DEPARTMENT OF THE NAVY
OFFICE OF THE CHIEF OF NAVAL OPERATIONS
WASHINGTON 25, D.C.

Op-95/rwb
Ser 3P95
28 January 1960

~~FOR NAVY EYES ONLY~~

From: Chief of Naval Operations
To: DISTRIBUTION LIST

Subj: Testimony to the House Science and Astronautics Committee

Encl: (1) CNO ltr ser 2P95 of 26 January 1960 with enclosures thereto
(2) CNO ltr ser 1P95 of 27 January 1960 with enclosures thereto
(3) CNO ltr ser 4P95 of 28 January 1960 with enclosures thereto

1. The Science and Astronautics Committee of the House of Representatives currently is holding hearings on the general subject of the adequacy of the space and missile programs of this country. Navy witnesses who will appear before this Committee are Secretary W.B. Franke, Assistant Secretary J.H. Wakelin, Jr., Admiral Arleigh Burke, VADM R.B. Pirie, VADM J.T. Hayward, RADM W.F. Raborn, RADM K.S. Masterson, RADM T.F. Connolly.

2. The open hearings of the Committee are being monitored by naval personnel. Enclosures (1), (2) and (3) are statements of witnesses to date and briefs of the testimony given.

T. B. Owen

T. B. OWEN
By direction

DISTRIBUTION LIST

CINCLANTFLT
CINCPACFLT
CINCNELM
BUWEPS
BUWEPS (SP)
BUSHIPS
ONR
COMPMR
CO NOTS
BUMED
CO, APL
NAVWPNLAB Dahlgren
NRL
NAVORD MISSILE TESTFAC (WSMR)
NAVSCHOLAVMED
NAVAIRANDACT

~~FOR NAVY EYES ONLY~~

DEPARTMENT OF THE NAVY
OFFICE OF THE CHIEF OF NAVAL OPERATIONS
WASHINGTON 25, D.C.

Op-95/rwb
Ser 2P95
26 January 1960

~~FOR NAVY EYES ONLY~~

MEMORANDUM FOR THE CHIEF OF NAVAL OPERATIONS

Subj: Testimony of Secretary Gates to House Science and Astronautics Committee on 25 January 1960; forwarding of

Encl: (1) Statement of the Secretary of Defense Thomas S. Gates, Jr., before the House Space Committee - 25 January 1960
(2) Op-95 Memo for Record dated 27 Jan 1960

1. On 25 January 1960, Secretary of Defense Thomas S. Gates, Jr., appeared before the House Science and Astronautics Committee and presented the statement which is attached as enclosure (1).

2. Enclosure (2) is a debrief of the testimony presented by Secretary Gates before the Committee and is forwarded for your information.

Very respectfully,

~~T. B. Owen~~
for T. F. CONOLLY
RADM, U.S. Navy

Copy to:
09
05
06
07
04
03
93
60
54
74
76
44

Encl (1) to OP95
Ser 3P95 of 1-28-60

~~FOR NAVY EYES ONLY~~

STATEMENT OF THE SECRETARY OF DEFENSE
THOMAS S. GATES, JR.
BEFORE THE HOUSE SPACE COMMITTEE
25 JANUARY 1960

Mr. Chairman and Members of the Committee:

I am glad to have this opportunity to discuss the missile and space programs of the Department of Defense and their relation to national security.

Out ballistic missile and space programs are only about ten years old. In that short span of time we have achieved impressive results.

In the years between 1945 and 1953, following the end of World War II, we were interested in the possibilities of developing rockets into weapons systems of longer range. Our experts examined the problem thoroughly and came to the conclusion that with the relatively low yield atomic weapons then available ICBMs could not compete with other approaches such as aircraft and air breathing missiles.

Following the invention of the thermonuclear weapon, our experts re-studied the problem and concluded that with a thermonuclear warhead the ICBM could become a competitive strategic weapon. These first thermonuclear weapons were, however, very heavy.

In face of this difficulty, there were two direction in which to go. We could go ahead and start the development work on a massive rocket, or we could direct our energies toward a reduction of the size and weight of the warhead and thus the

ENCLOSURE (1) to Op-95
ser 2P95 of 26 Jan 60

entire weapon. We chose the latter. We also carried on extensive work on missiles of the air breathing type and developed several excellent weapons systems as a result.

In 1953, our nuclear scientists made a genuine break through. They told us they could make nuclear warheads a great deal smaller and lighter than earlier warheads. Our long range ballistic missile program really started at that point. It has progressed since then with astonishing speed.

We have been successful in developing the ATLAS, the first of our ICBM systems, from design to maturity in a far shorter period than was originally estimated. In 1954 the Von Neumann Committee composed of some of our top scientific experts estimated that with unlimited funds and top priorities, we could have ICBMs in 1962 or '63. Actually, the ATLAS was turned over to the operational forces of the Air Force nearly three years ahead of that schedule.

The POLARIS system was first conceived about three-and-a-half years ago, and the target date was optimistically set for 1963. We now fully expect to have this system operational in 1960 -- a full three years ahead of prediction.

There are other examples. We have made rapid progress in developing the IRBM. We are moving ahead with the second-generation ICBM, the MINUTEMAN. Each year since 1953 we have spent increasing amounts on our ballistic missile programs and

we have the weapons to show for these expenditures. Today, our ballistic missiles are reliable, accurate and effective.

Our present ICBM and IRBM boosters are adequate for our immediate needs for military satellites. We anticipate a continual growth with our improved upper stage boosters for space vehicles, which will provide considerably more weight carrying ability in a year or two.

The development of the very large thrust boosters has been assigned by the President to NASA. In accord with this decision, there is pending before Congress a proposal to transfer the SATURN project -- the large clustered space booster -- and the Development Operations Division of the Army Ballistics Missiles Agency to the National Aeronautics and Space Administration.

This does not mean that the Department of Defense has no interest in large boosters. We are very much aware of the importance to the welfare of the United States of a vigorous program in space flight and exploration, and of the need for bigger boosters for the space exploration program. In view of the potential military need for much larger boosters than are now available, we strongly endorse a vigorous NASA program. We have, of course, made available military personnel to assist him, whenever requested by Dr. Glennan.

ENCLOSURE (1) to Op-95
ser 2P95 of 27 Jan 60

We intend to follow NASA progress in large boosters closely just as we follow other NASA projects -- TIROS (Meteorological Satellite) and MERCURY (Man-in-Space), for example -- that have potential military applications. Let me assure you that we have very close working relationships with NASA and we're going to keep them that way.

There are now several DOD-NASA working groups which provide on a day to day basis essential liaison and cross-fertilization of requirements and technical knowledge on projects of mutual interest. The National Missile Ranges and tracking stations of both NASA and DOD have been used heavily in support of space launchings for both agencies. In order to make the most effective use of these facilities, a comprehensive study in the area of integrated range support for missiles and space vehicles currently is underway. To assure effective DOD support for the NASA MERCURY project, Major General Donald N. Yates has been named as DOD coordinator for Project MERCURY support. In this task, he reports to me through the Joint Chiefs of Staff. General Yates is also continuing his assignment as Commander of the Atlantic Missile Range located at Cape Canaveral, Florida.

Earlier in my statement when I described our rapid and solid accomplishments in the ballistic missile field, I did not desire to leave the impression that these represent the Department of Defense's only effort in the support of our space program. Ballistic missiles are by no means the only systems now under development. Earth satellites will provide us with new means

of extending our present military capabilities. Perhaps the most important are the reconnaissance and early warning satellites which will contribute significantly to our deterrent posture. If warning of enemy missile launchings exceeds the reaction time of our own retaliatory forces, the enemy would be strongly deterred from launching an attack.

