

Anti-Satellite Weapon

Why in news?

Recently US accused Russia of developing a space based nuclear weapon that could destroy or damage other satellites in the orbit.

Anti-Satellite Weapon

- Anti-satellite weapons are designed to debilitate and/or destroy satellites that are already in orbit and operational.
- **Kinetic anti-satellite weapon**- These are usually launched from the ground or from the wings of an airplane and destroy satellites by running into them at high speeds.
- **Co-orbital anti-satellite weapons**- They are first launched into orbit and then change direction to collide with the targeted satellite from space.
- **Non-kinetic anti-satellite weapon**- They use technology like lasers to disrupt satellites without physically colliding with them.
- **Anti-satellite weapon capability**- US, Russia, China and India have demonstrated the ability to attack satellites in orbit that support services like GPS, communication and weather forecasting.
- **Mission Shakti**- It is India's anti-satellite missile launched from the Dr A P J Abdul Kalam Island launch complex near Balasore in Odisha in 2019.
- Anti Satellite weapons violates certain provisions of Outer Space Treaty, 1967.

What are the key provisions of Outer Space Treaty (OST), 1967?

Outer Space Treaty, 1967 is often called as the magna carta of space law.

- It is formally known as the "Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies."
- **Adoption**- By United Nations General Assembly in 1967.

The provisions of the treaty are binding on the signatories

- **India**- It signed the treaty in 1967 and ratified in 1982.
- **Peaceful use of outer space**- Outer space shall be used for peaceful purposes, and the exploration of outer space shall be carried out for the benefit of all countries.
- **Prohibition of sovereignty**- Outer space including the [Moon](#) and other celestial bodies, is not subject to national appropriation by any means.
- **International cooperation**- States are encouraged to conduct international cooperation in the exploration and use of outer space, including the exchange of

information and assistance in case of emergencies.

- **Prohibition of weapons of mass destruction**- The Moon and other celestial bodies shall be used exclusively for peaceful purposes. The stationing of weapons of mass destruction and military bases on celestial bodies is prohibited.
- **Freedom of exploration**- The exploration and use of outer space shall be carried out for the benefit of all countries, and there shall be free access to all areas of celestial bodies.
- **Liability for space activities**- States are internationally liable for any damage caused by their space activities to other states or their space objects.
- **Limit non-governmental activities**-The private entities and other non-government organizations are required to avoid harmful contamination of outer space and celestial bodies.
- **Registration of space objects**- States are obligated to register space objects launched into outer space with the *UN Registry of Objects Launched into Outer Space*.
- **Protect astronauts**- States are obligated to render assistance to astronauts in distress and to return them safely to Earth.
- **Avoidance of harmful contamination**-States shall avoid harmful contamination of space and celestial bodies, it emphasizes environmental protection and the prevention of the spread of harmful substances in outer space.

The Act is against nuclear weapons, it does not prohibit nuclear-powered satellites in space.

- **Notify harmful activities**- States are encouraged to inform the international community in advance about any space activities that could cause harmful interference with the activities of other states.
- **Coordination**- States are encouraged to consult with each other and coordinate their activities in outer space to prevent harmful interference.

Space weapons prior to OST

- **US**- It carried out a series of high-altitude nuclear tests, the biggest of which was the **Starfish Prime** in 1962, which triggered electromagnetic pulse that was much larger than expected.
- **Soviet Union**- In 1978, a **nuclear powered satellite Kosmos 954** malfunctioned and crashed into northern Canada, it spread radioactive debris across hundreds of miles.

How will nuclear weapon impact satellites?

- **Electromagnetic pulse**- A burst of electromagnetic radiation will be created which would damage or disrupt electronic devices and systems.
- **Creation of radiation belt**- A nuclear explosion in space can create or enhance these belts, which can harm satellites and astronauts. Starfish Prime by US caused the formation of radiation belts around the Earth.

Radiation belt is the zone of energetic charged particles trapped by the earth's magnetic field.

- **Kessler syndrome**- A scenario where the density of [space debris](#) in low-earth orbit is high enough to cause frequent collisions, which in turn create more debris and make space activities and exploration more difficult or impossible.
- **Space-based laser**- A weapon that uses a laser beam to target and destroy other satellites, it could also be powered by a nuclear reactor or a nuclear explosion.

Reference

[The Hindu- Is Russia testing new anti-satellite weapon](#)

