

# MSC, Brazil Launch Radiation Belt Probe

A rocket probe is scheduled for launching over the South Atlantic from Natal, Brazil on June 10 to obtain data useful to scientists in studying the dynamics of the inner radiation (Van Allen) belt. The project is a cooperative effort of NASA and the Brazilian National Space Commission (CNAE). The information obtained by the probe should also be useful in safeguarding astronauts in relatively low altitude missions in the vicinity of the radiation belts.

The project, known as the South Atlantic anomaly probe, will be carried out by CNAE scientists and technicians from the Barreira do Inferno range near Natal, with launching services being provided by Brazilian Ministry of Aeronautics crews. The project takes its name from a region over the South Atlantic where the radiation belts come uniquely close to the earth's surface.

Launch vehicle for the probe is the Canadian-built Black Brant IV, a two-stage, solid propellant rocket designed for scientific soundings of the upper atmosphere and the near space environment. The 37-foot-tall Black Brant will boost the payload to an altitude of 535 nautical miles above the South Atlantic.

The experiment package, which weighs approximately 80 pounds, consists of magnetometers for magnetic field measurements, five-channel electron spectrometer for defining the electron flux of the anomaly, three ion chambers for radiation dose measurements and a heavy ion detector.

Measurements within the anomaly will begin when the rocket reaches 360,000 feet at 50 seconds into the flight. The experiment package will transmit data to ground stations at Barreira do Inferno range. Data will be collected by the Brazilian team on magnetic tapes for evaluation by MSC which is managing the program for NASA.

The second stage of the Black Brant IV is scheduled to land in the ocean 200 miles downrange from the launch site. It is not planned to recover the instrument package.

Launch window is from June 10-18 based on the correct position of the Moon for the lunar aspect (sensor) device aboard the rocket.

Under the cooperative agreement, MSC's Space Physics Division, of the Science and Applications Directorate, which designed and fabricated the ex-

periment instrumentation, is directing the program. The Sounding Rocket Branch of NASA's Goddard Space Flight Center, Greenbelt, Maryland, is assisting in the launch and data recovery. For Brazil, the CNAE is providing overall management direction and scientific coordination and the Brazilian Ministry of Aeronautics is carrying out launching and data recovery operations.

The Black Brant is manufactured by Bristol Aerospace Limited, Winnipeg, Canada. In addition to furnishing the rockets and related hardware, Bristol is responsible for the training of Brazilian launch crews at Natal.

Subsequent flights are planned to obtain similar data in the future.

## Aeromedics Name Berry 1969 Prexy

MSC Medical Research and Operations Director Dr. Charles A. Berry May 9 was elected 1969 president of the Aerospace Medical Association at the ASMA 39th annual meeting in Bal Harbor, Fla.

Six MSC employees presented papers at the four-day session. They were Drs. E. L. Beckman, K. N. Beers, and J. A. Rummel; M. I. Radnofsky, Crew Systems Division chief Richard Johnston and Edward Michel.

