



FOR BOYS HOME—Mrs. W. E. Stoney, Jr. receives \$224.45 from MSC Director of Administration Wesley L. Hjernevik as a contribution to the Harris County Boys Home fund drive. The money was collected in lieu of exchanging Christmas cards among Administration Directorate employees. A similar collection was made in the directorate for Christmas 1966.

## Scholarship Application Deadline is February 15

College-age children of MSC employees may be eligible for financial assistance under a college scholarship program established last year by the NASA Exchange Council—MSC. Paying up to \$600 per academic year for four years, the fund awards will 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 base income does not exceed \$8,000 per year.

Students who will be graduated from public, private, or parochial high schools in January or June are eligible to apply provided they have a high school grade average of 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 and it is felt there are extenuating circumstances, scholarships may also be applied for.

Scholarship application forms are available from Mrs. Betty Schick, Administration Directorate, Building 2, room 138. Completed forms in sealed envelopes must be returned to Betty Schick, code BA1, no later than February 15, 1968.

The MSC Scholarship Committee is appointed by the Chairman of the NASA Exchange Council—MSC, subject to approval by the Director. They will evaluate students' applications and scholastic records for selecting scholarship winners. All information will be kept confidential and will be reviewed only by the Committee.

The winners of the two four-year scholarships will be notified by mail no later than April 15, 1968.

### AFGE Meets Monday

Pete Evans, national representative of the American Federation of Government Employees, will speak at the January 8 meeting of AFGE Lodge 2284 at 5 pm in the Bldg 30 auditorium. All AFGE members and interested non-members are invited to attend.

### FGAA Chapter Hears Plans for Free Workshop

Details of a free computer time-share workshop sponsored by General Electric Company will be outlined at the January 16 meeting of the Houston Chapter of the Federal Government Accountants Association.

The workshop will demonstrate time sharing through "hands on" experience, including concepts in computer use for management, accounting, and audit applications in statistical sampling, improvement curves, correlation analysis and multiple regression analysis.

The FGAA meeting starts at 6:15 pm in the Texian Room of Bill Bennett's Restaurant, Crawford and Gray, Houston. Guests are welcome to attend the meeting. For reservations, call Henry W. Fancher at Ext 7356.

FGAA membership includes contractor, government and municipal employees and covers such financial management areas as financial examiners, economists, administrative officers, management analysts, computer systems analysts and programmers, financial managers, management technicians, accountants, auditors and budget analysts.



## JANUARY 18 LAUNCH—

# Lunar Module I Loaded With Hypergolic Propellants

Prelaunch preparations, systems environmental and flammability testing and drops of the Apollo parachute systems rounded out this week's activities at Kennedy Space Center, MSC and at the Naval Air Facility, El Centro, Calif.

Loading of hypergolic propellants aboard Lunar Module I, planned for launch no earlier than January 18, was scheduled late this week. The Office of Manned Space Flight held its Apollo V/LM-1 Flight Readiness Review Wednesday at KSC.

Apollo spacecraft 020, scheduled for the Apollo VI (A/S 502) this week began integrated testing in the KSC Vehicle Assembly Building.

In Apollo command module flammability testing at MSC, some 24 of 40 planned tests were completed at *Roundup* press time and engineers hoped to have completed the series by next week. The first series of tests are at 6.2 psi cabin pressure in 95% oxygen, duplicating orbital conditions. The second

series will be at 16.5 psi in 95% oxygen, duplicating launch pad conditions.

Apollo command and service module 105 was scheduled to be moved into the high-bay of Bldg 49 Vibration Laboratory late this week for preparations for launch environment vibro-acoustic testing. These tests must be completed prior to the

first manned Apollo mission in spacecraft 101.

The modified main parachutes will also be tested in the two-out-of-three overload condition. The test series is aimed toward qualifying the modified drogues, chutes and two-stage reefing system under consideration to handle the increased weight of the Apollo command module.

## RIFed MSC Employees Get Pink Slips Today

About 50 MSC civil service employees today will receive layoff notices as a part of the total reduction in force of 125 positions for the current fiscal year. The reduction will affect approximately 50 employees at MSC and 13 at MSC White Sands Test Facility, N.M.

Separation will be effective February 16.

The reduction of 125 positions will be a combination of separations and normal attrition. Permanent positions authorized for

MSC in FY 67 are 4704. The FY 68 ceiling has been reduced to 4579.

