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NASA, AIAA To Co-Sponsor National Space Meet

Saturn Second Stage Readied For Fall Launch

Success of NASA's S-I first stage of Saturn underscored a related event on the West Coast where the first flight version of the S-IV upper stage of the vehicle is being readied for shipment to the Cape Canaveral launch site.

The S-IV is scheduled to leave the Douglas Aircraft Company in Santa Monica, Calif., soon. Douglas Missile & Space Systems Division is S-IV prime contractor.

At the Cape the S-IV will be joined to the S-I as the second stage of the two-stage Saturn I rocket which will boost a payload into space later this year. This will be the initial launch of the complete vehicle—with *both* stages "live."

The Saturn flight test program has been spectacularly successful. The NASA Marshall Space Flight Center S-I booster scored four successful flights in the past 18 months.

Currently other S-IV vehicles are undergoing extensive testing at MSFC in Huntsville, Ala.; at the Cape and at the Douglas, Sacramento, Calif., static test installation.

The first S-IV was delivered to MSFC late last year for dynamic testing. A second S-IV is at

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OFFICIAL CEREMONIES opened the MSC permanent exhibit in Houston's World Trade Center April 4. Weilding twin pairs of scissors are Mayor Lewis Cutrer (left) and MSC's Paul E. Purser, special assistant to the director, who cut the ribbon opening the exhibit. Mayor Cutrer then signed the register as the first visitor, one of several hundred who saw it on opening day.

'Ballute' To Act As Safety Device For First, Last Stages of Gemini

A balloon shaped like a child's spinning top is being designed as a safety device for astronauts during the first and last stages of Gemini flights, Manned Spacecraft Center has announced.

The drag balloon, called Ballute, is being built by Goodyear Aircraft Corporation of Akron, Ohio, under a contract from Weber Aircraft Corporation, Burbank, California, subcontractor for the Gemini ejection seat escape system. McDonnell Aircraft of St. Louis is prime contractor for the spacecraft, under the technical direction of NASA's Manned Spacecraft Center.

Ballute (BALLoon-parachUTE), a system developed by GAC during 20 test programs in the past four years, would be used if astronauts were forced to use their ejection seats, the planned mode of escape for altitudes below 70,000 feet.

The inflatable rubberized fabric structure would stabilize and slow their fall until conventional parachutes could be deployed at the lower altitude, GAC engineers said.

Gemini is a National Aeronautics and Space Administration long duration orbital rendezvous spacecraft which will return to land at a pre-selected landing point in the United States.

During the Gemini flight, American scientists will study rendezvous docking techniques and the effects of long periods of weightlessness upon astronauts.

Because free fall descent above 35,000 feet could result in a tumbling motion greater than man can stand, Goodyear Aircraft engineers are developing the stabilizing device as a precautionary measure.

Ballute will be packaged in a deflated condition in the ejection seat during flight. Soon after ejection from the spacecraft, the astronauts would separate from their seats and the drag balloon would inflate within a fraction of a second and trail above them.

The inflated Ballute is expected to be about 18 inches in diameter and two feet long, according to preliminary GAC designs.

During previous tests, the drag device has successfully stabilized the descent of payload weighing as much as 500 pounds. The system has been proven at speeds up to 10 times that of sound.

GAC also has suggested use of Ballute for recovery of booster assemblies, nose cones and research vehicles re-entering the earth's atmosphere.

See Ballute deployment diagram, page 3.

Frick Resigns As Apollo Head; Piland Named Acting Manager

Dr. Robert R. Gilruth, Director of NASA's Manned Spacecraft Center, accepted the resignation of Charles W. Frick, manager of Project Apollo, April 3.

In submitting his resignation, Frick expressed great regrets at leaving MSC and his work on the Apollo program. He said that pressing personal reasons dictated that he return to the aerospace industry.

Frick agreed, however, to stay on at the space center in the role of a consultant to the Apollo program until April 25th.

"It is with reluctance that I accept this resignation," Dr. Gilruth stated. "Charles Frick's outstanding management and engineering capabilities have been of major importance in organizing the Apollo project, and in the many successes so far achieved in this program."

Gilruth also announced that he has named Robert O. Piland to be acting manager of the Apollo program, with the additional responsibility as chief, command and service module. James Decker was selected to replace Piland as chief, lunar excursion module.

Frick had joined MSC as manager of the Apollo program in February, 1962, after serving on a consultant basis to the program since December of 1961. He was employed at that time by General Dynamics Corporation.

Without revealing his future career plans, Frick indicated that he will return to the west coast to join his wife, June, and daughters, Barbara and Kathleen, at the family residence in La Jolla, California. A third daughter, Ann, attends Santa Clara University in California.

MSC Management Has Leading Role; LBJ To Be Speaker

A number of Manned Spacecraft Center personnel, including MSC Director Robert R. Gilruth, will have important roles in the Second Manned Space Flight Meeting co-sponsored by NASA and the American Institute of Aeronautics and Astronautics in Dallas Monday through Wednesday.

Hundreds of leading space scientists and engineers from throughout the nation are expected to attend the review of current space programs and projection of trends and requirements for space projects of the future.

Vice President Lydon B. Johnson will be guest speaker at the banquet Tuesday night. His subject will be "New Frontiers of Space."

Host for the meeting is the North Texas Section of the AIAA. MSC's Paul E. Purser, special assistant to the director, is co-chairman of the meeting, with James J. Bingham of General Electric.

Both Dr. Gilruth and MSC Deputy Director Walter C. Williams will chair sessions of the meetings.

Gilruth will set the stage for the proceedings with an opening address, following a welcome by Governor John B. Connally, of Texas. The director of the Manned Spacecraft Center also will be chairman of the initial session at which Astronauts M. Scott Carpenter

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Florida Firm Gets Maintenance Job For Clear Lake

The William J. Graham and Son Company of Golden Beach, Florida, has been awarded a cost-plus-fixed-fee contract, estimated at $800,000, to maintain and operate the Manned Spacecraft Center's buildings, facilities, utilities and grounds.

The work under contract will run for one year and will include support services at MSC's Clear Lake site, Ellington Air Force Base and various leased facilities in Houston.

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Preflight Checkout System

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ties of data during tests—long hours of watching panels covered with constantly blinking lights, hampered by predictable human weaknesses such as fatigue. Under this system, future flights would have required a constantly expanding staff of highly trained technicians and engineers to evaluate test data.

The improved system designed by Parsons and his task groups, however, provides tremendous quantities of electronically acquired information in a readily understood form. It is a sophisticated piece of engineering—so much so that one part of the operation calls for the anticipation of every conceivable problem engineers might encounter during the test, and the storing of solutions to those problems for instant computer delivery as needed.

The PACE system required little of the expense of designing, developing or manufacturing new equipment. The extensive array of components used in the PACE system are currently available on the commercial market.

For comparison, early Mercury equipment handled data at 112 units per second. The new system can handle the same type of information at 20,000 units per second.

The engineers involved are specialists in the relatively new field of electronic communications. They work in strangely lighted rooms with walls that are great banks of humming, blinking panels. But they are derisive of the idea of computers being "giant brains." They look at computers as tools. "You can't program even the most advanced computers without the intelligence of man," says Tom Walton. "All you really do is put them to work in areas where machines are strong and man is weak."

Organized originally as an operations group, the six quickly forsaw the need for faster acquisition and interpretation of test data. They went to Manager of Cape Operations G. Merritt Preston, and with his approval, began designing a better way to do it.

Woods and Walton scoured the country for computers. Parsons and Johnson worked on overall design. Marlow planned facilities. Bradford worked up the part of the system which anticipates problems, finds solutions and prestores them for the test engineers.

"I've heard so much said about teamwork in the past that it seemed little more than a cliche," commented Woods, "but I've never seen anything like the way on the people in these groups came through to help us on the new system."

With the shortage of trained personnel in electronic communications in private industry across the country, many of the people in data acquisition groups of Preflight Operations have received offers to join other companies, usually at salaries well above their present ones. Significantly, few have accepted.

"This is going to be a big achievement," Bradford said, "and I want to have a part in it."

Maintenance Job

(Continued from Page 1)

Work is expected to begin at once with the establishment of Graham's office at Ellington.

The Graham company was selected by a source evaluation board from more than 20 companies offering their services to MSC. Negotiations with the Graham company began on March 5.

The contract will be administered and monitored by the Center Facilities and Construction Procurement Branch of MSC's Procurement and Contracts Division.

THESE SIX ENGINEERS from the Preflight Operations Division of MSC, Cape Canoveral, are the developers of the PACE-S/C system for spacecraft checkout before flight which promises to be a major advance. Left to right (standing) are Gary Woods, Tom Walton, Dan Marlowe, and Cliff Bradford; (sitting) Harold Johnson and Walt Parsons. Parsons headed the group.

OSO Completes One Year Of Operation; Still Going Strong

Orbiting Solar Observatory 1, the most successful and most complicated satellite put into earth orbit by the National Aeronautics and Space Administration, its first year in orbit was completed in March.

