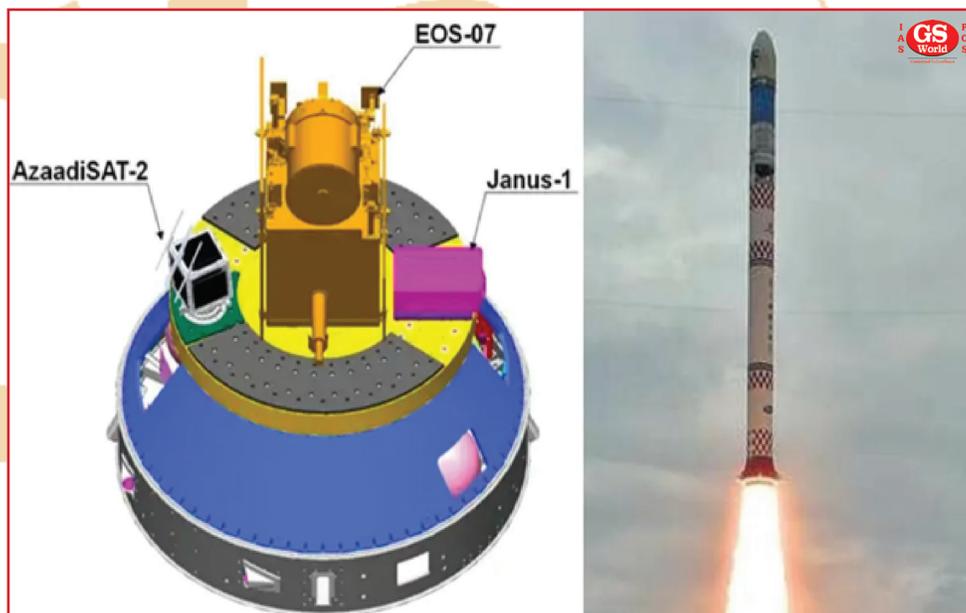


SSLV-D2: ISRO Launches Smallest Rocket

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(Science & Technology)

India's space programme received a major boost on Friday when the ISRO's Small Satellite Vehicle (SSLV-D2) lifted off from the Satish Dhawan Space Centre at Sriharikota on Friday. Last August the rocket's maiden flight was a partial failure because it could not place the satellites it was carrying in their intended orbits. The glitch has been rectified. The three passengers on the rocket's successful foray are testimony to the global space economy's scope and potential.



This Rocket Will Carry Three Satellites With It

An 8 kg satellite developed by 750 government school girls from all over the country shared space with another small payload created by an American software company and a conventional earth observation satellite, weighing about 150 kg, developed by the ISRO.

The first test flight had failed

The first test flight of SSLV failed on August 9 last year. According to ISRO, investigation into the failure revealed that there was a vibration disturbance for a short duration on the Equipment Bay (EB) deck during the separation of the second stage. The vibrations affected the Inertial Navigation System (INS), which resulted in sensor malfunction of the Fault Detection and Isolation (FDI) software, resulting in mission failure as expected.

Opportunities in the Space Industry

Space industry observers believe that the sector is poised for a three-fold expansion in the next two decades, propelled by the miniaturisation of satellites and the growing presence of a range of private players. Small satellites have utility in fields as diverse as education, defence, earth sciences, emergency-related data services and smart power grids. In most parts of the world, these satellites hitch onto conventional rockets.

With its PSLV (polar satellite launch vehicle), ISRO carved a niche for itself in the traditional launch segment. But in its 44-year history, the space research agency has averaged less than five launches a year. Today's data-driven world requires more frequent rocket launches. Private players, especially in China and the US, are stepping up to this challenge. Elon Musk's SpaceX, for instance, launched an orbital mission once every six days last year. Such rockets can be assembled, on-demand, at a fraction of the cost of conventional satellites in three to four days; the turnaround time for the PSLV, in contrast, is at least a month.

Private sector plans to operate SSLV Technology

The ISRO plans to transfer the SSLV technology to private players. In 2020, the government set up the Indian National Space Promotion and Authorisation Centre (IN-SPACe) to enhance the diffusion of ISRO's research. The launch of India's

Small Satellite Launch Vehicle (SSLV-D2)

- The SSLV-D2 rocket can place satellites up to 500 kg in low earth orbit on a 'launch-on-demand' basis. This rocket makes it easy to access satellites in low earth orbit at a low cost. It is distinguished by its low turn-around time and minimal launch infrastructure.
- The rocket is configured with three solid propulsion stages and a velocity terminal module. Its weight is about 119 tonnes. SSLV-D2 (SSLV-D2) has a length of 34 meters while its diameter is 2 meters.

What is a Small Satellite Launch Vehicle?

- The Small Satellite Launch Vehicle (SSLV) is a three-stage launch vehicle configured as a terminal stage with three solid propulsion stages and a liquid propulsion based Velocity Trimming Module (VTM). SSLV is 2 meters in diameter and 34 meters in length and has a lift-off mass of about 120 tonnes.
- SSLV is capable of launching 500 kg satellites from Satish Dhawan Space Center (SDSC) into 500 km flat orbit.

Features

Low cost, short turnaround time, flexibility to accommodate multiple satellites, minimal launch infrastructure requirements, etc.

Importance

- At present the importance of small satellites has increased. In the past, large satellite payloads were preferred, but smaller players such as businesses, government agencies, universities and laboratories are now sending their own satellites, which mostly fall into the category of small satellites.
- The demand for launching small satellites has grown at a rapid pace in the last eight to ten years due to the ever-increasing need for space-based data, communication, surveillance and commerce.
- Satellite manufacturers and operators used to have to wait months or pay exorbitant travel fees for space on rockets, but with the help of mini satellite launch vehicles, both time and cost will be reduced.
- With the increase in demand, rockets can be launched more frequently with less cost, this provides a commercial opportunity for space agencies such as ISRO to tap the potential of the sector as most of the demand comes from companies that use it for commercial purposes.

first private sector-developed rocket last year is an early indication of the initiative's success. The presence of more than 100 start-ups testifies to the appetite of private players for the space sector. However, the country has a long way to go to become a significant player in the small satellite-driven space economy its share is about 2 per cent.

Conclusion

The private sector's learning curve is likely to be steep. The success of such players in the US, including Musk's venture owes much to the enabling partnerships forged with NASA. India's premier space research agency would do well to emulate its American counterpart.

Expected Question

Que. With reference to India's satellite launch vehicles, consider the following statements:

1. PSLVs launch the satellites useful for Earth resources monitoring whereas GSLVs are designed mainly to launch communication satellites.
2. Satellites launched by PSLV appear to remain permanently fixed in the same position in the sky, as viewed from a particular location on Earth.
3. GSLV Mk III is a four-staged launch vehicle with the first and third stages using solid rocket motors; and the second and fourth stages using liquid rocket engines.

Which of the statements given above is/are correct? *Excellence*

- (a) 1 only (b) 2 and 3
(c) 1 and 2 (d) 3 only

Answer : A

Mains Expected Question & Format

Que.: What is Small Satellite Launch Vehicle (SSLV)? Presently throw light on the utility and need of small satellites as well as its importance.

Answer Format :

- ❖ Explain about Small Satellite Launch Vehicle (SSLV).
- ❖ Explain the importance of its utility and necessity.
- ❖ Give a balanced conclusion.

Note: - The question of the main examination given for practice is designed keeping in mind the upcoming UPSC mains examination. Therefore, to get an answer to this question, you can take the help of this source as well as other sources related to this topic.