

MISSILE DEVELOPMENT AND SPACE SCIENCES

HOUSE OF REPRESENTATIVES,
COMMITTEE ON SCIENCE AND ASTRONAUTICS,
Washington, D.C., Monday, February 9, 1959.

The committee met at 10 a.m., in room 356, Old House Office Building, Hon. Overton Brooks (chairman) presiding.

The CHAIRMAN. The committee will please come to order.

Mr. Ducander, there is no use to call the roll. Will you check up on the attendance?

Mr. DUCANDER. I have it, sir.

Mr. FULTON. The Republicans are here.

The CHAIRMAN. Now that we are represented in a well-balanced way here, to the right and left, we will go into session.

This morning we have two witnesses, Maj. Gen. W. W. Dick, Director of Special Weapons, Office of Chief of Research and Development, and Maj. Gen. D. E. Beach, Director of Air Defense and Special Weapons, Deputy Chief of Staff for Military Operations.

Initially, as I understand it, both of these witnesses have prepared statements. The session will be open. I hope that the witnesses will let the committee stay in open session as long as possible and then when we get to a point where classified material is being received, of course, we will have to go into executive session. We will finish the open session this morning so the press won't have to wait around. But in any event let us give the press all we can conscientiously.

Now, Maj. Gen. W. W. Dick, Director of Special Weapons, Office of Chief of Research and Development. General Dick.

STATEMENT OF MAJ. GEN. W. W. DICK, JR., DIRECTOR, SPECIAL WEAPONS, OFFICE OF CHIEF OF RESEARCH AND DEVELOPMENT, U.S. ARMY

General DICK. Mr. Chairman, members of the committee, I would like to outline very briefly this morning two subjects, both of which are of vital concern to the Nation.

The first item is concerned with the Army's current and future interests in space; the second item will be the status of the anti-ICBM development program.

Space is a newly entered, largely unknown medium which transcends the exclusive interest of any service or even of the Department of Defense. Space development and operations in space must be a national

effort. The Army's role is to participate in that effort, both in research and development and in operations.

The Army is working in support of both the National Aeronautics and Space Administration and the Advanced Research Projects Agency of the Department of Defense in the furtherance of the national space effort. All space research and development projects and funds for these projects are provided by these two agencies. Because of its record of success in space, and its capabilities, the Army is particularly suited to this role.

The Army, in furtherance of its primary mission, has specific requirements for not only data that can be obtained from satellite and space vehicles, but as in the case of communication satellites, for their actual use. The functional areas in which the Army has requirements are survey and geodesy, communications, meteorology, intelligence, and space defense, which I have shown on the chart at the rear of the room.

Since General Barclay and Dr. von Braun have covered in some detail communications and meteorology, I shall not read those parts of my statement.

With respect to geodesy—

The CHAIRMAN. May we interrupt for a moment, General. A colleague of mine has asked what geodesy is. I do not know. I think every member of the committee would like to know.

General DICK. It is the location of various points on the surface of the earth with relation to one another.

Mr. MILLER. The Navy needs geodesy much worse than the Army when it comes to getting ships from here to there.

General DICK. We both need it.

Mr. MILLER. Of course.

General DICK. Within the Defense Establishment, mapping as it pertains to land surfaces is an Army responsibility. The sea topography is a responsibility of the Navy, the preparation of charts as opposed to maps.

Mr. MILLER. I understand the Air Force takes jurisdiction over both.

General DICK. I had not so understood.

In addition to geodesy the Army also has primary responsibility for mapping. Accurate maps are needed for land warfare. Accurate geodetic data must be obtained if firing data for long range missiles is to be calculated accurately. Even through limited use of satellites thus far, the Army Map Service has corrected the location of some Pacific Islands by as much as 2 or 3 miles. There is a most urgent requirement for a survey and geodesy satellite.

I shall skip the paragraphs on communications and meteorology with your permission.

(The paragraphs skipped are as follows:)

COMMUNICATIONS

The Army maintains an extensive communications network worldwide, consisting of radio, telephone, and teletype. These communications serve not only the Army but also the Air Force, Navy, State Department, and other Government agencies in many oversea areas and are subjected to tremendous workloads even during peacetime. Additionally, the radio frequency spectrum becomes more overcrowded with every year that passes, and long-range radio communi-

cations linking oversea commands with the United States are subject to atmospheric disturbances. In view of these facts, worldwide communications must be improved. By acting as radio relay stations in space, earth satellites can help overcome, to a pronounced degree, these communications deficiencies. The Score satellite, fired last December, demonstrated the feasibility of communication by satellites. They can transmit speedily tremendous amounts of communications traffic over long distances. One technique is to transmit data by ground radio in the United States to a satellite passing over the United States for storage on a tape recorder. As the satellite passes over an oversea installation or field unit, it is interrogated and thereupon transmits the recorded data to a ground receiver. Another technique will be the use of communications satellites in 24-hour orbits; this technique will provide an instantaneous worldwide communication capability. Such capabilities will provide hitherto undreamed of speed and efficiency in communications support not only for Army operations but also for commercial application as well. The Army Signal Corps is actively participating for ARPA in the development of communication satellites as well as in the development of the necessary ancillary ground stations.

METEOROLOGY

Weather has historically exerted an important and often predominant influence on land warfare. By obtaining information on cloud cover and other atmospheric phenomena, the earth satellite will provide basic meteorological data which will produce more dependable weather forecasts to the field Army worldwide. Although all military services and other Federal agencies are interested in weather, each has requirements peculiar to its mission. Specific Army interests lie in receiving basic meteorological data for long-range planning and also in receiving local weather data pertaining to specific areas of land combat. Being developed today for ARPA by the Army Signal Corps is a meteorological satellite package that ARPA plans to place in orbit before the end of this year.

The CHAIRMAN. All right.

General DICK. Although each of the military services has a reconnaissance and intelligence requirement, each has targets peculiar to its mission. In conducting ground warfare, the Army must determine the existence and exact location of ground targets. These include "deep" targets such as missile launching sites, troop concentration areas, communications centers, or defense complexes interfering with operations of our ground forces. The ground soldier must have the capability to maintain continuous surveillance over highly mobile enemy forces to prevent being surprised. He must also have the means to assess damage. The earth satellite promises improved capabilities to satisfy the Army's requirements.

Space defense: The assignment to the Army of the task of developing an antiballistic missile weapon is a logical extension of the Army's responsibilities and capabilities in air defense. This leads directly to the problem of intercepting and destroying all enemy missiles or space vehicles threatening our Nation or our forces in the field. A weapons system capable of solving this problem is an early development objective.

My previous statements have been restricted, in the main, to the exploitation of space by earth satellites which are under development at the present time. Only current Army missions have been analyzed as they are affected by the space age; however, the Army recognizes that man stands on the threshold of the space age, and that new scientific discoveries and accomplishments may well bring changes not only in capabilities to accomplish old missions but in the missions themselves. It is possible in the future that the Army can employ rockets and missiles to deliver troops and critical supplies where they

may be required. New missions and new capabilities will evolve with time. The Army is determined to keep pace with this evolution as it occurs.

To summarize Army interests and requirements in space, I would like to restate that the Army believes that space exploration must be a national effort, and that the functional areas in which the Army has immediate requirements are survey and geodesy, communication, meteorology, intelligence, and space defense. In addition, we foresee in the future the possibility of transporting Army troops and supplies by ballistic missile.

My second subject is concerned with the status of anti-ICBM development.

During World War II, the employment of the V-2 ballistic missile ushered in a new era in warfare. Immediately after cessation of hostilities, the Army laid plans to develop a family of guided missiles, both offensive and defensive.

Perhaps our most difficult requirement was for an antimissile missile.

Several years ago, a feasibility study conducted for the Army by the Western Electric Co. and Bell Telephone laboratories, indicated that it was possible, using extensions of then known techniques, to design and construct an air defense guided missile system which would be capable of engaging all forms of the air threat expected to exist in the 1960-70 decade including the ICBM.

As a result of this study, which included some development work in order to verify the practicability of applying certain new theories and concepts, a system development program was ordered by the Army. This system is the Nike-Zeus, and in its design, primary attention was to be given the ICBM threat.

System development of the Nike-Zeus proceeded at a fairly normal rate but with great success for several years. As it became apparent that the ICBM threat was quite a bit ahead of earlier predictions, on January 16, 1958 the DOD instructed the Army to proceed with the development of the Zeus system as a matter of urgency. Several months later, a 1959 budget amendment provided sufficient support for a highly accelerated development program, and still later, the Advanced Research Projects Agency and the Atomic Energy Commission supported several research projects designed to help clear up certain unknown physical phenomena associated with the AICBM problem.

Development progress to date has been most encouraging and the program is on schedule. During the course of the program several major technical breakthroughs have been achieved. For example, the successful implementation of a new technique in the radar field has made it possible for the first time to obtain very large volume coverages on large numbers of very small targets at very high data rates. Furthermore, the application of this new technique does not require the invention of new and vastly sophisticated receiver or transmitter elements. Rather it makes use of the best components which can be made available at any given time but in a system concept which not only permits existing components to be used to greatest advantage, but also provides the flexibility of permitting higher performance components to be substituted at any future time without

major redesign or modification. In addition, very substantial progress has been made in the field of solid propellants. The Nike-Zeus will be a three-stage missile, all stages being powered by solid propellant rocket engines. The first or booster stage is, of course, the largest. A milestone was reached when on August 26, 1958 a full-scale Zeus test engine was successfully static tested at a measured thrust of 450,000 pounds. This thrust lasts for only a short time, about 4½ seconds, but this is sufficient to launch the missile at a speed high enough to insure intercept of the incoming enemy nose cone.

The development program for the Nike-Zeus AICBM has now progressed to the point where several test models are being fabricated. These models will be used to demonstrate the system against various types of targets including actual ballistic missiles. The Army does not mean to imply that no problems have arisen during this program. Rather we wish to convey the great confidence we have in the success of the system which has been brought about by the manner in which all problems met to date have been successfully and rapidly solved.

The threat to this Nation is a dynamic one which grows greater both quantitatively and qualitatively with time.

In summary, gentlemen, the Army is proceeding with an urgent development program designed to demonstrate the feasibility of the Nike-Zeus AICBM system. Our progress to date plus the success of the Army-industry team effort with the other two Nike systems, Ajax and Hercules, provide confidence that the Nike-Zeus system will be successful. The Army believes that the Zeus system, when deployed, will counter not only the ballistic missile threat of the near future but can also grow to meet the more sophisticated missile which is sure to come.

