MSC Exchange Forms Scholarship Program

College-age children of MSC employees may be eligible for financial assistance under a scholarship program recently established by the MSC Exchange Council. Paying up to $600 per academic year for four years, the fund awards are to be made on the basis of financial need and high school scholastic standing.

Scholarship winners may pursue any course of study leading to a recognized bachelor’s degree at any accredited college in the country. Applicants must be children of NASA employees who have been at MSC for at least two years as of January 1 and whose tuition income does not exceed $800 per year.

Students graduating from public, private or parochial high schools in January or June 1967 are eligible to apply provided their high school grade average is 3.5 on the 5.0 scale, or 2.5 on the 4.0 scale, and a Scholastic Aptitude Test score of 1000. Students who have taken the American College Test must have scored 22 or higher. Students now in college are also eligible for scholarships.

Where base family income exceeds $8000 per year it is felt there are extenuating circumstances, scholarships may also be applied for.

Scholarship application forms are available from Mary Beeman in the Educational Programs Office in Building 1, Ext 4143. Completed forms in sealed envelopes must be returned to Mrs. Beeman/PA4 no later than February 15, 1967.

The MSC Scholarship Committee, made up of senior staff members, will evaluate students’ applications and scholastic records for selecting scholarship recipients. All information will be kept confidential and will be reviewed only by the committee. The winner of the scholarship (or winners, if more than one scholarship is awarded) will be notified by mail no later than April 15, 1967.

Rules Relaxed in Summer Hire Of Offspring

For the past three summer employment periods, sons and daughters of Federal employees (both military and civilian) have been prohibited from obtaining summer jobs in agencies where their parents are employed. The Civil Service Commission has announced a relaxation of this restriction for the summer of 1967. Under the new policy, an agency may employ sons and daughters of its own employees during the summer months, but only if they are appointed on the basis of a competitive Civil Service examination, and if no other applicant with the same or a higher rating is available for appointment.

Insofar as MSC is concerned, the new policy will pertain only to positions at grades GS-5 through GS-4 filled through the Office and Science Assistant Examination No. 403. This examination covers such positions as typists, stenographers, clerks, engineering aids, and similar jobs. Summer jobs at MSC which are not filled through a Civil Service examination, i.e., positions at GS-5 and above, will be filled only by sons and daughters of NASA employees.

Persons who are interested in applying for the Office and Science Assistant examination should file now by mailing Application Card Form 5000-AB to NASA, MSC, Science Assistant Examination Card Form, Washington, D.C. 20515. (This form may be obtained from your Personnel Officer.)

(Closed on page 2)

Flight Crews Selected

For 2nd, 3rd Apollos

Crews for the second and third manned Apollo missions were named at MSC December 22.

Prime flight crew for Apollo mission 205/208, the second manned mission, is James A. McDivitt, commander; David R. Scott, command module pilot; and Russell Schweickart, lunar module pilot. Backup crew is Thomas P. Stafford, commander; John W. Young, CM pilot; and Eugene A. Cernan, LM pilot.

Prime crew for the AJS-303 mission, the third manned Apollo flight, will launch using the Saturn V launch vehicle. It is Frank Borman, commander; Michael Collins, CM pilot; and William A. Anders, LM pilot. Backup crew is Charles Conrad, Jr., commander; Richard F. Gordon, Jr., CM pilot; and C. C. Williams, Jr., LM pilot.

Both missions are scheduled to be launched during 1967, but depend on the success of other Apollo missions including AJS-204, the first manned Apollo flight scheduled for the first quarter of the year.

AJS-204/208 is planned as a rendezvous and docking mission and will be the first manned operation of the Apollo Lunar Module which is the two-man spacecraft designed to land on the moon.

The mission plan calls for the manned command and service module to be launched into earth orbit by one uprated Saturn I launch vehicle. About 24 hours later an unmanned lunar module will be launched by another up-rated Saturn I. The crew in the command module will rendezvous and dock with the lunar module.

The commander and the lunar module pilot will transfer via a tunnel through the nose of the command module to the lunar module. After conducting a series of checks and making sure the two spacecraft are compatible, the crew will return to the command module for reentry and landing.

