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Title: S. Paul Johnston, Memorandum for Dr. J. R. Killian, Jr., "Activities," February 21, 1958, with attached: Memorandum for Dr. J. R. Killian, Jr., "Preliminary Observations on the Organization for the Exploitation of Outer Space," February 21, 1958.

Source: NASA Historical Reference Collection, NASA History Office, NASA Headquarters, Washington, D.C.

On February 4, 1958, President Eisenhower announced that science advisor James R. Killian had appointed a panel to recommend the outlines of a space program and the organization to manage it. The so-called "Purcell Panel" (General James H. Doolittle, NACA chair; Edwin Land, Polaroid Corporation president; Herbert York, Livermore Laboratory director; and Edward Purcell, Harvard University professor of physics), augmented by William Finan of the Bureau of the Budget and the staff support of S. Paul Johnston, who was director of the Institute for Aeronautical Sciences, assessed organizational alternatives for the proposed agency. The task of inventing an organization to manage a space program was a difficult one. The number and strength of the claimants for the right to direct the space program had peaked in the wake of Sputnik. Several bills were already pending before Congress that gave responsibility for space programs to the Department of Defense or to the Atomic Energy Commission. Johnston's thoughts on the subject eventually found their way into the March 5, 1958, memorandum to the president containing the formal proposal that the National Advisory Committee for Aeronautics (NACA) be reconstituted and given the responsibility for managing the nation's space program. In this copy of the memorandum, someone (possibly Killian) has made handwritten comments and changes to Johnston's text.

THE WHITE HOUSE
WASHINGTON

February 21, 1958

MEMORANDUM FOR DR. J. R. KILLIAN, JR.

FROM: S. Paul JOHNSTON

SUBJECT: Activities

1. During the past week in accordance with your suggestion, I have conferred on the problem of organization and its legal implications with the following:

James A. Perkins, Vice President, Carnegie Corporation
John Cobb Cooper, Legal Consultant, Professor, International Air Law, McGill University
Dr. James Fisk, Vice President, Bell Telephone Laboratories
John J. Corson, McKinsey & Company
Don K. Price, Vice President, Ford Foundation
Dr. Edward Mason, Harvard University
Dean David Cavers, Harvard Law

The above are in addition to the people we have talked to in the Bureau of the Budget at the meeting which you attended on Monday.

2. As a result of the above conferences I have prepared the attached memorandum which summarizes the various views which have been expressed on the organizational problem and which makes a recommendation which is my own but which appears to be consistent with the discussions of the past week. To date this has been discussed only with Dr. James Fisk.

S. P. Johnston

Attachment

[redacted]

THE WHITE HOUSE
WASHINGTON

February 21, 1958

MEMORANDUM FOR DR. J. R. KILLIAN, JR.

PRELIMINARY OBSERVATIONS ON THE ORGANIZATION FOR THE EXPLOITATION OF OUTER SPACE

The exploitation of any unknown areas involves two distinct objectives, - one, exploration and two, control. The first is largely a scientific operation and the second largely military.

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At the present time plans for the exploitation of outer space fall more nearly into civilian-scientific areas rather than into military areas. The "take" from the probing of outer space by rockets, satellites and interplanetary vehicles will be of more direct interest to the scientist than to the strategist. We can discount at this point most of the "Buck Rogers" type of thinking which anticipates hordes of little men in space helments firing disintegrators into each other from flying saucers. Certainly, ICBM's will transit portions of outer space in performing their missions, but for the moment the chief military interest lies in better methods of surveillance, communications and long-range weather forecasting.

The potential space explorations in the immediate future are well outlined in a paper dated 14 February 1957 titled "Basic Objectives of a Continuing Program of Scientific Research in Outer Space" by Hugh Odishaw, Executive Director of the U.S. National Committee for the IGY of the National Academy of Sciences. A good layman's summary of the same subject appeared in a recent issue of LIFE magazine by Dr. Van Allen.

The control of outer space, basically a military matter, involves many troublesome questions of international law. The problem of the vertical extent of national sovereignty has yet to be determined. It appears to depend on the capability of any nation to deny access to space above its territory by physical means. ~~As far as can be determined~~, No body of international law yet exists covering

the use of outer space. As a matter of fact, no acceptable definition has yet been evolved as to where "air-space" and "outer-space" begin and end. Maritime law has no such problem because, under most conditions, one is either afloat or ashore. The limits of the "high seas" have been determined by international agreement on the basis of very easily made physical measurements. With respect to outer space, however, such questions are wide open (a discussion of these problems is to be found in our files in papers on the subject by Professor John Cobb Cooper and others.)

