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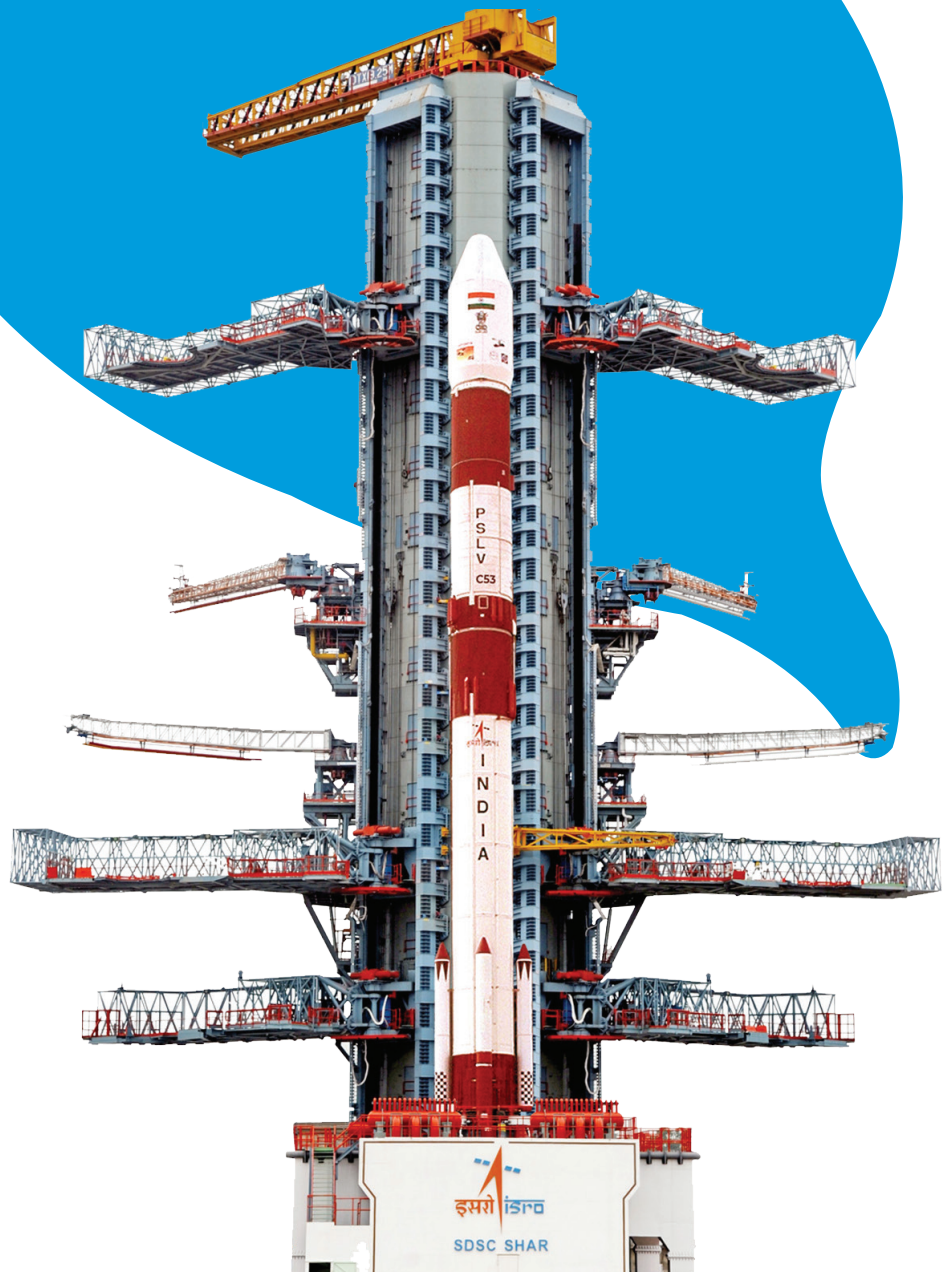
PSLV-C53/ DS-EO Mission

2nd Dedicated International Customer Satellite Mission of NSIL



PSLV-C53/DS-EO Mission

PSLV-C53 is a dedicated commercial satellite mission of NewSpace India Limited (NSIL), a Central Public Sector Enterprise (CPSE) under Department of Space, Government of India.

This mission will launch Singapore satellites DS-EO, NeuSAR and SCOOB-I to serve the Singapore governmental, commercial & educational purposes.

The launch of these satellites on-board PSLV-C53 is envisaged during the last week of June from SDSC-SHAR.

This mission is the 55th flight of Polar Satellite Launch Vehicle (PSLV) and the 15th flight of its Core-Alone (CA) version.

Milestone

- **55th** Mission of PSLV
- **15th** Flight of PSLV-CA variant
- **16th** PSLV launch from Second launch Pad
- **84th** Launch Vehicle Mission from SDSC SHAR
- **342** foreign Satellites from 34 countries

PSLV Orbital Platform Experiment Module (POEM)

PSLV-C53 mission is also planned to carry out in-orbit scientific experiments by using the spent PS4 stage as an orbital platform, named as PSLV Orbital Platform Experiment Module (POEM).

