Space News NASA ROUNDUP!

VOL. 3, NO. 26 MANNED SPACECRAFT CENTER, HOUSTON, TEXAS OCTOBER 14, 1964

Worldwide Tracking Network Being Tested For Manned Flights

A major test of the NASA Worldwide Tracking Network began October 9 with network countdowns, interface drills, preparation, and simulations through October 16, to be climaxed with a MCC launch simulation on October 17, in preparation for manned earth-orbital flights in the Gemini program.

Simulated flight missions will be carried out over a nine-day period involving Cape Kennedy, Goddard Space Flight Center and eight remote sites in the worldwide network to test tracking and communications equipment and flight control procedures and equipment.

The Worldwide Network for Gemini control and communications will be essentially the same as that used in the Mercury Earth orbital flights. The network, however, has been updated to meet the more complicated needs of the Gemini program.

Manned Spacecraft Center will deploy approximately 50 flight controllers, medical monitors, astronauts and other ground support systems opertors for the test. About half of this number will man positions in the Mission Control Center at Cape Kennedy.

The test will be carried out under the supervision of Christopher C. Kraft Jr., assistant director for Flight Operations at MSC and operations director for the Office of Manned Space Flight, NASA Headquarters, for the upcoming GT-2 (Gemini-Titan 2) suborbital flight. Kraft also will serve as operations director for GT-3.

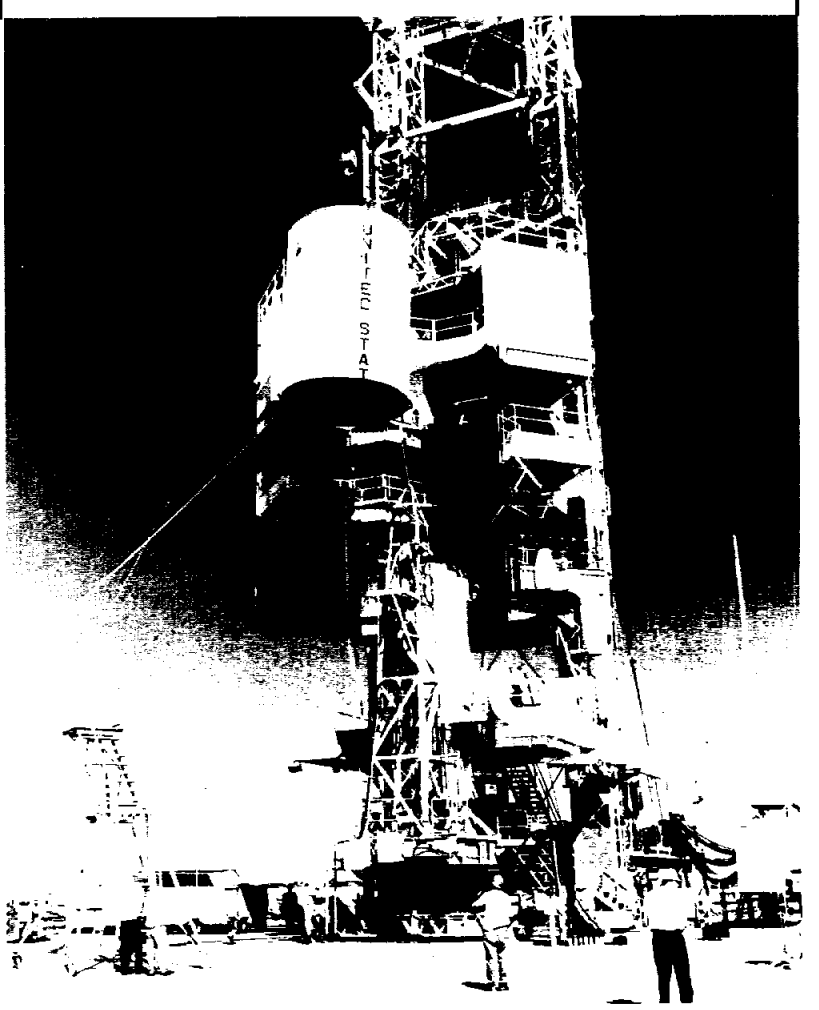
All four recently announced flight directors, Kraft, John Hodge, Gene Kranz and Glenn Lunney will handle flight director duties for the network simulations. L. Gordon Cooper, one of the original Mercury Program pilots, will serve as Capsule Communicator (Capcom) at Cape Kennedy. Astronauts Charles Conrad and Neil Armstrong will observe the simulations at remote sites, Conrad at Carnarvon, Australia, and Armstrong at the Kuai Station in Hawaii. Ted Freeman will serve as Booster Tank monitor at MCC.

Other remote sites involved in the simulations will be in the Canary Islands, Bermuda, Guaymas, Mexico, Corpus Christi, and on two ships, the Rose Knot Victor at San Juan, Puerto Rico and the Coastal Sentry Quebec enroute between Baltimore and San Juan.

Goddard Space Flight Center which is responsible for the design and implementation and maintenance and operation of

(Continued on Page 3)

First LJ-II With Attitude Control



THIRD LITTLE JOE II—The Little Joe II launch vehicle which will launch Apollo boilerplate 23 on a test flight later this year, is shown being erected on the launch pad at White Sands Missile Range. This vehicle, first to be equipped with attitude control system, is the third one to be delivered to NASA by GD/Convair in San Diego, Calif. Little Joe II, number three, was delivered September 18.

Full Scale LEM Mock-Up Reviewed By MSC Team

A full scale metal mock-up of the Lunar Excursion Module (LEM) was reviewed at Bethpage, N.Y., October 8, by officials from the NASA Manned Spacecraft Center, in order to achieve a design representative of the actual LEM flight model.

An Apollo Spacecraft Program management and engineering team, headed by Dr. Robert R. Gilruth, director, MSC; Dr. Joseph Shea, Apollo program manager; O. E. Maynard, chief, Systems Engineering; and William Rector III, LEM project officer, capped a week-long analysis of the mock-up design with a critique aimed at definitizing the LEM design.

The design is representative of the configuration proposed by Grumman to satisfy the LEM mission, in order to continue development and qualification testing of the vehicle. Also to establish the design, as embodied by the mock-up, in order to use it as a basis for tooling and fabrication of portions of LEM.

Center of attraction for the week-long meeting was the all metal mock-up, constructed mostly of aluminum, in which the various equipment and systems for the Lunar Excursion Module were expressed.

In many cases, actual equipment was utilized in the interior of the mock-up. Designated M-5, the mock-up is also used to check the location of equipment and displays in the vehicle and the compatibility of these units with astronaut requirements.

NASA and Grumman representatives carefully analyzed and critiqued the LEM equipment and systems. Alterations of modifications that are required will be incorporated in subsequent LEM ground and flight test vehicles.

Manned Space Flight Meeting, Set For Nov. 4-6

A description of proposed lunar-base locations and functions, together with complete status reports on the Gemini and Apollo programs, will highlight the Third Manned Space Flight Meeting, November 4-6 at the Rice Hotel in Houston.

The meeting, co-sponsored by AIAA and NASA, will review in depth progress thus far and future plans for all manned spaceflight projects.

The program has been planned to provide systems-oriented sessions, and contains discussions of Gemini, Apollo, launch vehicles, guidance and control, biotechnology, spacecraft design, and simulation and training. The final day of the meeting will cover advanced manned missions and future challenges.

Paul E. Purser, special assist-

(Continued on Page 2)

Martin L. Raines Named Manager MSC-White Sands Operations

A retired Army colonel whose engineering and administrative background includes work with Project Mercury is the new manager of NASA Manned Spacecraft Center's White Sands Operations.

The appointment of Martin L. Raines to manage White Sands Operations activities supporting Apollo and Gemini Program testing in New Mexico was announced October 3, by Dr. Robert R. Gilruth, director of the Manned Spacecraft Center.

Raines, recently retired from the Army in Washington, arrived for duty in Las Cruces on October 5. He replaces Wesley E. Messing, who transferred to MSC-Florida Operations in July. Interim management of White Sands Operations has been conducted by Paul E. Purser, special assistant to Dr. Gilruth.

White Sands Operations includes the Apollo flight test launch complex at White Sands Missile Range and the Propulsion Systems Development

(Continued on Page 3)

MSC United Fund Drive Halfway To $47,848 Goal

The United Fund drive here at the Manned Spacecraft Center reached the halfway mark with $24,363.98 pledged toward a goal of $47,848.

Tabulations as of October 8, show that of the 3,507 employees here at the Center, 1,549 have made pledges or contributed for a total employee participation of 44.2 per cent. The pledges to that time amount to 50.9 per cent of the goal set for the Center.

Tony Yeater, campaign chairman for MSC said that in some areas at the Center response to the drive has been exceptional, but that other areas seem to be "dragging their feet," and he said that he would like to encourage all team captains to exert a little extra effort and make certain that all persons are contacted for pledges.

Yeater went on to say that he knew 100 per cent participation by the entire center was too much to hope for, but the nearly 2,000 who have not filled out their pledge cards for this worthy 68-in-1 campaign should give some serious thought to it today. And any person desiring to increase his pledge is most welcome to do so.

He continued by saying, "The price of a package of cigarettes each week from each MSC em-

(Continued on Page 3)

Gemini-Titan 2 Launch Vehicle Test Conducted

A test simulating the last 30 minutes of the launch countdown, the launch, and the first six minutes of flight of NASA's Gemini-Titan 2 launch vehicle was conducted last Wednesday.

The complete systems test, which was performed successfully on the booster and Complex 19 at Cape Kennedy, was a significant step in preparation for the second unmanned Gemini flight.

Scheduled during the fourth quarter of this year, the flight will send the spacecraft on a ballistic trajectory down the AF Eastern Test Range, where recovery is planned.

Dr. Gilruth Helps Open 'British Fortnight In Texas'

BRITAIN IN TEXAS—Dr. Robert R. Gilruth, director of the Manned Spacecraft Center, is shown with Dr. D. W. Hill (left), British Institute of Dinsbury, Manchester, England. Dr. Gilruth partitipated in the opening October 5, of the "Britain and America In The Space Age" exhibition at the "British Fortnight In Texas" which is being held at the Main Building in Houston. Also attending the opening ceremonies were His Excellency Right Honorable Lord Harlech, K. C. M. G., British ambassador to the United States; and the Right Honorable Lord Mayor of Manchester, Dr. William Chadwick.

Gemini Astronauts Will Use Mobilehome To Suit-Up, Check Out At Launch Site

Based on experience gained from Project Mercury, MSC-Florida Operations Launch Site Medical Operations branch has designed a mobilehome unit that will be used close to the launch site to store Gemini flight units, to suit-up the flight crew, and to check out the suits and suit instrumentation.

This 1200 square-foot, air-conditioned unit, now sited on Launch Complex 16, was created to refine some of the suiting and suit checkout procedures used in the earlier manned space program.

During Project Mercury, the astronauts were suited and checked out at a facility located approximately twenty minutes away from the launch area and then moved to the actual launch site in a transfer van. Because of this trip, and the time involved, possible suit or suit instrumentation damage posed a continual threat. To ensure astronaut safety, various phases of suit-checkout had to be reaccomplished at the launch complex, often resulting in delays and astronaut discomfort.

By adding this new facility and eliminating the transfer-van trip, potential suit damage and decreased prelaunch preparation time will be minimized. For example, Gemini's crew will board the spacecraft at T minus 60 minutes instead of T minus 140 minutes as in Project Mercury, affording a time saving 80 minutes, part of which is directly attributable to this suiting and checkout facility.

Further, the unit serves as a temporary rest area for the back-up crews who work with launch teams in preflight tests and simulated mission procedures.

Composed of a suiting and suit checkout area, two astronaut rest-work areas, a suit storage room, a repair room, a small kitchen, and a bathroom, the mobile trailer is an integral part of prelaunch operations.

The unit's functional hub is the suiting and suit-checkout area in which are housed two suit checkout consoles and two aero-medical consoles. The suit consoles are used to test and verify the many systems that are part of the Gemini flight suit. This phase ranges from suit leakage rate and pressure tests through communication checks. The aeromedical console is used to test the medical instrumentation the crew members wear as part of their flight-borne apparatus.

