

'DESIGNATED GIVING'—

Joint Agencies Drive Kicked Off at Center

An opening-day rally last Thursday for the Joint National Health Agencies and International Service Agencies Campaign here heard an appeal for "designated giving".

Dr. James L. Youngblood, MSC Assistant for Academic Relations and heading the 1967 MSC drive, called for 100 per cent donor participation and larger individual gifts.

"By informing all personnel about the health agencies' programs of research, education and service," he said, "we hope to encourage everyone to divide his gift among the agencies of his choice."

Educational folders, contributor envelopes, and designation cards will be given to all employees. By designating, each donor can specify the health agencies he wants to support and the way he wants to divide his gift among them.

The campaign will be conducted here between March 27 and April 17 with 12 voluntary health agencies and four international service agencies participating. They are:

- National Health Agencies:**
 American Heart Association (Heart Fund)
 The Arthritis Foundation
 Muscular Dystrophy Assns. of America (March Against Time)
 National Association for Mental Health

Saturns Shuffled For Apollo 206 LM Test Flight

The Apollo-Saturn 204 launch vehicle will be used to launch the first Apollo Lunar Module on an unmanned flight this summer. NASA had planned to use the Apollo-Saturn 206 launch vehicle for this first space test of the Lunar Module, but will use 204 because it is the last launch vehicle equipped with full research and development instrumentation.

Objectives of the first Lunar Module mission are to obtain data on the ascent and descent propulsion systems, including a restart of the descent system; verify the LM structure, and evaluate staging.

The mission will last about six hours and the Lunar Module will not be recovered.

The AS-204 rocket, which was undamaged at the time of the January 27 fatal AS-204 spacecraft fire, will be moved from Cape Kennedy's Launch Complex 34 to Launch Complex 37 which is equipped for unmanned launches of the Lunar Module.

The AS-206 launch vehicle on Launch Complex 37 will be removed and placed in storage for use in a subsequent mission.

- National Association for Retarded Children**
National Cystic Fibrosis Research Foundation
March of Dimes
National Multiple Sclerosis Society
Nat'l. Soc. for Crippled Children & Adults (Easter Seals)
National Society for the Prevention of Blindness
United Cerebral Palsy Associations
American Cancer Society
International Service Agencies:
Project HOPE
American-Korean Foundation
Care
Radio Free Europe

Dr. Youngblood's assistants in this campaign are E. H. Yeater, Engineering and Development; D. T. Gregory, Flight Crew Operations; J. G. Cairl, Medical Research and Operations; L. J. Sullivan, Flight Operations; J. T. Arnold, Administration; J. W. Harris, Science and Applications; R. J. Bailey, Apollo Program Office; and J. T. Null, Apollo Applications Program Office.

Space Club Sets Robert Goddard Essay Contest

The National Space Club has announced the opening of the 1967 annual Robert H. Goddard Historical Essay Award competition. The first prize has been raised from \$200 to \$500.

Deadline for entries in the competition is November 1. The competition is named in honor of rocket pioneer Dr. Robert H. Goddard, whose work helped make space flight possible.

Essays entered in the competition may treat significant aspects of the historical development of rocketry and astronautics. Complete competition rules will appear in the April 14 *Roundup*.

Gemini VIII's Agena Target Won't Give Up

Officially, the Gemini Program is completed. But the Agena rendezvous vehicle used in the world's first space docking has not got the word.

Agena VIII, in orbit for more than a year, is not expected to reenter until the first week in October. The vehicle is in a 198 nm circular orbit with a 91.8-minute period.

Gemini VIII crewmen Neil Armstrong and David Scott on March 17, 1966 completed the first docking of two vehicles in space when they plugged Gemini's R&R cone into Agena's docking collar six hours 34 minutes after Gemini liftoff.

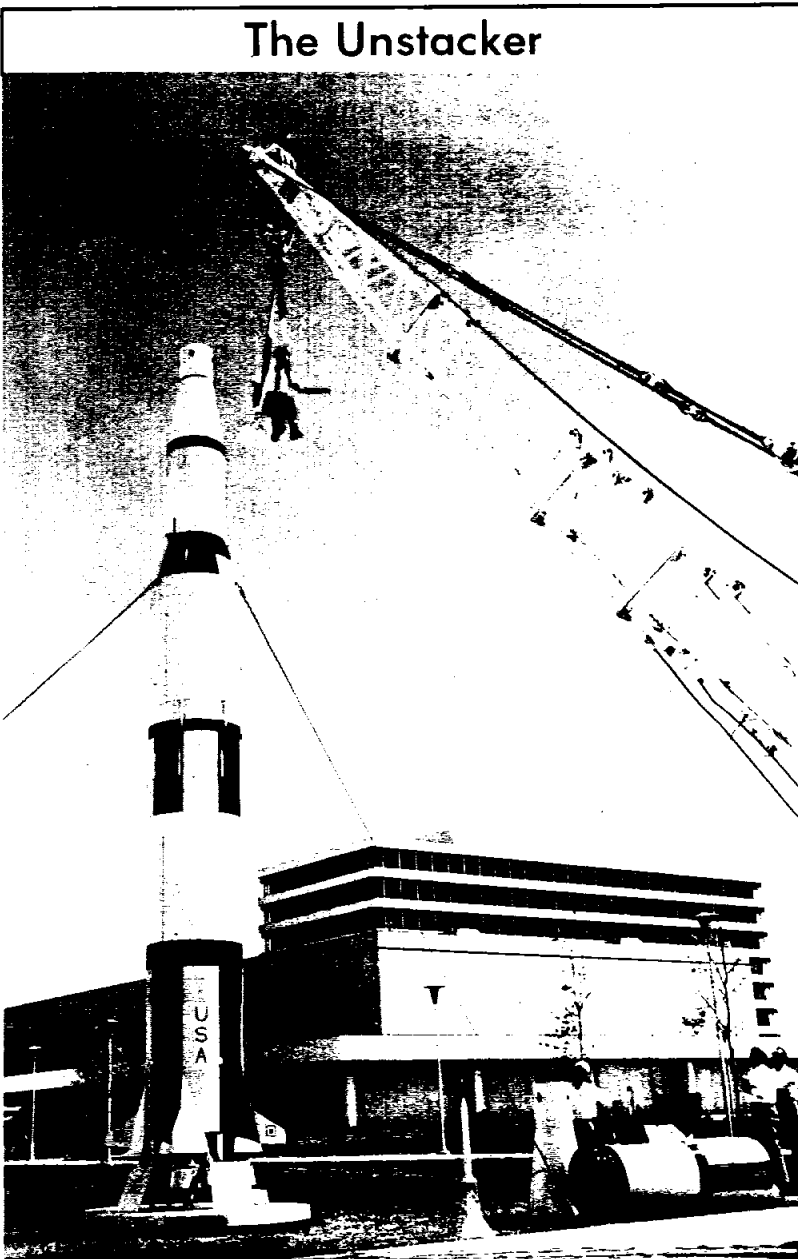
Some 27 minutes after the docking, a short in electrical circuitry to a Gemini yaw thruster forced the crew to undock and terminate the mission at 10 hours 41 minutes ground elapsed time.

Agenas X, XI and XII, all launched subsequent to Agena VIII, all reentered within a week of each other. Agena XII reentered December 23, 1966 at 157° ELong by 21° SLat; Agena X December 29 at 123° WLong by 25° SLat; and Agena XI December 30 at 134° ELong by 21° NLat. All reentries were over water.

APPROACH TO ORBITAL STATION—

First AAP Mission Forms Cluster by Four Launches

Imaginative and flexible use of existing Apollo spacecraft and launch vehicles may permit NASA to place into orbit the nation's first approach to a space station in the near future.



STARTING AT THE TOP—Glen L. Higdon of the NASA Marshall Space Flight Center Manufacturing and Engineering Laboratory directs the motorcrane operator from his sling seat as he dismantles the tenth-scale Saturn V near the MSC Auditorium. The Saturn V and uprated Saturn I models were dismantled last week and shipped to Marshall for refurbishment, after which they will be re-erected at MSC. The models have been at MSC since last November. Marshall has agreed to a permanent loan to MSC of a tenth-scale horizontal Saturn V cut-away model which shows launch vehicle and Apollo spacecraft innards.

For Departed Comrade



MEMORIAL—Tom Stafford, Gordon Cooper and Rev. Conrad Winborn, pastor of Seabrook Methodist Church, announced the establishment of the Edward H. White II Memorial Youth Center Fund at a March 21 press conference. The Youth Center will be built on land provided by the church and will be open to the entire community.

Planning is currently under way, pending program approval, for the first Apollo Applications two-phase mission which would involve four separate uprated Saturn I launches to assemble components of an orbiting laboratory.

Later Apollo Applications missions will include extended stay and exploration on the lunar surface after the initial lunar landings have been accomplished in the Apollo Program.

Components of the first Apollo Applications Program mission are a 10,000-cubic foot orbital workshop converted from the expended S-IVB second stage of an uprated Saturn I, an astronomical/solar telescope mounted in a modified Lunar Module, a Lunar Mapping and Survey System module (LMSS), a Multiple Docking Adapter (MDA), and an Airlock assembly which would permit extravehicular activity by crewmen without having to depressurize any of the other components. Basic Apollo Command/Service Module (C/SM), would bring crews to the station and to return them to earth.

