Indian Anti Satellite Weapon: Necessity, Urgency and the Way Ahead

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Introduction

India is a developing nation with a major role in Asia. The pace of development is moving ahead with positive growth, even in the times of recession the world over. India's growing stature in the world is reflective of the new role which the country has started to play in the world affairs. This economic growth has resulted in a bigger geopolitical and geostrategic role for India, not only in Asian continent, but also in the World Order which is apparently transforming into a New Economic World Order. In this new scheme of things, the space assets have been instrumental in shaping the Indian success story. As a result, more and more satellites are being launched to support large number of services which are poised to shore up the economic activities of the country, apart from supporting a large number of social welfare programmes.

When so many satellites are there in space, their safety and security becomes crucial for India's progress and sustained growth, especially when India is facing a hostile adversary Pakistan in the West and not so friendly a neighbour in China in the East. The security of Indian satellites has become a matter of concern, ever since the shooting down of a defunct Chinese weather satellite by China's anti satellite (ASAT) test in January 2007. The test opened a new flank of vulnerability in India's $12 billion (Rs 60,000 crore) space infrastructure.[1] China's alarming test spurred India's quest for a similar satellite-killing system.

The Necessity

Offence is the best form of defence. Apart from the military, even a common man understands this axiom. However, when transposed to the national level, it is surprising that the "killer instinct", which pumps the adrenaline and justifies one's belief in "offence is best defence", appears to be amiss. Perhaps that's the

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only justification for the country's political leadership to withhold the decision of developing its own ASAT programme, inspite of the fact that the country, as per the top defence scientists, does have the capability of developing an ASAT weapon for India, as and when the situation demands. In this regard Dr VK Saraswat, the Director General of Defence Research and Development Organisation (DRDO) has gone on record while briefing the reporters at Thiruananthapuram in January 2010, "India is putting together building blocks of technology that could be used to neutralise enemy satellites. We are working to ensure space security and protect our satellites. At the same time we are also working on how to deny the enemy access to our space assets." The nation's grit towards building ASAT capability was also visible from the statement of Dr Saraswat after the successful test of Advanced Air Defence (AAD) missile programme in April 2012, wherein he said, "Agni-V's launch has ushered in fantastic opportunities in building ASAT weapons and launching nano / micro satellites on demand. The said ASAT would include marrying Agni-V's propulsion system with the kill vehicle (AAD) of the successful II-tier Ballistic Missile Defence (BMD) system. Since the ASAT is required to reach an altitude of 800 km – Agni-V will give the boosting capability and the "kill vehicle", with advanced seekers, will be able to home into the target satellite". He further stated that "India will not test ASAT capability through destruction of a satellite so as to avoid space debris. Instead, the Indian ASAT capability would be fine tuned through simulated electronic tests".

Infact, there appears to be an intense debate going on within the Indian space and the strategic community on two counts; firstly, the necessity of possessing an ASAT, and secondly, its impact on the security architecture in the Asia-Pacific region. India appears to be sceptical about disturbing the Asian security architecture, which is led by China. Yet, it also appreciates the vulnerability of its space assets and thus the necessity to protect them in view of their importance as national assets, which are indeed the engines for economic growth and development. Dr Kasturirangan did appreciate this necessity immediately after the Chinese tested their ASAT on 11 Jan 2007. After the Chinese ASAT test, which took the world, including India by surprise, Dr Kasturirangan said "India has spent a huge sum to develop its capabilities and place assets in space. Hence, it becomes

necessary to protect them from adversaries. There is a need to look at means of securing these."

Towards this, the development efforts in respect of the Indian ASAT have moved forward. In a televised press briefing during the 97th Indian Science Congress in Thiruvananthapuram, the DRDO Director General VK Saraswat announced that India was developing lasers and an exo-atmospheric kill vehicle that could be combined to produce a weapon to destroy enemy satellites in orbit. Dr Saraswat also claimed that the kill vehicle for intercepting the satellite, needed to be developed, and that work was going on as part of the ballistic missile defence programme.[2] He said that the propulsion module and kill vehicle already existed in principle on the Agni (missile) series of ballistic missiles, but that India did not have a formal ASAT weapon project as yet. He indicated, however, that the ASAT weapons could be developed as part of the Indian BMD Programme, which will complete the development stage in totality by 2014.[3] India had identified development of ASAT weapons "for electronic or physical destruction of satellites in both Low Earth Orbit (LEO) (2,000-km altitude above earth's surface) and the higher geosynchronous orbits" as a thrust area in its long-term integrated perspective plan (2012–2027).[4]

