ISRO MISSIONS: SCIENCE & TECHNOLOGY

NEWS: New rocket, plus moon and Venus missions, herald new beginnings

WHAT'S IN THE NEWS?

The Indian government has approved various new projects in space exploration, enhancing India's role in lunar, planetary, and satellite missions.These projects include the development of a new rocket, missions to the Moon and Venus, and upcoming satellite launches like NISAR and Proba-3.The private sector is also contributing with satellite development and green propulsion technology.

Recent and Upcoming ISRO Missions

Gaganyaan Human Spaceflight Programme:

- **Goal**: India's first crewed space mission for human spaceflight capability.
- **Components**: Includes two uncrewed and one crewed Low Earth Orbit (LEO) missions.
- **Funding**: ₹11,170 crore for an additional uncrewed flight (total four missions).

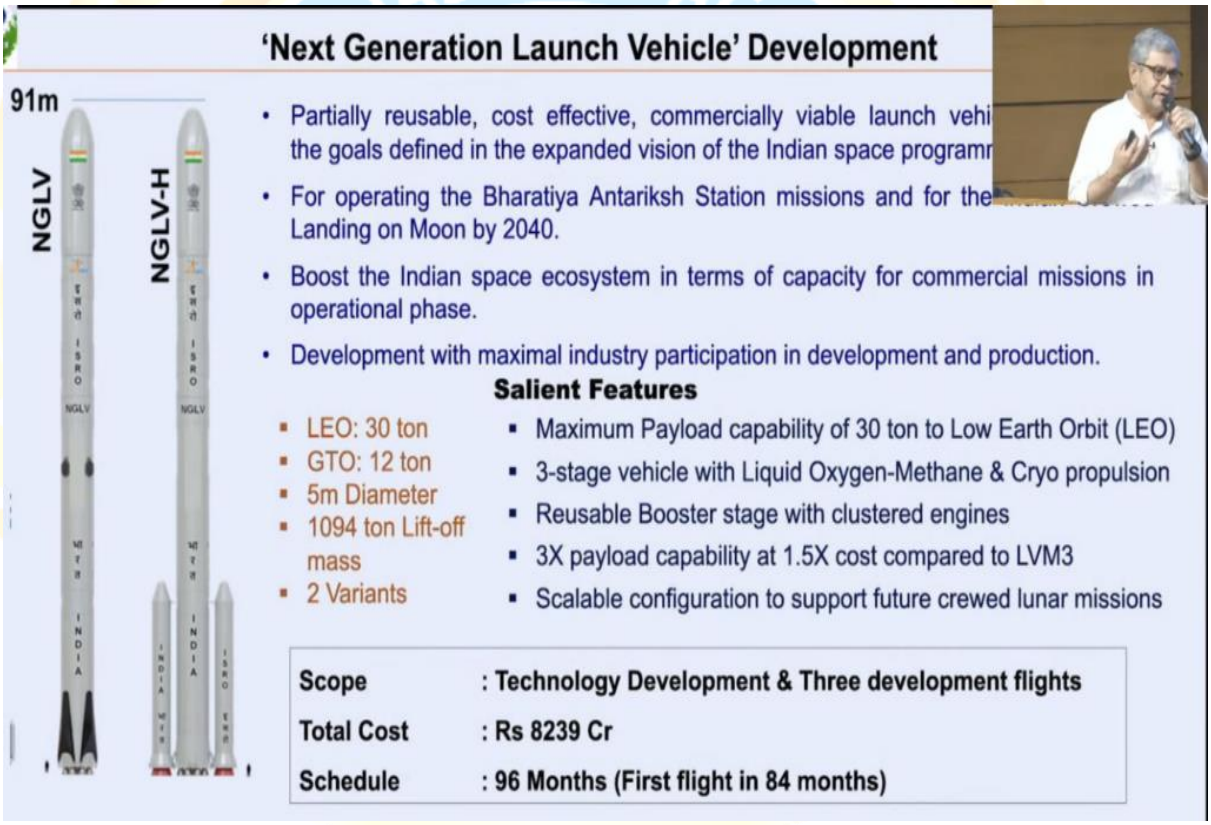
- **Timeline**: Crewed flight expected by 2025.

