



India needs to demonstrate ASAT capability

Evolve a posture

A credible ASAT capability can ensure India's space assets

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Since China conducted its anti-satellite (ASAT) test and demonstrated its capability in January 2007 to the rest of the world, there has been a rigorous and intensive debate among the members of academic and strategic community on India's technological ASAT capabilities and how should India respond to these emerging challenges.

It had taken almost a week time for the United States' scientific community to confirm that China used an ASAT rocket to destroy its own obsolete weather satellite (Feng Yun 1C) in a weapons test that scattered debris in the low earth orbital field.

It was also generally believed that China's development and testing of such weapons was inconsistent with the spirit of cooperation that was envisaged among the space fairing nations.

The ASAT test conducted by China demonstrated its S&T prowess and signaled to the international community in general and the space

fairing nations in particular that Outer Space is going to be a major place for the next battlefield.

It is, most likely so because there is an ongoing competition among the major powers in terms of creating sphere of influence in the Outer Space. The US space-tracking sensors have shown that the Feng Yun 1C was broken up into hundreds of small orbiting pieces.

The loose debris certainly has posed a grave risk and danger to other satellites, space vehicles and any other space assets deployed in low earth orbit, which is basically an altitude that extends from 193 km to 1930 km above the earth's surface. The debris has posed a major hazard to other satellites in the same as well as nearby orbits.

Controlling space

Reactions to the ASAT test conducted by China and subsequent developments in space especially in the last four years have compelled India to rethink and strategise a robust space policy, which would deal with the emanating challenges from the

space fairing nations in general and China in particular.

How India would be able to protect its satellites has been an area of serious concern. India needs to articulate how it is going to be a major stakeholder in controlling the space and projecting its capabilities.

The technological requirements in the field of space power projection and anti satellite capabilities are immense as far as the pace at which the developments have taken place in the field.

The space-based lasers and space-based interceptors have impinged with the larger requirements for having anti-satellite capabilities. The anti-satellite capabilities are one of the essential requirements for making the inroads into the weaponization of space.

The space weapons debate began after the United States and the Soviet Union tested their first anti-satellite rockets in 1959 and 1968 respectively. Much of the S&T debate on this issue had generated lots of interests by other nations in terms of

dealing with the challenges and responding to such developments.

The United States and the former Soviet Union grappled with Asats in the 1970s and 80s in talks that had not reached anywhere. Even the two countries could not even agree on a definition of an ASAT.

In the current context, China's entry into the exclusive club of select anti-satellite capable countries has wider ramifications for the United States' satellites in general and India's national security in particular.

Technologically, India would require to evolve a mechanism and capability in terms of assuring that its satellites are well protected. It may also like to demonstrate its anti-satellite capability so that it can find exclusive place in Outer Space.

There is a growing concern among the members of academic and strategic community that the weaponization of space would jeopardize international peace and stability.

China's entry to the exclusive club of anti-satellite capable nations (United States and Russia) may become a factor in evolving an international treaty supported and sponsored by the United States in banning nations acquiring such capability.

All the three nations (US, Russia and China) combine can come up with this idea to put up a cutoff date on the patterns of the Nuclear non-proliferation Treaty (NPT).

India's recent successes in achieving missile defence interceptors certainly symbolize its anti-satellite capability. Undoubtedly, the arms race has started in Outer Space and India certainly would like to address many of these emanating issues to protect its satellites and advance its national interests.

The polluted space environment has been posing a threat to all the satellites in LEO above 175 km including Indian satellites. The Indian remote sensing satellites are also placed in this region.

It is a well acknowledged fact that the low earth orbits are effective for surveillance and reconnaissance as well as meteorological observation and resource monitoring.

Space certainly constitutes a strategic sector and impacts both domestic and foreign policy. Hence, space debris from the ASAT test constitutes a major concern. China's test has also signaled to the rest of the world about its ability and intention in terms of developing and deploying a dedicated weapon system, which has been designed to deny an adversary the use of its space assets.

The question which is being debated among scientific and technical community circles has been whether India has built the capacity to conduct ASAT test. The question which is being debated among strategic, diplomatic and academic community has been that what India will get out of conducting ASAT test and what it will lose if it does not demonstrate its capability.

What will happen if India acquires technological capabilities to defend its satellites in orbit? Whether India has the relevant techniques available to protect its satellites or not is a major question of debate.

The relevant techniques include advanced technical means to overcome denial and deception, radiation hardening and shielding, command and data encryption, anti-jamming measures and limited orbital maneuvering.

Complex challenges

However, the technical feasibility of these safeguards mechanism are yet to be proven. It must be mentioned here that neither the commercial satellites nor the military satellites have the ability to detect electromagnetic or physical attacks in space.

It must be highlighted here that the risks to individual satellites vary by function and orbital location. However, there are certain generalized threats, which are applicable to any satellite across the spectrum in the space.

The Indian satellites are vulnerable to jamming satellite signals and inserting false commands. There may be an attempt to blind the satellite sensors. There may also be an attempt to conduct pellet-cloud attacks on low earth orbit imaging satellites. The adversary can also use microsatellites to destabilize the space assets of India. Another significant form of attack

could be conducting high-altitude nuclear explosions.

India in the current circumstances certainly requires to address a number of challenges emanating from the developments in the space. India must consider a constellation of space-based lasers, which would provide defence and protection against debris-like anti satellite weapons.

Low earth orbits are to some degree self cleaning due to atmospheric drag. However, debris in higher orbits lingers for decades. India needs to do a careful planning and craft a strategy to mitigate the space debris.

The challenge before India has been to build space-based lasers. It seems to have confronting with severe and significant operational barriers.

It is only because the satellite would move with respect to a fixed point on Earth, which to a greater extent covers strategically important areas on a continuous basis and it would require a constellation of several dozen lasers to perform the required function. Space-based lasers acquisitions would also be an expensive proposition.

India has been able to achieve ASAT capability and it was clearly demonstrated through its recently concluded Anti ballistic missile test. The technologies required for conducting both ASAT and ABM tests are by and large similar. The ASAT capabilities require to have a number of technologies in place.

These are relating to space based sensors, synthetic aperture radars, electronics, a sound navigation system, guidance and control and global positioning systems. A number of different types of sensors including infrared sensors, optical sensors, electronic-optical sensors and magnetic sensors are vital to monitor, detect and help in sensing the events.

It is high time India shall decide whether it requires an active posturing in space. India would certainly require to evolve a posture, which would require a careful crafting of its policies in terms of dealing with many of the emerging complex challenges. India has certainly been provoked by its neighbor who has already conducted ASAT test. ■