AJS-303 will launch the entire Apollo spacecraft — command and service modules and lunar module — into earth orbit.

Giruth, Faget Reach Antarctic

Dr. Robert R. Giruth, Director of the Manned Spacecraft Center and Dr. Maxime A. Faget, Director for Engineering Development are in the Antarctic until January 12 observing U.S. scientists and Navy personnel who are surveying the mountain ranges of this supercold continent.

Dr. Giruth and Dr. Faget joined Dr. Werner von Braun, Director of the Marshall Space Flight Center and Dr. Ernst Stuhlinger, research chief at Marshall during a 10-day expedition to study Antarctica’s environmental conditions and observe investigations in progress under the United States Antarctic Research Program.

The NASA group is expected to see how logistical problems are faced in the extreme cold and examine on the scene the Navy-designed modular vans which have been assembled into self-contained mobile base at Plateau Station, Antarctica.

Dr. Giruth left for McMurdo Sound, Antarctic Monday, January 3 and was being flown by Dr. Faget on January 12. They are scheduled to return to Houston on January 15.
NEXT FIRING IS FOR REAL—Five J-2 engines of the first flight stage S-II vehicle generate a vapor cloud in the test stand as a water-cooled flame deflector during the first static firing at Mississippi Test Facility. The stage will be shipped to NASA Kennedy Space Center to become the second stage of the first Saturn V, now scheduled for launch in the second quarter of 1967.

Saturn S-II Flight Stage Completes Second MTF Captive-Firing Test

The first flight model of the second stage for the Apollo Saturn V space vehicle underwent its second, and possibly final, preflight captive firing test December 30 at the NASA Mississippi Test Facility in Hancock County.

NASA Buys 3rd Apollo Simulator

NASA has awarded a $9.5 million contract to the Link Group, General Precision Inc., Binghamton, N.Y., to build and install an Apollo Mission Simulator at Cape Kennedy, Fla. This will be the third Apollo simulator built by Link.

Simulators provide flight training for crews assigned to a specific mission. Nearly every detail of the flight except weightlessness can be simulated, giving flight crews extensive useful training before they leave the ground, especially in handling emergencies.

The two simulators obtained from General Precision earlier were scheduled for installation at MSC and the John F. Kennedy Space Center, Fla. Each is capable of complete simulation with the Command and Service Module as well as the Lunar Module. The two were ordered under subcontract to the prime contractors for the modules, North American Aviation Inc. and the Grumman Aircraft and Engineering Corp.

The third simulator, ordered by NASA, an Apollo Command Module only, will be installed to provide flight training for Apollo crews during the active flight phase of the program.

Under terms of the NASA incentive contract General Precision will complete the installation by the fall of 1967. The company also has a contract to supply modification kits for the simulators.

NASA and North American Aviation test engineers are making preliminary analysis of all test data recorded during the firing of the S-II’s rocket engines.

Preliminary indications are that the firing was successful. The test, which began at 3:34 p.m., lasted 6 minutes (the approximate time the stage is expected to perform in flight). Conducting the test was the Space and Information Systems Division of North American Aviation, Inc., prime contractor to NASA’s George C. Marshall Space Flight Center for development and manufacture of the stage.

The nation’s largest hydrogen-powered rocket completed its initial acceptance test on December 1 at MTF in a static firing lasting 384 seconds. A minimum of two successful full-duration ground tests is required by the space agency before issuance of a flightworthiness certificate. The S-II-I, upon acceptance, will be refurbished and shipped to the NASA Kennedy Space Center in Florida to become part of the first Saturn V launch vehicle, now scheduled for flight in mid-1967.

The stage is 82 feet long and 13 feet in diameter and is powered by five Rocketdyne J-2 engines which develop a total of one million pounds of thrust at altitude, equivalent to more than 21,000,000 horsepower. During testing, the stage was held captive in a concrete and steel test stand 200 feet high.

Measurements of the stage’s performance during the second firing were recorded by some 550 data channels, each carrying multiple signals indicating events such as temperatures, pressures, flow rates, vibrations and thrust. The processed data will permit detailed evaluation of the stage’s operation and predicted performance in flight.

