Militarisation of Space: Security Implications

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Changing Scenario

For the past 50 years, outer space has been used for scientific endeavuors, commercial applications as well as for military support functions. Use and dependence on space technologies and space assets have been on a steady increase but there has been careful restraint of not putting any weapon in space so as not to disturb the international consensus on preserving outer space as a "common heritage of mankind," as was agreed vide the Outer Space Treaty(OST) of 1967. Therefore, scientific and commercial endeavours have been able to develop with minimal concern about military interference or any direct military implications. The prevailing international norms have served to establish a very smooth and non-controversial framework for scientific cooperation, commercial usage and even military support activities to coexist and progress simultaneously in the outer space.

However, over the past few decades, phenomenal advances in space applicable technologies and the increasing strategic importance of techno-military capabilities in space have brought renewed focus on the future potentials of outer space for defence and security at all levels. Integration of outer space capabilities in security and war-fighting doctrine have changed the nature of warfare as well as security perceptions around the world, signalling the dawn of a new era of leveraging "space superiority" for international power balance equations. Consequently, there is a new momentum to increasing militarisation of space for diverse functions such as strategic and battlefield surveillance, command, control, communication, intelligence (C3I), navigation and guidance and even for terrestrial weapon targeting, as demonstrated by the US in the recent wars in Iraq

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and Afghanistan. Several space-faring nations are today routinely using space assets for military support functions and in future more nations would be aspiring for space capabilities that would not only contribute to improving the techno-military edge but will also help the pace of economic development. Technology already exists for possible weaponisation of space and some of the stated policies of leading nations now talk of "space dominance" and "space control" that may easily result in crossing the threshold of accepted peaceful uses of outer space. Present perceptions of cost-benefit analysis may continue to prevent further military escalation in space, but the situation is quite volatile as any changed security perception of leading powerful space-faring nations could lead to open conflict over space dominance.

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The far-reaching military, political and economic ramifications of this impending technological transformation in outer space comprise a matter of serious concern to all nations, as this would permanently change the baseline for security and threat perceptions as well as influence defence strategies at all levels – land, sea and air. This transition may not only represent a major revolution in military affairs (RMA) but will also drive a possible revolution in political affairs because cooperation and competition among nations will have to coexist in the space domain. As a space capable progressive nation with a clear need to protect and enhance its space capabilities, India must address the issues of future militarisation of outer space and evolve well thought-out space policy and defence doctrines with strategic foresight to protect its national security interests. In the true spirit of dual-use technology, space will also play a vital role in techno-commercial competitiveness for economic security.

Dual Use of Outer Space: An Overview

Outer space is common to satellites, space transportation systems, ballistic missiles as well as future missile defence systems – a classic case of the dual-use application arena. In contrast to the time when over-flights of U-2 type spy planes were considered hostile, today similar and even better military reconnaissance capabilities of satellites have come to be accepted as legitimate defensive capability by all nations. This transition has not been very smooth. Anti-satellite (ASAT) capabilities were created by both the superpowers with a significant amount of technology commonality with anti-ballistic missile (ABM) efforts. However, the delicate balance of nuclear missile deterrence between the two superpowers dictated that space remains devoid of weapons or direct military activities.

Soon after the Soviet launch of the Sputnik in 1957, a flurry of research and development (R&D) resulted in several civilian and military applications for space-based technologies. For communications, TELSTAR and COMSAT were established in 1962, and for military surveillance, the Key-Hole (KH) series of imaging satellites were deployed in the mid-1960s. NAVSTAR and the first global positioning system (GPS) satellites were operational in 1978. Today, there are over 800 satellites in low earth orbit (LEO) of which over 80 per cent are operated by the USA. Of these, nearly 170 satellites are known to be dedicated military satellites for a variety of military support functions such as secure communication, battlefield surveillance, aerospace navigation and even weapon guidance applications. International agreements also exist on the use of satellites for verification of arms control treaty compliance. So far, no major dispute has emerged on this kind of dual use of fairly sophisticated space based technologies.

The 1967 OST signed by 97 countries was the result of shared international concern that military exploitation of space, beyond a point ,will not only seriously jeopardise the civilian space programmes but may even upset power balance equations and endanger international peace and stability. The 1972 Anti-Ballistic Missile (ABM) Treaty was the US-USSR bilateral agreement for not disturbing the balance of deterrence that held off direct military confrontation for decades. The 1983 announcement of the Strategic Defence Initiative (SDI) was the first shock to this balance and this became instrumental in accelerating the development of technologies for enhanced space capabilities.

