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## 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](#)



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