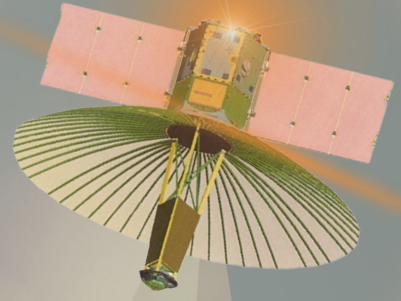


PSLV-C56 DS-SAR MISSION





MISSION

PSLV-C56 / DS-SAR, is the Dedicated Commercial Mission of NewSpace India Limited (NSIL) for ST Engineering, Singapore. DS-SAR, a Radar Imaging Earth Observation satellite is the primary satellite for the mission. In addition to this, there are six co-passenger customer satellites also belonging to Singapore. All satellites would be injected into 535 km circular with 5° orbital inclination.

This is the 58th flight of PSLV and 17th flight of PSLV in Core Alone configuration. After injecting all the satellites, the upper stage of the rocket would be placed in lower orbit to ensure its reduced orbital life. PSLV-C56 launch will be accomplished from First Launch Pad (FLP) located at Satish Dhawan Space Centre (SDSC), Sriharikota.

Payloads onboard PSLV-C56

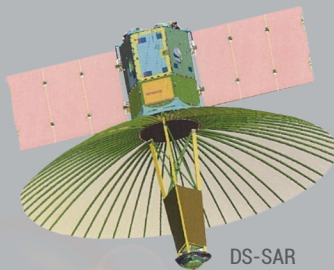
Satellite	Agency / Country	Separating Mass (kg)
DS-SAR	DSTA-ST Engineering, Singapore	352
ARCADE	NTU, Singapore	24
VELOX-AM		23
SCOOB-II		4
ORB-12 STRIDER	ALIENA Private Limited, Singapore	13
Galassia-2	NUS, Singapore	3.5
NuLioN	NuSpace Private Limited, Singapore	3

PAYLOAD



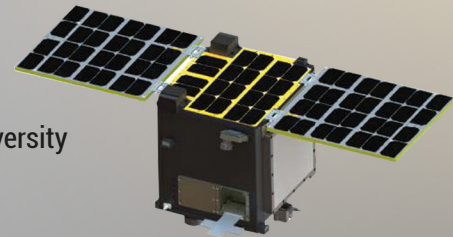
DS-SAR VELOX-AM ARCADE SCOOB-|| NuLIoN Galassia-2 ORB-12 STRIDER

DS-SAR satellite is developed under a partnership between DSTA (representing the Government of Singapore) and ST Engineering. Once deployed and operational, it will be used to support the satellite imagery requirements of various agencies within the Government of Singapore. ST Engineering will use it for multi-modal and higher responsiveness imagery and geospatial services for their commercial customers.

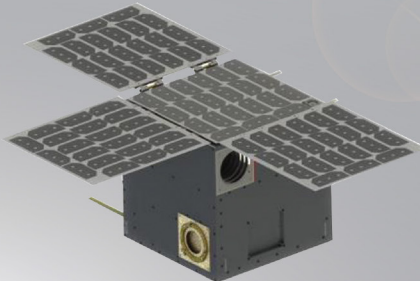


DS-SAR carries a Synthetic Aperture Radar (SAR) payload developed by Israel Aerospace Industries (IAI). This allows the DS-SAR to provide for all-weather day and night coverage, and capable of imaging at 1m-resolution at full polarimetry.

VELOX-AM is a microsatellite developed by Nanyang Technological University (NTU), Singapore, for technology demonstration of Additive Manufacturing (AM) payloads.



VELOX-AM

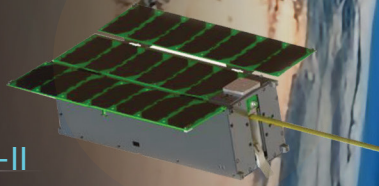


ARCADE

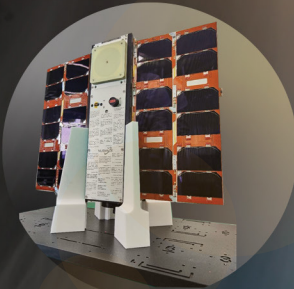
ARCADE is a 27U microsatellite designed and built by Nanyang Technological University (NTU), Singapore, in collaboration with the INSPIRE (International Satellite Program in Research and Technology) consortium. ARCADE carries iodine based solid propellant propulsion module, based on Hall effect thruster for orbit maintenance during the low altitude mission.