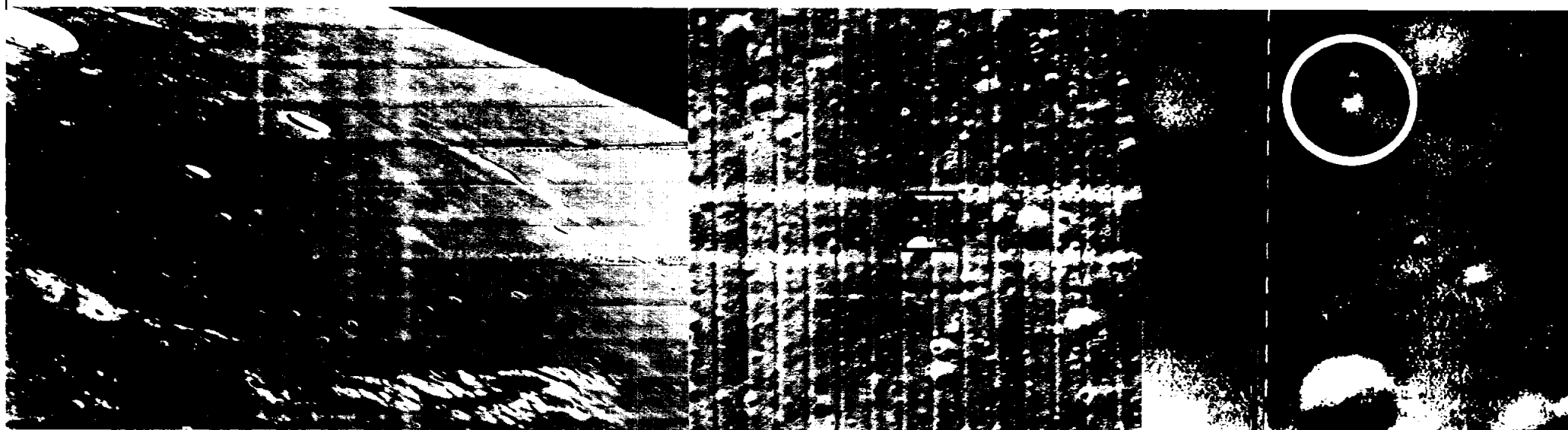
As the first Apollo Applications mission is currently conceived, an Apollo Command and Service Module with the Lunar Mapping and Survey System module attached would be launched into a 120 nautical mile circular orbit by an uprated Saturn I launch vehicle. Three to five days later, after the LMSS had been evaluated, a second uprated Saturn I would place into orbit the spent second stage S-IVB vehicle with the Airlock and Multiple Docking Adapter attached.

Plans call for the LMSS to be docked radially into one of the five ports of the Docking Adapter for future reuse. The Command and Service Module is then docked in line into a side port and preparations are begun to activate the S-IVB Orbital Workshop, where the crew would conduct operations and experiments for the remainder of the first 28-day period.

At the conclusion of the 28-day Orbital Workshop operation period, the three-man crew would undock from the cluster in the Command/Service Module, make a deorbit maneuver

(Continued on Page 4)

Lunar Orbiter Takes Posthumous Photo of Surveyor I



SURVEYOR I'S RESTING PLACE—The low mountains in the left photo were on the horizon of several television pictures transmitted by Surveyor I. The oblique photo was made February 22 by Lunar Orbiter III from 30 miles looking toward the crater Flamsteed on the other side of Surveyor's landing site. The center photo shows the Surveyor landing site, indicated by

square, taken by Lunar Orbiter's telephoto camera. The right photo is a blowup of the immediate area of Surveyor, which appears as a white object casting a 30-foot long shadow. Surveyor was identified by triangulation of distant objects on Surveyor I's picture horizon.

MSC Ducks Duck Out, Move Into Apartments

MSC's ducks, at least it was claimed they were MSC's ducks, made the national press wire earlier this month in the following story by United Press International staffer Ed DeLong.

SPACE CENTER, Houston (UPI)—Half a hundred ducks, apparently disenchanted with watching astronauts, have waddled away from the Manned Spacecraft Center and settled at a spanish-style apartment complex across the street.

"I'm telling you, those ducks are just driving us crazy," Mrs. Marion Peters, manager of the apartments, said Wednesday. "I don't know what we're going to do."

She said she first noticed the ducks one morning about three weeks ago and that they have been under foot ever since.

"I heard them and went outside. They were so cute," she said. "Then I made the mistake of feeding them, not knowing that when you feed a duck once you've got a duck for life."

"They block the drive. When you honk at them they just honk back. They're so pretty with their brown bodies and green heads, and they're so tame they'll eat out of your hand. You feel mean chasing them away."

The ducks apparently migrated from a colony of ducks that live around ponds on the campus-like grounds of the space center.

No one knows exactly how the colony got started, although most say it grew from a flock of wild ducks living on the site where the center was built. The astro-

duck colony now numbers in the hundreds.

Last year \$146.65 was spent for duck feed. It came from a fund comprised mostly of profits from cafeteria and vending machine operation.

A favorite haunt of the astro-ducks is the grassy slope next to the building where the 47 astronauts have their private offices, leading many space center employees to speculate laughingly that the ducks are just there to get autographs.

Whatever the reasons the astro-ducks are at the space center, Mrs. Peters wishes her AWOL visitors would go back—or at least somewhere else.

"I'm just afraid they'll find the swimming pools," she said. "They're too pretty to eat, but..."

NASA Renews Cal Tech JPL Operation Pact

The Government's contract for the operation of the Jet Propulsion Laboratory, Pasadena, Cal., for a period of two years has been renewed without major change.

JPL operates as a major installation of the National Aeronautics and Space Administration, under a cost-plus-fixed-fee contract between NASA and the California Institute of Technology. Since October, 1958, NASA has owned the property, facilities and equipment; Cal Tech staffs and operates it.

The original contract was revised in December 1964 and the action just concluded extends it through December 31, 1968.

JOINT RESEARCH—

XB-70 Management Transferred to NASA

An agreement reached by NASA and the United States Air Force transfers to NASA program management responsibility for the supersonic 250-ton XB-70 aircraft for continuation of the joint research program. Transfer on March 25 of responsibility to NASA for overall management of the program, and planned utilization of the aircraft at a reduced rate constitute the major changes from an earlier agreement, signed between the two agencies in May 1965. DOD research and test projects will continue, as will DOD pilot participation and aircraft support.

The XB-70 research program, much of it related to supersonic flight and in support of the National Supersonic Transport Pro-

gram, will be continued as a joint NASA-Air Force effort. Flight operations of the 2,000-mph airplane will be directed by NASA's Flight Research Center, Edwards, Calif. Mission support by the Air Force Flight Test Center (AFFTC) at Edwards will continue.

Major objectives of the XB-70 research program are to study dynamic loads imposed on the airplane and to further define and evaluate stability and control characteristics and handling qualities of large supersonic vehicles.

North American Aviation, Inc., and General Electric Co., are under contract for maintenance, parts replacement and repair and overhaul of the aircraft and engines respectively.

The \$10 million requested by NASA for FY 1968, together with Air Force and NASA Fiscal Year 1967 funds will permit continuing the flight research program at least through June 30, 1968, and will provide for certain systems and instrumentation changes.

Basic airworthiness of the XB-70 airframe and engines was established during earlier Air Force and North American flight tests, concluded on June 8, 1966. On that date one of the two XB-70's built for the Air Force was destroyed in a mid-air collision. Following modification, the remaining aircraft was used for a series of eight flights, from November 3, 1966, to January 17, 1967, to measure the magnitude and the effects of sonic booms produced by large aircraft during supersonic flight at various mach numbers, altitudes, and gross weights. Two additional flights during January provided other data of interest to the National Supersonic Transport Program. The airplane has been undergoing maintenance, modification and the installation of additional instrumentation since January 31, in preparation for the joint NASA-USA F research program. The next XB-70 flight was scheduled for late March or early in April.

Counseling Session



JOY EMPLOYEES—Eight Job Opportunities for Youth (JOY) employees are shown at a weekly counseling meeting conducted by Counselor Rosa Broussard, right. Left to right are Ruby Calhoun, Betty Jefferson, Faye Hayes, Carolyn Stafford, Gwendolyn Shelton, Eliza Richards, Lillie Talamantes and Jesse Darrett. The 58 JOY employees at MSC attend weekly counseling meetings in four groups.

RED CROSS
help us help

Mississippi Facility Tries to Keep Firing Noise Down to Dull Roar

A by-product of static test firings of space vehicle stages at the NASA Mississippi Test Facility centered in Hancock County is noise, but technicians and management at MTF try hard to see that the "sounds of progress" don't cause discomfort or annoyance to the citizens of surrounding communities.

In fact, if it is indicated that excessive noise will be generated in such cities as Bay St. Louis, Picayune, Slidell or Perlington, a test firing would be postponed. The "go" or "no-go" decision is made on the basis of scientific predictions.

Most Noise Absorbed

Much of the thundering, low-frequency sound produced by the rocket stages, capable of up to 160 million horsepower, is dissipated in the 25 square-mile test facility and in the five mile-wide uninhabited buffer zone that surrounds it. That which travels beyond to populated areas has been compared to the sound of a freight train, a pneumatic hammer or a power lawn mower. NASA officials say that persons within a 20 mile radius of the test stand in use are likely to hear the noise, but, though different, it is normally no louder than such familiar noisemakers.

Noise is the result of energy which, when released in the air, causes vibrations which we "hear". Its loudness, or intensity, may be measured in decibels. The louder the sound, the greater the decibels. A pneumatic hammer produces about 120 decibels, a power lawn mower about 115, distant thunder between 65 and 85.

