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NATIONAL ACADEMY OF SCIENCES
NATIONAL RESEARCH COUNCIL
OF THE UNITED STATES OF AMERICA

SPACE SCIENCE BOARD

March 31, 1961

Mr. James E. Webb, Administrator
National Aeronautics & Space Administration
1520 H Street, N.W.
Washington 25, D. C.

Dear Mr. Webb:

I am enclosing two major policy positions that have been developed by the Space Science Board as recommendations to the Government.

The first of these concerns the enunciation of the major objective of space exploration and thus embraces man's role. The Board believes that the enunciation of such a policy would clarify the objectives of the national space effort by clearly focusing upon its goals.

The second document considers the support of basic research and argues, quite aside from current flight-package and related research, that a major and broad effort is required for the long-range success of our national space efforts. Our recommendations in this area represent careful discussions over a period of some three years.

Sincerely yours,

L. V. Berkner
Chairman

Enclosures

cc: Dr. H. L. Dryden
Dr. J. B. Wiesner
Dr. H. F. York
Dr. Hugh Odishaw

SPACE SCIENCE BOARD
National Academy of Sciences
2101 Constitution Avenue
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Man's Role in The National Space Program

At its meeting on February 10 and 11, 1961, the Space Science Board gave particular consideration to the role of man in space in the national space science program. As a result of these deliberations the Board concluded that scientific exploration of the Moon and planets should be clearly stated as the ultimate objective of the U.S. space program for the foreseeable future. This objective should be promptly adopted as the official goal of the United States space program and clearly announced, discussed and supported. In addition, it should be stressed that the United States will continue to press toward a thorough scientific understanding of space, of solving problems of manned space exploration, and of development of applications of space science for man's welfare.

The Board concluded that it is not now possible to decide whether man will be able to accompany early expeditions to the Moon and planets. Many intermediate problems remain to be solved. However, the Board strongly emphasized that planning for scientific exploration of the Moon and planets must at once be developed on the premise that man will be included. Failure to adopt and develop our national program upon this premise will inevitably prevent man's inclusion, and every effort should be made to establish the feasibility of manned space flight at the earliest opportunity.

From a scientific standpoint, there seems little room for dissent that man's participation in the exploration of the Moon and planets will be essential, if and when it becomes technologically feasible to include him. Man can contribute critical elements of scientific judgment and discrimination in conducting the scientific exploration of these bodies which can never be fully supplied by his instruments, however complex and sophisticated they may become. Thus, carefully planned and executed manned scientific expeditions will inevitably be the more fruitful. Moreover, the very technical problems of control at very great distances, involving substantial time delays in command signal reception, may make perfection of planetary experiments impossible without manned controls on the vehicles.

There is also another aspect of planning this country's program for scientific exploration of the Moon and planets which is not widely appreciated. In the Board's view, the scale of effort and the spacecraft size and complexity required for manned scientific exploration of these bodies is unlikely to be greatly different from that required to carry out the program by instruments alone. In broad terms, the primary scientific goals of this program are immense: a better understanding of the origins of the solar system and the universe, the investigation of the existence of life on other planets and, potentially, an understanding of the origin of life itself. In terms of conducting this program a great variety of very intricate instruments (including large amounts of auxiliary equipment, such as high-powered transmitters, long-lived power supplies, electronics for remote control of instruments and, at least, partial data processing) will be required. It seems obvious that the ultimate investigations will involve spacecraft whether manned or unmanned, ranging to the order of hundreds of tons so that the scale of the vehicle program in either case will differ little in its magnitude.

Important supporting considerations are essential to realization of these concepts:

(a) Development of new generations of space vehicles, uniquely designed for use in space research and not adaptations of military rockets, must proceed with sufficient priority to ensure that reliable vehicles of adequate thrust are available for lunar and planetary research. This program should also include development of nuclear stages as rapidly as possible.

(b) Broad programs designed to determine man's physiological and psychological ability to adapt to space flight must likewise be pushed as rapidly as possible. However, planning for "manned" scientific exploration of the Moon and the planets should be consummated only as fast as possible consistent with the development of all relevant information. The program should not be undertaken on a crash basis which fails to given reasonable attention to assurance of success or tries to by-pass the orderly study of all relevant problems.

(c) Consideration should be given soon to the training of scientific specialists for spacecraft flights so that they can conduct or accompany manned expeditions to the Moon and planets.

The Board strongly urges official adoption and public announcement of the foregoing policy and concepts by the U.S. government. Furthermore, while the Board has here stressed the importance of this policy as a scientific goal, it is not unaware of the great importance of other factors associated with a United States man in space program. One of these factors is, of course, the sense of national leadership emergent from bold and imaginative U. S. space activity. Second, the members of the Board as individuals regard man's exploration of the Moon and planets as potentially the greatest inspirational venture of this century and one in which the entire world can share; inherent here are great and fundamental philosophical and spiritual values which find a response in man's questing spirit and his intellectual self-realization. Elaboration of these factors is not the purpose of this document. Nevertheless, the members of the Board fully recognize their parallel importance with the scientific goals and believe that they should not be neglected in seeking public appreciation and acceptance of the program.