



## CARTOSAT-2 SERIES REMOTE SENSING INDIAN SATELLITE SYSTEM REVIEW

Beer Singh

Department of Information Technology  
Babasaheb Bhimrao Ambedkar University  
Lucknow, India

Dr. Alka

Department of Information Technology  
Babasaheb Bhimrao Ambedkar University  
Lucknow, India

**Abstract:** In This article, we are describing Indian satellite technology PSLV-C40 / Cartosat-2 series satellite .basically it is the mission of Indian space research organization (ISRO). This was the 42<sup>nd</sup> mission of the PSLV-C40. PSLV-C40/Cartosat-2 series successfully carried 31 satellites and deployed in Sun-synchronous orbits. Cartosat2 series remote sensing satellite launch for the Earth observation and its carried 30 co-passenger satellite. In this article present an overview of cartosat-2 series remote sensing satellite system that was the ambitious project of the Indian space research organization.

**Keywords:** PSLV, CARTOSAT-2. Orbits, satellite.

### INTRODUCTION

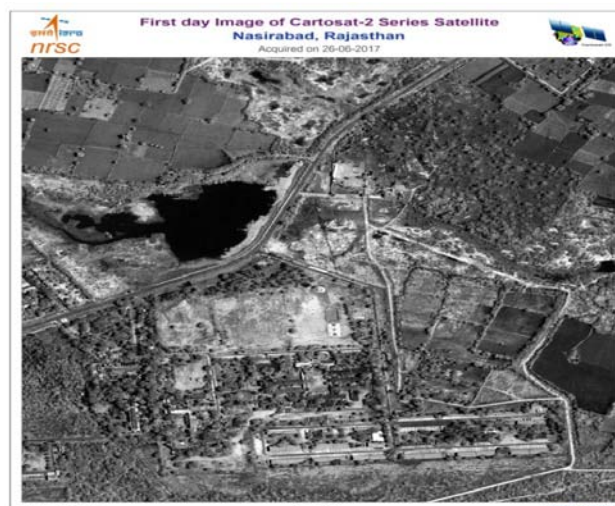
Indian space research organization recently launch the cartosat-2 series remote sensing satellite through pslv-c40 on january 12, 2018, cartosat-2 series remote sensing satellites system onboard pslv-c40 rocket system launch from its spaceport at sari haricot this remote sensing satellite is comparably similar to the recently launch-6 aircraft.[5] this remote sensing satellite technology from the space. In space india satellite system capture images and record useful data about earth environment monitoring. Remote sensing satellite is one of the useful satellite of cartosat-2 series satellite. The given image captured at the time of launching this satellite.[2]



### THE CONFIGURATION OF CARTOSAT-2 SERIES REMOTE SENSING SATELLITE SYSTEM

Cartosat-2 satellite system is an Earth observation satellite that carried panchromatic camera it can take black and white picture of the earth in reassigning of the electromagnetic spectrum the distance covered by this high-resolution panchromatic camera is 9.6km and their minimum resolution is less than 1meter this satellite can rotate up to 45 degrees along with it place cartosat-2 is an advanced remote sensing satellite system able to providing seen specifics spot imaginary the data received from the satellite will we used for different type of application like cartographic application and detailed road mapping application it can be used for urban and rural infrastructure development application in land information system .[4] the main objective of the cartosat-2 satellite system is to provide a high-resolution image from a highly agile spacecraft. the collection of images captured by cartosat-2 satellite given below.[3]

### EASE OF USE



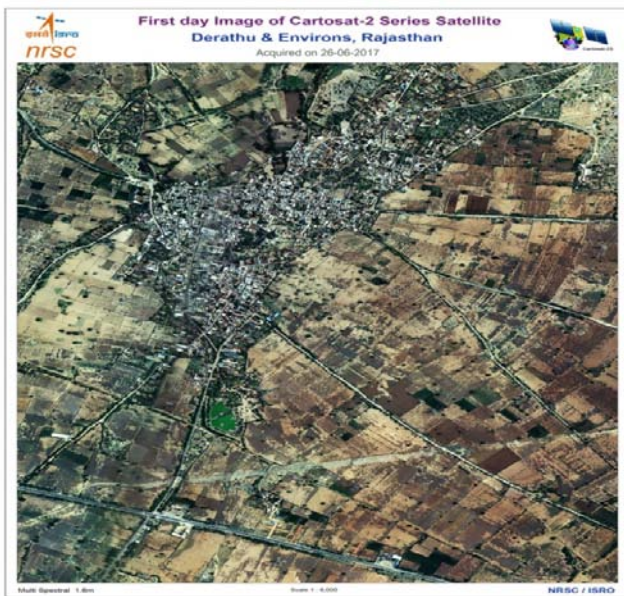


Fig-1: this image are taken by satellite for earth observation (from ISRO)

### Spacecraft-

Several new technology elements are introduced into the design of cartosat -2

- These Aircraft contain Hexagonal, compact and lightweight structure.
- CFRP (Carbon Fabric Reinforced Plastic) based electro-optic payload structure with a two mirror on-axis camera
- Introduction of **BMU** (Bus Management Unit) for integrated main spacecraft bus functions. The integration of Bus Management Unit and high torque reaction or wheels and thermal control functions the high stable Inertial Management Unit, Dual Gimbal Antenna, and advanced control algorithm.