Acoustics experts at the Mississippi Test Facility say that the five rocket engines of the S-1C, the largest stage tested at MTF, produce a maximum of 211 decibels at the test stand and the smaller S-11 stage about 201 decibels. The noise level decreases to about 110 to 115 decibels at the outer edge of the buffer zone. This is equivalent to the sound of a freight train passing near by at 45 miles per hour.

Research into the causes and effects of noise generated during rocket engine test firings started at the NASA George C. Marshall Space Flight Center in Huntsville, Alabama ten years ago. There, as now, the concern was over possible adverse effects to the stages, the facilities and public reaction. Similar studies began at the Mississippi Test Facility, an element of the Marshall Center, in December, 1962. A wealth of knowledge has been accumulated on the subject, permitting predictions to be increasingly accurate.

Noise Predictions

At the test facility, eight employees of the U. S. Weather Bureau who man the Atmospheric Acoustic Facility and some 15 General Electric Co. employees of the Acoustics Laboratory work full time measuring, recording and analyzing data upon which their predictions of sound propagation are

based. Some of the work is done in the Data Acquisition Facility and the Data Handling Center, also GE-operated.

Atmospheric conditions that cause weather — temperature, humidity, wind speed and direction—have a direct and major effect on sound travel and intensity, according to the technicians. A temperature inversion can cause sound, which normally goes up into the atmosphere, to bounce back to the ground. Normally the sound in downwind areas will be louder.

Weather Bureau personnel at MTF daily record weather data on the surface and release large balloons which lift instrument packages to heights of 20 miles. The packages contain devices to measure atmospheric conditions, and a small radio transmitter to send the information down to a ground receiver. Radar equipment at the weather station tracks the balloons to determine their drift and position. After conversion by a computer, the data is correlated with that from weather stations across the nation to prepare a prediction of atmospheric conditions that will be present over the test facility at a particular time.

Big Horn Used

In between static firings, acoustics engineers and technicians at MTF utilize an exponential horn to continually record measurements of sound under all weather conditions. The trumpet-shaped, electronically controlled, air operated horn, 35 feet long and 12 feet wide at the mouth, can simulate a full range of intensities and frequencies. Readings and recordings are taken over a wide area—at the test stands, throughout the test area and buffer zone, and in the communities as far out as 35 miles. Mounted microphones, a small fleet of vehicles equipped with meters and tape

and strip recorders, and technicians on foot with portable equipment obtain recordings over a 500 square-mile area.

On a day a static firing is scheduled, atmospheric and acoustic measurements are made during the hours-long countdown and right up to the minute the rocket engines are ignited. Both atmospheric and acoustic predictions are calculated and adjusted as conditions change. An analysis of the predicted sound propagation, verified by the exponential horn, provides the basis for informing the MTF Manager of predicted sound levels expected in various locales during the test firing. A test will generally be postponed if there is a prediction sound levels in populated areas would exceed safe levels.

Firings Measured

Scientific measurements are taken during the firing, as well. These are utilized, in conjunction with reports made by structural engineers, in the thorough and scientific investigation of every claim or possibility of damage that is received by the NASA Legal Counsel at the site.

Despite all their professional efforts, NASA, GE and Weather Bureau personnel point out that the predictions cannot always be 100 percent accurate. There is always the possibility an abnormal atmospheric condition will cause unusual noise at a point outside the test area, even rattle windows and pots and pans. However, they point out that the noise level, while possibly annoying, is well within the "safe" zone and should not result in property damage. (Several inquiries have been received on days where there were no test firings.) For most residents of south Mississippi, noise from the test firings at MTF is truly "the sound of progress."

Saturn V Contract Switched to Incentive

NASA has converted the final element of its three-part Saturn V contract with the Boeing Co., Seattle, to a cost-plus-incentive fee arrangement.

In the process of conversion, \$35.9 million was added to continue current work on the Saturn V vehicle system. This element of the contract is performed at NASA's Marshall Space Flight Center, Huntsville, Ala., and calls for the company to provide systems engineering and integration support services for the Saturn V and its ground support equipment.

This brings the total estimated value of this portion of the contract to \$171.9 million, including a "target fee" which may be increased or decreased according to the quality, timeliness and cost of the firm's performance. The contract will extend through 1968.

Included in this work statement are the responsibility for dynamic testing of the vehicle, operation of a Saturn V development facility at Marshall and providing pre-and post-flight systems documentation.

The systems documentation will require Boeing to determine if the vehicle is capable of accomplishing a given mission and to perform post flight evaluation to examine the results of the

Pushers of Paper?

Are federal employees just paper pushers?

No! With a capital N.

No matter what they do or how far removed they are from the customer, the federal employees are all in the business of providing service to the American people.

Moreover, indifference and inefficiency can give the public an ugly image of the government employee.

mission when completed to determine the vehicle's performance. Boeing also will make a complete operations and maintenance analysis of the Saturn V vehicle as assembled for launch.

Phases one and three of the contract were placed on an incentive basis previously. Respectively, they give Boeing responsibility for the S-IC stage booster development at the Marshall Center's Michoud Assembly Facility, New Orleans, La., and Saturn V launch support services at the Kennedy Space Center, Fla.

Interest Costs Vary by Type Borrower Pays

To most people, interest is some nebulous amount of money paid for the privilege of borrowing money. Interest comes in several different types, and it is well to know the types and how they impact the pocketbook.

Add-On Interest: A fixed percentage is added to the principal borrowed, often with an investigation fee added. The borrower pays interest on the full amount for the entire term of the note. Example: \$100 + 6%=\$106, amount to be repaid, plus add-ons.

Discount Interest: A fixed percentage of interest is subtracted from the borrowed principal, and again, an investigation fee is often deducted. The borrower pays interest on the full amount, but actually receives less. Example: \$100 less 6% (\$6)=\$94 borrower receives. He repays \$100 plus add-ons.

True Interest: This is the kind of interest paid on loans from the MSC Federal Credit Union. The borrower pays Credit Union interest on the exact amount owed only for the exact time he has the money—no add-ons, no discounting, no extra charges.

A borrower never pays more than one cent per month on each dollar of the unpaid balance—a deal hard to pass up when compared to the other types of interest.

MSC Spanish Club Organizes April 4

Persons interested in Spanish and Latin-American culture and language are urged to attend the organizational meeting April 4 of the MSC Spanish Club. The meeting will be at 5:15 pm in room 108, Bldg 13.

If enough employees show interest in forming such a group, Employee Activities Association support will be sought. On-site contractor employees are eligible to take part.

For additional information, call Helen Newton at 4708 or Jack Capps at 4871.

First in Safety



MSC SAFETY RECORD RECOGNIZED—Ross Carr of the Texas Safety Association presents MSC Safety Officer J. E. Powell with the Association's first place Aerospace Industrial Safety Award, Group A, for 1966. At right is Howard Pyle, National Safety Council president and former Arizona governor. The award was made during the 28th Annual Texas Safety Conference in Houston March 19-22.

Passport Preparers



PASSPORT SEMINAR—Passport agents and travel office representatives from six NASA centers March 15 attended a passport seminar at MSC. NASA Headquarter's Martha Platt outlined proper preparation of visa and passport forms, and State Department's Virginia Carroll described how her office processes applications. Left to right are Dottie Parker, KSC; Elva Rollins, Langley; Phoncille DeVore, MSC; Evelyn Vaughn, GSFC; Virginia Carroll, State Department; Violet Norcio, ARC; Martha Platt, NASA Hq; Glenda Garrett, MSC; Anne Sabin, MSC, and Jean James, MSFC.

New Tracking Station Dedicated at Canberra

Vice President Hubert H. Humphrey March 17 sent a message of congratulations to Prime Minister Henry E. Holt of Australia on the occasion of the dedication of a new United States manned flight tracking station near Canberra, Australia.

Vice President Humphrey called the establishment of the long range tracking and communications facility to support Project Apollo "another link in the long chain of cooperative efforts in space between the Commonwealth of Australia and the United States."

"In its support of the Apollo program," the Vice President told the Prime Minister, "this new station will play a vital role in communications with our astronauts in preparation for their landing on the moon and return to earth."

Representing the United States at the dedication were Dr. Robert Seamans, Jr., Deputy Administrator of the National Aeronautics and Space Administration, and Edmond C. Buckley, Associate Administrator, Tracking and Data Acquisition, NASA.

Prime Minister Holt officially opened the station in the presence of other members of Parliament, representatives of

industry, and members of the Australian cabinet including Senator Denham Henty, Minister for Supply whose ministry is responsible for Australia's space activities.

The Honeysuckle Creek station, about 25 miles southwest of Canberra, the Australian capital, is the newest member of NASA's 16-station network to support the manned Apollo missions.

The station together with two similar stations located 120 degrees apart around the earth at Goldstone, Cal., and Madrid, Spain, will give continuous coverage of the Apollo flight from the time it leaves orbit of the earth, on its course to the moon and back. For long range tracking, communications and command out to the 240,000-mile moon distance, the stations are equipped with 85-foot diameter dish antennas.

The Honeysuckle Creek facility brings to six the group of NASA tracking and data acquisition facilities in Australia. Two besides the Apollo facility are near Canberra, a Deep Space Network facility at Tidbinbilla and a Data Acquisition Facility of the STADAN scientific satellite network at Orroral Valley. Other sites are the facility at Toowoomba for the Applications Technology Satellite, at Carnarvon for manned flights, and at Woomera for deep space probes.

The new station is to be entirely operated by Australians, as are all NASA facilities in the country.

Apollo Applications Cluster

(Continued from Page 1)

with the Service Propulsion System's engine and reenter the earth's atmosphere to land.

