

SPACE WEAPONS: A RAPIDLY EVOLVING THREAT TO SOUTH ASIAN STRATEGIC BALANCE

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Abstract

Debate about probability of outer space militarization and weaponization is getting traction. International political system is transforming from uni-polarity to the multi-polarity. The United States (US), which had been enjoying the sole super power status, is at the verge of sharing its power pie with rising China and resurging Russia. Besides Russia and China, India is also striving hard to secure its place in the world power politics with help of the US. For achieving the power status at global level, outer space has been in the limelight for extension and projection of power aspirant states. Outer space militarization and its subsequent weaponization are being debated. Arms controllers foresee it as a nightmare to their efforts for bringing peace and stability. India, in this regard is no different which has a matured space program with an experience of over fifty years. Being one of the major space faring nation, there are tangible indicators that India would not hesitate to join the club of states with space weapons capability. Indian probable space weaponization capability would be detrimental to the deterrence stability in South Asia which houses two nuclear weapons states with border contiguity. Issue of space weaponization in South Asian context needs to be pre-empted less it is too late.

Keywords: Space Militarization, Space Weaponization, Anti-Satellite Weapons (ASATs), Space Control, Confidence Building Measure (CBM), Proliferation.

Introduction

Since the emergence of human society, quest for power and supremacy has been the hall-mark of bilateral relations. Inter-state conflicts and rivalries have been the outcome of states' impulsiveness to dominate and rule over communities, groups and societies. Hence, the strong side has always been on an outlook to seek opportunities for subduing the weaker rival side.¹ Outer space is no different and has been under limelight for its likely use of yet another domain of conflict as well as exercising power for subduing rival actors.

In the contemporary evolving global power politics paradigm, importance of having space weapons is getting traction among the space faring nations with an

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ambition of seeking more active and enhanced role in global decision making process. Maintaining a modernized army with state of the art weapons have been one of the most important element of national power. It is graded as one of the influential tangible factor in support of foreign policy and national interests. International politics takes lead from the military advancement as it has the capability of leaving its foot-print. More the military might and reach a state possesses, more powerful and influential it is considered to be at the global helm of affairs. For instance, during the World War I, Germany dominated the British forces due to their overwhelming superior submarine technology.² Similarly, the US dominated the battle hardened opponents in Gulf War, Global War on Terror (GWOT) and Operation Iraqi Freedom due to their superior edge in outer space applications. Gulf War was even named as the 'first space war'.³

Space weapon's probability is on higher side of the trajectory. Arms controllers are also worried that to what extent this competition would go un-noticed as the space faring nations who have tested their Anti-satellite (ASAT) capability generally do not advertise their achievements and keep refining it silently for obvious repercussions at diplomatic, political and economic levels. Unfortunately, less than a few political driven initiatives have been trying to exercise control on actualization of space weapons, otherwise there is no legal instrument or an active diplomacy to address the issue.⁴

In South Asian context, Indian capabilities are remarkably leaping up in all the global commons including land, sea, air, cyber and outer space. India would thus be able to poise its influence on decision making apparatus of these commons in the near future.⁵ India after having achieved a respectable status with regard to its civilian space program has started thinking loud for using its mature space capacity for multiplying its security arrangements. Indian scholars and officials alike are urging their government to attain space control for the deterrence purpose so that no one dares to infringe with their rapidly increasing outer space assets. The deterrence could only be achieved, provided India has an offensive space capability whether space or terrestrial or outer space based. Offensive space capabilities would increase the cost for an adversary in case of a misadventure, thus outweighing the benefits accrued.⁶ In addition, the Indian military modernization especially in space and its derivative technology of ballistic missiles has motivated and encouraged its political leaderships to take hawkish positions against Pakistan.⁷

On the other hand, Pakistan's space program is in its early stages of maturity; however, it has an ambitious space vision to be achieved by 2047. Although, Pakistan has no competition with India in outer space context, yet its security concerns are India centric and outer space would not be different as it develops its outer space

assets in times to come. Technically, satellites have one of the pivotal roles in nuclear and conventional conflicts as they would act as eyes and ears for an early warning of any type of attack. Moreover, an ASAT can also severely impact upon adversary's capability to employ second strike capability, if employed against its Command, Control, Communications, Computer, Information, Intelligence, Surveillance and Reconnaissance (C4I2SR) satellite(s).⁸

Pakistan needs to have a robust space program for maintaining credibility of its deterrence. Pakistan's nuclear based deterrence needs an assured and uninterrupted communication, early warning of an attack including missile launch, strategic weapons' guidance and real time battle situational awareness. All these elements of deterrence require dependable outer space assets in the form of communication satellites, early warning satellites, constellation of navigational satellites and remote sensing satellites, respectively. How Pakistan would achieve it, is yet to be seen especially under the discriminatory technology denial environment being faced by Pakistan.

