



Earth Observation Satellite EOS-04

For Prelims: Indian Space Research Organisation, earth observation satellite, EOS-04, PSLV, Cartosat, RISAT-2B, SSLV (Small Satellite Launch Vehicle), EOS-03, RISAT-1, India-Bhutan Joint Satellite (INS-2B).

For Mains: Achievements of Indians in Science & Technology, ISRO and its achievements, current issues with ISRO.

Why in News?

Recently, [Indian Space Research Organisation's earth observation satellite EOS-04](#) and two small satellites (INSPIRESat-1 and INS-2TD) were successfully placed into the intended orbit by the **PSLV-C52 rocket**.

- This launch was the **54th flight of the [Polar Satellite Launch Vehicle \(PSLV\) rocket](#)**, and the **23rd** of its most powerful **XL-version** that has six strap-on boosters.

What are Earth Observation Satellites?

- Earth observation satellites are the **satellites equipped with remote sensing technology**. Earth observation is the gathering of information about Earth's physical, chemical and biological systems.
- Many earth observation satellites have been employed on [sun-synchronous orbit](#).
- Other earth observation satellites launched by ISRO include **RESOURCESAT- 2**, 2A, CARTOSAT-1, 2, 2A, 2B, RISAT-1 and 2, OCEANSAT-2, Megha-Tropiques, SARAL and SCATSAT-1, INSAT-3DR, 3D, etc.

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First launch of 2022

On Monday, Earth Observation Satellite **EOS-04** and two small satellites – **INSPIRESat-1** and **INS-2TD** – were placed in the orbit by the **PSLV-C52** rocket. A detailed look at the payload

DETAILS OF THE LAUNCH

1 Monday's was the 54th flight of PSLV and 23rd mission using PSLV-XL configuration with six PSOM-XLs (strap-on motors)

2 After a flight of about 18 minutes, the vehicle injected the satellites into their intended orbit

3 Primary satellite EOS-04 was put into the intended sun synchronous polar orbit of 529 km altitude at 6.17 a.m.

EOS-04 Weight: **1,710 kg**

Mission life: **10 years**

Use: Radar Imaging Satellite is designed to provide high quality images under all weather conditions for applications such as agriculture, forestry and plantations, soil moisture and hydrology and flood mapping

INSPIRESat-1 Weight: **8.1 kg**

Mission life: **1 year**

Use: Two payloads in the satellite are aimed at improving the understanding of ionosphere dynamics and the sun's coronal heating processes

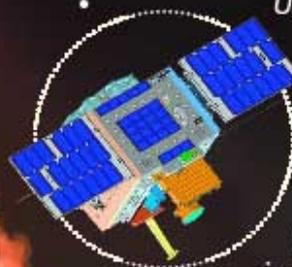
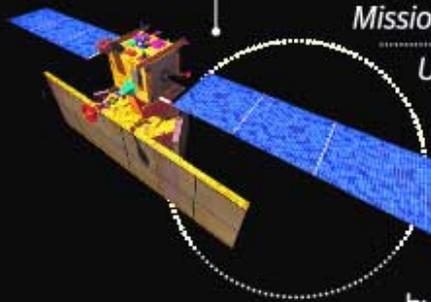
- The satellite is built by Indian Institute of Space Science and Technology in association with Laboratory of Atmospheric and Space Physics at University of Colorado Boulder, NTU, Singapore and NCU, Taiwan

INS-2TD Weight: **17.5 kg**

Mission life: **6 months**

Use: Having a thermal imaging camera as its payload, the satellite benefits the assessment of land surface temperature, water surface temperature of wetland or lakes, delineation of vegetation (crops and forest) and thermal inertia (day and night)

- This is a technology demonstrator satellite from ISRO, a precursor to the India-Bhutan Joint Satellite (INS-2B)



What are the Three Satellites Launched?

▪ EOS-04:

- EOS-04 weighing 1,710 kg and with a **mission life of ten years designed to provide high quality images** under all weather conditions for applications such as Agriculture, Forestry and Plantations, Soil Moisture and Hydrology and Flood mapping.
 - It will complement the data from **Resourcesat, Cartosat and RISAT-2B** series of satellites that are already in orbit.
 - The first of these newly named satellites, **EOS-01**, launched in November 2020, is in orbit right now. **EOS-02**, a micro-satellite to be flown on a new launch vehicle called **SSLV (Small Satellite Launch Vehicle)** is yet to be launched, while launch of **EOS-03** had ended in a failure in **August, 2021**.
- It will be placed in a **sun synchronous polar orbit** of 529 km, is a radar-imaging satellite which would have made it a part of the **RISAT series earlier**.
- In fact, it would **replace the RISAT-1** which was launched in 2012 but has been non-functional for the last few years.
 - RISATs use **synthetic aperture radars** to produce high-resolution images of the land.
 - **One big advantage that radar imaging has over optical instruments** is that it is **unaffected by weather, cloud or fog**, or the lack of sunlight.
 - It can **produce high-quality images** in all conditions and at all times, making it suitable for surveillance.

▪ INSPIRESat-1:

- INSPIRESat-1 is **part of a constellation of satellites planned under the International Space Program in Research and Education (INSPIRE)** involving the Small-spacecraft Systems and Payload Centre (SSPACE) at IIST, University of Colorado (US), Nanyang Technological University (NTU), Singapore, and National Central University (NCU), Taiwan.
- Two scientific payloads on INSPIRESat-1, with a mass of 8.1 kg and mission life of one year, are **aimed at improving the understanding of ionosphere** (part of Earth's upper atmosphere) **dynamics** and the **sun's coronal heating processes**.

▪ INS-2TD:

- INS-2TD is a **technology demonstrator for the first India-Bhutan joint satellite** that is scheduled to be launched in March, 2022.
 - The two countries had **signed a space agreement last year**, and its first outcome would be the launch of **BhutanSat, or INS-2B, on a PSLV rocket** in March, 2022.
- The **thermal imaging cameras of the INS-2TD** are meant for **earth observation purposes**, like assessment of land and water surface temperature, and identification of forest and tree cover.

How many satellites does India have in space?

- India currently has **53 operational satellites**, of which 21 are earth observation ones and another 21 are communication-based.
- Eight are navigation satellites, while the remaining three are science satellites.

[Source: IE](#)