GSLV-F14/INSAT-3DS Mission: ISRO's 'Naughty Boy' Rocket to Launch Meteorological Satellite

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Why in News?

- Meteorological satellite INSAT-3DS will be launched into space onboard a Geosynchronous Launch Vehicle (GSLV), in a crucial mission for the rocket nicknamed "naughty boy" for its spotty record.
- The GSLV-F14 will lift off from the Satish Dhawan Space Centre (Sriharikota) and this will be the rocket's 16th mission overall and its 10th flight using the indigenously developed cryogenic engine.

About the GSLV-F14

- Geosynchronous Satellite Launch Vehicle (GSLV) is a three-stage (51.7 m long) launch vehicle having a liftoff mass of 420 tonnes.
    - The first stage (GS1) comprises a solid propellant (S139) motor having 139-ton propellant and four earth-storable propellant stages (L40) strapons which carry 40 tons of liquid propellant in each.
    - The second stage (GS2) is also an earth-storable propellant stage loaded with 40-ton propellant.
    - The third stage (GS3) is a cryogenic stage with a 15-ton propellant loading of liquid oxygen (LOX) and liquid hydrogen (LH2).
- It can be used to launch a variety of spacecraft capable of performing communications, navigation, earth resource surveys, and any other proprietary mission.

GSLV-F14/INSAT-3DS Mission and its Primary Objective

- About the mission:
    - INSAT-3DS Satellite is a follow-on mission of Third Generation Meteorological Satellite from Geostationary Orbit and the Indian industries have significantly contributed to the making of the Satellite.
    - The mission is fully funded by the Ministry of Earth Sciences (MoES) and it will augment the Meteorological services along with the presently operational INSAT-3D and INSAT-3DR satellites.
- The primary objectives of the mission are:
    - To monitor Earth’s surface, carry out Oceanic observations and its environment in various spectral channels of meteorological importance.
    - To provide the vertical profile of various meteorological parameters of the Atmosphere.
    - To provide the Data Collection and Data Dissemination capabilities from the Data Collection Platforms (DCPs).
    - To provide Satellite Aided Search and Rescue services.

Significance of the GSLV-F14/INSAT-3DS Mission

- At least four of the 15 launches using the GSLV so far have been unsuccessful.
    - In comparison, only three of the 60 missions so far by ISRO’s workhorse PSLV (Polar Satellite Launch Vehicle), and none of the seven by its successor LVM-3, have failed.
    - Therefore, the mission’s success will be crucial for the GSLV, which is scheduled to carry later this year the Earth observation satellite, NISAR, which is being jointly developed by NASA and ISRO.
- INSAT-3DS, with a mission life of 10 years, will take over the functions of INSAT-3D (launched in 2013) and INSAT-3DR (2016) that have come to the end of their mission life. It
- The mission will help in short-range forecasts of extreme weather events such as thunderstorms, provide visibility estimation for aviation, and help in studying forest fire, smoke, snow cover, climate studies.

Q1) What is the difference between India’s PSLV and GSLV rockets?

Polar Satellite Launch Vehicle (PSLV) is a 4-stage launch vehicle to place satellites into sun-synchronous polar orbits, LEO and GEO. On the other hand, Geosynchronous Satellite Launch Vehicle (GSLV) is a 3-stage launch

vehicle to place satellites into geosynchronous orbits, where they can remain stationary relative to a fixed point on the Earth’s surface.

Q2) What is the NISAR satellite?

NASA-ISRO Synthetic Aperture Satellite (NISAR) is a Low Earth Orbit (LEO) observatory being jointly developed by NASA and ISRO. NISAR will map the entire globe in 12 days and provide spatially and temporally consistent data for understanding changes in Earth’s ecosystems, etc.

Source: ISRO’s ‘naughty boy’ rocket to launch India’s latest weather satellite today | TH | ISRO