US Space Policy: Politics and Implications

Dissertation submitted to the Jawaharlal Nehru University
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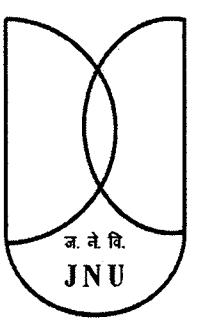
MASTER OF PHILOSOPHY

MANISH KUMAR VERMA



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CENTRE FOR CANADIAN, US AND LATIN AMERICAN STUDIES
SCHOOL OF INTERNATIONAL STUDIES
JAWAHARLAL NEHRU UNIVERSITY
NEW DELHI - 110067

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DECLARATION

I declare that the dissertation entitled **"US Space Policy: Politics and Implications"** submitted by me in partial fulfillment of the requirements for the award of the degree of **MASTER OF PHILOSOPHY** of Jawaharlal Nehru University is my own work. The dissertation has not been submitted for any other degree of this University or any other university.

Manish Kumar Verma

CERTIFICATE

We recommend that this dissertation be placed before the examiners for evaluation.

Prof. Chintamani Mahapatra
(Chairperson, CCUS&LAS)

Prof. Chintamani Mahapatra
(Supervisor)

Dedicated to

JNU

where I learnt about Research and Life

US Space Policy: Politics and Implications

Contents

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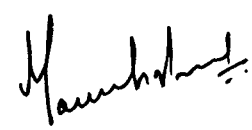
In the end I take all the responsibilities for any and all shortcomings.



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Manish Kumar Verma

Preface

This study is a modest attempt at analyzing the US policy towards the space use and the process of space militarization. The debate between space militarization and space weaponization is one of the main themes of this study. The possibility of space weaponization has become a debatable issue among scholars. There is no doubt about the fact that US is leading the world in the field of military exploitation of the outer space. US has also relied heavily on the space assets not only for military activities but also for commercial and economic activities. This dependency over space assets like satellite has led to the idea of space security and subsequently towards the idea of space weaponization.

The idea of space weaponization and intense militarization of space has its repercussions as well. China and Russia have also started pursuing an active space programme with the aim to counterbalance the US supremacy in this field. This study would try to focus on the politics and implications of the idea of space weaponization and its influence over the US space policy along with the external responses towards these developments.

This study's main focus points are:

- the historical background of US space policy since the launch of Sputnik and significant developments during the historical background of a coherent and a strong US national space policy
- the linkages between the US and Soviet space activities during Cold War and the assessment of space security in post- Cold War scenario
- the examination of US efforts to maintain supremacy in outer space and growing challenges by countries like China and Russia
- and the multilateral efforts especially through the UN to control the emerging new space race

With these points at the core of the study, the introduction chapter focuses on the definition of space weapons and tries to differentiate between space militarization and space weaponization process. This chapter systematically analyzes the evolution of US space policy and brings out the continuity and change in the US approach toward use of outer space.

Second chapter focuses on the US- Soviet rivalry in outer space during Cold War days. This chapter analyses the influence of US and Soviet space activities over each other and traces the major developments during space race. Some treaties and bilateral negotiations between the superpowers have also been analyzed in this chapter.

Third chapter focuses on the issue of space security and its ramifications over national security. It also analyses the debate over space weaponization.

The fourth chapter of this study focuses on the implications of US space policy. External responses especially from China and Russia have been investigated in this chapter. The possibility of a new space race has also been analyzed in this chapter.

The last chapter is an attempt to draw broad conclusions by highlighting the findings of this dissertation.

LIST OF ILLUSTRATIONS

List of Graphs, Figures and Tables

Abbreviations

ABM-	Anti- Ballistic Missile
ASAT-	Anti Satellite
BMD-	Ballistic Missile Defense
CD-	Conference on Disarmament
COPUOS-	Committee on the Peaceful Use of Outer Space
DOD-	Department of Defense
DSCS-	Defense Satellite Communication System
EMP-	Electro-Magnetic Pulse
FOBS-	Fractional Orbital Bombardment System
GLONASS-	Global Navigation System
GPS-	Global Positioning System
ICBM-	Inter Continental Ballistic Missiles
INF-	Intermediate-Range Nuclear Forces
INTELSAT-	International Telecommunications Satellite Organization
ISS-	International Space Station
MDA-	Missile Defense Agency
NASA-	National Aeronautics and Space Administration
NCW-	Network- centric warfare
NSD-	National Security Directive
NSP-	National Space Policy
NSpC-	National Space Council
NSPD-	National Space Policy Directives
NSSD-	National Security Decision Directives
ODS-	Operation Desert Storm
OIF-	Operation Iraqi Freedom
OST-	Outer Space Treaty

PAROS-	Prevention of an Arms Race in Outer Space
RMA-	Revolution in Military Affairs
SALT-	Strategic Arms Limitation Talks
SDI-	Strategic Defense Initiative
SDIO-	Strategic Defense Initiative Organization
SLBM-	Submarine-launched ballistic missile
STS-	Space Transportation System
UAV-	Unmanned Aerial Vehicle
USAF-	United States Air Force
USSPACECOM-	US Space Command
USSTRATCOM-	United States Strategic Command
WMD-	Weapons of Mass Destruction

Chapter One:

Introduction: Evolution of US Space Policy

Space is an arena of growing importance in the twenty first century for the United States and also for other nations. The United States today remains the leader in space exploration and the most dependent of all nations on space both for its national security and its economic wellbeing (Pfaltzgraff, 2009: 1). The idea of militarization of outer space is as old as the dawn of the Space Age following the launch of Sputnik by the USSR. Sputnik forced the Eisenhower administration to consider a new world of space arms. However, before the launch of Sputnik there had been some developments in the direction of space uses for military purposes. The development of aircraft drastically changed the fighting style during the twentieth century, leading to 'command of the air' as a key strategic concept. Initial attempts for control of space were led by the US and the Soviet Union. They conducted exercises for controlling the space with nuclear and conventional devices. The Cold War period served as a major propellant for the exploration of space. The space race began effectively with the launch of the Soviet Sputnik I on 4th October 1957 (Lee 1999: 249). Due to the Cold War rivalry, scientific research converted into strategic race for both the superpowers. Thus, the militarization of space, which started way back, is now evolving into weaponization of space with the effort to actually place weapons in space by the US for actively military advantages over others.

Space Weapons

For a better understanding of space race and US space policy, clarity about space weapons is needed. What exactly constitute space weapons? Space weapons can be based in space or on the ground and they may be aimed at targets in either place. So there is the possibility for Space to Space, Space to Earth, Earth to Space, or Earth to Earth (through space) weapons (Webb 2005: 8). This is one view but experts have divergent views on space weapons.

In this context United Nations Institute for Disarmament Research (UNIDIR) proposed a definition which sheds more light on the understanding of space weapons. According to that definition:

> A space weapon is a device stationed in outer space (including the moon and other celestial bodies) or in the earth environment designed to destroy, damage or otherwise interfere with the normal functioning of an object or being in outer space, or a device stationed in outer space designed to destroy, damage or otherwise interfere with the normal functioning of an object or being in the earth environment. Any other device with the inherent capability to be used as defined above will be considered as a space weapon (SIPRI 1991: 13).

Rationale for Space Weapons

The main logic behind the US debate on space militarization and space weaponization is to defend the space assets linked with American national security. The possibility of a surprise strike against U.S. assets in space forms a strong element of current U.S. military thinking. With the U.S. military's reliance on satellites for imaging, intelligence and communications, a possible 'Pearl Harbour in Space' could have a crippling effect on the armed forces' ability to function (Space Commission report, 2001). However, the motive behind the installation of weapon in the space can be classified under three main points. First, the supporters of use of space weapons mainly rely on its defensive use. For active protection of space assts, it is needed that the defence system should be strong. In US military arena the projection of 'pearl harbour in space' has been the motivating force behind the intensification of space weaponization process.

But this is only one aspect of the whole picture. Secondly, there are arguments regarding the offensive use of space aimed at getting the first advantage and a strategic upper hand. This approach alarms other States and elicits a response leading to space rivalry. For instance, Chinese expert Hui Zhang is of the view that the increasing influence of US in space might affect Chinese national security, international security and space environment (Zhang 2006). Hence offensive use of space weapons cannot be denied and in the extreme situation a dominant country can deny adversaries the use of space. Apart from this, space weapons are the best means for global and rapid power projection. US forces have used the space to establish domination in different parts of the world through

various operations. Operation Desert Storm, Kuwait, Iraq 1991; Operation Allied Force, Kosovo 1999; Operation Enduring Freedom, Afghanistan 2002; and Operation Iraqi Freedom, Iraq 2003 have shown that space has now become "the ultimate military high ground" (Webb 2006).

Space Militarization vs. Space Weaponization

The process of space militarization started even before the launch of Sputnik. But the Sputnik experiment by Soviets intensified the space race. Since then the space has become increasingly militarized. On the other hand, the idea of weaponization of space is comparatively new and has attracted the attention of experts in recent years. Deblois has stated that the space has been militarized for quite long time but it is not yet weaponized. (Deblois, 2003) There are differences between these two processes. The distinction between space militarization and space weaponization as seen in table 1.1 has been recognized by the experts of the field as important.

The term militarization of space could signify the usage of space assets in order to increase military effectiveness of ground based forces. Various developments in the field of information and communication satellites have made the global positioning system (GPS) an undeniable part of militaries across the world (Garwin 2000: 244). Space militarization could be understood as the use of assets based in space to enhance the military effectiveness of conventional forces or the use of space assets for military purposes (Mowthorpe 2004: 3). On the other hand, space weaponization could be understood as the placement of space based devices, which have destructive quality, into the orbit (Estabrooks 2003). Thus, space weaponization process is more destructive than space militarization process as for as the security of space assets are concerned.

Table 1.1 Distinction between Space militarization and Space weaponization

Space Posture	Perceived level of threat to foreign countries due to space posture	Threat Level	Type of activity	
High-ground	high	10	Permanently orbiting Space-to-Terrestrial Weapons (Uni lateral)	Space Weaponization
	--do--	9	Temporary, or "pop-up" Space-to-Terrestrial Weapons (Uni lateral)	''
	--do--	8	Space-to- Terrestrial Weapons (Multi lateral)	''
	--do--	7	Permanently orbiting Space-to-Space Weapons (Unilateral)	''
Control	--do--	6	Temporary, or "pop-up" Space-to-Space Weapons (Unilateral)	''
Survivability	Moderate	5	Space-to-Space Weapons (Multi lateral)	''
	--do--	4	Terrestrial-to-Space weapons (Uni lateral)	''
	Low	3	Terrestrial-to-Space weapons (Multi lateral)	''
	--do--	2	Space-to-Terrestrial ISR, MCG, Communications	Space Militarization
Sanctuary	--do--	1	Space-to-Space ISR, MCG, Communications	''
	None	0	Terrestrial-to-Space ISR, MCG, Communications	''

Source: Deblois (2003: 31)

Use of Space:

There has been an active debate among different schools of thought over the use of space. There is no universal theory of use of space and policymakers have generally preferred to adopt those views which cater to their national interests. The prominent schools of thought in this regard are:

- Sanctuary School
- Survivability School
- High Ground Doctrine
- Control School

The **Sanctuary School** holds that the primary value of space forces is their capability to "see" within the boundaries of other nations. Since space systems can legally fly high above the sovereign territory of other countries, they can perform treaty verification via their onboard sensors. Additionally, over flight by space systems has not been denied by other states in the past and, accordingly, surveillance and reconnaissance systems provide a stabilizing influence in international relations, especially when verifying arms control compliance between superpowers (Klein 2006: 17). Space, therefore, should be designated war and weapons free sanctuary to insure this stabilizing effect in the future through continued over flight operations. (ibid)

The **Survivability School** emphasizes that space systems are inherently less able to survive than terrestrial assets and forces, and is predicated on three assumptions. (Lupton 1998: 36) The first assumption is that space systems are vulnerable to long range weapons. Second, it is reckoned that space assets cannot effectively use manoeuvrability or terrestrial barriers to protect themselves. Third, it seems doubtful that states would retaliate over the destruction of a space system because of its lack of political importance. While the survivability viewpoint acknowledges that space is an excellent medium for basing some military systems, space must not be depended upon for essential wartime functions, since space based systems are not likely to survive hostile attack (Klein 2006).

Advocates of **High Ground Doctrine** state that domination of the high ground ensures domination of lower lying areas. Furthermore, since space systems provide a global presence, when coupled with an offensive weapons capability, they can provide a defence against ballistic missiles or deter an adversary's aggressive actions. Consequently, space forces should have a dominant influence during military operations, including the use of offensive weapons and missile defence systems. The high ground view has been around since the late 1940s and is exemplified by the prevalent belief at that time that the nation which first built a space station would be in a position to rule the earth (Klein 2006). Thus space offers the promise of freeing the nation from the terror of enemy offensive strike capabilities (Levy 1997: 6).

Control School advocates base their argument on outer space's inherent value through the relationship with both air and naval strategies. According to this view whoever controls space controls whatever is beneath it (Lupton 1998: 21), therefore, whoever has the capacity to control space will likewise possess the capacity to exert control over the surface of the earth. This school also holds the view that space operations are coequal with those of land, sea and air and control of space is viewed as essential to ultimately achieve military success (Klein 2006).

Among the four schools of thought, Control School looks most promising to the strategic community in the United States. Lupton states that the control school doctrine is the dominant view among the US military community, especially with regard to space weapons and space use (Lupton 1998). During the initial phase of space use, Eisenhower administration followed the sanctuary view of space. The same line of thought was followed even during the Kennedy and the Johnson administrations which resulted eventually in the conclusion of the Outer Space Treaty (Mowthorpe, 2004: 15). In the later period, sanctuary view was replaced by the view of the Control school which emerged at the time of President Reagan's Strategic Defense Initiative (SDI) speech which observed space as a medium from which earth could be controlled.

Politics of Space

Several experts maintain that the space race between the US and the Soviet Union during the Cold War was purely the result of international politics. During the Cold War, the superpowers' activities in outer space were influenced by the race for supremacy not only in the field of space but in every aspect of world politics. It would be appropriate to say that space and politics are, and always have been, interlinked. The central driving force for all space programs has been political objectives. Space programs have re?ected and implemented the prevailing national and international ideologies of the time, whether they are power politics, communist internationalism, European integration, or national self- determination. For example, in the early 1960s, the vigorous American space programme was being driven both by a domestic requirement of the Kennedy administration to divert attention from the set-backs such as the Bay of Pigs disaster. At the same time, it was also a reaction to the successes of the Soviet space programme and reflected a perceived need to demonstrate American strength to an international audience of nervous allies and uncommitted Third World states (Sheehan 2007: 14). In 1972, as the United States prepared to send Apollo 17, the last manned mission to the Moon, the Black September group, who were responsible for the Munich Olympics massacre in the same year, threatened to sabotage the launch (ibid: 2). The period of détente and the end of détente period with re-emergence of the Cold War was clearly visible in space activities. Both space and politics have influence over each other. On the one hand, space programs have been shaped by the politics of the past half-century; on the other hand, the utilization of space has helped shape the politics of the modern world in post World War II. The use of space has been instrumental in providing images of planet Earth to energize the environmental and peace movements, stabilizing the Cold War through deterrence and arms control and producing satellite communications systems (ibid).

The opening of space age has provided unprecedented power to the humanity, yet it comes with unprecedented vulnerability. Space has become the 'new high ground' for military purposes and with the advent of RMA (Revolution in Military Affairs), the role

of space in wartime has become crucial. Thus, the fact has become evident that the space has a significant role in the power politics.

Politics of Space Weaponization:

The drive towards weapons for use in or from space has two principal justifications: first, that space weaponization is essential to protect space assets from a pre-emptive attack, called a 'Space Pearl Harbor' by the Commission to Assess United States National Security Space Management and Organization (known as the 2001 Space Commission, chaired by Donald H. Rumsfeld); and secondly, that who controls space will control the Earth and obtain an unassailable military and commercial dominance. In addition to the assumptions of vulnerability and space power, some also argue from historical analogy that space weaponization is inevitable, and that whoever gets there first will enjoy an overwhelming advantage. The weaponization of space has to be seen in the context of missile defence, increasingly accepted by US allies in the post 11 September political environments. Advocates of US weapons in space have difficulty comprehending the degree to which their plans are viewed as a security threat by others because they assume that US superiority is beneficial for international stability.

Showing the importance of space, Vision for 2020[1], an American military document, declared that 'the medium of space is the fourth medium of warfare along with land, sea and air'. The 2001 Space Commission Report argued that the US government should pursue the relevant capabilities 'to ensure that the President will have the option to deploy weapons in space to deter threats to and, if necessary, defend against attacks on US interests'. (Space commission report 2001) The conclusion of Space Commission was that space interests be regarded as a top national security priority and that the United States must ensure continuing superiority in space capabilities in order 'both to deter and

[1] Vision for 2020 or United States Space Command Vision for 2020 is a US military document, which is supposed to serve as a bridge in the evolution of military space in 21st century. According to the document, Vision for 2020 is the standard by which United Space Command and its components will measure progress into the future.

to defend against hostile acts in and from space', including 'uses of space hostile to US interests' (ibid).

EVOLUTION OF US NATIONAL SPACE POLICY

The space policy of a country is composed of space law and space doctrine and goals and objectives showing commitment towards better use of space. US space policy came in response to Soviet advances in space exploration through the Sputnik launch. After that successive US administrations contributed to the evolution of a compact, well defined and clear National Space Policy outlining the goals, objectives and implementation guidelines. The most recent National Space Policy has been published in 2006 under Bush administration and this 2006 policy clearly supports the idea of the weaponization of space to maintain national security and space supremacy. Chronological analysis of the space policy of successive administrations might provide a clear background of the steps taken by Bush administration through 2006 NSP and will also help to understand the evolution of US space policy.

Launch of Sputnik and US Space Activities:

The launch of Sputnik on 4 October 1957 was epochal as it had an immediate and dramatic impact on the formulation of US space policy. It was the single most important event that triggered U.S. advance into a new era of space. Although the military had expressed an interest in space technology as early as the mid-1940s, a viable program failed to emerge for a number of reasons. The reasons include intense inter-service rivalry; military preoccupation with the development of ballistic missiles that prevented a sufficiently high funding priority from being assigned to proposed space systems; and perhaps most importantly, national leadership that did not initially appreciate the strategic and international implications of emerging satellite technology.

Sputnik demonstrated that the Soviets had the missile technology to deliver warheads at long ranges. President Dwight D. Eisenhower described it as "Sputnik Crisis"[2] because of the looming threat of the Soviet Union. This resulted to the first official US government statement that space indeed was of military significance. This statement was issued on 26 March 1958 by President Dwight D. Eisenhower's science advisory committee. It said that the development of space technology and the maintenance of national prestige were important for the defence of the United States. Immediately after that the US Congress also accepted that space activities were potentially vital to the national security.

The first official announcement of national space policy was spelt out in the National Aeronautics and Space Act (NASA) of 1958. This act declared that the policy of the United States was to devote space activities to peaceful purposes for the benefit of all mankind. It mandated separate civilian and national security space programs and created a new agency, NASA, to direct and control all US space activities except those "peculiar to or primarily associated with the development of weapons systems, military operations, or the defense of the United States"(Muolo 1993). The Department of Defense (DOD) was to be responsible for these latter activities. This act established a mechanism for coordination and integration of military and civilian research and development. It also encouraged significant international cooperation in space, and called for preserving the role of the US as a leader in space technology and its application. Since the adoption of this act in 1958 the principles of peaceful use of space, separation of civilian and military space activities, emphasis on international cooperation, and preservation of a space role have been the basis of US space policy under all the presidents and all the Presidents have shown their belief in these basic tenets.

Though Eisenhower administration initiated the official space policy, its approach to implementing the new space policy was characterized as conservative, cautious, and constrained. According to Sadeh, Eisenhower's role was "that of an unenthusiastic

[2] The Sputnik crisis was a turning point of the Cold War that began with the launch of sputnik satellite. Sputnik's appearance upset the United States. The people found themselves lost in a sense of fear. The surprising announcements of Sputnik 1's success led the Sputnik crisis in the United States and started the Space Race during the Cold War.

participant in a highly public program of research and development that had all of the earmarks of a race but that the participant himself resolutely defined as a non-race" (Sadeh 2004: 65). A substantial space programme was still missing. Early DOD and NASA plans for manned space flight programs were disapproved consistently. Instead the administration preferred to concentrate on unmanned, largely scientific missions.

Space Policy under President John F. Kennedy and Richard Nixon Presidencies:

President John F. Kennedy and Richard Nixon provided more focus to America's space program than their predecessors. Kennedy's announcement on 25 March 1961 provided added momentum to efforts aimed at space exploration. It came during a period of intense national introspection. The Soviet Union was successful in its mission to put a man in outer space and Yuri Gagarin became the first human in outer space. This Soviet success compelled the United States to question its scientific and engineering skills and its entire educational system. President Kennedy responded to these developments and set a national challenge to land a man on the Moon and return him safely to Earth. These challenges defined US space goals for the remainder of the decade.

The main objectives of the Kennedy space program were prestige and international leadership in space exploration. The generous funding that accompanied the Apollo programme permitted the build-up of US space technology and the establishment of an across-the-board space capability that included planetary exploration, scientific endeavours, commercial applications, and military support systems (Ibid).

When Nixon came to power, the domestic socio-political and external geopolitical environment was changing fast. During this period, the combination of domestic unrest, an unpopular war in Asia, and inflationary pressures forced the nation to re-examine the importance of the space program compared to other national needs. In this environment, President Nixon made his long-awaited space policy announcement in March 1970. His announcement clearly reflected his awareness of political realities and the mood of Congress and the public at the time.

According to President Nixon:

> Space expenditures must take their proper place within a rigorous system of national priorities. . . . What we do in space from here on in must become a normal and regular part of our national life and must therefore be planned in conjunction with all of the other undertakings which are also important to us (Nixon, 1970).[3]

It is notable that the Nixon administration did not consider the space program a national priority and could not increase investment in or the initiation of large new space projects. It viewed space as a medium for exploiting and extending the technological and scientific gains that had already been realized. The emphasis was on practical space applications to benefit American society in a variety of ways (Muolo 1993). Though this period experienced reduced emphasis on manned spaceflight, it marked development of initial operating capability for many of the space missions performed today. For example, initial versions of the systems now known as the Defense Satellite Communications System, the Defense Support Program, the Defense Meteorological Satellite Program, and the Navy's Transit navigation satellite program (now its Global Positioning System) were all developed and fielded during this period.

The development of Space Transportation System (STS) or space shuttle was a major new space initiative undertaken during the 1970s. It had greater impact on the nation's space program. The shuttle's goal was routine and low-cost access to orbit for both civil and military sectors. As development progressed, the program experienced large cost and schedule overruns. These problems caused the US space program to lose much of its early momentum as it became clear that the high costs would adversely affect other space development efforts, both civil and military, and that schedule decline meant a complete absence of American astronauts in space. (ibid)

[3] See for more information- http://www.presidency.ucsb.edu/ws/index.php?pid=2903

President Jimmy Carter's Space Policy

After Nixon, President Jimmy Carter showed some enthusiasm about the space programme and declared his space policy through the Presidential Directives 37 and 42. President Jimmy Carter's administration conducted a series of interdepartmental studies to address the problems in nation's space effort. The studies sought to develop a coherent recommendation for a new national space policy. These efforts resulted in two 1978 presidential directives (PD): PD-37 on national space policy and PD-42 on civil space policy.[4]

President Carter's PD-37 reaffirmed the basic policy principles contained in the National Aeronautics and Space Act of 1958, and for the first time, coherently described broad parameters of the US space program and provided specific guidelines governing civil and national security space activities.[5] This Presidential initiative was important from a military perspective because it contained the initial, tentative indications that a shift was occurring in the national security establishment's view on space. Traditionally, the military had seen space as a medium in which to deploy systems to increase the effectiveness of land, sea, and air forces. Although the focus of the Carter policy was clearly on restricting the use of weapons in space, PD-37 reflected an appreciation of the importance of space systems to national survival, a recognition of the Soviet threat to those systems, and a willingness to push ahead with development of an anti-satellite capability in the absence of comprehensive international agreements restricting such systems. Thus it can be said that the administration was beginning to view space as a potential war-fighting medium (Muolo 1993).

The PD-42 found exclusively on the civil space sector. This directive was free of any long-term space goals, and clarified that the nation to pursue a balanced evolutionary strategy of space applications, space science, and exploration activities. There was the absence of a more visionary policy during Carter presidency for shuttle development and

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[4] FAS 1999: President Directives (PD), Carter Administration, 1977-81 http://www.fas.org/irp/offdocs/pd/index.html

[5] ibid

this reflected in the developmental problems with the shuttle. President Carter had expressed publicly about his plan for space shuttle by saying, "I'm interested in the shuttle program, because it's going to be a much cheaper means by which we can perform our very valuable flights in space and still return the costly vehicle back to Earth"(Sadeh 2004).[6]

President Ronald Reagan's SDIO

President Ronald Reagan showed deep interest in space issues and articulated a coherent and profound space policy. He appeared to be a true believer in space exploration efforts, just like President Kennedy in early 1960s. Reagan seemed genuinely entranced by the space programme (McCurdy 1990:41). President Ronald Reagan's administration issued comprehensive space policy statements in 1982 and 1988. The first space policy statement reaffirmed the basic tenets of previous US space policy and placed considerable emphasis on the STS as the primary space launch system for both national security and civil government missions. His administration also introduced the basic goal of promoting and expanding the investment and involvement of the private sector in space and space-related activities as a third element of US space operations, complementing the national security and civil sectors.

National Security Decision Directives-85 (NSSD-85) under Reagan administration clearly reflected the transition to a potential development space war-fighting framework. In this document, President Reagan stated as a long-term objective, elimination of the threat of nuclear armed ballistic missiles through the creation of strategic defensive forces. This NSDD coincided with the establishment of the Strategic Defense Initiative Organization (SDIO) and represented a significant step in the evolution of US space policy. Since 1958, the US had for a variety of reasons refrained from crossing an imaginary line from space systems designed to operate as force enhancers to establishing a war-fighting capability in space. The anti-satellite (ASAT) initiative of the Carter

[6] Presidents and Space Policy by Linda T. Krug in Eligar Sadeh (2004), Space Politics and Policy An Evolutionary Perspective, New York: Kluwer Academic Publishers

administration was a narrow response to a specific Soviet threat. The SDI program on the other hand, represented a significant expansion in the Department of Defense's assigned role in the space arena (Muolo 1993).

The Reagan administration's second comprehensive national space policy in early 1988 incorporated the results of a number of developments that had occurred since 1982. One of those developments was the US commitment in 1984 to build a space station. The other notable incident was the space shuttle Challenger accident in 1986. For the first time, the national space program treated commercial space as an equal of the traditional national security and civil space sectors, and addressed it in some detail. Importantly, the new policy retreated from dependence on the STS and moved towards expendable launch vehicle programs. In the national security sector, this program was the first to address space control and force application with developing the transition to war-fighting capabilities in space.