I have appreciated this opportunity of appearing before the committee and shall be happy to answer any questions you have during the discussion period following the next Army speaker. The next speaker will be Maj. Gen. Dwight E. Beach, Director of Air Defense and Special Weapons, Office of the Deputy Chief of Staff for Military Operations, Department of the Army.

The CHAIRMAN. General Beach, suppose you proceed and then we will ask both of you gentlemen questions on what you have covered. General Beach, you may proceed.

STATEMENT OF MAJ. GEN. DWIGHT E. BEACH, DIRECTOR OF AIR DEFENSE AND SPECIAL WEAPONS, OFFICE OF THE DEPUTY CHIEF OF STAFF FOR MILITARY OPERATIONS, DEPARTMENT OF THE ARMY

General BEACH. Mr. Chairman and members of the committee; the purpose of my presentation is to inform you of the Army's roles and missions in air defense and its role in surface-to-surface missiles of ranges beyond 200 miles. The roles and missions are comprehensive and include such items as provision of forces, operation of a training and logistical base, and the development of weapon systems.

These roles and missions are derived from the primary functions assigned to the Army. Among these primary functions two have

a direct bearing upon this discussion. The first function assigned to the Army and which I now quote is:

To organize, train, and equip Army forces for the conduct of prompt and sustained combat operations on land—specifically, forces to defeat enemy land forces and to seize, occupy, and defend land areas.

In order to carry out its assigned function and to survive on the modern battlefield, the field Army must be provided with effective air defense means. Freedom of movement on the battlefield depends to a significant degree upon the quality of the air defense provided. The field Army commander requires organic air defense forces which are designed specifically to meet the broad vista of tactical situations which can occur in land warfare.

The Army must have weapons which possess the necessary mobility characteristics to provide air defense for the most forward ground elements. Behind the forward elements we must have effective air defense for the larger echelons; that is, the divisions and corps. Further to the rear our lines of communication must be made secure against air attack if we are to sustain ground combat operations.

Accordingly, the Army uses the weapons family concept for air defense of combat forces. We have in the research and development phase an optimum family of air defense weapons for field Army use. Because of the classified nature of these developments, I cannot discuss them at this time; however, I can state that they are intended to replace the Nike Ajax missile system and the small automatic anti-aircraft guns which are a part of the field Army today. Included in this family of weapons we require a system to defend our forces against attack by ballistic missiles.

In addition, the possible rapid deployment of strategic Army forces and other airborne units places the requirement of air transportability on certain of the Army's air defense weapons.

It might be advantageous if a single weapons system could be developed to meet all air defense requirements for the forces in the field; however, the state of the technical art, coupled with the variations in mobility and other requirements, precludes such a single weapon concept for at least many years and possibly forever.

The second primary function of the Army is—

To organize, train, and equip Army air defense units, including the provision of Army forces as required for the defense of the United States against air attack, in accordance with doctrines established by the Joint Chiefs of Staff.

The Army in fulfilling this responsibility provides air defense weapons in support of specific requirements determined by the Commander in Chief, North American Air Defense Command, General Partridge, and approved by the Joint Chiefs of Staff. Certain of the Army air defense weapons which are developed for field Army use are equally effective against the air threat to the United States. Examples of this dual capability are found in Nike-Ajax, Nike-Hercules, and Hawk. Ajax and Hercules are now deployed in both the United States and overseas. Thus the optimum family of surface-to-air missiles for U.S. defense includes some of the new weapons being developed for the field Army.

Considering the cost and time required to develop a modern and complex air defense missile system, the advantages of employing essentially the same system both in the United States, at overseas

bases, and in the field Army should be obvious. A recent example of this was the deployment of a Nike-Hercules battalion to Taiwan on an emergency basis.

With the threat of the ICBM ever increasing, the Army considers that active defense against ballistic missile attack is a most pressing requirement. For the past 2 years the Nike-Zeus antimissile missile system has been under active development.

I will now discuss the Army's basic concept for providing air defense. It is apparent that a vast outlay of funds would be required to provide a completely adequate level of air defense for every square mile of the United States. In addition, it is beyond the state of the art to produce an air defense system which will guarantee defeat of the threat beyond the limits of the United States.

Accordingly, a realistic air defense capability can be maximized only by tailoring defenses specifically for protection of vital priority installations. Examples of these are Strategic Air Command bases, population centers, and military forces overseas.

As these adjacent local defenses become integrated they provide defense coverage of large areas in addition to the denial of penetration to priority installations. Therefore, as a determined enemy attempts to press home his attack he must face increasing concentration of fire power.

The Department of Defense concept for air defense is defense in depth. The Army wholeheartedly supports the DOD concept. We believe the first priority is for the deployment of local defense weapons around vital installations and subsequently pushing these defenses outward to the extent resources are available to permit engagement of any attacker as early as practicable. This is basic military philosophy as opposed to the Maginot Line concept. A simple analogy to our defense in depth is the infantry platoon in the defense. Patrols and observation extend out to the front. As the enemy moves in, warning is given by these patrols and the enemy is engaged by the long-range weapons; that is, the artillery. Finally, as he makes his final assault, all of the infantry weapons, to include mortars, bazookas, machineguns, rifles, and even pistols come into being. History has proven that defense in depth is required. A perimeter air defense may appear at first glance to be attractive. Once the hollow shell of a perimeter defense is penetrated by a determined enemy, the naked area within is helplessly exposed.

To implement this defense in depth concept, the Army has investigated many different approaches to the problem. In each instance we have considered the current and future threat as well as the vulnerability of air defense systems to enemy attack. Both highly centralized and decentralized systems have been studied. As a result we believe in decentralization as far as practical. Although the Army research effort is aimed at meeting requirements in the future, we do not develop and engineer a new weapon system whose concept exceeds the state of the art by so much that the new system cannot become operational in time to cope with the threat. This is particularly true in defense against ballistic missiles. In other words you have to learn to crawl before you can walk and learn to walk before you can run.

A comparison of existing Army systems with other existing systems would be welcomed by the Army. However, the comparison

of existing systems with others not yet operational is of questionable validity. The acceptance of a concept as a weapon system over an existing or feasible engineered system could be disastrous.

The Army's air defense weapons are based upon what may be called the "building block" concept. Each battery is a completely self-contained combat unit and as such is capable of fully autonomous operation. The basic building block is the battery. The level of defense of an area can be increased on a pay-as-you-go basis by the addition of more batteries. Because each battery is an autonomous unit it is not dependent upon inputs from widespread radar networks or other ground environments which contain centralized control centers and thus are vulnerable to enemy action. Of course, Army air defense batteries are designed to accept such supplemental target location and identification data which may be available from external sources.

To support its air defense function the Army has an established support base of considerable magnitude. This support base includes development, testing, training, and supply facilities. The Army contractor team which developed Nike Ajax is unequalled in know-how and experience. This same team developed the Nike-Hercules and is now developing Nike-Zeus.

Army air defense systems of the Nike family are the only surface-to-air missiles deployed today in our defense. As such they constitute the hard core of U.S. active air defense means. The Army is proud of this significant accomplishment.

Turning now to the Army's missile role in the range of 200 miles and beyond, I shall mention again the first function of the Army which I quoted, referring to "sustained combat operations on land—specifically forces to defeat enemy land forces and to seize, occupy, and defend land areas."

The accomplishment of this assigned function requires that the field commander have at his disposal adequate weapons in terms of range and hitting power to assure his forces survival and the defeat of the enemy. He must be able to attack and destroy any enemy target which seriously threatens his mission. The expansion of the battlefield under the threat of atomic warfare has greatly increased the distances to which the Army must reach in order to engage and destroy the enemy threat against it. This threat now includes enemy guided missile launching sites and missile and atomic warhead storage facilities in addition to the type of targets encountered in past conflicts.

At the present time the longest range Army missile to meet the foregoing requirement is the Redstone.

This system provides a potent weapon at Field Army level, fully responsive to the needs of the Army commander.

Redstone is the result of a program begun in July 1950. The original program was for a missile of over 400 miles' range. However, at a later date it was determined that the weight of the warhead to be carried required a reduction in range to about 175 nautical miles, or about 200 statute miles.

The Redstone development program proceeded on the basis of a 200-mile range, and in December 1955 the decision was made to weaponize the system. The present Redstone, developed by the Army

ballistic missile team at Redstone Arsenal, is the result of this program.

Redstone was the first large U.S. ballistic missile. As such, it has contributed to other advances in the fields of missiles and space activities such as improvements in inertial guidance systems for large rockets, high altitude research, and in experience valuable to the Jupiter program.

The 200-mile range of the Redstone permits engagement of a large number of targets across an entire Army zone. Redstone has full cross-country mobility and has demonstrated in firing its suitability for troop use. Its employment in launching the Explorer satellites has further confirmed the Redstone reliability and the accuracy of the guidance system. Redstone, fully field tested, has been deployed overseas to provide fire support of United States and allied ground forces at Field Army level.

Emphasis is now being placed on the replacement missile for Redstone. This is the Pershing, utilizing the latest techniques in guidance and engineering design. Pershing was authorized for development in January 1958.

Pershing will be smaller and lighter in weight than Redstone and, using a solid propellant motor, will be particularly appropriate for field use under the Army concept of mobile operation. It will provide quick response, increased rates of fire, and will be fully air transportable. We envision that this missile will be employed by small compact organizations which can operate with minimum probability of detection by the enemy over any type of terrain. All the experience gained from other missile programs is being applied in the design of the Pershing missile and its associated ground equipment. The result will be a weapon as reliable as the artillery on which so much depended in World War II and Korea, but with the increased range, flexibility, and striking power which we must have for survival in the future.

The Army has still another role—that of supporting the Nation's deterrent forces. The Jupiter missile, developed concurrently with the Redstone, and by the same team of ballistic missile scientists, is in production for operational use today. Accuracy and reliability of the Jupiter has been conclusively demonstrated in numerous firings, and the difficult problem of reentry was solved as early as August 1957. The reentry into the atmosphere and recovery of a full-scale Jupiter nose cone in May of 1958 furnished additional proof of success. The method of solution of this one problem alone reduced the test firing otherwise required by a substantial degree, with corresponding savings in money and missiles. Operational responsibility for the Jupiter has been assigned to the Department of the Air Force, who will man and deploy this weapon. The Army is producing missiles and equipment for the system, and has furnished training and technical assistance to the Air Force to enable an early operational capability.

In summary, the Army looks forward to the future with confidence, based on past history as indicated by these Army firsts of which the Army is very proud.

First U.S. ballistic missile firing, in May 1947. That was a Corporal that went some 62 miles.

The Army made the first penetration of outer space, in February 1949.