We are pushing other programs that have direct military applications. These are communications and navigation satellites. In each of these areas, we have important research and development projects well under way. All show promise. Some have progressed to the point where they are now in the stage of applied development where we can test their feasibility on a systems basis.

The present satellites show promise in initial tests. They must undergo feasibility demonstrations on a systems basis, before we start line production. Let me assure you that when one of our projects proves itself in such fashion, we will make sure there are funds available to support production.

We have steadily increased expenditures and efforts for Defense Space Related Programs. The funding for separately identified space-related programs in Fy '59 was $381 million, for Fy '60 the funding is $414 million, and for FY '61 $481 million. These figures do not include funds for ballistic missiles or for programs transferred to NASA.

ENCLOSURE (1) to Op-95
ser 2P95 of 27 Jan 60

Remember these are test programs and there will be some failures. The reason why we test is to learn through experience where the bugs are, what has to be fixed or changed and how we should re-direct our research efforts.

During the last six months we have made improvements in the organizational structure and assignment of space responsibilities within the Department of Defense. I am confident these improvements will accelerate our programs by eliminating overlap and duplication.

On September 23, 1959, a plan for the progressive and orderly transfer of space projects from ARPA to the military departments was initiated. This plan assigns to the Air Force responsibility for the development, production, and launching of military space boosters; and for the separate assignment to the military departments on the basis of primary interest or special competence, of the development responsibilities for payloads and specialized ground support equipment for space and satellite systems.

Specific assignments for development of payloads have been made on MIDAS (Early Warning Satellite), SAMOS (Reconnaissance Satellite) and DISCOVERER (Engineering Research Satellite) to the Air Force. Transfer of the TRANSIT (Navigation Satellite) and NOTUS (Communication Satellite) projects to be designated military departments is anticipated some time during the current fiscal year.

Another important organizational improvement has been the strengthening of the position of Director of Defense Research and Engineering. We have recently placed the Advanced Research Projects Agency directly under his supervision. ARPA continues to be responsible for certain basic research programs. In particular that in the field of solid propellant chemistry will contribute to our future rocket development programs for use in missiles and space flight.

I have spent considerable time in describing the progress of our military missile and satellite programs because I feel that many have failed to distinguish between military and non-military achievements in space. Our satellite program has progressed. We have placed a number of satellites in orbit. I am confident we have gained much technical and scientific information which will enable us to demonstrate further progress in the next year.

The present day space programs of both NASA and the Department of Defense are, of course, largely outgrowths of missile programs. The technology, facilities, and components developed in the past for ballistic missiles are now used today for space projects. Similarly, today's missile development effort will no doubt find future application in both civil and military space activities. In this connection, the total direct obligations planned for research, development, test, and evaluation of missiles

in FY '61 will be approximately $2.4 billion dollars. This figure includes separately identified funds in the procurement budget for development, test, and evaluation of large missiles. Of course, our total missile program including procurement is much larger.

This summary of the space efforts of the Department of Defense offers no grounds for complacency of self-satisfaction. Nevertheless, we have made great strides in missile and satellite development. In the area of the Department of Defense's responsibility -- space activities having direct military application -- we have sound programs. We are moving swiftly toward their accomplishment.

Mr. Chairman, I appreciate the opportunity you and your Committee have given to me to develop these thoughts. Doctor York is here with me to assist in answering any questions you might have.

ENCLOSURE (1) to Op-95
ser 2P95 of 27 Jan 60

~~FOR NAVY EYES ONLY~~ 25 January 1960

MEMORANDUM FOR THE RECORD

Subj: House Science and Astronautics Committee; appearance of Secretary Gates before

1. Secretary Gates appeared before the House Science and Astronautics Committee at 1000, 25 January 1960. Accompanying Mr. Gates were Dr. York, DDR&E and BRIGGEN G.S. Brown, Mr. Gates' military assistant.

2. Mr. Gates read a prepared statement, a copy of which is attached.

3. Questions of Mr. Gates brought out the following statements considered of interest:

a. The DOD has sufficient booster power in present (missile) boosters to meet existing military requirements.

b. Our estimate of our military posture vis-a-vis the Soviet is now based on a broader intelligence base than formerly and has substituted what we think the Russian posture will be for what it could be.

c. Our overall military strength is greater than the Soviets.

d. DOD and NASA relations are excellent.

e. The DOD has a great sense of urgency in the military and space fields.

f. The DOD is following the progress of Saturn very carefully.

g. The B-70 program was reduced because at the time period the B-70 would be operational, this country will have Atlas, Titan, Minuteman, Polaris, the B-52, Hound-Dog, and advanced air launched BM and B-58. B-70 is being continued into a test phase and a final decision will be made later.

h. Mr. McElroy and Mr. Gates set the limit (or ceiling) on the FY61 Defense Budget.

i. No decision will be made on production of NIKE-ZEUS until completion of full scale tests in the Pacific.

ENCLOSURE (2) to Op-93 ser 2P95 of 26 Jan 60

~~FOR NAVY EYES ONLY~~

j. The decision to develop the size of boosters we have today (Atlas, Titan, Thor) was made as a military decision based on the warhead size this country could produce.

k. This country should "be on top of the Russians in everything including space".

4. Other items of interest were:

a. Mr. Gates left the impression the decision on the size of missile booster was a good decision made on military requirements.

b. Mr. Gates is sensitive to newspaper interpretation of his testimony to other committees that he, the DOD or the country is (or should be) complacent concerning our military strength.

c. Mr. Gates refused to be pinned down as to whether he thinks our civilian defense is adequate.

5. The general impression was:

a. Mr. Gates did not get a "hard time" from the Committee.

b. The majority of the Committee treated him with great respect.

c. Mr. Gates was polite with the Committee, but backed his department fully in all previous decisions. He was questioned at length on the B-70 and NIKE-ZEUS situation and stood off the questioners very well.

d. Mr. Brooks and Mr. Fulton were the committee members who supported Mr. Gates the most; Mr. Anfuso and Mr. Daddario the most critical (but not too critical).

ENCLOSURE (2) to Op-91
ser 2295 of 27 Jan 60

DEPARTMENT OF THE NAVY
OFFICE OF THE CHIEF OF NAVAL OPERATIONS
WASHINGTON 25, D.C.

Op-95/rwb
Ser 1P95
27 January 1960

~~FOR NAVY EYES ONLY~~

MEMORANDUM FOR THE CHIEF OF NAVAL OPERATIONS

Subj: Testimony of Dr. York to House Science and Astronautics Committee on 26 January 1960; forwarding of

Encl: (1) Statement of the Director of Defense Research and Engineering, Doctor Herbert F. York before the Committee on Science and Astronautics, House of Representatives, on the Department of Defense Research and Engineering Program dated 26 Jan 1960
(2) Statement by Brigadier General Austin W. Betts, appearing before the House Science and Astronautics Committee dated 26 Jan 1960
(3) Op-95 Memo for Record dated 27 Jan 1960

1. On 26 January 1960, Doctor Herbert F. York, the Director of Defense Research and Engineering and Brigadier General Austin W. Betts, Director, Advanced Projects Research Agency appeared before the House Science and Astronautics Committee and presented the statements which are attached as enclosures (1) and (2).

2. Enclosure (3) is a debrief of the testimony presented by Doctor York and BGEN Betts before the Committee and is forwarded for your information.

Very respectfully,

T. B. Connolly

for T. B. CONNOLLY
RADM, U.S. Navy

Copy to:
09
05
06
07
04
03
93
60
54
74
76
44

Encl (2) to OP-95
Ser 3P95 of 28 Jan '60

~~FOR NAVY EYES ONLY~~

STATEMENT OF THE DIRECTOR OF DEFENSE RESEARCH AND ENGINEERING DOCTOR HERBERT F. YORK BEFORE THE COMMITTEE ON SCIENCE AND ASTRONAUTICS, HOUSE OF REPRESENTATIVES, ON THE DEPARTMENT OF DEFENSE RESEARCH AND ENGINEERING PROGRAM

JANUARY 26, 1960

Mr. Chairman and Members of the Committee:

I welcome this opportunity to appear before you today and present information regarding the Department of Defense Research and Engineering Program, particularly the space effort as it is integrated into the over-all defense posture of the United States.

