

Guggenheim Aeronautical Laboratory
California Institute of Technology
Pasadena, California

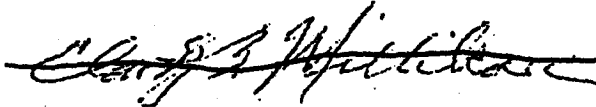
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RETURN TO
RC
TELETYPE UNIT 36112

JAN 29 1960

Dear Mr. Secretary:

Attached is the final report of your Management Study
Committee. It is my understanding that this completes the
activities of the Committee.

Sincerely,



Clark B. Millikan
Director

Attachment

Honorable Dudley C. Sharp
Secretary of the Air Force
Washington 25, D. C.

19 DEC 1985

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**REPORT OF THE
SECRETARY OF THE AIR FORCE MANAGEMENT STUDY COMMITTEE**

- I. Introduction and General Remarks**
- II. Findings**
- III. Recommendations**
- IV. Appendix**

I. Introduction and General Remarks

The Committee has reviewed the management of the Air Force ballistic missile and space systems programs, as requested by the Secretary of the Air Force in his letter of 3 September 1959. The Committee examined the high priority projects on which Space Technology Laboratories (STL), or its predecessor company, Ramo-Wooldridge (R-W), set the pattern of technical development, performed systems engineering and provided technical direction. Attention was focused on the unique management approach represented by the creation of the AFBMD/EMC/SAC Mike/STL complex and its relationship with the Air Force and industry in the management of advanced and complicated weapons systems. The Committee sought to evaluate the positive and negative aspects of this relationship and to determine the extent to which it might fulfill the longer term needs of the Air Force. In its deliberations, the Committee heard the views of senior governmental and industry personnel, including the Associate Administrator of National Aeronautics and Space Administration, the Commanders of Air Materiel Command and Air Research & Development Command, executives of major weapons systems prime and sub-contractors, and officers of STL and Thompson-Ramo-Wooldridge (TRW). Also, recognizing the fact that the Air Force had appointed another committee, of senior Air Force officers, to consider the broader problem of overall management of weapons systems in general, the Committee limited its effort to studying the development management phase of the Air Force ballistic missile and space systems programs. (See Appendices "A" and "B" for Committee Membership and schedule of meetings.)

II. Findings

1. The present management scheme for ballistic missile development, particularly as it involves STL's role as a civilian adviser and agent for the Air Force, was created in 1954 to meet a particular situation. It stemmed from the realization that neither industry nor the Air Force then had sufficient in-house competence to undertake broad technical management of ballistic missile weapon systems, and from the urgency of the military situation which called for strong measures to expedite the program. (See Appendix "C" for historical summary.)

2. The Air Force response to the recommendations of the Strategic Missiles Evaluation Committee, dated 10 February 1954, was rapid, well thought-out and effective. An unusually competent group of scientists and engineers, capable of making systems analyses, supervising the research phases and controlling the experimental and hardware phases of the ICBM program, was quickly assembled from universities, industry and research laboratories within the Ramo-Wooldridge Corporation.

The consolidation of authority for technical and procurement decision in the Western Development Division, and its location adjacent to R-W (STL), accelerated decisions at working levels. The Ballistic Missile Committees (established on recommendation of the Gillette Committee) provided rapid coordination through the Department of Defense level and insulated the program

from influences which might have retarded it. The priority given these projects by the National Security Council and the Department of Defense assured adequate and timely funding and facilities.

3. It is generally conceded and is the conviction of this committee, that this management device has worked extremely well, both in terms of the technical quality of the results and the speed with which missile system development has taken place. The rapid achievement of operational status in the THOR and ATLAS programs is tangible evidence of the outstanding results attained.

