The Commander in Chief of the Strategic Air Command analyzes the role of space applications in future US defenses—with particular emphasis on command and control—and comments on the several proposed approaches to the development of viable militarily useful spaceborne systems . . .

Military Aspects of Manned Spaceflight

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SOME people claim to see an inconsistency in the fact that this country exhibits an interest in military space applications while, at the same time, professing its desire to ensure the peaceful use of the space medium. But there is no inconsistency at all, because our military space effort is an integral part of a single national space program designed to benefit all mankind.

Space potentially offers unique military advantages, and we must anticipate that some nation or nations will endeavor to exploit such advantages to help them attain their political objectives. This leaves us no choice but to protect ourselves against such a contingency, and our military space effort is, therefore, essentially a matter of self-defense, which is the right and duty of all sovereign nations. Our main problem in this respect is the fact that we cannot foresee the exact nature of the threat which we will have to meet. Therefore, as Secretary of Defense McNamara [has] pointed out, “The requirements for specific military operations in space are not completely clear.”

It should be emphasized that any military space capability which we may develop would not be directed against a particular nation. It would be directed against any potential aggressors who, at some time in the future, might pose an offensive threat in space or attempt to deny us the space medium for peaceful pursuits. I submit that this concern on our part is well warranted. Just as we are now witnessing gradual proliferation of nuclear capability, there is the possibility of future proliferation of space capability. This would enable a growing number of countries to use space for aggressive purposes unless we are in a position to prevent them effectively from doing so.

The question arises as to what we can do today to meet any space threat of the future. To answer that question we have to choose among three dif-
The inspection of spaceborne objects to determine their purpose is just one of the many possible military missions in space. This is an artist’s sketch of a manned inspector vehicle closing with an Agena-B in space, testing the feasibility of inspection concept.

Different approaches. The first approach requires that we try to anticipate the type and scope of the military threat from or in space we may have to face, both in the immediate and more distant future, and then take all steps necessary to cope with such threat or threats. I call this the “defensive approach.”

The second approach entails the expeditious development of a military space capability which is so advanced that it would discourage any attempt to use space for aggressive purposes and, at the same time, augments our present retaliatory deterrent. This may be called the “deterrent approach.”

The third approach which has been suggested is based on the realization that, while we have made great strides in space technology, we still know too little about future military space potentials to establish parameters for an operational capability in either the defensive or offensive areas. Therefore, the proponents of this approach maintain that we should direct our military space effort primarily toward basic research in all the scientific disciplines and fields which, in one way or another, can contribute to the development of military space systems, both manned and unmanned. The point is that, once we can determine definite operational requirements for such systems, we would have the knowledge and techniques or, in other words, the “building blocks” for developing them speedily and economically.

The choice among these three approaches is not only a most difficult one but also very critical because we cannot afford to make a mistake. If this country should suddenly be confronted with a “Space Cuba,” and have the wrong or perhaps no means to deal with such an emergency, our very survival might be at stake.

What makes the choice so difficult is a complex combination of a variety of factors, such as political considerations, limitation of resources, and technological problems. Most of all, the lead time required to bring a new weapon system from original inception to operational readiness has generally been in the order of years and can be expected to be much longer for military space systems even if we should have all the essential “building blocks.” Moreover, the state of the art advances at such a rapid pace that any space system under development may be obsolete before it becomes operational and, hence, would no longer suffice to cope with the more advanced weapon systems of an aggressor.

It has been said that military space technology is now at the stage where aerial warfare was in 1908 when the War Department accepted its first airplane from the Wright brothers. I would go farther than that and say that it is at the stage of the very beginnings of the military utilization of air, namely, the French Revolution when balloons were first used for battlefield observation. Then as now, no one could predict the ultimate potential of the new operational medium, let alone speculate on how best to exploit that potential or how an enemy might exploit it.

Let us assume that this was the year 1938 instead of 1963, and you had asked me to talk about the evolution of aerial warfare during the next twenty-five years. I might have told you that, by 1963, we would have airplanes flying at speeds of five hundred miles an hour and at altitudes of 50,000 feet, and that these airplanes might carry bombs with the explosive power of ten to twenty tons. You probably would have accepted these predictions as being in the realm of possibility. But what would your reaction have been if I had been able to forecast what we really have today—combat airplanes without propellers, flying at more than twice the speed of sound and at altitudes of some seventeen miles, each carrying the equivalent of millions of tons of TNT? And what would you have said if I had dared to predict that, within less than twenty-five years, we would have unmanned rockets which could take pay-
loads of similar magnitude to targets 6,000 miles away in half an hour?

By the same token, it is just as impossible to foretell today what lies ahead for us in space. Considering the ever-accelerating pace of technological progress, I am convinced that the next decade will bring even more dramatic advances than the past twenty-five years. For this reason, it would seem unwise to project our programs for military space systems on the basis of present knowledge and present weapons concepts unless we allow ourselves sufficient flexibility and latitude to adapt these programs to any future developments.

