aerospace

Gifts for Skylab student experiments

Cash gifts NASA has received since 1959 totaling $5,548 will be used to help pay for 19 Skylab student-experiments to be operated—now on a reduced basis—during the three manned missions (SN: 5/5/73, p. 294). Twenty-five students from across the United States won the chance to have their experiments carried out in weightlessness. The experiments range from spider-web weaving to studying the stars. Of the 25 winners, 19 have actual hardware or experiments on board. The total cost, including design and fabrication of hardware and analysis of the data returned, will be around $200,000.

NASA is authorized by the Space Act of 1958 to accept unrestricted gifts. Over the past 15 years, individual gifts have ranged from $1,500 to 35 cents from an eight-year-old boy who heard NASA was having to delay a launch because of lack of funds.

Passengers to rate jetliners' rides

How a pilot rates an aircraft under all kinds of flying conditions is crucial to flight research programs. But now NASA's Flight Research Center in Edwards, Calif., wants to know what passengers think of their rides. NASA thinks the information may smooth the ride of future passenger aircraft, a possibility veteran riders look forward to.

The responses of 30 volunteers to various measured motions of the aircraft are being recorded and compiled to determine a common reference basis and standard for the entire aircraft industry. Artificial motions of the aircraft during flight are controlled by pre-programmed tapes. The motions include turn-and-bank maneuvers during climb and descent, as well as pitch, roll and yaw maneuvers. The passengers at the time are reading, writing, eating or drinking while they rate the ride.

Learjet version of supercritical wing

The supercritical wing, developed by Richard T. Whitcomb of NASA's Langley Research Center, has been successfully tested in more than 75 flights on several types of aircraft over the past two years (SN: 7/17/71, p. 41). The wing shape, relatively flat on top and rounded on bottom, delays the rise in aerodynamic drag and increases aircraft efficiency by 15 percent. The F-111 has been modified to incorporate the wing design, and joint NASA-Air Force tests are expected late this summer.

But the wing also has commercial aviation use. William P. Lear, developer of the Learjet, says the supercritical wing will increase the cruising speed of his plane almost 10 percent and the range by 20 percent without any increase in power or gross weight. LearAvia Corp. of Reno, Nev., is developing the Learjet version of the wing.

Taking earth's temperature from space

NOAA 2, an environmental satellite, is now taking 1,200 to 1,400 temperature soundings of the earth's atmosphere daily and transmitting the readings to ground receivers. From the ground receivers they are distributed to weather stations around the world. The satellite covers every portion of the globe twice a day, providing atmospheric temperature measurements over land and ocean in clear areas up to an altitude of 20 miles. The measurements are used to calculate the vertical temperature distribution from which is derived total moisture content—information extremely useful in weather forecasting.

earth sciences

Cyclone shape is related to its course

Inspired by a 1966 study of sunspots, two Massachusetts Institute of Technology scientists have discovered that there is a relationship between the shapes of cyclones and anticyclones and the directions in which they move.

While using sunspots to study the general circulation of the solar atmosphere, Frederick W. Ward Jr. of the U.S. Air Force Cambridge Research Laboratory found that longitudinally elongated sunspots generally seemed to move faster in a longitudinal direction than did those of other shapes.

The MIT researchers, Hilda T. Storari and Norman J. MacDonald, decided to see if there was a similar correlation for cyclones and anticyclones in the atmosphere of the earth. A study of U.S. Weather Bureau pressure distribution maps for 1959 through 1962, the meteorologists report in the May 20 JOURNAL OF GEOPHYSICAL RESEARCH, has revealed just such a link.

"Over most latitudes," they found, "the systems usually move more rapidly in the direction of their major elongation." The east-west-oriented systems moved eastward much more rapidly than the north-south ones, and somewhat more rapidly than the relatively round ones. Round cyclones moved poleward more rapidly than either asymmetrical shape, but the north-south systems were still faster than those elongated in an east-west direction.

Getting to the heart of cloud seeding

One of the major reasons that cloud seeding is still a controversial activity is the difficulty of measuring just how much of the precipitation in a given area is actually due to water condensing around the crystals deliberately seeded into the clouds, rather than around natural nuclei. Some help may come from a new technique for locating and analyzing the nuclei of ice crystals.

The key is to look at the crystals with a scanning electron microscope, which works by bombarding the sample with a stream of electrons. This causes the elements in the nucleus around which the crystal has formed to emit characteristic X-rays. Thus, according to Farn P. Parungo and Rudolf F. Pueschel of the National Oceanic and Atmospheric Administration's Atmospheric Physics and Chemistry Laboratory in Boulder, Colo., by combining the microscope with an X-ray analyzer, "it is possible to obtain data about the shape of an ice crystal and the exact location and chemical composition of potential nuclei within the crystal in one operation." Such information, they suggest in the June 8 SCIENCE, could help researchers determine if the silver iodide crystals seeded into the cloud indeed caused the water vapor to condense, rather than dust or other natural nuclei.

Shaking up the quake-watchers

Several major seismological and earthquake research programs have been transferred from the National Oceanographic and Atmospheric Administration to the U.S. Geological Survey in an effort to consolidate Federal quake studies.

The Earthquake Mechanism Laboratory in San Francisco, the Seismological and Geomagnetic Research Groups in Boulder, Colo., and the Special Projects Party in Las Vegas (which studies underground nuclear blast effects) have been moved to the USGS. The Seismological Field Survey in San Francisco will be managed by the USGS under the direction of the National Science Foundation.