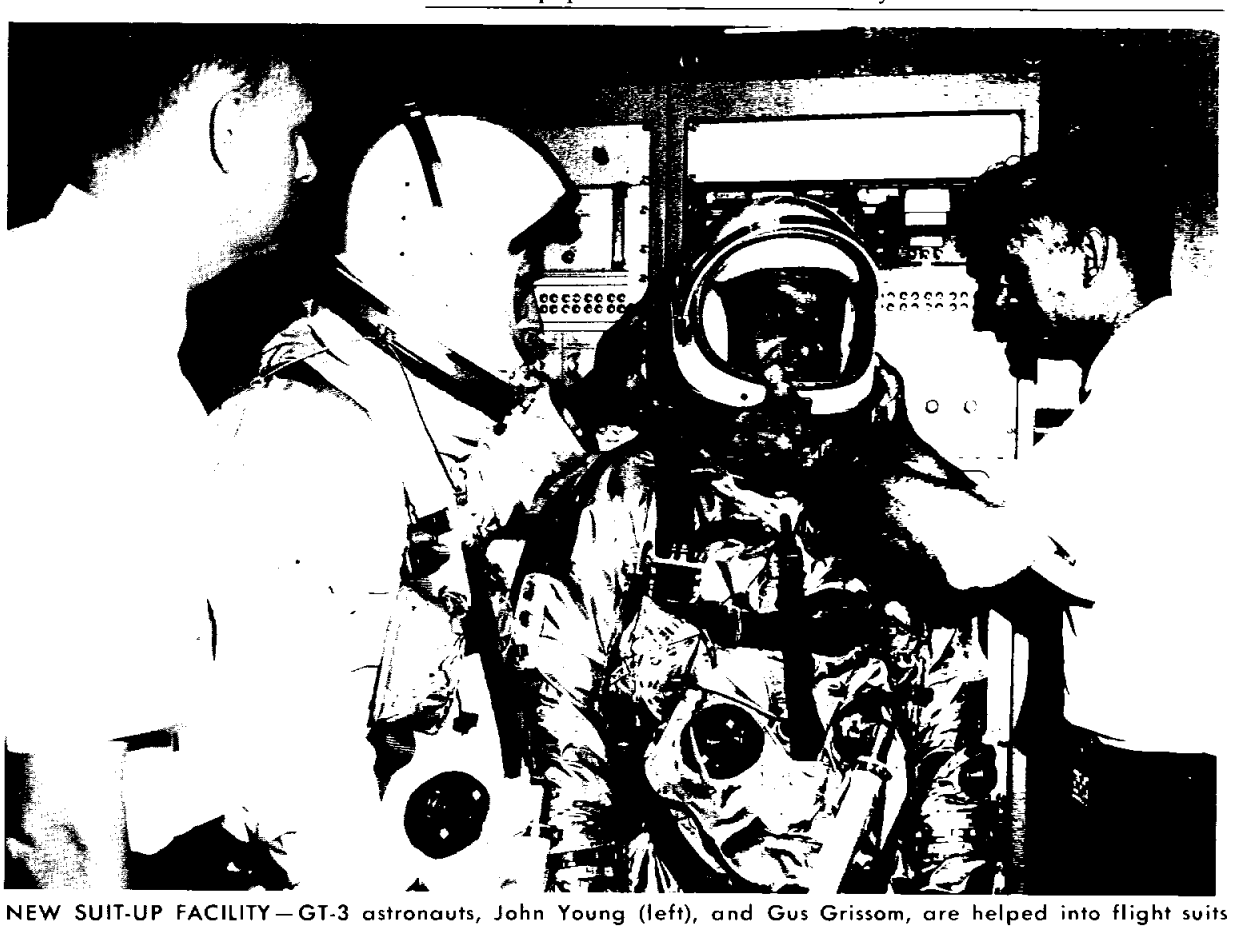
With especially designed sensor units fastened to the astronauts, physiological factors can be monitored and recorded. These systems document and relay information concerning such body actions as respiration, blood pressure, heart beat, and body temperature. Also, suit inlet and outlet temperatures are checked.

Immediately adjacent to the suiting facility is the repair area where minor adjustments and repairs can be made to the flight suits, sensors, circuits, or other related equipment.

The two rest-work areas are furnished with writing tables, chairs, and beds. The flight crew members will use these rooms for short periods of time during launch site operations. Living quarters are comfortably furnished and adequate for brief rest periods between tests.

The suit storage area is fitted with racks for storing flight suits until they are needed. The suits are stored in sealed plastic bags to keep them free of dust and dirt.

The small kitchen contains a sink, a two-burner hot-plate, and a refrigerator. It is adequate for the preparation of light meals and for storage of certain foods and drugs used during flight missions.



NEW SUIT-UP FACILITY—GT-3 astronauts, John Young (left), and Gus Grissom, are helped into flight suits by suiting engineers, Al Rochford (left), and Joe Schmitt in MSC-Florida Operations new mobile suiting facility, designed to expedite suiting procedures for the Gemini program, at Cape Kennedy's Launch Complex 16.

LLRV Tilt-Table Testing Conducted At Edwards AFB

Tilt-table tests with the Lunar Landing Research Vehicle (LLRV), to ground check the electronic flight control systems in preparation for actual flight testing, were conducted recently at the NASA Flight Research Center, Edwards AFB, Calif.

The tilt-table is a piece of equipment that allows the LLRV to be ground tested in preparation for actual flight testing scheduled for later this year.

Complete freedom of movement by the LLRV around its axes is permited by the table which restricts it from actual flight. The table is bolted to the concrete apron in the test area.

During the tests, the attitude rockets, the lift rockets, and the jet-engines were all operated. Project pilot Joe Walker was at the controls of the LLRV during most of the testing.

Safety precautions such as protective clothing and continuous water wash down of the area were used to guard against the harmful peroxide generated from the rocket motors.

The LLRV, which was built by Bell Aerosystems for NASA, is to be used to study the piloting and operational procedures that will be involved in the final phases of a manned lunar landing and during the initial portion of the lunar take-off by the Lunar Excursion Module.

MSF Meeting

(Continued from Page 1)

ant to the director of the Manned Spacecraft Center, is the general chairman of the conference and will take part in the opening ceremonies along with Dr. Robert R. Gilruth, director, MSC; and Louie Welch, mayor of Houston. Scott Royce, AIAA Houston Section, is co-chairman of the meet.

Included on the program will be Dr. George E. Mueller, associate administrator for Manned Space Flight, NASA Hq.; Edward C. Welsh, executive secretary, National Aeronautics and Space Council; Dr. Gilruth; and other prominent personages from government and industry.

A briefing and tour of MSC has been scheduled for three time periods, so attendees may view the Center and yet not miss technical papers of interest.

Ranger Program Scheduled For Local AIAA Meet

A special showing of slides and movies made from photographs taken by Ranger VII will be presented at 7:30 p.m., this Friday to members and guests of the American Institute of Aeronautics and Astronautics local chapter.

The Ranger VII lunar photographic mission will be briefly reviewed including a spacecraft description, mission profile, decisions resulting in the lunar impact site, and the camera performance.

Making the presentation, which will be at the Flintlock Inn on FM 528, will be Newton W. Cunningham, manager of the Ranger Program in NASA's Office of Space Science and Applications in Washington, D. C.

Cunningham joined the NASA lunar exploration program in April 1959 and became manager of the Ranger program in 1961.

The program will be preceded by a dinner meeting for AIAA members. Guests may attend the dinner and/or only the program portion of the meeting if they wish.

New Tool Saves $30,000 Every Time It Is Used

A new tool developed at the NASA Marshall Space Flight Center saves the government about $30,000 every time it is used.

It has been used eight times during the past six months—for a saving estimated at $240,000.

Known as a magnetic hammer, the tool is used in the manufacture of fuel tank domes for the giant Saturn V moon rocket booster which will send U.S. astronauts to explore the moon. The magnetic hammer removes distortions from metals quickly and easily without marring the surface.

Saturn V fuel tanks have a dome at each end. Each dome is made of eight "gore" segments resembling the peel of half an orange cut into eight equal parts.

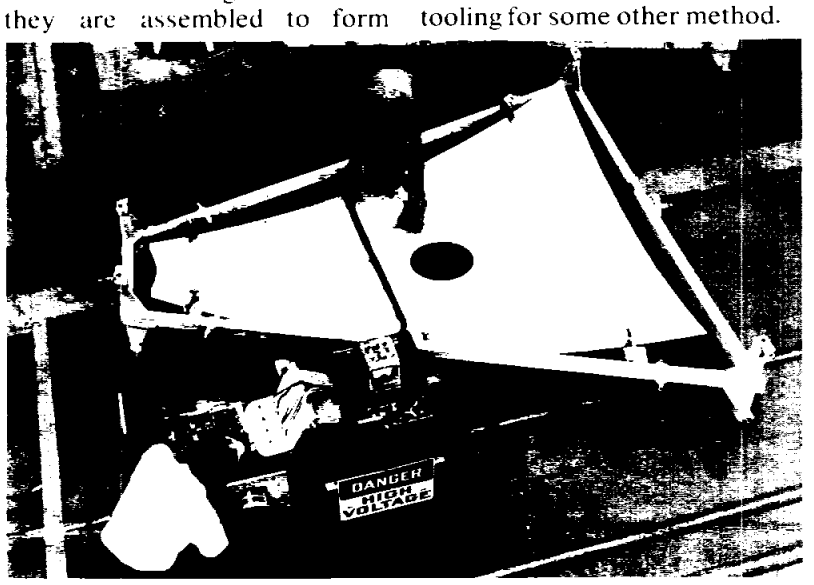
Fittings for fuel lines and other purposes must be welded into some of the segments before they are assembled to form domes. The welding causes localized shrinkage of the segments. The resulting distortion can make the segments useless.

The new tool hammers out the distortions with electrical pulses lasting about 500 millionths of a second.

Since the magnetic field pressure is distributed through the volume of the material, the resulting metal forming is uniform with no surface blemishes.

Development of the hammer is based on the principle of like magnetic poles repelling, or pushing away from each other, and opposite poles attracting each other.

Estimates of the savings to date are based strictly on the value of the gore segments salvaged and do not take into consideration such other factors as time saved, schedules met and avoidance of the costs of tooling for some other method.



MAGNETIC HAMMER IN USE—Two workmen prepare the revolutionary magnetic hammer for use on the apex half of a gore segment at the NASA Marshall Space Flight Center where the hammer was developed.

Thirty-Nine Foreign Representatives Tour MSC Facilities

AIR ATTACHES—A group of air attaches representing 39 foreign countries, here in the United States as guests of the U.S. Air Force, were visitors last week to the Manned Spacecraft Center. Part of the group is shown peering into the Gemini simulator as they were conducted on a tour of the Center. Members of the group stated that their visit here to MSC was the highlight of their U.S. tour.

United Fund

(Continued from Page 1)

ployee, or if you don't smoke, a package of gum each day, is all that is needed to put us over the Center's goal."

Organizations within the Center that have 100 per cent participation and/or have reached or exceeded their goal are: Office of the Director, Assistant Director for Administration, Assistant Director for Engineering and Development, Legal Office, Reliability and Quality Assurance Division, Flight Support Division, Aircraft Operation Office, Guidance and Control Division, Management Analysis Division, Personnel Division, Security Division, Office of Technical and Engineering Services, and Technical Information Division.

Those living outside Harris County are again reminded that their pledges through the UF drive here at the Center will count toward the MSC goal, but will be forwarded to the county or city fund designated on the pledge card, with the individual's home county getting the funds and the individual the credit in their home county or city fund drive.

White Sands

(Continued from Page 1)

Facility 20 miles northeast of Las Cruces.

Raines has been assigned since April to Project Cloud Gap as test director of Field Test CG-9. Project Cloud Gap is a joint project sponsored by the Arms Control and Disarmament Agency and the Department of Defense for the purpose of developing and field testing arms control concepts in support of national policy.

Raines is 47 years old and has completed 22 years of active duty in the Army.

His assignment to NASA's Project Mercury was from January 1959 until September 1960 as chief of the Army Ordnance Missile Command Office with the nation's first manned spaceflight program.

Technical And Scientific Employee Exchange Arrangement Made By NASA-Air Force

New arrangements for the exchange of technical and scientific people by the National Aeronautics and Space Administration and the U. S. Air Force were announced recently.

In the past, no NASA employees have been assigned to the Air Force. However there are about 100 persons in the Air Force on duty with NASA under a basic agreement dating from 1959. The 100 Air Force officers include 13 astronauts not affected by the agreement and 40 recent ROTC graduates.

About 40 more senior Air Force officers are scheduled for NASA assignments in the near future.

As of this week, 39 officers and four enlisted men from the Air Force were assigned to the Manned Spacecraft Center. They included one colonel, four lieutenant colonels, 11 majors, 21 captains, one first lieutenant, one second lieutenant, one master sergeant, and three technical sergeants.

James Koplin, Military Assistance Officer with the MSC Personnel Division said that at least 11 more Air Force officers were scheduled to join the Center before the end of the year.

NASA will assign employees to the Air Force on a when-needed basis. These will be civil servants in the grade of GS-13 ($12,075) and above. Air Force officers assigned to NASA will be majors or higher in rank unless "the position offers exceptional opportunity to the Air Force," according to the agreement.

Two memorandums of understanding, signed by Air Force Secretary Eugene M. Zuckert and NASA Deputy Administrator Dr. Hugh L. Dryden, became effective September 15.

The agreed criteria specify that the positions in NASA for Air Force officers "will be at a key or middle management level of NASA activity, experience which would be potentially beneficial to the Air Force." Specifically mentioned is manned space flight which may contribute to future Air Force capabilities.

NASA has agreed to request officers for only those positions requiring education, experience or skills especially developed by the Air Force in the fields of technical program management, engineering and physical or life sciences, but only after NASA has made a reasonable effort to fill these positions from civilian sources.

Requests from either agency will be by required technical skills and scientific knowledge.

Civilians selected from NASA will be from the following five areas: (1) aeronautical and aerodynamic sciences; (2) astrophysical and space sciences; (3) aeromedical and physiological sciences; (4) communications, tracking and launch-site technology; and (5) spacecraft and launch vehicle technologies.

The assignments of NASA employees to AF generally will be for two years with the understanding that these may be extended for an additional year. Air Force people will be assigned to NASA for three years, a normal tour of duty for the military.

These criteria were established by a Joint Air Force/NASA Military Requirements Review Group whose final report included the draft of the two memorandums of understanding and a recommendation that the review group, having accomplished its mission, be abolished.

Network

(Continued from Page 1)

the network will also provide computation of orbital tracks and voice and teletype communications in the worldwide net.

MSC-United Fund

PICTURE LIFE through the eyes of Beth, a mentally retarded child. You live in a world where everything grows, everything changes—except you. If you cry, it's for love and understanding; that's all you'll ever ask. The United Fund-supported Opportunity Center sees that such children do get this, plus training to use what they have.