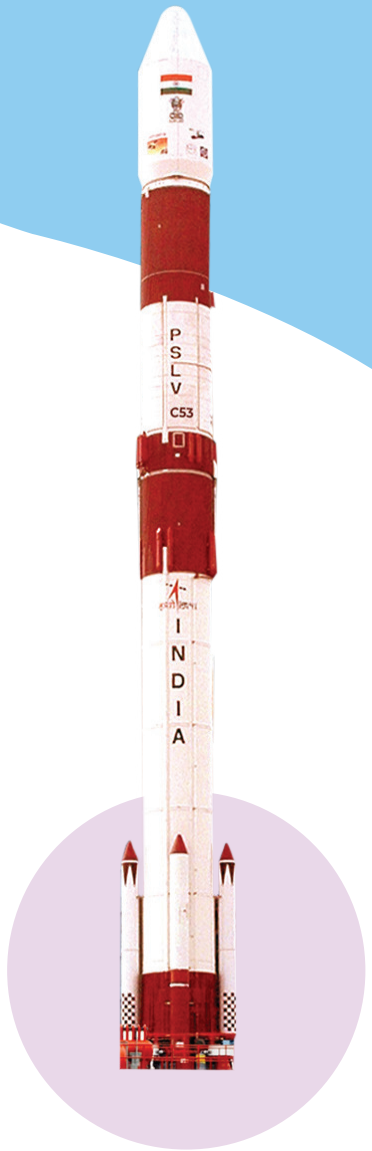
- The power for the platform is derived from the solar panel mounted around the PS4 tank and a Li Ion battery
- The stage navigation system aided by sensors (4 sun sensors, Magnetometer, MRGPD & NavIC) will be used to provide the navigation inputs
- Enabled Tele-command features on-board
- OP Passivation after intended period of operation
- Attitude stabilization using a dedicated NGC system
- Dedicated control thrusters (8 Nos.) using Helium (He) gas storage in 5 gas bottles
- Initiation of OP NGC functions, after all satellites separation at a predefined time

POEM configuration

Payloads on POEM:

- Software Defined Radio based Telemetry Multi-Media Transmitter (SDRT-MTx)
- UHF Transmitter
- OP-VIS - Configured with one GVIS and two cameras
- Dhruva Space Satellite Orbital Deployer (DSOD)
- Space Radiation Monitoring (ROBI)

PSLV-C53 Mission



Vehicle Characteristics

Vehicle Height
44.4 m

Lift off Mass
228.433 t

Propulsion Stages

– First Stage	S139
– Second Stage	PL40
– Third Stage	HPS3
– Fourth Stage	L1.6 (Ti)(0.8t)

Mission Specifications

Parameter	
• Semi-Major Axis	6948.137 km (Altitude wrt Equatorial Earth Radius: 570 km)
• Eccentricity	0.0
• Inclination	10°
• Launch Pad	SLP
• Launch Azimuth	104°

PSLV-C53

DS-EO

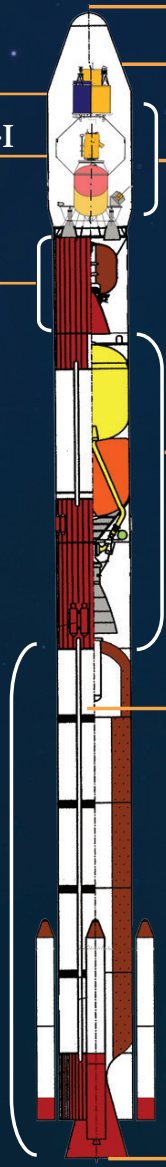
Co-passenger Satellites-NeuSAR, SCOOB-I

Third Stage

HPS3
Length: 3.6m
Diameter: 2m
Propellant: Solid (HTPB based)
Propellant Mass: 7.65t

First Stage

PS1



Payload Fairing

Fourth Stage

PS4
Length: 3.0m
Diameter: 1.34m
Liquid Propellant: MMH + MON3
Propellant Mass: 0.8t

Second Stage

PS2
Length: 12.8m
Diameter: 2.8m
Liquid Propellant: UH25+ N_2O_4
Propellant Mass: 41t

PS1

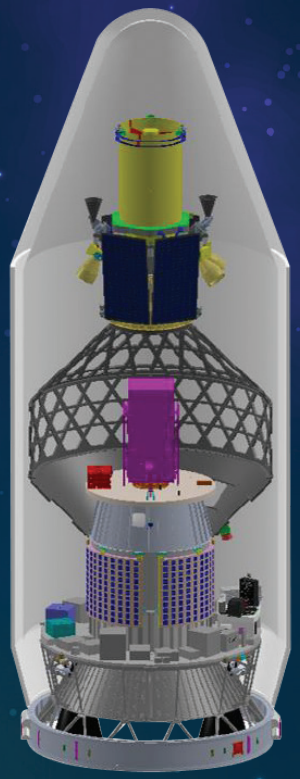
Length: 20m
Diameter: 2.8m
Propellant: Solid (HTPB based)
Propellant Mass: 139t