The analysis of Reagan administration's concrete decisions and actual actions show that, Reagan accomplished little for the space program. He did come close to making an Apollo-type decision by calling for a manned space station. He did authorize NASA to build a replacement shuttle for the lost Challenger. Also, he delivered the idea about "space shields" (i.e., Strategic Defense Initiative). However, what Reagan did for the program was to revitalize it rhetorically. (Sadeh 2004: 68). In 1988, the last year of the Reagan presidency, Congress passed a law allowing creation of a National Space Council (NSpC),a cabinet level organization designed to coordinate national policy among the three space sectors.

George H. W. Bush Administration Space Policy

Bush administration's national space policy retained the goals and emphasis outlined in Reagan administration's policy, which was released in November 1989 as National Security Directive 30 (NSD-30). The Bush policy resulted from a National Space Council (NSpC) review to clarify, strengthen, and streamline space policy, and has been further

enhanced by a series of national space policy directives (NSPD). Bush policy exerted influence over civil and commercial remote sensing, space transportation, space debris, federal subsidies of commercial space activities, and space station Freedom (Muolo 1993). The policy reaffirmed the organization of US space activities into three complementary sectors: civil, national security, and commercial. The three sectors coordinated their activities closely to ensure maximum information exchange and minimum duplication of effort.

The general goals of Bush's space policy were not much changed from the goals articulated in 1978 by President Carter, and their legacy went back as far as the 1958 National Aeronautics and Space Act (ibid). This national space policy was different from other in terms of its detailed policy objectives and implementation guidelines as well as emphasis on use of space to strengthen the security of United States. The recognition that space, like land, sea, and air, is a potential war-fighting medium was also given by this administration. At the end of Bush administration, US national space policy had kept pace with the growth of its space program and had become one of the well documented areas of government policy. It clearly articulated its goals that were both challenging and within the area of possibility.

Despite his efforts towards space, experts, like Vedda, state that "after this initial rhetoric, Bush never intervened on behalf of the space program again. Whatever the reason, Bush's eventual political inaction did lead some observers to suggest that Bush was a 'space advocate' in the same sense that he was the 'environmental President' or the 'education President'" (Vedda, 1996).

Overall Assessment of US Space Policy during Cold War

The first official national space policy was the National Aeronautics and Space Act of 1958. This act provided separate civilian and national security space programs. NASA, a new agency was created, to direct and control all US space activities except those "peculiar to or primarily associated with the development of weapons systems, military

operations, or the defense of the United States." The Department of Defense was to be responsible for these latter activities (Muolo 1993).

The goals set for the U.S. Space program were initially a product of the Cold War. Beginning with the Kennedy administration, each statement of national space policy issued since 1961 identified leadership as a major goal of U.S. space policy. The latest example is the November 1989 space policy approved by President George Bush, which noted that "a fundamental objective guiding United States space activities has been, and continues to be, space leadership" (Wilkening 1992: 2).

Origins of Separate Civil and Military Programs

A significant development took place with the advent of space race between the US and the Soviet Union. The development was the separation of Civil and Military programs. President Eisenhower initially favored centralizing space efforts within the Department of Defense (DOD) on the grounds that he wanted to avoid needless duplication of activities and capabilities and that the most pressing space requirements were military in character. But later he was convinced with the separation plan. NASA was given the responsibility to manage the civilian space programme and DOD was given the responsibility to manage military programs.

The policy decisions made in the early years of the space age resulted in the establishment of separate and distinct space sectors within the U.S. government:

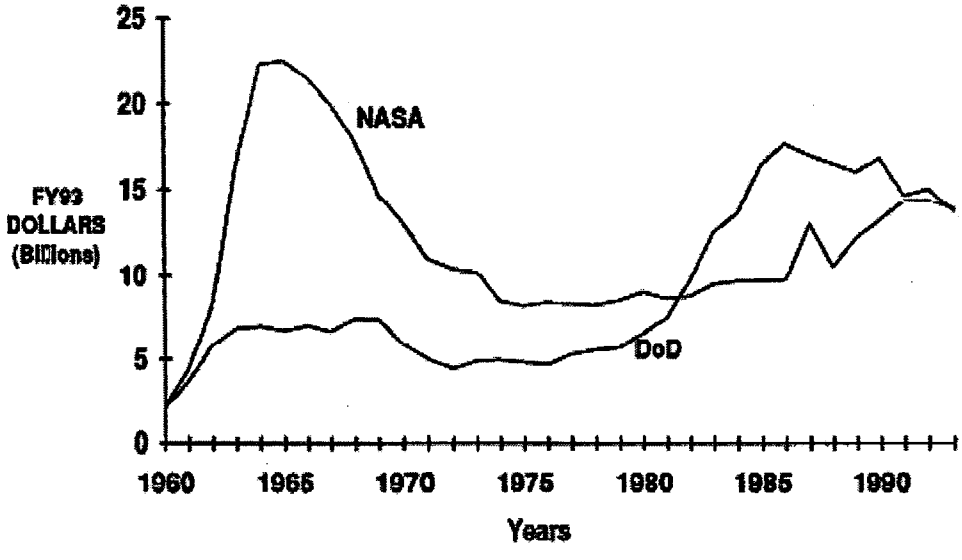
- A civil space program managed by NASA and focused on demonstrating America's technological leadership through human space exploration and new scientific knowledge.
- A military space program focused on supporting strategic deterrence and an evolving role in supporting tactical forces.
- An intelligence space program focused on providing comprehensive surveillance of areas of the world closed to normal observation and on providing strategic indications and warning to National Command Authorities.

- In addition, a commercial sector emerged as private industry became involved in space programs. (ibid: 4)

Each of these sectors evolved under separate organizational structures for management, budgetary control, and policy oversight.

The scope and character of government space activities changed significantly during the Cold War. These changes reflected in annual spending levels for space.

Figure: National Space Spending during the Cold War



Source: Wilkening and others 1992

Some significant factors had large effect on the funding levels.

First, was the Apollo program, which clearly dominated space spending through the 1960's. The investment over this programme was an extraordinary investment which established the NASA institutional structure still in existence today.

Second one was the Space Shuttle program. This program started in the mid-1970's and became a symbol of US leadership in this field. The Challenger failure in 1986 and the actions necessary to recover from that failure added more funding.

The third major factor affecting space spending was DOD'S increasing reliance on space to perform essential national security missions formerly accomplished using terrestrial or aircraft systems. This reliance demonstrated during Desert Storm. Space had become the preferred means to accomplish essential military functions. (ibid)

President Bill Clinton and 1996 National Space Policy:

The National Space Policy was announced on September 19, 1996. One of the most significant aspects of this policy was the convergence of some defence space programs with civil space programs, with the promotion of the Pentagon's utilization of commercial services (Mowthorpe 2004: 191). Two issues captured his attention early in his tenure, the redesign of Space Station Freedom and international cooperation in the space station project. How he dealt with both of these issues set the stage for how his administration would come to view the space program as a whole: as an economic investment (Sadeh 2004: 69). For instance, speaking at a news conference in June, 1993, President Clinton stated:

> "I think it would be a mistake, after all the work we've done, to scrap the space station... We're going to be able to get more people to come in and invest with us, and we're going to have to make some very tough management decisions at NASA to get that done."(Clinton, 1993)[7]

Even though Clinton was by and large a moderate, he articulated a strong 1996 National Space Policy. This policy emphasized using space for peaceful purposes and for the benefit of all humanity including intelligence gathering and defence related activities

George W. Bush and National Space Policy 2006

The concept of space use started changing with the publication of Space Commission report in 2001. The threat of 'Space Pearl Harbor' compelled US strategists to think

[7] For more information- URL:http://www.gpo.gov/fdsys/pkg/WCPD-1993-06-21/pdf/WCPD-1993-06-21-Pg1108.pdf.

about the security of space assets and surveillance over use of space by other major actors like Russia and China. These developments shaped President Bush's thinking regarding space use. He felt the need for articulation of a new space policy, which could openly support the installation of weapons into the space for the security of space assets and to contain the adversaries' activities. President Bush was of the view that the space should be fully militarized from security point of view. Under his presidency the National Space Policy 2006 was passed and this document clearly shows the intentions of Bush administration towards space use.

The fundamental goals of NSP 2006 were to:

- Strengthen the nation's space leadership and ensure that space capabilities are available in time to further U.S. national security, homeland security, and foreign policy objectives;
- Enable unhindered U.S. operations in and through space to defend our interests there;
- Implement and sustain an innovative human and robotic exploration program with the objective of extending human presence across the solar system;
- Increase the benefits of civil exploration, scientific discovery, and environmental activities;
- Enable a dynamic, globally competitive domestic commercial space sector in order to promote innovation, strengthen U.S. leadership, and protect national, homeland, and economic security;
- Enable a robust science and technology base supporting national security, homeland security, and civil space activities; and
- Encourage international cooperation with foreign nations and/or consortia on space activities that are of mutual benefit and that further the peaceful exploration and use of space, as well as to advance national security, homeland security, and foreign policy objectives (US national space policy 2006)[8]

[8] See Annexure- 1 for National Space Policy 2006

A careful comparison of the 1996 National Space Policy and 2006 National Space Policy reveals important changes, which reflect the Bush Administration's shift towards a unilateralist approach to space. With greater emphasis on national security, the 2006 NSP opens the possibility that space will be weaponized (Katz-Hyman 2006). According to US administration the 2006 NSP was a continuation of the principles and priorities established in the 1996 NSP, but Hitchens has made it clear that the prominence given to national security, US unilateral action, and free operations in and through space creates a perspective on space as "a game of 'every man for himself'" that largely denies the rights of other states (Hitchens 2006).

According to section 2 of NSP 2006, the US will "take those actions necessary to protect its space capabilities; respond to interference; and deny, if necessary, adversaries the use of space capabilities hostile to the U.S. national interests" (NSP 2006). It gives an indication that the Bush Administration is serious about deploying weapons to defend its space assets. Despite its offensive terminology, the 2006 policy also talks about new areas for military cooperation with foreign entities, in particular the sharing of intelligence and capacity for space situational awareness (Section 5, NSP 2006). Adding to this, the US will continue to cooperate internationally on space exploration, space surveillance, and Earth observation systems (Section 6, NSP 2006).

Bush administration's unwillingness to prevent weaponization of space through international cooperation was exposed when it voted against a resolution in the First Committee of the United Nations General Assembly on the Prevention of an Arms Race in Outer Space (PAROS) for the first time in 2005. In the 2006 sessions of the Conference on Disarmament (CD) and the First Committee, it continued to prevent the negotiation of a PAROS treaty. United States insisted that it will continue to consider the role of space weapons in protecting space assets. This shows the willingness of Bush administration to go to any extent on the name of national security even weaponization of space.

The above discussion provides various stages of US space policy since the launch of Sputnik till the end of the Bush administration. In the beginning the US policy was reactive to the Soviet advancements, which later converted into a desire for space leadership. It would not be inappropriate to say that space leadership or space control has become a fundamental objective guiding US space activities. In addition to this, it can also be said that US national space policy has been influenced by the major actors, like Russia and China, active in the space.

Space race between the US and the Soviet Union started with the Sputnik crisis and since then has influenced the space programs of both countries. Due to the Cold War rivalry between the two, the advancements in outer space became a matter of prestige. This race for supremacy was evident in the various efforts by both countries notably development of Inter Continental Ballistic Missiles (ICBMs), Manned Spaceflight, Moon Mission etc. Throughout the Cold War period, Soviet Union was seen as a threat by US policy makers and this perception was a catalyst in the process of US progress into outer space. An elaborate study of Cold War from the perspective of space use becomes inevitable for the better understanding of US space policy. This is the main rationale for dedicating the next chapter to US- Soviet relationship in outer space during Cold War.

Chapter Two:

US- Soviet Rivalry in Outer Space during the Cold War

The space race with the Soviet Union, which the United States took up in 1957, was entirely the result of international politics, as the US endeavoured to contain the perceived damage to its self-perception as the world's leading scientific and industrial power, and it responded to what it saw as a military as well as a political challenge posed by Moscow (Sheehan 2007). The Space race between US and Soviet Union became an important part of the cultural, technological, and ideological rivalry during the Cold War. Space technology became a particularly important arena in this conflict, because of both its potential military applications and the morale-boosting social benefits.

After World War II, the US and the Soviet leadership began to identify each other as primary threats and competitors. Several crises in Europe and Asia intensified the superpower rivalry and hardened the perception that the superpowers' goals were incompatible. One specific goal incompatibility involved the exploration, monitoring and control of space. Genesis of the space race between the US and the Soviet Union can be traced to this period of intense Cold War competition and rivalry (McDougall 1985). Through the space race, the cold war got extended into the heavens and even threatened to end the earthly life in a nuclear devastation.

In 1957, the USSR successfully launched its first ever satellite, Sputnik. The US soon responded, as the ability to place objects in orbit encouraged serious space research in the United States. This action- reaction phenomenon unleashed, came to be known as the Space Race. Competition over space officially began with the launch of Sputnik I, but competition for taking position in Space had begun before that date. As reflected in RAND reports as early as 1946, US strategists identified the use of satellites as a vital solution to one of the most pressing issues the United States faced after World War II: the gathering of reliable intelligence of Soviet activity and capabilities (McDougall 1985).

By the end of the 1960s, both countries regularly deployed satellites. Spy satellites were used by militaries to take accurate pictures of their rivals' military installations. Both the United States and the Soviet Union began to develop anti-satellite weapons as well to

acquire the capability to destroy each other's satellites. Arms control talks between the superpowers began during the period of détente which resulted in the signing of the ABM treaty in 1972.

However, the debate was short-lived and by early 1980s American President Ronald Reagan proposed the idea of Strategic Defense Initiative (SDI), a space-based system to protect the United States from any surprise attack by Soviet strategic nuclear missiles. SDI was based on the idea of Star Wars that compelled many scholars to think about full fledged weaponization of space. Apart from Inter Continental Ballistic Missiles (ICBMs), Soviet Union researched innovative ways of gaining space supremacy. Among two notable efforts, inter-alia, by the Soviet Union was the Fractional Orbital Bombardment System (FOBS)[1] and Polyus (spacecraft) orbital weapons system[2]. However, the SALT II treaty[3] (1979) prohibited the deployment of FOBS systems.

Because of its rival and competitive nature, Cold War influenced the international space programme in general and the space programs of the US and the Soviet Union in particular. For many reasons, the desire to seize control not only of planet earth, but the universe itself became a top priority. This competition held in the balance not only national pride, but control of all that existed at that time. As an extension of the Cold War, the Space Race was a race not only to be the first country to successfully explore outer space, but also to be the first to ultimately control other planets and therefore dominate not only the world as most people know it, but the entire universe and all of the other planets in it. The notion was clear; being able to control all of this would likely settled the rivalry that defined the Cold War. At the height of the Cold War, which coincided with the high point of the Space Race, there were rumours that control of outer space was being sought so that whichever nation took control of other planets would use

[1] The Fractional Orbital Bombardment System (FOBS) was a Soviet ICBM program in the 1960s that after launch would go into a low Earth orbit and would then de-orbit for an attack. The missile was phased out in January 1983 in compliance with SALT II agreement.

[2] The Polyus spacecraft was a prototype orbital weapons platform designed to defend against anti-satellite weapons. It was launched on May 15th 1987 by the Soviet Union.

[3] Strategic Arms Limitation Talks II (SALT II) was one of the two rounds of talks involving the United States and the Soviet Union on the issue of armament control. This talk took place between Jimmy Carter and Leonid Brezhnev from 1977 to 1979.

them for the growth of nuclear weaponry, such as being able to develop and test the weapons in absolute secrecy, as well as using other planets as a convenient staging and launching area for nuclear weapons (Raver 2006). Thus, space race became a medium to win the Cold War. Space programs of these two superpowers became entangled with this Cold War rivalry. The action- reaction of both superpowers resulted in the deployment of ICBMs and spy satellites which had a larger strategic significance over world politics. In the subsequent period, the purpose of Space Race extended beyond the Cold War, although victory in the Cold War was always one of its largest purposes (ibid). During the period of intense space race, Soviet challenges in outer space emerged as threats for the United States.

Launch of Sputnik: Genesis of Space Rivalry

Sputnik launch by the Soviet government led to revolutionary changes in the US space approach. The successful launch of Sputnik satellite by the Soviet Union sent a feeling of inferiority among US people as well as policymakers. Not since the Japanese attack on Pearl Harbour had Americans felt so vulnerable to a foreign power (McDougall 1985: 22). The Sputnik launch triggered an outburst of American self-criticism and even self-doubt. After the news of launch, President Eisenhower attempted to calm American anxieties by arguing that the US satellite programme had 'never been conducted as a race with other nations'. He also saidthat American people were overreacting, but the hitherto prevailing perception that the Soviet Union was a clearly backward society in comparison to the United States made its space achievement seem all the more surprising and shocking (Sheehan 2007: 27). Expressing the technological and political implications of Sputnik launch, Brooks had stated 'not since the explosion of the atomic bomb over Hiroshima had a technological event had such an immediate and far-reaching political fall-out' (Brooks 1983: 6). Gene Kranz in his book has also articulated the Sputnik experience as he has stated that the unexpected achievement of Soviet science gave Americans 'both an inferiority complex and a heightened sense of vulnerability in what was then the most intense phase of the Cold War' (Kranz 2001: 15)

It is evident that Sputnik episode had great influence over the US political community and scientific community. Even the American people were also greatly influenced by this development. It was a big shock, introducing the average citizen to the space age in a period like Cold War. The event created an illusion of a technological gap and provided the drive for increased spending for aerospace activities, technical and scientific educational programs, and the chartering of new federal agencies to manage air and space research and development. Not only had the Soviets been first in orbit, but Sputnik 1 weighed nearly 200 pounds, compared to the intended 3.5 pounds for the first satellite to be launched in Project Vanguard[4] by the US (Launius 2005)[5].

Even before the effects of Sputnik 1 died down, the Soviet Union struck again on 3 November 1957 and launched Sputnik 2 carrying a dog, Laika. While the first satellite had weighed less than 200 pounds, this spacecraft weighed 1,120 pounds and stayed in orbit for almost 200 days (ibid). This was the time when Cold War was at its height and 'Realism' was the dominant thinking in the international politics. From the perspective of international politics, this incident was a big setback to American position. America's strong reaction was expected. The US reaction came and it was so intense that Eisenhower declared it "Sputnik Crisis". Sputnik was seen as evidence of a vigorous missile development programme, particularly in regards to long-range nuclear missiles, and in a way threatened the credibility of America's extended deterrence for its NATO allies (Dockrill 1996: 216). Four months after the launch of Sputnik 1, the United States successfully launched its first satellite, Explorer 1.

The perception of strategic implications of launch of Sputnik forced Washington to take major initiatives to counter Soviet challenge. Eisenhower administration quickly enacted several initiatives to address the perceived technical shortcomings in the United States. On February 4, 1958, President Eisenhower appointed a panel to form the civilian space agency. The panel released a report called "Introduction to Outer Space". This report

[4] Project Vanguard was a US Naval Research Laboratory (NRL), which intended to launch the first artificial satellite into Earth orbit using a Vanguard rocket as the launch vehicle.

[5] More information is available on: http://history.nasa.gov/sputnik/sputorig.html

gave four reasons for developing space technology. Firstly, Opportunities for scientific research and experimentation; secondly, International prestige; thirdly, National defence and lastly, Man's compelling urge to explore (Jones and Benson 2002: 68). With these elements at the core, the United States Congress passed the legislation creating National Aeronautics and Space Administration (NASA) and also passed the National Defense Education Act with huge funding to US educational institutions at all levels.

The launch of Sputnik I and II by the Soviet Union and Explorer satellite by the US led the cycle of the action- reaction that started in the field of satellites development. Both countries developed various satellites. Some notable efforts in this field are following:
1958: American Project SCORE
1960: Echo 1A: first passive communications satellite
1962: Telstar: the first "active" communications satellite (experimental transoceanic)
1963: Syncom 2: the first geosynchronous communications satellite (Clarke orbit)
1972: Anik 1: first domestic communications satellite
1974: Westar: first U.S. domestic communications satellite
1976: Marisat: first mobile communications satellite

The United States launched the first geosynchronous satellite, Syncom-2, on 26 July 1963. The success of this class of satellite meant that a simple satellite dish no longer needed to track the orbit of the satellite because that orbit remained geostationary. Thus, ordinary citizens could use satellite-mediated communications transmissions for television broadcasts, after a one-time setup.

Spy satellites were used during the Cold War to photograph the activities of the Soviet Union and China (Tara M. 1997). In the context of installation of spy satellites during cold war, in 2005, the National Reconnaissance Office (NRO), National Security Agency (NSA) and Naval Research Laboratory (NRL) declassified the fact that a series of satellites was orbited from 1962 through 1971, designated POPPY. POPPY's mission was to collect radar emissions from Soviet naval vessels – an activity called electronic

intelligence, or ELINT. In total, seven POPPY satellites were lofted into space from 1962 to 1971 (David 2005).

Though, the rivalry between the two had been established in the field of satellite developments, it was not limited to this field only. The rivalry extended from the development of ballistic missiles to the manned spaceflights and strategic defense initiative.

Development of Inter Continental Ballistic Missile (ICBM)

In 1953, the USSR initiated, under the direction of the Sergey Korolyov[6], a program to develop an ICBM. Korolyov had constructed the R-1[7]; a copy of the V-2[8], based on some captured materials, but later developed his own distinct design. Subsequently, the R-7[9] was successfully tested in August 1957 becoming the world's first ICBM and, on October 4, 1957, placed the first artificial satellite in space, Sputnik.

The U.S., on the other hand, initiated ICBM research way back in 1946 with the MX-774[10]. However, its funding was cancelled and only three partially successful launches in 1948, of an intermediate rocket, were ever conducted. In 1951, the U.S. began a new ICBM program called MX-774 and Atlas[11]. The U.S.' first successful ICBM, the Atlas A, was launched on 17 December 1957, four months after the Soviet R-7 flight.

Military units with deployed ICBMs would first be fielded in 1959, in both the Soviet Union and the United States. The R-7 and Atlas each required a large launch facility, making them vulnerable to attack, and could not be kept in a ready state. These early ICBMs also formed the basis of many space launch systems. Examples include Atlas,

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[6] Sergey Korolyov was the head Soviet rocket engineer and designer during the Space Race between the United States and the Soviet Union in the 1950s and 1960s. He is considered by many as the father of practical astronautics.

[7] R_1 was a copy of V-2 rocket and first missile developed by Soviet Union in 1947

[8] V-2 was the world's first ballistic missile and first human artifact to achieve sub-orbital spaceflight, developed by Nazi Germany

[9] The R-7 Semyorka was the world's first true intercontinental ballistic missile and was deployed by the Soviet Union during the Cold War

[10] MX-774 was the United States' first attempt at an intercontinental ballistic missile (ICBM)

[11] The Atlas, first tested in 1957, was the United States' first successful ICBM (Intercontinental Ballistic Missile)

Redstone[12], Titan[13], and R-7 which was derived from the earlier ICBMs but never deployed as an ICBM.

Deployment of these systems was governed by the strategic doctrine of Mutual Assured Destruction. In the 1950s and 1960s, work on Anti-Ballistic Missile systems began in the U.S. and the USSR; only to be restricted by the 1972 ABM treaty. The 1972 SALT treaty froze the number of ICBM launchers of the USA and the USSR at existing levels, and allowed new submarine-based SLBM launchers only if an equal number of land-based ICBM launchers were dismantled. Subsequent talks, called SALT II, were held from 1972 to 1979 and actually reduced the number of nuclear warheads held by the USA and USSR. SALT II was never ratified by the United States Senate, but its terms were nevertheless honoured by both sides until 1986, when the Reagan administration "withdrew" after accusing the USSR of violating the pact.

Missile Gap Controversy:

The Missile gap controversy arose in the late 1950s as a result of intelligence estimates that between 1960 and 1964 the Soviet Union might have more intercontinental ballistic missiles (ICBMs) operational than the United States. Assuming the existence of a missile gap, opponents of the Eisenhower administration argued the existence of a deterrence gap, that Soviet supremacy in ICBMs was so great that the American strategic forces could be eliminated in a single massive attack (Licklider 1970: 601) According to Licklider the missile gap was the result of a deliberate decision by the Eisenhower administration. The United States had many more strategic bombers than did the Soviet Union (Bloomfield, Clemens & Griffiths 1966).

[12] Redstone was first launched in 1953. it was a direct descendant of the German V-2. Redstone was used for the first live nuclear missile tests by the United States

[13] The Titan I was the first version of the Titan family of rockets. It began as a backup ICBM project in case the Atlas was delayed

However, the Soviet Union had taken a lead in the field of developing ballistic missiles. The US tried to counter this challenge in its own way. The US had two choices. The choice was between rockets powered by liquid and by solid fuels. The liquid-fuel missile could be operational first, but the solid-fuel missile would be less expensive, have a much faster response, and be easier to transport and harden. It was decided to develop both types as rapidly as possible but to produce only a minimum number of liquid-fuel rockets, concentrating production on the more efficient solid-fuel missiles. The problem was that if the Soviet Union concentrated on producing liquid-fuel ICBMs, it appeared that the USSR could achieve temporarily a large numerical advantage. before the United States would begin to introduce its solid-fuel Minutemen and Polaris weapons in 1963 and 1964; this period of potential danger became known as the missile gap (Licklider 1970: 601).

Talking about the earlier US concerns, Allen Dulles, then Director of the Central Intelligence Agency, accepted the fact that, in the early 1950S, the United States became concerned about the Soviet development of ballistic missiles. According to Dulles, this concern was primarily responsible for the initiation of the U-2 over flights in 1955, and after 1956, photographs from the U-2 became available, furnishing much needed "hard" intelligence upon which later estimates were based (ibid: 1970).

However, despite these early activities and concerns, it is fair to say that real public concern started when the Soviet Union announced in quick succession the firing of an ICBM and the launching of Sputnik. For the first time the American public suddenly realized that the Soviet Union had developed a superior technology. Immediately, serious questions were raised: whether a possible technological missile lag existed, whether the United States was two or three years behind the Soviet Union in missile and space technology development (Licklider 1970: 603).

With the launch of Explorer 1 and Atlas missile, the question of missile lag came to an end. But with the decline of missile lag question, the question of missile gap rose rapidly. The problem concentrated over the production of missiles and not over the knowledge of

technology. Different data was presented by different agencies. For example the CIA estimates were different from National Intelligence estimates. An intense debate over missile gap was started in domestic politics. Both Democrats and Republicans were actively involved in this debate. Moreover, the time of the debate was election period and missile gap was a hot issue. Democrats used the issue during 1960 Presidential campaign. Many critics during that period had charged that intelligence estimates had been doctored through using a subjective method of evaluation in order to keep defence expenditures low. (ibid: 608) However, even when there was controversy over the estimates of missiles, there was no confusion over the gap between the US and Soviet Union missile strength. Henry Kissinger had also approved this gap and had stated in 1960 that "For all the heat of the controversy, it is important to note that there is no dispute about the missile gap as such. It is generally admitted that from 1961 until at least the end of 1964 the Soviet Union will possess more missiles than the United States" (Kissinger 1960). The table below provides the comparative analysis of the estimates by different sources.