Foregoing above discussion in view, an endeavor would be made to test the derived hypothesis i.e. 'The Indian quest for space weaponization would deteriorate deterrence stability in South Asia'. In order to set the stage for testing hypothesis, the first part of this article seeks to unfold parameters of space militarization and space weaponization debate besides the global space arms control efforts to preempt space weaponization. It would be followed by an Indian centric discussion which would inquire into the probability of Indian efforts of weaponizing the outer space. In the end, a way forward would be suggested to preempt the introduction of space weaponization in South Asia.

Theoretical Lens to View the Issue

Before, the Indian space weaponization quest is dilated upon with empirical evidences, let's look at the phenomenon through theoretical prism of offensive realism, given by Mearsheimer. An off-shoot of the realist paradigm states that ultimate objective of any state in an anarchic international system is to keep maximizing hard or military power so that to have as much possible share in the world power for eventually dominating the system. In simple terms, the whole exercise of maximizing power by a state is to hegemonies the region which they belong to, as the ocean barriers. Ironically, even after attaining status of regional hegemon, the states continue to build further militarily to check emergence of a peer competitor by creating troubles for it.⁹ India is also on the same course i.e. to hegemonise the South Asian region by exponentially increasing its military might and modernizing armed forces. SIPRI year book of 2017 has also indicated that India tops the list of arms importing countries from 2013 to 2017.¹⁰ Pakistan's Space Vision of 2047

would thus not be acceptable for Indian policy makers and thus efforts might be made to create hurdles in meeting the space vision objectives using the technological influence through Missile Technology Control Regime (MTCR) platform, to which it was membership in 2016.¹¹ Indian quest for becoming a major (regional) power on the global power chess board, the empirical indicators of which remain under discussion,¹² could thus be facilitated by increasing its military might in outer space domain. Introduction of space weapons in South Asian power calculus might thus bring back security-insecurity paradox in the region due to an action-reaction syndrome between the two competitors India and Pakistan.

Space Militarization and Space Weaponization – A Debate

With every passing year the use of outer space is exponentially increasing, ranging between defence, civilian and commercial uses. As a sequel, with the congested uses of outer space, issues like competition and contest have also come up. Competition and contest naturally warrants strength and thus the debate about uses of weapons has surfaced, making it a point of concern for stake holders in outer space. Satellites are easy to build but difficult to keep as the sand houses due to their obvious and known flight paths and locations. Notwithstanding, it is space dilemma kind of situation. On one hand space faring nations having more number of space assets consider weapons as an essential for maintaining their technological edge besides space control and deterrence while on the parallel, they also fear an action-reaction syndrome by their competitors who could also follow suit and build space weapons of their own.¹³

Debate to recognize the differences between space militarization and space weaponization remains dynamic. Thoughts about militarizing space started right from day one when in 1957 the Soviet Union introduced Sputnik as first ever satellite in outer space. Introduction of communication satellites further strengthened the militarized perception. Contemporarily, due to the dual use nature of space applications, almost every space application is being viewed as an effort towards supporting military operations. The same dual use natured space applications have blurred the concept of term peaceful uses of outer space.¹⁴ For instance, navigational satellites like Chinese Beidou and American Global Positioning System (GPS), which are being used for aircraft guidance, are also being used for guiding delivery vehicles carrying lethal payloads. In nutshell, due to the contribution of outer space based assets towards supporting terrestrial based military operations, the outer space is said to be militarized.

