

SHIFTING OF WAR TO THE FOURTH DIMENSION

Historical Development

1. The thrilling and unforgettable events that occurred in space in the mid-1950s were the watershed between airpower and what is today being termed as aerospace power. China is said to have invented the rocket in the 13th century to fend off invading Moguls. However, the launch of the first orbiting satellite, the 184-pound Sputnik-1 by the Soviet Union on 04th October 1957, marked the commencement of the exploration of Space. Subsequently, Yuri Gagarin's space voyage on 12th April 1961 stirred the USA to respond to the evolving space technological developments. This marked the beginning of the Apollo Programme which began on the 28th May 1964. History was made on 21st July 1969 when Neil Armstrong became the first human to walk on the moon. Exploitation of outer space for military and commercial purposes was expanded in many folds by several nations, thereafter. USA launched the orbital station Skylab on 14th May 1973. Thereafter, it gave priority for the concept of Space Shuttle Project which became a reality by the first flight on 12th April 1981. The USSR's decision to build a reusable Space Station saw the development of the Salyut stations which provided the technological platform for the Mir orbital research complex which was launched on 20th February 1986. After it was brought down onto the Pacific Ocean on 23rd March 2000, USA and Russia embarked on a path of mutually beneficial corporation with the launching and implementation of the International Space Station (ISS) Project. It provides them to use their own ISS elements to carryout surveillance, communications, global navigation, Weather monitoring and of course to keep tabs on terrorists. France, China, Israel and India are some of the other countries evolving technology for space exploitation. Destruction of an aged satellite in the orbit using a surface launched missile by China few months back opened the eyes of many nations and it had shown the World the current development in space technology.

Concepts and Precepts of Space

2. History has shown that key high ground has always played an important role in military confrontations. Space platforms provide the same advantage. Carl Von Clausewitz noted that high ground offered the commander advantages in tactical strength, protection from enemy access and a wider view of the battle ground. The space has been often referred to an 'ultimate high ground', a position from where one can have a commanding view. Technological advances enable a space platform to view every object and activity taking place in air, land and sea both during day and night. The problems posed by adverse weather are also not insurmountable.

3. The space platforms do not need permission of a country to fly over like aircraft or missiles passing through controlled air space. While sovereignty of air space is to be guarded at the levels similar to country's territorial borders, no such concept applies to the outer space, which is something similar to high seas. However, space offers military advantages unparalleled by air, land or sea. It has been asserted that one Corona satellite was able to undertake information gathering of 28 U-2 aircraft missions.

4. In line with the concepts of air superiority and information superiority along with dominance of both media, concept of space superiority is espoused on the same analogy. It is necessary to dominate the space effectively to exploit its advantages fully. Space superiority also has a cascading effect on information superiority and contributes greatly to battlefield superiority. The space has become an area of vital national interest and control of space is therefore essential to achieve the force multiplying effect of information



superiority. 'Control of Space' is the ability to assure access to space, freedom of operations within the space medium, and an ability to deny the use of space, if required.

5. According to US Armed Forces, the aim of the overall space effort is to assure information dominance. It says that assured access to space, surveillance of space, protection of space platforms, prevention of adversary's interference with space assets and negating adversary's space capability are subsets of the overall aim of space dominance. These basic concepts and precepts have been practiced to a great degree in the second Gulf War and offer very useful lessons for militaries all over the world.

Space Control

6. Space control activities include those operations that help to provide effective utilization of space for own/friendly forces and at the same time deny the same to the enemy. Therefore, it can be categorized in to Offensive Space Control and Defensive Space Control.

Military Space Doctrines

7. David Lupton's writing on Space Warfare postulates his 'Space Doctrine' that analyses the strategic requirements of militarization of space. His rationale comprises of four tenants.

a. Sanctuary Doctrine: It provides for monitoring military activity, early warning to lessen the chances of a surprise attack, serving as national technical means of verification to ensure the implementation of arms control regimes. These put together will enhance strategic stability.

b. Survivability Doctrine: It espouses the utilization of military systems not only to meet strategic requirements, but also to provide the war fighter with tactical support. This can be assured by distributed network of assets, redundancy, hardening, on-orbit spares, cross linkages, manoeuvrability, less vulnerable orbits, stealth, reconstitution, defensive capability and 5Ds that include deception, disruption, denial, degradation and destruction.

c. Control Doctrine: It requires the need to control space so that space power can be applied urgently and as and when demanded. This is analogous to sea or air control, and requires space surveillance, as well as offensive and defensive capabilities.

d. High Ground Doctrine: Again it is analogous to terrestrial forces requirements as in time; space will be the dominant environment that will influence surface/sub-surface conflict in decisive ways.

Dynamics of Space Warfare

8. Space warfare as an operational paradigm has emerged as an inevitable dimension in the 21st Century. The paradigm of space warfare is defined by the nature of space operations that are as follows.

a. Space Control Operations provide the freedom of action in space for friendly forces while when directed, denying it to an adversary.



b. Space Force Enhancement operations multiply joint force effectiveness by enhancing battle space awareness and providing needed war fighter support.

c. As the sustaining dimension in Space, Space Support Operations consist of operations that launch, deploy, augment, maintain, sustain, replenish, de-orbit and recover space forces.

d. Space Force Application Operations consists of attacks against terrestrial based targets carried out by military weapons systems operating in or through space.