The first military revolution in space was marked by the communications and reconnaissance satellites that provided added stability via elimination of surprise attack. The second revolution in military use of space was marked by the integration of advanced digital information and communication technology with orbiting assets not just for enhanced command communication, intelligence, surveillance, reconnaissance (C3ISR) capabilities but also for precision targeting and weapon guidance that are today high priority for modern warfare, particularly for land warfare, where collateral damage is a major issue. The action-reaction spiral has, therefore, already started with the development of GPS jammers and directed energy weapons (DEW) to defeat or reduce the space advantage of the adversary.

The technology and political developments of the past decade have, thus, heightened the concerns of the space technology threshold being crossed by the advanced space-faring nations, because further militarisation of outer space will certainly lead to a new race for space weapon technology and space control strategies. The trend lines indicate that it is perhaps only a matter of time before this next transformation in outer space takes place with the introduction of weapons in space for missile defence, anti-satellite operations and even for extended force projection from earth orbits for what the elite among military planners today define as "full spectrum dominance".

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Space Applicable Technologies for Defence and Security

The "space (applicable) weapons" may be defined as kinetic energy weapons (KEWs) or directed energy weapons (DEWs) or any special weapon from any platform against space assets or any space-based weapon or space-based force that can be used in earth wars or space wars. Early space weapon concepts of the USA included nuclear-tipped interceptor missiles and those of the USSR included the co-orbital missile interceptors. These were products of intense R&D since and were tested for effectiveness till the mid-1980s. In 1982, US announced the 'kinetic kill' concept for ASAT applications and tested a 2-stage missile called the air launched miniature vehicle (ALMV) that could physically collide with the enemy satellite to achieve the kill. This was successfully tested in 1985 at the 555 km range but put on hold due to concerns of space debris and also so as not to contravene the ABM Treaty of 1972.

The SDI, announced by the US in 1983, was intended to make nuclear weapons impotent and obsolete in the long term. Conceptually, the space-based ballistic missile defence generated a lot of interest and created a new momentum in high-technology pursuit for space oriented systems. The DARPA

(Defence Advanced Research Project Agency) was activated to address the high-tech challenges by pooling all available expertise for new ambitious projects in key technology areas like sensors, data processing, KEWs and DEWs. The gains from SDI were not spectacular but they were very substantial in pushing major enabling technology development programms for ballistic missile defence (BMD) and in vastly improving the early warning capabilities based on defence satellite programmes (DSP). This actually provided the USA with the clear technology edge over the Soviets that finally contributed significantly to the Soviet military-economic crisis and eventual disintegration of the USSR.

While SDI provided the boost for space capable technologies, the weapon system focus came from the BMD requirements that necessarily used the outer space. Typical long range missiles (over 5,000 km) take about 3 minutes for the boost phase, about 20 minutes for a mid-course ballistic flight and a few more minutes after reentry at terminal velocities of about 7-8 km per second (kps). Intermediate range missiles (5,000-3,500 km), medium range missiles (3,500-1,000 km) and short range missiles (under 1,000 km) have slower terminal velocity in the range of 3 to 5 kps. Interceptor missiles for BMD, therefore, have to not only be very fast but also very precise. Such capabilities are easily applicable for ASAT applications.

Withdrawal from the ABM Treaty, effective June 13, 2002, cleared the way for the US to develop, test, deploy and even transfer any form of BMD system. The exo-atmospheric kill vehicle (EKV) is a hit-to-kill vehicle that separates from the booster and seeks out the target through radar updates and onboard electro-optical (EO) sensors. This is a very demanding technology but the integrated flight tests started in 1997 did achieve limited success. Technology seems to be mature for air-launching of a limited number of EKV at short notice to loiter in preferred orbits at 8 km/sec velocity and accelerate on command to about 14 km/sec velocity to kill the desired LEO satellite. These could also be made to rise to geosynochronous earth orbit (GEO) orbit for offensive space activity. ASAT capability has been proved not only by the US but also by China; and Russia is also known to have the necessary technology capability.