First successful intercept of aircraft by guided missile, November 1951.

First operational air defense GM unit, December 1953. That was the first in the free world, the Nike-Ajax.

The first U.S. operational ballistic missile unit, November 1954.

First free world successful IRBM firing, May 1957.

First free world solution of reentry problem, August 1957.

First free world satellite in orbit, Explorer I, January 1958.

First intercept of very low altitude aircraft, May 1958.

First intercept of very high altitude supersonic target missile, December 1958.

From these, I feel that our confidence is warranted.

I have appreciated the opportunity of appearing before the committee and I shall be happy to answer any questions you may have. Thank you, sir.

The CHAIRMAN. I want to say this: Both of these statements, the one made by you, General Beach, and the one made by Maj. Gen. W. W. Dick, Jr., are excellent statements on the use of missiles.

General BEACH. Thank you, sir.

The CHAIRMAN. I read with great interest the discussion of your defense in depth. That is the concept of warfare adopted in the Army. Now, that is the concept of our defense used in Korea, too, was it not, with such success?

General BEACH. That is right.

The CHAIRMAN. That is what really beat the Chinese in Korea; and we are simply transferring the theory of defense in depth to our own country.

General BEACH. That is correct.

The CHAIRMAN. Now, in the development of this defense in depth, the Army has three types of missiles in the Nike series, really four. Would you call the Pershing part of the Nike series?

General BEACH. No, sir; Pershing is a surface-to-surface missile to be used with the Field Army.

The CHAIRMAN. You have Nike-Ajax, Nike-Hercules, and Nike-Zeus.

General BEACH. And Hawk, also.

The CHAIRMAN. So there would be four types of Nike missiles and then you have the Pershing. Now, is the Nike-Ajax going obsolete?

General BEACH. It is still effective, but we are replacing it as rapidly as we can with the Hercules. Hercules, as you know, is now on site, and it is replacing the Nike-Ajax because it is far more effective.

The CHAIRMAN. The Hercules is being used in the general defense of the United States by the Army.

General BEACH. That is right.

The CHAIRMAN. Then, as to the Zeus, you state that its development is proceeding rapidly.

General BEACH. Right, sir.

The CHAIRMAN. Have we reached a point, however, where we could say that it is approaching operational qualities? If you do not want to answer that in open session, do not hesitate to say so.

General BEACH. I am a little afraid to answer that one in open session, Mr. Chairman.

The CHAIRMAN. We are depending, however, on the Zeus for intercepting ballistic missiles.

General BEACH. That is right.

The CHAIRMAN. Do we have any other missile, any other weapon in either the Army, Navy, or Air Force for that purpose?

General BEACH. No, sir; there are no other weapons in development to intercept an incoming ICBM. There are some other studies on this whole problem, but the only development program leading to some hardware is the Nike-Zeus.

The CHAIRMAN. Can you tell us in open session anything about the studies that have been made?

General BEACH. All of the studies that I have read are stamped secret, sir.

The CHAIRMAN. Well, we are placing, then, our full reliance for intercepting missiles on the Nike-Zeus, and you state that we are pretty well financed on that program.

General BEACH. As far as research and development is concerned it is proceeding as rapidly as it can.

The CHAIRMAN. Is there anything that we can do, since we have placed such heavy reliance on the Zeus, to help speed the development of that program?

General BEACH. Yes, sir; there is one thing. You could start establishing a production base for it now. It is a question of taking a slight risk, perhaps, but there is a certain amount of leadtime from the time you decide to go into production until you have an operational unit. The longer you delay starting your production line, the further off that operational date becomes.

The CHAIRMAN. Well, that would mean, then, the beginning of the plans for the release of contracts for the construction of Nike-Zeus?

General BEACH. Of the actual sites, no, sir.

The CHAIRMAN. The building of the missile, itself?

General BEACH. Construction of facilities in which you would build the various components of the missile, yes.

The CHAIRMAN. Well, can't you use the Zeus in Ajax and in Hercules sites?

General BEACH. I doubt very much whether the Ajax and Hercules sites will be suitable for the Zeus. In addition, you must have air defense against the air-breathing threat so Zeus will not make the missiles that will combat the aerodynamic threat obsolete. The facilities I had reference to were production facilities that would make up parts of the Zeus systems. It would be a little early now to actually start constructing Zeus sites.

The CHAIRMAN. You would begin to work on the factories from which you could produce parts for the Zeus in quantity?

General BEACH. That is right, sir.

The CHAIRMAN. That ought to start at once. You haven't started it yet?

General BEACH. Well, the decision was made, as Secretary McElroy has testified that, based on the advice of top scientists, we weren't far enough along in the research and development area to warrant going into production, and that is the status now. The de-

cision was made above my level, and probably for very good reasons.

The CHAIRMAN. So this committee could recommend that we push the program of planning production for the Zeus. Is that correct?

General BEACH. The committee could recommend anything it chose, I am sure.

The CHAIRMAN. But I am asking you for suggestion there, and you suggest that is the way we could help?

General BEACH. From my level we recommend going ahead with production. We thought that the threat was so urgent that it was warranted. The decision was made not to do so, and I am loyally abiding by the decision.

The CHAIRMAN. Well, now, from your viewpoint, from your level, is that program being delayed?

General BEACH. Well, as I said, there is a certain fixed leadtime from the time you start production until you have the first operational unit. That is fixed. The longer you wait to start your production, the further off that operational date becomes.

The CHAIRMAN. So we have been dragging a little bit, and it is time then to start, is that your statement?

General BEACH. That was our recommendation, but that is not the position of the advisers of the Secretary of Defense.

The CHAIRMAN. I want your recommendation, General.

General BEACH. Well, my recommendation is the same as it always has been, to start early production facilities so we could get a capability—

The CHAIRMAN. We will have the Secretary of Defense here later on. We will ask him about that also. He has consented to come, and we will hear from him.

Now, the Pershing is your newer successor to the Redstone, and that is not a part of the Nike series?

General BEACH. That is correct, sir.

The CHAIRMAN. Before I get away from the Zeus, would you say that the Zeus is effective, and to what extent could you tell us its effectiveness?

General BEACH. Well, we have very high confidence that it is going to be very effective. It has a history behind it as an outgrowth of the Nike-Ajax, which was the world's first surface-to-air missile. Those same basic techniques were used to make the Nike-Hercules, which is many times as effective as Ajax, and those same basic techniques and the same team is developing the Nike-Zeus, so we have high confidence that it will be a very effective system.

The CHAIRMAN. You believe it will be better than 90 percent effective?

General BEACH. Yes, sir; I do.

The CHAIRMAN. Now, the Pershing successor to the Redstone will have what additional qualities over the Redstone?

General BEACH. First, it will be much smaller and lighter and therefore much more mobile.

The CHAIRMAN. It is portable, then, over our roads?

General BEACH. Yes, sir. It will have the mobility of medium artillery. It has a solid propellant. We get away from the problems of handling toxic liquids in the field, which is quite a difficult problem. It is much simpler. We need fewer people. It is much more reliable, and its range will be greater than that of Redstone.

The CHAIRMAN. So you could deploy that either in the homeland or overseas, as you wished, and it would have the mobility of shifting from one position to another?

General BEACH. Yes, sir. Redstone has the same capability, but not to the degree that the Pershing would. You could deploy Redstone anywhere. It can be moved.

The CHAIRMAN. But it is rather difficult. It is rather a large missile.

General BEACH. It is a large missile, and it uses liquid propellants, and that is rather difficult to handle out in the field.

The CHAIRMAN. What is your program for constructing Pershing and making it operational?

General BEACH. Well, the research and development is going on at an optimum rate. I believe the operational date is classified, Mr. Chairman, but as soon as we have Pershing, it will replace our Redstone.

The CHAIRMAN. The operational date is classified, but is there any problem? Do you have enough money?

General BEACH. Yes, sir; we have sufficient funds for the Pershing.

The CHAIRMAN. So there is nothing that we can do to push that program in the committee; is there?

General BEACH. Not to my knowledge; no, sir.

The CHAIRMAN. Mr. McCormack.

Mr. McCORMACK. We have heard witnesses of another service use the term "aerospace."

What service do you think should have overall responsibility for military space activities?

General BEACH. Well, I never heard of that term before. I always heard of "armospace."

Mr. McCORMACK. Well, we encountered it the other day, a very sweet term, a very all-embracing term. As I said to somebody in the Army, whoever coined it ought to be made a full general.

But my question is, what service do you think should have overall responsibility for military space activities?

General BEACH. Congressman McCormack, I don't believe any one service should have overall responsibility. It should be a national effort.

As General Dick has outlined, the Army has specific requirements in space, and our position is that no single military department should be assigned sole responsibility for military space operations. Maybe General Dick could elaborate.

Mr. McCORMACK. What about duplication, lack of coordination?

General BEACH. I believe we have sufficient coordinating agencies to prevent any duplication or overlapping.

Mr. McCORMACK. Where are they?

General BEACH. At Department of Defense level, sir, and outside of Department of Defense, so that there will not be duplication between the military and the civilian.

Mr. McCORMACK. How much money do you need to start production on the Nike-Zeus system?

General BEACH. Could I defer that to General Dick, sir?

Mr. McCORMACK. My questions are asked of anyone that you may want to collaborate with.

General DICK. If a decision were made that production would proceed as soon as possible, we would require about \$30 million in this fiscal year. We would require an additional \$700 million in fiscal 1960.

Mr. McCORMACK. This fiscal year is 1959. Is that what you mean, General, the remainder of the fiscal year?

General DICK. We need \$30 million if we decided to get going right away in this year. We would need an additional \$700 million in fiscal 1960.

Mr. McCORMACK. Starting July 1 of this year?

General DICK. That is right.

Mr. McCORMACK. What is the earliest operational date for this system?

General DICK. I think that would be better covered, Mr. McCormack, in executive session.

Mr. McCORMACK. And also how soon it could be put into production, would you rather state that in executive session?

General DICK. I would prefer to; yes, sir.

I might state, sir, that we have about a 15-minute presentation which we would like to give you in executive session, which I think will clear up many of the questions which probably exist in the minds of the committee members.

The CHAIRMAN. If the gentleman would yield for a question.

You agree with the witness who has just testified that it should be put in production at an early date?

General DICK. That is my personal opinion, yes.

Mr. McCORMACK. Why does the Army favor the point-defense weapon such as Nike instead of the longer range weapon such as Bomarc?

