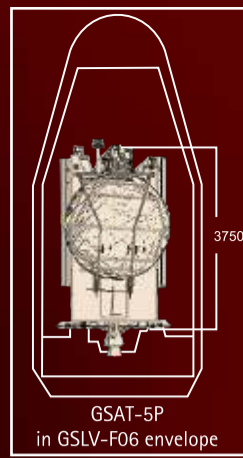


GSLV-F06 is the seventh mission of Geosynchronous Satellite Launch Vehicle GSLV aimed to inject a 2310 kg communication satellite, GSAT-5P, into a Geosynchronous Transfer Orbit (GTO).

GSLV is a three stage rocket. First stage is configured around a core 139 tonne solid rocket motor (S139) with four liquid strap-on stages each carrying 42 tonnes of earth storable liquid propellants: UH 25 and N₂O₄. S139 Solid booster uses Hydroxyl Terminated Polybutadiene (HTPB) based propellant. Second stage is a liquid stage with 39.4 tonnes of liquid propellants UH 25 and N₂O₄. Third stage is a cryogenic stage with 15.2 tonne propellant loading using liquid Hydrogen as fuel and liquid Oxygen as oxidiser.

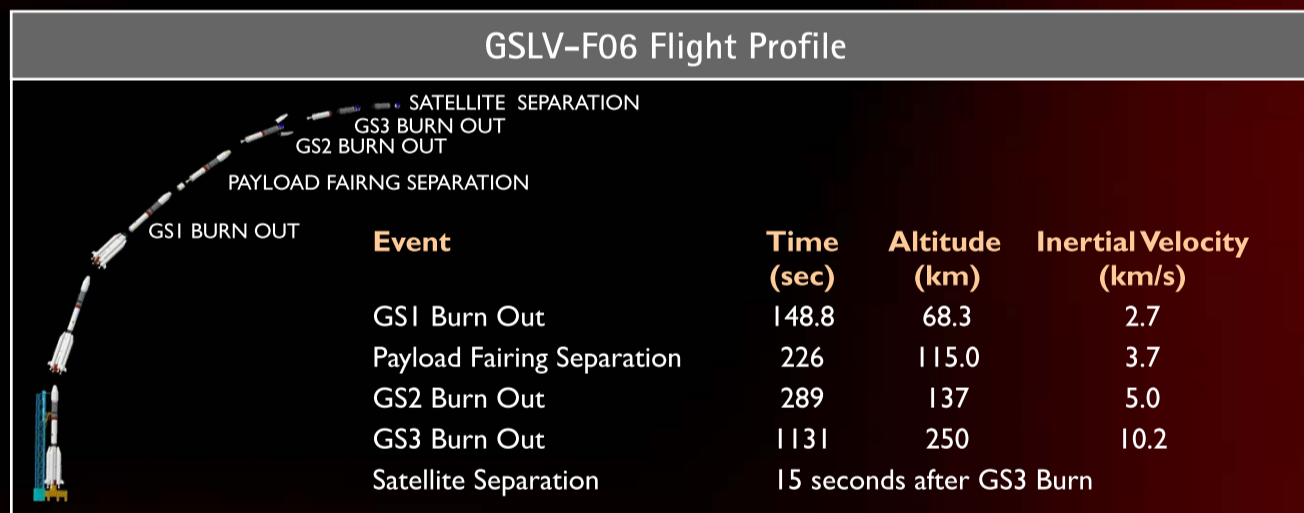


Payload fairing, which is 8.6 m long, 4 m in diameter and made of composite material, protects the vehicle avionics and the spacecraft during its ascent through the atmosphere. GSLV employs various separation systems such as Flexible Linear Shaped Charge for the first stage, Pyro Actuated Collet Release Mechanism for the second stage and Merman Band Bolt Cutter Separation Mechanism for the third stage. Spacecraft Separation is by spring thrusters mounted at the separation interface.

The Redundant Strap down Inertial Navigation System/Inertial Guidance System of GSLV housed in its equipment bay guides the vehicle from lift-off to spacecraft injection. The digital auto-pilot and closed loop guidance scheme ensure the required attitude manoeuvre and guided injection of the spacecraft to the specified orbit. State of the art advanced Mission computer hardware is used for this purpose.

GSLV employs S-band telemetry and C-band transponders for enabling vehicle performance monitoring, tracking, range safety/flight safety and Preliminary Orbit Determination.

