



GSLV- F16

NISAR

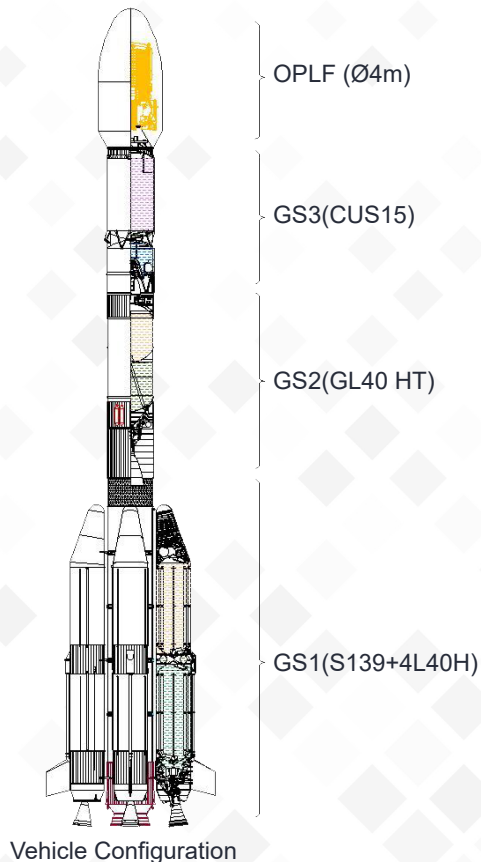
NASA - ISRO SAR Mission

GSLV-F16 / NISAR MISSION

GSLV-F16 is the 18th flight of India's Geosynchronous Satellite Launch Vehicle (GSLV) and the 12th flight with Indigenous Cryogenic stage. This is the 9th operational flight of GSLV with indigenous Cryogenic stage. The Payload Fairing in GSLV-F16/NISAR Mission is 4 m dia Ogive configuration.

GSLV-F16 Mission is the first mission with GSLV to Sun Synchronous Polar Orbit.

The GSLV-F16 with indigenous Cryogenic stage will place NISAR satellite into a Sun-Synchronous Polar Orbit. Launch is planned from the Second Launch Pad (SLP) at Satish Dhawan Space Centre, SHAR.



102nd
Launch
from
Sriharikota

18th
Flight of
GSLV

12th
Flight with
Indigenous
Cryogenic
stage

GSLV-F16 Vehicle Characteristics

Vehicle Height	51.70 m
Lift off Mass	420.5 t
Stages	3
First Stage (GS1)	S139+4L40H
Second Stage (GS2)	GL40HT
Third Stage (GS3)	CUS 15 (Indigenous)
Payload Fairing	Ø4 m Ogive PLF

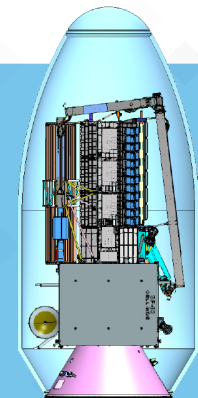
GSLV-F16 Stage Configuration

(S139 + 4 L40H) + GL40HT + CUS15 + Ø4m Ogive PLF

GSLV-F16 Stages at a Glance				
Stages	First Stage (GS1)		Second Stage (GS2)	Third Stage (GS3)
Parameter	S139	4L40H	GL40HT	CUS15
Length (m)	20.176	19.682	11.958	9.894
Diameter (m)	2.8	2.1	2.8	2.8
Propellant	HTPB	UH25 + N ₂ O ₄	UH25 + N ₂ O ₄	LH ₂ + LOX
Propellant Mass (t)	138	171	42	14
Stage Mass at Lift-Off (t)	160.9	191	47.3	17