4. Since 1954 there have, however, been a number of changes which suggest a review of the original plan. These include, for example, the achievement of the first operational capability in the ICBM field, indicating that emphasis should now be placed on the establishment of continuing management institutions rather than on an expedient tailored to a pressing problem. Further, industry competence has greatly increased, and a number of companies now appear fully capable of managing the development of weapons systems of comparable advancement and complexity. On the other hand, the Air Force's "in-house" capability to plan, analyze and procure weapons of this complexity, while it has increased substantially, has not yet reached a point where the Air Force can direct the development of such systems without contractual assistance having high scientific and technical competence.

5. In numbers of technical personnel employed, size and type of facilities and expansion of its field of interest and activity, STL has grown far beyond what was originally contemplated for it. This growth, most rapid in the last two or three years, is continuing and appears to be encouraged, or at least tolerated, by the Air Force. It has been contributed to in part by the utilization of the STL organization as an available and effective instrument for tasks outside its primary area. It is the basis of widespread concern that an Air Force "arsenal" for the development and production of advanced weapons could result.

This undefined growth and uncertainty as to total purpose appear to be beginning to adversely affect STL's ability to perform its essential functions with maximum effectiveness. Its continued operation as presently constituted could tend to restrict the free flow and competition of technical ideas, thereby denying to the Air Force fully effective access to available technical resources of the nation.

III. Recommendations

1. It has been suggested that the Air Force might wish to return to earlier methods of weapons system management. The Committee has considered this possibility and has come to the conclusion that it is not desirable to make any such over-all return in the large ballistic missile and military space programs. The urgency of many of these programs is still too great to allow the disruptions which could follow such a move. Moreover, in any case,

the proved effectiveness of the present management plan is, for certain projects, an asset which should be conserved if at all possible.

2. A reorientation of the role and the mission currently assigned to STL is urgently required in order to preserve its capacity to perform its essential functions and assign to industry and other agencies those functions which can be performed by them. This should be programmed immediately and implemented as rapidly as practicable.

3. The Air Force will require for the foreseeable future scientific and technical assistance in the following areas of the large ballistic missile and military space fields:

- a. Advanced planning and evaluation of new ideas.
- b. "Broad-brush," initial system design.
- c. Technical evaluation of contractors' proposals.
- d. Technical monitoring of program progress.

In order to have the requisite top level competence this must be furnished by a civilian contractor organization occupying a privileged and continuing position with the Air Force. This organization must be basically non-competitive. ("Competition" in this fast moving field must be taken to apply to experimental systems and new technical approaches as well as to production hardware.) Recognizing that the monitoring function will inevitably tend toward considerable involvement in details of current programs, the Air Force will need to remain continuously alert to the problems of growth control and of possible excessive direction of contractors.

4. Detailed planning and technical direction of specific projects should eventually be the responsibility of competitive industry, either of a prime manufacturing contractor utilizing sub-contractors, or of a non-manufacturing management engineering company, using the associate contractor mechanism for major sub-systems.

5. All projects, functions or other work assignments currently performed by STL should be identified and budgeted. Those which do not conform to the criteria set forth above should be terminated, phased out or transferred on a planned basis as rapidly as possible. In transferring such projects special consideration should be given to those contractors and subcontractors engaged in the program who have performed well. The committee believes that it should be possible to transfer to industrial weapon-systems contractors the complete responsibility for the management of THOR and ATLAS projects in the near future, but that such transfer of TITAN and MINUTEMAN and current satellite projects cannot, in all probability, be made for some time.

6. The Air Force should continue to develop its own "in-house" capability to plan, analyze and procure weapons systems in the ballistic missile and military space areas.

7. The Committee was made sharply aware that the rapidity with which weapons technology is expanding and the continued competitive threats which face the nation call for a continuation of the alert, aggressive and highly responsive attitude which the Air Force demonstrated in meeting the ICBM challenge. It must continue to be receptive to unusual or unorthodox procedures when emergency situations can best be met by them.

