

ISRO to Launch India's Heaviest Communication Satellite

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Communication Satellite Latest News

- The **Indian Space Research Organisation (ISRO)** is preparing to launch **CMS-03**, its heaviest communication satellite ever to be launched from Indian soil, on **November 2, 2025**, aboard the **LVM3-M5 (Launch Vehicle Mark-3)**.

About the CMS-03 Satellite

- The **CMS-03** satellite, weighing **4,410 kg**, is designed as a **multiband communication satellite** that will provide secure and high-bandwidth communication coverage over a wide region, including the Indian subcontinent and surrounding oceanic areas.
- It will be placed in a **Geosynchronous Transfer Orbit (GTO)** of approximately **29,970 km x 170 km** from the Earth's surface.

- This mission marks the **first time ISRO will launch a satellite exceeding 4,000 kg** to a GTO from Indian soil.
- Previously, India's heavier communication satellites, such as **GSAT-11 (5,854 kg)** and **GSAT-20 (4,700 kg)** were launched by **Arianespace** or **SpaceX** due to payload limitations.
- With CMS-03, ISRO achieves a new benchmark in self-reliant satellite launches.
- The satellite will serve critical communication needs, particularly for **defence and strategic applications**, providing encrypted data relay for the Indian Armed Forces.

LVM3-M5: India's Most Powerful Rocket

- The **LVM3**, also known as **GSLV Mk-III**, is India's most powerful and reliable launch vehicle.
- The **43.5-meter-tall three-stage rocket** is designed to carry **up to 4,000 kg payloads to GTO** and **8,000 kg to Low Earth Orbit (LEO)**.
- **Structure and Design**
 - **First Stage (S200)** – Two massive solid rocket boosters provide the initial thrust for lift-off.
 - **Second Stage (L110)** – A liquid-propellant stage powered by twin **Vikas engines**.
 - **Third Stage (C25 Cryogenic Engine)** – The most advanced component, using **liquid hydrogen (LH2)** and **liquid oxygen (LOX)** to provide the high thrust needed for orbit insertion.
- This launch vehicle has been developed using entirely **indigenous technologies**, including the **C25 cryogenic stage**, giving India full autonomy in launching heavy satellites.
- The LVM3 has had a 100% success rate so far, including the landmark **Chandrayaan-3 mission**, which made India the first country to land near the lunar south pole in 2023.

Advancements and Future Upgrades

- ISRO is continuously enhancing the performance of the LVM3. With the **C25 cryogenic stage** currently providing 20 tonnes of thrust using 28,000 kg of propellant, ISRO plans to replace it with a more powerful **C32 cryogenic stage**, capable of carrying 32,000 kg of fuel and producing **22 tonnes of thrust**.
- Additionally, ISRO is developing a **semi-cryogenic engine**, which will replace the L110 liquid stage with a kerosene and liquid oxygen-based engine.
- This will **increase payload capacity to 10,000 kg in LEO**, a crucial requirement for India's upcoming **Gaganyaan human spaceflight programme** and the proposed **Bharatiya Antariksh Station** (India's space station).

Significance of the Mission

- **Self-Reliance in Heavy Satellite Launches**
 - Until now, India has relied on foreign space agencies to launch heavy communication satellites.
 - The CMS-03 launch demonstrates that India can now **independently launch 4-tonne-class satellites**, significantly reducing costs and ensuring strategic autonomy.
- **Strategic and Military Capability**
 - CMS-03's secure communication bands will serve as a **key enabler for India's defence communication network**, linking naval, air, and ground assets through encrypted signals.

- It will enhance **situational awareness, real-time data exchange**, and **maritime domain monitoring** across the Indian Ocean Region.
- **Boost to Gaganyaan Mission**
 - The same LVM3 vehicle, in its human-rated version (HRLV), will be used for the **Gaganyaan mission**, which aims to send Indian astronauts into space. This launch thus serves as another validation of the LVM3's reliability and adaptability.
- **Paving Way for Space Station Missions**
 - The upgraded versions of LVM3 will support future missions such as the **Bharatiya Antariksh Station** and **Lunar Module Launch Vehicle (LMLV)**, which ISRO plans to use for deep-space and lunar missions carrying payloads up to **80,000 kg in LEO**.

Track Record of LVM3

- The LVM3 rocket has completed **seven successful missions** to date, including the launches of **Chandrayaan-2**, **Chandrayaan-3**, and several GSAT satellites.
- Compared to its predecessor, **GSLV Mk-II**, which had multiple failures, LVM3 stands out as ISRO's most reliable heavy-lift vehicle.
- This success rate makes it the **preferred launch vehicle** for both national and international missions, cementing India's reputation as a **global space technology leader**.

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