COST REDUCTION CORNER

To provide for a faster and less expensive mail service between the Gemini Program Office and McDonnell Aircraft Corporation (MAC), a "bulk" mail system has been developed.

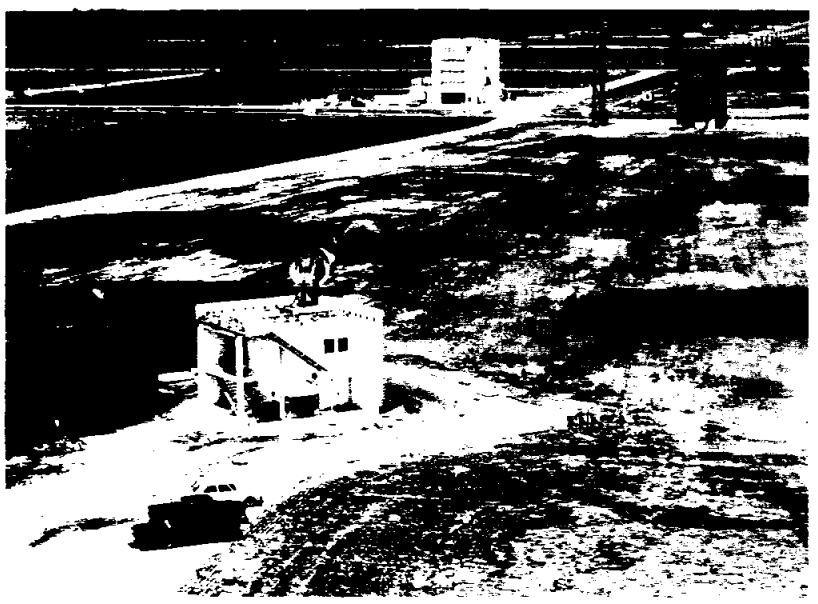
This new system will send all mail to MAC in a single bulk package, therefore eliminating envelopes, individual packages, and separate handling. In addition, this bulk package will be delivered to a separate MAC post office box at the St. Louis airport instead of the downtown box.

It is anticipated that this new method will produce faster delivery by approximately ½ day.

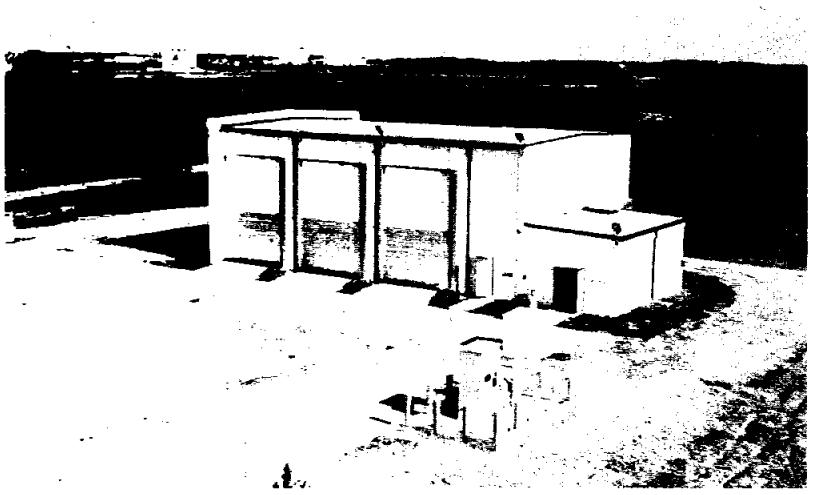
This savings was attributed to Lt. Col. R. C. Henry who suggested and implemented this improved method. Savings first year $3000.

MSC-Florida Operations First

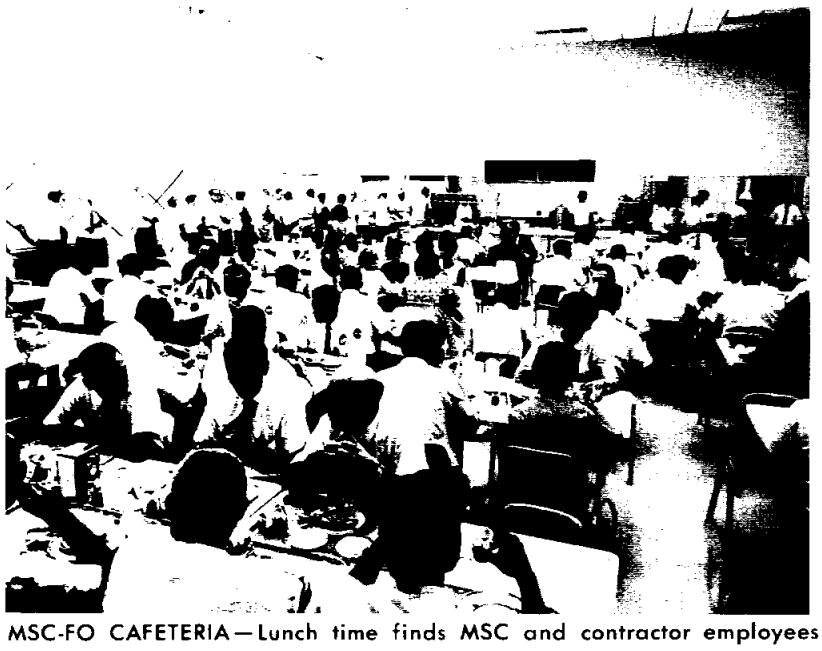
FIVE MILE MOVE—Push, pull, lift and strain are the orders of the day as office files and other equipment are trucked the five miles from Cape Kennedy, across the Banana River to the new MSC-Florida Operations facilities on Merritt Island.



RADAR RANGE—Shown here is the RF Systems Test, used to adjust, test, and checkout spacecraft rendezvous apparatus and procedures in a simulated free space condition. The large structure in the background is the Life Support Test, buildings 1 and 2, of the Fluid Test Complex.



LES CHECKOUT FACILITY—This single-story Ordnance Supply building provides remote, safe storage for solid fuel motors, pyrotechnic actuating devices, and aligned launch escape towers. The Launch Escape System tested on the launch of the Apollo SA-7 vehicle was checked out in this facility and became the first piece of hardware to be checked out at the Merritt Island Launch Area.



MSC-FO CAFETERIA—Lunch time finds MSC and contractor employees eating in the brightly lit, pastel-colored cafeteria.

During the month of September and October, Manned Spacecraft Center-Florida Operations became the first major NASA organization to occupy new facilities on NASA's Merritt Island Complex, as 1,270 MSC and contractor employees moved from Cape Kennedy to the Merritt Island Industrial Area.

The move, which started the last weekend of August, was made at night and on weekends to facilitate an orderly flow of personnel and equipment.

The new facilities are built on part of the 88,000 acres acquired by NASA during the latter part of 1961 at a cost in excess of 55 million dollars. Today, a multi-million-dollar industrial area and launch complex are taking shape.

The majority of MSC-Florida Operations personnel are located in the Manned Spacecraft Operations building, formerly known as the Operations and Checkout Building. When fully completed, facilities assigned to MSC-Florida Operations will consist of 18 different installations manned by 3,000 MSC and contractor personnel.

The MSO building, focal point of Manned Spacecraft Center-Florida Operations, is centrally located in the Industrial Area of NASA's John F. Kennedy Space Center. The sand colored, 575,000-square-foot building rises 106 feet above the surrounding countryside and includes Administrative and Engineering, Laboratory and Control, and Spacecraft Assembly, Test, and Servicing areas.

On the north side of this massive building is the Administrative and Engineering (A&E) area. This three-story, 188,000-square-foot area is devoted to office space, service areas, and conference rooms for MSC-Florida Operations engineers and administrative personnel. From this area comes the planning, coordination, and supervision of Gemini and Apollo spacecraft preflight checkout and acceptance testing operations.

Between the A&E area and the Laboratory and Control area (L&C) of the MSO building are a cafeteria and a main conference room.

The five-story L&C area is one of the most extensively equipped areas in the MSO building. Here spacecraft component checkout operations are performed, malfunction analyses conducted, and test data monitored. The area contains an integrated system of laboratories; control equipment rooms; shop support offices; and areas for spacecraft inspection, quality control, contractor facilities, and ACE-S/C, (Acceptance Checkout Equipment for Spacecraft).

Astronaut quarters, aeromedical facilities, and suiting and suit checkout areas are also provided.

Adjacent to and connected with the L&C area is the Assembly and Test Area (A&T) of the MSO building. Here, in high and low bays, spacecraft modules are mated and integrated tests performed to verify interface connections and integrated performance of spacecraft systems.

The high bay area is 224 feet long, 84 feet wide, and more than 106 feet in height. It contains spacecraft stands, altitude chambers, staging areas, spacecraft modules, and launch escape tower fixtures. In addition, it will contain ground support and control equipment plus cranes for assembly and handling operations. Integrated Systems testing in this area is controlled from consoles on the second floor of the L&C area.

At the east end of the high bay area is an 80-foot high, motorized, vertical bypassing door, permitting removal of fully mated spacecraft.

The 251-foot long low bay of the Assembly and Test area provides for spacecraft module testing prior to mating. It is serviced by two 25-ton cranes operating the entire 475-foot length of the Assembly and Test area. In addition to bench assembly and module stand positions, there are receiving areas, spacecraft workstands, checkout benches, and a smaller altitude chamber for environmental testing of Gemini spacecraft.

The Service area of the MSO building is a single-story, 475 foot-long section adjacent to the A&T area, and contains shop areas that support the functions carried out throughout the building.

Fluid Test Complex

Located 1.5 miles southeast of the MSO building is the Fluid Test Complex, used to preflight test and checkout spacecraft fluid systems other than primary propulsion.

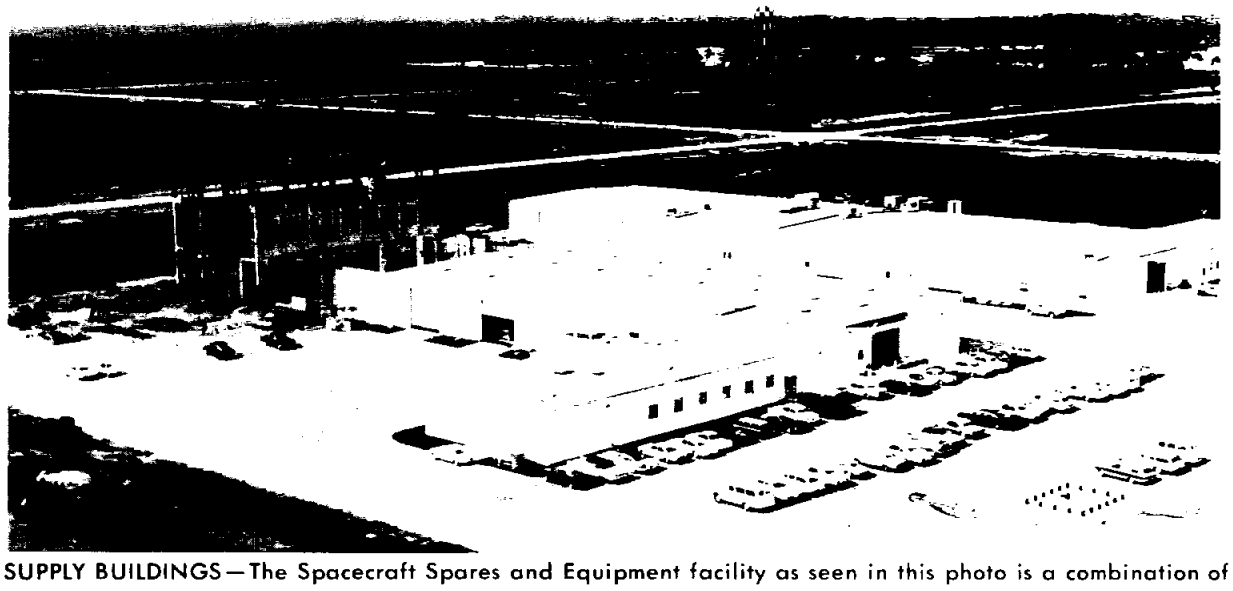
The 77-acre, limited-access facility is composed of the Life Support Test facilities, Hypergolics Test facilities, Cryogenic Test facilities, Fluid Test Support Building, and fluid transfer pads and leaching ponds.

The special storing, piping, transferring, and handling devices used in this complex combine the best elements of personnel and equipment safety with optimum utility. Temperatures, pressures, toxicity, and volatility are just a few of many factors considered in the design and location of this complex.

In the Hypergolic Test facilities, testing and checkout of spacecraft stabilization and attitude control, orbital maneuvering, and re-entry control systems begins when a 45-foot-hook height crane lifts the spacecraft from the transport vehicle to a test stand mounted on a non-sparking aluminum grillwork floor. A chilled-water ponding system beneath the grill work provides rapid dilution and removal of hypergolic spills.

The bulk of the test operation is controlled remotely from a two story control room located between the two test cells. Housed in the first-floor of this building are SCAPE suit (Self Contained Atmospheric Protective Ensemble) and locker rooms, a mechanical equipment room, and an equipment checkout room.

The fuel is piped to the spacecraft from trailer-tank units parked on fluid transfer pads



SUPPLY BUILDINGS—The Spacecraft Spares and Equipment facility as seen in this photo is a combination of the Supply and GSE Service building and the Supply Shipping and Receiving building, now respectively designated the East and West Wings of the Spacecraft Spares Equipment facility. The 40,000-square-foot East wing provides for contractor Ground Support Equipment. The West wing is a single-story, L-shaped building and provides approximately 40,000 square feet of shipping, receiving, and supply facilities for MSC-Florida Operations. Construction of a middle section connecting the two wings is scheduled to begin the first week in January 1965. A high bay area is now under construction and will become a part of the East wing.

