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THE INTERNATIONAL IMPLICATIONS OF MAN/MACHINE IN SPACE

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ABSTRACT of

THE INTERNATIONAL IMPLICATIONS OF MAN/MACHINE IN SPACE

The manner in which the destiny of nations has historically been shaped by the application of science and technology to revolutionary military capabilities is briefly discussed. Space capabilities are demonstrated to be the most recent and advanced product of science and technology. The impact on international affairs of man/machine in space and the potential of a nation's space capabilities to provide new tools of political and military strength are treated. A comparison of the space accomplishments of the United States and the Soviets is presented in the context of the significance of these accomplishments. The peaceful approach to space which has been adopted by the United States as a matter of principle in the face of unproven but potentially significant strategic military space implications is judged an imprudent course to follow.

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TABLE OF CONTENTS

CHAPTER		PAGE
	ABSTRACT	ii
	INTRODUCTION	iv
I	THE APPLICATION AND IMPACT OF SCIENCE AND TECHNOLOGY	1
II	THE SPACE AGE DAWNS	9
III	THE SOVIET SPACE PROGRAM: "WITH MALICE TOWARD SOME"	16
IV	THE UNITED STATES SPACE PROGRAM: "WITH MALICE TOWARD NONE"	27
V	THE CONCEPT FOR THE MILITARY UTILIZA- TION OF SPACE	44
VI	CONCLUSIONS	64
	BIBLIOGRAPHY	68

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INTRODUCTION

Science and technology are keystones upon which nations build. A nation's military capabilities particularly reflect the strength of these keystones as they are coupled with the motivation to establish military power. Today, scientific and technological advances are being made at a faster rate than ever before, providing military capabilities which are radically different from, and in many ways superior to, previous means. In short, national scientific/technical abilities and the motivation to use them are manifest in weapon systems of revolutionary capabilities that are coming into being at an accelerated pace.

With these conditions existent and clearly identifiable, it becomes increasingly apparent that should one nation gain technological supremacy in capabilities which have potential military application, or achieve technological surprise of a nature which provides obvious military advantages, that nation attains a position of superiority which could place all others in an extremely hazardous situation. The United States had military technological superiority over all other nations and also achieved technological surprise over the rest of the world when it developed and was sole possessor of the atomic bomb. It is grim to contemplate what the international results would have been had

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Russia, rather than America, achieved this position of supreme power.

Furthermore, should technical superiority yield a monopoly on accomplishments in a particular military field, or should an accomplishment in itself prevent others from taking steps to catch up, it could be disastrous. Thus far, this latter type of circumstance has not occurred, but developments have been brought about which point out that such a possibility should not be entirely discounted. Developments in the field of space suggest that it may be possible for a nation to achieve technological superiority and technological surprise, and, with special space capabilities, keep other nations out of space.

The injection of objects into space by man and the activities of man and machine in space are awe-inspiring achievements which have made universal headlines since the first Soviet Sputnik of 4 October 1957. Still, the value and significance of space undertakings continue to be debated throughout the world. Although the ability to place objects in orbit is unquestionably a demonstration of a national technological capability of the highest order, what will be the ultimate significance of "space power"? There has been conjecture on capabilities of such startling implications as to cause the most advanced and powerful nations in the world to make the conquest of space a project

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of vital importance and endeavor. The Soviet Union and the United States have invested heavily in the scientific, technological effort necessary to support a space program because the capabilities of man/machine in space, while already impressive, are in an embryonic stage and must be more completely determined. Paramount is the definition of military strength which space systems may provide -- the extent to which man and machine in space can be used for offensive and defensive military purposes.

To date, no nation has ever acknowledged the existence of an instrument of destruction in earth-orbit. However, the potential of space systems to become the next generation of weapon systems, providing the military backdrop for all international affairs, is very real. The development of a revolutionary type of military capability with man and man-made objects in space, possession of which would tip the balance of power heavily on the side of its possessor, is quite feasible. The lead which the Soviet Union has in space capabilities and the orientation of the space program of the United States continue to be cause for grave national concern.

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THE INTERNATIONAL IMPLICATIONS OF MAN/MACHINE IN SPACE

CHAPTER I

THE APPLICATION AND IMPACT OF SCIENCE AND TECHNOLOGY

Man has always sought to use science, technology, invention, and innovation in his personal battle against the environment in which he found himself. This capacity was utilized in his application of combatant force. Indeed, as the history of mankind evolves and accumulates, it becomes progressively apparent that the possession and application of force have been the ultimate and decisive factor which determined man's status and oftentimes his very existence. History well illustrates that peoples with more developed technologies have had an advantage which enabled them to conquer, while those with less industrial science eventually disappeared as a race or as a nation.

The earliest Neolithic society is given credit for vanquishing and causing the eventual disappearance of the Paleolithic society by making a great effort to equip itself with much sharper tools and possibly using these tools as weapons.¹ The Minoan society of Crete used bronze as

¹Arnold J. Toynbee, War and Civilizations, (New York: Oxford University Press, 1950), p. 131-132.

its primary metal and became the victims of the European hordes who were certainly stronger because they possessed weapons of iron.² The Japanese nation of today was created as a result of their introduction by Europeans to new military technology in the form of pistols, rifles, and cannon.³ In both the American Civil War and the Bismarckian Wars of the same period, a dominating factor leading to the success of the victors was their "technological and industrial superiority over their opponents."⁴ Likewise, in World War II, the success of the Allied forces can, in the final analysis, be credited to the superior industrial and manpower base of the United States, harnessed to a scientific/technological capability which culminated in the most revolutionary military capability yet created, the atomic bomb.

In spite of this long historical record, nations oftentimes are reluctant to fasten with immediacy on new technology and associate it with advanced capabilities. Such a condition may occur when decision makers are too conservative in their thinking, immersed in the concepts of yesterday to the extent of weighing potential military strengths

²Ibid.

³Encyclopaedia Britannica Conference on the Technological Order, The Technological Order, (Detroit: Wayne University Press, 1963), p. 112.

⁴Arnold J. Toynbee, Civilization on Trial, (New York: Oxford University Press, 1948), p. 35.

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only on the basis of the capabilities of proven weapon systems and current military strategies and tactics.

The utilization of gunpowder and invention of guns by the Europeans are two early classic examples. The cannon ball, the metal tube, and gunpowder had been in use in Europe for almost one hundred years before they were mated to form the cannon and drastically change the art of warfare.⁵ Moreover, the entry of these weapons into warfare was greeted with great apprehension and derision.⁶ The potential for aircraft to provide significant military capabilities was belittled for years by the leaders of this nation. At one time the outcries of a few had caused official contemplation long enough to bring about the establishment of a special fact-finding board for aviation in 1925, which reported: "the next war may well start in the air, but in all probability it will wind up, as the last one did, in the mud."⁷ Here it may be noted that in 1915 there had been enough national interest generated to create a National Advisory Committee for Aeronautics, NACA, which was to be charged with the responsibility for leading United States technological

⁵Encyclopaedia Britannica Conference on the Technological Order, p. 111.

⁶Ibid.

⁷American Heritage, History of Flight, (New York: Simon & Schuster, 1962), p. 202.

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progress in aviation for the next 25 critical years.⁸ It has since become apparent that this was not a very practical approach to counter developments in military aviation occurring elsewhere across the international scene. There is something in this nation's approach to space today that is reminiscent of the earlier assignment to a civilian agency, NACA, of the responsibility for the development of a capability which could conceivably have dramatic military applications.

Science and technology's next great achievement for military application was the development of the atomic bomb. Another product of United States ingenuity, its advent was unquestionably hastened by some number of years by the war-time circumstances which brought it to fruition; but the application of science and technology in support of the nation's military strength was again cast in the shadow of doubt. In January 1939, United States scientists learned that Germans had been able to split the uranium atom, and there was alarm expressed at the possibilities of the military capabilities that this feat might signify.⁹ Subsequently, no less an authority than Albert Einstein, in discussing work which was eventually to lead to the development

⁸Robert Hotz, "Aeronautics: History," The Encyclopedia Americana, (New York: 1961), I, p. 183.

⁹John H. Manley, "Atomic Energy," Encyclopaedia Britannica, (Chicago: 1962), II, p. 648.

of the atomic bomb, stated: "The results gained thus far concerning the splitting of the atom do not justify the assumption that the atomic energy released in the process could be economically utilized."¹⁰ Later, Einstein was to send a letter to President Roosevelt explaining the possibilities of the atomic bomb and requesting the personal attention of the President to the matter; but even then the letter was delayed in reaching Roosevelt for over two months because a Presidential advisor believed the President to be involved in more important--neutrality--legislation.¹¹

Succeeding the scientific/technological triumph of the atomic bomb, but occurring only nine years later, the ballistic missile appeared as the next revolutionary weapon system.

As with the airplane, United States leaders were once again faced with a technological accomplishment turned into a weapon system providing dynamic military capabilities which long ago they had seen developed in their own country and had shunted aside as being militarily worthless. Two Americans had originally conceived the missile idea. "The

¹⁰Albert Einstein, The New York Times, 14 March 1939, quoted in Otto Nathan and Heinz Norden, Einstein on Peace, (New York: Simon & Schuster, 1960), p. 291.

¹¹Ibid., p. 291-297.

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first practical guided missile--the Bug--was developed in 1918 by Elmer A. Sperry and Charles F. Kittering. It was built of papier mâché with wood framework and could carry a 300-pound bomb load automatically delivered on a target 40 miles from takeoff."¹² Another American, Dr. Robert H. Goddard, had visualized flight into space in 1903 and on 16 March 1926, built and launched the first liquid-fuel rocket which lifted 42 feet above a Massachusetts barnyard. By 1941, he had constructed a rocket almost identical to the German V-2 rockets which landed on London three years later.¹³

Far ahead of his time, Goddard received skeptical and often jeering publicity in the United States, and most Americans soon forgot about him. But Germans and Russians read his writings with interest, and in those countries his influence helped shape rocket development that by World War II was ahead of the rest of the world.¹⁴

Over 3,000 V-2's fell on England and Belgium, and when the war ended, a project was underway in Germany to convert the V-2 to a piloted spacecraft to bomb New York.¹⁵ There can be little question that had German scientists and technicians had resources behind them equivalent to those of the United States, the world today would present a far different

¹²Hotz, p. 185.

¹³Milton Lehman, This High Man, (New York: Farrar, Straus, 1963), p. 140-143, 379-382, 385-391.

¹⁴American Heritage, p. 204.

¹⁵The Thiokol Magazine, v. II, no. 1, 1963, p. 14.

picture. Yet, even after Germany had eagerly seized American technology and once again vividly demonstrated its military potential, the missile was looked upon with derision and skepticism by some of the most influential personalities of the United States government.

Vannevar Bush was chairman of NACA from 1939 to 1941 and director of the Office of Scientific Research and Development from 1941 to 1947.¹⁶ In 1949, discussing guided missiles as a form of weapon system, and specifically referring to the system we now know as the ICBM, he wrote:

Its cost would be astronomical. As a means of carrying high explosives, or any toxic substitute therefor, it is a fantastic proposal. It would never stand the test of cost analysis. If we employed it in quantity, we would be economically exhausted long before the enemy.¹⁷

The Soviets fired a 650-mile range ballistic missile in 1953,¹⁸ but the rest of the world paid scant attention until 27 August 1957, when the Russian ICBM test was announced and verified.¹⁹ The full impact of this accomplishment stunned

¹⁶"Bush, Vannevar," The Encyclopedia Americana, V, p. 72.

¹⁷Vannevar Bush, Modern Arms and Free Men, (New York: Simon & Schuster, 1949), p. 85.

¹⁸U.S. Air Force, Strategic Air Command, Space Offense Panel's Briefing, (Offutt Air Force Base, Neb.: April 1962), p. 45. SECRET.