The Personnel Division will conduct individual counseling with affected employees on rights and benefits such as severance pay, rights of appeal, "bumping" procedures and downgrading. Employees receiving layoff notices may examine a retention register based upon eliminated functions and positions which shows an employee's ranking relative to his fellow employees.

An outplacement office has been established at MSC to assist separated employees in relocating either within federal service or in private industry.

The bulk of today's layoffs were made in the Engineering, Administrative Services and Technical Services Divisions, Public Affairs Office and White Sands Test Facility.

## UofH Course Sign-Up Scheduled January 25

Registration for the 1968 spring semester classes at the University of Houston Clear Lake Graduate Center will be held at the MSC News Center Auditorium (Building 6), January 25, 1968, from 9-11:30 am and 1-3:30 pm for students enrolling in classes offered at the Clear Lake Graduate Center only.

Late registrants and combination students (part Clear Lake and part main campus classes) will register February 2, 1968, from 9-11:30 am, at the MSC News Center Auditorium. Combination students must register on the main campus first.

Counselors will be available from the Math, Physics, Electrical Engineering, Mechanical

Engineering, and Political Science Departments during registration. Students working on other majors must have their program slips signed at the University of Houston campus before they can register for Clear Lake courses.

MSC employees wishing to enroll in courses at Clear Lake or at the main campus should submit an application for training (MSC Form 75) to the Employee Development Branch (BP3) by January 19, 1968.

The spring semester classes begin February 5, 1968, and end May 29, 1968.

The schedule of classes to be offered at the Clear Lake Graduate Center is as follows:

Course No.	Course Title	Time & Days
Math 432	Introduction to Analysis	3-4:30 pm T-Th.
Math 439	Selected Topics in Applied Math	3-4:30 pm M-W
Math 632	Theory of Functions of a Complex Variable	3-4:30 pm T-Th.
Math 668	Point Set Topology	4:30-6:00 pm M-W
Math 683	Selected Topics	4:30-6:00 pm T-Th.
Phy 494	Modern Physics	3:30-5:00 pm T-Th.
Phy 681	Advanced Mechanics	7:30-9:00 am T-Th.
EE 696	Space Communications	4-5:30 pm M-W
EE 732	Statistical Design of Control Systems	4-5:30 pm M-W
ME 634	Advanced Heat Transfer II	7:30-9:00 am W-F
ME 677	Continuum Mechanics I	4-5:30 pm M-W
ME 691	Engineering Analysis II	7:30-9:00 am T-Th.
ME 730	Astrodynamics	4-5:30 pm T-Th.
Mgt 631	Seminar in Management	3-6:00 pm Th.
Pol Sci 660	The Study of Public Administration	3-6:00 pm Tues.
Pol Sci 386	The Budgetary Process & Financial Administration	4-5:30 pm M-W

## Lunar Module Orbital Mission Planned Jan. 18

The first flight test in earth orbit of the Apollo Lunar Module is scheduled for no earlier than January 18. Primary objective of the Apollo V mission is to verify that the Lunar Module is ready for manned operations in space.

Planned for an early morning launch from Kennedy Space Center Launch Complex 37, the 31,700-pound Lunar Module will be inserted into an initial 88 by 123 nm orbit. Inflight tests will qualify the descent stage propulsion engine including restart, the ascent stage propulsion engine including fire-in-the-hole abort staging, and the Lunar Module's structural integrity and systems.

Launch vehicle for the 6 hr 30 min mission will be the 1.6 million pound thrust Uprated Saturn I (AS-204) launch vehicle originally scheduled for the first manned Apollo mission last February.

**Total 225 Years of Service**



**TEMPUS FUGIT**—It may seem like only yesterday to them that these nine Procurement and Contracts Division employees came into federal service, but it was actually 25 years ago. Receiving the 25 Year Service Awards from Deputy Director of Administration Philip H. Whitbeck are James C. Bishop, Raymond A. LaPlante, Parker L. Carroll, Martin Hooper, Glenn F. Bailey, L. V. Lindley, Leon Kister, Robert L. Kline and Arthur E. Garrison.

**STANDARDIZED TERM LIST—**

**New Thesaurus Aids Information Retrieval**

A preliminary edition of a new thesaurus has been published by NASA to provide a standardized list of terms for indexing and retrieving documents in the NASA scientific and technical information system.

The *NASA Thesaurus* contains approximately 15,000 indexing terms, together with scope notes, subject categories, and cross reference for each term. It is designed to assist users of the NASA technical information system in the retrieval of documents and journal articles in all fields of aerospace and technology. It has extensive cross referencing and access points for each subject concept.

