



Indian Space Situational Assessment Report 2023

For Prelims: [ISRO](#), [PSLV-C55/ TeLEOS-2](#), [Chandrayaan-3](#), [Chandrayaan-2](#), [Aditya-L1](#), [POEM-2](#), [Indian Space Research Organisation](#)

For Mains: Space Missions, Achievements of Indians in science & technology, India's Growing Involvement in Space Activities

Source: TH

Why in News?

The [Indian Space Research Organisation \(ISRO\)](#) has released the **Indian Space Situational Assessment Report (ISSAR) for 2023**, which provides a comprehensive overview of the current state of India's space assets and their vulnerability to potential collisions in space.

What does the ISSAR 2023 Report Highlight?

- **Space Object Population:**
 - **Global Increase:** Globally, 3,143 objects were added in 2023 from 212 launches and on-orbit breakup events.
 - **Indian Additions:** India contributed to this with the launch of 127 satellites by the end of December 2023.
 - In the year 2023, all seven launches of ISRO, namely [SSLV-D2/EOS7](#), [LVM3-M3/ONEWEB 2](#), [PSLV-C55/ TeLEOS-2](#), [LVM3-M4/ Chandrayaan-3](#), and [PSLV-C57/Aditya L-1](#), were successful.
 - A total of 5 Indian satellites, 46 foreign satellites, and 8 rocket bodies (including [POEM-2](#)) were placed in their intended orbits.
- **Indian Space Assets:**
 - **Operational Satellites:** As of 31st December 2023, India has 22 operational satellites in [Low Earth Orbit \(LEO\)](#) and 29 in [Geostationary Orbit \(GEO\)](#).
 - **Deep Space Missions:** There are three active Indian deep space missions, [Chandrayaan-2 Orbiter](#), [Aditya-L1](#), and [Chandrayaan-3 Propulsion Module](#).
- **Space Situational Awareness Activities:**
 - ISRO regularly carries out analyses to predict close approaches by other space objects to Indian space assets.
 - In case of critical close approaches, ISRO carries out **Collision Avoidance Maneuvers (CAMs)** to safeguard its operational spacecraft.
 - About 1 lakh close approach alerts were received from **USSPACECOM (US Space Command)**, and over 3,000 alerts for close approaches within a distance of 1 km were detected for ISRO satellites.
 - No close approaches with other space objects were detected for the Chandrayaan-3 mission throughout its mission phases, and also for Aditya-L1 during its Earth-bound phase.
- **Collision Avoidance Maneuvers (CAMs):**
 - The report highlights a significant increase in the number of CAMs conducted by ISRO in

2023.

- ISRO conducts **Collision Avoidance Analysis (COLA)** to assess and prevent potential collisions.
 - A total of 23 Collision Avoidance Maneuvers (CAMs) were carried out during 2023 to protect Indian space assets, compared to 21 in 2022 and 19 in 2021.
- **Satellites Re-entry:**
 - The report details the successful re-entry of 8 Indian satellites in 2023. This includes the controlled **de-orbiting of Megha-Tropiques-1**, showcasing ISRO's commitment to responsible space debris management.
- **International Cooperation on Space Sustainability:**
 - ISRO is an active participant in many international fora such as the [Inter-Agency Debris Coordination Committee \(IADC\)](#) with 13 space agencies, the **International Academy of Astronautics (IAA) space debris working group**, **International Astronautical Federation (IAF) space traffic management working group**, **International Organization for Standardization (ISO) space debris working group** and **UN-Committee on the Peaceful Uses of Outer Space (COPUOS)**, contributing to discussions and guidelines on space debris and long-term sustainability of outer space activities.
 - ISRO, as the chair of **IADC for 2023-24**, hosted the 42nd annual IADC meeting in April 2024.
 - ISRO participated in the IADC annual re-entry campaign and contributed to the revision of IADC space debris mitigation guidelines and other space sustainability aspects.
- **Challenge of Space Debris:**
 - The report also acknowledges the ongoing challenge of space debris. It notes that **82 rocket bodies from Indian launches remain in orbit**, with fragments from a 2001 PSLV-C3 mishap still contributing to the total.