However, the poignant silence on the ASAT programme maintained by India, since the Chinese ASAT test in 2007, could apparently be for the lack of technical competence towards development of a potent ASAT weapon or international considerations. Since Dr VK Saraswat has already gone on record to say that the capability was available within the country, there could be two questions bothering the Indian policy makers; specially the mandarins of Ministry of External Affairs. Firstly, who will have the onus to justify to the world about the strategic compulsions for India to go for an ASAT weapon. Thereafter, the more arduous task would be of countering the move by the world powers to isolate India through sanctions, if any. Thus, there are two basic questions which India needs to consider : –

(a) Should India disturb the status quo in Asia by testing its own ASAT weapon?

(b) International fallout of ASAT test by India, specially the Chinese reaction?

The Necessity of Protecting the Satellites

Since the country's economic development is so dependent on satellite based technologies, the Indian space assets need to be secured from physical damage and destruction. This destruction could be from internal threat of sabotage and physical damage of ground support systems or threat of physical destruction of the satellites, which are vulnerable to ASAT threat from our adversaries. Towards this, India definitely needs to develop its indigenous ASAT capability. The technology apparently is available within the Country, as has been claimed by the defence scientists from DRDO. If that be the case, the time has come for India to initiate its effort towards demonstrating its ASAT capability, which would act as a deterrent to our adversaries from initiating any attack on Indian space assets. Deterrence is credible only when it is physically demonstrated.

The Urgency

The necessity of testing an ASAT weapon to fulfil the Indian strategic requirement has been well appreciated in the strategic community. They also have appreciated that the strength to negotiate and talk peace with a powerful neighbour like China will come from a potent deterrence in the form of ASAT, which can effectively provide an asymmetric advantage to India against China. The only factor that needs to be appreciated is the international reaction towards testing of an ASAT weapon. Since a strong international reaction may be expected, India needs to prepare in advance the ways and means to tackle the fallout, which is likely to impact Country's economic development. Since the international community is paranoid about the space debris, the repercussions are likely to be strong and thus India needs to guard against the negative impact. Since restrictive regimes or negative list is nothing new for India and also the fact that India has learnt to live with nuclear apartheid, the expected restrictive regime consequent to ASAT testing by India, is not bound to have significant impact. The present day India is economically much stronger to handle the impact of any regime and would be able to handle the fallouts, without compromising its economic activities and international relations.

However, there is a way to avoid the international fallout over ASAT test, if the space debris is avoided or controlled in such a

way that it re-enters the earth's atmosphere and automatically burns out. This can be conducted on the lines of the US ASAT test on 21 Feb 2008, wherein the US destroyed its malfunctioning spy satellite USA-193 using a RIM -161 Standard Missile 3. We need to appreciate the whole gamut of this supposed Kinetic Kill Vehicle (KKV) Test by the US. The satellite, USA-193 was an American spy satellite, which was launched on 14 Dec 2006 by a Delta II rocket, from Vandenberg Air Force Base. It was reported about a month after launch that the satellite had failed. In Jan 2008, it was noted that the satellite was decaying from orbit at a rate of 1,640 feet (500 m) per day.[5] On 14 Feb 2008, it was reported that the US Navy had been instructed to fire an SM-3 ABM weapon at it, to act as an anti-satellite weapon.[6] The *RIM-161 Standard Missile 3 (SM-3)* is a ship-based missile system used by the US Navy to intercept short-to intermediate-range ballistic missiles as a part of Aegis Ballistic Missile Defense System.[7] Although primarily designed as an ABM, the SM-3 has also been employed in an ASAT capacity against a satellite at the lower end of Low Earth orbit.[8]

The primary reason for destroying the satellite, according to the US Government, was the approximately 1,000 lb (450 kg) of toxic hydrazine fuel contained on board the satellite, which could pose health risks to persons in the immediate vicinity of the crash site, should any significant amount survive the re-entry.[9] On 20 Feb 2008, it was announced that the launch was carried out successfully and an explosion was observed consistent with the destruction of the hydrazine fuel tank.[10] Experts debated whether the hydrazine tank would have survived an uncontrolled re-entry. However, if it had, any human fatality would still have been very unlikely. Although hydrazine is toxic, a small dose would not have been immediately lethal. The chance of the (assumed intact) hydrazine tank landing close enough to at least one person for that person to be killed if he or she lingered in the vicinity of the crash site was about one per cent, while the cost of the intercept was about $100 million.