The approved vocabulary was based on the indexing terms developed by NASA during 1962-1966. Other government agency thesauri and subject authority lists supplied additional terms.

The *Guidelines for the Development of Information Re-*

*trieval Thesauri* adopted by the Committee on Scientific and Technical Information (COSATI) of the Federal Council for Science and Technology provided the framework for the formulation of the thesaurus conventions and the cross reference structure used. Close coordination with the Department of Defense's Project LEX has enhanced the effective communication between the technical information systems of DOD and NASA.

The *NASA Thesaurus*, designated NASA SP-7030, is available as a three-volume set for \$8.50 from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

**Revised Apollo Chutes Pass El Centro Test**

A modified parachute system, designed to handle the added weight of the Apollo Command Module, was successfully tested December 20 at the Naval Air Facility, El Centro, California.

The test was a repeat of a similar test which failed October 30 due to a structural weakness in the two drogue chutes used to stabilize and decelerate the spacecraft prior to deployment of the three main chutes. Rings which hold the reefing lines in place separated from the drogue chute canopy, causing the chute to go from partial-open to full-open prematurely and fail.

For the test the reefing ring attachment to the drogue chutes had been strengthened. An instrumented parachute test vehicle (PTV) containing the two drogue chutes and the three main chutes was dropped from an aircraft at an altitude of 30,000 feet. The drogue chutes deployed as planned at about 24,000 feet, stabilizing and slowing the 13,000 pound PTV sufficiently for deployment of the main chutes at an altitude of 10,000 feet.

A 16.5 foot diameter drogue chute and a two stage reefing system for the main chutes are modifications being tested to handle weight increases in the Apollo Command Module resulting from the new hatch design and fireproofing modifications recommended by the Apollo 204 Review Board. The previous Apollo earth landing system used two 13.7 foot diameter drogue chutes and a single stage of reefing for the 83.3 foot diameter main chutes.

The main chutes, with the new two stage reefing system, had successfully completed a series of tests before the unsuccessful PTV test combining both drogue and main chute systems.

Following the PTV failure October 30, the enlarged drogue chutes were strength-verified in a separate test to determine if fixes to the reefing ring attachments were sufficient. The chutes were dropped with a 13,000 pound weight December 8 at El Centro in a test, which subsequent data analysis showed, produced loads on the chutes far in excess of design limits. Although both drogues eventually failed in the test, they remained intact until dynamic loads reached 150 per cent of "worst case" conditions.

The full complement of Apollo parachutes will be tested at least three more times with an instrumented parachute test vehicle before being dropped with a full-scale boilerplate spacecraft.

