

ISRO successfully launches SSLV's second developmental flight

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Context- The Indian Space Research Organisation (ISRO) has successfully launched its second developmental flight of a Small Satellite Launch Vehicle i.e. SSLV-D2 also placed three satellites in its precise orbit.

Key Highlights

- The three satellites are Earth Observation Satellites of ISRO and those are EOS 07, Janus-1 of U.S.-based firm Antaris and AzaadiSAT-2 of Chennai-based space start-up SpaceKidz.
- SSLV-D2 lifted off from the first launch pad at Satish Dhawan Space Centre-SHAR, Sriharikota as the first satellite launch in 2023.
- The launch vehicle injected satellites into close to 450 km circular orbit at an inclination of 37.2 degrees.
- The tracking network took control of the EOS-07 satellite and the Deployment of the solar panels and the generation of power was also confirmed.
- In its second attempt SSLV-D2 has placed the EOS-07 satellite in its intended orbit accurately.
- The two other satellites i.e. Janus-1 and AzaadiSAT-2 were also placed in the required orbit.
- SSLV had its maiden flight SSLV-D1 and it had a narrow miss of placing the satellite in the orbit due to a shortfall in velocity.
- The first developmental flight of SSLV by ISRO lifted off from Satish Dhawan Space

Centre on August 7, 2022, and ended up to be a partial failure, as the rocket failed to inject its satellite payload in their intended orbits.

- According to ISRO, the spacecraft was injected into a highly elliptical unstable orbit because of a shortfall in velocity, leading to their decay and deorbiting immediately, in spite of the normal performance of all solid propulsion stages.
- Subsequent detailed analysis of the flight events and observations ranging from the countdown, lift-off, propulsion performance, stage separations and satellite injection revealed that there was a vibration disturbance for a short duration on the Equipment Bay (EB) deck in the second stage (SS2) separation.
- It affected the **Inertial Navigation System (INS)**, resulting in declaring the sensors faulty by the logic in **Fault Detection and Isolation (FDI)** software.

SSLV-D2

- EOS-07 satellite is a 156.3 kg satellite designed, developed and realized by ISRO.
- The objective of the mission is to design and develop payload instruments compatible with microsatellite buses and new technologies that are required for future operational satellites.
- Moreover, it will design and develop a microsatellite accommodating certain new technology payloads in a quick turn-around time.
- The new experiments include mm-Wave Humidity Sounder as well as Spectrum Monitoring Payload.
- Weighing about 10.2 kg, Janus-1 is a technology demonstrator, smart satellite mission that is based on the Antaris software platform.
- Weighing about 8.7 kg satellite AzaadiSAT-2 is a combined effort of around 750 girl students across India guided by Space Kidz India, Chennai.
- As per the details provided by ISRO, SSLV caters to the launch of up to 500 kg satellites to Low Earth Orbits on a “launch-on-demand” basis.
- This provides low-cost access to space, offers low turn-around time and also flexibility in accommodating several satellites, and demands minimal launch infrastructure.
- It is further configured with three solid propulsion stages and a velocity terminal module.
- This is a 34 m tall, 2 m diameter vehicle having a lift-off mass of 120 tonnes.