aerospace

SPACE PHYSICS

Studying Encke's comet

Scientists believe that comets are composed largely of ice and hydrogen. They have detected giant hydrogen clouds surrounding comets (SN: 5/23/70, p. 508). They can calculate the comets' orbits and study their tails, which are apparently composed of material dispersed from the comets. But they do not know what determines the dispersion rate.

When the spacecraft Mariner 4 passed through the orbital path of the comet Encke, it detected dust particles. On Feb. 23 the earth crossed (as it does every three and one-half years) the orbital plane of the comet Encke. During that time experiments were scheduled to study the comet's dust.

Drs. Sherman Poultney of the University of Maryland and Eric Silverberg of the University of Texas' McDonald Observatory have calculated a model of how some of the dust would reach the earth if the comet were giving off dust. The National Aeronautics and Space Administration was to launch an Aerobee rocket to collect some particles or at least obtain signatures of the dust. (It is known that dust does accumulate in the earth's upper atmosphere, but whether it is from comets or other phenomena is not known.)

Dr. Robert Roosen of NASA's Goddard Space Flight Center has been studying the gegenschein, the faintly glowing region in the direction opposite the sun, for the last four years. He was to try to see any darkening of the gegenschein that might be caused by the comet's dust.

If observations can be made of the dust both in and out of the earth's atmosphere, scientists could calculate the rate of dispersion, which would give a key to the comet's composition.

RADAR SOUNDER

Approved for Apollo 17

An experiment of high priority that had been scheduled to fly on Apollo 19 before that flight was canceled was approved last week to fly on Apollo 17 in December 1972. The instrument, the lunar radar sounder, will be contained in the orbital science package operated by the command module pilot while the lunar module is on the surface.

The lunar surface has been bombarded, altered and formed at different rates throughout the moon's history. The sounder will be able to probe into the moon, to a depth of one kilometer, to measure and map the depth of the lunar regolith, determine any bedrock interface and look for subsurface structure, discontinuities or layers. If there are ice or frost pockets or cavities, the sounder should be able to find them. The returned data will aid scientists in reconstructing the events that have happened on the moon since its formation.

The system will use frequencies of 5, 15 and 50 megahertz.

"We are delighted that we have finally been able to resolve the schedule and cost problems and reach a satisfactory experiment design so that we can fly the experiment," says Floyd Roberson, project scientist for the Apollo orbital experiments at NASA Headquarters in Washington. The principal investigators for the sounders are Dr. Stanley H. Ward of the University of Utah in Salt Lake City and Walter E. Brown Jr. of California Institute of Technology's Jet Propulsion Laboratory in Pasadena.

X-RAY ASTRONOMY

Crab nebula pulsar

Ever since its discovery, the pulsar in the Crab nebula has been an object of astronomical interest. Scientists believe that the pulsar is producing high-energy particles which account for its cosmic-ray emissions.

Scientists also believe that high-energy particles in the nebula produce visible radiation through acceleration by a magnetic field in the nebula because of the strong polarization of the optical emission.

NASA launched a recoverable X-ray polarimeter Feb. 21 on an Aerobee rocket to determine whether or not the X-rays from the pulsar are also produced by this magnetic acceleration process. If the X-rays are, the experimenters expect to see an X-ray polarization of about 12 to 20 percent.

AIRPORT SAFETY

Runway condition tests

Although not classified as a serious problem, slippery or icy airport runways were partially at fault in 75 general aviation and two air carrier accidents in 1969.

In a joint NASA-Air Force runway traction program conducted at NASA's Langley Research Center in Hampton, Va., engineers have come up with a solution already being used by at least 18 commercial airports and by 35 to 40 Air Force bases.

A conventional car is equipped with a diagonal braking system in which the front right and back left tires are braked or vice-versa. The locked tires are slick while the other two are left with tread. This system results in less fishtailing and weaving, thus allowing more accurate measurements.

The car is then used to test surface characteristics of airport runways under various types of weather conditions. The data can then be used to make accurate prediction of stopping distance and cross-wind limitations for different kinds of aircraft.

LUNAR ROVER

Finishing touches

The Lunar Roving Vehicle, a four-wheeled, 480-pound, battery-powered jeep (SN: 9/12/70, p. 215) designed to operate in one-sixth gravity, will go through a crew review this week at the Boeing Co. in Seattle.

Apollo 15 Astronauts David R. Scott and James B. Irwin and backup crewmen Richard F. Gordon Jr. and Harrison H. (Jack) Schmitt will walk through the equipment procedures to be used on the moon. The rover, to be delivered to Cape Kennedy April 1, will allow exploration of 28 square miles of the Hadley Rille/Apennine region during three six- to seven-hour periods outside the LM. The crew will be on the moon for three days.