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Outer Space: Emerging Frontier of Weaponisation

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"If you are not in Space, you are not in Race"

—General Lance W. Lord, Commander, US Air Force Space Command[1]

Introduction

In the last five decades, outer space has been used for scientific endeavours— civil and commercial applications as well as for military support functions. The restraint of 'not putting' weapons in space, so as not to disturb the international consensus on preserving outer space as the common heritage of mankind, is increasingly diminishing in the present world, with countries like USA, Russia and China undertaking 'space control' and 'space force' application missions. The militarisation of outer space began just over a year after the launch of Sputnik-1(launched by erstwhile Soviet Union) in October 1957. The world's 'first ever Space Weapon

Key Points

- Space has been defined as a new domain after land, air, and sea. It is fast emerging, not only as the new 'Economic High Ground' but also as the military frontier of becoming the new 'Strategic High Ground'.
- During 'Operation Iraqi Freedom' (2003-2011), US deployed 10 times the satellite capacity employed in the First Gulf War. The ongoing investment by nations in this arena is expanding in geometric progression.
- Space is emerging as a crucial medium for power projection in the evolving world geo-politics— among world space powers.
- India continues with a space programme and opposes its weaponisation. Research and development in the domain of space based weapons, must be initiated to remain relevant in this emerging space race.

experiment' was a series of three high altitude nuclear tests carried out above the South Atlantic by US in August and September 1958, as part of 'Project Argus'[2] harbinger to weaponisation of space.

Space as a New High Ground

Space has been defined as the new battlefield after land, air and sea. For hundreds of years, military tacticians have exploited the importance of 'keeping the high ground in military campaigns'. Space is fast emerging not only as the new 'Economic High Ground' but also as the military frontier of becoming the new 'Strategic High Ground'[3]. Everett C Dolman in his book *Astropolitik: Classical Geopolitics in the Space Age,* have tried to prompt the formulation of a neo-classical astropolitical dictum —"Who controls Low-Earth Orbit controls Near-Earth Space. Who controls Near-Earth Space dominates Terra. Who dominates Terra determines the destiny of humankind"[4].

Understanding Trends and Pointers: Weaponisation of Space

During 'Operation Iraqi Freedom' (2003-2011), US deployed 6,600 GPS guided munitions and over 100,000 precision GPS receivers and used '10 times the satellite capacity employed in the First Gulf War of 1991[5] —27 GPS satellites to help determine the exact location of special operation teams and targets, and 24 communication satellites for command and control were employed. There were also weather forecasting, and other space systems in operation. The human resource employed in this domain was also extensive. According to the Director of Space Operations (US) Major General Franklin J. Blaisdell, approximately 33,600 people at 36 sites around the world were involved in the space-war activities.[6]

The ongoing investment by nations in this arena is expanding in a geometric progression[7]. The withdrawal of US from the Anti-Ballistic Missile (ABM) Treaty in June 2002, US Space Vision 2020, Chinese anti-satellite (ASAT) test in January 2007, and Russian ASAT in 2015 indicates that it may be just a matter of time before weapons are placed and operationalised in the outer space. With increasing dependence on satellites for conduct of military terrestrial operations, US' concern for its safety has been echoed in its Space Vision 2020[8] and its Space Policy. Not surprisingly, therefore Washington is keen to progress from 'space force enhancement to space control and ultimately to space force application' which envisions weaponisation of space.[9]

Future Space Weapons: Evolving Developments

Technology has led to numerous developments in future space weapons. Depleted Uranium Rods, often known as **Rods from Gods**[10] orbiting the Earth, can be directed towards targets on Earth's surface. **Space Mines** are small satellites which are difficult to detect, and can keep following the target satellite and destroy it by colliding. **Orbiting Solar Power Stations**[11] (which are under development) can boost the power of radio frequency satellites and help the space based high-energy lasers. **Electronic Space Jammers** can be in the form of 'uplink jamming' or 'downlink jamming'. **Military Space Plane** is a reusable spacecraft like the US Air Force's X-37B space plane[12], and has been 'zipping' around the Earth since May 2015. However, it has led to some speculations that the vehicle is some sort of space weapon– perhaps the one designed to take out or capture satellites. Concept of 'hacking a satellite' and make it slave to own commands is an evolving dimension of space warfare. Another developing arena is the **Attack Satellite**[13] which entails the use of brute force on the target satellite. To reduce costs, these satellites have been developed in the form of attacking robots. China is investing heavily in this format.

Space: Medium of Power Projection

"Mankind Will Not Remain Tied to Earth Forever"

–Inscription on the tombstone of Konstantin Tsiolkovsky[14]

The world took note of the potential of space based assets during the First Gulf War— as a medium of power projection, which was also referred to as the First Space War. It not only brought home the prominence of space assets in war but proved the decisive edge that it can provide to a state in conflict. China took note of this and started its space odyssey.[15] Space is likely to play an important medium in China's power projection. It adds muscle to both soft and hard power— soft power in terms of employing assets for humanitarian assistance and hard power in terms of deterrence. Utilisation of GAOFEN-1 satellite, in search of the missing Malaysian airliner MH370, demonstrated China's capability of broad maritime surveillance. With over 50 countries having invested billions and billions of dollars in space, it has undisputedly become an economic centre of gravity. Hence, the concept of **"Space Control / Denial"** has come into existence, which involves the protection of own and friendly country's orbital assets, thereby attacking enemy's assets and denying enemy access to the space.