A second series of two up-rated Saturn I launches would place a second Command/Service Module and crew and the Lunar Module/Apollo Telescope Mount (LM/ATM) into orbit for revisit and rehabilitation of the dormant Orbital Workshop. The second crew will reactivate the Workshop for operations lasting up to 56 days before they, too, undock and return to earth.

Several primary mission objectives have been laid out for the first Apollo Applications missions. Among these are determining the feasibility of operating the S-IVB spent stage Orbital Workshop as a habitable structure for long periods of time, orbital rendezvous with the Workshop by the other components of the cluster, and biomedical evaluations of the effects of long-term space flight crews. Crew mobility, both intra- and extravehicular will also be evaluated.

Moreover, the Orbital Workshop is designed for possible reactivation by crews rendez-

vousing with it in later missions, and it is planned to place the Workshop in an orbit with a lifetime of at least a year.

Other mission objectives include complete operational evaluation of all spacecraft and cluster module systems and carrying out experiments assigned to the mission.

A large number of engineering, scientific and technological experiments have been proposed for both phases of the mission. As flight date nears, the list will be narrowed down to those experiments with the most potential benefit and which have the least impact upon payload capabilities.

Crew training, spacecraft module and Orbital Workshop development and other phases of putting together the Apollo Applications missions are spread throughout the NASA centers that come under the NASA office of Manned Space Flight.

MSC is responsible for the Apollo Command Service modules, the modified Lunar Module used in conjunction with the Apollo Telescope Mount, the Lunar Mapping and Survey System module, the Airlock, crew

training and flight operations, experiment development and in-flight monitoring.

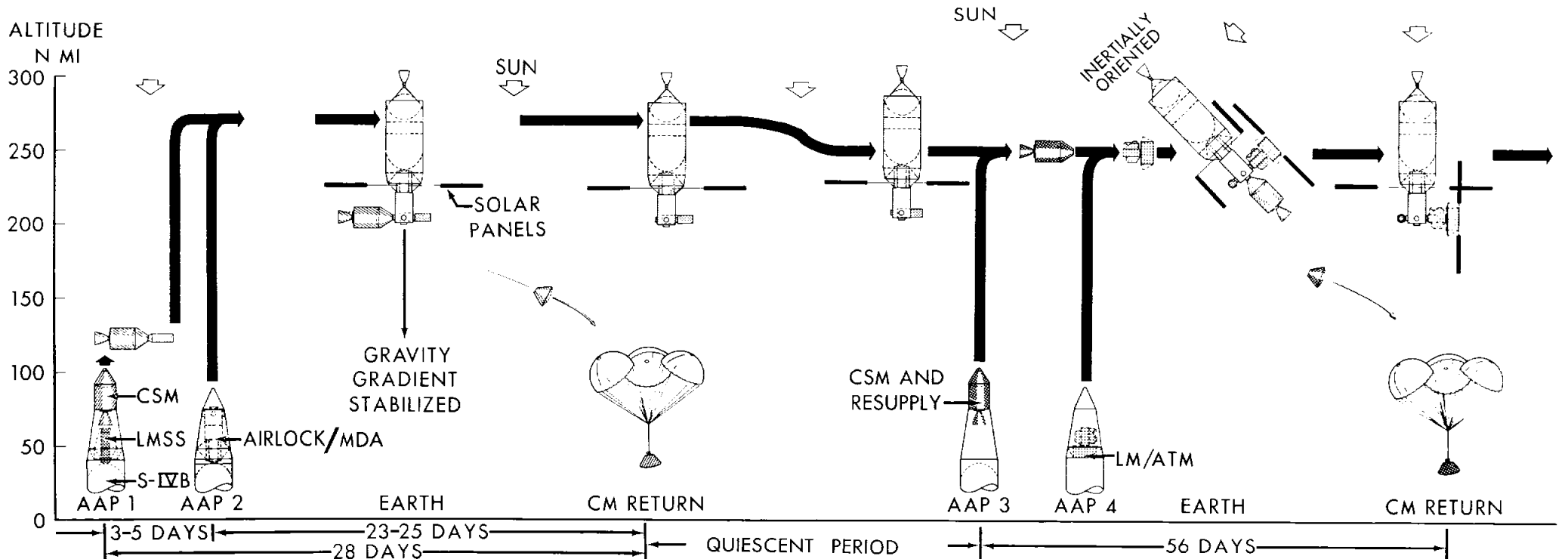
Marshall Space Flight Center, Huntsville, Ala., is responsible for modifications to the S-IVB stage to adapt it for the Orbital Workshop, all Saturn I launch vehicles, the Apollo Telescope Mount and the Multiple Docking Adapter.

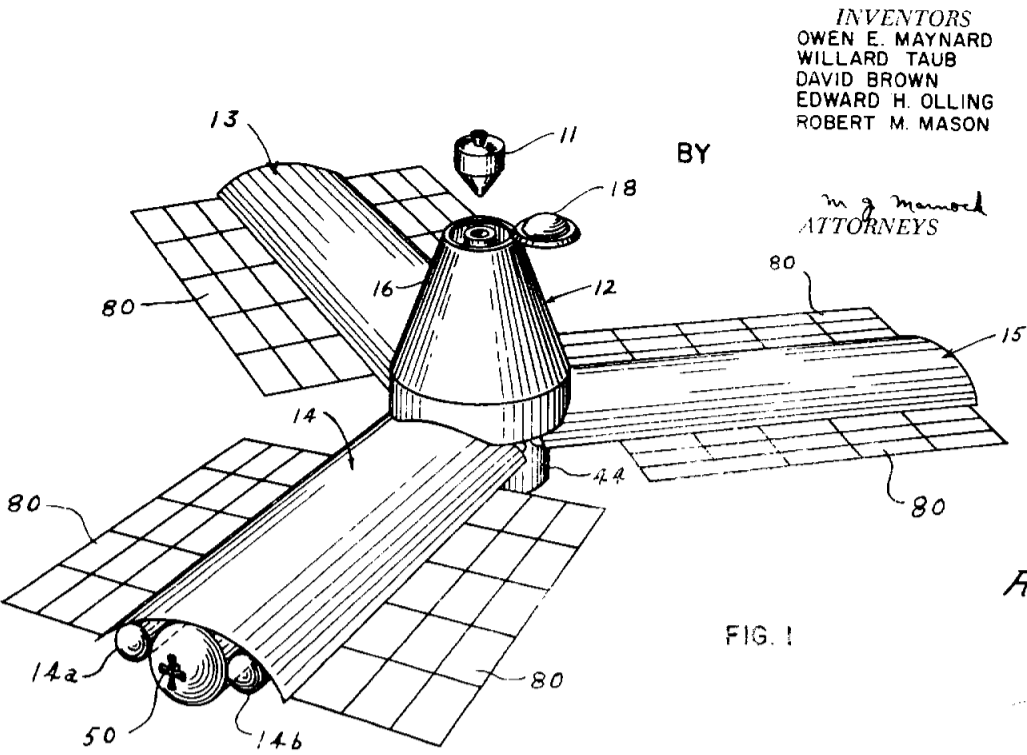
1967 MSC/EAFB Basketball League

Final Standings

American Division			National Division		
TEAM	WON	LOST	TEAM	WON	LOST
FCD	12	0	IBM (Gold)	11	1
P&PD	10	2	USCG	11	1
MPAD (RAB)	10	2	IESD/LEC	9	3
IBM (Blue)	9	3	Philco	8	4
TRW	9	3	Univac	8	4
NAA	6	6	MPAD -Red Roaches	7	5
ANG	5	7	LINK	7	5
ISD	4	8	G&CD	5	7
FSD	4	8	LRD	4	8
CSD	4	8	MI	3	9
ASPO	3	9	FCSD	2	10
747th	2	10	Grumman	2	10
CAD	0	12	MPAD-Hawks	1	11

AAP MISSION PROFILE



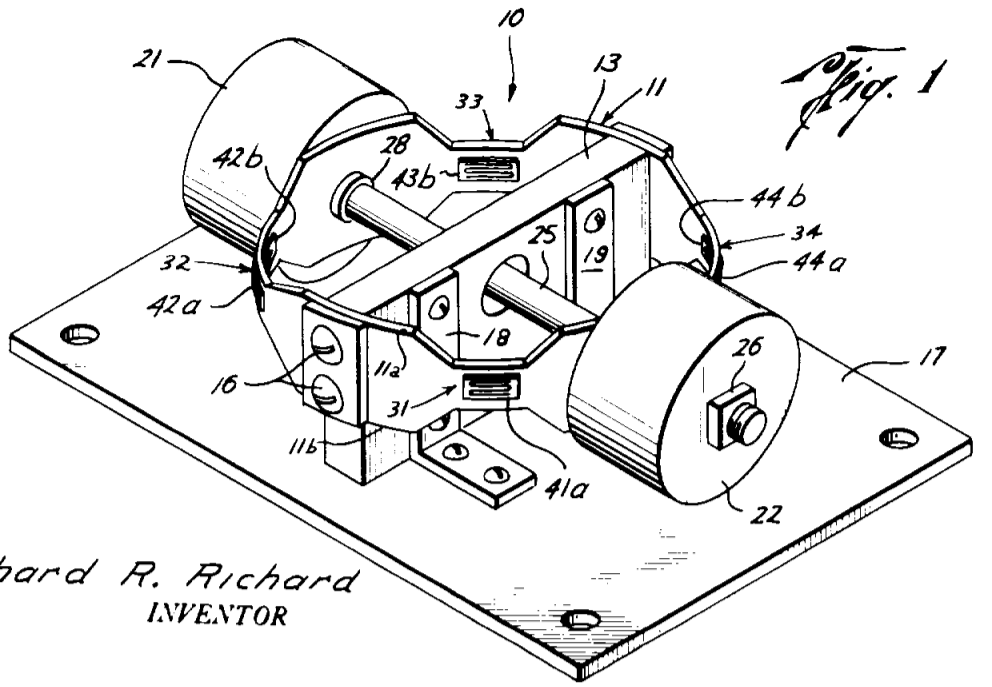


INVENTORS
OWEN E. MAYNARD
WILLARD TAUB
DAVID BROWN
EDWARD H. OLLING
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BY

M. J. Mannock
ATTORNEYS

FIG. 1



Richard R. Richard
INVENTOR

BY

M. J. Mannock
ATTORNEYS

'BIG WHEEL IN THE MIDDLE OF THE AIR'—Advanced Spacecraft Technology Division employees Willard Taub, David Brown, Edward Olling and Robert Mason, and Apollo Spacecraft Program Office Mission Operations Division chief Owen Maynard, recently were awarded a patent for this radial module space station concept.

