

# GSLV-D6 / GSAT-6 Mission

27 August, 2015

## THE MISSION

GSLV-D6 carrying on-board the GSAT-6 Satellite lifted-off from the Satish Dhawan Space Centre (SDSC) SHAR, Sriharikota on August 27, 2015. GSLV is designed to inject 2 ton class of communication satellites into Geosynchronous Transfer Orbit (GTO) and the satellite achieved a GTO with a perigee of 170 km and an apogee of 35,957 km, inclined at an angle of  $19.95^\circ$  to the Equator.

After reaching GTO, GSAT-6 will use its own propulsion system to reach its final Geostationary Orbital home and will be stationed at  $83^\circ$  East longitude. GSAT-6 is an advanced, cuboid shaped, communication satellite which provides communication through S-band payload with five spot beams covering the entire country for user links and C-band payload with one beam covering India for hub links. It is the 12<sup>th</sup> satellite from the GSAT series.





# GSLV - D 6

## THE LAUNCH VEHICLE

GSLV-D6 is the 9<sup>th</sup> flight of India's Geosynchronous Satellite Launch Vehicle (GSLV). It is also the 5<sup>th</sup> developmental flight of GSLV and third time the indigenously developed Cryogenic Upper Stage (CUS) was carried on-board. GSLV-D6 flight is significant since as it continued the testing of CUS. The metallic payload fairing of GSLV-D6 has a diameter of 3.4 m.

The Cryogenic Upper Stage (CUS) being flown in GSLV-D6 is designated as CUS-06. A cryogenic rocket stage is more efficient and provides more thrust for every kilogram of propellant it burns compared to solid and Earth-storable liquid propellant rocket stages. The main engine and two smaller steering engines of CUS together develop a nominal thrust of 73.55 kN in vacuum. During the flight, CUS fires for a nominal duration of 720 seconds.

S-band telemetry and C-band transponders enable GSLV-D6 performance monitoring, tracking, range safety / flight safety and Preliminary Orbit Determination (POD).



## SPECIFICATIONS

<b>Height</b>	49.1 m
<b>Lift-Off Mass</b>	416 t
<b>No of Stages</b>	3
<b>Payloads</b>	GSAT-6
<b>Inclination (deg)</b>	19.95°
<b>Apogee</b>	35,975 km
<b>Perigee</b>	170 km
<b>Launch Pad</b>	Second Launch Pad (SDSC, SHAR)

Parameters	STAGE CHARACTERISTICS			
	Stages			
	First Stage (GS1)		Second Stage (GS2)	Third Stage (GS3)
	(4) L40Hs	S139		
<b>Length (m)</b>	19.7	20.2	11.6	8.7
<b>Diameter (m)</b>	2.1	2.8	2.8	2.8
<b>Propellants</b>	UH25 & N <sub>2</sub> O <sub>4</sub>	HTPB	UH25 & N <sub>2</sub> O <sub>4</sub>	LH <sub>2</sub> & LOX
<b>Propellant Mass (t)</b>	4 x 42.6	138.1	39.5	12.8
<b>Max. Thrust (kN)</b>	759.3	4815	799	73.55
<b>Duration (sec)</b>	148.9	106	150	720

# GSAT-6

## THE SATELLITE

GSAT-6 is the 25<sup>th</sup> Geostationary Communication built by ISRO and after its commissioning, GSAT-6 joined the group of India's other operational Geostationary Satellites. One of the advanced features of GSAT-6 satellite is its S-Band Unfurlable Antenna of 6 m diameter. This is the largest satellite antenna realised by ISRO. This antenna is utilised for five spot beams over the Indian main land. The spot beams exploit the frequency reuse scheme to increase frequency spectrum utilization efficiency. The other advanced feature of the satellite is the 70 V bus, which is flying first time in an Indian Communication Satellite.



## SPECIFICATIONS

<b>Weight</b>	2117 kg
<b>Power</b>	3100 W
<b>Stabilisation</b>	Momentum biased 3-axis stabilised
<b>Antenna</b>	One 0.8 m (fixed) and One 6 m unfurlable antenna (transmit and receive)
<b>Type of Satellite</b>	Communication
<b>Payloads</b>	<ul style="list-style-type: none"><li>• S-band payload with five spot beams covering India for user links</li><li>• C-band payload with one beam covering India for hub links</li><li>• S-band payload uses 6 m unfurlable antenna and C-band uses 0.8 m antenna.</li></ul>
<b>Mission Life</b>	9 Years

