

Space News

NASA ROUNDUP!

## U of H Graduate Education Center Approved For Establishment Here

At a recent meeting, the Texas Commission on Higher Education approved the establishment of a University of Houston Graduate Education Center at the Manned Spacecraft Center Clear Lake Site.

Approval of this Center had been requested jointly by Dr. Robert Gilruth, director, MSC, and Dr. Philip Hoffman, president of the University of Houston.

The primary purpose of the Graduate Center will be to provide graduate study opportunities in engineering, physical sciences, public administration, and management for MSC employees and other interested persons working or living in the NASA area.

Approval of the Graduate Center represents a significant advancement in the development of the MSC Graduate Study Program in Houston. The pro-

gram began in 1962 with 162 employee-enrollments, and was expanded to 328 enrollments in 1963 and to 567 in 1964.

Through participation in the program, seven employees have earned master's degrees, and at the end of the current academic year, required course work will be completed by 25 masters' candidates and six doctoral candidates. Participation in the graduate program is expected to increase substantially as a result of the establishment of the MSC Graduate Center.

Dr. Gilruth, on several occasions, has emphasized the necessity of having a high quality

graduate study program readily available to MSC employees. The establishment of the Graduate Center at Clear Lake will do much to improve the program.

Through courses offered by the Graduate Center, MSC employees will have an opportunity to complete most degree requirements at Clear Lake while obtaining knowledge needed to broaden their job capabilities. For the first time, MSC employees will be awarded "resident" graduate credits for courses taken at MSC.

All courses offered through the Graduate Center will be conducted during early morning or late afternoon hours and will be taught in conference rooms located in various buildings at the Center.

To achieve maximum advantage from the MSC Graduate Program, every participant is encouraged to pursue a planned, orderly program of courses which will be of benefit to both MSC and the employee. To assist employees in planning their courses of study, the Center employs a consultant, Dr.

(Continued on Page 3)

## NASA Scientist Astronauts To Be Selected During June

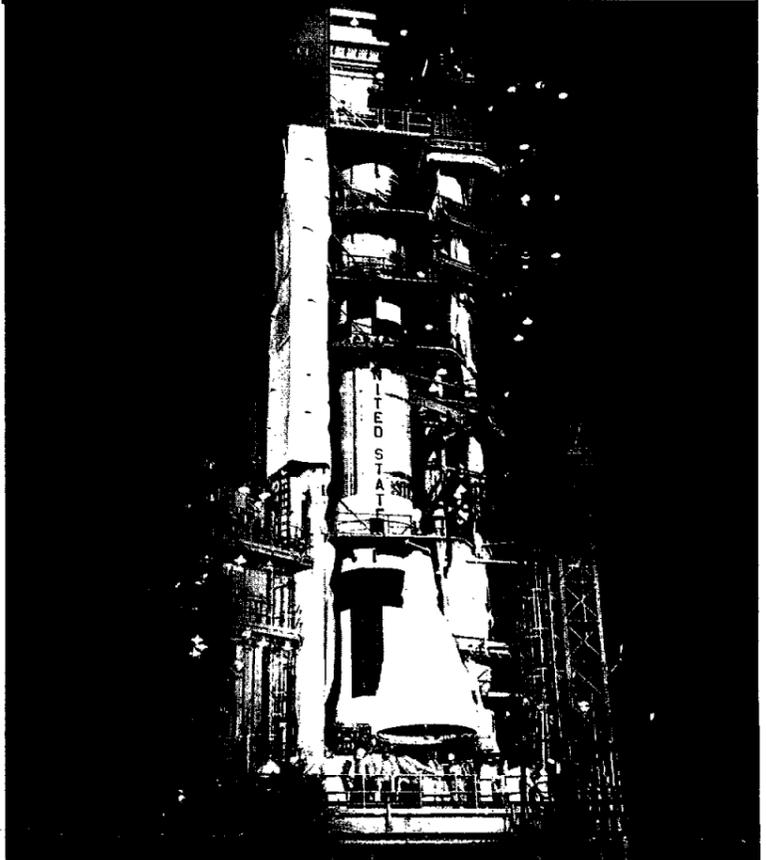
Ten to 20 scientist astronauts will be selected for the space program sometime during the month of June from those that were determined eligible by the National Academy of Sciences in Washington, D. C., it was announced Monday.

The group includes physicists, geologists, engineers, medical

doctors, and astronomers. All have a minimum of an academic doctors degree. Most are civilians, all are male and some pilots are included in the group.

Final selections will be determined by NASA and the individual's ability to pass the physical requirements set up for the scientist astronaut program.

### Gemini - GLV-4 Mated



GEMINI-4 PREPARATIONS—The Gemini-4 spacecraft is hoisted to the white room above the Gemini Launch Vehicle for soft mating April 14 at Launch Complex 18, Cape Kennedy, Fla. The Gemini-4 spacecraft and the launch vehicle were mated in the launch configuration April 23.

## LEM Moon Ascent Engine Test Fired At White Sands

The first NASA test firing of a Project Apollo lunar excursion module engine, the ascent stage that will lift two Americans from the moon, was conducted April 15 at the Manned Spacecraft Center's White Sands Operations near Las Cruces, N.M.

The hypergolic fueled 3500-pound-thrust ascent engine was fired for five seconds at ground-level conditions in an open static test stand.

NASA spokesmen term the test another major milestone in the U.S. manned lunar exploration program.

This first in a series of development firing tests was conducted under NASA auspices by the Grumman Aircraft Engineering Corp., prime contractor on the Apollo LEM.

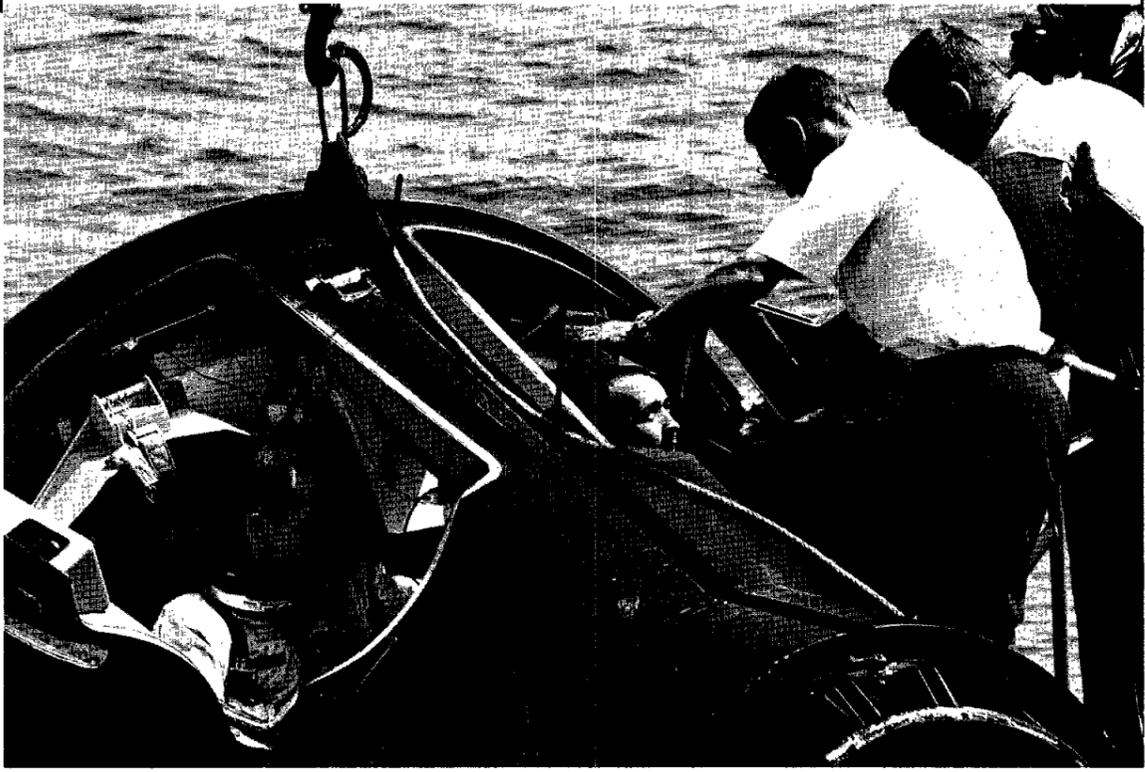
Bell Aerosystems Co., Buffalo, N. Y., produces the LEM ascent engine.

During the test series at the White Sands Operations Propulsion Systems Development Facility the ascent engine will be integrated with the reaction control system, then will be mated with the descent stage for combined tests and finally will be checked out in its ultimate moon-bound configuration.

The recent test however involved only the engine and its fuel system. The liquid fuel used in LEM is hypergolic — the propellant and the oxidizer ignite spontaneously when mixed.

The ascent engine will lift the top half of LEM, with its two lunar explorers, off the moon and into a rendezvous orbit that will rejoin the LEM with the command module carrying the third astronaut. The ascent stage then is left in orbit around the moon while the main spacecraft returns to Earth.

### GT-4 Crewmen Train In Gulf Of Mexico



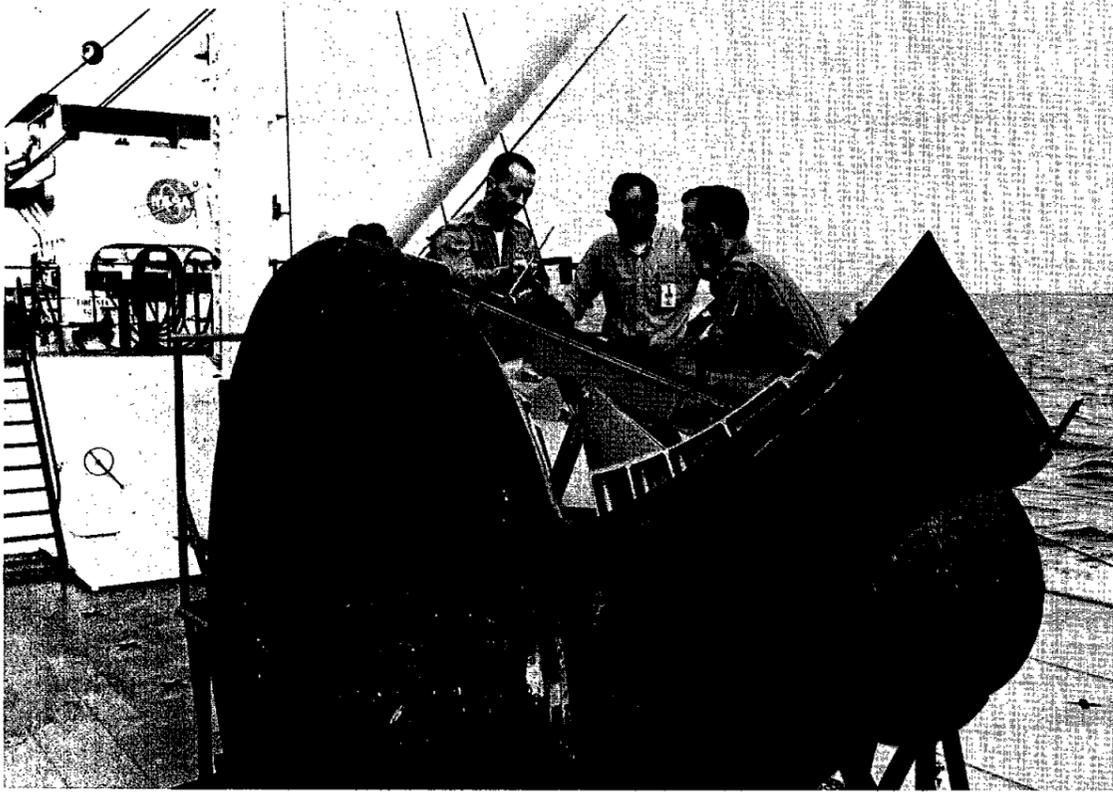
WATER EGRESS TRAINING—The GT-4 prime crew, Astronauts Edward H. White II (left), pilot, and James A. McDivitt, command pilot, receive instructions from Gordon Harvey, training officer, Flight Crew Support Division and Alan M. Rochford, suit technician, Crew Systems Division, before closing the spacecraft hatches. The crew for the next Gemini mission took part in water egress training in the Gulf of Mexico on April 14. (SEE ADDITIONAL PHOTOS ON PAGES 2-3).

