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Neo-Realism and American Space Policies, Capabilities and Endeavours

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Abstract

Neo-realism effectively provides the theoretical lens to understand the American Space policies, capabilities, endeavours, and accomplishments in space realm. According to the neo-realism it is the anarchic international system that dictates the behaviour of units/states. There are two offshoots of neo-realism: defensive and offensive realism. Defensive realism aimed at security maximization and offensive realism aimed at power maximization. Main hypothesis is that US is both security and power maximiser in outer space and neo-realism provides effective theoretical understanding of the American space program. America is maintaining its hegemony and control in space because it knows that the one who dominate in the space will dominate in the terrestrial power domain. USA is maintaining its full spectrum dominance in space. Reagan incepted "Star Wars" and "Strategic Defence Initiative" program, Trump inaugurated a separate space force, US withdrew from Anti-Ballistic Missile treaty, its Anti-satellite tests, X-37B capability, and American use of space technology in Operation Desert Storm of 1991 and Operation Iraqi Freedom of 2003 indicated that America regarded space as essential component to amalgamate its space assets with terrestrial warfighting capabilities and to enhance its space power posture and offensive space capability. The scope of the study is that this article is using descriptive, analytical, qualitative, and deductive research approach where theoretical framework of neo-realism, defensive realism and offensive realism are used, applied, tested, and verified. The rational of study is that it provides the detailed theoretical analysis of American space policies, endeavours, and capabilities.

Key Words: *Strategic Defence Initiative (SDI), Space Force, Space Assurance, Star Wars, Anti-Satellite (ASAT), National Aeronautics and Space Administration (NASA), Ground Protection Against Limited Strikes (GPALS).*

Introduction

Space emerged as a new fourth medium of warfare after terrestrial means i.e. land, air and naval power. Space race was started since inception of space age. Space exploration was started by launching the first satellite Sputnik I in 1957 by former Soviet Union and followed by launching Explorer I by United States of America (USA) (Sheehan, 2007). This space expedition was started in the peak time of hostility in cold war between two superpowers i.e. USA and erstwhile United Socialist Soviet Republic (USSR). Space race shifted our angle of attention towards theoretical paradigm of realism. At the time of cold war period space race remained continued between US and formed USSR. USA emerged as space hegemon in Cold War period. Neo-realism effectively provides the theoretical lens to understand the American space

capabilities, endeavours and accomplishments in space realm. According to the neo-realism, it is the anarchy that dictates states to be a security maximiser (i.e. defensive realism) or power maximiser (i.e. offensive realism). USA is both security maximiser and power maximiser in outer space. It is maintaining its hegemony and control in space because it knows that the one who dominate the space will dominate in the terrestrial power domain.

Problem Statement

The problem statement is that USA is major spacefaring state but still it is maximizing its power and security in space realm because of the anarchic nature of international system.

Research Questions and the Aims and Objectives of the Study

The aims and objectives of this research are to investigate the theoretical understanding of the questions that:

- Why America is behaving in certain way to get space control?
- Space policies of USA are examined to get the answer that Why America adopted space policies of space control?
- Why USA is depending on space?
- How America used space assets at the time of wars?
- Why USA is tilted toward space weaponization and want to get space hegemony and space power status?

This paper contributes to the field of study in the ways that it is providing theoretical answer to the aforementioned questions. It provides policy perspectives and theoretical perspectives of American space program.

Significance and the Scope of the Study

The significance and the scope of the study is that it is applied research where Neo-realism and its two offshoots i.e. defensive and offensive realism are used to address the aforementioned questions. This article is using descriptive, analytical, qualitative, and deductive research approach where theoretical framework of neo-realism, defensive realism and offensive realism are used, applied, tested and verified. It is the anarchy that dictates USA to adopt offensive and defensive space policies to maximise power and security. It is the anarchy that forced USA to behave in certain way to be space hegemon.

Structure of the Study

The structure of the study includes different sections such as, Introduction, Problem Statement, Research Questions and the Aims and Objectives of the Study, Significance and the Scope of the Study, Structure of the Study, Literature Review, Literature Gaps, Proposed Approach and Solutions, Research Methodology, Neo-realism, its application on US space capabilities, defensive realism, its application for US space arm race, Offensive realism, its application for US space endeavours, Neo-Realism and American Space Policy Development Since Space Age, Neo-Realism and American Space Usage in Conflicts, Critical analysis, and Conclusion.

Literature Review

Dora Holland and Jack O. Burns throw light on American space polices adopted since the time of Eisenhower till the period of Obama administration and divided American space policy making into three major domains. The objectives behind American space program are to enhance its private space program, to compete with China in space realm, and to have human, Mars, and military space program. They used content analysis techniques on the five basic themes such as "competition, prestige, collaboration, leadership, and "a new paradigm". Forty primary and secondary documents were analysed. According to Holland and Burns American leaders are drafting mixed space policies. On one side American objective was to dominate and on other side they were internationally cooperating with their allies. Every American leader from the Eisenhower till Obama designed space policies to maintain American space hegemonic and leadership role. Holland and Burns suggested that America should adopt realistic policy, play effective role, and wisely collaborate with international allies by lowering ITAR barriers (Holland & Burns, 2018).