SPACE NEWS ROUNDUP

CHRISTMAS JEANS—Boys in the Teen Librators Boys Town examine the blue jeans and cash presented to them by employees of the Instrumentation and Electronic Systems Division. At right are Rev. Freddie Gage, Teen Librators founder, and Joe Fowler of IESD.

IESD Employees Raise $500 For Gift to Teen Librators

More than $500 in cash, clothing and food were given to the Teen Librators Boys Town in Lincoln City Christmas by MSC and contractor employees in the Instrumentation and Electronic Systems Division.

Spacecraft 012 Altitude Tests Finished at KSC

Apollo spacecraft 012, scheduled for the first manned Apollo mission (A/S I 204) has successfully completed altitude chamber tests at the Kennedy Space Center. Leaks in the command module Environmental Control Unit (ECU) during earlier chamber runs had delayed the tests until the ECU could be replaced.

The spacecraft was moved from the altitude chamber to a work area in the Manned Spacecraft Operations Building at KSC where the service propulsion system engine expansion nozzle will be installed.

The spacecraft was moved from the altitude chamber to a work area in the Manned Spacecraft Operations Building at KSC where the service propulsion system engine expansion nozzle will be installed.

NASA Sponsors Systems Design Faculty Program

NASA will sponsor three special 10-week programs during the summer of 1967 for young engineering faculty members in the field of systems engineering design. These 10-week summer programs will be undertaken as cooperative efforts between NASA research centers and adjacent universities.

The principal objective of the program is to allow the participants to develop competence which will enable them to organize multi-disciplinary design engineering courses at their home institutions. Faculty members from various engineering disciplines will work together as a team to design a complex space system.

In addition to introducing the participants to the challenges of the space program, the activity is expected to foster the application of systems engineering theory to actual engineering problems, develop communication between engineers in different specialties, and stimulate innovation.

Participating universities and cooperating NASA centers are: Stanford University and Ames Research Center; Auburn University, University of Alabama and Marshall Space Flight Center, and University of Houston, Rice University and Manned Spacecraft Center.

About 70 faculty members will be participating in these three programs. This is the second year that NASA has sponsored such activity.
Two MSC Employees Commended
For Rescue in Chamber Emergency

Two MSC employees—Decem-
ber 14th, 1966—were awarded certificates of
commendation for their role in
solving the life of a suit tech-
nician who collapsed during a high altitude test in a vacuum at the
Maned Spacecraft Center.

MSC Director Dr. Robert R. Gilruth presented the awards to
Henry A. Rotter and Clifford W. Hess.

In presenting the award, Dr. Gilruth said that he was deeply
impressed with the way the MSC employees
reacted to the emergency.

It was a highly efficient
and effective action, he said, in
rescuing the technician.

The award was presented
to Henry A. Rotter, who
reacted immediately to
the emergency.

Rotter heard the
drop and observed
the technician's
condition.

He then
opened the airlock
door and went inside
the chamber.

The technician was
awake and was
able to communicate
with Rotter.

He was transported
to the hospital,
where he was
later released.

The technician
was later
awarded a certificate
of commendation.

Sellout Crowd
Atends Opening
Of Moonglow 66

Moonglow 66, last
night opened to a
capacity crowd
of 800 in the MSC auditorium.

MSC resident director
Jim Gorman opened the show
by introducing the actress
Dorothy Lamour and
the dancer Tony Flanagan.

The show, which
features a cast of
100, has been
running for over
a year in the MSC auditorium.

The audience was
well dressed and
enjoyed the show
enthusiastically.

The cast includes
Dorothy Lamour,
Tony Flanagan,
and other well-known
actors.

The show features
a variety of acts,
including music,
comedy, and
dancing.

The audience
enjoyed the
performances
and gave a
cheer at the
end of the show.

Blowup from a 16mm
Kinescope of video tape
recorded during the test
show the sequence of Jim Le Blanc's predicament. Here, Le Blanc is in
a pressurized Apollo suit with the chamber pumped down to 150,000 feet equivalent altitude.

