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NATIONAL  
AERONAUTICS  
AND SPACE  
ADMINISTRATION



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*cc Administration Allowance*  
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October 21, 1960

MEMORANDUM FOR Dr. Seamans - NASA Headquarters



Dr. von Braun - Marshall Space Flight Center

Mr. Donlon - Langley - STG

Mr. Gilruth - Langley - STG

Subject: Apollo - Should It Be Committed to Weightlessness

The attached paper regarding the above subject, dated  
4 October 1960, was developed in our office. I hope it will  
be of interest to you.

*Clark T. Randt*  
Clark T. Randt, M. D.  
Director  
Office of Life Science Programs

1 Attachment

4 Oct 1960

APOLLO - SHOULD IT BE COMMITTED TO WEIGHTLESSNESS

The first phases of the Space Task Group in-house study of the Apollo system will not consider the engineering aspects of providing an artificial gravity environment for the crew. Although there is no definitive data available at this writing, there is reason to suspect that prolonged periods of weightlessness may have undesirable psychological and physiological effects on human beings. These may be direct effects on the circulatory, nervous, gastrointestinal or renal system or they may be indirect effects such as the atrophy of various muscles. The manned Mercury flights with their short durations are expected to shed only a small light on these problems, the chimpanzees-Mercury flights perhaps a little more. It is believed that it would be foolhardy, at this early stage, to commit the Apollo project vehicles to a physiologically weightless environment, since the manned and chimpanzee data will not be available until 1961-1963. If a weightless Apollo were selected at this time and proved impractical in 1962-1964 at least a year's delay would be involved in redesign. If, on the other hand, the chimpanzee-Mercury and early orbital Apollo tests with Centaur were to prove conclusively that weightlessness is tolerable, the artificial "g" feature could be readily eliminated.

There are a number of other important reasons for providing an artificial gravitational environment. The first is to enable us to isolate the effects of gravitation from radiation, which may act