

Meet Miss Transportation of Houston



TOPS AMONG 26—Wanda Slack of Computation and Analysis Division place first among 26 entrants in the Miss Transportation of Houston finals April 30 at the World Trade Club. She will compete for the Miss Transportation-USA title in September in New Orleans. National Transportation Week is May 15-21. Wanda met with Governor John Connally May 9 in a proclamation-signing ceremony.

NEBA Boosts Rates For Group Coverage

Premiums for the NASA Employee's Benefit Association group life insurance program will increase July 1 from the present \$1.10 per thousand dollars coverage per quarter to \$1.30.

The Association, in announcing the rate increase, said that "considerations of prudence and sound financing require an upward adjustment in rates." Part of the need for higher premium rates is attributed to an increase in the average age of the group covered. Other factors contributing to the raised rates include increased rates charged the Association by the insurance carrier, coupled with above-average claims experience over a period of several years. The higher losses substantially reduced the Association's reserves used for stabilizing rates charged employees for coverage.

During the fourteen years the NEBA has provided group coverage, the initial rate of \$2.20 per thousand dollars per quarter has steadily decreased to the present \$1.10. Even with the increase effective July 1 of \$1.30, the new rate is \$0.64 per thousand dollars under the standard rates established by the underwriters association and \$0.25 per thousand dollars less than the rate charged by the carrier, the Home Life Insurance Com-

pany of New York.

The NEBA also announced that negotiations with the carrier would begin as soon as practicable to amend the contract to offer coverage to family members. A survey of employees on the family-coverage proposal brought widespread interest.

VOL. 5. NO. 15 MANNED SPACECRAFT CENTER, HOUSTON, TEXAS MAY 13, 1966

MSC Invites Local Business To Conference

Procurement and Contracts Division last week announced plans to sponsor a Business Conference May 24 at MSC.

The Business Conference will be slanted toward assisting Houston, Clear Lake and adjacent area business firms and industrial development groups in gathering information about MSC, its role in area development and a forecast of its support activities and requirements.

Topics on the Conference agenda include MSC's facility construction programs, Civil Service manpower, support contractor requirements and the Center's procurement activity.

Invitations have been sent to more than 1000 local business and industrial groups and to all area Chambers of Commerce for distribution.

Wesley L. Hjernevik, Assistant Director for Administration at the Manned Spacecraft Center will serve as Panel Chairman and Moderator. Other key participants will include J. V. Piland, Manager, Technical and Engineering Services, who will discuss the Center's facilities, master planning, status of construction, and housing capacity; Floyd D. Brandon, MSC Personnel Director, will present a statistical review of the manpower program, including personnel strengths, payrolls, recruitment, and future projections; Charles F. Bingman, Manager, Office of Center Support Planning and Control is scheduled to discuss kinds of

(Continued on page 2)

Gemini IX Looks Good For Tuesday Launch

Spacecraft Gemini IX last Sunday was hard-mated to its launch vehicle on Launch Complex 19. An abbreviated electrical interface and interference test was conducted the same day.

Simultaneous launch demonstrations on both the Atlas/Agena and the Gemini/GLV vehicles, including all normal launch-day operations except actual ignition, were conducted Tuesday. A spacecraft simulated flight was run the following day.

All tests and preparations are on schedule for a May 17 launch. (See related stories on pages 6 and 8.)

Pre-mating activities at Kennedy Space Center included the Flight Readiness Review held May 4 at the KSC Manned Spacecraft Operations Building, and mating of Agena 5004 rendezvous vehicle to its Standard Atlas Launch Vehicle on May 3.

In Mission Control Center-Houston, the White, Green and Black flight controller teams participated in network simulations, supported the pad in Tuesday's Simultaneous Launch Demonstration, and took part in the final spacecraft simulated flight Wednesday.

The final network simulation is in progress today, with Agena lift-off scheduled for 9 am, with Gemini IX lifting off one hour and 40 minutes later. All three flight controller teams are participating in today's network simulation in a foreshortened launch day shift-change scheme.

In Apollo/Saturn 202 preparations, reaction control system

engines this week were installed in Service Module 011 at the KSC Manned Spacecraft Operations Building. The command and Service modules were scheduled to be stacked later in the week prior to environmental tests in the KSC vacuum chamber.

Command Module 008, scheduled for extensive manned and unmanned vacuum chamber testing at MSC arrived here Monday. Its service module arrived May 5.

May 16 Deadline For MSC-Backed UofH Courses

The graduate and undergraduate summer session study program for MSC employees at the University of Houston's Clear Lake branch and downtown will start June 9. Tuition and most course fees will be paid for those employees for whom the courses will substantially improve job performance, and job-related courses may be attended during duty hours.

All MSC-sponsored training must have supervisor approval and justification that the courses are of sufficient benefit to the government. Nominations for the University of Houston courses must be in to the Employment Development Section (Code BP23) on MSC Form 75 by Wednesday, June 1.

Each employee is responsible for his own admission arrangements with the University. Admission deadline for undergraduate and post-baccalaureate (non-graduate credit) courses is May 16. The deadline for graduate courses was May 10.

Approved employees will be sent letters of authorization and instructions for registering for courses.

Gulf Freeway Widening Work Starts Monday

Work begins Monday on widening the Gulf Freeway from FM 1959 (Ellington AFB Exit) south to the Clear Creek bridge under terms of a highway construction contract recently let by the Texas Highway Department.

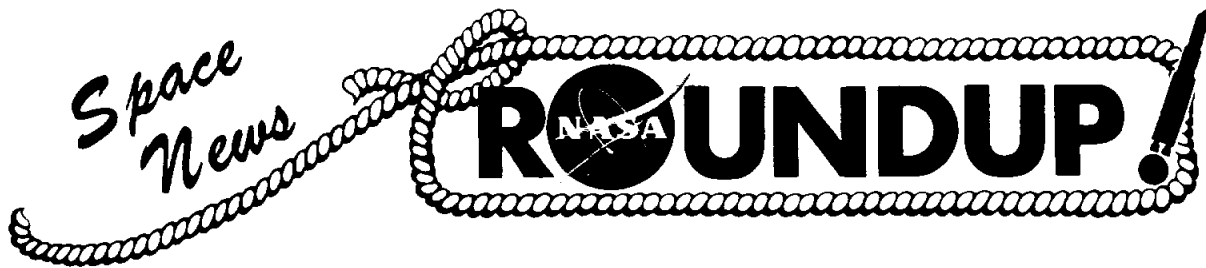
Speed limits will be reduced to 45 miles per hour after the construction progresses, which means MSC employees driving the Gulf Freeway must leave home earlier than customary.

Extension work includes adding one lane in each direction, continuing the service roads and construction of three overpasses.

Meet the Press, and Vice-Versa



NEW GROUP—Seventeen of the 19 new astronauts met May 2 with members of the newspaper, radio and television media in a debut press conference at the MSC News Center. From row, left to right: Dr. Donald L. Lind, Jack R. Lousma, Thomas K. Mattingly, Bruce McCandless, Edgar D. Mitchell, William Pogue, Stuart A. Roosa, John L. Swigert, Paul J. Weitz and Alfred M. Worden. back row: Vance D. Brand, John S. Bull, Charles M. Duke, Joe H. Engle, Ronald E. Evans, Fred M. Haise, James B. Irwin and Donald K. Slayton, MSC Director of Flight Operations. Unable to attend the press conference were Edward G. Givens, Jr. and Jerry Carr.



Instrument Society Officer Corps



NEW ISA SECTION—Officers of the newly-formed Apollo section of the Instrument Society of America (ISA) discuss plans for future section activities. Left to right are Earl W. Hicks, program chairman; Charles Benavides, alternate national delegate; Frank H. Sawberger, social chairman; Tom Miracle, arrangements chairman; George Zivley, treasurer; Alfred Eickmeier, president; Ron Grogan, secretary; Davis Batholomew, national delegate, and Lawrence W. Lockwood, publicity chairman. ISA is an organization with more than 16,000 engineers, scientists, technicians and aerospace sales representatives interested in instrumentation and its associated technologies of measurement, information acquisition, telemetry, data processing, display and automatic control. The Apollo section is made up of MSC and local aerospace industry members. Membership chairman Richard R. Richard at 2497 has information on joining the section.

MSC Aero Club Gets 2-Place T-34 Aircraft

A Beech T-34 two-place aircraft will be acquired by the MSC Aero Club for use by club members under an arrangement with the Civil Air Patrol. The Club's executive board recently met with Col. Russ Ireland, CAP Chief of Operations, to discuss details of acquiring the aircraft.

Persons interested in getting stick-time in the T-34—an Air Force trainer version of the Bonanza—should call Lou Bernardi at 3831.

The Aero Club's first ground school class, originally scheduled for May 17, has been rescheduled for May 24 at 5 pm in the MSC News Center, Nassau Bay Building 6. Conflict with the Gemini IX launch caused the postponement.

The next business meeting will be on June 7 at 5 pm in the News Center.

KUHT Airs Programs On US Space Effort

Thirteen new programs dealing with various aspects of the nation's space program will be presented on KUHT Channel 8 every Thursday night at 7:30 beginning May 19. The programs, "Science Reporter," were produced by NASA and station WGBH in Boston for the National Educational Television Network. Series host of MIT science reporter John Fitch.

The first telecast, "The First Soft Step," deals with lunar surface research in preparation for the Apollo manned landing on the moon within this decade.

