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THE MILITARY ROLE IN SPACE (U)

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Abstract of THE MILITARY ROLE IN SPACE (U)

In the past few years the United States has made significant progress in its national space program largely due to the achievements of NASA's civilian managed efforts. Meanwhile, the Soviet Union, since the launching of Sputnik I in 1957, has reaped momentous political, propaganda and technology benefits from their numerous "firsts" in space. Within this country government officials were slow to accept the Soviet challange in space although our ballistic missile force and technological capabilities were expanded and improved. The government has repeatedly emphasized our objective in space is peace. Except for some highly classified unmanned military projects, no clear cut mission in space was assigned to the Department of Defense until August of this year when the President approved the military requirement to develope a manned orbiting laboratory for space research and exploration.

The potential military missions in space are many and require a priority effort to be realized within the next decade. Experience and knowledge gained from the NASA program will complement and augment the development of

these programs. However, the general public must realize and acknowledge that the development of a military space program is essential to our national security. The technological and scientific capabilities of American industry and the scientific community must be accelerated to support the effort, and the Soviets must be relegated to second place in the space race.

The complexity of our military space program requires that the highest priority be given to our space efforts, including the establishment of a military space academy and a seperate Air Force Space Command.

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INTRODUCTION

Scholars tell us the Stone Age lasted many thousands of years. Early in the twentieth century we entered the Air Age. In the mid-fifties it was the Missile Age and then on 4 October 1957, the Soviet Union launched the first earth satellite, Sputnik I, dramatically announcing to the world that we had entered the Space Age. Just as the previous Ages have all had profound effects on our way of life the conquest of space will shape world history and the destiny of civilization in the foreseeable future.

The average American citizen recognizes the scientific exploration of space and the challange it offers. It has been impressive and most encouraging to view on television the successful achievements of our NASA manned space programs. The use of the space environment for peaceful purposes is our avowed national policy. The commericial applications of weather and communications satellites are clearly apparent. The potential that space offers to the military has been and continues to be somewhat controversial. The average person is unaware that the Department of Defense, since Sputnik I, has pursued an active program to gain

authority for expanding our unmanned and manned space program. The purpose of this thesis is to identify the most useful military missions in space which will assure military superiority, enhance national prestige and guarantee national survival.

To accomplish the theme of this paper attention will be first directed toward reviewing and analyzing the progress made to date in the space environment and now this nation was motivated to develope a military mission in space. Next, a comprehensive discussion of the potential military space missions is presented. Although these space missions may appear speculative or unrealistic, they actually constitute an extension of our present day earth based military roles and missions. An analysis is then made of the impact and contributions that a military space program has upon the nation's political strength, balance of power and technology. Finally, it is concluded that an aggressive military space program must become our highest military priority if this nation is to maintain an effective deterrent force.

This thesis is based exclusively on unclassified material most of which is available in published form.

THE MILITARY ROLE IN SPACE

CHAPTER I

SPACE PROGRESS TO DATE

MOL Announcement. On 26 August 1965, the United States offically made known its intention to proceed with a military manned space program. On that date President Johnson announced his approval for allocation of $1.5 billion for construction and development of the Air Force's Manned Orbiting Laboratory (MOL).[1] The decision to proceed with the MOL program long urged by the Air Force but delayed by the Administration, represents a significant modification of American policy and goals in space. Since the space age emerged nearly eight years ago, it has been the policy, incorporated in the 1958 space law, that United States activities would be devoted to peaceful purposes. Now the U.S. has made a major and open commitment to explore and possibly exploit space for military purposes. Actually the President has announced to the world that the

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[1]"Space Goals, President Defines Them," The New York Times, 29 August 1965, Section 4, p. 1:1.

United States will stand second to none in assuring that man's military medium, heretofore limited to land, sea and air will be exploited to include a fourth dimension, space.

Early Military Developments. The announcement of the MOL program should not be distinctly surprising - especially to those who are familiar with our nation's technological capability and persistence in maintaining world peace. Our interest in utilization of space for military purposes actually dates back to 1915 when Dr. Robert H. Goddard began his experiments with rockets and fuels.[2] His proposals in 1919 to carry instruments to high altitudes for upper atmosphere testing and prediction for reaching the moon with a rocket brought no great response by the American government or public. In the years between the two world wars scientific progress in Europe contributed significantly to the military evolution of the space age. The Germans especially appeared to recognize the great potential and importance of rocketry which is the first

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[2]Major General John B. Medaris, USA (Ret.), Countdown For Decision (New York: Putnam, 1960), p. 29.

requirement for orbiting space vehicles.[3] In World War II, Germany utilizing their previous research with rockets, developed the military V-1 and V-2 rockets for attack against Great Britain.

Post World War II Programs. Following World War II with the general attitude in America of military reduction and weapons disarmament, the progress in missiles and space was generally sporadic. In the Spring of 1946 the Air Force gave intermittent and pessimistic support to studies pertaining to long-range missiles. The manned bomber appeared to be the most logical, reliable, and least expensive medium to delivering the new atomic bomb. The nation's missile program received an isolated but significant boost when Dr. Wernher Von Braun arrived in the United States from Germany.[4] Von Braun, one of the world's top rocketry scientists, worked for the government at the Army's Ballistic Agency in Huntsville, Alabama. From 1946 to 1950

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[3]General Bernard A. Schriever, "Does The Military Have A Role In Space," Lillian Levy, ed., Space: Its Impact on Man and Society (New York: Norton, 1965), p. 64.

[4]Medaris, p. 40-41.

the Army, with Von Braun's assistance conducted a successful high altitude testing program called project "Bumper."[5] This eight missile test program used a combined V-2 and WAC corporal rocket and involved both military and civilian agencies.

Ballistic Missiles. During this same period, (1949-1951) the Air Force School of Aerospace had initiated studies of human high altitude problems and convened the first major international meeting on space medicine.[6] Meanwhile Von Braun and the Army received increased support in development of missiles and finally in 1955, they were authorized to develop an IRBM. It should be noted that it wasn't until 1953 that the DOD including all services, finally were allocated funds exceeding $1 million for ICBM-IRBM missile systems. The Soviets were rapidly moving ahead in the missile field and the prospect was that within a few years, long range Soviet missiles might be able to destroy cities and air bases in the United States. The U.S.

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[5]Martin Caidin, Countdown for Tomorrow (New York: Dutton, 1958), p. 140-145.

[6]Schriever, p. 65.

technological superiority over the USSR had been sidetracked by the political leaders of the country due to budgetary considerations and the reliance placed upon SAC forces.[7]

As missiles were developed, the feasibility of launching satellites gradually received more support. In 1954, the DOD had two significant projects under development - project "Orbiter", an Army and Navy program using the Army Redstone booster that Von Braun was developing, and project "Vanguard", under development by the Navy. Unfortunately Orbiter received no high level government interest although the Chief of Naval Research and the Commander of the Army Ordinance Department approved the program, provided it did not interfere with other weapon systems.[8] The Orbiter program was cancelled in July, 1955. On 29 July 1955, project Vanguard was approved as part of the U.S.