James Clay Moltz in his article titled as "The Changing Dynamics of Twenty-First-Century Space Power" provides the comprehensive understanding of international space politics in cold war and 21st century period. According to Moltz, the politics of space in cold war period was military led. However, in 21st century, space goals aimed to achieve cheapest space technological development to explore space. Moltz pointed out the fact that to be space hegemon, states need to enhance their commercial space endeavours. Balance of power in military and commercial space realm is mandatory. Moltz quoted Gen Jay Raymond in his article where Raymond stated that space hegemonic stature is only earned and cannot be hereditary transferred. Moltz elucidates that American space program is better than Russian and Chinese because it is having less governmental interference and more commercial robustness. Succinctly, USA is space power (Moltz, 2019).

Fabio Tronchetti and Hao Liu in their article titled as "The Trump administration and outer space: promoting US leadership or heading towards isolation?" throw light on Trump's space policy. Trump signed Space Policy Directive 1 and established National Space Council. He wanted American leadership in space. He reinvigorated human and moon mission. He was the proponent of commercial space program where private companies could play role in space exploration. Trump's approach was American-centred approach that was not appealing to other states and resulted into American isolation in space realm. The successful policy must be a balanced approach between individual and collective interests. In order to maintain American leadership role, it needs to adopt balanced approach (Tronchetti & Liu, 2018).

Brian Weeden in the chapter titled as "U.S.-China Cooperation in Space: Constraints, Possibilities, and Options" published in the book titled as "Anti-satellite Weapons, Deterrence and Sino-American Space Relations" edited by Michael Krepon and Julia Thompson provided two approaches to enhance the prospects of Sino-US space cooperation. First one is top-down approach and second one is bottom-up approach. The second approach is less costly and more feasible because first approach involves distrust at leadership level amid both states (Weeden, 2013). Michael Sheehan in his book titled as "The International Politics of Space" provide enlightening detail about the American space program. However, this book provides limited knowledge about America space program. Sheehan covered only the US space policy making from 1957 till 1972 (Sheehan, 2007).

Literature Gaps, Proposed Approach and Solution

Dora Holland and Jack O. Burns in their article provides the one-sided picture of American space endeavours and neglect the Chinese space role. The writers proposed the unrealistic goals of Sino-US

space cooperation and suggested that by lowering the ITAR barriers for China, US and China can cooperate in space realm, which seems impossible for USA. This article lacks the theoretical framework as well. Michael Sheehan's book also provide little information regarding American space program. He covered the initial period of the American space program from 1957 till 1972. Fabio in his article only analysed space policy of Trump administration.

Succinctly, there is lack of comprehensive data available in this field of research which can provide best political, strategic, and theoretical answer to this study. Available data is having shortcomings and deficiencies which this proposed study will fill. None of the study address the question that why US is behaving in this certain way? This study will address this question by adopting theory of Neo-realism. USA is behaving in this way because of anarchic international system. According to this theory, it is the anarchic international system that dictates states to adopt self-help strategy to maximize national power and security. Proposed study is significant because it is providing up-to-date and authentic study. It is using the theory which appropriately provides answer to the aforementioned question. In social sciences and especially in IR, things and events keeps on changing shortly. This is postmodernist world where narratives matter. Every writer has its own scheme of study. So, to fill the literature gap, this research article is mandatory. This article will provide a new insight to policy makers in drafting national space policy.

Research Methodology

Qualitative research methodology is adopted in this article. Deductive approach is used, and the theoretical framework of Neo-Realism is applied, tested and verified in this research. Primary and secondary data are used which contain material from official documents, books, articles from research journal, newspaper articles, website material, reports, magazine articles and material from online sources such as Google scholar, Google, ISI Web, online libraries, HEC digital library, and Wiley online library. Descriptive and analytical research technique is used.

Theoretical Framework: Neo-Realism

Kenneth Waltz in his publication "Theory of International Politics" (Williams, 2008) published in 1979 introduces a new theory related to structure of international politics. International system consists of structure and the interacting units (Williams, 2008). While defining structure, Waltz provided three elements that compose structure. The ordering principle (in form of anarchy of hierarchy), character of units (Are states function in same manner or not) and distribution of capabilities (multi-polarity, bipolarity or unipolarity) dictate the role of structure (Elman, 2007). Anarchy and the element of self-help are common in structure so the element of differences in capabilities serves as the decisive factor in describing the characteristics of structure prevailing in international system. System dictates the behaviour of units. States follow certain norms that servers their best advantage.

Jervis focused on two concepts while defining system. Firstly, units in system are interconnected so; the change in one part foresees the change in other. Secondly, the differences in properties, behaviour and relationship in system made it complex. The policies or the outcomes of units are grounded on the aggressive nature as well as on the attainment of their goals. In international politics the aim of states is to acquire capabilities for the sake of prestige and survival as a sovereign political entity.