General BEACH. The Army, per se, does not necessarily favor the point-defense weapons over the others. I think in my opening statement I explained the building-block principle, that we first defend our critical installations, such as SAC bases or population centers and our retaliatory force; that a long-range system is fine if it works. Now, we have in being efficient and capable systems such as the Nike-Ajax and the Nike-Hercules that are now on sites, something over 200 sites, and the only ones that are operational today. We think by an extension of these you could get a relatively high order of defense. The problems involved in an unmanned, long-range system would be fine if they were all solved. We support the Department of Defense completely in their defense in depth, which is a mix of weapons. We have both point defense and area defense. The interceptors and the Bomarc are area-defense weapons. That is a responsibility of the Air Force. The local defense is a responsibility of the Army. We feel you have to have a mix of both systems. The interceptor will probably be with us for some time to come.

General DICK. I think that is a fair statement.

In my opinion point defense is not a choice descriptive term. It gives a concept of a defense which is not a true reflection of the weapon. Many hundreds or thousands of square miles can be covered in, for instance, a Hercules battalion's effective area, so it is in itself a pretty good weapon for covering an area.

General BEACH. Could I expand on this, also?

The area defenses require an elaborate communications system. Our local defenses are autonomous. We use centralized control, but if that should ever break down, our weapons can still fire. If you are completely dependent on a centralized system and that centralization and communication should go out, your system is probably not very effective. Also, we feel a system of defense based on a multiplicity of point defenses is basically cheaper than an area-defense system, which requires very expensive missiles, very complete radar coverage and centralized and extensive communications.

Mr. McCORMACK. How much is the Army now spending on surface-to-surface missiles in the present fiscal budget or in the 1959 budget?

General BEACH. In the 1959 budget we are spending about \$450 million.

Mr. McCORMACK. How will that compare with fiscal 1960?

General BEACH. It was \$50 million more in 1959 than in 1960. In other words, we are spending in round figures \$400 million in fiscal year 1960, and in round figures \$450 million in fiscal year 1959.

Mr. McCORMACK. Do you think that is advisable? What is your opinion on that? I will put it that way.

General BEACH. Well, this budget was worked over very thoroughly. This was the decision, and I am willing to support it. We are getting our Pershing at—

Mr. McCORMACK. In other words, what you are saying is that you have to support it.

General BEACH. Well, we are getting our Pershing going along at the optimum rate.

Mr. McCORMACK. I think I have got enough from your answer. I am not going to press it any more, General.

Now, we have been told, the country has been told, by no less authority than Secretary of Defense McElroy, and I quote him:

Our principal reliance at this time is on the heavy and medium bomber capability of the Strategic Air Command. That is certainly No. 1. We have, however, major supplements to that in being.

But he says that SAC is certainly No. 1.

Do you consider the ICBM to be the decisive weapon in the foreseeable future?

General BEACH. I think at some time in the future it become the decisive weapon.

Mr. McCORMACK. What do you mean by sometime in the future? Would you give an idea?

General BEACH. Well, when both our enemies and ourselves have sufficient of them, and the manned bomber fades out of the picture. Right now I agree that our main force is in SAC. It is a very fine force.

Mr. McCORMACK. Well you have talked about the antimissile missile. That is what you have referred to?

General BEACH. Yes, sir.

Mr. McCORMACK. And if an antimissile missile is capable of development, wouldn't it be much easier to develop a defense against bombers?

General BEACH. Would it be easier, sir?

Mr. McCORMACK. Yes.

General BEACH. Well, I still think we need a defense against bombers. Maybe I didn't get your question, sir.

Mr. McCORMACK. I said if an antimissile missile is capable of being devised and put into operation from a practical angle, wouldn't it be also as easy if not easier, to develop a defense against attack by bombers?

General BEACH. Yes, sir; that is what our surface-to-air systems, such as the Hawk and the Nike systems, are designed to do.

Mr. McCORMACK. What do we have to counter missiles other than missiles of our own? Suppose the Soviets perfect an intercontinental ballistic missile before we do?

General BEACH. Well, our counter is our SAC, our manned bomber, today.

Mr. McCORMACK. Well, all right, suppose they perfect their intercontinental ballistic missile before we do and perfect a pretty good defense against SAC; where are we?

General BEACH. Well, if they do both of those things, we are in a bad way.

Mr. McCORMACK. That is not an improbability, is it?

General BEACH. Well, for the immediate future, I would suspect that they could not have an airtight defense against SAC.

Mr. McCORMACK. What do you mean by immediate future?

General BEACH. The next year or two or three.

Mr. McCORMACK. Well, of course, we are dealing with a pretty sinister mind on the other side.

General BEACH. Yes, sir, but we also have an ICBM program which is coming along, and we also have some IRBM's.

Mr. McCORMACK. Well, in other words, we could have control of the sea and command of the air areas within our defense positions and of the land areas and still lose if we lacked missile strength, couldn't we?

General BEACH. It would be possible, yes. That was one of the reasons we have been pushing for the Nike-Zeus. We think that an undefended retaliatory force such as SAC should be defended. It is pretty dangerous to leave it open.

Mr. McCORMACK. Our B-47's are now our main potential striking force in the delivery of nuclear bombs, is that correct?

General BEACH. I believe the B-52 is also in there. I am not an expert.

Mr. McCORMACK. Yes, that is true, but I say our B-47's because of the numbers we have.

General BEACH. That is probably correct.

Mr. FULTON. The Snark would be in there, too.

General BEACH. Of course we also have forces deployed overseas with weapons that can reach.

Mr. McCORMACK. Well, of course, they are vulnerable.

General BEACH. Well, we also have some on board ship.

Mr. McCORMACK. That is true.

General BEACH. Our whole spectrum of weapons is still pretty formidable, I'd say.

Mr. McCORMACK. I am not disputing that. But our bases overseas, in case of a general attack, would be vulnerable.

General BEACH. Yes, sir.

Mr. McCORMACK. The extent to which carriers could be used in modern warfare is a matter of serious dispute among military minds, as I understand. Is that correct, their vulnerability?

General BEACH. Well, I believe there is some discussion along that line as compared with the Polaris submarine.

Mr. McCORMACK. Well, when you get into the Polaris, you get into a little different situation from a large aircraft carrier.

General BEACH. Yes, sir.

Mr. McCORMACK. Now, our B-58 program is not going ahead very well; is it? They have been cut down; haven't they?

General BEACH. I believe so. I am not competent to talk about the B-58's numberswise.

Mr. McCORMACK. Well, they are intended to replace the B-47; isn't that correct?

General BEACH. The B-52, I believe.

Mr. McCORMACK. There are more B-52's provided for in the budget, and the Hound Dog, the air-to-surface missile, but the B-58's have been pretty well cut down.

General BEACH. I don't have the facts at my fingertips on the B-58's. I would hate to comment on that.

Mr. McCORMACK. In other words, if the Soviets should perfect—get the bugs out—I will use that for descriptive purposes. You know what I mean. Let me ask you this: They certainly had the decided advantage on the United States, our country, on overcoming the thrust of propulsion.

General BEACH. There is no question about that.

Mr. McCORMACK. And if we proceed upon the theory that they are not working zealously, then we are making a mistake in effecting delivery.

General BEACH. That is right. We should go upon the basis that they are going ahead full speed.

Mr. McCORMACK. And one thing we have always got to have is a retaliatory power.

General BEACH. That is correct.

Mr. McCORMACK. If we lose that retaliatory power, we would be in a very bad position.

General BEACH. That was my point in this discussion of air defense. Retaliatory power is a combination of offensive delivery vehicles and an active and passive ability to defend that capability.

Mr. McCORMACK. I understand that. My questions are not to be misconstrued. I am trying to find out just this: With this powerful military strength that we have, what is our one weakness, because all I read is that overall our military strength is great, and that word "overall" is what interests me. That could change very well, that overall military strength, could it not, General?

General BEACH. In this age of technological breakthroughs, I agree with you; yes, sir, it could.

Mr. McCORMACK. Can you say in good conscience, with 180 million Americans involved in the country, that it is not probable that the Soviets, unless we accelerate our programs, may not be in a position where they have an advantage over us in delivery of an intercontinental ballistic missile and at the same time have a pretty good defense against our intercontinental bombers?

General BEACH. Well, I think it is possible that in the ICBM area they could have the advantage numberswise, for the next few years at the current rates.

Mr. McCORMACK. Both is what I have in mind.

General BEACH. I am not so sure as to where they stand. I don't think we have much information on their defense against ICBM's.

Mr. McCORMACK. Well, how about defense against the bomber? If our main retaliatory power is intercontinental bomber capability of delivery and a defense against that is easier to develop than one against the intercontinental ballistic missile itself, which would seem to be reasonable, that you could prepare a defense against a 600- or 700- mile-an-hour instrument more easily than against a 6,000- or 7,000-mile-an-hour instrument, and they perfect their intercontinental ballistic missile before we do, that would be a dangerous position for our country to be in?

General BEACH. Very dangerous, yes, sir.

Mr. McCORMACK. I am sure you gentlemen have thought of that. That is not original in my mind. It would be a sad day for America if that day ever arrives.

General BEACH. That is right.

Mr. McCORMACK. That is all.

The CHAIRMAN. Mr. Fulton.

Mr. FULTON. I am glad to have you both here and I want to congratulate the Army on its list of firsts. I think the public should know more about these firsts, and if you will fill in for me those various programs as to where they took place, under whose command, who were the scientific teams participating, and what the methods used were, I will put them in the record now.

General BEACH. Yes, sir, we will get that for you.

Mr. FULTON. There will probably be some questions on the outline, and that would serve to inform the Congress and the people generally as to what you have done. It has been a magnificent achievement.

The question first comes up on the current budget, the 1959 budget, on the development of your Nike-Zeus system. You have said that you have adequate research funds or funds for the current budget, is that not correct?

General DICK. That is correct.

Mr. FULTON. And second, that you have put into production several test vehicles of the Nike-Zeus system that you are going to test.

General DICK. More correctly stated, we have tested various components of the system.

Mr. FULTON. But you have mentioned several vehicles that you are going to move into the Nike-Zeus system.

General DICK. Well, we expect shortly to test the initial vehicles, that is correct.

Mr. FULTON. As far as the components, you tested the engine of the first of the three stages of the Zeus, but you are moving ahead now to test the vehicles.

General DICK. That is correct.

Mr. FULTON. Now, is there any major modification or change in design or redesign necessary at the present time in the Nike-Zeus system before you declare it ready for production models for testing and then operational use?

General DICK. If I understand the question—

Mr. FULTON. Do you, among yourselves, have any disputes?

General DICK. No material disputes that I am familiar with, Mr. Fulton. In any modern system it is not usual, or it is not done at all as far as I know, that you complete your system and test it 100 percent before you decide to go into production. If you did this, your leadtime would just double.