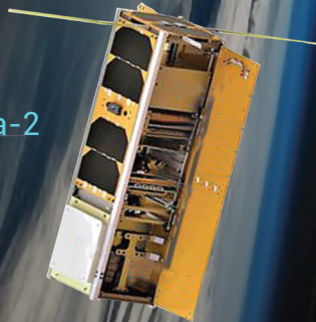
SCOOB-II



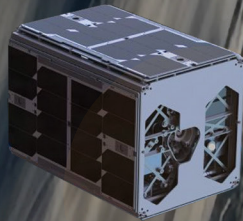
NuLoN



Galassia-2



ORB-12 STRIDER



PAYLOAD

SCOOB-II is a 3U CubeSat designed and developed by a student team at Satellite Research Centre (SaRC), Nanyang Technological University (NTU) in Singapore. The satellite is designed for a 6-month mission lifetime. SCOOB-II utilizes a three-axis controlled reaction wheel assembly for attitude control.

NuLoN is a 3U nanosatellite developed by NuSpace as the seed satellite for a LEO equatorial constellation providing continuous LoRaWAN IoT services.

Galassia-2 is an educational 3U nanosatellite by National University of Singapore (NUS). The main mission of GALASSIA-2 is to perform an inter-satellite link (ISL) with TeLEOS-1. Galassia-2 will demonstrate the capability of using Commercial Off The Shelf (COTS) multispectral imagery for space applications.

ORB-12 STRIDER is developed under an international collaboration, coordinated by Singapore-based ALIENA, including Orbital Astronautics as bus providers, and Aurora Propulsion Technologies as subsystem co-developers. It will demonstrate next generation propulsion systems catered specifically for small satellite constellations. ORB-12 STRIDER will carry the world's first Multi-modal all-Electric Propulsion Engine (MEPE), featuring ALIENA's flagship Multi-Stage Ignition Compact (MUSIC) Hall thruster and Aurora's ARM resistojets.

PS4 De-Orbiting Experiment



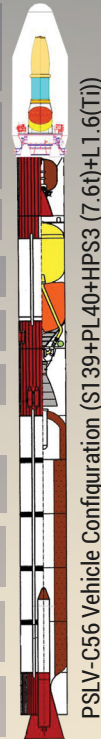
PS4 will be de-orbited to Low Earth circular orbit ~300 x 300 km, using left out propellants to reduce orbital life of spent PS4 stage.

PSLV-C56 Vehicle Characteristics

Vehicle Height	44.4 m
Lift-off Mass	228.642 t
Propulsion Stages	
First Stage	S139
Second Stage	PL40
Third Stage	HPS3(7.6 t)
Fourth Stage	L1.6 (Ti)

PSLV-C56 Mission Specifications (Osculating Elements)

Parameter	Orbit-1 (Satellites)	Orbit-2 (Spent PS4 Stage)
Semi-major Axis (km) (wrt. Equatorial Earth Radius)	6914.137	6678.137
Altitude (km)	536	300
Inclination	5° + 0.2°	
Launch Pad	FLP	
Launch Azimuth	102°	

