APOLLO 11

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FOR RELEASE: Immediately

Many months after man leaves the forbidding atmosphere of the moon, his instruments will still probe the mysteries of earth's celestial companion.

An extremely sensitive device called a cold cathode gauge instrument, developed at the Manned Spacecraft Center by Lockheed engineers in cooperation with NASA scientists, will tell the moon's atmospheric pressure and temperature.

The cold cathode gauge, a part of the Apollo Lunar Surface Experiments Package (ALSEP), will accurately measure pressures many times less than found on earth.

At the same time, the cold cathode gauge's sensitivity allows it to determine the rate of loss of gaseous contaminants left on the lunar surface by rocket exhausts or spacesuit venting.

Because of the severe environmental conditions to be experienced by the instrument gauge during its expected one year life, several qualification models were subjected to vigorous vibration and temperature tests prior to flight certification and delivery to the ALSEP prime contractor.

Working together with Lockheed Electronics' engineers in the development of the cold cathode gauge experiment were NASA's Dallas Evans and Dr. Francis Johnson of the Southwest Center for Advanced Studies in Dallas.

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FOR RELEASE: Immediately

LOCKHEED RECORDERS TO STORE AND PLAYBACK MARINER-MARS PHOTOS ON JULY 31

Eleven days after the scheduled landing of America's astronauts on the moon, another NASA spacecraft will fly by Mars giving man his second television look at the mysterious red planet. The first views of Mars were taken by Mariner IV in 1965.

Launched on February 24 of this year, the 850-pound, windmill-shaped, unmanned Mariner VI will arrive in the vicinity of Mars on July 31, five days before its sister craft Mariner VII, which lifted off from Cape Kennedy on March 27.

Aboard each spacecraft are two Lockheed Electronics Company-built tape recorders which will record and playback to earth television pictures and other scientific data.

The program, which is directed by the Jet Propulsion Laboratories, calls for each Mariner to perform six experiments--five designed to yield data on Mars' physical, chemical and thermal properties, the sixth to refine astronomical measurements.

The television experiment consists of photographing the surface and atmospheric features over as much of Mars as possible. This experiment will start cameras as each spacecraft approaches Mars. The first series of photographs will be taken of the entire planet with its disk appearing larger as the spacecraft draws nearer. Most of the surface will be photographed as the planet revolves beneath the approaching Mariner.

In the far-encounter, Mariner VI will take 50 pictures, while Mariner VII is programmed to take 91. Far-encounter TV sequence pictures will be recorded on Lockheed's analog tape recorder. Every seventh picture element, to aid analysis, will also be stored in Lockheed's digital unit which will simultaneously record all other science data.

Four hours after the first encounter, playback of the information on the digital machine will start and continue at 270 bits per second rate for 17 hours.

It is then stopped and the analog recorder, which has only TV data, will be played back at a high bit rate of 16,200 bits per second. One complete playback of the analog recorder will take two hours and 53 minutes.

After initial playback of data, the analog TV data will be transferred to the digital tape recorder and played back again at 270 bits per second.

Though these spacecraft will not determine if life exists on Mars, their TV photos may help solve such Mars mysteries as the straight line markings--termed canals by some observers--as well as other surface phenomena.

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FOR RELEASE: Immediately

REAL-TIME ANALYSIS SYSTEM SELECTS BEST APOLLO COMMUNICATIONS CHANNEL

Each time the transmission/reception conditions of the Apollo 11 trip to the moon change, America's three astronauts will have to determine the best communications system mode to talk to earth-based controllers.

A computer-aided analysis system, located at the Manned Spacecraft Center and developed by Lockheed Electronics Co., under NASA direction will help the astronauts select the right system mode. This communications analysis equipment aids channel selection throughout each mission phase--to and from the moon, in moon orbit and on the moon--and/or both command and lunar modules.

Developed for NASA's Information Systems Division, the analysis system makes rapid predictions of the Apollo communication system performance.

Using a system of displays and a console typewriter, an operator/analyst is able to choose particular configurations for antenna, sky-noise, environment, channel, mode configuration, and ground station which are converted to control data.

This information is then used to configure a math model of the selected communication system and to predict its overall performance. Based on this performance analysis, the astronauts/controllers are able to select an optimum system for communication with the ground-based network.

The analysis system has the optional capability to return to the start for a new computation iteration to modify the plots for direct use in reports and to generate hard copies of the displayed results.

The Apollo communication system utilizes a two-way coherent link to transmit a combination of voice, telemetry, command, and ranging data, requiring extensive analysis to assure successful operation.