The oxygen coupling to Le Blanc's suit disconnects and he loses consciousness, falling backward from his work station.

Henry Rotter enters from the man-lock as soon as the emergency repressurization reaches 27,000 feet and releases Le Blanc's suit glove clamps to allow oxygen to enter the suit and revive him.

Now conscious, Le Blanc is helped from the chamber by Bill Schneider, Rotter and Fred Humbert. Schneider and Dr. Humbert entered the chamber as soon as it had reached sea-level pressure.
FLIGHT CONTROLLERS HAVE TO LEARN COMPLICATED APOLLO COCKPIT LAYOUT

By Milton Reim

Knowing where over 500 controls and indicators are located in the cockpit of an Apollo spacecraft and being able to interpret their function and interrelation-ship, helps if you are to be a flight controller on one of the upcoming Apollo missions.

But, how do you familiarize all the flight control people required for each mission? A couple of small rooms and offices jammed with equipment and staffed by what is known as the Cockpit Familiarization Group, headed up by Ed Middleton, have the situation well in hand.

They are part of the Flight Control Qualification Section of the Flight Control Division's Simulation Branch and their function is to provide the tools that make it possible for the flight controller to have an intimate knowledge of the Command Module interior arrangement to insure his recognition of the capabilities and limitations of the spacecraft crew during a mission.

The group is an expanded version of a similar program that was used to familiarize flight controllers with the Gemini cockpit layout. In addition to the Apollo Command Module Familiarization equipment which is now being used by flight controllers for the first manned mission, this group is also in the process of designing and assembling a cockpit that will familiarize flight controllers with the cockpit layout of the Lunar Module.

Familiarizing flight controllers with the Apollo cockpit layout is a continuing process because the configuration of the panels and other interior equipment changes from mission to mission. Each flight controller is required to participate in a series of familiarization exercises prior to each flight.

The training is divided into three phases of from one to two hours each. The first phase orients the flight controllers as to the location of controls and indicators, the flight sequence, and the changes in position and/or function of these components for various missions. Again the audio and video aids are used to guide the flight controllers.

Phase three of the familiarization training is mission oriented and deals with crews prelaunch inspections and the flight phase, i.e., lift off, in-flight procedures such as fuel cell purges, engine burns, electrical power systems control and communication, on through the entry portion of the mission.

In addition to the flight directors and flight controllers manning the Mission Control Center, Houston, the remote site flight controllers must also take the familiarization training.

The Apollo Command Module cockpit and fiberglass shell for the trainer was obtained from North American Aviation. Design of the cockpit panels, instrumenta-

TEACHER'S DESK—Ed Middleton, head of the Cockpit Familiarization Group, mans the instructor's console from which switch positioning and other command module crew actions can be monitored. Sam Wennacker focuses the television camera on a schematic of the command module instrument panel which is fed to the rendezvous window monitors.

Som Wennacker is the engineer for the Command Module. Pete Price is the engineer for the Lunar Module. Mike McGabey is the training engineer. Bill Cornelius is a design specialist for the group and Mike Grey is a draftsman. The first three are Philco employees and the latter two are with ITT.

While Middleton is concerned with the overall training program, Wennacker is mainly concerned with the cockpit configuration for a particular mission and also assists with the operation of the console during training periods.

Price also assists with the training but is mainly concerned with work on the Lunar Module familiarization unit which is scheduled to be in operation in the early part of 1967. McGabey assists with the training and console operation.

Cornelius and Grey do the detailed design and drafting work on plans for the cockpit layout and also do wiring diagrams for the installation. Technical Services builds the actual hardware for the units utilizing the plans supplied by the group.
Apollo Guidance Tests Link Labs Mile Apart

By Bob Gordon

Test facilities, linked together by miles of underground cable, recently completed an around-the-clock six-day test at MTC of the Apollo stabilization and control system and the service module's reaction control system engines.

