REVIEW OF THE SPACE PROGRAM

THURSDAY, FEBRUARY 4, 1960

HOUSE OF REPRESENTATIVES,
COMMITTEE ON SCIENCE AND ASTRONAUTICS,
Washington, D.C.

The committee met at 10 a.m., the Honorable Overton Brooks (chairman) presiding.

The CHAIRMAN. The committee will come to order.

I have a little preliminary matter here that I think I can read into the record and by that time we will have fuller representation from all sides of the committee.

I have a copy of the Air Force magazine of February 1960. There is an article in it entitled "A Strange Dualism," and this article—by the editor, apparently—says:

A strange dualism that invades the administration's thinking on space technology is underscored by the statement above. ["* * * I refer to our effort in space exploration, which is often mistakenly supposed to be an integral part of defense research and development." From the President's state of the Union message, Jan. 7, 1960.] The President's view has caused some consternation on Capitol Hill and it may become the basic touchstone of arguments between the executive and the legislative branches in the weeks ahead. Already Representative Overton Brooks, Democrat, Louisiana, chairman of the House Committee on Science and Astronautics has taken strong exception to the President's view. Congressman Brooks was quoted prior to his committee's current hearings on missile and space posture as saying: "The President's statement fails to take into account the effect of space achievements on other countries and fails also to consider the potential of satellite vehicles in the U.S. defense." An extension of this latter idea, the use of military space vehicles as a possible new key to world peace was explored by Air Force Chief of Staff, Gen. Thomas D. White, in his recent address at the National Press Club, excerpts from which are now printed on pages 62 and 63 of this periodical.

Now, General, what I thought would be a very good idea, if we could start the proceedings this morning by asking you to give us a copy of your address which we will be glad to insert in the record at this point, to set out your views on the future missions of the Air Force.

STATEMENT OF GEN. T. D. WHITE, CHIEF OF STAFF, U.S. AIR FORCE

General WHITE. I am sure we have a copy of that address, Mr. Chairman, and we will be glad to submit any other views in writing that you may desire.

(The information requested is as follows:)

ADDRESS BY GENERAL THOMAS D. WHITE, CHIEF OF STAFF, U.S. AIR FORCE, BEFORE THE NATIONAL PRESS CLUB, WASHINGTON, D.C., MONDAY, JANUARY 11, 1960

Mr. Lawrence, members of the National Press Club and guests, I am honored to address the National Press Club once again. An appearance before this audience is a privilege and an opportunity I value highly.

For over 175 years, our country has successfully countered threats to its existence from depressions, disease, internal conflict, and wars with other nations. Our country prospered because its foundation was deep in the solid rock of rugged determination. Our success in the future will need the same determination. Whether we like it or not, the United States is now faced with a new and different challenge—and this time the challenge is to its very survival. The continued existence of our country and the basic principles for which it stands will depend on how we meet this challenge. We must be willing to expend that extra effort required to be first in a race where there are no rewards for second place.

It is to this thesis that I want to direct my remarks today.

The economists are calling this new decade "the Golden Sixties." Others refer to the next 10 years as "the Soaring Sixties." The military man must look on them as "the Serious Sixties," unless drastic changes transpire in the world of tomorrow.

Some of the problems which confront us can be highlighted by these queries:

What are the prospects for peace?

What is the Communist plan?

What is the true nature of the threat to national security?

What effect will the new weapons have on our future security?

What are the prospects of military operations in space?

These next 10 years hold many promises and, no doubt, many surprises. Technology will continue to advance and will provide man with increased capabilities in various fields—including that of waging war. It is my earnest hope—and I am sure yours, as well—that the means of waging peace also will improve.

We enter the 1960's with new evidence that peace is truly a universal goal—at least on this side of the Iron Curtain. The enthusiastic reception given President Eisenhower on his recent trip abroad stands as a monument to that fact.

The President has defined our objective as "* * * peace with justice * * *" None will quarrel with that goal. However, anyone who reads the newspapers knows that many differ on how best to achieve it. That is the problem that comes with the challenge.

How do we achieve peace with security and freedom? How much military strength is adequate to preserve the peace? What kind of strength? How should it be used? These are the military elements of our national strategic problem.

The world knows that the United States will never commit aggression. On the other hand, I have seen no real sign or portent to indicate that Communist leadership has abandoned its plan for world domination. Communists have committed acts of aggression. They have recently reaffirmed their intention to dominate the world. At the same time, they profess their desire for lasting peace and have suggested universal disarmament.

If we draw false conclusions that the fundamental Communist plan has changed, our peril will be immeasurably increased. In all our unhappy dealings with communism and its leaders we must have learned one sure lesson: we can only negotiate with communism from strength.

The word "stalemate" has sometimes been used to describe the current situation wherein two great strategic attack systems face each other. "Stalemate" is incorrect, in fact—misleading—because of the word's static implication. We are actually in a dynamic situation keyed to exploding technological development. Until dependable disarmament measures can be achieved, we have no recourse but to maintain and improve the fighting forces which will make an enemy fear to attack. Possession of such forces provides the United States with the strength and the opportunity to work out arrangements to secure the permanent peace we want.

Today, this Nation possesses a strong strategic deterrent—the great majority of which is contained in the Strategic Air Command. This is not an indiscriminate force—but one which has the ability to destroy the warmaking capacity of any aggressive nation, no matter how powerful, and to achieve military victory. To maintain this capacity and to continue as a powerful deterrent to war, SAC must remain strong—not only in quality but in quantity. We must continually advance this force—in the national interest—through the development and procurement of better weapons, by improved protective measures such as hardening and mobility and through precise coordination and control.

As technology and military weapons advance hand-in-hand, the expense goes up accordingly. This aggravates the problem of national security because we must be equally prepared for today while we develop our weapons for the future. This essentially is the mandatory task of modernization—an expensive task which I expect will become more so as time goes on.

Of course, there is a positive need for military capabilities to fight various types of lesser wars. But in our evaluation of this requirement, we cannot for a single moment lose sight of the fact that a flareup anywhere in the world is a potential fuse to a complete blowup. Recognizing this, every measure must be taken to keep our general war deterrent strong and ready. Capabilities designed primarily to meet the requirements of lesser wars must not be gained at the expense of our capability to fight and win a general war.

In evaluating U.S. military potential for actions short of general war, two important points are often overlooked. First, in any assessment of free world capacity for smaller wars, the strength of our allies must be taken into consideration along with our own. We in the Air Force recognize fully that in addition to strategic deterrence, one of the keystones to national security is collective security. The United States is not the sole "limited war policeman." The remainder of the free world also has substantial military capabilities. In 1958, these forces consisted of 5 million men, 1,700 combat vessels and 14,000 jet aircraft.

Another point that is often neglected in the somewhat freewheeling discussion that goes on concerning "limited" war—is the military budget. Obviously, none of the military services operates with a blank check whereby it can build special forces for every type of war we might have to fight. Even so, less than one-third of this country's total military expenditures over the last decade has gone for the development and support of the forces designed primarily for their general war role. In my opinion, the other two-thirds of the military budget has served to provide something very substantial in the way of capabilities for limited war. The U.S. Marines, most of the Army and Navy, and much of the Air Force are specifically prepared for small wars.

Now, in the light of these general observations, let's take a look at the effect some of the new weapons will have on our military position. First, I would like to emphasize that the Air Force will require both manned and unmanned systems. Missiles and aircraft, for example, are complementary weapon systems—each with definite and decided advantages. Although the growing performance capability of missiles indicates they will have an increasing role, the needs for manned vehicles will be many and varied.

I agree with those who feel there has been excessive talk about manned expeditions to the Moon, Venus, Mars, and beyond—as though these ventures were well within our present capability. They are not. However, our pilots will probe far above the Earth's surface in the X–15 rocket craft and in the Dynasoar. We are also participating with NASA in the Astronaut program. All three of these projects are steps toward exploiting man's judgment and skills. With the Dynasoar, for example, we will gain knowledge basic to the control, return and precise landings of suborbital vehicles. This knowledge will help make piloted space operations of the future practical.

For the present, the advent of long-range air-to-surface weapons launched from aircraft presents us with a whole new realm of possibilities. Early this year, the first of these weapons will be operational with Strategic Air Command units. One of them, the Hound Dog, is a supersonic air-to-surface weapon with a nuclear warhead. It will enable the bomber to launch attacks while still several hundred miles from its designated target.

We also have under study an air-launched ballistic missile. This missile, which I have nicknamed the Sky Bolt, will, of course, be hypersonic. It is being designed to attain ranges of approximately 1,000 miles. We have already proved in prototype tests of this new weapon that it can be launched from aircraft at both subsonic and supersonic speeds. You can well imagine the potential of such weapons when carried by our current long-range bomber aircraft—and eventually by nuclear-propelled aircraft with practically unlimited endurance. This combination of aircraft and missile will provide our country with the most mobile striking power ever achieved. Sky Bolt aircraft would possess true global mobility. They could operate over the high seas, friendly land masses, or areas inaccessible by other means—with the capability of attacking within minutes. In addition, they would be essentially invulnerable to surprise attack.

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A strategic striking force composed of airborne missile launchers, land-based missiles, submarine-launched missiles, and fast long-range bombers will provide this Nation with the versatility required to achieve optimum combat effectiveness—until such time as even more advanced systems are developed.

Of course, the majority of Air Force systems today operate within the atmosphere. One notable exception is the ballistic missile which is really the first of the space vehicles. Thus, certain weapons of war already have the capability of invading the fringes of that heretofore inaccessible area popularly called "space." More can be expected to follow. This is a logical outgrowth of the technological explosion to which the world has been exposed.

Lacking specific guarantees that the benefits of space science and technology will be used solely for peaceful purposes, it is essential that we consider the application of this knowledge to our own military capabilities. There is no dividing line between air and space—they are one vast operating arena—and they must be considered as one medium—aerospace. Advancing technology will inevitably carry with it the opportunity for improved aerospace capabilities. Therefore we must move steadily toward operations in space—not merely because it is there—challenging us—but because it is vital to our Nation's security to do so.

The overpowering element in evaluating military stability in the world today is the possibility of surprise attack. It is a major obstacle to preserving the peace, the big barrier to reducing our military budget and the key to much of our strategy and tactics. With this in mind, let us consider an interesting series of developments in the technological revolution.

The development of nuclear warheads made it practical to develop aerospace vehicles with intercontinental range. It made practical the concept of the big missile which required a new and radical development in rocket propulsion. The nature of this vehicle, with its intercontinental range, also demanded new and radical developments in electronic guidance. These concepts and developments have now become a practical reality—for example, we possess an operational ICBM whose effectiveness far exceeds our original planning objectives.