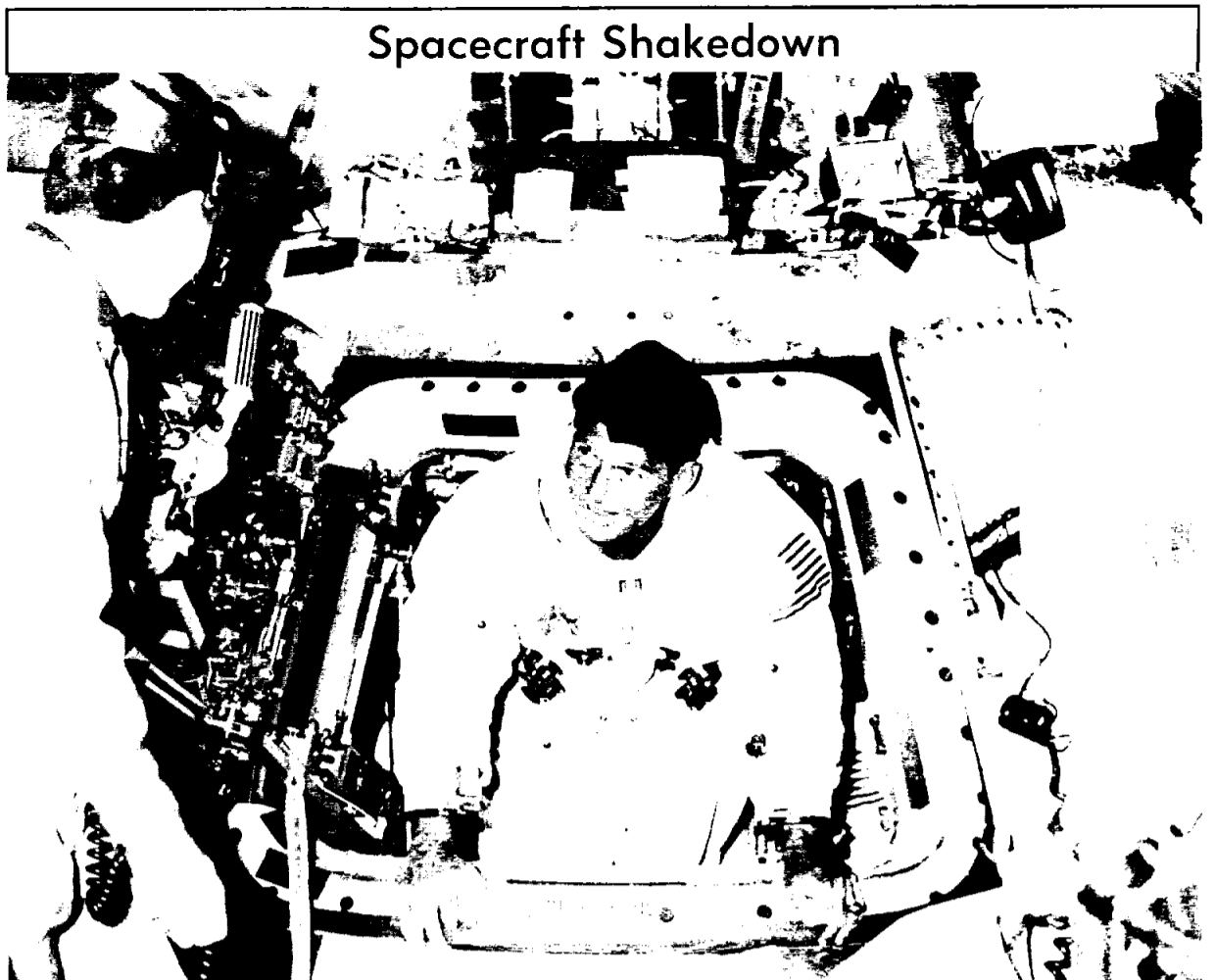
Four MSC Medical Directorate doctors took American Board of Preventive Medicine examinations during the ASMA meeting.

In the closing session, ASMA named astronaut Edwin E. Aldrin as an honorary member, bringing to 78 the total of honorary members named in 39 years — among whom are astronauts Alan B. Shepard, Jr. and John H. Glenn, Jr.

## Hodge to Head Lunar Plan Group

Reassignment of three MSC officials aimed at closer coordination of advanced lunar exploration planning and strengthening of the Center's system testing activities was announced last week by MSC Director Dr. Robert R. Gilruth.

Flight Control Division chief, John Hodge has been assigned as Director of a newly estab-

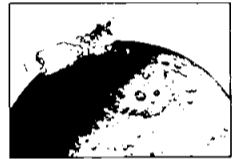


**CHECKOUT**—Apollo command module 101 May 11 underwent a day-long Crew Compartment Fit and Functional test (C<sup>2</sup>F<sup>2</sup>) in North American Rockwell's Downey cleanroom. Here, astronaut Walter M. Schirra, Jr. crawls out of the spacecraft at the end of the test. Schirra is command pilot for the first manned Apollo mission with Walter Cunningham and Donn F. Eisele as LM pilot and command module pilot, respectively.

# ROUNDUP

NASA MANNED SPACECRAFT CENTER

HOUSTON, TEXAS



VOL. 7, NO. 16

MAY 24, 1968

## Apollo 101 SM Goes to KSC, Support Testing Continues

The service module for the first manned Apollo mission last Friday was shipped to Kennedy Space Center from the North American Rockwell plant at Downey, Calif. Apollo command module 101 is scheduled to follow later this month.

After the command and service modules have been mated they will undergo manned and unmanned vacuum chamber tests at the KSC Manned Spacecraft Operations Building prior to being stacked on the A/S 205 uprated Saturn launch vehicle.