Table: Summary of Estimates of Soviet ICBMs Strength:

Date	Source	1959	1960	1961	1962	1963
Nov. 1957	N.I.E.[a]	10	100	500	—	—
Jun. 1958	Alsop	100	500	1000	1500	2000
Jan. 1959	N.I.E.	—	100	300	500	1000-1500
Mar. 1959	Symington	—	—	—	3000	—
May 1959	Alsop	—	300	1000	—	—
Oct. 1959	Alsop	—	100	500	1000	1500
Jan. 1960	N.I.E.	—	—	100-150	—	400-500
Mar. 1961	Air Force Intelligence	—	—	200	—	—
Mar. 1961	N.I.E.	—	—	50	—	—
Actual[b]	USSR	0	30	50	100	150
	USA	0	0	75	250	400

Source: Licklinder 1970

Above table shows the variation in the estimates of ICBMs by different agencies. The main reason behind this varied estimate was the unavailability of any reliable sources in this field. Most of the debates over missile gap were based on the speculative data (Licklider 1970: 615). During the whole missile gap debate, according to Preble, President Eisenhower repeatedly asserted that there was no missile gap. During the period from late 1957 through early 1961 he struck to the point that the United States' nuclear deterrent forces were vastly superior to those possessed by the Soviets (Preble 2003). Contrary to Eisenhower, Kennedy, first as a senator and then as a candidate for the presidency, was convinced with the idea of missile gap and called for closing the gap by spending much more on defence. As a Senator in November 1957, Kennedy had stated:

> "the nation was losing the satellite-missile race with the Soviet Union because of ... complacent miscalculations, penny-pinching, budget

cutbacks, incredibly confused mismanagement, and wasteful rivalries and jealousies." (ibid)

Kennedy's belief in a missile gap influenced the formulation of national security strategy during the first year of his presidency. In the first few weeks of his presidency, in early 1961, President Kennedy was told by members of his own administration that there was no missile gap (ibid). However, Kennedy refused to declare the missile gap closed. Instead, the Kennedy administration pressed on with its promised defence build-up that was deemed necessary to rectify the potentially destabilizing inferiority posed by the missile gap. One of the major consequences of Kennedy pushing the idea of missile gap was that Soviet premier Nikita Kruschev and senior Soviet military figures began to believe that Kennedy was seeking to plant the idea of a Soviet first-strike capability to justify a pre-emptive American attack. This belief about Kennedy was reinforced in Soviet minds by the Bay of Pigs invasion of 1961 and led to the Soviets placing nuclear missiles in Cuba in 1962.

Cuban Missile Crisis

Cuban Missile Crisis was a dangerous chapter in the consequences of space race between the US and the Soviet Union, which threatened to take the world into the brink of a nuclear holocaust. The space race was continuing along with the arms race. On 14 October 1962 an American U2 spy-plane took pictures of a nuclear missile base being built on Cuba. Kennedy's advisers told him he had 10 days before Cuba could fire the missiles at targets in America.

The new Cold War rockets came perilously close to being used in the Cuban Missile Crisis in 1962 (Jones & Benson 2002). In October 1962, Soviet Premier Nikita Khrushchev, lacking a capable long- range missile force, put medium- range missiles in Communist Cuba, only 90 miles from Florida. After President Kennedy challenged this move and imposed a naval blocked on Cuba, both countries brought their missiles to a state of full alert (ibid).

As the delivery system improved with advance of the space race, a war between the superpowers would have meant 'total' war. The confrontation between superpowers was almost set and the possibility of nuclear holocaust was created during the Cuban Missile Crisis (Galbreath 2007). Talking about the contributions of space advancements in Cuban Missile Crisis, Collins has expressed the opinion that after Sputnik Cold War conflicts intensified which reflected in the events such as Cuban Missile Crisis (Collins 1999: 7). However, sincere efforts of the leaders of the United States and the Soviet Union led to avoid this crisis.

Humans in Orbit

Soviet Union extended their early lead in space by launching probes that hit the Moon (Luna 2) and returned the historic first photograph of the far side of the Moon (Luna 3). On the other hand, the unfortunate Americans failed to launch far smaller satellites (Vanguard 1 in December 1957) and lunar probes (Pioneer 1-4) during 1958-60.[14] On 12 April 1961, Yuri Gagarin orbited the Earth in a Vostok spacecraft. Once again, the Soviet Union had beaten the Americans. The general opinion became prevalent that the Americans were not doing too well in the space race (Levine 1994). In the West, Gagarin excited jealous rage. An amazing number of people tried to convince themselves that his flight had been faked or that he was the first survivor of many attempts in which cosmonauts had died (ibid 1994: 119). However, the dominant reaction was worry and a determination to catch up. Gagarin's flight was a setback for the US and coupled with other events like 'Bay of Pigs incident', President Kennedy had the necessary base for a national commitment and, on 25 May 1961, sent to the US Congress the message 'that this nation should commit itself to achieving the goal, before this decade is out, of landing a man on the Moon and returning him safely to the Earth.' These developments finally provoked the United States into deciding to go to the moon.

[14] Marcus Lindroos in The Soviet Manned Lunar Program: Edited & Compiled http://www.fas.org/spp/eprint/lindroos_moon1.htm

Moon Mission

American mission to the Moon was a powerful response to USSR advances into space. The American resolution was clear in President Kennedy's famous speech;

> I believe this nation should commit itself to achieving the goal, before this decade is out, of landing a man on the Moon and returning him safely to Earth. No single space project in this period will be more impressive to mankind or more important in the long-range exploration of space; and none will be so difficult or expensive to accomplish (Kennedy1961).[15]

In 1962, following Kennedy's speech to the American people, the USSR responded by commissioning Korolyov to build the N-1 launch vehicle to send a Soviet cosmonaut to the moon (TheSpaceSite.com).

In this rivalry, America clearly won the race. After eight years of development accompanied by many test flights (unmanned and manned, testing all the systems including Apollo 8 and Apollo 10 that actually orbited the Moon), July 16, 1969 saw the launch of Apollo 11, the first formal attempt by man to land on the moon. On July 20 1969, America landed on the moon and Neil Armstrong became the first man to walk on the surface of another planetary body. Although US had lost to the USSR in the space race consistently from the late 50's and into the early 60's, the Apollo program changed this scenario and with Apollo program, US had won the most important battle in the space race.

The Soviets never put a man on the Moon, but they did send a number of unmanned, robot vehicles to the Moon. These robots were called Lunokhod. The Lunokhod were actually roving vehicles, which could move around on the surface of the Moon. They also had television cameras and antennas to transmit pictures back to Earth. Three of these robotic probes collected lunar soil samples and returned them to Earth in 1970, 1972, and 1976 (Irvine 2006).

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[15] See for more details- President Kennedy- The Decision to go Moon http://history.nasa.gov/moondec.html

Shuttle Programme:

After successful Apollo project end, American triumphed in space competition, NASA turned to the construction of a space shuttle, sometimes known as the Space Transportation system (STS) (Launius and McCurdy 1997: 180). While the Soviets had taken an early and commanding lead in the space race in the 1950s and early 1960s, by the beginning of the next decade, they had fallen behind. The Soviet leadership mobilized its industrial aerospace capabilities to create a Shuttle at least as large and capable as NASA's Shuttle.

Even though the U.S. had already won the race to the Moon with the Apollo 11 mission in 1969, the Cold War continued to be an important factor surrounding space exploration. Thus, the perceived military characterization of the U.S. Shuttle as well as the U.S. military's reluctant support of the Shuttle were key factors affecting the development of space transportation systems in the U.S. and the Soviet Union. (Garber 2002: 9)

On January 5, 1972, President Nixon made a public announcement giving NASA the formal authority to build the Space Shuttle and the development program moved forward. The military was a key supporter of the program. The Air Force, which was responsible for launching all the U.S. defence and intelligence satellites, had agreed tacitly to support NASA's Shuttle development program (ibid: 11). Four goals were decided for creating a space transportation system. They were: making it reusable and thereby lowering the cost of accessing space, making it safe enough for humans to pilot, having 1,100 mile cross-range capability, and having a significant payload capacity. NASA chose a Shuttle with delta wings that seemingly could achieve all these objectives. (ibid: 14)

The decisions to build the U.S. and Soviet Shuttles took place in a similar atmosphere of superpower technological competition, which was prevalent at the time of Moon Mission some years ago. As the goal of Project Apollo was to put humans on the Moon before the

Soviets did, so the goal of Buran (Soviet Union's alternative to the US space shuttle) was simply to match or exceed the capabilities of NASA's Shuttle. (ibid: 16)

Harford has stated that Soviet analysts concluded that the US Shuttle's real mission was military. The Soviets distrusted the Americans' intentions and thus decided to go ahead and copy the Shuttle (Harford 1997: 314). It is accepted that the Soviets built the Buran largely to counter a perceived military capability from the U.S. Shuttle. While the concept that the U.S. would use the Shuttle to drop nuclear weapons on the Soviet Union may seem paranoid in retrospect, it is hard to overstate the significance of the Cold War political environment of the 1970s and 1980s.

Anti- Satellite Weapons

Anti- satellite weapons are space weapons, intended to harm or destroy enemy countries' satellites for strategic reasons. During the Cold War period, both the United States and Soviet Union had developed this weapon. Before the launch of Sputnik, this concept was given low priority but the Sputnik launch made the development of an ASAT device not only possible, but much more desirable (Nordile 1992). Both countries started various projects for the development of anti- satellite weapons. For example Project Bold Orion was designed to research the feasibility of an air-launched ballistic missile, but was also used to test a possible ASAT system (ibid). Stares has pointed out that Anti-satellite capabilities were developed as part of the Soviet space defence program and were also residual capabilities of systems developed for other purposes. The United States also pursued ABM/ASAT systems, in part because of a perceived threat of Soviet orbital bombardment systems.

Kennedy administration provided the amenities to the projects on American ASAT programs. The same ASAT programs were continued by President Johnson. The Regan administration too wholeheartedly backed the development of ASAT systems. He gave the policy of ASAT deterrence much more credit than the previous administrations. In the "star wars" speech, Reagan shocked everyone in announcing the Strategic Defense Initiative program; a program to develop a "leak-proof" ABM system (Nordile 1992).

Strategic Defense Initiative (SDI):

The Strategic Defense Initiative (SDI) was a proposal by U.S. President Ronald Reagan on March 23, 1983 to use ground and space-based systems to protect the United States from attack by strategic nuclear ballistic missiles of the Soviet Union. The initiative focused on strategic defence rather than the prior strategic offense doctrine of mutual assured destruction (MAD) (FitzGerald 2000)

The SDI program changed its focus significantly over the years. At the beginning of this programme, it focused on the threat of a massive Soviet attack, but by 1991 it had switched to protection against much more limited strikes from anywhere on the globe. Dissolution of Soviet Union was the main reason behind this changed strategy. It would not be inappropriate to say that Reagan's SDI initiative was against the Soviet threat and to maintain supremacy in space. SDI program began with idea of defence against a massive Soviet attack. In accordance with directives from the President, the secretaries of Defense chartered the Strategic Defense Initiative Organization (SDIO) in 1984 to research and develop a set of technologies supporting concepts for Ballistic Missile Defense (BMD). SDIO was to support a decision to be made in the early 1990s on whether to begin developing BMD for deployment. Initial deployments were to contribute to strategic defence and move the United States toward a goal of eliminating the strategic nuclear missile threat mainly by Soviet Union. SDI was also to protect options for near-term deployment in case of a Soviet deployment in violation of the Anti-ballistic Missile Treaty (ABM).

The SDIO intended to develop a wide range of key technologies for sensors, kinetic kill weapons, and directed energy weapons. As President Reagan stated:

> "the SDI program was to provide to a future president and a future Congress the technical knowledge required to support a decision in whether to develop and later deploy advanced defensive systems."

In the fall of 1986 a national missile defence design was developed. The concept of phased deployment was to "develop and deploy militarily useful increments of

capability" that would also add to arms control negotiating leverage for reductions in offensive weapons. If the Soviets responded favourably to arms reduction proposals the phased deployment proposals could be modified.

There were three phases. The first phase aimed at denying the Soviets initial strike capability or the ability to blunt follow-on strikes, which would complicate Soviet attack options and defeat limited attacks and accidental launches. The Second phase, also known as early follow-on phase, included directed energy systems and active discrimination sensors. The final phase, the late follow-on phase, included advanced energy directed weapons and support technologies (Mowthorpe 2001). The latter two phases led to highly effective, multi-layered defences. These developments emphasized the space based elements as being of critical importance to countering the Soviet proliferation of offensive missiles. The White House also called SDI "a main inducement for the Soviets to negotiate for deep cuts in offensive arsenals."(ibid)

As the idea unfolded, SDIO began investigating a new, innovative space-based interceptor, known as "Brilliant Pebbles". These were to be a constellation of up to thousands of individual interceptors, each with its own surveillance capability and enough power to operate autonomously, within its own field of vision. Brilliant Pebbles, the top anti-missile program of the Reagan and the first Bush administrations, was an attempt to deploy a 4,000-satellite constellation in low-Earth orbit that would fire high-velocity, watermelon-sized projectiles at long-range ballistic missiles launched from anywhere in the world. Although the program was eliminated by the Clinton Administration, the concept of Brilliant Pebbles remains among the most effective means of ballistic missile defence. (MISSILETHREAT.COM)

Analyzing the space policy making during Reagan administration, especially related to SDI, Mowthorpe has stated that during the Reagan administration, it was the White House which set the most ambitious plans for military space rather than the Pentagon; this ushered in a reversal of the formulation of military space policy that was witnessed under the Eisenhower and Kennedy administrations. (Mowthorpe 2001)

Overall Assessment of Soviet Challenge in Outer Space during Cold War

Though in the field of space research, the competition between the superpowers was supposed to be of scientific nature, the cold war phenomenon converted this scientific competition into a strategic race and then a race for supremacy. Soviet weapon systems and advanced technology kept on challenging the US policy makers and the strategists. Four main challenges were identified by American strategists. Manned space flight, offensive weapons, defensive weapons, and reconnaissance, which formed the centre point of Cold War competition between the US and the Soviet Union in outer space.

Manned Space Flight

The rivalry between the US and the Soviet Union was also visible in the manned space flight missions conducted by them. The Soviet Union became the first country to send an astronaut into space. The rivalry in this field symbolized American and Soviet technological achievements and had significant military applications. The technology used to place astronauts in orbit could also be used in military missiles. The Soviets pursued a permanent presence in space, launching the Salyut space station series beginning in 1971, followed by the Mir space station in 1986(source). U.S. manned space flight efforts competed with the Soviets in this race for prestige and technological superiority.

Vostok manned space flight began on April 12, 1961, with Yuri Gagarin's single-orbit mission. The liquid-fueled, two-stage Vostok rocket that lifted Gagarin into space was used to launch a variety of military and civilian spacecraft from 1959 to the 1980s. During the 1980s, the Soviets began using Vostok rockets to place commercial satellites into orbit for other countries.[16]

[16] The Soviet Challenge in the Space: Illustrating the threat
(online web) http://www.nasm.si.edu/exhibitions/gal114/spacerace/sec600/sec610.htm

Buran got developed in the 1970s and the Buran space shuttle resembled the U.S. Space Shuttle in design and concept. The Soviets planned to use it to place satellites in orbit and to resupply the Mir space station. The Soviets launched the Buran only once, in 1988 without a crew. Russia cancelled the program in the early 1990s after the end of the Cold War.[17]

Offensive Weapons

Yet another area of superpower competition was development of offensive weapons. Soviet offensive forces' development intensified during the Cold War. These included missiles, submarines, and aircraft capable of delivering nuclear weapons. The United States devoted considerable resources to assessing and countering this threat. Both the United States and the Soviet Union produced thousands of offensive nuclear warheads. Arms control treaties like SALT and ABM treaty had significantly reduced these nuclear arsenals in later period of the Cold War. From the US point of view some offensive weapons like scud B, delta III submarine and sickle were significant.

Scud B was first deployed in the late 1950s by Soviet Union. A tactical, mobile, ballistic missile, it could deliver a conventional, nuclear, biological, or chemical warhead to a target about 320 kilometres (200 miles) away. The Soviet Union exported Scud B missiles to its Warsaw Pact allies and to such countries as Iraq, China, and North Korea. The Iraqi use of Scuds during the Gulf War showed the continuing threat posed by these weapons.[18]

Delta III Submarine was completed shortly after the warship entered service in the late 1970s. A Delta III could fire the nuclear-tipped SS-N-18 Stingray ballistic missile from 16 launch tubes. With a range of 6,500 kilometres (3,900 miles), Stingrays could hit targets in the United States from Soviet home ports or coastal waters. The Delta III is still deployed with the Russian navy today.[19]

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[17] ibid

[18] The Soviet Challenge in Space: Illustrating the Threat
(online web) http://www.nasm.si.edu/exhibitions/gal114/spacerace/sec600/sec620.htm

[19] ibid

Sickle intercontinental ballistic missile (ICBM) in the 1980s made Soviet land-based nuclear forces harder to locate and destroy. The Sickle carried a single nuclear warhead and was about the same size as the U.S. Minuteman ICBM. Post-Soviet Russia continues to deploy this missile.[20]

Defensive Weapons

Apart from manned space flight and offensive space weapons, the Soviet Union conducted a substantial research program to develop a defence against ballistic missiles. The Soviet Union built the world's only operational anti-ballistic missile (ABM) system around Moscow in the 1970s. Additional programs focused on the development of other ground and space based weapons using laser, particle beam, and kinetic energy technology. ABM, space laser and particle beam weapon became the basis for defensive weapon system in Soviet Union. The first real and successful ABM hit-to-kill test was conducted by the Soviet forces.

Reconnaissance Systems

The United States and the Soviet Union used many different reconnaissance systems during the Cold War. Some imaged military targets, others detected radar and radio emissions, and still others intercepted communications. Advances in technology enabled both nations to conduct these missions from the relative safety of space beginning in the 1960s. Soviet systems provided military and political leaders with information on U.S. military forces and developments.

Mandrake, high-altitude reconnaissance aircraft, was a response by Soviet Union to the American U-2 over flights of Soviet territory in the late 1950s. Unlike the U-2, the Soviets designed the Mandrake around an existing airframe, the all-weather Yak-25 interceptor. Carrying cameras and signals intelligence equipment, the Mandrake flew missions in the early 1960s over the Middle East, South Asia, China, and the border regions of NATO nations.[21]

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[20] ibid

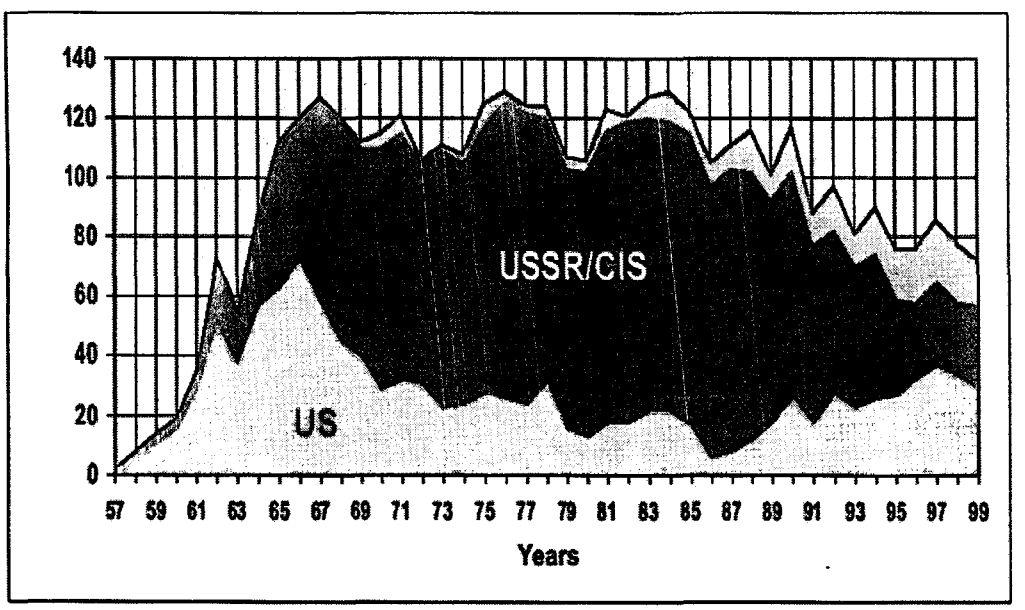
[21] The Soviet Challenge in Space: Illustrating the Threat

Cosmos 389 was launched in December 1970 and performed electronic intelligence (ELINT) missions. Cosmos 389 was the first in a series of "ferret" satellites that pinpointed sources of radar and radio emissions to identify air defence sites and command and control centres. Transmitted to ground stations, the data was used for Soviet targeting and war planning.[22]

RORSAT (Radar-equipped Ocean Reconnaissance Satellites) was placed by Soviet Union in low Earth orbit beginning in 1967. Employing powerful radars and working in pairs, they located and targeted U.S. ships for destruction by Soviet naval forces.[23]

The following graph gives the idea about comparative picture of annual space launchers of US and Soviet Union which also point out the Soviet threat during Cold War period.

Graphical Representation of Annual Space Launchers of US and Soviet Union



Source: US and Soviet/CIS launches through 1998: Mehuron, "Space Almanac," pp. 38 and 47; 1999 and other launches (China, the European Space Agency, etc.) have been drawn from two sources: Jonathan C. McDowell's master launch log at hea-www.harvard.edu/QEDT/jcm/space, and Analytic Graphics' all-satellites database at www.stk.com. Among the twelve members of Commonwealth of Independent States are Russia, Ukraine, Belarus, and Kazakhstan, which contains the Baikonur cosmodrome at Tyuratam. The "Other" category includes launches by Brazil, China, the European Space Agency, France, India, Israel, and Japan.

(online web) http://www.nasm.si.edu/exhibitions/gal114/spacerace/sec600/sec640.htm

[22] ibid

[23] ibid

(Source: Watts 2001: 15)

The above discussed Soviet challenges were catalyst in the making of any US space strategy during Cold War. These Soviet developments were seen as threat and steps to establish supremacy during Cold War days. All the US efforts in outer space like satellites installation, development of Anti ballistic missile system and ICBMs, efforts towards human spaceflight, American Moon mission and SDI (strategic defense initiative) were the result of US- Soviet rivalry, particularly in outer space and Cold War in general. Considering the Soviet threats, US followed a dynamic approach towards outer space during Cold War. Every American President was aware of the Soviet rivalry in outer space and contributed in the evolution of a coherent and well articulated National Space Policy. In the previous chapter, the evolution of US National Space Policy has been discussed but for the better understanding of the nature of US- Soviet relationship in outer space, the study of US approach towards use of outer space during the Cold War period becomes vital.

An Analysis of US approach towards use of Outer Space during the Cold War:

US use of outer space for military purposes during Cold War period can be understood by using theories of Space use as discussed in the first chapter. Sanctuary, Survivability, High- Ground and Control doctrine explain the dynamics of Cold War in outer space. US- Soviet Union Relationship in outer space was shaped to an extent by the US approach towards military use of outer space. The evolution of US space policy can also be seen from the prism of US- Soviet rivalry in outer space. The use of outer space was basically concentrated on the main rival Soviet Union.

Before the successful launch of Soviet Sputnik, the US was not interested in the military use of outer space. The primary goal of Eisenhower's space policy was to examine and exploit the potential of space to open up the closed Soviet state by using satellite reconnaissance. The second major goal was to design policies to create a new international legal regime which would legitimize satellite over flight for 'peaceful

purposes' including reconnaissance. The third major goal was to investigate space for scientific purposes. (Mowthorpe 2001) At the time, US did not have any comprehensive doctrine for the potential military use of space. (ibid: 2)

The reaction to the Sputnik launch was astonishment and some measure of fear, in the U.S. and some of the allied countries. All of a sudden, there was an "enemy satellite" streaking across the sky over the U.S. At the time, no one knew what it was capable of doing. What U.S. political leaders did know was that if the Soviet Union had rockets powerful enough to launch a satellite, they had rockets powerful enough to launch atomic bombs on the U.S. (nebraskastudies.org). The Sputnik shock compelled US administration to react quickly and as a reaction NASA was created. The Sputniks incident also provided a rationale for the U.S. military to explore the requirement of an ASAT capability.

President Eisenhower actively provided leadership to guide the country's space program and in 1958 established a special panel which came out with the Purcell Report on Space. This report endorsed the military uses of space which included reconnaissance, communication, and weather forecasting as well. The reports support for these passive military benefits of space also included a rejection of the notion of space weapons. This report was to establish the basic guidelines for the US military exploitation of space (Mowthorpe 2001: 3). Though Eisenhower administration had taken the initiatives, President Kennedy provided solid foundation for the efforts of US in the outer space. Responding to Soviet's manned space mission, Kennedy launched a Moon programme. Apart from this, Kennedy administration through a resolution in the United Nations General Assembly 1963[24] called for the prevention of placing nuclear weapons or weapons of mass destruction in outer space. These developments laid the foundation for the Johnson administration to negotiate the Outer Space Treaty of 1967, which strongly influenced the development of subsequent military space policy. American ASAT programs, which were undertaken by the Kennedy administration, were continued by President Johnson continued the ASAT programs. The SALT I agreements comprising of

[24] Resolution 1884 (XVIII) on the 17 October 1963

the Treaty on the Limitation of Antiballistic Missile Systems and the Interim Agreement on the Limitation of Strategic Offensive Arms in May 1972 had significant implications for US military space policy.

Under Carter administration, US sought to establish a verifiable ban on ASAT systems. This period witnessed the signing of the SALT II Treaty[25] and invasion of Afghanistan by the Soviet Union. Soviet invasion in Afghanistan became high on US agenda than any other developments. In the subsequent development in US approach towards outer space, the announcement of the Strategic Defense Initiative in March 1983 set out a research and development programme into the feasibility of utilizing space for strategic defence. This SDI programme met with the Challenger disaster[26] which led to a revised policy on U.S. space policy in January 1988.

Different Treaties and Talks:

Despite their rivalry during Cold War, US and Soviet leaders developed an understanding not to be paranoid about the space race and development of space weapons. Though this period witnessed developments of various satellites, ICBMs, ASAT systems and exploration to space; the US and the Soviet Union showed enough understanding to restrict them to a limit. Both countries signed some significant treaties during this period, which are still relevant and are instrumental in deciding the activities in outer space. Outer Space Treaty, SALT I and II and ABM treaty are some of those agreements on which both countries were agreed.