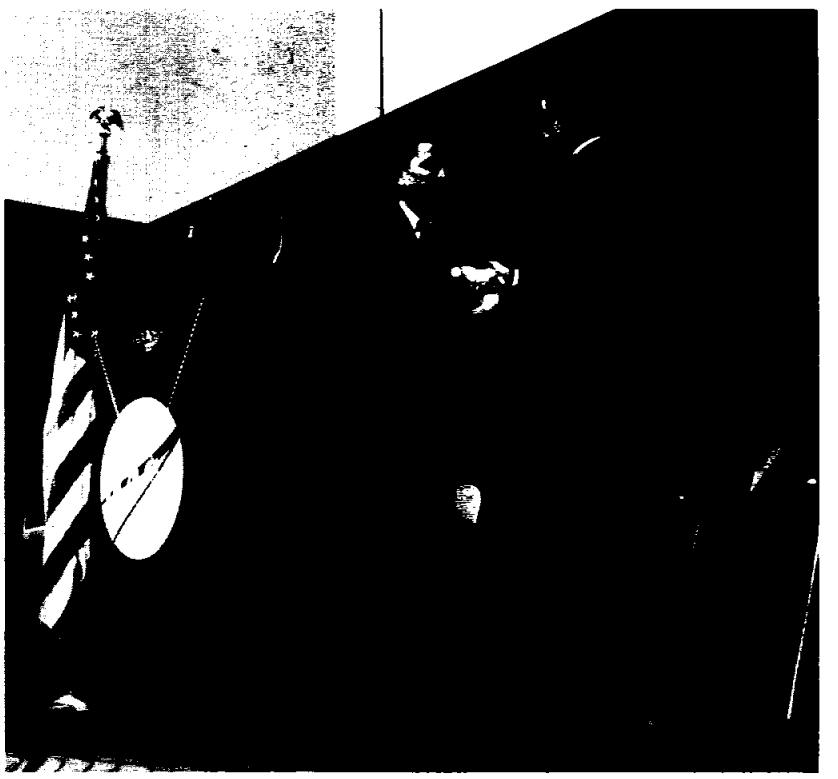
It has exceeded its estimated operating life by six months, serving to prove that NASA's goal of more than one year operating lifetime for satellites is achievable.

Eleven of its 13 complex scientific experiments are still fuctioning, having sent back to earth more data on the behavior and composition of man's nearest star—the life-giving sun—than any single ground based observatory and all previous rocket, balloon and satellite flights combined. It has observed hundreds of solar flares which often disrupt communications on earth, searched for extra-terrestrial gamma ray sources, and acted as a materials laboratory for scientists working on the Apollo program.

While much of the wealth of scientific information gained from OSO-1 has yet to be analyzed by the experimenters, data gathered by the satellite holds definite promise of answering what parts of the sun's radiant energy are responsible for creating the earth's ionosphere. Variations in the sun's radiations are believed responsible for this electrified layer that makes radio communications possible.

The satellite's control systems have exceeded design expectations and are still keeping the satellite pointed at the center of the sun within plus or minus one minute of arc.

NASA's Orbiting Geophysical Observatory (OGO) can carry 50 scientific experiments on a single mission.



WALTER C. WILLIAMS, MSC deputy director, presents the NASA Group Achievement Award to G. Merritt Preston, Manager of Cape Operations of MSC-AMR, in recognition of the contributions made to the success of Project Mercury of MSC's Preflight Operations Division. Individual copies of the Award were later presented to 250 members of POD by Preston, who also extended appreciation to representatives of various organizations supporting Mercury operations. These included McDonnell Aircraft, Launch Operations Center, the Department of Defense, Air Force Systems Command, the 6555th Test Wing, AFMTC, Pan American Airways, RCA Service Co., the Weather Bureau, General Dynamics/Astro. General Electric Co., Burroughs, Rocketdyne, Federal Electric Co., and Aerospace Corp.

NASA, AIAA Sponsor Meet

(Continued from Page 1)

and Virgil I. Grissom will present a technical paper on the Mercury flight experiences.

Also at this session, James T. Rose of Gemini Project office will present a paper on that spacecraft's program and mission, co-authored by James A. Chamberlin, senior engineering advisor to the director; and Charles W. Frick, the center's manager of the Apollo spacecraft project, will outline the program and mission of the nation's first manned lunar spacecraft.

Williams will be chairman of a technical session on space operations Tuesday. The session will feature papers authored by five MSC space authorities: F. J. Bailey, chief of the Reliability and Flight Safety Office; C. C. Kraft, chief of the Flight Operations Division; John Hodge and Eugene F. Kranz, also of Flight Operations, and Warren J. North, chief of the Flight Crew Operations Division.

Bailey's paper is on "Flight Safety Aspects of Manned Space Flight;" Kraft, Hodge and Kranz co-authored "Mission Control for Manned Space Flight;" and North co-authored "Gemini Launch Escape" with William B. Cassidy of Ling-Temco-Vought at Dallas.

In addition to papers on Mercury, Gemini and Apollo, first day sessions will include reports on the X-15 rocket plane and the X-20 (Dyna-Soar) space glider. A secret briefing on Russian manned space flight programs is scheduled for the evening. All sessions on Monday are classified.

Problems in launch vehicle development, spacecraft design, cislunar and rendezvous guidance and control, life sciences and future spacecraft operations will be among topics for the second day's sessions.

Post-Apollo planning, manned flight to Mars and Venus in the 1970's, space age transportation systems and military use of manned space systems will be discussed in a classified session devoted to future space systems Wednesday. Research requirements and engineering and management needs for future spaceflight programs will be considered in the final three sessions of the meeting.

Other highlights of the meeting will include luncheon and banquet addresses by several of the nation's leading space experts from NASA, the Air Force and the aerospace industry. An array of NASA exhibits also will be on display at the Marriott Hotel headquarters.

Monitors

(Continued from page 8)

ations are providing 12 hours of instruction in the concept of whole spacecraft systems.

Other lecturers are covering the flight plan, mission objectives, the medical countdown and equipment, blockhouse acitivity, Mercury Control Center and the tracking sites, the data plan and reporting system, communications details, instrumentation, sequencing, and operational concepts, and medical criteria during astronaut selection, not to mention quite a bit on recovery operations.

Design Work On Acceleration Facility Is Moving Forward

Work on the design of a Flight Acceleration Facility capable of whirling a simulated Project Apollo command module and its moon-landing crew of three with forces many times the normal pull of gravity is going ahead at Ford, Bacon & Davis, Inc., New York engineering firm.

The huge machine—technically an advanced flight acceleration facility — will be erected at Clear Lake. With its rotunda and supporting structures and equipment, it is estimated to cost $10,500,000.

Work is now proceeding with preparation of construction drawings and specifications under a "follow-on" contract with the Fort Worth District of the Army's Corps of Engineers. Consultants to Ford, Bacon & Davis are the McKiernan-Terry Corporation, division of Litton Industries, and the Raytheon Company.

The machine, which will require the equivalent of 6,700 horsepower to accelerate a 50-foot boom and 3,000 pound payload with an onset rate of three g per second, will be the most advanced man-rated centrifuge ever built. The design incorporates the capability of expansion to 10,000 equivalent horsepower and a 10g's per second rate.

It's primary function will be to train and test. The gondola will be so oriented that the astronaut trainees inside will *feel the same magnitude and* direction of g forces experienced during actual lift-off (launch) and reentry without sensing that the centrifuge is actually rotating in a circle.

The entire simulated mission will be programed and controlled by computer. Trainees will respond to flight problems under abnormal as well as normal flight conditions, such as the ballooning of their space suits due to loss of air pressure within the spacecraft.

Safety factors will be paramount. For example, the computer will automatically reject a decision on the part of a crewman if there is a possibility of dangerous results. If, however, the decision is a correct, one, in line with the planned program, it will incorporate the decision into the flight pattern.

To simulate loss of pressure, in the event the spacecraft is penetrated by space debris, the gondola of the centrifuge will be capable of being evacuated to 3mm Hg, the equivalent of the low pressure found at 20 to 25 miles of altitude.

Vacuum capability will be sufficient to reproduce the rapid decompression experienced within the spacecraft during normal launch trajectories.

Temperatures within the gandola will also be controllable from 50 degrees to 200 degrees Fahrenheit, with continuous circulation of gondola atmosphere.

The centrifuge's regular gondola will measure 12 feet in diameter and weigh 8,000 pounds with its three occupants and instrumentation.

At the end of the standard 50-foot arm this load may be whirled continuously at 20g or at 30g for short periods. Between runs, the arm will be able to be extended to 60 feet or shortened to 40 feet for varying load and performance by inserting or removing a 10-foot section.

To achieve the illusion of straight flight, the gondola will have three degrees of freedom, controlled by the computer. It will be able to accomplish the motions simultaneously, with the result that to the occupants, strapped into their space flight couches, the acceleration will always appear as a force perpendicular to the line of their bodies. The man will have no sense of going around in a circular path.

The centrifuge will be housed in a circular room about 150 feet in diameter. There will be two wings, one for offices, controls, the computer, and a room for preparing trainees for testing, and the other for services.

The service wing will be laid out in such a way as to permit expansion, so that additional interchangeable gondolas can be substituted on the centrifuge arm in order to keep down time at a minimum and the centrifuge working with the least interruption.

Saturn

(Continued from Page 1)

the Cape for testing of vehicle and facility propellant loading systems under launch conditions. At Douglas Sacramento an S-IV "all-systems" vehicle test program is under way.

This advanced test program at Douglas Sacramento follows a series of successful static firings there of the S-IV six-engine cluster of RL-10 liquid-hydrogen, liquid-oxygen engines, conducted with a heavy-duty, stainless steel "battleship" S-IV. The engines are built by Pratt & Whitney Aircraft Division.

Since August, 1962, the S-IV engine cluster has been fired 13 times for an accumulated running time of 1735 seconds. The firings included three full-duration tests of seven minutes or more.

Last January 26, a cluster of six RL-10A3's—an advanced version of the 15,000-pound thrust engines—was fired for almost 7 minutes, approximating the duration of an actual flight firing. The RL-10A3 is the model that will power the S-IV on its space missions.

NASA's Surveyor spacecraft is designed for a soft landing on the moon.