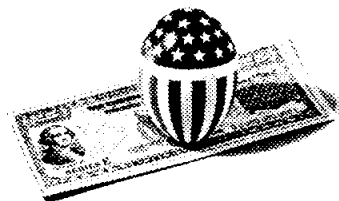
Business Conference

(Continued from page 1)

MSC services presently under contract, numbers of contractor personnel involved, dollar magnitude of support contracts and near-term trends in support contracting; and MSC's Procurement Officer, Dave W. Lang, will review the scope of MSC's procurement activity, the flow and distribution of procurement dollars, what-where and how MSC buys, and emphasis will be placed on those procurement activities which support the day-to-day operations of the Center and which are generally procured in the local business area.

Attendance will be by reservation only and reservations must be received by the Manned Spacecraft Center on or before May 16. If sufficient response is indicated a second session will be held on Wednesday, May 25.

The Star Spangled Nest Egg



We Get Letters . . .

Dear Sirs:

If you want to launch rockets, go right ahead. It's your privilege. But don't interrupt my TV shows! I don't mind if you put it on the news, but it burns me up when you keep interrupting our shows to say the same thing over and over again, that isn't really important to us. Look, I'm proud of my country, and I love it. But I also love my TV shows. If you're going to interrupt the programs on TV, you could at least stop the program, then when you were through, start it at the same place again. I could name dozens of other people who agree with me. Please take this into consideration.

A very angry

12 year old girl

P.S. *If you ever interrupt a show that the Beatles or Herman's Hermits are on, you'll hear from me. (especially the Beatles!)*

Scientists, Engineers Gain Pay Raise in Some Grades

The Civil Service Commission has increased the minimum salary rate ranges for positions in grades GS-6, 7, 8, and 9 of all occupational series in the Engineering and Architecture Group, GS-800, and certain positions in the Science Series and Specializations including GS-1221, 1301.1, 1310, 1320, and 1520. Special rates previously authorized for these occupational series at grades GS-5, GS-10, and GS-11 are not affected by this change.

The effective date of the increase will be June 5, 1966, and will be reflected on pay checks received June 25, 1966. As of this date, pay adjustments will be processed to increase the pay of current employees in the affected occupational classes. For example, the pay of an employee currently paid at the third step of GS-9, \$8,495, will be adjusted to the third rate of the new step range, \$8,749.

The revised rates are as follows:

Step	1	2	3	4	5	6	7	8	9	10
Grade GS-6	\$6,854	\$7,046	\$7,238	\$7,430	\$7,622	\$7,814	\$8,006	\$8,198	\$8,390	\$8,528
GS-7	7,511	7,718	7,925	8,132	8,339	8,546	8,753	8,960	9,167	9,374
GS-8	7,781	8,009	8,237	8,465	8,693	8,921	9,149	9,377	9,605	9,833
GS-9	8,241	8,495	8,749	9,003	9,257	9,511	9,765	10,019	10,273	10,527

New GI Bill Extends Employment Preference

Preference in federal employment has been extended to an additional group of ex-servicemen under the new "Cold War GI Bill." Under the new law, special consideration in federal employment will be given to honorably separated ex-servicemen and women who have had more than 180 consecutive days

of active duty—other than for training—in the armed forces since January 31, 1955. Service during an initial period of active duty for training under the "six-month" Reserve and National Guard program does not count.

A veteran who has filed an application for a federal position will not have to do anything more now to receive proper preference under the law. Preference will be granted automatically if the application shows the necessary military service. Proof of service will not have to be furnished until requested at the time an applicant is being considered for a particular job.

AID Seeks 500 Qualified People For Overseas

Federal agencies have been asked by the Agency for International Development to assist in locating candidates for employment with the United States Operations Missions in Vietnam and the Far East. Presently there are over 500 vacancies that must be filled as soon as possible. The President is personally interested in seeing to it that this recruitment effort is successful because it is vital to the national interest that the best qualified people available are selected for this important work.

Current vacancies exist for program economists, Assistant Program Officer, Program Officer (Operations), Assistant Program Officer (Evaluation), Public Administration Advisor (Civil Administration) and Industrial Advisor.

Persons with degrees (preferably advanced) plus experience in the following fields may be considered for one or more of these positions: Economics, Political Science, International Relations, Public Administration, Business Administration and Industrial Engineering.

Salaries for these positions range from \$7,000 to \$18,000, plus overseas differential, housing allowance, and other benefits. The overseas pay differential is currently 25%, and legislation is now pending to increase this to 50%.

Additional information regarding employment with AID may be obtained by contacting Burney Goodwin at extension 7391.

The US Civil Service Commission, which has taken action to put the new preference provision into effect immediately, also stated that five points will be added to the examination scores or ratings of all applicants already on Civil Service Registers who qualify under the new law.

The Commission has emphasized that veterans entitled to preference under some other provision of law will still be entitled to preference under that provision. For example, an honorably separated veteran who was disabled on active duty would still be entitled to preference even though he did not meet the six-month requirement of the new law. The same thing is true for a veteran who served in a campaign.

Veterans receiving the benefits of the new law will have additional retention rights in reductions-in-force as well as preference in appointments.

New Astronauts Visit MSFC For Saturn Booster Briefing

Twenty MSC astronauts will visit NASA Marshall Space Flight Center May 25, 26, 27, to take a look at the heavy-duty Saturn launch vehicles that will be used for future U. S. manned space flights and talking to the men who are developing them.

Attending will be eighteen of the nineteen new astronauts whose selection was announced April 4. All are pilots and hold degrees in engineering or the physical or biological sciences.

The other two attending will be scientist-astronauts selected last year, Joseph P. Kerwin, a medical doctor, and F. Curtis Michael, a physicist.

The eighteen new pilots, who entered on duty with NASA this month, are Vance D. Brand, John S. Bull, Gerald P. Carr, Charles M. Duke, Jr., Joe H. Engle, Ronald E. Evans, Edward G. Givens, Jr., Fred W. Haise, James B. Erwin, Don L.

Lind, Jack R. Lousma, Thomas K. Mattingly, Edgar D. Mitchell, William R. Pogue, Stuart A. Roosa, John L. Swigert, Jr., Paul J. Weitz, and Alfred M. Worden.

One of the nineteen recently picked, Bruce McCandless, II, is still working on his doctorate at Stanford University.

Doctor Preston T. Farish, Chief of MSFC's Manned Flight Awareness Program and host during the visit said this is the first time the men will have visited Marshall Center.

Their itinerary calls for briefings on the Saturn 1B and Saturn V launch vehicles during the first day and a half.

The group will tour Marshall Center laboratories and test facilities Thursday afternoon (May 26) and continue on to MSFC Michoud Assembly Facility in New Orleans for an all day tour Friday.

CCHS P-TA Elects Mildred Rogers Prexy

Mildred Rogers, Photographic Technology Laboratory secretary, was elected April 25 President of the Clear Creek High School Parent-Teacher Association. She previously held the office two years ago at which time she was also made a life member of the P-TA.

Apollo Mission Simulator Gives Liftoff-to-Reentry Realism

Many aspects of the upcoming Apollo missions require critical pilot control and the training for these flights will be provided in large part by an Apollo Mission Simulator at MSC.

Training for the first Apollo Crews who will orbit the earth in flights preparatory to landing on the surface of the moon in the latter part of this decade will include all phases of the flight from liftoff to reentry.

