Deputy Director Elms To Return To Private Industry

George M. Low, NASA Hq., Named As Replacement

The decision of James C. Elms, deputy director of the Manned Spacecraft Center, to return to private industry was announced this past week by Dr. Robert R. Gilruth and as Elms' replacement, NASA has named George M. Low who is presently deputy associate administrator for Manned Space Flight. Low will assume his new duties as deputy director here at MSC when Elms leaves in February, and in addition will continue to act in his post as deputy associate administrator of MSFL until May 1.

Dr. Gilruth said that Elms decision to leave MSC was made after he had completed his primary mission of reorganizing the management structure of the space center here.

"Like all growing organizations, the Manned Spacecraft Center reached a point in its evolution about one year ago, where a major management reorganization was necessary to more expeditiously carry forward the Gemini and Apollo spacecraft programs," Gilruth said.

"Because we had a remarkable background and experience in the field of industry organization and general management, I requested Jim Elms to assist me with this task. I'm pleased, I think, to be able to have him fully reassume his career in industry when the job was completed. I have done an extraordinary job here," Gilruth said.

"Our center, our agency, and our nation owe him a debt for his accomplishment. I cannot adequately express to him my own deep and personal appreciation. I sincerely wish that he could be persuaded to devote further time with us, I do understand, however, the urgency of the personal considerations which compelled him to set a time limit on his service to our center."

"We worked on the management structure for about one year and announced our reorganization on November 1. We have since noted with great satisfaction the (Continued on page 3)

Design Submitted To MSC For Mars Return Vehicle

Astronauts making a trip to Mars in 1975 may carry quite a bit of "excess baggage." However, they won't mind having it around, for they couldn't get back home without it.

The "excess baggage" may be a space vehicle made up of portions of a bluntly circular cone and an elliptic cone, fitted together. This odd vehicle will do nothing much but "go along for the ride" for most of an approximate 400-day mission. But, for the final eight hours of the mission -- near Operations Wing, Lobby and an Administration Wing. It's three stories high and contains 245,000 square feet of space.

In addition a 6,300-square-foot MCC Mechanical and Electrical Control Building has been constructed and heating plant expansion is in progress under terms of the MCC building contract.

Two mission control rooms, located on the second and third floors, are in the windowless operations wing. The rooms, similar in configuration, each contain 7,800 square feet of space. Identical control rooms are required because of the detailed control preparation that will go into the missions, frequency and length of the flights and the extensive training programs that are essential to mission success.

Gemini rendezvous and

(Continued on page 3)

John Glenn Resigns From Space Program

John H. Glenn Jr., one of the original seven Mercury astronauts and the first American to orbit the Earth, resigned from his assignment with the NASA Manned Spacecraft Center, effective at noon on January 16.

The request to be relieved of his assignment with NASA was submitted by Glenn to Dr. Robert R. Gilruth, director of MSC, who granted the request.

Dr. Gilruth praised Glenn for his outstanding contribution to the manned space flight program and wished Glenn and his family every happiness.

With the resignation of Glenn, six of the original seven astronauts remain and they, along with the other two groups selected, make a total of 20 astronauts to fill the flight requirements for the future Gemini and Apollo flights.

Glenn, a lieutenant colonel in the U. S. Marine Corps, was assigned to the Manned Spacecraft Center in April 1959 after his selection as a Project Mercury astronaut.

(Continued on page 6)

MCC Moves Step Nearer Completion

The nerve center of the world-wide tracking network which will be used to control the later Gemini and future Apollo missions has moved a step nearer completion in recent weeks at the Clear Lake site.

The Manned Spacecraft Center's Mission Control (MCC) reached a point in the construction which permits cable and pneumatic tube installation by the Philco Corporation, prime contractor for flight control equipment.

The control center complex consists of a Mission Center shrine, two mission control rooms, located on the second and third floors, are in the windowless operations wing. The rooms, similar in configuration, each contain 7,800 square feet of space. Identical control rooms are required because of the detailed control preparation that will go into the missions, frequency and length of the flights and the extensive training programs that are essential to mission success.

Gemini rendezvous and

(Continued on page 3)
Flight Control, Plans, Provides Training For MSC Missions

During the upcoming Gemini flights, members of the Flight Control Division of the Manned Spacecraft Center will have as their fundamental aim the safety of the astronauts and the successful completion of the missions.

