

# PSLV-C16 / RESOURCESAT-2 Mission

20 April, 2011

## THE MISSION

PSLV-C16 carrying on-board the RESOURCESAT-2 lifted-off from the Satish Dhawan Space Centre (SDSC) SHAR, Sriharikota on April 20, 2011. PSLV-C16 placed three satellites RESOURCESAT-2, the Indo-Russian YOUTHSAT and Singapore's X-SAT into an 822 km polar Sun-synchronous Orbit (SSO) with a total payload mass of 1404 kg. All the three satellites were placed in the targeted orbits with high precision.



Immediately after the injection of the primary satellite, the two solar panels were deployed. The three Imaging Cameras had been oriented towards Earth. All operations and health checks required prior to switching on the three Imaging Cameras were completed. Orbital Trimming Manoeuvre was conducted successfully on April 22, 2011.

The satellite pass covered a 3000 km stretch of Indian landmass from Joshimut (Uttarakhand) to Kannur (Kerala). The data received will be used for a host of applications and services in the area of agricultural monitoring, natural resources management, disaster management support as well as infrastructure planning.



## PSLV - C 1 6

### THE LAUNCH VEHICLE

PSLV-C16 is the 18<sup>th</sup> flight of ISRO's Polar Satellite Launch Vehicle. In this flight, the 'Standard Version' of PSLV with six solid strap-on motors is used.

The major changes made in PSLV since its first launch include changes in strap-on motors, ignition sequence, increase in the propellant loading of the first stage and strap-on solid propellant motors as well as the second and fourth stage liquid propellant motors, improvement in the performance of the third stage motor by optimising motor case and enhanced propellant loading and employing a carbon composite payload adapter.

### SPECIFICATIONS

<b>Height</b>	44 m	
<b>Lift-Off Mass</b>	295 t	
<b>No of Stages</b>	4	
<b>Payloads</b>	<ul style="list-style-type: none"> <li>RESOURCESAT-2</li> <li>YOUTHSAT – Indo-Russian</li> </ul>	<b>International Customer Satellite Singapore (1)</b>
<b>Orbit Height</b>	822 km	
<b>Inclination (deg)</b>	98.77°	
<b>Apogee</b>	815.6 km	
<b>Perigee</b>	808.6 km	
<b>Launch Pad</b>	First Launch Pad (SDSC, SHAR)	



STAGE CHARACTERISTICS				
	Stage-1	Stage-2	Stage-3	Stage-4
<b>Nomenclature</b>	Core Stage (PS1) + 6 Strap-on Motors	PS2	PS3	PS4
<b>Propellant</b>	Solid (HTPB based)	Liquid (UH25 + N <sub>2</sub> O <sub>4</sub> )	Solid (HTPB based)	Liquid (MMH + MON-3)
<b>Mass (t)</b>	138.2 (Core), 6 x 9.0(Strap-on)	41.0	7.6	2.5
<b>Max Thrust (kN)</b>	4703 (Core), 6 x 635 (Strap-on)	804	244	7.3 x 2
<b>Burn Time (sec)</b>	107 (Core) 50 (Strap-on)	151	116	510
<b>Stage Dia (m)</b>	2.8 (Core), 1 (Strap-on)	2.8	2.0	2.8
<b>Stage Length (m)</b>	20 (Core), 11.3 (Strap-on)	12.8	3.6	2.6

## RESOURCESAT-2

### THE SATELLITE

RESOURCESAT-2 is a follow on mission to RESOURCESAT-1 and also it is the 18<sup>th</sup> Remote Sensing Satellite built by ISRO. RESOURCESAT-2 is intended to continue the remote sensing data services to global users provided by RESOURCESAT-1, and to provide data with enhanced multispectral and spatial coverage as well.

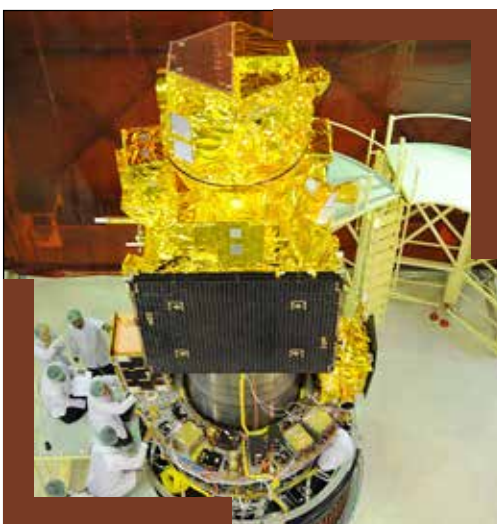
#### Important changes in RESOURCESAT-2 compared to RESOURCESAT-1 are:

- Enhancement of LISS-4 multispectral swath from 23 km to 70 km.
- Improved Radiometric accuracy from 7 bits to 10 bits for LISS-3 and LISS-4 and 10 bits to 12 bits for AWIFS.
- Also, suitable changes including miniaturisation in payload electronics have been made in RESOURCESAT-2.

RESOURCESAT-2 also carries an additional payload known as Automatic Identification System (AIS) from COMDEV, Canada as an experimental payload for ship surveillance in VHF band to derive position, speed and other information about ships. It also carries two Solid State Recorders with a capacity of 200 Giga Bytes each to store the images taken by its cameras which can be read out later to ground stations.