Therefore, this country endeavors to find ways of meeting the demands of both the immediate and more distant future without committing itself to a rigid approach. Toward that end it may be well to analyze the potential military uses of space, recognizing that this is necessarily a matter of conjecture. Within that frame of reference, I want to discuss some potential areas of strictly military space applications which have a direct bearing on the subject of man in space.

One such area concerns future means for command and control of our global strike forces. Effective command and control of these forces is an integral component of our over-all retaliatory capability, and its survivability in case of a surprise attack is, therefore, a vital element of a credible deterrent. There must be reliable two-way communications between the authorities in command and all combat forces in the field, be they under water, on the ground, in the air, or, ultimately, in space. Because of the immense scope and worldwide deployment of these forces, there must also be extensive electronic equipment for rapid processing of all information received from them so that the command element can make instant and appropriate decisions.

The Strategic Air Command now has in operation the most advanced and extensive communications network in existence. Among the many measures taken to enhance the survivability of command and control of SAC's far-flung bomber and missile forces are: backup or "redundancy" of our communications, alternate headquarters, and, for over two years, an airborne command post equipped to assume command in case all other command facilities should be put out of commission.

While these measures should ensure the survivability of SAC's command-and-control system for some time to come, continuous improvements will be needed to keep up with any new developments that might impair the effectiveness and survivability of that system. Communication satellites offer a variety of possibilities in this respect. However, we may find that, eventually, the only really survivable command-and-control structure—not only for SAC but all our military forces—would be one employing a maneuverable command post in space.

Should such a spaceborne command post become necessary, it would have to be large enough to carry all electronic gear required to gather, process, and disseminate operational information on a global basis. Also, it would have to be capable of defending itself against any interference or attacks from the ground and space. It is inconceivable to operate such a central command post, especially one in deep space, without a skilled crew to operate and maintain its complex equipment and without competent officers fully qualified to assume command of the strike force whenever necessary. Here, then, may be the first major requirement for military men in space.

Another area of military space applications conceivably could be means for inspecting suspicious satellites. A large number of man-made objects are now orbiting the earth. In addition to instrumented satellites launched by both ourselves and the Soviets, there is also considerable space debris, that is, components of the rockets employed to put the satellites in orbit. Because of the steadily growing number and small size of all these objects, it will become increasingly difficult to keep track of them, let alone determine their nature.

The time may well come when our security will make it necessary to ascertain whether and which of these space objects constitute an offensive threat. They might be orbital ballistic missiles or, perhaps, employ some radically new and still more potent weapon technique.

Future developments may permit conclusive inspection of potentially hostile satellites and, if need be, their neutralization from the ground or by means of some type of unmanned satellites. A large number of man-made objects are now orbiting the earth. In addition to instrumented satellites launched by both ourselves and the Soviets, there is also considerable space debris, that is, components of the rockets employed to put the satellites in orbit. Because of the steadily growing number and small size of all these objects, it will become increasingly difficult to keep track of them, let alone determine their nature.

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ing defensive systems against any future military threat from or in space stems from the fact that we cannot predict, with any degree of assurance, the nature of the threat against which we may have to defend ourselves. We must expect the discovery of new phenomena and techniques which, by the time there will be operational space systems, may have revolutionized all current concepts and tools of warfare. This means that we must anticipate dramatic advances in the state of the art and technological breakthroughs with which we must be prepared to cope in both their defensive and offensive applications.

There is, however, one definite trend which is indicative of what we can expect, and that is the continuing compression of time in the application of firepower. It used to take months and even years to carry firepower to a military objective and additional weeks or months to apply that firepower in sufficient amounts to achieve the desired results. The airplane compressed the total time for reaching and destroying a military objective to hours; the missile with its nuclear warhead has compressed that time to minutes. It seems reasonable to expect that future weapons will reduce it to seconds and even less. We must bear this in mind as we try to visualize future defensive systems which doubtless will present a still greater challenge than we face today.

As of now, there is not even an effective defense against ballistic missiles although it is safe to assume that the Soviets are just as intent on developing such a defense as we are. While we have limited knowledge about Soviet efforts and progress in this field, except for propaganda statements, indications are that they are pursuing the development of antimissile missiles. Our present efforts are along similar lines but, even if we should succeed in producing a reliable antimissile missile, it would be a stop-gap measure at best.

As the missile inventories of both sides continue to expand, the "shotgun method" of missile defense would become increasingly ineffective against an all-out missile attack, with hundreds of warheads and decoys flashing through the skies. The ultimate solution, therefore, may lie in the development of space-based manned systems capable of destroying enemy missiles during their boost phase or in midcourse.

Assuming such a system should become technically and economically feasible some time during the next decade, any nation whose strategic capability were to rest primarily on ballistic missiles would no longer have a deterrent against aggression employing other types of weapons. We have taken this contingency into account by continuing to program our strategic forces on the basis of the mixed-force concept. This concept entails a balanced mix of both manned and unmanned weapon systems in which the advantages of both can be exploited to the fullest, providing invaluable flexibility and optimum effectiveness in their employment.