Present US plans for BMD deployment include 10 ground-based (GB) strategic missile interceptor units of which 4 would be based at Fort Greeley, Alaska, and 6 at Vandenburg AFB, California. Another 10 GB interceptor units are planned for the future. Twenty more ship-based interceptor units and an undisclosed number of PAC-3 short range interceptors for theatre missile defence (TMD) would also be deployed. Long and medium range interceptors would use the EKV systems. Other BMD components include the space tracking and surveillance system (STSS), space-based infrared system (SBIR), in low and high orbits, sea-based radars (AEGIS), theatre high altitude area defence (THAAD) for GB mid-course defence and the airborne laser (ABL) for the boost-phase kill of ballistic missiles with directed energy. The space technologies for defence and security are expected to evolve further in the coming years to offer unprecedented capabilities for advanced space-faring nations.

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Military Applications of Space: A Trend Analysis

The modern war-fighting strategies are getting highly dependent on space-based assets and technologies – whether it be for real-time situational awareness or for precision guidance of standoff weapons. The trend towards "network-centric warfare" is unstoppable since it offers hitherto unavailable military advantage to technologically superior forces and satellite-based sensors and secure communication links constitute vital components of such networked capabilities. These high value assets are, however, vulnerable to relatively low cost threats, particularly for the ground segments of the satellite networks. The current techno-military situation and the prevailing atmosphere of asymmetric threat demands that space-faring nations with critical space assets develop robust deterrence capability to prevent any hostile action against space-based assets and capabilities. There is, thus, a new sensitivity and urgency emerging about the security of outer space and related techno-military superiority in space. Counter-space capabilities such as missile defence, anti-satellite capabilities and a new class of DEW, thus, assume critical importance for defence and security perceptions.

The ASAT capabilities of BMD systems are very significant. A closer look at the US BMD programmes brings this out very clearly, as elaborated below.

Ground-Based Mid-Course Defence – A 3 stage rocket booster to carry the KEW interceptor with own propulsion and sensors, etc. to track and lock-on to target for direct impact destruction. GB interceptors with burn-out speeds of 7-

8 km/sec can have vertical range of 6,000 km if launched straight up. On-board sensors of such interceptors that identify and track missiles can very easily target enemy satellites in LEO.

Aegis-LEAP System – The US ship-based mid-course defence (SMD) called the "navy theatre-wide" defence can intercept missiles in the 1,000-2,000 km range with light-weight exo-atmospheric projectile (LEAP). These short range interceptors have burn-out speeds of 3 km/sec and can reach 600 km altitude if launched for vertical lift. Such systems can be very effective against highly elliptical LEO imaging satellites at relatively low altitudes.

Airborne Laser (ABL) – This is essentially a modified B-747 aircraft with a mega-watt class chemical laser flying at over 13 km altitude, with a 600 km slant range for destroying the enemy missile in its boost phase by the intense radiation of the high power laser as a DEW. This would offer unique BMD capability with promising potential for space warfare. For a 300 km range enemy missile, burn-out would occur at about 25-30 km altitude and for longer range missiles, the boost-phase may last till 200 km altitude. The ABL beam director, therefore, must have look-up capability for its reported slant range of over 600 km and will, therefore have assured capability to damage LEO satellites and even blind GEO satellites with less dwell-time than required for missiles, because satellites are much softer targets than missiles. This high power laser (HPL) technology thus provides a low-cost per shot option for ASAT purpose and even ground-based powerful lasers have been tested successfully by for blinding LEO satellites as well as for infrared counter-measure (IRCM) applications in space. HPL also allows graduated effects from blinding to disabling to destroying the target.

The ABL not only represents the first mature attempt to deploy the HPL system as a weapon for BMD purposes for the boost-phase kill, it also represents a quantum jump in defensive-offensive capabilities in space with the introduction of the new class of DEWs. ABL will also herald the possible use of DEW technology for tactical war-fighting in land warfare as part of force projection from aerospace. The success of the US Air Force project, scheduled for live testing in 2009, will open the path for future-space based HPL systems, representing yet another major technology leap in space. A major advantage of laser weapons is the potential of covert use for blinding sensors without causing any space debris. Hence, this is emerging as a priority choice for space weapons.

