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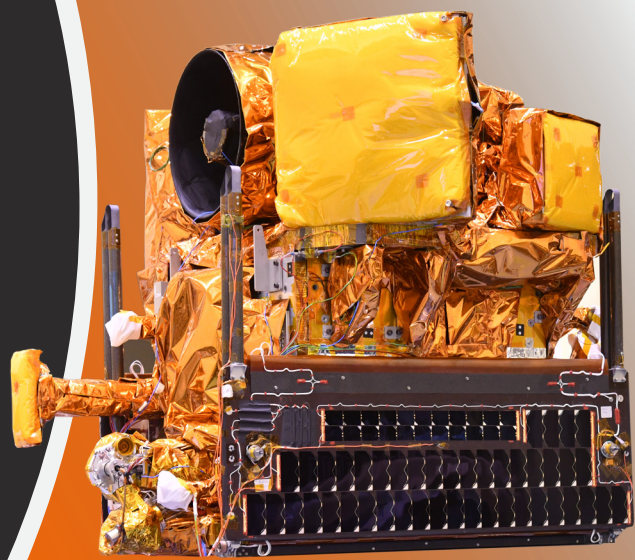
SSLV-D3
EOS-08
Mission



SSLV-D3/EOS-08 MISSION

Small Satellite Launch Vehicle (SSLV) is capable of launching Mini, Micro or Nano satellites (10 to 500kg mass) into 500km planar orbit. SSLV is a three-stage launch vehicle with all solid propulsion stages and liquid propulsion based Velocity Trimming Module (VTM) as terminal stage.

Design drivers of SSLV are Low cost, low turn-around time, flexibility in accommodating multiple satellites, launch on demand feasibility, minimal launch infrastructure requirements, etc.

SSLV-D3 is the third developmental flight of SSLV.

Mission Objectives

1. Demonstration of repeatable flight performance of SSLV Vehicle Systems.
2. Injection of EOS-08 satellite and SR-0 DEMOSAT passenger satellite into 475 km circular orbit.

SSLV-D3 Vehicle characteristics

Vehicle Height	34 m
Vehicle Diameter	2 m
Lift off Mass	~119 t
Vehicle Configuration	SS1 + SS2 + SS3 + VTM

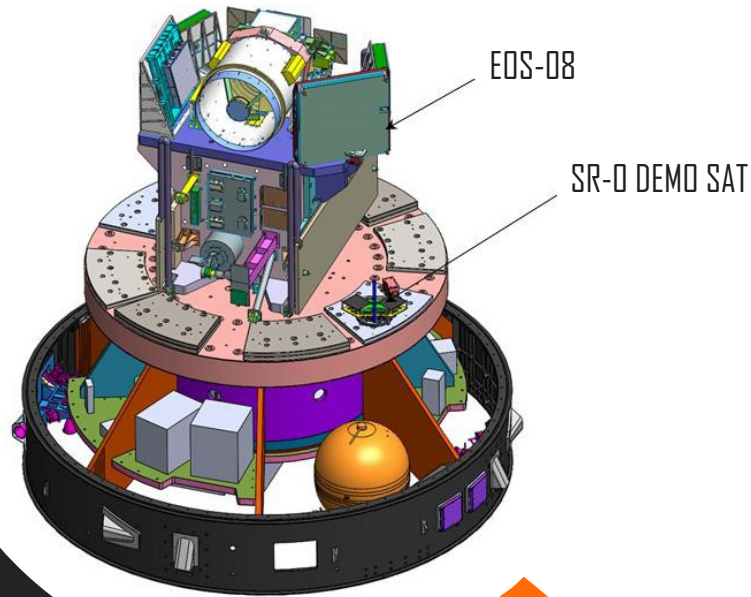
SSLV-D3 Mission Specifications

Parameter	Specification
Altitude (km)	475 km
Inclination (deg)	37.4
Launch Pad	FLP
Launch Azimuth (deg)	135