Hans Morgenthau argued that the ultimate goal of states is to secure themselves in anarchical international system through self-help. The struggle for power in form of space race resulted in security

dilemma and trilemma. The increase in space capabilities of one state increases the insecurity of other state/s that resulted in endless space arm race. The increasing space capabilities of USA appeared as threatening to the nuclear capabilities of China and posed hurdle in reunification issue of Taiwan (Zhang, 2005). So, action-reaction game to counter other state never ends. Power is the irreplaceable constituent in space competition. Space assets not only give military superiority but also a source of prestige for (space capabilities owning) states.

Advent of space age embraces space in making national security policy of state. National security policy includes the power struggle in space to dominate in earth-based relations or in international system. USA wants to maintain its full spectrum dominance in space till 2020 (Granoff & Eisendrath, 2005). John F. Kennedy in 1960s declared space exploration as an important adventure that cannot be ignored by states to get power and dominance in international system. Reagan took Strategic Defence Initiative (SDI) and Trump decided to have separate space force. Intention of American policy makers is to intact terrestrial war fighting capabilities with space to become unchallengeable hegemon in international system (Granoff & Eisendrath, 2005).

Use of space and satellite are considered as an important element in making of foreign policy and strategies. Strategic significance of satellite increases day by day. Satellites are using for many purposes including communication, surveillance, reconnaissance, navigation, and also for metrological purposes. The dependence on satellites increases their vulnerability. These satellites act also as weapons to destroy the adversaries' satellites present in space. Element of uncertainty also lies in space. Space assists the states to use force in combat/conflict. States' ultimate aim is to use space for its own favour and deny the use of space for their enemy (Sheehan, 2007).

Application of Neo-Realism and US Space Capabilities

Ordering principal of space is based on anarchy. It is a no-man arena, where technology is deployed to ameliorate terrestrial and extra-terrestrial power and prestige. Character of units is also alike while dealing with space. States especially USA is using space for their power maximization. Due to the absence of mankind from space, states started developing space weapons that are enhancing the prospects of weaponization of outer space. States are functioning alike and keep on developing their space assets and space weapons to enhance their power and (national) security (and security of their space assets). Endless arm race is leading towards security dilemma/trilemma in international anarchic system. For instance, USA is having civilian and military satellites. It also tested its Anti-Satellite (ASAT) technology. International system dictates states to behave in the same way. The objectives of states are same to secure themselves by use of latest space technology and instruments. In order to avoid conflict and mutual insecurities, Glaser gives strategy to cooperate, but Weber considers this cooperation limited and unstable.

Defensive Structural Realism

Neo-realism is also known as structural realism. It is having two offshoots that is known as defensive and offensive realism. Defensive realism is also known as the structural theory of realism. Its origin seems in late 1970's with the publication of "Theory of international politics" by Waltz. There is anarchy in international system; the aim of states is to seek security, dominance and survival through power without disturbing "Balance of Power (BOP)". States act defensively instead of offensively. The threat comes from other states that lie in close proximity; their intentions and aims are aggressive and possess offensive capabilities. Close proximity is justified not only on the bases of geography but with the advent of nuclear and space age every state includes in close proximity.

There are three main components or characteristics of defensive realism. Firstly, the behaviour of states is based on rational choices. Secondly, offense-defence balance favours defence. The conquest and revisionist ideology are difficult to pursue. The concern of states is to protect their existing position and resources rather than gaining benefits by the use of war as a mean. Thirdly, the aim of state is to maintain status quo and balance (Elman, 2007). Randall Schweller argues that defensive realism is status quo biased theory (Mearsheimer, 2001) because the target of state is to "attain appropriate amount of power" (Elman, 2007) so that no other state disturbs its position (Waltz, 1997). The hegemony-seeking attitude is irrational.

"Balance checkmates offence" (Mearsheimer, 2001) is the key concept of this theory. The basics of defensive realism are seen in the "Balance of threat theory" (Elman, 2007) that emphasis on balancing through formation of alliances as a mean to protect from aggressor state in anarchy. At the time of conflict, the urgent decision of victim state is to go for balancing through alliances against aggressor and afterwards increase their capabilities without exceeding power. Excessive power creates security dilemma. Wolfer in his writing security dilemma concludes that security dilemma produces worst scenario and left states in permanent situation of uncertainty and quest for "appropriate amount of power" is apropos (Elman, 2007).

Herz argued that defensive actions are misinterpreted as offensive that give rise to the chances of war (Elman, 2007). Element of uncertainty, miscalculation, desire for gain benefit, security dilemma and domestic level factors leads states to go for war, but rational state never choose war as mean to achieve end. Joseph Grieco's term of "defensive Positionalist" focuses on the defensive role assign to state (Donnelly, 2005). The objective of states is to minimize the gap that favours other state through alliance or enhancing power. If there is balance in the relation, the aim of states is to preserve that balance of power and not to maximize the gap in their own favour (Waltz, 1997). They deny the argument of war against all however underscored on concept of BOP.