Indian Space Research Organisation (ISRO)

- ISRO is a major constituent of the **Department of Space (DOS)**, Government of India.
 - The department executes the Indian Space Programme primarily through various Centres or units within ISRO.
- ISRO was previously the **Indian National Committee for Space Research (INCOSPAR)**, set up in 1962, as envisioned by Dr Vikram A Sarabhai.
- ISRO was formed on **15th August 1969** and superseded INCOSPAR with an expanded role to harness space technology.
 - DOS was set up and ISRO was brought under DOS in 1972.
- The prime objective of ISRO/DOS is the development and application of space technology for various national needs.
- ISRO has developed satellite launch vehicles, PSLV and GSLV, to place the satellites in the required orbits.
- **ISRO has its headquarters in Bengaluru.**
- Its activities are spread across various centres and units.
 - Launch Vehicles are built at **Vikram Sarabhai Space Centre (VSSC), Thiruvananthapuram**
 - Satellites are designed and developed at [U R Rao Satellite Centre \(URSC\), Bengaluru.](#)
 - Integration and launching of satellites and launch vehicles are carried out from **Satish Dhawan Space Centre (SDSC), Sriharikota**
 - Development of liquid stages including cryogenic stage is carried out at Liquid Propulsion Systems Centre (LPSC), Valiamala & Bengaluru
 - Sensors for Communication and Remote Sensing satellites and application aspects of the space technology are taken up at Space Applications Centre (SAC), Ahmedabad
 - Remote Sensing satellite data reception processing and dissemination is entrusted to **National Remote Sensing Centre (NRSC), Hyderabad.**
- The activities of ISRO are guided by its Chairman, who would also be the **secretary of DOS and Chairman of Space commission** (the apex body that formulates the policies and oversees the implementation of the Indian Space Programme).

Way Forward

- Establish a **global framework for Space Traffic Management (STM)** to standardise procedures for **collision avoidance and inter-operator coordination**.
- Promote responsible space practices, including **debris mitigation measures** and sustainable satellite deployment.
- Encourage innovation in **active debris removal and on-orbit servicing technologies**.
- Facilitate international collaboration to share resources, expertise, and data for space situational awareness.
- Review and update space regulations to accommodate the evolving needs of the space sector and raise awareness about space sustainability.

Drishti Mains Question:

Q. Evaluate ISRO's impact on India's socio-economic development, particularly in agriculture, communication, and disaster management, through satellite applications and space technology spin-offs.

Read more: [Space Missions in 2024](#)

UPSC Civil Services Examination, Previous Year Question (PYQ)

Prelims

Q.1 In the context of space technology, what is “Bhuvan”, recently in the news? (2010)

- (a) A mini satellite launched by ISRO for promoting the distance education in India
- (b) The name given to the next Moon Impact Probe, for Chandrayaan-II
- (c) A geoportal of ISRO with 3D imaging capabilities of India
- (d) A space telescope developed by India

Ans: (c)

Q. Consider the following statements: (2016)

The Mangalyaan launched by ISRO

1. is also called the Mars Orbiter Mission
2. made India the second country to have a spacecraft orbit the Mars after USA
3. made India the only country to be successful in making its spacecraft orbit the Mars in its very first attempt

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) 1, 2 and 3

Ans: (c)

Mains

Q.1 What is the main task of India's third moon mission which could not be achieved in its earlier mission? List the countries that have achieved this task. Introduce the subsystems in the spacecraft launched and explain the role of the 'Virtual Launch Control Centre' at the Vikram Sarabhai Space Centre which

contributed to the successful launch from Sriharikota. **(2023)**

Q.2 What is India's plan to have its own space station and how will it benefit our space programme?
(2019)

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