Bridging Rhetoric and Reality: Harnessing Space Capabilities for India's Defence

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Introduction

Military space affairs are the flavour of the season. A veritable cottage industry grows around it, not only in India, but all across the globe. In case of India, the surfeit of visions and doctrines put forth far surpass the actual satellites launched. Nonetheless, a vast gap exists between consummation of this deluge of visions and doctrines and obtainment of actual space capabilities. Rhetoric is yet to be matched with reality in any credible manner. It is generally well-known and accepted that space has emerged as an essential component in furthering a nation's comprehensive national power. Every body is in common agreement that space capabilities have become absolutely essential for national development, economic well-being, commerce, and everyday life, besides becoming a crucial component of successful military operations. Yet, no common agreement exists on the need for the military to get involved in space and hence it would be essential to first explore the rationale for the military to be involved in space before going headlong into aspects related to harnessing space for national defence.

The Rationale for Military Involvement in Space

India has a robust civil space programme which is essentially geared towards scientific and development goals. As we move towards greater development, utilisation of space for economic and developmental purposes is likely to increase, and as dependence on space assets and systems increases, the concurrent vulnerability of our country to hostile action seeking to destroy, degrade or deny our space capabilities so painstakingly built over the decades would increase. India's dependence on space for vital economic purposes has been growing rapidly and hence any serious damage or degradation would have a major negative impact on our nation's well-being.

The lessons of history, on the other hand, are clear that wherever serious threats to national economic interests arise, military force would be necessary to protect them in the best manner possible. Military organisations have evolved as instruments of national power to protect national interests and investments. This generates the rationale for military involvement in space; apart from the fact that space enabled capabilities are the core of Revolution in Military Affairs (RMA) aimed at enhancing terrestrial military capabilities and national defence. The kind of modern precision warfare witnessed during the Gulf-War is largely a by-product of this RMA which is aimed at combining the cumulative potential of air and space forces in terms of Intelligence Surveillance Reconnaissance (ISR), communications, navigation etc for providing information dominance vital to nuanced application of force which in-turn enables decisive war-winning effects.

The Utility of Space for the Military

In order to harness space for national defence, it would be essential to briefly acquaint oneself with the basic utilities of space in a military context. The military uses of space expand with every passing conflict as emerging technologies afford greater exploitability of the environment for pursuance of military activities. Until the last conflict, however, the uses were largely of a pacifist military though "non-weapon" nature. Space based assets were mainly aimed at 'Force-Enhancement' missions like observation, communications, navigation, meteorology etc which allowed terrestrial military forces to conduct military affairs more efficiently. Thus most military space missions were auxiliary to other more direct military activities. In fact, the capacity to deliberately cause damage to another party is not the main criterion for attributing a military character to satellites. Most present day satellites affording military capabilities or performing military functions are incapable of directly destroying or damaging another country's property. Apart from 'Early-Warning' satellites which have a clear-cut military role, most of the other military activities can also be performed by civilian satellites and vice-versa. For example, civilian 'Earth-Observation' satellites are used for military remote sensing, civilian (even commercial) communication satellites have been known to carry military transponders and military navigation satellites have overwhelming civilian users etc.

However, as military and commercial reliance on satellites grows, so too has the awareness that space based assets are centres of gravity which are likely to be targeted in war. This in turn has fuelled the quest for development of techniques for protecting one's assets in space as well as denying an adversary the use of space. Thus, while up to the last conflict involving space, space systems were mainly focussed on force-enhancement missions the present focus has shifted to controlling the realm of space for one's own benefit while denying it to the adversary1. The accent on military utilisation of space is gradually shifting beyond enhancement of military force capabilities to control of the environment and actual application of military force "in, from and through space"2. The above trend is evidenced in the quest of space-superpowers like the US embarking on programmes aimed at space control and space force projection.3 Some of these include programmes like the Experimental Satellite Series (XSS) which seeks to use small satellites to manoeuvre around other satellites in order to inspect, service or attack. They also include Kinetic Energy Anti-Satellite (KEASAT) systems, Directed Energy programmes as well as 'Counter-Space' initiatives like the Counter Communications System (CCS) aimed at disrupting satellite based communication used by an enemy for military purposes. The first of such CCS systems was delivered to the US's 76th Space Control Squadron in the year 2004.4Apart from the above, a "space based interceptor test-bed" programme is also underway to develop and test space based miniature missile defence interceptors. The Pentagon's Missile Defence Agency has already provisioned budgetary allocations for the

same.5 The concept broadly envisages a limited constellation of space-based interceptors of 50 to 100 satellites offering a thin boost/ascent defence against ICBM's and a multishot mid-course defence against medium to intercontinental range missiles. The agency's plans call for the first contract to be let out in 2008, the first intercept tests by 2012 and "a constellation production decision" by 2014.6 From the foregoing it is amply evident that space based systems are presently in the process of transition from an era of militarization to weaponisation.