On the other hand, when the debate started about probability of space getting weaponized, it was perceived that only in-orbit weapons would mean space weaponization. However, as the debate grew, other definitional lacunas started

surfacing with regard to exact space weaponization identification.¹⁵ The advanced space faring states including the US pointed out about the dual use capabilities of terrestrial based weapons which could engage outer space based assets, for instance, the Ballistic Missile Defense (BMD) projectile that could engage an incoming hostile missile as well as a satellite orbiting in outer space. There was yet another void regarding space weaponization definition i.e. what about those weapons which use outer space medium to reach their intended targets, for instance, the Intercontinental Ballistic Missiles (ICBMs) etc.¹⁶ The arguments about exact definition of space weapons kept a space arms control treaty from becoming a reality.

Till to-date, none of the advanced space faring nations have claimed to have space based weapons; however, the US, Russia and China have tested terrestrial based ASAT weapon systems, thus posing a direct threat to the peace and stability. In the current scenario of non-existent space weapon definition, anything that moves across the space could be perceived as space weapon, thus the definitional short-coming would keep haunting initiatives of having arms control initiatives even at the Conference on Disarmament (CD), until/unless an intended space weapon poses existential threat to the humanity. From above debate it can be conjectured that the worries about terrestrial based space weapons are more pronounced with regard to the global fears about space getting weaponized, as compared to the actual placement of weapons in the outer space.¹⁷

International Outer Space Arms Control Efforts and their Status

Since the beginning of space age in 1957, concerns about use of outer space for military purposes remain at forefront. States with space capabilities have remained suspicious of each other's outer space activities and even the civil uses applications have been seen with skepticism. With nuclear weapons in forefront after the World War II, the issue of space weaponization was first time addressed in the Outer Space Treaty (OST) in 1967, which prohibited placement of nuclear weapons as well as other Weapons of Mass Destruction (WMD) either in orbit or in any celestial bodies. The treaty had many shortcomings, which include lack of definition of space weapons, non-addressing the conventional weapons in outer space and terrestrial based space weapons and above all included terminologies like 'self defence' and 'peaceful uses', thus leaving the door open for the space weapons. In 1980, however, Russia and China using the platform of CD proposed a UN Resolution titled, 'Prevention of Arms Race in Outer Space (PAROS)' however, due to the US opposition, PAROS did not make any headway to-date.¹⁸

Due to the continued stalemate on PAROS, in 2008 China and Russia jointly proposed a new treaty to address the rising space weapons' concerns titled,

'Prevention of Placement of Weapons in Outer Space and of the Threat or Use of Force against Outer Space Objects (PPWT)' at the CD, which included the definition of space weapons specifically. The PPWT defines the space weapon as:

"Any device placed in outer space, based on any physical principle, which has been specially produced or converted to destroy, damage or disrupt the normal functioning of objects in outer space, on the Earth or in the Earth's atmosphere, or to eliminate a population or components of the biosphere which are important to human existence or inflict damage on them....A weapon shall be considered to have been "placed" in outer space if it orbits the Earth at least once, or follows a section of such an orbit before leaving this orbit, or is permanently located somewhere in outer space."¹⁹

However, same was rejected again by the US.²⁰ Interestingly on the parallel the same year i.e. 2008, the European Union (EU), also introduced a non-legally binding space code of conduct (currently called as International Code of Conduct (ICoC)) to set the norms and regulations for the conduct of outer space activities.²¹ The ICoC also met the same fate of rejection by the US, China, Russia and even India. Russia, China and India opined that ICoC could not be a substitute to a legally binding instrument while the US rejected it for being an EU specific instrument.²²

Having seen the unmoved status of the space arms control initiatives, probability of outer space getting weaponized seems likely; albeit, not yet done. A critical appraisal of stalemate related to a space treaty banning the space weapons highlights following reasoning which might be different for every state depending upon its political and security concerns:²³

- A state which has an edge in advanced space technology would never let it go in favor of those states from which it is facing threats, for instance, the US with an advanced space program vis-à-vis China and Russia would not consider relegating its strength in favor of a space arms control initiative and leave a vacuum to be filled by its competitors.
- Defensive or self-defense needs are increasingly dependent on the outer space. Anything that enhances a state's security is difficult to be compromised, including outer space applications.
- Technological edge including the space technology is one of the main elements of a state's power stature. It also adds to the prestige and political mileage of a political government. Backing-off or slowing down a capacity could impinge negatively upon both.

From above, it could easily be inferred that the international space arms control regime happens to be weak and open ended. Mother of space treaty, the OST provide space for venturing into developing all those weapons which do not fall into

WMD category. Thus, there is no legal binding on to the major space faring nations including India to develop space weapons.

