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News Release

GRADUATE RESEARCH CENTER OF THE SOUTHWEST

2400 NORTH ARMSTRONG PARKWAY, RICHARDSON, TEXAS

MAIL ADDRESS: BOX 30365, DALLAS, TEXAS 75230

AD1-1471
Extension 25

Al Mitchell
Director of Information

RELEASE ON RECEIPT

TWO MOON-ATMOSPHERE INSTRUMENT PROGRAMS NOW AT GRADUATE RESEARCH CENTER OF THE SOUTHWEST

Two programs to measure the gases of the Moon's ultra-thin atmosphere are now underway at the Graduate Research Center of the Southwest in Dallas.

Two types of instruments are to be designed for transport to the Moon by Apollo astronauts on their first, or early flights. One is a 10-pound coincidence mass spectrometer. The other instrument is a cold cathode ionization gauge system weighing about 7 pounds.

The CMS program was announced in September, 1965, and is being carried out under a National Aeronautics and Space Administration grant.

The CCIG program was approved late in May, and will be undertaken jointly by the Graduate Research Center and the NASA Manned Spacecraft Center at Houston. Funding in the NASA-MSC grant is $420,000.

Prof. Francis S. Johnson, head of the Earth and Planetary Sciences Laboratory at the Graduate Research Center, is the principal investigator for GRC in both projects. In the CMS program, he is being assisted by Research Scientist Glen H. Riley of the Geosciences division.

Co-investigator at Manned Spacecraft Center, for the CCIG program, is Dallas Evans, who heads the MSC Space Physics Section.

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A 1,200-pound coincidence mass spectrometer has been delivered to the Graduate Research Center as a first-stage completion in development of the one Moon instrument. The large instrument was built by Johnston Laboratories, Inc., of Baltimore, Md., under sponsorship of the Atomic Energy Commission and the U. S. Air Force.

The task at GRC will be to retain or better the capabilities of the large laboratory instrument in a design that weighs 10 pounds. Power consumption will be about 10 watts, compared to the 6,000 watts needed by the laboratory unit.

The basic cold cathode ionization gauge will be furnished by GCA Corporation, located at Bedford, Massachusetts. The complete lunar system will include a 4,000 volt power supply and a logarithmic electrometer, from which telemetry data will be taken.

A time-scale of less than four years is imposed on both instrumentation projects, with Apollo flights scheduled to begin in 1970.

In both projects, the desire is to leave instruments on the Moon to determine the density of any ambient atmosphere, including variations that may be associated with "Moon-time" day and night or solar action; and to determine the rate at which contamination by lunar vehicles may disperse.

The Lunar Excursion Module (LEM) carrying Apollo teams to the Moon surface is expected to release as much as 5 metric tons of exhaust gases.

The experiments therefore are intended to operate for several months, until contaminating gases may disperse and the atmosphere can return to its steady state.

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Both instruments would be sealed when they are placed on the Moon, and will be designed to open automatically in about 48 hours (Earth-time) after the Lunar Excursion Module leaves. During the delay, severe contamination from both exhaust gases and the astronauts' space suits may reduce enough to permit useful measurements.

Instruments will be evacuated, baked out at several hundred degrees, and sealed under high vacuum before delivery to the Apollo launches, to reduce Earth atmosphere effects. A very small amount of gases remaining in the instruments actually will be useful, because it can be measured during the pre-flight checkout.

Measurements of the Moon atmosphere (believed to be one-millionth as dense as the Earth's) are of interest in atmospheric physics. In addition, such measurements are expected to supplement geological data gathered on the Moon, because the lunar atmosphere may have evolved from solid material. Volcanic action, or release of trapped gases by strong Earth-caused tidal forces that cause fault lines in the lunar crust to shift and slip are both possible contributors to the Moon atmosphere.

Bombardment of the lunar surface by energetic particles, by the high-temperature solar wind, and by meteors may also contribute to the atmosphere.

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