SSLV-D3 Stages at a Glance				
	STAGE 1 (SS1)	**STAGE 2 (SS2)**	**STAGE 3 (SS3)**	**VTM**
Length (m)	22.5	3.2	2.8	0.85
Diameter (m)	2	2	1.7	2
Propellant	Solid (HTPB based)	Solid (HTPB based)	Solid (HTPB based)	Liquid (MMH+MON3)
Propellant mass (t)	87	7.7	4.5	0.05
Action Time (s)	114.9	116.0	108.4	-

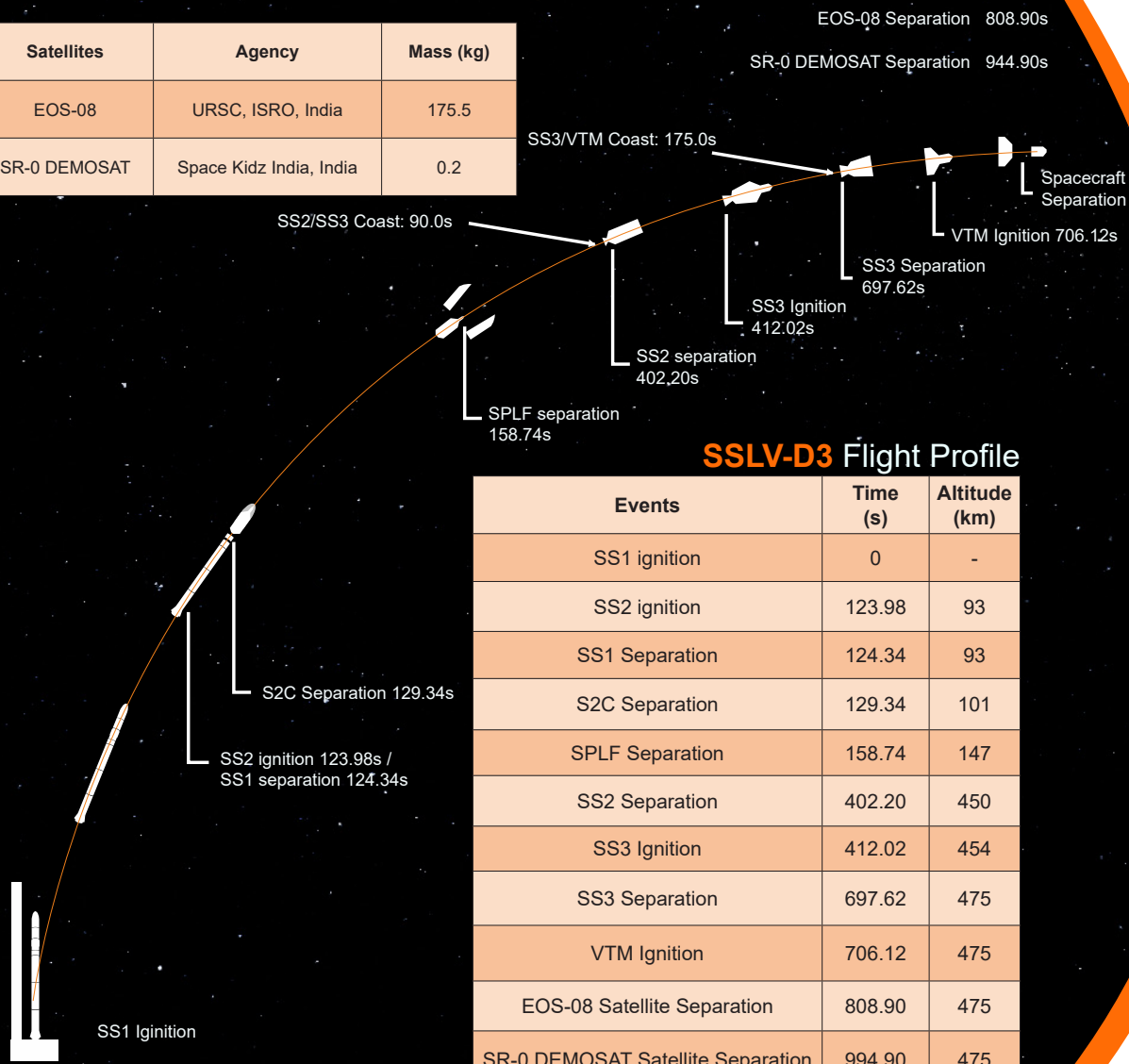
Payload Accomodation in

SSLV-D3



SSLV-D3 Flight Sequence

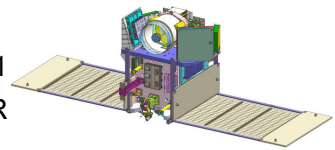
Satellites	Agency	Mass (kg)
EOS-08	URSC, ISRO, India	175.5
SR-0 DEMOSAT	Space Kidz India, India	0.2