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[7]President L.B. Johnson, "The Politics of the Space Age," Lillian Levy, ed., Space: Its Impact on Man and Society (New York: Norton, 1965), p. 5-6.

[8]U.S. Congress, House, Committee on Astronautics and Space Exploration, Astronautics and Space Exploration, Hearings on House Resolution 11881 (Washington: U.S. Govt. Print. Off., 1954), p. 293.

participation for the International Geophysical Year (IGY).[9] The decision to proceed with Vanguard and to cancel Orbiter was an unfortunate one since it revealed that there was no urgency in the space program and little recognition of national prestige as relating to the space technology leadership role of the U.S. The top priority program within the country was the ballistic missile development program, which by pursuing, the U.S. fortunately created the technology, facilities and hardware for a future space program.[10] This concurrency of development was not recognized by all.

Sputnik I and the Space Race. The Army research organization, under the leadership of General Medaris and the technology of Von Braun, continued to pursue their satellite launching theories with vigor, even though Orbiter was cancelled.[11] In September 1956, after a Jupiter C was launched 3,300 miles down range, the Army announced

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[9]Vernon Van Dyke, Pride and Power (Urbana: University of Illinois Press, 1964), p. 13.

[10]Caidin, p. 260.

[11]Medaris, p. 98-101.

it had a capability to orbit a satellite. Approval for the Army to launch a satellite was withheld as the Navy's Vanguard program was to perform the task. Estimates that the Soviets would launch a satellite in 1957 were predicted by the Army within 30 days of the actual Sputnik I launch date.[12] On 4 October 1957, Sputnik I was launched and a month later, Sputnik II. Vanguard was having problems and finally the Army received permission to launch Explorer I with a Redstone missile on 31 January 1958. Vanguard I was launched successfully in March 1958.[13] The United States had followed the Soviets into space.

With Sputnik I the race in space was on. Within two months President Eisenhower announced the establishment of a new office, the Office of Special Assistant to the President for Science and Technology. The new office was chartered to assist the President in analyzing any delays in the scientific development and improvement of the country's defense programs.[14] The potentialities of space

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[12] Ibid., p. 153-155.

[13] Ibid., p. 230-232.

[14] Van Dyke, p. 16.

received a vote of confidence and Congress increased appropriations for the National Science Foundation from $40 to $130 million.[15] Within the Department of Defense in February, 1958, the Advanced Research Projects Agency (ARPA) was established. Activities relating to weapon systems, military requirements, and advanced space projects as designated by the President were assigned to ARPA. In April, 1958, the National Aeronautical and Space Act was enacted and with it the civilian agency known as National Aeronautics and Space Administration (NASA).[16]

Space activity, mostly non-military, was accelerated with the formation of NASA. The Navy lost Vanguard to NASA, the Army lost its jurisdiction over the Jet Propulsion Laboratory and also the Werner Von Braun team to NASA. Within DOD the Army, Navy, and Air Force battled for space programs and missions. General Lemnitzer and the Army possibly forseeing the ultimate outcome maintained that all services should cooperate in the exploration of space, preferably under a joint military organization controlled by

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[15] Ibid., p. 17.

[16] Ibid.

DOD.[17] The Air Force was active in its space programs between 1958-1961 with the development of boosters for its ICBM and IRBM programs. They held access to more launch vehicles than the other services and participated in many NASA support activities including procurement of boosters, launch services, and conduct of missile range operations. In March, 1961, the Department of Defense issued a directive placing principal responsibility for military space programs with the Air Force. The few exceptions to this policy of the USAF responsibility for research, development, test and evaluation of military space programs included the Army and Navy's research for their own space systems - Nike-Zeus, SPASUR, and Polaris.[18]

Air Force Spacetrack System. The Air Force, possibly anticipating the eventual assignment of the major portion

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[17]General L.L. Lemnitzer, Chief of Staff, U.S. Army, in U.S. Congress, House, Committee on Appropriations, Sub-Committee on Department of Defense Appropriations, for 1961, Hearings (Washington: U.S. Govt. Print. Off., 1961), p. 477-478.

[18]Dr. Herbert F. York, Director of Defense Research and Engineering in U.S. Congress, House, Committee on Appropriations, Department of Defense Appropriations for 1962 (Washington: U.S. Govt. Print. Off., 1962), part 4, p. 42-43.

of the services' space mission, initiated Project Spacetrack in November, 1957.[19] The project brought together electronics, geophysics, computer, communications, astronomical and mathematical experts in a unified program to predict satellite behavior. In 1958, ARPA assigned the Air Force responsibility for handling tracking data obtained by objects in orbit.[20] The system is operated by the USAF Air Defense Command and utilizes more than 100 world wide tracking stations to catalog more than 500 earth satellites today.[21] Concurrent with the development of the satellite tracking center, the DOD investigated and proposed military applications for space including communications, navigation, and meteorology. These projects are used by both military and non-military agencies and will be discussed in detail in the next chapter. An effective reconnaisance system has been developed.[22] It was known as "SAMOS", for Satellite

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[19]"Spacetrack Records All Orbiting Objects," Air Force Systems Command Newsreview, August 1965, p. 8.

[20]Ibid.

[21]Ibid.

[22]"USAF Developing Space Wide Capabilities," Aviation Week and Space Technology, 25 September 1961, p. 94.

Missile Observation System, until 1962, when DOD curtailed the release of information and use of the name. Newsweek reported in December 1962, that DOD launched at least 35 reconnaisance satellites in 1962.

During the 1960-1965 period, the Air Force had difficulty in gaining approval for a military space mission and particularly support for a military man-in-space program. The NASA Mercury, Gemini, and Apollo programs received the priority attention of the nations' space directors. DOD officials resisted attempts by the Air Force for a separate manned space program emphasizing the absence of a definable military requirement for man-in-space. This was indicated in June 1962 by the testimony of Dr. Harold Brown, then Director of Defense Research and Engineering when he stated:

> When it comes to manned orbital systems it is not at all clear that there is a military need. Neither is there a military program for manned orbital rendezvous.... We cannot at this time identify a manned military space mission.... In the past, and again now, I have expressed my doubts that manned military space vehicles will be a requirement.[23]

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[23]U.S. Congress, Senate, Committee on Aeronautical and Space Sciences, NASA Authorizations for 1963 (Washington: U.S. Govt. Print. Off., 1963), p. 346-347.

The Air Force did not accept the apparent verdict and continued to develope justification for a military mission in space. In December 1963, however, the X-20 or Dyna-Soar program which involved a one man space glider launched into orbit was cancelled due to progress made by NASA and the close evaluation of possible duplication between DOD and NASA programs. Instead of the Dyna-Soar an investigation was initiated on the program now known as MOL.[24]

DOD-NASA Relations. Pressure from the Air Force finally led to an agreement in 1963 between DOD and NASA. The agreement was designed to assure that the scientific and operational experiments undertaken as part of the Gemini program were directed at objectives and requirements of both the DOD and the NASA manned space flight programs. There is no doubt that to this date the actual programs, experience, and data achieved by NASA with its manned space program lends itself significantly to the research program the military will use in the MOL program. Considerable less time is now needed for developing the military MOL

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[24]William Leavitt, "MOL: Evolution of a Decision," Air Force and Space Digest, October 1965, p. 36.

program due to the outstanding success achieved by NASA.