APPENDIX A

List of Committee Members

| | |
|---|---------------------------------------|
| Professor Clark B. Millikan (Chairman) | California Institute of Technology |
| Dr. Hendrik W. Bode | Bell Telephone Laboratories |
| Mr. Malcolm P. Ferguson | Bendix Aviation Corporation |
| Mr. Robert L. Hamill | Sanderson and Porter |
| Dr. Laurence A. Hyland | Hughes Aircraft Company |
| Honorable Roger Lewis | Pan American World Airways |
| General Charles A. Lindbergh | |
| General James McCormack | Massachusetts Institute of Technology |
| Professor Jerome B. Wiesner | Massachusetts Institute of Technology |
| Major George G. Troutman (Secretary) | United States Air Force |

(Dr. Emanuel Piore, International Business Machines Corporation, resigned membership in November 1959 due to personal reasons. Mr. Hamill was unable to participate in the Committee's last meeting and final report preparation due to serious illness.)

APPENDIX B

Schedule of Meetings

1. 7 October 1959 First Meeting - The Pentagon
Discussions with senior Air Force officials.
2. 22 October 1959 Informal meeting in Culver City, California
between Drs. Millikan and Hyland and officials
of Aerojet General and Rocketdyne.
3. 29 October 1959 Second Meeting - New York City
Discussions with Dr. C. Stark Draper of MIT
and senior officials of the Burroughs
Corporation, AVCO, General Electric, and
Remington Rand-UNIVAC. (This meeting chaired
by Mr. Lewis in the absence of Dr. Millikan.)
4. 5, 6 November 1959 Third Meeting - Santa Monica, California
Discussions with senior officers of AMC and
AFBMD/BMC, and with senior officials of
Thompson-Ramo-Wooldridge, Space Technology
Laboratories, Martin Corp., Convair,
Lockheed Aircraft, Boeing Aircraft, Douglas
Aircraft, and RAND.
5. 3, 4 December 1959 Fourth Meeting - The Pentagon
Discussions with senior officials from NASA
and ARDC; Deliberations in Executive Session.
6. 22 December 1959 Fifth Meeting - New York City
Deliberations in Executive Session.
7. 12 January 1960 Sixth Meeting - The Pentagon
Discussions with Deputy Secretary of Defense,
Secretary of the Air Force, Assistant Secretary
of the Air Force (Research & Development), Air
Force General Counsel; Deliberations in
Executive Session.

APPENDIX C

History of the Origin of the AFBMD/STL Complex

The AFBMD management complex is a direct outgrowth of the 10 February 1954 von Neumann Strategic Missiles Evaluation Committee findings and recommendations. Important excerpts from this report are:

Part IV, paragraph 1, "...it is the conviction of the Committee that a radical reorganization of the IBMS project considerably transcending the Convair framework is required if a militarily useful vehicle is to be had within a reasonable span of time. Specifically, the Committee believes that the design must be based on a new and comprehensive weapons systems study, together with a thorough-going exploration of alternative approaches to several critical phases of the problem, adequately based on fundamental science. ...new IBMS development group, which we propose should be given directive responsibility for the entire project."

Paragraph 2, "...However, the Committee expects that the new group referred to above will within a year be in a position to recommend in full detail a redirected, expanded, and accelerated program..."

Paragraph 6, "The most urgent and immediate need in the IBMS program is the setting up of the above-mentioned new IBMS development-management agency for the entire program, including the Convair effort. This program can then be subsequently extended and accelerated in some optimum manner to be determined by the studies of this new group. The setting up of various parallel projects as required will then also follow. The nature of the task for this new agency requires that overall technical direction be in the hands of an unusually competent group of scientists and engineers capable of making systems analyses, supervising the research phases, and completely controlling the experimental and hardware phases of the program -- the present one as well as the subsequent ones that will have to be initiated. The type of directorial team needed is of the caliber and strength that may require the creation of a special group by a 'drafting' operation performed by the highest-level government executives on university, industry, and government organizations."

