

PSLV-C40

CARTOSAT-2 Series Satellite

Microsatellite

INS-1C



International co-passenger Satellites

Telesat Phase-1 LEO

POC-1

PICSAT

CANYVAL-X

CNUSAIL-1

KAUSAT-5

SIGMA

STEP CUBE LAB

CBNT-2

Flock-3P' (4 no.)

LEMUR (4 no.)

DemoSat-2

Micromas-2

Tyvak-61C

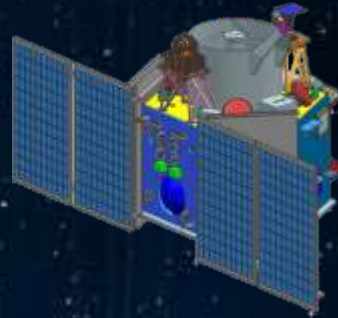
SpaceBEE (4 no.)

Fox-1D

Corvus BC3

Arkyd-6

CICERO-7



PSLV-C40/CARTOSAT-2 SERIES SATELLITE



PSLV-C40 at the First Launch Pad

PSLV-C40

India's Polar Satellite Launch Vehicle, in its forty second flight (PSLV-C40), will launch the 710 kg Cartosat-2 Series Satellite for earth observation and 30 co-passenger satellites together weighing about 613 kg at lift-off.

The co-passenger satellites comprise one microsatellite and one nanosatellite from India as well as 3 microsatellites and 25 nanosatellites from six countries, viz., Canada, Finland, France, Republic of Korea, UK and USA. The total weight of all the 31 satellites carried onboard PSLV-C40 is about 1323 kg.

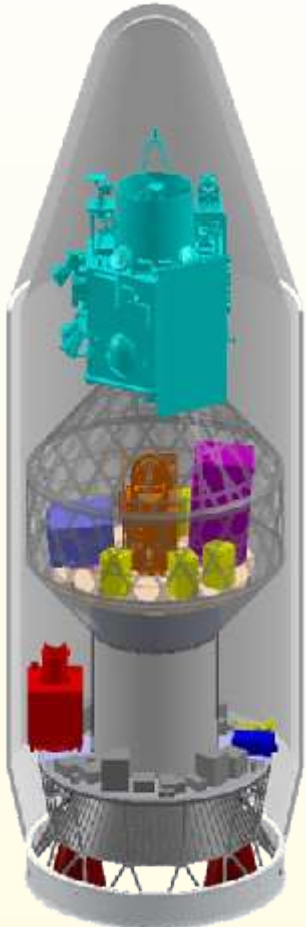
30 of 31 satellites carried by PSLV-C40 will be first launched into a 505 km polar Sun Synchronous Orbit (SSO) while Microsat built by ISRO will be placed in a 359 km polar SSO after bringing down the orbital height by twice restarting the PSLV-C40 fourth stage. PSLV-C40 will be launched from the First Launch Pad (FLP) of Satish Dhawan Space Centre (SDSC) SHAR, Sriharikota.

The 28 International customer satellites are being launched as part of the commercial arrangements between Antrix Corporation Limited (Antrix), a Government of India company under Department of Space (DOS), the commercial arm of ISRO and the International customers.