TOUGHER INSTRUMENT—Richard R. Richard of Instrumentation and Electronic Systems Division received a patent on this improved angular accelerometer of lightweight, rugged construction which is unaffected by vibration and temperature variations that induce unwanted signals. Richard's accelerometer has uncomplicated measuring circuitry.

INCLUDES SPACE STATION—

Six MSC Employee Inventions Receive Patent Office Approval

A U.S. Patent has been awarded to five employees of the NASA Manned Spacecraft Center for design improvements of the Radial Module Space Station.

The patent is among six inventions of MSC employees and former Center employees which recently received U.S. Patent Office acceptance and approval. Marvin Matthews, MSC Patent

Counsel, said another invention by an MSC employee has been allowed by the patent office. A patent will be issued shortly, he said.

The space station invention was the handiwork of Owen Maynard, Willard Taub, David Brown, Edward Olling and Robert M. Mason. This invention which received Patent Number

3,300,162 comprises three elongate rigid cylindrical modules, each of which, when fully erected, extends radially from a central hub structure which includes hangar and docking facilities for spacecraft.

This is the thirty-third MSC employee invention approved and accepted by the U.S. Patent Office. Possibly the most famous MSC invention among these was the one submitted by Dr. Max Faget on October 17, 1959, for the Mercury "space capsule." The spacecraft invention was granted Patent Number 3,270,908 last fall after more than seven years of technical search and review by the U.S. Patent Office. (See *Roundup*, November 11, 1966.)

Included in the list of inventions is one submitted by Richard R. Richard, of the General Instrumentation Branch of Instrumentation and Electronics Systems Division. Richard's invention is an improved angular accelerometer for measuring angular accelerations during flight.

Richard's idea, Patent Number 3,295,377 is an improvement over existing accelerometers which are undesirable for use in harsh environments since their operation is adversely affected by large temperature variations and vibrations which induce unwanted signals. This new accelerometer is of relatively lightweight, rugged construction with an uncomplicated measuring circuitry.

Other patents issued to MSC employees during the past several weeks:

- Patent Nbr. 3,298,362 — Maxwell W. Lippitt, Jr., of Crew Systems Division and Dr. John H. Reed, Jr., formerly with CSD, for their invention of a fluid pressure control device for use in evaluation of the cardiovascular system.

EVALUATE POTENTIAL BENEFITS—

Space Station Economics Study Contract Negotiated

NASA is negotiating with Planning Research Corp., Washington, D. C., for a study of the economic benefits and implications of space station operations.

The contract being negotiated is expected to cost about \$275,000 and to cover a nine-month period.

Planning Research Corp. will identify, analyze and evaluate potential economic returns from possible space station activities in the mid-1970's. Earth-oriented application areas such as natural resources, meteorology and communications will be considered as they may affect both the national and world economy.

The University of Michigan Willow Run Laboratories will be a major subcontractor to Planning Research in technical feasibility of remote sensing.

NASA will work closely with other organizations and agencies

to coordinate requirements. These include the Department of Agriculture, Geological Survey of the Department of Interior, Department of Commerce, and the U. S. Navy Oceanographic Project.

Some examples of potential economic benefits are in oceanography, fisheries, hydrology, farming and forestry.

The contract is the responsibility of the NASA Headquarters Office of Manned Space Flight, Advanced Manned Missions Programs.

Accountants Hear FGAA President At April Meeting

Fletcher Lutz, deputy director of the Bureau of Economics and national president of the Federal Government Accountants Association, will be the featured speaker at the April 11 meeting of the Houston Chapter FGAA.

Lutz' topic will be "The Administrator Views Financial Management". Lutz from 1947 to 1957 was with

GAO as supervisory accountant on DOD programs and later became regional manager of the St. Paul office. He later transferred to the Civil Aeronautics Board and is now deputy director of the Bureau of Economics. He has served as FGAA vice president, chairman of the Budget and Finance Committee and Chapter Auditor.

The meeting will be held in the Texian Room at Bill Bennett's Restaurant, Crawford and Gray. Social Hour is at 6 pm and dinner at 6:45. Non-FGAA members are also welcome to attend. Make reservations with Ralph Rhodes at Ext 7771.

Alley Aces



HOW AM I GONNA DO IT?—Harley Erickson of the MSC Men's Monday Night Bowling League wonders how he is going to make the 7-10 split. But after wondering, he did it. Now he will wear an American Bowling Congress patch on his shirt for the pickup, almost as rare as a 300 game.



HIGH SCORES—This is the alley form used by top MSC Men's Monday Night League bowlers Bill Stransky and Bernard Marlow. Stransky currently is in first place in high individual game with 234 and Marlow is high individual three-game first placer with 588.

CROSS-FEED OF KNOWLEDGE—

Professional Societies Provide Information Exchange Outlet

One of the provisions spelled out in the National Aeronautics and Space Act under which NASA was created was that a full exchange of information would be carried out on a continuing basis. Such exchange is not limited to major technological break-throughs or the so-called "fall-out" that influence other scientific fields or consumer products.

Information exchange can be a cross-feed among small groups and individuals who pursue a particular discipline in the aerospace field or, say, in the medical or petroleum fields.

One major medium through which information exchange may be carried on at the "troop" level is by participation in professional and technical societies that have chapters in the MSC-Houston area.

Some of the societies are rather broad in the scope, while others have a more narrow, specialized interest. For example, the American Institute of Aeronautics and Astronautics is an organization encompassing most of the disciplines working in the aerospace/hydro-space fields, while the Society for Applied Spectroscopy focuses its activities on the techniques for spectral analysis of substances.

Not all professional societies are slanted toward the scientific/engineering fields, for many organizations are directed toward administrative areas such as contract management and accounting.

It is to the individual's benefit to take part in the professional organization allied to his work, not only from the standpoint of broadening his knowledge but from the standpoint of furthering his career.

The following synopses outline a few of the organizations

78 Girls Friday Attend Seminar

A three-session seminar sponsored by the Houston Chapter of the National Secretaries Association was attended by 78 MSC secretaries at the Shamrock-Hilton. More than 800 Houston-area secretaries attended the seminar.

The three seminar sessions were "Pathways for Secretarial Success", for beginning secretaries; "Three Rs" for experienced secretaries with increasing responsibilities; and "The Pinnacle of Perfection" for executive secretaries and administrative assistants.

Several MSC secretaries also attended a recent secretarial seminar in Baytown sponsored jointly by the San Jacinto Chapter of the National Secretaries Association and Lee College. Doris Kreske of Procurement and Contracts Division and Eugene Brock, chief of the Computation and Analysis Division took part in a seminar panel discussion.

with chapters in the MSC-Houston area. There are undoubtedly many more societies active in the area, and as information about them is received, the *Roundup* will run similar articles in future issues.

Houston Section American Institute of Aeronautics and Astronautics—Provides opportunity to keep current in specialties of mechanical, electrical, chemical, aeronautical, electronic and medical fields related to aero-hydro-space activities. Dues \$20/year. Houston Section meets second Monday each month. Officers: George Low, chairman; Jack Waite, secretary; Charles Appleman, vice chairman-programs; Dr. Alan Chapman, vice chairman; John Bonney, treasurer. Secretary can be reached at 591-3030.

Apollo Section Instrument Society of America—The scope of ISA includes the theory, design, manufacture and use of instruments and embraces the science and technology of measurement, information acquisition, telemetry, data processing and display and automatic control. It further includes measurement standards, precision calibration and systems engineering and is concerned with instrumentation applications in industrial, laboratory, biophysical, geophysical, marine and space environments. Dues \$15/year. Meets monthly. Officers: Alfred B. Eickmeier, president; Robert C. Rogers, vice president; Herbert H. Bloshies, secretary; George Zively, treasurer; Davis Bartholemew, council delegate; Richard R. Richard, membership chairman (Ext 2497); Lawrence W. Lockwood, publicity chairman; Frank Sawburger, arrangements.

Houston Chapter Federal Government Accountants Association—FGAA has as its basic aims the uniting of federal service professional accountants for constructive endeavors, encouragement of and providing a means for idea exchange among government accountants, improvement of government accounting and auditing, and contributing to the improvement of accountancy education. MSC employees comprise about half of the Chapter's 63 members, although more than 100 MSC employees are eligible for membership. Dues: \$15/year active; \$10/year associate. Meets second or third Tuesday each month. Ralph Rhodes, Ext 7771, is chapter president.