This division, headed by John D. Hodge, is part of the Flight Operations Directorate under Christopher C. Kraft Jr. and is responsible for the planning, training, documentation, and provision of flight control support for all MSC spaceflight missions.

Areas of responsibility include establishing requirements for ground instrumentation and for providing the MSC point of contact for coordinating the implementation of these requirements to meet operational schedules.

Other functions of the Flight Control Division include furnishing requirements to the Ground Systems Project Office for the mission control center and the necessary interface with the network and the launch facility, and for assisting the Mission Planning and Analysis Division in the development of mission logic for real-time and simulation computer programs for mission control.

This ground-based system of people and equipment is designed to provide the link between the Operations Director, who is in charge of the mission, the Flight Director and the astronauts, who control the spacecraft. The continuous monitoring of the mission status and flight systems provides the Flight Director with a course of action to ensure the safety of the crew in a normal situation. The monitoring, the analysis, the decision-making and the action must all take place while the mission is in progress.

Flight Control Division is divided into three branches: Flight Control Operations, Operational Facilities and Mission Control Center.

The task of Flight Control Operations covers the premission preparation phase and terminates with the recovery of the spacecraft and crew.

Areas of responsibility include preparation of the ground crews prior to launch, which covers the detailed development of flight plans, countdowns, mission rules, and training of personnel in vehicle systems and ground network operations.

This group, with Eugene P. Kranz as its head, directly supervises and coordinates the mission real-time ground support. They supplement the vehicle systems analysis capability of the spacecraft crew, primarily by the compilation, reduction, and evaluation of telemetered and voice data from the spacecraft and its crew.

The Flight Control Operations also assists the spacecraft crew in obtaining the mission objectives by participation in the development of an optimum flight plan. This includes the provision and coordination of real-time ground support necessary for execution of this optimum flight plan and modification of the flight plan in real-time as required.

Another phase is participation in postmission analysis, recommendations and the preparation for subsequent flight programs.

The Operational Facilities Branch, Dennis E. Felder, head, is responsible for the concepts, planning, development, and specification for all facilities required for the operational support of all manned missions.

Facilities included in the area of responsibility are NASA, DOD and other sites or facilities incorporated for the operational support of manned missions of space flight programs.

These facilities, interconnected with communications and data links, controlled from the Mission Control Center, are the Manned Space Flight Network.

Some of the major systems of this network are tracking, telemetry, command (up-data), voice communications, and data transmission and processing.

This branch also develops the ground support requirements for all manned space flight programs and determines the operational compatibility between the spacecraft and the ground operational support. Another duty is the preparation of the related ground support system documentation.

In addition, the Operational Facilities Branch provides engineering services to the other elements of Flight Control in the resolution of operational system design trade-offs, information, data flow, and frequency management coordination.

The Mission Control Center Branch under Tecwyn Roberts is responsible for the building of the Mission Control Center (MCC). Tasks of this group include determining operational requirements for the MCC, evaluating requirements levied on the MCC by other branches, monitoring the equipment design and providing flight dynamics personnel for the operating positions in the MCC.

This branch, responsible for overall Clear Lake MCC and Cape MCC operational requirements, is concerned with the requirements for the Clear Lake MCC communications system, the visual display system and the expansion of the Mission Control Center at Cape Kennedy to support the early Gemini missions.

Also determining requirements upon the two Mission Control Centers, and the Gemini and Apollo spacecraft insures adequate protection of the mission with respect to flight dynamics, and determining requirements of the Clear Lake MCC Display and Control System.

Another area of responsibility is the requirements placed on Clear Lake MCC-Simulation Checkout and Training System, SCATS provides a facility for training of the flight controller within the MCC and the Ground Operational Support System remote sites.

This branch ensures that the flight crew trainers are interfaced with the SCATS to provide integrated flight controller and flight crew training.
**Elm**

(Continued from page 1)

increased efficiency that is now being generated by the management team, "Gil- ruth said.

I have enjoyed my tour of MSC and my association with Bob Gilruth more than any other year of my career," Elm said. "I believe that MSC is a manag- erial team that I consider to be unparalleled in the country. I am certainly the team that will get us to the moon and back suc- cessfully.

Elm said his future plans would be announced shortly.