¹⁹Firmin J. Krieger, The Soviet Union and the Political Uses of Outer Space, (Santa Monica, Calif.: Rand, November 1961), p. 21.

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the West when it was followed within two months by the first of the world's three man-made satellites.²⁰

It would appear as though Americans have scrupulously avoided pursuing and developing any new science or technology which was evolved by United States interests and was revolutionary in the art of weaponry, preferring to react when others have demonstrated capabilities rather than to assume the initiative. It would also seem that as the progress of science, technology, and the machine have accelerated, the bulk of the United States' scientific community has exercised an increasingly inhibiting conservatism to its application to national military capabilities. Peculiarly, this tendency is completely contradictory to the fundamental prerequisites for scientific/technological advancement: boldness and imagination. The one outstanding exception is the development of the atomic bomb, brought about by the duress of active participation in all-out hostilities. The United States may never again have the opportunity to recover from surprise as it has in the past.

But the danger is that a democracy will not come to focus on the right issues in time. Dictatorships always have counted on the tendency of democracies to preoccupy themselves with their domestic concerns, and then to turn--too late, convulsively, and at a disadvantage--to the issues of international power.²¹

²⁰ Ibid.

²¹ Walt W. Rostow, "The Struggle for Power," General Electric Forum, January-March 1963, p. 7.

CHAPTER II

THE SPACE AGE DAWNS

"Soviet Fires Earth Satellite into Space . . .,"¹ and the Space Age dawned. What is the significance of man/machine in orbit about the earth? When the Russians placed the first man-made object into earth orbit on 4 October 1957, there were mixed reactions. "Dr. Joseph Kaplan, chairman of the United States program for the International Geophysical Year, described the 184-pound weight as 'fantastic.'"²

The successful launching of the first earth satellite into outer space by the Soviet Union caused a sensation throughout the world. While great admiration was everywhere expressed at the achievement of the Soviet scientists and technologists, considerable concern and even alarm was felt, especially in the United States, that the lead gained by Russia might be exploited for military ends.³

It cannot be claimed that this event took the United States completely by surprise. There were many in the nation's military, scientific, and technical communities who were aware of the Soviets' interest in space and had considerable knowledge of the progress of their work. Firmin J. Krieger, in a Rand report published in June of 1957, forecast that the first artificial earth satellite would be placed in orbit

¹Headline, The New York Times, 5 October 1957, p. 1.

²Ibid.

³"A. Soviet Union--Launching of First Man-made Satellite into Outer Space," Keesing's Contemporary Archives, 5-12 October 1957, p. 15792.

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by the Russians on 17 September 1957, because this was the 100th anniversary of the birth of K.E. Tsiolkovskii, the founder of the science of astronautics in Russia.⁴

Yet, the Space Age opened with the United States relatively unprepared for its arrival. Those in the country who had forecast its coming had been virtually ignored. For America it was a rather puzzling situation in which to find itself, and public reaction ranged from the blissful "so what" attitude to one of righteous indignation that such an achievement should be carried out by anyone other than the United States. However, there was national unanimity of agreement that the Soviets had accomplished a feat which was no small technical and scientific attainment and which the United States was not in a position to duplicate.

While public pronouncements declared the United States dumfounded by Sputnik I, there were some Americans who were not so astonished. It could have also been reported that there had been at least one visionary in the nation who had been so rash as to propose as much as 37 years previously that Americans get into a space program; that a token effort by our military forces had been proceeding for some years; and that the Soviets had announced their intentions well in advance of their accomplishment.

⁴Firmin J. Krieger, A Casebook on Soviet Astronautics, (Santa Monica, Calif.: Rand, 1957), Pt. II, p. 10.

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As early as 1920 Dr. Goddard had published a treatise proposing to impact the moon with a rocket and had been castigated by The New York Times.⁵ It has been previously mentioned that in 1945 the Peenemünde V-2 program was discovered to be proceeding toward the development of a military space weapon system--but there was little apparent interest in space in the United States. In 1946, both the Navy and the Army Air Force made studies on satellites; however, the fact that they lacked a clear utility as weapon systems made them ineligible for funding support.⁶ Hearing of this United States military effort, in December of 1947, The New York Times went so far as to condemn any use by America of "Hitlerite ideas," and decried such a ridiculous scheme as reconnaissance satellites.⁷ In 1948, DOD's Research and Development Board was not quite that harsh. Reviewing the reports of the Navy and Army Air Force, it judged satellites to be too expensive a vehicle in comparison with any scientific or military gains to be expected in return.⁸ This same year Secretary of Defense Forrestal

⁵ Lawrence L. Kavanau, "The Military Space Program in Perspective," Speech before the Aviation/Space Writers Association, Dallas, Tex., 21 May 1963, p. 2.

⁶ Ibid., p. 3.

⁷ Ibid.

⁸ Ibid.

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made public for the first time some of the activities of the services in the investigation of the use of satellites, with little response from the nation. Behind the scenes, the Rand Corporation had continued a study on the utility of space which had begun in 1946, and in general, their findings, published in 1949, could be summarized in one revealing sentence: "Since mastery of the elements is a reliable index of material progress, the nation which first makes significant achievements in space travel will be acknowledged as the world leader in both military and scientific techniques."⁹ This observation was then followed by some light speculation on what American reaction would be in the very unlikely event that some other nation than the United States accomplished such a thing.¹⁰

In a revealing series of intermittent articles in Collier's during the period 1949 to 1954, Wernher Von Braun, Willy Ley, Dr. Fred Whipple, Dr. Joseph Kaplan, and Dr. Heinz Haber, at that time the nation's leading authorities on space, discussed at length the potentials of space flight, and had many of the activities of man and machine in orbit vividly demonstrated in colorful illustrations by a prominent

⁹Ibid., p. 5.

¹⁰Ibid.

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astronomical artist, Chesley Bonestell.¹¹ (These articles and illustrations remained so authoritative that they were used as reference material by the Air Force in 1962 in producing a motion picture on space.) This attempt to awaken the nation to the potentials of space fell on the deaf ears of an unattentive public. The subject was too hypothetical, too extreme, to be taken seriously. Besides, the things that Von Braun, Ley, and others were writing about, even if possible, were of a nature which could be achieved only by a country which possessed the ultimate in scientific/technological capabilities. If such things were to come to pass, they could be achievements only of the United States. What other nation could match it?

The United States was blissfully complacent concerning the technological capabilities of the Soviets, and perhaps logically so. There were the results of two world wars to attest to the sophisticated military might that America could summon, once aroused. It had an advanced society with the highest standard of living in the world. It was a nation whose scientific, technological, industrial, and economic capabilities were intact, physically unscarred by conflict, while Russia, England, and the rest of Europe were still reeling from the effects of a great war in their homelands.

¹¹"Man Will Conquer Space Soon," Collier's, September 1949-April 1954.

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Still, the signs were there. It could have been remembered, for example, that in 1948, Robert Oppenheimer, in a letter to the chairman of the General Board of the Navy, stated that "for a long time to come" the Soviet Union would not be able to "obtain a significant atomic armament."¹² The following year the Soviet Union exploded their first atomic bomb.¹³ The United States saw the Russians' technological capabilities, and any doubts should have been dispelled once and for all in 1953 when they detonated their first hydrogen bomb, just one year after the Americans had succeeded in detonating their own.¹⁴

Even though the Soviet New Times had reacted to Forrestal's 1948 announcement of DOD interest in satellites by proclaiming such vehicles to be "instruments of blackmail,"¹⁵ the signs were also visible for all to see that the Soviets were at least contemplating a space program. On 27 November 1953, the president of the U.S.S.R. Academy of Sciences, A.N. Nesmeyanov, announced: "Science has reached a state where it is feasible to send a stratoplane to the moon, to create

¹²J. Robert Oppenheimer, quoted in Robert Gilpin, American Scientists and Nuclear Weapons Policy, (Princeton: Princeton University Press, 1962), p. 75.

¹³Manley, p. 648.

¹⁴Ibid.

¹⁵Kavanau, p. 4.

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an artificial satellite of the earth."¹⁶ Subsequent activities by the Soviets bore out the earnestness of their desires, but the realism was provided by the Soviet ICBM of 27 August 1957, and a demonstration of things to come with Sputnik I on 4 October 1957 and Spütnik II on 3 November 1957.¹⁷

Even then there seemed to be no reason for the people of the United States to be overly concerned. Dr. A.A. Blagonravov, one of the ranking weapon specialists in the Soviet Union and a scientist who played the leading part in the Soviet earth satellite program,¹⁸ spoke on the subject on 6 October 1957: "The Russian ambition, he declared, was to contribute to science, and 'not to gain control over the earth,' and nobody should have 'anything to fear' from the Soviet satellite program"¹⁹ The President of the United States affirmed: "'Earth satellites, in themselves, have no direct effect on the nation's security . . . their current military significance lies in the advanced techniques and the competence in military technology they imply."²⁰

¹⁶Firmin J. Krieger, "Soviet Space Experiments and Astronautics," Aerospace Engineering, July 1961, p. 29.

¹⁷Ibid.

¹⁸"A. Soviet Union--Launching of Second Earth Satellite," Keesing's Contemporary Archives, 2-9 November 1957, p. 15835.

¹⁹"A. Soviet Union . . ." Keesing's Contemporary Archives, 5-12 October 1957, p. 15791.

²⁰"A. United States: the President's White House Broadcast on Science in National Security," Keesing's Contemporary Archives, 16-23 November 1957, p. 15860

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CHAPTER III

THE SOVIET SPACE PROGRAM: "WITH MALICE TOWARD SOME"

Internationally, space is being regarded as the testing and proving ground for the scientific and technical capabilities of nations. Emotionally, there is something more, an aura about man and machine in space which has appealed to the imagination of all mankind, much as the early exploits of aviation did, but on a more impressive and universal scale. The natural attraction of the mysterious and unknown, dramatized and heightened by intimate glimpses of individuals such as Gargarin and Glenn in melodramatic singular feats, and the fact that man-made objects traveling in their orbits in space can often be seen with the naked eye just a hundred miles or so away, strengthen the dramatic credibility of space ventures and are a powerful psychological force that the Soviets have turned to account in order to fan the flames of nationalism and serve as a rallying point for communism the world over.

The Soviets were first into space and continue to lead the field in space accomplishments. The Russian space program has proceeded without evident abatement in the level of effort that originally brought their endeavors to fruition. Their program has been characterized by its expediency and austerity, and has been highlighted by its deliberate

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concentration on sequential progression rather than repetition. It has provided Khrushchev with a unique opportunity to demonstrate in a nonprovocative fashion--ironically, to the accompaniment of the world's accolades--and without divulging technical information of any critical military importance, an example of military potential unmatched in history. Boastful of their superiority over the United States, the Russians feel that these accomplishments have become a powerful new political instrument and major element in their strategy. The straightforward association of scientific/technological capabilities and military power is blatantly obvious, and the space achievements of the Soviets have served to strengthen their ability to undermine confidence in the United States and promote communism as the hope and logical course for the future of mankind.

The manner in which Russia has flexed her space muscles in time with the political moves of great international importance is no coincidence. Immediately prior to Khrushchev's visit to the United States, the Soviets launched a space vehicle which impacted the moon. Upon his arrival in Washington, he presented to the welcoming President Eisenhower a Soviet flag, a replica of which, he announced, was now "flying on the moon."¹ During the unsuccessful Paris

¹Arnold L. Horelick, The Soviet Union and the Political Uses of Outer Space, (Santa Monica, Calif.: Rand, 1961), p. 26.

