SPACE

Fourth Orbital Spaceflight

Advance information on the objectives of the fourth U.S. orbital spaceflight planned for 22 orbits with Astronaut L. Gordon Cooper at the controls has been provided.

➤ THE fourth Atlas-boosted manned orbital space flight, Mercury-Atlas 9, piloted by Astronaut L. Gordon Cooper, is the first aimed at an original objective of the Mercury program, manned one-day space flight.

MAIN OBJECTIVES—Study effects of approximately one day in orbital flight on the astronaut; verification that man can function in space as a primary "system" aboard the spacecraft for an extended period of time; and evaluate the combined performance of the astronaut with a Mercury spacecraft modified for a full-day mission.

ORBIT—Covers more than 100 countries. Altitude range from 100 miles (perigee) to 170 miles (apogee). If the mission continues through the 22nd orbit, landing will be 80 miles southeast of Midway Island.

MEDICAL STUDIES—The 22-orbit mission will allow evaluation of man's cardiovascular system response to extended orbital flight conditions. In addition, observations will give information during flight of the pilot's water balance, body temperature and blood pressure. ECG readings will be made with four sensors located on the torso and the effects of exercise on cardiovascular functions will be evaluated.

FOOD—Food supply consists of ready-to-eat, bite-sized food and experimental Gemini-type dehydrated food. Food supply will total 2,376 calories.

EXPERIMENTS:

Flashing beacon—To acquire data on visual capabilities at various distances in the space environment.

Dim light phenomenon—To gather photographic data on Zodiacal light.

Radiation measurement—To measure radiation at Mercury orbital altitudes. This will give additional information on the decay of the artificial radiation belt created by high altitude nuclear detonations.

Tethered balloon—To measure atmospheric drag and obtain data on atmospheric density of different regions. The balloon will also provide a conveniently located space object for tracking and ranging after its release from the towed position.

Infrared weather photography—To obtain photographs for studying weather phenomena from orbital altitudes and to provide information on spectral characteristics of the cloud and earth radiances.

Television evaluation—Carried for the first time to test its operational value for monitoring the pilot's well being, observing tests and external phenomena through the spacecraft window.

The MA-9 spacecraft is provided with survival equipment consisting of a life raft, desalting kit, shark repellant, dye markers, signal mirror, rations and ten feet of nylon cord, among other items.

The Mercury spacecraft after insertion in orbit in the vicinity of Bermuda travels at 17,500 miles per hour. During reentry the spacecraft speed slows to 270 miles per hour in a little more than five minutes, while covering a slant distance of about 760 miles between 55 and 12 miles altitude.

At impact, after 22 orbits, at a point some 170 miles southeast of Kyushu, Japan, the main parachute and reserve chute are jettisoned. On board electrical equipment shuts down and dye marker, beacon and flashing light are activated.

Throughout the mission, flight progress is continuously evaluated and contingency landing areas have been established. Worldwide Mercury tracking stations, including 19 land stations and U.S. ships at sea, are monitors for the MA-9 flight.

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NASA

SPACEMEN CONFER — Astronauts John H. Glenn (left) and L. Gordon Cooper discuss the helmet and gloves especially developed for Project Mercury to provide maximum comfort and mobility.

GEOPHYSICS

Whistling Noises Give News From Atmosphere

➤ THE ATMOSPHERE whistles while scientists work.

Series of whistles—short or long, going up scale or down—keep radio scientists busy deciphering their messages of the density of charged particles in the outer regions of the earth's atmosphere.

The whistling radio waves bring news from a high area that only extremely expensive techniques can reach, Dr. Robert A. Helliwell, Radioscience Laboratory, Stanford University, stated at Washington, D. C.

Generated by lightning as it strikes the earth, the radio waves are propagated back and forth in the atmosphere of the earth, in a north-south direction, Dr. Helliwell said at a meeting of the U.S. National Committee of the International Scientific Radio Union.

By analyzing the duration of the whistle tone, the length of time it lasts, and the changes as it slides up or down the musical scale, Dr. Helliwell said that scientists could construct a model of the earth's atmosphere 3,500 to 5,000 miles high.

These whistles are recorded at the rate of one or two every second, or once in every few days, at stations that stretch along the meridians from Greenland and Alaska to the South Pole.

Another type of atmospheric radio noise is the "chorus" that sounds like the chirps of birds at dawn, or frogs and peepers in a marsh.

This noise is more continuous, and is associated with the solar gas streams or precipitation of solar winds, Dr. Millett G. Morgan, Thayer School of Engineering, Dartmouth College, stated.

Unlike the "whistles" whose origins are spots on earth where lightning strikes, the "chorus" originates somewhere in the ionosphere, that region of electrically charged air beginning about 25 miles above the surface of the earth.

This is the electric layer by which radio waves are bounced back to earth for long distance transmission.

The "chorus," as well as hisses and other ionospheric noises, falls upon earth in relatively steady and long streams, Dr. Morgan said at the radio meeting.

At the Byrd Station in Antarctica, scientists are finding that hissing radio noises erupt at the same time as the visual displays of the aurora borealis.

Sun flares may trigger the amount of magnetic disturbances, radio noises, signals, aurora borealis and other phenomena that are felt on earth, both scientists agree.

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ARCHAEOLOGY

Nitrogen Tests Aid In Dating Fossils

➤ THE AMOUNT of nitrogen found in bones, antlers and teeth of prehistoric animals can help scientists estimate how long ago the animals lived.

The nitrogen test is an auxiliary to the radiocarbon test for dating ancient fossils, Dr. Kenneth P. Oakley, British Museum of Natural History, London, reported in Science, 140:488, 1963.

The nitrogen content is an index of the protein in the ancient bone. By evaluating the amount of nitrogen in a piece of old bone, scientists can then determine the amount of organic carbon content.

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