Outer Space Treaty:

The 1967 Outer Space Treaty (OST) provides the basic legal framework for the governance of outer space. Multilateral agreements were signed and ratified between the U.S., U.S.S.R., and U.K. banning:

- Placement of nuclear weapons or "weapons of mass destruction" in orbit around the Earth,

[25] SALT II Treaty on June 18 1979
[26] Challenger disaster happened in January 1986

- Installation of nuclear weapons or "weapons of mass destruction" on the moon, on any other celestial body, or in outer space,
- Use of the moon or any celestial body for military purposes, including weapons testing of any kind. (atomicarchive.com)

The treaty was drafted at a time when military competition threatened the preservation of outer space for peaceful purposes. This treaty is commonly described as a "non-armament" treaty, though scholars like West find inaccuracy with the use of term for two reasons. First, the OST does not ban all weapons in outer space, just weapons of mass destruction. Second, the scope of the OST is more comprehensive; besides weapons, it addresses the broader security of outer space (West 2007).

Strategic Arms Limitation Talks (SALT)

Strategic Arms Limitation Talks were a series of negotiations between the United States and the Soviet Union that were aimed at curtailing the manufacture of strategic missiles capable of carrying nuclear weapons. The first agreements, known as SALT I and SALT II, were signed by the United States and the Union of Soviet Socialist Republics in 1972 and 1979, respectively. These agreements were intended to restrain the arms race in strategic (long-range or intercontinental) ballistic missiles armed with nuclear weapons. First suggested by U.S. President Lyndon B. Johnson in 1967, strategic arms limitation talks were agreed on by the two superpowers in the summer of 1968, and full-scale negotiations began in November 1969.

SALT I

SALT I, the first series of Strategic Arms Limitation Talks, extended from November 1969 to May 1972. During that period the United States and the Soviet Union negotiated the first agreements to place limits and restraints on some of their central and most important armaments. In a Treaty on the Limitation of Anti-Ballistic Missile Systems, they moved to end an emerging competition in defensive systems that threatened to spur offensive competition to still greater heights. In an Interim Agreement on Certain

Measures with Respect to the Limitation of Strategic Offensive Arms, the two nations took the first steps to check the rivalry in their most powerful land- and submarine-based offensive nuclear weapons.[27]

Soviet and American weapons systems were not symmetrical. The Soviet Union had continued its development and deployment of heavy ballistic missiles and had overtaken the U.S. lead in land-based ICBMs. Soviet ICBMs increased from around 1,000 to around 1,500 during the SALT I years. Soviet submarine-based launchers had also enlarged significantly. The huge payload capacity of some Soviet missiles was seen as a possible threat to U.S. land-based strategic missiles even in heavily protected launch-sites. On the other hand, the United States had not increased its deployment of strategic missiles since 1967, but it was conducting a vigorous program of equipping missiles with "Multiple Independently-targeted Re-entry Vehicles" (MIRV). "MIRVs" permit an individual missile to carry a number of warheads directed at separate targets.

The United States also retained a lead in long-range bombers. The Soviet Union had a limited ABM system around Moscow; the United States had begun to deploy ABMs at two land-based ICBM missile sites to protect its retaliatory forces. Besides the asymmetries in their strategic forces, the defence needs and commitments of the two parties differed significantly. The defence of allies like Western Europe and Japan was the US obligation while the Soviet Union's allies were its near neighbours. All these circumstances made for difficulties in categories of weapons, and in defining overall strategic equivalence. In a summit meeting in Moscow, after two and a half years of negotiation, the first round of SALT was brought to a conclusion on May 26, 1972, when President Nixon and General Secretary Brezhnev signed the ABM Treaty and the Interim Agreement on strategic offensive arms. [28]

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[27] for more information- (online web)
http://www.state.gov/www/global/arms/treaties/salt1.html

[28] http://www.atomicarchive.com/Treaties/Treaty8.shtml

ABM Treaty

In the Treaty on the Limitation of Anti-Ballistic Missile Systems the United States and the Soviet Union agreed that each country would have only two ABM deployment areas, so restricted and so located that they could not provide a nationwide ABM defense or became the basis for developing one. Each country thus leaves unchallenged the penetration capability of the others retaliatory missile forces. Precise quantitative and qualitative limits are imposed on the ABM systems that may be deployed. Both Parties agreed to limit qualitative improvement of their ABM technology.[29]The US and the USSR signed a Protocol to the treaty which entered into force in 1976 which reduced the number of ABM deployment areas from two to one, deployed either around each party's national capital area or, alternatively, at a single ICBM deployment area. The USSR deployed an ABM system around Moscow, but the US elected not to deploy an ABM system and in 1976 deactivated its site at Grand Forks, North Dakota, around a Minuteman ICBM launch area.[30]

SALT II

It was a controversial series of negotiations between US President Jimmy Carter and Soviet leader Leonid Brezhnev from 1977 to 1979, which sought to curtail the manufacture of strategic nuclear weapons. It was a continuation of the progress made during the SALT I talks. SALT II was the first nuclear arms treaty which assumed real reductions in strategic forces to 2,250 of all categories of delivery vehicles on both sides. This bilateral, unratified agreement between the U.S. and U.S.S.R. tried to set the limit on strategic offensive weapon systems and tried to impose qualitative restraints on existing and future strategic systems. This included:

(a) 2,400 aggregate limit on strategic nuclear delivery vehicles (ICBMs, SLBMs, and bombers)

(b) 1,320 subceiling on MIRV ballistic missiles

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[29] for more information- (online web) http://www.fas.org/nuke/control/abmt/

[30] ibid

The primary goal of SALT II was to replace the Interim Agreement with a long-term comprehensive Treaty providing broad limit on strategic offensive weapons systems. The United States did not ratify the treaty after the Soviet Union invaded Afghanistan in December 1979. But President Carter, and later President Ronald Reagan, agreed to comply with the provisions of the treaty as long as the Soviet Union reciprocated. Soviet Premier Brezhnev made a similar statement regarding Soviet intentions.

In 1980, President Carter announced that the United States would comply with the provisions of the Treaty as long as the Soviet Union reciprocated. Brezhnev made a similar statement regarding Soviet intentions. In May 1982, President Reagan stated he would do nothing to undercut the SALT agreements as long as the Soviet Union showed equal restraint. The Soviet Union again agreed to abide by the unratified Treaty. Subsequently, in 1984 and 1985, President Reagan declared that the Soviet Union had violated its political commitment to observe the SALT II Treaty. However, President Reagan declared that the United States would continue to refrain from undercutting existing strategic arms agreements to the extent that the Soviet Union exercised comparable restraint.

On May 26, 1986, President Reagan stated about the future US approach towards SALT II. He declared that,

> "Given this situation ... in the future, the United States must base decisions regarding its strategic force structure on the nature and magnitude of the threat posed by Soviet strategic forces and not on standards contained in the SALT structure...."
> (atomicarchive.com)

Thus, Reagan Administration withdrew from SALT II after accusing the Soviets of violating the pact. Subsequent discussions took place under the Strategic Arms Reduction Treaty (START) and the Comprehensive Test Ban Treaty. In the mean time the US and

the Soviet Union signed INF treaty.[31] These developments coincided with end of the Cold War. With the end of Cold War and the dissolution of Soviet Union, the superpower rivalry came to an end.

Concluding the above discussion, it can be said that the Sputnik transformed the dream of space exploration into reality. Four years later, Yuri Gagarin was the first human to see Earth from space. The launch of Sputnik marked the beginning of space exploration and with it the start of the debate surrounding the militarization of outer space. With the progresses in both countries US and Soviet Union scholars, politicians and diplomats began to take an interest in the issue of space and started a debate about what should and should not be permitted in space. With Gagarin's flight, human beings became space travellers. Less than ten years later, men walked on the Moon. Manned space vehicles, such as the Space Shuttle and the Russian Soyuz, now fly regularly between Earth and low Earth orbit. Besides exploration and scientific research, orbiting satellites have also facilitated the world in communication and rapid dissemination of information, the military use of space has been a logical corollary of all these developments. Thus space has also become an important military tool. The dependence over satellites have increased so much that Space Commission Report 2001 has predicted the danger of 'Space Pearl Harbor'. US- Soviet rivalry in outer space during Cold War had influenced the space programme of both countries. After the dissolution of Soviet Union, US emerged as the victor of Cold War and tried to maintain the supremacy in every field including space.

The US reliance over space assets has increased manifold in post- Cold War scenario. The invention of concepts like RMA (Revolution in Military Affairs) and 'Network Centric Warfare' and their excessive use by the United States has made the US more dependable over the use of outer space than other countries. This over dependence has created new problem of security of space assets. Moreover, the emergence of China in

[31] The Intermediate-Range Nuclear Forces Treaty (INF) was an agreement between the United States and the Soviet, signed on December 8, 1987 1987, with the aim to eliminate nuclear and conventional ground-

this field with recently acquired ASAT capability and Russia's efforts to regain its old superpower status has much more implications to the US national security. Owing to these challenges, United States has intensified its efforts towards space weaponization. Especially George W. Bush's administration has taken some significant steps towards this process. The US withdrawal from ABM treaty and its Missile Defense plan in Europe has intensified the whole debate of space militarization and space weaponization. In the subsequent chapters these aspect will be dealt in detail.

Chapter Three:

Space Security, National Security and Space Weaponization in the Post Cold War Era

The end of Cold war was an epochal turn in the history of international relations as it triggered certain changes that altered the character of the prevailing world order and reset certain equations. The most relevant change was the transformation of the bi-polar international system into a uni-polar one (Krauthammer 1990; Layne 1993) and the end of rivalry between the two superpowers. The United States emerged as the sole superpower. With the end of the politics of cold war the nature of challenges to the leadership of U.S. also underwent a shift. The leadership of the U.S. in space emerged as an un-contested reality of space politics for the time being. This also meant the U. S. was reliant on space for both military and civilian purposes more than ever, as a consequence the security of space based assets and capabilities emerged as a critical issue for the policy makers and political leadership. Over the years a consensus has emerged among the strategic thinkers and the leadership that any harm to the space assets would seriously jeopardize the capabilities of United States and thus emerged a series of policy initiatives that shaped the post cold war space politics within and outside America. There is no doubt about the fact that US remains the dominant leader in space and is more dependent on space than any other nation not only for national security but economic benefits also. There is a close relationship between the military and commercial uses of space. Many space-related technologies are dual-use technologies for both military and civil uses. This is also a fact that without space the phenomenon of globalization would not be possible.[1] Moreover, the private sector plays a growing and critically important role in developing and exploiting space technologies. Thus space security is very significant from military as well as civilian point of view. Any adversary state seeking to attack the United States would have a motivation to destroy U.S. space-based capabilities.

This chapter attempts to delineate the policy response of the United States to the changed scenario of the post-cold war era in the arena of space. The argument here is that the challenges and opportunities in the arena of space were considerably different from that in the cold war era and thus American initiatives were in response to these changes. To

[1] For instance the use of space as a platform for communication satellites has brought revolutionary changes in the field of communication technology bringing the people around the globe closer. This has been a major driving force behind the process of globalization of which America is the greatest proponent

state it more clearly the need for safeguarding space assets and acquiring pre-emptive lead became the motivating factors rather than any concern for strategic rivalry. Though space security was a concern during cold war rivalry but more than that the developments during this period were motivated by super powers rivalry and the race for supremacy. Still the offensive use of space was ruled out in the cold war era as noted by an expert:

> Even during the height of the Cold War, the two superpower rivals eschewed serious development of offensive space weapons- in fact, though they experimented with the technology, the two sides also refrained from actively deploying weapons that could shoot down satellites from ground, air or sea as well. They even signed a treaty, the 1972 Anti-Ballistic Missile (ABM) Treaty, which forbade either side to tamper with the other's "national technical means," i.e., spy satellites (Hitchens 2002).

In the changing circumstances, the issue of space security and use of space changed rapidly and has increasingly become linked with national security. In 2002 Rumsfeld wrote in an article in Foreign Affairs:

> Defense Department must focus on achieving six transformational goals: ?rst, to protect the U.S. homeland and our bases overseas; second, to project and sustain power in distant theaters; third, to deny our enemies sanctuary, making sure they know that no corner of the world is remote enough, no mountain high enough, no cave or bunker deep enough, no suv fast enough to protect them from our reach; fourth, to protect our information networks from attack; ?fth, to use information technology to link up different kinds of U.S. forces so they can ?ght jointly; and sixth, to maintain unhindered access to space, and protect our space capabilities from enemy attack (Rumsfeld 2002: 26).

Thus space based capabilities came to be seen as an important requirement for the transformation required to effectively achieve American foreign policy goals.

Space Assets and National Security:

Space security and national security are linked mainly because of the threat to space assets. U.S. is so heavily dependent on the use of space that if these assets are damaged there will be crippling effect on US national security. These threats might occur in various forms. Some of them might be in the form of Electronic Warfare, Ground Station

Attack, Sensor Blinding, Denial & Deception, Micro Satellites, Direct-Ascent Interceptors and Nuclear Detonation in space. To counter these threats, it is extremely important to have a strong space policy for the security of space assets and national interests. Considering the importance and vulnerability of space, US administration since Eisenhower has maintained continuity in official statements supporting US activities in space.

The central principles of US space policy increasingly came to be based on the recognition that space is essential to US national security in critically important areas of security as well as foreign policy. Rumsfeld Space Commission had also concluded in 2001 that:

> Space-related capabilities help national leaders to implement American foreign policy and, when necessary, to use military power in ways never before possible. Because of space capabilities, the U.S. is better able to sustain and extend deterrence to its allies and friends in our highly complex international environment (space commission 2001: xi).

Thus there exists an important link between space policy and effective implementation of U.S. foreign policy objectives. Space based capabilities which are very significant from military purpose include early warning and communications that warn military forces of attacks, provide a basis for communications, allow real-time information to be collected and distributed to users, make it possible to navigate conflict areas while avoiding hostile defences, and identify and strike targets with devastating effect (Pfaltzgraff 2009: 3).

In the absence of space-based intelligence, US ability to face the crises and conduct precise and effective military operations would be seriously hampered. Similarly, space has become vitally important not only for national security but also for homeland security in the post-9/11 world. With the ongoing speed of efforts of proliferation of weapons of mass destruction (WMD), the issue of space security and along with this the issue of national security has become very critical. In case of these proliferation would not be stopped, counter-proliferation strategy becomes essential and the Missile Defense system seems an appropriate strategy to counter check these proliferation activities.

Though successive US administrations acknowledged the strategic importance of space and the need to protect it for decades, President George W. Bush's National Space Policy was the first to explicitly identify space as "vital" to U.S. national interests (NSP 2006). Even before Bush administration, President Clinton's 1996 national space policy had also emphasized on the point but not so explicitly as Bush administration did in 2006. The Clinton Administration's policy of 1996 stated that:

> "the United States will develop, operate, and maintain space control capabilities to ensure freedom of action in space, and, if directed, deny such freedom of action to adversaries. The capabilities may also be enhanced by diplomatic, legal, or military measures to preclude an adversary's hostile use of space systems and services" (NSP 1996).

Thus, it can be said that the need to enhance space security began to be increasingly reflected in the official stance of the various U.S. administrations since the end of cold war. Off late space has received special attention. It would be significant to note that the defence and intelligence-related activities for countries' national interests come under right of self- defence which is recognized by Article 51 of United Nations charter.

Security Scenario in Post Cold War Era:

In the post- Cold War era, when one pole had lost its existence, the other pole, the US, almost enjoyed the domination in world affairs. At this juncture Charles Krauthhammer asked, and appropriately so, "can America long sustain its unipolar preeminence?"(1990:26). . . The answer to this question probably lied in American capability to adapt and respond to the prevailing security scenario as well as its advancement of capabilities to do so. Space based capabilities thus were to play a crucial role. Commenting on the strategic scenario in the Post cold War era Krauthammer wrote:

> The post cold war era thus perhaps better called the era of weapons of mass destruction. The proliferation of weapons of mass destruction and their means of delivery will constitute the greatest single threat to world security for the rest of our lives. That is what makes a new international order not an imperial dream or wilsonian fantasy but a matter of the sheerest prudence (Krauthammer 1990: 31-32).

The challenges to U.S. leadership were considerably changed in the post cold war era. In this changing scenario, the US started using space as a significant medium in warfare. Some war operations like Operation Desert Storm to Operation Iraqi Freedom provided the evidence of strategic use of space by US for surveillance and other purposes. Military satellites and Global Positioning System satellites were available to help determine the exact location of special operations teams and of targets and communication satellites that were used for command and control and to give warning of missile attacks.(Dolman 2005: 6).

Discussing the US reliance over space Abbey and Lane have argued that 'this is not only after cold war that US has started reliance over space but since the 1960s, the United States has relied heavily on intelligence gathering from space. Increasingly complex space systems continue to fulfil this need. Space assets played a key role in the Gulf War in the 1990s and now play a significant role in US military operations in Afghanistan, Iraq, and around the world' (Abbey and Lane 2005: 3).

While use of space for military purposes was intensified in post- Cold War scenario, the 2001 Space Commission Report made the concept of the "security of space" more prominent an issue. The perceptive threat of 'space pearl harbor' had managed to force the policy makers to take some serious steps towards space security.

This Report identified the importance of space to national security and outlines a series of recommendations for the future of military space activities (Space Commission report 2001). The report proposed, among other things, that the military vigorously pursue capabilities that would enable the President to deploy weapons in space "to deter threats to and, if necessary, defend against attacks on U.S. interests" (ibid). This proposal represents a departure from President Kennedy's vision of 1962, when he vowed, "We shall not see space filled with weapons of mass destruction but with instruments of knowledge and understanding" (Kennedy 1962). This commission has also projected the perception of 'Space Pearl Harbor' and has supported the US proactive steps to protect the space assets.

Space "Pearl Harbor" and National Security

The breakup of the Soviet Union in 1989, the cessation of anti-satellite weapons testing, the signing of the Strategic Arms Reduction Treaty outlawing the use of FOB systems, and a reduction in the number of military space launches helped decrease the perceived threat to US space assets from attack. However, this reduction in the threat perception has also led to some concerns. Some leaders at the highest levels of the US government have stated that the United States must avoid a 'Space Pearl Harbor' Some of this concern is due to the idea that a decrease in the perceived threat to the space assets of the US after the breakup of the Soviet Union coupled with a competition for space resources has resulted in a corresponding erosion of US space threat warning and attack assessment capabilities. On the other hand, the corresponding up gradation in the outer space capabilities of countries such as China has also given weight to such concerns (Burke 2006).

The threat to space assets can be checked by the deployment of weapons in space but the ultimate solution to this problem rely with the reduction of the dependence on satellite while maintaining the benefits of satellites at reasonable cost. A significant way of reducing vulnerability is to reduce the threat. The threat can be reduced by agreement among countries not to damage or destroy non-weapon satellites. This arrangement should be backed up by US developments to intercept or counter such weapons or ASAT used in violation of such an agreement. Though some experts like Haeckel are in favour of US control over space to secure its space assets. Space control, defined as the ability to "assure freedom of action in space and deny same" to the enemy, is now a key military mission, and at the centre of U.S. Space Command's role (Hitchens 2002).

Haeckel stated that space control is not only for the protection of space assets but it spreads over to other areas as well. Space control as explained by the military has four key aspects:

Surveillance, including the ability to detect and track space objects;

Protection, concentrating on passive measures to enhance survivability of U.S. space assets, such as electronic hardening;
Prevention, prohibiting enemies from "exploiting U.S. or allied space services" through measures such as encryption or shutter control (shutting down access to imagery satellites); and,
Negation, preventing enemies from using their own space forces, including through offensive means. (ibid)

The key aspects of space control show that in the guise of protection of space assets others ends are also served by this medium. Thus, it would be appropriate to say that US is trying to establish the supremacy in the space arena and prevent the other forces from the access to space in extreme situation. This perhaps serves the purpose of pre-emption as far as space security is concerned. It is quite evident that first hand advantage in the space is determined by the preparedness and foresight of a state in assessing future threats and opportunities.

In addition to the above discussion, the development of missile defence can also be counted as political-military thinking about weaponizing space not only for the security of space assets but also to establish complete domination. The Bush administration already had announced its intent to withdraw, on June 13, 2002, from the ABM treaty, this not only opened the path for development of missile interceptors but also cleared the way for the United States to develop anti-satellite weapons targeted against potentially hostile spy satellites (Hitchens 2002: 6).

In the wake of the September 11 terrorist attacks on the United States, space weapons proponents have been more vocal about concepts for using space weapons to attack a wide range of terrestrial targets anywhere on the globe. Now the question comes whether it is necessity to protect space vulnerability or the want of projection of capabilities, which is driving the US space policy and its activities in space. Proponents of weaponizing space usually cite the emergence of an acute threat in the 2020 time frame or beyond; the Space Commission report puts the possible development of hostile anti-

satellite systems at decades away (ibid). The Space Commission report also includes extensive analysis of the possible vulnerabilities of U.S. space assets, especially commercial satellites and communications grids: "The reality is that there are many extant capabilities to deny, disrupt or physically destroy space systems and the ground facilities that use and control them" (Space Commission report 2001).

However, vulnerabilities do not necessarily result in threats. In order to threaten U.S. space assets, military or commercial, a potential adversary must have both technological capabilities and intent to use them in a hostile manner. There is little hard evidence that any other country or hostile non-state actor possesses either the technology or the intention to seriously threaten U.S. military or commercial operations in space- nor is there much evidence of serious pursuit of space-based weapons by potentially hostile actors (Hitchens, 2002: 10). Indeed, the Space Commission report acknowledges that:

> Attacking or sabotaging the supporting ground facilities has long been considered one of the easiest methods for a U.S. adversary to conduct offensive counter-space operations. Most of these facilities are relatively easy to get in close physical proximity to or access by way of a computer network, making them a prime target (Space commission report 2001).

Further the 2001 Space commission report observed that threats to U.S. space systems might arise under a variety of conditions:

- In peacetime, as a terrorist act.
- In time of crisis, as an act of coercion or escalation.
- In wartime, as an effort to degrade U.S. intelligence or military performance. (ibid 2001:24)

It is obvious that the United States must ensure the integrity of its increasingly important space networks, and find ways to defend against threats to space assets. Still, there is little reason to believe that it is necessary for the U.S. to put weapons in space to do so. It is not palpable that any nation has any intention, or even incentive, to launch a war in space. Instead, most countries, including China and Russia, have been urging a global ban on weapons in space. Many experts, including a number of Air Force strategists,

persuasively argue a U.S. move to put offensive weapons in space could have the perverse effect of creating a new threat because other countries would feel compelled to follow suit (Deblois 1998).

However, it is imperative to look at risks emanating from such a decision. These include: the potential for starting an arms race in space that does both military and political damage to the United States; and the possibility that the advent of space warfare might negatively impact the U.S. commercial space and telecommunications industry, which now dominates the world marketplace (Hitchens2002: 12).

Irrespective of the conclusions drawn from the above discussion the fact cannot be ignored that the growing dependence on space capabilities by the US makes events like space Pearl Harbor more likely and has serious national security implications. This is more alarming given incentives for other nations or non-state actors to target US space capabilities. Thus, some potential threats to US space assets need to be identified.

Potential Threats to US Space Assets

Though, the space is not weaponized yet, growing US reliance on space for national security and the inherent vulnerability of space assets make them a prime target for potential attack by states like Russia and China, and well-organized terrorist groups or rogue states. Russia's anti- satellite capability along with their space programme is well known and in any adverse situation they can go to the extent to threaten the US national security through their space capability. This fact cannot be ignored easily. On the other hand, China also presents a potential threat to US space forces as senior Chinese military officials openly advocate the importance of developing the capability to counter US dominance in space. (Zhang 2008)

Many Chinese experts have expressed the view regarding the vulnerability of space assets and space- based weapon systems. In this context Hui Zhang warned that: "Given the inherent vulnerability of space-based weapons systems to more cost-effective anti-

satellite (ASAT) attacks, China could resort to ASAT weapons as an asymmetrical (defense) measure" (Zhang in China Space Daily 2005). Zhang also implied that China would only adopt these counter-measures if the US pushed ahead with its own missile defence and space weaponization plans first. China is also emphasizing that space warfare will be the new and critical mode for waging future wars.

Other analysts like Dr. Michael O'Hanlon, a Brookings Institute space policy expert, has pointed out in his book, Neither Star Wars or Sanctuary, that high-value satellites are few enough in number, and sufficiently valuable, that China (and other adversaries) may well find the means to go after each one(O'Hanlon 2004: 100). Here, Burke has given his own logic and has written that Russia and China are reliable and responsible nations and they will not take any illogical or irresponsible steps to destroy the established peace and security but some other disturbing actors like rogue states (Iran, North Korea) and non-state actors also pose a potential threat to US space assets, and senior US officials and military leaders have considered the possibility of a terrorist attack on space systems to disrupt the global economy as well as disrupting space-based services and degrading capabilities (Burke 2006: 7).

Implications for National Security

Considering the potential threat to US space security, it would be appropriate to say that any erosion of the ability of US to execute the space threat warning mission has serious implications for US national security. Such degradation would involve a degradation of US' war fighting effectiveness as it would put at risk even its land, sea and air based capabilities. The knowledge of reduction in US' space threat mitigation capacities, could result in its adversaries developing new weapons or covertly conduct probing attacks on US space systems. As a result, the US would not be able to check against preventable loss of critical high value satellites, facilities or services.

The failure to develop a reliable space threat warning and attack verification system has a lot of serious consequences as it would result in a loss of key early warning indicators of

an attack on the US homeland or an attack that is part of a major regional action by a near-peer adversary such as an attack on European states by Iran or on Taiwan by the China. This threat has the echoes of Pearl Harbor[2]. The attack was part of the start of a larger campaign to establish a Japanese Pacific sphere of influence which included the forceful acquisition of US territories. At this time, the Pacific Fleet was viewed as a US centre of gravity whose destruction would enable Japan to achieve regional domination and discourage future US intervention. Today, space-based assets of the US may represent the equivalent of the World War II Pacific Fleet. Moreover, other nations have stated they view the US reliance on space as a potential weakness and a centre of gravity whose destruction or disruption is critical to future military success against the US (DoD annual report 2004).

The absence of credible early warning capabilities has other major consequences as well. The perception that US space capabilities are vulnerable to a surprise attack weakens conventional deterrence. In the case of a US-China conflict over Taiwan, the Chinese might seek to disrupt or destroy regional space capabilities as part of a delaying strategy to deny US forces access to the region until their military operations were well underway, making the Chinese takeover of Taiwan almost a surety (Freese 2005: 8).