Futuristic space-based missile defence efforts may see revival of: (a) R&D on space-based lasers (chemical lasers or nuclear-pumped X-ray lasers); and (b) reactivation of the "Brilliant Pebbles" concept, perhaps in limited clusters

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of hit-to-kill vehicles. New technologies such as MEMS and nano-technology could make the Brilliant Pebbles concept practical and economically viable. The present high focus on space technologies can be appreciated by the budgetary commitments of the USA in which the BMD programme is supported by about $ 8 billion per year funding and the US Air Force (USAF) is seeking another $ 30 billion to put 30 space-based lasers in the earth's orbit by 2012. While the USA, Russia and China have advanced ASAT capabilities, R&D in space technologies has acquired significant momentum in 15 other countries. China particularly has been enhancing its counter-space capabilities over the years through the extension of its own theatre missile defence programme. Since the 1990s, China has reportedly intensified its HPL programme to build ASAT capabilities and is believed to have developed systems capable of blinding/damaging enemy satellites.

China's push for space technology was demonstrated by its successful manned space flight, and more recently by the space walk by Chinese astronauts, claiming to be only the third nation to achieve this. China is also reported to be developing 'piggyback' mini-satellites that can attach to enemy satellites and jam the electronics on command. A manoeuvrable satellite or space vehicle for benign civil application can be a guided weapon in space if covertly commanded to collide with a chosen space target. Even a space shuttle could be used as a 'weapon' in war-time if the cost justifies the military objectives. This kind of 'dual-use' dilemma is going to pose serious concerns in the future in the context of space security.

Micro-satellites represent yet another promising technology emerging for future space weapon applications. Micro-satellites using MEMS and nano-technology can be deployed by a mother satellite and controlled from the ground to attach to the target satellite to cause disruption or destruction in a suicide mode on command. US R&D efforts are fairly advanced, as demonstrated by the US-XSS-10 satellite (28 lb weight) that was tested successfully in 2003 and the subsequent XSS-11 tests. China is also believed to have developed experimental micro-satellite of the 40-50 kg weight-class that contain solar panels, batteries, computers, CCD camera, propulsion and telemetry support systems. A very attractive feature of micro-satellites is that they can be launched at a small fraction of the conventional launch cost, once deployed as part of the space defence system. The National Aeronautical Space Agency (NASA) has also tested several Microsats and may be planning to launch 100 Nano-Sats simultaneously to test formation-flying by 2009-2010.

Other possible future space weapons may include “Rods from Gods” – orbiting platforms with 20 feet long tungsten rods that could be satellite guided to hit earth targets with 12,000 ft/sec velocity driven by gravity and with a 25 feet CEP (circular error probability). The US is also developing the space plane “FALCON” (force application and launch from continental US), a hypersonic bomber that can be launched directly to space to cruise at 12 Mach speeds at over 100 km altitude to attack any earth target within four hours from the US base. Satellite control of long endurance combat unmanned aerial vehicles (UAVs) also opens up new potentials for use of space and modern technology for unprecedented offensive capabilities for land warfare.

The American way of life depends fairly heavily on space assets, more than any other nation’s. Vulnerability of space assets is, therefore, a matter of major concern for the US. Both the Rumsfeld Report of 2000 and the US policy statements of 2006 recognise that “weapons in space” may be a matter of time and comprehensive space control must be achieved not only to protect one’s own space assets but also to deny the use of space to the adversary, at least in times of conflict. The US Space Command’s “Strategic Master Plan”, therefore, calls for “full spectrum dominance” in space by 2010 through integration of space capabilities with information security and defence strategies. The stage is, thus, set for increasing use of outer space, including possible deployment of weapon technology in space for earth wars.

Global Space Order: Implications for India

As of now there is universal agreement among all nations on peaceful exploitation of outer space and there is harmonious cooperation among several space-capable nations on peaceful use of outer space. There is no conflict even on the use of outer space for support to military activities, much of which are now universally accepted. International systems for satellite-based applications for communication surveillance, remote sensing and global positioning have so far evolved under this ‘no conflict’ umbrella, thanks to mature treaties such as the Outer Space Treaty and subsequent various multilateral arrangements such as the COPUS (Cooperation for Peaceful Use of Space). However, US plans for exploitation of space for future missile defence systems and active military oriented operations for space dominance may dramatically change the security perspectives of outer space capabilities.

There is some concern that the Outer Space Treaty may be the next casualty if it is seen as constraining the 'space control' ambitions of powerful nations.

