

## GSLV Mark III

### Introduction

The **GSLV-III** or Geosynchronous Satellite Launch Vehicle Mark III is a launch vehicle under development. **Geosynchronous Satellite Launch Vehicle** is a launch vehicle under development. ISRO is developing this to enable India to launch its **heavier satellites** without dependence on foreign rockets and providers. GSLV has attempted eight launches to date, since its first launch in 2001 through its most recent launch in 2014.

### Features

- The GSLV MK-III is a 3 stage vehicle and will have an **Indian cryogenic** third stage.
- The 3 stages of GSLV MK III are **solid boosters, liquid motor and cryogenic upper stage**.
- The experimental mission of India's GSLV-Mk III is launched in the first half of December. The 630-tonne GSLV-MK III will carry a crew module (3.65 tonnes) without astronauts
- GSLV-MK III can put a communication satellite of **4 tonnes** into **geo-synchronous orbit** or **10 tonnes** satellite into **low earth orbit**.

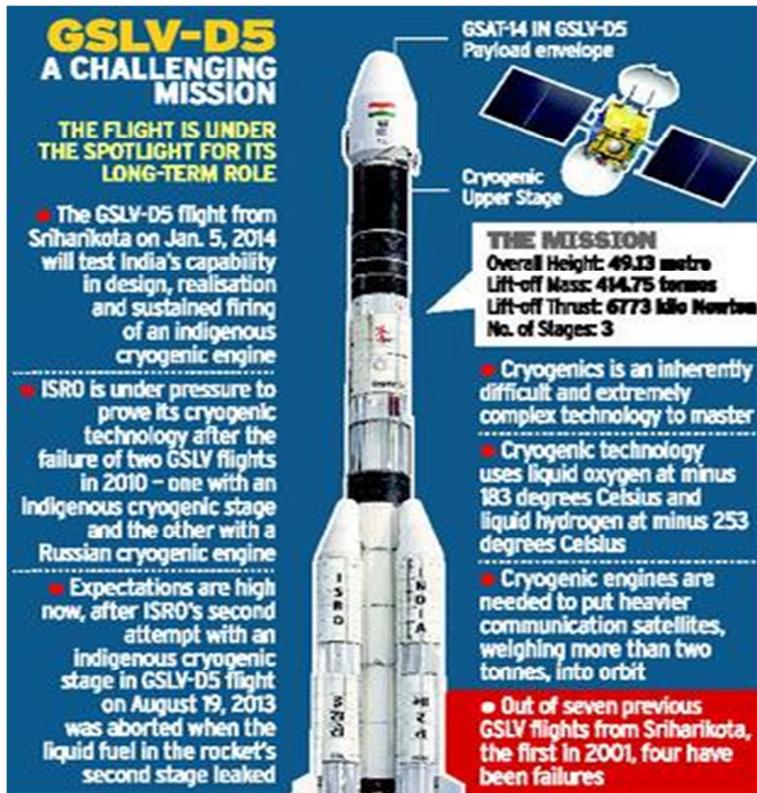
### Specification of GSLV MK-III-X



Payload	Atmospheric Reentry Experiment (CARE)
Stages	Three: Active S200 and L110 propulsive stages, and a passive C25-X stage with dummy engine.
Propellant	<ul style="list-style-type: none"><li>• S200 stage: Hydroxyl-terminated polybutadiene (HTPB)</li><li>• L110 stage: Hypergolic propellant UH25 &amp; Dinitrogen tetroxide (N<sub>2</sub>O<sub>4</sub>)</li><li>• C25-X: Liquid Nitrogen (LN<sub>2</sub>)</li></ul>
Overall Height	43.43 meter
Lift-Off Mass	630.58 ton
Characteristic	<ul style="list-style-type: none"><li>• External vehicle configuration is identical to that of GSLV MK-III-D1 which is the generic vehicle configuration.</li><li>• The mission is designed to provide a suitable altitude, velocity and flight path angle to CARE at separation.</li></ul>

## History of GSLV MK III

- Development for the GSLV-III began in the early 2000s, with the first launch planned for 2009-2010.
- The first flight of the GSLV Mk. II, with an Indian-developed third stage engine was made in April 2010 but it resulted in a failure as 3<sup>rd</sup> stage failed to ignite.
- The next launch, in December 2010, used the Russian engine; however the vehicle went out of control during first stage flight so it was also failed.
- **GSLV-D5**, launched on January 5, 2014, was the first successful flight of the GSLV Mark. II using the indigenously developed cryogenic engine.
- A flight test of the GSLV-III launcher, with a cryogenic third stage, was successfully carried out on 18 December 2014. It was not a full flight. It carried a crew module to a height of 120km.



### Significance

- The launch of GSLV Mark III will **enhance India's capability to be a competitive player** in the multimillion dollar commercial launch market. It will help in earning huge foreign exchange.
- India's **dependence on foreign launch vehicles** to put its heavy satellites (eg. INSAT series) will be **reduced**. The GSLV Mark III will help ISRO put heavier communication satellites of INSAT-4 class into orbit.
- This will unleash India's dream of **sending its astronauts into space** come true. ISRO calls its mission to send astronauts to space the **Human Space Flight (HSF)** programme.

### Crew Module Atmospheric Re-entry Experiment (CARE):

- The **Crew Module Atmospheric Re-entry Experiment (CARE)** is an experimental test vehicle for the Indian Space Research Organisation's future Orbital Vehicle. It was launched successfully on 18 December 2014.
- The test flight had a crew module as a dummy payload and cryogenic engine for weight simulation.
- The sole payload was the 3.7-tonne Crew Module Atmospheric Re-entry Experiment (CARE). Just over five minutes into the flight, the rocket ejected CARE at an altitude of 126 km. CARE then descended at high speed, controlled by its onboard motors.

- The experimental flight with the crew module in a spacecraft tested whether its heat shield can survive very high temperatures during its re-entry into the atmosphere.
- The success of the module is the core for a future **Human Space Project.**( Programme of ISRO to send human into space)

### Future

- The first development flight (**GSLV Mk-III D1**) with an operational cryogenic stage is planned between 2016 to 2017 and second development flight (**GSLV Mk-III D2**) is planned in 2017 to 2018.
- ISRO Chairman K Radhakrishnan has announced that a project report compiled by the agency envisages a Rs. 12,400-crore manned space mission by 2021. This manned mission will be launched by GSLV MK III vehicle.

### Conclusion

Thirty long years after Rakesh Sharma became the first Indian to travel into space aboard a Soviet Soyuz spacecraft, India has now come a step closer to realising its long-held dream of sending humans into space, with the successful test flight of GSLV Mark III. The success of the new launch vehicle would also help the country to send four tonne communication satellites, which were being sent through European Space Agency satellites at present. This successful experiment enhanced India's capability as well as reputation at world stage. This will be economically beneficial to India.

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