PERFORMANCE AWARDS—Dr. Robert R. Gilruth (left) director, Manned Spacecraft Center, presented sustained superior performance awards at recent ceremonies to: (front row l. to r.) Joseph S. Algranti, Aircraft Operations Office; J. Thomas Markley, Apollo; Owen E. Maynard, Apollo; and Jack C. Heberlig, assistant directorate for Engineering and Development; (back row l. to r.) James L. Raney, Computation and Analysis Division; Edward N. Jones, Resources Management Division; Chester H. Jenkins, Office of Administrative Services; and Alfred B. Eickmeier, Instrumentation and Electronic Systems Division.

MSC-EAFB Softball League Champions

SOFTBALL CHAMPIONS—The Primary Propulsion Branch softball team members are shown with the two trophies they won as playoff and league champions of the MSC-EAFB Softball League. Eight teams were in the league. Team members are (front row l. to r.) W. W. Weber, Don Stafford, Merl Lausten, Alex Madyda, Harold Lambert, and Bob Polifka, (back row l. to r.) Bill Hammock, Roger Hicks, Frank McCrimmon, Gordon Spence, Joe Thames, Dick McComb, and Benny Sprague. Other team members not shown are Oscar Cabra, Charles Yodzis, Hugh White, and Neil Townsend.

Duplicate Bridge Club Votes On Constitution

The MSC Duplicate Bridge Club voted on a Constitution and By-Laws at the October 13 meeting.

Copies of the Constitution and By-Laws may be obtained from Evelyn Huvar.

The following were winners at recent rating point games held by the MSC Duplicate Bridge Club:

September 22, north-south, Gil Conforte and Art Manson, first; J. N. LaMarche and J. R. Arnett, second: east-west, Tom Holt and Harold Granger, first; Ray Lynch and Paul Swanzy, second.

September 29, north-south, Sara and William Stewart, first; Elizabeth and Wayne Brewer, second; east-west, Ray Lynch and Paul Swanzy, first; Richard Reid and Tom Moore, second.

Health Insurance Plans To Increase Premiums

Most of the health benefits plans participating in the Federal Health Benefits Program will increase their premium or benefits or both for the contract term which begins November 1964.

The increased rates will apply to employees enrolled under the high options of the government-wide service plan (Blue Cross-Blue Shield) and the indemnity system (Aetna Insurance Company).

Participants in the high option of the service plan will pay an additional $2.06 each biweekly pay period for self and family protection, increasing the premium from the current $5.82 to $7.88. Those enrolled for self only will pay an extra 81 cents, resulting in a premium of $2.92 instead of the $2.11 charged now.

The indemnity plan will change its high option premium from $5.64 to $7.73 for self and family, an increase of $2.09; and the self-only category will go from $1.82 to $2.84, an adjustment of $1.02.

Neither of these two major plans will make any changes in the low option costs or benefits.

The service plan has made benefit changes in the high option to be effective along with the higher premiums. The high option benefits of the indemnity plan are not being changed.

To inform employees of the changes, the Civil Service Commission has prepared pamphlet BRI 41-117 entitled Information About Plan Changes Effective November 1964. Copies of this pamphlet will be distributed before November 1. Employees will also receive a revised edition of pamphlet Standard Form 2809A reflecting recent changes in the health benefits laws and regulations.

The Civil Service Commission has scheduled an open season for February 1965, during which employees may change plans, options, and type of enrollment. Further information on the open season will be announced at a later date.

Spotlight On Secretaries . . .

ANN BILAN (lower left) is secretary to Robert H. Ridnour, manager, Resident Apollo Spacecraft Program Office at North American/Space and Information Systems Division at Downey, Calif. In August 1962, she joined NASA at RASPO-Downey as secretary to the chief of Reliability and Quality Assurance. Lamesa, Tex. is her birthplace and her early schooling was in Texas. She completed high school in Long Beach, Calif., and attended Long Beach City College. Previous jobs held by Ann were at the Long Beach Naval Shipyard; U. S. Army, Ft. Sill, Okla.; Redstone Project, White Sands Missile Range, N. M.; and the U. S. Navy at Autonetics, Downey, Calif. Her husband Don is manager of an automotive paint and body shop and the couple has a girl, Kelly Ann 1. They reside in Lakewood, Calif. Ann includes in her outside interests, bicycle riding and iceskating.

ALMA GRIFFEY (lower right) is secretary to Harvey W. Fritz, chief, Quality Assurance Branch, Resident Apollo Spacecraft Program Office at North American Aviation in Downey, Calif. She joined NASA in August 1963 in her present position. She was born in Biloxi, Miss., where she also completed high school.

Alma attended Draughons Business College, San Antonio, Tex. Prior to joining NASA, she worked at the Air Force Flight Test Center, Edwards AFB, Calif; SAC Headquarters, Omaha, Nebr.; and Dyess AFB, Tex. Her husband Gilbert is a quality assurance representative for NASA's Western Operations at NAA, Downey, Calif. The couple has two children, Bert 23, and John 19, and the family resides in Downey. Alma said her outside interests included travel and boating.

Test Your Security I. Q.

1. Cover sheets are required to be attached to classified material: (a) At all times while in MSC; (b) When the material is unattended; (c) At all times, except while in proper storage containers.

2. In the event of a traffic accident within MSC, the persons involved are required to: (a) Report accident to MSC Safety Office; (b) Call Security Guards and render aid to injured; (c) Proceed to destination, if damage is less than $50.00.

3. Traffic violation points are assessed at MSC: (a) At the discretion of the Guard Patrol; (b) According to MSC Management Manual 24-6-1; (c) To inform employees of new traffic regulations.

4. Classified material may be hand carried from MSC for official purposes when: (a) The employee attends a classified meeting outside of MSC; (b) The courier has a Secret clearance; (c) Approved by the Division Chief and material cannot be transmitted in advance.

5. Custody controlled material for destruction shall be: (a) Released to Security Guard; (b) Placed in classified waste container; (c) Returned to Technical Library if received from there, otherwise returned to Mail and Records Section.

(Answers on page 5-A)

MSC BOWLING ROUNDUP

MSC MIXED LEAGUE
Standings as of Oct. 5

TEAM	WON	LOST
Celestials	12	4
Alley Cats	12	4
Eight Balls	12	4
Dusters	10	6
Gutter Nuts	10	6
Chugg-A-Lugs	8	8
Hawks	7	9
Playmates	7	9
Virginians	6	10
Falcons	6	10
Shakers	5	11
Goof Balls	1	15

High Game Women: C. Barnes 180.

High Game Men: F. Schmidt 221.

High Series Women: C. Barnes 511.

High Series Men: J. Sargent 560.

High Team Game: Celestials and Virginians 796.

High Team Series: Virginians 2225.

MIMOSA MEN'S LEAGUE
Standings as of Oct. 1

TEAM	WON	LOST
Sizzlers	13	7
Fabricators	13	7
Alley Oops	12	8
Pseudonauts	12	8
Green Giants	10	10
Technics	10	10
Whirlwinds	9	11
Roadrunners	8	12
Turkeys	7	13
Spastics	6	14

High Game: Grimwood 220.

High Series: Whipkey 561.

High Team Game: Alley Oops 919.

High Team Series: Alley Oops 2551.

Scuba Divers Have Social, Plan Activities

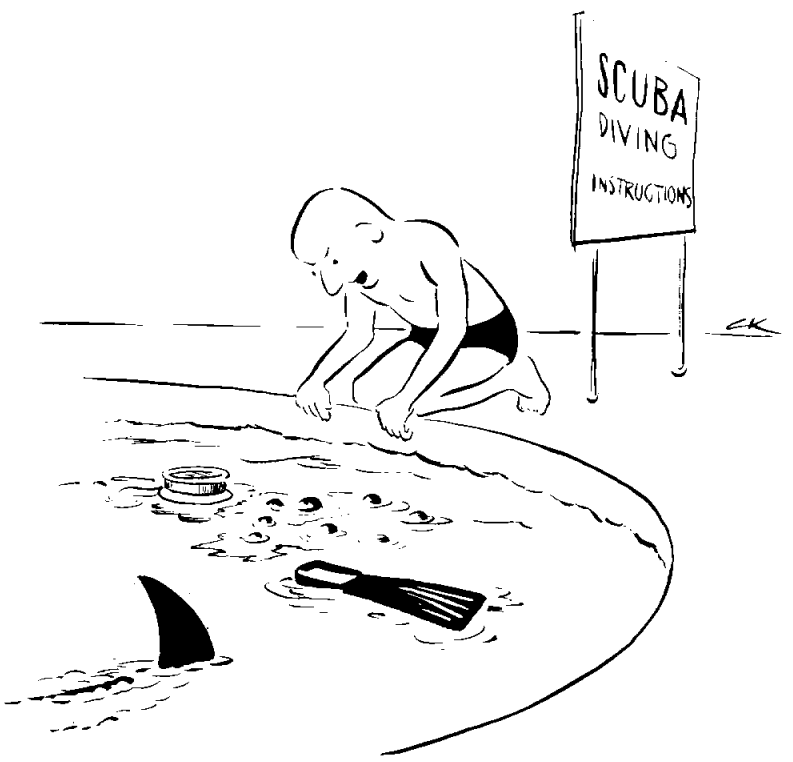
The next monthly meeting of the Lunarfins (MSC Scuba Diving Club) will be held at 7:30 p.m., October 21, in the east conference room of Building 1.

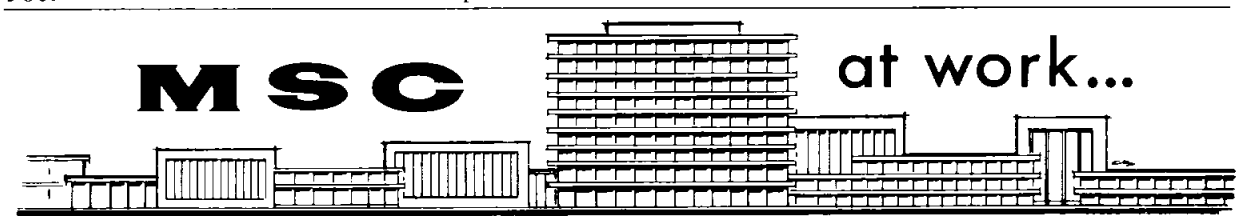
Last month's meeting was combined with a social fish fry in San Leon, and members, their familes, and prospective members feasted on fresh boiled shrimp and fried fish that club members had speared.

Seven members of the club are now attending the small boat handling course being taught by the U. S. Coast Guard Auxiliary.

Future activities planned by the club include entering the Alligator Gar Spear Fishing Contest at Lake Bistineau, near Shreveport, La., November 28-29. The Texas Gulf Coast council, with which the Lunarfins are associated, will have an underwater film festival in November at a time and place yet to be established.

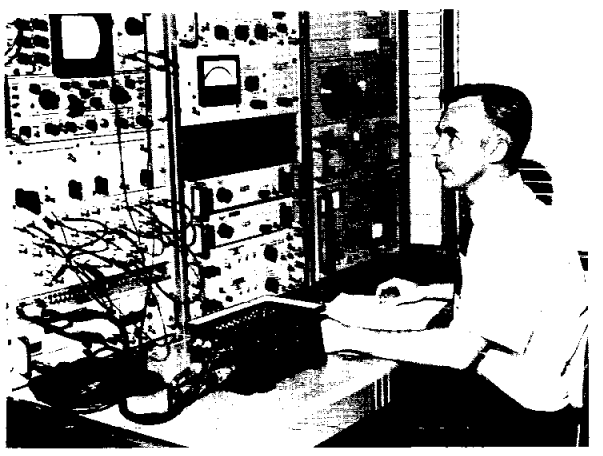
All interested parties are invited to attend the next meeting of the Lunarfins.





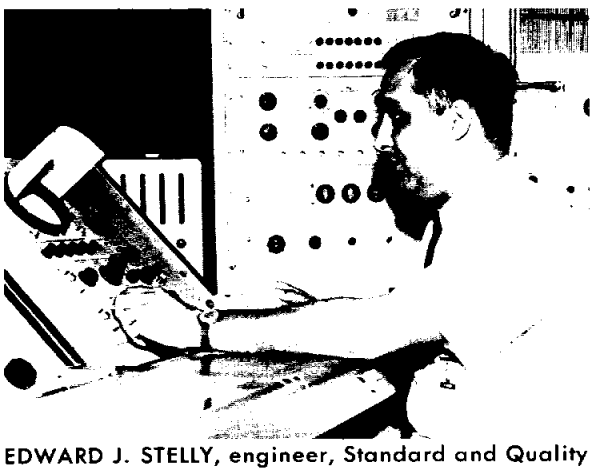
"PLAY GAMES ON YOUR OWN TIME, FROBISH"

MYRA LEE SHIMEK, Personnel Security Branch of the Security Division, checks and files appointment applicant cards.