Dr. George E. Mueller, associate administrator for Manned Space Flight in Washington, said, "George Low has had a strong right arm for me in Washington." The smooth transition dur- ing our recent management re- structuring of this highly ranked office will be reassured.

Low's chair at Headquarters, but now that his background and tal- ent are needed to other programs, this is an opportunity for me to give you further assurance that we will be successful in continuing the major programs of the manned lunar landing program."

Dr. Robert G. Gilruth, director of the Manned Spacecraft Center, stated, "I am delighted to have a manager who has capable management capabilities and long ex- perience in manned space flight." He added, "I have been in Houston as my deputy. He was chairman of the Select Committee which performed the original studies leading to the manned space program, and he is thoroughly familiar with all aspects of our program."

Low joined the National Advisory Committee for Aeronautics in 1942, four years after it became the National Aeronautics and Space Administration. At that time, he was assistant administrator for Manned Space Flight, and in 1946, he was assigned to the head- quarters office as assistant director of the Manned Space Flight Programs. Since that time he has held several positions of increasing responsibility, including the National Aeronautics Headquarters of Manned Space Flight, culminating in his current position as associate administrator for Manned Space Flight in 1962.

Low will be responsible to the associate administrator for Manned Space Flight in Washington. He will have direct control of all management and direc-

**Mars Vehicle**

(Continued from page 1)

Apollo a kilometer away. The pressure readings were run by Mercury Control at Cape Canaveral (now Cape Kennedy).

MCC will be the focal point for the entire ground operational support sys- tem. It will include the spacecraft and the network of worldwide tracking sta- tions. The center will consist of several major electronic subsystems: communica- tions, displays, computers, simula- tion and training, and emergency systems. The complex will also be integrated into an operational sys-

The computer complex and com- munications center will be located on the first floor. The computer will inter- connect data displays that will provide quantities of real-time data which can be plotted and displayed on huge control panels. The displays will use television and back- lighted projection tech- niques extensively. Fewer than 20 controllers will be in the control room during a flight, but upwards of 250 technical and admin- istrative people will be in- volved in carrying out sup- porting functions in adjacent rooms. These include recovery control, communica- tions, meteorology, terrain, trajectory data, network support, life support and vehicle systems personnel.

The real-time computer is being built by the Federal Systems Division of International Business Ma- chines Corporation, Bethesda, Md., under a $230,000 contract for fixed fee equipment.

Completion of the computer complex from the Weather Man has sent the control center rocketing toward completion ahead of schedule. If no significant delays occur, flight control engineers will occupy the Administration Wing of the complex by mid-64. Per-

A NASA contract, entry speeds up to 65,000 feet per second had to be con- sidered for a return from a 1975 Mars mission!

By comparison, the Mercury control station used the Earth's atmosphere only; 26,000 feet per second. Apollo flights will be sub- jected to the slightly higher rate of 36,000 feet per sec- ond.

Thus, Earth re-entry heating rates will be very high. Air temperatures can be as high as 20,000 degrees centigrade, compared to the Sun's surface temperature of 6,000 de- grees!

Protection from this heat will come from a shield of ablating material of advanced design. This material, about 3 inches thick, will absorb the incoming heat.

New Concept in Vehicle Re-Entry Design--This preliminary design for a 1975 Mars mission Earth re-entry vehicle was conceived by the Lockheed Missiles & Space Company for NASA's Manned Spacecraft Center. It could return as many as six astronauts to earth, after being detached from the main mission module eight hours before the end of a 400-day trip.

The concept is designed for parabolic re- entry, as in the Apollo series, and surface landing. Emergency water landing would be avoided.

Perceivable atmosphere will be entered at about 400,000 feet altitude at an entry angle of approximately seven degrees. The vehicle will pull out of its trajectory at about 200,000 feet, and decelerate in level flight.

At this point, reaction jets -- actually rockets -- will control the vehicle's attitude. Manoeuvering will be done by rolling the ve- hicle to control the direc- tion of the lifting force. This will allow the selection of wide- ly-separated, alternate landing sites.

For example, a down-range flight of 10,000 nautical miles may be achiev- able, with a cross-range movement of 1,000 nautical miles. This means that if the original landing site had to be changed, the alternate landing point could be as far away as Woomera, Australia!
Mercury and Apollo Escape Rockets Developed

At precisely 9 a.m. last November 7, the stillness at White Sands Missile Range was shattered by a rocket's roar, and four angled bright yellow columns of fire thrust the Apollo boiler-plate spacecraft into the sky. Simultaneously, a smaller flame shot out at right angles near the nose of the launch escape system to shove the vehicle into a curving flight path.