Houston Chapter Society of Technical Writers and Publishers—STWP lists the following purposes in life: to advance the theory and practice of the arts and sciences of technical communication through reading and discussion of papers and by exchanging ideas, knowledge, philosophy and techniques; encouragement of the preparation of original papers, articles, monographs, periodicals and

books dealing with science/engineering communication techniques; guiding and informing students and aiding colleges and universities in forming technical communication curricula, and development of better educated technical communicators. Dues \$12/year. Meeting dates vary. Officers: Howard D. Cole, chairman; Eston F. Meade, vice chairman; Ted Bruno, director; Bruce F. Greek, director; David N. Holman, treasurer; John B. Colby, secretary; John B. Crosby, Jr. (HU 8-3300 Ext 611) membership; Bill Campbell, publicity; Louis Dartez, employment; Marx Isaacs, editor; Alfred F. Fukal, illustrator.

Houston Engineering and Scientific Society—Open to engineers, architects, teachers of physical sciences and to professional men engaged in any of the physical sciences. Members under 30: initiation fee \$25, quarterly dues \$9. Members 30-34: initiation fee \$75, quarterly dues \$18. Members 35 and over: initiation fee \$150, quarterly dues \$24. Officers: Walter E. Heffler, president; James R. Sims, 1st vice president; Ralph Eads, Jr., 2nd vice president; A. J. Mundy, Jr., secretary; Carrington Mason, treasurer; A. C. Lederer, Jr., W. S. Spangler, George W. White, B. M. Stephens, Jr., and Harold J. Kongabel, directors. Society office at 2615 Fannin, Houston 77002, CA 2-2283.

Space City Chapter National Contract Management Association—Aimed toward fostering improved contract management skills through educational programs, interchange of ideas, establishing a uniform code of ethics for persons engaged in contract management, and encouraging a professional attitude toward contract management and procurement. Meets first Monday each month at Kings Inn. Admission fee \$5; dues \$25/year. Officers: O. D. Scherer, president; M. E. Dell, vice president; R. M. Stoll, secretary; C. D. Heald, treasurer; Lambert Turner and J. B. Aldredge, representatives to national board of directors.

Houston Chapter American Society for Public Administration—Develops ties among officials of different agencies, programs, jurisdictions and areas; broadens executive perspectives through exchange of ideas and experience; makes more accessible the growing knowledge about public administration, and stimulates and assists education and research in governmental management. No firm meeting schedule. Dues \$15/year. Officers: Don Blume, president; Earle Young, vice president; Hilda Bolling, secretary; James Fulton, treasurer; council members, Philip Whitbeck, Floyd Brandon, William Parker and Ken Durrett. Applications available from treasurer at Ext 3271.

EASE THE SQUEEZE ON BUDGET



COST REDUCTION

The *Roundup* is an official publication of the National Aeronautics and Space Administration Manned Spacecraft Center, Houston, Texas, and is published every other Friday by the Public Affairs Office for MSC employees.

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

Space News Of Five Years Ago

April 4, 1962—Soviet cosmonauts have had changes introduced into their training, including special gymnastics, in an attempt to offset nausea induced by prolonged weightlessness, according to *Trud*, newspaper of the Central Labor Union.

April 5, 1962—X-15 No. 3 flown to speed of 2,830 mph (mach 4.06) and to altitude of 179,000 feet in a test of new adaptive control system to be used in Dyna-Soar and Apollo vehicles. NASA's Neil A. Armstrong was pilot. Whereas the previous control system was automatic only while the X-15 was in the atmosphere and the pilot had to control flight with reaction jets while in space, the new system would be automatic in both regimes.

April 6, 1962—NASA sponsored a day-long technical symposium in Washington on results of the MA-6 three-orbit space flight. John H. Glenn, Jr. and officials of Project Mercury reviewed the findings of the February 20 flight and stressed the conclusion that the presence of the pilot had been indispensable to successful completion of the three-orbit mission. On the Glenn effect—the firefly-like particles Glenn reported seeing outside the spacecraft during each of the three sunrises—Dr. John A. O'Keefe, Assistant

Chief, Theoretical Division, Goddard Space Flight Center, reported that study had shown them to be flakes of paint from the spacecraft.

April 9, 1962—John H. Glenn was awarded the Hubbard Medal of the National Geographic Society "for extraordinary contributions to scientific knowledge of the world and beyond as a pioneer in exploring the ocean of space." Awarded only 20 times since it was struck in 1906, the Hubbard Medal honorees have included Adm. Robert E. Peary, Charles A. Lindbergh, Roald Amundsen and Adm. Richard E. Byrd.

April 12, 1962—NASA was studying the problem of falling fragments from orbital objects and the possibility of injury or damage to persons or property on earth. Four fragments from the Atlas booster that put John Glenn into orbit were recovered on earth, the first pieces known to have reentered from an orbiting object without burning up. Statistically the chances of injury to anyone on earth would be extremely small, especially since orbits are over water about 80 percent of the time. NASA pointed out that some 100 meteorites weighing two pounds or more struck the US every year, yet there had never been a report of anyone being struck by one.



STREETCAR RIDERS—Tennessee Williams' script for the prize-winning play "Streetcar Named Desire" is given a pre-rehearsal review by Pasadena Little Theater president and play director Bill Simmons, left, his wife Jo, who plays Blanche, and Jim Myers in the support role of Mitch. "Streetcar" opens tonight at the Pasadena Little Theatre with performances each Friday and Saturday night through April 15.

WIFE HAS MAJOR ROLE —

Bill Simmons Directs 'Streetcar' Production

Three members of the MSC family are riding a streetcar in Pasadena right now and some 200 more will board April 2 and 9. Bill Simmons, Apollo Pyrotechnics Subsystems Manager in the Propulsion and Power Division, his wife Jo, and Jim Myers, on-site employee of Philco-Ford, are deeply involved in the Pasadena Little Theatre production of Tennessee Williams' play "A Streetcar Named Desire" which opens tonight. Simmons, the President of PLT, is the director and scene designer of "Streetcar". He also directed PLT productions of "Bad Seed" and "Marriage-Go-Round". Jo is playing the difficult and emotional leading role of Blanche. An accomplished, professionally experienced actress, Jo has played leading roles in four other PLT shows including "Gypsy" and "The Glass Menagerie", as well as working with the Clear Creek Country

Theatre in League City where she played in "Affairs of State" and directed the recent production of "The Heiress". The Simmonses have had wide experience in the theatre in Europe and the US before coming to MSC.

Myers, like the Simmonses, is extremely active in PLT both onstage and behind the scenes. He is playing the major male support role of Mitch, who almost marries Blanche. He has also previously appeared in "Gypsy" and "The Miracle Worker" with PLT and has worked backstage on every other show since he joined the group. Jim is a maintenance controller for the Philco-Ford M&O Department, working in the Mission Control Center. Sparked by Myers, Philco-Ford employees at MSC have purchased two special Sunday night performances of "Streetcar".

"Streetcar" is the only drama ever to win both the New York Drama Critics Award and the Pulitzer Prize. It is the poignant story of the final dissolution of a person of worth who cannot adapt to the cynicism of today's world. A tragedy full of primitive power and fury, "Streetcar" contains the most difficult female role in the history of American theatre — that of Blanche, in whose terms the story is told. Audiences are often shocked by the play's brutality, but they carry away a haunting memory.

"Streetcar" opens tonight and continues on Fridays and Saturdays only until April 15th. Some tickets are still available at \$2 from Simmons (Ext 5371) and Myers (Ext 2948). Simmons can discuss special performance and block sales to organizations.

ASPA Chapter Meets April 7 At Lamar Tech

The Houston Chapter of the American Society for Public Administration April 7 will meet at 6 pm on the campus of Lamar State College of Technology in Beaumont, where they will hear Port Arthur City Manager George Dibrell speak on "Urban Renewal—The Port Arthur Story."

The meeting will also include a campus tour. For reservations, call Jim Fulton at 3271 or Phyllis Dewey at 5461.

AFGE Meets April 10

Lodge 2284 of the American Federation of Government Employees April 10 will meet at the Webster State Bank at 5 pm for nominating officers for the coming year.

A nominating committee chaired by R. L. Clay will present a slate of proposed officers at the meeting, and nominations will be accepted from the floor. Lodge members having nomination suggestions are urged to call Clay at 5576.

Tech Writers Society Holds Illustration Panel

"Technical Illustrations" will be the topic of the April 19 meeting of the Houston Chapter of the Society of Technical Writers and Publishers. The meeting will be at the Ramada Inn on NASA Road 1, with a social hour at 5:30 pm, dinner at 6:30, business session at 7:15 and panel discussion.

The "Technical Illustrations" panel will be chaired by Alfred F. Fukal and panel members will be Dr. Everett Evans, John Colby, Eston Meade and Vic Morova.

For reservations call Dave Holman at 2611.

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—REAL ESTATE

1 and 1/2-acre sandy, high-ground country lots within sight of MSC, good drainage, reasonable. Mac Owen, 877-1689.

4-2/2-2 in Clear Lake City, separate family and dining rooms, fenced, landscaped, drapes, extras. Near school and parks. Refinance FHA. \$25,500 loan available with \$2700 down including closing. James Gray, HU 8-0415.

3-bdr 1/2-bath brick, 2-car garage, central air/heat, large paneled den, living room, kitchen with dining area, large walk-in closets, 80x120-ft lot, backyard fenced, schoolbus available. Take \$1500 for \$3000 equity; \$110/mo payments include everything. James Weaver, 1506 Webster St., League City, 932-2371.