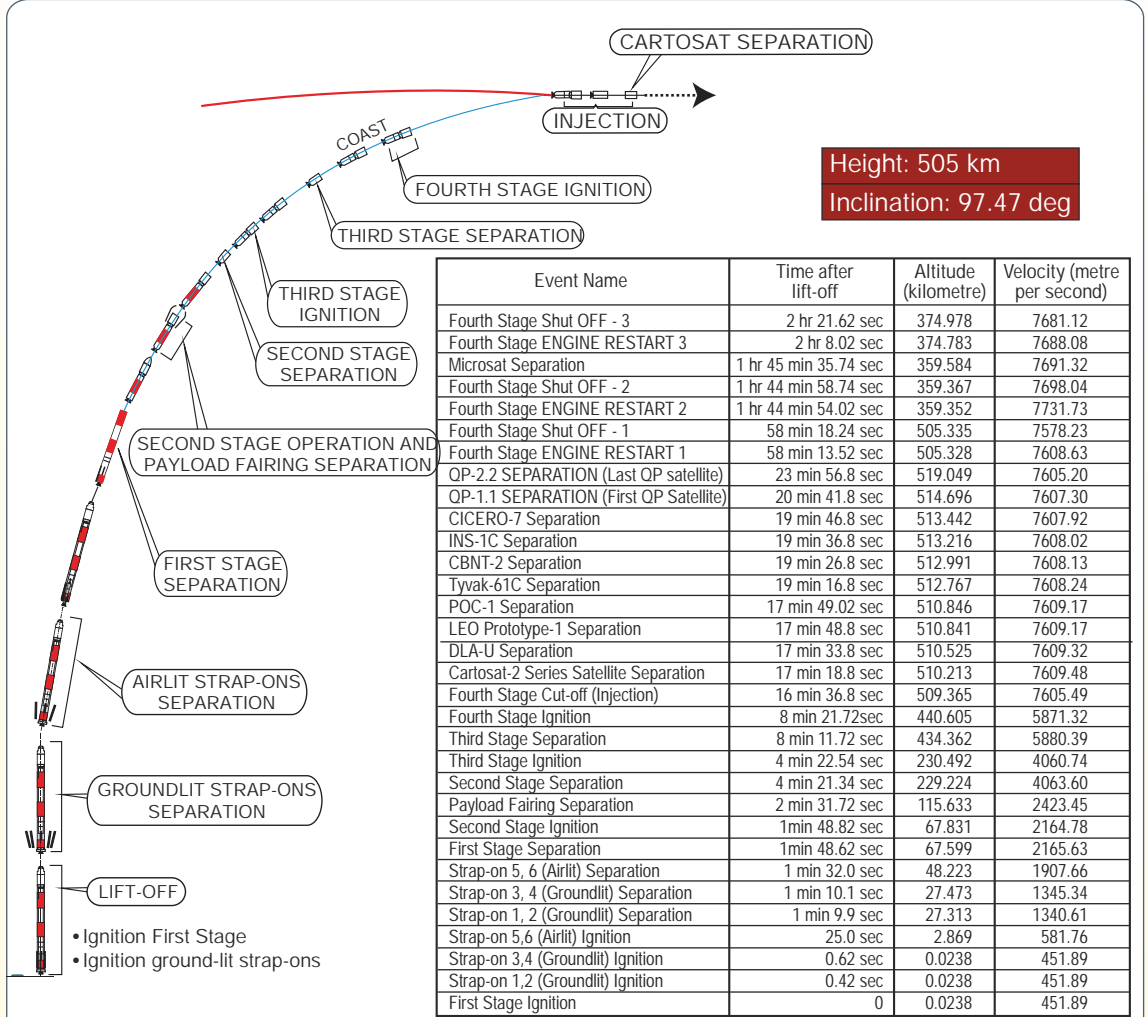
PSLV-C40 at a glance (lift-off Mass: 320 tonne Height: 44.4 m)

	Stage-1	Stage-2	Stage-3	Stage-4
Nomenclature	Core Stage PS1 + 6 Strap-on Motors	PS2	PS3	PS4
Propellant	Composite solid	Earth Storable Liquid	Composite solid	Earth Storable Liquid
Propellant Mass(T)	138.2 (Core), 6 x 12.2 (Strap-on)	42.0	7.6	2.5
Stage Dia (m)	2.8 (Core), 1 (Strap-on)	2.8	2.0	1.34
Stage Length (m)	20 (Core), 12 (Strap-on)	12.8	3.6	3.0

PSLV-C40/CARTOSAT-2 SERIES SATELLITE



Payload Accommodation details of PSLV-C40



PSLV-C40 Typical Flight Profile



Hoisting of PSLV-C40 core stage nozzle end segment during vehicle integration



PSLV-C40 integrated upto fourth stage inside Mobile Service tower

Primary Satellite

The Cartosat-2 Series Satellite is the primary satellite being carried by PSLV-C40. This remote sensing satellite is similar to the earlier six satellites of the Cartosat-2 series and is intended to augment data services to the users. After its injection into a 505 km polar Sun Synchronous Orbit by PSLV-C40, the satellite will be brought to operational configuration, following which it will begin providing regular remote sensing services using its Panchromatic and Multispectral cameras.

The imagery sent by the satellite will be useful for cartographic applications, urban and rural applications, coastal land use and regulation, utility management like road network monitoring, water distribution, creation of land use maps, change detection to bring out geographical and manmade features and various other Land Information System (LIS) as well as Geographical Information System (GIS) applications.






















CARTOSAT-2 Series Satellite at clean room

Salient features

Satellite mass	710 Kg
Orbit type	Circular polar Sun Synchronous
Orbit height	505 km
Orbit inclination	97.47 degree
Orbit period	94.72 min
Local time of Equator crossing	9:30 am
Power	Solar arrays generating 986 Watts; Two Li-Ion batteries
Attitude control	Reaction wheels, Magnetic torquers and Hydrazine thrusters
Design life	5 years

PSLV- C40/CARTOSAT-2 SERIES SATELLITE

International co-passenger Satellites

Satellite	Country	Objective	Satellite	Country	Objective
 Telesat Phase-1 LEO	Canada	Ka-band communication satellite meant for demonstrating the capability of satellite and customer terminal for delivering low latency broadband experiences	 Flock-3P' (Four)	USA	Earth Observation
 POC-1	Finland	SAR Payload Proof-of-Concept demonstration	 LEMUR (Four)	USA	Automatic Identification System (AIS) for Vessel monitoring
 PICSAT	France	Measurement of exoplanetary transits	 DemoSat-2	USA	UHF radio test
 CANYVAL-X	Republic of Korea	To demonstrate astronomy with virtual telescope	 Micromas-2	USA	Microwave radiometer test
 CNUSAIL-1		To demonstrate solar sail technology	 Tyvak-61C	USA	To catalog variability of luminous stars
 KAUSAT-5		Infrared imaging of the Earth	 SpaceBEE (Four)	USA	2-way satellite communications and data relay
 SIGMA		To demonstrate probing of space radiation	 Fox-1D	USA	Amateur radio communications
 STEP CUBE LAB		To demonstrate thruster, radiator and heat pipe technologies	 Corvus BC3	USA	Multi-spectral remote sensing
 CBNT-2		UK	CBNT-2 is an Earth observation technology demonstration mission, to test and validate a high definition imagery and video system	 Arkyd-6	USA
			 CICERO-7	USA	To measure global weather patterns with high accuracy using a GPS radio occultation sensor