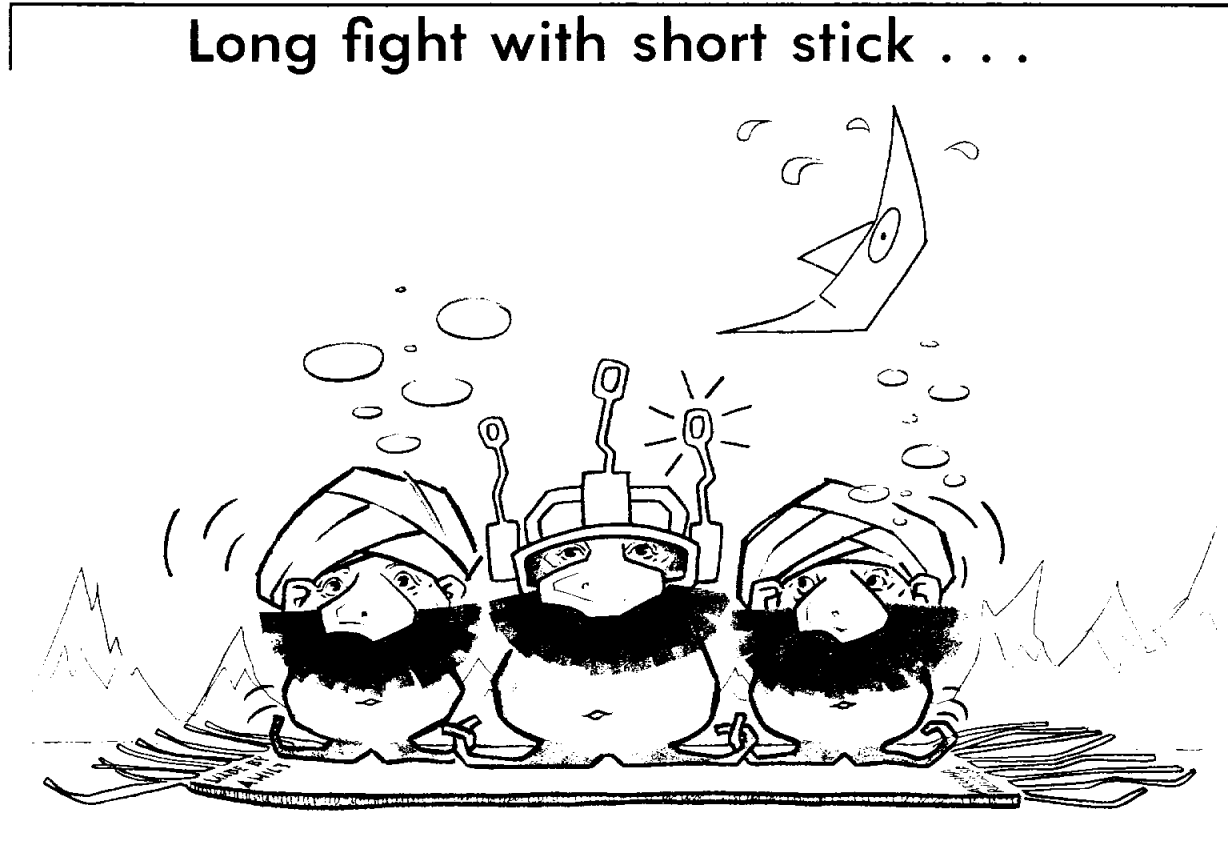


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The *Roundup* is an official publication of the National Aeronautics and Space Administration Manned Spacecraft Center, Houston, Texas, and is published every other Friday by the Public Affairs Office for MSC employees.

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



**Markley Resigns To Take Post With Link Group**

J. Thomas Markley announced December 22 his resignation as Assistant Manager, Apollo Spacecraft Program Office (ASPO), effective late in January.

Markley has accepted the position of Assistant to the President of Link Group, General Precision Systems Inc., Binghamton, New York.

The vacated position here will not be filled. George M. Low, ASPO Manager, said Markley's responsibilities will be distributed among the program office's division chiefs. Those responsibilities include supporting Low in the management of the overall Apollo program, with particular emphasis on contract management, budgeting, scheduling, and program planning.

Markley has been involved in the Apollo Program since 1960. Prior to becoming Assistant Manager, he served as Chief of the Program Control Division, and Resident Manager of the ASPO office at the North American Aviation plant, Downey, California.

Markley joined NASA in 1956 at Langley Research Center, Virginia, after graduation from Shippensburg State College, Shippensburg, Pennsylvania, with a Bachelor of Science degree in physics and mathematics. He was active in the Mercury Program and has served on loan to the Air Force as a technical advisor and to industry to develop management systems.

Markley said that he has desired for some time to gain industry management experience with a diversified organization. He said he considered the successful Apollo IV mission a milestone in his personal career plans and the culmination of his contribution to the program, and he would like to pursue his interest in corporate management.

Markley, his wife, and their three children live in Dickinson, Texas.

# 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/RENT—REAL ESTATE

For rent—3-2-2 in Seascope (Seabrook). \$200. Immediate possession. Lease for period of two months or more. Glenn Smith, 591-4761

3-2-2 brick in Fairmont Park, Central air/heat, built-in kitchen, carpets, fenced yard. Monthly payments \$129. 5 3/4 VA, low equity. R. L. Baumgartner, GR 1-4765.

### FOR SALE—AUTOS

62 Chevrolet Biscayne, 6 cylinder, standard transmission, air conditioning, radio, heater. Excellent condition. Paul Stokholm, 932-3753 after 5 pm.

63 Fiat 1100, 4 dr. sedan, 4 speed, clean, good tires, R and H. \$300. L. Browning, 932-2750.

64 Ford Country Sedan, V8, automatic, air conditioning, heater, radio, tinted glass, whitewall tires, \$950. Mary Dunn, GR 9-1295.

52 Chevrolet, 2 door, new engine, good mechanical condition, \$175. Mary Dunn, GR 9-1295.

Jaguar Sedan, 3.8-litre MkII, 4 year w/ O/D, air conditioned, 44,000 miles, very good condition. R. Soens, 877-2380.