### GT-4 Crew To Be Interviewed Here By Newsmen

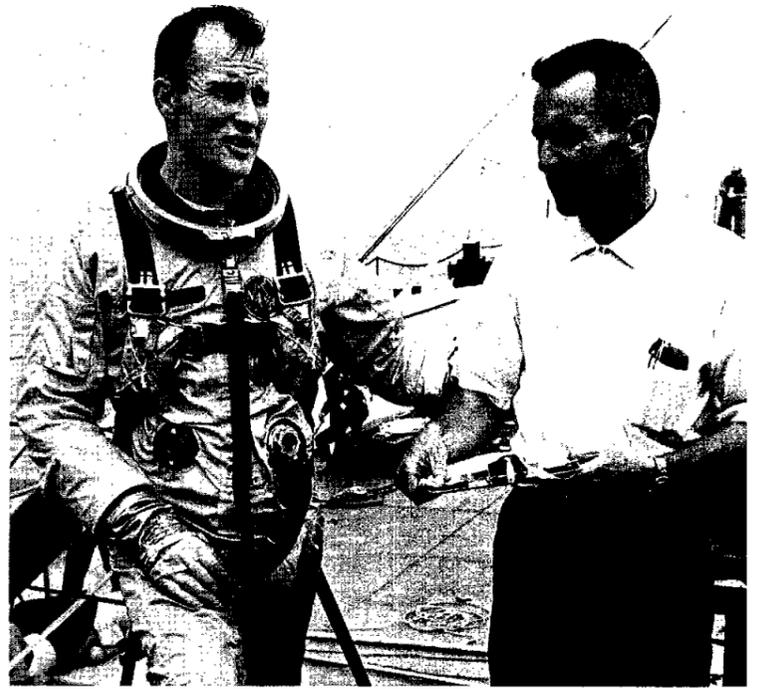
Astronauts James A. McDivitt and Edward H. White II, the GT-4 Prime flight crew with Astronauts Frank Borman and James A. Lovell Jr., backup crew, have been scheduled for half-hour interviews with local and national news media here at the Manned Spacecraft Center May 3.

The GT-4 astronauts were to have held a general press conference in Washington, D. C., yesterday.

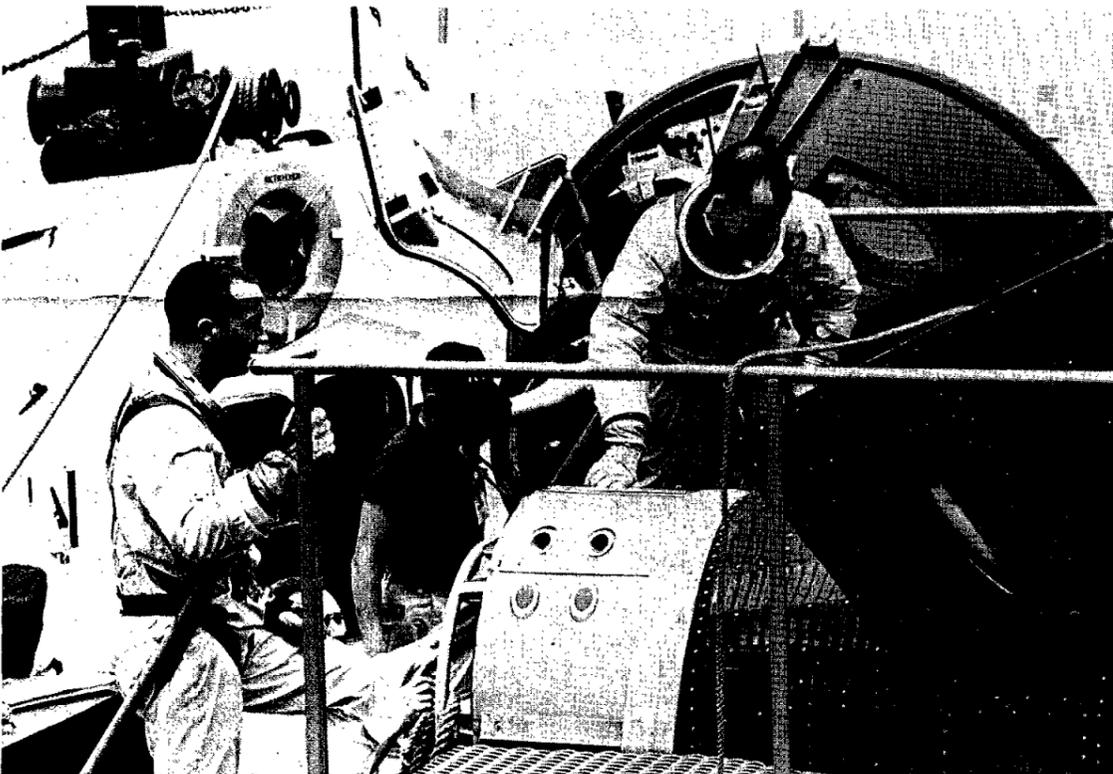
# GT-4 Prime Crew Performs Egress Training In Gulf



**ON WAY TO TRAINING AREA**—While the NASA boat Retriever takes the GT-4 prime crew to the training area in the Gulf of Mexico for water egress training, Warren J. North, chief, Flight Crew Support Division discusses the exercise with them. Shown with Gemini boilerplate 201 are (l. to r.) Astronaut James A. McDivitt, command pilot; North; and Astronaut Edward H. White II, pilot. The training exercise took place April 14.



**AFTER FIRST EGRESS EXERCISE**—Astronaut Edward H. White II, pilot for the GT-4 crew, after completing the first egress exercise of the day, discusses the results with Gordon Harvey, training officer from Flight Crew Support Division. They are on the deck of the NASA boat Retriever.



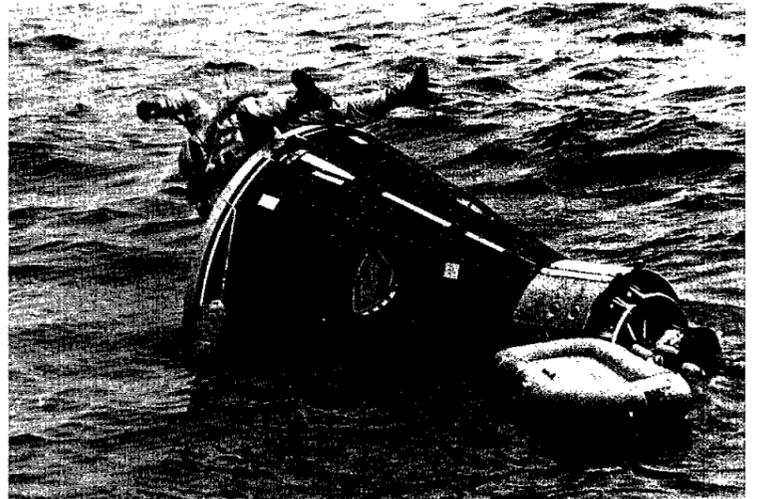
**BOARDING THE SPACECRAFT**—Astronaut Edward H. White II, GT-4 pilot, climbs into the Gemini Static Article Five spacecraft on the deck of the NASA boat Retriever as Astronaut James A. McDivitt, GT-4 command pilot stands by to enter the craft. Kenneth N. Beers, M.D., (center), medical monitor for the exercise in water egress training observes. The training was conducted in the waters of the Gulf of Mexico.



**SUIT ADJUSTMENT**—Suit Technician Alan M. Rockford makes an adjustment in the pressure suit of Astronaut James A. McDivitt, command pilot for the upcoming GT-4 mission. McDivitt had just completed an egress exercise from a Gemini spacecraft in the Gulf of Mexico.



**OVER THE SIDE**—Astronaut James A. McDivitt, command pilot for the GT-4 mission, slides over the side of the Gemini spacecraft into the water as Pilot Edward H. White II makes his egress from the Gemini prior to closing the hatch and going into the water. Frogmen stand by with a large liferaft.



**GEMINI EGRESS IN GULF**—Astronaut Edward H. White II, pilot for the upcoming GT-4 mission makes a back dive into the water after closing the hatch of the spacecraft. Astronaut James A. McDivitt, command pilot is in the water by the reentry control section of the Static Article Five spacecraft, being used for the egress training exercise in the Gulf.

# Gemini Launch Vehicle Production Anticipating Frequent Launchings

Two Gemini launch vehicles were erected recently in the Vertical Test Fixture (VTF) at the Martin Company's Baltimore Division for the first time as factory testing is speeded up in anticipation of more frequent launching in the NASA Gemini program.

The two modified Air Force Titan launch vehicles will be used for the GT-5 and GT-6 missions.

Vertical testing is nearing completion on the GT-5 launch vehicle which is scheduled to boost Astronauts L. Gordon Cooper Jr. and Charles Conrad Jr. on a seven-day orbital mission later this year.

The first stage of the GT-6 launch vehicle slated for the first rendezvous mission with Astronauts Walter M. Schirra Jr. and Thomas P. Stafford as the crew, was raised in an identical test

cell in the VTF for its checkout.

Gemini Launch Vehicle-4 has been undergoing pre-flight testing at Cape Kennedy since March 29 in preparation for a late-spring launching of Astronauts James A. McDivitt and Edward H. White on a four-day mission.

GLV-3 carried Astronauts Virgil I. "Gus" Grissom and John W. Young on a three-orbit flight March 23, and GLV-1 and GLV-2 launched unmanned missions in the program which is scheduled for 12 flights.

The Gemini Launch Vehicles undergo months of exhaustive testing in the VTF at Martin including several simulated count-downs and launching, prior to shipment to Cape Kennedy.

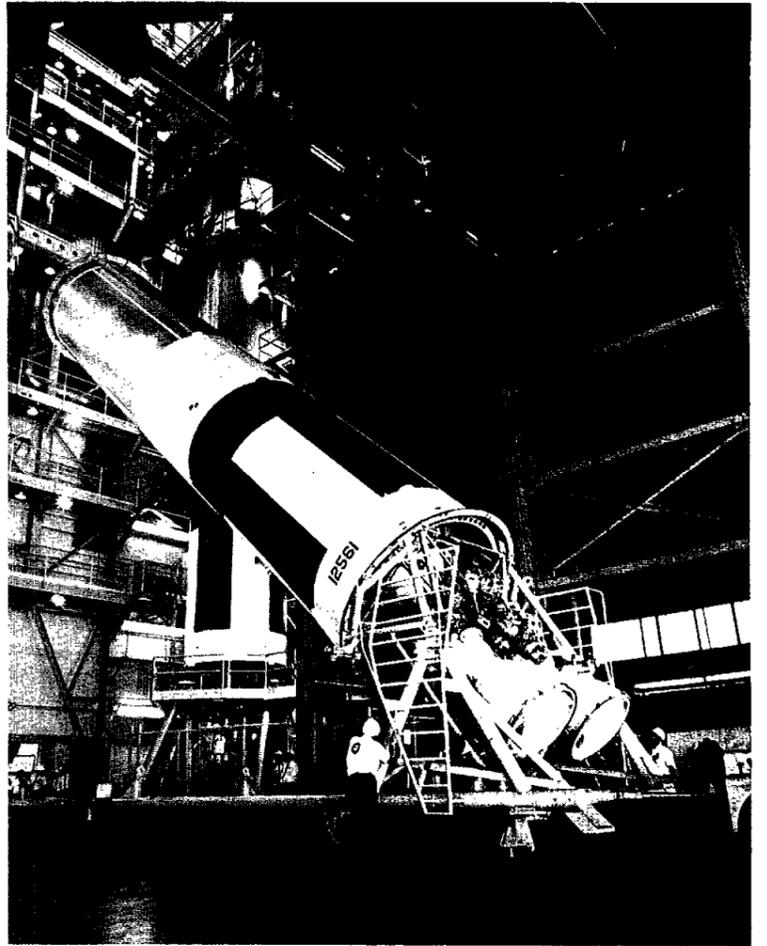
Martin Company is prime contractor to the Air Force Systems Division for development, manufacture and test of the Gemini Launch Vehicles.