Bharatiya Antariksh Station 1 (India's Space Station):

- **Objective**: First Indian space station for space science research.
- **Plan**: Four missions to test key technologies.
- **Budget**: ₹11,170 crore.
- **Timeline**: Completion expected by 2028.

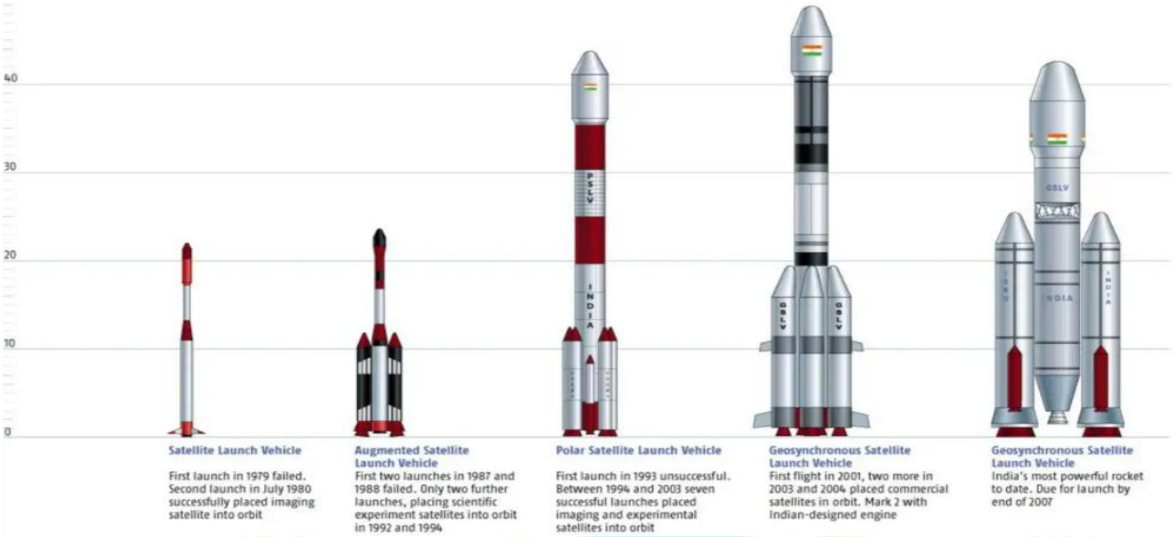
Next Generation Launch Vehicle (NGLV):

- **Purpose**: New rocket to replace PSLV and GSLV, supporting diverse missions.
- **Funding**: ₹8,240 crore, covering three test flights.
- **Industry**: ISRO and private sector collaboration.
- **Significance**: Enhances India's space launch capabilities.



PSLV by Private Sector:

- **Objective**: First PSLV fully developed by Hindustan Aeronautics Ltd. and Larsen & Toubro.
- **Launch**: By end of 2024 or early 2025.
- **Significance**: Shift to industry-driven launch capabilities.