All of this has intensified the problem of surprise attack—but, the same technology which gave birth to the big guided missile carries in it the seeds of a possible solution to lasting peace. The big rocket has propelled us into space, and its guidance requirements have accelerated the science of electronics.

These technologies have advanced to the point where new controls for peace are conceivable. I do not say that there will ever be an absolute guarantee against surprise attack. Absolute guarantees are few. But I do say that the time is coming when the possibility of surprise attack will be reduced—reduced through advanced technology to the point that we can live with the problem and perhaps solve it.

In this respect, there are certain specific military advantages that we can expect to gain from the extension of our capabilities farther out into aerospace. Among them are more reliable communications, improved early warning and better reconnaissance. Two of these are particularly valuable as far as defense is concerned—their main purpose is to provide us with warning of impending attack. Midas, a satellite containing infrared detection devices, is being developed to obtain the earliest possible warning of an ICBM attack against this country. Samos is another defensive satellite designed to give us a reasonable answer to the question "What are the actions of a potential enemy?"

A year ago, in testifying before the House Committee on Science and Astronautics, I said, "The major military threat which faces our Nation today lies in Soviet aerospace power—even though, at the moment, this power is expressed in terms of aircraft and ballistic missiles. The primary military deterrent which has contained this threat and which has precluded it from developing into catastrophic reality, is U.S. aerospace power. This has been true for the past 10 years with our conventional and early jet fighters and bombers. I am convinced that it will continue to be true as we operate with improved jet aircraft, missiles and eventually spacecraft and satellites. The decisive weapons of the future will be aerospace weapons. That nation—or group of nations—which maintains predominance in this area—not only in its military forces, but also in its laboratories, in its industries and in its technology—will possess the means for survival."

Nothing has occurred since that time to change my conviction. Moreover, further contemplation of man's extension into space suggests to me that here in this vast arena we may find the most imaginative and challenging key to the control of peace. We must take every advantage of this possibility.

The CHAIRMAN. I want to say to the committee we have one of the finest Chiefs of the Air Force that we have had. He has helped as much as anybody I know in developing the Air Force from a corps in the Army to an independent, self-integrated Air Force such as we have at the present time and I think we owe, to a large extent, the peace of the world today to the dynamic attitude of the Air Force in making it the better part of wisdom for anyone not to attack us at this time.

So we are pleased to have General White here. The general tells me he has other commitments, which I know to be the case, and I am therefore going to ask him, if he will, to proceed to read his statement. We will then go around for questions and then we will release him after that and General Wilson and General Boushey will remain.

By the way, too, General, we are requiring all of the witnesses to be under oath at this hearing. Would you ask General Wilson and General Boushey to arise, too?

Do you and each of you swear that the testimony you will give before this committee in matters under consideration will be the truth, the whole truth, and nothing but the truth, so help you God?

General WHITE. I do.

General WILSON. I do.

General BOUSHEY. I do.

The CHAIRMAN. Have a seat, gentlemen.

General White, you have your statement and we will be glad if you will proceed.

General WHITE. Thank you, sir.

Mr. Chairman and members of the committee, it is a pleasure to appear before your committee once again. This Nation's activities and progress in science and astronautics are matters of great concern to the Air Force and we welcome the opportunity to discuss these important subjects with you.

Our country's announced national policy is that the use of the expanding medium of aerospace be directed to unselfish and constructive ends—to the advancement of scientific knowledge and techniques for the benefit of all mankind. The Air Force is committed to that policy without reservation. We are most desirous of seeing this Nation's space program flourish.

The Air Force is an instrument for safeguarding peace. Thus, as far as the Air Force is concerned, our mission in space is for security purposes. Technology has enlarged our operational sphere, permitting us to achieve greater altitudes. The conduct of military operations in this ever-expanding area of aerospace is one of our major responsibilities.

In a way, the Air Force position today with respect to operations farther out in aerospace is somewhat analogous to that of the Montgolfier brothers after they successfully launched the first unmanned balloon in 1783. Free flight had been achieved—but there were many questions unanswered. Could man utilize this new means to travel with reasonable safety? How far and how high could he go? What pattern might the evolution of air transport be expected to follow? The first man went aloft that same year, in 1783, but it took over a hundred years to find some of the answers to those questions.

Today, the question is often asked, "How far do we plan to send manned vehicles into space?" The answer, as I see it, is—as far as

they need to go in regular operations. I feel that initially our systematic missions will operate at rather shallow altitudes—relatively speaking—within a few hundred miles of the earth. Our immediate operational concern is events which may occur on earth and in the zone immediately above it. We don't prove anything by operating farther away than we need to go. I want to emphasize, at this point, that what I have said concerns regular operations of manned vehicles. Naturally, we can expect these to be supplemented by special operations at greater altitudes by both manned and unmanned vehicles.

Knowledge gained thus far in the preliminary probings far above the earth is of absorbing interest to members of the civilian scientific fraternity—not only in this country, but elsewhere in the world. This information—the reports, studies, and analyses—is also of significant interest to the Air Force. This is true because it deals with phenomena, conditions, and other aspects of the expanding operational arena in which the Air Force must continue to operate. For example, the stability and control of an IRBM or an ICBM is a subject of very urgent importance. During missile test firings all the various components must be carefully checked and tested individually, since they must work together in an environment which cannot be simulated on the ground. The more we learn about the interplay of all the forces acting on a free flying missile such as vibration, aerodynamic and dynamic loads, the sooner can our research show the way to development of improved and more reliable systems. Stability and control will, of course, become even more of a critical requirement as we phase into manned space operations.

During the past year, the Air Force was given primary responsibility for assisting NASA with the launching of future research vehicles and for giving other support to the projects they may require. This is a very logical arrangement. Our missile bases on either coast are the only existing major installations with the adequate facilities the necessary experienced personnel for placing sizable research devices in orbits or other trajectories. The Air Force's future operational concepts will be significantly influenced by the scientific profile which NASA develops on space environments and phenomena. I feel it is equally certain that the Air Force, in the course of its own operational or experimental test missions, will develop byproduct research data of prime interest to the civilian program.

At the present time, the Air Force is engaged in five major projects designed to further our operational capacity at greater altitudes above the earth's surface. Two of these are manned vehicle projects—the other three are unmanned satellite projects.

The X–15 and the Dyna-Soar, of course, cannot be considered true space vehicles. They are, however, our initial efforts in placing man at speeds and altitudes never before achieved. Of equal importance, they are our first attempts to place man in this medium with the ability to maneuver—a most important element in manned vehicle aerospace operations of the future.

The three unmanned satellite systems to which I referred are the Midas, the Samos, and the Discoverer series of satellites. Two of these are particularly valuable as far as the defense is concerned—their main purpose is to provide us with warning of impending attack. The Midas will be a satellite containing infrared detection devices

designed to obtain the earliest possible warning of an ICBM attack against this country. The ballistic missile warning system we now have under construction—called the BMEWS—should give us an average of 15 minutes' warning from approaching ballistic missiles. Midas will detect missiles just after launch—while in the boost phase—thus giving us longer warning. We feel this system will complement the BMEWS system and, in addition, give us double verification of any ballistic missile attack against us.

The Samos is another defensive satellite which is designed to give us a reasonable answer to the question "What are the actions of a potential enemy?" The Discoverer series of satellites is primarily designed to furnish us with advanced engineering data and to develop biomedical recovery techniques.

A year ago in testifying before this committee, I said:

> The decisive weapons of the future will be aerospace weapons. That nation—or group of nations—which maintains predominance in this area, not only in its military forces, but also in its laboratories, its industries, and in its technology, will possess the means for survival.

Nothing has occurred since that time to change my convicition. In fact, each passing day confirms my belief.

The probable theater of initial space operations for the Air Force is an infinitesimal sliver of space in comparison to the diameter of our solar system which I am told is on the order of 9.2 billion miles. Nevertheless, it is important that we continually press forward to achieve even greater altitudes and speeds. Contemplation of operations farther out into aerospace suggests to me that in this vast arena we may well find the most imaginative and challenging means for attaining the permanent peace we all desire. I feel that the time is coming when the possibility of surprise attack, for example, will be reduced—reduced through advanced aerospace technology to the point that we can live with the problem and perhaps solve it. It is to our common interest to assure that we overlook no opportunities to gain the specific advantages which I am certain exist in such an extension of our military capabilities.

The CHAIRMAN. Thank you very much, General White. We appreciate very much your fine statement.

Now, yesterday morning we adopted a rule. We will go around the committee for one question and then if there is time available we will go around the second time with more leisure. That is with the idea of giving everybody an opportunity to question such outstanding witnesses as we have been having before this committee this year.

With that in mind, I am going to ask General White, the Chief of Staff of the Air Force, this question:

We have been reading in the press, hearing over the radio, and seeing over television so many references to the situation with respect to our national defense. The need of having the strategic air force that will be on 24-hour duty, in the air 24 hours of the day; we have been hearing about the progress which Russia has made in the science of ballistic missiles. We have been reading about the missiles falling into the Pacific, southwest of Hawaii, which is pretty close to this country and we are disturbed. Will you now, General, in your answer to this question, give us the facts as you see them with reference to these vital issues which concern the committee and the people of the country so much at this hour.

General WHITE. I must be mindful of the fact that this is an open session, Mr. Chairman. I will do my best to fulfill your request within the perimeters of complete security.

The CHAIRMAN. I think there has been so much said in the press that it ought to be an open session.

General WHITE. I will try to make a statement which will clarify the situation.

The very fact of the existence of atomic weapons and intercontinental ballistic missiles means that warning time, in case of an attack, is relatively short. The most we could expect to get under the presently contemplated warning system that we have in BMEWS is about 15 minutes. Now until that system is in operation and has been proved out and on the assumption that at some point the Soviet Union will have a significant number of missiles, then prudence would indicate that we must maintain a certain proportion of the Strategic Air Command on air alert. Anything on the ground is not likely to be able to get off within the 15-minute period, but anything that is in the air is relatively invulnerable. That is the theory on which an airborne alert has been developed, particularly by the Strategic Air Command.

The publicity on this subject seems to me to have acquired considerable impetus from a speech that General Power, the commander in chief of the Strategic Air Command, gave in New York several days ago in which he referred to the Soviet Union having a hypothetical number of missiles. I would like to point out that what he said was hypothetical. He didn't say they did have them, nor did he state they would have them at any particular time. He was speaking purely of a hypothetical case in which he did certain mathematics which showed what the result of a surprise attack without warning, with that number of missiles, might do to the atomic retaliatory forces of the United States. The whole burden of his speech was leading to the solution which he foresees for this problem, namely, the airborne alert which I have just described.

Now there has been some confusion over the difference between the actual initiation of an airborne alert and what has been termed the on-the-shelf capability to do so. I think that clarification here might perhaps be useful.

