - The development and manufacture of the SSLV are **expected to create greater synergy between the space sector and private Indian industries** – a key aim of the space ministry.
 - Indian industry has a consortium for the production of PSLV and should come together to produce the SSLV as well once it is tested.

- One of the mandates of the newly-created ISRO commercial arm, **New Space India Limited (NSIL)** is to **mass-produce and manufacture the SSLV and the more powerful PSLV** in partnership with the private sector in India through technology transfers.
 - Its aim is to **use research and development carried out by ISRO** over the years for commercial purposes through Indian industry partners.
- Small satellite launches have **so far depended on 'piggy-back' rides with big satellite launches on the Polar Satellite Launch Vehicle (PSLV)** — ISRO's work-horse with more than 50 successful launches. As a result, small satellite launches have relied on ISRO finalising launch contracts for larger satellites.



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Indian Space Research Organisation (ISRO) over the years has successfully realized five generation of launch vehicles viz. SLV-3, ASLV, PSLV, GSLV and GSLV MkIII to cater to national developmental needs. This has enabled ISRO to develop and master critical technologies related to solid, liquid and cryogenic propulsion systems in addition to Navigation, Guidance, Control and Mission Design aspects of launch vehicles.

To cater to emerging global small satellite launch services market, ISRO has taken up the development of Small Satellite Launch Vehicle (SSLV), which is an all solid three stage vehicle, with a capability to launch on demand.

LAUNCH SERVICES BY NSIL

NewSpace India Limited (NSIL) a Govt. of India company under Department of Space and the Commercial Arm of Indian Space Research Organisation (ISRO), will be the sole nodal agency responsible for providing end-to-end **SSLV** Launch services for the customer satellites starting from contractual, technical, programmatic, launch campaign, launch and post launch activities.

SSLV will commence its commercial Small Satellite Launch Service Operations from early 2020 onwards.

SALIENT FEATURES

- Launch on demand
- Lower per kg launch cost
- Reduced turnaround time
- Increased production rate from industries
- Multiple satellite mounting options for Nano, Micro and Small satellites

Capability to launch 6 to 8 mission per year

SSLV LAUNCH CAPABILITY IN 500 KM CIRCULAR ORBIT

- LEO : 500 kg
- SSO : 300 kg

Source: IE

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