Application of Defensive Realism and US Space Arm Race

Erstwhile USSR launched Sputnik I in 1957 and for the sake of balancing, USA launched Explorer-I in January 1958. Later on, former USSR developed space mines and Reagan started the "Star Wars and "Strategic Defence Initiative" to balance the space power of earlier Soviet Union. Furthermore, the space arms race is not only existing between USA and Russia, afterwards new spacefaring states emerged, and the space race was started between USA and China. Chinese had serious concern over "Counter space operation doctrine" released in 2004 by American Air Force about space superiority. This doctrine has based on argument of freedom to attack and freedom from attack (Hui, 2006). Defensive realism motivates states to secure themselves by maintaining balance of power. So, in order to balance it, in January 2007 China tested its Anti-Satellite (ASAT) capability (MacDonald, 2008). America threatened from that Chinese ASAT test and tested its own ASAT technology in 2008. In space realm, states in order to balance the power of other states keeps on building and tested its space (weapons) capabilities that is simply leading to unending arm race and security dilemma/trilemma. The National Intelligence Director of USA, James Clapper argued that Chinese Anti-Satellite missile tests of 2007 pose a threat to satellites present in Low Earth Orbit (LEO) of USA. So, USA tested its own ASAT capability to balance Chinese ASAT threat.

Offensive Realism

Offensive realism shares some commonalities with other variants of realism to identify the reasons of

conflict. Offensive realism is differentiated from defensive realism on the subject matter of amount of power. Appropriate amount of power to maintain balance of power is enough for defensive realism whereas, there is no limit for acquiring power in offensive realism. The ultimate target of every state is to become unchallengeable hegemon. The reason of acquiring limitless power is to gain advantage of the situation in which benefits surpass costs (Mearsheimer, 2001).

Element of uncertainty in anarchic international system of offensive attack by other state could not be eradicated and that forced state to acquire relative power at the expense of others to ensure their survival and security. Relative power maximization in anarchic international system to survive is possible by becoming hegemon. There are five basic assumptions of offensive realism given by John Mearsheimer (Elman, 2007):

- Anarchy is the basic element of international system. No overarching government is there to perform the function of check and balance in international system.
- States possess offensive military capabilities that can be used to damage others.
- States are not sure about the intentions of other states. States have imperfect knowledge about fluctuating intention of states. There is no guarantee that other side would not use force against them.
- Main aim of state is to secure their survival. Security and survival of states depends on themselves. Pre-requisite responsibility of state is to survive autonomously in anarchic international system through self-help. So that no other state challenges their survival.
- States acts rationally. Their strategies are based on rational choice to secure themselves unconditionally.

An argument was established from these assumptions that the best way to secure a state is through self-help. Mearsheimer's theory of offensive realism is based on the ideology of revisionism. Offensive Positionalist motivates states to acts offensively in international system. States kept on increasing their share in world politics to become hegemon. That led them to an unending security competition (Snyder, 2002). The best defence of every state is its good offence (Snyder, 2002). In Offence-defence balance, offense favours in offensive realism. Offensive action of state considers the fact that it should not be proved as a self-defeating action for them.

Unit/State level decide to preserve their security through power-maximizing. In anarchic system the increment in power is the way that ensures the chances of survival. States act rationally. Offensive aims of states are not always a source of motivation for states. All states don't act always offensively to maximize power. States' choice can be balancing, buck-passing or bandwagoning to deter the aggressor. Rational choices of states are based on the prevailing system in anarchy that can be bipolar, balanced multi-polar or unbalanced multi-polar.

Application of Offensive Realism and US Space Endeavours

In 1950's both superpowers i.e. former Soviet Union and USA acquired nuclear weapons, which decreased the chances of direct military confrontation. The conflictual and competitive behaviour in cold war forced states to seek advantage in term of military capabilities in form of long range missile system (capable to deliver nuclear weapons) and satellite system (aimed to perform reconnaissance mission over adversary's territory) (Sheehan, 2007). Lack of intention of other states in anarchic world forced states to make rational choices of securing itself from offensive military capabilities of other states by getting more sophisticated technologies to tackle formerly existing space assets through Ballistic Missile Defence

system (BMDs) and anti-satellite system.

The desire of becoming unchallengeable hegemon is deeply rooted in nature of states, that motivates states to pay attention towards manned and un-manned space program (Sheehan, 2007). Military and civilian space programs are interlinked. Imperfect knowledge of intentions of states forced other states to make ambiguous programs. Many military space programs work undercover/covert civilian program e.g. the satellite of USA named as Corona/explorer is military space program under the cover of civilian one (Sheehan, 2007).

States kept on increasing their capabilities on other's expense. Anarchy put states in permanent situation of security dilemma. Intentions of states are to deter other states from gaining power at former states' expense and at same time decide to enhance their own power through technological advancement as compared to other states. American Anti-Ballistic Missile (ABM) system and Anti-Satellite test are rational choice to enhance their own offensive capabilities to get asymmetrical superiority as compared to rest of the world in military terms. Counter-space-weapons age provoke weaker (space) state to balance the asymmetry in space technology and get strategic space hegemony.

Era 1957-67 gave superpowers free hand to use space for unfair means including the test of nuclear weapons. In 1967 United Nations (UN) banned the test of nuclear arsenals in outer space under the banner of Outer Space Treaty (OST). In Post 1967 space was used for surveillance. USSR developed its "Space Mines" to destroy spy satellites of USA and in response Reagan administration in 1980's took "Strategic Defence Initiative" by starting its "Star Wars" program (Billings, 2015). "Star War" was a countermeasure program to secure satellites of USA in orbit from Soviet's Intercontinental Ballistic Missiles (ICBM) attack.