The control of radio-communications in our upper atmosphere and in space is another problem which must be settled by international agreement if a completely chaotic condition is to be avoided. Within the next ten years the probabilities are that dozens, if not hundreds, of objects will be in orbit around the earth. Apart from the question of sorting scientific intelligence from this "celestial junkyard" it will be highly important from a military point of view to be able to distinguish an incoming ICBM from other less lethal objects.

By any standards of comparison, the problems involved are tremendous and the programs which must be undertaken in their solution will be lengthy and costly. The technical feasibility studies and the forecasts that have been made by Doctors Purcell, York and others, anticipate the development of such items as booster rockets of one million to five million pounds thrust in a period of 15 to 25 years. It is estimated that such development programs, quite apart from the missile requirement of the military, may cost anywhere from 500 million to a billion a year. We are, therefore, considering something of the general order of magnitude of the AEC. Obviously the Bureau of the Budget will exert an important influence in deciding whether the national economy can stand such a drain for such purposes.

General Organizational Requirements

In considering the proper organization to handle a project of such magnitude two factors must be taken into consideration, - first, how to get the program off the ground immediately, ie. how to get something started now with the facilities that are presently available and, second, how to gear-up for a long-range program to take care of the 5-10-25 year development. This leads to the thought that some sort of Ad Hoc organization could be set up in a very short time, possibly by Executive Order of the President, to take care of the immediate requirements. Such a group would

not only act as a temporary operating organization but would also initiate studies that would lead toward a more permanent organization on some basis that could be agreed upon by all departments of government and for which the necessary enabling legislature could be obtained.

Whatever plan is adopted, either for the short or for the long-range period, it would appear that certain basic characteristics should be incorporated. First of all, for reasons stated above, it should be a civilian managed organization both at the policy and at the operating levels. It must have wide contractual powers, and it must be free from the limitations of the Civil Service in hiring personnel. It must have access to, and be able to draw upon, all existing scientific talent in the country, both within government, and without, and it must be able to utilize the physical facilities that already exist in industry, universities, government laboratories and military installations. It must be able to purchase whatever hardware, systems or components it needs from all available sources. It must have its own physical facilities for testing completed vehicles and it must also be empowered to operate airborne and space vehicles.

Possible Organizational Patterns.

To date four specific proposals have been made as to possible organizations to accomplish these ends. These include:

1. the formation of an entirely new agency of government;
2. assignment of the project to the AEC;
3. establishment of the NACA as the controlling agency, with assistance from National Science Foundation, National Academy of Sciences, the military services, etc.
4. assignment of the project to the Advanced Research Projects Agency of the Department of Defense (ARPA).

In the following paragraphs some of the advantages and disadvantages of the above suggestions will be briefly noted.

1. New Agency

The establishment of a wholly new agency may prove to be the eventual solution to the problem. Such an agency should report directly to the Executive Office of the President. It should be empowered by law to perform all the functions stated above and be given the necessary funds to accomplish them.

The major difficulty would be in the time required to establish such an agency. New legislation would be required which might involve a very long time to debate and to formulate. It would need a new staff both on the management and on the scientific sides. This would take a long time to recruit, and in view of the overall shortage of scientific personnel in the country, would draw off key people from other necessary jobs. This procedure would also take a long time.

It would also need new facilities, with the inevitable delays in reaching decisions as to what was needed and where new laboratories should be located, before the planning and construction phases could begin.

In summary, the establishment of a new agency would require a very great legislative effort and a very long time to get into operation.

2. Atomic Energy Commission

Strong Congressional support is in evidence for assigning the mission to the AEC.

This proposal is accomplished in Space Committee AE

There is no question but that the AEC is organizationally sound and is a going concern. It already has the necessary authorization to contract for anything it needs and also is free from civil service restraint in hiring people. Its scope could very easily be expanded so that it could legally perform any additional assignment.

On the other hand, the technology of flight both in and out of the atmosphere is not a part of the normal AEC area of competence. Although it is true that nuclear propulsion for aerial and space vehicles comes within its field, consensus seems to be that practical utilization of such propulsion is 5 to 10 years away. AEC, therefore, has an interest in a very small part of the space exploitation picture but it has had little experience in such matters as high speed aerodynamics, control, guidance, structures, telecommunications, etc.

Furthermore, the AEC is already engaged in a huge operation of great national importance. If it were asked to undertake an additional program of the magnitude contemplated for space exploration, its efforts

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in each one might be so diluted that long delays in the production of and items would be inevitable and its overall effectiveness seriously impaired.

Although the AEC has unquestionably adequate management and all the authority it would need, it would be required to expand both its facilities and its staff into wholly new technical areas if it were given the space exploitation job.