To order an airborne alert at this time is one condition which we do not see is needed as of now. There could well be a situation which would make an airborne alert prudent in the future. By an on-the-shelf capability we mean having first the trained crews in the proper number and the necessary spare parts and extra engines which would permit General Power to maintain a proportion of his heavy bombers on this air alert continuously. Because of the lead times in the procurement of equipment and in the training and in developing the techniques, it is necessary to plan this, to give the orders for the production of this extra material and to start the training of the crews some time in advance. That is what we mean by having an on-the-shelf capability. At the end of this lead time, when you have the material, when you have the people; then, if it appears desirable, you give the order to execute the airborne alert.

I think that highlights the issues as I have interpreted them from what I have read and, of course, what I have heard and been involved in, in a number of the committee hearings.

The CHAIRMAN. Mr. Martin?

Mr. MARTIN. I have no questions at this time, Mr. Chairman.

The CHAIRMAN. Mr. Miller?

Mr. MILLER. No questions.

The CHAIRMAN. Mr. Van Pelt?

Mr. VAN PELT. No questions.

The CHAIRMAN. Mr. Teague?

Mr. TEAGUE. No questions, Mr. Chairman.

The CHAIRMAN. Mr. Riehlman?

Mr. RIEHLMAN. General, I only have one question and that is this: Certain provisions are underway for an on-the-shelf program. Do you feel that with the information that you have, that that program is sufficient?

General WHITE. I would say this, Mr. Riehlman, that from my relatively narrow position, I did ask for more money than has been provided in this budget for that purpose; but I would like to make it very clear that my views were fully considered by my constituted superiors who have the responsibility for the final decision. The provision made for an airborne alert capability is significant, and I accept the decision of my superiors as I properly should, and must.

Mr. RIEHLMAN. That is all I have.

The CHAIRMAN. Mr. Anfuso?

Mr. ANFUSO. General, I asked an ordinary citizen yesterday how she felt about what she was reading in the newspapers, about the disagreements between President Eisenhower and generals in our Armed Forces and she said that she was in a state of confusion. She didn't know whom to believe.

I don't want to get you involved, General, in a squabble with the President—you have enough headaches of your own—but I am sure you would agree with me that General Power, like yourself and other generals who feel that they have a duty to perform in safeguarding their commands and the security of our country, have performed a valuable service to the country, to the President and to the Nation in making these criticisms, in that they are welcome in a democratic form of government.

However, the situation still exists that as far as the public is concerned, they are in an utter state of confusion.

Would you recommend, sir, that this Congress as soon as possible, after these hearings, make some kind of a clarifying report actually stating the nature of our defenses, compared with the Soviet strength in actually giving the people the facts as to the security, the present security of the United States?

General WHITE. I can't help, Mr. Anfuso, but state that in that context it becomes a national political problem, and it is far beyond my purview to offer a recommendation.

The CHAIRMAN. Mr. Sisk?

Mr. SISK. General White, the question which I am going to ask probably should have been directed to the Secretary yesterday and unfortunately the opportunity wasn't presented but because of a statement within the overall statement which he made, I want to ask you this question: To what extent do you think the philosophy of the Air Force today is giving proper emphasis to space, space exploration, and the use of space militarily—and I am referring now to the fact

that an ICBM uses space—as against what many people have charged was a failure on the part of the Air Force to wake up to the realities of space. And I am sure you are familiar, General White, with the common charge that sometimes people have made that one of the problems we had in getting into this overall picture was the fact that the philosophy of the Air Force was that the manned aircraft was the last word and would forever be the last word. I am quite concerned because of a statement in Secretary Sharp's remarks before the committee yesterday which indicated that to some extent possibly the old philosophy still hangs on that in the foreseeable future, or as far ahead apparently as the Air Force can see, the manned bomber is still the ultimate.

I feel this is a fearful philosophy and I would like to have you express what you believe to be today, the Air Force's philosophy of space. And I am speaking both militarily and otherwise.

General WHITE. Well, I am very happy to have the opportunity to make a statement in that respect.

I believe that the record will show that the Air Force has been the leader in recognition of, and in attempts to take advantage of, the unique characteristics that space offers. I think the record will show that the Air Force took the lead, the first step in aerospace, namely, the development of guided missiles and more particularly and more lately, ballistic missiles, which are truly aerospace vehicles in that they travel into outer space outside the palpable earth's atmosphere before returning to it.

I think it is also a proper statement, and one that I have made many times, that there will be a continuing requirement for manned vehicles, manner aircraft and in the future, manned space vehicles.

We are faced with a most difficult situation, involving both technology and the efforts of our potential enemies, in that we must do a number of things. We must maintain a capability as of right now.

Now, let me discuss the capability and the requirement right now: The bulk of both Soviet and U.S. retaliatory forces lie in the manned aircraft because we are just coming into the ballistic missile age. This is something that we are also developing.

I see a mix between that type vehicle and manned aircraft in some proportion from here on out, but that proportion will change. As of now, the manned aircraft is numerically and predominantly the major element of the force; but as time goes on, as we develop, and as we produce and make operational more ballistic missiles, then the proportion of manned aircraft in relation to the overall, will go down.

Now, on top of this we now have before us capabilities, opportunities, requirements, in the next extension of this element. That is into space beyond the palpable earth's atmosphere. Here, too, we are going ahead with those developments which have either a unique capability in that medium which we cannot acquire elsewhere, or where we can do a job better in space than we can either on the ground or in the atmosphere, or we can do it cheaper.

And that, I think, poses the type of technological and I might say personnel problem, base problem, with which the Air Force is faced. Trying to integrate the force needed now and for the immediate future, making certain that we are properly covered for the future in those types of weapons systems which will be available in the immediate

future and at the same time not neglecting those unique characteristics, unique opportunities, that the state of the art indicates will still be a little further into the future.

I would like to state unqualifiedly that the Air Force feels that space is an area in which there will be certain military requirements and that we certainly have programed a very large part of our budget in missiles. But we are also maintaining our manned aircraft, modernized to the degree that we can and to the degree that we feel—or largely to the degree that we feel necessary—to meet the present or the very immediate future.

Mr. SISK. Thank you, General White.

Mr. MCCORMACK. Will the gentleman yield?

Mr. SISK. If I have time, I will be glad to yield.

Mr. MCCORMACK. I have heard some opinions from competent persons about the life of manned aircraft from a military view. Would you care to express an opinion, General, on that?

General WHITE. I believe that history has proved that the manned aircraft has been controversial since its invention. I have personally been in the flying business since the days of Billy Mitchell. I have observed these problems over the years. We are presently having a recurrence, perhaps. In my opinion there will be a requirement for manned weapons systems from here on out. But the proportion will change. In the past we have had 100 percent bombers in our retaliatory forces.

As of now, I can't give you the exact proportions, but it is less than 100 percent because we are beginning to phase in air-breathing missiles, the intercontinental ballistic missiles, and the intermediate range missiles.

So the mix is changing now, and I anticipate it will continue, with the proportion of manned vehicles on a relative basis being smaller than it is now, but, nevertheless, an appreciable part of the future forces.

Mr. MCCORMACK. You haven't any limit in your mind, then? Nobody can say definitely?

General WHITE. It is too early, in my opinion, Mr. McCormack, and we have given a great deal of thought to just what the proportion should be. We are certainly little beyond the dawn of this age of ballistic missiles.

I can cite an example of the difficulty of stating that now. At what rate of exchange would you exchange a single intercontinental ballistic missile for a single B–52 bomber, for instance? It is an equation we don't have worked out yet and I think it will be some time, but I think it is fair to say, as I have—and we do have it in our programs—that the proportion of manned bombers is going down. There are other fields such as the tactical field and, of course, the airlift field where the manned aircraft has the predominant role from here on out, in my opinion.

The CHAIRMAN. May I say to the members of the committee, we are operating under Mr. Fulton's motion of yesterday to limit everyone to one question. Mr. Fulton, you will be recognized.

Mr. FULTON. The question comes up as to your method of phasing down the manned aircraft and phasing up the ballistic missiles—IRBM and ICBM.

That decision as to the weight of phasing and the method of changing the reliance from solely manned airplanes to some dependence on missiles is not a political decision, but it is a very complicated technical decision, based upon balanced forces upon which the United States relies for its defense—and the capabilities of potential enemies and their combined forces.

So that the question then resolves itself not to what we would call a missile gap, but whether there might be an overall defense gap.

I believe that there is no overall defense gap, because we have the predominant power in the world today in the United States, as against our potential enemy, and that the question must be dealt with on a technical basis, rather than on a political basis. Do you agree?

General WHITE. I agree, in general, that that is a very erudite statement, if I may say so, of the military problem. It really is. I agree with you.

I would like to take just the kind of problem that you have mentioned: How do you equate a bomber that can carry multiple weapons and heavier weapons with a ballistic missile which carries only one warhead? How do you equate that bomber when it is equipped with air-breathing missiles that will go 400 or more miles with an atomic warhead on it now and probably in the future? Then add the air-launched ballistic missile with a thousand-mile range on top of that of the airplane.

That gives you some feel for it. I agree it is diversity of forces that has the greatest effect on our overall national defense posture.

The CHAIRMAN. Mr. Hechler——

Mr. HECHLER. General White, with your indulgence, my question will take about 2 minutes to ask, and I hope I have the indulgence of the committee while I ask it.

The CHAIRMAN. You have one question, Mr. Hechler. Go right ahead.

Mr. HECHLER. General White, you are in a position of leadership and what you say has very great influence over what the people in the country think and I believe your job is made much easier by stressing the nature of the crisis that we face.

Now, the Secretary of the Air Force yesterday quite honestly pointed out that he, as well as the Secretary of Defense, had to look at the broader picture and that perhaps General Power as a field general had to look at the picture somewhat through dark glasses.

Secretary Sharp said that he preferred to take a somewhat rosier view. We had a little discussion here about the use of rose-colored glasses [putting on a pair of rose-colored glasses].

Now, it is entirely possible to look at our missile program through rose-colored glasses. And when you do put on rose-colored glasses, you see quite a few amazing things. The Russian missiles suddenly look not as powerful. Their capabilities become intentions, and pretty soon, after you look through these rose-colored glasses for a while, there just isn't any missile gap at all.

And furthermore, as you look through these glasses you might say that the United States should not be overly concerned with catching up with the Soviet Union. And as you look through these glasses, you see a parade of generals—Gavin, Ridgway, Taylor, Medaris, Power. Perhaps through these glasses those generals and their point

of view may seem a little parochial. The generals have all sorts of ideas [taking off the rose-colored glasses].

But the question I would like to ask you, General White, is this: Isn't it high time in this country that we take off these rose-colored glasses and stop lulling the American people into complacency and tell the people that they are really facing the greatest crisis in American history?

Some people have said we shouldn't panic the people. I have never met a man in this country that is scared or panicked, but I have met thousands of people who are complacent.