The service module RCS engines were fired approximately 3,000 times during the test conducted jointly by the Propulsion and Power Division and the Guidance and Control Division. The tests were to evaluate the electrical compatibility of the stabilization and control system and the reaction control engines, demonstrate the closed-loop capability of the two systems, and gain experience in support of manned Apollo flights.

The stabilization and control system (S/C) provides control and monitoring of the spacecraft attitude and may be operated automatically or manually. The service module reaction control system (RCS) consists of 16 1,000-pound thrust engines arranged in quad sets of four providing thrust required for three-axis stabilization and control during earth orbit and lunar trajectory.

Underground lines linked engineers in the Thermochemical Test Area who supervised the engine firings in the Auxiliary Propulsion Test Facility's 20-foot-diameter subsystem test chamber with the Guidance and Control personnel, one mile away in Building 16.

Test components, in addition to the flight qualified stabilization control system hardware and the RCS engines, consisted of the three-axis yaw, pitch and roll flight table and analog computers. All systems were in a closed-loop setup.

Paul Horsman, chief of the Guidance and Control's Electro-Mechanical Section, described the test. Guidance and Control programmed the firings of the RCS through the stabilization control system from Building 16, the resulting impulses of the RCS engines were measured in the 20-foot chamber and relayed back instantaneously to the analog computer which then computed the resulting vehicle dynamics and relayed the spacecraft angular position to the three-axis flight table on which the RCS's were mounted.

Horsman explained the gyros would then sense the attitude rate and transmit this information to the stabilization systems which if required would then initiate corrective measures via the underground cable to the RCS engines in the Thermochemical area.

Throughout the series, G&C engineers had the capability of changing the flight simulator causing the stabilization system to initiate new RCS firings. For example, Horsman explained, the three-axis flight simulator was placed in a motion causing the stabilization system to initiate RCS burns to damp out this movement.

This was accomplished by programmed commands through the analog computer or by manual operation of the hand controller on the test consoles in Building 16. James P. Crabb of Propulsion and Power's Auxiliary Propulsion Test Section said this was the first time these two systems have been linked together in such a test. Crabb said two quads of the RCS system were mounted in the test chamber at Building 353. An altitude of 130,000 feet was maintained in the chamber throughout the test series.

The RCS 100-pound thrust engines used in the test were flight qualified. Special aluminum nozzles replaced the quaternary pyrocoated molybdenum. This was done to assure proper measurement of the engine impulses during firing.

Engineers in the Auxiliary Propulsion Test Section monitored the RCS engine firings on the closed-circuit TV in 353. Test firings were conducted in 20-minute runs. Approximately 20 separate firings were made during each run. Crabb said each engine was fired approximately 500 times during the test.

Viewing the firings on the TV monitors in the control room in 353, one might miss a firing with the blink of an eye. A blip of light accompanied by a dull pop, similar to the crack of a .22 rifle, marked the sight and sound of the firings. Crabb explained the firings were milliseconds in length with 500 milliseconds the longest impulse during the test.

\[ \text{HEART OF THE MATTER—The Apollo inertial platform of the spacecraft's stabilization and control system is mounted in the Guidance and Control Laboratory's three-axis semi-controlled simulator in Building 16. Computer-programmed attitude changes by the platform remotely initiated RCS thruster quad firings in the Auxiliary Propulsion Test Facility a mile away.} \]

\[ \text{BEHIND WALLS—Don Laschewich at BR-N, left, and Bill Talafarre of Thermochemical Test Branch monitor Apollo service module RCS thruster quad firings at the control panel in the Auxiliary Propulsion Test Facility. Closed-circuit television monitors show the thrusters in the 20-foot diameter subsystem test vacuum chamber. The control room is separated from the test chamber by foot-thick reinforced concrete walls.} \]

\[ \text{ON THE TUBE—John Hammond, BR-N, remotely adjusts the television camera viewing the RCS quad thrusters in the chamber.} \]

\[ \text{AND IT COMES OUT HERE—Output of the Apollo inertial platform and RCS thruster quad link-up is recorded on continuous graphs in the Guidance and Control Laboratory. Foreground, left to right, are Norm Robertson, Control System Development Branch, Bill Munro, Lockheed Electronics and Frank Elam, Control System Development Branch. Standing rear are Nolan Lerche and Ron Brennan, both of Lockheed Electronics.} \]
Space News Of Five Years Ago

January 8, 1962 — Special hand tools for use in zero-gravity conditions were tested by personnel of the Manned Spacecraft and Marshall Space Flight Centers. Experiments were conducted in simulated space environment to try out non-torque hand tools drawn from a number of industrial sources.