67 Chevy Impala fordor hardtop, 9000 miles, full power, air. Paul Weitz, 591-3071.

2 door hard-top 64 Bonneville Pontiac fully equipped with factory air, AM/FM

radio, 6-way power seats, power brakes and steering (adjustable steering wheel), and power windows. Clean car in excellent running condition. Can be seen at the Balboa Apartments, 2002 San Sebastian Court, Apt. 238, Nassau Bay. Home phone 591-2783, business phone 591-7494. R. H. Lundberg.

63 Volvo P-1800 sports coupe, ivory with red leather interior, overdrive, AM/FM, very good condition but needs tires, \$1625. Gary C. Hitt, HU 8-3530 Ext. 2207, or 591-2730 (Nassau Bay) after 5.

59 Triumph TR3. New tires and black paint, telescoping steering wheel, radio, heater, tonneau cover, boot, and convertible top. Runs very good. Extra clean. Price: \$550. Will pay all transfer fees. Clayton Pollard, HU 7-0024.

1929 Model A two door sedan. Call to see. Larry Arnim, HU 8-2757.

### FOR SALE—MISCELLANEOUS

Early American Furniture, Orange and brown tweed chair/one half with matching ottoman, \$135; Sprague and Carlton hard-rock maple coffee and two end tables, \$90. Maple dinette set, round table with formica top and four captains chairs, \$60. James W. McBarran, 591-3778.

Roller skates, Chicago, boys, size 6. Very good condition. \$15. R. Hill, 471-4305.

Interested in Viviane Woodward cosmetics? Flossie D. Leggett, 591-4591 after hours.

61 Chevrolet Engine disassembled and ready for rebuilding, power pack heads and four-barrel, intake and exhaust manifolds. \$65. N. Corbett, Ext. 5961 (no home phone).

1960 Glasper Citation, six individual seats, 75 hp Evinrude, tilt trailer, top and stern cover, extras, excellent condition, \$1250. N. Corbett, Ext 5961 (no home phone).

Instrument flight instruction, Cessna 172/Skyhawk. Full panel, beacon, heated-pitot, dual altimeters, cylind. and carb. temps., man. press., triple clocks. MARCO; dual MK XII A transceivers, dual VOA-9 VOR/ILS Nav., UGR-2 glide-slope, ADF-31, UDI-4

DME/GS, UAT-1 transponder. KING; 3 light marker beacon, 12-B master radio control. TELEX; dual boom mikes and earphones. Also, instruction toward commercial, multi-engine, and instructor ratings. Story Musgrave, 877-1416.

Puppy, half Boxer, very smart. Free. 932-2897, J. Rodman.

21 ft. Cris Craft, 1954, plus 4-wheel trailer. \$800. Williams, 5779 Bellfort, MI 3-7337 after 6 p.m.

Two speaker enclosures. Large folded corner horns. Jensen design, custom built for 15 inch speakers. Walnut speakers and baffle boards. \$25 each, both for \$45. Call Jerry Grayson, GR 4-3770.

Spanish-Mediterranean style double bed (box springs and mattress included), barely one year old. Will take best offer. C. Maltese, Ext. 2321. (no home phone)

Brittany Spaniel puppies, national champion sire, four generation pedigrees furnished. Good pointers, retrievers, and family dogs. David O'Brien, 946-3570.

### WANTED

Female roommate wanted. Would like to move to Tally Ho Apts. to one-bedroom. Terry Martin, MO 5-1883 or JA 9-4301, Ext. 48.

Roommate to share three bedroom house. Near Foley's on Gulf Freeway. Ray Bruneau, 946-5810, Ext. 5945.

Wanted: female roommate to share apt. at College-Field apt. near University of Houston. Arminta Yanez, MO 6-2398 after 5:30 pm.

Model Railroad Buffs interested in local club information please contact Don Lee, 483-7447.

Will the person who took, during the NASA Christmas Party at the Shamrock Hilton on December 16, 1967, a black pony-skin purse (8" by 8") containing black leather gloves and no identification please return same to Malcolm E. Jones at EG26 or at 1015 North Country Club Drive, LaPorte, Texas 77571. Thank you.

## Out of the Woodwork



**MOPPETSVILLE**—More than 800 hungry tads stowed away 1000 cupcakes, drank 30 gallons of fruit punch and carried home as many gifts from the December 16 MSC Children's Christmas Party. MSC's contribution to the population explosion gathered first in the auditorium to visit with TV catgirl Kitiriki and to sing along with Wanda Slack before migrating to the cafeteria for grub and gifts handed out by Mr. and Mrs. S. Claus (Cy Baker and Margaret Buford). The party committee was chaired by MSC chief telephone operator Helen Ragsdale.