Preparations began Tuesday in the MSC Space Environment Simulation Laboratory for the seven-and-a-half day thermovacuum test of spacecraft 2TV-1 scheduled for early June. Dry-runs for rehearsing ingress, egress and emergency procedures and checkout of spacecraft suit loops with spacecraft and SESL Chamber A at ambient temperature and pressure, were begun by astronauts Joseph Kerwin, Vance Brand and Joe Engle.

The crew leaves the spacecraft at the end of each day's dry run, but will remain in the spacecraft during the actual test for the entire period.

Conducted for the Apollo Spacecraft Program Office by Structures and Mechanics Division, the test series has a primary objective of assuring that the spacecraft maintains the proper thermal balance in the thermovacuum environment of space. Equipment heating and cooling and life support functions of the spacecraft environmental control system will be under close scrutiny during the 2TV-1 test.

In SESL Chamber B, at the other end of the facility's high bay, countdown was scheduled to begin today in a similar series of tests of Lunar Module Test Article-8 (LTA-8). Countdown, chamber pumpdown, vehicle thermal stabilization and initial

lished Lunar Exploration Working Group. Eugene F. Kranz, deputy chief, Flight Control Division, will serve as acting chief.

Aleck C. Bond, Manager of the Reliability and Quality Assurance Office and the Flight Safety Office, has been reassigned, effective June 1, 1968, as Manager, Systems Test and

Evaluation, Engineering and Development Directorate.

White Sands Test Facility Manager Martin L. Raines will become acting manager of the Reliability and Quality Assurance Office and the Flight Safety Office, in addition to his White Sands assignment.

Gilruth said that the Lunar Exploration Working Group will be responsible for planning, coordinating and directing all aspects of the Lunar Exploration Program at MSC.

As Director of the group, Hodge will be responsible for coordination and direction of all MSC activities relating to lunar exploration and representing MSC with the Apollo Lunar Exploration Office in the Office of Manned Space Flight, NASA Headquarters, and other groups outside MSC involved in the Lunar Exploration Program.

The group will be charged with reviewing and coordinating all Center activities which support future missions, including ad-



John D. Hodge

Eugene F. Kranz

## Space Seminar Hears Dr. Foelsche June 21

Dr. Trutz Foelsche, staff scientist of the NASA Langley Research Center Space Mechanics Division, will be the speaker at the June 21 MSC Space Physics Division seminar at 3 pm in Bldg 31 conference room.

Foelsche's topic will be "Radiation Measurements on Lunar Orbiter."

(Continued on page 2)

(Continued on page 2)

**Win Cash for Ideas**



**Ray Heiskala, \$595**  
Apollo equipment maintenance recall system.



**Dean C. Glenn, \$100**  
Invention "Rolling-Element Bearings"



**L. G. Fehrenkamp, \$35**  
Flexible foam insert packaging method



**Allivan F. Bray, \$25**  
Fire extinguishers for Downey Bldg 290



**C. P. Canup, \$25**  
Install step on Tri-chlor tank



**Joyce Gaddy, \$25**  
Publish announcements of misplaced property



**Elmer Hardaway, \$25**  
Install eyebath



**E. L. Shropshire, R. A. Donatto, split \$25**  
Guards for shear control switches



**David L. Starkey, \$25, \$15**  
Electrical connector color code; improve wiring procedures



**Art Torres, \$25**  
Test Record quick-look status block



**Terry White, \$25**  
MCC viewing room seats for employee recognition



**William Douglas, \$15**  
Reuse of Polaroid slideholders



**Emily Ertl, \$15**  
Cafeteria box lunches



**Mary L. Turpin, \$15**  
Monthly reminder calendar

**Balloon Jolt Hurts Consultant**

MSC consultant Dr. Jeanette Piccard last week sustained a broken ankle when the balloon in which she and two members of her family were flying made a hard landing near Canyon, Texas. With her were Dr. Jacques Piccard and Don Piccard. The trio had taken off from Amarillo, center of US helium production.

Dr. Piccard was to have been released from an Ama-



rillo hospital by mid-week and planned to keep a speaking engagement tomorrow night in Minneapolis and a heavy speaking schedule during the next few months. Her ankle will be in a cast for six weeks.

She and her husband, Jean Piccard, in 1934 ascended to 57,579 feet in a stratosphere balloon for which she received that year's Clifford B. Harmon International Trophy for outstanding achievement in the aeronaut (spherical balloonist) category.