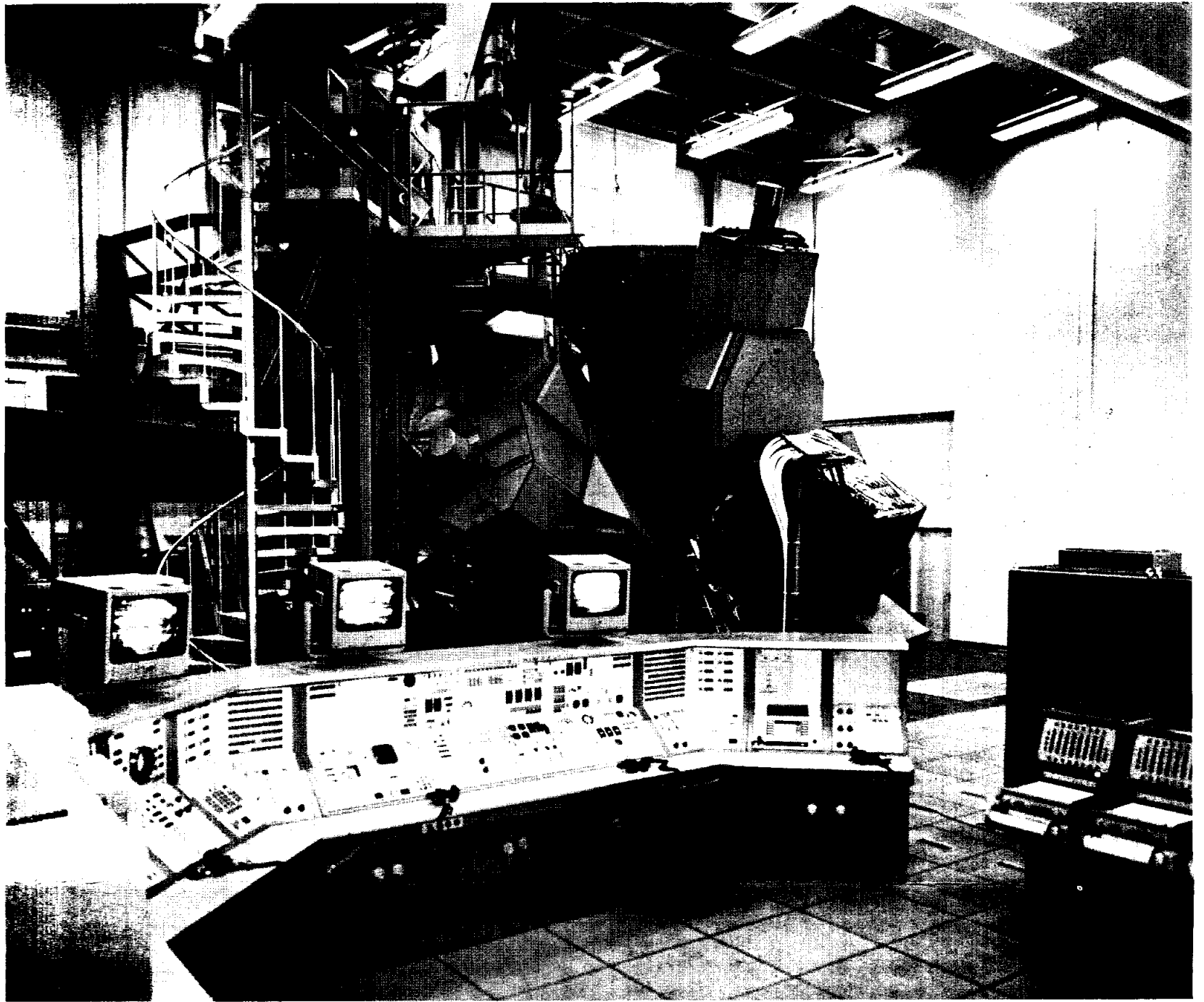
Five major areas of training in the Apollo simulator include: launch abort; navigation sightings; inflight maneuvers with the service propulsion system; monitoring and control of the various onboard systems; and retrofire and reentry.

Located in a large high-ceilinged room in Building 5 where several other flight simulators are housed, the Apollo simulator and the equipment associated with it rise some 28 feet above the floor. The crew compartment is identical in size and the configuration of the instrument panels are the same as those that will be on actual flight spacecraft.

Surrounding and enclosing the Apollo Command Module crew station like a giant mechanical octopus, is the Visual System that simulates all the out-of-the-window views that will be visible to the astronauts during an entire flight.

The entire simulation unit is driven by three digital computers acting as a single unit and called the Apollo Mission Simulator Computer (AMSC). Real time simulation is provided by the (AMSC) of all Apollo subsystems throughout the duration of the mission, along with simulations of Saturn vehicle subsystems to provide the astronauts with a realistic enactment of the launch boost and injection portions of the mission. All "motion" sensations are provided by viewing the visual system.

Realism of a mission is maintained by the simulation of aural effects such as those representing booster engine and thruster firings, pyrotechnic noises, and the introduction of smoke into the command module to simulate electrical fires or chemical reactions. To complete the reality,



FORTY-TON TRAINER—Somewhere under all the protruding grey visual display generating devices sits an Apollo command module crew station for realistic training of Apollo flight crews. Television, motion picture and planetarium-type projection equipment provide training crewmen with

food storage, food refrigeration, and water injection units and food warmer equipment are provided as well as other support equipment.

Views seen through each of the four Apollo windows are simulated by four separate but similar units in the Visual System. A fifth unit of comparable design is used to simulate the telescope and sextant views. This system allows the astro-

nauts to move about in the Command Module and see a realistic view through each window framed by the window outline. The sun, moon, earth and star images are presented in three dimensions at infinity, and the astronaut may move from window to window and see these images in the same perspective that they would appear on an actual flight. A closed circuit TV system, which is used for rendezvous and docking sequences, presents image of the Lunar Excursion Module (LEM) to the docking windows and the telescope.

The Visual System simulates three-dimensional effects by utilizing mirrors and beam splitters to superposition two or more images for viewing out of the windows of the spacecraft. Views of the earth and moon are simulated by using a mission effects film projector with lunar and earth terrain views. The star field is simulated by a round black sphere impregnated with small BB size reflection spheres which simulate stars. The larger sphere is rotated to correspond with the attitude of the spacecraft and with the aid of a projected light onto the sphere, mirrors convey the star field

out-of-the-window views of star fields, the moon and the Lunar Excursion Module. The consoles in the foreground from which simulated problems can be fed into the trainer are manned by instructors from the Flight Crew Support Division.

image to the spacecraft window.

Three simulation engineers act as instructors for the Apollo Mission Simulator. The Simulator Operator Console is located adjacent to the simulator. Using a variety of displays, indicators and controls, they monitor the crew action, provide cues for system management, direct crew actions, insert malfunctions and initial conditions, and record flight parameters and crew reactions.

Among the displays are duplications of all Command Module displays with indicators, lights and dials to indicate the positions of the spacecraft switches and controls. Means of communicating with the crew, as well as television monitoring of the crew during simulated missions, are provided the simulation engineers.

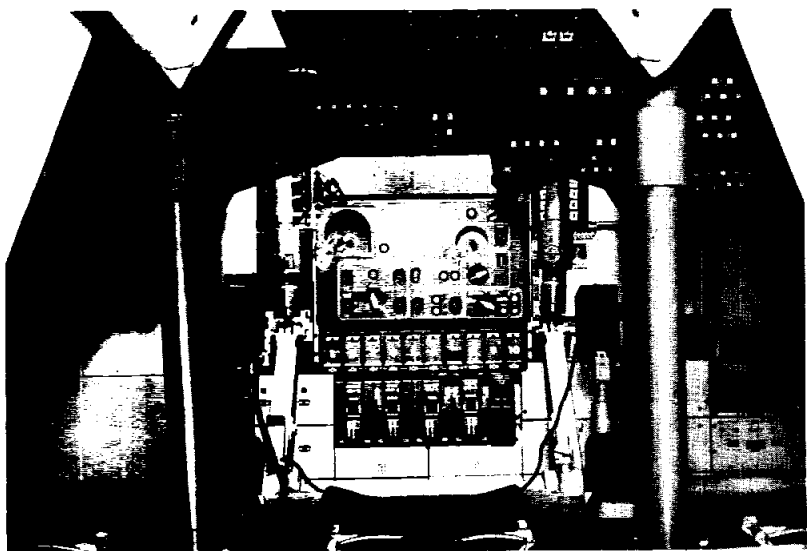
In addition to the normal "operate" mode, "problem freeze" and "store" modes are programmed and can be inserted into the system at the Simulator Operator Console. The problem freeze mode is holding of all computing time, and the store mode permits the operator to store unusual situations while continuing the mission, then

return to the stored situation for evaluation of crew procedures.

Through the use of specially designed equipment and spacecraft flight hardware, the simulator computer complex generates telemetry information in actual format for simulated transmission to ground station equipment. The computer adapts to changes in routines caused by malfunctions and other special inputs. Solution rates as high as 20 times per second are provided when required.

Two of these simulators will be provided for training Apollo flight crews. In addition to the one in Houston, another will be located at the Kennedy Space Center in Florida. Both simulators will be capable of operating in conjunction with the Mission Control Center in Houston (MCC-H) and will be tied to the MCC-H Real Time Computer Complex. In this mode of operation, training will be provided for both flight and ground crews.

The Apollo Mission Simulator was produced by General Precision Inc., Link Group, Binghamton, N. Y., under contract to North American's Space and Information Systems Division, Downey, Calif.



CREW STATION INTERIOR—Instrumentation, control and couch arrangements of the Apollo Command Module are faithfully duplicated in the Apollo Mission Simulator's crew station. Training runs can provide the sounds, smells and sights of a mission—everything except liftoff and reentry acceleration and orbital weightlessness.



RESCUE:—In the above sequence, personnel of the Flight Acceleration Facility practice emergency medical operations for removal of test subjects from the centrifuge. First picture, Dr. John J. Gordon (left) facility medical director

and Dean Spake, Systems Test Branch carry test subject Ted Heaton, Brown and Root Northrop technician, from the gondola to the stretcher where Robert Stevenson is waiting with oxygen mask. Second picture: retractable walkway

lowers medical team to the centrifuge floor. Third picture: the team races for the exit where an ambulance is waiting to rush the simulated victim to the medical dispensary for treatment.

CENTRIFUGE FACTS

"G" forces	20 G's sustained 30 G's for three minutes
Arm radius	50' basic
Maximum rotations per minute (rpm)	42 (30 g's)
Rate of "g" onset	7.5 g's per second from 2 g base
Motor horsepower	6,700 normal 10,000 overload
total arm end load	17,000 pounds
Gondola	12 ft. Diameter
Payload (gondola)	3000 pounds
Gondola interior test volume	500 cubic feet

Volunteer Subjects Begin Training In MSC's New 50-ft Centrifuge

Test subjects entered a circular arena at MSC this week to renew the battle with an old enemy of manned flight—the effects of changes of speed on the human body.

A pool of 17 volunteers began riding the newly completed centrifuge in Building 29 to train themselves for test runs to evaluate and qualify Apollo lunar spacecraft equipment for launch and reentry.

The centrifuge can produce gravity or "G" forces which simulate the same stresses which make the astronauts feel many times their own weight at the beginning and end of a space flight.