## Graduate Center

(Continued from Page 1)

Lawrence R. Daniel, head of the Mechanical Engineering Department at Louisiana State University. Dr. Daniel visits MSC at least three times each year to counsel with MSC employees and to formulate programs of study.

The MSC Graduate Study Program is administered by the Training Section, Personnel Division, with guidance from the Graduate Study Steering Committee headed by Paul E. Purser, special assistant to the director, MSC.



TWO AT A TIME—A second Gemini Launch Vehicle is erected in the Vertical Test Fixture (VTF) at Martin Company's Baltimore Division for the first time. The vehicle in the VTF is GLV-5, and the one being erected is GLV-6.

## NFFE Meetings Scheduled

The National Federation of Federal Employees will meet individually with interested employees during the week of May 3 to discuss membership in NFFE.

Representatives of NFFE will be available in the cafeterias, Clear Lake Site and Ellington AFB, during lunch periods to discuss membership with inter-

ested employees.

All employees have the right to participate or refrain from participating in accordance with the following schedule:

May 3-4—11:00 a.m. through 1:00 p.m., Cafeteria, Ellington AFB, Building 367.

May 5-7—11:00 a.m. through 1:00 p.m., Cafeteria, Clear Lake Site, Building 3.

## MSC's Gemini News Center May Be In Leased Facility

The Gemini news center for the upcoming GT-4 mission may be located in a building located in Nassau Bay across the street from the Manned Spacecraft Center.

Negotiations are underway by NASA officials to lease a vacant two-story 25,000 square foot building in the development for use as a news center to accommodate working representatives from newspapers, magazines, wire services, radio and television that are expected to be here to cover the Gemini launch.

The setup will be similar to the news operation at Cape Kennedy past manned launches and will open 10 days before the scheduled launch. Public Affairs Office people will move to the news center during launch and flight periods and staff the facility.

It is estimated that a minimum of 300 news media representatives will be here for the launch and a minimum of 200 more will arrive here within five to six hours after the launch from Cape Kennedy.

Access to the facility will be restricted to badged news representatives. The building will contain pay telephones, teletype machines, for the newsmen as

well as television and radio feeds directly from the Mission Control Center. Work areas for the news representatives will also be provided. Space for equipment trailers for television, radio and news services will be provided adjacent to the news center building.

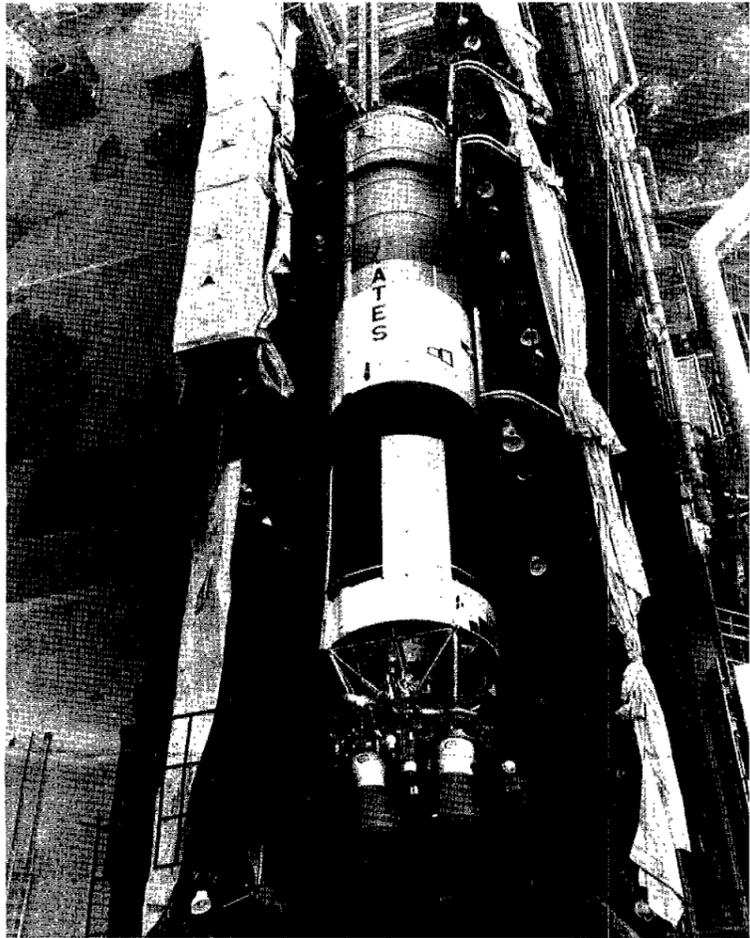
A press conference for the GT-4 astronauts will be held in the Building 1 Auditorium at the Center at recovery plus two to three days.

## Gemini Target Miss Attributed To Faulty Wind Tunnel Data

Faulty wind tunnel data was said to have been the cause of the Gemini-3 spacecraft coming down nearly 60 miles short of its target on March 23.

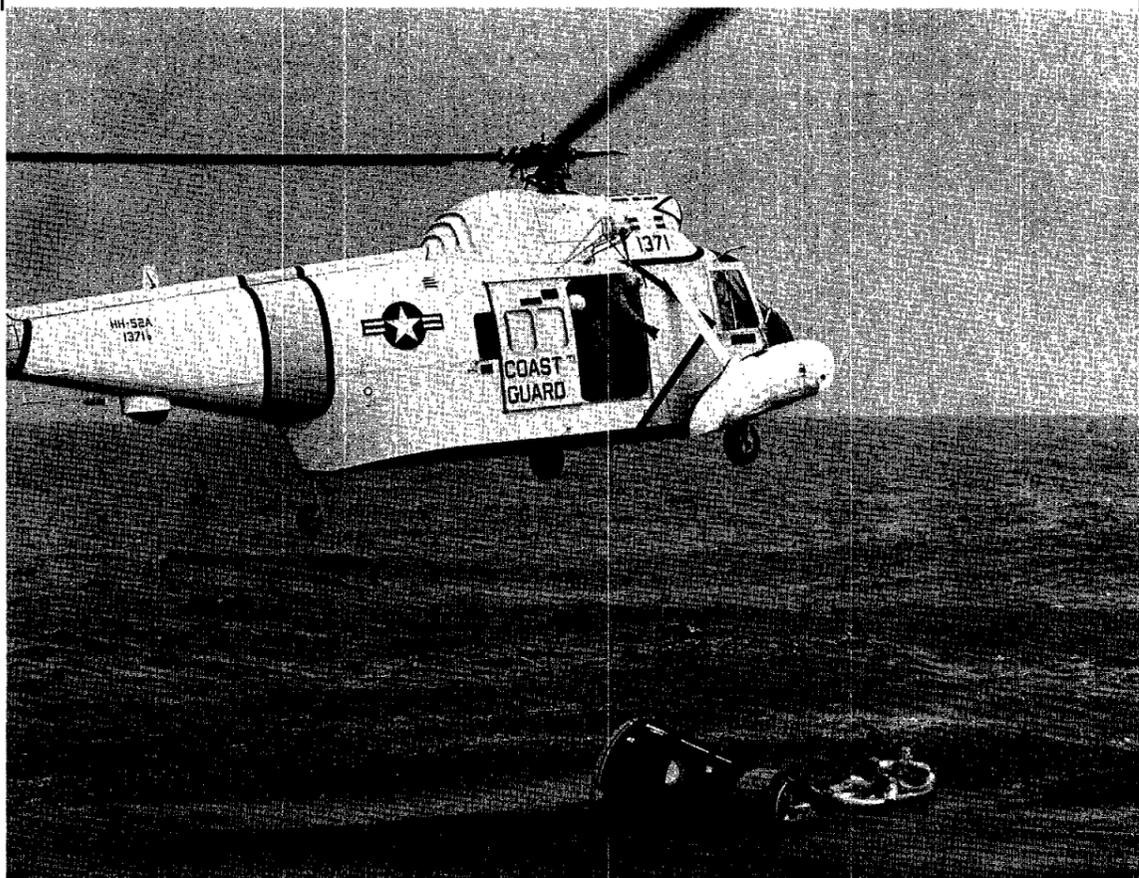
Homer W. Dotts, Gemini engineer here at the Manned Spacecraft Center said wind tunnel tests months ago indicated the Gemini spacecraft had more aerodynamic lift than it actually had.

"Wind tunnel testing is not an exact science," Dotts stated. "We have no way to test a spacecraft except in actual flights. We have to learn with each mission."



ERECTING GLV-4—The first stage of Gemini Launch Vehicle-4 is shown in the erector on Pad 19 at Cape Kennedy as preparations are made to erect the stage on the pad.

## GT-4 Crew Egress Training In Gulf



HELICOPTER RECOVERY—Astronaut Edward H. White II puts on the rescue harness as the Coast Guard helicopter hovers overhead ready to lift him into the cabin in the simulated rescue exercise in the Gulf of Mexico. The water egress training is being conducted for the GT-4 crew in preparation for their upcoming flight.

# Gemini Rendezvous Radar Develop

"The primary objective of the first Gemini-Agena rendezvous flight is to achieve rendezvous and docking with the Agena target vehicle, using both the spacecraft and Agena capabilities as required," it was stated by Astronaut Charles A. Bassett II, at a meeting of the Society of Experimental Test Pilots, Wichita, Kan.—July 15, 1964.

Achievement of the primary objective of the flight referred to by Astronaut Bassett, will depend heavily on one of the most unusual radars ever built. Light in weight and extremely compact in its construction, the radar and its associated display equipment will enable the two-man Gemini crew to seek out the Agena, determine its range and bearing, and make necessary changes in orbital velocity to complete the rendezvous operation.

The radar was built by the Aerospace Division of Westinghouse Electric Corporation's Defense and Space Center at Baltimore, Md., for McDonnell Aircraft Corporation, prime contractor for the Gemini spacecraft.

On an earlier mission, Gemini astronauts will have had some practice in techniques involved in solving rendezvous problems. Rehearsal for actual rendezvous will be made possible through the use of a "rendezvous evaluation pod."

The pod will be carried into space aboard the Gemini spacecraft and then ejected from the craft once in orbit. It was also built by Westinghouse under an extension of its contract with McDonnell.

Basically rectangular in shape, the pod will be three feet long, two feet wide and one foot deep. It will contain a radar transponder, which can both receive and transmit radar signals, and necessary batteries for power. In addition, the unit will be equipped with flashing lights for visibility and a radar antenna similar to the one which will be installed aboard the Agena target vehicle.

The Gemini radar and the rendezvous evaluation pod are among a variety of projects on which Westinghouse is working for programs of NASA's Manned Spacecraft Center. Products to be utilized in these projects range from the largest direct current motor ever built by Westinghouse to "molecular electronic" circuits so small that technicians who make them must use microscopes to see what they are doing.