### SPECIFICATIONS

<b>Weight</b>	1206 kg
<b>Power</b>	1250 W
<b>Stabilisation</b>	3-axis body stabilised using Reaction Wheels, Magnetic Torquers and Hydrazine Thrusters
<b>Type of Satellite</b>	Earth Observation
<b>Payloads</b>	<ul style="list-style-type: none"> <li>• LISS-3</li> <li>• LISS-4</li> <li>• AWiFS-A</li> <li>• AWiFS-B</li> <li>• AIS</li> </ul>
<b>Mission Life</b>	5 Years





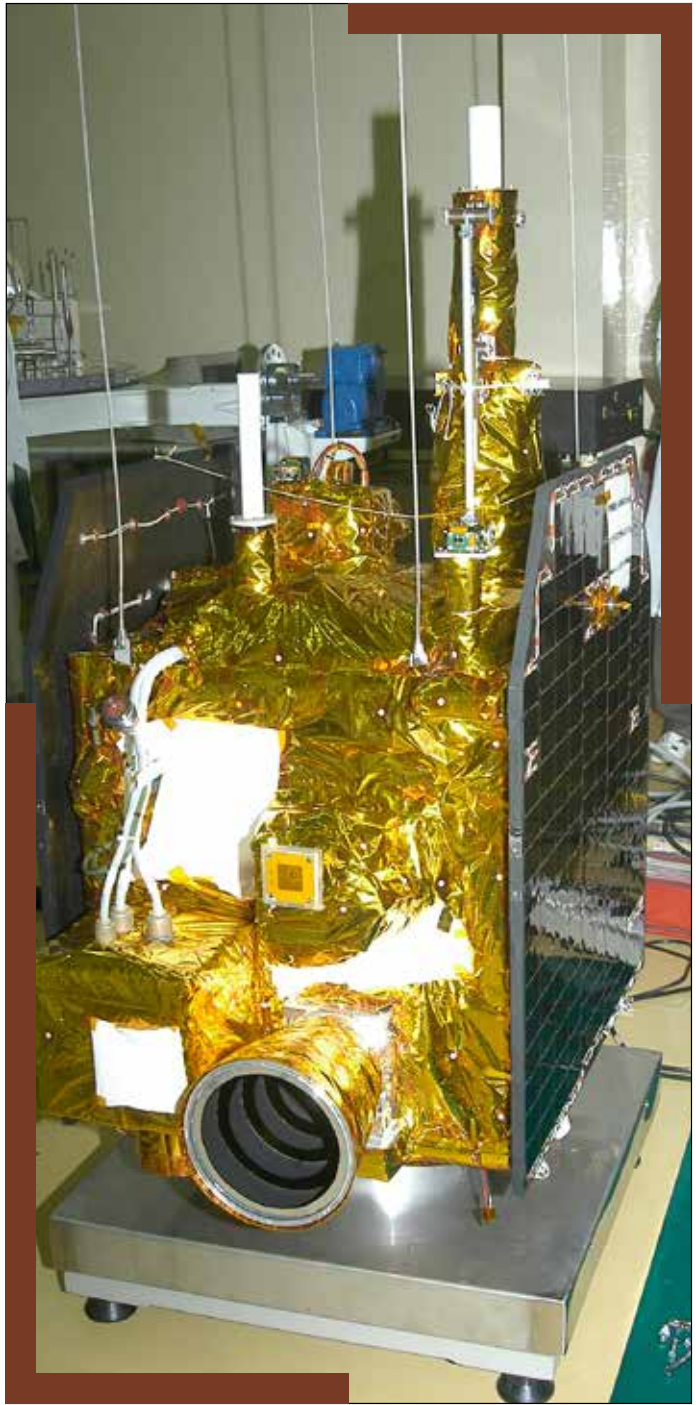
# YOUTHSAT

## THE SATELLITE

YOUTHSAT is a joint Indo-Russian Stellar and Atmospheric Satellite Mission with the participation of students from Universities at graduate, post graduate and research scholar level. YOUTHSAT is a minisatellite and the second in the Indian Mini Satellite (IMS) series. YOUTHSAT mission intends to investigate the relationship between solar variability and Thermosphere-Ionosphere changes. The satellite carries 3 payloads, of which 2 are Indian and 1 Russian. Together, they form a unique and comprehensive package of experiments for the investigation of the composition, energetics and dynamics of Earth's upper atmosphere.

### SPECIFICATIONS

<b>Weight</b>	92 kg
<b>Power</b>	Solar Array: 206 W Batteries: Li-Ion 10.5 Ah
<b>Stabilisation</b>	3-axis body stabilised using Sun and Star Sensors, Miniature Magnetometer, Miniature Gyroscopes, Micro Reaction Wheels and Magnetic Torquers
<b>Type of Satellite</b>	Experimental & Small Satellite
<b>Payloads</b>	<p><b>Indian Payloads</b></p> <ul style="list-style-type: none"> <li>• RaBIT (Radio Beacon for Ionospheric Tomography)</li> <li>• LiVHySI (Limb Viewing Hyper Spectral Imager)</li> </ul> <p><b>Russian Payload</b></p> <ul style="list-style-type: none"> <li>• SOLRAD (Solar Radiation Experiment)</li> </ul>
<b>Mission Life</b>	2 Years



# THE INTERNATIONAL CUSTOMER SATELLITE

## X-SAT

X-SAT is Singapore's first satellite. Weighing 106 kg at lift-off, X-Sat is a minisatellite with a multispectral camera IRIS as its primary payload. X-SAT mission was to demonstrate technologies related to satellite based remote sensing and on-board image processing.

