



Mission Shakti, ASAT and India

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This editorial is based on the article [“ASAT test: How India shifted gears to match changing geopolitical realities in space with Mission Shakti”](#) which appeared in "Financial Express" on 9th May, 2019. The article talks about how the India' space programme is in line with the changing geopolitical realities in Asia and beyond.

Mission Shakti

On march 27th, India completed its first successful attempt at shooting a satellite in lower earth orbit (LEO). In doing so, India has become the fourth country after the US, Russia and China to acquire the capability of space warfare.

What is Mission Shakti and ASAT Missile?

Mission Shakti was undertaken to develop highly-potent Anti-satellite weapons (ASAT). It is a joint programme of the Defence Research and Development Organisation (DRDO) and the Indian Space Research Organisation (ISRO). Anti-satellite (ASAT) System is missile-based system to attack moving satellites. [Read More...](#)

- ASAT propels India to the coveted **space-superpower league**.
- **India will now have the power to decimate satellites for pure military and strategic purpose.**
- With this missile, India will have the capability to interfere with satellites or engage in direct attacks.
- **ASAT missile can be air, sea or land-based.**

Why is there a need to destroy Satellite?

- Satellites assume a great importance now-a days, because it is a part of critical civil and defence infrastructure of any country, manifested in the fact that a large number of crucial applications are dependent on it.

- These include navigation systems, communication networks, broadcasting, banking systems, stock markets, weather forecasting, disaster management, land and ocean mapping and monitoring tools, and military applications.
- Destroying a satellite would render these applications useless. It can cripple enemy infrastructure without causing any threat to human lives.
- **Outer space is also emerging as the fourth arena of warfare.** Hostile state and non-state actors can therefore damage Indian space assets.
- The ASAT capability has created some deterrence against potential hostile behaviour against Indian interests.

Why it is a big achievement for India

- In USA, it is often called that success in ASAT mission is equivalent to hitting a bullet with another bullet.
- It requires very advanced capabilities in both space and missile technologies for achieving success in an ASAT mission.
- A satellite travels at an amazing speed of 28 times that of the speed of sound, on a predictable path. Destroying such a satellite, using ballistic missile is an important milestone for any country space security.

Further, ASAT can also help in creating nuclear missile deterrence.

- **The idea is to blind the enemy country of its navigation powers.**
- Moreover, an incoming missile can also be destroyed using ASAT.

A History of Ballistic Missile Defence System in India

- A Ballistic Missile Defence system (BMD) is a missile defence system that acts as a shield against ballistic missile attacks.
- **India's BMD development began in 1999, after the Kargil war.**
- **The primary aim was to augment India's defence against possible nuclear attack from Pakistan.** It holds a place of prime importance especially when India follows a 'No first use' policy.
- **India seeks to deploy a functional 'iron dome' ballistic missile defence (BMD), incorporating both low-altitude and high-altitude interceptor missiles.**
- India's BMD is primarily developed by DRDO with help of many public and private firms like BEL, Astra Microwave, L&T, etc.

Geopolitical Implication of Mission Shakti

- With the establishment of India as a space power, India will be accorded a place in any future international treaty that relates to the governance or usage of Space.

- In case of Pakistan, a terrestrial power, the use of nuclear arsenal can now come at a heavy cost.
 - As of now Pakistan presumes that the no first use doctrine of India gives it an advantage, but with the development of ASAT capabilities, India would be able to destroy an incoming Pakistani nuclear missile.
 - This will create a significant deterrence vis-a-vis the position of Pakistan.
- In case of China, which is a significant space power, counter-space capabilities of India will provide a critical balancing deterrent.

Challenges to Mission Shakti

Third Party satellites: Since nations use third-party satellites for their various needs, even striking down every satellite of a nation might not disable military communication of that nation entirely because that nation will simply use another nation's satellite to communicate.

Deterrence

- **As all major nations have hundreds of dual-use satellites in orbit, it is near to impossible for any nation to stick down these satellites by such missiles.**
- Also, if the situation comes when nations are striking down the satellites of adversary nations then the world has already reached the nuclear threshold.

Convention on Space

Outer Space Treaty of 1967 (United Nations): It prohibits countries from placing into orbit around the Earth “any objects carrying nuclear weapons or any other kinds of weapons of mass destruction”.

It also prohibits the stationing of such weapons on celestial bodies, like the moon, or in outer space. “The moon and other celestial bodies shall be used by all state parties to the treaty exclusively for peaceful purposes.”

- However, what should be noted is that, India violated no treaties, in pursuance of Mission Shakti. As, the ASAT mission, generates the energy by the velocity of the missile and not by a blasting of explosives.
 - ASATs take many shapes, but the clearest examples follow kinetic-kill models, in which an object in space or on the ground is sent to collide with an orbiting satellite, destroying both object and target with the energy of the crash.
- However, in pursuance of destroying a satellite, space debris is generated, which can be very detrimental for operational satellite.

The Issue of Space Debris

- **Space debris consists of pieces of non-functional spacecraft, and can vary in size from tiny paint flecks to an entire “dead” satellite.**

- Space debris orbits from hundreds to thousands of kilometres above Earth.
- The presence of space debris increases the likelihood of operational satellites being damaged. The threat from the space debris is that it could collide with the operational satellites and render them dysfunctional.
- Mission Shakti created around forty-five debris, in the LEO, and the test was done in the lower atmosphere to ensure that there was no space debris.
- According to ISRO, Whatever debris that was generated will decay and fall back on to the earth within a week.
- However it is alleged by the NASA that Mission Shakti created debris which can impact the International Space Station (ISS). But such allegations are rejected by Pentagon.

Kessler Syndrome

- The Kessler syndrome (also called the Kessler effect, collisional cascading or ablation cascade), proposed by the NASA scientist Donald J. Kessler in 1978, is a scenario in which the density of objects in low Earth orbit (LEO) is high enough that collisions between objects could cause a cascade where each collision generates space debris that increases the likelihood of further collisions.
- One implication is that the distribution of debris in orbit could render space activities and the use of satellites in specific orbital ranges impractical for many generations.

Militarization and Weaponization of Space

Mission Shakti can start a race towards militarization and weaponization of space.

- As of now only four countries possess ASAT technology, but the test by India will start a race among many countries to possess the ASAT capacity (including countries like Pakistan).
- But, what has to be observed is that Space has always been militarized.
Since the time of the Cold War Space was militarized (i.e space-base military satellites; spy-satellites, etc.) if not weaponized.
- **If it has to be stopped, then the world has to come together so that, such aggressive tendencies and arm race stops.**

Way Forward

Alternative technologies

- There are alternative technologies such as jamming which are more effective than kinetic kill (of an ASAT system).
- **India should not lose sight of the larger goal, namely to completely de-militarise space and only use it for peaceful non-commercial exploration.**

- **ASAT Mission opens up new vistas for India for collaborative ventures** in space with a number of other key space powers such as the US, Japan, and France, in area of New Space Dynamics.
 - New Space Dynamics is an unfolding and complex phenomenon encompassing various trends, including technological, political, and commercial trends that are together contributing to an increasingly more prominent role for private actors' involvement in space.
 - It will act as an enabler to expand capacity and capability for the industry to offer end-to-end products and services.

Drishti Input:

Apart from establishing India as a space power, Mission Shakti has significant geostrategic importance. Discuss.

Mission Shakti makes India a Space Power: 10 FAQs on DRDO's ASAT answered
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