Salient Features	
Overall length	: 51 m
Lift-off weight	: 418 t
No. of stages	: 3
Payload	: GSAT-5P
Orbit (GTO)	: 170 km x 35,975 km



Parameter	GS1 (First Stage)		GS2 (Second Stage) (L37.5H)	GS3 (Third Stage) (C15)
	S139 Booster	L40H Strap-on		
Length (m)	20.13	19.7	11.56	9.8
Diameter (m)	2.8	2.1	2.8	2.8
Propellant mass(t)	138	42	39.4	15.2
Case / Tank material	Maraging steel	Aluminum Alloy	Aluminum Alloy	Aluminum Alloy
Propellant	HTPB	UH25 and N ₂ O ₄	UH25 and N ₂ O ₄	LH2 and LOX
Burn time (s)	106.9	148	137	838
Max Vac Thrust (kN)	4768	763	799	73.5 (Nominal)
Control System		Engine Gimbaling - Single Plane	Engine Gimbaling Two plane for pitch and yaw control, hot gas Roll Control System (RCS) for roll control	2 Vernier engines for thrust phase control and cold gas RCS for coast phase control



GSLV-F06



INDIAN SPACE RESEARCH ORGANISATION

Publications and Public Relations, ISRO Headquarters, Antariksh Bhavan, New BEL Road, Bangalore-560 231, India
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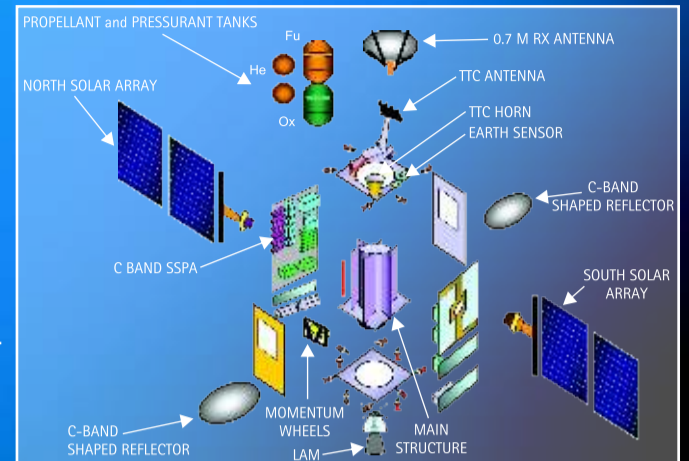
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GSAT-5P

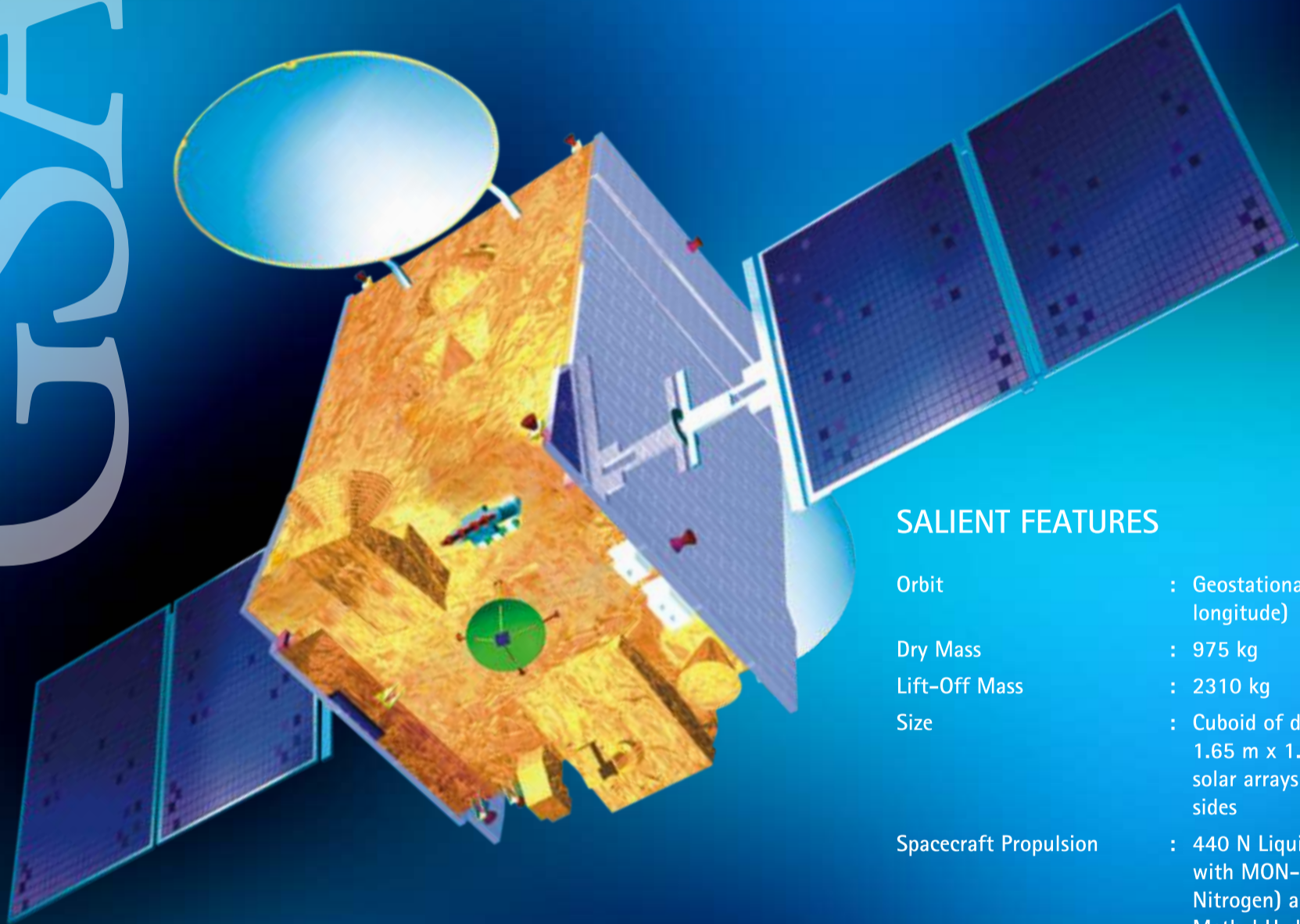
GSAT-5P is the fifth satellite to be launched in the GSAT series. It is an exclusive communication satellite to further augment the communication services currently provided by the Indian National Satellite (INSAT) System. Weighing 2310 kg at lift-off, GSAT-5P carries 24 Normal C-band and 12 Extended C-band transponders.