The extended space race left states in permanent situation of uncertainty. In order to avoid uncertainty only viable option is to become hegemon. The element of uncertainty is clear from the statement issued by Frank rose, an American state assistant secretary for arms control, verification and compliance department that "the bottom line of USA is against of outer space's conflict" but USA is clear about defending any offensive attack against its space assets. In order to avoid this uncertainty, Trump inaugurated a separate space force to meet with the emerging space challenges.

The best way USA espoused to avoid any offensive attack against space assets is to place additional small objects (Kosmos-2491, 2499 and 2504 as additional objects) near satellites to secure their space assets. USA spend more than $ 5 billion (from its budget) on space program to enhance its defensive and offensive space capabilities (Dougherty, 2015). These additional small objects placed near satellite act as debris that hits any time and destroy the exiting space assets. USA has ability to destroy satellite in range of 240 km attitude (Billings, 2015). ASM-135 project has range of 500km but was shut down from 1987 due to malfunctioning. The robotic, manoeuvrable, American ballistic missile defence system, X-37B space plane further enhanced space power of USA.

National security policy of USA in terms of Congress has been strictly offensive. This has been evident from the fiscal budget of 2015, that was meant to increase funding to Pentagon for developing "offensive space control and active defence strategies and capabilities" of USA (Dougherty, 2015). This policy has clear implications for space arena. However, United States is also pursuing policy of having earth-based space weapons to secure outer space from increasing debris that would decrease the chances of sudden collapse of satellite from debris (Gady, 2015).

Protection of space assets is the ultimate aim. Progress and strategic security of any state is deeply linked to the safe space assets. Intentional or un-intentional destruction of space assets of any states can be resulted into brinks of conflicts in earthly states' relations. Space weapons are used to attack space assets intentionally but presence of more than 20,000 elements of debris in space increases the chances of accidental collapse of satellites and can be misinterpreted as a hostile action of other state against space assets.

Neo-Realism and American Space Policy Development Since Space Age

USA is pursuing its military, economic and political objectives in space domain. Arms race for securing hegemony in outer space was continued in cold war and post-cold war era. Timely adjustments in doctrines are the prerequisite for ensured supremacy. The inceptive policy endeavour of USA was noticed when Resolution 1770 was adopted in May 1958 to demise future threats from Soviet side by developing ABM system (Jaspal, 2008). Eisenhower replaced National Advisory Committee for Aeronautics (NACA) with National Aeronautics and Space Administration (NASA) on 1 October 1958 (Jaspal, 2008). Later in 1958 Presidential Science Advisory Committee (PSAC) dispensed four goals for space policy of USA including "space exploration for scientific probe, military force enhancement, national prestige and human urge for benefits" (Jaspal, 2008). These goals assisted policy makers to inaugurate black, blue and white space programs. White program was run by NASA to accomplish civilian space goals. Blue program served military objectives and steered by Department of Defence (DOD). Black program was directed by intelligence agencies for reconnaissance purposes (Jaspal, 2008). It is the anarchic nature of international system that dictates USA to go for self-help and build space capabilities for ameliorating its military power and hegemony.

Speech of President Kennedy of 25 May 1961 avowed the significance of exploring and utilizing space for achieving their national security. He estimated the cost of accomplishing predominant space goals and beseech from "American nation to pay the price" for accomplishing space objectives. His space objectives encompass three main ethos; first was about landing and return from moon, second was regarding "developing Rover nuclear rocket" to explore space and last was to ameliorate and enhance the use of communication satellites (Moltz, 2013). Space relations amid both superpowers were competition driven. Yuri Gagarin launch of Soviet side persuaded Kennedy to pursue the struggle for space power. His strategy was limited. He was impotent to formulate long term strategy and moreover remained unsuccessful and inept in providing reason to his nation to motivate them to enhance moon and space quest.

President Carter crafted "Presidential Directions NSC-37" on 11 May 1978 to determine the fundamental goals of American space strategy. These goals are of passive and active nature. Passive application or goals consist of military intelligence through satellites to secure national security, boost up the utilization of space for commercial benefits, international cooperation, scientific advancement and underlining the operation of innocent passage; whereas, active military endeavours are to maintain American space leadership role and to maintain right of self-defence.

President Reagan on 4 July 1982 announced policy that was termed as "National Security Decision Directive 42" which merely has reiteration of preceding Carter Administration's policies. Aforementioned "Directive" endorsed additional space endeavour of private sector and exertion of monitoring "space arm control measures" (Moltz, 2013). Recurrent (sections of previous) polices were to keep National Reconnaissance Office (NRO) confidential, uphold hegemony of US in space, and to setup for short time span. Afterwards on 23 March 1983, President Reagan instigated Strategic Defence Initiative (SDI) that was an ABM program to protect US from former Soviet attack. This hi-tech was designed to be deployed

in space. SDI was dubbed as “Star Wars” program because the deployed system in space directly target and destroy the target in its re-entry phase. But the conducting of early studies has established the fact that space weapons for targeting ICBMs in boost phase have been deployed. Use of boost-phase interceptor could enhance the probability to hit and destroy target by scattering its warhead.