**Sullivan Elected ASPA President**

Leslie J. Sullivan of the MSC Flight Operations Directorate recently was elected president of the Houston chapter of the American Society for Public Administrations. ASPA is a national professional organization of federal, state and local government employees and educators dedicated to improving public service management.

Other newly-elected chapter officers are: Vice president Jim Fulton of MSC Work Package Task Force Committee; Treasurer Evon Collins of MSC Resources Management Division, and Secretary Aneta Davis of MSC Management Analysis Branch.

Chapter council members elected are Edward Farley, University of Houston; Tom Lord, executive director of the Houston Mayor's Committee on Housing; Jack Lister, chief of MSC Personnel Division; Don Blume, chief MSC Management Services Division; Earle Young, chief MSC Management Analysis Branch, and Dr. Irving Dawson, chairman of the Lamar State College of Technology Department of Government.

Young and Blume are chapter past-presidents. NASA Administrator James E. Webb is a member of the National ASPA Council and past president of the society.

**Apollo Hardware**

*(Continued on page 2)*

unmanned testing are expected to take about three days, with first of four manned runs scheduled for May 28 or 29. Crewmen for the tests will be astronaut James Irwin and Grumman pilot Gerald Gibbons.

**Hodge**

*(Continued from page 1)*

vanced technology, experiment definition and other related activities.

Gilruth said other members of the Lunar Exploration Working Group will be named at a later date.

The reassignment of Bond to his former position in the Engineering and Development Directorate is to enable him to assist E&D Director Maxime Faget in planning, directing and managing the large volume of test activity carried out by the directorate, Gilruth said. This activity is now at its peak in the Apollo Program, Gilruth pointed out.

Raines' assignment as acting chief of the Reliability and Quality Assurance Office and the Flight Safety Office recognizes the value in that position of Raines' experience during the past six months as a member of a special team headed by Dr. Eberhard Rees of Marshall Space Flight Center, which has been assisting Apollo Spacecraft Program Manager George M. Low with manufacturing problems arising in that program.

**United Fund Leader**



**EXCEEDS GOAL**—MSC White Sands Test Facility manager Martin L. Raines, left, presents the El Paso United Fund Leadership Award to MSTF Operations Support Office chief L. Maurice Clelland for his effort as chairman of the 1968 WSTF Combined Federal Campaign in which the dollar goal was exceeded by 20 percent with a 98.5-percent WSTF employee participation.

**HERE WE GO AGAIN—**

**Job Level Freeze Lessens Potential FY69 Cut Impact**

NASA has notified all field centers and offices to hold permanent employment to their on-board strength as of the close of business May 13.

Additionally, centers have been advised that this level may be further decreased by 75 percent of its attrition between May 14 and June 30. For example, for every four losses by attrition one may be replaced.

The NASA action is prompted by budget considerations.

No adjustment in the currently authorized summer employment is planned at this time.

Through limiting new employment now and reducing personnel ceilings by attrition, NASA hopes to minimize the impact of potential manpower adjustments which may become necessary at the beginning of the new fiscal year.

NASA's budget request for FY 1969 includes 32,727 permanent civil service employees. The actual employment level which can be supported in FY 1969 will depend on the final action by Congress on pending legislation and on actions by the Administration.

If current employment limitations are continued, the reductions in civil service employment in NASA for FY 1969 could exceed 1000.

For planning purposes, NASA installations have been requested to assess the program impact of continued reduction of civil service employees and contractor support effort.

**Spectroscopists Briefed by King**

MSC Lunar Receiving Laboratory curator Dr. Elbert King May 21 briefed some 80 members of the Houston chapter of the Society of Applied Spectroscopy on the techniques to be used on returned lunar samples. During the detailed LRL tour, King outlined experiments and analyses to be run on moon samples in the LRL.

King recently was awarded a fellowship in the Meteoritical Society.

**Directorship Handover**



**NEW BOSS**—Edgar M. Cortright, left, takes over reins of the NASA Langley Research Center in May 1 handover ceremonies in the Center auditorium. Outgoing Director Dr. Floyd L. Thompson, right, headed the Langley Center for eight years, and will serve as special assistant to NASA Administrator James E. Webb until he retires later this year. Cortright until May 1 was Deputy Associate Administrator for Manned Space Flight.

MOPPET THESPIANS

# Pint-Size Theater Stages Wizard of Oz

A child's natural ability to "play like" has been mobilized for the Childrens' Theater on the Bay July 12-13 performances of L. Frank Baum's *Wizard of Oz*, and several aerospace industry and MSC adults are helping the moppets get the play off the ground.

