



NETRA Project & Space Junk

For Prelims: Network for Space Objects Tracking and Analysis (NETRA) project, Anti-satellite (ASAT) System (ASAT), Space Junk, Kessler Syndrome, space situational awareness (SSA).

For Mains: Space Debris, India as Space Power, Scientific Innovations & Discoveries.

Why in News?

With [space junk](#) posing an increasing threat to Indian assets in space, the [Indian Space Research Organisation \(ISRO\)](#) is building up **its orbital debris tracking capability**.

- In this pursuit, a space debris tracking [radar](#) with a **range of 1,500 km and an optical telescope** will be inducted as part of establishing an effective surveillance and tracking network under the **Network for Space Objects Tracking and Analysis (NETRA) project**.

What is Space Junk?

- Space junk or debris consist of **spent rocket stages, dead satellites, fragments of space objects and debris** resulting from [Anti-satellite \(ASAT\) System \(ASAT\)](#).
- Hurling at an average speed of 27,000 kmph in [Low Earth Orbit \(LEO\)](#), these objects pose a very real threat as collisions involving **even centimetre-sized fragments can be lethal to satellites**.
- This free floating space debris is a **potential hazard for operational satellites** and colliding with them can leave the satellites dysfunctional.
 - This is referred to as **Kessler Syndrome**, named after [National Aeronautics and Space Administration \(NASA\)](#) scientist Donald Kessler in 1978.
 - It says if there is too much space junk in orbit, it could result in a **chain reaction where more and more objects will collide and create new space junk in the process**, to the point where Earth's orbit becomes unusable – a **Domino Effect**.

What is the NETRA Project & Its Advantage?

- **About:** 'Project NETRA' is an **early warning system in space** to detect debris and other hazards to Indian satellites.
 - Once operational, it will give India its own capability in **Space Situational Awareness (SSA)** like the other space powers.
- **Need:** With countries launching more and more satellites, each one of them being a **strategic or commercial asset, avoiding collisions** could become a challenge in the future.
 - For protecting its space assets, the ISRO was forced to perform 19 **Collision Avoidance Manoeuvres (CAM) in 2021**.
- **Modus Operandi:** Under NETRA, the ISRO plans to put up many observational facilities: **connected radars, telescopes, data processing units and a control centre**.
- **Benefits:** NETRA can spot, track and catalogue objects as **small as 10 cm, up to a range of 3,400 km and equal to a space orbit of around 2,000 km**.

- The NETRA effort would **make India a part of international efforts** towards tracking, warning about and mitigating space debris.
- More importantly, the SSA also has a **military quotient** to it and adds a new ring to the country's overall security, **against attacks from air, space or sea.**
- This is a vital requirement for **protecting our space assets and a force multiplier.**

What is the Current Scenario?

- **Currency SSA Capability:** At present, India uses a **Multi Object Tracking Radar at Sriharikota range (Andhra Pradesh)**, but it has a limited range.
 - Further, for SSA, India depends on data from NORAD and others available in the public domain.
 - However, these platforms don't provide accurate (or comprehensive) information.
 - NORAD, or the **North American Aerospace Defence Command**, is an initiative of the U.S. and Canada that shares selective debris data with many countries.
- **Implementing Agency:** ISRO's efforts towards space situational awareness (SSA) is coordinated by the **SSA Control Centre in Bengaluru** and managed by the Directorate of Space Situational Awareness and Management at the ISRO headquarters.
- **Global Initiative: Clearspace-1 (of European Space Agency)**, which is scheduled to launch in 2025, will be the first space mission to eliminate debris from orbit.

UPSC Civil Services Examination, Previous Year Questions (PYQs)

Q. Consider the following statements: (2016)

The Mangalyaan launched by ISRO

1. is also called the Mars Orbiter Mission made India the second country to have a spacecraft orbit the Mars after USA
2. 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)

Exp:

- **Mangalyaan**, launched by ISRO to study martian surface and atmosphere, is also called **Mars Orbiter Mission**. It is India's first interplanetary mission.

Q. 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 Chandrayan-II
(c) A geoportal of ISRO with 3D imaging capabilities of India
(d) A space telescope developed by India

Ans: (c)

Exp:

- **Bhuvan** is a geoportal developed by ISRO focused entirely on providing free access to high resolution imagery of the Indian region

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