

This article is related to General Studies Paper -III (Sci & Tech)

The Hindu

23 May, 2019

"RISAT-2B will enhance India's monitoring capabilities for civil and military purposes."

With the successful pre-dawn launch of RISAT-2B satellite on May 22, the Indian Space Research Organisation (ISRO) has added another feather to its cap. The satellite will enhance India's capability in crop monitoring during the monsoon season, forestry mapping for forest fires and deforestation, and flood mapping as part of the national disaster management programme.


All-season satellite

RISAT-2B is a radar imaging earth observation satellite developed by ISRO


Key features

- Lift-off weight | 615 kg
- Altitude | 557 km
- Payload | X-Band radar
- Inclination | 37 degrees
- Mission life | 5 years


Applications



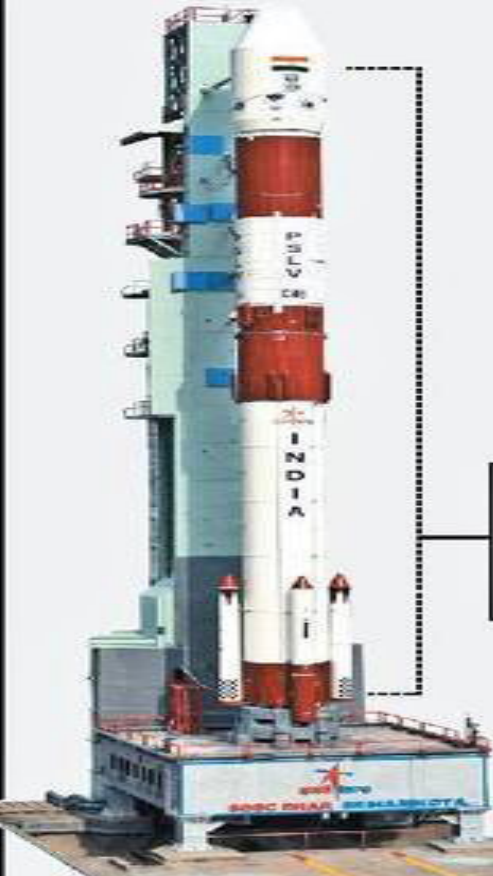
Disaster management support



Forestry



Agriculture

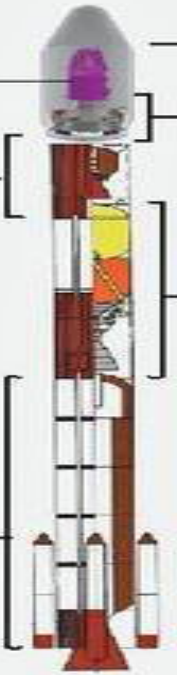


RISAT-2B

Third stage (HPS3)

PSLV-C46
Height: 44.4 m

First stage (PS1)



- Payload fairing
- Fourth stage (PS4)
- Second stage (PS2)

Source: ISRO

Given that overcast skies are a constant during the monsoon season and during times of flood, the ability to penetrate the cloud cover is essential. While optical remote sensing that relies on visible light for imaging gets obstructed by clouds, RISAT-2B will not. Much like the RISAT-1 satellite that was launched by ISRO in April 2012, RISAT-2B will also use microwave radiation.

Unlike visible light, microwaves have longer wavelength and so will not be susceptible to atmospheric scattering. Microwave radiation can thus easily pass through the cloud cover, haze and dust, and image the ground. Hence, RISAT-2B satellite will be able to image under almost all weather and environmental conditions.

Since it does not rely on visible light for imaging, it will be able to image the ground during both day and night. The satellite does not have passive microwave sensors that detect the radiation naturally emitted by the atmosphere or reflected by objects on the ground. Instead, RISAT-2B will be transmitting hundreds of microwave pulses each second towards the ground and receiving the signals reflected by the objects using radar.

The moisture and texture of the object will determine the strength of the microwave signal that gets reflected. While the strength of the reflected signal will help determine different targets, the time between the transmitted and reflected signals will help determine the distance to the object.

The RISAT-2B satellite uses X-band synthetic aperture radar for the first time; the synthetic aperture radar was developed indigenously. Unlike the C-band that was used by RISAT-1, the shorter wavelength of the X-band allows for higher resolution imagery for target identification and discrimination.

Since it has high resolution, the satellite will be able to detect objects with dimensions of as little as a metre. This capacity to study small objects and also movement could be useful for surveillance. As K. Sivan, ISRO Chairman and Secretary, Department of Space, had said last month, the satellite could be used for civil and strategic purposes.

RISAT-2B will have an inclined orbit of 37 degrees, which will allow more frequent observations over the Indian subcontinent. With ISRO planning to launch four more such radar imaging satellites in a year, its ability to monitor crops and floods as well as engage in military surveillance will be greatly enhanced.

GS World Team...

RISAT-2B

Why in the discussion?

- Recently, the successful launch of 'RISAT-2B' Radar Satellite via PSLV-C 46 has been done by the Indian Space Research Organization (ISRO).
- About seven years later the RISAT-2, RIASAT-2B has been launched.
- It can also monitor satellite in day, night, dense cloud and in the rain.
- This is the fourth satellite of this series.

Background

- This Satellite uses X-band synthetic aperture, which is why it is able to know the size, structure, speed and change of objects on Earth.
- On April 20, 2009, the first satellite of the RISAT series was launched.
- This satellite was created by Israel Aerospace Industries.
- ISRO plans to launch a main satellites such as RISAT-1A, RISAT 2A, RISAT-2 BR1, RISAT-2BR2, and RISAT-1B after the RISAT-2B.

Features

- It will also help security forces prevent infiltration on the borders.
- This satellite will increase the capacity of monitoring Indian security forces in all weather, and also help Indian security forces to monitor the border.
- It will be used in agriculture sector, forest science and disaster management. At the same time, the people who are involved in internal security and disaster relief work will be greatly helped by the RISAT-2B.
- The activities of terrorist camps in Pakistan-Occupied Kashmir (PoK) will also be monitored. This satellite can take photos of any building or any object on the earth for two to three times a day.
- Through this satellite, excellent pictures can be taken from the height of three feet on the ground. It will release the exact location of the object and its photographs in the night, the cloud or the rain in every season.

Expected Questions (Prelims Exams)

1. Consider the following statements -

1. The first satellite of RISAT series was launched in 2010.
2. RISAT-2B is capable of monitoring in all seasons.
3. It is the fourth satellite of this series.

Which of the above statements is/are correct?

- (a) Only 1
- (b) 1 and 2
- (c) 2 and 3
- (d) 1 and 3

Expected Questions (Mains Exams)

Q. How will the RISAT-2B increase the monitoring capability of India for achieving the civil and military goals? Comment.

(250 Words)

Q. What do you mean by remote sensing satellite? The RISAT series satellite has unprecedentedly increased the military capabilities of India. Discuss.

(250 Words)

Note: Answer of Prelims Expected Question given on 22 May. is 1 (d)