- This technique used to high bit rate telemetry and data handling.
- The capacity of this spacecraft is 64Gbit and solid state onboard record.
- The three solar cell junction are GSAT-2, INSAT-4A, and CARTOSAT-2. These are first ISRO missions and also called multijunction solar cell arrays as the prime power generator. <sup>8)</sup>
- Using this technique (Inertial Reference Unit) for improved quality of the image.
- This technique shows the high performance of star sensor.
- In this series uses satellite system and satellite positioning system. There is 8 number of channels (GPS) receiver for the spacecraft.
- This satellite system is able to manage dual data transmission antenna use to show the point towards the required reception station during the spacecraft overpass.
- This is also called the sun sensor and used for sun point and safe mode attitude holding the operation of the spacecraft.
- The thruster technique is used in this series for maintaining the spacecraft for acquired sun geometry with negative pitch axis.
- This is also called the data compression technology which can use to compress the video data and show the compression ratio 1:3:2(JPEG Algorithm).<sup>7</sup>

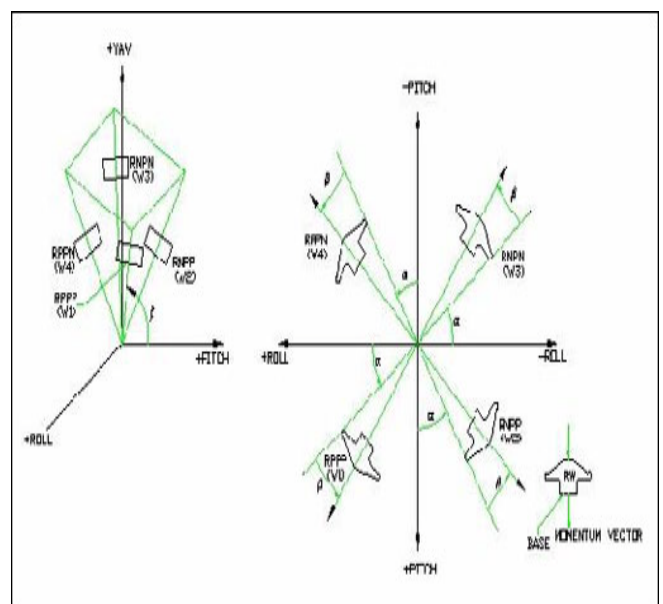


Figure-2: This image shows the Tetrahedral reaction wheel configuration of cartosat-2 series (the image taken from ISRO)

**Satellite Configuration Table**



Spacecraft stabilization	3-axis stabilized platform carrying a single linear array CCD based panchromatic camera
Attitude pointing accuracy about all axis	0.05°
Attitude drift stability	$5 \times 10^{-5}$ °/s
Attitude determination accuracy	0.01°
Ground location accuracy	< 100 m
Spacecraft bus size	~ 2.5 m x 2.4 m
Thermal control	Active thermal control of the payload making use of precision thermistors and heaters. Overall spacecraft thermal control is achieved by making use of multilayer insulation blankets and optical solar reflectors.
FOR (Field of Regard)	±45° (providing a revisit capability of certain target regions within 4 days)
Electrical power	~ 900 W average (EOL), use of ATJ (Advanced Triple Junction) cells with 26.5% efficiency
Propellant mass	64 kg (orbit maintenance)
Spacecraft launch mass	680 kg
Spacecraft design life	5 years
RF communications X-band	Payload downlink at 105 Mbit/s. Use of electronically steerable, Phased Array Antenna or Dual Gimbals and Solid State Recorder with 64Gbit capacity.
S-band	The TT&C data rate of 4Kbit/s.

Satellite Configuration table contains all the specification that indicates how to configure low-cost space exploration program through this satellite system. The above configuration table shows the specification about spacecraft stabilization, attitude pointing about its all axis, spacecraft bus size, thermal control, FOR(field of Regard, Electrical Power, Propellant Power, Spacecraft design life, RF Communications x-band and S-band.