GSLV-F16 Mission Specification

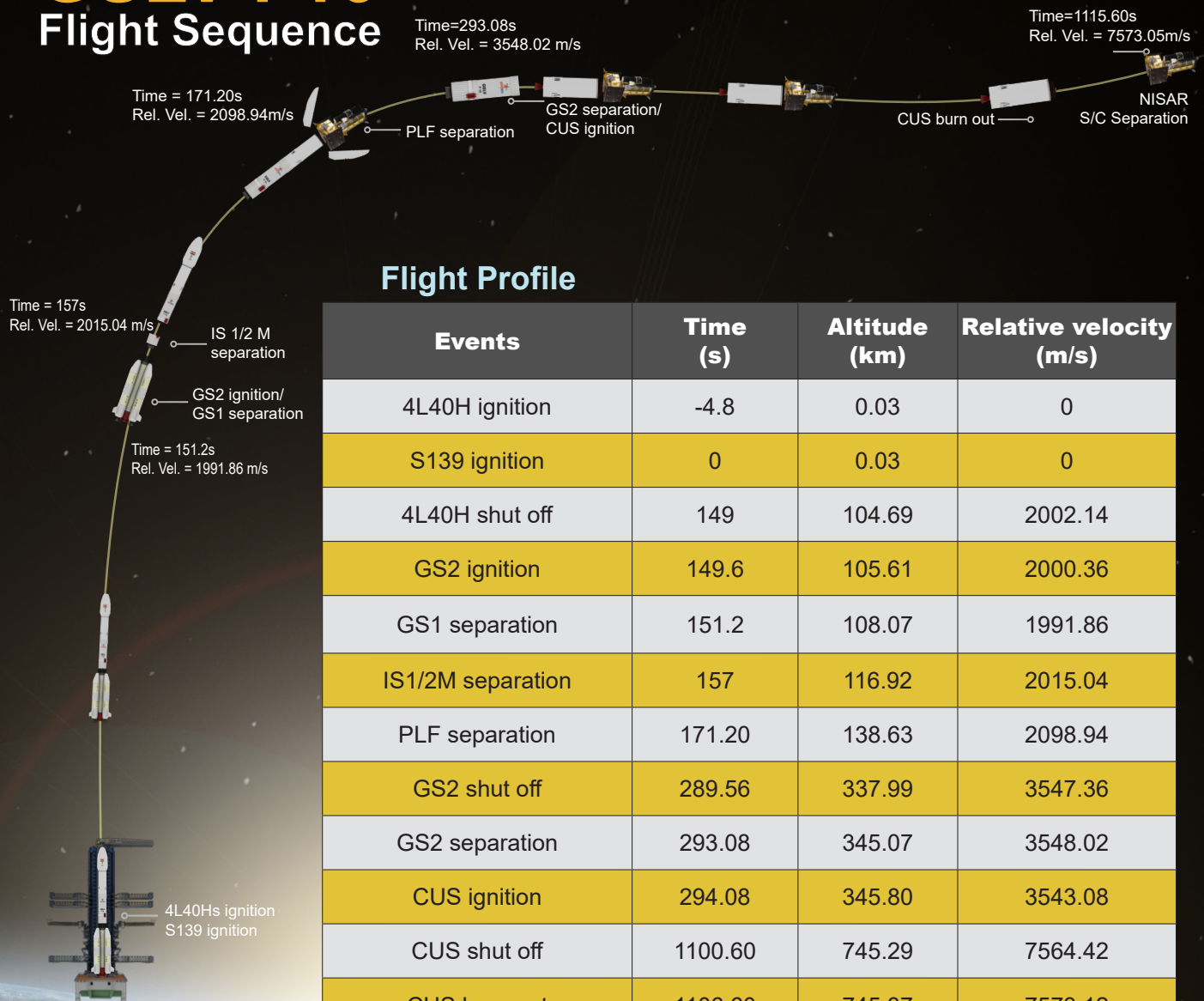
Orbit	SSPO
Semi-Major Axis	7121.544 ± 20 km
Inclination	98.400 ± 0.2 deg.
Launch Azimuth	135 deg.
Payload Mass	2393 kg