The Strategic Missiles Evaluation Committee findings and recommendations pertaining to the ATLAS program were approved by The Secretary of the Air Force on 19 March 1954. Likewise, on 23 March 1954, the Chief of Staff, USAF approved the recommendations that (1) "The B-65 (ATLAS) program be reoriented so as to achieve the early establishment of an optimum intercontinental ballistic missile system"; and (2) "The field responsibility for initiating the establishment of this system be assigned to the Commander, Air Research and Development.

Command and he be directed to establish within his organization a military-civilian group with the highest possible technical competence in this field. This group should be able within a year to recommend in full detail a redirected, expanded and accelerated program."

Headquarters, U. S. Air Force action on this matter was published by letter directive dated 21 June 1954, Subject: (Uncl) Project ATLAS. Excerpts from this letter follow:

Paragraph 2, "...The ATLAS program will be reoriented and accelerated to the maximum extent that technological development will permit."

Paragraph 2.e, "The ARDC will establish a field office on the West Coast with a General Officer in command having authority and control of all aspects of the program. This responsibility will include the development of recommended operational, logistic, and personnel concepts."

The West Coast field office was established with operating elements of Headquarters, ARDC and AMC in Inglewood, California, on 1 July 1954. The initial authority and responsibilities of the field office commander were spelled out in a memorandum dated 29 July 1954 from Lt. General Thomas S. Power, Commander, ARDC, to Brig. General B. A. Schriever.

The ATLAS Scientific Advisory Committee, chaired by Professor John von Neumann, met in Los Angeles on 20-21 July 1954 to discuss additional ways and means of reorienting and accelerating the ATLAS program. In addition to considering technical aspects of the program, the Committee reviewed the recommended field office organization and the proposed assignment of responsibilities to the field office civilian staff (proposed to be the Ramo-Wooldridge Corporation) and to the industrial contractors. The Committee was unanimously opposed to the recommended field office organization and proposed assignment of responsibilities presented at that time. They felt that no aircraft company was strong enough in scientific-technical depth or experience to successfully discharge systems responsibility for the ICBM. The Committee recommended the field office organization be studied further and that systems responsibility be either clearly assigned to the field office or to some organization other than an aircraft company. This recommendation of the Committee was endorsed by Mr. Quarles, who was present throughout the meeting. Mr. Quarles stated that Ramo-Wooldridge must either be a small technical staff of the Air Force and systems responsibility must be assigned to the airframe contractor, or Ramo-Wooldridge must be placed in a line position and assigned systems engineering and technical direction responsibility. In the latter case, Ramo-Wooldridge could not be a small staff but should be whatever size should turn out to be necessary in carrying out the program in the most expeditious manner.

Following this meeting, General Power, who was also in attendance, directed the Commander, Western Development Division to restudy the role of Ramo-Wooldridge and the airframe contractor in the Air Force ballistic missile program, and to submit to him recommendations on the management organization. This study

entitled "A Study of the Development Management Organization for the Atlas Program", was completed on 18 August 1954. Following is an extract of a message, dated 24 August 1954, from Commander, AFBMD to Commander, ARDC, indicating results of the study:

"Part 2. Based on study of development-management organization for the ATLAS program, it is recommended that Ramo-Wooldridge working directly for the USAF 'West Coast Office' (Western Development Division, Headquarters, ARDC, plus Special Aircraft Project Office-AMC) be made responsible for technical direction and systems engineering for the IBIS program. Ramo-Wooldridge would remain ineligible as at present for development and production of the missile or any of its components. Reasons follow:

"a. A clear line of responsibility and authority for technical direction and engineering decision is established. Further, the Scientific Advisory Committee strongly feels that old line aircraft companies would find it difficult to attract top flight scientists and therefore scientific and technical competence could be established only at the expense of time.

"b. Convair and other aircraft companies have workloads which will detract from the quality and quantity of technical competence necessary for Atlas.

"c. Ramo-Wooldridge being a new organization without IBMS production and sales motive presents a unique opportunity for the USAF. It provides technical objectivity and great organizational flexibility for integration with the Air Force 'West Coast Field Office'. On past record its chief executives have proven their competence in technical management of complex systems and currently demonstrate capability to attract top flight scientific and engineering talent.