28 International Customer Satellites together weigh 470 kg.

PSLV-C40/CARTOSAT-2 SERIES SATELLITE

Indian co-passenger Satellites

Microsatellite

PSLV-C40 carries a Microsat built by ISRO as a co-passenger payload. Microsat is a small satellite in the 100 kg class that derives its heritage from IMS-1 bus. This is a technology demonstrator and the fore runner for future satellites of this series. The satellite bus is modular in design and can be fabricated and tested independently of payload.

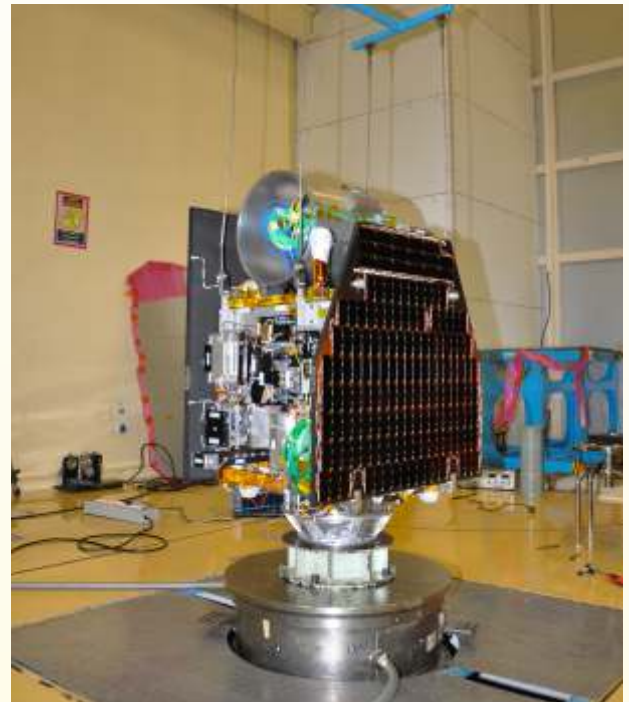
Indian Nano Satellite-1C (INS-1C)

Indian Nano Satellite-1C is another Indian co-passenger payload of PSLV-C40. It is the third satellite in the Indian Nanosatellite series. The first two satellites of this series were carried as co-passenger payloads by PSLV-C37 in February 2017. INS-1C will be carrying Miniature Multispectral Technology Demonstration (MMX-TD) Payload from Space Applications Centre (SAC). Data sent by this camera can be utilised for topographical mapping, vegetation monitoring, aerosol scattering studies and cloud studies.

Indian Nano Satellite (INS) is a versatile and modular Nano satellite bus system envisioned for future science and experimental payloads. With a capability to carry up to 3 kg of payload and a total satellite mass of 11 kg, it offers immense opportunities for future use. The INS system is developed as a co-passenger satellite to accompany bigger satellites on PSLV launch vehicle. Its primary objectives include providing a standard satellite bus for launch on demand services and providing opportunity to carry innovative payloads.



INS-1C with its panels in deployed condition



Microsat during prelaunch testing

Major Specifications of INS-1C

Parameter	Specifications
Mass	11 kg
Overall Size	245 x 227 x 217 mm ³
Structure	Milled aluminium decks
Thermal control	Passive (OSR, MLI, Paints etc.) & Battery Heaters
Mechanisms	Solar panels & Antenna deployment
Power	Solar Panels generating about 27W 11.2 Ah Lithium Ion battery
Attitude and Orbit Control System (AOCS)	Attitude sensors: Star Sensor, MEMS IMU, Micro Sun sensors, Digital Magnetometer Actuators: Four Reaction wheels, Magnetic Torquers
Control accuracy	<0.5 about each axis
TM and TC links	Telecommand: (VHF) Telemetry: (UHF), S - Band
Data Transmission and storage	One Mbps in S-band On-board Micro SD of 8 GB capacity
Mission life	6 months
Payload	MMX-TD

January 2018



Indian Space Research Organisation

Publications and Public Relations
ISRO Headquarters, Antariksh Bhavan
New BEL Road, Bengaluru - 560 094, India.
www.isro.gov.in



Antrix Corporation Limited

Antrix Corporate Office
Antariksh Bhavan, Near New BEL Road
Bengaluru - 560 094, India.
www.antrix.co.in