As NASA MSC observers watched, including Dr. Robert R. Gilruth and Dr. Joseph F. Shea, the two Lockheed Propulsion Company solid propellant rocket motors completed their assignment in the first launch test of an active Apollo system. Seconds later, the vehicle coasted for a distance of nearly a mile, and a jet- tisoned motor fired to remove the escape tower. A series of parachutes lowered the spacecraft to a soft landing on the desert floor.

The successful pad abort test was the most spectacular milestone to date in Lockheed Propulsion Company's assignment, as a subcontractor to North American Aviation's Space and Information Systems division, to develop and perfect the launch escape motor and pitch control motor which will safeguard lunar astronauts on Apollo missions.

Preceding this test were an integrated "tie-down" firing of the escape system, and a large number of individual static firings of each of the Lockheed motors. Still ahead, lie in-flight tests after launch atop Little Joe II and Saturn vehicles. Only after the system passes these tests, and sufficient data is gathered on additional qualification ground tests, will it be considered "man rated" for its vital Apollo mission.

The larger unit, the launch escape motor, is about two feet in diameter and 15 feet long. When the nozzle assembly is added the overall length is 18 feet. Containing a bit less than two tons of propellant, the motor develops 155,000 pounds of thrust. Burning time is 8 seconds. The pitch control motor can be lifted by one man. It weighs considerably less than 100 pounds, and burns for just half a second.

Design and manufacture of these motors takes place at Lockheed Propulsion's headquarters at Redlands, Calif., 65 miles east of Los Angeles. A 750-acre site there is devoted to research, development, testing of smaller motors, and production. Twenty miles southeast near Beaumont, the 3,000-acre Potrero facility is currently the scene of Apollo launch escape motor firings. It also houses a 20 million electron volt X-ray unit used to seek out propellant grain cracks or other defects in Apollo motors.

Future plans for Potrero include establishment of large motor production. The company also owns a second large test site, some 2,500 acres, in the Beaumont area.

LPC's staff presently numbers about 700 persons, many with advanced technical degrees. The company is a division of Lockheed Aircraft Corporation, with the full support of that organization.

Because it is one of the firm's top-priority programs, Apollo receives much personal attention from LPC President Robert F. Hurt, who acted as full-time program manager during early stages, and
developed by Lockheed

from G. R. Makepeace, vice president and technical director. But Apollo at Lockheed is really the baby of Irwin A. Spitzer, program manager, who began as senior project engineer at the program's inception in February, 1962. Working with him is Thomas G. Flock, now senior project engineer. Spitzer and Flock are among the most pleased observers at the pad abort test.

Spitzer, a recognized authority on launch escape systems with previous experience on the similar job LPC performed for Project Mercury, believes that their design philosophy requires an approach quite different from that taken to the average solid propellant motor. In a paper presented to an American Institute of Chemical Engineers meeting at Galveston, Texas, he explained that "...achieving high reliability outweighs all other considerations." Only thoroughly proven propellants, concepts, hardware and fabrication methods can be considered. Design, therefore, is conservative.

This approach paid off on the Mercury escape rockets. Fortunately, Lockheed's motors never had to be fired in an emergency. Nevertheless, they were fired on each of the manned flights in self-jettisoning procedures, and performed perfectly each time. In all, there were 24 consecutive successful firings of the Mercury rocket motor.

Such reliability has been a keynote of the firm's 12-year record. Early achievements included the upper stages which placed Explorer I and Vanguard satellites in orbit, SWORD rockets used for staged separation of the Titan, second-stage motors for Nike-Zeus, JATO rockets, and the JAVELIN and VIFPER series of supersonic sled rockets used in experiments with G-forces.

Along with reliability, the firm has stressed cost consciousness. Its current Apollo efforts reflect the results of an eagle-eye recruiting by the company's formal cost reduction management organization, as well as of participation in an Apollo team cost reduction campaign coordinated by North American.