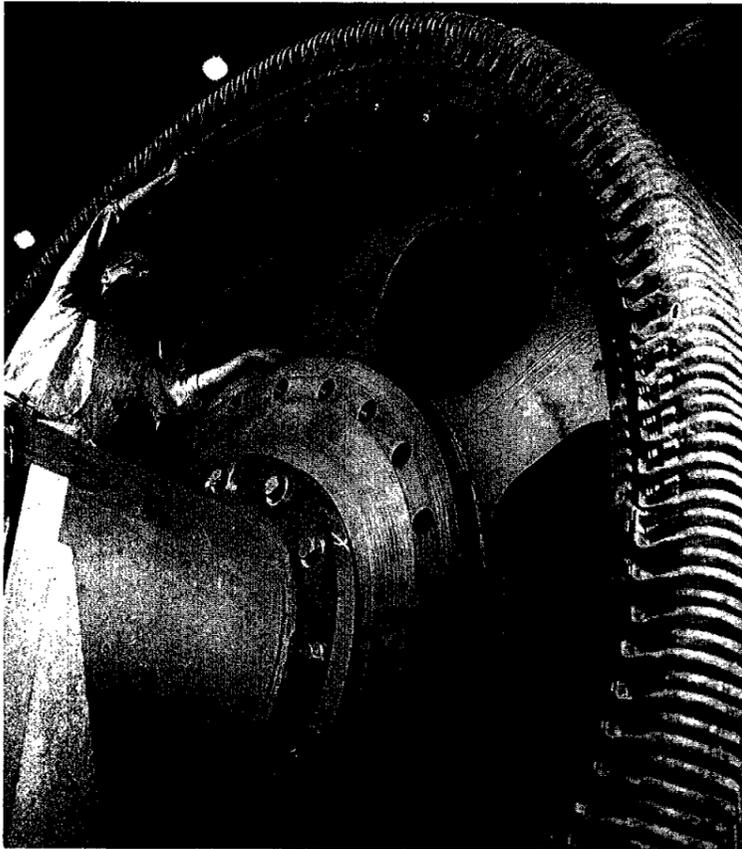
The motor, for example, is a 100-ton giant approximately 15 feet high and 15 feet in diameter. It can develop up to 10,700 horsepower and will be used to drive MSC's Flight Acceleration Simulator, a man-rated centrifuge capable of simulating an

acceleration of 20 times the force of gravity for extended periods. The facility will be able to test at 30 G's for a period up to three minutes. Astronauts will ride in a gondola attached to a 50-foot radius arm.

Other important projects on which Westinghouse engineers and scientists are working include equipment that will be used in the Apollo moon mission.

The company's Aerospace Electrical Division at Lima, Ohio, will provide a power conversion unit for the Apollo command module. Westinghouse was selected for the project by North American Aviation's Space and Information Systems Division, Downey, Calif., principal contractor on the spacecraft for NASA.

Called a static inverter conversion unit, the component will be used to convert the electrical power output of the Apollo's fuel cells and batteries from direct current to alternating current. The inverter will be a departure from conventional unit which is a rotating device that delivers power in a manner similar to a normal generator. The component will be transistorized and will have no moving parts. It will require less



**CENTRIFUGE MOTOR**—The largest direct current motor ever built by Westinghouse Electric Corporation will soon be providing astronauts with a ride important to future manned space flight missions. Shown under construction at the firm's East Pittsburgh, Pa., plant, the motor can develop up to 10,700 horsepower. In operation at the National Aeronautics and Space Administration's Manned Spacecraft Center in Houston, Texas, the motor will power a flight acceleration simulator.



**GEMINI RADAR**—George F. Towner, manager of the Space Department of the Westinghouse Aerospace Division, is shown with the Gemini rendezvous radar. The photo was made in the Division's RF anechoic chamber.



**MOON TV CAMERA**—A small television camera, shown in this artist's drawing, being used by an American astronaut on the Moon, will enable earthlings to share the space traveler's view of the earth as seen from the lunar surface. The camera will be built by the Aerospace Division of the Westinghouse Defense and Space Center.

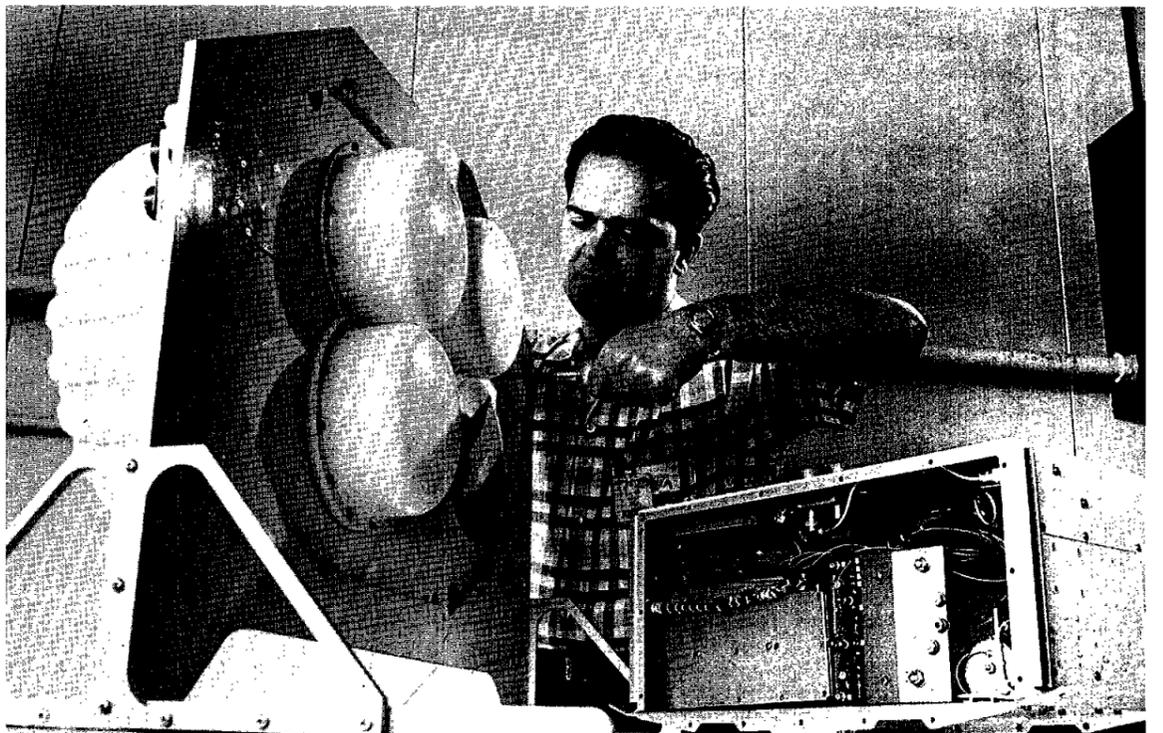


**DONALD C. BURNHAM**  
President,  
Westinghouse Electric Corporation

**EDITOR'S NOTE:** This is the forty-third in a series of articles designed to acquaint MSC personnel with the Center's industrial family, the contractors who make MSC spacecraft, their launch vehicles and associated equipment. The material on these two pages was furnished by Westinghouse, Atomic, Defense and Space Group.



**CHARLES H. WEAVER**  
Vice President and  
General Manager  
Atomic, Defense and Space Group  
Westinghouse Electric Corporation



**GEMINI TEAM MATES**—Final versions of these two components of the Gemini rendezvous radar system, shown with Westinghouse model assembler, J. R. Miceli, will work as a team helping to perform the task of mating two earth orbiting satellites. At the left is an engineering test unit of the radar. At the right, nearly completed, is a radar "transponder" such as will be installed on the target Agena rocket with which the Gemini spacecraft will rendezvous.

## Rad For NASA By Westinghouse

cooling than a rotating unit, operate at a higher efficiency and eliminate the noise of rotating equipment.

When the Apollo astronauts land on the moon, they will have with them a small television camera. Being built by the Aerospace Division at Baltimore under contract to MSC, the camera will make it possible for earth bound television viewers to see the lunar surface "live" over commercial television networks.

The hand-held camera itself will operate on only six watts of power and weigh only five and one-half pounds (earth weight) without the lens. Its light weight is made possible, in part, by the use of "molecular electronic" circuits. Molecular electronics is a concept which integrates into tiny blocks of solid materials functions ordinarily performed by an assembly of electronic components.

Specifications call for the camera to be completely automatic, maintenance-free and 99.9 per cent reliable for 14 consecutive days. Using an SEC (secondary electron conduction) Vidicon imaging tube which is highly sensitive at low light levels, the camera will be able to operate in almost total darkness. The tube was developed by the Westinghouse Research Laboratories, Pittsburgh, Pa., and is being produced by the Elmira, N. Y., Electronic Tube division.

Television picture transmission from the moon will be at 10 frames per second with 320 lines with resolution. This signal will be converted to commercial frame and scan rates at the earth receiving station for immediate rebroadcast over national TV. The TV scan conversion system is being developed by the Westinghouse Electro-Optical Equipment Department.

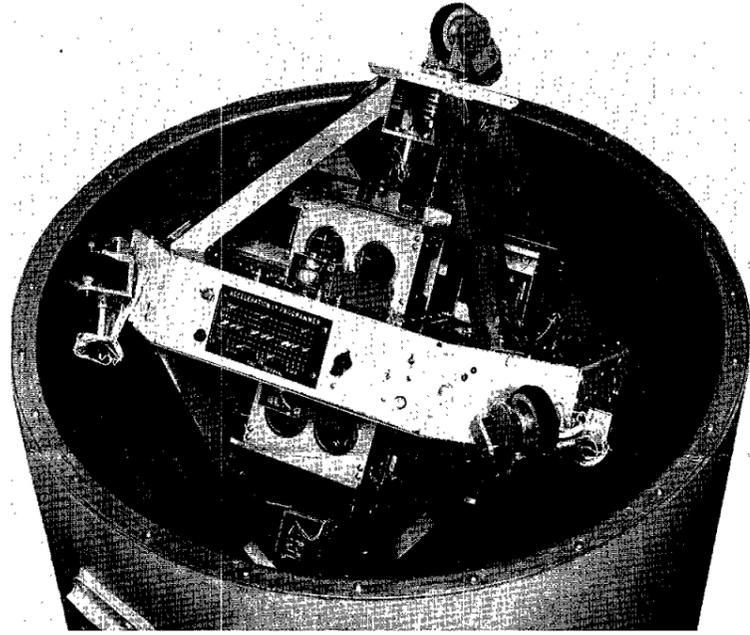
Westinghouse also built for

MSC a small working model of a dynamic motion simulator that can produce unlimited angular motion for a large, heavy vehicle such as a mockup of the Apollo command module. The 34-inch working model has six sets of steerable dual aircraft wheels which are driven and steered by hydraulic motors. The entire assembly rotates within a cup-like open hemispherical base to give the spacecraft unlimited angular motion about any axis. A full scale unit, if built, would be 23 feet in diameter.

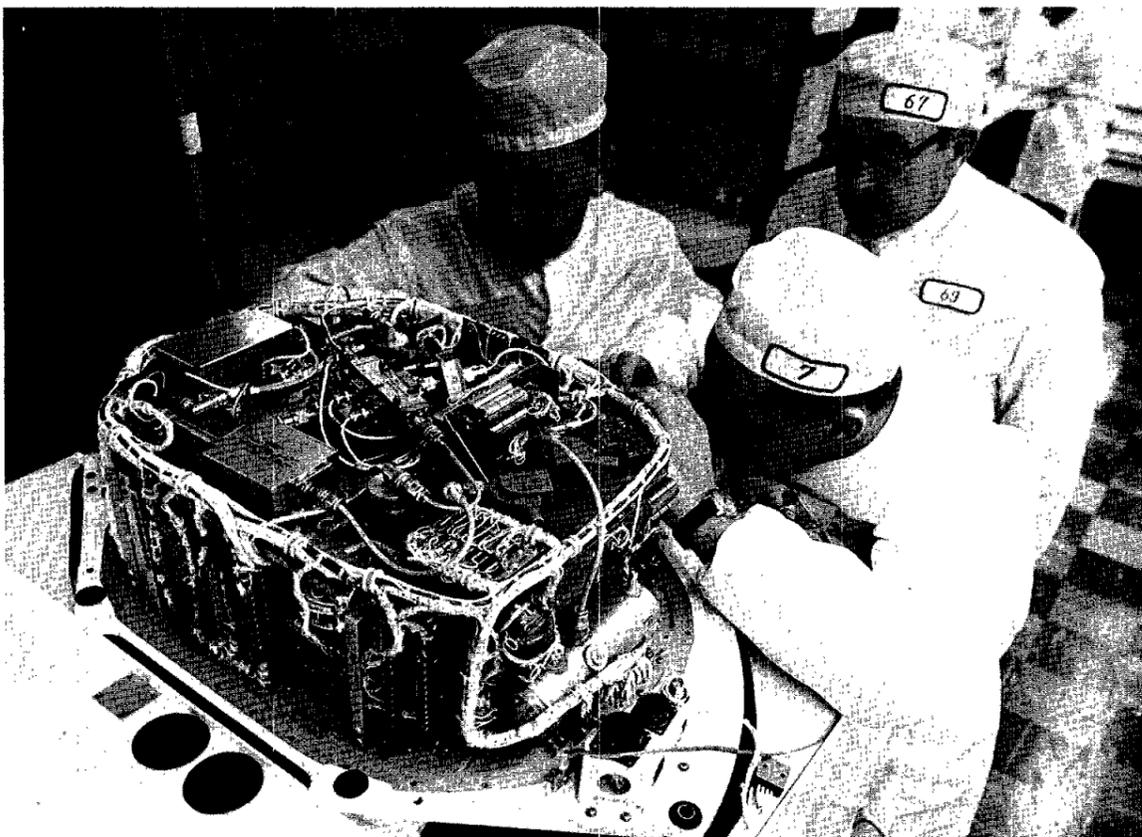
Although the bulk of Westinghouse work in the nation's space and defense programs is concentrated in the company's Atomic, Defense and Space Group, broad corporate capabilities of other product Groups are often utilized to meet requirements imposed by space age technologies.