In December 1964, President Johnson announced that the United States possessed two operational anti-satellite systems capable of destroying hostile satellites circling the earth. It was clear indication that although there is a continued policy of utilizing space for peaceful purposes, this country is pursuing space programs that are enhancing U.S. military power and national security.

Today. Within two months after the $1.5 billion MOL allocation, the Air Force officially identified space as a career for Air Force officers.[25] This new career skill field identifies personnel qualified and assigned duties as space systems analysts, space systems operations, space systems staff officers, and commanders. The Air Force also formed a seven member top-level policy committee headed by new Air Force Secretary, Dr. Harold Brown, to function as the Chief Advisory Group for MOL objectives and problems.[26]

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[25]"Space Career Set Up for Officers," Air Force Times, 20 October 1965, p. 1:1.

[26]"Top Level MOL Policy Committee Formed," Aviation Week, 4 October 1965, p. 22.

As a member of this committee and also as MOL program director, General Bernard A. Schriever is assigned the overall management responsibilities as they are approved and assigned by Brown. It appears that the Air Force go ahead for investigating the military's role in space is being given every opportunity to succeed.

CHAPTER II

POTENTIAL MILITARY SPACE PROGRAMS

> Space is in an area of vital concern to the military strategist. It is a new medium of operations where the actions of our opponents must be closely observed by those of us concerned with national security. It is also a region where our activities could enhance our security against both earth-based and space-based threats. Thus, space adds a new dimension to military thinking. For 6000 years land has been a military medium. The sea has been a military medium for some 4700 years. By contrast the atmosphere has been a military medium for less than sixty years, and space has been a potential military medium for about eight years.[1]

The development of military space systems offers certain advantages for military operations because of its four unique characteristics:

(1) Extreme altitude - operation of manned or unmanned satellites above 100 Nautical miles.

(2) Very high speed - capability of circling the earth in eighty to ninety minutes.

(3) Long flight duration - limited only by capability of man to environmentally survive in

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[1]General Bernard A. Schriever, "The Space Challange," Air University Review, May-June 1965, p. 3.

a manned satellite and only by the energy or power available in unmanned vehicles.

(4) Extreme accurate predictability of flight - a capability exists with the satellite tracking sensors to predict almost the exact position, speed, and altitude of a non-maneuvering satellite.

With these characteristics, it is highly desirable to develop military space systems to perform required military tasks and missions.[2] These military tasks, such as offensive and defensive systems, communications, weather, navigation, intelligence and others, are not new but actually an extension of military missions that exist today.[3] The technology for military space programs is based upon many of the same fundamentals as those of NASA's programs. However, the inclusion of military requirements such as quick reaction, repeated missions, and survivability

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[2] Ibid.

[3] General Thomas D. White, Chief of Staff, USAF, in U.S. Congress, House, Subcommittee on Defense Appropriations, Hearings (Washington: U.S. Govt. Print. Off., 1961), p. 409-410.

in a combat environment, introduce unique characteristics that usually are developed by the DOD.[4] An example of the military characteristics is the rendezvous and docking program. NASA is developing a capability of rendezvousing with friendly or "cooperative" satellites for space exploration and experimentation; the military is interested in developing the capability of rendezvousing with enemy or "uncooperative" satellites.[5]

The following military space missions are discussed by identifying some of the advantages space based systems would have over the present day earth based systems. No attempt is made to determine the exact technical feasibility or when and how rapidly a potential system can be made operational to perform the new military space mission. Also the proposed military space programs are not listed in order of urgency or priority as some would be developed

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[4]General Bernard A. Schriever, "Does The Military Have A Role In Space," Lillian Levy, ed., Space: Its Impact on Man and Society (New York: Norton, 1965), p. 61.

[5]Eugene M. Zuckert, Sec. of the Air Force, in U.S. Congress, House, Committee on Appropriations DOD Approp. for 1963 (Washington: U.S. Govt. Print. Off., 1963), p. 461-462.

concurrently or as a result of success with other test programs.

Offensive. The United States and the Soviet Union have apparently followed the United Nations resolution against orbiting any weapons of mass destruction. Various military and civilian spokesmen have recognized the potential use of space for conducting offensive military operations. Acknowledging the technological capability that the USSR possesses in developing space systems, the United States should plan to develop offensive space weapons systems. General Gavin after leaving the service, suggested that once an anti-missile is developed it may be well to have alternative launching platforms in space.[6] The present day emphasis on the strategic intercontinental ballistic missiles and the Polaris, augmented by an improved manned bomber force cannot be expected to provide the deterrent force forever. It would be more reasonable to assume that the arms race will cease completely, but discounting that, then a follow-on offensive system in space

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[6]James M. Gavin, War and Peace in the Space Age (New York: Harper, 1958), p. 224.

appears to be a logical extension of the present day strategic forces.

Space offers some distinct advantages over present day strategic offensive weapon systems. Numerous weapons orbiting the earth would present to any enemy a difficult task of countering the dispersed space force, and those operating in a "deep space" orbit of 2000-3000 miles would provide a country with a more survivable "second-strike" force. Also, space offers a relatively shorter time-to-target responsiveness than other strategic forces. As an example, a satellite operating in a 300 mile high orbit would require only about 11 minutes from launch to impact.[7] These advantages for conducting offensive operations in space, the possibilities of dispersal and quick responsiveness, were emphasised by Lt. Gen. James Ferguson, Deputy Chief of Staff, Research and Technology, Headquarters USAF, as early as 1962 when he stated:

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[7]"Space and National Security," Air War College Supplement, June 1965, p. 85.

> Space bombers in low orbit may afford the short time-to-target and fast reaction essential to some strike tasks. In addition, should the survivability of earth-based systems become marginal, deploying systems in deep space may be the only means of providing disperal and remote location to insure survivability.[8]

Delivery of space weapons presents a problem to a defending force since the interception of the vertically descending re-entry vehicle would be virtually impossible within the present day capabilities. It is expected that the development of an effective anti-space defense system would require a considerable amount of a nation's military budget as well as a breakthrough in technology.