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summit conference in May 1960, the Soviets placed an object in orbit triple in weight to anything orbited up to that time.² And as the Warsaw nations met to close the border of East Berlin, Titov went around the world 17 times, the second Soviet manned space flight accomplished before the United States could place their first man in orbit.³

Typically, the Soviets have been quick to exploit all aspects of their space program in any manner most suitable to the circumstances. For example, should a statement appear in an American periodical pointing out the military potential of space or United States neglect of the military potential of space, the Soviets immediately accuse the United States of attempting to utilize space mainly for military purposes. Should America likewise call attention to the military implications of Soviet space accomplishments, the Russians quite candidly admit that it is the statements from United States sources on the military significance of space which are the compelling reasons for their own military space efforts. Marshal Vasily Danilovich Sokolovskiy, First Deputy Minister of the Soviet Armed Forces, as a basis for comment in discussing military capabilities in space in his book Military Strategy, recalls the words of presidential

²Ibid.

³Ibid.

candidate Kennedy in October 1960, i.e., the country which controls space can control the earth. The Soviet Union "cannot disregard" United States plans to "use space exploration for military purposes"; therefore, "it would be erroneous to permit the imperialist camp to become superior in any way in this field"; the U.S.S.R. must counter with "more effective means and methods by the use of space for defensive purposes . . . only this may compel [the United States] to abandon the use of space for a shooting and destructive war."⁴ This has been a very successful maneuver on the part of the Soviets, because of its feedback into United States and allied news media which has resulted in a form of conscience and defensive attitude that has inhibited enthusiasm for development of American military capabilities and created a reticence by the West to attempt to relate Soviet space accomplishments with aggressive military space capabilities.

Nevertheless, there is ample evidence that the Soviets are developing military capabilities in space in accordance with their expressed needs,⁵ and it is noteworthy that "historically the Soviets do not admit a requirement for a new

⁴Vasily D. Sokolovskiy, "The Problems of Using Outer Space for Military Purposes," a translation from the book Military Strategy, by Headquarters, USAF, (AFCIN-3F1), 1962, p. 2-6.

⁵Ibid.

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military capability unless they have the solution at hand."⁶

Today, a large segment of the American public is essentially of the opinion expressed in so many publications that achievements of the Soviet space program, when coupled with the avowed Soviet aims, are a threat to its security and that the United States should take whatever steps may be necessary to maintain military parity in space, at the very least. It is a fundamental fact that the West is the equal of, or superior to, the Soviets in military capabilities on land, in the air, and at sea. Only in space is the Soviet virtually unopposed. The commander of the Soviet strategic rocket force has stated unequivocally that missiles could be launched from satellites "at any desirable time and at any point in the satellite trajectory."⁷ Premier Khrushchev has warned that his satellites "can carry other freight than man. We will hold a sword of Damocles above the earth."⁸ The Soviet leader was quoted in December of 1963 as asserting that the Russians had a rocket that can fly around the world, in any direction: "You wait for it at the door but it climbs through the window."⁹ What Khrushchev is describing is

⁶Murray Green, "Soviet Military Strategy," Air Force and Space Digest, March 1963, p. 42.

⁷Francis V. Drake, "We're Running the Wrong Race with Russia," Reader's Digest, August 1963, p. 50.

⁸Ibid., p. 51.

⁹"Reds Claim ICEM That Flies in All Directions," Washington Post, 4 December 1963, p. 26:3.

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the capability to put bombs in satellites. For quite obvious reasons, the Soviets have not released the keys to the technology of their space program, particularly the most meaningful, propulsion and guidance, which are closely guarded secrets. However, Allied intelligence has obtained extremely valuable information from both overt and covert sources upon which to base a realistic appraisal of the Russian space program.

The following tables, showing a comparative level of accomplishment of the United States and Soviet space programs, are informative and should help place the two programs in their proper perspective. Although the United States has placed many more objects in space than the Soviets, it has yet to have the success of a "first," and, other than in the number of space launches, it cannot duplicate the level of Soviet space capability. Sputniks I and II were launched into orbit by ICBM's. Sputnik III, launched the following year in April 1958, signified the inauguration of the use of a superior booster specifically for space work.¹⁰

There are some Soviet accomplishments not yet mentioned or apparent in the following illustrations which are so significant as to deserve further attention. They were the first

¹⁰Firmin J. Krieger, Recent Soviet Advances in Aerospace Technology, (Santa Monica, Calif.: Rand, February 1962), p. 3.

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Cumulative Orbital Payload Weight¹¹

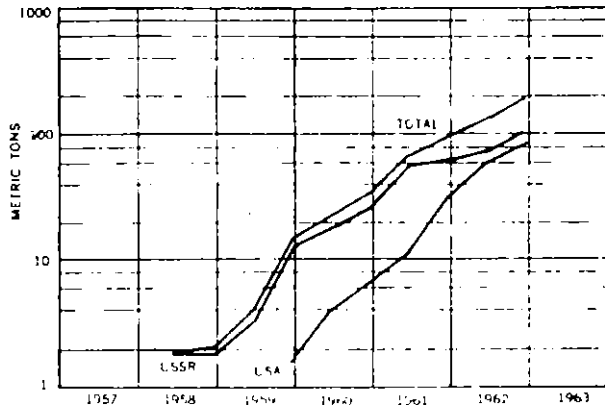


Fig. 5 Equivalent orbital payload weight (cumulative).

¹¹H.H. Koelle, "Trends in Earth-to-Orbit Transportation Systems," Astronautics and Aerospace Engineering, October 1963, p. 26.

Cumulative Number of Space Launches¹²

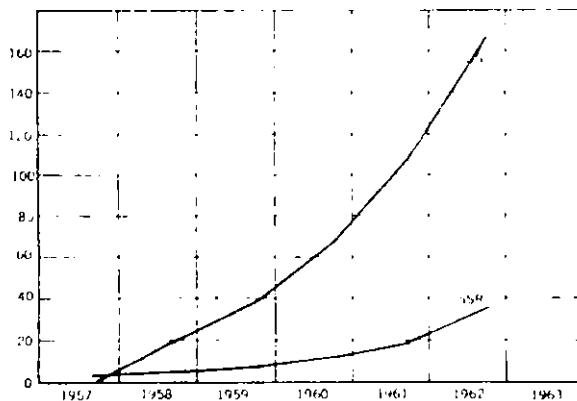


Fig. 3 Cumulative number of space launches.

¹²Philip K. Eckman and William M. Helvey, "Spacecraft and Life Systems," Astronautics and Aerospace Engineering, November 1963, p. 26.

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INDIVIDUAL MANNED SPACE FLIGHTS¹³

Date	Astronaut	Orbits	Flight Time
Apr 12, 1961	Gagarin	1	1 Hr. 29 min.
Aug 6, 1961	Titov	17	25 Hr. 18 min.
Aug 11, 1962	Nikolayev	64	94 Hr. 22 min.
Aug 12, 1962	Popovich	48	70 Hr. 57 min.
June 14, 1963	Bykovsky	81	119 Hr.
June 16, 1963	Tereshkova (Miss)	48	70 Hr. 57 min.
TOTAL		259	382 Hr. 03 min.
Feb 20, 1962	Glenn	3	4 Hr. 56 min.
May 24, 1962	Carpenter	3	4 Hr. 56 min.
Oct 3, 1962	Schirra	6	9 Hr. 14 min.
May 15, 1963	Cooper	22	34 Hr.
TOTAL		34	53 Hr. 06 min.

¹³Ibid.

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to achieve solar orbit, the first to impact the moon and obtain pictures of the back side of the moon, the first to inaugurate interplanetary travel by launching a Venus probe, and the first to place two manned spacecraft into near-rendezvous position.¹⁴ Also, the Soviet maneuverable satellite, Flight I, placed in orbit in November 1963, was a significant step in refining the capabilities necessary for rendezvous functions and the initial step in achieving all that maneuverability-in-space promises.¹⁵

Methods used in the Soviet Venus probe demonstrated a hitherto unobtainable flexibility of space operations which had some startling military implications: that objects could be launched from space at any time, in any direction, to strike any chosen earth target;¹⁶ and that rendezvous is a basic requirement for rescue from space, resupply of vehicles in space, or inspection and--if necessary--negation of hostile objects in space. The ability to rendezvous in space is necessary before further significant space accomplishments can be claimed by either the Soviet or the United States. America has not advanced to the point of attempting rendezvous with an object in space, nor has it been able to

¹⁴Krieger, Recent Soviet Advances . . . , p. 3; and Koelle, p. 26.

¹⁵Theodore Shabad, "Soviet Craft Put into 'Final Orbit,'" The New York Times, 3 November 1963, p. 33:1.

¹⁶Krieger, Recent Soviet Advances . . . , p. 5.

have more than one manned vehicle in orbit at the same time.

The Russian manned spacecraft have weighed in the neighborhood of 10,200 pounds, in contrast to the American Mercury spacecraft of approximately 2,000 pounds.¹⁷ However, the Saturn I shot of January 1964, which placed 37,700 pounds in orbit in contrast to the heaviest Soviet weight of 14,292 pounds three years previously, has manifested that the United States soon will have the ability to put larger manned capsules in orbit.¹⁸

It is highly improbable that the United States' program will make its lunar goal by 1970,¹⁹ but Professor Leonid Sedov, credited as the "father of Sputnik," indicated that the Russians would attempt to land a man on the moon in 1965 or 1966.²⁰ Public news sources ascribe to the Soviets the ability to orbit the moon with a manned spacecraft in 1964 to 1965, land on the moon between 1966 and 1968, and establish a laboratory on the moon in 1968 to 1970.²¹

¹⁷"Space Activities Summary," Aviation Week and Space Technology, 11 March 1963, p. 137.

¹⁸"U.S. Orbits Saturn I; It's World's Heaviest," Newport (Rhode Island) Daily News, 29 January 1964, p. 1:5.

¹⁹"Off Target," Newsweek, 23 September 1963, p. 73.

²⁰"Red Expects Moon Shot in 3 Years," Washington Post, 8 October 1963, p. 1:1.

²¹"Soviet Lunar Landing, 1966-68," Space Business Daily, 30 October 1963.

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United States intelligence reports attribute to the Soviets the capability of placing in space today--

Between 100 and 200 Titov type vehicles, each carrying a 4- to 5-megaton warhead with a 50-mile accuracy;

and in the future--

A more sophisticated force with major improvements in weight-carrying capabilities and weapon accuracy;

By 1965, a permanent type large military station in near-earth orbit;

In 1964, 90,000 pounds in orbit, which could be translated to 540 megatons of weapon yield;

By 1966 to 1968, 150,000 pounds in orbit, which translates to 1 gigaton (1,000 megatons); and

By 1970, 1,000,000 pounds in orbit, which translates to multi-gigatons.²²

²²SAC, Space Offense Panel's Briefing, n.p. SECRET.

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CHAPTER IV

THE UNITED STATES SPACE PROGRAM: "WITH MALICE TOWARD NONE"

Once the Space Age had been opened, there was no serious question in the nation regarding the requirement for the United States to have a space program of its own which would be comparable to that of the Russians. Admittedly, the United States had lost some prestige in the world at a time when it was sorely needed. At the same time, there were some sober, thought-provoking, real-world facts-of-life which could not be ignored. Even to equal the Russian space accomplishments would be an expensive national effort; eventually to surpass them might conceivably be an impossibility. Was "prestige" alone worth the effort? What would the significance of the ability to put objects in space finally prove to be?

Fundamental to the position taken by the United States was the premise that any action pursuant to the development of a space capability should not be one which could be construed to be aggressive or military in nature. There was no wish to distort the image of a peaceful Uncle Sam, particularly in view of the fact that no one could establish "beyond a reasonable doubt" that the initial Soviet space accomplishment was anything more than a technological/scientific feat which in itself did not diminish the security of this nation. It could not be proven that man/machine in space would ever

have any real military value. Even the most rabid exponents of the military advantages to be gained by that nation which had superiority in space had to retreat before the unalterable fact that this had not yet come to pass and that the present weapon systems in the inventories of both the free world nations and the Communist bloc were many times more effective than any space capability yet demonstrated. The nation needed a space program of consequence, but not military consequence. Was the historical pattern being repeated once again in the fabric of time?