In 1985, Reagan administration was successful in conducting destructive ASAT test against its aging weather satellite (Jaspal, 2008). The supporters of SDI had pointed out “that space-based missile defence would improve crisis stability by making it more difficult for the first striker to eliminate all silo of the other”. But the incubated counterargument is that “these systems would help eliminate the retaliating missile and thus give confidence to the first striker” (Jaspal, 2008). However, USSR seems SDI as an effort to energize the program “to attack USSR without risk of retaliation” (Jaspal, 2008). Succinctly SDI supported the development of “‘space-based beam weapons’, for instance natural particle (hydrogen atom) beams or space-based lasers”.

Afterwards on 11 February 1988 Reagan directed another national space policy for USA that extended American space goals by adding different sectors and sphere of specific objectives, including deep exploration of space, developing private space sector, ensure persisting manned presence in space and deter and defend hostile attack. Deficiencies of this policy initiative were because of the short-term application. It is evident that every policy of every American administration is based on security and power maximization that are the two main goals of neo-realism that are also termed as offensive and defensive realism.

Space policy of President Clinton of 19 September 1996 was the balanced policy that emphasized on civilian, military, and commercial space programs to maintain hegemony of USA in space. Partnership and cooperation in launching space shuttle in International Space Station (ISS), intelligence gathering, monitoring of compliance of agreement and global threats are manifested in post-cold war era. First time in history of space policy making document, use and application of NRO was revealed. This policy was designed for short time but spelled out the detailed and comprehensive outlook of substantial space endeavours including Missile Defence system, “export control and debris mitigation”.

President Bush senior metamorphosed the Reagan’s SDI program into Global Protection Against Limited Strikes (GPALS) program. GPALS is also dubbed as Brilliant Pebble program. This program aimed at adopting ground based or space-based interceptors, sensors and ballistic missile system for protection against limited strike. For this reason, USA withdrew from Anti-Ballistic Missile (ABM) treaty on 13 December 2001 to pursue its goal of having strong defence system.

President Bush demonstrated the new modified space policy on 6 October 2006. This policy document is vague and complex. This policy aimed to reject every regime that curbs American right of self-defence and the “right to conduct research, development, testing and operation in space”. USA wants to maintain space control and air superiority and a lead in space weapons. The schema of this policy is to maintain American “freedom of action in space” and deny the adversary from taking hostile action against America mainland and American space assets (Jaspal, 2008). It emphasized on the space development by professionals, “interagency cooperation, procuring space satellite system, maintain scientific and technological bases” and nuclear based space exploration to get space power. Space exploration is to undertake national security aims. Freedom of action is required to be enough powerful to accomplish “unhindered space operation”. Exploration of Moon, Mars and other planets were relegated. Basic elements of document were grounded on “Rumsfeld commission report” of 2001 related to “space management”.

Anarchy and absence of overarching government in space forced USA to go for formulating offensive and defensive space policy. USA is super power and acted to be a space power. There were two poles of power at the time of cold war. USA wanted to maintain balance and did not want to lose its superpower status. For that objective it kept on adopting these sorts of offensive space capabilities, policies and tactics. This self-help tactics in anarchic nature of international system dictates the behaviour of USA. USA was not aware of the intention of others, so it prompted towards power maximiser and security maximiser.

Space policy of Obama Administration of 28 June 2010 concentrated on the concept of international cooperation and collaboration without neglecting the right of self-defence. Core objectives of 2010 policy of Obama administration were to have mechanism of debris mitigation, Transparency and Confidence Building Measures (TCBMs), right of self-defence and innocent passage, maintaining and strengthen role of leadership, showing responsible behaviour and ensuring security and strategic stability regionally and globally without interfering the space assets of foreign state. Manned moon mission was overlooked in that policy.

Obama Administration proposed the policy of "Space Assurance" in 2011. Samuel Black elucidate that "a space assurance strategy strives to ensure that the president, U.S. armed forces, and U.S. citizens, allies, and friends can call upon space assets when needed" (Rendleman, 2013). Succinctly, space assurance emphasized on protection of space along with pursuing space race to deter the enemy from interfering with space assets of USA. This policy has four elements including SSA, global engagement, responsive infrastructure and deterrence and defence. So, the response depends upon the nature of threat.

Subsequently, on 29 May 2013 Joint publication of department of Air force and Navy of USA was circulated that directed that space policy of USA have five principles; "Space Situational Awareness (SSA), space control, space support, space force enhancement (SFE) and space force applications (SFA) (Department of the Army, United States of America, 2013)". Furthermore, "AFDD 2-2.1 declares firmly that "space superiority provides freedom *to* attack as well as freedom *from* attack" (Department of the Army, United States of America, 2013).