The question I would like to ask you is this: Is it not high time that every man, woman, and child in this country has to put forth every ounce of heart, mind, and muscle if we are going to meet what is really the gravest crisis which has faced humanity, and the American people are going to have to sacrifice a few big tail fins and fat consumer expenditures and work hard for the preservation of humanity, itself?

You, in your statement, have said, "It is for our common interest to assure that we overlook no opportunities." I think that is a step in the right direction, but isn't it time we sound a warning bell in the night?

General WHITE. You have asked me a very long question. Mr. Chairman, I can only reply at about equal length, if I may.

Without seeing it in writing to review, I would have difficulty in replying to every point. But I would like to make the first point, that in my opinion—and I have been around a long time—there is no complacency in the Department of Defense. There are sincere and dedicated people to whom the love of this country and recognition of their responsibilities is uppermost in their minds.

I believe I stated earlier that the invention of the atomic weapon and the long-range delivery vehicles has had a very decided impact on the whole business of planning for national security.

You spoke of rosy glasses. I would prefer to use another color if I might. I used this as an example once before and I haven't been able to think of a better analogy and I think it is a really useful one.

Let's start with General Power, who has a single, but exceedingly important command—in my opinion, the most important command in the world today—in the free world, certainly. He has a certain mission. General Power sees his problem in black and white. Now, let's move it just one echelon higher—which happens to be myself. General Power is charged with the strategic forces of the Air Force. As Chief of Staff of the Air Force, insofar as my duties are concerned, I have to consider strategic forces for the Air Force, the air defense of the United States, which is a large portion of the responsibility of the Air Force, and I have to think of our tactical forces which are for the purpose of meeting oversea commitments for limited war. I have to think of airlift forces for the same purpose. I have to keep in mind the balance of well-being of nearly a million people, of the research and development requirements, and so on and so on.

So when General Power's requests come to me, they have the utmost scrutiny. But instead of seeking the problem at my level, in black and white, I begin to see it now in a shade of dark gray.

Now, let's go to the next echelon which is the Secretary of the Air Force, my immediate superior. He has other considerations which

make the problem—I am not saying it downgrades any problem, but it is really a broadening of the responsibility—he has other things to think of. He is one of the civilian Secretaries; he is a close personal adviser of the Secretary of Defense. His view is broadened and, for want of a better phrase, I would say he sees things in a little lighter shade of gray.

Now, you come into a kind of an anomaly. We next come to the Joint Chiefs of Staff. I take off my hat as Chief of Staff of the Air Force, and I sit down with my colleagues, the Chief of Naval Operations and the Chief of Staff of the Army, and I immediately become concerned with not only the Air Force problems, but also with those in the Army, the Navy, and the Marine Corps.

And here again, you get different evaluations, different judgments based on factors which, themselves, are in many cases unknown, and which vary. The reflection of the doctrine, of the experience and of the different responsibilities of these people comes up with yet another element.

Now, we go to the Secretary of Defense. He is concerned with these things and many other things. So each gradation has new factors and new judgments, and that is one of the reasons that General Power may appear to be solely concerned with one thing. That is really all he is concerned with, in the narrow sense of the word. And that, I think, is what causes some of the difficulties.

Mr. McCormack. Have you eliminated the Director of the Budget?

General White. I have not eliminated the Director of the Budget because you can go on higher.

The Chairman. He is not in the air.

Mr. Teague. He is in the air.

Mr. Fulton. Let the record show the gentleman from West Virginia took his rose-colored glasses off at the end of his questioning.

The Chairman. The gentleman will loan everyone on the committee those rose-colored glasses at the proper time.

Mr. Moeller.

Mr. Moeller. I would like to follow with a question comparable to that asked by Congressman Anfuso.

I am sure we wouldn't expect you to clear the air all of a sudden here but certain statements were made by top people in the Air Force in recent weeks and quoted in the papers, and these same men seem to have been slightly ridiculed in other statements made by other people—this could easily become a political situation, I am sure, but I think we as a committee would like to know, would you stand by and put your approval upon the statements made by General Power and, for example, General Schriever? He expressed some disappointments and dissatisfactions a few days ago which appeared in the newspapers.

You would say this is absolutely correct and accurate? You would approve of this?

General White. I will give you a very frank answer to that. General Power's speech was properly cleared, according to all of the rules of the game. I feel certain—I can't speak for him—but I believe General Power, himself, did not realize the turn that would be given to his speech. As I say again, the purpose, if you read it all, was directed to support for the airborne alert, which he feels is necessary. So I would say that in that respect it was unfortunate that he made the speech the way he did.

But it was not foreseen by him that it would lead to—and evidently not by any of the clearing authorities—that it would lead to the kind of a situation that we find ourselves in now, creating so much discussion.

The CHAIRMAN. Mr. Roush.

Mr. ROUSH. General White, my question is a simple, practical question.

General WHITE. I will be very grateful for that.

Mr. ROUSH. How soon do you contemplate a military need for a million- or a million-and-a-half-pound booster engine?

General WHITE. That is a difficult question for me to answer because I am not a scientist. I have great enthusiasm, and I hope not an excess of imagination, about the future of space for military purposes. I am confining myself only to the military side of it, because that is the only side that I am concerned with as Chief of Staff of the Air Force.

I think that as of the moment the boosters we have are adequate for the military space missions, but as we learn more about space, as the state of the art progresses, I have no doubt that larger boosters will have an application in the military sphere.

I would point out that for the immediate future, I would anticipate that the military requirement will be more for numerous boosters than it will be for a few very large boosters.

Now, General Boushey and General Wilson are here, who are really experts in these matters, and I think that they can give you a more authoritative answer in that respect than I can.

The CHAIRMAN. Mr. Chenoweth.

Mr. CHENOWETH. I would like to ask just one question.

General White, I personally have great confidence in you and your staff and in the Air Force to accomplish its mission, and I am telling my people that the Air Force and the Army and the Navy and the Marine Corps are ready to meet any emergency or contingency which may develop.

And I am on good ground in telling them that, or should I resort to some of the tactics which others have, and spread a word of fear and concern among them that they might have some real fear?

General WHITE. You are absolutely on solid ground in my opinion, sir.

Mr. CHENOWETH. I appreciate that.

The CHAIRMAN. General, I know you have to leave shortly, but before you leave I would like to ask you two or three questions.

Are Midas and Samos and Discoverer—they are your programs—also X–15, that is your program—do you have in your budget sufficient funds to push those programs with all optimum speed?

General WHITE. We feel we are adequately funded in the Discoverer program, and in the Samos program. We would like to study more the immediate future of the Midas and it is presently before the Department of Defense.

The CHAIRMAN. You are asking for more money for the Midas?

General WHITE. We feel perhaps we could go faster. We have to have a scientific evaluation of it, which is not completed yet, which would justify more funds if the scientists tell us that what we would like to do is a practicable and desirable thing to do at this time.

The CHAIRMAN. Just for the purpose of explaining fully, what is the Midas program?

General WHITE. The Midas program is a satellite which would, through infrared detection devices, be able to report the boosting of a thing like a ballistic missile at the time it blasts off. In other words, you don't have to wait until you see the warhead coming through the radar screen as you would with other types of warning. Here you get much earlier warning because the heat generated by the booster will be picked up by the satellite.

The CHAIRMAN. Now, that is a defensive program. How much more money do you need on that?

General WHITE. I would have to turn to one of my staff here to give you the amount of money that we are asking for, and I rather suspect that that might be something best stated for executive session.

I feel that since this is a future thing which has a bearing on the overall aspects of security, it would be best to have that entered into the record under classification.

The CHAIRMAN. Do you favor the Air Force having a monopoly on the military use of space, or do you favor a joint command, or a joint development program?

General WHITE. I don't favor any of those things, sir. I believe that there are military requirements for all of the services in space. I believe, as I stated earlier, that any military mission that can be done either uniquely, more cheaply, or better in space should be done that way. All of the services could have, and some do now have, requirements in space.

Now, the joint development of the services is very closely integrated in R. & D. now. To have a single R. & D. program for this even in the military, I feel would be a mistake, for the same reason that we don't have them in the other weapons.

In other words, I look on the space weapons systems just exactly as I do on the terrestrial and aeronautical ones.

The CHAIRMAN. Well, General, what is holding up our Dyna-Soar program? It has been in the works a long time. When we were out in California they told us they would have certain tests over in February. That was last February. Is it proceeding as it should?

General WHITE. We have adequate funds to do the program as we see it now, but again, those who are connected with it think that we can go faster. I am happy that they do, because I think we should get on with these new weapons systems. Here again a technical evaluation is in progress which will decide whether we should go faster and therefore have more funds.

The CHAIRMAN. So you will let us know later on that?

General WHITE. Yes, sir.

The CHAIRMAN. Are there any further questions?

Mr. McCormack?

Mr. MCCORMACK. I yield to Mr. Anfuso.

Mr. ANFUSO. General, you spoke about what happens in the different stages—how appropriations are made, and how requests are made.

General Taylor, in his book, said that the fault really lies at the top; that you are given a set amount to start off with—say $40 billion—and then all of the military agencies have to conform to that and, therefore, you have to take off a lot of things that you may require and need in order to comply with that figure at the top.

Do you think that perhaps this might be an answer: Do you think if we added a couple billion dollars at the top, and then during these discussions in the Joint Chiefs of Staff you might permit all of these different agencies to get a little bit more money and maybe they will all be able to wear rose-colored glasses?

General WHITE. I think every service chief would like to have more money. I think Mr. Gates has stated that. While we all support the program as a composite program, if we were individually permitted to change the priorities, each of us would have different priority from that which we support as a composite.

I don't know whether any given number of dollars additional would reconcile these priorities and changes. Obviously at some point they would, because if everybody's priorities were fulfilled then everybody would agree with them.

Mr. ANFUSO. And do you think some additional money would have helped in 1953, 1954, 1955, 1956, and right after the first sputnik?

General WHITE. I can only say that I have been more or less in the front office of the Air Force for a good many years, and I remember no year when any service was fully satisfied with the amount of money it got.

Mr. MARTIN. Or any other service.

Mr. ANFUSO. Would additional money have helped us in catching up with the Russians in those years?

General WHITE. Well, certainly any money that one gets to translate to hardware requires several years' lead time so I can only say "yes." If we had bought more things, or had money for more things several years ago, we would have more things today.

The CHAIRMAN. Mr. Sisk.

Mr. SISK. Just one question, General White. In the light of your answer to my question a while ago, with reference to the continuing need for manned aircraft—and I am inclined to agree completely with you on this, General White—what is your personal opinion on the decision to pull the plug on the B–70 program?