In regard to the broad Department of Defense policy on the role of space in our over-all defense effort, I would like to refer to the statement made by the Secretary of Defense yesterday which pointed out that we are directly concerned only with those space activities having direct military applications, and supplement this by stressing that the objectives of the defense efforts in space are (1) the development, production, and operation of space systems where it can be demonstrated with reasonable certainty that the use of space flight will enhance the over-all defense program, and (2) the development of components which would be needed in systems which cannot be clearly defined at this time, but which will develop as the future unfolds in this new sphere of activity.

I would also like to talk further on the organizational changes as related to space activities and the basic reasons therefor. It was decided in September, 1959 that the satellite and space vehicle operations of the Department of Defense would be assigned to the appropriate military department after consideration of the primary interest or special

ENCLOSURE (1) to Op-95
ser 1P95 of 27 Jan 60

competence of the respective services. Where no one military department has primary interest or special competence, consideration will be given to special competency in associated fields of development. The responsibility for the development, production and launching of space boosters and the necessary systems integration incident thereto has been assigned to the Department of the Air Force. The Air Force is now completing the development of the AGENA-B, upper stage vehicle for DISCOVERER, SAMOS and MIDAS, which was initiated by ARPA and since transferred to the Air Force. Also, the improvement programs of our current ICBM missiles will undoubtedly provide improved components and considerably increased weight launching capabilities which will be utilized for some of our military space requirements as well as increased payload capabilities for our ICBM's. The Air Force will also, as required, develop the necessary upper stages for these improved boosters.

The specific assignments of the payloads for space and satellite systems are being made separately to the appropriate military department which, in addition to budgeting for the payload, will also budget and reimburse the Department of the Air Force for the necessary boosters, launching vehicles and other unique equipment required in launching and for the necessary systems integration. At the present time, the DISCOVERER (Engineering Development and Test Satellite), MIDAS(Early Warning satellite) and SAMOS (Reconnaissance Satellite) Projects have been transferred to the Air Force. Transfer of these projects was effected on 17 November 1959. The remaining space oriented systems of communication (NOTUS) and navigational satellites (TRANSIT) will probably

be transferred during the later part of this fiscal year.

A recent analysis of the programmed space systems funding of the Department of Defense for the current fiscal year, exclusive of the SATURN Project which is planned to be transferred to NASA, indicates that approximately 85% of the Reorganization of the DOD space-related programs, as measured in dollars, has already been accomplished. The remaining 15% of the Department of Defense space systems effort is principally under ARPA management, with the remainder expected to be transferred to the military services by the end of this fiscal year.

As you already know, the CENTAUR space booster project was transferred to the National Aeronautics and Space Administration last year. The transfer of the SATURN booster project and the Development Division of the ABMA to NASA is currently pending Congressional approval. The National Aeronautics and Space Administration and the Department of Defense will coordinate their requirements and thus eliminate the need for both agencies developing these very large space boosters. Even though these super booster programs are now being pursued by NASA, the Department of Defense strongly supports these programs and considers that there will be a requirement for them in future military applications.

The DOD-NASA working relationships over the past year have become better coordinated, with many members of my staff, ARPA, and the Services meeting frequently with their counterparts in the NASA Administration. These meetings are taking place at various working levels on a day-to-day basis. In addition to mutually supporting relationships on the related space projects of the Department of Defense and NASA, our National Missile

ENCLOSURE (1) to Op-95
ser 1P95 of 27 Jan 60

Ranges have been supporting the research and development programs of both NASA and DOD. It is expected that integration of range support for both missiles and space vehicles will be given increasingly greater emphasis as both the missile and space efforts continue to grow. As an interim measure until a permanent management scheme can be developed to coordinate all launching and tracking support activities, General Donald Yates, Commander, Atlantic Missile Range, has been appointed as coordinator for all DOD support to Project MERCURY.

The currently programmed defense systems having space subsystems are SAMOS (Reconnaissance Satellite), MIDAS (Early Warning Satellite), NOTUS (Communications Satellite), and TRANSIT (Navigational Aid Satellite). The two most advanced, and probably most important, space systems are the MIDAS and SAMOS. The remaining two space systems are less far along and the scope of their use is less clear. It is expected that considerable effort will be required to implement both SAMOS and MIDAS with a major part of the effort lying in the fields of data tracking, data transmission, data reduction and data analysis.

Other space related programs in the Department of Defense include DYNASOAR, which is an aerospace exploratory development program designed to investigate the problems of controlled flight at speeds up to Mach 25 (i.e., reentry velocity) and at altitudes up to several hundred thousand feet (i.e., reentry altitudes); Components Development Research in such fields as auxiliary power and advanced propulsion methods; and Project

SHEPHERD and VELA, described below in the summary of present ARPA activities.

The funding for FY 1959 for the separately identified space related programs (DOD wide) amounted to $381 million. For FY 1960 the funding is $414 and for FY 1961 the funding is $481 million. These figures do not include SATURN or other programs which were earlier carried in the Defense budget but subsequently transferred to NASA.

I have brought a number of charts indicating the concept, goals and funding of the various defense space systems and related space projects, which are available for presentation to the Committee after the reading of this statement, if so desired. However, a few of the charts are of a classified nature and can be shown and discussed only in an Executive Session.

In addition to these specifically identified space-related programs, the technology, facilities, and components developed and built for past and present missile programs have provided the major source of, and support for, today's space programs, and the future missile programs will continue to be a major source of support, in all aspects, to the future space programs, both military and civilian. The total research, development, test, and evaluation program for all missiles in FY 1961 will be approximately $2.41 billion. These figures include both the missile items in the RDT&E appropriation, and the separately identified DT&E items, principally for the ICBM's, in the procurement appropriation.

Further, many of the basic applied research projects of ARPA and the Services will contribute to progress in rocketry for either missile or space flight applications. These include such projects as the ARPA

PRINCIPIA program, and numerous programs in the Services in such fields as rocket propulsion, guidance and control menthods and mechanisms, propellant chemistry, and electronic components development especially as related to reliability, long life, and miniaturization.

All together, the above programs in space related programs, missile research and engineering, and rocket oriented applied research, constitute approximately one-half of the total defense RDT&E budget request.

The Projects which will remain in ARPA after the presently planned transfers are accomplished are: Project DEFENDER, which is a research, experimentation, development and systems feasibility demonstration undertaking to obtain technologically advanced defense against extra-atmospheric offense vehicles, including ballistic missiles and space vehicles. The project is aimed toward exploration of fundamental phenomena, development of new systems concepts and the application of new techniques. The DEFENDER project now consists of more than 50 programs in the area of missile flight phenomenology, characteristics of the upper atmosphere, radar development, reentry body identification, etc; Project PRINCIPIA, which is a research program to develop more optimum performance for solid propellants for missiles and space boosters; Project PONTUS, which is concerned with basic research in materials - it includes fundamental theoretical and experimental work aimed at realizing a major advancement in structural and power conversion materials; Project LONGSIGHT, which is a series of studies and systems analyses in the military sciences field to obtain on a continuing basis recommendations as to projects which should be initiated to satisfy the future military needs of the various Services; Project SHEPHERD, which provides for

the development of a satellite detection and tracking system which will include a National Space Surveillance Control Center; and Project VELA, which provides for the development of adequate means for the world-wide policing or surveillance of a moratorium or atomic weapons testing. The new obligational authority being requested for FY 1961 for these ARPA programs is $215 million.