LEOs at altitudes between 300 and 2,000 km are becoming the most used part of outer space. Over 800 satellites are in such orbits today, providing key support to a variety of civilian, commercial and military support functions. These and other man-made experiments have, however, created a significant amount of space debris over the years. As of 2005,over 9,000 man-made objects of larger than 10 cm diameter were being tracked, while perhaps additional 100,000 smaller pieces of debris may exist in earth orbits, each travelling at about 27,000 km/hour. LEO satellites, therefore, face the danger of accidental collision that can be potentially lethal to all space assets. Given the heavy dependence of modern society on satellite-based systems, the effects of such disruptions could be of staggering proportions.

The US BMD envisages ground-based interceptors that would collide with targets, creating hundreds of debris particles. Future longer range interceptors operating at higher altitudes will cause longer lasting space debris. Experiments and deployment of BMD, thus, could create significant additional debris-hazard in space.

The missile defence technologies of the US include destroying incoming missiles and also striking back at the adversaries who fired them. Dual use of missile defence technology for ASAT applications is a cause for serious concern. The US is planning a space test-bed to test prototype space-based interceptors that can also target satellites. Space-faring countries have the greatest technical ability to threaten satellites, but they are also the countries with the greatest incentive to develop guidelines to safeguard the use of space. Hence, the US, while opposing any new treaty such as the treaty for Prevention of an Arms Race in Outer Space (PAROS), seems to be advocating a possible "Responsible Code of Conduct" for space-faring nations – to enhance transparency and develop confidence-building measures.

The Outer Space Treaty of 1967 banned testing and deployment of nuclear weapons or any weapon of mass destruation (WMD), in earth orbit or on any celestial body. It prohibited interference with other nation's peaceful space activities as well as any interference with "national technical means" for verification of treaty compliance. While the OST and ABM Treaty banned nuclear weapons in space, there are actually no limits to non-nuclear tests in space or on tests against space targets from the ground, sea or air. With the abrogation of the ABM Treaty, effective as of June 2002, arms control in space is pretty much an open slate today. There is some concern that the OST may be the next casualty if it is seen as constraining the 'space control' ambitions of powerful nations. Deployment of any type of ASAT weapon by the USA/Russia/China can be hazardous to all types of satellites — commercial, environmental or military.

While there is some acceptance on the unavoidability of missile defence deployment and the consequent need for space arms control to prevent weaponisation of space, there is lack of clear understanding on how peaceful use of space and active BMD/ASAT defence can be made either compatible or complementary.

US plans on BMD and ASAT defence appear narrowly conceived and based on US priorities, with little thought to international implications. It could well prove to be self-defeating, because it may end the international consensus on peaceful use of space, and trigger a space defence race with Russia, China, India and other space capable nations that will have legitimate security concerns. A likely future US led space control initiative can seriously affect not only the security perceptions but also the existing universal agreements on commercial utilisation of space. Progressive developing economies like India, with independent space assets, need to carefully evaluate the impact of militarisation of outer space and develop their own strategies and technologies to protect their own security and economic interests in the outer space.

Future technology trends indicate a keen competition for space technologies most of which are technologies of dual use nature and controlled tightly under the various technology control regimes such as the Missile Technology Control Regime (MTCR) or the Wassenaar Arrangement for multilateral export controls. Pursuit of space related technologies for defence of national assets by several sovereign nations is likely to clash with the objectives of the present export control regimes. The MTCR today seeks to control all missile technologies that could contribute to delivery of WMD and yet, US missile defence plans envisage cooperation with several countries on technologies that are far more sophisticated than needed for simple ballistic missiles. How the present understanding on international cooperation in space will survive the future conflicting situations is a question vital to international peace and stability.

There is a general consensus that the weaponisation of space must be prevented or at least slowed down. Following many attempts to raise the issue at the UN since 1982, a joint proposal was submitted to the UN Conference on Disarmament (CD) by Russia and China in May 2002 for PAROS. The treaty is aimed at supporting the OST and seeks to get broader agreement on preventing weapons in space. However, the USA and Israel have emerged as the main opponents of any such treaty. The blockade situation at the CD is a matter of serious concern, prompting China to link the progress on PAROS to any move forward on the Fissile Material Cut-Off Treaty (FMCT) — as weapons in space would directly influence its nuclear deterrence calculations. However, the recent ASAT test by China in January 2007 has raised questions about China's own commitment to preventing weapons in space. The general mood in the arms control community, therefore, is to focus on confidence-building measures (CBM) to slow down a possibly imminent arms race in space while trying to build a wider consensus on preventing more aggressive or exclusively offensive space capability development.