Mr. FULTON. I agree with you thoroughly. I have had some experience in that end of it.

The question is, Have you made your cutoff point where you think you are at a successful level where you can put a model into test and then into production?

General DICK. The Army so thinks; yes.

Mr. FULTON. So when the decision was made by the Department of Defense, you could not base the reason for that decision on moving toward operation, production. That was a design or a modification or a structural reason. It wasn't that, it was budget. Is that your decision?

General DICK. No, sir; I don't feel that way. It was due to a basic difference in opinion on the question of whether we were at a point where we could proceed to production within a reasonable area of risk. The Army so felt. The Department of Defense felt that we had not yet reached that point.

Mr. FULTON. I had read something about that, and that is why I asked you definitely whether you felt you were.

General DICK. We feel that we are, yes.

Mr. FULTON. Then I asked you next about the decision of the Secretary of Defense because he either made it on the basis that you were not correct on that assumption of yours as to your progress or for a budgetary reason.

Now, will you tell us who, then, in the Department of Defense feels that you are not ready to go?

General DICK. The Secretary of Defense, as I recall, has stated that based on scientific advice available to him, the decision was reached that we were not ready to go into production.

Mr. FULTON. Now, I am really inquiring who it is in the Department of Defense who disagrees with you.

General DICK. I can't say, sir; I don't know.

Mr. FULTON. Are they people within the Army or people within the Department of Defense?

General DICK. I am morally certain they are not people within the Army.

The CHAIRMAN. Are they in the Budget Bureau?

Mr. FULTON. I asked that and he said no.

General DICK. I cannot say, sir. I do not know.

Mr. FULTON. We must separate the question. First, there is a budgetary question. Second, there is the point of whether you are able to perform as you say you are. Thirdly, if the decision has been made, who is making the recommendation to the person who decided directly contrary to you on the state of progress or state of the art that you say you are in.

I believe that we should have provided for the record, with the chairman's permission, that necessary information, so we can see how the decision was made.

The CHAIRMAN. Do you think you can get that information, General?

General DICK. I doubt, Mr. Brooks, that it is available within the Army.

The CHAIRMAN. We could get that from the Secretary of Defense when he comes up here, couldn't we?

General DICK. I am sure you could.

The CHAIRMAN. Mr. Ducander, have we set up a date for him?

Mr. DUCANDER. Yes, sir; March 2.

The CHAIRMAN. If we will withhold the question, then we can ask the Secretary of Defense. I am sure he can answer.

Mr. FULTON. We will finish that later. But you certainly must have, on the staff decisions, been battling somebody down there in the Department of Defense to get your program through. You were not battling unknown, faceless people before you came up to the Secretary's level. Who were you battling down there? I am trying to help you.

General DICK. Perfectly frankly, Mr. Fulton, we were not battling anyone that I know of.

Mr. FULTON. Well, then, who is this group of ghosts who stopped this program on recommendation to the Department of Defense? Was it just done without your having a chance to make your case?

General DICK. The Army's case was made, and I feel with a certain degree of success, at certain levels in the Department of Defense. The exact group or groups who advised Mr. McElroy before he made his decision, I cannot say, because I do not know.

Mr. FULTON. How many levels of decision are there between you and Mr. McElroy?

General DICK. Well, there are quite a number before you get out of the Department of the Army.

Mr. FULTON. Just tell me. At one time—I believe Mr. McCormack will bear me out—when von Braun was here, he said he had to go through 23 levels of decision before he could go ahead. And he only had to get one “no” and he was out. We have to find out where the “no’s” come from.

General DICK. My office coordinates directly with Mr. Holaday's office on most of these programs connected with missiles. That is our main point of contact. Mr. Holaday, in his position I presume, has direct access to Mr. McElroy.

Mr. FULTON. Would he go through Dr. York first at the present time? This is serious.

General DICK. I don't believe that it has been so defined in detail. I don't know. I have heard one story, and I have heard another story. As of now, we work through Mr. Holaday, and whether he is totally responsible to Dr. York, I do not know. I cannot say.

Mr. FULTON. You see, we are trying to set up a space program on this committee, find where the blocks are and find where the things are. That electric current just gets sort of dissipated as to the push for these programs. If you don't know the channels up to the Secretary of Defense in your program, I think we ought to have a statement

submitted for the record by the Department of Defense so that the Army will know it as well as this committee.

General DICK. I think we know the channels.

Mr. FULTON. I was taking you a little far as a cross-examining lawyer.

The CHAIRMAN. Any more questions?

Mr. FULTON. Yes; I have one or two more.

A question came up earlier on the ICBM threat, and I tried to point out that when we have a general weapons system that it is not that we just have to have the same number of ICBM's as the Russians. We need to have defense and defense in depth with other instruments as well.

For example, deployed abroad already have been the Nike-Ajax and the Nike-Hercules. Is that not correct?

General DICK. That is correct, sir.

Mr. FULTON. And likewise the Redstone?

General DICK. That is correct.

Mr. FULTON. And you were planning on the extension abroad of these various systems like the Pershing and the Zeus; were you not?

General DICK. Not the Zeus; no.

Mr. FULTON. Well, wouldn't you defend our major installations abroad?

General DICK. The system is designed as a defense of the continental United States. There are no plans that I know of to deploy it overseas.

Mr. FULTON. To finish with this last point, you have said that the Army has under process, under development, the sending of men and equipment by capsule and intercontinental ballistic missile and the range may be 4 to 10 thousand miles an hour for an ICBM. That would mean that you could get to Japan in an hour; you could get to Berlin in an hour; you could get to Buenos Aires in an hour. Is that right?

General DICK. Yes; those times are correct.

Mr. FULTON. That would mean that you could really use it as sort of a spray or a fountain so you could really start them from the United States and put men and equipment most any place in the world that you wanted to within a period of 1 or 2 hours, if we went ahead with such a development. Is that not right?

General DICK. No, sir; not as I see the picture. We are going to start on a much more modest level. The first requirement is undoubtedly in the neighborhood of 50 to 100 miles. The delivery within a combat area of the few specialist people or the few high-priority items of equipment and supply, both of which are badly needed.

What might lie 25 years from now in the area of delivery through missiles of people and things, I can't say. We are not going to leap into a program of deploying to Berlin and Moscow as a starter.

Mr. FULTON. No, not as a start, but in the future you would expect to be replacing planes and troop carriers and trucks and trains by capsulized forces that could be launched in any direction, regardless of weather or distance?

General DICK. I think that is a fair statement.

Mr. FULTON. I will finish this and I am through.

We have the DEW line, and the Navy has been supplying some of those outposts in Canada by ship. They have had quite a bit of trouble, as you know, with the ice floes and possible loss of use of the ships.

Why don't you right now have a practical program for supplying the Dewline by missile with their supplies? Could you not do that right now?

General DICK. I have never thought of that specific problem. I don't believe there is any present capability or immediate capability in the future for delivering the bulk of supplies which would be required.

I believe you are going to have to go in by ship for many, many years to come.

Mr. FULTON. That is all. Thank you.

The CHAIRMAN. Mr. Anfuso?

Mr. ANFUSO. I yield to Mr. Miller.

The CHAIRMAN. Mr. Miller.

Mr. MILLER. General, have the Russians anything comparable to the Nike-Zeus?

General DICK. I do not know, sir. I couldn't even make a good guess, Mr. Miller.

Mr. MILLER. How about the Nike-Zeus and Polaris in degree of development? Is the Nike-Zeus as far along as the Polaris, do you think?

General DICK. I am not intimately familiar with the Polaris, but I would say generally it is further along in the program insofar as it has been determined that it would be produced.

Mr. MILLER. Do you think, then, that Nike-Zeus is as far along at least as the Polaris? You must have some knowledge of that.

General DICK. I feel that in development, Nike-Zeus is probably at about the same point as Polaris, understanding that it is a much more complex system than Polaris.

Mr. MILLER. That is my question: Zeus is much more complex.

General DICK. Yes, sir.

Mr. MILLER. But you think that it is as far along in its overall development?

General DICK. I feel roughly that is so.

Mr. MILLER. But the Navy has gone into making provision for production of Polaris right now. Is that not so?

General DICK. That is right.

Mr. MILLER. And a great deal of money has been expended theoretically by a private contractor, but reimbursable by the Federal Government, in putting up a plant to build Polaris?

General DICK. That is right.

Mr. MILLER. That is about what you would like to have for the Nike-Zeus right now, isn't it?

General DICK. That has been the Army's recommendation.

Mr. MILLER. That is the recommendation?

General DICK. Yes.

Mr. MILLER. I think that is quite important.

The CHAIRMAN. We went into it before you arrived. I think it is very clear that the Army has recommended it and somewhere along the line someone turned it down. We haven't found out who turned it down, but we will.

Mr. MILLER. Well, I just wanted the record to show in one instance somebody has authorized going into the operational field or the production field in the Polaris missile and I am very happy to see them do that. The thing that I would like to see is having this done with Nike-Zeus also.

The CHAIRMAN. I think it is critically important, too.

Mr. Anfuso?

Mr. ANFUSO. General—

Mr. MILLER. Wait a minute.

The CHAIRMAN. I thought you were through.

Mr. MILLER. Well, I will be through to accommodate you, Mr. Chairman.

The CHAIRMAN. No, don't accommodate me at all. I thought you were through, Mr. Miller.

Any questions?

Mr. MILLER. No, no further questions.

The CHAIRMAN. Mr. Anfuso.

Mr. ANFUSO. Does the gentleman wish me to yield to him?

Mr. MILLER. No, I have no desire.

Mr. ANFUSO. Well, General, I wish to congratulate both of you on the progress you are making, I believe that all of us here are entirely dependent on you for further research and for the security of our country.

What is the range you are aiming for with respect to the Pershing, if you can say? Is that top secret?

General BEACH. I would like to answer that in executive session.

Mr. ANFUSO. Fine.

Is there a jurisdictional fight among bureaus in this research program?

General DICK. We have no bureaus in the Army, Mr. Anfuso. Do you mean between our technical services?

Mr. ANFUSO. Departments.

General DICK. I know of no serious jurisdictional battle. We are involved in a comprehensive program. It is inevitable that occasionally one technical service will move into an area which another technical service thinks it is more properly employed in. These things are quickly resolved. I know of no existing problem of that nature today.

Mr. ANFUSO. Well, I would like to know whether this statement has been correctly reported in the press.

General Twining is supposed to have made a statement in the privacy of his office, referring to the rivalry, and he said "Bureaucrats, they are a bigger threat than the Russians."