To get the nation's space effort into high gear, the first significant legislation enacted to provide the means for a space capability was the National Aeronautics and Space Act of 29 July 1958, which was explicit in its intent that United States space activities should be peaceful in nature and purpose.¹ Translating this stated objective into action, the bill created the National Aeronautics and Space Administration, a civilian agency, which was to be responsible for the national space program and, in particular, all non-military activities in space.² NASA began its operations on 1 October 1958 by immediately absorbing the personnel and facilities of the NACA (National Advisory Committee for

¹B. Spencer Isbell, "National Aeronautics and Space Administration," The Encyclopedia Americana, (New York: 1961), XIX, p. 725-726.

²Ibid.

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Aeronautics) in order to have a tangible organization.³
(It will be recalled that NACA was the civilian organization which had been established in 1915, under similar circumstances, when the nation found itself critically lacking in progress with aircraft. See p. 3.) NACA became NASA, and began to grow--in size, in responsibility, in prestige. It grew from 9,200 people in 1959 to 32,500 in 1963;⁴ from a \$339-million budget in 1959 to \$5.7 billion requested for FY 1964;⁵ and from a minor research facility and three relatively small tenant installations on Navy and Air Force bases to a present total of nine major installations.⁶ The Army Ballistic Missile Agency was directed to transfer the George C. Marshall Space Flight Center at Huntsville, Alabama, including 5,500 people and the nucleus of former German rocket experts, to NASA on 1 July 1960.⁷ The latest major installation is the 1,600-acre \$130-million Manned Spacecraft Center at Houston.⁸

³Ibid.

⁴John W. Finney, "Delays Beset the U.S. Space Program," The New York Times, 8 September 1963, p. 6E:1.

⁵"Space Program Faces Leveling-off," The New York Times, 5 January 1964, sec. L, p. 54:3.

⁶Ibid., and Isbell, p. 726.

⁷Ibid.

⁸"Off Target," p. 73.

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In short, in just over five years, NACA has changed its name, more than tripled in size, increased its fiscal spending approximately 13 times over, and experienced having its mission in life changed from the capacity of a relatively unknown advisor to aviation to that of overall director, manager, and implementer of one of the most vital and ambitious endeavors in the history of the United States. The new NASA, or old NACA, was neither prepared nor qualified for this responsibility; bureaucratic growth of this magnitude was certain to breed difficulties. This aspect, which in itself has created built-in road blocks to the progress of the national space program, will be discussed later. Nevertheless, the NASA space program has come a long way since its inception as a national effort in 1958. Its accomplishments with man and machine in space are invaluable and absolutely fundamental to further progress, many of these developments having military utility.

Specifically, NASA's efforts have been aimed at investigation of the general space environment, communications to and from space, solar phenomena, aids to meteorology from space, environments of Mars and Venus, geophysical measurements from space, astronomy, and man-in-space.⁹ Like the Soviets, NASA has had to utilize ICBM's for its initial space

⁹"Astrolog," Missiles and Rockets, 13 January 1964, p. 25-31.

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launchings for lack of a booster specifically tailored for space launch purposes. The first successful United States space launch was a rather meager effort--30.8 pounds in orbit in comparison to the 8,000-pound weight of Sputnik I.¹⁰ However, United States capabilities have vastly improved, and the Saturn I payload has now surpassed the Soviets' heaviest weight by over $2\frac{1}{2}$ times. The matter of the amount of weight that can be placed in orbit is of course critical, for weight can be translated into equipment, men, volume to move around in, fuel for in-orbit maneuver, and many other desired capabilities.

The impact of many of the NASA satellites has been international in scope and promises to be even more so in the future. The United States has utilized TV via its communications satellites as political and diplomatic tools on an international scale. American TV programs, pictures of the President, and American points of view on international questions have reached viewers and information media throughout the world within minutes of their transmission by using the United States' orbital facilities.¹¹ On 26 September 1963, Pope Paul VI, while sitting in his private library, sent a message by the United States Telstar to Georgetown

¹⁰"Space Activities Summary," p. 137.

¹¹"Space Diplomacy," Denver Post, 6 August 1963, p. 6:1.

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University on its 175th anniversary.¹² Officials of the International Telecommunications Union have stated "that by 1980 two-thirds of the world's broadcasting will utilize space satellites."¹³ The Echo 2, a light-reflecting balloon as high as a 13-story building, was launched on 25 January 1964, and NASA chiefs pointed out that it could be seen by more people than any object ever produced by man.¹⁴ If plans materialize to work with the Soviets to bounce facsimile pictures and code signals off the skin of Echo, it will be both a demonstration of American capabilities and a visible sign of intent for peaceful cooperation in space before the whole world.¹⁵

Another area of space performance is in the field of meteorology. Everyone is interested in the weather. The United States Tiros weather satellite program has been highly successful. Seven satellites have been placed in orbit thus far, and over 250,000 pictures of world weather phenomena have been employed for forecasting purposes for

¹²"Pope Speaks via Telstar to America," Providence Journal, 27 September 1963, p. 49:2.

¹³"U.S. and Soviet Make Space Radio Accord," The New York Times, 5 November 1963, p. 6:7.

¹⁴"U.S. Lifts Largest Satellite in World," Newport (Rhode Island) Daily News, 25 January 1964, p. 1:5.

¹⁵Ibid.

the benefit of all mankind.¹⁶

It may even turn out that the best place to dig for gold is in space. Striking color photography taken from NASA's Project Mercury capsules show geological features of the earth which are revelatory in the location of minerals and which provide an ease of location unobtainable by any other means.¹⁷

William Leavitt, associate editor of Air Force/Space Digest, has proposed space technology as today's tool for controlled peace in that even though technology cannot be abolished by agreement, its use may control conflicts. He makes the point that when satellite pictures of Cuban missile sites were shown in the UN, the traditional cloak of Soviet secrecy was penetrated, and all the world could see the truth. He also asserts that arms control experts see observations from space--as demonstrated by United States satellite photos, satellite detection of missile firings, and the satellites for the detection of nuclear testing--as encouraging and positive contributions to the problem of conflict control in a cold war world. In other words,

¹⁶Marvin Miles, "International Weather Satellite to Be Orbited," Los Angeles Times, 16 August 1963, p. 48:1.

¹⁷"Orbiting Spacecraft May Spot Minerals," Providence Journal, 21 October 1963, p. 3:1.

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the capabilities and intentions of the world, including the Soviets, become open to inspection.¹⁸

By far, the largest single space program of NASA and the nation's space effort is the Man on the Moon program. This venture may rank as one of the all-time colossal endeavors of mankind. Originally announced as a first priority national objective by President Kennedy in his second State of the Union message to Congress on 25 May 1961, the program was presented as the way for the nation "to take a clearly leading role in space achievement."¹⁹ The proposal followed shortly after the Soviet's first manned orbital flight by Gagarin and the Bay of Pigs debacle and was envisioned as the most dramatic method available for restoring American prestige. This seems to be a debatable conclusion.

Many scientists believe that there will not be enough scientific value to justify the cost of the lunar program. The editor of Science magazine is reported to have determined that 107 out of 110 scientists not connected with NASA did not favor placing a man on the moon by 1970, and the

¹⁸ William Leavitt, "Space Technology: Today's Tool for Controlled Peace," Air Force and Space Digest, April 1963, p. 106-107.

¹⁹ "Transcript of Kennedy Address to Congress on US Role in Struggle for Freedom," The New York Times, 26 May 1961, sec. L, p. 12:1.

president of Carnegie Institute of Technology claims that the United States space program has been established for the purpose of building prestige, not for purposes of scientific or military values.²⁰ Dr. Linus Pauling, twice honored with Nobel prizes, addressed the National Academy of Sciences in October 1963, and agreed with British nuclear physicist Sir John Cockcroft's opinion of the American space program, which he quoted: "'I believe it is a pitiful demonstration of something wrong in our system of values that the United States is spending so many billions in exploring space for international prestige . . .'" rather than spending the money on basic research on the human body.²¹

The cost of the effort was just one of the reasons why the NASA lunar program found itself in serious trouble with the nation some two years after its inception. There was an increasing lack of confidence in the national space effort as a result of a General Accounting Office report to Congress that poor management by NASA and private industry had wasted \$176 million and two years' work.²² The moon program is beset by technical and management problems and

²⁰Blake Clark, "A Job for the Next Congress: Stop the Race to the Moon," Reader's Digest, January 1964, p. 76.

²¹Stuart H. Loory, "Our Race to the Moon Blasted by Pauling," Washington Post, 23 October 1963, p. 8:6.

²²"A Dark Shadow Falls over the Whole Space Program," Providence Journal, 6 October 1963, p. 38:1.

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almost certainly will not meet the target date of 1970 set by President Kennedy.²³ "What is disturbing . . . is that more than two years after the space agency was handed the assignment, there is still indecision over how the lunar landing project should be managed."²⁴ The directors of the NASA facilities most directly involved in supporting the moon program, all strong-willed and resolute men, have had a tendency to create their own hierarchies and engage in a power struggle for authority and responsibility.²⁵ D. Brainerd Holmes, the administrator of the program, resigned in dissatisfaction.²⁶ Also, the moon's value to national security was extremely questionable and the lunar program was not strongly endorsed by the military services.²⁷ In brief, there was general disagreement among the most influential strata of the populace on the real value of the lunar program; and its great expense and lack of desired progress presented to many the opportunity at least to slow it down and re-examine it.

²³"Off Target," p. 73.

²⁴Finney, "Delays Beset the U.S. Space Program," p. 6E:1.

²⁵John W. Finney, "Manned Test Flight Lags 9 Months in Moon Project," The New York Times, 1 September 1963, p. 1:2.

²⁶"Off Target," p. 73; Providence Journal, 18 October 1963, p. 4:1.

²⁷Ibid.

Into the middle of this controversy came the report that Russia was about to get out of the moon race, but that it would be willing to cooperate with the United States in a joint venture to land a man on the moon.²⁸ Although this report proved to be erroneous, the effect on the United States at the time was significant. While NASA spokesmen stated that the Russian position was the highest compliment ever paid to the United States space program, it appeared that some of the leading members of Congress felt that the Soviet stand was the clinching argument substantiating the lack of necessity for a lunar program.²⁹

Both NASA and the Administration were deeply disturbed by the prospect of a cut in funds for NASA or a slowdown of the lunar program. One consideration was that by October 1963 the United States had already invested over \$13 billion in support of the project.³⁰ But paramount was the Kennedy Administration's very strong stand on the whole space issue--the Man on the Moon program particularly. The national space effort had been used as a successful political

²⁸ Neal Stanford, "Soviet Bid Aired to End Moon Race," Christian Science Monitor, 14 August 1963, p. 14:3.

²⁹ "No Change Urged in Space Plans," Baltimore Sun, 28 October 1963, p. 3:4.

³⁰ "US Space Leaders Say Moon Projects Should Be Continued," Providence Journal, 28 October 1963, p. 2:1.

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lever to gain support for the Administration's ideas and ideals on both the national and international scenes; it was too useful and potent a tool to be allowed to fade into the background, since it had an impact on almost any subject at hand: politics, economy, science and education, security, and technological progress. It was also a great emotional stratagem.

It was therefore a dramatic surprise proposal when President Kennedy, on 20 September 1963, placed before the United Nations the offer to join the Soviets in a joint expedition to the moon.³¹ This move accomplished two immediate objectives: it strengthened the United States image of peace and cooperation on the international scene, and it put pressure on Congress to uphold the position of the Chief Executive of the nation and to refrain from trying to hamstring or to slow down the NASA space effort.