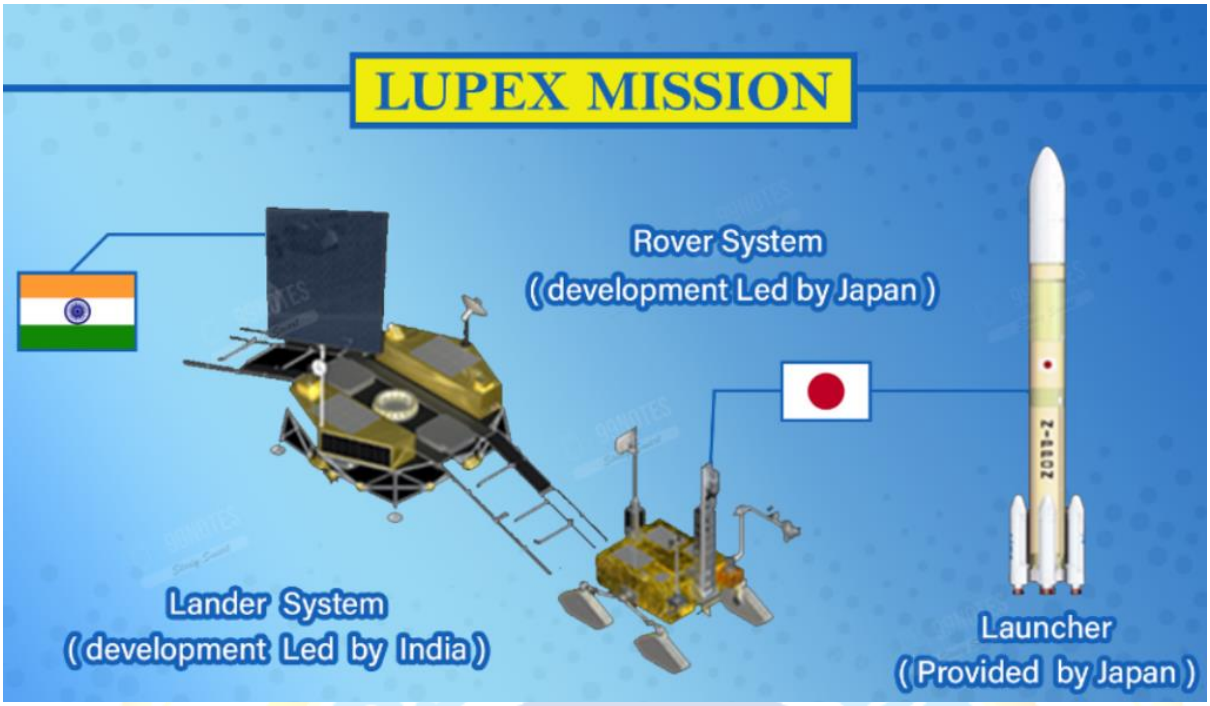


Chandrayaan-4 Moon Mission:

- **Type**: Lunar sample-return mission.
- **Launch Vehicle**: Components on LVM-3, docked in Earth orbit.
- **Landing**: Near Chandrayaan-3 site for sample collection.
- **Budget/Timeline**: ₹2,104 crore; launch by 2027.

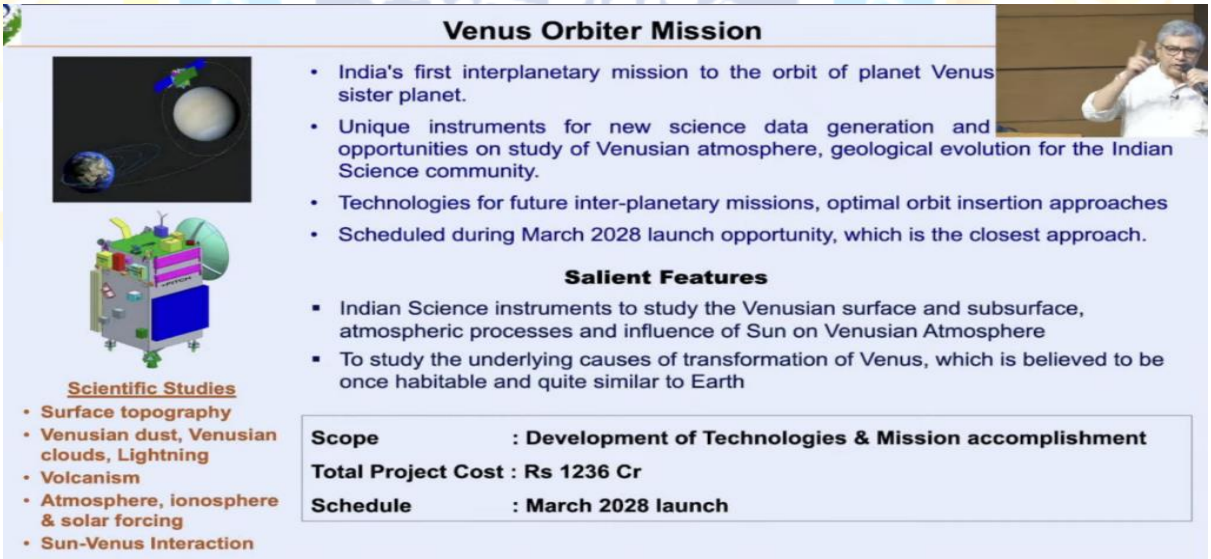
Lunar Polar Exploration Mission (LUPEX) with Japan:

- **Goal**: Joint exploration of lunar poles.
- **ISRO Role**: New lander with potential for future crewed missions.
- **Focus**: Lunar south pole region.



Venus Orbiter Mission:

- **Objective**: Study Venus's atmosphere and surface.
- **Timeline**: Launch in March 2028.
- **Budget**: ₹1,236 crore.

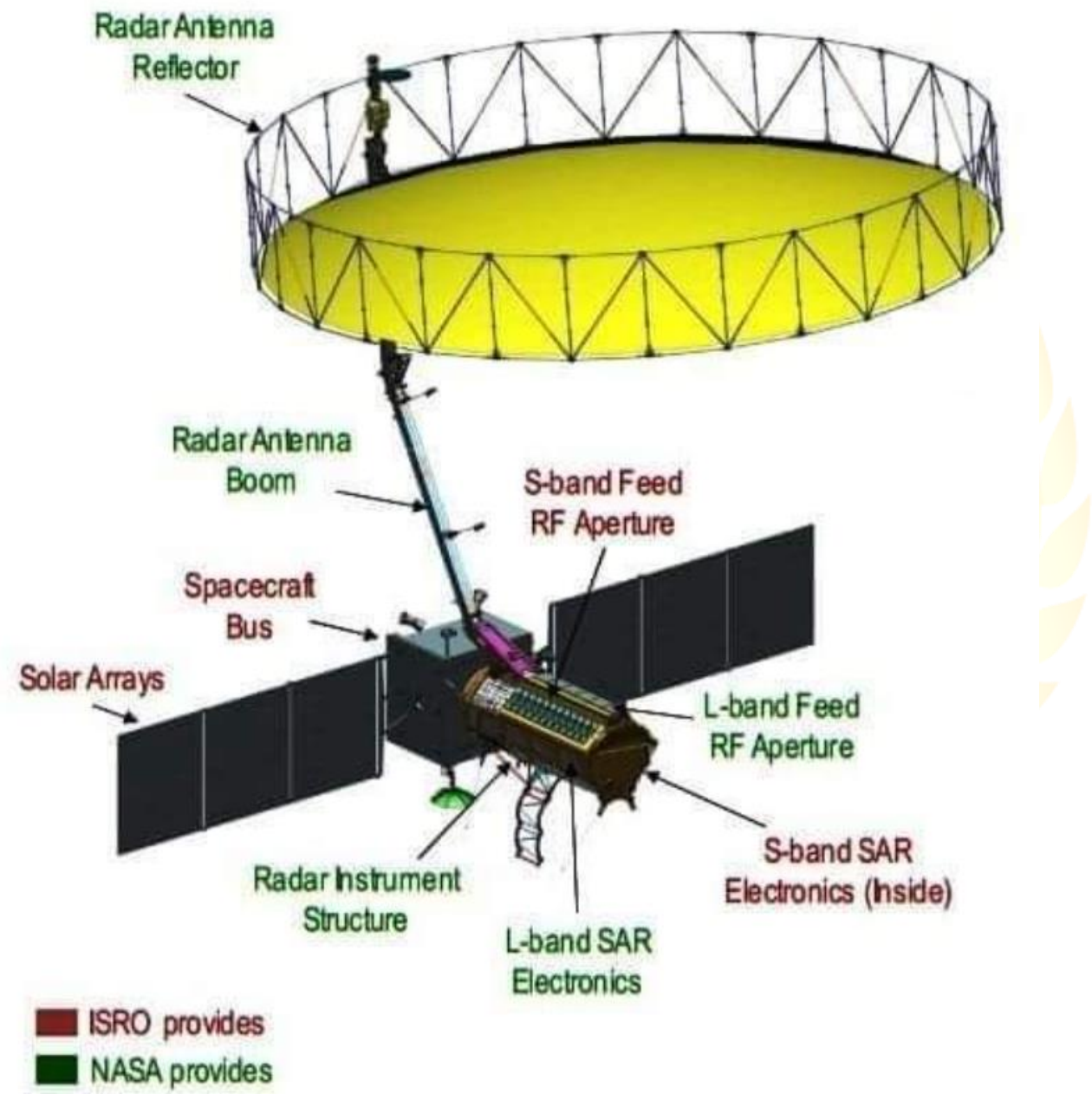