I am asking for your own personal opinion, General White, and I don't propose to put you on the spot, but as I understand this is the only proposed weapons program in the military for a really advanced manned aircraft and I have been somewhat concerned by this. If you could, I would appreciate your giving me your personal opinion on what you think of the situation.

General WHITE. I will do so, sir.

I have certain responsibilities which are relatively narrow, as Chief of Staff of the Air Force. I have certain backgrounds as a professional miiltary airman. I can only say that as I understand you ask me the question that I personally feel that we ought to go on with the B–70 as a weapons system as rapidly as feasible.

The decision was made not to do that. I respect those who made the decision, and naturally I must accept it. We are going to do the very best we can with what we have.

Mr. SISK. I appreciate your answer, General White, because I was asking you for your own personal opinion, and I appreciate having it.

Thank you, Mr. Chairman.

The CHAIRMAN. I want to concur with the general. I think we ought to go ahead with the program.

Mr. Fulton.

Mr. FULTON. General, you are an expert on Government procedures, as well as an expert in your own particular military department.

Actually, it is the Congress of the United States that raises the money for a particular year's budget, and the Congress that then sets what the proportions of distribution will be and gives you the amount that you are entitled to spend in a particular fiscal year of the U.S. Government; is that not right?

General WHITE. I am sure that the Constitution states that the Congress shall raise armies or something to that effect.

Mr. FULTON. There is no element in your answer that would be a criticism of the Congress of the United States during the fiscal years 1953, 1954, 1955, 1956, 1957, 1958, 1959, and 1960, that would make it appear that there has been a strategic failure of Congress to defend this country, or give adequate funds to the military establishment, that have seriously impeded its progress in research, development, or in hardware?

General WHITE. Of course not, sir. My reply was to a question that if we had had more money in past years we would have more forces today. I am not criticizing anyone. I am not saying we should have had it, but it is a fact that had we had more money to buy things with several years ago we would have more things today.

Mr. MARTIN. If we all had more money we would have more things.

General WHITE. That is exactly right. It is a fact of production.

Mr. FULTON. Let me finish on one point. I am interested in the development of thrust and perhaps the Saturn program is not the only program that we can have for the development of large thrust. For example, you have the inverted cone type engine, a jet engine, with the power around the base of the cone.

Can you tell us whether you could have progress in that direction through added research money, if you got it? For example, I would like some competing programs for large thrust, and when you in the Air Force have the capability of an engine with greater efficiency than you get under the ordinary type engine, maybe we on this committee should look into it.

General WHITE. Well, sir, I can only say that in the general case, competition between very much needed elements that go into making up a weapons system is healthy, provided the competition is not wasteful duplication.

Now, as to this particular aspect of it, I think that either General Wilson or General Boushey can give you a more authoritative answer than I.

Mr. FULTON. Why it is that the strategic area in which the Air Force is interested, everything that you would call the cis-lunar area—that is between this earth and the moon—because of the capability of orbiting vehicles that could be brought in in a very short time to a target within the free world—why isn't your strategic area broader than you say in your statement?

I talked this over with General Boushey a couple of years ago, and I think we both agree that it is clear out to the moon.

General WHITE. Well, I personally think that getting out to the moon is something that may well develop as a military requirement,

but at the moment I am advised that the real requirements from a military point of view, are at relatively lower altitudes; several hundred miles from the Earth's surface.

Mr. FULTON. There has been testimony here before this committee on this particular set of hearings that probably within this coming year, the Russians will have a soft landing on the moon. Would the establishment of a base by a potential enemy on the moon that we could not in any way reach give them freedom of action and, therefore, a strategic advantage that would cause us to have a less capable defense in the United States?

General WHITE. I do not rule out any possible developments from space. I can only say that as of the moment we have not figured a way to use the moon for a military purpose, which would be either cheaper or better than ways that we have in the present state of the art to do the same mission.

Now, what the future would reveal, my imagination tells me we don't begin to know, but we should not close our minds to the possibilities.

Mr. FULTON. That is all. Thank you.

The CHAIRMAN. Mr. Hechler has one short question.

Mr. HECHLER. A very quick question, General White.

You were talking about leadtime. I wonder if you would comment on what you feel the importance of a strong educational system is, in relation to the strength and national defense of our country a decade hence.

General WHITE. I am out of my field, certainly out of my responsibilities, but I think that history shows that an educated populace is a better population as a whole. I think that there are many requirements in the educational field. I think we must, of course, keep up, advance, improve our technical education. We need to have youth encouraged to go into the more difficult disciplines, shall I say certainly in my own case, and I think in the popular view—mathematics, physics, chemistry, nucleonics, and so on—are among the difficult disciplines. We must encourage the young man to take that kind of an education.

On the other hand, I think that the humanities have a very great value, because science alone and things alone do not make a good civilization. So there is a balance in which I am not qualified to predict or to recommend but we certainly must have both, and I would give emphasis in the present state of affairs to the scientific side.

The CHAIRMAN. I don't want to cut off anybody, but we promised to let the General go early, and we have another very important witness this morning, General Roscoe Wilson, Deputy Chief of Staff.

Mr. QUIGLEY. General, if the Bureau of the Budget recommends additional funds for military expenditures, and if the administration recommends additional funds for military purposes, and therefore these additional funds are recommended or included in the budget message, then isn't it easier for the military services to get these additional funds from Congress than it is if they are omitted from the budget message?

General WHITE. Well, the executive side of the Government, the President, sends his budget to the Congress and presumably——

Mr. QUIGLEY. If these additional funds are included in the budget message, then it is easier to get those additional funds from Congress than if those additional funds are omitted from the message; isn't that correct?

General WHITE. I would assume as a general case that is true. You mean as opposed to a supplemental?

Yes, I think I would agree.

Mr. MCCORMACK. General, I have been in Congress 32 years. I don't know much. When Congress appropriates money, how can we force the executive to spend it if the executive doesn't want to? I refer you to Nike-Zeus and I can refer you to other things—the 900,000-man Army, the 200,000-man Marine Corps. Will you just tell us, when we do all these things you talk about, how we can force it?

General WHITE. That is a problem, Mr. McCormack, far beyond my purview or ability to answer.

The CHAIRMAN. Mr. Chenoweth.

Mr. CHENOWETH. Last year, General, when you were before a committee, you made some estimate as to what the future of the manned air force was in the Air Force program.

I think you made some predication that perhaps in 10 or 15 years it might be obsolete. Would you care to comment on that? I want to be sure I have your thinking on that.

General WHITE. I don't believe I said it just that way, Mr. Chenoweth. Earlier today I have stated what my thesis is, and I am sure it has been that right along. As far into the future as I can see, we will have a requirement for manned aircraft, and perhaps manned space vehicles. But the ratio under the conditions as I foresee them now, of bombers—we will take that one field—to other types of strategic weapons, will decrease. The exact ratio will probably never be static for very long, but as a general rule for the immediate future, the ratio will go down.

Mr. CHENOWETH. Thank you very much, General.

The CHAIRMAN. One more question and then the Chair is going to call the next witness.

Mr. Fulton.

Mr. FULTON. I am sure the good gentleman has never forgotten when Congress said to you, "Instead of a 48-group Air Force you should have a 70-group Air Force," and we couldn't get the President clear back in 1948 or 1949 to go ahead and give you the planes. Could we?

General WHITE. I don't know, sir.

Mr. FULTON. You remember that, don't you?

General WHITE. I remember many——

The CHAIRMAN. Thank you very much, General, for coming here and before you get away I want to say that you have sent us for liaison an excellent man there, and that is Col. Jack Sims, and I want the record to show how cooperative he has been with this committee.

We certainly thank you for coming and bringing your able Deputy Chief of Staff with you. We will hear him in a moment, and, as I understand, you have a very busy schedule so we are going to release you.

General WHITE. Thank you, Mr. Chairman. As always, it is a pleasure, and an honor to be here.

Mr. MARTIN. I am very delighted to know we have such an excellent man at the head of our Air Force.

Mr. FULTON. And such a diplomat.

The CHAIRMAN. Now, Lt. Gen. Roscoe C. Wilson, Deputy Chief of Staff, Development, Headquarters, U.S. Air Force.

We are pleased to have you, General Wilson. You have a statement. I have been glancing through it. It is a very fine statement. We will appreciate your presenting that statement to the committee.

You have sitting with you General Boushey. We are happy to have General Boushey, too. We know him and we know he has a wonderful background. With men like you in the Air Force we can depend upon you.

STATEMENT OF LT. GEN. ROSCOE C. WILSON, DEPUTY CHIEF OF STAFF, DEVELOPMENT, HEADQUARTERS, USAF, ACCOMPANIED BY BRIG. GEN. H. A. BOUSHEY, DIRECTOR, ADVANCED TECHNOLOGY, USAF

General WILSON. Mr. Chairman and members of the committee, I am honored to appear again before this committee to discuss the U.S. Air Force activities in development of military space systems.

I thought that in the course of this discussion, sir, I would like to pursue the philosophy you discussed with us in the Pentagon about 3 weeks ago.

The Air Force, throughout its history, has constantly strived for greater speeds and higher altitudes, because as our speed and altitude capabilities have increased, the military effectiveness of our weapon systems has experienced a corresponding increase. We are confident that the exploitation of space through militarily significant space systems will increase our ability to deter attack on this Nation and to strike effectively in the event of attack.

The first point that I would like to make is that in our view space is a location. It is not a function, nor a military program. Secondly, space is only a part of a larger location which we call the aerospace. The term "aerospace" has solid scientific foundations. The physical characteristics of this location are such that it is impossible to set a limit on the end of the earth's atmosphere and the beginning of true space. This environment has gradually changing physical characteristics, but unlimited extension. Thus, aerospace is a meaningful term necessary to the understanding of our future military operations.

The Air Force does not compartment its activities into aeronautics and astronautics, or into nonspace and space. Because the aerospace is a continuous area of operations, our overall research and development program is oriented toward the fulfillment of military requirements in the most effective manner without regard to the question of where in the aerospace medium the necessary weapon systems will operate. The major criterion for the choice of a particular system to satisfy a particular military requirement must be the relative effectiveness of that system compared with other methods of doing the same job.

When we apply this criterion of relative effectiveness to military space systems we consider that the Air Force should develop a space system to perform a particular function if—

(*a*) It is the only way to do the job. For example, satellite interception; or

(*b*) It is the best way to do the job, and is not prohibitively expensive. For example, early warning and tracking of hostile ICBM's; or

(*c*) It is the most economical way to do the job. For example, certain communications requirements can be met in different ways. An artificial ionosphere or a satellite system may prove to be the least expensive.

Our research and development program has the dual purposes of providing the technical information on which these decisions can be based and of developing operational weapon systems.

The Air Force does not separately identify a space research and development program. However, it is possible to discuss the part of our research and development program which is primarily oriented toward operations beyond the sensible atmosphere of the earth. I emphasize, however, a large part of our effort is applicable to both aeronautic and space systems and, hence, is aerospace.