Did he ever make that statement in your presence?

General DICK. No, sir. I have never been in his presence.

Mr. ANFUSO. Do you know whether such a statement was ever made?

General DICK. I have no knowledge, sir.

Mr. ANFUSO. Now, does the Army in its research and development program take its orders from Mr. Roy Johnson or from Dr. York?

General DICK. It receives directives from both sources, each speaking of course for the Secretary of Defense.

Mr. ANFUSO. Is there any rivalry as far as you know between the two of them?

General DICK. I have no knowledge of that.

Mr. ANFUSO. Do you think that the Secretary of Defense can override either one of them?

General DICK. I am sure he can.

Mr. ANFUSO. They seem to be in dispute about that. Would you place in top priority the development of a protection system for SAC, which you regard as our main striking or retaliatory force, at this time?

General DICK. I would, and the Department of Defense does, Mr. Anfuso.

Mr. ANFUSO. Can you conceive of a more effective retaliatory force than SAC, assuming that SAC turned out not to be the best retaliatory force? Can you conceive of a better retaliatory force? Would you say, perhaps, full speed ahead on the intercontinental ballistic missile might be the better answer?

General DICK. As I understand SAC, it comprises both the manned bomber and the ICBM when it becomes operational. They will both be elements of the Strategic Air Command.

Mr. ANFUSO. Where would you place the top priority, on the development of a defense to SAC or the development of an intercontinental missile?

General DICK. I would move one along in pace with the other.

Mr. ANFUSO. You would try to move them both, in other words, at the same time?

General DICK. And I think it might be well to point out that both of these programs do have the highest national priority, the anti-ICBM for development and the ICBM for development and production.

Mr. ANFUSO. You wouldn't spare any expense to achieve that end, would you?

General DICK. I would spare no reasonable expense if I were running the show.

Mr. ANFUSO. I mean the question of trying to balance the budget wouldn't disturb you, if it involved our national security?

General DICK. I would be disturbed at a badly unbalanced budget; yes. I would be disturbed at a defense posture which appeared inadequate to me. I am sure there would have to be a balance in anybody's mind.

Mr. ANFUSO. To which would you give top priority, the security of our country or a balanced budget?

General DICK. I would give first priority to the defense of the country.

Mr. ANFUSO. Thank you.

The CHAIRMAN. Mr. Sisk.

Mr. SISK. General, I have only one question or one point I would like to discuss. I do not know to what extent you will want to comment on this. But to what extent do you feel that the Army's progress, not only the Nike-Zeus but other programs you are concerned with, by the confusion at top level as to who actually has responsibility and who is giving the orders, to what extent the Army's progress is being delayed?

General DICK. I feel, Mr. Sisk, there is some delay in processing certain decisions, employment decisions, funding decisions. This is my personal decision from where I sit. How much delay is a little difficult to define. You may be delayed in getting your money 3 months which may mean a 3-month delay. In some cases a delay of a month might bring on a year's deferment. It is hard to say. Someone else gets the money before the decision comes in.

Mr. SISK. By your knowledge, to what extent have the agreements between NASA and the Army, and Redstone Arsenal specifically, with respect to the programs you are carrying on, to what extent has the Secretary of the Army, or others who must do so, implemented or supplemented that agreement to give you clear sailing ahead or a green light?

General DICK. To the best of my knowledge, the programs of NASA and ARPA to be performed by the ballistic missile agency at Huntsville are moving at a maximum rate, at the rate which they have been funded. I know of on lack of understanding at any echelon of the agreement between the Department of Defense and NASA or how it should be applied. I hope I have answered your question.

Mr. McCORMACK. Would the gentleman yield?

Mr. SISK. I would be very happy to answer.

Mr. McCORMACK. You made two propositions in answer to the question, General. Proceeding at the maximum rate in accordance with the way they have been funded.

General DICK. That is right.

Mr. McCORMACK. Well, would you separate them? Do you think they are going at a maximum rate? Suppose you had more funds; would you proceed faster?

General DICK. I think General Barclay, who is closer to this particular part of the question than I am, answered this thing last week when he stated essentially, as I recall, the provision of more funds at this time would not speed up any of our space programs. It would provide an added assurance of completion on time and completion with a successful system. I could not provide an answer which I would judge to be as good as his. He is much closer to it than I.

Mr. McCORMACK. Mr. Miller suggested asking this question: Would you consider that as being top priority?

General DICK. The general NASA program, is that the question?

Mr. MILLER. The assurance that you would get your program, if you had more money, the assurance that the program would be completed on time. Is that not of the utmost importance?

General DICK. That is certainly of importance.

Mr. MILLER. Would you put a higher priority on anything in development than that?

General DICK. I believe we are talking now about NASA and ARPA programs.

Mr. MILLER. We are talking about enough money for you to proceed.

General DICK. Well, the particular programs that our agencies are carrying forward for NASA are not military programs. Those are space programs. My personal priority is for defense purposes first, nonmilitary space second.

Mr. SISK. Well, now General, the question, of course, that I am attempting to get at this moment is this: Let us take, for example, the Nike-Zeus. Now as I understand it, there is money to proceed along certain lines and to go so far with the program, but is it not a fact that there is desperate need for some implementation or some specific decision if that program is to be put into, let us say, operational status at sometime in the future, whether it be just for illustration 1961 or 1963 or whatever date. Is there not need right now for a decision on that matter? Is it not a fact that so far as making it useful for defensive purposes sometime in the future, that decision is being delayed, and that time is being put off month by month, awaiting a final decision, either budgetary or otherwise?

General DICK. That is the Army's decision, and that is my personal opinion, that we are losing time.

Mr. ANFUSO. Well, let me ask you this: You had a budget request for your program.

General DICK. That is right.

Mr. ANFUSO. Was that cut in any way?

General DICK. It was.

Mr. ANFUSO. How much was it cut?

General DICK. Roughly \$700 million from what was the Army's objective. This would differ from what might be in the budget line item as it was finally forwarded.

Mr. ANFUSO. What was the Army's objective and why did you want this extra \$700 million?

General DICK. For the purpose of going into production on the components of the system; setting up the machinery to produce.

Mr. ANFUSO. Well, now, the fact that you did not get that \$700 million prevented you from going ahead with production.

General DICK. That is correct.

Mr. ANFUSO. That is all.

The CHAIRMAN. That is on the Zeus program?

General DICK. That is correct.

The CHAIRMAN. Mr. Mitchell?

Mr. MITCHELL. No questions.

The CHAIRMAN. Mr. Wolf.

Mr. WOLF. I am not sure whether this should be on the record, but let us go ahead. A few weeks ago, General Dick, some pretty rational people were discussing with me in my office the question of the still existing flying saucers. These two men hold doctors' degrees in physics. They are pretty rational people. They are right now doing some work with the Government. They did not have any facts in their hands from their personal knowledge, only the scuttlebutt that is drifting around in the Department that they work in—that there is some possibility of the existence of flying saucers, some pictures in existence and things of this kind to prove this existence.

Now maybe this sounds a bit ridiculous. I do not want it to seem so. I think a couple or three years ago we were hearing a lot about flying saucers. Today we are not. Yet these two men, who have obviously demonstrated their ability to the right department head, questioned this thing. I just thought I would ask a question on that.

General DICK. My personal opinion?

Mr. WOLF. Either one of you. It has to be an opinion, I presume.

General DICK. I speak with fear and trepidation, because my wife believes in flying saucers. Personally, I doubt the existence of any flying saucers as of now.

Mr. WOLF. Well, one of the things they mentioned was a picture that was taken, so they say, of a saucer that landed somewhere up the North Platte River, Nebr., and is in existence somewhere in the Defense Department today, this one which landed, and that there are two witnesses who apparently saw it.

General DICK. I am not familiar with that, sir.

Mr. WOLF. And there was another one down south somewhere that was seen and witnessed by purely rational people, they say.

General DICK. I chased one one afternoon in the Midwest. It turned out to be a flock of birds.

Mr. WOLF. Well, this is something that keeps coming up from time to time and since we had the Director of Research here and I thought this would be the right place to ask it.

General DICK. My research is on a little more practical lines than that. I know nothing about flying saucers of an authoritative nature.

Mr. WOLF. Would you say, then, that this is mostly whims?

General DICK. We may have been the victims of a few hoaxes.

Mr. WOLF. Thank you. I did not want to embarrass you.

The CHAIRMAN. Mr. Karth?

Mr. KARTH. No questions.

The CHAIRMAN. Dr. Hechler.

Mr. HECHLER. Mr. Chairman, General Beach, I would like to ask you one broad question to help me sharpen up the information on your program.

How do you rate the chief handicaps that you now face and face in the foreseeable future in carrying out the program that you have in mind? This is a very broad question and I would like to get a rating of what you consider in terms of importance the handicaps which you are likely to confront in the foreseeable future.

General BEACH. Are you speaking now of Nike-Zeus?

Mr. HECHLER. I am speaking of the entire program.

General BEACH. Well, I think one of our biggest handicaps, and it is going to last for a long time, is that as soon as we get an existing system in operation we immediately know how to build one far better and by the time we are developing that one and going along we know how to make one that is still much better, so we are in this constant problem of where do you stop and get something on the ground that you can fight with. Nobody has ever won a war with items on a drawing board. You have to have hardware in the hands of trained troops and this is a big problem of where do you put your money? Do you wait for another year and do nothing until you can get something far better or do you spend some now to get some hardware that will be in the hands of troops. I think that problem is the overall one. Two thousand years ago a weapons system lasted for a thousand years. Now it lasts 5 or 10 years and apparently it is going to get worse in the future, and the more sophisticated ones are also getting more expensive.

I am happy to say in certain areas they are probably getting less expensive as we know how to build them smaller and cheaper and more simply.

Mr. HECHLER. What about the question of trained scientific talent? Has that been a handicap to you in any respect or is it likely to be?

General BEACH. Well, not in my area of interest, it has not been to date. General Dick may be able to add something in the research area.

Mr. HECHLER. I would also like to ask you the same broad question I asked General Beach: Is there anything you can add in describing the handicaps likely to be encountered? I gathered from General Beach's response he felt there was no final answer to this question, that this is a matter of just measuring where you concentrate your funds.

General DICK. I agree with that entirely. I think we will always have the problem of money. There will never be enough money to go around to satisfy every requirement to the ultimate. I agree with General Beach's analysis, I think it was a good one. As far as the second part of your question is concerned, I know of no real difficulty that the Army has encountered in obtaining such scientific talent as was required. There was some delay but I think this is always the case in the technical field when trying to find the best available.