SSLV-D3 Flight Profile

Events	Time (s)	Altitude (km)
SS1 ignition	0	-
SS2 ignition	123.98	93
SS1 Separation	124.34	93
S2C Separation	129.34	101
SPLF Separation	158.74	147
SS2 Separation	402.20	450
SS3 Ignition	412.02	454
SS3 Separation	697.62	475
VTM Ignition	706.12	475
EOS-08 Satellite Separation	808.90	475
SR-0 DEMOSAT Satellite Separation	994.90	475

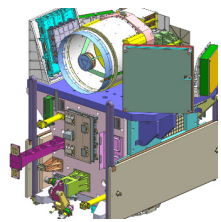
EOS-08



EOS-08 is a first-of-its-kind mission built on a standard ISRO's Microsat/IMS-1 bus with a suite of advanced payloads for observation in IR range, novel GNSS-R Payload and SiC UV dosimeter.

The satellite carries a host of new technology developments in satellite mainframe systems like an Integrated Avionics system - Communication, Baseband, Storage and Positioning (CBSP) Package, Structural panel embedded with PCB, embedded battery, Micro-DGA (Dual Gimbal Antenna), M-PAA (Phased array antenna) and Flexible solar panel & Nano star sensor etc for onboard Technology Demonstration. The satellite is slated for launch by Small Satellite Launch Vehicle (SSLV)-D3.

The primary objectives of the mission are design and development of:



- ✓ Payload instruments compatible to micro satellite bus and with new technologies that are required for future operational satellites.
- ✓ A micro satellite accommodating new mainframe technologies like integrated avionics package, structural panel with embedded PCB/battery, flexible Solar Panel and m-DGA.

Payloads: The satellite carries three payloads namely Electro Optical Infrared Payload (EOIR), SAC, Global Navigation Satellite System- Reflectometry payload (GNSS-R), SAC and SiC UV Dosimeter, LEOS.

✓ EOIR payload is to image in Mid-Wave IR (MIR) band and in Long Wave IR (LWIR) band during day and night for various applications like Satellite based surveillance, Disaster Monitoring, Environmental Monitoring, Fire Detection, Volcanic activities and Industrial and power plant disaster.

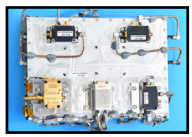
✓ GNSS-R payload is to demonstrate the capability using GNSS-R based remote sensing to derive applications like Ocean Surface Winds, Soil moisture, Cryosphere applications over Himalayan Region, Flood detection, In-land waterbody detection etc.

✓ SiC UV Dosimeter is to monitor the UV irradiance at the View Port of the Crew Module in Gaganyaan Mission and to use as a high dose alarm sensor for UV Radiation.

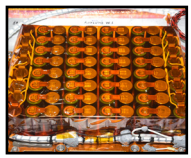
New Technologies

Communication, Baseband, Storage and Positioning (CBSP) is a single package with cold redundant systems designed using COTS components and evaluation boards performing Communication, Baseband, Storage and satellite positioning functions supporting storage of 400 Gb.

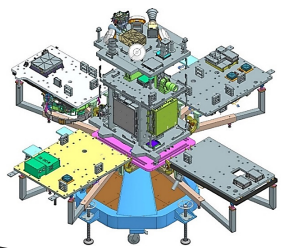
RFS package consists LNAs, S-Band and X-Band filters, Switches and Solid State Power Amplifier.



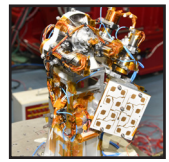
Multi-functional Structural Panel with Embedded Battery and Power Electronics Card Enables mass and volume savings with improved functionality.