The concept of military control of space by the employment of offensive weapons is a significant possibility. For example, a nation may control space if it could orbit numerous space weapons that would be invulnerable to another nation's military defensive forces. By controlling space through the use of offensive weapons, a nation would enhance its national security. The correlation between the

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[8]Lt. General James Ferguson, in U.S. Congress, House, Committee on Armed Services, Hearings on Military Posture and H.R. 9751 (Washington: U.S. Govt. Print. Off., 1962), p. 3771.

control of space and national security has been noted by the late General Thomas D. White, who remarked: "Only through our military capability to control space will we be able to use space for peaceful purposes. I visualize the control of space as the late-twentieth century parallel to the ageold need to control the seas and the mid-twentieth century to control the air."[9]

Of course, for this country to pursue a policy of orbiting bombardment satellites, a reversal of national policy would be required and this is unlikely and notably undesirable in the forseeable future. Before such a major policy decision would be considered the administration would be faced with determining answers for a number of the following questions. If the United States led the way in placing nuclear bombs in orbit, would it be promoting or endangering the attainment of world peace? If another country led the way, would it be necessary to follow suit? Would a counterforce strategy still be feasible, or would a reliance on bombardment satellites require the adoption

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[9]General Thomas D. White, "Military Strategy's Fourth Dimension," Air Force and Space Digest, December 1960, p. 38.

of a counter-value strategy - that is, could the strikes be confined to the more strictly military targets, or would they have to be aimed at urban centers? If we used bombardment satellites at all, would we keep them in orbit on a routine basis, or would we put them up in times of special crisis?[10] These questions are numerous, complicated, controversial and no attempt is made to answer them within the scope of this paper.

In summary, the potential of using space for offensive missions is valid but unlikely as indicated by the present day national policy of this country reiterated most recently by President Johnson in his announcement of the MOL program when he said: "We intend to live up to our agreement not to orbit weapons of mass destruction, and will continue to cooperate with everyone, including the Soviet Union in future exploration."[11]

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[10] Thomas C. Schelling, "The Military Use of Outer Space: Bombardment Satellites," Joseph M. Goldson, ed., Outer Space in World Politics (New York: Praeger, 1963), p. 97-113.

[11] The New York Times, 29 August 1965, Section 4, p. 1:1.

Defense. A portion of the military deterrent force that this country has continuously maintained is a defensive force that is capable of detecting, identifying, intercepting and destroying an aggressive force. The potential of military space programs both manned and unmanned, for these defensive missions is unlimited and most promising.

The detection capability that is apparent from the use of space vehicles concerns both detection of earth-based systems and detection of space orbiting systems. First, in considering the detection of earth-based systems, one must acknowledge that todays non-hardened ballistic missile early warning detection system, BMEWS, is adequate, but vulnerable to sabotage, and destruction by an enemy. It would appear that a feasible back-up system to BMEWS would be a satellite system orbiting the earth that would transmit TV or other data to provide continuous surveillance of the enemy's launch areas. An additional monitoring system would employ infra-red sensors to detect the ballistic missile engine ignition. The mission of the so called "spy in the sky" could be combined with other missions both in unmanned or manned vehicles as it would be very costly to

orbit a large number of satellites solely for the purpose of detection of land based offensive systems.

The detection of all space objects is presently being accomplished by land based military systems, one of which was discussed in Chapter I, the Air Force Spacetrack System. Space platforms could ultimately perform an augmentation mission of detecting space objects with the inherent advantages of a military manned system over an unmanned system. With a manned maneveuring satellite interceptor patrolling in space, the time to detect, identify, and intercept a potential hostile satellite would be reduced considerably. Numerous U.S. officials have acknowledged the potential of detecting a possible ICBM attack or other military offensive activities by the use of defensive space systems.[12]

Once detection is achieved, then the identification problem must be solved before a decision to proceed further can be made. If the detection system, either land-based or space operated, pinpoints the object as being launched

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[12]Robert S. McNamara, House Appropriations Committee Hearings, DOD Appropriations for 1962, Excerpt in Air Force Information Policy Letter No. 110, 1962, p. 17-18.

from an unfriendly nation then the identification question appears solved. However, identification really includes inspection and the determination of the mission of the newly launched uncooperative satellite. To accomplish the complete inspection of an orbiting satellite requires rendezvous or interception. Again, this is probably best accomplished by a manned vehicle, but is technically feasible with a unmanned system.[13] Once rendezvous is made, inspection involving cameras, a human beings judgement, or possibly other sensors is required to provide information concerning size, shape, antennas, mission, etc. of the vehicle.

The final phase of defensive systems, destruction or negation, is employed only after authorities at the highest national level determine that a serious and imminent threat exists. Again the threat may come from space vehicles or launched from the ground as the ICBM force would be. The destruction of a hostile satellite could be accomplished

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[13]Dr. Harold Brown, U.S. Congress, Senate, Committee on Aeronautical and Space Sciences, 14 June 1962, Excerpt in Air Force Information Policy Letter Supp. No. 110, 1962, p. 1.

by a satellite defense system, manned or unmanned, using nuclear, non-nuclear or possibly Laser systems.[14] Once the capability is achieved to rendezvous with or intercept a hostile space object, the destruction mission is technically simple and involves first, the transmission of a command to do so, and second, the activation of the space weapon.

This country has pursued the development of a strategic deterrent force based upon a large number of ICBMs. The USSR has developed the same capability and the medium of space to defend against the ICBM threat is the last consideration presented as a defensive mission in this chapter. Lt. General James Ferguson's remarks concerning the defensive mission in space are noteworthy:

> Space systems may also give us a breakthrough in defense against ballistic missile attack. If we could develope techniques for interception of enemy missiles during their hot boost phase, we could avoid entirely the critical problems of discrimination and interception during the re-entry to the target. Moreover, this earlier intercept would offer the additional security of defense in depth and give us flexibility in destroying other types of space weapon systems. The need for destruction of enemy systems before they

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[14]General Bernard A. Schriever, "Laser: A New Spectrum in Technology," in Air Force Information Policy Letter Supp. No. 111, 15 September 1962, p. 10-12.

are over the U.S. targets becomes even more acute as the USSR stockpiles warheads of megaton yield.[15]

When and if this country elects to develope and deploy an operational anti-ICBM system such as the Nike-Zeus, the cost is expected to exceed $20 billions. The problem of defending against the ICBM threat should not be left to land based systems alone. Advanced techniques in employing the ICBM force - such as decoys and penetration aids - require a complex and sophisticated defensive system. A space defense system could possibly resolve this problem by providing a capability to intercept ballistic missiles during the boost or mid-course phase. Today's systems are designed to intercept and destroy the enemy warheads as they penetrate the atmosphere above our strategic targets and cities. The probability of effectively negating the possible large ICBM force is most challenging due to the numbers of warheads and decoy targets alone. When the capability of the enemy to use a maneuvering terminal phase

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[15]Lt. General James Ferguson, in U.S. Congress, House, Committee on Armed Services, Hearings on Military Posture and H.R. 9751 for 1963 (Washington: U.S. Govt. Print. Off., 1962), p. 3769.

and electronic counter-measures against our anti-ICBM radar systems is attained, the problem becomes particularly difficult and the solution costly.