3-bdr, den, living and dining rooms, kitchen and utility room, 100x152 lot; fruit, fig and pecan trees, central heat/air, 3-car garage, no traffic problem—25 min to MSC. Bud Powell, LaMarque WE 5-3580.

70-ft frontage 150 ft deep, 87 ft across back, wooded Timbercove lot abutting Champion Paper Co. recreational area. W. Humphrey, 877-4804.

3-bdr 2-bath in League City, large den, separate living room, attached 2-car garage, central heat/air, large lot w/trees, carpets, built-ins. \$2100 equity and assume \$16,500 mortgage or refinance. Leroy Hall, 932-3888.

2.14 acres near Crosby (62 1/2 x 1491) \$1200. Linda Collier, GR 2-6243 after 5.

3-bdr 2-bath in Huntington subdv, Pasadena; 2-car garage, central air. Equity plus take over \$130/mo payments. Full price \$18,200. Bob Bliesser, HU 7-1469.

FOR SALE—AUTOS

1962 Rambler Classic station wagon 4-door delux 400 series, factory air, reclining bucket seats, headrests, vinyl interior, radio, autotrans. Original owner who ordered it from factory. \$875. Financing can be arranged; consider trade. Floyd Turner, RE 3-7667.

1964 Rambler 2-door Classic hardtop, V-8, autotrans, radio, reclining seats, low mileage, xclnt condition, extras. Bernard Cox, HU 4-6077.

1964 9-passenger Pontiac station wagon, power steering/brakes, air, clean, swap or trade equity for late-model VW. Luther Palmer, 877-1269.

1961 Volkswagen, xclnt mechanical condition, 49,000 miles, one owner. \$600. Jim Peacock, 932-4458.

1959 VW sedan, rebuilt engine, runs well, looks fair, costs little; first \$295 steals it. H. C. Goff, 591-2198.

1964 Pontiac Grand Prix, power, air, hydramatic, tilt steering wheel, many extras, xclnt condition, good rubber, low mileage. LtCol J. O. McReynolds, NB 591-3246 or HU 7-1400 Ext 204-494.

1952 Studebaker pickup, radio, heater, overdrive, trailer hitch, bumper, spotlight, airhorn, 6-ply tires, dark blue w/white trim, big-6 engine, leatherette upholstery. \$225. E. L. Wright, 877-3059.

1965 Buick Wildcat, full power, air, new tires, xclnt condition, still in warranty. Bob Becker, HU 4-5118.

1954 Olds 88 2-door V-8, autotrans, heater, radio, good work car. \$150. J. L. Bullard, 877-4155.

1962 VW, factory air, pushbutton transistor radio, whitewalls, (still in warranty) 39,000 miles, clean. \$895. Bob Hardy, HU 4-3652 after 6.

1961 Chevy Impala convertible, power, air, white w/blue interior, xclnt condition. C. T. Hyle, HU 7-0002.

1962 Cadillac 4-door hardtop, air, radio, all power, automatic headlight dimmer, good tires, xclnt condition. \$1350. W. L. Walker, GR 9-4809 after 5.

1963 VW sunroof, good rubber, xclnt condition. \$700. 591-2480.

1966 Mustang hardtop, 289 V-8, standard shift, factory air, radio, heater, whitewalls, xclnt condition. \$1950. C. C. Summers, MI 9-8838.

1958 Plymouth station wagon, runs well, must sell. \$150. Virginia Reese, HU 2-1671.

1964 Corvair Monza 4-door, air, xclnt condition. \$1095 or best offer over \$950 before April 5. Bruce Johnson, 591-3186.

FOR SALE—MISCELLANEOUS

1966 Ducati Motorcycle, 160cc, 70-75 mph, 90 mpg, 1500 actual miles, xclnt condition. Also helmet, tinted bubble, cable lock w/keys tarpaulin \$300 for all. J. M. Walker, RI 8-5910.

Six registered standard poodle puppies: four black females \$50 each, two black males \$65 each. Available March 1. Lynn Gripon, 932-3256.

Used Sears VW trailer hitch. \$7. A. E. Kilpatrick, 591-2165.

Hi-Standard .22 automatic pistol w/holster, xclnt condition. Jim Sulester, MI 5-5603.

1967 Honda 305 Super Hawk, low mileage, xclnt condition, \$600. John Hirasaki, MI 9-1800.

Registered sable-color Shetland Sheep Dog (Toy Collie) puppy, ideal for child. D. Greenwell, HU 8-1034.

F-hole guitar in good condition, has all nylon strings, \$16. Deep fryer w/basket, \$3. sunlamp, holder, socket, cord, used twice, \$9. Large attractive serving dish in perfect condition \$2. Bob Allgeier, HU 4-6166.

French provincial hide-a-bed, 7 mos old, no stains, gold brocade reversible foam cushions and mattress, cost \$359—sell for \$200. Light beige brocade wingback chair, cost \$79—sell for \$50. LeAnne Bible, 3003 Long Meadow, Baytown, 582-7214.

12-inch coaxial speaker in bass-reflex enclosure. J. D. Roberts, GR 9-3929.

Pearson Ariel 26-ft sloop, all accessories, mainsail and working jib, less than year old. Mike Ballas, GR 1-1595 after 5:30.

18,000-BTU Sears Coldspot window air-conditioner, used two seasons, all brackets and panels. \$175. Ted Leech, MI 9-3685.

14-ft ChrisCraft, wood w/fiberglass bottom and sides, deck w/windshield, remote controls, 18-hp Johnson, TeeNee trailer, extras. Must sacrifice; will accept best offer over \$100. Jay Carlton, 932-3055.

Pentax single-lens reflex camera with f/1.8 automatic Super Takumar lens, like new. \$75. Jim Null, MI 5-7958.

Long formal lace wedding dress, size 8. \$50. Carol Yeager, GR 7-1354 or GR 3-3825.

1965 Honda Trail 90, 7000 miles, good condition. \$100. Richard Nygren, MI 3-2622.

4-hp Wizard riding lawnmower, 2 years old, good condition. \$50. Fred Webster, HU 4-7901.

1965 Super Porpoise sailboat complete with trailer. \$450. Victor L. Etrredge, 591-2110.

1963 Yamaha motorcycle, 250-cc, 1400 miles, includes helmet. \$250. Steve Musselman, HU 6-4866.

Almost-used wedding ring set. Cost \$350—sell for \$175. Millie Dolive, MI 3-7825 after 5.

.22-cal Hi-Standard Sentinel revolver w/holster, good condition. \$30. Bob Handley, HU 2-7041.

1966 Johnson 9 1/2-hp outboard motor, \$250. 8-ft hydroplane, \$25. Beginner's clarinet, xclnt condition, half cost at \$70. D. H. Johnson, 591-3541.

Mint condition Heathkit SB-100 transceiver, power supply, monitor scope and 14 AVS antenna, works beautifully, will demonstrate. \$350. Ken Jones, GR 1-3760.

Flight instruction for private, commercial and instrument ratings by experienced instructor in 1966 Cessna 150 Commuter evenings and weekends. Ken Jones, GR 1-3760.

Large Hamilton drafting table, \$50. Inez Donaway, GR 3-1297 after 5.

Ping-pong table, 3/4-in plywood w/folding wood legs, table and net in good condition, new set paddles, box 12 imported English balls. All for \$25. Carl Busch, RE 3-8286.

1964 4x7 tent trailer, xclnt condition, heavy white canvas top, blue sides, nylon floor, sleeps 6 comfortably, 4-in thick foam mattress sleeps double, 3 big screened windows, plenty storage space, spare tire. \$400. Ed Lattier, 534-2756.

Two used Goodrich 6.50x13 tires, good rubber, both for \$12. R. Dean, HU 6-3997.

1966 Super 90 Honda, xclnt condition, bargain price. James McLane, HU 8-0312.

One-wheel trailer, \$20. Hi chair, \$5. 591-2480.

13-year old mare, xclnt for children. \$100. Virginia Reese, HU 2-1671.

WANTED

Bachelor wants to share 2-bdr furnished lakefront home on Clear Lake, 10 minutes to MSC, large recreation room w/svc bar and fireplace, fenced 1/2-acre, 4-car carport, outside barbecue, two patios, new private pier w/three boat docks and sundeck on top, ideal for boatowner. \$100 deposit; \$115/mo rent plus half of utilities. Bill Munro, 877-2219.

Want ride from 5735 Belfort to Bldg 8 7:30 to 4. Dolores Marino, RE 3-7328.

Want registered AKC miniature male Schnauzer. Dean C. Glenn, 932-4050.

CU Members Get Several Benefits

What benefits do MSC Credit Union members enjoy? Let us count the ways:

- It's a handy place to save, with good dividends.
- Loans can be made for any good purpose.
- Low interest charge on loans.
- Help in emergencies.
- Paid-up loans in event of member's death.
- Shares double in value (up to \$2000 in shares) in event of member's death.

ROUNDUP

SECOND FRONT PAGE

Apollo Telescope Mount Hardware Contracted

The NASA-Marshall Space Flight Center has requested quotations from the aerospace industry for manufacturing a star tracker for use on the Apollo Telescope Mount solar observatory.

Bids for the contract were due at the Center on March 28.

The contractor receiving the award will be asked to build one prototype and five flight-type model star trackers.

One of the flight models will be used for the ATM mission and another will serve as the backup system. Three remaining devices will be used for qualification testing, system checkout at the Marshall Center and system checkout at a wind tunnel facility.

Project engineers said the star tracker seeks and locates a target star needed for guidance purposes. A special gimbal system having a freedom of plus or minus 70 degrees provides information needed for ATM roll reference. The star Canopus is proposed as the target star.

