

3. PSLV-C62 / EOS-N1 Mission - Science & Technology

ISRO's PSLV-C62 mission failed to place the EOS-N1 and 15 co-passenger satellites into the intended orbit, marking a rare setback for India's trusted "workhorse" launch vehicle. The incident highlights the inherent risks in space missions even as ISRO advances heavier launchers like the LVM-3 and plans for the future Lunar Module Launch Vehicle (LMLV).

PSLV-C62 Mission Failure

Event- ISRO's first launch of the year, the PSLV-C62 mission, failed to place its satellites into the intended orbit.

Significance- This marks the second consecutive failure of the Polar Satellite Launch Vehicle (PSLV), a rocket historically celebrated as ISRO's reliable "workhorse."

1. Mission Details- PSLV-C62 / EOS-N1

Mission Profile

Flight Number- This was the 64th flight of the PSLV.

Commercial Aspect- It served as the ninth commercial mission facilitated by NewSpace India Limited (NSIL).

Payloads- The rocket carried a total of 16 satellites (1 primary + 15 co-passengers).

Key Payloads

EOS-N1 (Primary Satellite)

Type- Earth Observation Satellite.

Purpose- Dedicated to environmental monitoring, resource mapping, and disaster management.

Kestrel Initial Technology Demonstrator (KID)

1. Origin- Developed by a Spanish startup.
2. Purpose- A re-entry vehicle prototype designed to return to Earth.
3. Goal- To provide crucial data for the development of future re-entry systems.

2. About Polar Satellite Launch Vehicle (PSLV)

Overview

Generation- It is India's third-generation launch vehicle.

Reputation- Known as "the workhorse of ISRO" due to its history of consistently delivering satellites into Low Earth Orbits (LEO) with a high success rate.

Milestone- It was the first Indian launch vehicle to be equipped with liquid stages.

Stage Architecture (Four-Stage Vehicle)

The PSLV operates on a four-stage system where each stage has its own engine and fuel, functioning sequentially.

Stage	Propulsion Type	Function & Mechanism
First Stage (PS1)	Solid Fuel	Provides high thrust for lift-off to overcome gravity and air resistance. Jettisoned approximately two minutes after launch.
Second Stage (PS2)	Liquid Fuel	Powered by the Vikas engine. Accelerates the rocket to high speeds, reaching an altitude of 220–250 km.
Third Stage (PS3)	Solid Fuel	Provides a rapid increase in horizontal speed. Places the vehicle onto a sub-orbital trajectory.
Fourth Stage (PS4)	Liquid Fuel	The final stage used for precise maneuvering. Places the satellite into its designated Low-Earth Orbit.

Historic Achievements

Debut- First successful launch in **October 1994**.

Versatility- Launched satellites for communication, navigation, meteorology, and scientific experiments.

Interplanetary Missions

1. Chandrayaan-1 (2008)- India's first moon mission.
2. Mars Orbiter Mission (2013)- India's first Mars mission (Mangalyaan).