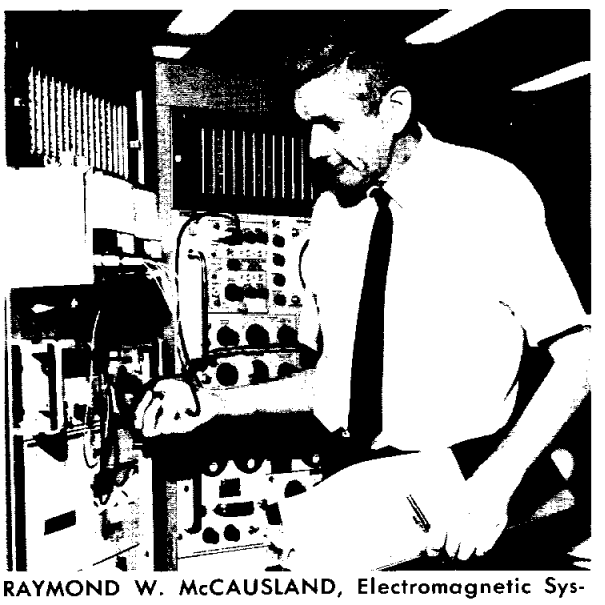
ROBERT F. JONES, project engineer, Flight Data Systems Branch, Instrumentation and Electronic Systems Division, evaluates the operation of a single sideband advanced telemetry system.

JOYCE K. PATTERSON, Administration and Finance Office, Resources Management Division, prepares to make a travel advance payment to a MSC employee going on travel.



EDWARD J. STELLY, engineer, Standard and Quality Assurance Branch, Instrumentation and Electronic Systems Division, operates a 10,000 force-pound automatic random and sine vibration system.

PEGGY F. NEAL, Personnel Security Branch of the Security Division, checks personnel security files.



RAYMOND W. McCAUSLAND, Electromagnetic Systems Branch, Instrumentation and Electronic Systems Division, makes a transmitter telementry flight qualification test.

Water Ski Winners Get Trophies

The Water Ski Tournament held in conjunction with the MSC Picnic at Galveston County Park, September 27, attracted 22 contestants.

Trophies were presented to the overall competition winners in six different classes by George Low, deputy director of MSC.

Winners were: men, Ben Hood; women, Bernice Hanway; children, Donna Osgood; beginning men, Bill Drewes; beginning women, Rita Sommer; and beginning children, Macy Lippitt.

Chief judge for the event was Cecil Herren, who has judged regional and national ski tournaments. He was assited by Ervin Asbeck.

William Dryer, a leading regional tournament driver, operated the ski boat throughout the afternoon of the tournament. A highlight of the day was a drag boat demonstration, held during an intermission in the ski tournament.

ANSWERS TO SECURITY QUIZ

1. C; 2. B; 3. B; 4. C; 5. C.

MSC Golfers Plan Tournament For Veterans Day

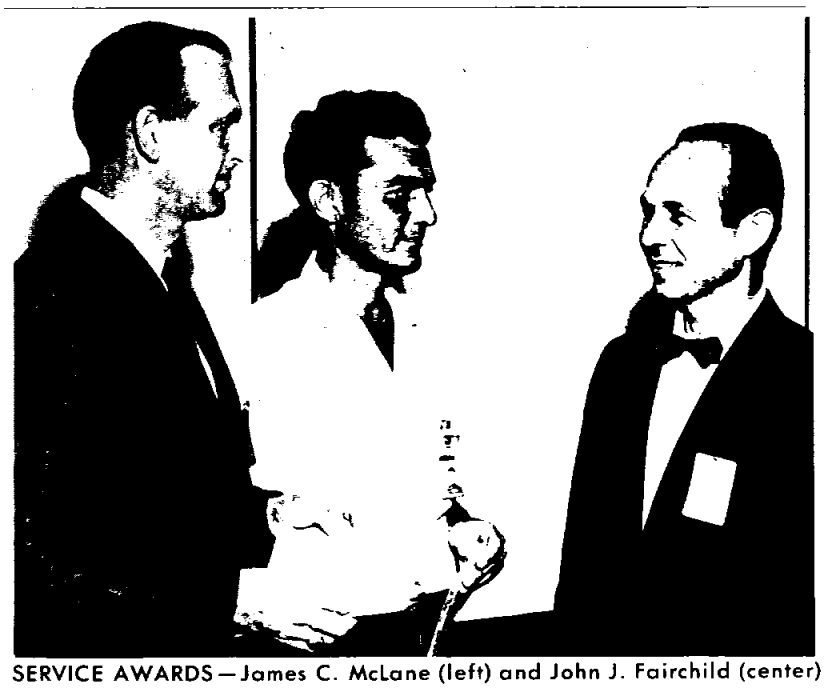
The MSC Golf Association's first annual Veterans Day Tournament will be held at the Clear Lake Country Club, November 11.

Waymond Armstrong, manager of the Clear Lake Club, invited the MSC association to use the golf course with no charge for green fees.

Play will be by four-man teams playing their best ball.

Due to the time needed for organizing and publishing teams and starting times, applications must be to the MSC Golf Association president by no later than Monday, November 2.

Submit application with check for three dollars payable to the MSC Golf Association, to Paul J. McGarrigle at symbol BF.



SERVICE AWARDS—James C. McLane (left) and John J. Fairchild (center) are shown receiving 15-year awards for government service from Maxime Faget, assistant director for Engineering and Development.

To Move Into New Merritt Island Facilities

just outside the test cells. The oxidizer is supplied from a similar facility sited 200 feet from the building.

An additional hypergolics test building has been funded and will be constructed during the current fiscal year.

The Cryogenic Test facilities are similar to the Hypergolic Test facilities. This structure includes a 40 by 40-foot test cell and similar crane equipment, but differs in the construction of the floor, which is composed of electrically grounded, monolithic concrete rather than aluminum grillwork. It includes four, 40-foot, vertical-bypassing doors rather than three. The additional door is required to avoid the formation of oxygen vapor pockets in case of leakage.

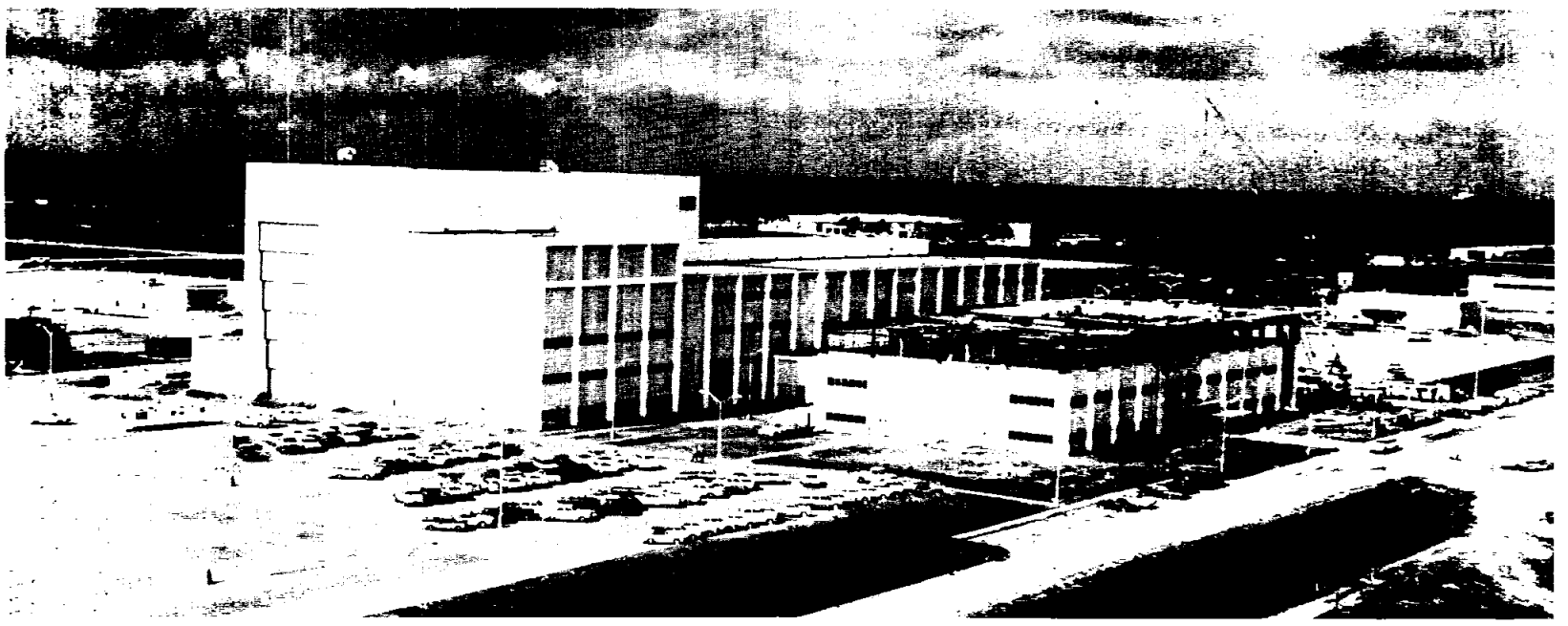
After the transfer of cryogenics and fuel cell operational test preparations are completed, personnel are evacuated and tests are conducted remotely from the hypergolics control room.

Cryogenic component testing can be accomplished in a specially equipped laboratory that is part of this building. This single-story structure is also air conditioned and equipped with an exhaust system. Already funded is an additional cryogenics facility to be constructed during the current fiscal year.

Another phase of spacecraft testing takes place in the Life Support Test facility, where systems that control the astronauts in-flight environment are checked out.

Physically, this building is similar to the other facilities. It includes two, 40 by 40-foot test cells, and a central core between the cells, which houses offices, ground support equipment rooms, and locker rooms. A laboratory wing includes test and checkout equipment, and component storage space.

The 14,000 square-foot, single-story Fluid Test Support building houses laboratories, shops, and service areas where work is conducted to support the activities of the entire complex. Special clean room conditions are maintained in the laboratories so that especially critical component tests can be conducted.



MSC-FO NERVE CENTER—The Manned Spacecraft Operations Building, the nerve center of MSC-Florida Operations, is shown in this helicopter view. The Administration and Engineering area is on the right and is connected to the Laboratory and Control area by the single story auditorium and cafeteria. The 80-foot high vertical by-passing doors open to expose the high bay area. The low bay area is toward the rear. The Service area is shown on the extreme left.

Leaching ponds complete this complex and are used to carry away, dilute, and neutralize toxic and hazardous wastes and by-products that result from testing.

A Pyrotechnic Storage facility is used for installation of pyrotechnic devices, optical alignment of guidance and control systems, propulsion vector alignment, and static weighing for determination of centers of gravity.

East of the Pyrotechnic Storage facility is the Ordnance Laboratory building which provides humidity-controlled, remote storage for solid fuel motors, pyrotechnics, and escape systems.

RF Systems Test

Located approximately one mile southeast of the MSO building is the RF Systems Test. It is composed of the spacecraft mock-up, a concrete building, a 50-foot wooden tower, and other highly specialized equipment that is used to adjust, test, and checkout spacecraft radar rendezvous apparatus and procedures.

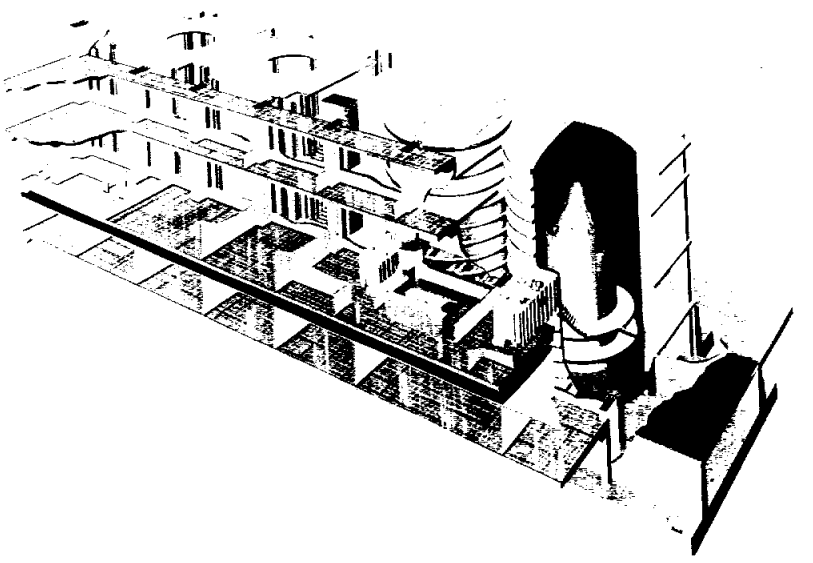
The spacecraft mock-up, mounted on an antenna positioner, and radar module occupy the top level of the building. The second floor houses electronic test and recording equipment. An air conditioner, a rest room, junction panels, and test support tools are located on the first floor.

The wooden tower supports a radar target fixture and is exactly 1,000 feet away. It is separated by a smooth, sodded grass strip that has been graded to a 1-inch tolerance to minimize "ground scatter," an electronic phenomenon that occurs when a portion of the radar signal is reflected from the ground and interrupts normal signal reception.

The facility was validated during May and June of 1964 for making acceptance measurements for Gemini spacecraft rendezvous radar.

In addition to preflight acceptance test operations, MSC-Florida Operations is responsible for interface compatibility between manned spacecraft systems, launch support systems, launch vehicles, launch complexes, and launch control centers plus securing Air Force Eastern Test Range Support.

