

ISRO Completes SSLV Development with Successful Launch of SSLV-D3

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- What is Small Satellite Launch Vehicle (SSLV)?
- SSLV development is complete

Why in News?

The Indian Space Research Organisation (ISRO) successfully launched the third and final developmental flight of the Small Satellite Launch Vehicle (SSLV) from the Satish Dhawan Space Centre in Sriharikota.

The SSLV-D3 placed the Earth observation satellite EOS-08 precisely into orbit. This also marks the completion of ISRO/Department of Space's SSLV Development Project.

NewSpace India Limited (NSIL), ISRO's commercial arm, and India's private space industry can now produce SSLVs for commercial missions.

What is Small Satellite Launch Vehicle (SSLV)?

• About

- SSLV is the new small satellite launch vehicle developed by ISRO to cater for the launch of small satellites.
- It has a three-stage launch vehicle, having a lift-off weight of about 120 tonnes and is 34 metres in length and 2 metres in diameter.
- It is a 3 stage Launch Vehicle configured with three Solid Propulsion Stages and liquid propulsion-based Velocity Trimming Module (VTM) as a terminal stage.
- VTM is the last liquid-propellant based stage of the rocket which is used to correct the velocity just before injecting the satellites into orbit.

• Uses

- The SSLV missions are useful to launch small-sized satellites weighing anywhere between 10 to 500kg into the Low Earth Orbit.
- Going by their size and weight, these are typically referred to as mini, micro or nano satellites.
- They are low on cost and intended satellite insertion into orbits takes a shorter flight time.
- SSLV are best suited for commercial and on-demand launches.
- Previously, satellite projects built by college students and private players involved in the space sector have benefitted from SSLV missions.

• India's journey towards SSLV

- The first SSLV mission — SSLV-D1 — carrying two satellites, including EOS-02 and AzaadiSat, in August 2022, was a failure.
- The insertion of the two satellites after their separation took place into a 356 km circular orbit instead of the intended elliptical orbit.
 - In its second attempt with the **SSLV-D2** in February 2023, ISRO tasted success.
- The rocket inserted three satellites onboard into the intended 450 km circular orbit following a 15-minute flight.
 - SSLV-D3 has been launched recently.

• Significance

- **Seamless launch of small satellites**
 - The launch of small satellites has until now been dependent on 'piggy-back' rides with big satellite launches on ISRO's PSLV.
 - Against this backdrop, the SSLV is intended to cater to a market for the launch of small satellites into low earth orbits.
- **Suited for launching multiple microsatellites**
 - SSLV is perfectly suited for launching multiple microsatellites at a time and supports multiple orbital drop-offs.
 - The new launch vehicle has been designed keeping in mind commercial launches of small satellites with a quick turn-around time for the missions.
- **Shift the burden from PSLV**
 - SSLV will shift the burden of commercial launches from Polar Satellite Launch Vehicles (PSLV).

- The SSLV is likely to cost a fourth of the current PSLV.

SSLV development is complete

• About the News

- **ISRO** successfully completed the third and final developmental flight of its SSLV, marking the vehicle's readiness for commercial launches and opening the door for industry-led manufacturing through technology transfer.
- The SSLV-D3 mission was launched from Satish Dhawan Space Centre in Sriharikota.
- The mission placed two satellites—EOS-08, an earth observation satellite, and SR-0 Demosat—into a 475 km circular low-earth orbit.

• Manufacturing and launch of SSLV for commercial purposes

- ISRO is exploring two routes for the commercial launch of this vehicle.
- One is through NSIL, which will fund and realise the rockets required for commercial purposes, and the other is through technology transfer, which InSpace will handle.

• Payloads on SSLV-D3

- ISRO's EOS-08, the primary payload of the SSLV-D3 mission, is a 175-kg experimental satellite equipped with three new technologies.
- The **Electro-Optical Infrared Payload (EOIR)** captures day and night images in mid-wave and long-wave infrared for various applications like surveillance, disaster and environmental monitoring, and fire detection.
- The **Global Navigation Satellite System-Reflectometry (GNSS-R)** payload demonstrates the use of reflected GPS signals for ocean wind analysis, soil moisture assessment, and flood detection.
- Additionally, the **SiC UV Dosimeter payload** will study UV radiation exposure on the crew module, aiding the Gaganyaan mission preparations.

• Second spaceport in Kulasekarapattinam

- Second rocket launchport of the ISRO is being developed at Kulasekarapattinam in coastal Tamil Nadu's Thoothukudi district.
- This will be extensively and exclusively used for commercial, on-demand, and small satellite launches in the future.
- The existing Sriharikota spaceport will handle launches to orbits that require the rocket to fly eastwards.

Q.1. What is Low Earth Orbit (LEO)?

Low Earth Orbit (LEO) refers to an orbit around Earth at an altitude between 160 to 2,000 kilometers (100 to 1,200 miles). Satellites in LEO travel rapidly, completing an orbit in about 90 minutes. This orbit is ideal for communications, Earth observation, and scientific research due to its proximity.

Q.2. What is InSpace?

InSpace (Indian National Space Promotion and Authorization Center) is a regulatory body established by the Indian government to promote, authorize, and oversee private sector activities in space. It facilitates private participation in space missions, fosters innovation, and ensures compliance with regulations, aiming to boost India's commercial space industry.

Source: [After launch success, ISRO says SSLV development is complete | Vikram Sarabhai Space Centre | Times of India](#)

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