This spring, near the time of the next flight test of the Apollo launch escape system, Lockheed will test at its Portero site a 156-inch diameter motor containing two-thirds of a million pounds of propellant and developing nearly a million pounds of thrust. This feasibility demonstration, funded by the Air Force but under joint sponsorship with NASA as part of the national space program, will kick off a new generation of giant solids. It could unlock the door to multimillion-pound-thrust solid booster rockets for a multiplicity of military and civilian space assignments.

As LPC's Spitzer pointed out in his talk at Galveston, solid-propellant rockets are not new. They date back to the "arrows of flying fire" with which the Chinese fought Mongol invaders in the 13th Century. Their development, however, has been slow, spurred sporadically by the needs of specialized jobs for which they were best suited.

But advancements in the solid field in the past decade have made it apparent, Spitzer believes, that the arrows of flying fire will travel farther than their Oriental inventors ever could have dreamed. The bulk of solid propulsion history, he concludes, seems to lie more in the future than in the past.

And LPC's President Hurt touched on the same note when he remarked recently, "In the uncharted vastness of space it is hard to look a decade into the future. But however far man will voyage, Lockheed Propulsion is confident that it will have helped to get him there."

EDITOR'S NOTE: This is the twentieth in a series of articles designed to acquaint MSC personnel with the Center's industrial family, the contractors who make MSC spacecraft, their launch vehicles and associated equipment. The material on these two pages was furnished by the Public Relations Office, Lockheed Propulsion Company.

PROPELLANT MIXER—Technicians maneuver fuel slurry into position under bladed 300-gallon vertical mixer. On upper level of structure, hopper containing oxidizer for solid propellant is waiting for use. This mixer, largest in the industry, can make a 4000-pound batch of Apollo launch escape motor propellant in two hours.

COMPLETE APOLLO launch escape system, including tower, is rigged for tie-down firing at Lockheed Propulsion Company's Patrerno site near Beaumont, Calif. At right (with dark glasses) Tom Carpenter, test engineer who has conducted most of the Apollo static firings, discusses its requirements with another engineer.

HIGH-POWERED TOOL—Lockheed Propulsion Company non-destructive test technician aims a 25-million electron volt X-ray machine at solid propellant rocket motor at the firm's Portero facility near Beaumont, Calif. The test equipment, capable of inspecting 156-inch diameter solid rocket motor segments of 20 inches of steel, can detect in seconds flaws which might otherwise pass unnoticed.
**On The Lighter Side**

"Triggered Flip Flop", ...now there's an interesting sounding item that was designed to do a job and apparently does it well, because according to Rex P. T. of Instrumentation and Electronic Systems Division, they are used by the hundreds.

Before finding out what the item was (of course anybody should know, it's just what it says it is), a call was made to Procurement and Contracts Division to find the person that ordered "it". The first reaction from the girl that answered the phone was rather mirthful as she replied..."I typed the contract order but I have no idea what it could be,"

As Rex explained, it's a bi-stable multi-vibrator switching element, with one input and two outputs, one in the opposite sense or state from the other such as positive or negative polarity. When triggered with a pulse or signal, this causes it to switch from one circuit to the other, or one flip conditioned and the other is flop conditioned.

And there it is...no high sounding phrases are used to name this item...it's just a plain old Triggered Flip Flop and without this digital device or circuit, MSC's airborne and ground digital data equipment probably wouldn't hit a lick, and it might also put a few computers out of business.

**Glenn**

(Continued from page 1)

Glenn was born in Cambridge, Ohio and grew up in New Concord, Ohio where he met his wife, the former Anna Margaret Castor. They have two children, John David and Carolyn Ann.

Glenn was a member of Marine Fighter Squadron 16 during World War II and he flew 59 combat missions. During the Korean action he flew 90 missions. He has been awarded the Distinguished Flying Cross on five occasions and holds the Air Medal with 18 clusters for his service during World War II and Korea.

**Postmaster General Visits MSC—Postmaster General John A. Gronouski visited MSC and presented a copy of the news of the completion of the 1959 fiscal year, the 50th year of postal operations, to the Postmaster General’s Office. He was in Houston for the purpose of discussing the changes in the postal service with the Postal Service Commission.**

**WELCOME ABOARD**

Twenty-four persons joined the Manned Spacecraft Center's operation during the period Dec. 22, 1953 and Jan. 6, 1954. Of these, two were assigned to MSC's White Sands operations and one to the MSC Florida Operations.