January 10, 1962 — NASA announced that the Advanced Saturn launch vehicle, to be used for manned flights around the moon and for manned lunar landings with rendezvous technique, would have five-engined first and second stages. The first stage (S-I) would be powered by five F-1 engines (total of 7.5 million pounds thrust) and the second stage (S-II) would be powered with five J-2 engines (total of one million pounds thrust). A third stage (S-IVB) with a single J-2 engine would be used on escape missions.

January 11, 1962 — In his State of the Union message to the Congress, President Kennedy said: "With the approval of this Congress, we have undertaken in the past year a great new effort in outer space. Our aim is not simply to be the first on the moon, any more than Charles Lindbergh's real aim was to be the first to Paris. His aim was to develop the techniques and authority of this country and other countries in the field of the air and the atmosphere, and the sea, and the space." And our objective in making this effort, which we hope will place one of our citizens on the moon, is to develop in a new frontier of science, commerce and cooperation, the position of the United States and the free world. This nation belongs among the first to explore it. And among the first, if not the first, we shall be.

January 13, 1962 — Organization and staffing of the Manned Spacecraft Center's Mercury Project Office was completed. Major organizational division of this staff element included Office of Project Manager, Project Engineering Office, Project Engineering Field Office (duty station at Cape Canaveral), Engineering Operations Office and Engineering Data and Measurement Office. Kennke Kleinnkhof was appointed manager of Project Mercury.

January 16, 1962 — Spacecraft 16 was delivered to Cape Canaveral for the third manned (Schnura) orbital flight, Mercury Atlas 8.

January 19, 1962 — Dr. John P. Mechan of the University of Southern California reported that Enos, 37-pound chimpanzee who orbited the earth in MA-5 on November 29, 1961, developed temporary hypertension during flight due to frustration and confusion caused by equipment malfunction.

Unnamed Soviet scientist, called "chief designer of Soviet spacecraft," reported by Tass as saying that USSR planned to continue its 16-man program of manned flight, beginning a new manned flight every two months.

MSC Credit Union

The MSC Federal Credit Union January 26 will hold its fifth annual meeting in the Cafeteria at 7:30 pm. Even if the law did not require an annual meeting of the Credit Union at which the board and committees and the membership gather to discuss Credit Union operations, such a meeting would still be held. For the democratic basis upon which the Credit Union is formed makes it imperative for the membership to have a say in what actions the elected officers take, and, moreover, to be able to vote on issues.

At the annual meeting, the Credit Union directors will report to the membership the accomplishments of the past year in line with the premise that a credit union is a self-help financial organization owned and operated by its members for its members. Mark your calendar now to attend the MSC Federal Credit Union's annual meeting January 26.

Spectral Society Elects Townsend Houston Prexy

The Houston Chapter of the Society for Applied Spectroscopy December 7 held an organizational meeting in Houston to elect officers. Elected president was James E. Townsend of the Geology and Geochemistry section of Space Science Division.

Other officers elected were: Mike Foster, Spectrochemical Research, vice president; Miss Ruby Keeler, Shell Development Company, secretary; Miss B. J. Jahanke, Baroid, treasurer.

The Society covers the art and science of absorption, emission, infrared, Raman, mass, NMR, X-ray and other related forms of spectral investigation for the determination of composition and structure of matter.

Monthly chapter meetings will be held to foster an exchange of information in these fields with emphasis on applications, and will include technical papers and notes from the membership along with panel discussions and guest speakers. The next meeting will be on January 9 at a place as yet to be selected.

Membership dues are $10 annually and include subscription to Applied Spectroscopy, the national SAS journal. Town- send may be reached at 2781 for further chapter information.