"d. Summarizing, the recommended approach appears best suited to meet the extraordinary technical problems and time goals established since:

"(1) Militarily, policy decisions, operational considerations, contract administration and broad management control will remain with the USAF. At the same time, Ramo-Wooldridge can provide great flexibility in organizational arrangement, relationships and procedures.

"(2) Industrially, a broad participation will be provided through the utilization of associate contractors.

"(3) Scientifically, provision of a top-flight system engineering capability insures the support of the scientific group. A number of eminent scientists have voiced enthusiasm to participate.

"e. In conclusion, the recommended approach has the widest area of agreement from the military, the scientist and industry."

The study was approved by the Commanders of Air Materiel Command and Air Research and Development Command on 3 September 1954, wherein it was recommended to the Assistant Secretary of the Air Force, Materiel, that Ramo-Wooldridge (in the chain of technical control) have systems engineering responsibility for the ATLAS program. This course of action was approved by the Assistant Secretary of the Air Force, Materiel, on 8 September 1954.

On 8 September 1955, the ATLAS program was assigned highest national priority. The attainment of an initial operating capability was directed to be limited only by technology. On 17 September 1955, the Secretary of the Air Force was directed by the Secretary of Defense to:

- a. Prosecute within his assigned responsibilities the ICBM research and development program with maximum urgency, and
- b. Recommend to the Secretary of Defense such additional actions or administrative arrangements as he considers necessary on the part of the Secretary of Defense to implement this (the Secretary of the Air Force's responsibility), and
- c. Keep the Secretary of Defense currently informed on the progress of the program.

In response to this directive, an Air Force Plan for simplifying administrative procedures for the ballistic missile program, dated 21 October 1955, called the "Gillette Committee Plan", was prepared. The Secretary of Defense approved the "Gillette Committee Plan" on 8 November 1955, and directed its implementation. This same directive included the development of an Air Force land-based IRBM on a co-equal priority basis with the ICBM.

OTHER COMMITTEE THOUGHTS

I. Preface

During its deliberations, the Committee studied all aspects of the AFEMD/STL management structure. It considered a number of possible detailed courses of action with the pros and cons of each, and also general limitations and problems which could be relevant regardless of action taken. While the thoughts do not represent unanimous Committee opinion and are not a part of the Committee's Report, it is felt that they may be of value to the Air Force as background information in any detailed action it may take with regard to the management of its ballistic missile and space systems programs. The thoughts follow.

II. Criteria for the Contractual Assistance Which the Air Force Will Need

1. Whatever the form of STL or its successors, the agency or agencies furnishing technical assistance to AFEMD should satisfy the following requirements:

- a. Possess the highest possible level of technical competence, which implies, under present circumstances, that it should be a civilian, non-civil-service organization.
- b. Have the capability of effectively assisting in policy formulation, systems planning, proposal evaluation and program monitoring.
- c. Have the further capability of carrying out certain Systems Engineering and Technical Direction functions in special cases where needed.
- d. Have no possible competitive advantage over the industry to which the Air Force looks for its weapon and space systems and their components.

2. The requirements listed above imply:

- a. That the present STL organization, which has so effectively served the AFEMD, should not in the future continue in its present form and must be replaced by some alternative organization(s).
- b. That the relation between the civilian organization(s) performing the functions outlined in Recommendation Number 3, and the uniformed Air Force personnel (who have the ultimate responsibility for final decisions) must be a very close and consistently maintained one.
- c. Any contractor in a new organizational scheme who enjoys a continuing privileged position with the Air Force should be completely independent of industries furnishing hardware in the missile and space areas.

3. In any scheme of organization the amount of detailed work by a future contractor can be drastically less than that now done by STL.