**MSC Florida Operations**

PLANT ORANGE: Cape Kennedy, Fla.: Melville J. Shepheard, flight operations director; Patricia Lee Cliffeey, and James M. Rutland.

**Center Operations**

1. **FLIGHT CREW OPERATIONS**: Dr. William A. Lee.
4. **SPACE ENVIRONMENT DIVISION**: John Gentry, and Peter Gillette.
5. **GROUND SYSTEMS PROJECT OFFICE**: William J. Drewes.
7. **CREW OVERALL DIVISION**: Martin H. Graham.
8. **SPACE ENVIRONMENT DIVISION**: Thomas W. Lee.
10. **GROUND SYSTEMS PROJECT OFFICE**: William J. Drewes.
12. **GROUND SYSTEMS PROJECT OFFICE**: William J. Drewes.
14. **GROUND SYSTEMS PROJECT OFFICE**: William J. Drewes.
16. **GROUND SYSTEMS PROJECT OFFICE**: William J. Drewes.
18. **GROUND SYSTEMS PROJECT OFFICE**: William J. Drewes.
20. **GROUND SYSTEMS PROJECT OFFICE**: William J. Drewes.
22. **GROUND SYSTEMS PROJECT OFFICE**: William J. Drewes.
24. **GROUND SYSTEMS PROJECT OFFICE**: William J. Drewes.

**MSC PERSONALITY**

Two Historic Flight Events Part Of John Mayer's Past

Break the sound barrier is nothing new today but it was in 1947 when the first aircraft attained that speed. Mayer and John P. Mayer, chief, Mission Planning and Analysis Division was on hand to participate in that historic event. He was the first to know that the X-1 rocket research plane had broken the sound barrier. By tracking the plane on radar he knew before the pilot was aware that he had passed mach 1.

Mayer said they heard an loud noise but at the time no one knew what a sonic boom was. Mayer said that as far as he was concerned there were three major divisions in flight—the Wright brothers, breaking the sound barrier and manned space flight—and he was proud to have participated in two of them.

As chief of the Mission Planning Division, Mayer is responsible for the development and the design of operational trajectories for all Manned Spacecraft Center space flight missions. Other responsibilities include formulation of computer logic, mathematical formulation and programming techniques associated with the real-time and simulation programs, Postflight trajectory analysis for development, and other analysis programs are also performed by this division.

A native of Binghamton, N.Y., Mayer was graduated from the University of Michigan in 1944 with a B.S. degree in aeronautical engineering and mathematics. He then joined the Langley Aeronautical Center, Virginia and conducted flight testing of fighter planes for low subsonic and supersonic flight research in supercruise and aerodynamic techniques.

In 1957, Mayer was transferred to Edwards AFB, Cal, where he participated in the tests of the X-1 rocket research plane. He also spent some time at Edwards in 1950–51 doing research on the D-558–2 Douglas Skystreaker.

In 1957, Mayer became involved in space flight research in orbital mechanics, orbital trajectories and lunar trajectories.

Mayer's early period while with the National Advisory Committee for Aeronautics, Mayer said it was almost a matter of self education when it came to matters on space.

Conceived the "Orbital Mechanics and Lunar Trajectories" section to a book "Notes on Space Technology" which was published by NASA in February 1959. This was one of the first space text books.

Mayer said a lot of the book is now elementary, but it wasn't in 1959. He was one of the original 35 from NASA that formed the Space Task Group which later became MSC.

Mayer has authored some ten known works and has written dealing with flight research, supersonic aerodynamics, and flight tests on research planes. He is a member of the American Institute of Astronautics and those in the American Rocket Society.

His hobbies include photography and golf. He also enjoys hi-fi stereo music. His interest in photography stems from his high school and college days when he was a trumpet player in a dance band.

Mayer lives in Houston with his wife, the former Geraldine Couch of Elkin, N.C. The couple has three children: Dale H., Cynthia J., and Owen Ellen 3.
South Pole Living Problems Compared To Other Planets

A NASA-Marshall Space Flight Center engineer returned recently from the South Pole, convinced that information exchanges be isolated at the South Pole other worlds has long fascinated operations, physiological experts, and physicists. A specialist in lunar operations, deFries said his trip confirmed a suspicion that astronauts and scientists on long stays following the early moon landings will need more supplies than their engineers presently think. NASA scientists have known for years that living on the moon will be much more severe than conditions anywhere on earth. Even the ice and snow which blankets the North and South Pole, would welcome, in smaller quantities, to moon dwellers. It doesn't have air, either.

