

# PSLV-C9 / CARTOSAT-2A & IMS-1 Mission

28 April, 2008

## THE MISSION

PSLV-C9 carrying on-board the CARTOSAT-2A & IMS-1 Satellites lifted-off from Satish Dhawan Space Centre (SDSC) SHAR, Sriharikota at 09:24 AM (IST) on April 28, 2008. PSLV-C9 also successfully launched 8 Nanosatellites for international customers. All 10 satellites were launched into a 637 km polar Sun-synchronous Orbit (SSO) inclined at an angle of 97.94° to the Equator.

## PSLV - C 9

### THE LAUNCH VEHICLE

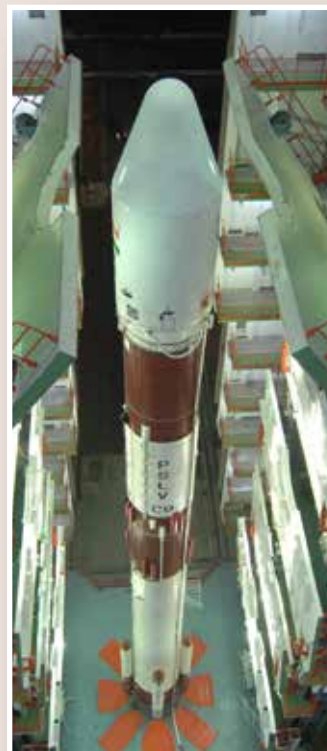
With much lighter payloads compared to the ones placed into orbit by its standard version, PSLV-C9 is configured without the six solid propellant strap-on motors of the first stage. The 'Core-alone' PSLV-C9 had a lift-off mass of 230 tonne.

PSLV's bulbous payload fairing has a diameter of 3.2 m. The vehicle has S-band telemetry and C-band transponder systems for monitoring its health and flight status respectively. It also has sophisticated auxiliary systems like stage and payload fairing separation systems.



## SPECIFICATIONS

<b>Height</b>	44 m	
<b>Lift-Off Mass</b>	230 t	
<b>No of Stages</b>	4	
<b>Payloads</b>	<ul style="list-style-type: none"> <li>• CARTOSAT-2A</li> <li>• IMS-1</li> </ul>	<b>8 International Customer Satellite</b> <ul style="list-style-type: none"> <li>• NLS-4</li> <li>• RUBIN-8</li> <li>• CUTE 1.7</li> <li>• SEEDS</li> <li>• CAN-X2</li> <li>• AAUSAT-II</li> <li>• COMPASS-1</li> <li>• DELPHI-C3</li> </ul>
<b>Orbit Height</b>	637 km	
<b>Inclination (deg)</b>	97.94°	



# CARTOSAT-2A

## THE SATELLITE

CARTOSAT-2A is the 13<sup>th</sup> satellite in the Indian Remote Sensing Satellite Series (IRS). It is a sophisticated and rugged remote sensing satellite that can provide scene specific spot imagery. This satellite carried a Panchromatic Camera (PAN). The spatial resolution of this camera is better than 1 m and swath of 9.6 km. Imageries from this satellite were used for cartographic applications like Mapping, Urban and Rural Infrastructure Development and Management, as well as application in Land Information (LIS) and Geographical Information System (GIS).

### SPECIFICATIONS

<b>Weight</b>	690 kg
<b>Power</b>	Solar Array: 1200 W Batteries: Ni-Cd 18 Ah
<b>Stabilisation</b>	3-axis body stabilised using high Torque Reaction Wheels, Magnetic Torquers and Hydrogen Thrusters
<b>Type of Satellite</b>	Earth Observation
<b>Payloads</b>	Panchromatic Camera
<b>Mission Life</b>	5 Years





# INDIAN MINI SATELLITE (IMS-1)

## THE MICROSATELLITE

Indian Mini Satellite-1 (IMS-1), previously referred to as TWSAT (Third World Satellite), is the first Earth Observation Microsatellite developed by ISRO. IMS-1 incorporates many new technologies and has miniaturised subsystems like miniature magnetometers with mems based magnetometer in one channel, miniature 4 pi sun sensors, miniature micro reaction wheels and gyro cluster, miniature digital S-band receiver and transmitter, miniature satellite positioning system, miniature four-band multispectral camera, etc.

Both Mx-T and HySI-T payloads operate in the visible and near infrared regions of the electromagnetic spectrum. The nominal ground resolution of Mx camera is 36.87 m with a swath of 151 km while that of HySI camera is about 506 meter with a swath of 129.5 km. The versatile IMS-1 has been specifically developed to carry different payloads in future without significant changes in it.

### SPECIFICATIONS

<b>Weight</b>	83 kg
<b>Power</b>	Solar Array: 206 W Batteries: Li-Ion 10.5 Ah
<b>Stabilization</b>	Star Sensor, Miniature Sun Sensors, Magnetometers Gyros, Miniature Micro Reaction Wheels, Magnetic Torquers, Single 1 N Hydrazine Thruster
<b>Type of Satellite</b>	Earth Observation
<b>Payloads</b>	<ul style="list-style-type: none"> <li>• Multispectral Camera (Mx-T)</li> <li>• Hyper Spectral Camera (HySI-T)</li> </ul>
<b>Mission Life</b>	2 Years



# THE INTERNATIONAL CUSTOMER SATELLITES

Eight Nanosatellites from abroad are carried as auxiliary payloads besides IMS-1 as well as CARTOSAT-2A. The total weight of these Nanosatellite payloads is about 50 Kg. Six of the eight Nanosatellites are clustered together with the collective name NLS-4. The other two Nanosatellites are NLS-5 and RUBIN-8.

NLS-4 developed by University of Toronto, Canada consists of six Nanosatellites developed by various universities. Two of them – CUTE 1.7 and SEEDS - are built in Japan, while the other four – CAN-X2, AAUSAT-II, COMPASS-1 and DELPHI-C3 are built in Canada, Denmark, Germany and the Netherlands respectively. NLS-5 is also built by University of Toronto and RUBIN-8 is built by Cosmos International, Germany.

The eight Nanosatellite payloads are built to develop nano technologies for use in satellites as well as for the development of technologies for satellite applications.