A ICBM space defense system is a potential that is only limited by technology and of course, funds. To be able to intercept an ICBM force in the early stages of flight would increase our chances of survival and impose a strong deterrent providing the enemy acknowledges the capability. Numerous satellites equipped with a terminal radar or a heat seeking device could perform the intercept mission. To those individuals who doubt the development or technology for this capability, one first has to reflect on the progress made by this country in the last two decades. Gen. Ferguson has summed up the accelerated progress in technology with the comments:

> The most startling thing about this bursting forth of technology is the increased pace of change. Technology seems to be rushing headlong into the future.... It has been estimated that more than fifty percent of our scientific knowledge today was acquired in the last twenty years. This is not surprising if you reflect that ninety percent of the scientists and engineers who ever lived are

> alive today! ... It's a brave man who is willing to predict what it will bring in another twenty or forty... or sixty years...[16]

One cannot discount the potential use of space defense systems as an anti-ICBM system.

Communications, Command and Control. The importance of survivable military communications and command and control systems cannot be overemphasized. Space based systems may offer significant advantages over existing worldwide military communications systems. In fact, DOD has recognized the capability and advantages of earth satellites to provide military communications and are actively pursuing the development of a military communications satellite system.[17]

Communications satellites are either active or passive. An active (repeater) satellite has receiving and transmitting equipment aboard which receives signals from a ground

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[16]Lt. General James Ferguson, "The Air Force in the Space Age," excerpts from speech given at Purdue University, 13 April 1964, in Air Force Information Policy Letter Supp. No. 131, May 1964, p. 17

[17]U.S. Congress, House, Committee on Government Operations, Military Communications Satellite Program (Washington: U.S. Govt. Print. Off., 1963), p. 46-47.

station, amplifies them and retransmits the same signals back to earth. A passive satellite (reflector) merely reflects or scatters radiation signals from the earth with a portion of the signals being reflected back to earth.[18] The moon has been used as a passive relay satellite system by the U.S. Navy for communications between Washington, D.C. and Hawaii. Echo I, another passive satellite, was used for many communications experiments including voice, data and facsimile transmissions while in a 900 n.m. orbit above the earth. Active systems successfully operated include the low altitude (less than 400 N.M.) demonstrations of Telestar and the present operational synchronous (19,100 N.M.) satellites, Syncom and Early Bird.[19]

Compared with the conventional communications methods, a communications satellite system has certain distinct advantages that insure reliability, security and rapid communications. The spaceborne relay is more survivable and less vulnerable to nuclear attack or sabotage than low and

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[18]Robert W. Buchheim, et al., New Space Handbook (New York: Random, 1963), p. 250.

[19]Major William B. Liddicoet, "Communications Satellites," Air University Review, September-October 1965, p. 43-46.

high frequency radio transmissions, cables, and ground based relay stations. It is also less susceptible to atmospheric conditions and tropospheric disturbances.

Space based communications systems provide a distict advantage over today's command and control communications systems. Alternate or back up facilities can be provided by operation of both unmanned communications satellites and manned control space stations. If the U.S. military leaders are required to direct the employment of military weapons and forces, then the command and control systems must be survivable, global and sophisticated. The potential for space-based communications, including a command and control system, was noted recently by the former Secretary of the Air Force, Eugene M. Zuckert:

> Communications satellites give promise of providing, in the 1970 period, reliable, secure, and uninterrupted communications on a global basis. ... We believe that space should be in use only for peaceful purposes, but in order to assure that it is, we must know what useful or nonmilitary nature can be performed in space. The command-and-control functions inevitably will be projected into that environment.[20]

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[20]Eugene M. Zuckert, "Command and Control - Firm Hand and All-Seeing Eye," Air Force and Space Digest, April 1965, p. 71.

The Department of Defense has chosen for its initial operational communications satellites system, a system of random drifting satellites at near-synchronous altitudes. This system will use much of the demonstrated technologies of the NASA and Defense Communications Agency programs. However, the DOD must pursue its own development and operational programs due to the characteristics of commercial communications satellites and the requirements of a military command and control system, particularly during a national emergency. An effective, survivable military system requires an anti-jamming capability, terminals located in remote as well as populated areas, and terminals able to be rapidly transportable to meet military contingencies.[21] The potential of a military communications satellite system is being explored very thoroughly and on a priority basis by the U.S. government.

Weather. One of the most obvious and possibly least controversial applications of space technology is meteorology. Although NASA and the U.S. Weather Bureau

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[21]House, Committee on Government Operations, p. 47.

have been designated as the two prime agencies responsible for development and operation of a weather satellite system the military has made known its interest in obtaining satellite weather information for military missions and requirements. General Schriever's recent remarks are typical: "Space systems can enhance the defense of the United States by increasing in many ways the military capabilities of our forces.... Surveillance weather can report meteorological conditions...."[22]

The military most likely will have to share in the benefits of the NASA and Weather Bureau weather satellite programs within the immediate future due to the existing applications and the lack of justification for a seperate DOD operational program. Current satellite meteorology data is highly useable for determining existing weather conditions all over the world, improving weather forecasting capabilities, and also for exploiting the possibilities of modifying the weather.[23]

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[22]General Bernard A. Schriever, "Does The Military Have A Role in Space," Lillian Levy ed., Space: Its Impact on Man and Society" (New York: Norton, 1965), p. 62.

[23]Vernon Van Dyke, Pride and Power (Urbana: University of Illinois Press, 1964), p. 34.

For one to understand fully the potential of weather satellites to military operations, a brief review of the state-of-the-art is required. The military applications are then evident based on these existing and proposed capabilities.

The weather satellite program was born on 1 April, 1960 with the successful launch from Cape Kennedy of the first TIROS satellite. (TIROS-Television Infra-Red Observation Satellite)[24] TIROS is mission commanded by three ground stations in Virginia, California, and Alaska which give two basic commands: (1) to take pictures in a remote area or within sight of the station itself and (2) to transmit these pictures to the ground.[25] In addition to television cameras that take pictures, some TIROS satellites have been equipped with radiation sensors for infra-red observations. By 31 March 1964 eight TIROS launches were conducted and all performed the weather satellite mission successfully.[26]

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[24] J. Gordon Vaeth, Weather Eyes in the Sky (New York: Roland Press, 1965), p. 23.

[25] Ibid., p. 40.

[26] Ibid., p. 28-31.

Over 270,000 meteorologically useable pictures were obtained from the eight TIROS satellites with the average life span of each satellite varying from the low of 79 days for TIROS I, to 388 days for TIROS VI. TIROS VII and VIII are still operating after being launched in late 1963.[27] The average orbit has been 400 miles above the earth.

The successor to TIROS is the second generation weather satellite system called NIMBUS. This space craft design consists of three major elements: (1) a sensory ring on which is mounted the TV cameras, infra-red equipment, batteries and related communications and electronic systems, (2) a stabilization and control system, (3) a solar array system made up of two paddles, 39"x96" each of which rotate in flight. The first NIMBUS satellite, weighing 800 pounds, was launched on 28 August 1964, on a polar orbit to achieve coverage that TIROS could not provide. Orbital altitude was about 575 miles. This was the first and only NIMBUS launched to date and has been highly successful.[28]

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[27] Ibid., p. 76.

[28] Ibid., p. 77-83.

Weather satellites have a usefulness to all military services for targeting, mission planning, and in determining radioactive fallout patterns.