Three test subjects, lying side by side in couches inside a three-ton metal ball at the end of a 50-foot arm, can be whirled around a circular course at 24 revolutions per minute and speeds up to 88 miles per hour in mock spacecraft flights.

The training runs for familiarization with the "G" forces of the centrifuge will be done individually in a modified Gemini

seat, mounted upright in a swing cradle below the arm.

In training, the test subjects will receive as many as six "G's" in this position, simulating the forces an aircraft pilot feels when he pulls out of a steep dive. The subjects will practice muscle-tensing and breathing methods used to withstand "G" forces during flight.

Before the test subjects could begin their training, the operators who control the centrifuge also had to be trained. They made more than 100 unmanned runs, representing approximately 40 hours of training time, operating the wheel in its different control modes and speeds, exercising its various safety and emergency devices, and using four methods of braking the machine to a smooth stop.

They also studied the physiology of the human body and learned how it reacted under "G" forces. They received lectures on safety, demonstrations on handling fire equipment, giving first aid, artificial respiration, and heart massage. They will get their training in manned operation as the test subjects ride the wheel in their training program.

The switchover from training to testing is expected to come this summer when test subjects will don Apollo suits and ride the wheel to qualify the suit for the first manned Apollo flight. It will be followed by a test program to qualify the Apollo re-

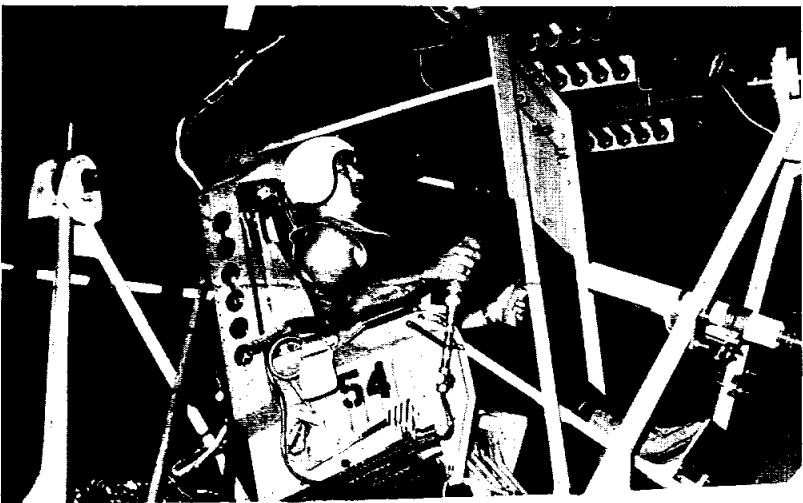
straint and support system and the biomedical sensors.

Astronaut training is another function the centrifuge will perform. The new group of 19 pilots is scheduled to ride the wheel in typical Apollo launch and reentry profile accelerations for familiarization with the forces encountered in space flight.

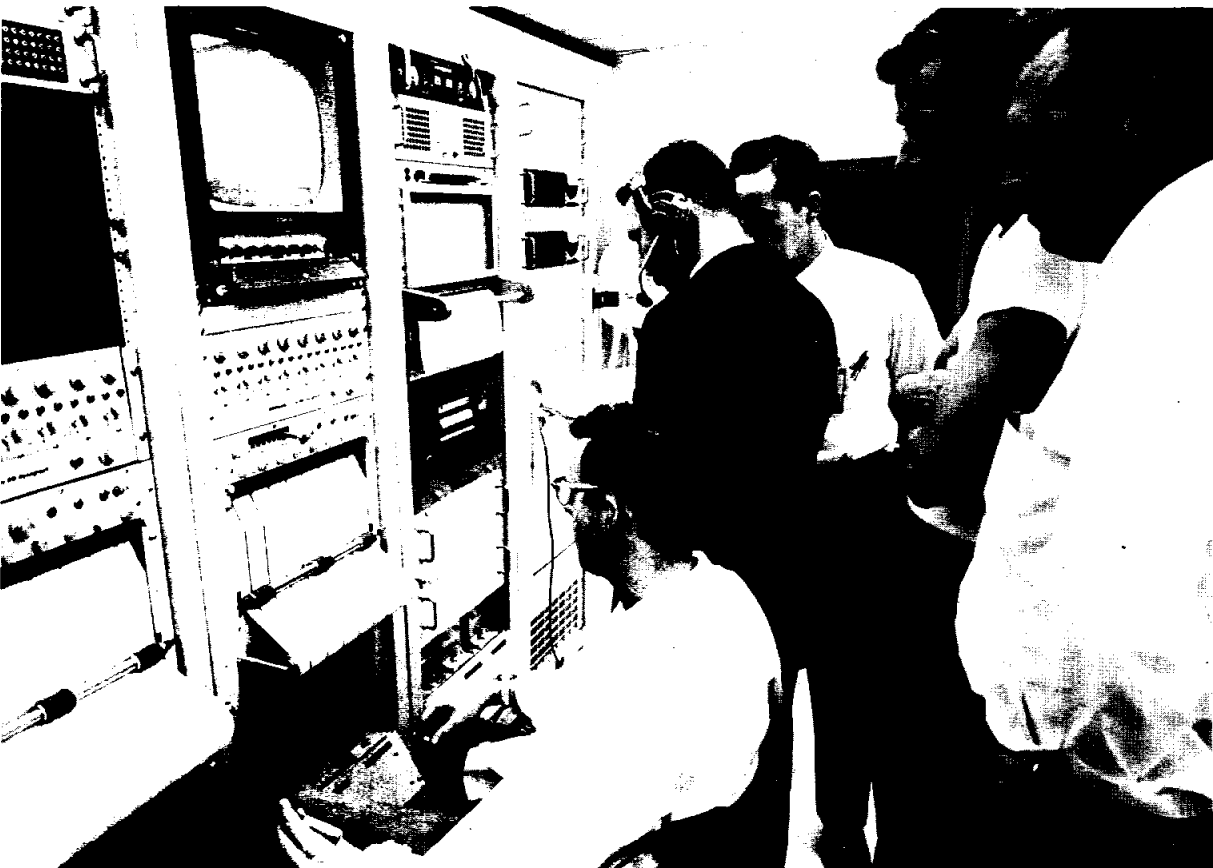
Although the personnel of the facility are undergoing an intensive training period now in preparation for manned testing, there is a hard core of experienced personnel here who have operated centrifuges at Navy facilities at Johnsville, Pennsylvania, and Pensacola, Florida. Some of the members of the test subject pool have also had experience in riding wheels at other locations.

Ralph Drexel is project officer for the first Apollo testing on the centrifuge. Warren Glover is in charge of operations. He has three operators; Paul Kloetzer, chief; E. K. Windler and Gene Spake, assistants. Dr. John Gordon is medical director.

Max Fox is chief of the test subject pool. MSC employees in the pool are Paul Ferguson, James LeBlanc, Randy Hester, Clifford J. Kingsmill, Jack D. Mays, Fred L. Spross, Hank A. Rotter, Robert C. Stevenson, Robert W. Thomas and James L. Tyler. BR-N employees are A. J. Barber, R. L. Dugan, Vernon E. Dugan, Robert Petner, Philip Schneider and Fred Wilson.



REV HER UP.—Gene Windler, System Test Branch, checks out a modified Gemini seat mounted in the cradle of the centrifuge for first manned training runs on the "big wheel." Test subjects will familiarize themselves here with gravity or "g" forces produced by the centrifuge before the start of equipment testing in the centrifuge gondola.



DATA READOUT—Ron Herron (with earphones) checks the flow of information from the data racks in the East Control Room of the Flight Acceleration Facility. He is assisted (left to right) by Charles Mitchell, Brown and Root-Northrop, Jack Dunaway, Systems Test Branch, Bob Vortilla and Jerry Beausguard, BRN.



TEST PREPARATIONS—Chief operator Paul Klotzer (left) assisted by Elree Wilkinson conducts a countdown for an unmanned training run of the 50-foot centrifuge. The gondola which will carry three test subjects in manned runs can be seen through the control room window.

Suit Demonstration



CLOSE-UP INSPECTION—Dr. Lloyd V. Berkner, right, president of the Graduate Research Center of the Southwest, examines a developmental pressure suit in the Crew Systems Division suit room in Building 7. Briefing him is Crew Systems Division Chief Richard S. Johnston, center. BR-N technician Bell Fausnet is in the suit.

MSC To Hire 75 Summer YOC Employees

In support of the President's Youth Opportunity Campaign, summer employment by MSC to 75 young men and women, ages 16 through 21. A total of 505 openings will be filled in NASA centers and at Headquarters. Employment will begin early in June.

The hiring will be over and above MSC's normal summer employment levels and includes nine Youth Opportunity Campaign employees already working at MSC on a part-time basis during the school year.

More than 200 YOC employees will be in the manned space flight program with opportunities being offered at MSC, Kennedy Space Center and Marshall Space Flight Center.

MATHEWS REVIEWS MISSION—

Docking Helps Compensate For Gemini VIII Failures

Demonstration of the ability to link physically two vehicles in space plus further refinement of reentry and landing accuracy helped compensate for lost experiments in the abbreviated Gemini VIII flight, MSC's Gemini program manager said.

Charles W. Mathews also cited the reaction of the Gemini VIII crew during the period of uncontrolled rolling shortly after the first successful in-space docking of one vehicle with another.