Most of the free world's nuclear firepower—between eighty and ninety percent—is presently concentrated in the Strategic Air Command which, in addition to its fleet of strategic bombers, has a rapidly growing inventory of Atlas, Titan, and Minuteman ICBMs in widely dispersed and well-hardened sites. The nation's missile inventory is being augmented by the Navy's Polaris weapon system which, because of its mobility and underwater operation, has good survivability and is, therefore, an effective deterrent. The targeting and operational planning for all these strategic forces, as well as for other nuclear strike forces under the control of the Unified Commands, has been fully integrated through the Joint Strategic Target Planning Staff, an agency of the Joint Chiefs of Staff located at SAC Headquarters.

As a result of this joint effort, there is now assurance that all our nuclear strike forces, being committed to a single strategic target list and single operational plan, fully complement and supplement each other rather than compete with one another as was possible in the past. This has not only strengthened the nation's over-all nuclear deterrent immeasurably but also made it easier to maintain that deterrent in the face of any new developments that, otherwise, might impair it. Among such developments would be an effective defense against ballistic missiles along the lines I mentioned. In this case we would merely revise the present concept of our common war plan by assigning a different role to SAC's manned aircraft.

At the moment and for some time to come, the bombers still carry the bulk of the deterrent load, a fact which is not too well understood. As our missile inventories increase, the role of the manned strategic weapon systems will decrease proportionally until we have reached the relative strengths deemed necessary for a well-balanced mixed force. We cannot anticipate today what that balance should be five or ten years from now because we cannot predict the factors that may influence it. But if it should become possible to

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perfect effective defenses against ballistic missiles, we will undoubtedly have to place more reliance on manned weapon systems again.

In fact, manned aircraft may have to serve as a penetration aid to our missiles by seeking out and destroying an enemy's missile defenses, at least those based on or controlled from the ground. This task can be greatly enhanced by employing air-breathing air-to-ground missiles, similar to the Hound Dog with which many of SAC's B-52s already are equipped. In contrast to ballistic missiles, the Hound Dog can fly close enough to the ground to be rather immune to any presently foreseeable missile defenses. Its penetration capability, accuracy, and firepower make it such a promising weapon against these defenses as to warrant the development of long-endurance aircraft which can carry a number of Hound Dog missiles on extended airborne alert, without itself ever approaching enemy territory.

I have dwelled on the subject of manned bombers because it has considerable bearing on the last area of potential military space applications I want to discuss, namely, space-to-ground offense.

As a nation, we abhor the very prospect of offensive weapons in space, and if it were possible to conclude enforceable international treaties for banning offensive space weapons, we would no doubt take the lead in promoting such treaties. On the other hand, we must be realistic enough to accept the possibility that, regardless of any future treaties, some hostile nation may succeed in placing offensive weapons in space which would gravely impair our deterrent.

Preservation of our military deterrent is a vital prerequisite for our statesmen in their continuing endeavor to maintain an honorable peace. The value of the "strategic umbrella," represented by SAC, as the nation's principal military deterrent, was demonstrated again during the recent Cuban crisis when, as President Kennedy stated, it "provided a strategic posture under which all United States forces could operate with relative freedom of action." I am confident that, if our survival should demand extension of our strategic capability into space, we will be ready and willing to do so.

This may require the addition of manned strategic spacecraft to SAC's inventory so as to provide a truly mixed force, capable of accomplishing a wide range of missions across the entire spectrum of strategic operations. No one can predict today what these operations will entail, but I do know that SAC has the competence and flexibility to adapt itself to any new requirement and any new weapon system, no matter how revolutionary. Therefore, I have no doubt that it can meet any future demands of the space age.

From what I have said so far, it should be evident that none of the three approaches to which I referred in the beginning—the defensive, deterrent, and "building-block" approaches—will by itself suffice to counter the over-all military threat from space. Instead, we must select that combination of all three approaches which makes the most economic use of our human and material resources on one hand and, on the other, assures us an adequate military space capability for both the immediate and distant future.

Next, we must continue our intensive nonmilitary effort along the entire spectrum of space and space-related sciences. The primary responsibility for this effort rests with the National Aeronautics and Space Administration. Its close cooperation with the Department of Defense will not only further its own objectives of the peaceful conquest of space but also help create the building blocks for the future military systems which may be required, [in] President Kennedy's words, "to make sure that space is maintained for peaceful purposes."

Finally, we should keep adding to the select group of men who are being trained to live and work in space. I have pointed out the reasons why certain types of military space systems may have to be manned. If and when the time comes to employ such systems operationally, we must be certain to have sufficient numbers of highly qualified and motivated officers to man them. That is a requirement we know we will have to fill, no matter what technological surprises the future may have in store for us.

In this age of computers and automation we tend to forget that, at the beginning and end of the chain, the most important element is still man himself.—END

Gen. Thomas S. Power was named Commander in Chief, Strategic Air Command in mid-1957. A military flyer for more than three decades, he served in Europe, North Africa, and the Pacific during World War II. General Power has also served as SAC Vice Commander, and Commander, Air Research and Development Command (now Systems Command). Above is condensed from an address to the American Institute of Aeronautics and Astronautics Manned Spaceflight Meeting, Dallas, Tex., April 24, 1963.