Space News Roundup

Space News Of Five Years Ago
Sustained Superior Performances

Sea Scout Ship Seeks Crewmen

Adult crewmen are needed for the Sea Scout Ship (hull number 913) which serves youngsters in the Clear Lake area. To serve as a summer camp, the ship does not have to be a Jason Stocum or have 15 years experience. Kingfishers also work with boys in this area of maritime scouting will do.

The ship meets all hands every Wednesday evening at the end of Barbuda Lane in Nassau Bay, is open to all Clear Lake-area boys 14 to 18 years of age.

To sign on the Ship's roster, contact Ed Campagne at $556, H. P. Douglas at HU 8-0880 Ext 70, or Kevin McCabe at 3547.

BOWLING

MIMOSA MEN'S LEAGUE

Standings as of December 22

TEAM WON LOST POINTS

TEAM WON LOST POINTS

Mexico A Went-Went

TEAM WON LOST POINTS

Radio Modelers Seek Members

The MSC Radio Control Club has launched its 1967 member-drive to bring in other radio-control model enthusiasts from among MSC and contractor employees. A club membership now stands at 20 who meet regularly to fly and discuss their hobby. Real-time, day-light hours have ended after work flying sessions, but club members turn out to fly their “birds” Sundays on the antenna test range west of Building 14. The club welcomes participants to the flying sessions but asks that all cars be kept in the Building 14 parking lot and not on the range.

Provisions for club membership include valid FCC licenses to operate citizen-band or amateur radio frequency radio-control equipment, and membership in the Academy of Model Aeronautics. AMA membership provides group liability insurance coverage.

The club has written field rules designed to promote safety and minimize confusion at the flying site.

Club contacts for further information are Bill McCarty at 4546 and Tim Brown at 5558. The next club meeting, at which members will bring in their air-planes and radio equipment for a "show-and-tell" type program, will be Tuesday, January 10 at 5 pm in Room 279, Building 4.
Lunar Orbiter Makes 6-Degree Plane Change

The Langley Research Center, Hampton, Va., directing the flight of NASA's successful Lunar Orbiter II, in early December commanded the spacecraft to change the inclination of its elliptical orbit around the Moon. The new orbit is tilted 17.5 degrees to the Moon's equator in contrast to the 11.8 degree orbit of the satellite since November 10. Purpose of the change is to improve tracking data to expand available knowledge of the lunar gravitational field (selenodesy) and to gain experience in flight operations at higher inclinations for future Orbiter mission planning. The maneuver, believed to be the first plane change accomplished by any spacecraft circling the Moon.

The event occurred at 2:36 p.m. CST, December 8, with the firing of the spacecraft's velocity control engine for a 62-second burn. The engine was operated for the fourth time in Lunar Orbiter II flight.

Engine burn occurred shortly after the spacecraft had passed its apolune or high point. The engine thrust of 100 pounds was exerted long enough to tilt the orbital plane to the new inclination. At the end of engine operation, engineers predicted the spacecraft would have more than enough fuel to permit it to be deliberately crashed as was Lunar Orbiter I, should that action be needed.

Before the maneuver began, the spacecraft's orbit had the following characteristics: perilune, or low point, 24.18 miles; apolune or high point, 1,154.5 miles; inclination 11.8 degrees; period, 3 hours 28 minutes 30 seconds.

Expected values following the maneuver: perilune, 26.5 miles; apolune, 1,168.7 miles; inclination, 17.5 degrees; period, 3 hours 30 minutes.

Eighteen or more hours of tracking were required to determine precisely the elements of the new orbit.

On December 6, Lunar Orbiter II failed to respond to commands turning on its high-power transmitter, cutting short its photog- raph readout. The command was sent from the Woomera, Australia, tracking station. NASA engineers believe the failure occurred in the high-power transmission system of the spacecraft.

All other subsystems in the satellite continue in good order, returning data on operating conditions, radiation environment, meteoroids, and lunar gravity.