BALLUTE DEPLOYMENT

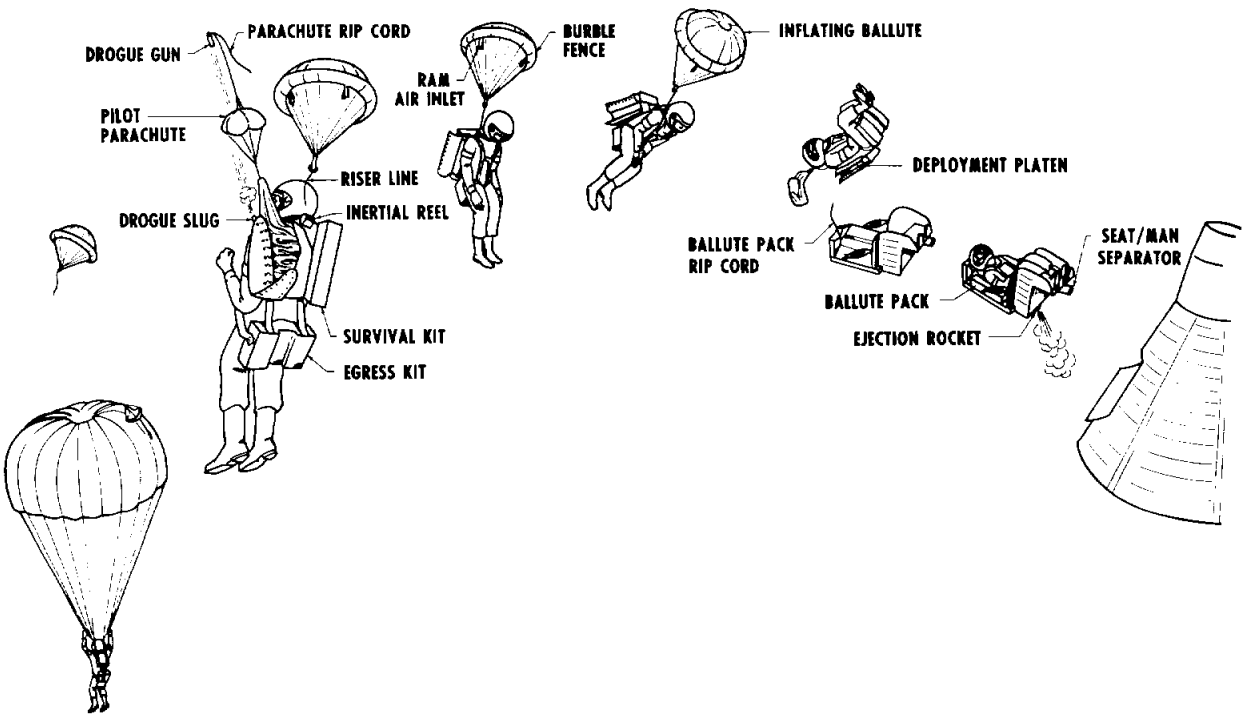


DIAGRAM shows sequence in which Gemini astronaut will eject from spacecraft. After the ejection seat separates, ballute inflates within a fraction of a second to trail above the descending astronaut, stabilizing and slowing his fall until the conventional parachute can be deployed at a lower level. Goodyear Aircraft Corp. is building the device. (See story, page 1)

Crew Systems Chief Will Return To Air Force Duties On May 1

Space Surgeon Stanley C. White, named 1962 Laureate by the International Academy of Aerospace Medicine for his role in organizing the medical support of U. S. manned space flights, has been reassigned by the U. S. Air Force.

The chief of Manned Spacecraft Center's Crew Systems Division will continue his Air Force career at the Aerospace Medical Division of Brooks Air Force Base, Texas. The reassignment, effective July 2, concludes a "detached (from the Air Force) duty" with MSC, to which he was assigned in October, 1958, then the Space Task Group at Langly Air Force Base, Virginia.

At lieutenant colonel in the USAF Medical Corps, Dr. White is best known for contributions leading to the development of the life support systems for Project Mercury. In 1960, he was named for the Melbourne W. Boynton award for space medicine research, and in 1961, he received the Louis G. Bauer Founders award from the Aerospace Medical Association for his efforts in bringing together the total medical, human engineering, and man-support system efforts in Project Mercury. In 1962, he was also honored with selection to membership in the International Academy of Astronautics, elected as a fellow in the Aerospace Medical Association, and he was named one of two Laureates (in U. S. and in U. S. S. R.) by the International Academy of Aerospace Medicine, Brussels, Belgium.

Dr. White has served on the Bio-Astronautics Committee of the National Research Council of the National Academy of Sciences from 1959 to 1960; and on the Man-in-Space Committee from 1960 to 1962.

Dr. White has also acted as medical operations directors of manned space flights through MA-7.

Apollo ECS Testing Begins At Garrett-AiResearch Firm

An important milestone in the development of the NASA Apollo environmental control system was marked recently when first tests of the system begin in Garrett-AiResearch, Los Angeles. System development testing of the ECS will continue for approximately six months.

According to Paul C. Scofield, AiResearch Apollo program manager, the test profile will include simulating prelaunch, ascent, orbital and reentry pressure conditions on an operating environmental control system. Function of the ECS is to provide life supporting atmosphere in the command module of the Apollo spacecraft.

Development testing of the ECS will be conducted in a new laboratory facility built especially for the Apollo program. AiResearch is developing the ECS under contract to North American Aviation Space and Information Systems Division, prime contractor to the Manned Spacecraft Center for the NASA Apollo vehicle.

The new laboratory is composed of a programmed altitude chamber, and an array of auxiliary test support equipment such as heat exchangers, vacuum pumps and refrigeration units.

A unique feature of the test lab is its data acquisition system, one of the most comprehensive ever devised for development of an ECS.

More than 200 data points (temperature and pressure) will be automatically recorded on the new data acquisition system (DAS). ECS sensor data recorded on magnetic tape by the DAS will be analyzed by an IBM 7070 computer to minimize engineering data reduction time. this rapid analysis permits design engineers to correct problem areas on a continuing basis since a complete test run is analyzed in less than one day. Previously, weeks of calculations would have been necessary to determine test results.

Visual monitoring and recording of fluid temperatures, pressures, and flows are made during each test run. This data assists engineers conducting the test to remotely control the ECS under test in the altitude chamber.

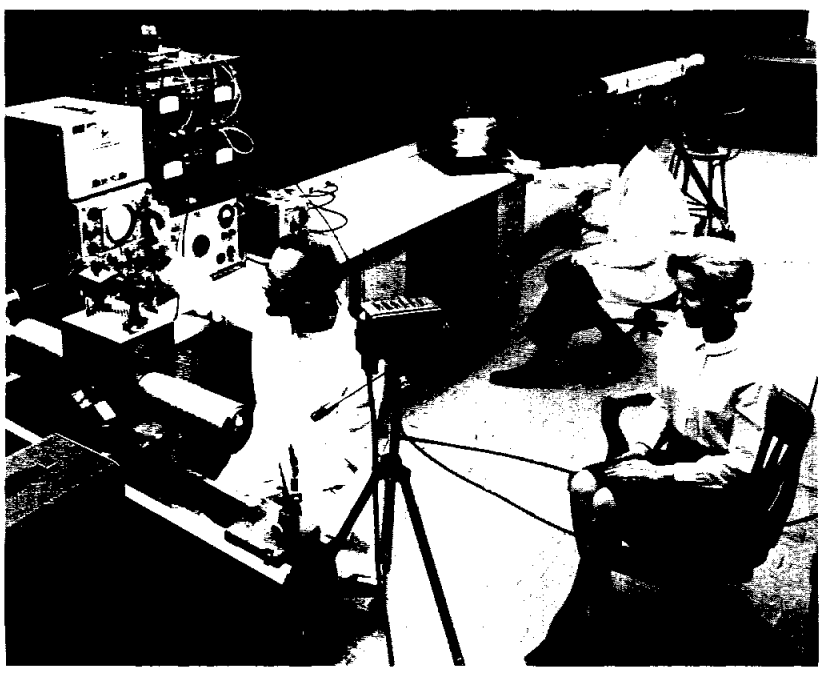
This also permits the test conductor to evaluate the performance and control of the entire ECS system during the test.

Prelaunch condition for the ECS is evaluated by integrating the actual test equipment checkout console into the test loop. A metabolic simulator is used to inject carbon dioxide, heat and water vapor in quantities simulating one, two or three men in the spacecraft.

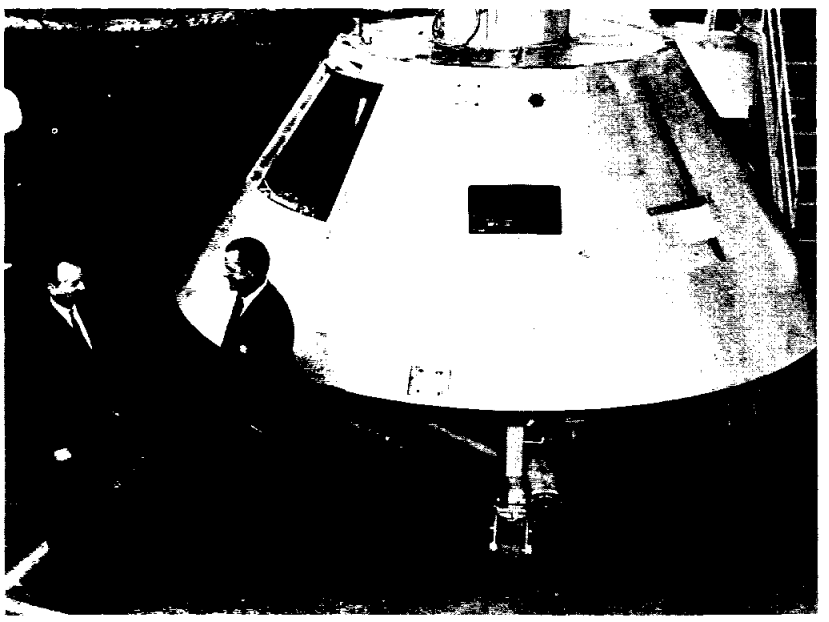
Other major portions of the Apollo test equipment such as electrical, liquid and low pressure component test stands are included in the new testing lab. This equipment is used to check ECS components during development testing and later to perform acceptance testing of all Apollo ECS components manufactured by AiResearch Los Angeles.

North American's Space and Information Systems Div

SATURN S-II propellant tank bulkhead mockups under construction provide African jungle hut effect. S&ID is principal contractor to Marshall Space Flight Center on S-II, second stage of the Saturn V launch vehicle which will boost Apollo.



