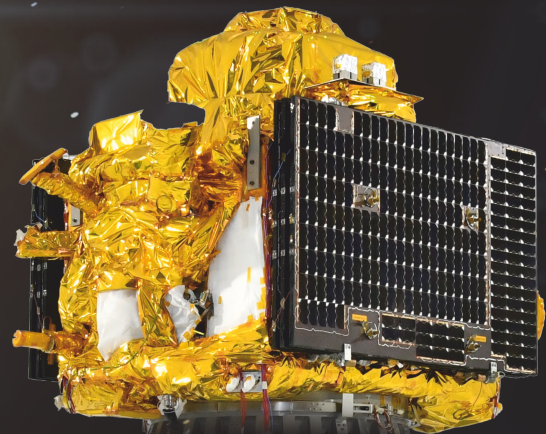




PSLV-C58 XPoSat MISSION



PSLV-C58/XPOSAT Mission

ISRO's PSLV-C58 Mission is to launch XPOSAT Satellite into an Eastward low inclination orbit. After injection of XPOSAT, the PS4 stage will be re-started twice to reduce the orbit into 350 km circular orbit to maintain in 3-axis stabilized mode for Orbital Platform (OP) experiments. The PSLV Orbital Experimental Module-3 (POEM-3) experiment will be executed meeting the objective of 10 identified payloads, supplied by ISRO and IN-SPACe.

4th

PSLV-DL

60th

PSLV

XPOSAT Orbit

Semi Major Axis : 7028.317 km
(Altitude wrt Equatorial earth Radius: 650.18 km)

Eccentricity : 0.0

Inclination : 6.0 deg



PSLV-C58 Vehicle Characteristics

PSLV-C58 Vehicle Characteristics	
Vehicle Height	44.4 m
Lift-off Mass	260 t
Propulsion Stages	
First Stage	2PSOM-XL+ S139
Second Stage	PL40(HP)
Third Stage	HPS3
Fourth Stage	L1.6(Ti)

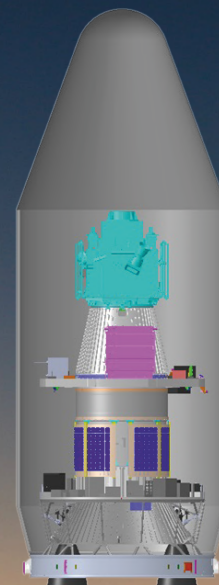
PSLV-C58 Mission Specifications		
Parameter	Orbit-1 (XPOSAT)	Orbit-2 (POEM-3)
Semi-Major Axis (km)	7028.317	6728.137
Altitude (km) (wrt. equatorial Earth radius)	650.180	350
Inclination (deg)	6	9.6
Launch Pad	FLP	
Launch Azimuth (deg)	102°	

PSLV-C58 Vehicle Configuration (2PSOM-XL+S139+PL40 (HP)+HPS3+L1.6(Ti))

PSLV-C58 Stages at a Glance					
	Stage 1		Stage 2 (PS2)	Stage 3 (HPS3)	Stage 4 (PS4)
	PS1	PSOM-XL			
Length (m)	20	12	12.8	3.6	2.5
Diameter (m)	2.8	1	2.8	2	1.34
Propellant	Solid (HTPB based)	Solid (HTPB based)	Liquid (UH25 + N ₂ O ₄)	Solid (HTPB based)	Liquid (MMH+ MON3)
Propellant Mass (t)	138	2 x 12.2	41.9	7.66	1.6

Satellite in PSLV-C58

Satellite	Agency	Separated Mass (kg)
XPOSAT	URSC, ISRO	469



**Payload Accommodation
in PSLV-C58**

PSLV-C58

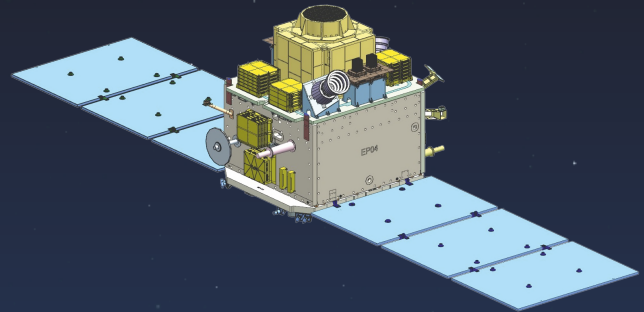
Flight Sequence



Event	Time (s)	Local Altitude (km)	Inertial Velocity (m/s)
RCT Ignition	-3	0.025	451.9
PS1 Ignition	0	0.025	451.9
PSOM XL 5,6 (GL) Ignition	0.42	0.025	451.9
PSOM XL 5,6 (GL) Separation	69.9	23.630	1157.9
PS1 Separation	109.40	57.285	1998.6
PS2 Ignition	109.60	57.481	1997.9
CLG Initiation	114.60	62.309	2020.0
Heat Shield Separation	175.10	113.680	2750.0
PS2 Separation	261.50	161.380	4978.7
PS3 Ignition	262.70	161.783	4978.0
PS3 Separation	586.26	351.435	7532.6
PS4 Ignition	1011.42	592.879	7254.6
Ps4 Engine Cut-off	1258.92	650.182	7529.1
Xposat separation	1315.92	650.161	7530.8

XPOSAT

XPoSat (X-ray Polarimeter Satellite) is the first dedicated scientific satellite from ISRO to carry out research in space-based polarisation measurements of X-ray emission from celestial sources. The Satellite configuration is modified from the IMS-2 bus platform. The Configuration of the mainframe systems are derived based on the heritage of IRS satellites. It carries two payloads namely POLIX (Polarimeter Instrument in X-rays) and XSPECT (X-ray Spectroscopy and Timing). POLIX is realized by Raman Research Institute and XSPECT is by Space Astronomy Group of URSC.