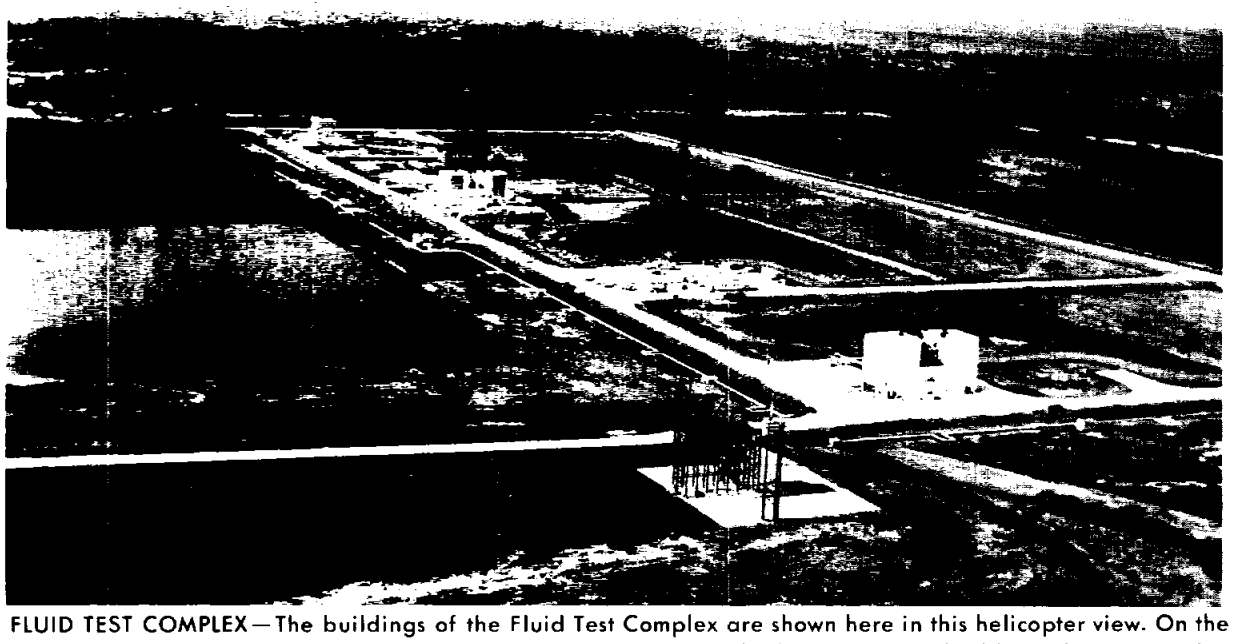
According to G. Merritt Preston, manager, MSC-Florida Operations, "The objective of our operations is to provide at lift-off, a flight ready vehicle and support systems whose performance will assure mission success and astronaut safety.



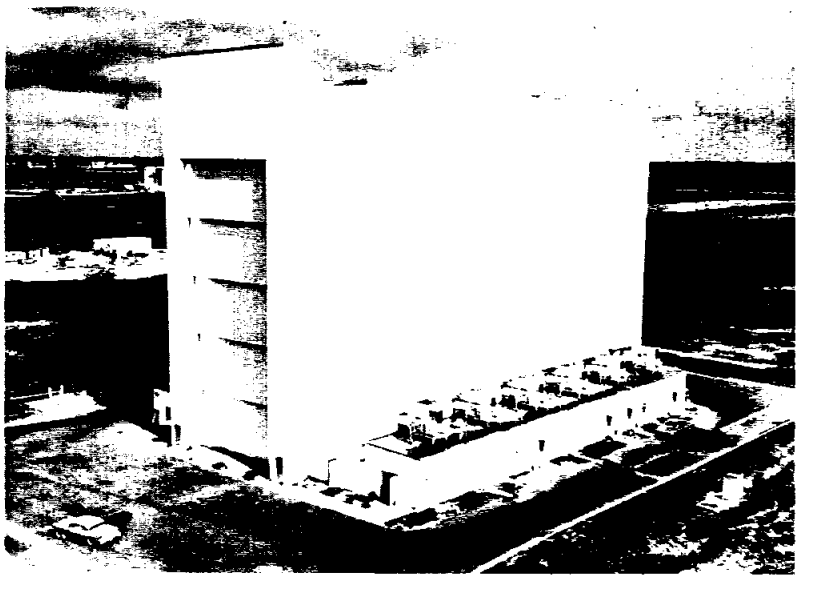
CHECKOUT CHAMBERS—Two domed, 50-foot-high, steel, cylindrical Altitude Chambers, located in the high bay area of the Manned Spacecraft Operations Building, will be used by MSC-Florida Operations for environmental testing and checkout of Apollo spacecraft in conditions simulating altitudes of 250,000 feet. With an inside working diameter of approximately 33 feet, the upper dome will be a removable hatch through which the spacecraft is lowered or raised by a 25-ton, 85-foot, hook-height crane. It will be equipped with 18 observation windows, a service elevator, three airlocks, and a control room which is located adjacent to the chamber. Two-way communication is provided by means of closed-circuit television.

These new facilities at Merritt Island will allow MSC-Florida Operations to accomplish integrated systems tests, compatibility checks, and testing of MSC-Florida Operations cryogenic, hypergolic, and pyrotechnic systems. Operations are sequenced to attain the spacecraft configurations that occur during various phases of a mission.

The move was coordinated by R. C. Johnson, chief of the Facilities Planning Branch,



FLUID TEST COMPLEX—The buildings of the Fluid Test Complex are shown here in this helicopter view. On the right is the Life Support Test, building 1 and 2, the one-story Fluid Test Support building, the Hypergolics Test, buildings 1 and 2, and the Cryogenic Test building. The large body of water on the left is one of the leaching ponds. The "Timber Tower" in the foreground is part of the RF Systems.

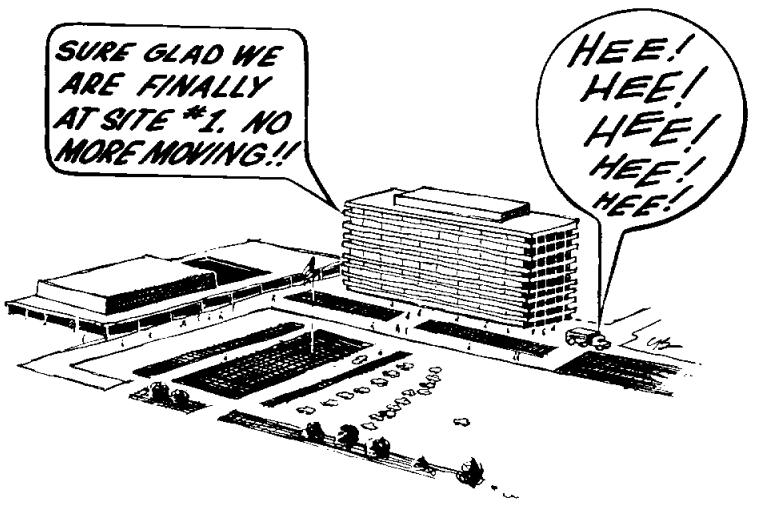


PYROTECHNIC FACILITY—Within the Pyrotechnic Storage building shown here, the spacecraft in its mission configuration is statically weighed and balanced to determine the center of gravity, propulsion thrust vectors are aligned, and optical alignment of the guidance and navigation system is made. In addition, acceleration tests are performed on a dynamic fixture within the building.

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.

Director . . . . . Robert R. Gilruth
Public Affairs Officer . . . . . Paul Haney
Chief, News Services Branch . . . . . Ben Gillespie
Editor . . . . . Milton E. Reim

On The Lighter Side



Welcome Aboard

One-hundred and three new employees joined the Manned Spacecraft Center during the last reporting period. Of these, ninety-four were assigned here in Houston; five to White Sands Operations in New Mexico; two to Merritt Island, Fla.; one to St. Louis, Mo.; and one to Downey, Calif.

AUDIT OFFICE: Terry J. Forrest.

PUBLIC AFFAIRS OFFICE: Mary P. Beeman.

RELIABILITY AND ASSURANCE: Elizabeth B. Harlowe, and Merle W. Schwartz.

TECHNICAL INFORMATION DIVISION: Eston F. Meade, and Joseph C. Sammon.

LOGISTICS DIVISION: Ginger H. Dean.

PROCUREMENT AND CONTRACTS DIVISION: Penelope L. Hathaway, Janice S. Lauhon, Shirley A. Stuber, and David M. Harrell.

PERSONNEL DIVISION: Mary C. Dittlinger, Marilyn E. Dotson, Pauline J. Freeman, Geraldine Gatlin, Suann C. Gibson, Judy E. Immel, Karen E. Johnson, Mildren M. Patterson, and Antoinette J. Zahn.

RESOURCES MANAGEMENT DIVISION: Evelyn G. Benzie, Mary J. Chalfont, Thelma J. Cowles, Frances F. Miller, Ronald G. Pratt, and E. Alan Troeger.

SECURITY DIVISION: Cynthia J. Buchanan, and Helen M. Lewis.

PHOTOGRAPHIC DIVISION: Susan J. Rush, Majorie J. Senasac, and Gene D. Yee.

ENGINEERING DIVISION: Charlene B. Wooten.

FACILITIES DIVISION: M. Elaine Korenek, Nina E. Lamb, Charlotte L. Smith, and Barbara M. Spears.

TECHNICAL SERVICES DIVISION: Jerry D. Brackman, Ansel E. Brown, William F. Dees, Rachael C. Graham, Stanley N. Jones, Wayne E. Martin, William P. Miller, James N. O'Riley, Barry L. Martin, and Joseph A. Penn.

ASTRONAUT OFFICE: Kathryn W. Morgan.

FLIGHT CREW SUPPORT DIVISION: James O. Scales, and Leanne B. Todd.

ASSISTANT DIRECTORATE FOR ENGINEERING AND DEVELOPMENT: Robert A. Gardiner.

INFORMATION SYSTEMS DIVISION: Robert E. Duncan, Lorice B. McAnally, John T. Mueller, and Harold R. Rosenberg.

CREW SYSTEMS DIVISION: Jack Q. Dunaway, and Zalia L. Gray.

COMPUTATION AND ANALYSIS DIVISION: James A. Frizzell, James E. Greenlee, and Samuel M. Keathley.

INSTRUMENTATION AND ELECTRONIC SYSTEMS DIVISION: Andrew J. Farkas, and George D. Kimbrell.

GUIDANCE AND CONTROL DIVISION: Carol A. Janecek.

PROPULSION AND POWER DIVISION: Doris M. Fleming, Michael L. Fleming, and Reuben E. Taylor.

STRUCTURES AND MECHANICS DIVISION: Paul T. Keim, William G. McMullen, Everett E. Stackhouse, and John K. Finlayson.

ADVANCED SPACECRAFT TECHNOLOGY DIVISION: Robert T. Doty.

FLIGHT CONTROL DIVISION: Robert F. Bergholz, James E. Bouvier, Joseph R. Canion, Sam N. Hardee, Emily S. McDonald, Paul M. Richter, Steven D. Thompson, and Woodward L. Vogt.

LANDING AND RECOVERY DIVISION: Edith C. Boyd, and Richard C. Jacobs.

MISSION PLANNING AND ANALYSIS DIVISION: Lionel A. Jackson, William R. Lacy, Thelma C. McGee, John B. Miles, and William R. Pruett.

FLIGHT SUPPORT DIVISION: Robert E. Gaulding, and Jimmy L. Odom.

GEMINI PROGRAM OFFICE: Robert Buckley, Theodore Cieszko, John F. Flynn (St. Louis, Mo.), and Kenneth G. Martin.

MSC-FLORIDA OPERATIONS (Merritt Island, Fla.): David R. Bell, and Dorothy E. Hearn.

APOLLO SPACECRAFT PROGRAM OFFICE: Janet T. Bradley (Downey, Calif.), Faye E. Butler, Alfred J. Collom, William C. Loveless, and Martha F. Yokum.

WHITE SANDS OPERATIONS (Las Cruces, N. M.): Bertha G. Acosta, Bruce G. Galloway, John R. Kinney, Lois F. Kuglin, and Nancy J. Lee.

NASA-MSC Technical Papers

The following recently published Technical Papers by Manned Spacecraft Center staff members are available for reference at the MSC Library in Building 12.

"*Spacecraft Adapter Response to Fluctuating Pressure;*" George A. Watts. Thirty-fourth Symposium on Shock, Vibration, and Associated Environment, Oct. 13-15, 1964, Fort Ord, Monterey, Calif.

"*Biomedical Engineering Units Display Systems for Checkout and Flight of Gemini Spacecraft;*" Virden M. Mitchell. The 1964 International Space Electronics Symposium, Las Vegas, Nev., Oct. 6-9, 1964.

"*Contamination Control and Its Importance to Manned Space Flight;*" Charles F. Warnock, MSC-Florida Operations. The American Association for Contamination Control Journal.

SPACE QUOTES

VALUES OF SPACE PROGRAM ENUMERATED. Dr. Edward C. Welsh, Executive Secretary, National Aeronautics and Space Council, addressing Aerospace Industries Association Council, Seattle, Washington, August 8, 1964.

"The space program has been a catalyst, a stimulus to *education* at all levels, with particular attention to science and engineering. How much is it worth to have raised the educational sights of our young people and at the same time to have increased significantly the wealth of knowledge with which to condition them? I cannot put a price on it, but I believe its value will exceed the total cost of the space program.

"The contribution of our space program to our *national security* is also considerable. How much more secure are we, due to improved communications, more accurate navigation, more complete weather information, and better world-wide mapping? How much is it worth to be better informed about potential sources of danger? How can we assess the advantage of developing competence to detect and offset possible aggression from space? I cannot put a price on these contributions to national security, but I am confident that their value also exceeds the total cost of the space program.

"The space program stimulates the development of new products, new productive processes, and new managerial techniques. I cannot place a precise value upon such *innovations*, but I would estimate that such investment will repay itself many times over."

MSC PERSONALITY

Henry E. Clements Directs Implementation Of MSCC

Henry E. (Pete) Clements, as chief of the Flight Support Division, has the responsibility for providing technical monitoring and managerial direction to Manned Spacecraft Center contractors involved in implementing the Manned Spaceflight Control Center, providing maintenance and operation of the MSCC and the integration of the MSCC with the Manned Space Flight Network.