DeFries visited about half a dozen stations in Antarctica, meeting supply vehicles and interviewing scientists. He believes the area could be used effectively for environment tests on equipment proposed for long moon stays. He said morale was high at the South Pole stations. They were preparing for a routine white Christmas, minus a tree, while he was there.

Although the South Pole is cold (about 40 degrees below zero when deFries was there) it is not as cold as the moon at its coldest. During the 14-day lunar night, the temperature dips about minus 380. But during the lunar day, which is also 14 days long by our earth measurement, the temperature rises to more than 200 degrees above zero.

DeFries pointed out incidentally that the Antarctic day comes only once a year -- it was daylight the entire two weeks he was there.

DeFries said the men isolated at the South Pole were happy as long as they had (1) ample supplies and (2) good communications links.

Probing 'Gulliver' To Fish On Mars

Some day in the near future NASA's "Gulliver" may go fishing on Mars. The tackle will consist of three "sticky strings" dropped out of a porthole. If the strings are reeled in they will retrieve living organisms -- if any -- in the soil. Gulliver will "cook" the prey on the spot. And if Gulliver catches anything, it will radio the news to Earth after it digests the results of its fishing expedition.

The question of life on other worlds has long fascinated man and now, for the first time, he may be on the threshold of learning the answer. While NASA has already flown Mariner II past Venus and provided some clues as to whether life exists there, it will not be until instruments can be landed on the planets that conclusive answers may be had.

One experiment designed for this purpose is the radio-isotope biochemical probe, named Gulliver. Gulliver has been designed as part of an over-all package to be landed on Mars and a relatively small instrument for the job it must do.

Measuring about five inches across the base and only a little taller, it will weigh approximately three-fourths of a pound.

When Gulliver lands on Mars, small ports will open in the capsule wall and projectiles fired. They will carry three strings out about 50 feet. The strings, which will be covered with a sticky substance, will be reeled back. Once inside the capsule, soil particles picked up along the way will be dosed with a sterile broth tagged with radioisotopes.

Should the Martian soil contain any living organisms they should begin to grow within four hours and produce a radioactive gas inside Gulliver. This gas will be detected by a transistorized geiger counter. Thus, it may be a series of clicking noises radiated across the reaches of space which will tell men on earth of life on another world.
Hickey Named To Head MSC's Protocol Office

The establishment of a Protocol Office for the Manned Spacecraft Center was announced this past week by Dr. Robert R. Gilruth with Francis J. Hickey Jr. being named as chief of protocol.

As a branch of the Public Affairs Office, it will provide a central point of coordination for all MSC activities relating to official visitors to the Center, excluding members of Congress and their staffs.

Astronaut Shepard Undergoes Surgery Everything Is Fine

Astronaut Alan B. Shepard Jr., the first American to ride a rocket into space, underwent surgery last Friday in a Houston hospital for removal of a small benign nodule (lump) from his thyroid gland. The operation was successful and will not affect Shepard's flying status.

Astronaut Shepard was discharged from the hospital Monday, and will spend a few days resting at his home before returning to work.

Crushable Metal Honeycomb Under Study

The NASA Manned Spacecraft Center has awarded a $99,973 study contract to Bendix Products Aerospace Division, South Bend, Ind., for a shock absorbing device which will permit a soft landing on the moon.

The work involves testing full-scale crushable aluminum honeycomb structures under the various environmental conditions which scientists expect space-craft to encounter during a moon mission.

In the study program, Bendix engineers will test various sizes and shapes of shock absorbing capsules of the aluminum material to determine the performance characteristics.

For Communications

If a deep space mission is to be successful, the pilots that will explore the planets beyond the Moon must have continuous communications with the control center on Earth. To achieve this is the object of a study called for by the NASA Manned Spacecraft Center. The request asks for proposals for a deep space laser communication and tracking study from time of launch to a mean range of 30,000,000 nautical miles.

The system must be capable of handling two-way telemetry and voice communications, as well as spacecraft to ground television.

Using ultra-narrow beams, a laser device could penetrate fantastic distances more accurately than microwave devices. MDSV transmitters that sense deviations of the spacecraft attitude relay correcting signals almost instantly over the million mile range.