LASER RESEARCH beam, generated by helium-neon gas laser and directed into hand-size "optical modulator" carries TV image in demonstration by Space and Information Systems Division personnel of laser use in space communications.



HARRISON STORMS, left, president of North American Aviation's Space and Information Systems Division, and Executive Vice-President Harold Raynor check progress of Apollo spacecraft program during frequent tours of manufacturing area.

AERIAL PHOTOGRAPH shows headquarters site of Space and Information Systems Division at Downey, Calif., located 11 miles from center of Los Angeles. Division also has major plants at Seal Beach, Calif., and Tulsa, Okla., in addition to other facilities in Los Angeles area.

A distance of 239,000 miles separates the Earth from the moon.

Dedicated to bridging this gap is a team of government and industrial scientists and engineers who are pledged to land the first Americans on the lunar surface before the end of this decade. Their efforts will be crystallized in Project Apollo—called one of the most important programs and one of the greatest scientific and engineering challenges in history.

Working on the program under the over all direction of NASA's Manned Spacecraft Center are an estimated 100,000 persons in government agencies, educational institutions, and industries across the nation. One of these firms, North American Aviation's Space and Information Systems Division at Downey, Calif., is charged with building the Apollo spacecraft's command and service modules for MSC.

In keeping with the government-industry theme of teamwork for the program, a group of 30 MSC personnel are stationed at Downey, under the direction of George Lemke, resident Apollo project manager.

Space and Information Systems Division (S&ID) was selected to join the Apollo team on Nov. 28, 1961. Since that time, division Apollo program personnel have been engaged in the task of translating a spacecraft system design concept into hardware which will meet the stringent performance requirements of the program.

"The glitter and the glamour inherent in a program such as Apollo is dimmed. The job is down to the tough, hard-nosed engineering effort required to develop a highly-complex system," commented S&ID Vice-President and Apollo Program Manager John Paup recently.

Paup said one of the key operations of the program to date was S&ID's support to NASA in performing analysis and studies of the Apollo mission concept. These activities led to the major program highlight—the change to the lunar orbital rendezvous method of landing the astronauts on the moon.

Since the award of the contract in 1961, several mockups have been completed for use as engineering tools in refining the design. Boilerplates (prototype spacecraft) have been completed for use in flotation tests and in land and water impact testing, to check the spacecraft's Earth landing systems.

S&ID major subcontractors have completed successful first firings on all six Apollo spacecraft rocket engine configurations. The White Sands Missile Range, New Mexico, had been selected as the propulsion development facility for the spacecraft.

The first flight-rated spacecraft test vehicle, including the command and service modules and the launch escape system, had been delivered to MSC. This month, it will be mated atop a Saturn launch vehicle at NASA's Marshall Space Flight Center for dynamic and vibration tests.

Since the start of the program, S&ID has placed major subcontracts valued in excess of $150 million with 20 companies in a dozen different states in almost every part of the country.

An impact test facility was recently completed at Downey that contains a water impact area and a soil impact area. S&ID scientists are using it to duplicate actual Apollo Earth landing conditions.

S&ID's experience in space-oriented work began in 1945, when a handful of North American scientists began a thorough study of a captured V-2 rocket. A few months later, these men were "flight-testing" small rocket engines at the company's Los Angeles Division on one of the present S&ID parking lots.

This knowledge gave birth in 1947 to the Navaho, a large air-breathing missile designed to fly 5500 miles at a speed of Mach 3. In the next decade, the company built and flight-tested two preliminary versions of the Navaho, the X-10 and the XSM-64.

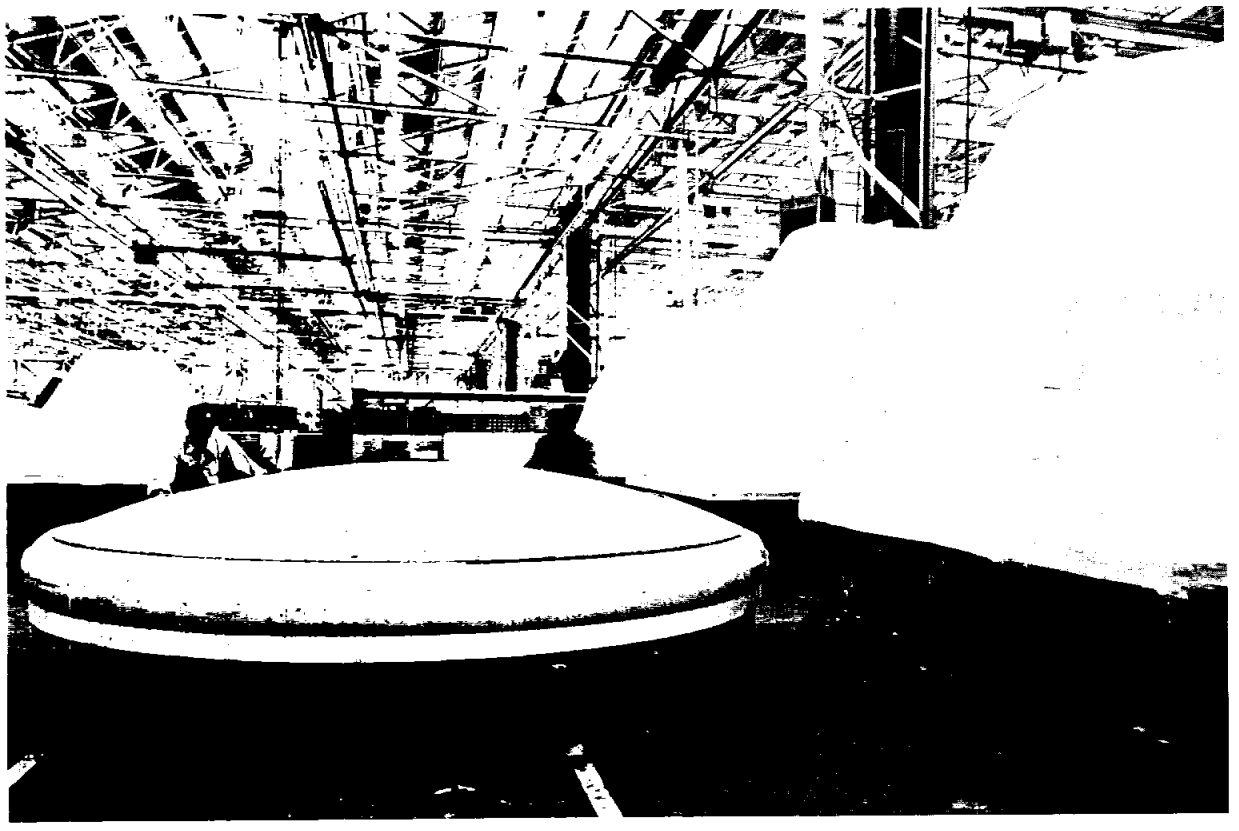
Although discontinued in 1957, the Navaho left a rich legacy. The Navaho booster flown in 1956 was the most powerful in the free world prior to Saturn. The first Redstone, fired in 1958, was powered by an engine developed by North American Aviation's Rocketdyne Division, from early Navaho research. The same engine boosted the first Explorer satellite into orbit in 1958, and it boosted Astronaut Alan Shepard into his ride down the Atlantic Missile Range in 1961.

Today's Space and Information Systems Division was born in December, 1960, when the organization's name was changed from Missile Division to reflect its new charter as North American Aviation's prime division for manned and unmanned space exploration vehicles, missile projects, and the management of information processing systems.

In addition to the Apollo spacecraft, the division currently has three other major programs. It produces the Paraglider recovery system for MSC, is principal contractor for the S-II stage of the Saturn V for the Marshall Space Flight Center, and builds the GAM-77 Hound Dog missile for the Air Force Strategic Air Command.

S&ID won a contract to study the Paraglider concept in

sion Builds Apollo Command And Service Modules



SPACECRAFT "MOLD," the Apollo spacecraft aft heat shield master facility tool (center) is fashioned to extremely close tolerances. At right are inner crew compartment master models of spacecraft. North American is prime contractor for the command and service modules.

MASTER FACILITY molds for Apollo command module, rear, and S-II stage of Saturn V, foreground, give precise dimensions to hardware at North American Space and Information Systems Division, where the job gets down to hard-core engineering.

1960, and was awarded a development contract in November of 1961. A bat-shaped inflatable wing, Paraglider will be used to guide manned Gemini space capsules to predetermined landing points.

In operation, Paraglider will be used to control the descent of the spacecraft through the lower atmosphere. It is planned to replace the conventional parachute being used in the Project Mercury program.

The S-II will be the second stage of the huge Saturn moon rocket. Parts and components of the S-II are being built at Downey and put together at the division's S-II Assembly and Test Facility at the U. S. Naval Weapons Station, Seal Beach, Calif. From there it will be transported to NASA's Mississippi Test Operations facility for testing prior to its arrival at Cape Canaveral. S&ID will build nine live flight units, one inert flight stage, and several system test vehicles.

Armed with a nuclear warhead and carried in pairs by the Strategic Air Command's B-52 bombers, the Hound Dog is an air-to-surface missile with a range of more than 500 miles. It has been deployed at SAC bases throughout the United States.

The division also built the Mercury Little Joe booster for NASA. It was designed to provide the space agency with a research and development vehicle to prepare for the eventual launchings of man-carrying capsules into space. Little Joe was used in the early phase of Project Mercury to check out the capsule that later carried America's first astronauts into orbit around the Earth.