Navigation. The use of satellites for navigation purposes has numerous applications that make possible all-weather navigation systems for the military services, especially the Navy. The progress made to date with the navigation satellites, as with the previously discussed weather satellites is most encouraging. Military officials have indicated that navigation satellites, because of their reliability in all kinds of weather, predictability, and stability in orbit, could be used by aircraft, ships, and submarines to determine their exact position at any location in the world.[29] A brief examination of the Navy's existing capability today will confirm the military potential of navigation satellites.

A recent DOD news release on the Navy's transit navigation system revealed that since July 1964 the system

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[29]Robert H. Puckett, The Military Role in Space (Santa Monica: Rand Corp., 1962), p. 19.

has been operational.[30] It enables all fleet units, including submarines, to pin point their position anywhere in the world. The system combines the merits of all weather capability, high accuracy, and ease of operation.[31] The program was originally initated in 1958 after two American scientists plotted the position of Sputnik I from its radio signals and then located their position on earth relative to the Russian satellite. After a period of government research the Navy's operational requirement was developed. The first experimental navigational satellite was placed in orbit in April 1960. Seven of 10 navigational satellites launched into orbit in the subsequent four years were successes.[32] The present system has three operational satellites, the last launched in December 1964. The three satellites can provide a ship or submarine with a fix about every 90 minutes. The system is supported by ground stations in Hawaii, Minnesota, and Maine. In

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[30]"News Items and New Products," Signal, March 1965, p. 56, and also "Navy's Transit Satellites Showing the Way in Outer Space," Navy, February 1965, p. 7-10.

[31]Ibid.

[32]Ibid.

August and September 1964, it was used extensively on the round-the-world sea voyage by the all-nuclear Task Force One.[33]

The system has such promise that in addition to greatly improved navigation, it can provide better traffic control and rescue service for aircraft and ships than the present ground based radio aids. Passive use of the satellites e.g., the aircraft or ship does not transmit, provides the users the desired option of concealment during periods of international tension. However, the passive system such as the Navy's Transit system, is costly due to the requirement for the satellite to be continuiously transmitting and each user must have the necessary complex equipment.[34] The cost is justifiable though because of the military necessity for concealment.

As with other space ventures the military community must continue to develope the full potential of navigation satellites for use with strike force aircraft, space vehicle

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[33] Ibid.

[34] E.S. Keats, "A Navigation System Using Distance and Direction Measurements from a Satellite," Navigation, Autumn, 1964, p. 335-336.

navigation and others. The benefits derived from NASA's programs will complement these developments.

Reconnaissance and Intelligence. A brief discussion of the potential of using satellites for military reconnaissance and intelligence was presented earlier in this chapter as applicable to the offensive and defensive space missions. The significance of reconnaissance satellites requires further development and clarification. The future use of space for military reconnaissance has been recognized by DOD officials many times in the past few years as General Thomas D. White's statements in 1959 so appropriately indicated: "One of the earliest things we did with the flying of aircraft was reconnaissance. We foresee that one of the earliest missions in space will be reconnaissance. The advantages of space reconnaissance, as we popularly call the area 200 nautical miles above the earth today, are enormous."[35]

Over a decade ago, in July 1955 at Geneva, President

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[35]General Thomas D. White, USAF, statements to House Appropriation Committee, DOD Appropriation for 1960, 17 February 1960 in Air Force Information Policy Letter Supp. No. 110, 1962, p. 24.

Eisenhower proposed to the Soviet Union the so called "Open Skies" program. The program could have served as the indispensable pre-condition of arms-control measures and would have assisted in eliminating a potent factor of international instability.[36] The Soviets rejected the "Open Skies" plan possibly due to misunderstanding it or their awareness that by accepting the proposal they would lose their intelligence gathering advantage. It is commonly recognized that due to the United States democratic society and free press, the Soviets have access to vast more military intelligence information than the United States. The unacceptance of overflight was in reality discarded by the USSR with the launching of Sputnik I in 1957 and their other satellites since then.[37] Of course the United States, using aircraft, have conducted overflights with the unfortunate result of having at least one, whose mission was acknowledged, destroyed - the U2 incident. The United States also has developed a space borne reconnaissance

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[36]Dr. Stefen T. Possony, "Open Skies, Arms Control, and Peace," Air Force and Space Digest, March 1964, p. 71-72.

[37]Ibid.

system called SAMOS (Satellite and Missile Observation System) with the first launching in 1960.[38] The system identity and details were classified shortly after public announcement, and the present status is unknown.

The United States must utilize space reconnaissance satellites if it is ever going to overcome the unbalanced USSR-US intelligence relationship. There has always been a requirement for information of the potential enemy's intent including his force composition and deployment. Reconnaissance and intelligence gathering satellites will provide this information and thereby minimize the chances of surprise attack and eventually strengthen the policy of weapons and arms control.

Exploration. In reviewing the potential military missions in space presented within this chapter - those of offensive; defensive; communications, command and control; navigation; reconnaissance and intelligence - there is one remaining mission that really ties together all the military applications of space. Exploration is an essential

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[38]"Highlights of United States Space Programs," Air Force and Space Digest, April 1965, p. 130.

requirement for the military role in space.

Military officials since the beginning of the Space Age in 1957 have identified many specific military space requirements. They have also emphasized that while there may be disagreement concerning the priority and timeliness for some of the space programs by other government agencies and Congress, it is essential to conduct research and exploration to provide the foundation of knowledge necessary until military space requirements can be more clearly identified. The importance of concentrating on the exploration (exploitation) of space for military purposes resulted in the formation of the "building blocks" theory of space research defined as follows:

> At this stage of development, it is difficult to define accurately the specific characteristics that future military operational systems of many kinds ought to have. We must, therefore, engage in a broad program covering basic building blocks which will develope technological capabilities to meet many possible contingencies. In this way, we will provide necessary insurance against military surprise in space by advancing our knowledge on a systematic basis so as to permit the shortest possible time in undertaking full-scale-development programs as specific needs are identified.[39]

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[39]Dr. Harold Brown, Director, Defense Research and Engineering, in U.S. Congress, Senate, Committee on Aeronautical and Space Sciences, NASA Authorization for FY-63, Hearings (Washington: U.S. Govt. Print. Off., 1962), p. 335.

Many of the classified military space programs tested and developed operationally to date have no doubt been justified with this concept and theory of supporting space research. The President's announcement of the MOL program certainly adds credence to the space exploration theory as he emphasised so clearly by the following statement:

> This program (MOL) will bring us new knowledge about what man is able to do in space. It will enable us to relate that ability to the defense of America. It will develope technology and equipment which will help advance manned and unmanned space flight and it will make it possible to perform very new and rewarding experiments with that technology and equipment.[40]

The Defense Department space programs will compliment the work of NASA and other government agencies and permit the timely development of future space systems and capabilities. Secretary McNamara recently indicated that about one-half of the DOD space effort is directly associated with the unmanned military uses of space- weather, communications, navigation, and observation; while the other half is concerned with the creation of technology for

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[40]President Lyndon B. Johnson, quoted in "Space Goals: President Defines Them," The New York Times, 29 August 1965, Section 4, p. 1:2.

future applications such as exploration and advanced developments. Only by continuing to create a foundation of military space technology, knowledge, and experience both unmanned and manned, can we ensure against the uncertain future and attain a strong military posture thereby enhancing our survival and the security of the world.