Still, Congress was obviously not 100 percent behind the space program proposed by NASA and the Administration. Reported originally to be in a mood to reduce the NASA budget by 25 percent,³² the House approved in October a slash of \$612 million from the \$5.7 billion requested by

³¹"Charge Waste," The New York Times, 6 October 1963, p. E2:6.

³²"House Unit Split on Space Budget," Washington Post, 29 September 1963, p. 18:1.

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NASA,³³ and NASA Director James E. Webb stated that under these conditions the 1970 Man on the Moon deadline could not be met.³⁴ Although the cut was only token, it seemed to express the attitude of Congress toward the NASA Space program. Many Congressmen believed Kennedy's proposal for the United States and the Soviet to join hands in the lunar effort to be a further sign of relinquishing the urgency and priority of the lunar program, and the Congress voted for a budget of \$5.1 billion.³⁵ As one official is reported to have commented, "How do you sell Congress a multibillion dollar space program on the idea of cooperation after having labored so long to sell it on the basis of competition?"³⁶

The Congress also voted against any joint Soviet-American lunar program;³⁷ but, as it turned out, a realistic analysis of such a cooperative effort as had been proposed showed that to be successful, both nations might have to scrap their present programs and start anew, a rather

³³"For the Record," Astronautics and Aerospace Engineering, December 1963, p. 5.

³⁴Robert C. Toth, "Outlay for Space Cut to 5.1 Billion," The New York Times, 8 October 1963, p. 1:2.

³⁵"JFK at the Controls," Newsweek, 21 October 1963, p. 98.

³⁶Chalmers M. Roberts, "Moon Project Switch Has Vast Implications," Washington Post, 21 September 1963, p. 31:1.

³⁷Ibid.

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unreasonable proposition.³⁸ Nevertheless, there may still be some cooperative ventures in space with the Soviets: in August 1963, an agreement was concluded for joint activities in meteorology, communications, and mapping the earth's magnetic field;³⁹ and in November 1963, the United States entered into an agreement with the Soviets, which was endorsed by the UN Assembly, on the utility of space for only peaceful uses, and a declaration of legal principles to govern the exploration and use of space.⁴⁰ This agreement had been initiated when Mr. Gromyko, in a speech before the UN, 19 September 1963, proposed a pact between the United States and the U.S.S.R. not to place nuclear weapons in orbit. President Kennedy, the next day, speaking before the UN, said that the United States was agreeable to such a proposal.⁴¹ It is appropriate, however, to remember that "Officials of the Truman, Eisenhower and Kennedy administrations have all reached the same basic conclusions in turn. This is that agreements based on trust are useless with the Soviet Union. The agreements must be, the late Secretary

³⁸"For the Record," p. 5.

³⁹"Joint Moon Trip Needs New Plans," Newport (Rhode Island) Daily News, 5 October 1963, p. 2:5.

⁴⁰"Cooperation in Space," The New York Times, 19 August 1963, p. 24:1.

⁴¹"East-West Dialogue," The New York Times, 6 October 1963, p. E1:7.

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of State John Foster Dulles used to say, self-enforcing."⁴²
At the moment, if a nation has a nuclear warhead in an orbiting vehicle, secretly or even publicly announced, no other nation has the capability to prove or disprove it.

Efforts to cooperate with the Soviet Union in space are in compliance with the nation's original approach to space, for one of the features of the National Aeronautics and Space Act of 1958 was direction that NASA would conduct its programs in cooperation with other nations.⁴³ An initial action by the United States in compliance with this directive was to urge the United Nations in 1959 to consider what actions that body could most profitably take in contributing to the peaceful uses of outer space.⁴⁴ Resultant was the formation of the Committee on the Peaceful Uses of Outer Space, which has recently been quite active. The United States has thus far received cooperation from 12 other nations (none communistic) in space research on a global scale and has cooperative space programs with almost as many, providing for the United States both tangible and

⁴²John M. Hightower, "Soviet Cooperation," Providence Journal, 10 November 1963, p. N26:1.

⁴³Arnold W. Frutkin, International Cooperation in Space, Armed Forces Information and Education Pamphlet, v. II, no. 21, (Washington: Dept. of Defense, 1 May 1963), p. 1.

⁴⁴Ibid.

intangible benefits.⁴⁵ Launches for these programs occur here and abroad, and space tracking stations are located in South Africa and England, with a 60-square-mile center for one of the American space tracking networks to be started in 1964 in Australia.⁴⁶

However, United States allies have been quick to appreciate the significance of space in advancing their own national technology, security, and prestige and have started space programs independent of American aid. The combined talents of Europe in any space venture would add up to a formidable capability, and the potential of this capability in the future maneuvers for world power positions has not escaped the attention of Europeans, nor has it been neglected. There are Europeans who fully realize that some of the penalties and inequities with which they now must contend because of their geographic position and size, could become virtually eradicated with a military space force. Britain, France, and West Germany are each preparing one stage of a three-stage rocket for the European Launcher Development Organization (ELDO) and the European Space Research Organization (ESRO). These organizations

⁴⁵Ibid. and Memorandum of Understanding between the French Centre National d'Etudes Spatiales and the U.S. NASA, NASA News Release 63-49, (Washington: NASA, 18 February 1963), p. 2.

⁴⁶"Australia Will Get U.S. Space Center," The New York Times, 2 August 1963, p. 1:4.

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expect to spend \$300 million on space projects in the next eight years.⁴⁷ Japan's largest solid-fueled rocket, with a thrust of 40 tons, was launched in August 1963; France has launched animals into space from its launch bases in the Sahara;⁴⁸ and in November 1963, Britain continued its space program with the launch of two space rockets within 24 hours of each other from ranges in England and Australia.⁴⁹

⁴⁷Frutkin, p. 1.

⁴⁸"French Launch Cat on Flight into Space," Washington Post, 24 September 1963, p. 1:5.

⁴⁹"Britain Fires Two Space Rockets," Philadelphia Inquirer, 22 November 1963, p. 12:6.

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CHAPTER V

THE CONCEPT FOR THE MILITARY UTILIZATION OF SPACE

When the nation launched its space effort in earnest in July 1958, a great issue was made of the fundamental premise of peaceful objectives. Although this did not appear to be an altogether unreasonable approach, there were some in the United States who had given the matter enough thought to be of firm belief that unless the national space effort was oriented to prove or refute conclusively the military value of space, the nation would be pursuing a foolhardy course of action. A position also taken was that any requirement to go to space for scientific knowledge or prestige could be satisfied by associate and accumulative by-products of a program tailored to satisfy military aims. Too, there was the thought that only the military services had the vast organization and experience to be responsive to the requirements of an effort of such national magnitude.

Envisioning military operations in space, most saw that vehicles in that medium would have attributes which the military tactician and strategist have always striven to possess: a vantage point from the aspect of occupation of a position higher than that of the enemy, thereby facilitating observation and the application of firepower; speed of movement which in relation to others is magnitudes greater; the inherent characteristic of space vehicles to remain in the

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operational medium; and the greatly increased expanse of operational environment, thus aiding in concealment, dispersion, and multiple routings for maneuvers, observation, patrol, and attack. Although the space environment was known to be a hostile one, there was general agreement that the application of science and technology would enable man to overcome and ever increase his utilization of this medium, as he had done with the land, sea, and air.

The Air Force has contended for some time that there is a valid military space mission and that by 1975 manned space-ships will be effectively utilized to detect the launching and determine the targets of missiles launched by an enemy, intercept these missiles prior to their reaching a point that can cause damage to target areas, and launch counter-attacks of their own.¹ Space warfare may have already started--the Air Force has acknowledged that some of the United States satellites have been damaged due to man-made radiation in space, but at the moment it cannot be determined if the damage is the result of nuclear detonations set off by the Americans or by the Soviets.² Today, the great majority of military men are convinced that the next truly significant gain in strategic military capabilities will be made with weapon systems in space.

¹Editorial, Newport (Rhode Island) Daily News, 10 January 1964, p. 6:1.

²Space Business Daily, 1 August 1963.

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To be sure, this belief is founded mainly on assumption, premonition, intuition, and conjecture; not on fact. We can no more see clearly now all of the utility and implications of space systems than could the Wright brothers or General Billy Mitchell have predicted that the airplane would be the carrier of a weapon whose destructive force was virtually beyond comprehension. Indeed, at the end of World War II there was no forecast that in less than twenty years, ICBM's, each with a warhead whose destructive power is measured in megatons rather than the just-unveiled kiloton weapon, would be the decisive military weapon of the world.

Dr. Lawrence L. Kavanau of the Department of Defense has very sagely expressed the United States' space position:

Our programs were (and still are) constrained by the slow-to-change American institutional framework. As always, dollar incentives have been the primary attraction for industrial sources in a new field. The free enterprise system needs time to shift gears to meet a new challenge. Defense planners traditionally have been reluctant to gamble heavily on distant possibilities before their precise practical value is demonstrable.³

The evolution of the United States military establishment into the space field has been accomplished with timidity, hesitation, and reluctance.

There continue to be important public figures who categorically deny the military offensive implications of

³Kavanau, p. 3.

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space. Representative of this position is a statement by John H. Rubel, Assistant Secretary of Defense, in the fall of 1961:

The near term prospects for new space weapons systems surpassing the ballistic missile are not very promising . . . these and other possibilities are unattractive now and are likely to remain so for many years if not forever . . . the ballistic missile will not be matched by some new product of space technology for a great many years . . . a successor . . . is not likely to evolve for a long time.⁴

Roswell Gilpatric, Under Secretary of Defense, stated in September 1962 that the Kennedy Administration did not intend to develop or mount any weapons of mass destruction in space.⁵ It is reported that top Pentagon scientists continue to express the belief that the Soviet missile threat is the danger, not the Soviet space capabilities which are of more psychological than technical importance.⁶ But of greater significance is the arbitrary course that has been settled upon by those who make national decisions. As expressed by Dr. Edward C. Welsh, executive secretary of the National Aeronautics and Space Council, which was headed by then Vice President Johnson, these decision makers refused

⁴John H. Rubel, "Research and Development Today," Astronautics and Aerospace Engineering, October 1961, p. 18.

⁵Paul W. Ward, "U.S., Russia Seek A-Arm Orbit Ban," Baltimore Sun, 16 October 1963, p. 1:1.

⁶"Bomb in Orbit Called Less Peril than Missile," Washington Star, 21 August 1963, p. 5:1.

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even to consider offensive space weapons as a matter of pol-
icy.⁷

When there is already an offensive weapon for which the United States has found no defense--the ICBM--the consternation expressed in some military circles concerning the state of the military space program, particularly space offensive capabilities, can be logically questioned. The answer is basically simple, but is not widely understood nor widely accepted by the scientific community. In today's dynamic military environment, unknown factors may require innovation, and, to be responsive, flexibility is indispensable. The ICBM is a relatively inflexible piece of military equipment. Being unmanned, it is more fixed in its performance limitations and more resistant to change. The reliability of a piece of equipment that has been used over and over again can be easily computed with certainty--not so easily if used only once, as a particular missile is. There is the possibility of the development of a creditable anti-ICBM. Should this event occur, there may be no modification possible to make to the ICBM which would significantly counter the defense. Lastly, no military man is so naive as to visualize any weapon system as an ultimate weapon. Weapons

⁷Edward C. Welsh, "Space Policy and Space Management," Speech before the American Institute of Aeronautics and Astronautics, Dallas, Tex., 24 April 1963, p. 3.

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become outmoded in time--occasionally because a practical defense against them is developed, but more often because a new, more effective weapon appears. There will be new weapon systems which will cause the ICBM to become just as obsolete as other weapons have, and this is even more of a possibility in this age of accelerating technological advancement.