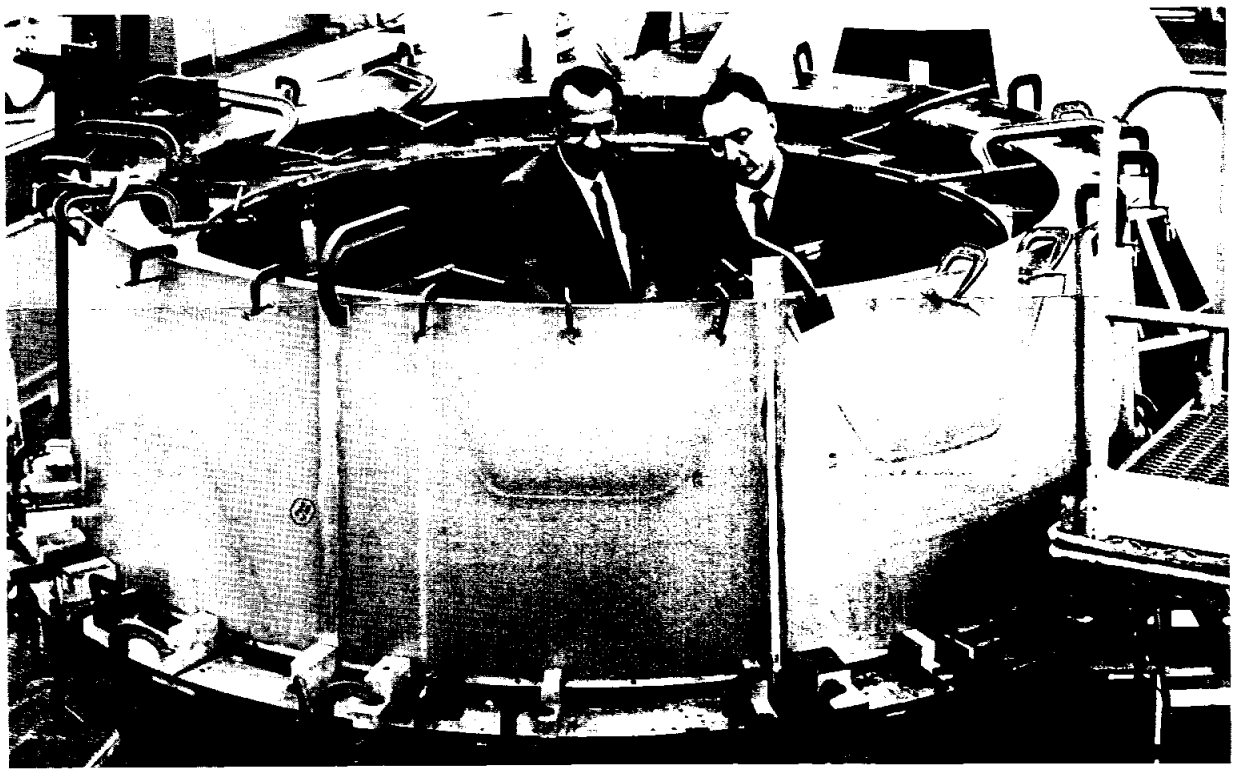
S&ID personnel presently are working on a number of research and study programs that range from large and advanced boosters to information systems, orbiting space laboratories and space stations, satellite rendezvous, micrometeorite impact, and various lunar projects. All are designed to add a broad scientific and engineering base for the division to enable it to stay abreast of today's ever changing technology.

Along with its Downey and Seal Beach sites, the Space Division also has a major facility at Tulsa, Okla. The role of this plant is to provide manufacturing and engineering support to all division programs.

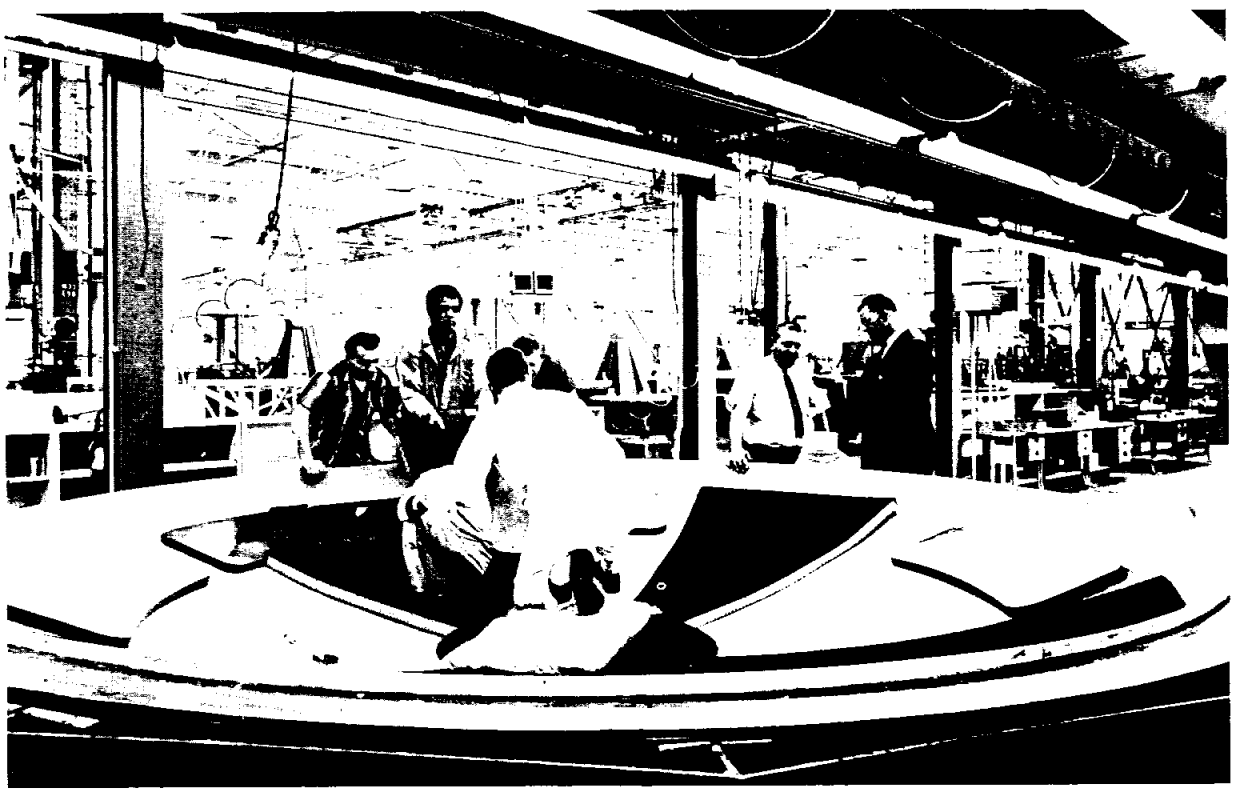
Since 1962, S&ID has more than doubled in size to where it presently occupies three million square feet of space at its Downey headquarters, in addition to facilities in nearby areas and at Tulsa. Employment has increased from 8000 persons early last year to the present number of more than 19,000.

"We believe we have made significant progress in the past, but we certainly have no desire to stand still," said Space Division President Harrison Storms in summing up the attitude of S&ID for employees. "The years ahead undoubtedly will produce challenges that will dwarf those we thought gigantic in the past. However, just as I have expressed confidence before in the ability of those in this division to rise to any occasion, I know we can meet whatever challenges the future might bring."

Editor's Note: This is the third in a series of articles designed to acquaint MSC personnel with the Center's industrial family, the contractors and subcontractors who make MSC spacecraft and their launch vehicles. The materials on these pages was furnished by NAA public relations personnel.



LOOKING OVER one of "boilerplate" command modules being fabricated for use in early Apollo test programs are George Lemke, left, Manned Spacecraft Center resident Apollo project manager at S&ID, and John Paup, Space Division vice-president and Apollo program manager.



CHECKED FOR SIZE, the command module heat shield skin is pre-fitted with lightweight metal honeycomb. Discussing project in background B. E. Dean, left, general foreman, and John Fleetwood, Apollo manufacturing manager at the Downey, California plant.

The SPACE NEWS ROUNDUP, an official publication of the Manned Spacecraft Center, National Aeronautics and Space Administration, Houston, Texas, is published for MSC personnel by the Public Affairs Office.

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On The Lighter Side

Housewives confused by the loss of "small, medium and large" designations for soap or cereal packages—in favor of such superlatives as "large, giant or economy" sizes—have the sympathetic understanding of space scientists.

The growth of their industry has brought about a similar problem in designation of rockets and missiles.

Time was, like back in the 1940s, when a 25-foot high rocket such as the Aerobee was called "large."

So when the 67-foot high Minuteman and the 103-foot high Titan II came along, they were larger than the large and were called "very large."

Now they're working on the Saturn V, which will tower 275 feet high, and they're describing it as "huge" or "giant."

Where do we go from there? Aerojet-General Corporation's proposed "Sea Dragon" will be a 500 footer, floated to sea for launching. This size gets into the "Monster" or "Colossus" category.

But despite the superlatives—space scientists solve their problem just the way the housewife does—by looking at the pounds and ounces in the fine print specifications.

That "large" Aerobee, for example, weighs only 3/4 of a ton and gives 2600 pounds of thrust. The very large Titan II weighs 150 tons and generates 530,000 pounds of thrust.

And the monster Sea Dragon: Weight, 20,000 tons, thrust, 80 million pounds. Which, admittedly, is pretty big fine print!

Copy by Don Bailer. Reprinted courtesy of Aerojet-General.

* * *

The National Aeronautics and Space Administration had one of its busiest flight days last November 16, when more than 2,700 birds were launched—all triggered by a Saturn rocket.

This is what a U.S. Bureau of Fisheries and Wildlife team found when they toured nesting areas and feeding spots within 8,000 feet of the Saturn launch complex.

They made the study to determine if rockets frighten away the Cape's expansive bird population. Brevard Audubon Society members recently counted 197 different species here.

The wildlife people found 40 species near the launch pad and concluded the mighty Saturn's roar only temporarily disturbed the birds—perhaps no more than a low flying aircraft or a truck's rumble causes humans to toss and turn during the night.