Space Based Surveillance (SBS-3):

- **Scope**: Third phase in space surveillance.
- **Components**: 21 ISRO satellites and 31 from private sector.
- **Budget**: ₹26,968 crore.
- **Purpose**: Enhances defense and environmental monitoring.

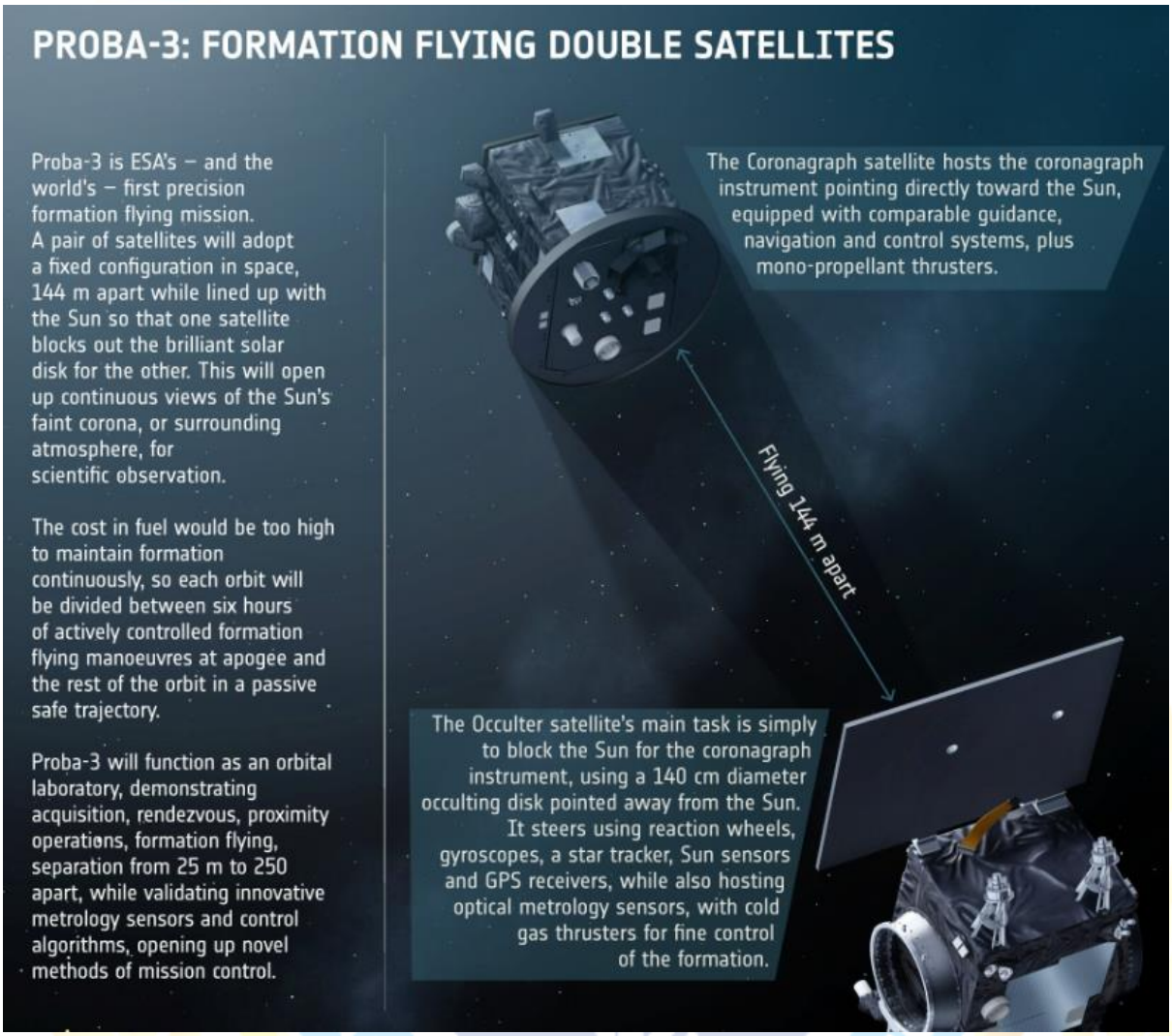
NISAR (NASA-ISRO Synthetic Aperture Radar):