The division which he heads was formed in August and prior to assuming his present duties he was manager of the Integrated Mission Control Center Program Office.

His division serves as the MSC single point of contact with other MSC elements, other NASA and government agencies and industry contractors connected with the flight control systems in support of MSC space flights.

Clements is a major in the Air Force and is assigned to NASA. Prior to joining NASA, Clements served as a range communications officer with the Atlantic Missile Range from July 1958 to February of 1960. From then until August of 1962, while working with the Department of Defense representative for Project Mercury, he served with NASA as a Network Status Monitor for all Mercury tests through MA-7.

In August of 1962 he was assigned to NASA as head of the Engineering Section of the Operations Facilities Branch. He became technical assistant for Gemini to the chief of the Flight Operations Division in December 1962, and in March of this year he became manager of the Integrated Mission Control Center Program Office, a job he held until assuming his present duties.


HENRY E. CLEMENTS

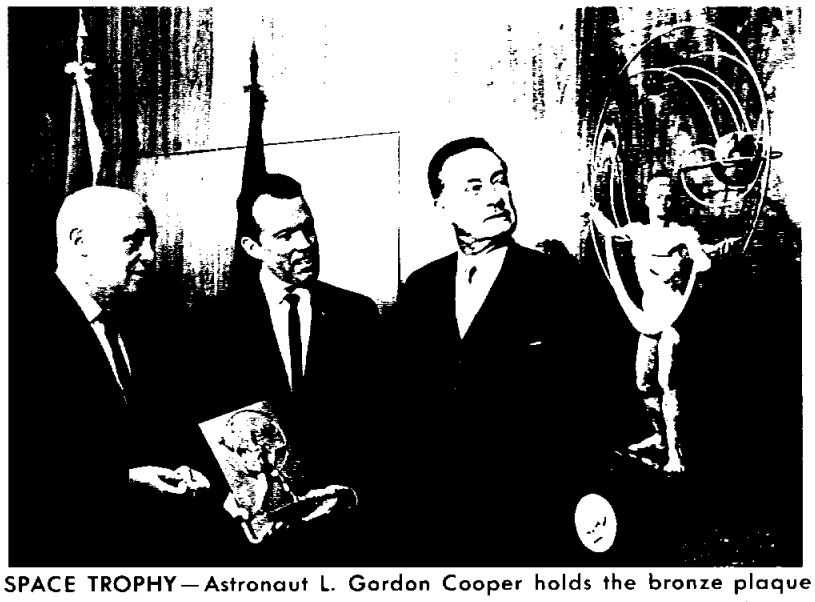
Clements was born in Baltimore, Md., where he attended Baltimore Polytechnic Institute.

He served in the U. S. Marine Corps from 1942 to 1946. In 1949 he entered West Point and was graduated with a BS degree in 1953, and entered the Air Force.

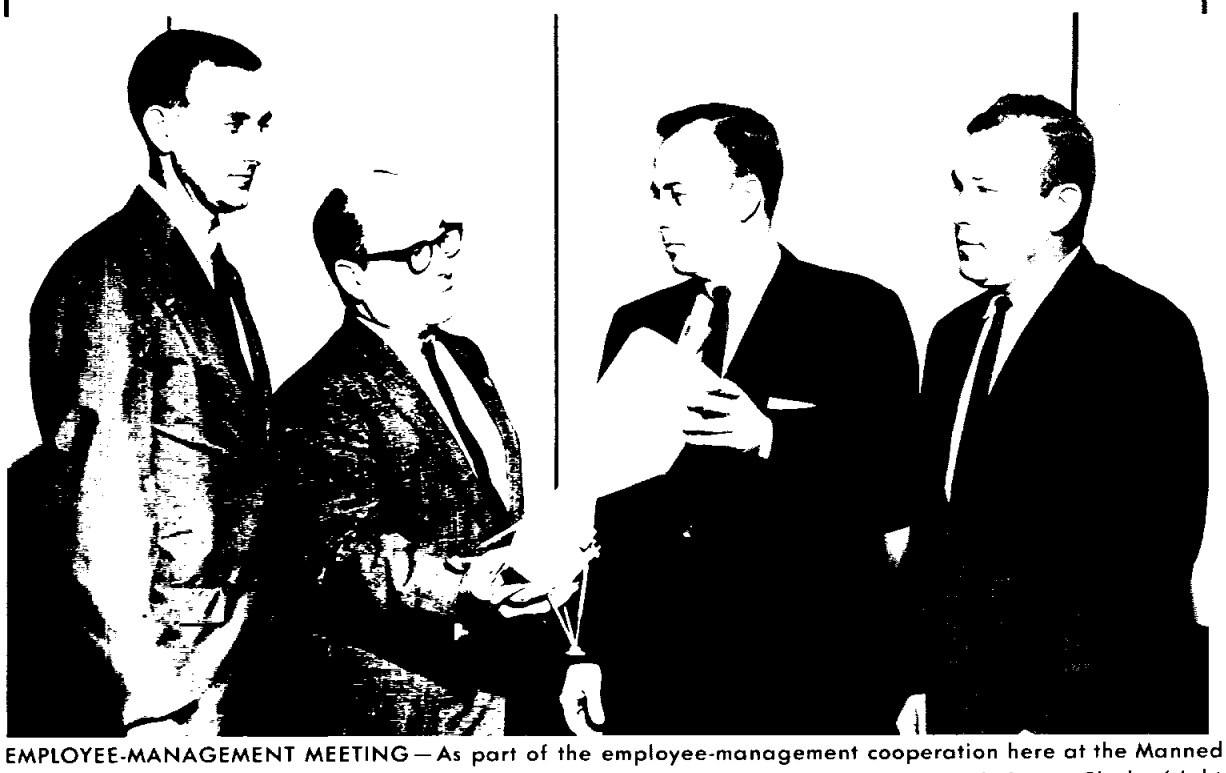
He received a masters degree in aeronautics from the Massachusetts Institute of Technology in 1958.

Clements is married to the Former Vivian Reckenberger of Baltimore and the couple has two daughters, Daryl 10, and Jill 4, and a son, Jay 8. The family resides in Houston.

Golf and pro-football are two of his main outside interests.


SPACE TROPHY—Astronaut L. Gordon Cooper holds the bronze plaque awarded him as the recipient of the White Space Trophy, for his 22 orbit flight May 15, 1963. The award is made annually to the Air Force officer making the biggest contribution to the nation's aerospace program. Shown with Air Force Major Cooper are Air Force Secretary Eugene M. Zuckert (left) and Gen. Thomas D. White, Ret., (right) as they look at the trophy which was named in honor of the general.

MSC Employee-Management Representatives Meet



EMPLOYEE-MANAGEMENT MEETING—As part of the employee-management cooperation here at the Manned Spacecraft Center, MSC employee representatives are shown at a recent meeting with Stuart Clarke (right center) chief of the MSC Personnel Division. Employee representatives are (l. to r.) Fred Rowell, president, American Federation of Government Employees, Local 2284; Charles Townsend, president, National Federation of Federal Employees, Local 1413; and (far right William Whipkey, business agent, Houston Pattern Makers Association, representing wood and plastic modelmakers.

Final Saturn I Booster Tested By Marshall Center

The final booster in the Saturn I rocket program was static fired at the NASA-Marshall Space Flight Center October 7, for its second and final time.

The test ran 156 seconds and was entirely satisfactory, according to the MSFC Test Laboratory. The booster was manufactured by the Chrysler Corp. at NASA's Michoud Operations, New Orleans, and tested at Marshall by Chrysler personnel.

This booster, S-I-10, is the second one built by Chrysler, all others having been built and tested by MSFC. Developing 1.5 million pounds thrust, S-I-10 will be launched next year.

Future boosters produced by Chrysler at Michoud will be for the Saturn IB vehicle. The booster will be an improved version of the present model, lighter in weight and with more power—1.6 million pounds.

The first Saturn I booster, rated at 1.3 million pounds thrust, was test fired at Marshall in April, 1961. The recent firing closed out about 3½ years of testing in which 11 R&D and flight vehicles underwent a total of 55 firings for a cumulative time of 3,867 seconds.

Apollo Service Module Engine Test Device Being Developed

Under a recent contract, equipment is being developed to hot-fire and swivel the Apollo service module engine which will return astronauts from the moon.

The contract for more than $1-million has been awarded Remanco, Inc., Santa Monica, by North American's Space and Informations Systems Division, Downey, Calif. for development and fabrication of the test and checkout equipment.

Hydrogen Powered Saturn S-II

33-Foot Fuel Tank Bulkhead Completed

Completion of a 33-foot-wide bulkhead for the hydrogen-powered Saturn S-II was announced last month by North American's Space and Information Systems Division.

The Saturn S-II is the second stage of NASA's Apollo moon landing rocket — the Saturn V. It is the most powerful hydrogen-fueled booster under production by North American's Space Division and is being devloped for NASA's Marshall Space Flight Center, Huntsville, Ala.

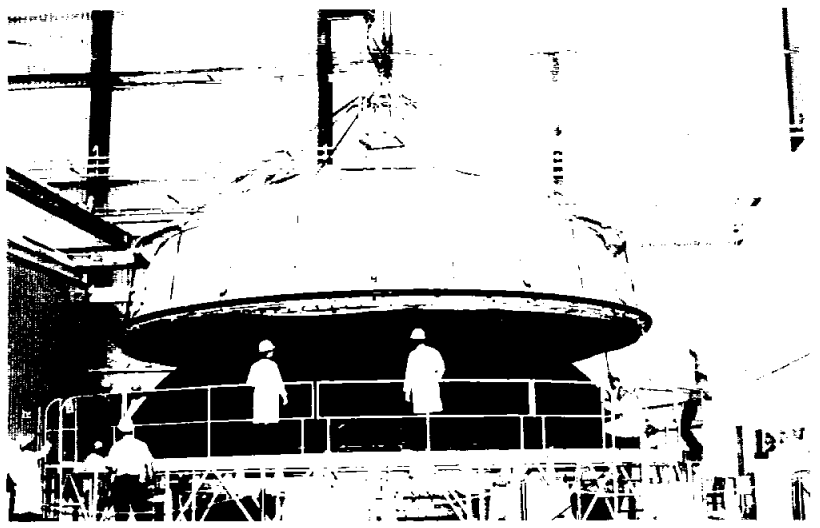
The dome-shaped component—called the common bulkhead—forms the bottom of the S-II fuel tank and the top of its oxidizer tank. Fabrication was completed at the division's Seal Beach facility.

The bulkhead has to endure the weight of 157,00 pounds of liquid hydrogen fuel and provide insulation to keep the liquid oxygen oxidizer from freezing.

"Completion of this first bulkhead is a real milestone for us in the S-II program," said William Parker, division vice-president and Saturn S-II program manager at North American's Space Division.

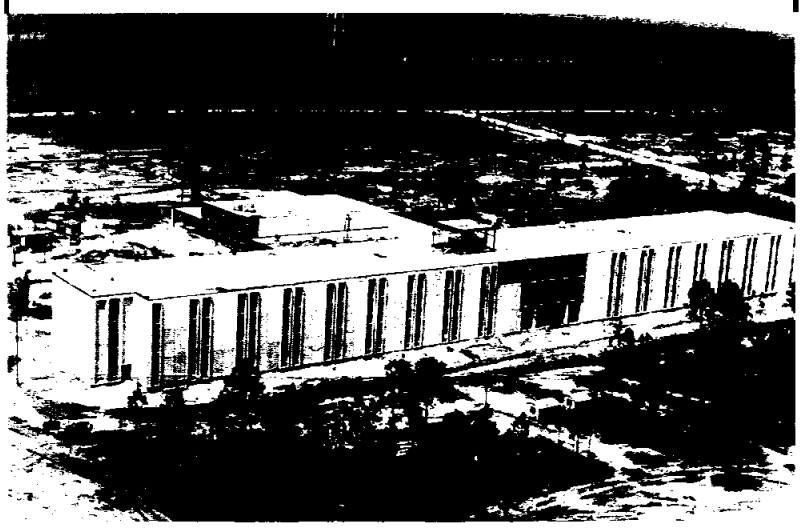
"It proves the design and manufacturing concept and the experience and data we have obtained from its construction will provide us with the vital pattern for fabricating succeeding bulkheads."

The completed common bulkhead will be installed in the first S-II structure.



SPACE AGE "SANDWICH"—Forward bulkhead of NASA's Saturn S-II, the hydrogen-powered booster under production is lowered onto aft bulkhead for precise fit-check prior to bonding in giant autoclave at North American Space Division's Seal Beach facility. The autoclave is a giant cooker 38 feet in diameter and 20 feet high. It bonds and cures common bulkhead assembly.

One Of Thirty Projects Underway



MTO FACILITY—The main Laboratory and Engineering Building at the NASA-Marshall Space Flight Center's Mississippi Test Operations, nearing completion, will serve as administrative headquarters for NASA and its contractors. The Laboratory and Engineering Building is one of about 30 major construction projects underway at a cost of some $250 million. At present, facilities are under construction for static testing the first two stages of the Saturn V moon rocket. Operations are expected to begin in late 1965.

Space News Of Five Years Ago

Oct. 17, 1959 — A second powered free flight of the X-15 (No. 2) research airplane accomplished most planned objectives.