* * *

The squirrel in the courtyard of Farnsworth Chambers Building, who has been adopted and fed during lunch hours by a long succession of office personnel since last summer, is apparently finding the going a bit rough since the opening of the F & C Cafeteria. He still hops along the ledge outside the glass-walled hallways, begging for handouts. But too many people have abandoned the sandwich machines in favor of hot meals—eaten indoors, without crumbs. Last week he decided enough was too much, and started boldly through the back entrance of the building, (headed, no doubt, for the cafeteria). He didn't make it more than a few feet inside the building before being scared off, but he had a lot to say about it afterward.

EDITORIAL EXCERPTS

Washington Evening Star
March 9, 1963

LIFE ON OTHER PLANETS STILL HOPE OF EXPERT

That ancient but endlessly fascinating question—does life exist on the other planets?—has been given another airing in a darkened basement hearing room on Capitol Hill.

And it seems that all hope for Venus is not lost.

Last week the results of the historic space probe Mariner II, which flew close by Venus, were announced. It turned out that the surface temperature of the earth's sister planet was 800 degrees Fahrenheit, far too high for life to exist "as we know it," as the saying goes.

That apparently ruled out Venus at a possible habitat of some forms of life, leaving principally cold and arid Mars to keep the prospect alive.

New Slant on Subject

But wait. Here comes Homer E. Newell.

Mr. Newell, director of space sciences for the National Aeronautics and Space Administration, had a new slant on it for members of a House Space subcommittee yesterday. The room was darkened so they could see slides to illustrate the talk.

Mr. Newell said recent experiments with balloons in the earth's upper atmosphere have proved that "at times the stratosphere does contain large numbers of micro-organisms."

And if it is found by future investigations that these micro-organisms "live out their entire life cycle at high altitude," Mr. Newell said, "one may conclude that the question of whether life exists on Venus is not necessarily settled by the very high surface temperatures that appear to exist there."

Instruments on Mars

As for Mars, Mr. Newell said "the truly exciting phase of the space biology program, when we shall place instruments on Mars in search of life on the red planet, is yet to come."

But already the hardware is ready. NASA now has a new and improved "sticky string" machine, called Gulliver. It would fire out two sticky strings, which are supposed to pick up living organisms on the surface of Mars.

Then the strings would be reeled back into a tank of nutrient solution. If live organisms were picked up, they would burgeon and change the fluid. That tipoff would be radioed back to earth.

WELCOME ABOARD

Some 31 new personnel joined the ranks of Manned Spacecraft Center between March 25 and April 8.

Included were:

Mercury Project Office: Pauline D. Crow and Phyllis E. Riley.

Gemini Project Office: Clifford J. Hall.

Apollo Project Office: Shirley J. Holland and Rob R. Tillet.

Apollo at Grumman Aircraft, Bethpage, N. Y.: Frederick A. Zito.

Spacecraft Technology Division: Maurice C. Brooks and Jr., Allen J. Louviere.

Systems Evaluation and Development Division: Richard W. Downs.

Flight Operations Division: William M. Boyce and Julius K. Pagon.

Flight Crew Operations Division: Anibal J. DaSilva and George C. Franklin.

Ground Systems Project Office: Floyd S. Schell and Walter D. Poates.

Computation and Data Reduction Division: Tom H. Daniel, Jr., Patrick S. Gaffney, and Floyd W. Rosenbaum.

Instrumentation and Electronic Systems Division: Olin L. Graham.

Personnel (Steno Services): Anita B. Kruger, Faye G. Chaviers, Grace R. Rison, and Mrs. Lee M. Brubaker.

Security: Barbara L. Jackowski.

Financial Management: William W. Grimes, Jr.

Procurement and Contracts: Nita A. Bouldin.

Administrative Services: Joseph A. Puccio.

Technical Services: Jerry O. McKown.

Technical Information: Gerald E. Meeks.

Logistics: Donna R. Booth.

White Sands Missile Range, N. M.: Carlos Pena.

MSC PERSONALITY

Joe V. Piland Is Engineering Assistant In Project Mercury

Say the name "Piland" around Manned Spacecraft Center, and the immediate reaction is "Which one?" Mercury or Apollo?" Lest the uninitiated get the idea that those are their first names, J. V. or "Joe" Piland is the assistant for engineering operations and administration to the manager of Project Mercury. (His brother, Robert O., is acting manager of project Apollo.)

Joe Piland entered Government service in 1941, and in his words, has "been here ever since."

"Here" includes a variety of places. Born in Portsmouth, Va. Dec. 8, 1923, he began his career as an apprentice machinist at the Norfolk Naval Shipyard in Portsmouth, Va. The war, interupted his college plans, and from 1943 to 1946, he was a navigator in the Army Air Corps.

Returning to school at William and Mary, Piland switched later to VPI and graduated in 1949 with a BS in mechanical engineering. Having been on leave without pay during his schooling, he returned briefly to the shipyard before transferring to the Bureau of Standards in late 1949.

Early in 1951, Piland joined the staff of Langley Research Center in the Engineering Division. He worked first as a designer of research equipment, and later as an engineering supervisor, specializing in

Joe V. Piland

the design, development and construction installation of super and hypersonic high temperature wind tunnels for testing jet aircraft.

In 1959, Piland became one of the early members of the Space Task Group which was to become Manned Spacecraft Center. He joined STG as head of the Contract Section of the Engineering Division, then moved up to assistant branch head of the Contract and Scheduling Branch, where he was deeply involved in the development of the Gemini program. With the formation of Mercury Project Office in January of 1962, Piland acquired his present title.

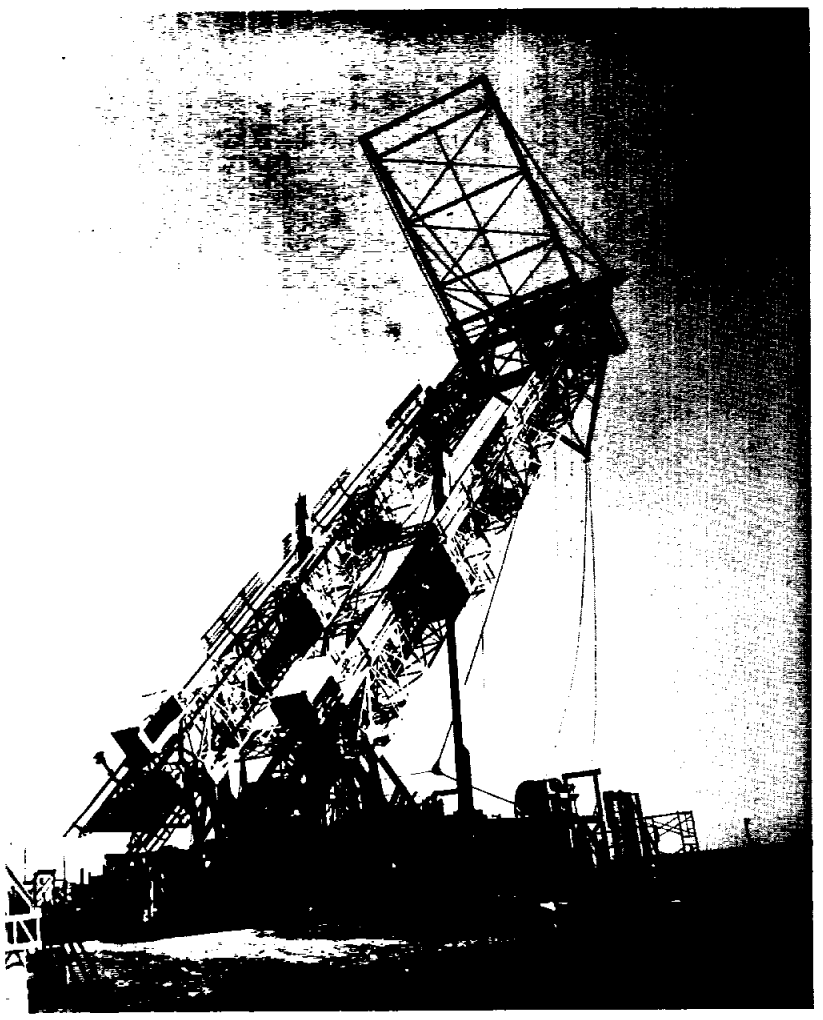
He is responsible to the project manager for the technical administrative management of the project, including scheduling, project control, cost and budgeting, documentation, management reporting, and procurement and methods—in short, he says, "everything but design."

Piland was chairman of the manufacturing panel for evaluation and selection of contractors for the Apollo spacecraft. He was also the NASA representative to the engineering committee of the "Project 60" field study group on contract management.