The Childrens' Theater production will be at the LaPorte Civic Center, and a run of *Peter Pan* is scheduled for later in the summer. Casting for *Wizard of Oz* will be held June 4 from 1:30 to 4:30 pm.

Marc Ligon is Theater director, with props by professional artist Ellie Rogers, costuming by Betty Durkee and Jo Ann Serr, and lighting by Theater vice president T. L. Dry. Lynn Wilbarger of Lockheed is Theater president and board members include Marian Di-Valerio, Vicki Gull and Allison Brown.

The Childrens' Theater is affiliated with the Bay Area Fine Arts Association.

Tickets for *Wizard of Oz* (\$2.50/family) can be bought from Theater members or at the door. To take part in the Theater's activities, call Mrs. T. L. Dry at GR 4-3116.

## Kraft Stresses Flight Ops Role, Responsibilities

MSC Director of Flight Operations Christopher C. Kraft, Jr. May 10 told a group of awardees from his directorate that the burden of responsibility for carrying out the United States manned spaceflight program in the coming months is upon them.

Kraft said that while most professions demand full attention of its workers for eight hours of the working day, flight operations people often must devote full attention to their job for most of their waking hours over long periods of time.

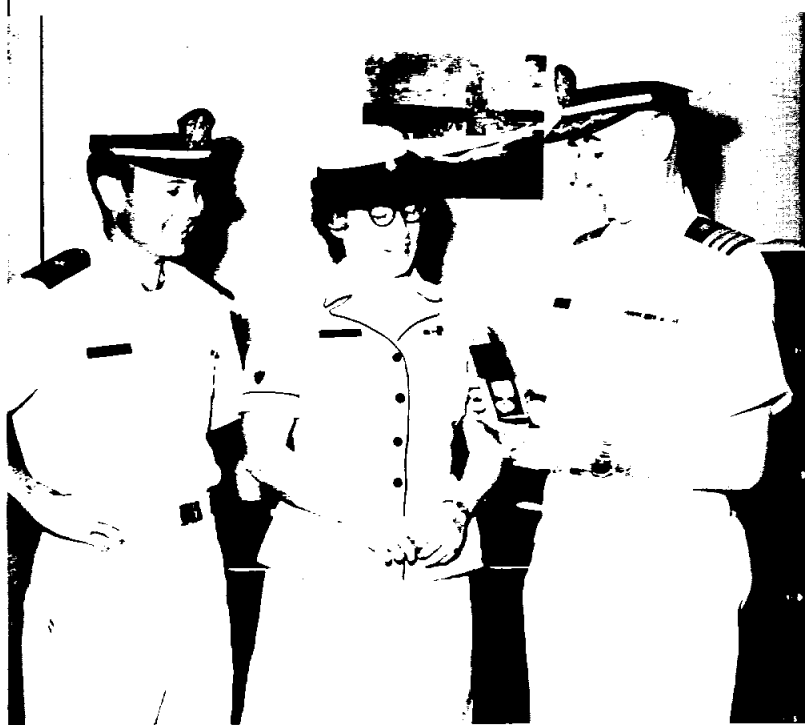
Outstanding performance rating awards, most of which also received quality salary increases or sustained superior performance awards, were presented by Kraft in a Bldg 30 auditorium ceremony.

Receiving OPRs were Jones Roach, James Saultz, Merlin Merritt and Joyce Gaddy of Flight Control Division; Milton Windler and Sheridan Berthiaume of Landing and Recovery Division; M. P. Frank, Robert Ernull, Stanley Mann and Jon Harpold of Mission Planning and Analysis Division; John Frere, John Garman and Judy Ernull of Flight Support Division, and Chris Critzos, Rodney Rose and Connie Love of the Directorate office.