Astronomer's Orbit

Dr. Allan R. Sandage of California Institute of Technology's Mt. Wilson and Mt. Palomar observatories and featured speaker at the December 28-29 Gulf Coast Science Foundation Holiday Lecture Series, elaborates for youngsters one of the points of his lecture. Dr. Sandage's topic was "The Current Revolution in Astronomy." At left is Lyle Jenkins of Apollo Spacecraft Program Office. Right, Dr. Armand Tramontozzi, director of Houston's Burke Baker Planetarium. The lecture series, sponsored jointly by the Gulf Coast Science Foundation and the American Association for the Advancement of Science, was held at Rice University's Hamman Hall.

E&D Employees Recognized for Apollo Testing

Twenty-five MSC employees and one NASA contractor recently received special recognition for their roles in Apollo test programs in the Space Environment Simulation Laboratory and Vibration and Acoustic Test Facility.

Dr. Maxime A. Faget, Director of Engineering and Development, presented the awards to personnel of the Structures and Mechanics Division, Instrumentation and Electronic Systems Division and to an employee of General Electric.


Dr. Faget presented a letter of commendation to Dan Earl Newbrough of General Electric for his work on LTA-3. SSP's were presented to the following SMD people for work on Apollo SIC 008 test series in the Space Environment Simulation Laboratory: Robert D. Fill- bert, Albert L. Branscomb, James P. Vincent, Billy D. Etherton, James S. Moore, Peter B. Campbell, David G. Billings- ley, Marion M. Lusk, and Edwin Kartosky. Richard J. Piotrowski and James H. Choppe received Quality Salary Increases for their work on SIC 008.

Dr. Faget also presented SSP's to Robert L. Johnson, William L. Castner, Samuel V. Glorioso, Robert E. Johnson and Leslie G. St. Leger, members of the Structures and Materials Branch of SMD.

WSTF Labor Group Has Session at MSC

Labor-management relations at MSC's White Sands Test Facility was the topic of a day-long meeting at MSC in early December at which representatives of contractor firms, organized labor and government toured MSC facilities and discussed labor relations at the New Mexico facility.

The White Sands group met monthly with MSC Labor Relations Officer Bailey R. Chaney to review potential labor problems and the running of test facilities at White Sands. Lost time caused by labor disruptions is at a minimum at that facility.

MSC Director of Administration Wesley L. Hjornevik welcomed the group to MSC and Astronaut Office Chief Alan B. Shepard, Jr. spoke to the group on flight crew training. Films of the Gemini XII mission and of White Sands Test Facility activities, a luncheon in the cafeteria and a tour of MSC rounded out the program.


Cal C. Andrews, business manager, International Brotherhood of Electrical Workers, Albuquerque; Luther Sizemore, executive secretary, United Brotherhood of Carpenters and Joiners of America, Albuquerque; James Price, president, Building and Construction Trades Council, AFL-CIO, Albuquerque; Floyd W. Sanders, business manager, United Association of Journeymen and Apprentices of the Plumbing and Pipe Fitting Industry, Albuquerque, and Ernie B. Hall, business representative, UAJAPPFI, Las Cruces, N.M.

Fred W. Davis, assistant regional director, National Labor Relations Board, Albuquerque; Lawrence Porterfield, NLRB, El Paso, Texas; and Clifford W. Potter, regional director, NLRB, Houston.

M. A. Graham, secretary, Houston Building and Construction Trades Council; Joe Shrode, president, HBCCTC; Don Horn, secretary-treasurer, Harris County AFL-CIO council, and Robert J. Ball, Jr. legal counsel, White Sands Test Facility.

QUESTIONS SESSION—Dr. Allan R. Sandage of California Institute of Technology's Mt. Wilson and Mt. Palomar observatories and featured speaker at the December 28-29 Gulf Coast Science Foundation Holiday Lecture Series, elaborates for youngsters one of the points of his lecture. Dr. Sandage's topic was "The Current Revolution in Astronomy." At left is Lyle Jenkins of Apollo Spacecraft Program Office. Right, Dr. Armand Tramontozzi, director of Houston's Burke Baker Planetarium. The lecture series, sponsored jointly by the Gulf Coast Science Foundation and the American Association for the Advancement of Science, was held at Rice University's Hamman Hall.