Exact strategies and tactics to be used with space offensive weapon systems cannot be laid out in detail when the weapon systems themselves are an unknown quantity. However, it must be understood that military planners who speak of space weapons do not contemplate a simple "bomb-in-orbit." The first space-to-earth weapons may be nothing much more than ballistic missiles which are launched from space platforms but which re-enter the atmosphere and strike targets at velocities greatly exceeding the ICBM of today and thus are less vulnerable to the type of ICBM defenses now contemplated. Consider a weapon launched from space with an equivalent impact of 8 million tons of TNT, which, striking Kentucky, would destroy the better part of the inhabited portion of the United States east of the Mississippi River, and, upon impact, would cause shock waves that would knock down structures in the entire country.⁸ The same weapon, impacting

⁸ Israel M. Levitt and Dandrige M. Cole, Exploring the Secrets of Space, (Englewood Cliffs, N.J.: Prentice-Hall, 1963), p. 265-267; and "Scientists Suggests an Asteroid Bomb Could Wreck U.S.," The New York Times, 19 January 1962, p. 19:6.

in the middle of the Atlantic, would cause a tidal wave which would engulf the entire Atlantic coast and a considerable portion of Western Europe at the same time.⁹ Should the Soviets choose to do this, they could wipe out the United States with possibly no chance of retaliation on America's part. Impossible? Not so, claims Dandridge M. Cole of General Electric's Missile and Space Vehicle Department. A large rocket having something on the order of 12 million pounds of thrust, like the United States-proposed NOVA, properly placed on an asteroid, of which there are thousands in the solar system, could force the asteroid out of its normal orbit and head it toward the earth.¹⁰ It is estimated that the Soviet Union could have rockets capable of the thrust required for such a scheme by 1970.¹¹ Controlled nuclear charges could furnish the same required thrust.

In speaking of the role of the military in space, Eugene M. Zuckert, Secretary of the Air Force, acknowledges that

The nation is holding to those peaceful objectives, but we also know that the military services will have to do the same thing in space that they have always done in the media of the land, sea, and air Space offers new aids. Observation, warning, communications, military geodesy and

⁹Ibid.

¹⁰Ibid.

¹¹Ibid.

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meteorology are areas for the application of space technology to defense.¹²

The Strategic Air Command states:

We estimate that by 1976 the USSR will have developed a family of military space systems to replace and/or augment their ICBM's and conventional forces as strategic weapons Space technology is sufficiently advanced to make necessary an immediate consideration of its application to an early phase of operational planning for an added dimension to our strategic military posture.¹³

Another typical statement is attributed to Allen F. Donovan, senior vice president of Aerospace, Inc. of Los Angeles, which is the Space System Division's primary technical advisor: "The nation that first gains uncontested control of the earth's space environs will rule the earth so thoroughly that nothing political or economic will take place without that nation's permission."¹⁴ This theme, with at times strong indictments of the nation's space program for its neglect of the military importance of space, has been subscribed to by John F. Kennedy, as Senator and President;¹⁵

¹²Eugene M. Zuckert, "The Military Role in Space," Address at the Air Force Missile Training Center, Patrick Air Force Base, Fla., 2 March 1963, p. 3.

¹³U.S. Strategic Air Command, Requirements Division, Directorate of Operations, Required Operational Capabilities, DORQM 63-15, (Offutt Air Force Base, Neb.: December 1963), p. 4. SECRET.

¹⁴"Beam Energy Weapon Favored," Toronto Globe and Mail, 13 August 1963, p. 5:1.

¹⁵"Tensions Ease under the Sign of the Moon," Newsweek, 30 September 1963, p. 18.

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Lyndon B. Johnson, as Senator, Vice President, and President;¹⁶ Richard N. Gardner, Deputy Assistant Secretary of State;¹⁷ James E. Webb, NASA head;¹⁸ Dr. Edward C. Welsh, Executive Secretary, National Aeronautics and Space Council;¹⁹ and countless Congressmen.²⁰ There continue to be increasing signs of Congressional apprehension and restlessness with the cost, management, overall objectives, and neglect of the military exploitation of space in the national space program.²¹

Yet, the Administration has expended great effort to convince the Congress that space has little military urgency, and the national philosophy continues to be reflected by the Department of Defense position on the military potential of man/machine in space as essentially one of "prove it," without providing all the means to really do so. Soviet accomplishments will in all probability remain the barometer

¹⁶"Johnson's Stand on Major Issues," The New York Times, 26 November 1963, p. 18:1.

¹⁷"Official Rips Red Demands on Space Laws," Chicago Tribune, 11 August 1962, p. 1:6.

¹⁸"Webb Presents Views," Providence Journal, 18 October 1963, p. 4:1.

¹⁹Welsh, p. 3.

²⁰"Military Space Lag Charged by G.O.P.," The New York Times, 22 November 1963, p. 21:1-3.

²¹John W. Finney, "Space Debate Grows Sharper," The New York Times, 6 October 1963, p. E5:1.

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for any important action of the United States. Indicative of this situation is the fact that in the face of potentially drastic cuts in the NASA space budget by Congress, proponents for the original amount requested were optimistically confident that another Russian "spectacular" would occur soon to provide the impetus necessary to acquire funds in the amount desired.²² However, if in the final analysis "It is essential to the United States, as the leading free world power, to dominate space,"²³ as President Kennedy stated in a news conference in July of 1963, it is then necessary to acknowledge the requirement for the military to be in a position to fulfill that obligation.

What are the broad, fundamental prerequisites which the Air Force believes are necessary to provide a desired military space capability at the present time? Very briefly, they are as follows:

1. Operationally flexible, economical forms of transport to and from space.
2. Vehicles in space accommodating sufficient weight and volume to allow adequate performance of required military tasks.
3. Vehicle subsystems, including weaponry, to support mission functions.²⁴

²²"House Unit Split on Space Budget," Washington Post, 29 September 1963, p. 18:1.

²³"Tensions Ease under the Sign of the Moon," Newsweek, 30 September 1963, p. 18.

²⁴U.S. Strategic Air Command, Required Operational Capabilities, p. 28-29. SECRET.

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The Air Force's Air Defense Command has stated requirements for the means to positively detect, identify, inspect, and negate--if necessary--man-made objects in space.²⁵ (A bomb in orbit may be less peril than a missile to some, but should the next Russian satellite, passing just 100 miles over the United States many times a day, contain a 100-megaton weapon what could be done about it?) The Strategic Air Command believes that the offensive capabilities necessary in space are "The same basic capabilities necessary to maintain a strategic deterrent capability today . . .,"²⁶ and lists them as--

1. Offensive Strike. Weaponry which can be positively applied against a potential enemy should it be necessary. This weaponry should include all methods and techniques of applying force or energy to achieve objectives (both space to earth and space to space).
2. Reconnaissance/Intelligence. To provide information relative to all threat systems, wherever they may be, both pre-attack and post-attack.
3. The maintenance of positive and sustained Command/Control of the force at all times, to include normal operation, alert, force execution, and reconstitution of the withheld and residual forces.
4. Logistic support, to include maintenance, resupply and rescue, as necessary.²⁷

²⁵Richard Witkin, "Pentagon Seeking Satellite Destroyer," The New York Times, 20 October 1963, p. 1:7.

²⁶SAC, Required Operational Capabilities, p. 4. SECRET.

²⁷Ibid., p. 5. SECRET.

American industry has proposals for "hardware" which would satisfy every one of the Air Force's stated requirements. Furthermore, the industrial proposals have been evaluated by the most competent scientific and technical personnel in industry, government, and educational fields and have been judged to be technically feasible.²⁸ It can be assumed that Soviet military space planners have stated similar requirements--and as soon as they demonstrate the capability, the United States decision to proceed with a development effort should be forthcoming.

The Air Force was assigned the responsibility for all military space system development in 1961.²⁹ Therefore, the key to the military role in the national space effort is the Air Force space budget. The FY 1964 DOD Air Force space budget which went before Congress in July 1963, has a total amount requested of \$1.1 billion.³⁰ This is in contrast to the NASA budget request to Congress for \$5.7 billion.³¹ It has been reported that more funds have been requested for new helicopters for the White House than for a manned orbital

²⁸U.S. Strategic Air Command, SAC in Space, Briefing, (Offutt Air Force Base, Neb.: May 1962), p. 32. SECRET.

²⁹Ibid. SECRET.

³⁰"Air Force Fiscal 1964 Space Budget," Space Business Daily, 26 July 1963.

³¹"JFK at the Controls," p. 98.

UNCLASSIFIED

development system for the military.³² Of the \$1.1 billion military space budget, those moneys in support of the strategic offensive mission space requirements amount to approximately \$460 million, of which an unverified sum of \$289.2 million, or about 60 percent, is for continued operation of the reconnaissance satellite program which has now been in existence for almost three years.³³ This leaves in the neighborhood of \$176 million, which will do little more than spoon-feed efforts in support of developments for the remaining Air Force space requirements.

It is logical to ask, then, how the military can best profit from the activities of that agency which is getting the lion's share of the support and funds for the national space program, NASA. Although the "hardware" developed under NASA direction does not satisfy military concepts and requirements for the performance of military space missions, unquestionably benefits to the military have accrued as a result of the NASA programs. The NASA Mercury program provided worthwhile information on some of the fundamental questions concerning man in the space environment. A two-man capsule, the Gemini program, is the NASA follow-on effort

³² Barry Goldwater, quoted in "Goldwater Hits Moon Stress, Urges Arms," Washington Star, 20 July 1963, p. 1:2.

³³ Space Business Daily, 26 July 1963.

UNCLASSIFIED

to Project Mercury and the Air Force had been led to believe that it would be allowed to share in Gemini to the extent that it at last would have a military man-in-space program.³⁴ In January 1963, Secretary McNamara and James E. Webb, administrator of NASA, went so far as to make an agreement to assure that the Gemini program would meet "the objectives and requirements" of civilian and military programs alike.³⁵ However, this arrangement was abrogated last September when the Department of Defense and NASA announced that the Air Force would play a very small part in the Gemini program, DOD still taking the position that there was no justification for manned military spacecraft.³⁶

Valuable information will come from the NASA Man on the Moon effort, but the military value of the moon as a place from which to conduct military operations is very questionable; and as no part of the moon program is tailored to add to American security, but represents a huge expenditure of dollars and national capabilities, the wisdom of such an undertaking is disputable to many. The booster being developed for the program cannot be adapted to operational military requirements and the capsule is designed

³⁴John W. Finney, "Air Force's Role in Gemini Is Cut," The New York Times, 3 September 1963, p. 1:8.

³⁵Ibid.

³⁶Ibid.

specifically for the lunar program and not as a vehicle to perform military functions in space. While some of the technology involved and some of the accomplishments necessary to complete the program successfully would be useful to the military, the ratio of gain, in terms of significant military space capabilities, versus the tremendous national expenditure, is relatively low. Even Dr. Von Braun has said that the Man on the Moon program is serving as a focal point for industrial efforts in the space program and has no apparent military significance other than this.³⁷ From a military standpoint, efforts in support of the moon program could be much more profitably spent on "hardware" development and space projects which would return more capability in the "near space" areas, for in its military strategy, the Air Force believes the ability to operate without restriction in "near space" orbit is a step which must be achieved in priority to serious moon ventures.³⁸ Such a capability would lend itself to early control of space, and in the hands of an aggressive nation could prevent attempts at further space activity by anyone else. Levitt and Cole have pointed out the military potential of operating in, and controlling inner space,³⁹ and Representative James D. Weaver

³⁷"Moon Flight Focuses Industry Effort, Von Braun Says," Missile/Space Daily, 3 September 1963.

