Geosynchronous Satellite Launch Vehicle (GSLV)

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Geosynchronous Satellite Launch Vehicle Latest News

Ahead of the launch of the NASA-ISRO NISAR satellite, the ISRO recently announced that the satellite had been mounted on a geosynchronous satellite launch vehicle (GSLV), and all systems of the rocket had been checked.

About Geosynchronous Satellite Launch Vehicle

- It is a space launch vehicle designed, **developed, and operated by** the Indian Space Research Organization **(ISRO) to launch satellites** and other space objects **into Geosynchronous Transfer Orbits (GTOs).**
- GSLV has the capability to put a **heavier payload in orbit than** the **Polar Satellite Launch Vehicle (PSLV).**
- GSLV is 49.13 m tall and the tallest among all other vehicles of ISRO.
- It is a **three-stage vehicle** with a **lift-off mass of 420 tonnes.**
    - The first stage comprises S139 solid booster with 138-tonne propellant and four liquid strap-on motors, with 40-tonne propellant.

    - The second stage is a liquid engine carrying 40-tonne of liquid propellant.
    - The **third stage** is the indigenously built **Cryogenic Upper Stage (CUS)** carrying 15-tonne of **cryogenic propellants.**
- The GSLV **improves on the performance of the PSLV** (Polar Satellite Launch Vehicle) by the **addition of liquid strap-on boosters** and a **cryogenic upper stage.**
- The **solid first and liquid second stages** are **carried over from the PSLV**, while the cryogenic upper stage is being supplied by Russia until India has developed an indigenous version.

Variants of Geosynchronous Satellite Launch Vehicle

- **GSLV Mk I:**
    - The first-generation GSLV with a **payload capacity of carrying 2-2.5 ton satellites** to GTO.
    - It used the **Russian-supplied cryogenic upper stage,** as it had early difficulty with mastering indigenous cryogenic technology.
    - It conducted around 5 flights from 2001-2010, including suborbital tests, with the **last launch in 2010.**
- **GSLV Mk II:**
    - It is an enhanced variant with an **indigenously developed cryogenic upper-stage engine and stage.**
    - It is capable of **carrying payloads** to GTO **around the 2.5-ton class.**
    - The **first successful launch** occurred in **2014**.
- **GSLV Mk III:** The GSLV Mk III, also known as LVM-3, is the **most advanced and powerful variant** in the GSLV series, currently in service with a **payload capacity of up to 4 tons** to GTO.

Performance of Geosynchronous Satellite Launch Vehicle

- The GSLV has **launched** various satellites, including **communication satellites like INSAT and GSAT**, as well as **spacecraft from the NavIC and IDRSS series, into GTO.**
- Notable missions include the launch of the **South Asia Satellite in 2017**, a satellite for military applications in 2018, and the **Chandrayaan-2** moon mission in 2019.

Source: TH