Emerging Global Space Order

United States. US has been the forerunner in space technology since the launch of 'Sputnik' by erstwhile USSR. Advanced strategic planning in the space domain for the United States is conducted by the Defense Advanced Research Projects Agency (DARPA). In February 2008, US carried out its successful ASAT test by destroying a non-responsive US satellite at an altitude of 240 km. The present Trump administration has shown tremendous interest in space regime by adding the 'sixth branch to US military in December 2019 — United States Space Force'.

Russia. Immediately after the launch of 'Sputnik', USSR launched Istrebitel Sputnikov meaning 'fighter satellite'[16] and embarked onto the journey of ASAT weapons. In 2015, Russians successfully tested its ASAT missile. This indicates that, Russia under President Putin, continues to follow an assertive space policy, to assist in leveraging its foreign policy.

European Union. Although, the European Union does not propagate weaponisation of space, however it recognises its importance in the present world order. Therefore, it is on the road to develop an effective space surveillance system.

Japan and China. The Japanese Aerospace Exploration Agency (JAXA) came into being in 2003. The activities of JAXA are all developmental and exploratory in nature. Japan has its presence in the International Space Station with its experimental module KIBO. China proved its might in ASAT domain on 11 Jan 2007 by bringing down its own weather satellite FY-1C by using a kill vehicle.[17] China is also believed to be investing heavily in technologies such as 'attack satellites'.

Weaponisation of Space: The Indian Dilemma / Necessity

Why India should have a space weaponisation programme? Even as India is advancing its space programme, the changing global and regional realities are important 'contextualising' factors, compelling it to change track, and therefore, there is a need to keep all options open. Although, India's official stand itself has not changed as New Delhi continues to oppose weaponisation of the outer space, however, there are indicators of a small shift in India's approach. India's political hierarchy has realised that space-faring nations are assigning an increasingly militaristic role to their space assets and India's inaction will not only leave it unprotected, but will also leave it lagging behind in critical capabilities.[18] India's increased dependence on "Space-Based Assets" may increase the vulnerability of India, as the

adversaries will have more domains to inflict damage especially on its capabilities in space.[19] The Chinese ASAT in January 2007 has a greater impact on India's new thinking. As an aspiring global and regional powerhouse, India needs to ensure that its space defence capabilities are competitive and this is only possible if India develops its military space assets both in space and on ground. Therefore, establishment of the Defence Space Agency in Bengaluru (2018) and the successful launch of India's ASAT missile (Mission Shakti) (2019),are steps in the right direction.

However, the degree of threats to space assets is primarily governed by the degree of dependence of forces on these assets. At present, Indian defence forces are utilising space assets primarily for communication and to some extent surveillance. If we have to grade our military dependence factor on space assets vis-à-vis availability of other systems, then the pointer falls in the zone of 'low dependency', thereby, implying low level of vulnerability and threat. However, the requirement is increasing and India needs to prepare itself for these new evolving threats in space.

Recommendations for India

The paradigm shift in approach of the global space order from 'militarisation of space' towards 'weaponisation of space' is evident. The developments of space based capabilities by China, its 'all-weather friend' relation with Pakistan and their 'anti- India rhetoric', has further enhanced this threat. India, therefore, must undertake certain steps in order to mitigate these threats. Research and development in the domain of space based weapons must be initiated at an appropriate level– to be able to produce such systems in another 10 to 15 years. Satellites solely dedicated for military purposes, should be launched on an urgent basis. As far as possible 'dual - use satellites' [20] must be launched. These satellites will not increase our 'visible' military presence in the space, and thus will not irk our neighbours or the entire global space community at large.

Defence of Space Assets. Ground stations and satellite launch facilities should be protected, as these are most vulnerable and less in number. Multiple dispersed facilities would be advantageous to launching facilities. India should also plan for micro/mini satellites which are difficult to detect and hit, as they are relatively cheaper and many of them can be launched in the same total budget, thereby, reducing strain on monetary aspects.

Counter Offensive Capability. Electronic warfare coupled with cyber attack will make fighting war in space economical and effective, in comparison to employing other forms of

weapons against space systems. India should concentrate its effort towards this aspect to degrade hostile satellites. 'Jamming' is another important tool to disrupt the command and control system. Unlike jamming of ground stations, the satellites are more vulnerable. Once hostilities begin, plans must be executed to degrade these assets which may pose as a potential threat to own space assets.

Conclusion

The space treaties and principles have proven to be ineffective in restraining the global space powers from undertaking the 'weaponisation of space'. The developments of space based capabilities by India's northern and western adversaries have further brought this threat closer to the Indian neighbourhood. India must therefore, undertake certain steps in order to mitigate this threat, while maintaining its steady economic growth trajectory.

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