The intercept, however, was widely interpreted as a demonstration of the US capabilities in response to the Chinese ASAT test a year earlier. The intercept was different from typical ASAT missions in that it took place at a much lower altitude (133

nautical miles or 247 kilometres) than would normally be the case, and the SM-3 missile as currently deployed would not have adequate range and altitude reach for typical ASAT missions in low-Earth orbit. However, the warhead was shown capable of hitting a satellite at orbital closing speeds. While an SM-3 missile would require significant modification to fill an anti-satellite role, the test was a proof of concept, demonstrating that it can operate in such a role if required. The best part of this demonstration was that it can be achieved with almost negligible debris; hence, not much of hue and cry can be expected from other space faring nations, except from the proponents of weapon free space. India could thus take a cue from this simulated incident, in case it wants to carry out testing of an indigenous ASAT system.

The Way Ahead

The successful 19 Apr 2012 trial of 5,500 km-Agni V Intermediate Range Ballistic Missile, that Dr Saraswat calls a "game changer", is another step towards the capability to target objects in space. The missile scaled a height of 600 km before re-entering the atmosphere. The ASAT weapon is unlikely to be publicly tested. This was confirmed by Dr Saraswat who said that India would not test this capability through the destruction of a satellite. Such a test risked showering lethal debris in space that could damage existing satellites. Instead, India's ASAT capability would be fine-tuned through simulated electronic tests.

Seeking to guide India's responses to this emerging threat, Space Security Coordination Group (SSCG) was set up in 2010. Chaired by the National Security Adviser, Shiv Shankar Menon, SSCG involved representatives of DRDO, Indian Air Force (IAF) and National Technical Research Organisation (NTRO). Besides laying down the Government's space policy, this body will also coordinate response on an international code of conduct in space.

In June 2010, the US indicated that they would consider a new treaty for restrictions on space-based weapons. A new treaty would foreclose India's options for testing ASAT weapons. Indian analysts say it could lead to a new restrictive regime on space weapons, like the present treaties on testing and possession of nuclear weapons and long range ballistic missiles. The SSCG has directed DRDO to accelerate its ASAT capability.

Another key ASAT milestone capability will be reached with the first test of a Prithvi Defence Vehicle (PDV) interceptor later this year. This slender two-stage missile can destroy incoming ballistic missiles at an altitude of 150 km. The Ballistic Missile Defence (BMD) project that aims to protect the country from hostile ballistic missiles has, in fact, developed the three critical elements required to destroy satellites. A long range radar able to detect them and a missile that can inject a "kill vehicle" or warhead into an orbit that actually homes in to destroy it. All these elements have been developed under the BMD programme. The DRDO's Long Range Tracking Radar can scan targets over 600 km away. The 'kill vehicle' has been developed as part of the ballistic missile system. It has both electronic and radio-frequency guidance that can home onto a target.

Besides the BMD system and an ASAT test, the following is strongly recommended to ensure that the Indian space assets are well protected and India has a credible deterrence : –

(a) Space surveillance network of satellites equipped with radars to ensure launch detection, tracking measures and cataloguing the orbiting objects and space debris, improved accuracy and surveillance.

(b) There is an urgent need for a dedicated Space Command. Space assets with military applications need to be placed under the Space Command. A dedicated Space force must be raised from within the Armed Forces cadre.

(c) Dedicated training of space forces to be initiated for effective and efficient adaption of space technologies in the Armed Forces.

(d) India's Kinetic Kill Energy (KKE) ASAT must be demonstrated at the earliest for strategic balance in Asia.

(e) Space assets with military applications ought to be concurrently taken-up alongwith integration of military capabilities in the Armed Forces.

If these recommendations are finalised and incorporated into the Indian strategic build-up, it is for sure that India's offensive space capabilities will not only ensure safety and security of Indian Space assets but will also enhance its strategic and tactical capability, which in turn will contribute to a secure India.

Endnotes

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10. "US shoots down toxic satellite". *Daily telegraph (Australia). 2008-02-20.*