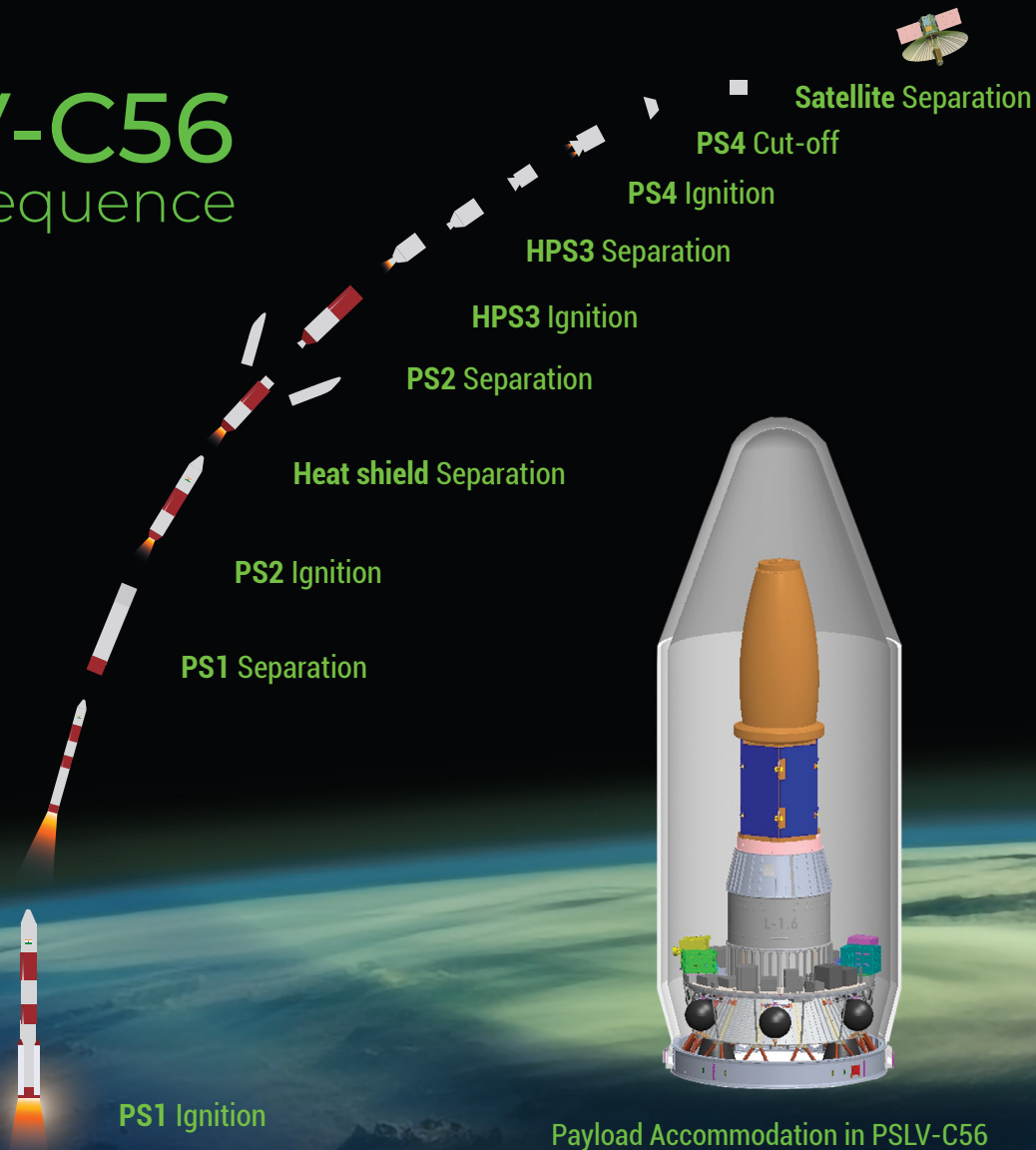


PSLV-C56 Stages at a Glance

	Stage 1(PS1)	Stage 2 (PS2)	Stage 3 (HPS3)	Stage 4 (PS4)
Length (m)	20	12.8	3.6	3.0
Diameter (m)	2.8	2.8	2	1.34
Propellant	Solid (HTPB based)	Liquid (UH25 + N ₂ O ₄)	Solid (HTPB based)	Liquid (MMH+ MON ₃)
Propellant Mass (t)	139	41	7.65	1.6



PSLV-C56 Flight Sequence





PSLV-C56


Typical Flight Profile

Event	Time (s)	Local Altitude (km)	Inertial Velocity (m/s)
PS1 RCT Ignition	-3	0.026	451.9
PS1 Ignition	0	0.026	451.9
PS1 Separation	110.46	50.019	1724.1
PS2 Ignition	110.66	50.208	1723.2
CLG Initiation	115.66	54.858	1743.0
PLF Separation	185.56	113.100	2606.8
PS2 Separation	262.98	164.089	4695.0
PS3 Ignition	264.18	164.752	4693.7
PS3 Burn Out	390.88	216.756	7693.0
PS3 Separation	590.88	325.175	7568.4
PS4 Ignition	951.42	480.280	7388.2
PS4 Cut-off (RTD-T6)	1224.42	536.079	7590.8
DS-SAR Separation	1271.42	536.059	7592.7
NuLloN Separation	1281.42	536.051	7592.7
ORB-12 STRIDER Separation	1326.42	536.004	7592.8
Galassia-2 Separation	1340.42	535.984	7592.8
SCOOB-II Separation	1381.42	535.914	7592.9
ARCADE Separation	1431.42	535.804	7593.0
VELOX-AM Separation	1486.42	535.652	7593.2



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