Indian Space Weaponization Intent Indicators

Indian approach towards international power projection pivots around the notions of having significant economic, soft and hard core military powers.²⁴ The Chinese ASAT test of 2007 brought Indian focus on having space security of its rapidly increasing space based assets. Albeit, the Indian political, military and scientific leadership have been voicing to have offensive space capability since long; however, the Chinese demonstrated ASAT capability introduced a new zeal into thinking process. India has started thinking about having its own ASAT capability while tacitly softening its well-known diplomatic position against the space weaponization.

India, despite being a space faring nation since early 1980s, is yet to have a public space policy,²⁵ which could be referred to identify the Indian intent of developing space weapons. There are tangible indicators of change of hearts at decision making level.²⁶ However, India is yet to start its space weaponization endeavors, at least to the level of testing.²⁷

On the parallel, Indian policy makers are being accused for being Pakistan centric who are not looking at rising Chinese threat from outer space. Indian strategists are criticizing Indian decision making circles for being myopic and have fallen prey to the complacency.²⁸ They are demanding for conducting space weapons test, as the demonstrated capabilities and intent signaling, are the key to strengthening of deterrence in bilateral relations.²⁹

Pakistan and China do not have a space related defense agreement but only space cooperation agreement in the form of 2012-20 space cooperation roadmap between the China National Space Administration and the Pakistan Space and Upper Atmosphere Research Commission (SUPARCO).³⁰ Under this cooperation agreement, China would help Pakistan in developing its space program so as to meet its socio-economic and security needs. Neither Pakistan nor China have demonstrated any intent to cooperate in development of space weapons; however, if India tries to create hurdles for the two states in development of civilian space program applications (both China and Pakistan are not members of the MTCR), might pull a strain on security relations between the three neighbors. Since, Indo-China space related competition is out of this research article, the succeeding discussion would keep its focus on Indian development of space offensive capabilities in the backdrop of Pakistan's strategic security concerns.

Currently India has 13 different dedicated military satellites meant for jobs like imageries, navigation, intelligence gathering and strategic communication. These

capabilities provides India technological advantages which could be exploited for both strategic and tactical benefits during outbreak of hostilities and most importantly to forewarn about an ICBM launch for timely employment of its BMD capability. Moreover, the Indian Space Research Organisation (ISRO) is fully involved in dual use projects as it is evident from its close cooperation with India's Defense Research and Development Organization (DRDO) and the Defense Research and Development Service (DRDS). Both of these organizations are known for their expertise in missile development. Latest example of cooperation between ISRO, DRDO and DRDS is the joint venture development of Agni- V, ICBM with a range of 5000 kilometers.³¹

Development of space weapon capability by the Indian scientists is still in its latent stages. However, there are tangible indicators from various decision making and user communities that India is all set to have its dedicated ASAT capability. A few of the indicators, though not exhaustive, are covered in succeeding part of the article.

Indian Space Weapons' Quest: Indicators from Scientist Community

After the 2007 Chinese demonstration of its ASAT capability, the then ISRO head G. Madhavan Nair had proudly committed that India possesses the capacity of deploying (it was deployment and not development) its own ASAT weapon; however, wouldnot do it as it desires to protect tranquility and peaceful status of outer space.³² Later in 2009, yet another chair of the ISRO Dr. K. Kasturirangan, indicated intent of developing defensive (although offensive in nature) ASAT capability. He stated:

*"China's ASAT capabilities displayed a few years ago were to show to the world that they too can do it. That China can do what it wants to do and demonstrate that it can do even more... to supersede the best of the world, that is the US.....Obviously we [India] start worrying. We cannot overlook this aspect..... 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."*³³

Moreover, when India tested its celebrated Agni-V ballistic missile in 2012, then Indian Defense Minister's scientific advisor Dr. Vijay Kumar Saraswat very proudly claimed that with the Agni-V test, India is confident of having all the relevant building blocks ready for an ASAT weapon. He argued:

*We [India] don't want to weaponize space but the building blocks should be in place, because you may come to a time when you may need it. A little fine tuning [in Agni-V technology] may be required but we [India] will do that electronically. We [India] will not do a physical test (actual destruction of a satellite) because of the risk of space debris affecting other satellites."*³⁴