The Air Force research and development program, since World War II, has provided the background and capability for the military exploitation of space. Without the knowledge, techniques, and equipment resulting from our extensive research and development on aircraft and missiles, we would not now be approaching the operational use of military space systems. In fact, the major portion of the total U.S. effort in space is based on propulsion, guidance, and control, and other techniques and hardware that resulted from Air Force research and development. We are confident that this background of knowledge and experience, together with the knowledge and experience which our tremendous supporting industrial complex has accumulated, will be a major factor in the technological struggle which we face.

Our current research and development effort in space is in three parts. The first area of effort is the study program. This program, while small from the standpoint of expenditures, has proven its worth many times. In this program, the Air Force and the industry consider new methods of doing a particular military job, and the systems that would be required by these new methods. In this way, we benefit from the efforts of many experienced and knowledgeable people and are able to pick and combine the best of many ideas. Currently, a major portion of our study program is directed toward possible space offensive and defensive weapon systems.

For example, we have studies on offensive orbital systems ranging from a low orbit Dynasoar-type vehicle to offensive systems dispersed and hidden in the vast reaches of space 100,000 miles or more from the earth. In the defensive area we are considering systems that will enable us to inspect satellites and determine their intentions, and space-based ICBM defense systems. Other studies are on recoverable boosters, reconnaissance, and space logistic, maintenance, and rescue ssytems. These studies include both manned and unmanned systems.

Our second area of effort is in applied research on space components and subsystems. In this program, our aim is to develop techniques that will provide the basis for development of future weapon systems. One extremely important part of this program is concerned with space power systems. The typical military space system must have a long, useful life. A critical factor in attaining

this long, useful life is the necessity for reliable electrical power generation with the minimum weight of equipment. We are actively working on methods for generating electrical power such as converting solar energy directly or mechanically, direct chemical conversion—a sort of continuous battery—and direct conversion of heat from either solar or nuclear sources. We are also much concerned with propulsion techniques, both for boosters and for low-thrust propulsion in space.

Propulsion is the key to space use. Up to the present we have not learned how to scale up a missile propulsion system to increase its thrust. Thus, each program must be undertaken as a separate and distinct development effort. On the other hand, there is every reason to anticipate a series of significant achievements in propulsion over the next decade.

For example, chemical propellants presently operate well below their 400-second theoretical limit in specific impulse. The result here is that only a small percentage of system gross weight is available for payload. Upward progress in specific impulse is forecast with improved chemicals, nuclear rockets, controlled nuclear explosion, ion rockets, and magnetohydrodynamic devices. Such advances will result in dramatic increases in payload percentage despite a significant increase in fixed weight of systems.

These and other advances will not be automatic. To achieve them we must support a selective research and development program carefully directed toward anticipated requirements. The boosters which we are currently developing for our ballistic missile programs have been designed for military missions. As you have heard in previous testimony, they are also proving to be the mainstays of our satellite and space systems. Nevertheless, it is apparent that Thor, Jupiter, Atlas, and Titan boosters will not be adequate for all of the systems we anticipate.

I will not go into detail on the third area of effort, the current Air Force space systems development. You have already heard about the Discoverer, Samos, Midas, and Dynasoar systems. General Schriever will cover the status of these systems in detail in his testimony tomorrow.

I would like to address myself to the question of possible military space systems of the future. Many of these systems have characteristics that we can foresee at this time. These systems can be grouped in the usual four military areas:

1. Defense.
2. Offense.
3. Reconnaissance and surveillance.
4. Support.

As with the aircraft, the first operational military space systems will be for reconnaissance and surveillance.

In considering the offensive possibilities, we must mention that the ICBM is essentially a space system. The same techniques, knowledge, and hardware are necessary for ballistic missile systems as for space systems. There will be improvements in ballistic missiles; improvements which will make them more effective weapon systems, and which will greatly complicate the problem of defense against them. We also envision other offensive systems which would fall

into the category of space systems and which would greatly increase the Nation's strategic military power.

It appears that for some time to come the offense will continue to maintain ascendency over the defense. The U.S.S.R. has the capability to develop advanced offensive systems. Therefore, we must make every effort to provide a defensive capability against both the ICBM and offensive space systems.

We have concluded that it will be possible to provide effective defensive measures against some offensive systems through the use of defensive military space systems. However, the timing of developments is such that our primary defense of the future as in the present must be based on the capability of our strategic forces to deter war, or, failing that, to survive an initial attack by passive measures.

The cost of satellite systems, is the source of much concern to us in the research and development program. In considering the various systems which could perform a particular military mission, we are constantly aware of the present high cost of putting a pound of payload in orbit. We are endeavoring to reduce that cost to 10 or 20 percent of the current figure.

To make reductions of the order we desire, we are studying the possibility of recovering the boosters which put our satellites in orbit. Here I would like to draw an analogy. Our present approach resembles a situation where we would load a jet airliner with passengers and fly it, without first test flying it, from New York to Los Angeles and then throw the airliner away on arrival. Obviously such an operation would be wholly uneconomical for the airline. If we find ways of recovering the launch vehicles for repeated reuse, we can greatly reduce the cost of placing numbers of satellites into orbit.

We are studying two ways of recovering boosters. One is by using parachutes carried in the main stage. The other is by using an advanced aircraft, say of the B–70 class, as the first stage.

Another approach is to use the boosters developed for scientific space programs. The ingredients of a military R. & D. program for "space" systems, like those of aerodynamic systems, are quite different than those of a scientific program. In the booster area such factors as military urgency, fast reaction, reliability, cost, concurrency and complexity of operations combine to make the military requirement incompatible with development for space exploration. It is expected that the civilian space program will require boosters of very large thrust. In this regard, the civilian and military requirements are similar in that many of the future military payloads will also require very large thrust. However, the military satellite will almost certainly be launched in much larger numbers than will the civilian space vehicle.

Consequently, the recovery and producibility aspects will be of much more importance to the military than to the scientist. The military booster research and development program will be more economical if we spend more money initially incorporating recovery, reproducibility, simplicity, and reliability into its development concept.

Checkout time on the launch pad is another factor which must be drastically reduced before this Nation can afford a large military space program. Again this becomes an important factor only when

large numbers of boosters are considered. Reliability is also a different problem for the military for similar reasons. In addition, it is conceivable that the military space vehicle will require a fast reaction capability whereas the civilian program does not need to pay for this capability during the development stage. While these are only a few of the factors involved, it should be apparent that very detailed coordination will be required whenever joint usage of large thrust boosters is envisioned. We expect to benefit greatly from the scientific and technical knowledge generated by the NASA; we also expect the NASA booster program to reflect military needs where possible without compromising their mission; but we believe that a booster program designed to meet military needs will in the end be necessary to make military space systems economically feasible.

In conclusion, I would like to reemphasize that the Air Force does not look on space as a function, but as an extension of the area of our operations. Our development efforts are geared to that philosophy and space systems must stand on their merits in comparison with other systems. We are confident that the Air Force research and development program can provide the capabilities required for the effective military exploitation of the entire aerospace medium.

The CHAIRMAN. Thank you very much, General Wilson, for your detailed statement. We appreciate it.

Would you like to elaborate, General Wilson, on any additional needs that these programs referred to by General White—the Midas, the Samos, the Discoverer, and the X–15—that there might be for additional funds there?

General WILSON. We are satisfied with the progress we are making in the Discoverer which as you know, sir, is the first stage of development, really, for the Midas and the Samos. This is the basic research portion of that program.

We are also satisfied with the progress on Samos because it is somewhat down the road and we think we are spending what moneys we have now effectively in this time period.

On the Midas we are not quite so sure as to what our needs will be. For the moment we are all right. But we are increasingly optimistic about the Midas program. We have high hopes for it and it is quite possible within the very near future we may need more money to exploit what comes out of this program.

So very briefly, I must say that we appear to be all right at the moment, but tomorrow we might need a great deal of help.

The CHAIRMAN. You overlooked the X–15.

General WILSON. We are satisfied with the X–15 program.

The CHAIRMAN. Mr. Fulton.

Mr. FULTON. I would like to have your judgment as to whether there will be, within the years 1961 or 1962, a gap, or deficiency in our defense capabilities in the United States as against any potential enemy, or grouping of enemies as far as the Air Force is concerned? That is based on the assumption that I had thought we had the best Air Force in the world and that in the present and projected future we were going to maintain it on a balanced approach, with many types of weapons.

Now, if that is not so and one country, for example, by an oversaturation in number of missiles, can wipe out your defensive capabilities in the U.S. Air Force, I would like to know it.

Would you please comment on that?

General WILSON. Well, sir, I can only comment, of course, from my position within the Air Force.

Mr. FULTON. I want it from the Air Force point of view completely.

General WILSON. And I would like to make this a personal answer if I may, sir.

Mr. FULTON. But only in your official capacity.

General WILSON. I think we have to look at all of our weapons systems in their entirety. It is possible that we may be behind in certain categories of weapons, but ahead in others.

If I could digress for a moment, there may be critics in Russia who might complain that there is a carrier gap since the Russians don't have any.

In this country my judgment is that at the moment we have a good Air Force, because we have at the moment the weapons systems that would appear to be capable of coping with the job with which we are faced.

Now, it is my job in the development side to make certain that technically no gap opens up in the future. You understand, sir, that I am not in the production or the numbers racket.

Mr. FULTON. That is why I ask for your judgment.

General WILSON. I think if we stay on the course we are on now, we have considerable assurance there will not be a technical gap open up which will be felt in the 1965 period and beyond which is the area in which we are interested.

Mr. FULTON. Not leaving my question, but asking simply for an explanation, what do you mean by the two words "considerable assurance"? I don't understand.

General WILSON. This may be because I have been dealing with scientists for a long time, sir, and hate to make flat statements. I, myself, have complete confidence.

Mr. FULTON. In what?

General WILSON. That we have the capability to cope, today, with an enemy situation.

Mr. FULTON. And in the future?

General WILSON. In the future I have the same confidence.

Mr. FULTON. Thank you. That is all.

The CHAIRMAN. And would you likewise give your own personal views to show how they differ from the official views?

General WILSON. I am not sure they differ at all, sir. I am just trying to make clear that I am a specialist in the Air Force and hesitate really to comment on the operational areas, on which I am simply tangent.

The CHAIRMAN. Mr. Miller.

Mr. MILLER. No questions.

The CHAIRMAN. Mr. McDonough.

Mr. MCDONOUGH. No questions.

The CHAIRMAN. Mr. Anfuso.

Mr. ANFUSO. General, are you taking into consideration all of our offensive and defensive capability, and comparing that with the Russian offensive and defensive capability?

