

NATIONAL
AERONAUTICS
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ADMINISTRATION



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IN REPLY REFER TO SL

NOV 22 1961

Dr. Joshua Lederberg
Stanford University
Medical Center
Palo Alto, California

Dear Dr. Lederberg:

Thank you for your letter of October 11. In the letter and the material accompanying it, you raised several questions relative to Mariner B. Since these missions are very important to us, I would like to take this opportunity to describe to you the basic philosophy and ingredients of the present NASA planetary program.

The points you made have been among those that we have considered very carefully during all efforts to develop our plans - although, at times, it may appear that they have not. The reasoning that has led to current program philosophy is, unfortunately, not simply stated; many constraints exist, some definite and essentially unalterable, some arbitrary. Furthermore, these constraints are closely related and interwoven.

The first constraint results from the launch vehicle capability required for planetary missions. Considering first the 1962 opportunities, the Atlas-Agena B, the only developed vehicle suitable at present, is just capable of sending a marginal planetary spacecraft (460 pounds) to Venus; a Mars mission is not practicable. In 1964, the Centaur vehicle should be available, and it is expected that it will be able to inject about 1,000 pounds to either planet. Even with this weight, the desired amount of systems redundancy is not possible, and the effect of mission complexity on overall reliability must be carefully considered.

A second constraint is related to the fact that, at present, a planetary mission is a difficult objective - even assuming injection into an escape trajectory. Part of the difficulty is that to have a reasonable possibility of completing a four to six-month trip and accomplishing a close fly-by with an operating spacecraft, all spacecraft subsystems - attitude control, guidance power, propulsion, scientific instrumentation, and communications - must have reliabilities that are difficult to attain within current weight limitations. If this reliability problem is added to the fact that maximum use must be made of the limited opportunities for planetary missions, the resulting viewpoint is that extreme care must be taken to see that any added complexity is well worth the associated reduction in reliability.

H. Dryden

Dr. Joshua Lederberg
Stanford University

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A third constraint is a consideration of the resources available and the optimum distribution of these between the various programs of merit. NASA has undertaken a great many programs of significance in a short time, and must carefully weigh the use of funds, personnel, and facilities for each, so as to maximize the return of valuable results per unit of time.

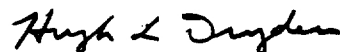
Consideration of these factors has led to a philosophy that calls for two launches at each planetary opportunity. It is also planned that these missions will be preceded by spacecraft demonstration flights. A principal objective for early planetary missions will be to prove the difficult technology necessary to send spacecraft to the planets that are capable of transmitting data to earth at the time of planetary encounter.

The present program plans call for utilization of the Atlas-Agena B to launch two Mariner R spacecraft to Venus in 1962. With a test flight in 1963, the Centaur Mariner B project is expected to include two launches to Venus and Mars at each opportunity, beginning with Venus in 1964 and continuing to overlap the first operational Voyager missions on Saturn. An entry capsule is being added to Mariner B at the earliest opportunity consistent with launch vehicle capability and mission reliability, hopefully for the Mars '64 missions. Interest in the capsule is very high, both because of the need to acquire the necessary entry-landing technology and because of the obvious scientific possibilities.

In conclusion, I think that the NASA planetary program is well planned to make maximum use of existing technology, and that it will be evolutionary in such a way as to maximize overall objectives. I also believe that the presently planned program, considering all factors mentioned above, is reasonably in keeping with the desirable requirements you have expressed, and hope that this letter will provide you some assurance that NASA is making every effort to achieve a sound, successful planetary program.

Thank you again for your interest in the NASA programs.

Sincerely,



Hugh L. Dryden
Deputy Administrator