Height: 44.4 m

PSLV-C53 Flight Sequence

PSLV-C53 Typical Flight Profile

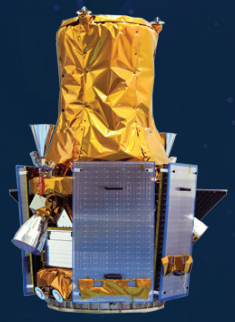
Event	Time (s)	Local Altitude (km)	Inertial Velocity (m/s)
RCT Ignition	-3	0.027	451.9
PS1 Ignition	0	0.027	451.9
PS1 Separation	108.20	50.728	1719.3
PS2 Ignition	108.40	50.926	1718.3
CLG Initiation	113.40	55.812	1736.5
Heat Shield Separation	176.60	113.032	2476.9
PS2 Separation	258.04	174.136	4580.8
PS3 Ignition	259.24	174.891	4579.3
PS3 Separation	583.82	364.583	7581.2
PS4 Ignition	888.42	535.827	7385.7
PS4 Engine Cut-off	1021.04	570.547	7572.1
DS-EO Separation	1078.04	570.516	7574.2
DLA Separation	1118.04	570.475	7574.3
NeuSAR Separation	1158.04	570.420	7574.4
SCOOB-I Separation	1162.04	570.414	7574.4
MON Passivation Start	1271.04	570.166	7573.7
MMH Passivation Start	1911.04	558.455	7582.1
POEM Start	2241.04	550.029	7591.5



Payload Accommodation within heatshield of PSLV-C53

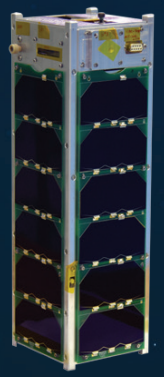
S. No.	Satellites	Country	Mass (kg)
1	DS-EO	Singapore	367
2	NeuSAR	Singapore	155
3	SCOOB-I	Singapore	2.8

Customer Spacecrafts in this mission



DS-EO carries an Electro-Optic, multi-spectral payload which will provide full color images, which are useful in recognizing scenes in different ground terrain features, generating high quality maps for land classification, and serving Humanitarian Assistance and Disaster Relief needs.

NeuSAR is Singapore's first small commercial satellite carrying a SAR payload, which is capable of providing images in day and night and under all weather conditions. This is particularly useful for applications like commodity reporting and maritime safety.



SCOOB-I satellite is the first satellite in the Student Satellite Series (S3-I), a hands-on student training program from the Satellite Research Centre (SaRC) at Singapore's Nanyang Technological University (NTU) School of Electrical and Electronic Engineering. SCOOB-I is of the size of a shoe box and carries a solar spectral sensor, earth imaging camera, attitude determination system and a novel solar panel developed at SaRC.

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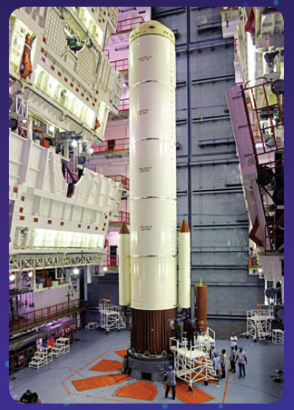

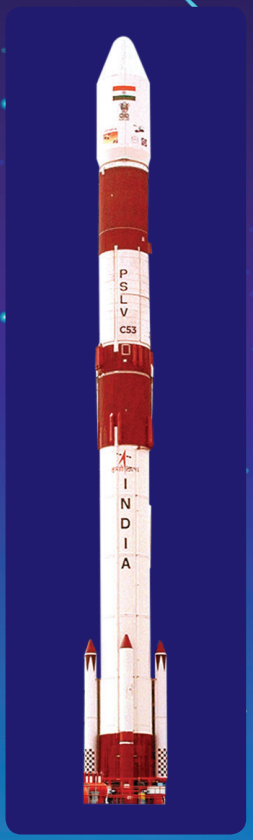

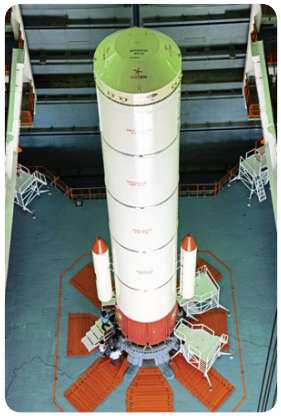

NewSpace India Limited
ISRO Headquarters Campus,
New BEL Road, Bengaluru, India. PIN-560 094.
Tel: +91 80 2217 2695
Email: contact-nsil@isro.gov.in

@NSIL_India www.nsilindia.co.in

Indian Space Research Organisation
Office of Media and Public Relations
ISRO Headquarters, Antariksh Bhavan,
New BEL Road, Bengaluru, India. PIN-560 094.
Tel : +91 80 2341 5474
Email: isropr@isro.gov.in

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