General WILSON. Yes, I am, sir.

Mr. ANFUSO. You mentioned the year 1965. Did you mean by that that in 1965 we will have that offensive and defensive capability?

General WILSON. By that, Mr. Anfuso, I meant that the efforts of the research and development begin to have their effect on the force in being about 5 years in the future. And so it is in this area that we are working now to make certain there will be no technical gap developing between us and the Russians.

Mr. ANFUSO. Will we be vulnerable at any time before that?

General WILSON. I don't believe so, sir. Not on the technical side. Not on the scientific side.

Mr. ANFUSO. Let me ask you, General, can you tell us the comparative destructive capability of a bomber loaded with atomic bombs as compared with an ICBM, or IRBM?

General WILSON. I believe this is classified, sir.

Mr. ANFUSO. You will give us that later?

General WILSON. I will be happy to get you the information.

Mr. ANFUSO. Do you believe in satellites that can carry out both military and civilian functions, or in vehicles which could land or take off from a manned space station?

General WILSON. We have adopted an open-end philosophy in our thinking. We have no designs at the moment for such a device, but at the same time, we recognize the possibility that this could happen. Our process has been to project our present technology as far into the future as possible: To include lunar bases and lunar landings and lunar weapons systems, and beyond. But not to start at this time to devote our energies on that end of the spectrum, but rather to devote our energies to the nearer end of the spectrum so that we can take advantage of moving into this outer area as our technology progresses and our needs demand.

Mr. ANFUSO. Just one final question: On page 9 you refer to the military booster research and your desire to recover the booster, which would be a very laudable thing to do and would save this country a lot of money.

General WILSON. Yes.

Mr. ANFUSO. Do you have the money to carry out that research?

General WILSON. We have the money at the moment to carry out the studies and to make certain starts on the program. We have enough money to do this. As soon as we hit paydirt in any of these areas, we will need more money in these areas, which we could probably either get from reprograming, or perhaps we would have to ask Congress for assistance.

Mr. ANFUSO. Thank you, General.

The CHAIRMAN. Mr. Chenoweth.

Mr. CHENOWETH. General Wilson, I want to commend you on a splendid statement. I think it one of the most impressive statements that I have heard in our whole series of hearings and it has greatly impressed me.

General WILSON. Thank you, sir.

Mr. CHENOWETH. As I understand it, the so-called space program as far as your part of the Air Force is concerned is just one of the components of the whole Air Force program. We are not relying solely on space vehicles or satellites, it is just a part of our overall offensive and defensive program.

General WILSON. Yes, sir.

Now, we have been evolving this philosophy and we checked it with the chairman the other day to be sure we were on the right track. There is a tendency to think horizontally, terrestrial, air, and space. We have been trying to think vertically in terms of weapons systems and to make these systems competitive.

The military requirement governs. Then we pick the best way to do the job.

Now over and above all this is the national space program which is indeed a horizontal show. But we feel this is probably the job of the NASA, and our job is to stick to the weapons systems.

Mr. CHENOWETH. You are trying to produce the weapons which you think will be of some benefit to the Air Force, either from an offensive or defensive standpoint.

General WILSON. That is correct, yes, sir.

Mr. CHENOWETH. On page 4 you referred to your studies dealing with offensive systems dispersed and hidden in vast reaches of space 100,000 miles or more from the Earth.

Would you care to elaborate on that just a little?

General WILSON. I would love to, sir, but this is classified. It is a very intriguing sort of an idea.

The CHAIRMAN. We will go into executive session later on.

Mr. Quigley?

Mr. QUIGLEY. No questions.

The CHAIRMAN. Mr. Sisk.

Mr. SISK. General Wilson, on page 9 right after you discussed the recovery possibilities you start the second paragraph with the statement that checkout time on the launch pad is another factor which must be drastically reduced before this Nation can afford a large military space program.

General WILSON. Yes, sir.

Mr. SISK. What do you mean by that statement?

General WILSON. Well at the present time every one of our launchings resembles a scientific experiment. We have vast arrays of equipment all over the place. We have large numbers of people, we have instrumentation checking on instrumentation. All of this costs a great deal of time and a great deal of money and the efforts of a lot of people. These things should be reduced to some sort of an automatic process to save time, effort, and money. This is what I mean, sir.

Mr. SISK. Well, the reason that I asked this question is because of a statement of the Secretary of the Air Force yesterday in answer to a question. It was a point I would have liked to have pursued at the time, but we did not have the time. It had to do with the fact that a 15-minute warning was sufficient. In other words, if we had 15 minutes' warning, we would have ballistic missiles in the air.

Now, I have visited Patrick Air Force Base, and, of course, we have Vandenberg out on the west coast and so on. I have some very grave doubts about that statement and I simply wanted an explanation of what we are talking about here. I agree with this statement, but I think at least at present, even our so-called operational equipment, launching is still a rather slow and tedious business, isn't it?

General WILSON. It can be greatly improved, Mr. Sisk, as you well know. Yes, it is slow and tedious. And with a certain amount of

misfortune, our timing could be delayed. But we are gaining ground. We are getting better and in the future we are going to get very much better in this area.

Mr. SISK. I appreciate that and I realize the necessity of the time element in launching and the checking and everything that must go on and I simply wanted to clear up this idea because I felt that the statement yesterday—and it may have been meant in a little different way, but it seems to me it left entirely the wrong impression because I think today, with a mere 15-minute warning, that we probably wouldn't have an ICBM in the air anywhere.

Certainly, based on what we have seen of our ability to launch—and I question that Russia could launch one in 15 minutes and I haven't seen their operation—but knowing the technical problems that you people are going through in this, I agree completely with your statement here. But I think it is important that people realize that we have a long way to go to get these things to where it is just automatic and you snap a button and it is on the way.

General WILSON. Well, this opens another area that we have taken under study. We have no solution for it at the moment, but that is how do you reduce the time of the decisionmaking process, which can be even more critical than the time to get the missile off its pad. This is a very difficult problem.

The CHAIRMAN. Mr. Bass.

Mr. BASS. General, I believe you testified earlier—I just want to make sure about this—that in your opinion, at the present time we have overall military superiority over Russia, is that correct?

General WILSON. Yes, sir; this is my opinion. I think General Power has the world's most powerful force. I see it occasionally. He has it under control and I am convinced that we have overwhelming superiority, today.

Mr. BASS. And, in your opinion, do you feel that for the balance of this year and for 1961, as the President had budgeted for defense do you feel that this is an adequate program to enable us to keep our military superiority over Russia?

General WILSON. I can't give a yes or no answer to that, Mr. Bass. I have to answer it this way: We have adequate funds to do what we are doing, now, but we are very hopeful of some breakthroughs in several areas. If these should occur, to exploit them properly, we probably will come back to Congress with a request for more money.

An example of this is the Dynasoar. At the moment it is moving along rather slowly. But if it lives up to our expectations, it can become an expender of very large sums by next year. There are several areas of this sort.

Mr. BASS. I understand, General, but for the present, at least the way things are at present, are you satisfied with the budget?

General WILSON. For the present, yes, sir.

Mr. BASS. Now, there has been a lot of newspaper publicity——

General WILSON. May I qualify this a little bit, too. We have a shifting situation in research and development and it is necessary to switch funds from project to project. Within this flexibility at the moment I am satisfied. But if you should take one project out and say, "Are you satisfied with the funding on this particular one, today?" I may not be. Do I make myself clear, sir?

Mr. BASS. What particular one?

General WILSON. For instance, we have great expectations for Midas. We could use a little more money on Midas, now. We probably have more money in Dynasoar than we can spend at the moment. I would rather take the money from Dynasoar and put it on Midas. It is an internal adjustment.

Mr. BASS. That is an internal adjustment but the overall amount seems reasonably correct.

General WILSON. Yes, sir.

Mr. BASS. There has been a lot of publicity over General Power's statement the other day, particularly with his contention or his statement that in his opinion we ought to budget funds right now for a 24-hour alert for his SAC forces. Do you agree with that?

General WILSON. This is really a little out of my sphere. I am an R. & D. type. I will answer it this way, sir: We have the world's most powerful military force. We don't have at the moment the defense against all of the things that the Russians might come up with in the next year or so.

To protect that force we have to resort to passive means and one of these passive means is the air alert. General Power is the expert on the techniques, whether he shall go to dispersion, hardening or air alert. It is his military judgment that that is the best way to go along. Since I can't improve on his judgment, I would have to back him up, you see.

The CHAIRMAN. Mr. Hechler——

Mr. HECHLER. General Wilson, I would like to add my compliments on your fine statement. I have no questions.

The CHAIRMAN. Mr. Moeller.

Mr. MOELLER. No questions.

The CHAIRMAN. Mr. King.

Mr. KING. General Wilson, could you state once more in the simple language of the layman, where the delineation of authority is between the Army, the Air Force and NASA, insofar as they are in the space field?

General WILSON. May I take the military side first?

Mr. KING. Yes.

General WILSON. As they exist today, there are four agencies concerned. There is ARPA, which is engaged in far-ranging studies. And each of the services are engaged in studies of their own particular weapons systems needs. The Army, for instance, is charged with the payload of the interim communications satellite.

The Navy has been given payload responsibilities for Transit, the navigation satellite.

The Air Force is charged with the entire systems responsibility for Midas, Samos, Discoverer—plus putting the Army and the Navy systems into orbit and integrating their payloads into the package that puts them into orbit.

Is that clear, sir?

Mr. KING. Now, our ICBM's that presumably are or will be shortly in readiness to go into action as a retaliatory measure if necessary and so on, are they the joint effort of the Air Force and the Army?

General WILSON. No. Those are assigned to the Strategic Air Command. Those that are operational. They are the Atlas, Thor, and

Jupiter. They are assigned to the Air Force for operational purposes.

Mr. KING. The Titan?

General WILSON. Titan is still in the research and development stage. It is assigned to the Air Force. That is an Air Force project. When it comes into operational status, it will be assigned to the Strategic Air Command.

The CHAIRMAN. Mr. Miller.

Mr. MILLER. General, you said, I believe, we have the world's most powerful military offensive capability in the world today.

General WILSON. Yes, sir.

Mr. MILLER. Then you qualified that by saying that we did not have—I am paraphrasing it now, as I remember it—a defensive apparatus to compare with that at this time, is that correct?

General WILSON. I believe I said, sir, that we don't have the defensive means to cope effectively—I meant effectively—with the weapons which the Russians might develop in the next year or two. I would like to qualify that once more, sir, by saying, "active" defensive means. We do have certain passive means.

Mr. MILLER. I appreciate that. Active defensive means.

Insofar as you know, if it is not classified, have the Russians, admitting that they too have a great offensive potential, have they an offensive potential any greater than our offensive potential?

General WILSON. To the best of judgment they have not, sir.