## Chorus Presents Mozart Requiem Pilot Memorial

The annual Bay Area Chorus spring concert will be a presentation of Mozart's *Requiem* as a special Astronaut Memorial Concert in memory of the eight MSC pilots who have died.

First rehearsal will be held January 7 at 7:30 pm at the Clear Lake City Recreation Center. Paul Harrison will direct the concert and rehearsals.

Harrison will hold auditions for four solo parts—soprano, contralto, tenor and bass—at 7 pm January 21 at the Clear Lake City Recreation Center. Experienced choral singers and soloists are invited to take part in the concert which will involve 14 Sunday night rehearsals. Participants are asked to bring \$2.50 to the first rehearsal to cover the cost of music sheets.

## Seven Take Part In Space Science Writing Seminar

Seven MSC and contractor employees will take part in a seminar on "Space Science Writing at a Down-to-Earth Level" January 20 at Rice University.

MSC participants are Public Affairs Officer Paul Haney, Reproduction Services Branch chief Roy L. Magin, Jr., scientist-pilot Dr. F. Curtis Michel and Management Services Division assistant chief for technical information programs Charles M. Grant, Jr. Contractor participants are Joe Godfrey IBM, John Stout ITT/FEC and Lee Estes, Rice University.

The seminar is sponsored jointly by Rice University and the Houston Chapter of the Society of Technical Writers and Publishers.

## Apollo Ship Mercury Gets Final Fitting-Out

The *USNS Mercury*, third of the Apollo insertion-injection ships, left the General Dynamics shipyard at Quincy, Mass., December 18 after successfully completing final contractor instrumentation system tests.

The *Mercury* docked at the Bethlehem Steel shipyard, Hoboken, N.J., to undergo US Coast Guard and American Bureau of Shipping inspections. Here NASA will begin instrumentation adjustments in preparation for Apollo 503, the eight-hour unmanned Earth orbital flight next year of the Saturn V and the Command and Service Module.

Range testing and final preparations for Apollo 503 will begin near the end of January when *Mercury* will arrive in Florida waters.

The *Mercury* and her two insertion-injection sister ships, the *Vanguard* and *Redstone*, and the reentry ships *Huntsville* and *Watertown*, are part of the National Range Instrumentation Ship pool. For Apollo missions, they are operated as integral

members of NASA's Manned Space Flight Network of 14 land stations, five ships and eight instrumented aircraft. This combination supports Apollo with tracking, command, and voice and telemetry communications by way of land lines, microwave, submarine cable and communications satellites.

*Mercury*, *Redstone* and *Vanguard* will be equipped with special antennas for communications between Apollo crewmen and Mission Control-Houston via satellites over the Atlantic and Pacific. *Mercury* and *Redstone* will be stationed in the Pacific for the Apollo 504 lunar mission simulation (unmanned) in 1968, the *Vanguard* in the Atlantic. The *Vanguard* is at the Quincy yard for completion of its satellite communications antenna.

Responsibility for operation of the Apollo ships is assigned to the Air Force Western Test Range in accordance with NASA/Apollo Mission network procedures. The ship's crew is provided by Military Sea Transport Service, and the technical instrumentation crew by Air Force. Operation of the Manned Space Flight Network is the responsibility of NASA's Goddard Space Flight Center, Greenbelt, Md.

### BUY U.S. SAVINGS BONDS

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## Bridge Club Conducts Class In Beginning Contract Bridge

The MSC Duplicate Bridge Club will conduct a beginners contract bridge class starting January 15 each Monday evening for 10 weeks. The class is recommended for persons who

have never played bridge or who have not played using the modern point-count system of bidding.

Each class will start at 7:30 pm and will end by 10 pm at Bldg 336, Ellington AFB.

The classes are aimed toward producing good rubber bridge players. Short lectures will be followed by bidding and playing of bridge hands. Since actual bridge experience begins at the first class, attendance is imperative.

Registration is limited and will require a \$10 fee payable in advance or during the first class period. Text books will be available—but not required—at a nominal charge. Call Jim Raney at Ext 4015 or HU 8-0324 for registration information.

Standings in Club Master Point games are as follows: November 28, 7 1/2-table Mitchell movement: North-South—D. E. and Betty Leighton 1st; F. Walser and W. W. Bryan, East-West—Mr. and Mrs. R. P. Karcis.