CHAPTER III

MILITARY SPACE CONTRIBUTIONS: POLITICAL, POWER, TECHNOLOGY

The impact and effect that an aggressive military space program has upon the nations of the world is investigated in this chapter. An analysis of the military space contributions to a nation's political strength, balance of power, and science and technology leadership will be reviewed.

Political. It was inevitable that space would become a political arena for the nations of the world. However, the United States was reluctant to take the initiative in the international political space battle just as they had been delinquent in the assignment of a high priority to the space program itself. Mr. Khrushchev clearly established the political and propaganda pattern three days after the launching of Sputnik I with his statement:

> When we announced the successful testing of an intercontinental rocket, some of the U.S. statesmen did not believe us; the Soviet Union, you see, was saying it had something it did not really have. Now that we have successfully launched an earth satellite, only technically ignorant people can doubt this. The U.S.A. has no intercontinental ballistic rocket,

otherwise it would also have easily launched a satellite of its own.[1]

It is common knowledge that in the U.S.S.R. space programs are directed and operated almost entirely by military men, with military goals of paramount importance. Thus, the Soviets are not engaged in just a race to the moon but are directing their efforts towards domination of space near earth as well. The success of the Soviet political and propaganda campaign based on the space achievments would not have been possible unless they had accomplished numerous firsts such as:

(1) First artifical satellite.

(2) First lunar rocket to record pictures of the reverse side of the moon.

(3) First recovery of space vehicle from orbit.

(4) First cosmic-rocket flight to Venus.

(5) First manned orbital space flight.

(6) First multi-spacecraft orbital flight.

(7) First man walk-in-space flight.

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[1]Nikita S. Khrushchev, Pravda (Moscow), 11 October 1957, quoted in Joseph M. Goldsen, ed., Outer Space in World Politics (New York: Praeger, 1963), p. 52.

(8) First woman-in-space flight.[2]

The efforts of the Soviets to extract political gains from these space successes is no mere coincidence or an unplanned political scheme. They have directed their efforts in both the publicized news media and have also tried to weaken the image of the U.S. in the West through a less direct approach. In the news media no event since the death of Stalin was so widely publicized by the U.S.S.R. as the 12 April 1961 one-orbital flight of Major Gargarin. The same propaganda treatment was used for subsequent astronauts and by the end of 1962 the Soviets had four military politicans-astronauts.[3] The United States has of course employed the NASA astronauts (all have been military men to date) as good-will ambassadors in an effort to counter the Soviet political exploitations. The Soviets' more selective and less direct approach has been aimed at weakening or, if possible, destroying the Western alliance by degrading the U.S. capability to provide the military,

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[2]Arnold L. Horelick, "The Soviet Union and Political Uses of Outer Space," Joseph M. Goldsen, ed., Outer Space in World Politics (New York: Praeger, 1963), p. 56-59.

[3]Ibid.

scientific, and technological superiority in space over other nations.[4]

The Soviets had attained excellent success prior to 1965 when the achievments of the U.S. space program, including military, have turned the political battle in favor of the U.S. The awakening of the United States in the Space Age has been an evolutionary process highlighted by President Kennedy's Apollo program to explore the moon within the decade, the Mercury, Gemini, and MOL programs.

The recognition of the political importance of the Space Age was slow to receive attention; however the situation has been acknowledged probably most clearly by President Johnson's recent comments:

> The orbiting of that first unmanned earth satellite was a feat of science. But the worldwide impact and importance was essentially political....The real challenge of the Space Age is for the politican to tear down the walls between men which have been erected by his predecessors and contemporaries in the political field.... If the potentials of the Space Age are fully realized, this period will someday be known - and blessed by all people on earth - as the Golden Age of Political Science.[5]

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[4] Ibid.

[5] Lyndon B. Johnson, "The Politics of the Space Age," Lillian Levy, ed., Space: Its Impact on Men and Society (New York: Norton, 1964), p. 4-9.

In summary both the Soviets and the United States have accomplished unprecendented and highly significant space achievements. These space feats have had critical cold war propaganda importance and are used as instruments of international politics and prestige. The military role in space will complement and in many instances lead our international political effort.

Balance of Power. The balance of power and what nation is ahead is usually determined by comparing the military posture of the United States and its allies to that of the Soviet Union and the Communist bloc. It is really a posture of deterrence based on the fact that an attack by the USSR would result in retaliation that would be unacceptable and devastating to the Soviets. Prior to the launching of Sputnik I, the manned bomber force of the U.S. tilted the balance of power in favor of the United States. Then the Russians shocked this era of nuclear stalemate and massive retaliation with their initial and subsequent space successes.

The Soviet space achievments were extensively exploited with their dramatic events involving firstness and bigness.

Their effective propaganda programs have altered the world view of the power balance.[6] Many people in many countries, especially in Eastern Europe, believed that the Soviet Union's space successes meant that they possessed greater technology and thereby had greater military strength. Deterrence is essentially a psychological position which is really based on two premises: actual strength and apparent strength.[7] The Soviets with their space feats were credited with more apparent strength than they actually had while the U.S. strength had diminished until our astounding space successes in 1965. In overall military potential a real shift in the balance of power had not been clearly demonstrated.

The emergence of outer space as an international arena for the balance of power does not come as a distinct surprise. However, some officials, mostly members of DOD, recognized the military space potentials and their influence on power doctrine before others as the Secretary of

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[6]Harold L. Goodwin, Space: Frontier Unlimited (Princeton: Van Norstrand, 1962), p. 83-107.

[7]Ibid.

the Air Force, Eugene M. Zuckert, indicated in 1961:

> Space is the high ground of todays' struggle for the world. In land warfare, the military forces which seized the high ground had the advantage over their opponent. We must seize the high ground of space to insure that the means of earth domination inherent in space mastery be not pre-empted by the enemies of freedom.[8]

The importance of the military control of outer space is best explained as an extension of the concept of air and sea power domination as an instrument of national policy. In World War II, allied air-power aided greatly in winning the war. For centuries, England came closer than any other nation in exercising complete control of the seas. In both examples the nations of the world were able to gain political strength and tip the balance of power in their favor by military control of these engagement areas. Control of outer space completely would be most difficult due to the vastness of space and the dependence on science and technology. However, control of sections of space such as the area extending up to 1000 miles above and 500 miles from the United States would be an accomplishment recognized

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[8]Eugene M. Zuckert, Secretary of the Air Force, address in San Bernardino, Calif., 22 April 1961, quoted in Air Force Information Policy Letter Supp. No. 110, 1962, p. 26-27.

by the world as a positive contribution to America's superior balance of power.