For example, the large motor for the MSC Flight Acceleration Facility was produced by the Large Rotating Apparatus Division of Electric Utility Group; facilities at the Steam Division, Philadelphia, Pa., are employed by the Rocket Motor Case Department to fabricate cases for large solid-fuel rocket motor cases; the Molecular Electronics Division of the Electronic Components and Specialty Products Group supplied molecular circuits for the Apollo program as well as for missiles and aircraft.

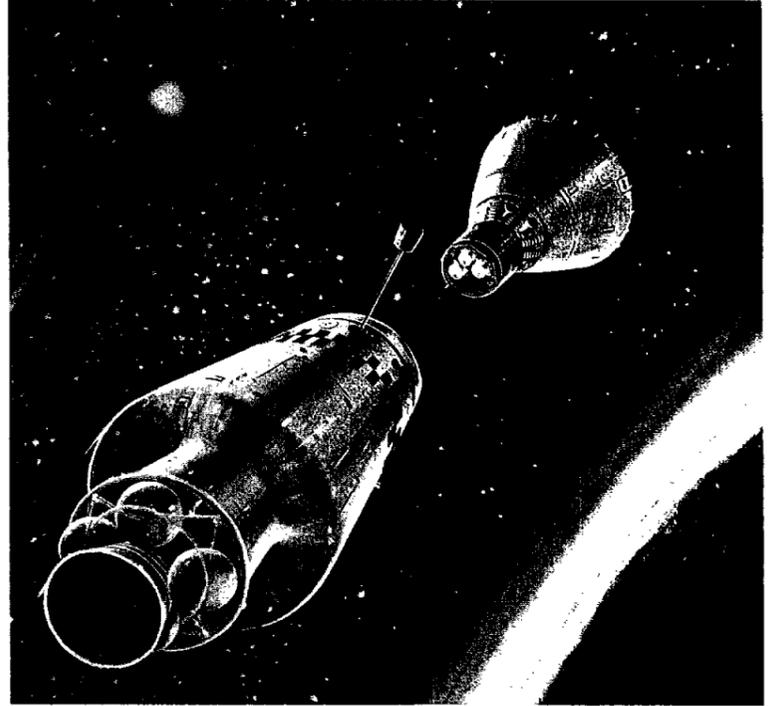
The company operates some 100 manufacturing and service plants across the country. Net sales for 1964 exceeded \$2.2 billion. Westinghouse is headed by President Donald C. Burnham. Charles H. Weaver is vice president and general manager, Atomic, Defense & Space Group.



**MOTION SIMULATOR**—Prototype working model of a dynamic motion simulator developed by the Aerospace Division of the Westinghouse Defense and Space Center under a contract to the Manned Spacecraft Center. The 34-inch-diameter working model was built to demonstrate feasibility of the simulation concept.



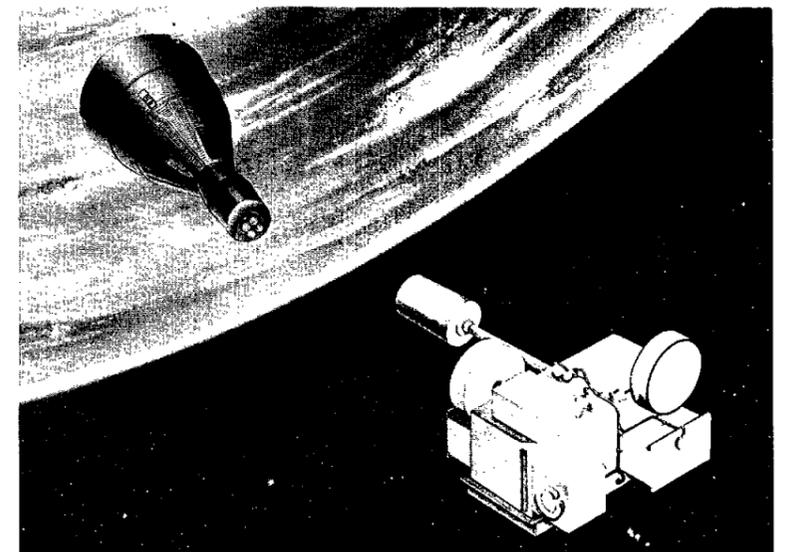
**FINAL TESTS**—Engineers at the Westinghouse Defense and Space Center make final tests on the Gemini rendezvous radar before its delivery to McDonnell Aircraft Corporation, prime contractor to NASA's Manned Spacecraft Center for the two-man spacecraft. The radar was designed and built by the Aerospace Division of the Westinghouse Defense and Space Center to provide information required to link two spacecraft as they orbit the earth.



**SPACE RENDEZVOUS**—One of the most unusual radars ever built is being assembled and tested at the Aerospace Division of the Westinghouse Defense Center. Purpose of the radar, as shown in the artist's sketch, is to assist in the rendezvous in space of two earth-orbiting satellites. One of them (at right) will be carrying two U. S. astronauts and the other will be an unmanned Agena rocket vehicle.



**CLEAN ROOM**—To minimize dust and impurities which might contaminate the Gemini radar's components, assembly work is performed in a "clean room" in which air circulation, temperature and humidity are precisely controlled. Welding operations on the electronic circuitry for the radar requires the use of special equipment such as the machine being used here by technicians.



**PRACTICE RENDEZVOUS**—This artist's concept shows how the two-man crew of the earth-orbiting Gemini spacecraft will practice rendezvous techniques with a "piggy-back" satellite they eject from the spacecraft. The satellite, called a "rendezvous evaluation pod," was built by the Westinghouse Defense Center's Aerospace Division under contract with the McDonnell Aircraft Corp., St. Louis, Mo.

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  
 Editor . . . . . Milton E. Reim  
 Staff Photographer . . . . . A. "Pat" Patnesky

## Welcome Aboard

During the last reporting period, 16 new employees joined the Manned Spacecraft Center.

Center Medical Programs Office: Doris J. Hoffman.

Procurement and Contracts Division: Joyce M. Fields, and Nickie L. Velasquez.

Astronaut Office: Viola J. Woolard.

Flight Crew Support Division: Dorothy S. Davis.

Information Systems Division: Donald A. Barron.

Instrumentation and Electronic Systems Division: James B. Trout, and Mary L. Turpin.

Guidance and Control Division: Max W. Craig.

Office of Assistant Director for Flight Operations: Edward J. Clarke.

Flight Control Division: Elizabeth W. Pieberhofer.

Landing and Recovery Division: William C. Lyons.

Gemini Program Office: Barbara A. Brocker, Bobbie R. Lampe, and Kathleen E. Michels.

Advanced Spacecraft Technology Division: Carl B. Peterson.

## Walt Disney Recent Visitor Here



CENTER VISITOR—Movie producer Walt Disney chats with Dr. Robert R. Gilruth, director, Manned Spacecraft Center, during a recent visit here. Disney who is on a tour of NASA Centers, was given a tour of the facilities. Disney was gathering ideas for a movie on the space program.

## On The Lighter Side



"Sorry fellows, Walt Disney was here for a visit, not for auditions"

## Security Office Issues Reminders On Decals, Classified Meetings

Security Branch officials at the Manned Spacecraft Center announced that recent incidents have disclosed a number of employees have failed to fulfill their responsibilities in the removal of automobile decals.

The employee to whom the decal is issued is responsible for removing the decal when ownership of the vehicle is transferred or when employment with MSC is terminated. Decal scrapings must be returned to the Security Office, Building 2, Room 157 during termination process. This procedure is necessary to assure that only authorized personnel will gain access to the MSC premises.

MSC sponsors of classified meetings are responsible for

notifying the Security Branch in advance if assistance in controlling access or monitoring security provisions is required.

Entry into classified meetings conducted at MSC can be expedited if the Security Branch is given advance notice of the non-NASA visitors who are to attend. This will enable the clearance level of the prospective visitors to be verified prior to their arrival at MSC. Badges will also be prepared in advance if large groups are anticipated.

Failure to provide this information may result in a delay in admittance of attendees at classified meetings. Additional information concerning classified meetings is contained in MSC Management Instruction 24-1-7.

## Space News Of Five Years Ago

MAY 8, 1960—A communications record was set at 5:04 a.m., EDT, when the 150-watt transmitter on Pioneer V interplanetary spacecraft was commanded and operated satisfactorily while it was 8,001,000 miles from earth.

MAY 9, 1960—McDonnell's first production spacecraft, with its escape rocket serving as propulsion force, was launched from Wallops Island. Designated the beach-abort test, the objectives were a performance evaluation of the escape system, the parachute and landing system, and recovery operations in an off-the-pad abort situation. The test was successful.

MAY 12, 1960—The Space Task Group established a field representative office at the Mc-

Donnell plant in St. Louis, Mo. A technical liaison representative, W. H. Gray, had already been assigned to the plant. A resident systems test engineer, a resident instrumentation engineer, and a team of inspectors were added to the staff.

MAY 12, 1960—A speed of Mach 3.2 and 78,000 feet altitude were attained in the X-15 (No. 1) with interim engines by NASA's Joseph A. Walker. This was the first remote-launch operation (100 miles from release from "mother" aircraft to landing site at Edwards AFB).

MAY 13, 1960—The Echo satellite, a 100-foot diameter passive reflector sphere, failed to orbit with the first complete three-stage Thor-Delta launch vehicle.

## SPACE QUOTES

ROLE OF MAN IN SPACE UNQUESTIONABLE. President Lyndon B. Johnson, White Houses ceremonies honoring Astronauts Grissom and Young, Washington, D.C., March 26, 1965, (New York Times, March 29, 1965.)

"A sense of history is present strongly here today. All of us are conscious that we have crossed over the threshold of man's first tentative and experimental ventures in space. The question of whether there would be a role for man himself in space is already firmly and finally answered and answered affirmatively. . . .

"We are not concerned with stunts and spectaculars, but we are concerned with sure and with steady success."

## World's Largest Building For Apollo Program Use Topped-Out In Ceremonies At Merritt Island, Fla.

A space-age construction milestone was reached the middle of this month at NASA's Merritt Island launch area building in Florida when topping out ceremonies were held signifying the structural steel for the world's largest building had reached its maximum height of 525 feet.

The huge structure—called the Vehicle Assembly Building (VAB)—is scheduled for completion in 1966 as an integral part of Launch Complex 39 where Apollo-Saturn manned moon rockets will be launched.

Within the 129 million cubic feet of the VAB, Apollo-Saturn V launch vehicles will be assem-

bled in an upright position in a controlled environment. When checkout is complete, they will be moved to the launch pad three miles away, ready for launch within a matter of days. This reduces pad stay and allows a greater launch rate than conditional methods which require a rocket to be prepared on the actual launch pad.