Analysis of the technology trends and strategic priorities indicate that the USA will eventually introduce weapon technology in space, perhaps in a phased manner, so as to be able to control the pace of the technology race in space. It will be imperative for other sovereign space-faring nations, such as India to step up the R&D in space relevant technologies to retain the international power position among the powerful and technologically advanced space-faring nations in the world.

Conclusion

The low earth orbits are already crowded with hundreds of satellites and thousands of pieces of debris material. US deployment of missile defence systems will entail additional satellite launches as well as testing of interceptor missiles, thus, creating more traffic and more debris. Add to that the space technology momentum that will prompt many more nations to want better space defence capabilities. It is, therefore, very likely that the prevailing international norm on use of space for civilian and military purposes could soon get destabilised and unless all nations can quickly reach an agreement on how to avert space accidents and a possible race for militarisation of space, the world will go through a period of 'free for all' situation in space.

An uncontrolled proliferation of space relevant technologies can also have the potential of such technologies falling into radical or unpredictable hands. Any such eventuality could seriously jeopardise the civilian space support assets that have become vital to everyday normal functioning of the modern societies. The free environment in which scientific space endeavours have been carried out so far would also suffer if technology gets misused. And last but not the least is the important issue of military power balance that has survived through the complex perceptions of nuclear-missile deterrence through the Cold War years and thereafter. Arms control in space, in whatever form it emerges, is unlikely to prevent the deployment of weapons in space. Hence, the issues of space arms control will have to be approached more as a challenge of 'technology management' than as 'arms control' and implemented in a manner that must be fair to all nations who are bound to be affected by the future evolution in space technology for defence, offence or peace.

Unlike most other countries, India's space programme has evolved entirely for capabilities in the civilian space domain, creating independent space assets for peaceful applications. The changing global space order will, however, require significant R&D in critical technologies that could contribute to military space capabilities. Within the country, there is urgent need for informed debate on the subject involving policy-makers, technologist experts, user Services and think-tanks, to prioritise actions for space security for India. The first priority should be on international cooperation to protect the existing space assets and enhancing indigenous capabilities to remain competitive in the space technology and space services domains. Simultaneously, development of critical technologies such as missile defence, advanced sensors, miniaturisation techniques, high power lasers, etc. must be pursued for counter-space capabilities. The prime objective must be to quickly bridge the technology gap with advanced nations, so that India does not again become one of the targets of space arms control, but is seen as a valuable partner in preserving peace and stability in space.

In India, defence and space activities have been traditionally kept separate and the two departments function pretty much independently. However, this must change now with space becoming an important dimension of defence and security. Strategic long-term planning must now integrate space capabilities with defence capabilities that are necessary for safeguarding national security interests. Evolution of a comprehensive 'space defence' and 'space control' policy will require a high degree of integration and coherence between the Space and Defence Departments as well as early integration of key private sector industry. India should be in a position to take an independent stand on space defence and space control, commensurate with its own assessment of national security priorities in outer space.

Space technology capabilities have global reach beyond the national borders and, hence, a new space order is emerging where the strengths in outer space capabilities would heavily influence the international power balance equations. Such strengths are derived from indigenous core competence across the full spectrum of space relevant technologies, and space assets in outer space for both civil and military applications. Suitable policy and organisational infrastructure are vital to bringing together all components of space power for deterrence, war-fighting or for power projections purposes to support the nation's national interest objectives. It may be very likely that by the year 2020, deterrence value of space technology may become as important as the nuclear deterrence is today, because military space capabilities and the new class of energy weapons will directly affect the nuclear-missile deterrence value. Space will then become an important new dimension in the calculations for military and economic power for any sovereign nation.

In conclusion, it is imperative for India to address the above concerns by adding to its civilian space capabilities the necessary techno-military components to address national security concerns and to protect the space security interests of the country. Space is clearly emerging as the new dimension for any future warfare on earth. Like the nuclear weapons, space capabilities may also emerge as the currency of power in the future and impact on international equations. Space also serves as a major catalyst for socio-economic development and techno-economic competitiveness. Space capabilities are, therefore, indispensable for the aspirations of a progressive country like India that is on the fast growth curve. India needs to have a well calibrated "Outer Space Policy" that would not only enhance the civilian space profile but also enable development of suitable counter-space capabilities to protect its own security concerns. Such an integrated approach alone will enable India to claim its rightful place among the advanced space-faring nations.