## BOWLING

MSC Men's League

TEAM	WON	LOST
Rompers	31	21
Humbugs	29	23
Jokers	28	24
Croakers	25	27
High Hopes	23	29
Wheels	20	32

High Series: J. W. McWhorter 610, H. F. Erickson 587, S. S. Esparza 584.

High Games: R. F. Fletcher 246, J. W. McWhorter 235, H. F. Erickson, H. L. Bell and A. K. Spivey all 232.

The MSC Men's League meets at 5:30 pm Mondays at Ellington AFB Bowling Alley and is a handicap league open to MSC and contractor employees when vacancies exist. For membership call Roy White at Ext 7741.

Receive Merit Awards



**Russel L. Newlin**  
Sustained Superior Performance

**Charles L. Royston, Jr.**  
Quality Salary Increase

Both of Information Systems Division

# Pioneer VIII Measures Solar Storm Hazards

The Pioneer VIII Space Probe launched successfully December 13 is considered a substantial aid to science in forecasting solar events that may be hazardous for space travelers.

The eighth solar orbiter joined Pioneers VI and VII, launched in December 1965 and August 1966 respectively—the three reporting solar events from points separated many millions of miles apart. Their findings are relayed through the NASA Deep Space Network.

Pioneer is able to warn of storms on the Sun as much as 17 days in advance of their effects reaching the vicinity of Earth.

All seven experiments on Pioneer VIII are operating well. The 145-lb. probe will begin measuring the shape of the Earth's magnetosphere 36 days after launch and about 1,842,000

miles from Earth. The magnetosphere is some 3.5 million miles long.

Pioneer VIII will make a complete solar circuit in 387.5 days. Its aphelion (farthest point) will be 101,130,940 miles from the Sun. Perihelion (nearest point) will be 92,131,930 miles.

The Pioneer series is a project of NASA's Ames Research Center, Mountain View, Calif.

## Straight Talk from your Credit Union

By Paul Sturtevant

### CU Annual Meeting Coming Up

The annual meeting and election of directors and credit committee members for 1968 will be held on January 24. All members are earnestly urged to attend this important meeting.

The nominating committee will have a slate of proposed directors and committee members for your selection, and, of course, nominations from the floor will be accepted.

The meeting will be held in the Bldg 11 cafeteria at 5:30 pm. Light refreshments will be served and a door prize of five Credit Union shares will go to some lucky member. Call Ext 2066 and let us know if you plan to attend.

### CU Declares 5% Dividend

A dividend of 5% was declared by the board of directors in a special meeting January 2. The dividends are payable on paid-up share on deposit on December 31, 1967. (A paid-up share is \$5, although a member may deposit any part of a share.)

# Midget Satellite Plays Tracking Target Part

The Test and Training Satellite (TTS-1) is a new, major aid in preparing tracking stations for Apollo space flights beginning early in 1968.

The Manned Space Flight Network (MSFN) can check out its stations for tracking telemetry and command signals which must be fully reliable for Apollo. At the same time, technicians can be trained under actual orbital conditions.

The small satellite was launched piggyback December 13 by NASA from Cape Kennedy on a rocket that sent Pioneer VIII into orbit around the Sun. TTS travels on a 187-by-303-mile orbit around the Earth, making one revolution each 92 minutes on an inclination of 33 degrees.

TTS-1, a 40-pound, two-foot, diamond-shaped spacecraft, has a gold-colored frame and blue solar cells covering its eight triangular faces. Its main component is a transponder, whose function is to receive radio signals and return them, on a different frequency, to Apollo S-Band stations for practice. A VHF radio receiver-transmitter system equips it for ordinary tracing and telemetry.

TTS takes the place of aircraft simulators flying over the tracking stations. It has advantage over the airplane ordinarily used for that purpose because TTS can more closely simulate Apollo orbital flight. Besides, it permits multiple station tracking.

Swinging around the 14 stations of Manned Flight Network at space flight altitudes, TTS-1 makes a moving transponder target for each station in turn to locate, send a signal and receive a reply. Comparing the test data sent out with the test data received, station technicians check out their systems and at the same time learn to use them to greatest advantage.

Getting TTS ready for these functions demonstrated how separate networks, the Manned Flight and the STADAN, back-up each other in the NASA world tracking facilities.

STADAN, the Satellite Tracking and Data Acquisition Network, is concerned with the unmanned scientific satellites, such as Explorer, orbiting observatories, weather and the Advanced Technology Satellites. Through years of experience, 24 hours a day, with 50 or more satellites, STADAN is well qualified for the TTS house-keeping task.