This concludes my prepared statement. I have with me Brigadier General A. W. Betts, the newly designated Director of the Advanced Research Projects Agency and Mr. William Godel, the Director of the Policy and Planning Division of ARPA, who are prepared to discuss in more detail the ARPA program within the Department of Defense, and I will be glad to attempt to answer any questions the Committee may wish to put to me.

ENCLOSURE (1) to Op-95
Ser 1P95 of 27 Jan 60

STATEMENT BY BRIGADIER GENERAL AUSTIN W. BETTS, APPEARING BEFORE THE HOUSE SCIENCE AND ASTRONAUTICS COMMITTEE 26 JANUARY 1960

It is, as always, a pleasure to appear before you this time to report on the activities of the Advanced Research Projects Agency during the past year. Secretary Gates and Dr. York have reviewed the recent changes in ARPA assignments with you, and Dr. York has outlined the range of advanced research projects currently under ARPA Management. I should like to speak more directly to them.

The work begun last year on ballistic missile defense, Project DEFENDER, has been continued in an attempt to discover adequate means to counter operational ballistic missiles in the future. About one half the ARPA Budget is devoted to this activity. Our thinking is geared beyond the more conventional NIKE-ZEUS concept which involves, as you know, destruction of a missile toward the terminal phase ofits flight.

ARPA is studying missile interception at the early, midcourse and terminal phases of flight by means extending beyond the current state of technical knowledge. To do this we must explore all of the phenomena associated with missile flight which might be helpful; that is, we must become intimately familiar with both the natural and disturbed conditions of the upper atmosphere and the space beyond. Such familarity is practically non-existent.

Measurement of the properties of the various constituent elements of the atmosphere and space qualified as a fundamental scientific unknown. The nature of even the undisturbed atmosphere is poorly understood; our problem, of course, goes beyond that to study of the interaction between the atmosphere and solid objects passing through it at high speeds. We seek not only the knowledge itself, but improved methods of obtaining that knowledge.

The study of such things as atomic cross-sections, changing molecular

the release of chemicals at high altitudes and the observation of artificial electron clouds and luminescence in order to determine basic data which will enlighten our understanding of the medium in which our weapon systems, and those of the enemy, will have to operate.

We are also examining a variety of techniques which might be helpful in solving the problems of detection, identification, intercept and kill of ballistic missiles. Further advances in our knowledge of radar, infrared and optical sensing systems are required, as well as the development of a capability to receive, process, communicate and effectively use the data collected by such sensing elements in a matter of minutes or fractions of minutes.

For example, once a missile or warhead is detected, it may be necessary to determine whether it is fully armed or merely a decoy designed to saturate or confuse our defense. The offense may also employ jamming devices for the same purpose. It is encumbent upon us, then, to consider the development of a capability to discriminate between "duds" and the real weapon and to neutralize jamming techniques. In other words, we are seeking a counter-countermeasure capability.

Once a ballistic missile is detected and identified, a "kill mechanism" must be employed to destroy it or its re-entry warhead. Obviously, a warhead traveling at great speeds and built to withstand the tremendous stresses involved in atmospheric re-entry will be difficult to bring down.

The data processing system required to structure or order the operation of a complex missile defense system is a crucial factor - consideration of the "judgment" which must be built into the system is a sobering yet exciting challenge. We are giving it close attention.

In the face of these unknowns, there are a few important resources available to use. The U.S. ballistic missile test program presents us with

a first rate laboratory in which we can undertake actual flight measurements. A complex of ground, ship and airborne instrumentation will be used at the Atlantic and Pacific Missile Ranges to collect this valuable data. Radars, of course, are the basic tool in experimental measurement work of this kind and we have produced a program of radar development which will hopefully increase the limited range and resolution capabilities of conventional radar equipment. The results achieved thus far in this area have been very encouraging.

Project PRINCIPIA connotes the ARPA effort to develop more efficient solid propellants for use in missiles and space vehicles. Our objective is a solid propellant with at least 10 percent higher specific impulse than any now under development. The current plan of attack is two-fold: (1) the synthesis of new propellant combinations which have never been made before and testing them in small-scale engines and (2) accomplishment of the related supporting research required for effective utilization of the new chemicals as they become available.

The great advantages of solid propellants, as compared to liquids, are instant readiness and reliability. Unfortunately, existing chemical and explosives technology has been almost fully exploited. It is our judgment that any further large improvement will require a chemical breakthrough.

During the last year, the Agency has also been assigned responsibilities in the field of advanced materials research and more recently in the field of research and development relating to techniques for inspection of a possible nuclear test ban.

The objective of the materials program, PONTUS, is the strengthening of the U.S. basic research cap bility in the field of materials. The chemical and physical properties of materials now available constitute major limiting factors in the development and performance of most weapons systems. The revolution in materials requirements stemming from the accumulative scientific

and technological advances of this century, and highlighted by the special case of nuclear energy development, has resulted in a serious national deficiency. The evolution of new weapons systems designed to perform under severe and previously unknown operating conditions has placed a great strain on existing basic materials.

At the present time, a considerable amount of materials research is being carried out on an ad hoc or emergency basis as a part of the development of weapons systems. The overall effectiveness of DOD research and development could be expected to improve if such materials were readily available.

The ARPA materials program will seek to augment our basic materials research capability by supporting inter-disciplinary laboratories for basic research in materials at selected universities. Materials problems are now so complex that various combinations of the knowledge of several disciplines are required to solve them; principally, solid state physics, inorganic and high temperature chemistry, metallurgy and ceramics. PONTUS is view as a continuing program designed to build a measure of stability and strength into the basic research foundation which underlies our defense capability.

In addition to these primary assignments, you have already been informed that the Agency has retained management responsibility for certain space programs, pending their transfer to the appropriate military department. The communications satellite program, NOTLS, is an effort to assess the technical feasibility of reliable, efficient and secure communications satellites for use in global command, control and support of military forces.

As part of Project TRANSIT, a navigation satellite was launched in September 1959. Orbit was not achieved, but useful systems data was acquired. Three further launches are contemplated for the balance of FY 1960 and 1961.

It is hoped that a satellite system can be developed to provide a more precise, worldwide, all-weather navigation capability of considerable value to ships and aircraft.

ARPA is also engaged in a three phase satellite tracking and data acquisition program based on a need, shared by both the Department of Defense and NASA, to know precisely where satellites and space probes are at any given time.

One element of the program is known as SPASUR, a continuation of the East-West Satellite Detection Fence project discussed last year. It is naturally in our interest to develop means to detect, track and identify unknown or silent satellites.

As a second feature of the program, a central catalogue of all satellites is being set up so that new orbiting objects may be identified at once. This activity is called SPACETRACK. It will involve the receipt, collation and analysis of data from a variety of sources such as the detection fence, the NASA Minitrack network and the military missile ranges.

The third project is for installation of tracking and data collection devices overseas. In addition, studies of other approaches to the poblems of satellite detection, tracking and data collection are planned.

This tracking and data acquisition program will support both the military scientific and development program in space and the non-military space program directed by the NASA. The worldwide character of this undertaking requires an extensive investment in stations and equipment, and the DOD and NASA have cooperated in the development of a mutually supporting system.

With this outline of ARPA's programs in mind, I believe the ARPA

budget figure becomes more meaningful. A reduction in the specific hardware requirements of the Agency's programs -- for example, expensive rocket boosters -- has occasioned a reduction in the over-all dollar expenditure request contained within our budget presentation. However, of the $215 million dollars requested, a significantly greater portion can now be devoted to the kinds of advanced research leading hopefully to "breakthrough" technology for which the Agency was created.

