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Encl: (1) ONR:461 28 March 58 Flight Prospectus, Strato-Lab Open Gondola

1. Enclosure (1) is forwarded for information to coordinate research activity.

2. The Strato-Lab concept of research employing manned plastic balloons, either with open baskets or sealed cabins, appears to have attractive possibilities for the future. Participation by the scientific community is encouraged. Suggestions, comments, and requests for further information are welcomed.

L. P. PRESSLER
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ONR:461:MDR:njc
28 March 1958

Flight Prospectus

STRATO-LAB Open Gondola

1. Summary

A manned plastic balloon flight into the low stratosphere with an open basket gondola is planned for early May 1958. The maximum altitude anticipated is about 40,000 feet.

Personnel aboard will represent the Navy (pilot from the Office of Naval Research, flight scientist from the Naval Observatory) and the launching will be conducted by representatives of General Mills, Inc., Minneapolis, under contract with the Office of Naval Research. Scientific observations will be made for investigators at the Naval Observatory, Naval Research Laboratory, the Naval Medical Research Institute, the Bureau of Aeronautics, and the University of Minnesota.

2. Background

The first manned plastic balloon flight into the stratosphere was conducted on 10 August 1956 under the Strato-Lab program, when the simple open basket system was employed for contrail investigations. Additional observations on the flight contributed to the fields of cloud physics and aeromedical research.

To date five Strato-Lab flights have been made into the stratosphere. Two of these (8 November 1956 and 18 October 1957) employed a two man sealed cabin gondola with the most recent flight reaching an altitude of 85,700 feet. The three open basket ascents have reached altitudes of 40,000 feet, 42,000 feet, and 38,000 feet. Other flights have been made to relatively high altitudes in the troposphere (29,000 feet and 26,000 feet) and a number have been conducted at low altitudes.

The flight discussed here is one in this continuing series of manned plastic balloon flights under the Office of Naval Research Strato-Lab program.

3. Flight Information

The open basket flight in May will employ a two mil polyethylene balloon which has a diameter of approximately 80 feet when floating at the ceiling altitude of about 40,000 feet.

Although the flight date has not been firmly established -- and is subject to suitable surface winds and a preferred meteorological situation -- the optimum period is from 30 April to 3 May and tentative planning

is for conducting the flight during that time. The launch site is expected to be the "old" University of Minnesota airport near New Brighton, Minnesota, which is a few miles north of Minneapolis. Personnel representing the Office of Naval Research will be responsible for the flight while it is airborne and will make the measurements planned.

4. Purpose of Flight

The primary purpose of the flight will be to conduct exploratory stellar scintillation observations at several altitudes. The object will be to measure the change in brightness of selected star(s) in the frequency range between 10 and 1000 cps. These measurements are extensions of measurements made from the surface and in aircraft by Mikesell and Hall at the Naval Observatory. Techniques and equipment used will be quite similar to those used on their earlier studies with appropriate modifications to conform with the environmental situation.

As a secondary, but also important fundamental problem, observations will be made of the atmospheric effects on "seeing". Information in this area could be of almost universal value to astronomers.

Additional observations will include a measurement to determine the twilight period, telescopic scrutiny of the moon's surface (the moon is full on 3 May), photography of the earth "glow", inspection of the planets (especially Jupiter, Venus and Mercury), some atmospheric measurements for the Naval Research Laboratory and the University of Minnesota, and some photographic measurements for the Bureau of Aeronautics. Other observations, particularly those which are uniquely associated with conditions at sunset, are expected to be made.

Aeromedical data during the flight will be obtained from the flight subjects by representatives of the Naval Medical Research Institute.

5. Personnel

Flight scientist will be Alfred H. Mikesell, astronomer of the Naval Observatory. Pilot will be Malcolm D. Ross, Strato-Lab program director, Office of Naval Research.

Captain Norman L. Barr, MC, USN, Bureau of Medicine and Surgery, will participate, with representatives of Project RAM from the Naval Medical Research Institute, to acquire aeromedical information and to assist in personnel safety aspects of the flight.

John H. Mastenbrook will represent the Naval Research Laboratory; measurements for the University of Minnesota will be made under the cognizance of Professor E. P. Ney; and the Bureau of Aeronautics representative for special photography will be E. D. Greinke.

Project engineer for General Mills, Inc., is Clifford P. Merrill. Operational field coordination of the flight will be under the direction of CDR. Robert C. Cochran, USN, ONR Field Representative, Navy Balloon Projects, Minneapolis.

6. Other Considerations of Flight

The planned astronomical measurements will be the first known attempt by an astronomer to make first hand quantitative astronomical measurements from the stratosphere.

In order to establish the desired experimental conditions it is planned for the ascent to be made in late afternoon with floating altitude reached before sunset. The maximum altitude will be maintained for a total of about two hours during which observations of astronomical "seeing" and stellar scintillation measurements will be made, then descent initiated to the tropopause (about 35,000 feet) where the measurements will be repeated. Additional "stops" for observations will be made at approximately 28,000 feet, 20,000 feet, and 12,000 feet. The latter altitude will be maintained until sunrise when the personnel will land.

During the times that stellar observations are being made from the balloon similar measurements will be made on the ground for correlation with the high altitude information.

Submitted Malcolm D. Ross

Malcolm D. Ross

Approved L. P. Pressler

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