³⁸U.S. Dept. of the Air Force, USAF Space Objectives, LR0733-S63, (Washington: 6 November 1963), p. 6. SECRET.

³⁹Leavitt and Cole, p. 266.

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of the House Space Committee has "warned" Congress of Russian efforts toward conquest of near space for military domination.⁴⁰

The military has been able to learn a great deal by looking over NASA's shoulder. As it possesses the facilities and the ICBM launch-experienced personnel, the Air Force launched more than 90 percent of the American satellites and space probes during 1962,⁴¹ including the major NASA shots.⁴² This arrangement has allowed the military to watch NASA space operations and assimilate a certain amount of experience, but it may also be falsely creating the impression on the public that the military is deeply involved in a space program which is comparable to NASA's and adequate for its own needs. Such is certainly not the case.

As stated in Newsweek:

The Air Force wants to fly its own missions and set up a manned station in orbit, but it finds itself curbed by a Defense Department that remains unconvinced that men in blue need to go flying off in space. Most NASA officials agree with the civilian chiefs in the Pentagon. But this agreement springs mainly from a fear that

⁴⁰"Manned Space Flight Program Revamp Set," Providence Journal, 29 October 1963, p. 26:2.

⁴¹U.S. Dept. of the Air Force, Information Fact Sheet 8-63, (Washington: August 1963), p. 5.

⁴²"DOD Balks Most Military Space Expansion except in Reconnaissance," Aviation Week & Space Technology, 11 March 1963, p. 117, 137.

the Air Force will take control of space. It breeds on jealousy and feeds on the uncertainties and conflicts within NASA itself.⁴³

The military does of course have several successful and vital space programs which have been approved by the Department of Defense. The Air Force reconnaissance satellites have been very successful in the collection of intelligence information on the U.S.S.R., and DOD satellites have succeeded in detecting the launching of a number of American ICBM's, thereby giving promise for greater warning against ballistic missile attack.⁴⁴ Twin satellites have been launched to maintain a continuous watch to detect nuclear detonations in space, supporting safeguards against violation of the test ban treaty. The Navy and NASA are cooperating in a navigation satellite venture, Transit,⁴⁵ which is designed to enable ships at sea to navigate anywhere on earth in any weather conditions with precise accuracy.⁴⁶ Furthermore, command and control of United States strategic forces is expected to be accomplished by a network of 24 to

⁴³"Space and the Atom," Newsweek, 23 September 1963, p. 73.

⁴⁴"Satellites See Launchings," Newport (Rhode Island) Daily News, 27 January 1964, p. 1:8.

⁴⁵U.S. National Aeronautics and Space Administration, "NASA-DOD Navigation Satellite Announced," NASA News Release 63-48, (Washington: 8 March 1963).

⁴⁶John W. Finney, "Navy Set to Orbit Atomic Satellite," The New York Times, 15 September 1963, p. 75:3.

30 communications satellites by 1966, if the DOD proceeds with recently announced plans.⁴⁷ These programs should at least serve as part of the foundation for the ultimate capabilities desired by the "in-uniform" military strategists.

Although there is probably no one who would deny that the full extent of the military utilization of space is not clear, there is a product of science and technology which, while still in its infancy, may be the real key to military operations in space, particularly destructive weaponry to, in, and from, space. This product is in the form of transmission of tremendous amounts of energy by beams or rays. The most widely known forms that this property appears in today are the LASER (Light Amplification by Stimulated Emission of Radiation) and the MASER (Microwave Amplification by Stimulated Emission of Radiation).⁴⁸

It has been written about the LASER:

Its invention is comparable to the invention of the vacuum tube--with all the developments of radio, radar, TV and transistors yet to come It has been calculated that, under the right conditions, a single laser beam could carry as many messages--radio, telephone, teletype writer and TV--as all communications channels in existence

⁴⁷"Military Space Network Slated," Providence Journal, 16 December 1963, p. 17:1.

⁴⁸Raytheon Co., Abracadabra, (Lexington, Mass.: 15 March 1963), p. 14-15.

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today . . . the narrow intense beams of laser light have an even more startling property: they can vaporize any known material.⁴⁹

Laboratory models of the LASER have already been developed to the point of cutting through diamonds and battleship steel, but because they are least effective in the atmosphere, they may be best utilized as a weapon in space--in the role of an anti-ICBM or as a weapon against enemy space vehicles.⁵⁰

Nicolaas Bloembergen, Harvard's Gordon McKay professor of applied physics, refers to a "Death Ray" type LASER, and says, "Research being done by Harvard and Massachusetts Institute of Technology scientists may lead to the most significant military development since the ballistic missile."⁵¹

Work with the MASER is proceeding also, and with the same startling potentials. Although the work on the LASER is somewhat more advanced at the present time, the MASER is not as affected by atmospheric conditions and could be more readily used from earth to space and space to earth as a destructive weapon.⁵²

⁴⁹ Maya Pines, "The Laser Lights Up the Future," The New York Times Magazine, 8 September 1963, p. 27.

⁵⁰ "The Amazing Laser," Life, 11 January 1963, p. 46; and John Woodfield, "The Race for the Laser," Providence Journal, 29 September 1963, p. N-39:1.

⁵¹ "Death Ray' Lasers May Counter Missile," Providence Journal, 21 January 1964, p. 12:3.

⁵² Ralph Dighton, "Will Ray Experiment Lead to Longer Life or Instant Death?" Omaha World Herald, 10 June 1963, p. 7:3.

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General Le May has hinted of the fantastic new military capabilities with this type of ray weaponry, as have the Russians.⁵³

During an interview with an American industrialist last winter, Premier Khrushchev picked up a steel ruler from his desk, pointed to tiny holes in it which he said had been drilled by laser light, and boasted that Soviet scientists were well ahead of ours in this field.⁵⁴

It may be well to remember that in 1953,

The thermonuclear breakthrough led to a recommendation by the Air Force Strategic Missile Evaluation Committee that the program for the Atlas intercontinental ballistic missile, which had been proceeding with limited funds since 1951, be redirected, expanded and accelerated.⁵⁵

The "breakthrough" was the ability to produce small-size, high-yield warheads. It was a breakthrough in weaponry, not propulsion or guidance or some other important component of the carrier that finally put into motion the present tremendous national effort in the general field of missile and space systems, placing the missile in the role of what is becoming the nation's primary military strategic deterrent. There are indications worth contemplating which suggest that it once again may be weaponry that may provide the final and accelerated impetus to the development of a true military space capability by America.

⁵³Pines, p. 27.

⁵⁴Ibid.

⁵⁵U.S. Air Force, The United States Air Force Report on the Ballistic Missile, (Garden City, N.Y.: Doubleday, 1958), p. 17.

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CHAPTER VI

CONCLUSIONS

The accomplishments of man and machine in space during the short time period such capabilities have been possible are singularly impressive. It is not surprising that most Americans share a common belief and assumption that space will prove to be, as have other great areas of technological development of this era, a dynamic and revolutionary element of national power. Despite the lack of hard proof, indications are that in time the rapidly expanding technology of space systems will place within reach new space capabilities extending across the spectrum of military missions. Categorical denials of this possibility will not make it any more unreal when it occurs.

To date, the space environment has been used as a psychological stimulant on the international political scene, with the military utilization of particular accomplishments, for the most part, implied. Gradually, striking new space capabilities with more obvious pure military significance are sure to be exploited for political purposes. This type of display may risk divulging certain technical intelligence and eliminating the potential for surprise at a later time, but may be so dramatic in itself as to be useful enough to justify the undertaking. In time, warfare in space--open military conflict--may be viewed as the answer to the present

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earthbound dilemma of nuclear stalemate or nuclear holocaust. Removal of the combat area from the earth environment would leave civilian populaces unharmed, man-made structures intact, and the landscape unchanged. Prospects for the limitation of conflict to space, avoiding escalation could be very favorable, providing that a mutually stabilizing inter-national strategic deterrence existed. In space, as with other types of conflict, however, both limitation of hostilities and deterrence of aggression would be critically dependent on the existence of space forces which were suitable for conflict control.

Irrespective of the future uncertain course of events, the great danger for the United States lies in the fact that the products of science and technology are not always predictable nor do they always occur at the right time on a particular political side. A technological breakthrough in space military capabilities, creating an immediate power imbalance, is not outside the realm of possibility, and the Soviets will strive in every way to make technological end runs, fully aware that supremacy in space means more complete access to every point on the earth's surface for applying military power.

In the final analysis, the argument over the adequacy of the United States military space program comes down to the question of lead times, direction, and support. It is a matter of judgment as to which is the most desirable way

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to proceed. However, judgment clouded by idealistic conceptions of an unrealistic nature are not in the interests of national survival. Decisions to develop military systems may be taken independently of possible enemy developments, as a reaction to achievement of novel capabilities by an enemy, or as a precaution against the possible acquisition of a weapon monopoly by an opponent. Since an optimal response to acute military instability requires prompt counteraction by forces in being, reactive decisions would be generally unsatisfactory for dealing with some of the crises which may arise in space. In view of the vast ranges of uncertainty concerning possible threats in space, precautionary decisions to develop some space weapons are mandatory in order to deal effectively with peripheral conflicts in space. Specifically, this conclusion applies to anti-satellite weapons and related capabilities.

The entire NASA space effort, including the lunar program, should be reoriented to support national security objectives. Some finesse in this action will eliminate offensive connotations and allow prestige and scientific achievements to be natural resultant by-products. This is the best insurance for the United States against the risk of a Russian military technological space coup.

As is often the case, the problem is not posed so much by Russia as by the sometimes inscrutable reasoning and

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actions of the United States. In this instance, the issues are clear--should the national space effort be primarily oriented toward prestige and scientific objectives or in the direction of national security? At stake is the future of the nation.

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BIBLIOGRAPHY

- "Air Force Fiscal 1964 Space Budget." Space Business Daily, 26 July 1963, n.p.
- Alexandrov, N.A. "Why the USA Is Straining to Get into Outer Space." Soviet Fleet, 25 December 1958. Translated by John R. Thomas. T-112. Santa Monica, Calif.: Rand, 26 February 1959.
- "The Amazing Laser." Life, 11 January 1963, p. 46-50, 53.
- American Heritage. History of Flight. New York: Simon & Schuster, 1962.
- "Astrolog." Missiles and Rockets, 13 January 1964, p. 25-31.
- "Australia Will Get U.S. Space Center." The New York Times, 2 August 1963, p. 1:4.
- "Beam Energy Weapon Favored." Toronto Globe and Mail, 13 August 1963, p. 5:1.
- "Bomb in Orbit Called Less Peril than Missile." Washington Star, 21 August 1963, p. 5:1.
- "Britain Fires Two Space Rockets." Philadelphia Inquirer, 22 November 1963, p. 12:6.
- Bush, Vannevar. Modern Arms and Free Men. New York: Simon & Schuster, 1949.
- "Bush, Vannevar." The Encyclopedia Americana, 1961. v. V, p. 72.
- "Calls It Perilous to Undergrade Soviets in Space." Providence Journal, 6 October 1963, p. N-28:2.
- "Charge Waste." The New York Times, 6 October 1963, p. E2:6.
- Chidsey, Donald B. Goodbye to Gunpowder. New York: Crown, 1963.
- Clark, Blake. "A Job for the Next Congress: Stop the Race to the Moon." Reader's Digest, January 1964, p. 75-79.
- "Cooperation in Space." The New York Times, 19 August 1963, p. 24:1.