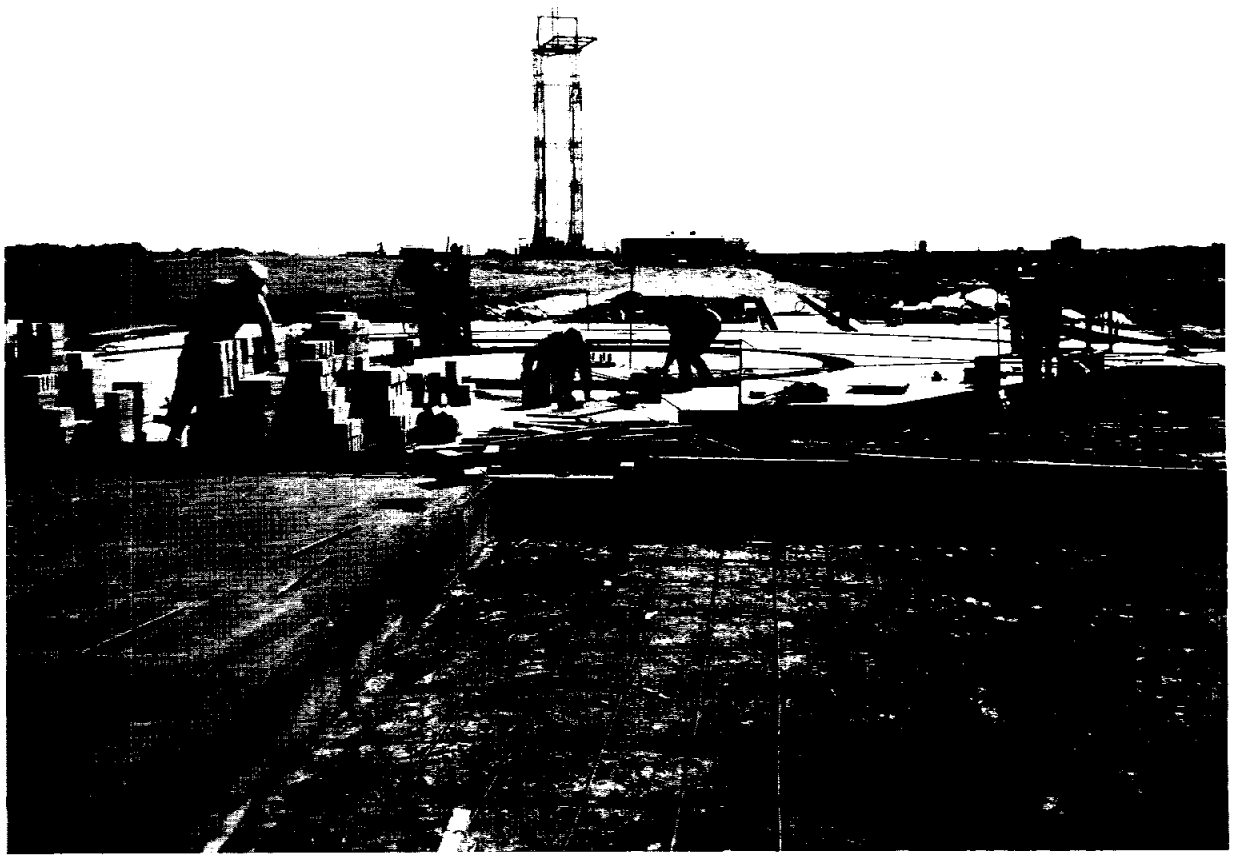
Piland and his wife, the former Ruth Beard of Portsmouth, Va. have three children: Ellen, 15, Joe, Jr., 14 and Johnny, 7. "My hobbies," he ways, "used to be golf and my home workshop, but ever since early 1959, it's been Project Mercury."

"This generation does not intend to founder in the backwash of the coming of the space age."

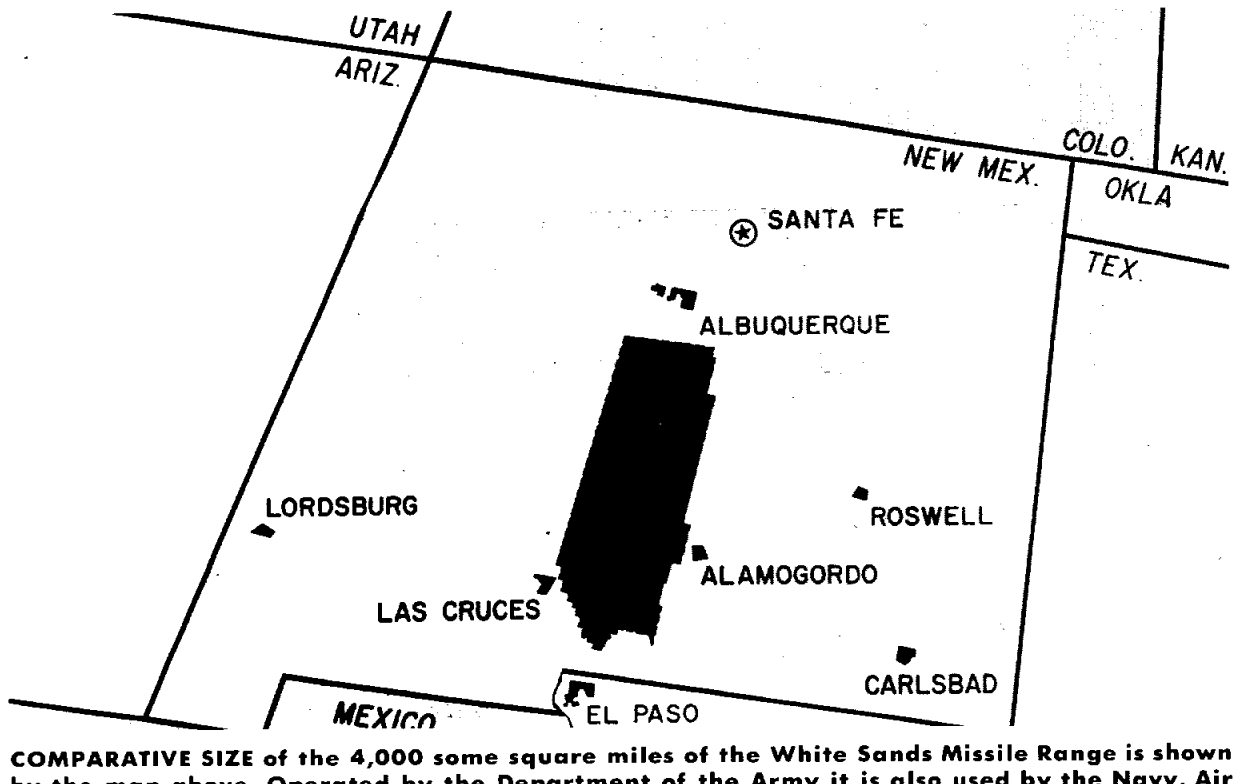
President John F. Kennedy



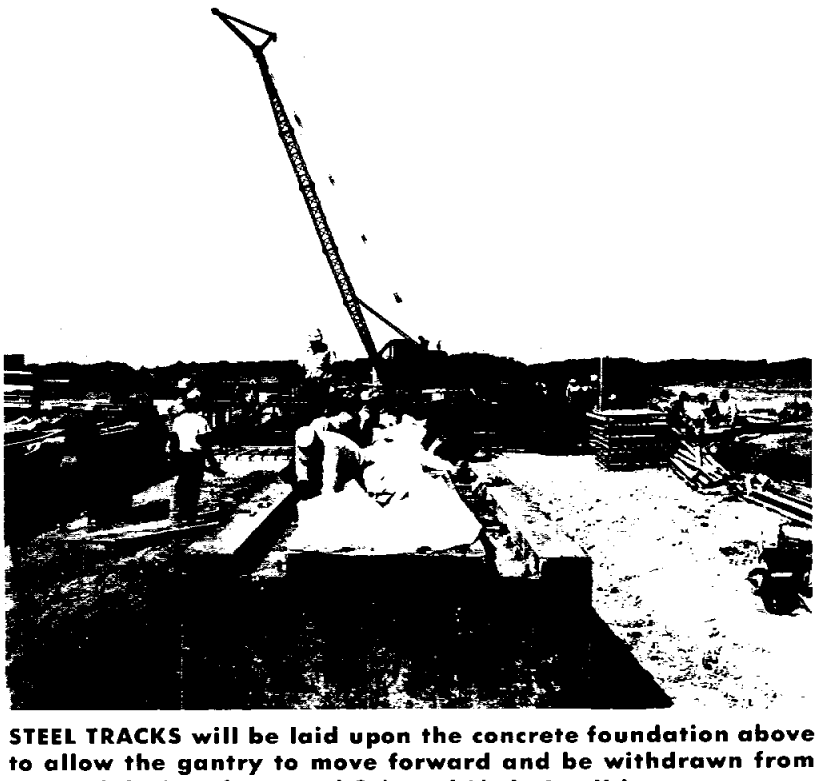
THE LITTLE JOE II gantry, formerly a part of the old Redstone launch site, is raised into position after modification for use in Apollo launch escape and high altitude abort tests.



CONSTRUCTION WORKERS lay fire brick and steel reinforcements for the pad from which the Little Joe II will be launched. The erected gantry is visible in the background, from which it will move forward on a specially constructed set of steel tracks to the launching pad above.



COMPARATIVE SIZE of the 4,000 some square miles of the White Sands Missile Range is shown by the map above. Operated by the Department of the Army it is also used by the Navy, Air Force, and the National Aeronautics and Space Administration, which has 87 square miles of it.



STEEL TRACKS will be laid upon the concrete foundation above to allow the gantry to move forward and be withdrawn from the pad during the actual firing of Little Joe II in tests.

Apollo Test Facility Going Up At White Sands Range

The 4,000-square-mile White Sands Missile Range is located in the southern part of New Mexico, stretching from just north of El Paso, Texas, to south of Albuquerque, New Mexico—100 miles—and is 40 miles wide.

As a result of an agreement late last year between the Department of Defense and the National Aeronautics and Space Administration, 87 square miles of the western part of the range has been set aside for the construction and operation of an Apollo Spacecraft Propulsion Development Facility.

Within that area, one square mile will be used for NASA or NASA contractor administrative facilities; and another one square mile section is to be used for the location of the NASA contractor technical, storage and development facilities, including test stands. The remainder of the land will serve as a safety buffer zone.

As of April 1 of this year the construction of required facilities and preparations for initial operations are on schedule. A Redstone gantry has been modified for use in the tests to come involving the Little Joe II and the various components of the Apollo configuration.

Basically, three types of tests are planned at the present time: (1) tests to develop and qualify the launch escape system during an off-the-pad escape; (2) tests to develop and qualify the launch escape system during an escape at maximum dynamic pressure; and (3) a high altitude atmospheric abort. The Little Joe II will be used for the last two types of tests. This launch vehicle will have a maximum capability for a thrust of 800,000 pounds.

At the present time NASA has 35 persons employed at White Sands and this number is expected to increase to about 100 during the testing period.

Contractor personnel will swell this total to about 1,000. This will include a large number of persons who will be engaged in support services to the engineers and technicians.

When the total complex is complete North American Aviation will have two static test stands, a control center, a preparation building and an underground concrete bunker for housing instrumentation equipment necessary to the Apollo Spacecraft Propulsion Development.