GSLV-F16
Payload
Accommodation

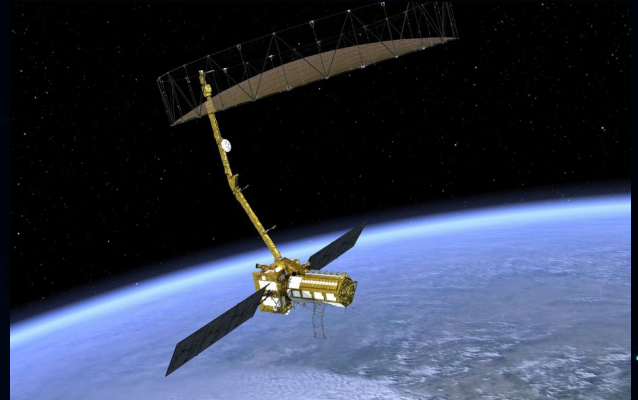
GSLV-F16

Flight Sequence

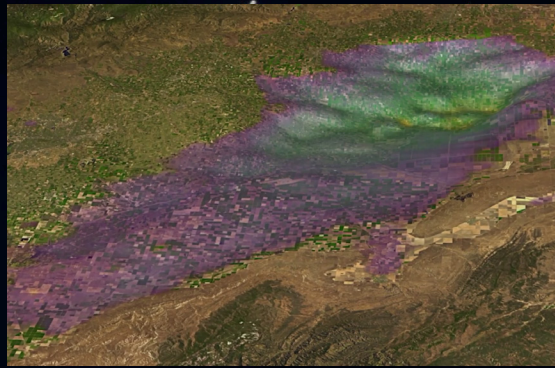


NISAR – NASA ISRO Synthetic Aperture Radar Mission

NISAR is the first of its kind mission, jointly developed by ISRO and NASA for microwave imaging purpose globally. It carries an L-band and S-band Synthetic Aperture Radar (SAR), with capability to acquire fully polarimetric and interferometric data.



The unique dual-band SAR employs advanced, novel SweepSAR technique, which provides high resolution and large swath imagery. NISAR will image the global land and ice-covered surfaces, including islands, sea-ice and selected oceans every 12 days.



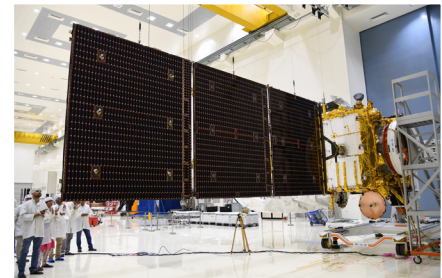
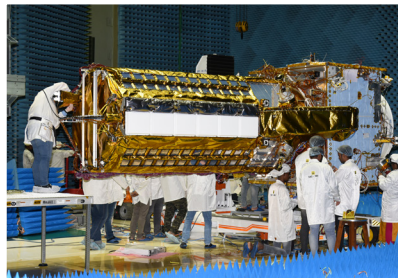
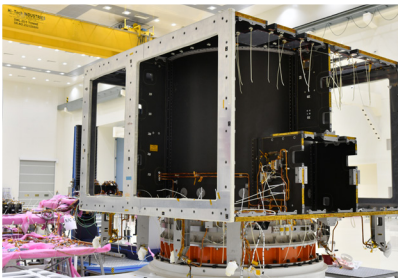
NISAR mission's primary objectives are to study land & ice deformation, land ecosystems, and oceanic regions in areas of common interest to the US and Indian science communities.

NISAR mission will help to

- Measure the woody biomass and its changes
- Track changes in the extent of active crops
- Understand the changes in wetlands' extent
- Map Greenland's & Antarctica's ice sheets, dynamics of sea ice and mountain glaciers
- Characterize land surface deformation related to seismicity, volcanism, landslides, and subsidence & uplift associated with changes in subsurface aquifers, hydrocarbon reservoirs, etc.

Spacecraft Configuration

The Spacecraft is built around ISRO's I-3K Structure.