The Military Utility of Space for Nascent Powers

However, it needs to be borne in mind that the above transition is applicable only to nations like the US. Its next closest rivals, the Russians and the Chinese are yet to embark on any operationally viable weaponisation programmes. The above is mainly on account of the prohibitive costs and technological challenges involved rather than lofty ethical considerations. The Russians inherited the entire range of capabilities for force-enhancement missions from the former Soviet Union (FSU). However, since the 1990's, its capabilities have been severely degraded due to funding problems. As of 2004, Russia maintained military space programmes only in five areas of early warning, optical reconnaissance, communication, navigation, and signal intelligence.7 With regards to ASAT's, the FSU was the only country that developed and operationally deployed an anti-satellites system (ASAT), designed to attack satellites on low-earth orbits. However, the present Russian Federation (RF) is not known to have any operational ASAT systems.8 With regard to the Chinese, though they are the undisputed leaders in Asia, in relative terms vis-à-vis the US, their capabilities are nascent. As for ASAT's, speculation on the subject is rife and China is known to be actively pursuing such capabilities though it has not presently succeeded in its efforts9 to arrive at an operationally viable system. China's ASAT test of 11 January 2007 was at best a forerunner of capabilities which are yet to move beyond 'proof-of-concept' stage. Simulated test are simpler, acquisition of actual operational ASAT capabilities is a much more complicated endeavour. Other countries with known space-based force enhancement assets in operation include France (Helios image intelligence satellite and theTelecomm-2 communications satellite), Italy (Sicral communications satellite), Spain (Hispasat communications satellite), Britain (Skynet-4 communications satellites), Israel (Eros and Ofeq imagery intelligence satellites), India (TES photo-reconnaissance satellite); Japan (commercial Superbird communications satellite system and information gathering satellites); and South Korea (Kompsat-1 remote sensing satellite). Thus apart from the US, most nations are yet to progress beyond rudimentary military space capabilities and force enhancement missions.

Imperatives of our Military Needs

From the foregoing it is apparent that space based systems provide vital capabilities to successfully execute national military strategy and have found common acceptance across the globe. More importantly, most nations recognise that information derived from space platforms would be vital for success in conflicts. Military affairs in our case cannot be drastically different. In our case also it would be imperative to attain a certain modicum of 'information-dominance' in order to complement our conventional capabilities. Thus, we need to enhance our conventional military prowess by harnessing available space capabilities and potential so as to comprehensively reciprocate to the spectrum of warfare being directed towards us and also limit (if not deny) our adversaries the opportunity to offset conventional military superiority by resorting to threats of WMD, or other forms of unconventional warfare.

There exists an emergent need for examining the options afforded by space primarily to address the following aspects :-

(a) Securing of our space and terrestrial assets and thereby ensuring uninterrupted national development.

(b) Coordination of military requirements and development of military space capabilities.

(c) Integration of space and conventional military capabilities.

National Space Options

While the promise of space is enormous, the actual acquisition of capabilities is nascent, at best. The same would continue to be so in the foreseeable future because of the simple fact that unlike most nations ranging from the US, Russia, China etc which evolved space capabilities for military purposes, in our unique case space capabilities evolved and are designed primarily for civilian uses. Hence, our acquisition and development of military space capabilities would be tempered by this reality. The promise of space for the military is fantastic; the reality of acquisition is more prosaic. We need to explore options with the same in mind and the same is undertaken below.

Enhance Conventional Military Force Capabilities. In view of the foregoing our overwhelming emphasis could primarily be towards force-enhancement missions (it may be borne in mind that for well around forty years, the primary US mission was related to force-enhancement) and also towards passive counter-space defence in order to secure our assets in space. The list of technical advances and innovations of our space capabilities is impressive, and there is an equally long list of potential paths and options for exploiting these advances, as the application of technological advances could support very different objectives. Nevertheless, our options could be primarily categorised as under :-

(a) Build the organisational edifice and infrastructure to support space endeavours.

(b) Use available civil capabilities for force-enhancement, i.e. improving current military force and system capability for optimal task and mission fulfilment.

(c) Undertake passive counter-space defence measures like hardening of satellites, nodes and links etc.

Thus while certain dual-use capabilities could be harnessed right-away, other capabilities would demand dedicated efforts. For example, apart from satellites aimed at providing early warning of Ballistic Missile and Ocean Reconnaissance satellites, the other missions of force enhancement like communications, ISR, meteorology, geodesy could be fulfilled by prevailing civilian space capabilities. To a certain extent an extremely limited exploitation is being undertaken, but the efforts are disjointed and uncoordinated leading to sub-optimal utilisation.