He assured an audience of aerospace writers and photographers that a relatively minor reworking of the Gemini spacecraft electrical wiring would prevent recurrence of the grounded "hot" wiring that short-circuited the No. 8 thruster.

Mathews also had praise for the Department of Defense recovery forces which implemented a contingency plan "that we had programmed but never before used. In the reality of Gemini VIII the contingency plan worked perfectly."

Mathews characterized the mission as smooth and without hitch from launch of the Agena target vehicle through Gemini-Titan launch, rendezvous, and docking.

After regaining control of the spacecraft, Command Pilot Neil Armstrong and Pilot David Scott brought Gemini VIII down safely in the Western Pacific Ocean in sight of the recovery aircraft. He pointed out that accuracy to target could not be pinpointed in terms of feet or miles because no recovery ship was in the area of splashdown.

With Gemini VIII in a docked configuration with the Agena target vehicle, Mathews said, the cause of the roll and yaw that brought about mission termination could not be isolated quickly. Based on past Gemini performance, the crew's first impression was that "the Agena's attitude controls had malfunctioned."

"Had they not been docked, the open thruster on Gemini would have been obvious almost immediately," he said.

He explained that the electrical system had been reworked to allow disengaging of the hot side of the lead activating the thruster solenoids.

Describing the Agena performance, Mathews said some 5100 commands were sent to the Agena while it still carried propellant. "The vehicle responded correctly to all 5100 commands."

The higher-than-planned orbit Agena went into during yaw maneuvers was determined to be a result of a greatly offset center of gravity to bring it within acceptable limits for both docked and undocked maneuvers," Mathews said. He added that no other changes in the Agena are being made.

Of the seven first-time experiments scheduled to have been performed on Gemini VIII, two are included in the Gemini IX flight plan. They are S-10 Micrometeoroid Cratering and D-14 UHF/VHF Polarization.

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Gemini IX Crew Terms Mission One of Most Sophisticated to Date

Gemini IX prime and backup crews April 23 briefed newsmen on the mission flight plan during a session at the MSC News Center.

Prime command Pilot Tom Stafford began the briefing with a description of the launch phase and rendezvous with the Agena up to the start of extravehicular activity.

"Gemini IX is designated to be three days in length as far as the total mission and will include as prime objectives the rendezvous with the Agena target and the extravehicular activities using the self-maneuvering unit," said Stafford.

"The secondary objectives as we have them outlined include two other rendezvous and the series of experiments which we will perform in a continuing experiment program at MSC and NASA is carrying out. We plan for the recovery to be in the Western Atlantic, just like we have on all the other missions.

"All of the latter Gemini missions, starting with plans from Gemini VIII through XII are what you call high concentrated work load mission and, which would envision EVA and rendezvous, multiple rendezvous. This is to date one of the most complex and sophisticated. We also plan to make three burns with the Agena's primary propulsion system. This is a 15,000 pound thrust engine. We will make one on the second day and several on the third day.

"A brief recap of the first day—we will launch at approximately one hour and 30 minutes after the Atlas Agena goes into orbit. We will try for a M=3 rendezvous. This will be closer to what the Apollo rendezvous will be like when the Lunar Excursion Module comes up to it. It will likely be less than M=3 but we will rendezvous M=3, which will be less than what we have done before in the total time

span. With this, we are going to burn inertial guidance velocities at insertion and then we will make our first maneuver over Carnarvon instead of waiting for one complete revolution around the earth and the second revolution near Carnarvon, we will circularize and go in for the rendezvous maneuver from there. After this, we will go through a docking maneuver and then Gene will have a docking maneuver and go through a bending mode test to check out the bending frequencies between the total combination, the vehicles have a static charge test and pretty much call it a day fairly early on the first day so we can get up early the second day for the EVA work."

Prime pilot Eugene A. Cernan continued the briefing with a description of his extravehicular activity during the mission.

"EVA, of course, is primarily built around the AMU-D12 experiment. The EVA will actually commence at sunrise of a day pass and the first whole day pass will be strictly without a propulsion system. We will be in a docked configuration with the Agena. We will be activating micrometeoroid experiments, on the Agena, installing some EVA cameras and retrieving another micrometeoroid experiment that we had already activated on our own spacecraft. Spending that first day pass generally becoming familiar with the extravehicular environment, doing some umbilical evaluations. This will all be done on a 25 foot umbilical.

"Toward the end of that first day pass, I will start heading back toward the adapter area to take a look at the adapter in daylight to make sure that the AMU and the adapter came through the whole boost phase without any difficulty or any problems and then during that night pass, we are talking about 54 minutes of daylight and then 36 minutes

of night time. During that night pass, I will be checking out and donning the AMU. Toward the end of that night pass, donning and checkout should be complete. Tom will then undock with the Agena, back off to a station keeping position of about 120 feet in plane with the Agena and at first light, sunrise of the second day of EVA activity, I will egress from the adapter with the AMU, come out into an area in front of the spacecraft between the spacecraft and the Agena, where Tom has a good visual acquisition of just what

(Continued on page 6)

Red-Ribbon Winner



PRIZE SCRAPBOOK—MSC chief telephone operator Helen Ragsdale shows Thomas W. Ullrich, Chief Telecommunications Branch, the 1965-66 PBX scrapbook with which she took second place honors at the PBX Club state convention April 27 in Lubbock, Texas. The scrapbook will be entered in the PBX Club International Convention scrapbook competition in Kansas City, Mo., in July. PBX Clubs International is the third largest group of professional women in the nation with chapters in Hawaii, Mexico and Canada.

OUT OF TEXAS' PAST—

How Was Buffalo Bayou Named? Try a Texas History Pop Quiz

Roundup readers who have followed this feature from its beginning should be sufficiently accidented by now to make a good score on a Texas history quiz. Want to try? Here are the questions:

1. Who was the first president of the Texas Republic?
2. On what holiday did this state secede from the United States in 1861?
3. The first capital of Texas was Monclova, Mexico, at the beginning of the 18th century. How many times has the capital's location been changed since then?
4. At the time of her annexation, Texas' borders embraced territory now lying in five other states. What are those states?
5. When a corporation's home office in Chicago wired the manager of its El Paso branch to rush a salesman to a special customer in Texarkana, the branch manager messaged back: "You send salesman." Why did he do that?
6. How did Buffalo Bayou get its name?
7. How did the town of La Marque get its name?
8. In January of 1842 the Texas Congress passed an act extending the nation's borders to the Pacific Ocean and annexing California, Lower California, New Mexico, Sonora, Chihuahua and parts of Coahuila,

Tamaulipas, Durango and Sinaloa. What was the result of this truly Texan piece of legislation, which would have made Texas bigger than the United States?

9. Where was the first prefabricated house erected in Texas? When?

10. Do Texans really eat beef brains served in the animal's skull, or is that just another tall tale?

All right, that's 10 questions. Please write down your answers. Then check them against the correct answers below, giving yourself 10 points for each one you got right.

1. David G. Burnet. Not Sam Houston. Tricky questions, aren't they?
2. On Texas Independence Day, March 2.
3. Fourteen times. First the capital was changed to Los Adaes (in present Louisiana); then to San Antonio, Saltillo, Monclova again, San Felipe de Austin, Washington-on-the-Brazos, Harrisburg, Galveston, Velasco, Columbia, Houston, Austin, Houston again, and at last back to Austin.
4. New Mexico, Oklahoma, Kansas, Colorado and Wyoming.
5. Because Texarkana is closer to Chicago than it is to El Paso.
6. From the once-plentiful buffalo fish, which you can still

buy in Houston fish markets. Not from the American bison.

7. There are conflicting reports. The most likely says that Edouard Beaugard, retired veteran of the French army, named the town shortly after he settled there in 1887. Another settler, who had served in the German army, wanted to name the town Bismarck. Beaugard suggested the name La Marque, which is French in form, as a compromise. An election was held, and La Marque won, 16 to 6.

8. President Houston vetoed the bill, opining that older countries might regard it as "a legislative jest" on the part of the emerging nation of Texas.

9. In Galveston, at 3601 Avenue P, where it still stands. It was first built and dismantled at Saccarappa, Maine, then was shipped to Galveston and erected in 1838. The big two-story raised cottage survived the storms of 1900 and 1915 and was for 20 years the home of Sam Williams, partner in the firm of McKinney and Williams, which financed the Texas Navy and loaned the Lone Star government \$100,000.

10. You better believe it. Barbecued brains served in the skull, with the eyeballs for hors d'oeuvres, is a gourmet's dish on the Texas border.

—Sigman Byrd

Space News Of Five Years Ago

May 15, 1961—Final reports of study contracts on Project Apollo presented by the three contractors at Langley Research Center and Space Task Group.

May 17, 1961—An Atlas investigation board was convened to study the cause of the Mercury-Atlas 3 mission launch vehicle failure. Several possible areas were considered, and three were isolated as probable causes based on a review of test data.

May 18, 1961—Announced by NASA Institute of Space Studies in New York that first major project, a 2-month seminar on the origin of the solar system, would be held in fall 1961.

May 19, 1961—Soviet Academy of Sciences revealed that the pulse rate of Maj. Yuri Gagarin had risen to 158 beats a minute in his *Vostok* flight, according to a report circulated by Tass.