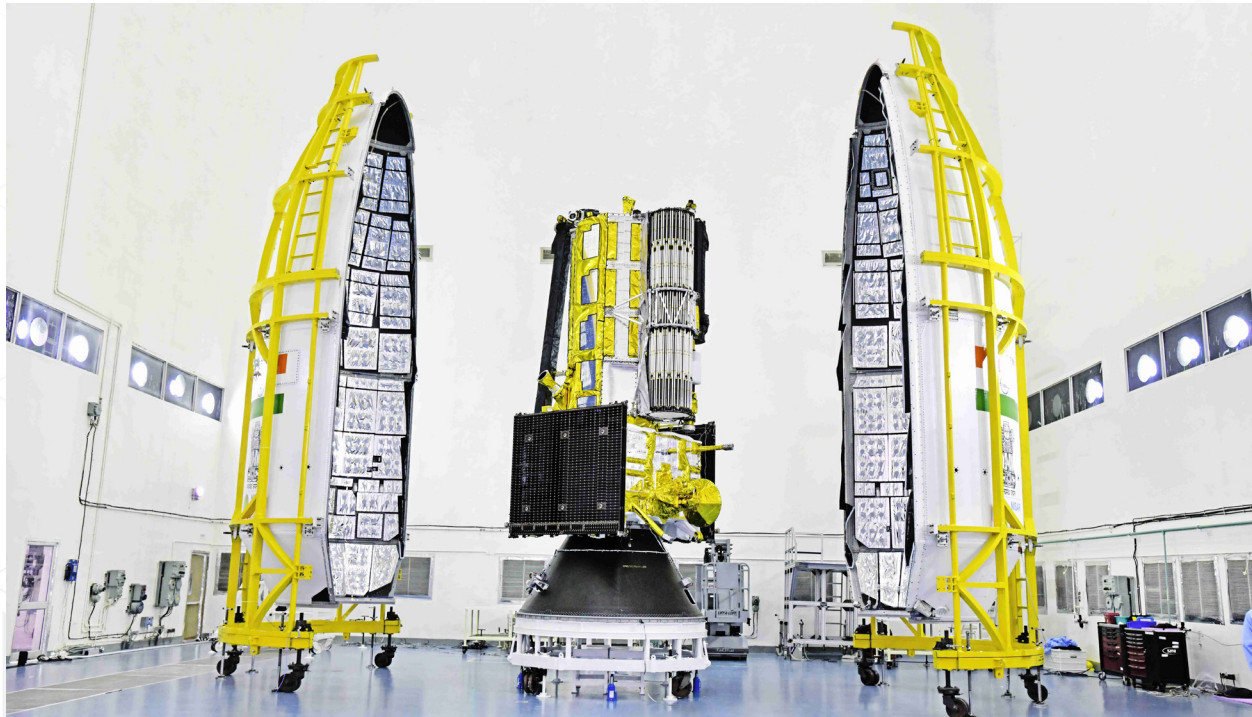


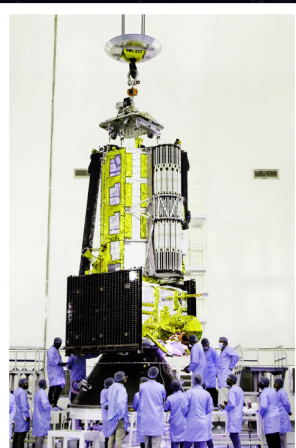
The S-band Radar system, data handling & high-speed downlink system, the spacecraft and the launch system are developed by ISRO. The L-band Radar system, high speed downlink system, the Solid-State Recorder, GPS receiver, the 9m Boom hoisting the 12m reflector are delivered by NASA. Further, ISRO is responsible for the satellite commanding and operations, NASA will provide the orbit maneuver plan and RADAR operations plan. NISAR mission will be aided with ground station support of both ISRO and NASA for downloading of the acquired images, which after the necessary processing will be disseminated to the user community.

The data acquired through S-band and L-band SAR from a single platform will help the scientists to understand the changes happening to Planet Earth.

Major Mission Characteristics (Joint Mission of ISRO & NASA)



Mainframe Bus	I3K Structure with ~2400Kg Lift Off Mass 70V Bus with ~5 kW Solar Power, 180 AH Battery 3-axis stabilized spacecraft
Imaging Payload	<ul style="list-style-type: none">• Dual Frequency (L & S-Band) Synthetic Aperture Radar (SAR).• L-band SAR (NASA); S-band SAR (ISRO)• Large size 12m diameter common unfurlable reflector antenna mounted on deployable 9m Boom.• ~240 km observable swath with (2-30 meters range resolution)
Orbit	Sun synchronous, Polar (6PM)
Orbit altitude	747 km – Circular
Inclination	98.405°
Mission Life	5 Years






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