III. Limitations and Problems

1. Regardless of what course of action is finally taken by the Air Force in rationalizing the management problems in the ballistic missile and space systems programs, certain limitations and problems were discussed relating to any agency set up to assist the Air Force under contract. These are:

a. Control of size and growth - In the case of a non-profit corporation, this can only be controlled by the Air Force, which assigns work loads. The Air Force must maintain constant vigilance to insure availability to the corporation of only those manpower and resources which are essential to the carrying out of the assignments. In the case of a "for-profit" corporation, which assumes responsibility for specific projects under individual contracts, an automatic and highly effective growth control mechanism might be found in the negotiated fee formula. Even in this case, however, it would also be the responsibility of the Air Force to place suitable bounds on the projects which the corporation is asked to undertake.

b. Financial - A large percentage of STL's present tangible value to TRW lies in buildings now owned by STL and occupied by the AFEMD management complex. If the Air Force adopted a "two-corporations" route, a major portion of this problem could be eliminated by AF purchasing or taking lease to the buildings and facilities which would be required by the non-profit corporation. It could be desirable for the Air Force to purchase or lease all of the property now occupied by the AFEMD management complex. If this were done, the division of the property between the different segments of the complex (the military, the non-profit corporation and STL) must then be the subject of negotiation between the Air Force and STL. This negotiation must recognize STL's proper payment of lease costs if they occupy property for work on "non-AFEMD" projects. Purchase by the Air Force of all or part of the present STL facilities would be of particular importance if a new "for-profit" corporation were established without TRW ownership interest, since the Air Force has indicated that a public sale of TRW holdings in STL would be entirely unacceptable, and the magnitude of the problem of a private transfer of TRW's equity would be much reduced by the removal of this considerable portion of the facilities from the picture.

c. Compensation and Benefits - The successor organization(s) should consider the present STL classification structure and compensation rates which have been established over a considerable period of time and are set so as to attract the required high quality of personnel. Relative to a possible non-profit corporation, consideration should also be given to the pension status of existing employees and to the development of a plan to credit their past service in R-W and STL. Further, other employee benefit plans, such as insurance, vacations, holidays, etc., should probably be analyzed to insure that existing employees might have adequate benefits

under the new organization. In addition, some type of deferred compensation or bonus plan should be considered as incentive compensation for executive employees if a non-profit corporation is organized. Care must be exercised in this regard so as not to preclude the corporation from achieving a tax-exempt status.

IV. The Transition Problem

The following comments were received too late to be coordinated with all Committee members. At least three of the members agree with the comments (but others may not).

"My principal point of concern with the report now as it goes forward is that our recommendations, because they deal with policy rather than execution, do not emphasize the importance of a carefully constructed, phased implementation program in the reduction of the detail of STL's activities and of the size of the organization serving RMD as projects are completed or transferred.

"The urgent, present projects in STL, which we do not recommend for early transfer or termination, require that integrated technical supervision continue without major unsettling change. It is a part of this problem that there will be pressures inhibiting key STL personnel in choosing, as a career, membership in an organization suitable to remain in a privileged advisory capacity to the Air Force. It therefore seems to me appropriate to note that organizational revision should not be forced in ways or at a pace which will make these career decisions of individuals in STL unnecessarily difficult, to the potential detriment of quality and range of competence of the continuing organization.

"For example, the present STL organization, properly reconstituted so as to remove it from the competitive arena, could qualify, in respect to certain presently assigned projects, for the role of technical direction covered in our recommendation No. 4 as well as for the staff role described in our recommendation No. 3. Such an arrangement could provide for continuity in endeavors of high importance to the Air Force while allowing turn-around time for any further degree of separation desired by the Air Force between staff and line functions performed by contractor organizations.

"At least, I would hope that the Air Force does not read our somewhat terse recommendations as precluding such flexibility in the crucial matter of implementation."



UNCLASSIFIED

July 29, 1958

MEMORANDUM FOR THE SECRETARY OF THE AIR FORCE

In line with our discussion, attached is a memorandum of July 29th from Mr. Roy Johnson dealing with the FY 59 National Space Program and the problem of funding \$117 million transfer from the Department of Defense to NASA.