With the increased US reliance on space assets for communication, intelligence, surveillance, and reconnaissance (ISR); and command and control of the US deployed forces; a successful space attack could significantly delay US response to regional aggression. During Operation Iraqi Freedom (OIF), over 60% of theatre communications travelled via satellites. (Lance W Lord Testimony 2005: 5) The Defense Satellite Communication System (DSCS) provided 90% of all protected communications and 70% of all military satellite communications into theatre (Larry Dodgen 2005). These capabilities significantly enhanced command and control of US and allied forces. Further, the employment of the satellite-based Blue Force Tracker system resulted in an unprecedented level of situational awareness which decreased fratricide and facilitating search and rescue operations and reinforcement operations (Lord 2005: 7). The United

[2] The Japanese attack on this US Naval Base, whose goal was the destruction of the Pacific Fleet

States also maximized the use of the space-based Global Positioning System (GPS) to enable precision weapons delivery, allowing the use of fewer and smaller weapons to achieve effects; to enhance navigation in featureless terrain; and to aid in the location of both friendly and hostile forces (ibid). General Lord testified to Congress: "Space capabilities are no longer nice to have, but are now indispensable to how we fight and win our nation's wars" (ibid: 3).

The possibility of a foreign nation attacking US space assets is increased by the failure to develop a credible space threat warning system. The inability to detect and provide timely warning of a space attack could result in the preventable loss of critical high-value satellites, facilities or services. There are a number of scenarios where the timely detection of a threat would allow space operators to intervene, thwarting the attack. In many instances, the ability to find, fix target and destroy the threat is currently a viable way to counter the attack. However, this is not always possible. In the case of a co-orbital ASAT attack, which involves the launch and manoeuvre of a satellite into a closing orbit of another satellite to destroy or disrupt it, the countermeasure require a pre-intercept manoeuvre of the target satellite. The support countermeasures for an attack on space ground facilities include increased physical and information security. Countermeasures for electronic warfare attacks or jamming of the space link segment exist but there is often a significant bandwidth cost when these measures are in effect (Burke 2006: 10). Satellite communication links to world-wide deployed forces are critical capabilities in protecting US security, sovereignty, and military combat capability. The inability to detect and assess space threats might allow adversaries to develop new weapon systems or conduct probing attacks on US space systems without its knowledge.

Although US surveillance technology and systems are more sophisticated today, the US should not assume it will always be able to detect the development of a new weapon. Experience in post-World War II scenario with the Germans is one example, when the allied forces were surprised by the technological advancements of the Germans (Burke

2006: 11). The Soviet Sputnik launches and the deployment of the FOB system are modern examples of technological surprise.[3]

In current scenario, other nations are working to develop new weapons to counter US dominance and to take the lead in what is termed Fourth Generation Warfare in the form of information war. The current coverage gaps in US's space surveillance network, a fragmented intelligence network, the current inability to rapidly detect an attack on on-orbit systems, and overall erosion over the last decade of the space defence mindset makes it more likely that an adversary could develop anti-satellite weapons without the US being aware of it.

Thus, space security has become a vital goal to pursue for policy makers. As Vision for 2020 declared, 'the medium of space is the fourth medium of warfare - along with land, sea and air' (Vision for 2020). The 2001 Space Commission had already argued that the US government should pursue the relevant capabilities 'to ensure that the President will have the option to deploy weapons in space to deter threats to and, if necessary, defend against attacks on US interests'. The Space Commission concluded that space interests must be regarded as a top national security priority and that the United States must ensure continuing superiority in space capabilities in order 'both to deter and to defend against hostile acts in and from space', including 'uses of space hostile to US interests' (Space commission report 2001)

The principal goal of national security of the United States is to deter aggression against the country. Recent development in Chinese space strategy and Chinese ASAT test in 2007 have alarmed the US strategists and Chinese activities in space have captured the top priority in US strategic thinking. That's why, the study of national security implications of China's space programme is essential.

US National Security and China's Space Program:

Chinese strategists are aware that the US is possibly the only state in the world with both the capacity and the intention to pose a serious challenge to China's rise. The US force

[3] For more detailes see chapter 2

projection in Operation Desert Storm has validated the Chinese fears (Deter and Yuan 2002). Hence, Chinese space programme is mainly centred to US space advances have started challenging the US militarization of space. The cumulative consequences of China's space and counterspace investments for U.S. national security will become manifest over the years. China's investments in both space and counterspace will affect U.S. national security and its military capabilities in consequential ways. These consequences will be manifest most clearly in the increased burdens imposed on the United States in regards to discharging its security obligations. China's space and counterspace programs signify an increase in the vulnerability of key U.S. military assets.

Some likely cases may be in the following form;

- The expansion of China's space and counterspace capabilities is an ineluctable part of the change in the balance of power in the Asia-Pacific and in the Asian continent in general.
- The growth of China's space and counterspace capabilities contributes to raising the costs of American victory in any future conflict with Beijing.
- China's evolving space and counterspace capabilities promise to expand the dimensions of the battle space, in the context of any future Sino-American conflict.
- The rise of China's space and counterspace capabilities poses specific challenges to the dominance traditionally enjoyed by the United States in the heavens (Tellis 2008).

The above discussion has sought to explain various possibilities related to the US space security, and in turn national interests. The US policy makers have expressed the view that the country must control its access to space; otherwise another nation will definitely do it. But it should control access with a balanced program of commerce, science and exploration, national security, and shared international partnerships.

The overall analysis of the US security policy shows that U.S. national security space policy is best characterized by continuity across many years and various administrations.

Continuity includes the U.S. commitment to basic principles first advanced by the United States at the outset of the Space Age, including the support for the Outer Space Treaty and other elements of international law, which US believes provide the legal authority to respond to the emerging challenges of the Twenty-First Century. International cooperation in space is crucial for the benefits of scientific research and human exploration. It is equally important to both U.S. national security and international security. Although the United States is determined to keep sufficient flexibility for its national security interests, the country also recognizes that some emerging external challenges require new forms of international cooperation with allies, friends and other responsible spacefaring nations to protect the free access to, and operations through, space. Amidst these discussions and the publication of space commission report in 2001, the debate over the space use has been vitalized. Space should be weaponized or not, on this issue there has been a division among scholars as well.

Debate: Space Weapons vs. Space Militarization

The debate about the weaponization of space has attracted the attention of experts in post-Cold War era. Though the space is not yet weaponized the efforts in that direction has been initiated by some countries especially United States. As has been mentioned earlier, it can be said that the weaponization of space is an advance step in the process of space militarization and that the process of space militarization was started during the Cold War with both superpowers using space for military purposes. But the idea of weaponization of space has not yet materialized. Whether space weaponization is good or bad, whether space weaponization can be avoided or it is inevitable, these things have become debatable. Experts are equally divided over these issues. Before proceeding on the debate over the space weaponization, the advancements of space militarization in post Cold War era is needed to understand.

Space militarization in post- Cold War period is reflected in excessive use of spy satellites, Global Positioning System (GPS), and Network- centric warfare (NCW). Military use of space has been confined to use of advanced technology. The influence of

modern information, communication and space technology over military has grown to the extent that it has been called as Revolution in Military Affairs (RMA).

RMA (Revolution in Military affairs)

Revolution in Military Affairs (RMA) is a military concept about the future of warfare. This concept is connected to modern information, communications, and space technology. As Gordon has pointed out, the concept of military transformation is often associated with Revolution in Military affairs (RMA) (Gordon 2008: 7). Some other experts have defined RMA as the combination of technological advances and revisions in operational concepts.1. According to Andrew Marshall, director of the Office of Net Assessments in the Office of the Secretary of Defense:

> "A Revolution in Military Affairs (RMA) is a major change in the nature of warfare brought about by the innovative application of new technologies which, combined with dramatic changes in military doctrine and operational and organizational concepts, fundamentally alters the character and conduct of military operations.[4]*

During the 1991 Gulf War, easy victory by the United States forces against Iraq was the result of military use of information technology at its zenith.[5] American dominance through superior satellite, weapons-guiding, and communications technology emphasized the enormous relative power of the US through technological advances. Subsequently, Kosovo war and second Gulf War also witnessed the experiment of RMA. Although the U.S. failures to capture Osama bin Laden and curb the Iraqi insurgency led some to question RMA's build-up as a military paradise.

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[4] (Online Web) http://www.iwar.org.uk/rma/resources/nato/ar299stc-e.html accessed on July 1st 2009

* "The Battlefield of the Future" - 21st Century Warfare Issues", Air University, (http://www.cdsar.af.mil/battle.bfoc.html) Chapter 3, p. 1, Jeffrey McKitrick, James Blackwell, Fred Littlepage, Georges Kraus, Richard Blanchfield and Dale Hill)

[5] "The Battlefield of the Future" - 21st Century Warfare Issues", Air University, (http://www.cdsar.af.mil/battle.bfoc.html) Chapter 3, p. 9, Col. James W. McLendon, "Information Warfare: Impacts and Concerns"

The consequences of RMA over warfare tactics and space militarization process has been observed by many experts. Russian analysts have noted the priority being given to the technologies seen as critical for automated command and control. Their defence leadership has openly acknowledged the need for serious and sustained effort in the area of information warfare (Gongora and Riekhoff 2000:94). From a comparative perspective, the United States remains well ahead in thinking of and implementing changes that stem from the RMA, although other nations like China and Russia may make selective use of the RMA to promote regional security goals (ibid).

Use of Space Based Assets

The use of space based assets has increased many fold in recent years. In Operation Iraqi Freedom (OIF), the United States used ten times the satellite capacity employed in the Gulf War of 1991. Over 100 military satellite supported the US and UK war effort. 27 Global positioning system satellites were available to help determine the exact location of special operations teams and of targets and around 24 communication satellites for command and control and to give warning of missile attack (Dolman 2005: 6).

The remarkable growth in use of space in warfare from Operation Desert Storm (ODS) to Operation Iraqi Freedom (OIF) is evident in the raw numbers. The use of operational satellite communications increased fourfold, despite being used to support a much smaller force (less than 200,000 personnel compared with more than 500,000) (Dolman 2005: 3). The permanent effect of space-enabled warfare was in the area of combat efficiency. The American striking power was more improved during these operations. In ODS, fewer than five percent of aircraft were GPS- equipped. By OIF, 100 percent were (Dolman 2005: 5). During Desert Storm, GPS proved so valuable to the army that it procured and rushed into theatre more than 4,500 commercial receivers to support 800 military- band ones it could deploy from stockpile, an average of one per company (around 200 personnel). By OIF, each army squad (6-10 soldiers) had atleast one military GPS receiver (Dolman 2005: 5)

Currently no US weapons have been stationed in space, but there are numerous components of weapons systems which forms an important element in modern war fighting. For example, in a battle situation the US military relies on space- based weather prediction system, military communication satellites (MILSTAR), espionage and surveillance satellites, early warning satellites (to provide information on missile launches) and military Global Positioning System (GPS) satellites to allow troops and vehicles to navigate and to quickly and accurately specify targets and guide smart bombs and unmanned aerial vehicles (UAVs) (Cooper 2003: 48).

The use of space by the military forces is now well established and in fact it has become indispensable for the US (Berkowitz 2007: 14). Pointing towards the importance of space, many experts have expressed the idea of space weaponization. In this context Theressa Hitchens has stated:

> "Unfortunately, the administration has done little thinking- at least publicly- about the potential for far-reaching military, political and economic ramifications of a U.S. move to break the taboo against weaponizing space. There is reason for concern that doing so could actually undermine, rather than enhance, the national security of the United States, as well as global stability. Thus it behooves the administration, as well as Congress, to undertake an in-depth and public policy review of the pros and cons of weaponizing space. Such a review would look seriously at the threat, both short-term and long-term, as well as measures to prevent, deter or counter any future threat using all the tools in the U.S. policy toolbox: diplomatic, including arms control treaties; economic; and military, including defensive measures short of offensive weapons. There is nothing to be gained, and potentially much to be lost, by rushing such a momentous change in U.S. space policy (Hitchens 2002).

Moreover, Bush administration has shown keener interest in space weaponization since the release of Space Commission Report in 2001. Noting that the United States is more dependent on the use of space than any other nation, the Space Commission report stated:

> Assuring the security of space capabilities becomes more challenging as technology proliferates and access to it by potentially hostile entities becomes easier. The loss of space systems that support military operations or collect intelligence would dramatically affect the way U.S. forces could fight, likely raising the cost in lives and property and making the outcome

less secure. U.S. space systems, including the ground, communication and space segments, need to be defended in order to ensure their viability (Space commission report 2001).

Rationale of Space Weaponization:

Supporters of space weaponization process mainly rely on the space commission report and the perceived threat against the vulnerability of US space assets. The United States' reliance upon space systems for numerous military force applications is an attractive target to many nations. The post-cold war era has left the United States with a reduced military in terms of personnel, equipment, and bases. This situation has forced US military to rely on space-based systems to overcome force size, enemy geographic advantages, and distance concerns.

Apart from this, the 1991 Persian Gulf War provided the first evidence of the growing danger commercial earth imaging satellite systems posed to US military operations. Military commanders have recognized that commercially available satellite images could deny their forces the element of surprise because images had become sharp enough to detect force deployments and movements. Since 1995 more than many countries have put commercial satellite-imagery systems into service, half with image-quality better than eight meters, further raising the threat posed to American and allied forces (Stephen Latchford 2005)[6].

In addition to this, Foreign Space Weapon Programs are a "Threat to U.S. Space Assets". Many countries (or groups of countries) are currently pursuing space power capabilities that could be a threat to the United States. China, with their recent demonstration of a physically destructive ASAT, may be the most dramatic example of threat to US space assets, but it is not the only one. Several states have developed capabilities that could be used against U.S. space systems. Russia also maintains significant space threat capabilities that were developed by the USSR. Russia also possesses laser, radio

[6] http://www.au.af.mil/au/awc/awcgate/cst/csat39.pdf

frequency, jamming, and electro-magnetic pulse (EMP) systems that could be employed against U.S. space capabilities (US State Department 2007)[7]. In addition to this, Non-state actors such as terrorist groups or individuals acting alone could attack and disable U.S. space assets.

"Threats" are not the only driving force behind the idea of space weaponization, other benefits are also derived from implementing space weaponization programs. Space weapons are the primary tools for information warfare, but at the same time they also provide an increased capability for stopping potential aggressors more effectively compared to conventional arms. However, the United States also stands to gain indirect benefits from achieving space dominance. It is possible that U.S. efforts to achieve primacy in space weaponization would prevent an arms race in space. Also, a space-based weapons system could be the basis of a stabilizing cooperative security regime in outer space under American leadership. (Park 2006).[8]

This way, US deployment of space weapons could bring more stability to international system. It would also maintain the US domination in space. The activities, efforts and strengths of counties like China and Russia, however, cannot be ignored. Moreover, without considering institutional arrangements to prevent the space race the whole picture of stable space weaponization does not appear.

Argument against Space Weaponization:

Things are not as smooth as framed by the supporters of space weaponization process. As Deblois has stated, Russia or China would not allow the United States to become the sole nation with space-based weapons. "Once a nation embarks down the road to gain a huge asymmetric advantage, the natural tendency of others is to close that gap. An arms race tends to develop an inertia of its own" (Deblois 1998).

[7] http://www.state.gov/documents/organization/85263.pdf
[8] http://www.hjil.org/ArticleFiles/28_3_871.pdf

The risks of weaponizing space for United States national security overshadow any gains. There are no credible threats to U.S. space hegemony in the near-term and any deployment or testing of space weapons would risk many of the advantages the U.S. currently enjoys. China and Russia have been worried about possible U.S. flight on space-based weaponry. Officials from both countries have expressed concern that the U.S. missile defence program is aimed not at what Moscow and Beijing see as a non-credible threat from rogue-nation ballistic missiles, but rather as a long-term U.S. effort to dominate space (Hitchens 2002)[9]. It is unbelievable that either Russia or China would allow the United States to become the sole nation with space-based weapons. And in this situation a space race becomes inevitable. Such a strategic-level space race could have negative consequences for U.S. security in the long run that would outweigh the obvious short-term advantage of being the first with space-based weapons.

Many experts also argue that there would be costs, economic and strategic, stemming from the need to counter other asymmetric challenges from those who could not afford to be participants in the race itself. Threatened nations or non-state actors might well look to terrorism using chemical or biological agents as one alternative. Karl Mueller, an analyst at RAND, in an analysis for the School of Advanced Airpower Studies at Maxwell Air Force Base, wrote, "The United States would not be able to maintain unchallenged hegemony in the weaponization of space, and while a space-weapons race would threaten international stability, it would be even more dangerous to U.S. security and relative power projection capability, due to other states' significant ability and probably inclination to balance symmetrically and asymmetrically against ascendant U.S. power" (Mueller 1998)[10]

The potential for strategic consequences of a space race has led many experts, including within the military, to push a space arms control regime as an alternative. A ban on space weapons and ASATs could help preserve the status quo of the U.S. advantage. It is

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[9] http://www.cdi.org/missile-defense/spaceweapons.cfm

[10] Karl Mueller, "Space Weapons and U.S. Security: The Dangers of Fortifying the High Frontier," prepared for the 1998 Annual Meeting of the American Political Science Association, Boston, Mass. (online web) http://www.cdi.org/missile-defense/spaceweapons.cfm#_ftn31

essential that U.S. policy makers must look at the potential strategic and direct military risks, and the costs, of weaponizing space.

Norms For Space Security

Cooperation at international level is the basic requirement for the peaceful use of space. Restricted use of space and restrain from full fledged weaponization of space can alone help in establishing a proper institutional arrangement to secure use of space. During cold war, many treaties like Outer Space Treaty in 1967, Rescue Agreement in 1968, Liability convention in 1972, Registration agreement in 1975 and Moon agreement in 1979 were some legal frameworks that have been negotiated in United Nations Committee on the Peaceful Use of Outer Space (COPUS). There have been some other treaties, convention and agreements which fall outside the aegis of COPUS like PTBT and INTELSAT. The overall purpose of these efforts was to establish a norm for space activities which could control the excessive space use and could prevent the degradation of space environment.

The prevention of an arms race in outer space (PAROS) has become a significant need, because there is at present no multilateral agreement banning the deployment of weapons other than weapons of mass destruction in outer space. The ad-hoc committee on the prevention of an arms race in outer space in 1994 came close to an agreement on starting negotiations on confidence- building measures. The Conference on Disarmament (CD) on 26th March 1998 agreed to establish special coordinators for prevention of an arms race in outer space. However, as of now this has not been institutionalized owing primarily to the fact that the US is opposed to any kind of treaty which prohibits deployment of weapons in outer space. The Bush administration openly advocated deployment of weapons in space for the security of space assets, which were considered critical to national and economic security. This US approach aggravated the situation, including space environment problem.

Space Debris and Space Environment:

Growing debris has been increasingly posing threat to safety of spacecraft. The number of objects in Earth orbit has increased steadily over the years and there were an estimated 35 million pieces of space debris in orbit in 2006 (Simon Collard-Wexler 2006). The growing trends of space militarization and the advancements towards space weaponization have created a grave problem of space debris. Space environment has been and still facing challenges in this regard. The impact of space debris upon space security is related to the amount of space debris at various orbits; space surveillance capabilities which track space debris to facilitate collision avoidance; and efforts to lessen existing space debris populations. The permanent solution to this problem is to stop the excessive space activities. Unless nations including major actors in space (US, China, Russia etc) will take some concrete steps, the question of space security will always be there. However, space weaponization process could certainly aggravate the problem. US should realize that the greed for space supremacy will ultimately harm the humanity as a whole and the blind space race either should stop completely or should be restricted.

Concluding the discussion in this chapter, it can be said that while there might be convincing logic for development of space weapons, for the security of satellites and other space instruments, possible offensive use of these weapons cannot be ignored. Any country with such capability can easily use it against its adversary. This is the main concern of many countries that are worried about the negative fallout of space weaponization. US efforts towards space weaponization and intense militarization have attracted strong reactions from several countries. Russia and China are two main actors who are very much active into space and have challenged the US supremacy in the space. In the next chapter, the whole action- reaction and responses of these actors will be analyzed in detail.

Chapter Four:

External Responses to Militarization of Space by the US

The Cold War period, among other things was dominated by the US and the Soviet competition in the outer space. In the second chapter, the relationship between the US and the Soviet Union space programs during the Cold War has been discussed in detail. During Cold War, Soviet Union was the main antagonist to the US space activities. Both countries during that period used the space for both military and civil purposes. Developments of spy satellites, ICBMs, ASAT missiles and SDI programs were some notable efforts towards militarization of space. With the end of Cold War a new development took place in the field of military use of space in the form of RMA (Revolution in Military Affairs). RMA changed the war strategy and afterwards focus shifted towards 'Network Centric Warfare'. During the first Gulf War, United States used this technique to win the war.

Dissolution of Soviet Union paved the way for the US domination of the space, as no other country was in a position to compete with the sole superpower. Soviet rivalry started converting into Russian cooperation on missile defences (Mowthorpe 2004: 214). But with the Clinton disapproval of the plan of missile defences with Russia, the offer of cooperation with Russia disappeared (ibid). This Russian move was forced by its economic insufficiency, but with its resurgence in later half of 1990s, Russia once again became a major player in space politics. In this process, Russia has been well supported by China. The People's Republic of China has developed considerable military capabilities including ASAT capability. These two countries, along with some European countries, have reacted strongly to US activities which have influence over the space security and space use.

Some recent developments have shown the responses of these countries towards the US space activities. For example, Russia has disapproved the intention of US policy makers to deploy Missile Defense in the Eastern European countries of Poland and the Czech Republic. Russia had also shown strong reactions when US, under the Bush administration, had withdrawn from ABM treaty. China tested ASAT missiles in January

2007. These developments show that the process of intense militarization and the idea of weaponization of space would necessarily attract responses and reactions.

The way the US military has used the space for intelligence, information and precision targeting, the dependence on space has increased extensively and with this, concerns have grown about the potential destabilization by adversaries. Washington's space doctrine is now set on maintaining dominance of the sector, while seeking to deny the use of space assets to its adversaries. In this context, when Russia is trying to regain its old superpower status in space through international cooperation with other actors such as the EU, China and India, and China is testing ASAT, there are speculations that all the major powers are engaged in the action- reaction cycle with the resolution to challenge anyone's domination in space.

China, an advocate of multi-polarity, is not prepared to accept US domination of the globe or outer space. In the Chinese strategic thinking, the US is perceived as the main threat, since it follows a policy of encircling China through Asian alliances. Both countries are very much suspicious about each other's ambitions in space and have perceived the necessity of space race. In the recent time, two major US initiatives attracted strong reactions from both China and Russia. First was the US withdrawal from ABM treaty[1] and second is the decision of deploying the Missile Defense system in Eastern Europe. Bush administration openly supported the idea of space weaponization and the developments mentioned above were the obvious outcome of the policies followed by the US. The analysis of these two incidents would proceed the way for the understanding of the politics of space and its implications on the policy making of a country.

US Withdrawal from the ABM Treaty:

[1] The Anti-Ballistic Missile Treaty (ABM Treaty or ABMT) was a treaty between the United States of America and the Soviet Union on the limitation of the anti-ballistic missile (ABM) systems used in defending areas against missile-delivered nuclear weapons. Signed in 1972, it was in force for the next thirty years until the US unilaterally withdrew from it in 2002.

The United States announced its unilateral withdrawal from the 1972 Anti-Ballistic Missile (ABM) Treaty on June 13, 2001. President George W. Bush in a short written statement noted that the treaty is "now behind us," and he reiterated his commitment to deploy missile defences "as soon as possible" to protect against "growing missile threats."

The ABM treaty was signed in 1972 by Washington and Moscow to slow the rapid missile race. This treaty barred both superpowers from deploying national defence systems against long-range ballistic missiles and also barred them from building the foundation for such a defence. The treaty was based on the premise that if either superpower constructed a strategic defence, the other would build up its offensive nuclear forces to counterbalance the defence. Till Bush entered into the White House, this treaty was accepted by most of the countries, including the United States, as the cornerstone of strategic stability because it facilitated later agreements limiting and reducing U.S. and Russian deployed strategic nuclear arsenals (Boese 2002).

According to Ronald Kadish[2], there were three benefits to US accruing from this treaty withdrawal. First is that the Pentagon will be permitted to experiment with different types of sensors, such as testing sea-based radars, to see if it can track strategic targets. In fact, the Missile Defense Agency (MDA) planned to use the radar in a test despite past Pentagon assessments that the radar is not capable of supporting strategic intercepts. Second, the Pentagon says it will now be able to explore greater international cooperation on missile defences and third, the United States will be free to deploy strategic missile defence systems. (ibid).

Though Bush had propagated the idea of deploying a missile defence system against attack from so-called "rogue states", like Iraq and North Korea, during the 2000 US presidential campaign, after the September 11 terror strikes on the World Trade Centre

[2] Ronald Kadish was director of the Pentagon's Missile Defense Agency (MDA) from Jan 2002 to September 2004.

and the Pentagon, Bush had emphasized the nightmare scenario of terrorists acquiring chemical, biological or nuclear arms and missiles able to reach the United States. The Bush Administration argued that North Korea and Iran constituted major strategic threats. North Korea not only tested a nuclear device but also has a ballistic missile program. The Bush Administration argued that Iran continues to acquire and develop ballistic missiles of various ranges (Hildreth 2009: 2). Further, in an interview, on 13 December 2001 Bush had said that "We know that the terrorists and some of those who support them seek the ability to deliver death and destruction to our doorstep via missile. And we must have the freedom and the flexibility to develop effective defences against those attacks," and "Defending the American people is my highest priority as commander-in-chief, and I cannot and will not allow the United States to remain in a treaty that prevents us from developing effective defenses." (Knox 2001)

After the withdrawal of the United States from the ABM Treaty, 'there is no longer a treaty prohibition against testing or deploying weapons in space other than weapons of mass destruction'(Jonathan Dean, 2002: 4). However, there are elements of the missile defence plans of the United States like space-based interceptors, which would necessitate the withdrawal from or modification of international treaties before their deployment. Its withdrawal from the ABM Treaty was a clear signal of America's commitment to moving ahead with space-based weapon options by removing legal obstacles in its path (Wolff 2003: 11).

Deployment of Missile Defense system

The planned deployment of Missile Defense system in Eastern Europe was one of the main reasons behind the US withdrawal from ABM treaty. On December 13, 2001, George W. Bush gave Russia a notice of the United States' withdrawal from the treaty, in accordance with the clause that requires six months' notice before terminating the pact. This was the first time in recent history the United States has withdrawn from a major international arms treaty. This led to the eventual creation of the Missile Defense Agency (ABM Treaty Fact Sheet 2001).

President George W. Bush announced the United States had pulled out of the 1972 Anti-Ballistic Missile Treaty in order to deploy a missile defence system despite Russia's objection (Knox 2001). According to Bush and other senior officials ABM treaty was the biggest obstacle in the way of development of National Missile Defense system. The announcement of US plan to deploy Missile Defense system in Eastern Europe was to counter the threat from "rogue states" such as Iran and North Korea. These developments have had enough effect to develop an apprehensive attitude by countries like China and Russia.

China's Reaction

There is debate among scholars about the Chinese reaction to US space policy. Because it is not clear what type of missile defence system the United States will finally deploy, or whether U.S. space control plans will be implemented, it is difficult to identify conclusively China's specific countermeasures. China's options for response include: building more ICBMs; adopting countermeasures against boost, mid-course, and terminal phase missile defence; developing ASAT weapons; and reconsidering China's commitments on arms control.