We look forward to a year of heavy activity and continued progress. The clarification of the Agency's role and mission which has been made possible by the recent decisions of the Secretary will, we are sure, permit us to devote increasing attention to our research and development task and less to the critical, but for ARPA unrelated, areas with which we have been previously concerned.

The Secretary noted in testimony before the Defense Appropriations Subcommittee of the House Appropriations Committee earlier this month that, considering the defense program as a whole, "the rate of adjustment to technological progress has been rapid and remarkable". It is ARPA's intent to contribute to and facilitate this continuing process of adjustment by reducing scientific unknowns to useful and manageable knowledge.

This completes my prepared statement. I shall be happy to answer any questions.

27 January 1960

MEMORANDUM FOR THE RECORD

Subj: Testimony of Dr. York to House Science and Astronautics Committee on 26 January 1960

1. Dr. York testified to the House of Representatives' Science and Astronautics Committee on 26 January 1960. He was accompanied by General Betts (Director, ARPA), Mr. William Godel of ARPA and Dr. George Sutton of ARPA.

2. Dr. York made the following points considered of interest:

a. The Dyna-Soar program has not been reviewed by the JCS.

b. Present ICBM Boosters are sufficient for present satellite payloads.

c. A "scale-up" of Atlas/Titan is under study to put 2-3 times our present satellite weight in orbit.

d. He (Dr. York) was consulted on drafting the proposed amendments to the Space Act.

e. The military services were "consulted at various times" on the proposed changes to the Space Act.

f. Dr. York approves of the proposed changes in the Space Act.

g. Dr. York believes you could speed up space system development by adding more funds but not in proportion to funds added. (double money-no double progress).

h. Dr. York agrees that there should be no Nike-Zeus production until completion of tests of system in the Pacific.

i. He made the point that if, in 1953, the U.S. had decided that a 600,000 lb Atlas booster was required, we would have no ICBM today (big booster more complicated and takes longer to develop than small booster).

j. Dr. York is for the transfer of ABMA to NASA because it puts like things (Saturn and Nova) in one organizations.

ENCLOSURE (3) to Op-95
ser 1P95 of 27 Jan 60

k. He doesn't believe Saturn transfer to NASA will slow development of Saturn.

l. He stated he knew his FY'61 and '62 budgets would be within 5-10% of the FY'60 budget.

m. He stated that the present budget ceiling "plays a role" in determining what systems could be developed.

n. He said DOD is very interested in Saturn, have so told NASA and will provide support to NASA (launching, tracking, etc).

o. He stated we will have an "anti-ICBM gap" for several years.

p. Stated that we had bet on the wrong program in pushing Vanguard rather than Explorer.

q. Believes we will not overtake the Russians for 5 years in space developments and achievements.

r. He doesn't believe Transit should have a top priority (as say, MIDAS).

s. Believes proposed DOD space organization satisfactory, because like things are in one organization, such as NOVA and Saturn in NASA.

3. The following is also considered of interest:

a. Although Dr. York was given a harder time than Sec. Gates, he held his own very well with the Committee.

b. Dr. York stated two mistakes have been made:

(1) Giving priority to Vanguard rather than Explorer.

(2) Not starting development of a big booster sooner (i.e. late '40's).

c. Dr. York stated that the DOD will use space only if it provides the best or only method of accomplishing military missions (same policy as Navy).

d. Dr. York believes that it is in the NASA area of responsibilit (man-in-space, lunar probes, etc) that we are behind the Soviets.

e. Areas of interest of Congressmen are:

(1) Mr. Fulton - strongly support Administration.

(2) Mr. Brooks, Mr. Anfuso, Mr. Teague, Mr. Daddario - not satisfied with "space gap" and "missile gap" and are looking for reasons for U.S. being behind.

(3) Mr. Hechler - Wants to speed-up education program.

f. General Betts was questioned only briefly. The questions and answers brought out that the ARPA program, budget, etc., were okay.

DEPARTMENT OF THE NAVY
OFFICE OF THE CHIEF OF NAVAL OPERATIONS
WASHINGTON 25, D.C.

Op-95/rwb
Ser 4P95
28 January 1960

~~FOR NAVY EYES ONLY~~

MEMORANDUM FOR THE CHIEF OF NAVAL OPERATIONS

Subj: Testimony before the House Science and Astronautics Committee on 27 January 1960 by Mr. Robert F. Keller, General Counsel of GAO and Mr. T. Keith Glennan, Administrator of NASA

Encl: (1) Statement of Mr. Robert F. Keller, General Counsel GAO before the House Science and Astronautics Committee on 27 January 1960
(2) Statement of Dr. T. Keith Glennan, Administrator NASA before the House Science and Astronautics Committee on 27 January 1960
(3) Op-95 Memo for Record dated 28 January 1960

1. On 27 January 1960, Mr. Robert F. Keller, General Counsel, United States General Accounting Office and Dr. T. Keith Glennan, Administrator of the National Aeronautics and Space Administration appeared before the House Science and Astronautics Committee and presented the statements which are attached as enclosures (1) and (2).

2. Enclosure (3) is a debrief of the testimony presented by Mr. Keller and Dr. Glennan before the Committee and is forwarded for your information.

Very respectfully,

238482

for T. F. CONNOLLY
RADM, U.S. Navy

Copy to:
09
05
06
07
04
03
93
60
54
74
76
44

Encl (3) to OP95
Ser 3P95 of 1-28-60

~~FOR NAVY EYES ONLY~~

STATEMENT OF ROBERT F. KELLER, GENERAL COUNSEL,
UNITED STATES GENERAL ACCOUNTING OFFICE
BEFORE THE HOUSE COMMITTEE ON SCIENCE AND ASTRONAUTICS
ON THE PROBLEM OF ACCESS TO RECORDS
OF THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Mr. Chairman and Members of the Committee:

I am Robert F. Keller, General Counsel of the General Accounting Office. I have with me today Mr. Lawrence J. Power, Assistant to the Comptroller General; Mr. L.K. Gerhardt, Associate Director, Civil Accounting and Auditing Division; and Mr. Irvine M. Crawford, Supervisory Accountant.

We are appearing at the request of the Committee to present our views on a question of access to records of the National Aeronautics and Space Administration. As you know, the Committee requested us some months ago to review the procedures followed by the Administration in the award of two contracts. The first contract is with the Rocketdyne Division of North American Aviation, Inc. for the development of a rocket engine capable of generating one and one-half million pounds of thrust; and the second is with the McDonnell Aircraft Corporation for the development and manufacture of manned satellite capsules to be used in Project Mercury. The contracts, which amount to $102 million and 28 million, respectively, were negotiated after proposals of these two firms were in each case selected over those of competitors. Our report on review of the procedures followed in awarding the contract to Rocketdyne was transmitted to the Committee on October 16, 1959. Our report on review of the contract with McDonnell was sent to the Committee on January 14, 1960.

ENCLOSURE (1) to Op-95
ser 4P95 of 28 Jan 60

In both reports we have had to state that we were unable to fully respond to the request of the Committee. We found, when we undertook to review the contract files, that some of the documents pertinent to the selection of the Rocketdyne and McDonnel proposals had been removed, notably the reports of the Chairmen of the Source Selection Boards. Under date of August 19, 1959, the Comptroller General informed the Administrator of NASA of the Committee's request for an examination of the Rocketdyne contract and requested access to the report of the Source Selection Board. The Administrator by letter dated August 28, 1959, refused to make the report available for the same reasons given to the Committee in a letter dated June 15, 1959, in part, as follows:

> "This document contains the personal evaluations and recommendations of certain officials of NASA who I consulted to aid me in reaching my decision on the selection of a prospective contractor. Since this document discloses the personal judgments of subordinates made in the course of preparing recommendations to me, I am sure you will agree with me that it would not serve the interests of efficient and effective administration of this agency for such a document to be reviewed by anyone outside of NASA."