NASA Headquarters and the Space Task Group began a concerted effort in reviewing Mercury progress to identify technical developments that were potential inventions, discoveries, improvements and innovations. This action was in keeping with the policy and concept of providing information on technical advances, within security limits and when appropriate, to other agencies of the government and to American industry.

Cape Canaveral opened to the general public for the first time in history.

May 25, 1961—President Kennedy, in a major message to

Congress, called for a vastly accelerated space program based on a long-range national goal of landing a man on the moon and bringing him safely back to earth. For this and associated projects in space technology, the president requested additional appropriations totaling \$611 million for NASA and the Department of Defense.

X-15 flown to record speed of 3,300 mph by NASA test pilot Joseph Walker at Edwards AFB, Calif.

May 26-27, 1961—First National Conference on the Peaceful Uses of Space held at Tulsa, Okla., at which leading American space scientists and technologists appraised the current and future applications of space science and technology for human welfare. It was sponsored by NASA and the Tulsa Chamber of Commerce, with the Aerospace Industries Association, Aerospace Medical Association, American Astronautical Society, American Institute of Biological Sciences, the American Rocket Society, the Electronic Industries Association, Frontiers of Science Foundation (Oklahoma) and the Institute of Aerospace Sciences as cosponsors.

May 26-June 4, 1961—Freedom 7, Mercury spacecraft in which Alan B. Shepard, Jr. made his space flight on May 5, was a major drawing card at the Paris International Air Show. Details of the spacecraft and of Shepard's flight were related to about 650,000 visitors.

Gemini IX Called 'Most Sophisticated Mission to Date'

(Continued from page 5)

is going on. Do some checkouts and warmups, still on the spacecraft umbilical.

"At that time I will go completely closed loop on the oxygen system and on a propulsion system of the AMU commence to operate on a 25 foot tether. This is 25 feet of tether from the end of the umbilical, which should be effective by maybe about 35 to 40 feet away from the spacecraft, operate on the tether, further checking out the capabilities and becoming familiar with the propulsion system of the AMU. When I am satisfied that the system is operating the way it is advertised to operate and that I am familiar enough, I will then go to 125 feet of tether and perform what you might call transfer maneuvers or very close in rendezvous type maneuvers with the Agena both in plane and out of plane. I probably should back-track a minute: Just prior to going on to 125 foot tether, I will progress as far away from the spacecraft as I can, which will be about 40 feet and Tom will perform and I will just stay there. Tom will perform a simulated rescue maneuver to see what the capabilities of the spacecraft are to pick up an EVA pilot who may be without a propulsion system or who may be so far away from his spacecraft that he doesn't really care to come in via the tether.

"Once on a 125 foot tether, there will be some rendezvous or transfer maneuvers back to the Agena, in plane and out of plane and then back to the spacecraft prior to sunset of that second day pass, doff or secure the AMU, get rid of it and go back on the spacecraft oxygen umbilical system, return to the spacecraft and open the hatch. The hatch will have been put down in a semiclosed position. Only open a couple or three inches. Open the hatch, stand in the hatch, take some S-1 or Milky Way and horizon airglow photography, pictures at night, retrieve our EVA camera, commence ingress and that whole time takes about two hours and 25 to 35 minutes."

Maneuvers of the Gemini/Agena combination after docking and rigidizing were covered by backup command pilot James A. Lovell, Jr.

"We have three Agena primary propulsion system burns scheduled for the mission," said Lovell. "One will be out of plane and two in plane and of course, it is the first time we have had an opportunity to burn the Agena while docked to the Gemini. We feel that there is a great potential here and we would like to prove it out in Gemini IX. The first PPS burn will be done out of plane, 90 degrees to orbital travel and will be about 100 feet per second

burn. We will do this in conjunction with a ground station. We have a definite procedure and we are anxious to see that it will work. We are going to have the bending mode test prior to this, as Tom had said, to make sure from the engineers on the ground that we are structurally sound when we make the burn. Our second PPS burn will be the following day and will be in plane 104 feet, posigrade, and then a retrograde maneuver of 104 feet."

Techniques for achieving rendezvous with the Agena after unlatching from the first rendezvous were spelled out by backup pilot Edwin E. Aldrin, Jr.

"In the last primary propulsion burn, the velocity to be applied will be loaded from the spacecraft instead of on the ground. The velocity meter for the first two burns will be loaded by ground stations. This means that the last burn will actually be done completely onboard," Aldrin continued. "Following

these two primary propulsion system burns, we are going to be executing if fuel permits, two separate rendezvous maneuvers with the Agena.

"The first one is called a passive rendezvous. It is very similar to the one that we had scheduled on Gemini VIII. It involves an equal period maneuver separating from the Agena with an outward velocity, which would bring the spacecraft back up to the Agena again one revolution later. This separation maneuver is timed so that the lighting, which will exist for the terminal phase, the last 80 degrees of orbital travel leading up to rendezvous, will be similar to the lighting conditions that will exist on the passive rendezvous for Gemini X. So this particular exercise is a dress rehearsal, you might say, for the passive rendezvous on Gemini X.

"The second rendezvous is called a rendezvous from above. The terminal phase will comprise 130 degrees as does the

present terminal phase for the initial rendezvous. Except the maneuver will be initiated from a co-elliptic orbit 15 miles above the Agena's orbit, instead of 15 miles below.

"The initial maneuvers to set up this orbital situation will be done by ground-commanded Agena maneuvers. There will be three different maneuvers that the Agena will make. The first is horizontal maneuver called a separation maneuver and about one and a half revolutions later, as it has gone to its maximum altitude, it will then make what is called a closing maneuver, again, a horizontal maneuver, drop down in altitude and then it will execute a co-elliptic maneuver, which will place it catching up with the spacecraft or the spacecraft catching back with the target.

"But now we are looking back toward the target from above, instead of toward the target at sunset, with the sun to our back as in the initial rendezvous. So the sun will just have set by the time we start to get our tracking information visually. The remainder of the rendezvous will be done without any stars to provide inertial background.

Several of the LEM abort trajectories, where they must abort during powered descent, or going down to the surface of the moon, require that they get into a position above the command module."

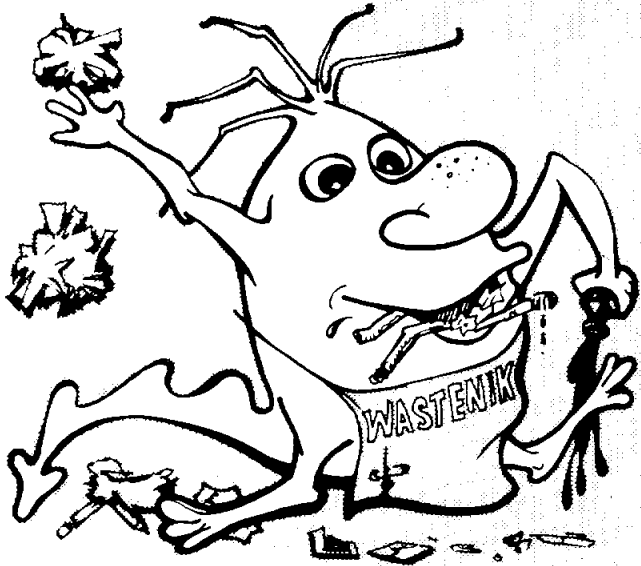
The SPACE NEWS ROUNDUP, an official publication of the Manned Spacecraft Center, National Aeronautics and Space Administration, Houston, Texas, is published for MSC personnel by the Public Affairs Office.

Director Dr. Robert R. Gilruth
Public Affairs Officer Paul Haney
Editor Terry White
Staff Photographer A. "Pat" Patnesky

Space News ROUNDUP!

MANNED SPACECRAFT CENTER, HOUSTON, TEXAS
EMPLOYEE NEWS

MSC DAYS ... ARE COMING!



DO YOU RECOGNIZE HIM?

Lunarfins Dive In Canyon Lake; Plan Reef Trip

Twenty-three MSC Lunarfins skin and scuba diving club members and their families spent part of a recent weekend submerged in Canyon Lake in the Central-Texas hill country near New Braunfels. The 12, 890-acre lake with 60 miles of shoreline had a temperature of a chilly 65° at the 70-foot depth, but outstanding visibility allowed divers to view the rugged terrain and plant life that had existed before Canyon Dam was completed.

Many of the members making the trip were graduates of the spring Lunarfins scuba course.

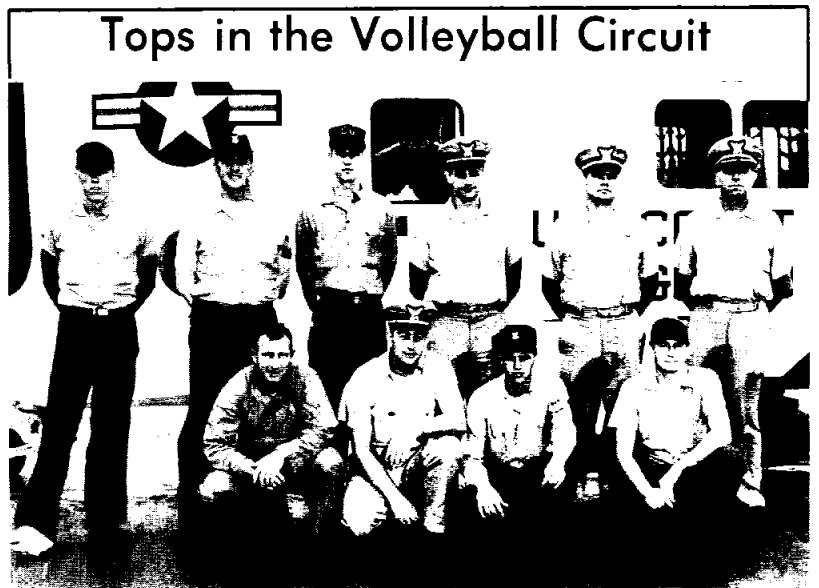
When not diving, members and their families made use of Canyon Lake's boating, fishing and picnicking facilities.