The CHAIRMAN. Mr. Hall?

Mr. HALL. No questions.

The CHAIRMAN. Mr. King.

Mr. KING. General, I have a question. There is a theoretical distinction, I suppose, between the different area of authority of the three branches of the service insofar as they relate to missile activity and space activity, but as a practical matter I see very little distinction at all. It seems to me that the three branches are trampling down the same grass and covering in large measure the same areas of activity. Would you discuss for a minute how you conceive the theoretical distinction between the assigned areas of the three branches and then discuss for a moment whether you think in practice it works out that way?

General DICK. Mr. Congressman, I feel that we have a pretty good basic division of responsibility. From the broad sense, you have warfare conducted on and in the sea; you have warfare conducted on the ground; and you have warfare conducted in the air. I think that is as reasonable a division as you can make.

My own personal feeling is, then, the next step is to provide each service and each commander with the means to carry out his responsibility. Inevitably we mesh all three areas of activity. For instance, within the Pacific, the commander in Hawaii has aerial problems, naval problems, and ground problems to consider, and he has a joint command. You get into difficulties when you get into things somewhat more specific. Some of these difficulties have been decided in the past at various levels, some by agreement, some by edict, some by law.

Basically and personally, my feeling is that we should always give the man with the job the means to accomplish the job. I do not agree with one statement you made, if I understand it correctly, that we have all services trampling down the same grass. We have an occasional duplication, I will admit. I do not think it is excessive. I do not think it is necessarily a bad thing.

Mr. KING. Well, do you have any recommendations at all in that area or do you think the problem is in hand, this problem of overlapping?

General DICK. I would have some recommendations to make if I thought it were appropriate to make them. I would have some changes to suggest. I think any man sitting in this chair from any of the military services would do things a little differently from any other. I see no great problems at the present time.

Mr. KING. Do you feel that the whole space program is sufficiently coordinated?

General DICK. I think, being as new as it is, that a great deal of coordinating effort must go on in the immediate future. I do not see anything right now from the national level that needs any radical change.

Mr. KING. Let me be a little more specific. They call it the National Aeronautics and Space Council. I believe that is the name of it and I believe the President of the United States is the Chairman of that Council. Is that correct?

General DICK. That is correct.

Mr. KING. Now, do you feel that that Council is close enough in touch with this situation and actually functions sufficiently to perform a coordinating function there, or does it tend to become more of a figurehead?

General DICK. I am not really familiar with the deliberations of the Council. I think the active operating agencies are NASA and ARPA of the DOD. Their deliberations and decisions are reported to the Council. I see no reason why the Council is not on top of the problem. NASA, and ARPA are, however, the operating and controlling agencies. I think they are active. I think they are going to have some problems. It is a big area, but I see no indication that they cannot fulfill their mission in life within the Government.

Mr. KING. Suppose there were a question as to whether NASA should assume jurisdiction of a particular project or ARPA? Would NASA have the final say-so in deciding that question or would it be this Council?

General DICK. No, I do not believe NASA would have the final say. I think such a question, if there were a difference, would have to be decided at the presidential level.

The CHAIRMAN. Would you yield?

Mr. KING. Yes.

Mr. FULTON. But it is first taken up, under the act we passed July 29, 1958, through the Civilian-Military Liaison Committee, is that not correct, to try to work out the jurisdictional matters before they go higher?

General DICK. That is correct.

The CHAIRMAN. Mr. Roush. Now before Mr. Roush asks his questions I wanted to say this, because I am afraid some of the members will get away. It was my thought that as soon as we finish these questions we would go into executive session. I have a short statement, an announcement, that I want to make to the committee in executive session. After that we could view the film. Then we will see where we are and perhaps have to adjourn until this afternoon for questions in executive session.

I was really in hopes that we would be able to finish this morning with these two witnesses, but apparently we are not going to do so. Consequently, if there is no objection to that procedure, that is the way we will proceed. Mr. Roush.

Mr. ROUSH. Mr. Chairman, I will try to make this brief. However, this Nike-Zeus question, General, leaves some question in my mind. Now, first of all, sir, do I understand that your office is charged with making recommendations as to budget requirements for an adequate air defense? Is that a fair statement?

I will put it this way—

General BEACH. Not entirely.

Mr. ROUSH. Let me ask this, General: You did make recommendations that we take steps for the construction facility for the Nike-Zeus.

General BEACH. That is correct.

Mr. ROUSH. And those requests were turned down by the Department of Defense.

General DICK. The funds were not provided in the 1960 budget as it stands now.

Mr. ROUSH. Now when this recommendation left your office, whose office did it go to from there?

General DICK. I suppose it went forward along several paths, the money path to Mr. McNeil's office. I know it went to Mr. Holaday's office.

Mr. ROUSH. All right, I am still within the Army now. You know for a fact that when the recommendations left the Army desk, so to speak, that the recommendations were still there; is that correct?

General DICK. I did not see them, Mr. Roush, I am morally certain that that was the final Army position.

Mr. ROUSH. Well, I wanted to make sure that it was not the Army or any part of the Army which caused these to be stricken from the—that is, these budget requirements which you felt you must have, stricken from the budget. As far as you know, it was still in the budget, still in the recommendations when it left the Department of the Army.

General DICK. I believe it was.

Mr. ROUSH. Now when you set that up, did you set up any series of priorities which led them to believe you did not consider this as important as other phases of the work?

General DICK. Not that I know of.

Mr. ROUSH. When you set up a budget, do you set up any priorities within the budget? I do not know, I am asking.

General DICK. I am not a budget expert, and I do not understand all of the details of budget processing. There are priorities established and there is always what is known as a shopping list which exceeds the possibility, if you will, of money.

Now the Army proceeds against its pocketbook with its shopping list, usually with priorities indicated.

Mr. ROUSH. Was there any priority indicated insofar as this proposed program was concerned?

General DICK. This program was never on any formal piece of paper that fit within the budget structure that the Army was required to operate within. It is a little bit involved. The Nike-Zeus program this year was funded outside of the Army's budget. The Army recommended that it be so funded in 1960.

Mr. ROUSH. Well, was the money in terms of dollars in your recommendations insofar as the budget was concerned? I am referring to construction of facilities for the building of the Nike-Zeus.

General DICK. I have not seen the final Army budget papers. They do not process through my desk. I have no doubt in my mind at all that the Army asked in whatever was the appropriate fashion for the rough \$700 million required to go into production of the Nike-Zeus.

Mr. ROUSH. But you are not sure yourself; is that correct?

General DICK. I have not seen the papers, and the exact way in which it was stated I cannot say.

Mr. ROUSH. Just one more question. Do you know of any person in the Army, or who might be related to the Army as a civilian employee, who recommended that this item be cut from your budget request?

General DICK. I know of none such.

Mr. ROUSH. Mr. Chairman, that is all.

The CHAIRMAN. Any further questions?

Mr. SISK. Mr. Chairman, could I make one very brief statement?

The CHAIRMAN. Mr. Sisk.

Mr. SISK. This is really not a question, Mr. Chairman. I simply want to say that I appreciate the statements which these gentlemen have made, what I have heard of them. I am sorry to say I was not able to hear all of this. I want to say this: I have all the sympathy in the world for the position you gentlemen have. I realize the gun you are under on many of these questions and yet I see no other way, really, to dig out some of the problems connected with the pursuance of these programs without, let us say, to some extent putting you fellows on the spot. I did feel that should be said, but I am certainly in sympathy with what you are doing. I think you are doing a good job, in general.

Thank you, Mr. Chairman.

The CHAIRMAN. I think they have made excellent witnesses. I believe that in executive session we can get to some of these matters more quickly than we can in open session. We can certainly make more pertinent questions and perhaps get quicker answers.

At any rate, if there are no more questions now we will go into executive session and see this portrayal that the Army has. Then we will adjourn and go to the House.

(Whereupon, at 11:59 a.m., the committee went into executive session.)

EXECUTIVE SESSION

The committee met in executive session at 12 noon in room 356, Old House Office Building, Hon. Overton Brooks (chairman) presiding.

The CHAIRMAN. We are now in executive session.

At the first I want to say this: We have set up for next week—not this week—a rather heavy program, if it is all right with the committee. We hope to begin with Secretary McElroy, Secretary of Defense, and then we hope—

Mr. DUCANDER. Mr. Chairman, we couldn't get him on Monday. He is scheduled for March 2.

The CHAIRMAN. Monday, a week, then.

Mr. DUCANDER. ARPA is next week.

The CHAIRMAN. Next week will be ARPA, Roy Johnson, Dr. York, and that group we will have next week.

It is going to be a heavy schedule. We may have one or two witnesses on weather control at that time.

The announcement I want to make—and it is not for publication—is this: We will plan to leave here Wednesday, at what time, Mr. Ducander?

Mr. DUCANDER. Two o'clock, from Bolling Air Force Base.

The CHAIRMAN. We will go to Cape Canaveral, and there that same night at Cape Canaveral there will be a shot of the Thor-able missile at 11 p.m., and then at 3 a.m. the Snark will be fired. So we will have that same night two shots, and I believe everybody here would like to see those two. They are very important. We will be up a good part of the night, but we can catch up on that later on.

I wanted to make the statement. That is not for publication, because, of course, weather permitting, and other things, would govern that; therefore, I will ask you not release that.

Now, we have these pictures now. Are we ready to proceed?

General DICK. Colonel Sydnor has about 15 minutes of slides and film.

The CHAIRMAN. Fine, if the colonel will proceed.

**STATEMENT OF LT. COL. W. D. SYDNOR, OF AIR DEFENSE DIVISION,
IN DIRECTOR, SPECIAL WEAPONS, OFFICE OF CHIEF OF RE-
SEARCH AND DEVELOPMENT, DEPARTMENT OF THE ARMY**

Colonel SYDNOR. Mr. Chairman, with your permission, I would like to stay up here as much as possible to get a little closer sense of communication with you and then direct your attention to the pictures.

The CHAIRMAN. You may come up to the elevated level or right here beside Mr. King.

Colonel SYDNOR. If I may stand here, sir, I believe it would be best, and we could see.

The CHAIRMAN. All right.

Colonel SYDNOR. As General Dick has told you, sir, we have been in active development on the Nike-Zeus system for about 3 years * * *

What I would like to cover is a description of the system, and the main thing I would like to point out here and get across is that this is not just a missile, it is a greatly integrated system. Then I have a movie that will give you, I hope, a good idea of where we stand hardwarewise.

The first slide, if I may have it.