A similar situation arose with respect to the McDonnell contract, and the Comptroller General addressed a letter to the Administrator on December 9, 1959, to which the Administrator replied on December 23, 1959.

Copies of the correspondence between the Comptroller General and the Administrator of NASA are included in our reports to the Committee of October 16, 1959, and January 14, 1960.

We think that access to documents withheld is essential to a proper review of the procurement procedures followed in awarding these contracts.

A contracting officer has the final responsibility in the award of a contract and may not delegate that responsibility, even though the subject matter of the contract is technical in nature. It follows, therefore, that the responsible exercise of the authority to select or reject contractor's proposals requires that the contracting officer (including the Administrator himself when performing that function) solicit to the extent appropriate the opinion of scientists, engineers, and specialists in the fields of contracting, finance, law, contract audit, and cost analysis.

The General Accounting Office examination of the procedures followed by the Administration in awarding the contracts to Rocketdyne and McDonnell was essentially directed to a review of the actions and decisions of the contracting officer. It is important to recognize this fact because the question logically arises as to why we wish access to documents prepared by technical persons which deal with technical subjects. One reason is that our responsibility as auditors in some areas parallels the responsibility of the contracting officers who not infrequently find that a procurement transaction involves matters beyond their own technical training. Accordingly, our review of a contract award may depend heavily upon the availability of the information supplied the contracting officer by the expert sources he contacted, as well as his statement in support of the final selection.

A fundamental objective of our review of the two contracts reported on was to ascertain whether the contracting officer in each case sought advise from appropriate sources in selecting the successful proposal

and, equally important, whether due consideration was given to that advice. The non-availability of the reports of the Chairmen of the Source Selection Boards, and other documents, means that the sole documentary links between the opinions of important segments of NASA necessary for proper evaluation of the proposals and the final decisions to select the Rocketdyne and McDonnell proposals, are missing. Without these key documents there is no positive evidence that the findings of the technical and management teams were relied upon, accepted in part, or rejected altogether.

The refusal of the Administrator to make certain information available not only prevents us from fully satisfying the request of the Committee but is, of course, an interference with our statutory responsibilities under section 312 of the Budget and Accounting Act, 1921 (31 U.S.C. 53), as we would have carefully examined these contracts even if your Committee had not asked us to furnish special reports. In order that we may carry out those responsibilities, section 313 of the act (31 U.S.C. 54) provides that:

> "All departments and establishments shall furnish to the Comptroller General such information regarding the powers, duties, activities, organization, financial transactions, and methods of business of their respective offices as he may from time to time require of them; and the Comptroller General, or any of his assistants or employees, when duly authorized by him, shall, for the purpose of securing such information, have access to and the right to examine any books, documents, papers, or records of any such department or establishment * * *."

Our audit work on government contracts under the act has consistently recognized that contracting through negotiation lacks many of the safeguards inherent in formal advertising; and the numerous reports on

negotiated contracts which we have transmitted to Congress substantiates this view. All experience points to the conclusion that the broad powers exercised by a contracting officer in contract negotiation make it essential that all factors relative to his decisions be available for review.

We do not agree with the position taken by the Administrator that making available information concerning the personal judgment of subordinates made in the course of preparing recommendations to him would interfere with efficient and effective administration of NASA. There seems no reason to think that such an action would promote a tendency of subordinate NASA employees to soften criticism, avoid doubtful matter, and generally offer more restrained opinion, which is apparently the basis of the Administrator's position.

We cannot accept summary statements prepared by, or subject to the approval of, the contracting officer as proper documentation of evaluations by technicians and other specialists. Our experience in the review of the Rocketdyne contract shows the unsatisfactory nature of such a procedure. Early in our reivew, it was brought to the attention of NASA officials that the contract file contained no reasons whatsoever for the selection of the Rocketdyne proposal and for the rejection of the other five. As a result, the unsigned statement which is included in our report to the Committee of October 6, 1959, as exhibit II, was inserted in the file about 6 months after the actual selection was made. Inquiry developed that this statement was drafted by a member of the NASA legal staff. An examination of the document

will reveal it as having the subjective tone of a justification for an action already taken. All comments on the Rocketdyne proposal are positive and favorable, all comments on the rejected proposals are unfavorable or at least stated negatively. This after-the-fact statement furnishes no evidence that sound procedure was followed in selection of Rocketdyne.

The McDonnell contract file contains a somewhat similar statement, summarizing the selection and negotiation process relative to that contract. This statement was inserted in the file after we began our review and about 8 months after the actual selection was made. A copy has been included in our report to the Committee of January 14, 1960, on the McDonnell contract as exhibit I.

Since transmitting our reports on review of contracts with Rocketdyne and McDonnell, we have been advised by the Committee that NASA has complied with a Committee request for certain documents relative to the selection of a contractor for design, development, and furnishing of "Little Joe" program boosters. This contract carries an estimated cost of $780,000. The documents released contain the opinions and recommendations of a Technical Evaluation Board and an Administrative Review Board, and are comparable in purpose to the reports by the Technical and Management Assessment Teams and the Source Selection Boards convened in the process of selecting the Rocketdyne and McDonnell proposals. There is a degree of inconsistency in this action. The only apparent basis for denying access to the Rocketdyne and McDonnell documents and releasing the documents relative to the "Little Joe" program contract is that a final

selection of a contractor was on one hand made by the Administrator and was on the other hand made by a subordinate official.

While NASA has not offered any policy statement defining the coverage or limits of executive privilege at that agency, the implication of the foregoing seems to be that the Committee and the General Accounting Office will not be permitted to examine the evaluations of technical and management personnel of competitive proposals where the amount of the contract exceeds $1,000,000. NASA regulations and procedures provide that the Administrator will generally make the final selection of the successful proposal in a competitive negotiated procurement when it is estimated that the cost of the contract will exceed $1,000,000. These regulations and procedures in conjunction with a policy of refusing access to the evaluations of technical and management personnel, where the selection of the successful proposal is by the Administrator, will leave only the contracts involving relatively small amounts, subject to effective review.

We do not believe that denial of access to the key documents in procurement transactions, such as I have described, promotes public confidence in the conduct of public business, especially in this case where Congress has provided NASA with research and development funds of $335,350,000, the bulk of which will be spent under negotiated contracts.

I might add in concluding that while in performing our audit work in the Department of Defense and other departments and agencies we have had refusals of access to certain information, we have not been refused access to documents similar to those removed by NASA from the Rocketdyne and McDonnell contract files.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

WASHINGTON 25, D.C.

FOR RELEASE UPON
PRESENTATION
Approximately 10 a.m.
January 27, 1960

Statement by

Dr. T. Keith Glennan, Administrator before

the

House Committee on Science and Astronautics

January 27, 1960

Mr. Chairman and members of the Committee:

I appreciate this opportunity to discuss NASA's program and its $802,000,000 budget appropriations request for Fiscal Year 1961.

The continuing interest in our program shown by the individual members of this Committee has been stimulating and gratifying. I have had the personal privilege of accompanying several members on visits to our Research Centers and to test launchings at Cape Canaveral. And all who have made these visits have expressed sincere gratification at the quality and dedication of the men who are carrying forward the Nation's space exploration program.

Before entering upon a discussion of our budget request and program, I want also to express publicly my appreciation for the effective support given to our operations by the several military services and by the Secretary of Defense. Cordial and effective working relationships have been developed during the past year and I am confident that the means now exist, or are in the process of creation, that will further minimize duplication and encourage even more effective mutual support in this difficult but exciting business.

ENCLOSURE (2) to Op-95 ltr ser4P95 of 28 Jan 60

As you know, the President recently directed me to study the possible need for additional funds to accelerate the high thrust launch vehicle program. As soon as this study has been completed, we will be requesting substantial additional funds.