Side trips were made to Landa Park to swim in the crystal-clear Comal River and to the Aquarena underwater show at San Marcos.

Beginning tomorrow, Lunarfins will have charter boats to the Gulf each weekend for spear fishing. Catches from several such trips will be used for the Club's fish fry planned in June.

A recent program by Dr. T. E. Pulley, director of the Houston Museum of Natural Science, was of special interest to the Lunarfins. Dr. Pulley discussed investigations of thriving coral reefs 100 miles off shore in the Gulf of Mexico, and showed underwater motion pictures made at the reefs. Dr. Pulley's talk was made before several area skin diving clubs.

The Lunarfins have planned a weekend diving trip to these reefs this summer.



LEAGUE CHAMPS—Winner of the MSC/EAFB Volleyball League playoff and champs in the National Division was the Coast Guard Air Station team. Front row, left to right are Slip Connor, Bob Baker, Joe Combs and Billy Hardcastle. Back row: Dennis Simmons, Marty Baker, Milt Craig, Bob Kuehnl, Bill Russell and M. G. Shrode, Jr., CGAS commanding officer. Coast Guard won two League playoff games against ASPO 15-8 and 15-13.



AMERICAN DIVISION CHAMPS—The ASPO volleyball team came out in top place in the American Division of the MSC/EAFB Volleyball League, but lost out to Coast Guard for League championship. Front row, left to right are Bill Pratt, Bob Stewart, Ray Southers, Frazier Coffie and Bernie Yockey. Back row: Ralph Albon, Jim Dunlap, Al Louviere, Jerry Grief, Marty Hays and Bill Higgins. Not in picture: Joe Samon.

MSC BOWLING ROUNDUP

MIMOSA MEN'S LEAGUE
Final standings

TEAM	WON	LOST
Chizzlers	87	33
Whirlwinds	74	46
Alley Oops	66½	53½
Foul Five	61	55
Road Runners	58	62
Green Giants	57½	62½
Fabricators	54	66
Technics	49	71
Goobers	47	73
Agitators	46	74

High Game: Bob Graham 273, Dan Kennedy 269.

High Series: George Amason 701, Bob Harris 701.

Most improved bowler: Bob Harris, 17 pins.

Whirlwinds, Green Giants and Chizzlers won \$50 prize for each third won.

Ballroom Dance Course Offered; Starts May 23

A five-week course in ballroom dancing starting May 23 will be offered for single-type MSC and contractor employees.

Held each Monday from 7:30 pm to 9:30 pm in the Seabrook Community House, the course will include instruction in American and Latin dances. Course cost is \$10 per person, and is open to all ages.

To enroll, call Faye Chaviers at 4801 or J. T. Edge at 2687.

Seek Summer Bowlers

The MSC Couples Bowling League need bowlers for the summer session. The League bowls Tuesday night at the Mimosa Lanes, Gulf Freeway Exit 14, at 6:30 pm.

Call Mary Lou Dorrough at 2557 before May 23 to register in the League.

Roundup Swap-Shop

(Deadline for classified ads is the Friday preceding Roundup publication date. Ads received after the deadline will be run in the next following issue. Send ads in writing to Roundup Editor, AP3. Ads will not be repeated unless requested. Use name and home telephone number.)

- FOR SALE**
- 1959 Hillman Mink deluxe station wagon, 81,500 miles, runs well, new valve job, \$150. 1963 Falcon deluxe station wagon, air conditioned, tinted glass, padded dash and visors, seatbelts, whitewalls, 35,500 miles. Book value \$1175, sell for \$1100. Dr. Howard Minners, 932-2417.
 - 9x12-foot Acrilan carpet, champagne color, w/rubber pad, like new-used 4 months, \$50. 20-in 2-speed Sears window fan, used 2 months, \$10. Leonard Swank, HA 4-2280.
 - 3-bedroom, 2-bath brick house, air conditioned, fenced, landscaped, in Swan Lagoon, \$22,500 or equity plus assume \$142/month payments. Dr. Howard Minners, 932-2417.
 - 1964 Kit Olympia 10x55 mobile home, 2-bedroom, air conditioner, nylon carpet, washer, \$3,700. John Whittier, HU 5-2287.
 - 1½-story 3-bedroom and den (or 4 bedroom) 2-bath, 30 ft beamed-ceiling family room, central air conditioning, carpets, drapes, covered patio, on 125-foot fenced corner lot, landscaped, walking distance three schools, Pasadena. FHA 5¼% loan J. C. Jones, HU 6-4849.
- FOR RENT**
- Studio-type home, 2 carpeted bedrooms, 3 garages and store room. On acre lot at 414 Bay Ridge Road, LaPorte, \$100/month. Stove and refrigerator furnished. Wilma Wells, GA 1-1512.
- RIDER POOLS**
- Additional rider/driver wanted to join an existing car pool in Fairmont Park, 8:30-5 shift. R. T. Gunderson, GA 1-1352.

1966 MSC/EAFB Fast-Pitch Softball League

American Division		National Division	
1. TRW		11. Lockheed Electronics	
2. IBM/RTCC		12. McDonnell Aircraft	
3. Lonestars (ASTD)		13. NAA	
4. Link		14. Brown & Root	
5. Graham		15. Hustlers (Comp & Anal)	
6. IESD/LEC		16. MSC/Pyros	
7. MSC/AF MOLS		17. Weather	
8. FCD		18. IESD	
9. Philco/WDL		19. CG/Houston	
10. 747th Rams		20. 2578th	

All games are played on EAFB Diamond No. 1. Game times are at 6 and 8 pm. Teams are listed in schedule by numbers assigned above.

May 16	May 17	May 18	May 19	May 20
10 vs 4	11 vs 17	18 vs 16	19 vs 15	20 vs 14
9 vs 5	1 vs 7	8 vs 6	9 vs 5	10 vs 4
8 vs 6				

May 23	May 24	May 25	May 26	May 27
3 vs 10	7 vs 8	5 vs 10	4 vs 2	3 vs 1
5 vs 8				
12 vs 1				

1966 MSC/EAFB Volleyball League

American Division	Final Standings		National Division	Won Lost
1. ASPO	7	0	Coast Guard	8 1
2. G&C	6	1	IBM (2)	7 2
3. IBM (1)	5	2	2578th	6 2
4. IESD (A)	4	3	FSD	3 4
5. NAA	3	4	MPAD	3 4
6. FCD (H)	2	5	FCD (I)	2 5
7. CSD	1	6	Link	1 6
8. —	0	7	IESD (B)	1 6

Note: National Division ended in a 3-way tie for first place with Coast Guard, IBM and 2578th (6 wins and 1 loss). IBM received a win (bye) on playoff draw. Coast Guard beat 2578th by scores of 15-12 and 15-3 with 2578th winning middle game by 15-11. Coast Guard beat IBM by scores of 15-2 and 15-7.

League Championship Tournament:
ASPO won 16-14 and 16-14 against G&C.
Coast Guard won 15-6 and 15-12 against IBM.
Coast Guard won 15-8 and 15-13 against ASPO to become MSC/EAFB Volleyball League Champions.

1966 MSC/EAFB Slow-Pitch Softball League

American Division	National Division	
1. TSD All Stars	13. SMD Moonrakers	
2. LRD	14. IBM	
3. TRW OGOS	15. CSD	
4. FSD Batmen	16. Univac	
5. MPAD/FAB	17. FSD Dirty Sox	
6. APSO Lunartics	18. RMD Plus	
7. IESD Misfits	19. P&PD Hustlers	
8. Security Mets	20. SSD	
9. Pro & Con	21. TSD Virginians	
10. MPAD Animals	22. MPAD/RAB	
11. FCSD	23. Lockheed Operators	
12. GE	24. CG/EAFB	

All games are played on EAFB Diamond No. 3. Game times are 6, 7:30 and 9 pm. Teams are listed in schedule by numbers assigned above.

May 16	May 17	May 18	May 19
10 vs 4	1 vs 7	22 vs 16	13 vs 19
9 vs 5	12 vs 2	21 vs 17	24 vs 14
8 vs 6	11 vs 3	20 vs 18	23 vs 15

May 23	May 24	May 25	May 26
3 vs 10	2 vs 11	15 vs 22	14 vs 23
5 vs 8	6 vs 7	17 vs 20	18 vs 19
12 vs 1	4 vs 9	24 vs 13	16 vs 21

Gemini IX's Agena Target Vehicle Passes Pre-Launch Test Series

The Agena target vehicle which will be used to dock with Gemini IX spacecraft is now undergoing final systems checks in preparation for its role in the three-day mission set for May 17. The Agena will be propelled into space by an Atlas-launch vehicle and placed into a precise orbit to await its docking mission with Gemini IX.