In 2007, China conducted an anti-satellite missile test. On 11th January 2007, a Chinese weather satellite was destroyed by a kinetic kill vehicle. Chinese government did not publicly confirm about the test in the first place; but on January 23, 2007, the Chinese Foreign Ministry officially confirmed that a test had been conducted. Experts like Eric Hagt have expressed the view that this test was an unambiguous challenge not to U.S. power in space but to its dominance in space (Hagt 2007: 31). China's success in human spaceflight mission in 2003 was also aimed at the US supremacy in the area. The People's Republic of China became the third nation to achieve human spaceflight when Yang Liwei launched into space on a Chinese-made vehicle, the Shenzhou 5, on October 15, 2003. Moreover, China is all set to develop its own navigation system, Compass

Navigation System, with the long-term goal to develop a global navigation satellite network similar to the GPS and GLONASS.[3]

These developments have made it clear that despite its opposition to the US militarization of space, China is not going to be a passive observer of the growing US efforts to dominate the space. China has its own perception about the US space activities that determines its progress and policies toward the outer space.

Chinese Perception of the US Space Activities:

Despite all the US claims about the Iranian and North Korean threat, a country like China is more apprehensive of the US challenge to its own security. Chinese are clearly more concerned about growing US presence in space. China released a White Paper in November 2000 with the title China's Space Activities (PRC 2000), which had described the Chinese strategy towards the development of a space programme. China is challenging the American space domination through all the possible ways. Perceiving the threat of intense militarization of space, Chinese expert Hui Zhang opines that US plans will negatively affect peaceful uses of outer space, disrupting current civilian and commercial initiatives; also the actions by the United States in space will result in a loss of strategic nuclear parity. Zhang detailed China's options for response which included building more ICBMs, adopting countermeasures against missile defence, developing ASAT weapons, and reconsidering China's commitments on arms control. Thus, it would be appropriate to say that introducing weapons into space would destabilize the already vulnerable international non-proliferation regime. Zhang has also added, "U.S. space weaponization plans would have potentially disastrous effects on international security and the peaceful use of outer space. This would not benefit any country's security interests" (Podvig and Zhang, 2008).

China's official view towards the space control and arms race in space is reflected in the statement made by Qiao Zonghuai[4]:

[3] For more information (online web) (http://www.sinodefence.com/space/spacecraft/beidou2.asp)

> Considerable progress has been made in outer space-related weapons research and military technology. It will not take long before drawings of space weapons and weapon systems [are] turned into lethal combat instruments in outer space. Meanwhile, military doctrines and [concepts] such as "control of space" and "ensuring space superiority" have been unveiled successively, and space operation [command] headquarters and combatant troops are in the making. If we should remain indifferent to the above-mentioned developments, an arms race would very likely emerge in outer space in the foreseeable future. Outer space would eventually become the fourth battlefield besides land, sea and air. If such a scenario should become reality it would be virtually impossible for mankind to continue their anticipated exploration, development and utilization of outer space, and all economic, cultural and social activities in connection with the utilization of outer space would be severely interrupted (Zonghuai 2002).

U.S. missile defence and space weaponization plans could directly affect China's national interests, security environment, and commercial and civilian space activities. A 2004 White Paper on China's national defence emphasized, "Outer space is the common property of mankind. China hopes that the international community would take action as soon as possible to conclude an international legal instrument on preventing the weaponization of and arms race in outer space through negotiations, to ensure the peaceful use of outer space " (PRC 2004).

According to Chinese officials, the United States is pursuing a "Space Control" strategy. Many Chinese officials and security experts have read with great interest the U.S. military planning documents issued in recent years. These documents clearly visualize U.S. control of space and the achievement of global military superiority through the use of weapons in or from space. The statements propose that the U.S. respond with the forceful domination of space and denial of access to those who may intend harm (Zhang 2008). A number of high-level official documents show the determination of the United States to develop, deploy, and use space weapons. In 2001, the report of a special commission on U.S. national security in space warned of the need to avoid a 'space Pearl Harbor'. The commission recommended that "the U.S. government...vigorously pursue

[4] Qiao Zonghuai was Vice Minister of Foreign Affairs during 2001- 2002 and is the leading Member of the Ministry of Foreign Affairs since 2002

the capabilities called for in the National Space Policy to ensure that the president will have the option to deploy weapons in space to deter threats to, and, if necessary, defend against attacks on U.S. interests" (Space Commission Report 2001). In August 2004, the Air Force released the document 'Counterspace Operations', which defines space superiority as the "freedom to attack as well as the freedom from attack" in space. Counterspace operations include offensive and defensive counterspace measures (Hitchens 2004). Thus, these reports and documents have shaped the Chinese thinking for containing the US efforts to achieve supremacy in space.

Some Chinese experts, like Zhigang, also feel that the U.S. plan to deploy a missile defence system is an intentional first step toward space weaponization. Fu Zhigang, the First Secretary of the Permanent Mission of the People's Republic of China (PRC) to the UN in Geneva, stated, "To pursue missile defense programs is part and parcel of the relevant country['s] long-term strategy to control...outer space." (Fu Zhigang 2000) Several documents have proposed that the U.S. military develop space-based weapons for prompt global force projection through space. Chinese officials believe the real purpose of U.S. space plans is not to protect U.S. assets but rather to further enhance U.S. military dominance. As one official pointed out, "Space domination is a hegemonic concept. Its essence is monopoly of space and denial of others' access to it. It is also aiming at using outer space for achieving strategic objectives on the ground. " (Wang Xiaoyu 1999)

Ambassador Hu Xiaodi warned:

> "It is rather the attempt towards the domination of outer space, which is expected to serve in turn the absolute security and perpetual superiority (many people call this hegemony) of one country on earth. The unilateralism and exceptionalism that are on the rise in recent months also mutually reinforce this. " (Hu Xiaodi 2001)[5]

Thus, it is quite evident that the Chinese strategic establishment has sceptical apprehensions regarding American plans for military use of space. Within China, it is

[5] For more detais see- http://news.xinhuanet.com/english/2005-05/23/content_2990285.htm

widely believed that U.S. missile defence and space planning targets China. Many Chinese are sceptical of U.S. statements that the purpose of missile defence is to protect against "rogue" states. Indeed according to Peter Brookes, advisor on East Asian affairs to the international relations committee of the U.S. Congress, "the major motive that drives the United States to develop and deploy missile defense systems is China's missile capability." Some Chinese analysts argue that deployment of U.S. missile defences will also support offensive operations. China is concerned about the US refusal to declare a no-first use policy. There is also concern in China about U.S. plans for global force projection. China also worries that U.S. space weapons and its missile defence system could subject China to political or strategic blackmail and infringe on China's sovereignty.

The inherent offensive and first-strike capabilities offered by space weapons would likely provoke destabilizing military and political responses from other countries. As Ambassador Hu points out, "With lethal weapons flying overhead in orbit and disrupting global strategic stability, why should people eliminate WMD (weapons of mass destruction) or missiles on the ground? This cannot but do harm to global peace, security and stability, hence be detrimental to the fundamental interests of all States."

The increasing amount of space debris is another worrying issue, as it poses a considerable hazard to all kinds of spacecraft, which concerns many Chinese scientists (Zhang 2008). Weaponizing space would worsen the space debris problem. Under U.S. space plans, a larger number of space weapons could be deployed. Many scientists are concerned that once space debris reaches a "critical density" a process of collisional cascading, a chain reaction where collision fragments trigger further collisions, will start. As a result, the density of debris surrounding Earth would be too great to allow the stationing or penetration of any satellites. Given concerns about space debris, some senior scientists in China emphasize that the definition of environmental pollution should not refer solely to Earth, but should include outer space, where human activities are also carried out.

Beijing is also concerned that the shield could one day be extended to East Asia and cover Taiwan as well. China maintains that Taiwan is an integral part of the Chinese mainland and has threatened to use force if it should ever declare independence (Knox 2001). From China's perspective, the United States' self-appointed guardianship of space is presumptuous and represents a genuine challenge to China's national security concerns. For the United States, China's extension into space symbolizes its ambitions to challenge U.S. national security. (Martel and Yoshihara 2003: 19)

Russian Response:

US unilateral withdrawal from ABM treaty was described by Russian President Vladimir Putin as "a mistake" (Knox 2001). Reacting sharply to this US move Putin further added:

> "Both Russia and the United States, compared with other nuclear powers, have for a long time had an effective system for penetrating anti-missile defenses and that is why I can say with complete certainty that the decision taken by the American president is not a threat to the security of the Russian Federation. We are not surprised by this decision, which we nevertheless consider to be a mistake..... Russia is not preparing to withdraw jointly from the ABM treaty as is proposed by the United States." (Knox 2001)

However, many experts including Podvig have expressed the idea that this US move would seriously jeopardize the security scenario at the global level. This move would further aggravate the space weaponization problem.

Russia and deployment of Missile Defense system

Russia has consistently opposed the US missile defense proposal since the United States first went public with the system. But despite appearing enraged, Russia remained calm, arguing that it already possessed the technology to deal with the interceptors the United States planned to place in Eastern Europe.

The United States, of course, insisted that the missile defence deployments would not target Russian missiles, but few people in Russia have been willing to believe this. In

Russia, U.S. missile defence is invariably thought to be directed against Russian strategic forces. Besides, the fact that elements of the missile defence system will reside in two new NATO countries alone serves as a point of contention (Podvig 2007). In a move, which can be said as a reaction to US Missile Defense plan, on February 10, 2007, Russian Federation President Vladimir Putin declared that the INF Treaty no longer serves Russia's interests. On February 14, ITAR-Tass and Interfax quoted General Yuri Baluyevsky, the Russian military's chief of general staff, as saying that Russia could pull out of the INF, and that the decision would depend on the United States' actions with its proposed Ground-Based Midcourse Defense missile defense system, parts of which the U.S. plans to deploy in Poland and the Czech Republic.

Putin's unhappiness with American foreign policy was evident from his denunciation of the "unipolar world." Putin particularly objected to the "almost unrestrained, exaggerated use of force" and what he sees as America imposing its legal norms "on other states in all spheres." Putin's complaints about American forces and missile defence systems being deployed in Eastern Europe "closer to our state borders" not only expresses his objection to the U.S. decision to send its forces there, but to East European governments' decisions to accept them (Katz 2007).

Supplementing the Chinese response to US space strategy Russia has also criticized the US space efforts towards militarization of space. In an interview, Head of Russia's armament department Vladimir Popovkin said that Moscow is ready to give an effective answer to Washington's plans to militarize space. In different interviews, Russian officials have expressed concerns about US effort to militarize the outer space. Sergei Ivanov in an interview in 2007 said that "The use of outer space for security and defense purposes is one thing, and the placement of weapons there is quite another." Further he added "The latter is absolutely unacceptable in our view, as it makes the global security situation unpredictable" (RIA Novosti 2009). Russia's strong reaction also came when US withdrew from ABM treaty and gave the idea of deployment of Missile Defense system in Eastern European countries Poland and Czech Republic.

Significantly, while the US has been openly following a policy of space militarization, Russia has advocated a different policy and has vehemently opposed militarization of space. According to Sergei Ivanov, "We will continue to work toward the demilitarization of space" (RIA Novosti 2007). Both countries are following different approaches for the use of outer space and in this way confrontation becomes inevitable. However, Russia's main concern is likely to be maintaining strategic parity with the United States. This parity will be destroyed by the deployment of weapons in space. Podvig writes, "Russia does not have many options for the development of its own weapon systems in space or for its reaction to the development of this capability by other countries. . . . However, this does not mean that there will be no reaction." He also suggests that Russia will be more likely to undertake other countermeasures such as extending the life of its ballistic missiles, measures that are "the most significant and dangerous global effects of new military developments, whether missile defense or space-based weapons" (Podvig and Zhang, 2008).

Russia's reaction to US National Space Policy 2006 also underlined opposition to US domination of space. Vitaly Davydov, deputy head of Roskosmos, added that the policy indicated that Americans "want not only to go to space but they want to dictate to others who else is allowed to go there." He claimed that if the US actually did deploy weapons in space, Russia "could respond." Davydov had called the NSP 2006 as "the first step toward a serious deepening of the military confrontation in space" (Space politics 2006).[6] Going in the same direction, a Russian analytical news site had reported at time of US withdrawal from ABM treaty that the danger of space war was potentially catastrophic and was being pursued without regard to its consequences. According to the news site, the true reason behind the American plans for global anti-ballistic missile defence and space militarization was that United States believed that over the next two to three decades, it could beat the others (Russia and China) in these spheres and gain a decisive strategic military advantage. In addition to this, the news site also said that US had initiated a Cold War type arms race and Russia and China would try to counter the U.S. missile defence systems and militarization of space (Rozoff 2009).

[6] http://www.spacepolitics.com/2006/11/30/russian-reaction-to-the-national-space-policy/

Going further, veteran Russian journalist Valentin Zorin said that "The new arms race will be incomplete without plans for the weaponization of outer space" and "U.S. attempts to turn outer space into a third field of combat operations may prove as dangerous as the American decision to use a nuclear device on August, 1945" (Voice of Russia 2008).

In what could be called as Russian initiative in the United Nations to oppose US policy of militarization of space, in November 2007, Russian ambassador to the UN, Vitaly Churkin, urged "UN member-states to join the moratorium on the deployment of weapons in outer space" and "mentioned that it is on Russia's initiative that the UN General Assembly has been adopting resolutions, for many years now, aimed at the prevention of the arms race in space. The only one who objected to the adoption of this resolution was the United States...." (Voice of Russia 2008)

Russian information agency in response to American space initiatives and the interconnection between missile defence and space-based first strike capabilities articulated that:

> "If [the missile defense system] is fully deployed (as three echelons of ground-, sea-, and air/space-based), the United States will regain the capability (for the first time since the 1940s-1950s) of launching a destructive first strike at Russia without fear of retaliation... The several dozen Russian missiles likely to survive a combined attack by nuclear and conventional forces (including precision weapons capable of destroying fortified launching sites), and hence meant to provide the retaliatory 'deterrent' strike, would be an easy target for a fully deployed combat-ready missile defense system"(Russian Information Agency Novosti, July 11, 2008).

After analyzing the action- reaction phenomenon in space, some arguments are noteworthy. It would be appropriate to say that the Russian leadership has been paying close attention to the US space program in recent years, which seems to indicate that Russia has set the goal of developing and deploying a full range of military space systems. If these plans become visible, Russian military satellites could become potential

targets for space-based weapon systems (or ground-based anti-satellite systems). In addition, the history of missile defence and anti-satellite programs of the Soviet Union suggest that Russia could initiate new development efforts in these areas as well. Programs in these areas would enable Russia to deploy its own space-based weapons to counter the military space systems deployed by the United States. Although it is highly unlikely that the relationship between Russia and the United States would reach the point of a competition or even an arms race in space, this possibility has been widely used to justify space- weaponization programs. It is, therefore, important to consider whether the current state of the Russian space program supports the idea of Russia as a competitor to the United States in space. (Podvig and Zhang, 2008: 26).

In this context, it is significant to note that, although an attack on some Russian space assets could theoretically have adverse effects on Russia's capability to conduct military operations, in practice none of the currently deployed military space systems is advanced enough for an attack to make a significant difference militarily (ibid: 28). The possibility that Russia will develop its own capability to deploy weapons in space or to build an anti-satellite system seems to be even more remote. First, Russia would certainly not become the first country to develop and deploy a space-related weapons system, as this would contradict its longstanding policy on the weaponization of space and its practice of following the United States in most technological developments. Besides, it is unlikely that without the United States committing itself to space-weapons development Russia would be able to make a decision to initiate any substantial effort of its own (ibid: 28). Even if the United States decided to introduce weapons in space, Russia would be unlikely to follow.

Podvig has further argued that it is more likely that Russia would turn to a policy of "asymmetric response," planning measures to counter the systems developed by the United States should they present a threat to Russia's space assets. This policy would be relatively easy to implement, for, as already noted, Russia's limited reliance on space systems does not make its armed forces overly susceptible to an attack on space assets (ibid). Russia does not have many options for the development of its own weapon

systems in space or for its reaction to the development of this capability by other countries, namely the United States. However, this does not mean that Russia will not react should the United States move forward with the weaponization of space. As was the case with the U.S. withdrawal from the ABM Treaty, the Russian reaction might not be very visible, but it will be strong nonetheless. For example, Russia has used the abrogation of the ABM Treaty as an excuse to extend the service life of its multiple-warhead ballistic missiles and has taken other measures that have not made nuclear arsenals safer or more secure (ibid).

European Responses to Missile Defense:

Not only have Russia and China responded to US initiative towards space, other countries especially friendly European countries have also responded to US move on ABM treaty and Missile Defense system. Mixed reactions came from these actors. Germany welcomed Bush's announcement as an opportunity to reduce the strategic nuclear threat. Reacting to the move, Germany announced that it was in favour of renegotiation of the ABM treaty. France had also responded by saying that US decision would provide strategic stability, though a French Foreign Ministry statement called the ABM treaty an essential component of strategic stability in recent years. Britain said the world had moved on since the ABM treaty was signed, stating that the treaty was a matter for those two countries and its future is essentially a matter for those, US and Russia.

Norway reacted sharply against this US move and said the move risked having serious consequences for the strategic stability that had been created in 1972. Norway was more restrained than its neighbour Sweden, which stated that the US decision could lead to new weapons' development and an increase in nuclear proliferation. Czech Republic had reacted by stating that the agreement was outdated. Thus, the reaction of Europe was mixed on these developments.

Space Ambition of Other Nations

Apart from China and Russia, other nations are also developing their space programs. Some of these countries are India, Japan, Brazil, Israel, South Korea and the EU. Though these countries' space programme are not directly a response to US space approach, it would be appropriate to say that in a changing global scenario some of these countries could pose a challenge to the US domination in the outer space. It has been observed that Russia is trying to regain its old superpower status in space through international cooperation with other actors such as the EU, China and India. In December 2005, the European Space Agency (ESA) and Moscow agreed on a space partnership that entailed boosting Russia's struggling manned space program with European technology in return for access to Russia's considerable expertise in the field. It has also entered into agreements with China and India on space exploration. As part of its newly found assertiveness, Moscow is intent on upgrading its own satellite system, GLONASS, and plans are underway for human missions to the moon and Mars.

As a result of all these collaborations, space is fast becoming a crowded place. China and India are now seeking to challenge Washington's dominance of the launch industry as well as emerge as low-cost competitors in the manufacturing of satellites for the would-be space powers. In the years to come, the outer skies and the solar system are likely to witness a mix of both competition and cooperation among the great and emerging space powers. For the sake of earth, it is hoped that cooperation and peace, rather than the weaponization of space, will gain the upper hand.

United Nations and Militarization of space by US:

The United Nations has consistently opposed any effort of militarization of space. Through all possible ways, UN has tried to discourage America from installing weapons into space. Since UN is powerless without the full consent of its permanent members, and US in one of them, it is almost impossible for UN to impose any restriction on American efforts towards militarization of space. Despite its limitation, UN has developed an

institutional framework to control use of outer space. Under the aegis of COPUOS (United Nations Committee on the Peaceful Uses of Outer Space) and CD (Conference on Disarmament), the UN has set a legal framework for the use of outer space. Moreover, countries like Russia and China have for years introduced resolutions in the United Nations calling for the prohibition of weapons in space and against the use of space for military purposes. The US has just as consistently opposed their efforts (Rozoff 2009). An expert has stated that "Along with the US missile shield program and the idea of a blitzkrieg, an outer space arms race is among the major destabilizing factors for global security" (RBC 2008). Amidst these global concerns, the better understanding of UN response towards space militarization and the knowledge of these institutional arrangements is needed.

United Nations and the Use of Outer Space:

The United Nations streamlines the use of outer space through United Nations Committee on the Peaceful Uses of Outer Space (COPUOS). COPUOS was established in 1958 (shortly after the launch of Sputnik) as an ad hoc committee. In 1959, it was formally established by United Nations resolution 1472 (XIV). The mission of COPUOS is "to review the scope of international cooperation in peaceful uses of outer space, to devise programs in this field to be undertaken under United Nations auspices, to encourage continued research and the dissemination of information on outer space matters, and to study legal problems arising from the exploration of outer space." Under the aegis of COPUS comes the implementation of five other treaties. They are the Outer Space Treaty, the Rescue Agreement, the Liability Convention, the Registration Convention and the Moon Treaty. All these agreements collectively deal with the activities in outer space.

Outer Space Treaty:

The Outer Space Treaty, formally known as the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, is a treaty that forms the basis of international space law. The

treaty was opened for signature in the United States, the United Kingdom, and the Soviet Union on January 27, 1967, and entered into force on October 10, 1967. As of January 2008, 99 countries are states-parties to the treaty, while another 26 having signed the treaty but have not yet completed ratification.

Article VI of the Outer Space Treaty deals with international responsibility, stating that "the activities of non-governmental entities in outer space, including the moon and other celestial bodies, shall require authorization and continuing supervision by the appropriate State Party to the Treaty" and that States Parties shall bear international responsibility for national space activities whether carried out by governmental or non-governmental entities.

The Outer Space treaty prohibits only weapons of mass destruction (WMD) in outer space. The principles of Outer Space Treaty prohibits States Parties to the Treaty from placing nuclear weapons or any other weapons of mass destruction in orbit of Earth, installing them on the Moon or any other celestial body, or to otherwise station them in outer space. This treaty exclusively limits the use of the Moon and other celestial bodies to peaceful purposes and expressly prohibits their use for testing weapons of any kind, conducting military maneuvers, or establishing military bases, installations, and fortifications (Article IV of Outer Space Treaty). However, the Treaty does not prohibit the placement of conventional weapons in orbit.

Rescue Agreement:

The Rescue Agreement was considered and negotiated by the Legal Subcommittee of the UN from 1962 to 1967. Consensus agreement was reached in the General Assembly in 1967 (resolution 2345 (XXII)), and the Agreement entered into force in December 1968. The Agreement, elaborating on elements of articles V and VIII of the Outer Space Treaty, provides that States shall take all possible steps to rescue and assist astronauts in distress and promptly return them to the launching State, and that Staes shall, upon request,

provide assistance to launching States in recovering space objects that return to Earth outside the territory of the Launching State (UNOOSA).[7]

Liability Convention:

The Convention on International Liability for Damage Caused by Space Objects, also known as the Space Liability Convention, is a treaty that expands on the liability rules created in the Outer Space Treaty of 1967. Because relatively few accidents have occurred resulting from space objects, the treaty has never yet been invoked.

Elaborating on Article VII of the Outer Space Treaty, the Liability Convention provides that a launching State shall be absolutely liable to pay compensation for damage caused by its space objects on the surface of the Earth or to aircraft and liable for damage due to its faults in space. The Convention also provides for procedures for the settlement of claims for damages.

Registration Convention:

This Convention requires states to furnish to the United Nations with details about the orbit of each space object. Since the Convention on Registration of Objects Launched into Outer Space entered into force in 1976, another register of launchings has been established for information received from Member States and intergovernmental organizations that are parties to the Convention. As of 1 January 2008, 51 States have ratified, 4 have signed and two international intergovernmental organizations (European Space Agency and European Organization for the Exploitation of Meteorological Satellites) have declared their acceptance of the rights and obligations provided for in the Registration Convention (UNOOSA).

[7] United Nations Office for Outer Space Affairs (UNOOSA)
For more details see- http://www.oosa.unvienna.org/

Moon Treaty:

The Moon Agreement was the outcome of intense negotiation in the Legal Subcommittee of the UN from 1972 to 1979. The Agreement was adopted by the General Assembly in 1979. The Agreement reaffirms and elaborates on many of the provisions of the Outer Space Treaty as applied to the Moon and other celestial bodies, providing that those bodies should be used exclusively for peaceful purposes, that their environments should not be disrupted, that the United Nations should be informed of the location and purpose of any station established on those bodies.

In practice, it is a failed treaty since it has not been ratified by any nation which engages in self-launched manned space exploration or has plans to do so (e.g. the United States, Russian Federation, People's Republic of China, Japan, India and Iran) since its creation in 1979 and, thus, has a negligible effect on actual spaceflight.

General Assembly First Committee and Fourth Committee:

The First Committee on Disarmament and International Security meets every year in October. At each meeting Disarmament Counselors and Ambassadors read statements on General or Thematic issues, propose draft resolutions, and vote on the resolutions. All 191 member states of the UN can attend. There is generally an annual PAROS resolution up for vote; some years addition resolutions related to outer space are proposed and voted on.

The Committee has played a crucial role in advancing space cooperation and provides a unique opportunity for the exchange of information among governments on the latest developments in the use and exploration of outer space. The fourth committee could be a better forum to work on preventing the weaponization of space than the first committee since the framework of this committee is based on development instead of security and there are more actors using space for development purposes than for military ones. The

4th Committee meets every year for a four or five week session following the General Assembly General Debate and is comprised of all UN member states.

Conference on Disarmament and PAROS Treaty:

There are two states that seem unwilling to cooperate with the international community on the issue of PAROS. The United States and Israel have consistently abstained during voting on the PAROS draft resolutions in First Committee. In 2005, the US hardened its position, voting "no" for the first time. The US argues that the existing multilateral arms control regime is sufficient, and that there is no need to address a nonexistent threat. The US said in the Conference on Disarmament on June 13, 2006, "there is no- repeat, no- problem in outer space for arms control to solve." The United States sent a State Department official to the CD to make its most overt defence of its right to develop space weapons to date. The US maintained that "The high value of space systems has led the United States to study the potential of space-related weapons to protect our satellites from potential future attacks, whether from the surface or from other spacecraft. As long as the potential for such attacks remains, our Government will continue to consider the possible role that space-related weapons may play in protecting our assets." The US maintained its rejection of the negotiation of PAROS treaty at the 2006 First Committee session. The United States is one of the states that are blocking progress of PAROS. The 1997 US SPACECOM document "Vision for 2020" outlined a new military vision to dominate the ace dimension and integrate space forces, in order to acquire "full spectrum dominance".

Criticism of US Role

Achieving consensus on a PAROS Treaty will be a challenge in the CD. It is difficult to imagine that the rest of the international community will be able to prevent the weaponization of space without the full cooperation of the US, given that the US has the largest number of space assets and commands the greatest control over outer space resources. The US is effectively blocking progress in the CD on the negotiation of a PAROS treaty. The Six Nation Initiative proposing that a General Assembly Ad Hoc

Committee for PAROS be established, in order to avoid the abuse of consensus rules in the CD, was effectively shut down by the US when they circulated a memo to the capitals of the six nations.

US Role during Voting in UN:

Towards the end of 2000, the United Nations General Assembly had a vote on a resolution called the "Prevention of Outer Space Arms Race." It was adopted by a recorded vote of 163 in favour to none against, with 3 abstentions. The three that abstained were the Federated States of Micronesia, Israel and the United States of America. (You can see the details from a U.N. press release, together with a list of countries that voted, were absent and so on.)