The fiscal year 1960 budget appropriation was $500,575,000. If the pending $23,000,000 supplemental request is granted by the Congress, the fiscal year 1960 total will be $523,575.000

Several members of our administrative and technical staffs will follow me with a detailed, program-by-program review of the $802,000,000, fiscal year 1961 budget request in the following three principal categories:

. . .Salaries and Expenses: $167,560,000

. . .Research and Development: $545,153,000

. . .Construction and Equipment: $89,287,000

I would like to discuss with you some of the pertinent facts about the Nation's program in space exploration as I see them today. In doing this, I will start with an evaluation of our position with respect to that of our competitor in this business, the Soviet Union. Then I would like to point out the major events in NASA's operations over the past year and outline the course we must follow if we are to gain for the United States the advantages that accure to a nation demonstrating leadership in the science and technology which must undergird a program in space exploration.

It is clear that the Soviet Union continues to hold a substantial space lead in the eyes of the world. It is equally clar that this lead is based principally upon the procession by the Soviets of one or more reliable launch vehicle systems having perhaps twice the thrust of our own first stage booster rockets. This imbalance will continue until we have achieved a launch vehicle system that fully exploits the thrust of the Atlas through

the construction and use of properly proportioned new upper stages, or until we have achieved a launch vehicle system which is based on a much more powerful first stage rocket -- or both. In no other aspect of the space business do we appear to lag the Soviet Union. In all other aspects, it is my opinion that we have an equal capability and that we have published more significant scientific results, more fully and more promptly than they.

This is a simple, straightforward statement. Like most such comparisons in the international scene, it is not subject to rigorous proof but my statement coincides, I believe, with the informed opinion of the scientific community at home and abroad. But this statement does not tell the whole story. The more powerful Soviet launching vehicles make possible their undertaking of some missions that are completely denied to us today. They are able, I should think, to move more quickly from the inception of an idea to the design and construction of payloads because weight restrictions are less stringent than ours. Thus they can avid the time-consuming tasks of miniaturization, optimum packaging and other weight-saving practices. It is probable, also, the the availability of high-thrust launch vehicles operates to increase the reliability of their flights, since they can undertake significant and spectacular missions with adecuate weight-carrying capacity permitting substantial margins for their operations.

You may properly say: All right, that was the situation a year ago. What have you done about it? Gentlemen, we have done a great deal. As my associates describe in detail out activities in the vehicle development field, you will see the effort that has been expended, the progress made, and the plans and promises for the future.

I am sure you are concerned, as I am, about the very long periods of time required for most of these significant development programs. It would be easy to promise earlier dates. Many people do. But I call your attention to

the history of the Atlas ICBM. Almost five years of intense, top priority effort -- an urgent program in every sense of the word -- had to be expended to bring that rocket to an operationally ready state. And the launch vehicle systems we are developing are more complex and versatile than the Atlas.

I think it is time that all of us recognize that on the basis of the present "scoring" system, one based almost wholly on weight-propelling capability, we cannot expect to outscore the Soviets for a considerable period of time. We should be able to match their present weight-lifting capabilities within the next twelve to eighteen months, based on present expectations for the Atlas-Agena B and the Atlas Centaur systems. If by that time, as may well be possible, the Russians have made optimum use of what we believe to be their present thrust levels, or have developed an even higher thrust booster, our expectations of superiority will not be satisfied for about four to five years, when the Saturn should be ready.

But we have used, to maximum advantage, the cards we have held in this game. Without desiring to play down our very real deficiency in thrust, I would like to cite an example. I think it is clear that we have made excellent use of launch vehicles utilizing rocket engines which were originally designed and developed for the armed services' missile program, not for space missions.

Out of 10 attempts to place spacecraft into orbit or on deep space trajectories in calendar year 1959, we achieved five successes. These, together with earlier Explorers, Pioneers, and Vanguards, have given us - - and we in turn have given the world -- a vast amount of data from which significant scientific information has thus far been derived.

As I have said earlier, in the extent and quality of our scientific findings we probably have an edge, in the judgment of the international scientific community. But the fact remains that novel and spectacular space experiments involving heavy and complicated payloads on difficult missions are

the big chips in this poker game at the present time. As one newspaperman has said: "It is not good enough to say that we have counted more free electrons in the ionosphere than the Russians have, that we know more about cosmic rays. We must achieve the obvious and spectacular, as well as the erudite and obscure."

There is only one way to regain the ground we have lost -- ground lost several years ago. It will be accomplished by the establishment of hard-headed, long-term goals (this we have done); the identifying of the technical tasks necessary to be undertaken in order to press forward those goals (this we have done for the shorter term future); the development of the organization and management to accomplish these tasks (this we are doing); the utilization of the genius and capabilities of industry, education, and other branches of government (this we are doing); and the funding, at an adequate level, of the work to be undertaken (this we seek in the authorization request now before this Committee for study and action). All these elements must be pursued diligently, urgently, relentlessly.

At the end of the present fiscal year, the National Aeronautics and Space Administration, with the support of the Congress, will have organized under one governmental agency what I believe to be the greatest collection of scientific and technical personnel ever assembled, to carry out vigorously this Nation's space exploration program. With the help and genius of American industry, the proven talents of Dryden, Horner, Pickering, Silverstein, Abbott, von Braun, Newell, Hagen, Stewart, and hundreds of others, will meet with confidence any competitive challenge in space that this Nation faces today or that may arise to face us in the future.

As responsible officials, each of us can recognize that space is but one of the areas of intense rivalry between out way of life -- freedom-- and the Communist dictatorship. As individuals, we do have a responsibility to recognize that while space is the most glamorous, the most visible area of competition -- and very fruitful also for propaganda purposes -- we are engaged in an across-the-board contest. I remind you of this because these other areas of competition also make large demands on the public treasury.

Now what are our plans for the future? We seek $802,000,000 in new obligational authority. Before many days have passed this amount will be increased as we turn on more steam in our super booster program involving saturn, its component rocket developments, and the F-1, 1,500,000-pound single chamber engine. Our intent here is to advance, as fast and as surely as the technological problems will permit, the time period in which the two-stage and three-stage Saturn vehicles will be available for initial tests and the time period in which we will have a reasonably reliable launch vehicle system in the multi-ton payload range. This program will be described for you by Dr. Wernher von Braun later in this series of presentations. The speed-up we hope to effectuate promises to be as much as one year for the complete first phase of the Saturn vehicle. The test dates referred to for the two- and three-stage developmental Saturn units will be advanced by three to nine months by the actions we expect to take.

Despite many expected problems, Project Mercury continues to move forward in an atmosphere of confidence apparent to all concerned. Morale is high, hours are long for the top staff, the Astronauts are busy and fit. In the third quarter of calendar year 1960 we expect to embark on the man-carrying, Red-stone-boosted ballistic training flights. The first manned, Atlas-boosted orbital flight should take place in calendar year 1961.

The Atlas-Able flight to the vicinity of the moon, which was attempted

on Thanksgiving Day last, will be repeated during the second quarter of calendar year 1960. A back-up booster has been scheduled for this flight, but a word of caution is needed here. Pad availability and check-out time required make it highly unlikely that a repeat mission can be scheduled within four weeks of first launch, should such a back-up flight be necessary.

Our experiments in space science and applications are scheduled at the rate of almost one per month for calendar year 1960. The Tiros meteorological payload; Project Echo, the passive communications satellite; and the several flights intended for the study of radiation and other phenomena of outer space, will keep our launch teams and scientists very busy. It is of interest to note the participation of one of the Nation's largest communications companies in the Project Echo experiment, with an investment totalling several missions of dollars of its own funds.

