

November 5, 1963

Mr. Maxwell W. Hunter, II
National Aeronautics and Space Council
Washington 25, D.C.

Dear Mr. Hunter,

Thank you for sending me a copy of your report on "Future Unmanned Explorations of the Solar System." I enjoyed reading it and like the way in which you considered the entire Solar System as a whole.

Your numerical calculations for Earth-Jupiter-Out of Ecliptic and Earth-Jupiter-Sun trajectories are very attractive. The development of accurate planetary approach guidance systems certainly seems to be well worth the cost. I have considered Earth-Venus-Sun missions with the hope of holding down total flight times and rough calculations show that a more detailed study should be made. On page 6 of your report I am not sure that you want to include the last two sentences of the first paragraph. There are six Earth-Venus launch opportunities in the decade 1965 thru 1974 and only the last three were found to contain favorable Earth-Venus-Mars trajectories. The first three required flight times are on the order of 800-1000 days. However, in the case of Earth-Venus-Mercury trajectories all six were found to be favorable.

Although I am by no means an expert in the field of rocketry I thought your arguments in favor of new high thrust engines were very convincing. In general, I believe that your report clearly demonstrates the feasibility of a much broader unmanned planetary program.

I shall be looking forward to reading your opinions on using unconventional trajectories for manned missions. Thank you for letting me know that I have been of some help to you.

Sincerely,

JET PROPULSION LABORATORY

Michael A. Minovitch

MAM/cw