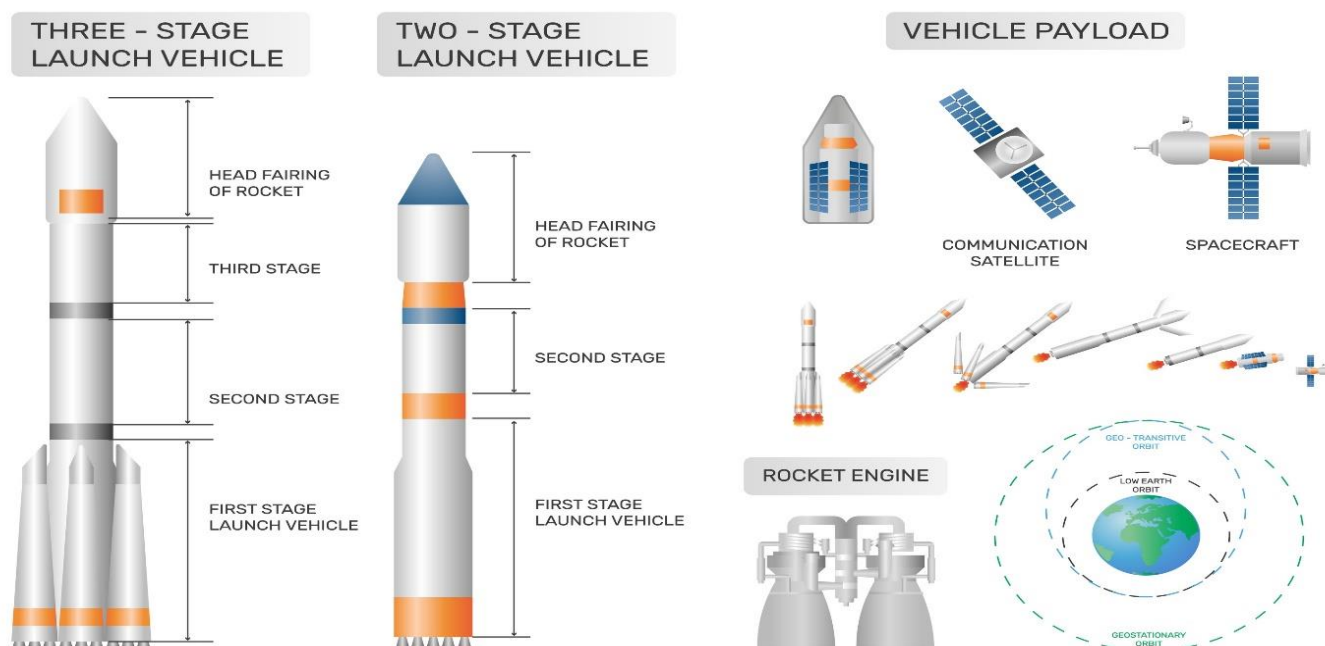
3. Astronomy- Launched Astrosat, India's first dedicated space observatory.

3. Other Launch Vehicles of ISRO

The following table differentiates India's heavier launch vehicles from the PSLV.

Feature	GSLV (Geosynchronous Satellite Launch Vehicle)	LVM-3 (Launch Vehicle Mark-3)
Generation	Fourth-generation vehicle.	Advanced variant (formerly GSLV Mk III).
Purpose	Designed to carry heavier payloads to higher orbits, overcoming PSLV limitations.	India's heaviest launcher, nicknamed 'Bahubali'.
Stages	Three Stages 1. Solid Rocket Motor 2. 4 Liquid Strap-ons 3. Cryogenic Upper Stage	Three Stages 1. Solid (S200 boosters) 2. Liquid (L110 core) 3. Cryogenic (C25 upper stage)
Engine Tech	Uses Cryogenic engines (Liquid Hydrogen + Liquid Oxygen) for greater thrust.	Uses advanced solid, liquid, and cryogenic propulsion.
Payload Capacity	LEO- Up to 1,750 kg (up to 600 km). GTO- Smaller payloads.	LEO- Up to 8,000 kg (up to 2,000 km). GTO- Up to 4,000 kg (36,000 km).
Key Missions	Deployed various communication satellites (GSAT series).	GSAT-19 (2017 - First Success) Chandrayaan-2 (2019) Chandrayaan-3 (2023)

MULTISTAGE ROCKET INFOGRAPHICS ELEMENT



4. Future Roadmap

Lunar Module Launch Vehicle (LMLV)

1. ISRO is currently developing its heaviest rocket.
2. Timeline- Expected to be ready by 2035.
3. Objective- To support future lunar missions, including India's first human Moon mission planned for 2040.

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ws/th/th_international/issues/166041/OPS/GI2FD7U5M.1+GT6FECMQK.1.html](https://epaper.thehindu.com/ccidist-
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