NCAR

*Information Release*

NATIONAL CENTER FOR
ATMOSPHERIC RESEARCH

BOULDER, COLORADO 80302

June 17, 1966

FOR IMMEDIATE RELEASE

GHOST Balloons are Still Flying

Boulder, Colo.---Twelve GHOSTS are flying over the Southern Hemisphere.

The GHOST (Global HOrizontal Sounding Technique) balloons were launched from Christchurch, New Zealand, in a large-scale experiment being conducted by the National Center for Atmospheric Research (NCAR) in Boulder, Colorado. The experiment is a joint effort of NCAR, the Environmental Science Services Administration (ESSA), and the New Zealand Weather Service. It is under the direction of Vincent E. Lally of the NCAR Scientific Balloon Facility.

Lally reported on June 12 that twelve balloons were aloft and being tracked by ground stations located throughout the Southern Hemisphere. Of these twelve, ten had circled the earth at least once and eight had been up for thirty days or more. The GHOST balloon which was the first to circumnavigate the globe, early in April, has been up for 74 days and has circled the earth at least six times.

The GHOST system is a concept for a weather observing network using free-floating balloons, equipped with sensing instruments and radio transmitters, to gather data on winds, temperature, humidity, and pressure from all over our planet. An operational GHOST system, which lies many years in the future, would employ a fleet of thousands of balloons; an earth-orbiting satellite to relay data from the balloons to a ground station; and a giant computer, programmed with a mathematical model of the atmospheric circulation, which would use the data to make long-range global weather forecasts.

The Southern Hemisphere GHOST experiment is the first step in developing such a system. The principal aim of the experiment is to determine the life expectancy of the GHOST balloons floating at altitudes of approximately twenty thousand, forty thousand, and eighty thousand feet. An average balloon life of one week would mean that an operational GHOST system would be prohibitively expensive and complicated. A lifetime of six months or more would make the system feasible.

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The GHOST balloons, which were developed under Lally's direction, are made of two layers of Mylar plastic, laminated to reduce leakage through microscopic pinholes. They are inflated with helium to a slight overpressure so that they will float at a constant atmospheric-pressure level in spite of daytime heating and nighttime cooling. The balloons vary from 5 to 34 feet in diameter, depending on the level at which they are designed to float.

Each balloon carries a lightweight radio transmitter powered by solar cells which produce electrical energy from the sun's rays. The transmitter and instruments are housed in a lightweight plastic dome suspended beneath the balloon. Each balloon is identified by a Morse-code letter sent out by the transmitter. The rate at which this letter is repeated is controlled by a sun-angle sensor, enabling anyone with a high-frequency receiver, a stopwatch, an instrument calibration curve, and a set of sun-angle tables to determine the location of any GHOST balloon within a range of several thousand miles. Tracking is limited to hours when the balloon is in daylight because of the solar power supply, and a balloon which drifts too far south may be lost to the tracking stations for days or weeks as it drifts through the long Antarctic winter night.

Several balloons have been brought down prematurely by ice which formed as they passed through cloud decks or frontal zones. Coating the balloons with wax or other substances has reduced their tendency to collect moisture in ground tests. Lally hopes that this treatment, combined with an increase in free lift to counteract the weight of ice that forms in spite of the coating, will enable the balloons to stay up for as long as six months.

The next phase in development of an operational GHOST system will be an experiment in which a satellite interrogates the GHOST balloons and relays their data to a ground station. This experiment, which is in the planning stage, is being developed by NCAR and ESSA scientists in collaboration with satellite specialists from the National Aeronautics and Space Administration.