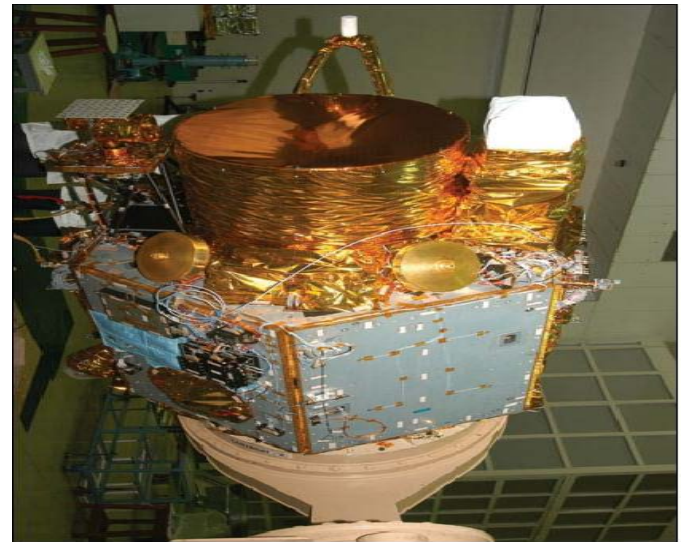


Figure-3: This image shows the view of cartosat-2 series and telescopes the image credit from ISRO

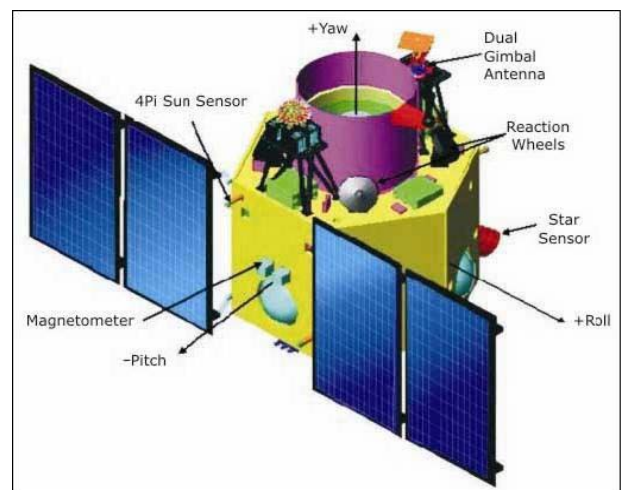


Fig-4: this an illustration of deployed the cartosat-2 series spacecraft and the image taken from ISRO.

**SPECIFICATIONS OF CARTOSAT-2**

Mission Category	Remote Sensing
Orbit	630.6 km Polar, Sun-synchronous
Semi-Major Axis	7008.745 km
Inclination	97.914 degrees
Local Time	9:30 A.M
Revisit	4/5 days
Receptivity	310 days
Orbits/day	14.78
Inter-path distance	8.75 km
The distance between successive orbits	2711.9 km
Orbital period	97.446 minutes
Payloads	Panchromatic camera

## Indian satellite system breaks the record of existing boundaries

Indian satellite system launches 104 satellites of Indian and foreign organizations. these satellites system carried by pslv in to launch in space from the earth.it contains lots of functionalities according to the objective of scientific observation and requirement. It is useful for earth observation that can help in monitoring the geographical area, climate environment, existing infrastructure monitoring and movement observation according to the specified protocols.



Figure 5: Image captured by the media Shoot (image credit: ISRO)

### Low-Cost Space Satellite Exploration Program-

India is working on the low-cost space satellite exploration program, that means marsh project has been done in low-cost exploration program rather than foreign projects and India has objective to get achievement cross from existing boundaries in its very low cost.

### Applications:-

The satellite system contains artificial remote sensing system that can sense the motion changes behavioral monitoring of

earth. This satellite contains lots of electronic devices with a high-resolution camera that can capture the image of the earth and send to the destination command center to reporting status of the earth. the application of this Indian satellite system can upgrade in future for different objectives. This satellite can be used for other application like monitoring road network.[1]

### CONCLUSION:-

This article concludes that the satellite system of Indian space research organization can more ambition operations perform in the space with the incorporation of PSLV C40/Cartosat-2 Series remote sensing satellite system. We presented the overview of the Cartosat-2 series remote sensing satellite system that was an ambitious project of ISRO. In Future Indian satellite system may be more useful rather than foreign satellite system because it is based on low-cost exploration program and less time compatibility. These satellite system prepared in less time so we can say that Indian satellite is much better. These satellite system can change the future of the space.

### REFERENCES

- [1] "ISRO releases the first image taken by a Cartosat-2 series satellite" Published in the Hindu business line on Jan 17, 2018.The Link available at "https://www.thehindubusinessline.com/news/science/isro-releases-first-image-taken-by-cartosat2-series-satellite/article10036334.ece"
- [2] <https://npsc.gov.in/CARTOSAT-2>
- [3] [https://npsc.gov.in/CARTOSAT-2\\_Series](https://npsc.gov.in/CARTOSAT-2_Series)
- [4] <https://www.isro.gov.in/Spacecraft/cartosat-2-series-satellite-2>
- [5] <https://en.wikipedia.org/wiki/Cartosat-2>
- [6] <http://www.gisresources.com/isro-successfully-launches-cartosat-2-series-remote-sensing-satellite-along-30-co-passenger-satellites-single-flight/>
- [7] Nagendra NP. Diversification of the Indian space programme in the past decade: Perspectives on implications and challenges. Space Policy. 2016 May 1;36:38-45. <https://directory.eoportal.or>