In June 2004, The United Nations reiterated concerns about the militarization of space and not being used for peaceful purposes in a U.N. General Assembly session:

> "The view was expressed that the [U.N.] Committee [on the Peaceful Uses of Outer Space] had not been fulfilling the mandate given to it by the General Assembly in recommending ways and means of maintaining outer space for peaceful purposes. That delegation expressed the view that the Committee should address itself to that issue, since military activities in outer space were seriously affecting international cooperation in the exploration and peaceful uses of outer space (COPUOS 2003).

Similar positions have been reiterated since, too. For example, October 2006 saw a near-unanimous vote at the General Assembly when 166 nations voted for a resolution to prevent an arms race in outer space. Only one country abstained, Israel, while only one voted against such a resolution, the United States of America.

Whether the Committee can be effective, as the General Assembly desires, depends largely on some of the most powerful nations in the world.

An overview of the Voting in the General Assembly:

year		US position
2008	International cooperation in the peaceful uses of outer space	adopted without vote
2007	International cooperation in the peaceful uses of outer space	opposed by America
2007	Recommendations on enhancing the practice of States and international intergovernmental organizations in registering space objects	No voting
2007	Transparency and confidence-building measures in outer space activities	opposed by America
2007	Prevention of an arms race in outer space	opposed by USA
2006	International cooperation in the peaceful uses of outer space	No vote
2006	United Nations Platform for Space-based Information for Disaster Management and Emergency Response	No vote
2006	Transparency and confidence-building measures in outer space activities	opposed by USA
2006	Prevention of an arms race in outer space	opposed by USA
2005	International cooperation in the peaceful uses of outer space	No voting
2005	Transparency and confidence-building measures in outer space activities	opposed by USA
2005	Prevention of an arms race in outer space;	opp. USA, Israel

Before 2005 (except in 2003 and 1983), in every GA resolution on use of outer space, USA had abstained from voting. But during most of the time under Bush administration, USA voted against the resolution which was against their plan of space militarization. On the basis of this it can be concluded that under Bush administration, US started following a strong and open policy on offensive use of outer space.

The above discussion indicates that the US is seriously considering the prospects of space weaponization. These changes started with the election of President Bush who, after coming to power, started showing the intention to use the outer space not only for military purpose but also for security and supremacy purpose. Even before the September 2001 attack, Bush had shown the intention to withdraw from ABM treaty. After six months of notice, US withdrew unilaterally from ABM treaty in December 2001. Incidentally these developments coincided with the September 11 attack. Though both incidents were not linked, September 11 attack gave the required motivation to go ahead with policy to contain any force which was active against the US national interests, by any possible means, be it outer space. ABM treaty withdrawal became the basis for the creation of 'Missile Defense Agency' in the US which gave the plan for the deployment of Missile Defense system in Easter Europe. The reason given for this was protection from the threats like Iran and North Korea. These developments send the idea to the world that the US was actively pursuing the policy of space militarization. This attracted responses from most of the actors in world politics. Reactions were mixed, both in support and against.

Moreover, the UN response towards space militarization has always been negative. UN, through its resolutions, always tried to discourage any activity which involved the military use of space and encouraged the activities involved peaceful use of outer space. But as far as UN working system is concerned, most of the time it is the superpowers (P-5) who decide the fate of UN resolutions. Since 2003, US has consistently opposed every resolution which prevents the military use of outer space. Under the Bush administration, US changed its stance from passive supporter of space militarization turned towards active support to the process of space militarization. Thus, it would be appropriate to say that under Bush administration, US efforts towards space militarization intensified and

US started pursuing the military use of outer space more openly. US National Space Policy 2006 has further consolidated this effort.

Considering the string of external responses especially from countries like China and Russia, it can be argued that though the US has tried to cooperate at international level, but the national interests has always dominated the debate about use of outer space. Nevertheless, Bush administration has driven by the perceived threat of 'Space Pearl Harbor' and the status of 'World Leader' not only in the land and sea but also in space.

Chapter Five:

Conclusion

National interests drive a country. It shapes a country's policy and its approach towards emerging circumstances. Use of space has begun to be accepted as one of the areas, which has the potential to promote and protect US national interests. In the latter half of the 20th century, space emerged as a strategic place where superpowers challenged each others' supremacy. The launch of Sputnik sparked a space race between the US and the Soviet Union which gradually resulted in space militarization. The development of ICBMs, Anti Ballistic Missile system, spy satellites etc intensified this process. Both the Superpowers started using space for defensive as well as offensive purposes and soon followed by countries like China. During the Cold War, the US first lagged behind its principal adversary, but seemed to be winning the space race by its successful Moon Mission. A significant development in the use of space became evident with the use of satellites by US forces during the first Gulf War for information gathering and attack on enemy's bases. Because of intense use of space, the issues of space security and later space weaponization became the focus of the whole discussion on space.

This study has made an attempt to examine some issues like evolution of US space policy, comparison between US space programme and Soviet space programme, the issue of space security and space weaponization and the external responses towards the US initiatives in space.

While the space age dawned in 1950s, the US national space policy 2006 provides a coherent and systematic US approach towards space. The evolution of US space policy actually experienced many phases. Before the launch of Sputnik, the US was not willing to take any major initiative to explore space. The Sputnik launch by a principal Cold War rival made the US scientific and technological abilities appear backward compared to the Soviets (at least on space) and compelled the US policymakers to structure a coherent space policy. The Cold War was continuing and realism was the dominant theory driving the international politics at that time. Successive US administrations adopted this thinking and the US space activities during this period were the combined outcome of these factors. Kennedy's Moon programs, the initiative of space shuttle program, Reagan's SDI program were implications of space politics. Space had become a medium to fulfil the national interests of that time and there is

no doubt about the fact that containing communism by defeating Soviets in every field was the main national interest of the United States.

Though the US administration had begun to view space as a potential war-fighting medium since late 1970s, the Space Policy of the US until after mid- 1990s mainly emphasized using space for peaceful purposes and at the same time for intelligence gathering and defence related activities. George W. Bush came with a new set of agenda to the White House. The 2001 Space Commission report focused on space security and spoke of the possibility of 'Space Pearl Harbor'. These developments indicated a change in US attitude towards space use. The neoconservative influence was perhaps responsible. National Space Policy towards national security opened the possibility of space weaponization. Experts like Katz and Hyman have also accepted the fact that US 2006 space policy has opened the way for the space weaponization. The change in US attitude could also be observed from the US voting in UN General Assembly on prevention on arms race in outer space. From 2003 onwards US has consistently voted against any initiative in UN to ban the weapons in space. Before this period, US used to abstain from voting on this issue. US official policy, during the George W. Bush administration, started openly supporting the space weapons for security purposes which drew strong reactions from countries like China and Russia. This analysis seems to prove the hypothesis of this study which stated that policy shift in US approach towards space threatened to start a new race for space weaponization. Though, from this study it is clear that the idea of space weaponization is not yet materialized, this idea has the potential to destabilize international peace and security. While chapter three explains the lethality of space weapons and danger towards world peace and security, it also points towards the necessity of space security. In case of US, the dependence over space has grown so high that any attack on the space assets like satellites will have crippling effect over its national security. So, the security of space assets have risen up in the US agenda. It has become evident that security of space is inseparably interlinked with the US national interest.

Not only national interest but space has been a medium to promote the US foreign policy goals. As one of the goals of National Space Policy 2006 is to strengthen the nation's space leadership and ensure that space capabilities are available in time to further U.S. national security, homeland security, and foreign policy objectives. The US officials have also accepted the fact that the space based capabilities have become an important requirement for the transformation required to effectively achieve American foreign policy goals. This

shows the mutual influence of space and politics over each other. Considering the US foreign policy goals, the US advancements in space has larger implications.

Soviet challenge in the space came to be perceived as a serious threat during the Cold War and this shaped the US space policy during the initial period. With the disappearance of Soviet threat in early 1990s and the end of Cold War, the US emerged as the lone superpower in world politics and the reflection of this transformation was quite evident in the US space activities. Chapter two focuses on the issue of comparison between Soviet space program and US space program, which is one of the objectives of the study. This study points out that initially US space policy was reactive to Soviet space advancements, but, as some experts have pointed out, with the successful Moon Mission, the US almost won the space race with the Soviet space program lagging behind. The US then went ahead with a proactive space policy.

Despite their rivalry in the outer space, both the superpowers avoided serious development of offensive space weapons, even during the height of the Cold War. Though they experimented with the technology, the two sides also refrained from actively deploying weapons that could shoot down satellites from ground, air or sea as well. They even signed many treaties including the 1972 Anti-Ballistic Missile (ABM) Treaty. American withdrawal from the ABM treaty in 2001 has fuelled the speculation that a new kind of space race might begin. The answer to this speculation lies with the future.

The end of Cold war was an epochal turn in the history of international relations as it triggered changes that altered the character of the prevailing world order. Space activities were also evident of this transformation. In post- Cold War period, use of space for military purposes has grown very much. During Operation Desert Storm, US military used the latest space technology and innovations to fight against Iraq. This transformation, called as RMA (Revolution in Military Affairs), has led to the new process of space militarization which is connected to modern information, communications, and space technology. During the 1991 Gulf War, victory by the United States forces against Iraq was seen as military use of information technology at its zenith. American dominance through superior satellite,

weapons-guiding, and communications technology emphasized the enormous relative power of the US through technological advances. The Kosovo war and second Gulf War also became the ground for the experiment of RMA. Although the U.S. failure to capture Osama bin Laden and the Iraqi insurgency led some to question RMA's build-up as a military paradise, the significant role of space for military has been established and the US more than any other country relies on the space assets for its military activities. By asserting that satellites are fair game in any military conflict, the United States arguably is providing even more incentives more political cover for any nation or actor interested in countering U.S. space power and space assets. Thus, protection of space assets has become vital from security as well as military point of view.

The US protection in space has practically culminated in militarization of space. The 2006 national space policy, with special emphasis on security, facilitated the space weaponization process. Critics have pointed out that the US is trying to establish the supremacy in the space arena and prevent others from access to space. US efforts towards the idea of installation of weapons in outer space have exposed their willingness to dominate the space with full control. It appears that the US has all the plans to secure its space assets at any cost, maintain complete domination of space, and deny the same to adversaries.

President Bush's National Space Policy is the first to explicitly identify space as "vital" to U.S. national interests. Space policy of the Bush administration has been criticized by many countries, especially China and Russia. One of the major implications of the US space approach is the emergence of China as a strong competitor in the outer space. Chinese activities into outer space have revealed the fact that China is all prepared to challenge the US supremacy in the space.

The People's Republic of China became the third nation to achieve human spaceflight in 2003. In addition to its recently acquired ASAT capability, China is all set to develop its own navigation system, Compass Navigation System, with the long-term goal to develop a global navigation satellite network similar to the GPS and GLONASS. Chinese perception is more concerned about its own national security and growing US influence in the region. According

to Chinese officials, the United States is pursuing a "Space Control" strategy. Some Chinese experts, like Zhigang, also feel that the U.S. plan to deploy a missile defense system is an intentional first step toward space weaponization. China also worries that U.S. space weapons and its missile defence system could subject China to political or strategic blackmail and infringe on China's sovereignty.

Recent developments have suggested the probable clash of interests between these two countries, which might lead to a new space race. In this context some examples can make the picture clearer. The US withdrew from the ABM treaty in 2001 and proposed establishment of a National Missile Defense System, which generated lots of criticism from Russia, China and some European countries. Russia and China clubbed each other at multilateral level against US unilateralist approach towards use of outer space. Subsequent developments led to China's ASAT test in January 2007 and in February 2008, shooting down of a falling spy satellite by the US. The US continues to back its missile defense plan and Russia, China still opposed to it. This whole picture leads to the conclusion that the US space programme and efforts towards intense militarization of space has now led to major space initiatives by countries like China and Russia to counter balance the increasing US presence in the outer space.

This study has also mead clear that as for as space weaponization is concerned, this process to be seen in the context of missile defence, increasingly accepted by US allies in the post 11 September political environment. The advocates of US weapons in space assume that US superiority is beneficial for international stability.

Here, it is appropriate to note that currently there is no US weapons stationed in space, but there are numerous components of weapons systems which form an important element in modern war fighting like MILSTAR, GSM etc. Frequent use of these systems along with the advancements of the missile defence plan led to the possibility of space weaponization.

An analysis of the 1996 National Space Policy and 2006 National Space Policy reveals important changes, which reflect the Bush Administration's shift towards a unilateralist approach to space. While the new policy stops short of endorsing a

strategy of war fighting "in, from and through" space as advocated by U.S. Air Force Space Command, it does show a clear emphasis on military action not only to protect U.S. space assets, but also to "deny" enemy use of space. Bush administration has accepted the fact that freedom of action in space is as important to the United States as air power and sea power. This led to the space exploration in hegemonic way.

The United States would not be able to maintain unchallenged hegemony in the weaponization of space, and while a space-weapons race would threaten international stability, it would be even more dangerous to U.S. security and relative power projection capability, due to other states' significant ability and probably inclination to balance symmetrically and asymmetrically against ascendant U.S. power.

There is no doubt about the fact that this kind of space race has all the potential to change the current power balance in world politics with adverse impact on international peace and security. With the issue of increasing space debris and more countries becoming active in the space, space is now evolving into a crowded and dangerous place, which necessitates regulation by a multilateral institution. For the achievement of stable peace and security, preventing weaponization of space through an understanding among big powers is required.

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Annexure- 1
U.S. National Space Policy August 31, 2006 (Unclassified)

The President authorized a new national space policy on August 31, 2006 that establishes overarching national policy that governs the conduct of U.S. space activities. This policy supersedes Presidential Decision Directive/NSC-49/NSTC-8, National Space Policy, dated September 14, 1996.

1. Background

For five decades, the United States has led the world in space exploration and use and has developed a solid civil, commercial, and national security space foundation. Space activities have improved life in the United States and around the world, enhancing security, protecting lives and the environment, speeding information flow, serving as an engine for economic growth, and revolutionizing the way people view their place in the world and the cosmos. Space has become a place that is increasingly used by a host of nations, consortia, businesses, and entrepreneurs.

In this new century, those who effectively utilize space will enjoy added prosperity and security and will hold a substantial advantage over those who do not. Freedom of action in space is as important to the United States as air power and sea power. In order to increase knowledge, discovery, economic prosperity, and to enhance the national security, the United States must have robust, effective, and efficient space capabilities.

2. Principles

The conduct of U.S. space programs and activities shall be a top priority, guided by the following principles:

- The United States is committed to the exploration and use of outer space by all nations for peaceful purposes, and for the benefit of all humanity. Consistent with this principle, "peaceful purposes" allow U.S. defense and intelligence-related activities in pursuit of national interests;

- The United States rejects any claims to sovereignty by any nation over outer space or celestial bodies, or any portion thereof, and rejects any limitations on the fundamental right of the United States to operate in and acquire data from space;

- The United States will seek to cooperate with other nations in the peaceful use of outer space to extend the benefits of space, enhance space exploration, and to protect and promote freedom around the world;

- The United States considers space systems to have the rights of passage through and operations in space without interference. Consistent with this principle, the United States will view purposeful interference with its space systems as an infringement on its rights;

- The United States considers space capabilities -- including the ground and space segments and supporting links -- vital to its national interests. Consistent with this policy, the United States will: preserve its rights, capabilities, and freedom of action in space; dissuade or deter others from either impeding those rights or developing capabilities intended to do so; take those actions necessary to protect its space capabilities; respond to interference; and deny, if necessary, adversaries the use of space capabilities hostile to U.S. national interests;

- The United States will oppose the development of new legal regimes or other restrictions that seek to prohibit or limit U.S. access to or use of space. Proposed arms control agreements or restrictions must not impair the rights of the United States to conduct research, development, testing, and operations or other activities in space for U.S. national interests; and

- The United States is committed to encouraging and facilitating a growing and entrepreneurial U.S. commercial space sector. Toward that end, the United States Government will use U.S. commercial space capabilities to the maximum practical extent, consistent with national security.

3. United States Space Policy Goals

The fundamental goals of this policy are to:

- Strengthen the nation's space leadership and ensure that space capabilities are available in time to further U.S. national security, homeland security, and foreign policy objectives;

- Enable unhindered U.S. operations in and through space to defend our interests there;

- Implement and sustain an innovative human and robotic exploration program with the objective of extending human presence across the solar system;

- Increase the benefits of civil exploration, scientific discovery, and environmental activities;

- Enable a dynamic, globally competitive domestic commercial space sector in order to promote innovation, strengthen U.S. leadership, and protect national, homeland, and economic security;

- Enable a robust science and technology base supporting national security, homeland security, and civil space activities; and

- Encourage international cooperation with foreign nations and/or consortia on space activities that are of mutual benefit and that further the peaceful exploration

and use of space, as well as to advance national security, homeland security, and foreign policy objectives.

4. General Guidelines

In order to achieve the goals of this policy, the United States Government shall:

- **Develop Space Professionals.** Sustained excellence in space-related science, engineering, acquisition, and operational disciplines is vital to the future of U.S. space capabilities. Departments and agencies that conduct space related activities shall establish standards and implement activities to develop and maintain highly skilled, experienced, and motivated space professionals within their workforce.

- **Improve Space System Development and Procurement.** United States space systems provide critical capabilities to a wide range of civil, commercial, and national security users. The primary goal of space system development and procurement must be mission success. Achieving this goal depends on effective research, development, acquisition, management, execution, oversight, and operations. Toward that end, departments and agencies shall create an environment that enables mission success, including, but not limited to, creating a common understanding of realistic and stable requirements and operational concepts; clearly identifying and managing risks, including system safety; setting and maintaining realistic and stable funding; delivering space capabilities on time and on budget; and providing acquisition managers with the tools, responsibility, budget flexibility, and authority to achieve this goal.

- **Increase and Strengthen Interagency Partnerships.** The challenges of the 21st century require a focused and dedicated unity of effort. Interagency partnerships provide opportunities to jointly identify desired effects, capabilities, and strategies. Departments and agencies shall capitalize on opportunities for dynamic partnerships — whether through collaboration, information sharing, alignment, or integration.

- **Strengthen and Maintain the U.S. Space-Related Science, Technology, and Industrial Base.** A robust science, technology, and industrial base is critical for U.S. space capabilities. Departments and agencies shall: encourage new discoveries in space science and new applications of technology; and enable future space systems to achieve new and improved capabilities, including incentives for high-risk/high-payoff and transformational space capabilities. Additionally, departments and agencies shall: conduct the basic and applied research that increases capability and decreases cost; encourage an innovative commercial space sector, including the use of prize competitions; and ensure the availability of space related industrial capabilities in support of critical government functions.

5. National Security Space Guidelines

United States national security is critically dependent upon space capabilities, and this dependence will grow. The Secretary of Defense and the Director of National Intelligence, after consulting, as appropriate, the Secretary of State and other heads of departments and agencies, and consistent with their respective responsibilities as set forth in the National Security Act of 1947, as amended, Title 10, U.S.C. and Title 50 U.S.C., the National Security Intelligence Reform Act of 2004, and other applicable law, shall:

- Support the President and the Vice President in the performance of Executive functions, and senior Executive Branch national security, homeland security, and foreign policy decisionmakers; other Federal officials, as appropriate; and the enduring constitutional government operations and infrastructure;

- Support and enable defense and intelligence requirements and operations during times of peace, crisis, and through all levels of conflict;

- Develop and deploy space capabilities that sustain U.S. advantage and support defense and intelligence transformation; and

- Employ appropriate planning, programming, and budgeting activities, organizational arrangements, and strategies that result in an operational force structure and optimized space capabilities that support the national and homeland security.

To achieve the goals of this policy, the Secretary of Defense shall:

- Maintain the capabilities to execute the space support, force enhancement, space control, and force application missions;

- Establish specific intelligence requirements that can be met by tactical, operational, or national-level intelligence gathering capabilities;

- Provide, as launch agent for both the defense and intelligence sectors, reliable, affordable, and timely space access for national security purposes;

- Provide space capabilities to support continuous, global strategic and tactical warning as well as multi-layered and integrated missile defenses;

- Develop capabilities, plans, and options to ensure freedom of action in space, and, if directed, deny such freedom of action to adversaries;

- Have responsibility for space situational awareness; in this capacity, the Secretary of Defense shall support the space situational awareness requirements of the Director of National Intelligence and conduct space situational awareness for: the United States Government; U.S. commercial space capabilities and services used for national and homeland security purposes; civil space capabilities and operations, particularly human space flight activities; and, as appropriate, commercial and foreign space entities; and

- Establish and implement policies and procedures to protect sensitive information regarding the control, dissemination, and declassification of defense activities related to space.

To achieve the goals of this policy, the Director of National Intelligence shall:

- Establish objectives, intelligence requirements, priorities and guidance for the intelligence community to ensure timely and effective collection, processing, analysis and dissemination of national intelligence;

- Ensure that timely information and data support foreign, defense, and economic policies; diplomatic activities; indications and warning; crisis management; treaty compliance verification; appropriate civil, homeland security, and law enforcement users; and perform research and development related to these functions;

- Support military planning and satisfy operational requirements as a major intelligence mission;

- Provide intelligence collection and analysis of space related capabilities to support space situational awareness for: the United States Government; U.S. commercial space capabilities and services used for national and homeland security purposes; civil space capabilities and operations, particularly human space flight activities; and, as appropriate, commercial and foreign space entities;

- Provide a robust foreign space intelligence collection and analysis capability that provides timely information and data to support national and homeland security;

- Coordinate on any radio frequency surveys from space conducted by United States Government departments or agencies and review, as appropriate, and approve any radio frequency surveys from space conducted by the private sector, State, or local governments; and

- Establish and implement policies and procedures to: classify attributable collected information and operational details of intelligence activities related to space; protect sensitive activities; and declassify and release such information when the Director determines that protection is no longer needed.

6. Civil Space Guidelines

The United States shall increase the benefits of civil exploration, scientific discovery, and

operational environmental monitoring activities. To that end, the Administrator, National Aeronautics and Space Administration shall: execute a sustained and affordable human and robotic program of space exploration and develop, acquire, and use civil space systems to advance fundamental scientific knowledge of our Earth system, solar system, and universe.

The Secretary of Commerce, through the Administrator of the National Oceanic and Atmospheric Administration, shall in coordination with the Administrator, National Aeronautics and Space Administration, be responsible for operational civil environmental space-based remote sensing systems and management of the associated requirements and acquisition process as follows:

- The Secretary of Commerce, through the National Oceanic and Atmospheric Administration, in collaboration with the Secretary of Defense through the Secretary of the Air Force, and the Administrator, National Aeronautics and Space Administration will continue to consolidate civil and military polar-orbiting operational environmental sensing systems in accordance with current policy direction;

- The Secretary of Commerce, through the National Oceanic and Atmospheric Administration, shall continue a program of civil geostationary operational environmental satellites with support from the National Aeronautics and Space Administration; and

- The Secretary of Commerce, through the National Oceanic and Atmospheric Administration, and the Administrator, National Aeronautics and Space Administration shall ensure to the maximum extent possible that civil space acquisition processes and capabilities are not duplicated.

The Secretary of the Interior, through the Director of the U.S. Geological Survey, shall collect, archive, process, and distribute land surface data to the United States Government and other users and determine operational requirements for land surface data.

The United States will study the Earth system from space and develop new space-based and related capabilities to advance scientific understanding and enhance civil space-based Earth observation. In particular:

- The Administrator, National Aeronautics and Space Administration shall conduct a program of research to advance scientific knowledge of the Earth through space-based observation and development and deployment of enabling technologies; and

- The Secretary of Commerce and the Administrator, National Aeronautics and Space Administration, and other departments and agencies as appropriate, in support of long-term operational requirements, shall transition mature research and development capabilities to long-term operations, as appropriate.

The United States will utilize government and commercial space-based and related capabilities wherever feasible to enhance disaster warning, monitoring, and response activities; and take a leadership role in international fora to establish a long-term plan for coordination of an integrated global Earth observation system and promote the adoption of policies internationally that facilitate

full and open access to government environmental data on equitable terms.

7. Commercial Space Guidelines

It is in the interest of the United States to foster the use of U.S. commercial space capabilities around the globe and to enable a dynamic, domestic commercial space sector. To this end, departments and agencies shall:

- Use U.S. commercial space capabilities and services to the maximum practical extent; purchase commercial capabilities and services when they are available in the commercial marketplace and meet United States Government requirements; and modify commercially available capabilities and services to meet those United States Government requirements when the modification is cost effective;

- Develop systems when it is in the national interest and there is no suitable, cost effective U.S. commercial or, as appropriate, foreign commercial service or system that is or will be available when required;

- Continue to include and increase U.S. private sector participation in the design and development of United States Government space systems and infrastructures;

- Refrain from conducting activities that preclude, deter, or compete with U.S. commercial space activities, unless required by national security or public safety;

- Ensure that United States Government space activities, technology, and infrastructure are made available for private use on a reimbursable, non-interference basis to the maximum practical extent, consistent with national security; and

- Maintain a timely and responsive regulatory environment for licensing commercial space activities and pursue commercial space objectives without the use of direct Federal subsidies, consistent with the regulatory and other authorities of the Secretaries of Commerce and Transportation and the Chairman of the Federal Communications Commission.

8. International Space Cooperation

The United States Government will pursue, as appropriate, and consistent with U.S. national security interests, international cooperation with foreign nations and/or consortia on space activities that are of mutual benefit and that further the peaceful exploration and use of space, as well as to advance national security, homeland security, and foreign policy objectives. Areas for potential international cooperation include, but are not limited to:

Space exploration; providing space surveillance information consistent with security

- requirements and U.S. national security and foreign policy interests; developing and operating Earth-observation-systems.

The Secretary of State, after consultation with the heads of appropriate Departments and Agencies, shall carry out diplomatic and public diplomacy efforts, as appropriate, to build an understanding of and support for U.S. national space policies and programs and to encourage the use of U.S. space capabilities and systems by friends and allies.

9. Space Nuclear Power

Where space nuclear power systems safely enable or significantly enhance space exploration or operational capabilities, the United States shall develop and use these systems. The use of space nuclear power systems shall be consistent with U.S. national and homeland security, and foreign policy interests, and take into account the potential risks. In that regard:

- Approval by the President or his designee shall be required to launch and use United States Government and non-government spacecraft utilizing nuclear power sources with a potential for criticality or above a minimum threshold of radioactivity, in accordance with the existing interagency review process;

- To that end, the Secretary of Energy shall: conduct a nuclear safety analysis for evaluation by an ad hoc Interagency Nuclear Safety Review Panel which will evaluate the risks associated with launch and in-space operations; assist the Secretary of Transportation in the licensing of space transportation; provide nuclear safety monitoring to ensure that operations in space are consistent with the safety evaluation performed; and maintain the capability and infrastructure to develop and furnish nuclear power systems for use in United States Government space systems; and

- For government spacecraft, the head of the sponsoring Department or Agency shall request launch approval and be responsible for the safe operation of the spacecraft in space.