Indian Space Weapons' Quest: Indicators from Strategic and Diplomatic Community

Indian strategic community is also supportive of Indian acquisition of ASAT capability. They are of the view that since DRDO and ISRO have developed sufficiently viable capabilities including ballistic missiles/ BMD and satellites/ Satellite Launching Vehicle (SLV) respectively, thus the conditions are ripe for India to outline its 'space war fighting strategy'. However, India has yet to unveil any such strategy because it has been vocal internationally regarding keeping space free of weapons and to be used for civilian purposes only. Besides that, all international space related cooperation, it received was for civilian uses and thus unveiling of such a strategy could severely hinder its rapidly developing space program.³⁵

India is on course of developing space facilitated Artificial Intelligence (AI) capability as its one of the main force multiplier for sifting, collating and applying the data for furthering its battle efficiency. A task force in this regard has been established which besides civil and industry representation has representation from ISRO, DRDO, Indian Atomic Energy Commission and the armed forces. IA would be instrumental in mirroring human intelligence i.e. fully accomplishing the process of receiving and collating the information, analysis and self-correction. In this regard, while addressing AI stake holders workshop on 'Artificial Intelligence in National Security and Defence', Indian Defense Minister Nirmala Sitharaman, urged that she would place cyber, nuclear and [offensive] space high on priority.³⁶

Indian decision makers at national level have also shown their intent of departure from the known Indian national position with regard to opposing weaponizing the outer space. In 2008, while addressing Indian military commanders Conference, Defence Minister A K Antony raised his concern about Chinese ASAT test in following words:

"[India is concerned over] emergence of anti-satellite [ASAT] weaponry, a new class of heavy lift-off boosters and improved array of military space devices in our neighborhood. [For how long India would] remain committed to the policy of non-weaponization of space even as counter space systems are emerging in our neighborhood".³⁷

Along the diplomatic front, India has been engaged with the US on two important issues i.e. space situational awareness and Long Term Sustainability (LTS) of outer space under the rubrics of Indo-US Space Security Dialogue process. Although, LTS does restrict India from getting into business of acquiring space weapons; however, space situational awareness merits having one, on the plea of safeguarding Indian outer space assets and attribution in case of a misadventure carried out in outer space by its rivals. Hence the Space Security Dialogue leaves the option of developing space weapons open ended for the India.³⁸

Indian Space Weapons' Quest: Indicators from Military Commanders

Modern armed forces are extensively getting dependent on outer space applications. The hybrid and integrated warfare is totally dependent on space applications in terms of intelligence provisioning, guidance of strategic weapons, navigation for troops movement, communication for command and control, mapping of an area for operational planning, weather forecast for planning military operations and infra-red photography. All these aids are extremely important for an assured domination over the adversary and success of operations. India is no different. India maintains 3rd largest army, needs assured and sustained outer space applications i.e. C4I2SR support applications³⁹. In 2008, Indian Army Chief Deepak Kapoor stated:

"The Chinese space program is expanding at an exponentially rapid pace in both offensive and defensive content... There is an imperative requirement to develop joint structures in the Indian armed forces for synergizing employment of space assets."⁴⁰

In structural terms, contemporarily, there is an Integrated Space Cell (ISC), working with Indian military to provide full operational support to the India armed forces' C4I2SR needs. It was established in 2010 at Indian Ministry of Defence. ISC is considered to Indian anticipated 'Aerospace Command'.

Besides the tangible indicators about India getting into space weaponization race, there is yet another important issue i.e. a space weapon especially the terrestrial based weapon cannot be identified as such because there are other weapons those could alternatively be used either for their primary purpose or for that matter in an ASAT role.⁴¹ For instance, BMD and space weapons have a nexus which can switch their roles by mere change in the intent of user.⁴² India has an advanced staged BMD system in place and claims that its two of the metropolitans Mumbai and New Delhi have a BMD shield.⁴³ If it is believed that the BMD shields are viable and effective, it infers that India has an operationally deployed terrestrial based ASAT capability.

Indian Space Weapons' Quest: Indicators from Academic Circles

In 2016, New Delhi based think tank Centre for Land Warfare Studies (CLAWS) organized a seminar titled 'Space: For National Security' and highlighted following space weapons related findings/recommendations in the seminar report.⁴⁴

- Hard and soft kill ASAT technologies are being developed. Moreover, most of the civil use technologies have inbuilt ASAT potential capabilities. Such dual use civil space technologies have to be controlled so that they do not fall into the hands of rogue states and non-state actors.