Lt. Col. DeDewey E. (Jack) Allen, Jr., Chief of the 6555th Aerospace Test Wing's Atlas Agena Division, said an aerospace ground equipment (AGE) compatibility check was conducted from 11 am to 4 pm May 3. A Joint Flight Acceptance Composite Test of the Atlas Agena combination was conducted May 6, and an L-Band transmission check between the Agena on Pad 14 and the Gemini

spacecraft on Pad 19—was completed the morning of May 7.

A key milestone event before liftoff was the simultaneous launch demonstration (SLD) conducted on May 10. Atlas Agena launch time on the 17th is set for 9 a.m. CST with the spacecraft to follow some 99 minutes later. The SLD duplicated this plan.

Col. Alfred J. Gardner, Agena Target Vehicle Program Director, with the Air Force Space Systems Division said only minor modifications and no structural changes have been made in the Gemini IX Agena, a virtual carbon copy of the vehicle which performed successfully in Gemini VIII and is now in orbit awaiting rendezvous with another spacecraft later this year.

Modifications to the Gemini IX Agena include: removal of two batteries and addition of 158 pounds of ballast, changed to slightly alter the vehicle's center of gravity to avoid a yaw offset rate anomaly like that which caused the Agena target vehicle, used in the Gemini VIII mission, to thrust into too high an orbit. (That problem which occurred the week after astronaut splash-down was quickly corrected by mission controllers at MSC who brought the vehicle back to its proper orbit.) No degradation in mission performance will result from the battery removal. However, only one of the vehicle's two sets of running lights will be automatically turned on later for visual acquisition in rendezvous during Gemini X. No attempt

was made to move the batteries to alter the CG because this would have involved a structural change.

Five sensors were moved in the aft position of the Agena main engine to provide better readout of nozzle and propellant temperature. This is critical to determine engine conduction prior to refiring.

A secondary propulsion system (SPS) heat shield bracket was added to increase the clearance between the heat shield and the launch vehicle adapter by about .08 inch.

Mission controllers may order a total of 17 main engine burns during the Gemini IX Agena's flight, including the ascent burn and 16 in-orbit firings. This would break the firing frequency record held by the Gemini VIII Agena, which successfully completed its ascent burn and 8 main engine in-orbit firings.

Three more Agenas are in various stages of preparation for use later in the Gemini program. Agena 5005 is in the final acceptance and review stage at the Lockheed Missile and Space Company facility, Sunnyvale, Calif. It is scheduled to be delivered to the Air Force on May 15.

Agena 5006 is in the final manufacturing stages at Sunnyvale, and Agena 5001 (original prototype and backup for Gemini VI is being refurbished for delivery later this year. Final decisions on the order in which the Agenas will be used on the remaining three Gemini missions have not yet been made.

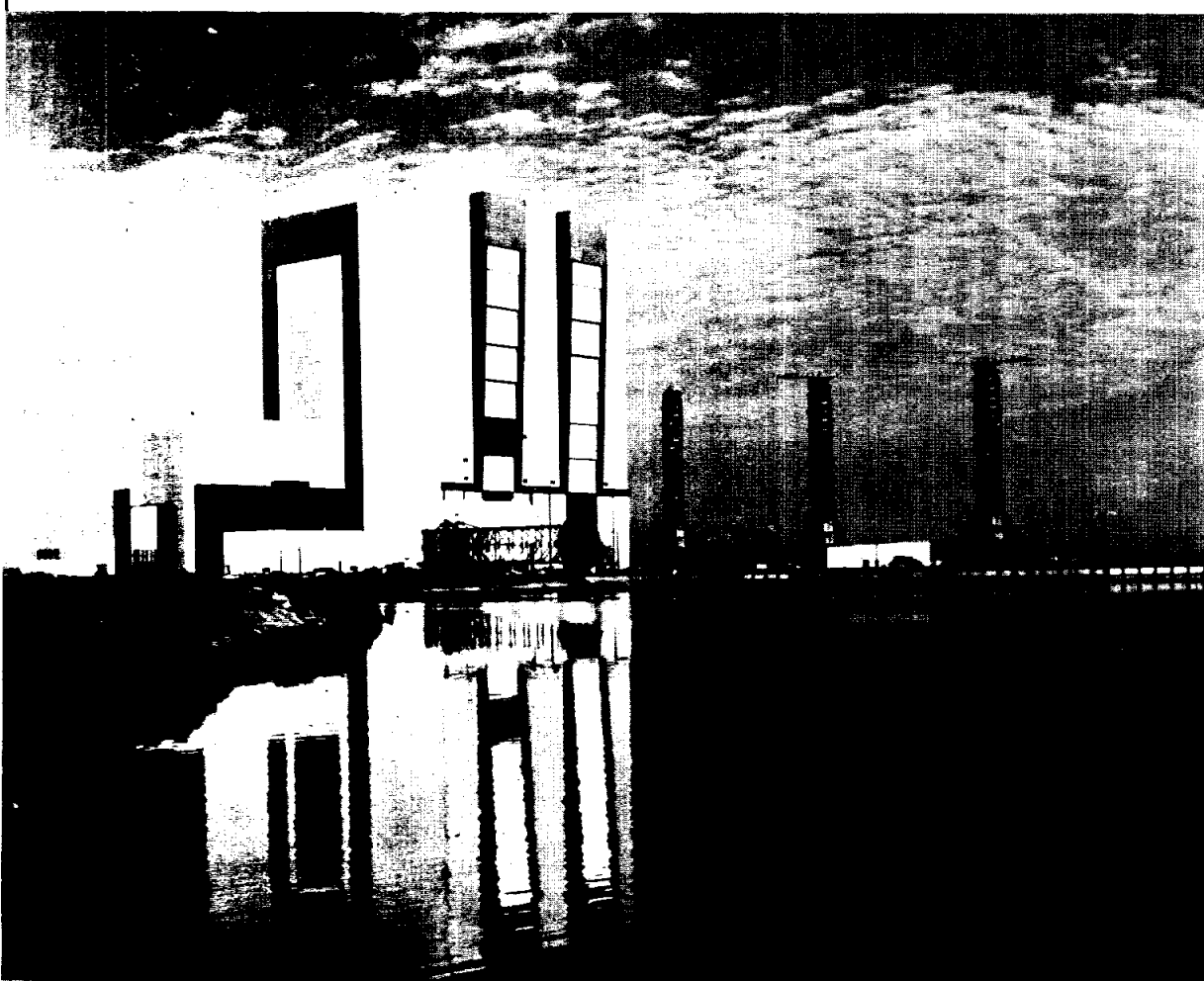
House Hearing Brings Repartee

The following exchange took place during a hearing of the House Committee on Science and Astronautics on March 23, 1959:

Victor L. Andruso (NY): "Do you think it should be the policy of Congress to provide some system of rewarding our scientists who make some unique discovery?"

Addison M. Rothrock, NASA Office of Program Planning and Evaluation: "I learned early in my some 30 years in government that the satisfactory salary is that of the grade above the grade you are in at the present time."

Skyscraper for Apollo



FOUR-BOOSTER GARAGE—The 52-story Vehicle Assembly Building and three 420-foot Saturn V mobile launch towers cast their reflections over the waters adjacent the Merritt Island Launch Area of Kennedy Space Center. Roadways supporting loads up to 18 million pounds run from the VAB to Launch Complex 38. Assembled Saturn V boosters with mated Apollo spacecraft will be moved along these roads by the mobile launch towers.



SECOND FRONT PAGE



COMMENCE FIRING—Larry York, Radiation and Fields Branch of the Space Science Division of Engineering and Development, prepares a metal target for bombardment by the atomic particle accelerator in the background. The accelerator can produce different types of space radiation to check out radiation detection instruments which will be carried on Apollo spacecraft.

NEAR SPEED OF LIGHT—

Radiation Accelerator Becomes Operational

An atomic particle accelerator which can simulate some types of space radiation has been put in operation by MSC engineers.

The device, called a Van de Graaf accelerator, will be used to assist in the design, development and calibration of radiation detection instruments and experiments carried on Apollo and other spacecraft.

Using as much as three million electron volts of electric current, the accelerator can push ions of hydrogen and electrons of helium and deuterium to nearly the speed of light.

The particles race down a tube to pepper a metal target knocking other particles loose from the material to produce secondary radiation. The accuracy of radiation detection instruments can be measured by comparing their readings with actual radiation which is known to come from the bombardment.

The accelerator can produce electron radiation that exists in the Van Allen Belt around the earth and the secondary radiation which occurs when the electrons strike the skin of the spacecraft.

Shielded behind five-foot-thick concrete walls covered by seven feet of earth, the accel-

erator can handle three tests at the same time. A magnetic switching device can divert the beam toward one of three targets at the end of the tube.

The accelerator can also be used to hurl microscopic particles of iron at six miles per second to simulate micrometeoroids travelling through space. Space suit protective materials can be tested for their effectiveness in shielding astronauts from these particles.

To add realism to the test situation, the radiation or micrometeoroids can be accelerated at targets in a four-foot by six-foot chamber in which the vacuum of outer space is created.

The first two tests in the new facility will investigate the types of secondary radiation which penetrate inside the spacecraft and how they are caused. In later tests, the three dosimeters which Apollo astronauts will carry on their suits, a dose rate meter for the lunar excursion module, and hardware for two Apollo in-flight radiation experiments will be checked out by the accelerator.

Larry B. York, Radiation and Fields Branch, is project engineer for the Van de Graaf accelerator.