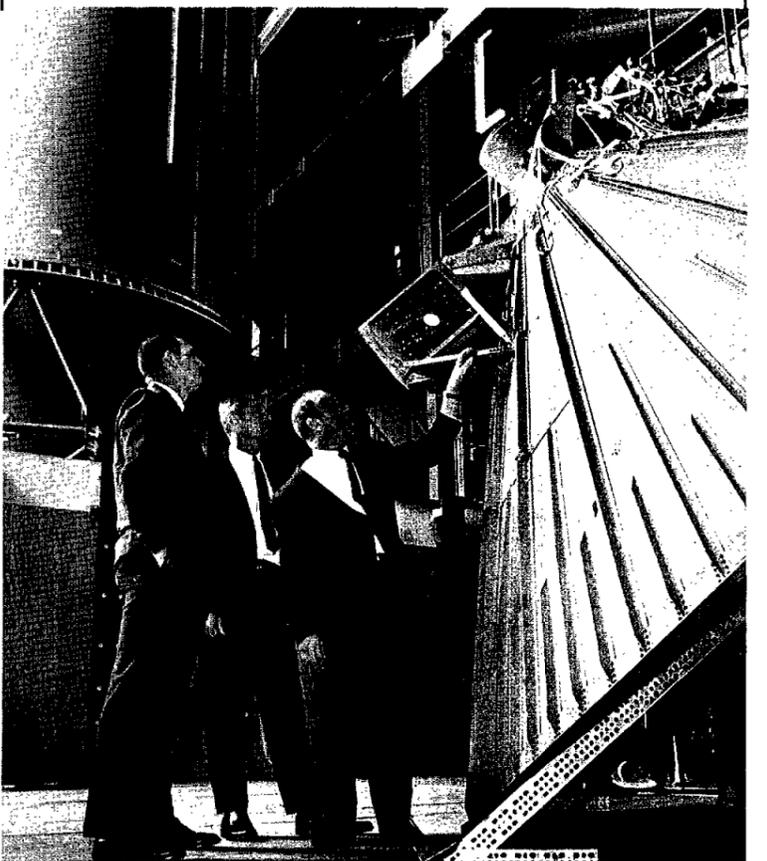
The topping out ceremony, traditional with ironworkers, was concluded when a 38-foot, four-ton steel beam was hoisted into place in the upper reaches of the VAB's steel skeleton. The beam bears the signatures of thousands of employees of the

NASA Kennedy Space Center, the Corps of Engineers and the construction workers employed on the Spaceport project.

The VAB will cost an estimated \$100 million when completed. It will contain some 50,000 tons of steel. The building—525 feet tall, 518 feet wide and 716 feet long—rests on some 4,000 steel pilings driven 160 feet into the Merritt Island soil.

It is the largest building in the world in terms of volume and is the tallest building south of the 555-foot Washington Monument, and east of the 570-foot San Jacinto Monument near Houston, Tex.

## Saturn Hardware Viewed



ASTRONAUTS VIEW HARDWARE—Saturn S-IVB thrust structure is inspected at Douglas Space Systems Center, Huntington Beach, Calif., by astronauts C. C. Williams Jr. (left) and Eugene A. Cernan (center), shown with J. L. Bromberg, vice president and director of the Douglas facility. Bromberg points out hundreds of sensors to be connected to electronic measuring equipment during stress testing, part of an exhaustive program involving thousands of tests to insure Saturn reliability.

# Space News ROUNDUP!

MANNED SPACECRAFT CENTER, HOUSTON, TEXAS

## EMPLOYEE NEWS

### Charm Club Elects New Officers, Lunar Luau' Fashion Show Set

In anticipation of the graduation of the first students to enroll in the charm class offered by the MSC Charm Club, and the formal organization of the group as in MSC Club, an election of officers was held at the April 20 meeting.

New officers for the year are: Judi Liles, president; Judy Levassar, vice president; Sandy McPherson, recording secretary; Dorothy Newberry, corresponding secretary; Sue Symms, treasurer; Jan Shrum, publicity officer; Wanda Slack, historian; and

Suellyn Johnson, program and social officer.

The club is now offering a class on Wednesday evenings and an organizational meeting for this class was held on April 21. A class for wives of MSC personnel and MSC on-site contractors is also planned. The exact starting date and time will be determined after an indication of the interest among the wives has been received. The class is fifteen weeks in duration and the cost is \$22.50 for fifteen one and one-half hour lessons. The instructor is Marilyn Flowers and the curriculum will include poise, makeup, styling, figure control and voice techniques. The classes will include guest speakers.

Any wives who are interested in such a class may call Judy Levassar at HU 3-4696.

The club's "Lunar Luau" fashion show by the pool at the Clear Lake Country Club will be held on May 5, featuring fashions by Battelsteins. Tickets are now on sale from all members of the Charm Club for \$2.50. A social hour will be held from 6 to 7 p.m. and the dinner at 7 p.m.

Models for this show will be Sandy McPherson, Judy Levassar, Marianne Campbell, Jean Dobbs, Barbara Robinson, Emily Ertl, Bea Anderson, Jan Shrum, Bobbie Lowery, Velma DeBusk and Dorothy Newberry.

MSC personnel, and on-site contractors, families and friends are invited to attend. For information on tickets call Sue Symms at HU 3-2281.

### Water Ski Club Elects Officers, Schedules Outings

Bill Drewes of IESD was elected president of the Boat and Water Ski Club at the April meeting. Ben Hood is the new vice-president and Barbara Arabian, the secretary-treasurer.

The water skiing season was kicked off with the first club outing Sunday, April 11. In spite of cloudy skies and a brisk, cool breeze, 21 people came out to the Houston Water Ski Association facility for the outing.

The club is looking forward to a very active summer of family skiing, training sessions, picnics, and trips to water ski events.

An outing will be held on the weekend following the dinner meeting on April 23 at Eric's restaurant. A trip to Austin, Tex. is planned for May 1 and 2. Anyone interested in participating may call Barbara Arabian at Ext. 3581 or Bill Drewes at Ext. 254.



**AERO CLUB OFFICERS**—Dr. John Zieglschmid (right), president-elect of the MSC Aero Club, is congratulated by outgoing president Jack Joerns. Looking on are other officers elected for 1965 (l. to r.), Richard Sutton, treasurer; Ernest Weeks, training officer; Barbara Arabian, secretary; Don Bray, information officer; and Bob Button, vice president.

### Aero Club Elects Officers For 1965

The election of new Aero Club Officers for 1965 was held at the April 12 meeting of the group.

The officers elected at this meeting were: Dr. John Zieglschmid, president; Robert But-

ton, vice-president; Barbara Arabian, secretary; Richard Sutton, treasurer; Don Bray, information officer; and Ernest Weeks, training officer.

Flying Club dues (\$1.00) for the quarter beginning April 1, 1965 and ending June 30, 1965 should be mailed to code FC or brought to room 2028 in Building 30.

Those wishing to pay their dues for the rest of the year

(\$3.00), through Dec. 31, 1965, may do likewise. Promptness in payment will be appreciated, the treasurer stated. A slip of paper containing members' office address and phone number should be included with payment of dues.

Meetings of the club are held the second Monday of each month and interested MSC employees should contact one of the above officers for more information.

### MSC Variety Show Proceeds To Benefit Freeman Libraries

Plans for "Vaudeville, Revisited '65" are taking shape in an effort to stage three variety performances tentatively scheduled for the evenings of June 18, 19 and 20 in the Building 1 Auditorium.

Proceeds from the production are to be shared by the Theodore Freeman Library of Aeronautics and Astronautics of the Houston Baptist College and the recently formed Captain Freeman Library of Clear Lake City.

A search for talent is continuing and anyone wishing to participate or knowing of talented MSC entertainers is urged to contact Juanita Bower at Ext. 4951. Mrs. Bower is chairman of the event and has asked that production people also volunteer their services. Families of MSC employees or on-site contractors are also invited to participate.

This is not an amateur show in the sense that the acts being presented should have had past experience. The staging, choreography and all phases of production are being handled in a professional-type atmosphere in an effort to showcase the best of MSC entertainers.

The show will last approximately two hours and offer a complete evening of song, dance, and comedy reminiscent of the great days of vaudeville. It will be keyed to delight the entire family.

Final dates, price and ticket information will appear on posters throughout the Center and in future editions of the Roundup. All district representatives of the Employees Activities Association, which is sponsoring "Vaudeville, Revisited '65," will also have information as it becomes available.

### Courses Offered To MSC Employees

The following courses will be offered by the Training Branch in May:

May 10 — Advanced Secretarial Seminar in Room 3, Bldg. 323, EAFB, 2:30-4:30 (24-hour course).

May 10 — Clear Writing I in Room 3, Bldg. 323, EAFB, 8:30-10:30 (30-hour course).

May 10 — Telemetry (MSC Form 75 required), location to be announced, 7:00-8:30 (22-hour course).

May 13 — New Employee Orientation in Room 661, Bldg.

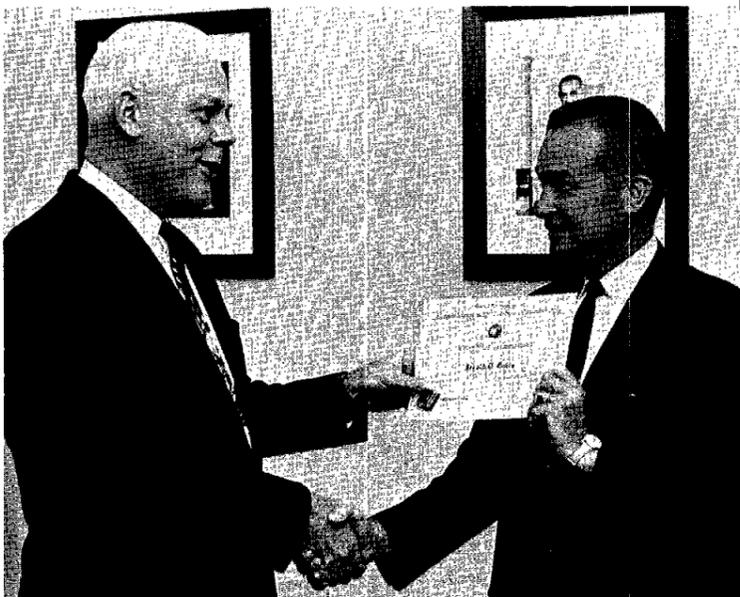
2, Site 1, 9:00-11:30 (2½-hour course).

May 17 — Middle Manager Seminar in Room 8, Bldg. 323, EAFB, 8:30-12:30 (20-hour course).

May 18 — Introductory Supervision in Room 7, Bldg. 323, EAFB, 8:30-12:30 (16-hour course).

Nominations for classes above should be in the Training Branch one week before the beginning date of the class. For more information call the Training Branch, Ext. 7311.

### Twenty-Year Award at WSO



**TWENTY-YEAR AWARD**—Gerald D. Bulls (right), Administrative Support Office, White Sands Operations, is presented a pin and certificate for 20 years of government service. Making the presentation is M. L. Raines, manager, WSO.

### Fifteen-Year Award Presented



**15-YEAR AWARD**—Karl P. Sperber (right), head of the Quality Assurance Branch, Reliability and Quality Assurance Office, is presented a 15-year service award certificate and pin by John Bailey Jr., chief of R and QA Office.

### MSC Employee Arts, Crafts, Clubs Meeting Times, Contacts Listed

The following arts, crafts and clubs at the Manned Spacecraft Center listed below, are open to MSC employees. For more information on any of these groups, contact Merv Hughes at Ext. 3761.