I would like to point out in the upper left-hand corner, the targets of the system which as mentioned, is designed to combat all forms of the air threat, ICBM's, IRBM's, and other air-supported targets. * * *

We can achieve intercepts against air-supported targets at whatever altitude they themselves are capable of flying, * * *

The CHAIRMAN. Well now, if you would tell the committee in executive session briefly how far have we really gone in the development of that missile.

Colonel SYDNOR. Sir, I hope my presentation here will bring that out, because it has so many pieces, and we are at different stages with the various pieces. May I clarify it afterwards?

The CHAIRMAN. Yes; you may proceed.

Colonel SYDNOR. The missile uses a solid propellant in both the motor and the booster. The problem of antimissile defense is similar to the anti-aircraft problem except for two things: The target is very, very small, and it is very very fast, * * * So our intercept is similar to what we have on Hercules, but the pickup and tracking problem is the major problem. * * *

The next slide will show how this * * * is used.

To explain it, I would like to start with the typical engagement by assuming the enemy warhead, coming in from the right-hand side of the picture. We show early warning as being the first thing that the continental United States gets. * * *

Mr. ANFUSO. Mr. Chairman, could I ask a question at this point?

The CHAIRMAN. Mr. Anfuso.

Mr. ANFUSO. Colonel, we are dealing here in a matter of seconds?

Colonel SYDNOR. That is correct, sir.

Mr. ANFUSO. That would mean we would always have to be on the alert?

Colonel SYDNOR. As I pointed out, sir, if we have an early warning system like the Air Force BMEWS early warning system, that operationally turns out to be 100 percent dependent, we could be perhaps on a 10-minute alert. If we don't have that, we would have to be continuously on the alert. * * *

Mr. ANFUSO. And you would have to have plenty of these defenses all over the United States; wouldn't you?

Colonel SYDNOR. * * * Therefore, depending on how many of these areas you have, this is how many batteries you would like to put in.

As General Beach pointed out, we think we should have a priority list and put the first one in No. 1, the second one in No. 2, and so on, to whatever extent the budget—and so on.

Mr. ANFUSO. With New York City No. 1, of course?

Colonel SYDNOR. I don't know where all of you gentlemen are from, so I wouldn't like to answer.

The CHAIRMAN. * * *

Colonel SYDNOR. * * *

The CHAIRMAN. * * *

Colonel SYDNOR. * * *

Mr. FULTON. * * *

Colonel SYDNOR. * * *

Does that answer your question?

Mr. FULTON. Yes. * * *

Colonel SYDNOR. Well, it has to—

Mr. FULTON. Thank you. That is enough.

Colonel SYDNOR. Now to get a better picture—this is schematic—the way one battery may look when it is deployed, the next slide shows what we have recommended as the initial type battery. * * *

Now we can successfully engage as many targets as we have missiles. The ultimate number would depend upon the number of missiles we decide to put in each battery. * * *

I would now like to describe in a little more detail the individual major components of the system.

The next slide shows the missiles themselves. * * *

Mr. MILLER. * * *

Colonel SYDNOR. * * *

General DICK. * * *

Colonel SYDNOR. What did I say?

General DICK. * * *

Colonel SYDNOR. * * *

The CHAIRMAN. Those have not been tested yet, then?

Colonel SYDNOR. That is right. * * *

The CHAIRMAN. Coming back to the original question about the Zeus, is that the reason they have not built up production facilities and not authorized building them up, because the missile has not yet been tested?

Colonel SYDNOR. Sir, the only stated reason I have seen is because—I can't quite quote it—the R. & D. has not reached the stage to warrant the expenditure of this money at this time. Nobody has said it is the missile's fault. Nobody has said it is the radar's fault. Nobody has said it is the computer's fault.

The CHAIRMAN. R. & D. is sufficiently assured to feel that missile will work to go ahead and build up the facilities?

Colonel SYDNOR. The Army so feels. That is our position.

Mr. FULTON. Do you correlate your test program on the Nike-Zeus missiles in connection with the lead-time required for the production facilities?

Colonel SYDNOR. * * *

Mr. FULTON. Well, the lead time on your production facilities or your site facilities is probably 6 months or a year. * * *

Colonel SYDNOR. Yes, sir. * * *

Mr. FULTON. * * *

Colonel SYDNOR. That is correct.

The CHAIRMAN. And during that interval we have no defense whatsoever to missiles, ballistic missiles?

Colonel SYDNOR. That is correct, * * * will be here * * * beforehand.

The CHAIRMAN. Your idea or the Army's idea is that the threat is so serious that we are justified in taking a reasonable risk to go ahead to production for that?

Colonel SYDNOR. * * * the risk of whether it really works like we think it is going to, will decrease with time. The risk to the country, of course, increases with time.

Mr. KARTH. Mr. Chairman. This might be an academic question, Colonel, but I would be interested in the answer. * * *

Colonel SYDNOR. * * *

Mr. KARTH. I see. One other question, sir—

Colonel SYDNOR. Actually the missile itself is destroyed in flight.

Mr. KARTH. * * *

Colonel SYDNOR. Sir, all through warfare there has never been an ultimate weapon, offensive or defensive. A lot of things have been conceived. None will be implemented until there is something to use them against.

Now some of the things that have been conceived in an antimissile system penetrate or are the use of electronic countermeasures in the enemy's warhead, the use of decoys that can take many shapes and sizes, spray hundreds of objects out in the air, and the poor old de-

fense doesn't know which one has the "Toni", which one to shoot at, and it has to use up all of its missiles shooting at all of them.

Some of these things are possible next year. Some of them aren't possible until 10 years from now. None are probable unless we build a system, because only this forces the enemy to do it. * * *

Now we have deliberately designed the system with as much flexibility as we know how to allow newer techniques to be integrated into it when they are discovered. Now it is going to be the old measure-countermeasure race that we have always been in. * * *

Mr. FULTON. * * *

Colonel SYDNOR. * * *

The CHAIRMAN. How much more do you have, Colonel, on your chart?

Colonel SYDNOR. I have three more charts, sir.

The CHAIRMAN. If you could go through them now, I think we would have enough time before the vote over there, or that may be adjournment.

All right, proceed.

Colonel SYDNOR. * * * I have a film which is 6½ minutes, that will give you an idea of what these things look like in the metal and the various things in the future.

The CHAIRMAN. Why not see the film then, so the men in charge of that could be released and then not have to come back.

Mr. FULTON. I have just one question.

The CHAIRMAN. Mr. Fulton.

Mr. FULTON. * * *

Colonel SYDNOR. * * *

The CHAIRMAN. Any further questions? If not, let us proceed with the other film.

(Film started.)

Colonel SYDNOR. Western Electric is the main contractor. Bell Telephone is taking care of the R. & D. program. I am sure you cannot read all of these, gentlemen. It just gives an idea of who is included at the moment. We have covered a good deal of the country with our work.

Goodyear is doing a good deal of work on this. * * *

General DICK. * * *

Colonel SYDNOR. * * *

That completes this part of the presentation, gentlemen, and of course we are available for any questions that you might have.

The CHAIRMAN. Well, any questions?

Mr. FULTON. Mach * * * is how many miles per hour?

Colonel SYDNOR. Sir?

Mr. FULTON. How many miles per hour is mach * * *?

Colonel SYDNOR. Well, sir, it depends on the altitude.

Mr. FULTON. That is what I am really getting at, but what is your operational speed when it is up for intercept?

Colonel SYDNOR. * * *

Mr. FULTON. * * *

Colonel SYDNOR. * * *

Mr. FULTON. * * *

Colonel SYDNOR. * * *

Mr. FULTON. * * *

Colonel SYDNOR. * * *

Mr. FULTON. * * *

Colonel SYDNOR. * * *

The CHAIRMAN. The problem is not to step up the speed. The problem is to intercept the missile.

Colonel SYDNOR. Yes, sir.

The CHAIRMAN. To have enough time to intercept it.

Colonel SYDNOR. Yes, sir; that is correct.

The CHAIRMAN. All right, I think we could finish with the executive session now. It is quarter to 1; what is the pleasure of the committee? Do you want to adjourn until 2:30 or we can go ahead now and finish up. I think it would be preferable now. It is all fresh on our minds.

Are there any questions now? Mr. Ducander, nobody on the committee has a question. Do you have one?

Mr. DUCANDER. No, sir; I think they are questioned out.

The CHAIRMAN. I want to ask you a question, too. In reference to pushing this program now I think we have cleared it up pretty well. The Army recommended going ahead with the program, but somewhere along the line it was stopped, that is substantially correct, is it not?

General DICK. Yes, sir.

The CHAIRMAN. * * *

General DICK. * * *

The CHAIRMAN. At the earliest or the latest?

General DICK. At the earliest.

The CHAIRMAN. * * *

General DICK. Yes.

The CHAIRMAN. It would take \$600 million.

General DICK. Yes; more in future years. It would take about \$30 million now.

The CHAIRMAN. And \$700 million next fiscal year.

General DICK. Yes, sir.

The CHAIRMAN. What about following that, the year after that?

General DICK. * * *

The CHAIRMAN. Is that much more expensive than the other features of the missile program?

General DICK. Offhand I do not recall the cost of the Hercules program. It is not as large as some missile programs. It is larger than most of the Army's antimissile or antiaircraft programs.

The CHAIRMAN. * * *

General DICK. The missile itself is not expensive as missiles go. The major cost, if I may speak off the cuff, is in the development and manufacture of the more complicated elements of the system, the powerful radars, and then, of course, you have the question of land acquisition costs. I do not believe I can give you off the top of my head the exact breakdown of the ultimate cost.

The CHAIRMAN. Is the land acquisition cost very large?

General DICK. I would not like to guess, Mr. Brooks. I would rather furnish that to you.

The CHAIRMAN. Is it possible for you to furnish the committee that information?

General DICK. We will do that.

The CHAIRMAN. Would that cost be classified?

General DICK. Yes.

The CHAIRMAN. So would you furnish that to Mr. Ducander and any member of the committee who wishes that information would have it available from Mr. Ducander. Do you have a question, Mr. Fulton?

Mr. FULTON. Is there not a possibility there are alternative methods that are cheaper? * * *

General DICK. * * * The main problem, though, is the time limits. We are convinced that this system is at least 5 years ahead of any substitute or alternate system.

The CHAIRMAN. Any further questions? If not, thank you very much, General, both of you generals, for coming here and helping us. We appreciate very much the value of the testimony you have given us.

If there is no further business, then the committee will stand adjourned until tomorrow morning at 10 o'clock.

(Whereupon, at 12:50 p.m., the committee recessed, to reconvene at 10 a.m., Tuesday, February 10, 1959.)