Consistent with our determination to hold to a minimum the number of different types of launch vehicle systems, we recently cancelled the Vega project in favor of the Atlas-boosted Agena B vehicle. We canceled Vega for a number of reasons. First, the Defense Department's demonstration of significant reliability in the Thor-boosted Agena A system; second, the decision of the DOD to up-rate the Agena A stage to a point where it approached the capability in most missions, of the Vega; third, the high rate of firing of the Agena systems using both the Thor and the Atlas as first stage boosters, thus promising greater reliability; and fourth, the fact that the Atlas-Agena B availability approximates that of the Vega. All of these considerations entered into our decision.

The decision to cancel Vega was made with probable cost expenditures, including termination costs, running in the neighborhood of $17,000,000. Some portion of this expenditure is recoverable in the Centaur program. Schedules will not be delayed by this change in vehicle systems.

Organizationally, we have made good progress. The President's decision to give NASA full responsibility for all super boosters made it desirable for NASA to acquire the Development Operations Division -- the von Braun team -- from the Army Ballistic Missile Agency at Huntsville, Alabama. The President's report and supporting papers dealing with this transfer now lie before the Congress. Negotiations to effect this transfer have been carried out in a highly cooperative atmosphere of good will, and I am confident that the needs of the Army for support of specific military tasks will be met.

The acquisition of the von Braun group has made possible the beginning of centralization at Huntsville of major responsibility for the bulk of our launch vehicle systems development and operations. A new division of the NASA headquarters organization, the Office of Launch Vehicle Programs, has been established evidencing the importance we attach to this activity in which our budget estimates show more than $250,000,000 to be obligated during fiscal year 1961. Subsequent speakers will discuss our organizational arrangements in more detail.

Construction of Goddard Space Flight Center, named for America's rocket pioneer, is proceeding on schedule at Greenbelt, Maryland. Initial occupancy is planned for mid 1960, thus beginning the consolidation of our Washington area staff engaged in space flight development and field operations.

In the field of international cooperation, we have made very great progress. Here our policy of frankness and our adherence to the traditional and well-understood policy of prompt disclosure of scientific results is building good will throughout the world. Agreements with several nations have been negotiated covering the installation, manning, and use of tracking and data acquisition equipment . Others currently are under negotiation. Cooperative satellite launching programs are being undertaken with Canada and England and initial discussions have been held with several other nations. We have participated actively in the deliberations of the U.N. Ad Hoc Committee on the Peaceful Uses of Outer Space, and of COSPAR, the Committee on Space Research of the International Council of Scientific Unions. In all of these activities, we have worked closely with, and have had the counsel and support of, the State Department.

I have not attempted in this statement to go into detail on any of these program and operating matters. As I pointed out earlier, my associates will present those I have mentioned, and several others, in sufficient detail to give you a good picture of the Nation's program and plans for space exploration . In this regard, the Associate Administrator will present a plan for research and development activities extending several years into the future. He will point out, of course, that any research and development plan is subject to continuing review and can be considered valid only to the extent that it is funded. Nevertheless, we believe we have developed a plan that will guide our programming toward significant and ambitious milestones and end objectives.

Now, if I may, I want to turn again to budgetary matters. There is pending before the Congress our request for supplemental funds for fiscal year 1960 in the amount of $23,000,000. You will remember that your Committee authorized expenditures of $530,000,000 last spring, but the Congress appropriated $500,575,000. It is hoped that the Appropriations

Committee will act promptly on this request, the majority of the funds being required for our top priority project -- Mercury.

New obligational authority in the amount of $802,000,000 is requested for fiscal year 1961. I believe this sum, together with the additional amount we will request for acceleration of the super booster program, will enable us to carry forward vigorously the program we will present to you. I should note, however, that ours is almost wholly a research and development operation, with all of the uncertainties and unforeseen problems that accompany any such activity. We are dealing with an enormously complicated technology. The most significant of our space experiments must operate in environments and under conditions not easily reproduced for component testing in ground based facilities. A few conditions cannot be reproduced at all. Furthermore, almost all significant tests and experiments result in the destruction of the rocket and payload. Re-use is impossible, or nearly so. All of this adds up to an expensive business. And this budget is a tight budget.

It provides for a determined and vigorous program to develop reliable launch vehicle systems with th thrust necessary to propel the spacecraft on the missions we want to undertake. It provides for the urgent prosecution of Project Mercury. It is intended to make possible difficult experiments in both the communications and meteorological fields. It provides for a significant number of flights for the purpose of probing more deeply into the secrets of outer space as we build up our knowledge of the conditions to be met by future human voyagers to the moon and beyond. It provides support for the basic and applied research and advanced component development which is necessary to undergird any program of this kind.

In short, this budget is intended to provide for the urgent prosecution of the Nation's program in space exploration in all its phases, with particular emphasis on the super booster developments. If approved, I am as certain as

anyone can be in the research and development game, that we will accomplish our goals for the coming fiscal year and will have taken significant steps forward toward the attainment of the long-term objectives we have set for ourselves. Respectfully, I urge you, Mr. Chairman, and I urge the members of your Committee, to approve this budget request as soon as you have satisfied yourselves on the validity of our requirements. Delays in both authorization and appropriations actions will severely limit our abilities to plan for, and proceed with, our difficult tasks.

And now, I would call your attention to the schedule of presentations to be made by my colleagues and associates. Each of us will be happy to explain, as fully as we can, any aspect of our program and to answer your questions to the best of our ability. Thank you again for this opportunity to appear before the Committee.

NO. 16-110

Op-95/fwl
28 January 1960

~~FOR NAVY EYES ONLY~~

MEMORANDUM FOR THE RECORD

Subj: Testimony before the House Science and Astronautics Committee on 1/27/60 by Mr. Robert F. Keller, General Counsel of GAO and Mr. T. Keith Glennan Administrator of NASA

Encl: (1) Statement of Mr. Keller
(2) Statement of Mr. Glennan

1. Testimony was given by Mr. Keller first. See Enclosure (1) for his prepared statement. The purpose of this testimony was to bring forth the facts about the refusal of NASA tp provide certain documents to NASA concerning the awarding of contracts to NAA for a 1,500,000 lb. thrust single booster and to MacDonald Aircraft Corporation for the Mercury capsule. Main facts of interest were:

a. The House Science and Astronautics Committee requested GAO to review the procedures followed in awarding these contracts.

b. GAO asked NASA for all pertinent documents.

c. NASA supplied many documents but refused to provide the internal NASA reports of management and technical competency of the various proposals which let to Mr. Glennan choosing NAA and MAC as winners of the competitions.

d. NASA contends these reports contain "personal evaluations and recommendations of NASA officials" and, as such, are priviledged.

e. Without these reports GAO contends that it cannot carry out its job of:

1. Determining that funds are legally spent.

2. Determining that funds are economically and efficiently spent.

f. The Committee considers this refusal by NASA is contrary to section 303 of the Space Act.

g. The Committee considers this particular problem specific evidence of a fundamental, long-standing disagreement between the Executive and Legislative Branches of government.

h. Four refusals by the Navy to provide info were mentioned -

1. Report on Performance of MSTS

2. Report on Procurement by Supply Depots

3. Report on Navy Military Construction

ENCLOSURE (3) to Op-95
ser 4P95 of 28 Jan 60

4. Report on Subic Bay Supply Depot.

1. Mr. Keller said that DOD refusal to produce certain documents apparently is based on DOD Directive 7650l.

2. Mr. Glennan was called to the stand to state NASA's views in this matter. Mr. Glennan stated that he did not know that the subject of Executive Privilege was to come up today and so was not well prepared to discuss it. The Committee postponed questioning him on this subject and asked him to read his prepared statement on programs and budget, Enclosure (2). Mr. Glennan was then excused.

3. Mr. Keller was recalled and asked a few more questions. At 1230 the meeting adjourned until 0930, 1/28/60, when Mr. Glennan will be the first witness.