Protection of Space Assets. With regard to protection of space based assets, as of now, no known protection measures have been undertaken to secure our assets in space. An ASAT attack by a hostile entity against our space capabilities would cause an insignificant (if at all any) dent in our military capabilities but an enormous dent on our economic capabilities. Apart from apocryphal scenarios of ASAT warfares, even in case of less debilitating scenarios like in July 2002, wherein the Chinese extremist cult “Falungong” penetrated Chinese communications satellites SINOSAT2A and SINOSAT3A, and began broadcasting Falungong programming,10causing enormous political and administrative difficulties, there is little that could be done to secure our assets considering that no security measures have been initiated.

Developing Passive Rather than Active Military Space Capabilities. In the previous millennium, military analysts had extolled the virtues of developing active military space capabilities, and the launch of GSLV-1 in 2001 was to mark India’s transition to “milspace dual use crossover”11. No such transition apparently took place then or even later with the launch of GSLV-2 in 2003 or thereafter since. Fantastic military space weaponry like Kinetic Attack Loitering Interceptor (KALI), Directionally Unrestricted Ray-Gun Array (DURGA) etc were envisaged with photo laser weapon testing to be completed by 2005.12 No such weaponry appears anywhere on the horizon as 2007 draws to an end. Certain eminent military analysts came up with grand visions of space and space based weapons being utilised to save us from nuclear war.13 Visions of tactics of ground warfare being applied to space warfare were also forwarded.14 However, the fact of the matter is that none of these visions fructified and most apparently turned out to be mirages. The point is not to criticize with the advantage of hindsight, but to accept the limitations imposed by the prevailing legalities, technological and monetary challenges. Building space capabilities for defence would be severely constrained by the above-mentioned factors now and even in the near foreseeable future. The endeavour hence should be to plan for and build capabilities within the existing capabilities and limitations. Our extant strengths would need to be exploited and ways of mitigating the challenges would need to be explored.

Extracting Capabilities from Civil for Military Uses

Civil and military space activities are complementary and no extra-ordinary ‘budget-draining’ effort is presently foreseen for technology transfer from civil to military space endeavours. For example, launchers make no difference between civil and military payloads. Similarly communication, navigation, imagery, meteorology and geodesic satellites have both military and civil applications. It is expected and would need to be accepted, that economic (and perhaps political) considerations may limit some civil to military spin-offs. However, the compulsions of national interests would endorse the approach that capabilities for defence should not be divorced from the economic and commercial uses of space. These need to be regarded as challenges to be overcome jointly in the larger national security interests, rather than permanent obstacles in building up our military space capabilities.

Differences for Modification. In the near term, the main differences perceived for modification of our prevailing space programme to meet security requirements relate to :-

(a Greater robustness and manoeuvrability to secure space assets against degradation, disruption and destruction by enemy counter measures like jamming, ASAT weaponry etc.

(b) Increased resolution capabilities coupled with more frequent revisit capabilities to meet intelligence, targeting and other requirements.

(c) Independent, secure, dedicated and redundant communication and navigation links to ensure uninterrupted access even during times of crisis, wars etc unlike in the case of the prevailing US based NAVSTAR GPS, Russian GLONASS etc whose use may be denied, restricted or even degraded by the service provider itself.

(d) Sharing of technological and related know-how for building up military specific space surveillance capabilities.

Limitations in Using Space

Nevertheless, it also needs to be understood that space is not a substitute for all forms of military capabilities, or equally important, a panacea for all information voids or military inadequacies plaguing our national security concerns. Defence policy on space, hence should be dictated by rational security needs and not the outer limits of what appears to be technically possible as in case of super powers like the US. Thus, keeping in mind the ‘availability and affordability’ criteria, presently available space technologies need to be dovetailed to meet present national security and defence requirements. future requirements should be projected with due attention to costs, legalities and treaties in vogue, technical feasibilities etc. At the same time, moving from crisis to crisis would not always be a good option. similarly waiting for a crisis to trigger off space support would also not be the best manner in which to evolve aerospace capabilities. Such luxuries in the new millennium are no longer affordable and hence the opportunities need to be seized while they present themselves.

Conclusion

The role of space has witnessed an expansion with every passing conflict and would only expand further as technology and doctrine mature and enable acquisition of greater military advantage. Increasing proficiency in cheaper and smaller micro and nano- satellites would enable greater expansion of their role in influencing terrestrial war-fighting in addition to providing an operational responsive space capability in times of wars and crises. As mentioned previously, increasing utility of space in influencing military results has also led to an increasing need for the capability to preserve and protect assets in space. Hence, in order to build up our military capabilities in space, it is imperative that we harness extant resources and act emergently for inclusion of our military requirements in synchronisation with ISRO’s decade plan in 2008.

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