



Protecting Earth's Orbit from Space Debris

For Prelims: Space Debris, United Nations Committee on the Peaceful Uses of Outer Space, System for Safe and Sustainable Operations Management.

For Mains: Project NETRA, Inter-Agency Space Debris Coordination Committee (IADC), Clean Space Initiative of European Space Agency (ESA).

Why in News?

Since, [United Nations](#) agreed [on a treaty to conserve and sustainably use the high seas](#) beyond national boundaries, scientists are calling for a **legally-binding agreement to protect the Earth's orbit** from space debris.

- The [United Nations Committee on the Peaceful Uses of Outer Space](#) has laid out guidelines to **mitigate [space debris](#)**, but there is **no international treaty** that seeks to minimise it.

What is Space Debris?

▪ About:

- Space debris refers to the **collection of artificial objects in orbit around the Earth** that have lost their utility or are no longer in use.
 - These objects include **non-functional spacecraft, abandoned launch vehicle stages, mission-related debris**, and fragmentation debris.

▪ Concern:

- The **number of satellites orbiting Earth** is expected to reach **60,000 by 2030**, up from the current **9,000**, and the amount of untracked debris is a cause for concern.
- **Around 27,000 pieces of "space junk" are being tracked by NASA but over 100 trillion untracked pieces of old satellites circle the planet.**
- Currently, **companies are not incentivised to clean up orbits** or to include de-orbiting functions in satellites.
 - **De-orbiting** means bringing dead satellites back to Earth.
- The **current [Outer Space Treaty](#)** is hindered by ever-changing geopolitics, technology and commercial gain.

▪ Initiatives to Curb Space Debris:

◦ India:

- In 2022, ISRO set up the [System for Safe and Sustainable Operations Management \(IS 4 OM\)](#) to continually monitor objects posing collision threats.
- '[Project NETRA](#)' is also an early warning system in space to detect debris and other hazards to Indian satellites.

◦ Global:

- [Inter-Agency Space Debris Coordination Committee \(IADC\)](#)
- [Clean Space Initiative of European Space Agency \(ESA\)](#)

How Space Debris Can be Tackled?

- **Space Treaty with Extended Producer Responsibility:** A legally binding agreement is necessary to protect the Earth's orbit from space debris.
 - The treaty should ensure that **producers and users take responsibility for their satellites and debris and** enforce **collective international legislation** with fines and other incentives to make countries and companies accountable for their actions.
- **Incentivisation:** Countries using the Earth's orbit should commit to **global cooperation**, and **companies should be incentivized to clean up orbits** and include de-orbiting functions in satellites.
- **Reusable Launch Vehicles:** Using reusable launch vehicles instead **of single-use rockets** can help reduce the number of new debris generated from launches.

Source: DTE

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