Entirely apart from the S-Band transponder, TTS has a Very High Frequency System for working with STADAN.

TTS was launched at 9:08 a.m. from Cape Kennedy as a piggyback on the second stage of the Augmented Delta vehicle whose third stage put Pioneer VIII in solar orbit. Exactly 31 minutes after liftoff, STADAN's 40-foot diameter paraboloidal antenna at Johannesburg, South Africa, had TTS in sight. Five minutes later the satellite swung directly over the slot-and-rail Minitrack antenna, confirming TTS in orbit.

TTS is now being used by the Apollo stations although the spacecraft is still in its stabilization and checkout phases. STADAN monitors all data, verifies when it can be used by Apollo stations, and commands TTS to its proper mode. When test work is over, STADAN returns the satellite to stand-by status. In this way STADAN relieves the Manned Space Flight Network of routine chores of control, giving all stations free hand to test and train for the big events of future Apollo flights.

## Co-op of Month



**HIGHLY COMPETENT** — Jack C. Boykin, co-op employee assigned to the Power Distribution and Sequencing Section of IESD's General Instrumentation Branch, is a student at the University of Houston. His assignments have included equipment analysis and systems test procedures in support of Apollo mission requirements, lab testing of Apollo Electrical Power System and developing computer simulation of Apollo EPS functions—all done, according to his supervisor, in a "high level of technical competence . . . showing cooperation and alertness inducing an excellent relationship with co-workers."



Dr. Jean Piccard and his comely wife Jeannette slipped silently into the heavens aboard the first stratospheric balloon piloted by a woman. Their objective was to measure cosmic radiation and conduct other scientific studies above the earth's sensible atmosphere.

Jeannette, the pilot, recorded an altitude of more than 57,500 feet in the ship's log.

The Piccard gondola was built to Jean's exacting specifications and provided what might aptly be described as the first U.S. spacecraft.

The adventurous Piccards paved the way for the manned spaceflights of this generation, and their pioneering efforts provided a dramatic test of basic design concepts, including the use of pyrotechnic devices, pressurized cabins, and viewports.

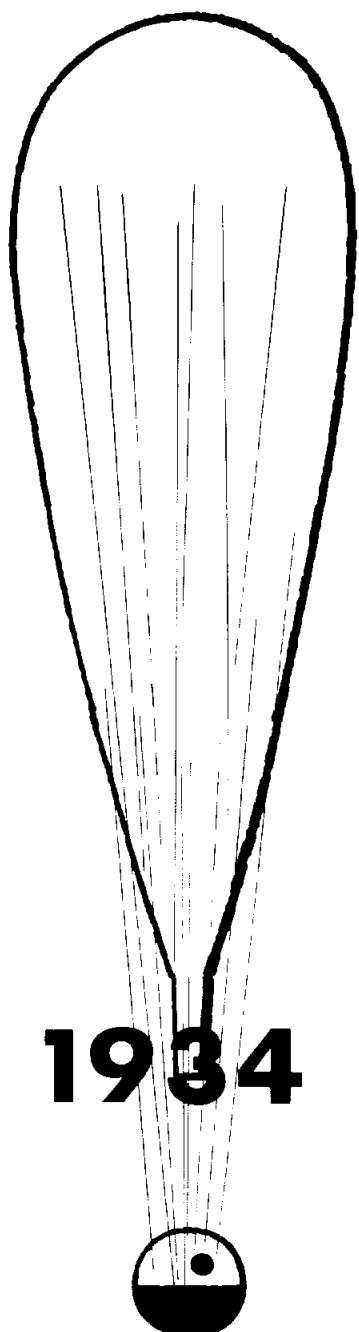
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Apollo, however, is another breed. With its more than five and one-half million parts, Saturn-Apollo bears little more resemblance to Piccard's balloon than would one of today's transcontinental jet transports (and will weigh as much as twenty-five 707's fully loaded, with fuel, passengers, and crew!).

Clearly, Apollo is more than a flight program. It is a test of the best of our energies and skills.

Any crew member will tell you, "There are no non-essential components in Apollo."

(Including you.)



## EAA to Discount Sea Arama Tickets

March will be MSC month at Sea Arama in Galveston.

Under arrangements made by the Employee Activities Association, MSC employees will be able to buy tickets to the Sea Arama marine life show for \$1 each for all ages. The discount price is less than half the regular adult price—\$2.25.