There are those individuals who have not been advocates of expanding the military posture into the space environment because it will disrupt international cooperation, increase tension, and further extend the arms race. General LeMay, among others, was against this philosophy and became a staunch advocate of the theory of developing a military deterrent force in space as an instrument of national policy. His statement in March 1963, reflected the Air Force's position as follows: "It is axiomatic that any medium which an aggressor can have to his advantage will be so used. Maintaining the peace in space, as elsewhere, will be accomplished through deterrence. Deterrence can be achieved only by the existence of ready military capabilities to operate in the area in question."[9] President Johnson has endorsed this theory of developing a military deterrent force in space as he has stated: "If peace is to be

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[9]General Curtis E. LeMay, USAF, in U.S. Congress, Senate, Committee on Armed Services, Military Procurement for Fiscal Year 1964, Hearings (Washington: U.S. Govt. Print. Off., 1963), p. 896-897.

maintained on earth, free men must acquire the competence to preserve space as a field of peace before it can be made into a new battlefield of tyranny.... If we abandon the field, space can be preempted by others as an instrument for aggression."[10] With the approval granted for the MOL program this country has clearly established that in future years this nation's balance of power will be influenced by the military's role in space.

Technology. Throughout history the defense needs of the United States expressed in terms of military strength and achievments have played a large part in stimulating the technology that exists today. In 1804 it was a military mission, headed by Lewis and Clark that explored the areas known then as the Louisana Purchase.[11] When the use of the airplane was being exploited it was a military pilot who first circled the globe in 1924.[12] The Arctic was explored

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[10]Lyndon B. Johnson, "Remarks," Congressional Record, 18 June 1963, p. 11069-11070.

[11]Lieut. General James E. Briggs, USAF, excerpts in Air Force Information Policy Letter Supp. No. 120, June 1963, p. 17.

[12]Ibid.

by Admiral Richard E. Byrd and as most people know the building of the Panama Canal was a military project which included the medical conquest of yellow fever. In the present decade the development of the long range manned aircraft expedited the development of the present day commercial jet airliners. It is generally agreed that the ballistic missile became the father of the Space Age since almost all of the world's satellites have been launched by military rockets.[13] Another military program for example is the X-15 program which provided significant knowledge about flight at the edge of the atmosphere and about the performance of man and materials at high altitudes. Indispensable military contributions to the Space Age also include the development and use of military payloads, facilities, space sensor systems, and operational experience. General Schriever has stated that these Air Force contributions laid the foundation for the U.S. space progress.[14]

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[13]Lieut. General James Ferguson, "The Air Force in the Space Age," quoted in Air Force Information Policy Letter Supp. No. 131, May 1964, p. 21.

[14]General Bernard A. Schriever, "The Space Challange," Air University Review, May-June 1965, p. 4.

Many of the great military defeats in past wars have been brought about by new weapons and technology which caught the enemy by surprise. The United States must fully develope on a priority basis potential military applications in space. The Soviets have shown a keen awareness of both the military and political aspects of space exploration and have boasted repeatedly that they can use their space technology for aggressive purposes.[15] By using space to strengthen the defenses on Earth and by possessing weapons that provide an acknowledge deterrent force the United States will be capable of meeting any foreseeable threat to national security.

The most challanging technological venture that exists today is the exploration of space. It has replaced the development of nuclear energy as the greatest unknown. If space is to remain free then the United States and the military must keep it free. The excellent relationship that exists between NASA and DOD should provide each Agency

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[15] General Bernard A. Schriever, "The Scientific Challange in the Space Age," Air Force Information Policy Letter Supp. No. 120, June 1963, p. 22.

with the technology to achieve a dominant role in space. The military (Air Force) space laboratories are not manned solely by chemists, physicists and mathmematicians, but also by specialists in such areas as molecular electronics, radio biology, psychology, geophysics, and nutrition.[16] The national space program has divided the military and the civilian roles in space but the technology benefits and potential are complimentary to both agencies. The world, besides living in the Space Age, is actually facing another era concurrently - the Technological Age. The highest priority effort of the military today is the building of the free world's space technology.[17]

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[16] Ibid., p. 23.

[17] Eugene M. Zuckert, Secretary of the Air Force, quoted in Air Force Information Policy Letter Supp. No. 110, 1962, p. 28.

CHAPTER IV

CONCLUSIONS

Conclusions. History has shown that any environment which affords military possibilities has been exploited for military purposes. This has been true for the land, sea, and atmosphere; and in view of the achievements and intentions of the Soviet Union in world affairs, space will be no exception.

It was clearly demonstrated in the Cuban crisis that the United States will not permit land based offensive weapons within 100 miles of our shores. Continued surveillance is made of the oceans and airspace in an effort to detect and identify a hostile force. In the past few years it has become increasingly apparent that our military capabilities in space must be explored, improved and made operational. Military space power augmenting the other military forces of the nation will prove to be a major deterrent force in the 21st century. The deterrent forces that the United States maintains and develops must be dynamic, flexible and powerful enough to meet any possible threat. Like the development of nuclear weapons, military

space capabilities will become a status symbol of great power.

Military applications, uses and missions will probably increase as research and technology proceed. Potential military space systems will cover every realm of military operations including:

1. Offensive - Provide a space bomber force.
2. Defensive - Provide anti-space interceptors capable of detecting, identifying, intercepting, and destroying both space-based and land launched targets.
3. Communications, Command and Control - Provide command posts operating with improved reliability and effectiveness.
4. Weather - Provide surveillance of atmospheric weather for mission planning in targeting and refueling areas.
5. Navigation - Provide a reliable world wide navigation system for all forces.
6. Reconnaissance and Intelligence - Provide an effective space information gathering force thereby minimizing the chances of surprise attack.

7. Exploration - Advance the basic technological capabilities and objectives of the nation and investigate all military applications.

These space missions, not all encompassing by anyone's imagination, will also provide an enormous political asset in enhancing the nation's prestige in the world. Scientific and technological achievements have long been valued as documentary proof of national strength, the balance of power and the capability for progress. The United States must develope the capability to conduct the military space missions concurrent with the progress made by NASA's programs. However, the military programs, due to their higher performance standards and responsiveness, must be allocated separate and distinct priority to assure expedious development.

The Air Force as the primary service responsible for the development and operation of military space programs should initiate a study to determine the requirement for creating a new and separate major command - the Space Command. The military space programs will continue to expand rapidly and will require unique and increased management at all levels. The Air Force Program director for MOL

is General Schriever, who is also the Commander of the Systems Command. At some future date, maybe five, ten or twenty years from now, the military space program will have become so enormous that a separate Space Command will probably be necessary.

The increasing role that is evolving for the military in space will require substantial funds, scientific and technological efforts, and national support. It will also require that the civilian and military agencies develope a large number of trained and motivated spacemen. In this regard an investigation should be conducted to determine the feasibility of establishing a military space academy. The academy most likely would be a responsibility of the Air Force and might even be developed as a graduate school of the present Air Force Academy. Future spacemen, including astronauts, engineers, managers and operators would receive their education and training. If military participation in space continues to explode then preparation must begin <u>now</u>.

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