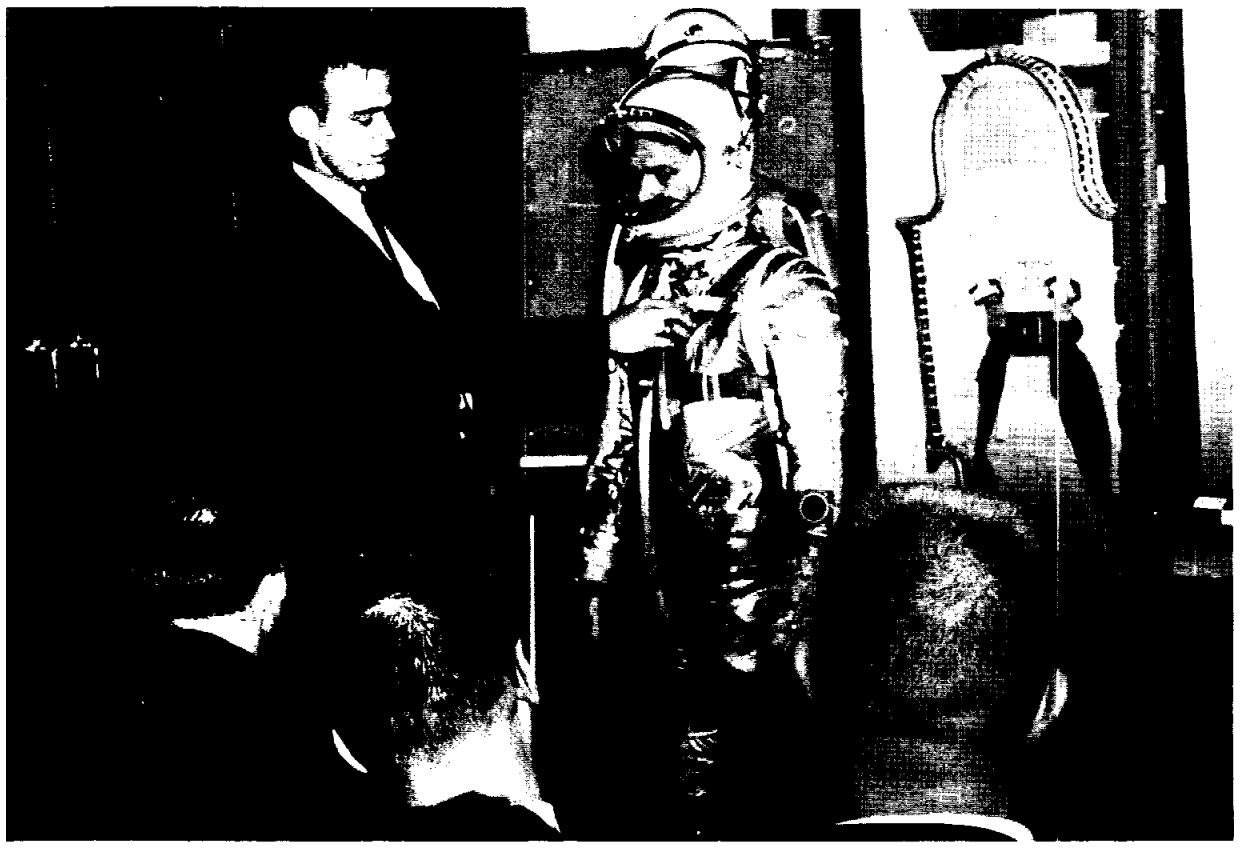
Grumman Aircraft, the prime contractor for the lunar excursion module, will have an additional four test stands, a ground control center, and other facilities necessary to test the LEM, which has the assignment of landing astronauts on the moon as well as serving as the escape vehicle from the lunar surface.

The effect of these activities on the local enonomy will be felt largely on nearby Las Cruces, New Mexico, and the surrounding area. About three-fourths of the personnel who have moved to the area in connection with the NASA programs there live in Las Cruces.

About $10.8 million will have been spent for the facilities at the range by the end of June, 1963, and an additional $15 million has been requested for the fiscal year beginning July 1. It is estimated that about 60 per cent of this money is spent in the local area.

"If we forfeit to any other nation the opportunity for preeminence in this important new field (space) the United States cannot retain its position as a leader of the Free World."

James E. Webb
NASA Administrator



ROBERT CRAFE (left) and Robert L. Spann (in suit) of Crew Systems Division demonstrated the Mercury pressure suit to a training class of future medical monitors for the manned space flight tracking stations around the world. The lecture was given during the first day's classes last week, at a lab session in Lane Wells Building. The group is mostly doctors from the services.

Medical Monitors For Tracking Stations Take Training At MSC

Some 27 new medical monitors for the manned space flight tracking stations around the world have been undergoing an intensive training period at Manned Spacecraft Center for the past week, and will wind up the course with a briefing at Cape Canaveral Friday.

They are physicians, drawn from various military or federal civilian organizations, who are becoming fully acquainted with the pressure suit, the biosensors, the manner in which medical information is telemetered to earth from an orbiting spacecraft, mission concepts, and the program as a whole.

From 8:30 to 5 p.m. daily and Saturday, the doctors attended classes at the medical dispensary at Ellington, lab sessions in Crew Systems Division shop at Lane Wells, lectures on spacecraft systems at Stahl-Meyers, and sat in on flight controllers' briefings.

"Many of them are already specialists in aerospace medicine," explained Dr. Duane Catterson of the Medical Operations Office "This course is to familiarize them with the manned space program's medical requirements, give them an understanding of the complexity of the entire effort, and an idea of the situation their "patient"—the astronaut—is working in.

Medical monitors for the tracking stations during the Gemini program will be drawn from this group, which will be identified as trained for the job after completion of the course.

Each is required to serve at least one mission as back-up monitor at a station requiring two monitors before handling a station as prime monitor. Some of them may get such experience during MA-9, but they will probably not be prime monitors until the Gemini manned flights begin.

Medical monitors for MA-9 —about 19 will be needed— will be drawn from the approximately 25 monitors trained in 1960. "They come from the Army, Navy and Air Force, and at least one is from NASA Headquarters," Catterson explained. The present group of trainees also represents all three services.

Instructors for the training course include various members of the medical operations staff and representatives of other specific areas in Manned Spacecraft Center, such as Security, Crew Systems, and Public Affairs. A lecturer from the Navy School of Aviation Medicine in Pensacola will discuss the interpretation of electrocardiograms.

"The interpretation of telemetry is new to most of them," Catterson pointed out, "so about a quarter of their class time is being devoted to this."

Lectures from all three project offices and from flight oper-

(Continued on Page 2)

Lingle Is Named To Headquarters Industrial Post

Dr. Robert C. Seamans, Jr., Associate Administrator for the National Aeronautics and Space Administration, announced the creation of a new NASA post, that of Deputy Associate Administrator for industrial Affairs, recently.

Walter L. Lingle, Jr., currently Assistant Administrator for Management Development, has been named to fill the position.

The establishment of this new position is another step in evolving NASA's organizational strength to meet its growing responsibilities in space research and development, Dr. Seamans said.

In making the announcement, Dr. Seamans stated Lingle's duties in this position will include responsibility for NASA's over-all relationships with industry and the development and review of NASA-wide procurement policies and procedures. He will continue his present duties as Assistant Administrator.

Space News NASA ROUNDUP!

SECOND FRONT PAGE

Cape Engineers Develop New Preflight Checkout System

A team of young engineers on MSC's Cape Canaveral staff has come up with a highly advanced system of gathering, sorting, interpreting, displaying and storing electronic information which promises to be a major step forward in the pre-flight checkout of spacecraft.

Known as PACE-S/C (Preflight Acceptance Checkout Equipment for Spacecraft), the system utilizes off-the-shelf equipment, including solid state high speed digital computers, to handle data received electronically during tests of spacecraft systems, efficiently and rapidly.

Designers of the system are Gary Woods, Tom Walton, Walt Parsons, Harold Johnson, Dan Marlowe and Cliff Bradford, of MSC's Preflight Operations Division. Parsons, chief of the Checkout Data Office, headed the group.

The problem is this: if astronauts are to remain safe for long periods of time in space, their vehicles must be thoroughly flight-tested and dependable. Since spacecraft become increasingly more complex as flights become longer this means longer, heavier workloads on the men who check the systems. Yet the allowable time periods for such evaluation will become steadily shorter as flight frequencies increase.

Earlier checkout methods involved the tedious process of visually scanning vast quanti-

(Continued on page 2)

Naval Reservists Hold Three-Day Seminar On Space

Six engineers for MSC lectured on Projects Mercury, Gemini and Apollo, crew, equipment and training, and MSC operations March 15-17 before a seminar attended by 85 at the Naval Reserve Training Center.

The space seminar concluded March 17 with a tour of NASA MSC facilities.

The group was made up of 35 members of Houston's Naval Reserve Research Co. 8-4, sponsors of the program, 12 members of Houston's Army Research and Development Co 4001, and reservists from New Orleans, Dallas, College Station, Austin and Freeport.

MSC speakers and their subjects included John B. Boynton, Project Mercury; Arthur J. Thiberville, simulation and crew operation; Homer W. Dotts, Project Gemini; Joseph T. Doke, Project Apollo; Paul Kiehl, crew equipment; and Elwyn H. Yeater, MSC operations; and James Prim, crew training simulator.

NAVAL RESEARCH RESERVISTS crammed a three-day space seminar into a busy weekend March 15-17, when six MSC engineers lectured on aerospace topics. Looking over samples of "space food" are, left to right, Lt. Commander Multon G. Gugenheim, C. O. of Houston's Naval Reserve Research Co. 8-4; Lt. James Nowlin, Jr., USNR; Lt. Robert J. Ward, USNR, seminar coordinator; and Paul Kiehl, MSC Crew Systems Div. Gugenheim and Nowlin are engineers in civilian life.