Space situational awareness (SSA) is a program that ensuring safety and security of spaceflight and space operation, monitoring compliance of agreed regimes, protecting the national interest and space assets. SFE is the mechanism to enhance efficiency, capability, and potential of combat forces. SFA intended to exert force on target from space or in space to accomplish anticipated goals. Space support assists military operation. Space control was delineated by Pentagon as an "ability to assure access to space, freedom of operations within the space medium, and an ability to deny others the use of space, if required". There are two spurs of space control i.e. offensive space control and defensive space control. Obama's 2011 policy was dealing with the defensive realism where it wanted USA to maintain deterrence and balance of power in space domain. However, the next policy of Obama was given in 2013. That policy was based on offensive realism, where the priority of USA was to get "space control" and to enhance the power and force through space, that means offensive space capabilities would be acquired to become space hegemony.

President Donald J. Trump rejuvenated National Space Council (NSC) on 20 July 2017 after 24 years (Department of the Army, United States of America, 2013). NSC was the active policy-steering body at the time of Bush administration in 1990s (Wall, 2017). Afterwards, on 11 December 2017, he signed Space policy Directive 1 to emanate America a space leader. Trump's space policy ordered and directed NASA to pursue the quest of manned space (especially Moon, Mars and Solar) exploration and take full advantage

of space technology to improve American space capabilities. Trump projected self-reliance by this policy because due to the retired space shuttle program since July 2011, USA were depending on Russian rocket and endure that costed burden of $ 70 million per seat.

Neo-Realism and American Space Usage in Conflicts

People's Liberation Army (PLA) of China critically evaluate the historical incidents (Cheng, 2015). The analysis of the few historical incidents proclaims that superiority of information along with other warfighting capabilities are the prerequisite to fight and win a war in prevailing industrial age. Capabilities of states and success are associated to (enrich) employment of economic resources for ameliorating warfighting capabilities. Information dominance is elucidated as "the ability to gather, transmit, manage, analyse, and exploit information, and preventing an opponent from doing the same" (Wall, 2017). "Metrological information gathering, weapon guidance and communication" were escorted through satellite systems in Vietnam War and Arab-Israel war of 1973 (Cheng, 2015). Satellites provided imagery surveillance and weather information in Vietnam War and imaging and signal reconnaissance all through Falkland war (Sheehan, 2007). Space dominance provides information dominance in every situation.

The review of military history incidents[1] (Cheng, 2015) revealed that superiority of air and space system was obligatory for accomplishing ground-based operation. NATO has pre-eminence in aforementioned technology. USA profoundly depended on satellite systems to multiply its force. Kosovo conflict[2] of 1998-99 was resolved after the NATO intervention ("Kosovo Conflict Balkan History [1998–1999]", 2016). USA intervened in Kosovo conflict and assisted Kosovo Liberation Army (KLA) to win their fight and bring peace in conflict zone. Information superiority (through satellites) and use of space system (Cheng, 2015) for command and control and navigation system gave collision forces advantage to launch air strike and win the war by signing peace accord with Yugoslavia ("Kosovo Conflict Balkan History [1998–1999]", 2016). In existing age, role of active and passive space technology in war fighting capabilities cannot be overlooked.

USA furthermore responded to Iraqi invasion in Kuwait by launching operation desert storm/shield (Pike, 2003), to protect its interest and allies in Persian Gulf.[3] This operation was dubbed as "first space war" (Pike, 2003) Space-based system such as "positioning, navigation, weather forecasting, communications, imagery and tactical early missile attack warning" (Pike, 2003) supported this operation. Afterwards of this operation, American Army regarded space as essential component to ameliorate military capabilities and acquire information superiority in wars.

Operation Desert Storm of 1991 (ODS) was different on many grounds from Operation Iraqi Freedom of 2003 (OIF). Former operation was the initial war that was fought with integrated terrestrial and space-based military capabilities but the military capability and use of space was augmented in later operation (Pike, 2003).[4] In former operation there were few individual soldiers in ad-hoc task force, but, in later

[1] "Chinese analysts had examined earlier conflicts and infer that space was used for information dominance. These conflicts includes first Gulf War (also dubbed as Operation Desert Shield/Storm), the NATO intervention in the Balkans, the American invasion of Afghanistan, the 2003 Iraq War, as well as Russian wars, 1973 Arab–Israeli War and the 1982 Falklands conflict".

[2] "Kosovo conflict is the ethnic conflict between Serbian (rulers) and Albanians in Kosovo province. KLA was formed by Muslim Albanians and NATO assisted KLA in their struggle".

[3] American and its allies' interests were to restrain Iraq from becoming fifth largest reserve and exporter of natural resources.

[4] "In the Gulf War of 1990-1991, the Iraqis launched 93 missiles against Coalition targets. The Army claimed that it intercepted 79 percent of the missiles targeting Saudi Arabia and 40 percent of those targeting Israel. A GAO

operation, services from different sectors[5] had been procured. Global Positioning System (GPS) was not operational fully at the time of Gulf war or ODS. Six weather satellites, ninety percent communication satellites and two civilian satellites (i.e. US LANDSAT and French SPOT) provided weather information, inter and intra theatre communication and monitoring and imaging of the launch of Scud missile respectively (or in that order). French embargoed the export of French Spot imaging satellite to Iraq in event of Iraqi invasion of Kuwait.