CLUB	CONTACT	PHONE NO.	MEETING TIME
Archery	Burt Cour-Palais	7295	To Be Announced
Barber Shop	Bill Drews	3254	Every Thurs., 7:30 pm
Quartet			
Bridge	Leona Kempainen	5339	Every Tues., 7:15 pm
Camera	Ken Cashion	7673	First Thurs. of Every Month, 8:00 pm
Charm	Suellyn Johnson	4973	Every Tues., 6:30 pm
Dance	Pauline Jones	4535	To Be Announced
Dance Band	R. P. Kehl	4091	To Be Announced
Flying	Jack Joerns	4471	Second Monday of Every Month, 5:00 pm
Folksong	Ken Cashion	7673	To Be Announced
Great Books	Marvin Matthews	3121	To Be Announced
Ham Radio	Don Wiseman	4061	Third Monday of Every Month, 5:30 pm
Horseback Riding	Becky Long	3761	To Be Announced
Judo	Don Bray	3995	Every Mon. & Wed., 7:00 to 9:00 pm
Language	Wes Brenton	4621	Every Tues., 5:15 pm
Radio Controlled Airplanes	Bill McCarty	5411	To Be Announced
Sailing	Jerry Grayson	3076	To Be Announced
Scuba Diving	Wally Graves	5311	Third Wednesday of Every Month, 7:30 pm
Toastmasters	Phil Hamburger	2765	First & Third Wed. of Every Month, 6:00 pm
Water Skiing	Don Osgood	3995	First Wed. at 5:00 pm Third Wed. at 7:00 pm

### MSC BOWLING ROUNDUP

MSC MIXED LEAGUE		Fabricators	25½	22½
Standings as of April 19				
TEAM	WON	LOST	Alley Oops	22½
Celestials	84½	31½	Spastics	21
Virginians	73½	42½	Fireballs	18
Alley Cats	72	44	Pseudonauts	13
Play Mates	59	57	High Game: Blair 254, Grimwood 244, Amason 233.	
Gutter Nuts	56½	59½	High Series: Morgan 629, Gaffney 613, McBride 587.	
Dusters	56	60	High Team Game: Fabricators 990, Alley Oops 975, Pseudonauts 973.	
Chugg-a-Luggs	55	61	High Team Series: Roadrunners 2681, Fabricators 2641, Spastics 2585.	
Shakers	55	61		
Falcons	54½	61½		
Hawks	49½	66½		
Eight Balls	48	68		
Goofballs	37	79		

High Game Women: Barnes 225, Morris 217, Smith 192.

High Game Men: McDonald 245, Morris 230, Lively 225.

High Series Women: Barnes 575, Morris 494, Gassett 474.

High Series Men: Keeley 588, Sargent 580, Spivey 574.

High Team Game: Shakers 919, Celestials 854, Virginians 840.

High Team Series: Shakers 2424, Celestials 2399, Virginians 2342.

#### NASA 5 O'CLOCK MON.

Standings as of April 19	
TEAM	WON LOST
Foul Five	67 45
Suppliers	65 47
Computers	64 48
Sombros	53 59
Hot Shots	48 64
Alley Gators	41 71

High Game: W. Kutalek 244, T. Hutchens 232, J. McDowell 230.

High Series: H. Erickson 595, E. R. Walker 591, T. Hutchens 590.

High Team Game: Computers 880, Suppliers 865, Foul Five 862.

High Team Series: Suppliers 2473, Foul Five 2341, Computers 2321.

#### MIMOSA MEN'S LEAGUE

Standings as of April 16	
TEAM	WON LOST
Whirlwinds	31 17
Roadrunners	31 17
Green Giants	27 21
Technics	26 22

#### MSC COUPLES LEAGUE

Standings as of April 20	
TEAM	WON LOST
Wha' Hoppen?	38 18
EZ-GO	35 21
Schplitz	32 24
Blitzf	31 25
Bowlernauts	31 25
Alley Cats	27½ 28½
Crickets	27 29
Pin Splitters	27 29
Goofballs	26 30
Hi-Ho's	24½ 31½
Sandbaggers	19 37
Thinkers	18 38

High Game Women: J. Foster 228, K. Gentile 224.

High Game Men: D. Benne 250, J. Garino 246.

High Series Women: J. Foster 564, J. Sands 538.

High Series Men: J. Garino 642, B. Jones 628.

#### NASA MIXED LEAGUE

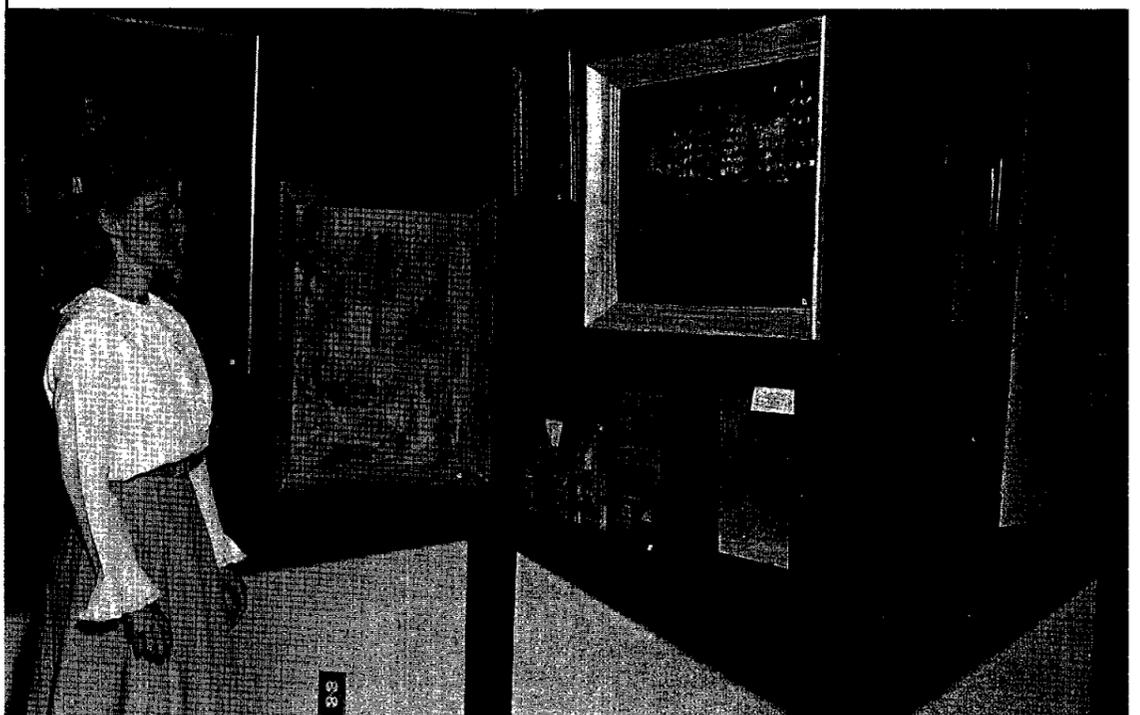
White Sand Operations	
Final Standings as of April 22	
TEAM	WON LOST
Goofballs	45½ 17½
Roadrunners	39 25
Bad Guys	36 28
Pinbusters	32 32
Woodbusters	31 33
Misfits	28½ 35½
Good Guys	28½ 35½
Scatterpins	17½ 46½

High Game: Winn 243, Glick-ners 243, Gantz 236.

High Series: B. Tillett 626, B. Colston 596, Glick-ners 596.

High Team Game: Roadrun-

### MSC Art Exhibit Viewed By Many



ART EXHIBIT—Paintings by MSC employees were displayed in Building 1, April 12-18 for the MSC Spring Art Exhibit. The non-jury show attracted numerous paintings. The show was open to employees and visitors to the Center. In the top photo, Paula Dennis, MSC employee, admires one of the paintings in the show. In the lower photo, Mrs. Howard Singer of Houston and Monsieur Arpad Plesch of Paris, France look at scientific illustrations from the MSC Graphics Section.

### Toastmistress Club Hears High School Speechmaker

Two high school students were the guest speakers at the Ellington Toastmistress Club's regular meeting Tuesday, April 20, at Ellington Air Force Base.

The spotlight was shared by Bari Watkins, a senior at South Houston High School and Cindy Chadwick, a sophomore at Sam Rayburn High School.

Miss Watkins, who is 18 years old and a first year speech student, gave a persuasive speech entitled "Dis-United Nations." Miss Watkins is the daughter of Harry Watkins of the Procurement & Contracts Division at MSC.

Miss Chadwick, who is 15 years old and also a first year speech student, first described the speech department at her high school and then gave a humorous interpretation entitled "Guinea Pig."

High Team Series: Roadrunners 2386, Goofballs 2352, Misfits 2276.

Toastmistress Bobbie Wright, introduced the speakers and expressed the Club's appreciation for the excellent presentations.

### Performance Award Presented



SSP AWARD—Francis J. Hickey (left) chief, Protocol Branch, Public Affairs Office, was awarded the Sustained Superior Performance Award recently. The presentation was made by Paul Haney, Public Affairs Officer.

# Longest 'Operating Table' Used To Pack Gemini Chutes

The orange and white ring-sail parachute that bore Astronauts Gus Grissom and John Young and the Gemini 3 spacecraft, Molly Brown, to an Atlan-

550 pounds. The nylon material can withstand a dynamic pressure of 120 pounds per square foot.

Parachutes are packed in their

lines are pressured for an additional two hours. The packing rig is operated by air and hydraulic fluid.

Pilot and drogue parachutes are pressured under an electric and hydraulically controlled packing rig.

Without need for repairs, a normal packing operation requires 12 hours. Repairs are handled in a special room containing four sewing machines.

The parachute first undergoes receiving inspection. Every inch, from the apex to the riser assemblies is rigorously checked. The numbered parachute gores are lined up in sequence to ensure against twisting or overlapping, are folded into a neat stack, and the folds recounted.

On a work stand, the main parachute is installed in the bottom of the spacecraft rendezvous and recovery section. The pilot and drogue parachutes are X-rayed to ensure that rings or cutters are not bent, and then they are installed in the top of the rendezvous and recovery section.

High over the desert at El Centro, Calif., Gemini parachutes have been tested in a realistic environment closely approximating spacecraft re-entry and parachute deployment. At an altitude of approximately 30,000 feet, an air transport plane releases a mockup Gemini spacecraft. As will occur in the actual spacecraft mission, a pyrotechnic device triggers the drogue parachute to stabilize the spacecraft.

The pilot parachute, which removes the spacecraft rendezvous and recovery section and deploys the main parachute, is initiated at 10,000 feet. The main parachute is reefed for 10 seconds before full inflation to reduce opening shock. Then, the

spacecraft is hung in two-point suspension for a water landing. The main parachute is jettisoned upon landing.

A built-in safety factor exists in the spacecraft in event the main chute fails to deploy. The astronauts can fire a pyrotechnic device which will eject them from the spacecraft and the astronauts would use their personnel parachutes to land.

With the advent of flight-

ready Apollo spacecraft, Beeker says that it will require three weeks to pack the three main parachutes for the command module.

With available space and manpower, this busy group of specialists is now looking forward to the day the Apollo command module, suspended by three main parachutes, descends from the sky following her historic lunar journey.



**GEMINI PARACHUTE TABLE**—The longest "operating table" in the world is at the Kennedy Space Center Parachute Building on Merritt Island. The table is coated with material identical to that used on hospital operating tables and eliminates all static electricity from the parachute. NASA and contractor people inspect every inch of the main parachute for possible defects.

tic Ocean touch-down, was packed on the longest "operating table" in the world at Kennedy Space Center's Parachute building.

This Merritt Island building was designed around a Gemini and Apollo main parachute packing table where NASA and contractor specialists maintain the most stringent parachute control and inspection procedures ever undertaken in the aerospace field.

This meticulously clean and environmentally controlled one-story structure houses the main parachute table, a 185-foot long by four-foot wide expanse of specially coated material identical to that used in hospital operating tables. This table, grounded every 30 feet, eliminates all static electricity from the spacecraft's main parachute.

A smaller table, 45-foot long by three-foot wide, is used to pack pilot, and drogue chutes.

