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FINAL AND PATENT REPORT
HIGH ALTITUDE BALLOON FLIGHT TEST OF THE GRAD EXPERIMENT

Project No.: N00014-87-J-1259
(originally a subcontract on N00014-87-G-0259)

OBJECTIVES

The responsibilities of the Department of Engineering Sciences at the University of Florida on this project were:

1. Design and construct the gondola which would carry the GRAD experiment, solar and battery power, and appropriate telemetry beneath a balloon.
2. Design and build a Sun sensor which would provide input to a rotator system designed to position the gondola for accurate pointing.
3. Participate in the integrating and testing of all the equipment and systems prior to flight. (RRH)

COMPLETED WORK

An aluminum pyramidal structure was built using aircraft construction techniques on angle and plate stock. The resulting gondola was strong and light, especially when compared to standard gondolas flown on other balloon missions. Careful attention to mass distribution yielded an almost perfectly balanced system when fully configured for flight.

The Sun sensor utilized four silicon detectors with near Lambertian spacial response to sense the position of the Sun and along with associated electronics generate quadrature sinusoidal positional signals. These were used by the rotator mechanism to position the gondola to within the accuracy of the rotator mechanism. Steering signals were pre-programmed within GRAD and also could be updated through telemetry.

Integration, balance tests, and pointing evaluation were begun at the University of Florida using dummy loads. Final assembly and shakedown was performed at Holloman AFB along with other participants on the project. This work was completed on 10/25/87. The gondola package subsequently flew over Antarctica during its summer period in early 1988.

No patent disclosures were made during this work.

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