- For the launch and use of non-government spacecraft utilizing nuclear power sources, the operator will be responsible for the safe operation of the spacecraft in space, including nuclear power sources. To that end:

- The United States Government shall designate a point of entry and develop procedures for reviewing non-governmental missions that use space nuclear power systems;

- The Secretary of Transportation shall be the licensing authority for U.S. commercial launch activities involving nuclear materials, including a payload determination, subject to the requirements described above;

The Nuclear Regulatory Commission will license activities prior to launch that involve

Energy;

- The United States Government will conduct safety analysis, evaluation, and nuclear safety monitoring on a fee-for-service basis, to the extent allowed by law, where the operator will fully reimburse the United States Government entity for services provided; and

- The Secretary of Energy shall establish and implement policies and procedures to protect sensitive information regarding the control, dissemination, and declassification of space-related nuclear activities.

10. Radio Frequency Spectrum And Orbit Management And Interference Protection

The use of space for national and homeland security, civil, scientific, and commercial purposes depends on the reliable access to and use of radio frequency spectrum and orbital assignments. To ensure the continued use of space for these purposes, the United States Government shall:

- Seek to obtain and protect U.S. global access to the radio frequency spectrum and orbital assignments required to support the use of space by the United States Government and commercial users;

- Explicitly address requirements for radio frequency spectrum and orbit assignments prior to approving acquisition of new space capabilities;

- Consistent with current approaches, assure, to the maximum practical extent, that U.S. national security, homeland security, civil, and commercial space capabilities and services and foreign space capabilities and services of interest to the United States Government are not affected by harmful interference; and

- Seek spectrum regulatory status under U.S. domestic regulations for United States Government owned and operated earth stations operating through commercial satellites, consistent with the regulatory status afforded commercial operations and with the allocation status of the satellite service.

11. Orbital Debris

Orbital debris poses a risk to continued reliable use of space-based services and operations and to the safety of persons and property in space and on Earth. The United States shall seek to minimize the creation of orbital debris by government and non-government operations in space in order to preserve the space environment for future generations. Toward that end:

Departments and agencies shall continue to follow the United States Government Orbital Debris Mitigation Standard Practices, consistent with mission requirements and cost

- effectiveness, in the procurement and operation of spacecraft, launch services, and the operation of tests and experiments in space;

- The Secretaries of Commerce and Transportation, in coordination with the Chairman of the Federal Communications Commission, shall continue to address orbital debris issues through their respective licensing procedures; and

- The United States shall take a leadership role in international fora to encourage foreign nations and international organizations to adopt policies and practices aimed at debris minimization and shall cooperate in the exchange of information on debris research and the identification of improved debris mitigation practices.

12. Effective Export Policies

As a guideline, space-related exports that are currently available or are planned to be available in the global marketplace shall be considered favorably.

Exports of sensitive or advanced technical data, systems, technologies, and components, shall be approved only rarely, on a case-by-case basis. These items include systems engineering and systems integration capabilities and techniques or enabling components or technologies with capabilities significantly better than those achievable by current or near-term foreign systems.

13. Space-Related Security Classification

The design, development, acquisition, operations, and products of intelligence and defense-related space activities shall be classified as necessary to protect sensitive technologies, sources and methods, and operations, consistent with E.O. 12958, E.O. 12951, and applicable law and regulation as amended.

- The Secretary of Defense and the Director of National Intelligence shall establish and implement policies and procedures to protect, disseminate, and appropriately classify and declassify activities and information related to their respective responsibilities outlined in this policy. Where appropriate, they shall coordinate their respective classification guidance.

The following facts are unclassified:

- The United States Government conducts: satellite photoreconnaissance that includes a near real-time capability; overhead signals intelligence collection; and overhead measurement and signature intelligence collection; and

- United States Government photoreconnaissance is used to:

Collect intelligence; monitor compliance with arms control agreements; collect mapping, charting, and geodetic data that is used to support defense and other

- mapping-related activities; collect scientific and environmental data and data on natural or man-made disasters; and the foregoing categories of information can be provided to authorized federal agencies;

- Provide information for indications and warning and the planning and conduct of military operations; and

Image the United States and its territories and possessions, consistent with applicable laws, for purposes including, but not limited to, homeland security.

Annexure- 2

National Space Policy: September 19, 1996

Introduction

(1) For over three decades, the United States has led the world in the exploration and use of outer space. Our achievements in space have inspired a generation of Americans and people throughout the world. We will maintain this leadership role by supporting a strong, stable, and balanced national space program that serves our goals in national security, foreign policy, economic growth, environmental stewardship, and scientific and technical excellence. Access to and use of space are central for preserving peace and protecting U.S. national security as well as civil and commercial interests. The United States will pursue greater levels of partnership and cooperation in national and international space activities and work with other nations to ensure the continued exploration and use of outer space for peaceful purposes.

(2) The goals of the U.S. space program are to:
(a) Enhance knowledge of the Earth, the solar system, and the universe through human and robotic exploration;
(b) Strengthen and maintain the national security of the United States;
(c) Enhance the economic competitiveness and scientific and technical capabilities of the United States;
(d) Encourage State, local, and private sector investment in, and use of, space technologies;
(e) Promote international cooperation to further U.S. domestic, national security, and foreign policies.

(3) The United States is committed to the exploration and use of outer space by all nations for peaceful purposes and for the benefit of all humanity. "Peaceful purposes" allow defense and intelligence-related activities in pursuit of national security and other goals. The United States rejects any claims to sovereignty by any nation over outer space or celestial bodies, or any portion thereof, and rejects any limitations on the fundamental right of sovereign nations to acquire data from space. The United States considers the space systems of any nation to be national property with the right of passage through and operations in space without interference. Purposeful interference with space systems shall be viewed as an infringement on sovereign rights.

(4) The U.S. Government will maintain and coordinate separate national security and civil space systems where differing needs dictate. All actions undertaken by agencies and departments in implementing the national space policy shall be consistent with U.S. law, regulations, national security requirements, foreign policy, international obligations, and nonproliferation policy.

(5) The National Science and Technology Council (NSTC) is the principal forum for resolving issues related to national space policy. As appropriate, the NSTC and NSC will co-chair policy processes. This policy will be implemented within the overall resource and policy guidance provided by the President.

Civil Space Guidelines

(1) The National Aeronautics and Space Administration is the lead agency for research and development in civil space activities.

(2) NASA, in coordination with other departments and agencies as appropriate, will focus its research and development efforts in: space science to enhance knowledge of the solar system, the universe, and fundamental natural and physical sciences; Earth observation to better understand global change and the effect of natural and human influences on the environment; human space flight to conduct scientific, commercial, and exploration activities; and space technologies and applications to develop new technologies in support of U.S. Government needs and our economic competitiveness.

(3) To enable these activities, NASA will:
   (a) Develop and operate the International Space Station to support activities requiring the unique attributes of humans in space and establish a permanent human presence in Earth orbit. The International Space Station will support future decisions on the feasibility and desirability of conducting further human exploration activities.
   (b) Work with the private sector to develop flight demonstrators that will support a decision by the end of the decade on development of a next-generation reusable launch system.
   (c) Continue a strong commitment to space science and Earth science programs. NASA will undertake:
      (i) a sustained program to support a robotic presence on the surface of Mars by the year 2000 for the purposes of scientific research, exploration, and technology development;
      (ii) a long-term program, using innovative new technologies, to obtain in-situ measurements and sample returns from the celestial bodies in the solar system;.
      (iii) a long-term program to identify and characterize planetary bodies in orbit around other stars;
      (iv) a program of long-term observation, research, and analysis of the Earth's land, oceans, atmosphere, and their interactions, including continual measurements from the Earth Observing System by 1998.
   (d) In carrying out these activities, NASA will develop new and innovative space technologies and smaller, more capable spacecraft to improve the performance and lower the cost of future space missions.

(4) In the conduct of these research and development programs, NASA will:
   (a) Ensure safety on all space flight missions involving the Space Shuttle and the International Space Station.
   (b) Emphasize flight programs that reduce mission costs and development times by implementing innovative procurement practices, validating new technologies and promoting partnerships between government, industry, and academia.
   (c) Acquire spacecraft from the private sector unless, as determined by the NASA Administrator, development requires the unique technical capabilities of a NASA center.
   (d) Make use of relevant private sector remote sensing capabilities, data, and information products and establish a demonstration program to purchase data products from the U.S. private sector.
   (e) Use competition and peer review to select scientific investigators.
   (f) Seek to privatize or commercialize its space communications operations no later than 2005.

(g) Examine, with DoD, NOAA, and other appropriate Federal agencies, the feasibility of consolidating ground facilities and data communications systems that cannot otherwise be provided by the private sector.

(5) The Department of Commerce (DoC), through the National Oceanic and Atmospheric Administration (NOAA), has the lead responsibility for managing Federal space-based civil operational Earth observations necessary to meet civil requirements. In this role, DoC, in coordination with other appropriate agencies, will:
   (a) acquire data, conduct research and analyses, and make required predictions about the Earth's environment;
   (b) consolidate operational U.S. Government civil requirements for data products, and define and operate Earth observation systems in support of operational monitoring needs; and
   (c) in accordance with current policy and Public Law 102-555, provide for the regulation and licensing of the operation of private sector remote sensing systems.

(6) The Department of the Interior, through the U.S. Geological Survey (USGS), will maintain a national archive of land remote sensing data and other surface data as appropriate, making such data available to the U.S. Government and other users.

(7) The Department of Energy will maintain the necessary capability to support civil space missions, including research on space energy technologies and space radiation effects and safety.

National Security Space Guidelines

(1) The United States will conduct those space activities necessary for national security. These activities will be overseen by the Secretary of Defense and the Director of Central Intelligence (DCI) consistent with their respective responsibilities as set forth in the National Security Act of 1947, as amended, other applicable law, and Executive Order 12333. Other departments and agencies will assist as appropriate.

(2) Improving our ability to support military operations worldwide, monitor and respond to strategic military threats, and monitor arms control and nonproliferation agreements and activities are key priorities for national security space activities. The Secretary of Defense and the DCI shall ensure that defense and intelligence space activities are closely coordinated and that space architectures are integrated to the maximum extent feasible, and will continue to modernize and improve their respective activities to collect against, and respond to, changing threats, environments, and adversaries.

(3) National security space activities shall contribute to U.S. national security by:
   (a) providing support for the United States' inherent right of self-defense and our defense commitments to allies and friends;
   (b) deterring, warning, and, if necessary, defending against enemy attack;
   (c) assuring that hostile forces cannot prevent our own use of space;
   (d) countering, if necessary, space systems and services used for hostile purposes;
   (e) enhancing operations of U.S. and allied forces;
   (f) ensuring our ability to conduct military and intelligence space-related activities;
   (g) satisfying military and intelligence requirements during peace and crisis as well as through all levels of conflict;
   (h) supporting the activities of national policy makers, the intelligence community, the National Command Authorities, combatant commanders and the military services, other Federal officials, and continuity of Government operations.

(4) Critical capabilities necessary for executing space missions must be assured. This requirement will be considered and implemented at all stages of architecture and system planning, development, acquisition, operation, and support.

(5) The Department of Energy, in coordination with DoD, ACDA, and the DCI will carry out research on and development of technologies needed to effectively verify international agreements to control special nuclear materials and nuclear weapons.

(6) Defense Space Sector Guidelines:
   (a) DoD shall maintain the capability to execute the mission areas of space support, force enhancement, space control, and force application.
   (b) In accordance with Executive Orders and applicable directives, DoD shall protect critical space-related technologies and mission aspects.
   (c) DoD, as launch agent for both the defense and intelligence sectors, will maintain the capability to evolve and support those space transportation systems, infrastructure, and support activities necessary to meet national security requirements. DoD will be the lead agency for improvement and evolution of the current expendable launch vehicle fleet, including appropriate technology development.
   (d) DoD will pursue integrated satellite control and continue to enhance the robustness of its satellite control capability. DoD will coordinate with other departments and agencies, as appropriate, to foster the integration and interoperability of satellite control for all governmental space activities.
   (e) The Secretary of Defense will establish DoD's specific requirements for military and national-level intelligence information.
   (f) The Secretary of Defense, in concert with the DCI, and for the purpose of supporting operational military forces, may propose modifications or augmentations to intelligence space systems as necessary. DoD may develop and operate space systems to support military operations in the event that intelligence space systems cannot provide the necessary intelligence support to DoD.
   (g) Consistent with treaty obligations, the United States will develop, operate, and maintain space control capabilities to ensure freedom of action in space and, if directed, deny such freedom of action to adversaries. These capabilities may also be enhanced by diplomatic, legal, or military measures to preclude an adversary's hostile use of space systems and services. The United States will maintain and modernize space surveillance and associated battle management command, control, communications, computers, and intelligence to effectively detect, track, categorize, monitor, and characterize threats to U.S. and friendly space systems and contribute to the protection of U.S. military activities.
   (h) The United States will pursue a ballistic missile defense program to provide for: enhanced theater missile defense capability later this decade; a national missile defense deployment readiness program as a hedge against the emergence of a long-range ballistic missile threat to the United States; and an advanced technology program to provide options for improvements to planned and deployed defenses.

(7) Intelligence Space Sector Guidelines:
   (a) The DCI shall ensure that the intelligence space sector provides timely information and data to support foreign, defense, and economic policies, military operations, diplomatic activities, indications and warning, crisis management, and treaty verification, and that the sector performs research and development related to these functions.
   (b) The DCI shall continue to develop and apply advanced technologies that respond to changes in the threat environment and support national intelligence priorities.
   (c) The DCI shall work closely with the Secretary of Defense to improve the intelligence space sector's ability to support military operations worldwide.

(d) The nature, the attributable collected information, and the operational details of intelligence space activities will be classified. The DCI shall establish and implement policies to provide appropriate protection for such data, including provisions for the declassification and release of such information when the DCI deems that protection is no longer required.

(e) Collected information that cannot be attributed to space systems will be classified according to its content.

(f) These guidelines do not apply to imagery products, the protection of which is governed by Executive Order 12951.

(g) Strict security procedures will be maintained to ensure that public discussion of satellite reconnaissance by Executive Branch personnel and contractors is consistent with DCI guidance. Executive Branch personnel and contractors should refrain from acknowledging or releasing information regarding satellite reconnaissance until a security review has been made.

(h) The following facts are UNCLASSIFIED:

(i) That the United States conducts satellite photoreconnaissance for peaceful purposes, including intelligence collection and monitoring arms control agreements.

(ii) That satellite photoreconnaissance includes a near real-time capability and is used to provide defense-related information for indications and warning, and the planning and conduct of military operations.

(iii) That satellite photoreconnaissance is used in the collection of mapping, charting, and geodetic data and such data is provided to authorized Federal agencies.

(iv) That satellite photoreconnaissance is used to collect mapping, charting, and geodetic data to develop global geodetic and cartographic materials to support defense and other mapping-related activities.

(v) That satellite photoreconnaissance can be used to collect scientific and environmental data and data on natural or human-made disasters, and such data can be disseminated to authorized Federal agencies.

(vi) That photoreconnaissance assets can be used to image the United States and its territories and possessions.

(vii) That the United States conducts overhead signals intelligence collection.

(viii) That the United States conducts overhead measurement and signature intelligence collection.

(ix) The existence of the National Reconnaissance Office and the identification and official titles of its senior officials. All other details, facts, and products of intelligence space activities are subject to appropriate classification and security controls as determined by the DCI.

(x) Changes to the space intelligence security policy set forth in the national space policy can be authorized only by the President.

Commercial Space Guidelines

(1) The fundamental goal of U.S. commercial space policy is to support and enhance U.S. economic competitiveness in space activities while protecting U.S. national security and foreign policy interests. Expanding U.S. commercial space activities will generate economic benefits for the Nation and provide the U.S. Government with an increasing range of space goods and services.

(2) U.S. Government agencies shall purchase commercially available space goods and services to the fullest extent feasible and shall not conduct activities with commercial applications that preclude or deter commercial space activities except for reasons of national security or public safety. A space good or service is "commercially available" if it is currently offered commercially, or if it could be supplied commercially in response to a Government service procurement request. "Feasible" means that such goods or services meet mission requirements in a cost-effective manner.

(3) The United States will pursue its commercial space objectives without the use of direct Federal subsidies. Commercial sector space activities shall be supervised or regulated only to the extent required by law, national security, international obligations, and public safety.

(4) To stimulate private sector investment, ownership, and operation of space assets, the U.S. Government will facilitate stable and predictable U.S. commercial sector access to appropriate U.S. Government space-related hardware, facilities, and data. The U.S. Government reserves the right to use such hardware, facilities, and data on a priority basis to meet national security and critical civil sector requirements. Government space sectors shall:
   (a) Enter into appropriate cooperative agreements to encourage and advance private sector basic research, development, and operations while protecting the commercial value of the intellectual property developed.
   (b) Identify, and propose appropriate amendments to or the elimination of, applicable portions of U.S. laws and regulations that unnecessarily impede commercial space sector activities.
   (c) Consistent with national security, provide for the timely transfer of Government-developed space technology to the private sector in such a manner as to protect its commercial value, including retention of technical data rights by the private sector.
   (d) To the extent feasible, pursue innovative methods for procurement of space products and services.

(5) Free and fair trade in commercial space launch services is a goal of the United States. In support of this goal, the United States will implement, at the expiration of current space launch agreements, a strategy for transitioning from negotiated trade in launch services toward a trade environment characterized by the free and open interaction of market economies. The U.S. Trade Representative, in coordination with the Office of Science and Technology Policy and the National Economic Council, will develop a strategy to guide this implementation.

(6) Consistent with Executive Order 12046 and applicable statutes, U.S. Government agencies and departments will ensure that U.S. Government telecommunications policies support a competitive international environment for space-based telecommunications.

Intersector Guidelines

The following paragraphs identify priority intersector guidance to support major U.S. space policy objectives.

(1) International Cooperation
The United States will pursue and conduct international cooperative space-related activities that achieve scientific, foreign policy, economic, or national security benefits for the Nation. International agreements related to space activities shall be subject to normal interagency coordination procedures, consistent with applicable laws and regulations. U.S. cooperation in international civil space activities will:
   (a) Promote equitable cost-sharing and yield benefits to the United States by increasing access to foreign scientific and technological data and expertise and foreign research and development facilities;
   (b) Enhance relations with U.S. allies and Russia while supporting initiatives with other states of the former Soviet Union and emerging spacefaring nations;
   (c) Support U.S. technology transfer and nonproliferation objectives;
   (d) Create new opportunities for U.S. commercial space activities; and
   (e) Protect the commercial value of intellectual property developed with Federal support and ensure that technology transfers resulting from cooperation do not undermine U.S. competitiveness and national security.

(f) In support of these objectives:
  (i) NASA and the Department of State will negotiate changes in the existing legal framework for International Space Station cooperation to include Russia in the program along with the United States, Europe, Japan, and Canada; and
  (ii) NASA, in coordination with concerned U.S. Government agencies, will explore with foreign space agencies and international organizations the possible adoption of international standards for the interoperability of civil research spacecraft communication and control facilities.

(2) Space Transportation
  (a) Assuring reliable and affordable access to space through U.S. space transportation capabilities is fundamental to achieving national space policy goals. Therefore, the United States will:
    (i) Balance efforts to modernize existing space transportation capabilities with the need to invest in the development of improved future capabilities;
    (ii) Maintain a strong transportation capability and technology base to meet national needs for space transport of personnel and payloads;
    (iii) Promote reduction in the cost of current space transportation systems while improving their reliability, operability, responsiveness, and safety;
    (iv) Foster technology development and demonstration to support a future decision on the development of next-generation reusable space transportation systems that greatly reduce the cost of access to space;
    (v) Encourage, to the fullest extent feasible, the cost-effective use of commercially provided U.S. products and services that meet mission requirements; and
    (vi) Foster the international competitiveness of the U.S. commercial space transportation industry, actively considering commercial needs and factoring them into decisions on improvements to launch facilities and vehicles.
  (b) The Department of Transportation (DoT) is the lead agency within the Federal Government for regulatory guidance pertaining to commercial space transportation activities, as set forth in 49 U.S.C. 701, et seq., and Executive Order 12465. The U.S. Government encourages and will facilitate U.S. private sector and State and local government space launch and recovery activities.
  (c) All activities related to space transportation undertaken by U.S. agencies and departments will be consistent with PDD/NSTC-4.

(3) Space-Based Earth Observation
  (a) The United States requires a continuing capability for space-based Earth observation to provide information useful for protecting public health, safety, and national security. Such a capability contributes to economic growth and stimulates educational, scientific, and technological advancement. The U.S. Government will:
    (i) Continue to develop and operate space-based Earth observing systems, including satellites, instruments, data management, and dissemination activities;
    (ii) Continue research and development of advanced space-based Earth observation technologies to improve the quality and reduce the costs of Earth observations;
    (iii) Support the development of U.S. commercial Earth observation capabilities by:
      — pursuing technology development programs, including partnerships with industry;
      — licensing the operation and, as appropriate, the export of private Earth observation systems and technologies, consistent with existing policy;
      — providing U.S. Government civil data to commercial firms on a nondiscriminatory basis to foster the growth of the "value-added" data enhancement industry; and

— making use, as appropriate, of relevant private sector capabilities, data, and information products in implementing this policy.

(iv) Produce and archive long-term environmental data sets.

(b) The U.S. Government will continue to use Earth observation systems to collect environmental data and provide all U.S. Government civil environmental data and data products consistent with OMB Circular A-130, applicable statutes and guidelines contained in this directive.

(c) The U. S. Government will seek mutually beneficial cooperation with U.S. commercial and other national and international Earth observation system developers and operators, to:

(i) define an integrated global observing strategy for civil applications;

(ii) develop U.S. Government civil Earth-observing systems in coordination with other national and international systems to ensure the efficient collection and dissemination of the widest possible set of environmental measurements;

(iii) obtain Earth observation data from non-U.S. sources, and seek to make such data available to users consistent with OMB Circular A-130, national security requirements, and commercial sector guidance contained in the national space policy; and

(iv) support, as appropriate, the public, nondiscriminatory direct readout of data from Federal civil systems.

(d) The U.S. Government space sectors will coordinate and, where feasible, seek to consolidate Earth observation activities to reduce overlaps in development, measurements, information processing, and archiving where cost-effective and consistent with U.S. space goals.

(i) In accordance with PDD/NSTC-2, DoC/NOAA, DoD, and NASA shall establish a single, converged National Polar-Orbiting Environmental Satellite System to satisfy civil and national security requirements.

(ii) NASA, DoC/NOAA, DoD, the intelligence community, and DoE shall work together to identify, develop, demonstrate, and transition advanced technologies to U.S. Earth observation satellite systems.

(iii) In accordance with PDD/NSTC-3, NASA, DoC/NOAA, and DoI/USGS shall develop and operate an ongoing program to measure the Earth's land surface from space and ensure the continuity of the Landsat-type data set.

(iv) Consistent with national security, the U.S. Government space sectors shall continue to identify national security products and services that can contribute to global change research and civil environmental monitoring, and seek to make technology, products, and services available to civil agencies for such uses. Both unclassified and, as appropriate, classified data from national security programs will be provided through established mechanisms.

(4) Nonproliferation, Export Controls, and Technology Transfer

(a) The MTCR Guidelines are not designed to impede national space programs or international cooperation in such programs as long as such programs could not contribute to delivery systems for weapons of mass destruction. Consistent with U.S. nonproliferation policy, the United States will continue to oppose missile programs of proliferation concern, and will exercise particular restraint in missile-related cooperation. The United States will continue to retain a strong presumption of denial against exports of complete space launch vehicles or other MTCR Category I components.

(b) The United States will maintain its general policy of not supporting the development or acquisition of space launch vehicle systems in non-MTCR states.

(c) For MTCR countries, we will not encourage new space launch vehicle programs which raise questions from a proliferation and economic standpoint. The United States will, however, consider exports of MTCR-controlled items to MTCR countries. Additional safeguard measures could also be considered for such exports, where appropriate. Any exports would remain subject to the nontransfer provisions of the INF and START treaties.

(d) The United States will work to stem the flow of advanced space technology to unauthorized destinations. Executive departments and agencies will be fully responsible for protecting against adverse technology transfer in the conduct of their programs.

(e) In entering into space-related technology development and transfer agreements with other countries, Executive departments and agencies will take into consideration whether such countries practice and encourage free and fair trade in commercial space activities.

(5) Arms Control

The United States will consider and, as appropriate, formulate policy positions on arms control and related measures governing activities in space, and will conclude agreements on such measures only if they are equitable and effectively verifiable and enhance the security of the United States and our allies. The Arms Control and Disarmament Agency (ACDA) is the principal agency within the Federal Government for arms control matters. ACDA, in coordination with DoD, the DCI, State, DoE, and other appropriate Federal agencies, will identify arms control issues and opportunities related to space activities and examine concepts for measures that support national security objectives.

(6) Space Nuclear Power

The Department of Energy will maintain the necessary capability to support space missions which may require the use of space nuclear power systems. U.S. Government agency proposals for international cooperation involving space nuclear power systems are subject to normal interagency review procedures. Space nuclear reactors will not be used in Earth orbit without specific approval by the President or his designee. Such requests for approval will take into account public safety, economic considerations, international treaty obligations, and U.S. national security and foreign policy interests. The Office of Science and Technology Policy, in coordination with the NSC staff, will examine the existing approval process, including measures to address possible commercial use of space nuclear systems.

(7) Space Debris

(a) The United States will seek to minimize the creation of space debris. NASA, the intelligence community, and DoD, in cooperation with the private sector, will develop design guidelines for future Government procurements of spacecraft, launch vehicles, and services. The design and operation of space tests, experiments, and systems will minimize or reduce accumulation of space debris consistent with mission requirements and cost-effectiveness.

(b) It is in the interest of the U.S. Government to ensure that space debris minimization practices are applied by other spacefaring nations and international organizations. The U.S. Government will take a leadership role in international forums to adopt policies and practices aimed at debris minimization and will cooperate internationally in the exchange of information on debris research and the identification of debris mitigation options.

(8) Government Pricing

The price charged for the use of U.S. Government facilities, equipment, and services will be based on the following principles:

(a) Prices charged to U.S. private sector and State and local government space activities for the use of U.S. Government facilities, equipment, and services will be based on costs consistent with Federal guidelines, applicable statutes, and the commercial guidelines contained within the policy. The U.S. Government will not seek to recover design and development costs or investments associated with any existing facilities or new facilities required to meet U.S. Government needs and to which the U.S. Government retains title.

(b) Consistent with mission requirements, NASA and DoD will seek to use consistent pricing practices for facilities, equipment, and services.

(c) Tooling, equipment, and residual hardware on hand at the completion of U.S. Government programs will be priced and disposed of on a basis that is in the best overall interest of the United States while not precluding or deterring the continuing development of the U.S. commercial space sector.