- States with increased outer space stakes, cannot afford to remain oblivious of the emanating space threat, thus, has to have 'means to deter & defend against hostile acts in, through & from space' so that to ensure the continuous and uninterrupted provisioning of space related data and other domestic services.
- India while maintaining its diplomatic stance regarding prevention of weapons in outer space, should also invest in securing its outer space assets.
- The evolving regional and global security environment demands Indian planners to have 'more proactive position and certain policy characteristics' that are basically security-oriented.
- ISRO is predominantly a civilian organization. For dedicated military operations support in coordination with ISRO, there is a need to have a 'Indian Defence Space Agency' with a mandate of viably integrating space applications with the national security requirements.
- While decision to develop dedicated ASAT capability rests with the political leadership, India should; however, demonstrate its ASAT capability for two tangible benefit accruing reasons. *First*, there still exists vacuum for the ASAT test less it is monopolize by the advanced space faring nations on the pattern of Nuclear Non-proliferation Treaty (NPT) when the nuclear weapons' technology was denied and monopolized by the nuclear haves. *Secondly*, for the purpose of deterrence i.e. a demonstrated capability would deter rival states from undertaking any misadventure in outer space for the fear of cost they would have to bear.

Indian strategic writers are pledging their leadership that while keeping the slogan of keeping the global common 'space' free of weapons, India cannot afford to remain oblivious of security situation and thus needs to have means for strengthening its outer space security interests.⁴⁵ After having gone through the empirical evidences discussed above, it is evident that India might opt for developing the space weapons. Space weapons, if developed by India could challenge the deterrence stability as these weapons might be employed against those critical satellites which are essential for the nuclear command and control. It is, thus, important to preempt any such development which might introduce a new form of arms race in the regional security calculus.

Way Forward

Introduction of new offensive doctrines and modernization of Indian armed forces have furthered the fragility of South Asian strategic stability. In present situation of dynamic deterrence, a misperception could lead to initiation of hostilities between India and Pakistan. The security related challenges need innovative and out of the box solutions so as to keep the hair-trigger situation at bay in South Asia. Outer

space security issues, as being debated globally, needs to be addressed at Indo-Pak bilateral level engagements. A few of the suggestions, although differing in probability of being viable, are discussed below:

- **Exerting Diplomatic and Political Pressure on India:** Barring a state from acquiring a technology is doomed to failure. Technologies cannot be controlled due to their dual use. Instead of limiting the technology access to a specific state, it would be productive to consider regulating offensive or destructive behaviors.⁴⁶ It is not about the technology but the intent behind it to meet the interests. Pakistan has never been in offensive mode vis-à-vis India being a smaller state and having relatively less resources. India, on the other hand, is a revisionist state and its quest to become a major power makes it anti-status quo state. Indian budget advisors also suggest to their government to invest more in Research and Development (R&D) programs of dual-use technologies (easily available under cooperation mechanisms) instead of hard-core military technologies.⁴⁷ Indian practice for acquiring space technology is no different from the stated approach. India is acquiring civil space technologies that could alternatively be utilized for military purposes. Indian space weapons' acquisition would thus be detrimental to South Asian deterrence stability. It needs to be addressed at political and diplomatic levels before it's too late and an unprecedented arms race in outer space gets unleashed.
- **Indo-Pak Bilateral Declaration on Non-Development of ASAT Weapons:** Pakistan could propose India the subject declaration whenever Indo-Pak composite dialogue process gets restarted. For the time being the process is stalemated due to Indian dismissive attitude and accusing Pakistan for sponsoring terrorism.⁴⁸ The subject proposed declaration could be linked with the Pakistan's earlier proposal of 'bilateral declaration on non-deployment of ABM weapons'. Subject proposal could first be initiated at track-2 or track 2 1/2 levels so as to build grounds for track 1 dialogue. The proposed Confidence Building Measure (CBM) is likely to get international traction due to the LTS issues attached to the flip side of ASAT weapons'; thus, could prove useful for Pakistan's diplomatic leverage.
- **Indo-Pak Bilateral Outer Space Code of Conduct:** Pakistan's space program is following a positive trajectory. With increased number of space assets on Indian and Pakistani inventories, it would naturally crisscross the interests in terms of physical locations of their respective satellites due to border contiguity as well as conduct of their outer space activities. Foregoing in view, there is a need to have an Indo-Pak bilateral outer space code of conduct based on the principle of 'non-interference'. It would ensure

transparency as well as eliminate chances of misperceptions. A few of the proposed elements of subject code could be as under:

- Include pre-warning of the SLV launching on the lines of Indo-Pak nuclear CBM of 'Agreement on Advance Notification of Ballistic Missile Tests', signed in 2005.⁴⁹ Objective of this agreement was to adopt appropriate measures to prevent misunderstanding by advance notification of missile flight tests. Respective side notifies each other through diplomatic channel prior to the planned missile test.
 - Notification of all satellites' launching with intended use.
 - Notification about change of outer space based assets' orbits.
 - Pre-warning of close vicinities of each other's space assets either intentionally or accidentally.
 - Mutual warning system be established about probable collision of meteors or man-made objects with each other's outer space based assets.
 - An institutionalized system of verification and inspections.
- **SUPARCO-ISRO Hotline:** To operationalize the non-interference based code of conduct as proposed above or may be as an independent measure, a dedicated secretary level SUPARCO-ISRO hotline may be established for timely exchange of information not only to address the misperceptions but also to exchange information about impending natural disasters.
- **International Cooperation to Address the Asymmetric Offensive Space Capability:** Although the outer space cooperation from the US and the MTCR participating states to the India does not indicate any specific assistance with regard to development of space weapons, yet India's track record with respect to vertical proliferation and diversion of peaceful uses technologies to military side is not appreciable. For instance, the NSG was created as a result of Indian diversion of civil nuclear technology to conduct the Peaceful Nuclear Explosion (PNE) of 1974. Similarly, unlike the US, Russia and China, Indian space program had a purely civilian start-off; however, later it diverted its civilian space cooperation towards the initiation of its Integrated Guided Missile Development Program (IGMDP) commonly perceived to be a military derivative of Indian civilian space program.⁵⁰ It is also important to highlight that MTCR whose membership has been granted to India in June 2016, was actually established on the suspicion that ISRO has diverted its space launch vehicle technology acquired under the umbrella of civilian use towards its ballistic missile program.⁵¹ In this backdrop, Indian efforts to mature its BMD or terrestrial based space weapons, even as a

defensive act to protect its space based assets, would be detrimental to peace and deterrence stability in the region. An asymmetry in strategic military capabilities between India and Pakistan would be counter-productive. In order to balance the deterrence equation, international community may propose to extend space defensive capability to Pakistan either through bilateral or multi-lateral international cooperation. Although the chances of such cooperation are bleak, based on realpolitik environment, yet the proposal could prevent India from indulging in counter-productive counter deterrence activities.

Conclusion

From above research, it could be inferred that albeit not tested, India has the capability of developing ASAT weapons. Notwithstanding, Indian BMD capability besides its Agni-V ICBM tacitly provide it with the space weapons capability, although, not tested with such an intent. Indian leadership and space experts in their speeches and writings have been explicitly signaling to develop overt space weapons capability. If developed, the Indian ASAT capability would help India in meeting its two strategic interests; *one*, a stepping stone towards becoming major (regional) power and *two*, increase its diplomatic and political leverage. Besides that, Indian ASAT capability would also contribute towards asymmetry in power equation and making India dismissive towards Pakistan in resolving outstanding territorial disputes. The subject capability with India might also result into strategic miscalculations that could result into preemptive strikes against Pakistan amid any staged terrorist act without fear of retaliation, in case Indian ASAT weapons knock out Pakistani command and control satellites. The development is alarming with regard to South Asian deterrence stability and needs to be addressed.

On the other hand, Pakistan is all set to meet its space vision 2047 while India has a matured space program. Both states with war prone and mistrust historic bilateral relations could thus find themselves plunged into yet another competition related to an entirely new zone of conflict. If not checked and addressed timely, it could become detrimental to peace and deterrence stability in the region. Both India and Pakistan besides the international community need to preempt the evolving situation of space getting weaponized in South Asian context. Indo-Pak space CBMs as discussed above or any other innovative initiatives deserve serious consideration by the two states duly facilitated and supported by the international community.

NOTES

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