- "A Dark Shadow Falls over the Whole Space Program." Providence Journal, 6 October 1963, p. 38:1.
- "'Death Ray' Lasers May Counter Missile." Providence Journal, 21 January 1964, p. 12:3.
- Dighton, Ralph. "Will Ray Experiment Lead to Longer Life or Instant Death?" Omaha World Herald, 10 June 1963, p. 7:3.
- "DOD Balks Most Military Space Expansion except in Reconnaissance." Aviation Week & Space Technology, 11 March 1963, p. 117, 137.
- Drake, Francis V. "We're Running the Wrong Race with Russia." Reader's Digest, August 1963, p. 49-55.
- "Dyna-Soar's Death." Washington Post, 19 December 1963, p. 8:1.
- "East-West Dialogue." The New York Times, 6 October 1963, p. E1:7.
- Eckman, Philip K. and Helvey, William M. "Spacecraft and Life Systems." Astronautics and Aerospace Engineering, November 1963, p. 20-28.
- "Editorial." Newport (Rhode Island) Daily News, 10 January 1964, p. 6:1.
- Encyclopaedia Britannica Conference on the Technological Order. The Technological Order. Detroit: Wayne University Press, 1963.
- Finney, John W. "Air Force's Role in Gemini Is Cut." The New York Times, 3 September 1963, p. 1:8.
- _____. "Delays Beset the U.S. Space Program." The New York Times, 8 September 1963, p. 6E:1.
- _____. "Johnson's Advisers Divided on the Nuclear Rocket." The New York Times, 17 December 1963, p. 19:3-6.
- _____. "Manned Test Flight Lags 9 Months in Moon Project." The New York Times, 1 September 1963, p. 1:2.
- _____. "Navy Set to Orbit Atomic Satellites." The New York Times, 15 September 1963, p. 75:3.
- _____. "Space Debate Grows Sharper." The New York Times, 6 October 1963, p. E5:1.

- "For the Record." Astronautics and Aerospace Engineering, December 1963, p. 5.
- "French Launch Cat on Flight into Space." Washington Post, 24 September 1963, p. 1:5.
- Frutkin, Arnold W. International Cooperation in Space. Armed Forces Information and Education Pamphlet, v. II, no. 21. Washington: Dept. of Defense, 1 May 1963.
- Gilpin, Robert. American Scientists and Nuclear Weapons Policy. Princeton: Princeton University Press, 1962.
- "Goldwater Hits Moon Stress, Urges Arms." Washington Star, 20 July 1963, p. 1:2.
- Goodrich, Leland M. The United Nations. New York: Crowell, 1959.
- Green, Murray. "Soviet Military Strategy." Air Force and Space Digest, March 1963, p. 38-42.
- Hightower, John M. "Soviet Cooperation." Providence Journal, 10 November 1963, p. N26:1.
- Horelick, Arnold L. The Soviet Union and the Political Uses of Outer Space. Santa Monica, Calif.: Rand, 1961.
- Hotz, Robert. "Aeronautics: History." The Encyclopedia Americana, 1961. v. I, p. 181L-191.
- "House Unit Split on Space Budget." Washington Post, 29 September 1963, p. 18:1.
- Isbell, B. Spencer. "National Aeronautics and Space Administration." The Encyclopedia Americana, 1961. v. XIX, p. 725-276.
- "JFK at the Controls." Newsweek, 21 October 1963, p. 98.
- Johnson, Lyndon B. "Foreword." Andrew G. Haley. Space Law and Government. New York: Appleton-Century-Crofts, 1963.
- "Johnson's Stand on Major Issues." The New York Times, 26 November 1963, p. 18:1.
- "Joint Moon Trip Needs New Plans." Newport (Rhode Island) Daily News, 5 October 1963, p. 2:5.

Kavanau, Lawrence L. "The Military Space Program in Perspective." Speech. Aviation/Space Writers Association, Dallas, Tex.: 21 May 1963.

Keesing's Contemporary Archives, 5 October-23 November 1957.

Kelly, Fred C. The Wright Brothers. New York: Harcourt, Brace, 1943.

Koelle, H.H. "Trends in Earth-to-Orbit Transportation Systems." Astronautics and Aerospace Engineering, October 1963, p. 25-30.

Krieger, Firmin J. A Casebook on Soviet Astronautics. Santa Monica, Calif.: Rand, 1957.

_____. Recent Soviet Advances in Aerospace Technology. Santa Monica, Calif.: Rand, February 1962.

_____. "Soviet Space Experiments and Astronautics." Aerospace Engineering, July 1961. p. 8-9, 28-37.

_____. The Soviet Union and the Political Uses of Outer Space. Santa Monica, Calif.: Rand, November 1961.

Lang, Daniel. "Profiles: a Scientist's Advice." The New Yorker, 19 January 1963, p. 39-59; 26 January 1963, p. 38-71.

Leavitt, William. "Space Technology: Today's Tool for Controlled Peace." Air Force and Space Digest, April 1963, p. 106-107.

Lehman, Milton. This High Man. New York: Farrar, Straus, 1963.

Levitt, Israel M. and Cole, Dandridge M. Exploring the Secrets of Space. Englewood Cliffs, N.J.: Prentice-Hall, 1963.

Ley, Willy. Rockets, Missiles and Space Travel. New York: Viking, 1951.

Loory, Stuart H. "Our Race to the Moon Blasted by Pauling." Washington Post, 23 October 1963, p. 8:6.

"Man Will Conquer Space Soon." Collier's, September 1949-April 1954.

Manley, John H. "Atomic Energy." Encyclopaedia Britannica, 1962. v. II, p. 647-652.

- "Manned Space Flight Program Revamp Set." Providence Journal, 29 October 1963, p. 26:2.
- Memorandum of Understanding between the French Centre National d'Etudes and the U.S. NASA. NASA News Release 63-49. Washington: NASA, 18 February 1963. p. 2-3.
- Miles, Marvin. "International Weather Satellite to Be Orbited." Los Angeles Times, 16 August 1963, p. 48:1.
- "Military Space Lag Charged by G.O.P." The New York Times, 22 November 1963, p. 21:1-3.
- "Military Space Network Slates." Providence Journal, 16 December 1963, p. 17:1.
- "Moon Flight Focuses Industry Effort; Von Braun Says." Missile-Space Daily, 3 September 1963, n.p.
- Nathan, Otto and Norden, Heinz. Einstein on Peace. New York: Simon & Schuster, 1960.
- "No Change Urged in Space Plans." Baltimore Sun, 28 October 1963, p. 3:4.
- "Off Target." Newsweek, 23 September 1963, p. 73.
- "Official Rips Red Demands on Space Laws." Chicago Tribune, 11 August 1962, p. 1:6.
- "Orbiting Spacecraft May Spot Minerals." Providence Journal, 21 October 1963, p. 3:1.
- Pines, Maya. "The Laser Lights Up the Future." The New York Times Magazine, 8 September 1963, p. 27, 124-126.
- "Pope Speaks via Telstar to America." Providence Journal, 27 September 1963, p. 49:2.
- Raytheon Co. Abracadabra. Lexington, Mass.: 15 March 1963.
- "Red Expects Moon Shot in 3 Years." Washington Post, 8 October 1963, p. 1:1.
- "Reds Claim ICBM That Flies in All Directions." Washington Post, 4 December 1963, p. 26:3.
- Roberts, Chalmers M. "Moon Project Switch Has Vast Implications." Washington Post, 21 September 1963, p. 31:1.

Rostow, Walt W. The Stages of Economic Growth. Cambridge, Eng.: University Press, 1960.

_____. "The Struggle for Power." General Electric Forum, January-March 1963, p. 4-7.

Rubel, John H. "Research and Development Today." Astronautics and Aerospace Engineering, October 1961, p. 18-21, 32-33.

"Satellites See Launchings." Newport (Rhode Island) Daily News, 27 January 1964, p. 1:8.

"Scientist Decries Power of Wiesner." The New York Times, 20 November 1963, p. 38:3.

"Scientist Suggests an Asteroid Bomb Could Wreck U.S." The New York Times, 19 January 1962, p. 19:6.

Shabad, Theodore. "Soviet Craft Put into 'Final Orbit.'" The New York Times, 3 November 1963, p. 33:1.

Sokolovskiy, Vasily D. "The Problems of Using Outer Space for Military Purposes." A translation from the book Military Strategy, by Headquarters, USAF. Washington: U.S. Air Force (AFCIN-3F1), 1962. p. 1-8.

"Soviet Lunar Landing, 1966-68." Space Business Daily, 30 October 1963, n.p.

"Space Activities Summary." Aviation Week and Space Technology, 11 March 1963, p. 137.

"Space and the Atom." Newsweek, 23 September 1963, p. 73.

Space Business Daily, 26 July 1963-1 August 1963.

"Space Diplomacy." Denver Post, 6 August 1963, p. 6:1.

"Space Program Faces Leveling-off." The New York Times, 5 January 1964, sec. L, p. 54:3.

Stanford, Neal. "Soviet Bid Aired to End Moon Race." Christian Science Monitor, 14 August 1963, p. 14:3.

"Tensions Ease under the Sign of the Moon." Newsweek, 30 September 1963, p. 18.

The Thiokol Magazine, v. II, no. 1, 1963.

Toth, Robert C. "Outlay for Space Cut to 5.1 Billion." The New York Times, 8 October 1963, p. 1:2.

Toynbee, Arnold J. Civilization on Trial. New York: Oxford University Press, 1948.

_____. War and Civilizations. New York: Oxford University Press, 1950.

"Transcript of Kennedy Address to Congress on US Role in Struggle for Freedom." The New York Times, 26 May 1961, sec. L, p. 12:1.

U.S. Air Force. The United States Air Force Report on the Ballistic Missile. Garden City, N.Y.: Doubleday, 1958.

U.S. Air Force. Strategic Air Command. SAC in Space. Briefing. Offutt Air Force Base, Neb.: May 1962. SECRET.

_____. Space Offense Panel's Briefing. Offutt Air Force Base, Neb.: April 1962. SECRET.

U.S. Air Force. Strategic Air Command. Requirements Division. Directorate of Operations. Required Operational Capabilities. DORQM 63-15. Offutt Air Force Base, Neb.: December 1963. SECRET.

"U.S. and Soviet Make Space Radio Accord." The New York Times, 5 November 1963, p. 6:7.

U.S. Dept. of the Air Force. Information Fact Sheet 8-63. Washington: August 1963.

_____. USAF Space Objectives. LR0733-S63. Washington: 6 November 1963. SECRET.

"U.S. Lifts Largest Satellite in World." Newport (Rhode Island) Daily News, 25 January 1964, p. 1:5.

U.S. National Aeronautics and Space Administration. "NASA-DOD Navigation Satellite Announced." NASA News Release 63-48. Washington: 8 March 1963.

"U.S. Orbits Saturn I; It's World's Heaviest." Newport (Rhode Island) Daily News, 29 January 1964, p. 1:5.

"US Space Leaders Say Moon Projects Should Be Continued." Providence Journal, 28 October 1963, p. 2:1.

SECRET

UNCLASSIFIED

- "Visit to a Small Planet?" Newsweek, 30 September 1963, p. 18-19.
- Ward, Paul W. "U.S., Russia Seek A-Arm Orbit Ban." Baltimore Sun, 16 October 1963, p. 1:1.
- Welsh, Edward C. "Space Policy and Space Management." Speech. American Institute of Aeronautics and Astronautics, Dallas, Tex.: 24 April 1963.
- "Webb Presents Views." Providence Journal, 18 October 1963, p. 4:1.
- Wesley, Frank C., ed. The Army Air Forces in World War II. Chicago: University of Chicago Press, 1948. v. I.
- Witkin, Richard. "Pentagon Seeking Satellite Destroyer." The New York Times, 20 October 1963, p. 1:7.
- Woodfield, John. "The Race for the Laser." Providence Journal, 29 September 1963, p. N39:1.
- Zuckert, Eugene M. "The Military Role in Space." Speech. Air Force Missile Training Center, Patrick Air Force Base, Fla.: 2 March 1963.

UNCLASSIFIED