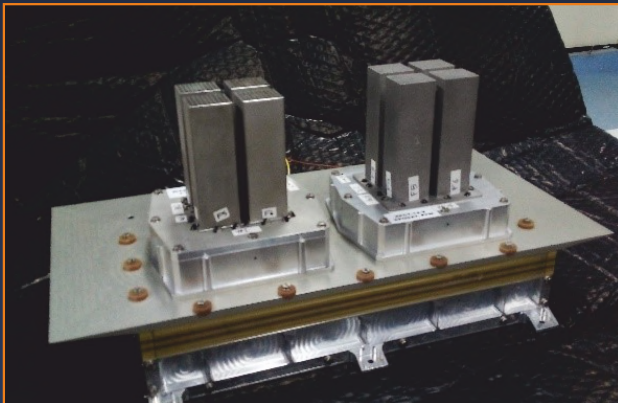
The objectives of this mission are

- To measure polarisation of X-rays in the energy band 8-30keV emanating from about 50 potential cosmic sources through Thomson Scattering by POLIX payload.
- To carry out long term spectral and temporal studies of cosmic X-ray sources in the energy band 0.8-15keV by XSPECT payload.
- To carry out polarisation and spectroscopic measurements of X-ray emissions from cosmic sources by POLIX and XSPECT payloads respectively in the common energy band.

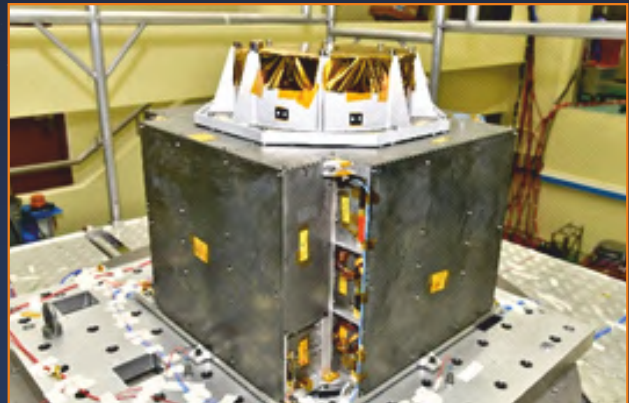
Scientific Goals of the Mission

- To study the distribution of magnetic field, geometric anisotropies, alignment w.r.t line of sight, nature of accelerator in galactic cosmic X-Ray sources by measuring degree of polarization and its angle.
- Structure and geometry of magnetic field of neutron stars, mechanism of X-Ray beaming and its relation with luminosity and mass of accretion rate of powered pulsars.
- Detailed understanding of galactic black hole binary sources.
- To study and confirm about production of X-Rays is either from polar cap of neutron star or outer cap of pulsar magnetosphere.
- To distinguish the synchrotron mechanism as dominant over thermal emission in Supernova remnants.

Payloads



XSPECT



POLIX

Orbit change and Passivation

After injection of XPoSat in 650km, 6 deg orbit, PS4 stage will be lowered to 350km, ~9.6 deg orbit, by restarting PS4 twice. The left out propellant in the PS4 will be disposed through the Main engines as a pre cursor to enabling safety of PS4 stage in atmosphere re-entry experiments planned in future. The Oxidiser will be let out first followed by Fuel in a predetermined sequence of operations. The existing scheme of Spent stage passivation by venting the tank pressure will also be active. Post passivation of PS4, the control of stage is transferred to POEM Avionics.


POEM


PS4 stage is configured as a 3-axis stabilized Orbital platform for conducting experiments to space qualify systems with novel ideas. The PS4 Stage Orbital Platform Electrical power requirements are catered by Flexible Solar Panel in conjunction with 50Ah Li-Ion battery in battery tied configuration. The orbital platform consists of Avionic systems to take care of Navigation, Guidance, Control & telecommands and Orbital Platform Attitude Control System to cater to control of the platform to test the payloads. The payloads are as follows.

Payload	Purpose	Agency/Company
Radiation Shielding Experiment Module (RSEM)	Evaluation of Tantalum coating effectiveness	TakeMe2Space
Women Engineered Satellite (WESAT)	Comparison of Solar Irradiance and UV Index	LBS Institute of Technology for Women
BeliefSat0	Amateur radio satellite	K J Somaiya Institute of Technology
Green Impulse TrAnsmmitter (GIT)	Green bipropellant CubeSat propulsion unit	Inspecity Space Labs Private Limited
Launching Expeditions for Aspiring Technologies Technology Demonstrator (LEAP-TD)	Demonstration of subsystem of microsatellite	Dhruva Space Private Limited
RUDRA 0.3 HPGP	Green Monopropellant Thruster	Bellatrix Aerospace Private Limited
ARKA-200	Heater less Hollow Cathode for Hall thrusters	Bellatrix Aerospace Private Limited
Dust Experiment (DEX)	Interplanetary dust count measurement	PRL, ISRO
Fuel cell Power System (FCPS)	Demonstration of fuel cell	VSSC, ISRO
Si based High Energy cell	Demonstration of Silicon based High Energy cells	VSSC, ISRO




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