This Lockheed Apollo 11 mission support effort will allow more reliable communications between the command module spacecraft and the Manned Space Flight Network (MSFN) ground stations.

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NASA SCIENTISTS OBSERVE SUN AS ASTRONAUTS HEAD FOR MOON

While most of the world watches the moon and America's Apollo 11 astronauts, some scientists will be giving the sun their undivided attention. Their purpose...to detect any solar flare which might produce radiation hazardous to the astronauts during their upcoming voyage to the moon.

The watch on the sun is maintained by a chain of six solar observatories, the NASA Solar Particle Alert Network (SPAN). Three of these stations are equipped with both radio and optical telescopes to monitor the sun's radiations. These three stations are at Carnarvon in western Australia; at the Grand Canary Islands, off northwestern Africa; and at the Manned Spacecraft Center in Houston, Texas.

While the radio telescopes are unaffected by cloud cover, this is not so in the case of the optical telescopes; so, three additional sites have optical telescopes only. Two of these, at Boulder, Colorado and at Culgoora in eastern Australia are operated under contract by ESSA. The third, at Teheran in Iran is operated by the United States Air Force. All these sites are linked to the Mission Control Center where radiation environment

specialists evaluate their reports and keep the flight director informed of the radiation effects to be expected.

Since the first lunar landing mission, scheduled to begin July 16, coincides with a period where there may be a high level of solar activity, the sun will be continuously monitored by the SPAN stations so that any radiation hazard to the astronauts, while on the surface of the moon or within the lunar module, can be detected. An early warning will enable the astronauts to return to the safety of the command module as it provides adequate shielding from the solar particles.

The radio telescopes monitor the sun at three selected frequencies in the microwave band - 1420, 2695, and 4995 MHz - using an 8-foot parabolic dish antenna which automatically tracks the sun from sunrise to sunset. The Houston telescope is operated by Lockheed Electronics Company under NASA's supervision. The data are recorded on strip charts, magnetic tape and punched tape, the latter being fed into the teletype for transmission to the Mission Control Center. The four-inch optical refractor is equipped with a narrow-pass band filter which enables the activity in the sun's hydrogen atmosphere to be monitored. The solar image is recorded on 35 mm film every ten seconds and the day's record can be shown as a movie.

Lockheed, under NASA supervision, is also responsible for the reduction of the film data from the optical telescopes. Several million pictures of the sun are now on file at MSC and

and each site is adding 200 ft. of film daily. Since man's knowledge of solar flares and the mechanism by which they can accelerate particles to high energies is still inadequate, the SPAN system is a magnificent source of data, as it provides almost continuous coverage of the sun with identical instrumentation, thus permitting studies of the evolution and development of the regions producing solar activity.

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FOR IMMEDIATE RELEASE

LOCKHEED NUCLEAR LAB SYSTEM TO HELP PROTECT ASTRONAUTS

DAWSONVILLE, Ga. -- A high range Cobalt-60 calibration system, developed by scientists at Lockheed-Georgia Company's nuclear division here, will help protect Apollo XI astronauts from the effects of space radiation. The system accurately calibrates nuclear radiation detectors installed on the moon-bound Apollo XI command module.

Radiation detectors installed on the spacecraft measure integrated radiation doses absorbed by the astronauts in space and detect increases in space radiation dose rates from radioactive areas such as the Van Allen belts.

The most important function of these detectors or dosimeters, however, is to measure dose rate increases due to solar flare activity. Solar flares can present a significant hazard to the astronauts in space. The radiation detectors allow ground control personnel to monitor radiation increases caused by flares and abort the mission if required to protect the astronauts.

Installed at NASA's Manned Spacecraft Center at Houston, Texas, the calibration system is electromechanical and pneumatic in operation. An electromechanical drive mechanism is used to remotely position a precision trolley system within a 30-foot-long concrete tunnel.

One of three Cobalt-60 sources is then selected and pneumatically transferred to the trolley in the tunnel. The sources are normally stored in a lead shield equipped with a rotating shield plug. After the trolley is positioned in the tunnel, a source position in the lead shield is programmed and the source is transferred into the tunnel. After a pre-set exposure time, the source is automatically returned to the lead shield. Source transfer time is adjustable from 250 milliseconds to 4 seconds.

(More)

Other contributions by Lockheed-Georgia nuclear scientists to the Apollo program include development of a meter to measure the quality of liquid hydrogen vented from the Saturn V booster and a nucleonic quantity indicator to measure water methanol accumulation in the Saturn instrumentation package.

John Bradburne, nuclear products and services specialist at Lockheed-Georgia's nuclear laboratory, is the project manager for the high range Cobalt-60 calibration system.

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