3. National Advisory Committee for Aeronautics

Persuasive arguments can be made for assigning the responsibility for space exploration to the NACA. The Committee itself has suggested that with the support of the National Science Foundation and the National Academy of Sciences it would undertake the job by expanding its facilities.

The NACA is basically a civilian-operated, independent government agency. It has a long history of accomplishment. Its relations with the Congress and with the Executive Departments are good and it has an international standing for competence in scientific fields.

The NACA has been in the space exploitation field for a long time. Most of the work that has been done in extremely high altitude and high speed aerodynamics on which the design of missiles and rockets has been based has been done in its laboratories. It has already made great progress in research in some of the very sophisticated propulsion systems required for space flight. It has recently established a special sub-committee in space flight technology made up of outstanding scientists in the field. Extending its interests into space technology would appear to be a logical evolutionary step from its research activities of the past 40-odd years.

The NACA budget for the coming year is of the order of 80 million and it has been authorized to expand its present personnel of 8,000 to 9,000. Its three laboratories (Langley, Ames and Lewis) and its missile firing range at Wallop's Island represent an aggregate investment of about 350 million dollars.

It has been argued that the difference between the size of current NACA operation and the proposed operation is so great that the result

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would be, in effect, the establishment of a wholly new agency to which the NACA would be attached. There is no reason to believe, however, given proper authority and adequate funds, that the NACA could not expand its management functions to handle the larger assignment effectively as it did in 1942 to meet the comparably tremendous demands of World War II.

A moderate amount of legislation would be needed to assign the job to NACA. Its contractual authorization would have to be expanded, and the present civil service limitations on personnel would have to be relieved.

4. ARPA - Department of Defense

A strong case can be made for integration of the space program into the Department of Defense under ARPA on the grounds of immediate action. A great deal of hardware is already available, essential facilities (e.g. JPL, ABMA) exist. The facilities are well staffed and the experience level is high.

It has been suggested that whatever form of organization is agreed upon to initiate the space exploration program it should be attached temporarily to ARPA. If this were done it would appear to be important that some provision be made so that the entire outfit could be detached and assigned to some other agency in the future if it subsequently appeared desirable. It might happen that military interests might outweigh the purely scientific and civil aspects to the detriment of the latter. It would be difficult to avoid security restrictions, and participation in international programs of a purely scientific nature, might thereby be hampered.

Under its present directive it seems that ARPA could take on the job with a minimum of additional legislation.

Suggested Compromise Program

Of the four proposals discussed above, No. 2, - i.e. assigning the project to the AEC, seems the least practical. As an example of appropriate organization and good management it deserves careful study, but the problems under discussion here seem somewhat outside its main fields of interest.

None of the other proposals would satisfy all the requirements in themselves. A possible compromise suggests itself which might satisfy the requirement for immediate action and also lay the groundwork both as the organization and legislation for future action.

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This consists, in effect, of the immediate establishment of a provisional Space Exploration Control Group headed by a special assistant to the President and composed of the operating heads of the several government agencies who are already involved in research, development or operation of space vehicles. Several outstanding individuals from non-government organizations might also be included, but the total group should not be large. Their main function would be the implementation of national space policy as determined by the President and Congress, utilizing all assets and facilities which already exist in established government agencies and in industry. Their secondary function should be the determination of the kind of agency which should be established to put space exploitation on a permanent basis to handle the requests of the foreseeable future.

The suggested procedure might be outlined as follows:

A. Short Range - By Executive Order for Immediate Action

1. Appoint a Special Assistant to the President for Space Exploitation (This should be the Chairman of the NACA - See Footnote) +

2. Appoint a Provisional Board of Regents for Space Exploitation consisting of:

   a. Special Asst. to President for S.E. (Chairman)
   b. Scientific Advisor to President
   c. Chairman, AEC
   d. Director, NACA
   e. President, NSF
   f. President, NAS
   g. Director, ARPA
   h. Two outstanding civilians, possibly from industry

3. Empower above to

   a. Establish immediate space objectives
   b. Establish program priorities
   c. Coordinate programs of associated agencies toward meeting established objectives
   d. Utilize funds already appropriated to the associated agencies to implement immediate objectives.

4. Instruct Special Assistant for Space Exploitation to make immediate plans for the establishment of a Permanent Space Exploitation Agency and to prepare the necessary legislation.

B. Long Range - By Legislation for Continuing Action

1. Organize a permanent Space Exploitation Agency

2. Authorize the Agency to:

a. establish, maintain and operate its own testing and operational facilities
b. enter into whatever contractual arrangements may be necessary with government and civilian agencies
c. hire personnel without regard to Civil Service restrictions
d. operate air/space Vehicles