GSAT-5P will be launched from Satish Dhawan Space Centre SHAR, Sriharikota by the seventh flight of India's Geosynchronous Satellite Launch Vehicle (GSLV-F06) into a Geosynchronous Transfer Orbit (GTO) with a perigee of 170 km and an apogee of 35,975 km inclined at an angle of 19.3 deg to the equator. The satellite will be manoeuvred to its final circular 36,000 km high Geostationary Orbit by repeatedly firing the Liquid Apogee Motor (LAM) on board the satellite. GSAT-5P will be stationed at 55 deg East longitude.

Commissioned in 1983, INSAT is the largest domestic communication satellite system in the Asia-Pacific region. At present, it has nine satellites – INSAT-2E, INSAT-3A, INSAT-3C, INSAT-3E, KALPANA-1, GSAT-2, INSAT-4A, INSAT-4B and INSAT-4CR – providing Telecommunications, TV broadcasting, Meteorological Imaging, Disaster Warning and Satellite-aided search and rescue services. INSAT system provides about 178 transponders in S-band, C-band, extended C-band and Ku-band.



Disassembled view of GSAT-5P

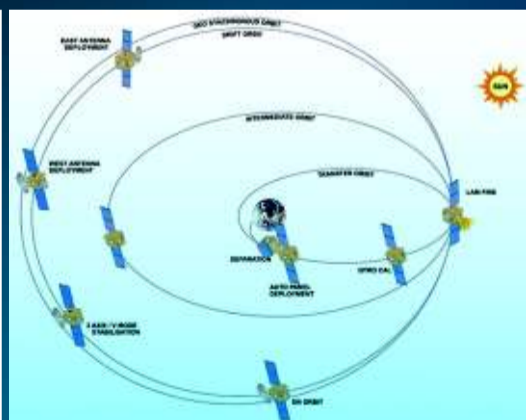


SALIENT FEATURES

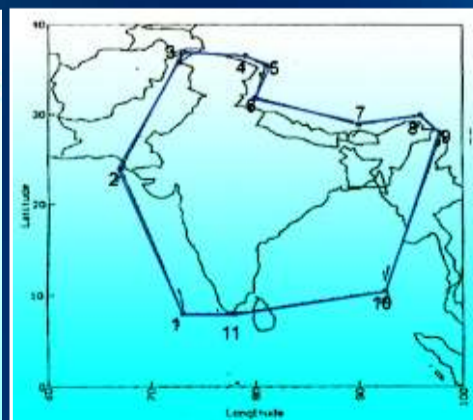
Orbit	: Geostationary (55 deg East longitude)
Dry Mass	: 975 kg
Lift-Off Mass	: 2310 kg
Size	: Cuboid of dimensions 1.65 m x 1.53 m x 2.98 m with solar arrays on North and South sides
Spacecraft Propulsion	: 440 N Liquid Apogee Motor with MON-3 (Mixed Oxides of Nitrogen) and MMH (Mono Methyl Hydrazine) for orbit raising
Stabilisation	: 3-axis body stabilised in orbit using Sun and Earth sensors, Gyroscopes, momentum and reaction wheels, magnetic torquers and eight 10 Newton and eight 22 Newton Reaction Control Thrusters
Power	: Solar array generating 2600 W. Two 64 Ah Lithium-Ion batteries to support full payload operation during eclipse period
Mission life	: 13.7 years



GSAT-5P during a pre launch test



GSAT-5P Mission Profile



Payload Coverage Polygon

COMMUNICATION PAYLOAD

24 Normal C-band transponders having India beam coverage, providing an Edge of Coverage-Effective Isotropic Radiated Power (EOC-EIRP) of 37 dBW

12 Extended C-band transponders having India beam coverage, providing an EOC-EIRP of 38 dBW