Deficiencies and Drawbacks have been observed in actual exploitation of space technology in theatre of ODS. These systems were unable to provide timely weather and imagery intelligence (Sheehan, 2007). Early warning system passed the information to US strategic headquarters rather than to troops and commanders in theatre of operation. The troops received information of early warning after the first SCUD missile had hit the target. In order to tackle with these deficiencies Tactical Event Reporting System (TERS) and Joint Tactical Ground Station (JTAGS) systems[6] were deployed.

Gulf war or ODS was the watershed event because use of space system did not reach to level "to achieve their full potential use". Aforementioned event witnessed that strategic deterrence was maintained with the assistance of space capability and system. Neo-Realism especially offensive realism pointed out that states always tried to acquire maximum power to use it in future conflict. In reality, USA acquired space superiority to use it at the time of conflict to fight and win war and to support its allies against their adversaries. In nuclear age, USA provide extended deterrence to its allies and space is the medium to enhance power and security. In all conflict mentioned above USA used space effectively and learned the lesson how to improve its capabilities for using it in forthcoming conflict. American use of space enhanced its terrestrial warfighting capabilities and it is the neo-realism which is effectively giving answer to the American acquiring of offensive and defensive space capabilities and using them at the time of conflict.

Vice admiral William Dougherty pointed out the few lessons from operation desert storm. He suggested that US must have the survivability doctrine (i.e. the ability to protect own space assets and deny the adversary's use of space) instead of sanctuary doctrine. It is likely to have the theatre where active military operation would be germinated that will menace the security of space assets and curb the power and potential of state to fight a war in battlefield.

In operation Iraqi freedom application of space assets has been augmented. "Real-time global position, navigation and timing capabilities embedded within the tactical units, space-based Blue Force Tracking and new applications for precision strike" have been employed. On-demand reliable communication, military map-making system and weather system had been updated in OIF. These updating technology is meant to get access to sophisticate and reliable technology for maintaining self-reliance and hegemony.

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investigation determined that only nine percent of the claimed interceptions could be verified. In 2003, according to open sources, the Iraqis launched 17 ballistic missiles and two cruise missiles. All ballistic missiles were intercepted or were considered to pose no danger and declared "out of bounds." One cruise missile eluded the defences. In Operation Desert Storm, the primary issue was the failure to intercept incoming missiles, while in Operation Iraqi Freedom the discussion has revolved around incidents of fratricide involving missile defence units".

[5] For instance, "1st Satellite Control (SATCON) Battalion, the 1st Space Battalion and a Colorado National Guard unit and the 193rd Space Battalion. These units control the satellite links for tactical and strategic warfighter communications networks, and support Army, Joint and Coalition warfighters worldwide through the Army Space Support Teams (ARSSTs) and the Joint Tactical Ground Station (JTAGS) systems".

[6] "JTAGSS was used to pull data from satellites with a direct downlink and processed and distributed it in theatre. It supported active defense, passive defense and attack operations".

This excessive access of states, presence of non-states entities in space and availability of active and passive space assets made the space relation complex and pose challenges to the survivability of space assets, so self-reliance and self-help will be demanded by states. Competition was started by two superpowers i.e. Former Soviet Union and USA during the cold war but now more than 35 countries have their own space research institutes and programs (Pfaltzgraff, 2013). Proliferation of space technology from core countries to peripheral countries is considered as the main reason for this increase in space technology and assets (Pfaltzgraff, 2013).

Realism focuses on power politics and the politics of space is also based on power politics. Space age neither mitigates nor amplifies conflicts but only added a new dimension of space into politics (Pfaltzgraff, 2013). Many states are dependent on space assets for their national security and adopted their own space policies. For instance, USA is having its own space policy that is directly linked to its national security. Aim of states is to become space powers and capture limitless power in space to get freedom of action in space (Pfaltzgraff, 2013). Space power according to Colin Gray is that state which is capable enough to use space for their own advantage and to deter their adversaries to take any step against them by using space capabilities (Gray, 1996). A lot of difficulty would be faced while declaring any state as a space power because it is complex phenomena. Many tangible and in-tangible elements would involve in it. Peter L. Hays defines the concept of space powers as “complex, indeterminate, and intangible” (Hays, 2002). So, space power and politics is complex and vague. This complex international space politics is dictating USA to behave offensively and defensively in space arena to maximize its power and security.

Conclusion

Neo-Realism is most suitable theorical paradigm to understand space competition and US space goals. Power politics in space and terrestrial domain is similar, where USA wants its hegemony. USA is power maximiser and security maximiser in space as described by neo-realism. It is anarchy and no-man land which USA wants to conquer, without having any competitor. In space before the advent of space age there was no concept of anarchy but, erstwhile USSR launch of Sputnik-1 that made America vulnerable and it decided to compete with USSR by launching its own satellite Explorer. In post-cold war, identities and interests of states are metamorphosed in space and US started space for economic and commercial purposed.

American space cooperation was noticed that means that states are not always going for power politics but somewhere their objectives can be cooperative, economic and commercial. In short, the prospects of cooperation are less, because the advent of space weapons and offensive and defensive American space policy making and acquiring military space technology in abundance proved the fact that neo-realism is the appropriate theory which can comprehensively applied on the American space program.

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