Mr. MILLER. That is one of the reasons that we have a stalemate, today.

General WILSON. Yes, that contributes to a balance.

Mr. MILLER. There is a balance there.

The CHAIRMAN. General, may I ask you a question or two here: This simplification program that you referred to, is that funded? I have been told by the Air Force there was nothing we could save as much money on as a simplification program and it is not underway, is it?

General WILSON. No, sir.

The CHAIRMAN. Why is that?

General WILSON. Well, it is in part. I think I must confess to you that our thinking is just being straightened out in this whole area. We have just evolved these thoughts and gotten ourselves straightened out within the last year. We are already funding certain reliability programs. These are an important part of the simplification program.

For the rest, they are in the study stage and we do have some funds in this area to see what we can do. Now, as soon as we can determine what we can do we will go ahead and do it.

The CHAIRMAN. Well, is there any phase of research there that the Air Force feels it should go into, that you are denied the right to do?

General WILSON. No, sir.

The CHAIRMAN. So in every phase of your research and development program you are satisfied with it, then?

General WILSON. I must qualify this, Mr. Chairman. I am an R. & D. man——

The CHAIRMAN. That is why I am asking you that, too, General.

General WILSON. And I can always think of things that we would like to do and would like to spend money on.

We do have in the Air Force a group——

The CHAIRMAN. Tell us about every one that you have in mind that has in your mind a DX priority.

General WILSON. I would like to consider this. May I put it in writing for you, sir?

The CHAIRMAN. I wish you would.

(The information requested is as follows:)

The following programs have a DX priority and are funded to meet the schedules as presently planned:

Atlas.
Titan.
BMEWS (Phase I).
Samos.
Discoverer.
Minuteman.

The funds that we are requesting in fiscal year 1961 are adequate to meet the requirements of the program as scheduled. However, it is conceivable that a technical breakthrough or an unusual degree of progress may dictate that more money be made available to exploit the event and thus to compress the present schedule. In the event that more money is required in any area, we have three courses of action open to us, depending upon the type of unforeseen success and the amount of money required to exploit it. We can reprogram within our existing program. This means eliminating or reducing funds for some other approved project. We may request money from the DOD emergency funds. And finally, we may request additional funds from the Congress.

Although the Midas program does not have a DX priority as yet, the Air Force considers it one of the highest priority projects and is endeavoring to obtain a DX priority comparable with the urgent requirement to add this system to the Air Force inventory. Based on present reviews of this program, we can already foresee a need for additional funds in fiscal year 1961. These funds will continue the fabrication of vehicles, continue the engineering efforts at an optimum rate, and take similar actions to hold the program to schedule.

The CHAIRMAN. I am perfectly willing to come back here this afternoon if the general can do it and the members would do it.

Mr. ANFUSO. Mr. Chairman, I will not be able to be here. May I ask him one question?

The CHAIRMAN. Wait just a minute. Let's get this settled. I don't suppose there are enough members who will be able to make it this afternoon to justify the general coming back.

Mr. FULTON. I suggest we finish this morning.

Mr. MOELLER. Will we have an executive session?

The CHAIRMAN. We can't do it this morning. We won't have time.

General, you will give us a complete list of those and approximately the amount of money that you need in reference to them.

General WILSON. Yes, sir.

The CHAIRMAN. Do you feel the Air Force should have a monopoly on the military use of space or do you think that a change in organization such as a joint command, or a joint development program would improve the situation?

General WILSON. No, sir, I don't agree that we need either of those. My whole thesis has been that we are considering systems, weapons systems in the military, and I believe that each service should develop its own requirements for its own weapons systems and pursue them.

There is the means among the services and with the NASA for flow and exchange of information and I certainly don't see the need for a common command to do this sort of work.

The CHAIRMAN. You think there is enough coordination now to get the results from every service and from NASA and everything else that you need?

General WILSON. I have noticed an increasing exchange. There is enough now and I think it is getting better because the spirit is getting better.

The CHAIRMAN. I am glad the spirit is improving.

Mr. Anfuso?

Mr. ANFUSO. General, do you have any knowledge upon which to base an opinion as to the number of ICBM's, IRBM's, and submarines with atomic power that the Russians will have in 1961, 1962, 1963, and 1964?

General WILSON. I have not, sir, personally.

Mr. ANFUSO. And of course the numbers of weapons I have mentioned will alter the previous opinion as to our military security for those years, will it not?

General WILSON. Yes, sir.

You see, the military side of the house determines the requirements and one of the controlling factors of that determination is intelligence—intelligence based on capabilities. Somewhere in this process, those factors are considered, but at my stage of the game I do not have any personal knowledge of it.

Mr. ANFUSO. Thank you.

The CHAIRMAN. Mr. Fulton?

Mr. FULTON. I think Mr. McCormack of Massachusetts and I are always interested in the Air Force's use of the word "aerospace," and we always get quite a chuckle out of it when you come up here because it seems to be either a badge or a defense. So many witnesses use it and they put it right at the beginning of their statements.

Now, I have been thinking of that since you were here and I told Mr. McCormack I was going to ask you some questions about it because you say the term "aerospace" in your statement has solid scientific foundations.

I was at one time going to be an economics and mathematics professor and was a fellow in it in my senior year at school, and I'd like to, in that context, do some defining with you.

General WILSON. All right, sir.

Mr. FULTON. I would agree with you that space is a location, but to me I think it might be better to say that it is an infinite series of points in three dimensions.

General WILSON. All right, sir; I will agree with that.

Mr. FULTON. And then on your word "aero." It is rather peculiar that your word "aero" doesn't even have in it the context atmosphere, or an atmosphere. So, on your own premise, I would take your word "aero" to mean something like this, that it would be a chemical mixture of gases with varying proportions and decreasing density and a lessening of the occurrence of the elements as well as a lessening of the pressure extending from the earth—and I don't say the surface of the earth—extending from the earth through either the ionosphere or the troposphere.

Now, the rather remarkable thing about that definition is, I am defining chemical elements, and then you hitch on a definition of chemical elements to a point of geography called space. So I don't think you have solid scientific foundations to hitch geography to a chemical mixture and make a word "aerospace." Now, do you?

General WILSON. We have solid scientific foundation for some term. Maybe the artifically manufactured word "aerospace"—perhaps it

should be "aero-space"—isn't precisely the word. But we do need some sort of a word that describes a vertical slice from the surface of the earth to infinity and we can't think of a better——

Mr. FULTON. You see what you get into with that, the other services see the word on your posters whereby you recruit people and you are assuming unto yourselves complete jurisdiction of the air, atmosphere, and outerspace, which cause trouble.

The CHAIRMAN. Would the gentleman yield? I just asked him if he thought the Air Force had a right to a monopoly. I had it written here so I could follow it and I asked General White that and they both denied it. Frankly, I think we are straining at a gnat when we question the word "aerospace."

If we can come up with a better word, that is something else.

Mr. FULTON. I yield to Mr. Hechler.

Mr. HECHLER. I think it was a great loss to the teaching profession when Mr. Fulton decided not to become an economics and mathematics professor. [Laughter.]

Mr. FULTON. I might say I wound up as a corporation lawyer because I couldn't make any money in teaching.

I am serious about this word "aerospace" and I am sure Mr. McCormack is, because it seems to be a fundamental of the Air Force premise when they come before committees on jurisdiction. Now, it is not a small thing. And it is all very well to defend and to deny monopoly, which, of course, I would expect. But it is a much different thing as to who has the basic jurisdiction, beginning at some point on the surface of the earth and extending outward.

For example, I think probably the Air Force is moving up so that the Army is taking over ground cushion effect. So from a point of 6 inches to 8 feet you have moved away from that surface. Likewise I think you are moving away from the vertical takeoff, and then moving that vehicle into close ground support and hedgehopping. You are moving out of that, aren't you?

General WILSON. No, sir, not at the moment. We do have an active project in this area. This is the VTOL-STOL program. Mr. Fulton, I am sorry that this term is objectionable to you. I am sure we would adopt anything that would describe a vertical way of looking at this. That is what we are searching for.

The CHAIRMAN. May I say this, if my colleague would yield, that there is enough bickering over there in the Pentagon that we ought not to have the bickering here over that question.

If the gentleman will come up with a better word I will be the first one to use it.

Mr. FULTON. I will be the first one to move to strike that remark in all good grace from the record.

The CHAIRMAN. Well, there is enough bickering over there.

Mr. FULTON. I don't want to characterize something that is not serious to you. It is to me. It is within our jurisdiction.

The CHAIRMAN. It is not within the jurisdiction of this committee.

Mr. FULTON. It is up to us to look into who is doing certain activities in space, or the atmosphere. This committee has the jurisdiction of both for peaceful purposes.

The CHAIRMAN. Will the gentleman proceed with his questions? I will not interrupt you again.

Mr. FULTON. I don't want to be stopped on the other.

Let me go a little further. I am interested in the big booster program. You heard me explaining my interest in the nozzle-type configuration for big booster engines. I think you have a good start. Now, do you need any money for research and development on the nozzle-type engine, on the possibility of using that as a substitute or an alternative to the Saturn program, and that we might be able to do it much cheaper by getting a big increase in efficiency through your developments already? Now, would you comment on that?

General WILSON. Yes, sir.

This is a fairly new application of an old principle, but it is a new thought and could very easily lead to a breakthrough.

Mr. FULTON. Then, don't you need some money on it?

General WILSON. Yes, sir.

Initially we will get the moneys we need through our internal reprograming process. If the thing indeed turns out to be a breakthrough, we have the authority to appeal to the Department of Defense for additional funds to pursue these breakthrough processes.

If this turns out to be enough, we will be all right. If it doesn't, we will have to come back to Congress. But right now, sir, we have enough to do what we are doing, by the process of reprograming.

Mr. FULTON. Can you put your program and your projection of it in the record at this point? I would like to follow up these various alternatives that may be quicker and cheaper than something we are embarked on, which, as you can see, is running into a tremendous program.

General WILSON. Sir, may I have the time to work this out in writing?

Mr. FULTON. I do want that.

The CHAIRMAN. I wish you would do that.

General WILSON. We will submit it to you, sir.

(The information was received but is classified.)

The CHAIRMAN. Now, General Boushey, do you have a statement to make?

General BOUSHEY. I have no statement to make.

Mr. FULTON. May we welcome General Boushey and say it is always a pleasure to have him. Both on our select committee and on the current committee he has given us every cooperation.

The CHAIRMAN. That is right and he is in charge of advanced technology. He has a very important contribution to make to the Air Force and to the country.

We want to thank you gentlemen for being here and if there is no further business we will adjourn until tomorrow morning at 10 o'clock.

(Whereupon, at 12:10 p.m., the committee adjourned to reconvene at 10 a.m., Friday, February 5, 1960.)

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