- **Purpose**: Joint Earth observation for land and ice monitoring.
- **Challenges**: Additional thermal protection needed.
- **Timeline**: Launch via GSLV in early 2025.



Proba-3 (ESA Mission):

- **Objective**: Sun corona study with simulated eclipse.
- **Timeline**: Launch on November 29 using PSLV-XL.



Astrosat:

- **Description**: India's first multi-wavelength observatory (launched in 2015).
- **Achievements**: Data for 400+ research papers; operational beyond mission life.
- **Current Status**: Expected to continue for two more years.

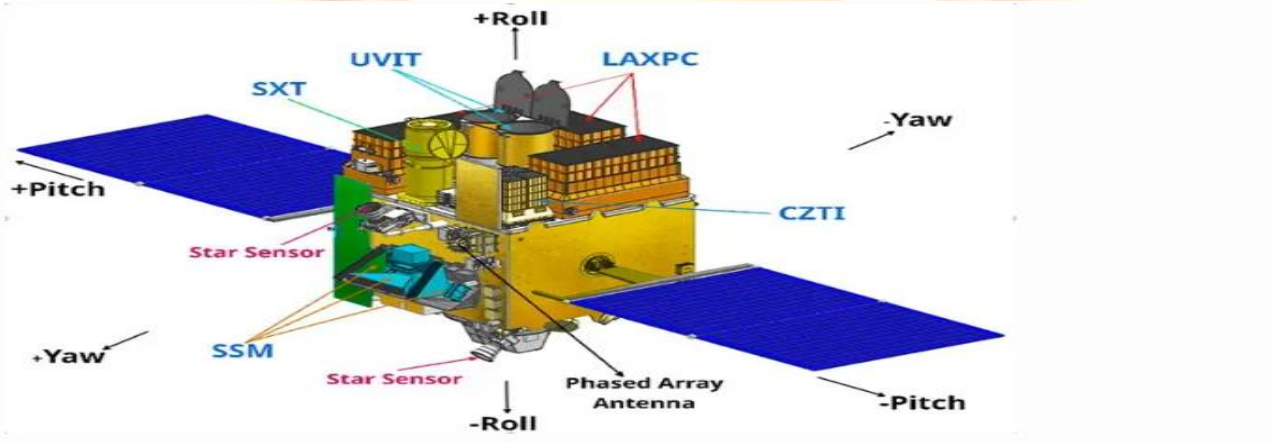


Fig: Image showing AstroSat spacecraft with various payloads.

Source : https://epaper.thehindu.com/ccidist-ws/th/th_delhi/issues/105138/OPS/GEBDGTFVF.1+G2NDGTG68.1.html