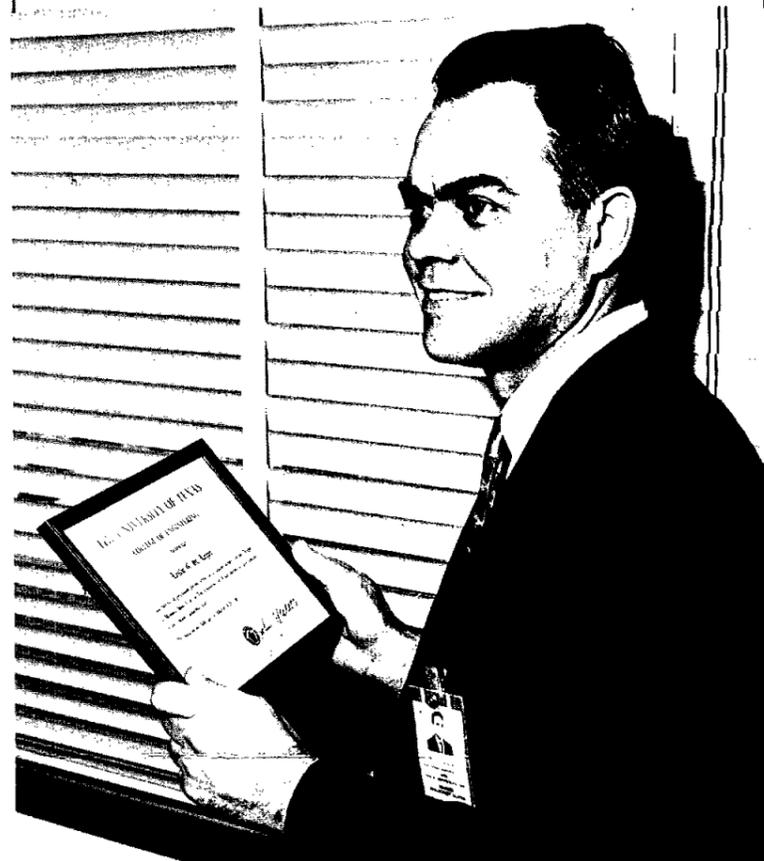
Kennedy Space Center engineer Bill Beeker of the Mechanisms, Structure, and Ordnance Branch oversees this critical operation. In addition to NASA personnel, contractor parachute specialists from McDonnell Aircraft Corporation, North American Aviation, Bendix and Northrop Ventura play a major role.

Beeker says the parachutes are packed with "tender loving care." The ring-sail, 84-foot main parachute has 72 gores or panels. Each suspension line has a minimum tensile strength of

small containers under tremendous pressure and then installed in the rendezvous and recovery section of the Gemini spacecraft.

In a special parachute packing rig, the canopy is first put under pressure for approximately two hours. Next, the canopy and

## Appreciation Certificates Received



**CERTIFICATE OF APPRECIATION**—Leslie G. St. Leger, head, Structural Mechanics Branch, shows a certificate of appreciation he was presented recently by Dr. John McKetta, dean, College of Engineering, University of Texas for his participation in the series of lectures at the University of Texas last fall. Other MSC employees also honored were: J. Funk, J. Modisette, E. Hayes, H. Kyle, A. Eickmeier, R. Duncan, J. Thibodaux, J. Lee, J. Mayer, J. Chamberlin, R. Thompson, L. Fisher and P. Pursler.

## University Of Texas Engineering College Heads Visit MSC



**VISITORS FROM UNIVERSITY OF TEXAS**—A group of University of Texas Engineering College department heads and research leaders recently visited the Manned Spacecraft Center to become more familiar with the Programs of MSC and to become better acquainted with the MSC staff. In addition, the group presented certificates of appreciation to MSC employees who participated in the series of lectures at the University of Texas last fall. Shown are (l. to r.) Dr. W. A. Cunningham, associate director of Bureau of Engineering Research; Dr. H. A. Walls, assistant professor, Mechanical Engineering; Dr. L. C. Reese, professor, Civil Engineering; Dr. F. B. Johnson, chairman, Architectural Engineering; Dr. B. D. Tapley, associate professor, Aero-Space and Engineering Mechanics; Dr.

E. F. Gloyne, professor, Civil Engineering; Dr. E. A. Ripperger, professor, Engineering Mechanics; Dr. M. J. Thompson, chairman, Aero-Space Engineering; Dr. J. J. McKetta, dean, College of Engineering; Dr. H. J. Plass, chairman, Engineering Mechanics; Dr. W. L. Moore, chairman, Civil Engineering; Dr. K. H. Jehn, associate professor, Atmospheric Science; Paul E. Pursler, special assistant to the director, MSC; Dr. B. H. Amstead, assistant dean, College of Engineering; Dr. B. H. Caudle, chairman, Petroleum Engineering; Dr. W. R. Upthegrove, chairman, Mechanical Engineering; Dr. C. L. Coates Jr., chairman, Electrical Engineering; and Dr. J. R. Brock, assistant professor, Chemical Engineering.

# Space News ROUNDUP!

## SECOND FRONT PAGE

First Pair Shipped To Cape

### Apollo Launch Escape Motor Qualifies For Lunar Program

The first pair of man-rated emergency launch escape motors, designed to safeguard the lives of America's Apollo astronauts, was shipped April 26 to NASA's flight test engineers at Cape Kennedy, Fla., by Lockheed Propulsion Company.

The launch escape motor is the first major Apollo component to be certified as "man-rated," that is qualified to be used on a man-carrying mission.

Designed and developed by Lockheed for North American

### Astronaut E. E. Aldrin Undergoes Surgery

An operation to remove an injured cartilage from the right knee of Astronaut Edwin E. Aldrin Jr., was successfully performed at Wilford Hall U.S. Air Force Hospital, San Antonio, April 23.

Col. George H. Chambers, who performed the 53-minute operation, reported Aldrin in excellent condition.

Aldrin was to be in the hospital for about a week after which time he was to return to limited duty for 6 to 8 weeks.

Aviation's Space and Information Systems Division, Downey, Calif., the solid propellant motors successfully passed an extensive series of static and flight test firings conducted under varying environmental conditions to insure the motors' reliability and to man-rate them well in advance of manned Apollo flights.

The launch escape motors, which develop 155,000 pounds of thrust, will provide the main impulse to pull the manned Apollo spacecraft away from the danger area in the event of an emergency on the launch pad or during early launch phases of the flight to the moon. From there, the spacecraft would descend by parachute.

Companion LPC-built pitch control motors, which point the escape tower into a curved path, also have been qualified for the Apollo program.

In recent flight tests at White Sands Missile Range, N. M., the two Lockheed motors teamed successfully to pull full-scale boilerplate Apollo spacecraft away from the launch vehicles in a few seconds while the

### GT-4 Astronauts Get Final Fitting Of Ejection Seats

Astronauts James A. McDivitt and Edward H. White II, prime crew members for the scheduled launch of America's second manned Gemini space flight, underwent final check-out and refitting of their spacecraft ejection seat escape system early this month in Burbank, Calif.

These final fitting operations were performed at Weber Aircraft Company's Burbank plant where the Gemini ejection seats are built.

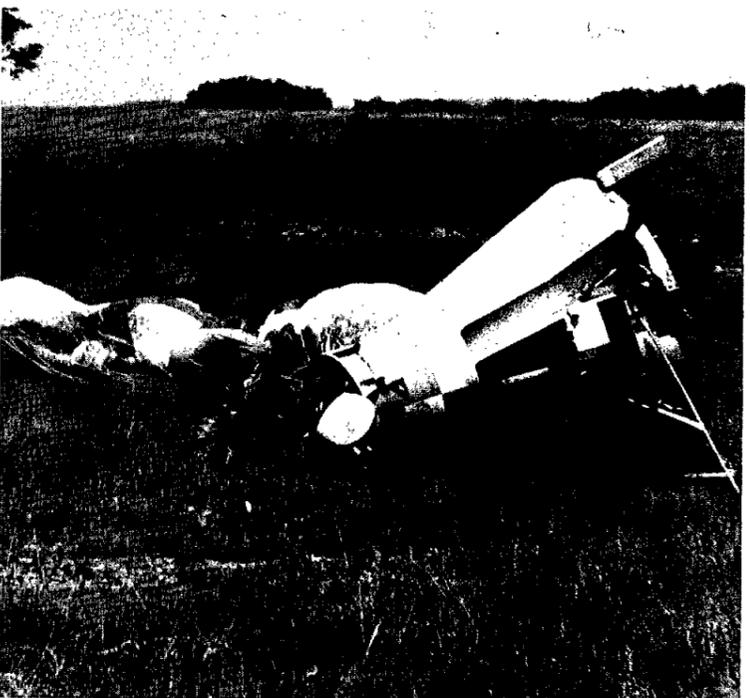
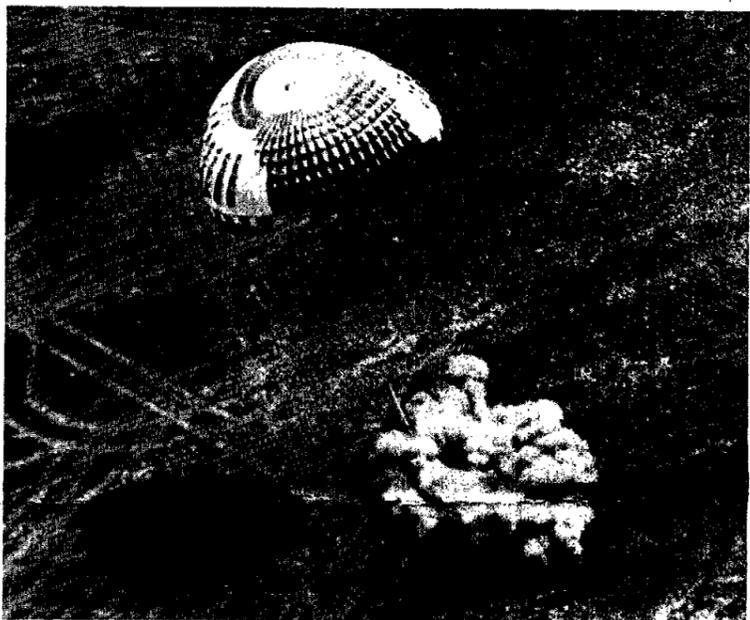
The seats are individually tailored and molded to each astronaut's precise body contour. The design refinements were incorporated into the seat's bottom cushion and will provide greater astronaut comfort during the longer missions that are now programmed for the Gemini spacemen.

Astronauts James A. Lovell Jr. and Frank Borman, back-up pilots for the next space flight, were also refitted.

As part of the process, the astronauts' personal parachute harnesses were refitted by technicians from Northrop Ventura which provides the escape system's parachutes under contract to Weber.

entire assembly was traveling at the speed of sound and at altitudes as high as four miles. The spacecraft drifted safely to earth under huge parachutes, as they would do in a manned flight emergency situation.

### Fort Hood Gemini Drop Test



**PARASAIL/LANDING ROCKET TEST**—The 5000 pound Gemini boilerplate is shown in the top photo making its descent over Ft. Hood, Tex. after being dropped from 11,500 feet by an Air Force C-119 aircraft. At 1400 feet the left turn motor that adjusts the chute for guiding the descent became locked on and would not respond to signals from the ground. In the center photo the landing rockets fire causing a cloud of smoke and dust. With the spacecraft in a left turn mode it toppled over on its right side (bottom photo) when it landed causing slight damage to the spacecraft and the landing gear. Lee Norman of the Structures and Mechanics Division was project engineer and Fred Koons, of Landing and Recovery Division was test conductor. Propulsion and Power Division designed the rockets, Structures and Mechanics Division designed the system hardware, Instrumentation and Electronic Systems Division furnished the instrumentation and data collection, the Photographic Technology Laboratory took engineering photos of the drop, and Technical Services provided support for the exercise. The test was successful with the exception of the left turn motor system. The test was conducted April 21.

### Regional Science Congress Winners



**YOUTH SCIENCE CONGRESS**—At the Regional NASA-NSTA Youth Science Congress held here at MSC on April 15 and 16. Dr. Arron Seamster, NASA Headquarters, deputy director of Educational Programs, (standing center) presents certificates to the students with the top three prize winning papers. Arthur E. Frankel (l.) won first place with a paper entitled, "The Effects of High Intracellular Sodium on the Biokinetics of Amino Acid Transport." Jane Ann Smith (c.) was second with her paper on "Studies on Genetic Recombination, Mutation, and Synchronization in *Escherichia Coli* K12." The third place winner was William Andrew Voolkle (r.) who presented a paper entitled, "Qualitative Analysis of Ion-beam Electrostatic Thrusters: The Sodium-Tungsten Contact Ion Electrostatic Thruster, Model 9A." Several mid-western states were represented at the science congress, but all three winners were from Texas.