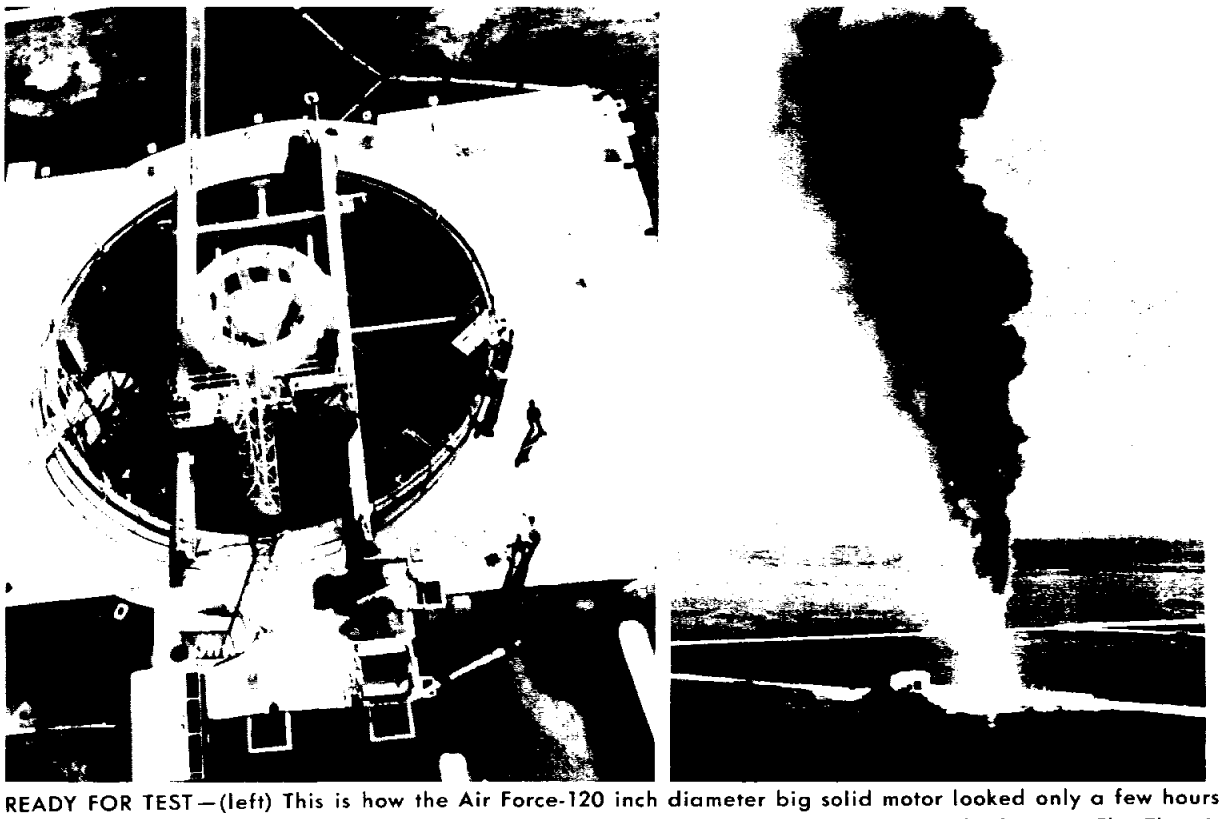
Oct. 18, 1959 — Lunik III provided man's first look at 70 per cent of the backside of the moon, two weeks after launch, by transmitting automatically taken pictures. Pictures were released on October 26.

Oct. 20, 1959 — Requests were initiated to test the Mercury spacecraft afterbody shingles, at the Navy's Dangerfield test facility, for heat resistance and dynamic pressure capabilities.

Oct. 21, 1959 — The President by Executive Order indicated that the Development Operations Division of the Army Ballistic Missile Agency would be transferred to NASA, subject to the approval of Congress.

During the month — North American Aviation and Minneapolis-Honeywell were notified to proceed with the production of hardware for an air-supplied launch-vehicle control system.

—McDonnell received the first ablative heat shield, designated for installation on Spacecraft No. 1. This particular heat shield was based on the Big Joe design, and was manufactured by General Electric.



READY FOR TEST—(left) This is how the Air Force-120 inch diameter big solid motor looked only a few hours before testing in Aerojet's special cast, cure and test pit at the Dade Division site south of Miami, Fla. The pit can easily handle full length 260 inch diameter motors developing some seven million pounds of thrust. THERE SHE BLOWS—(right) Looking somewhat like an oil well belching flames, the Air Force Space Systems Division's 120-inch solid rocket developed an average thrust of 600,000 pounds in a "perfect" 90-second test, September 19. The unit was fired from within a 150-foot deep cast, cure and test facility.

Command And Service Modules Inspected—

MSC Team Attends Apollo Mock-Up Review

A full-scale mock-up of the Apollo command and service modules, two-thirds of the vehicle designed to carry three Americans to the moon and back, was inspected October 1 at Downey, Calif., by astronauts, engineers, and officials of the NASA Manned Spacecraft Center.

This past week an inspection of the third module, called the LEM for Lunar Excursion Module, was made by MSC officials at Bethpage, N. Y.

The Apollo spacecraft lunar configuration comprises three separable major parts called modules, which are fastened together in tandem.

Apollo command and service modules are being produced by North American's Space and Information Systems Division, Downey, Calif., for MSC.

Atop the spacecraft command module is the launch escape system, a unit designed to whisk the command module and its occupants to safety in the event of a catastrophic booster failure before or during launch.

The Lunar Excursion Module, into which two of the three astronauts will transfer to land on the moon, is being built by Grumman Aircraft Engineering Corporation, Bethpage, N. Y.

Little Joe II Attitude Control Checked Out In Tests Here

Control and guidance for the Little Joe II vehicle which will launch the next boilerplate Apollo spacecraft from White Sands Missile Range in New Mexico, is being checked out at the Manned Spacecraft Center.

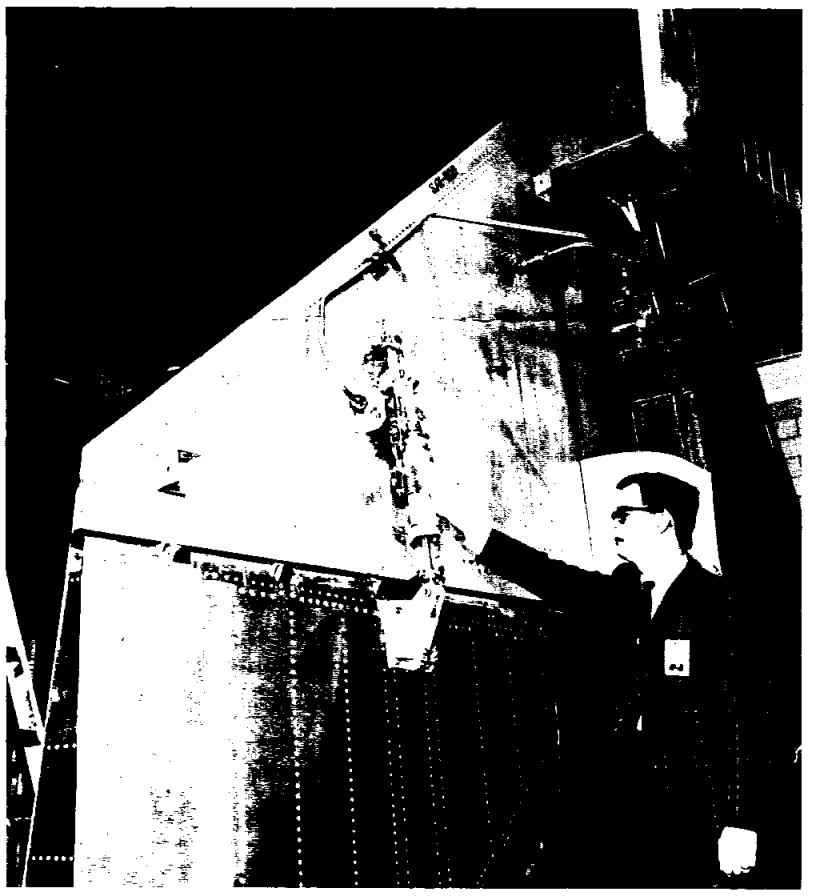
Test engineers of General Dynamics/Convair and MSC have set up a Little Joe II booster fin in the laboratory in a closed loop checkout of the ability of the booster to put the Apollo spacecraft through a high altitude maximum dynamic pressure abort.

The trajectory to be flown has been programmed on an analog computer which drives a three axis flight table. The rate and attitude gyros react to the computer input and feed commands to the moveable surface of the fin.

Engineers will introduce wind turbulence, thrust misalignments and structural bending into the flight to determine the ability of the guidance system to correct for these factors.

The tests will investigate the compatibility of subsystem components and determine the effects of component degradation on booster performance.

Two previous flights of Little Joe II at WSMR have not used the controllable fin. The Little Joe program is designed to qualify the Apollo Spacecraft launch escape system for astronaut safety.



LITTLE JOE II FIN—Frank Elam, engineer, Control Systems Branch, Guidance and Control Division, checks vibration and heat of the hydraulic servoactuator that operates the Little Joe II fin in flight. The actuator has a fairing over it during actual flight. On the back side of the fin, opposite the actuator, is a load ram that simulates the aerodynamic hinge moment on the elevon surface.

NASA-DOD Adopt New Information Exchange System

National Aeronautics and Space Administration and the Department of Defense have agreed on a new single system by which they can communicate their common problems in research and technology.

The agreement, covering "Research and Technology Information Exchange" involves some 45,000 items of research work.

The agreement, signed by Dr. Robert C. Seamans Jr., associate administrator of NASA, and Dr. Harold Brown, director of Defense Research and Engineering, abolished certain forms and procedures which the two agencies had used independently. It sets up a new standard reporting form, "Research and Technology Resume" (NASA Form 1122, DOD Form 1498) for common use.

Officials of the two agencies estimate it will take a year to complete the changeover. Dr. Raymond L. Bisplinghoff, NASA's associate administrator for Advanced Research and Technology, whose office has charge of the bulk of the NASA tasks concerned, said the new system will greatly improve communication and coordination between the two agencies and reduce duplication.

Dr. Chalmers W. Sherwin, Deputy Director, Research and Technology, Directorate of Defense Research and Engineering, whose office is responsible for the majority of the DOD programs in this area, said, "This system will give the managers of the Defense laboratories an up-to-date detailed picture of the total NASA and DOD programs so that they can select their own programs with a full understanding of how they relate to similar work in other labs."

A feature of the agreement is that each of the items of information on the new form is also expressed in a common digital language using a common set of definitions and a common set of codes.

Because each item of information contained in the new form appears in machine language, the complete form or any selected parts of it are suitable for quick data processing.

When the changeover is completed, any scientist or staff member from NASA or DOD will be able to obtain full basic information by fast machine processing on any given type of work unit.

DOD and NASA began the shift to the new form Oct. 1 for newly started work and will complete the shift for work under way by the end of the fiscal year.

Contract Let For Design-Testing Apollo Heat Shield System

NASA's Manned Spacecraft Center has awarded a contract to Emerson Electric's Electronics and Space Division for preliminary design and testing of a heat shield system for the Apollo three-man spacecraft to protect the vehicle during ascent and re-entry from manned orbital and lunar flights.

The heat shield will employ a new variation of the company's "Thermo-Lag" subliming material custom designed and developed to meet the overall system and mission requirements of the Apollo Spacecraft.

The heat shield will employ a involves the entire Apollo spacecraft, not just the blunt face subjected to the greatest portion of re-entry heat. Thus, a combination of a variety of different materials and formulations must be used to meet the thermal protection requirements encountered on a particular mission.

Emerson Electric heat protection systems are now in wide use on programs such as the X-15 rocket plane and Thor Delta, Polaris and Saturn rockets.

Space News ROUNDUP!

SECOND FRONT PAGE

APOLLO MOCKUP REVIEW—Astronauts Donald K. Slayton, Alan Shepard and Pete Conrad answer questions at the press conference held October 1, during the Apollo mock-up review at North American Aviation in Downey, Calif.

Gemini Recovery Systems Tested In Gulf Of Mexico

The Gemini recovery systems tests conducted in the Gulf of Mexico were successfully completed the morning of October 1, after 17 hours of continuous operation.

Eziaslav Herrin, Manned Spacecraft Center project engineer on the Gulf tests, said that although test results are not completely evaluated, the performance of the spacecraft systems under recovery conditions was "very good."

Astronauts James A. Lovell Jr. and Alan L. Bean participated as test subjects in the static article Gemini spacecraft. Conducted 40 miles offshore, the tests were supported by engineers and technicians on the NASA ship, Retriever, and by C-119 aircraft from Ellington AFB.

Although water conditions were choppy, the crew members in the spacecraft suffered only briefly from motion sickness.

Primary objectives of the test were to evaluate the environmental control system, the recovery communications, the spacecraft location aids, and the battery and power supply systems.

A new snorkel for a fresh air supply inside the floating spacecraft, and an improved HF retractable antenna for recovery communications were tested successfully and no further recovery tests are planned on these systems.

The recovery systems were tested to qualify the spacecraft for on-the-water operations after a spaceflight has been completed.

WSMR Commander General Thorlin Here For Briefing

Maj. Gen. Frederick Thorlin, commander of the U. S. Army White Sands Missile Range in New Mexico was here at the Manned Spacecraft Center recently for a series of briefings on the MSC program.

General Thorlin met with Dr. Robert R. Gilruth, director, MSC, and other center officials. He was briefed on the Apollo and Gemini programs, the MSC organization, and conducted on a tour of the MSC facilities by Astronaut M. Scott Carpenter, executive assistant to the director.

MSC makes use of WSMR for testing the Apollo Spacecraft and its launch escape system.