You will note that Mr. Johnson proposes that \$59.2 million be made up by three ARPA programs and that \$4 million of an accounting credit to ARPA on WS-117L be applied for a total of \$63.2 million. This leaves a total of \$53.8 million. You will recall the BOB funding total of \$71 million space projects in the Air Force FY 59 program. I realize that the Air Force feels that some substantial part of this would have been taken from the space programs through the reprogramming processes incidental to firming up of Air Force plans. After careful consideration, and as discussed with Mr. Horner and you, it is my conclusion that this \$53.8 million (in addition to the \$4 million accounting adjustment on WS-117L) should be transferred from the Air Force to the new agency to make up the balance of the \$117 million due from the Department of Defense.

Unless you feel that the matter should be given further consideration, I am asking Mr. McNeil, by copy of this memorandum, to work out adjustments along these lines with the BOB.

Inclosure

Memo for DepSecDef
dtd 7/29/58 s/Johnson
w/2 incls

cc: Secy McNeil

UNCLASSIFIED

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JUL 29 1958

MAKE-UP OF PROPOSED FUND TRANSFER TO NASA
(in millions)

From ARPA:

| | | |
|--|------------|----------------|
| To complete Scientific Satellite Program | \$ 13.6 | |
| To reduce DoD MIS Program frm 50.0 to 10.0 | 40.0 | |
| To reduce DoD share of Tracking frm 17.3 to 11.7 | <u>5.6</u> | \$ <u>59.2</u> |

From Air Force:

| | | |
|---|-------------|----------------|
| Due ARPA on WS-117L | \$ 4.0 | |
| Super-thrust engines (as shown on attached listing <u>except</u> the 3 - 400,000 lb Thrust in amount of \$11.5) | <u>44.9</u> | \$ <u>48.9</u> |

From Undetermined Source:

\$ 8.9

\$117.0



ADVANCED RESEARCH PROJECTS AGENCY
WASHINGTON 25, D. C.

JUL 29 1958

MEMORANDUM FOR THE DEPUTY SECRETARY OF DEFENSE

The purpose of this memorandum is to record my understanding of the budget decisions reached at yesterday's meeting with the President. Briefly, the decisions were:

(1) The total FY 1959 National Space Program, exclusive of WS-117L, to be \$350 million - \$242 million for NASA and \$108 million for ARPA.

(2) The make-up of the \$242 million for NASA to be \$125 million in new appropriations and \$117 million to be transferred from the DoD.

(3) The concept of joint programs approved.

(4) Man-in-Space to be at a \$40 million level divided \$10 million ARPA, \$30 million NASA.

(5) All programs subject to review by the National Aeronautics and Space Counsel, when operating.

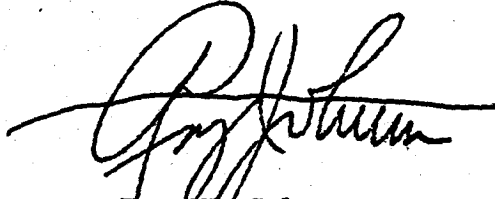
Attached is a listing of the source of the funds, and programs where applicable, to make up the total of \$117 million to be transferred to the NASA. This will leave the DoD space program, other than WS-117L, of \$108 million made up as follows:

| | |
|----------------------------|--------|
| Communications | \$ 9.0 |
| Navigation | 1.0 |
| Cloud Cover Reconnaissance | 6.0 |

JUL 29 1958

| | |
|-------------------------------|-------------|
| Components Development | \$ 10.0 |
| JUNO Vehicles (6) | 42.0 |
| Exploratory Research | 10.0 |
| ARPA Orders (4, 5, 6) | 2.6 |
| Maximizing Payload Capability | 5.7 |
| <hr/> | |
| MIS | 10.0 |
| Tracking (DoD share) | <u>11.7</u> |

Total \$108.0



Roy W. Johnson
Director

2 Incls

1. a/n above
2. High Energy Fuels - Details

cc: ASD(Compt) w/Incls