9. The above concepts define the process and stages inherent in the militarization and weaponisation of Space. The process of militarization and weaponisation opens the entire gamut of issues in terms of security and vulnerabilities of space assets of contending powers and the patterns of responses that generate from their activities. The preference for militarization would necessitate the development and deployment of non-offensive systems in space that have military value of reducing inherent vulnerabilities of space systems while enhancing the survival capabilities of space systems. Space based weapons have unique and optimal niches in terrestrial conflict. Optimal niches include prompt, long-range force projection, strikes on highly defended surface targets, and strikes on large surface vessels. Unique niches might include denied-area boost-phase missile defence and prompt destruction of terrestrial anti-satellite weapons.

Military Uses of Space

10. Control of Space will play an important role to guarantee the applicability of the time-honoured tenets of the Principles of War. Information gathered from and transmitted through Space will provide,

- a. Instant Communications.
- b. Early warning of ICBM, IRBM launch and the prospective targets.
- c. Near real-time intelligence and photo-reconnaissance.
- d. Safe navigation at sea or on land to avoid enemy threat areas/defences enroute.
- e. Identification and designation of targets and the enemy's centres of gravity, their specific locations and the post-attack damage assessment.

11. Space will be used for force application that involves the use of lethal or destructive forces from, to or within 'near earth space' against terrestrial based or sub-surface targets. It will also be used for Ballistic Missile Defence or Force Projection. Force Enhancement will comprise the following capabilities.

- a. Geodesy through LEO satellites.
- b. Environment monitoring by Polar LEO.
- c. Communication by GSO.
- d. Position, Velocity, Time and Navigation by SSO.
- e. Integrated attack warning and target assessment by GSO and LEO.
- f. Intelligence, Surveillance and Reconnaissance by variety of satellite options.

12. Military satellites will have significant remote sensing and imaging capability either through commercial satellite-imaging markets or through intelligence sharing agreements with other powers. Remote sensing will provide information to detect and precisely identify a variety of military targets.

Space Weaponisation

13. Missile systems for carrying out aggressive attacks were developed during the World War II, well before the advent of space age. Ballistic missile development has proliferated extensively across the World resulting in the production and stock piling of ground to space, air to space, space to space, space to air and space to ground missiles of various types and capabilities. Even after the signing of the Anti-Ballistic Missile Treaty in 1972, both US and Russia continued to carry out substantial research to guard against surprise ballistic missile attack. Russia started developing its co-orbital Anti-Satellite System [ASAT] in the early 1970s. US retaliated by developing a new generation ASAT weapon called Air Launched Miniature Vehicle [ALMV], a two stage missile which could be launched from a high altitude F-15 aircraft for direct hit to the target. The Strategic Defence Initiative [SDI] programme, popularly known as 'Star wars', initiated by President Reagan in 1982, to develop space based ballistic missile defence weapons including lasers and ASAT system. Even though the end of Cold War resulted much relief to this race, US enacting of National Missile Defence [NMD] Act in 1999, non-ratification of START-II Treaty by the Russian Parliament and President George Bush's withdrawal for the ABM Treaty in 2001 opened the door for the introduction of offensive weapons into space once again. The brilliant pebbles concept consisting of 1500 small satellites in low-earth orbit with thrusters on each satellite which can be directed on command to destroy a given military target is also under consideration which if implemented can start a new arms race in space. Even the prohibitive cost of the powerful Space Borne Lasers [SBL] with a range of 3000 km has not deterred the space war enthusiasts. The development of small micro satellite technology has led to the concept of a large constellation of them consisting of a number of easily manoeuvrable micro-satellites equipped with lethal space mines which can be exploded near the identified enemy targets. Even though detonation of nuclear warheads in space is not yet a part of the plan, use of nuclear tipped detonators for destroying enemy targets cannot be ruled out in an asymmetric warfare.

Conclusion

14. Other than the Air, Sea and Land, the known three dimensions, Space have been added as the fourth dimension of warfare. In spite of the enormous cost involved and the grave risk of causing incalculable destruction and havoc to life and property, which can spread and engulf the entire World, extensive use of space as the fourth medium of warfare is bound to grow. Space military power is expected to be increasingly leveraged to bridge the widening gap between diminishing resources and increasing military commitments. Rapid development in space war capabilities which, while being persuasive in peace, have become decisive in war. It is now well recognized that a nation which controls space will control the World. A serious consequence of the space war scenario is that accidental or intentional triggering of directed weapons, space mines and high energy electro magnetic beams can damage a large number of civilians and assets in space and on earth rendering them totally dysfunctional. Eventually, enactment of a comprehensive treaty forbidding space weaponisation is needed to ensure global peace and the safety of space based assets for the benefit of all humanity.

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