The star tracker concept is not new, although this particular device will be designed to be operated by an astronaut or automatically. Automatic star trackers have been flown on several launch vehicles and on the Goddard Space Flight Center's Orbiting Astronomy Observatory.

Maximum weight of the instrument is expected to be about 30

pounds and it will be designed for a 56-day mission and have a capability of being reused up to one year later.

Delivery of the first star tracker will be early in 1968.

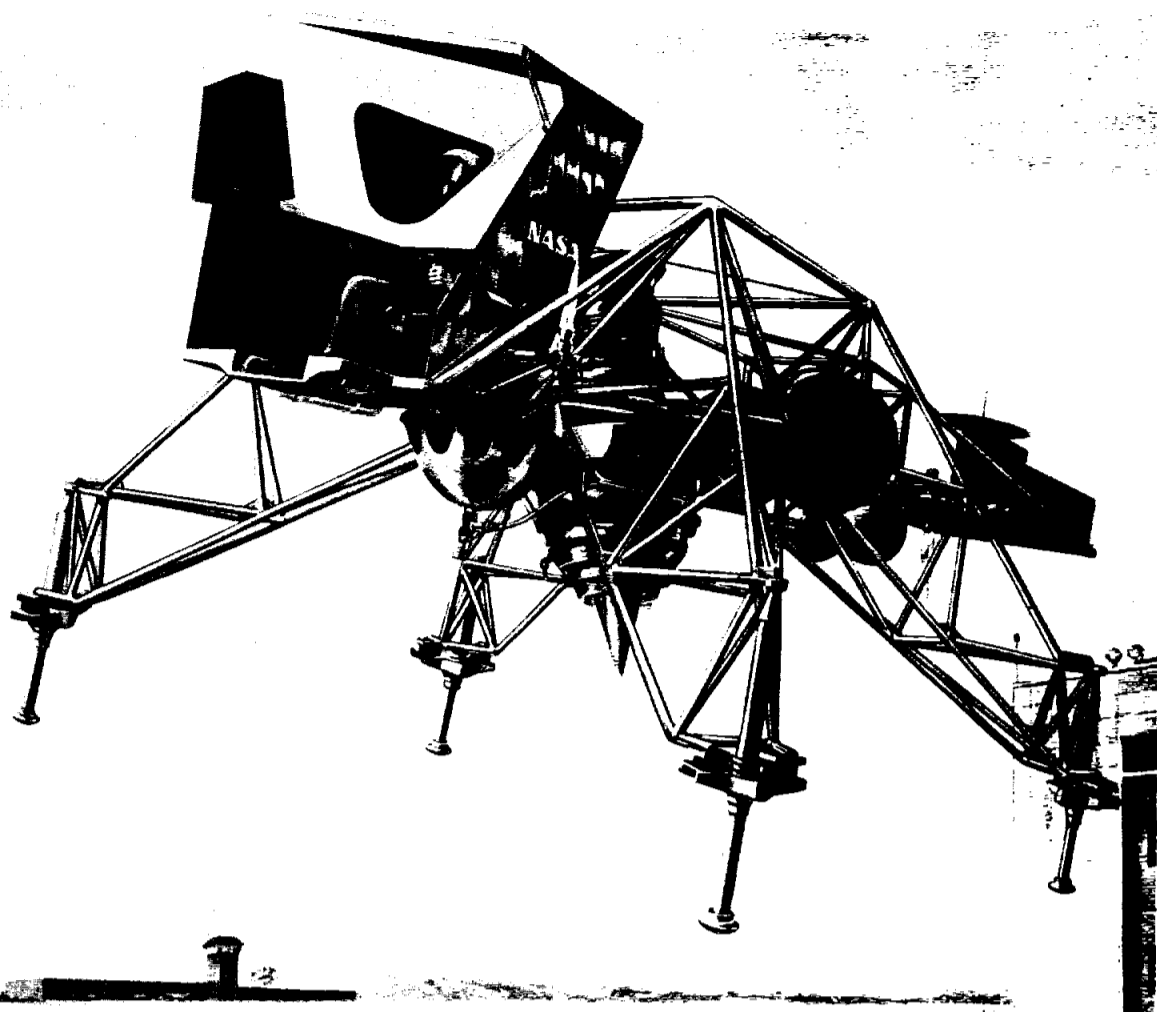
In other Apollo Applications hardware procurement, NASA March 20 awarded a contract to the Bendix Corporation's Navigation and Control Division, Teterboro, N.J. for development and production of a pointing control system (PCS) for the Apollo Telescope Mount.

Bendix will produce three units under a cost plus award fee contract to MSFC. The work will cost \$7.4 million and is scheduled for completion in August 1967.

The ATM mission will be designed to allow crewmen to point the telescope to selected regions of the sun during the period of maximum solar flare activity which begins in 1968.

The PCS is one of several flight systems which will be developed for the ATM program. Design is based on a control moment gyro being developed by Bendix for NASA's Langley Research Center, Hampton, Va.

Objectives of the solar observation mission are to acquire high resolution measurements and observations of the structure and behavior of the sun from above the earth's atmosphere and to test man's capabilities for conducting astronomical observations in space.



PLUMBER'S NIGHTMARE—Apollo lunar landing crews will do their homework in three of these Lunar Landing Training Vehicles (LLTV) being built for MSC by Bell Aerosystems under a \$5.9 million contract. The LLTV is a free-flying simulator that will give pilots a feel for the last few hundred feet of the lunar landing aboard an Apollo Lunar Module.

MSC To Host Science Students For 3-Day Meet

Fifteen high school students representing Texas, Oklahoma, Kansas, Colorado, and North Dakota, will participate in the Youth Science Congress to be conducted at MSC April 5-7.

The MSC conference is one of nine conducted at NASA facilities throughout the United States each spring. The conferences are jointly sponsored by NASA and the National Science Teachers Association.

During the course of the conference at Manned Spacecraft Center, each of the 15 attending participants will present an oral report on a scientific project or research-type study. In addition, each will engage in discussion sessions with fellow students and NASA scientists.

The program will include a tour of the MSC facilities, as well as a tour of the Houston and Galveston Bay area with visits to the Astrodome, the Burke-Baker Planetarium, and the San Jacinto Monument and Battleship Texas.

Congress participants are:

John P. Blanks, Galena Parks; Craig A. Bolton, Victoria; Sandra K. Dlabaj, Ennis; E. Lynne Dumenil, Houston; William A. Hayes, Catoosa, Oklahoma; Theresa A. Hubbard, St. George, Kansas; Emmitt C. House, Oklahoma City, Okla.; and Kenneth L. Jones, Enid, Okla.

Frederick J. Lazor, Victoria; Nancy J. Pfannenstiel, Seneca, Kansas; John M. Seward, Oklahoma City, Okla.; Marcia M. Shutze, Fort Collins, Colo.; Richard L. Taylor, Farmers Branch; Karen S. Turner, Manhattan, Kan.; and Patrick S. Weber, Dickinson, N.D.

Lunar Landing Trainer To Be Built for MSC

Bell Aerosystems Company of Buffalo, N.Y. has been awarded a \$5.9-million contract by NASA to build and ground test three wingless, free-flying simulators called Lunar Landing Training Vehicles (LLTV).

The LLTVs are scheduled to be delivered starting in June of 1967 to MSC where they will be used for training Apollo crews in lunar landing techniques.

Two other vehicles, similar in design to the LLTV, and identified as Lunar Landing Research Vehicles (LLRV), will be flown by MSC pilots at Ellington AFB. These simulators had previously been engaged in a two-year research program at NASA's Flight Research Center, Edwards, Calif., before being modified and shipped to MSC in December 1966.

The LLTV, like its predecessor, the LLRV, utilizes a unique combination of propulsion systems to sustain flight. Primary support for the vehicle is provided by a 4,200-pound thrust turbofan engine, modified for vertical operation and installed on a gimbal mounting behind the cockpit. The engine is automatically controlled and lifts five-sixths of the vehicle's weight. Thus, the engine counteracts five-sixths of the earth's gravity. In operation, the engine lifts the LLTV to an altitude approaching 800 feet for simulated Lunar Module landings.

The remaining one-sixth earth gravity is comparable to the gravity on the moon. Lift for the remaining one-sixth of the vehicle's weight is provided by two rocket motors with a maximum 500-pounds thrust each. Controlled by the pilot, these rocket

motors simulate those used for lunar landings.

The LLTV will have a cockpit and control system resembling those of the Apollo Lunar Module which is designed to ferry crewmen between their orbiting command module and the lunar surface. The vehicle can accommodate a pilot and 200 pounds of instrumentation.

NASA-German Sounding Rocket Program Begins

An agreement for study of electric fields in the upper atmosphere has been reached by the German Federal Ministry for Scientific Research (BMWF) and NASA.

Under the agreement, NASA will furnish five Nike-Apache sounding rockets which will be launched from the European Space Research Organization (ESRO) facilities at Kiruna, Sweden beginning next month. The rockets will be used to release barium clouds aloft, particularly in auroras, and the clouds will be observed from the ground.

BMwf will provide the chemical payloads and ground observation equipment and will conduct the launchings with the cooperation of ESRO and the Swedish Space Research Committee (SSRC).

The agreement, in the form of a Memorandum of Understanding, signed by Max Mayer for the Ministry for Scientific Research and Dr. Robert C. Seamans, Jr.



It's **MORE**
than a job

KEEP



THE SYMBOL OF EXCELLENCE

MANNED FLIGHT AWARENESS