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FOR IMMEDIATE RELEASE

Boulder, Colo. -- A balloon launched on a test flight from New Zealand by scientists from the National Center for Atmospheric Research (NCAR) has completely circled the globe and is well on its way around for the second time.

This accomplishment was announced last Friday (April 22) by Vincent E. Lally, of the NCAR Scientific Balloon Facility, in a talk presented to an international meeting of meteorologists and atmospheric scientists in Geneva, Switzerland.

The globe-circling balloon was one of a series of GHOST (Global HOrizontal Sounding Technique) balloons launched from Christchurch, New Zealand, by a group of NCAR scientists and technicians who are conducting large-scale tests of the GHOST balloons. It circled the Southern Hemisphere in 9 days and 23 hours, passing over South America, Australia, and vast expanses of empty ocean. The balloon had no artificial means of propulsion; it was carried by wind currents at an altitude of about 40,000 feet. As it made its journey, it was tracked electronically by monitoring stations in many countries.

The Southern Hemisphere GHOST balloon test is a joint effort of NCAR and the Environmental Science Services Administration (ESSA), working in cooperation with the New Zealand Weather Service and with an international group of volunteer observers. The project has been endorsed by the World Meteorological Organization (WMO) as the first step in developing a system for collecting meteorological data from all of the earth's atmosphere.

Why is such a system needed? One of the biggest problems in meteorology is the lack of effective methods for predicting the weather on a long-range global basis. As most of us know by experience gained from rained-out picnics and frozen-up water pipes, even the short-term local forecast that we get by way of our newspapers and television screens occasionally seems to be pretty much of a hit-or-miss propositon.

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But the atmospheric scientists who practice what is called dynamic meteorology, which is based on the use of electronic computers to simulate the behavior of the atmosphere, believe that they may have the key to long-range weather prediction. By programming a computer with a mathematical model of the atmospheric general circulation, and then feeding in hundreds of thousands of bits of data describing the state of the atmosphere over all the earth's surface, the dynamic meteorologists believe that they can simulate the behavior of future weather phenomena at speeds far greater than the real speed of atmospheric processes. By making the weather happen in their computers before it happens in the real atmosphere, they hope to be able to predict the weather as much as two weeks in advance.

The dynamic meteorologists are constantly testing their mathematical models against the real atmosphere, and refining them on the basis of the shortcomings revealed by such tests. They may be close to the point at which their refinement of mathematical models will be limited by the speed and capacity of existing computers. Some computer specialists believe that it is now possible to design a "super-computer" which would be up to 50 times faster than any computer now on the drawing boards. A group at the University of Illinois, headed by Professor Daniel L. Slotnick, is in charge of a program to develop a super-computer called Illiac IV, which they hope will be able to perform a billion computations per second. NCAR scientists have been working with the University of Illinois group, as well as with computer manufacturers, to define future requirements in the atmospheric sciences for such a super-computer.

But no matter how good a mathematical model is devised and how fast a computer is built, computer simulation of the future behavior of the weather can be no more accurate than the input of data which describe its present state. Only one-tenth of the earth's surface is now equipped with adequate weather observing stations. Meteorological satellites, such as the ESSA I and ESSA II which went into orbit early this year, provide photographic coverage of large-scale cloud patterns over all the earth, including the previously unobserved nine-tenths. These satellites have provided a great quantity of badly needed information, both about the basic nature of cloud systems and about forthcoming large-scale weather phenomena, including hurricanes. But the satellites cannot provide the constant input of basic data on the state of the atmosphere, including such things as humidity, temperature, pressure, and wind that the dynamic meteorologists need to feed their hungry computers. Thus there is a pressing need for a global weather observing network which can supply a steady stream of data from points distributed over every part of the globe, land or water, inhabited or uninhabited.

The GHOST project represents a joint effort by NCAR and ESSA to develop such a system. It is based on the somewhat startling concept of a fleet of 10,000 or more free-floating GHOST balloons, each equipped with weather instruments and a radio transmitter, drifting for months at predetermined levels over all the earth's surface. An operational GHOST system would include at least two earth-orbiting relay satellites, which would interrogate each GHOST transmitter in turn and would automatically relay the weather data and the balloon location back to a ground station. The data from the GHOST balloons, along with observations from conventional weather stations and unconventional means of observation such as instruments mounted on buoys floating in the ocean, would be fed into the super-computer, which would be programmed with the mathematical model devised by the dynamic meteorologists. The computer would then supply a continuously updated weather forecast, which would extend two weeks into the future and would cover the whole world.

Admittedly, this sort of GHOST system lies many years in the future. The super-computer has not been built, the mathematical models are still too crude, and the satellite relay has not been designed.

But the GHOST test flights in the Southern Hemisphere, including many successful shorter flights as well as the dramatic trip around the world, are the first step toward success. These flights are proving the feasibility of using long-lived constant-level GHOST balloons to collect weather data over large areas of the surface of our earth.

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