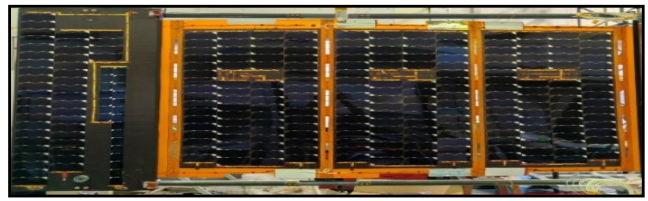
Hinge Based Integration Fixture: A New method of Integration of Housekeeping panels seamlessly using hinge based fixture was adopted for the mission to reduce the Assembly, Integration and Testing time of the satellite.



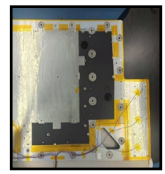
Micro-Dual Gimbal Antenna (mDGA) having rotational speed of 6°/s and pointing accuracy of ±1°.



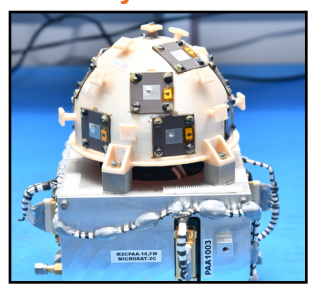
Flexible Solar panel consists of Foldable solar panel substrate, GFRP tube, CFRP honeycomb rigid end-panel.



Pyro-lytic Graphite Sheet Diffuser plate: Higher thermal conductivity of 350W/mK with reduced mass which can be used in multiple application.



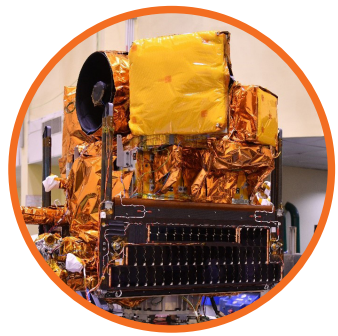
Miniaturised - Phased Array Antenna



New novel schemes in mainframe technologies

- ✓ X-band Data Transmission: Pulse shaping and FCM for X-Band data transmitters.
- ✓ Battery: SSTCR based battery charging / bus regulation by sequentially including / excluding strings (freq. 6Hz).
- ✓ TM-TC System: Dual mode for TM-TC system, Miniaturized micro-strip filters for Data.
- ✓ Indigenized process of Solar cell fabrication.
- ✓ Sensors: Use of Nano-Star Sensor for Microsat Application.
- ✓ Inertial System: Vibration isolations for Reaction Wheels.
- ✓ Interfaces: Single Antenna interface for TTC and SPS application.
- ✓ Thermal Management: Novel materials for Thermal management of antenna like Germanium Black Kapton, STAMET (Si-Al Alloy) Black Kapton were used.
- ✓ Mission Management: Auto Launch Pad initialization feature.

ISRO's IMS-1 Bus system capabilities are considerably improved with the induction of various new technologies in terms of enhanced power generation (16%), more payload mass (33%), increased data download rate (5 times data rate & FACM mode) and more data storage (12 times) in EOS-08 Mission.



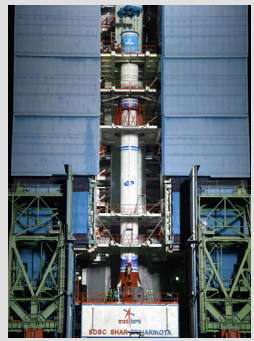
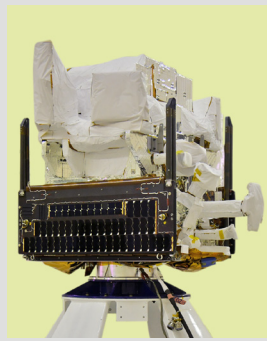
Spacecraft Mission Configuration

Parameter	Specifications
Orbit & Altitude	Circular LEO; 475 km; Inclination 37.4°
Mission Life	1 Year
Mass & Power	~175.5 kg and ~420 W





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Capacity Building and Public Outreach (CBPO)
Indian Space Research Organisation

Department of Space, Government of India
Antariksh Bhavan, New BEL Road
Bangalore-560094, India
Telephone: +91 80 2217 2119