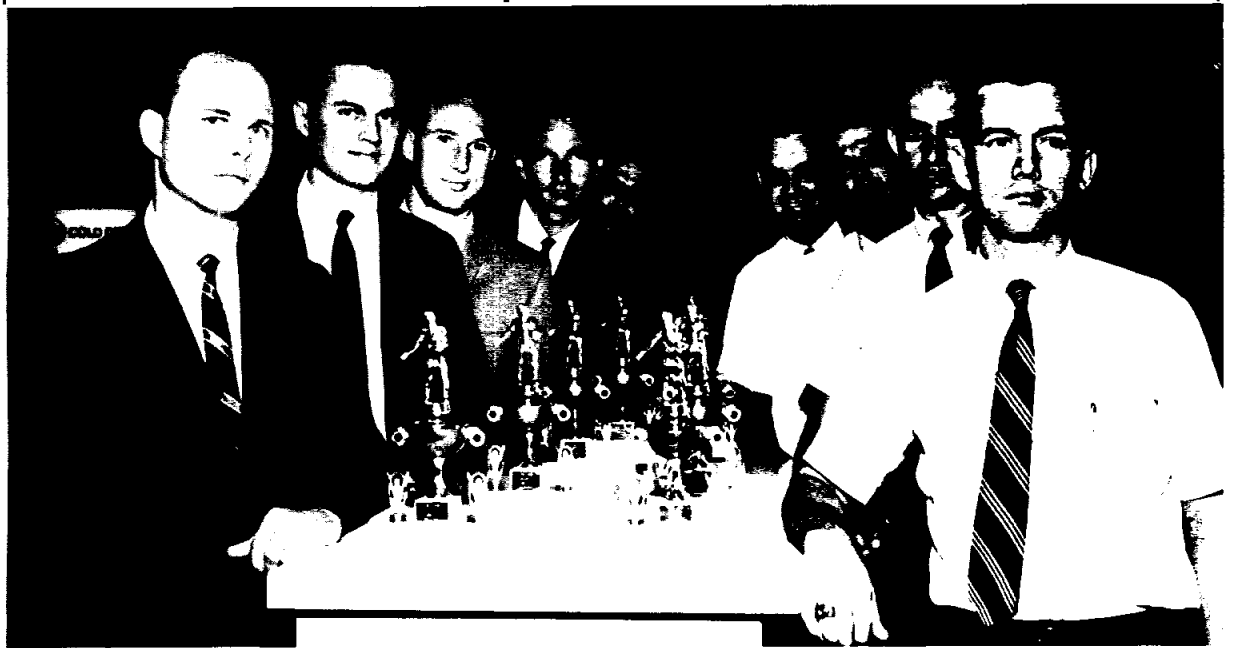
**MOUSEKETEER**—Childrens' Theater on the Bay director Marc Ligon coaches Stacy Dry 4, on the proper way to be a mouse in the upcoming Theater production of *Wizard of Oz*.

## Earns Reservist Medal



**PART-TIME COAST GUARDSWOMAN**—US Coast Guard Reservist PN1PH Virginia De Foy of MSC Photographic Technology Laboratory receives the Armed Forces Reserve Medal for her 10 years service in the reserves from her commanding officer Cdr. Robert A. Tremant, US Navy Reserve, of IESD Space Systems Engineering Office. At right is training officer Lieut. Richard M. Moore, Jr. of MPAD Guidance and Performance Branch. The three are members of the Navy Reserve Mobilization Team 8-15 which meets each Tuesday night at the Navy Reserve Training Center on Old Spanish Trail in Houston.

## Volleyball Court Aces



**TOURNAMENT CHAMPS**—Standing on the top rung when EAA Volleyball Tournament playoffs were over was the Flight Support Division team. Left to right are K. Westerfield, R. Seago, C. W. Vowell, Gid Weber, Matt Quinn, Ray Southers, T. Gibson, J. Stanley and T. Keeton. Not in photo: L. Klotz.



**RUNNERS-UP**—The Association was runner-up team in the volleyball tournament. Left to right are Al DuPont, Larry Hartley, Richard Simms, Wesley Ratcliff, Phil Shannahan, Gene Ricks, Richard Kruse, Bob Becker and Aldo Bordano. Not in photo: Ham Young.



**THIRD PLACERS**—Third place in the tournament was nailed down by the Regional Audit Office team. Left to right are Behn C. Taylor, Robert H. Voigt, Ray C. Longmire, Jerald L. Greif, Billy E. Bullock, Robert T. Voigt and Glenn L. McAvoy. Not in photo: Nick Jones.

## Aerobats Fly at CL Rendezvous Air Show

Chandelles, Cuban-eights, Immelmann turns and other such whifferdills will perforate the sky over Spaceland Airpark in League City June 8 and 9 as the Clear Lake Rendezvous Air Show gets off the ground.

Among the aerobats flying in all attitudes except straight and level will be the US Navy Flight Demonstration Team, otherwise known as the Blue Angels, flying Grumman F11 Tigers.

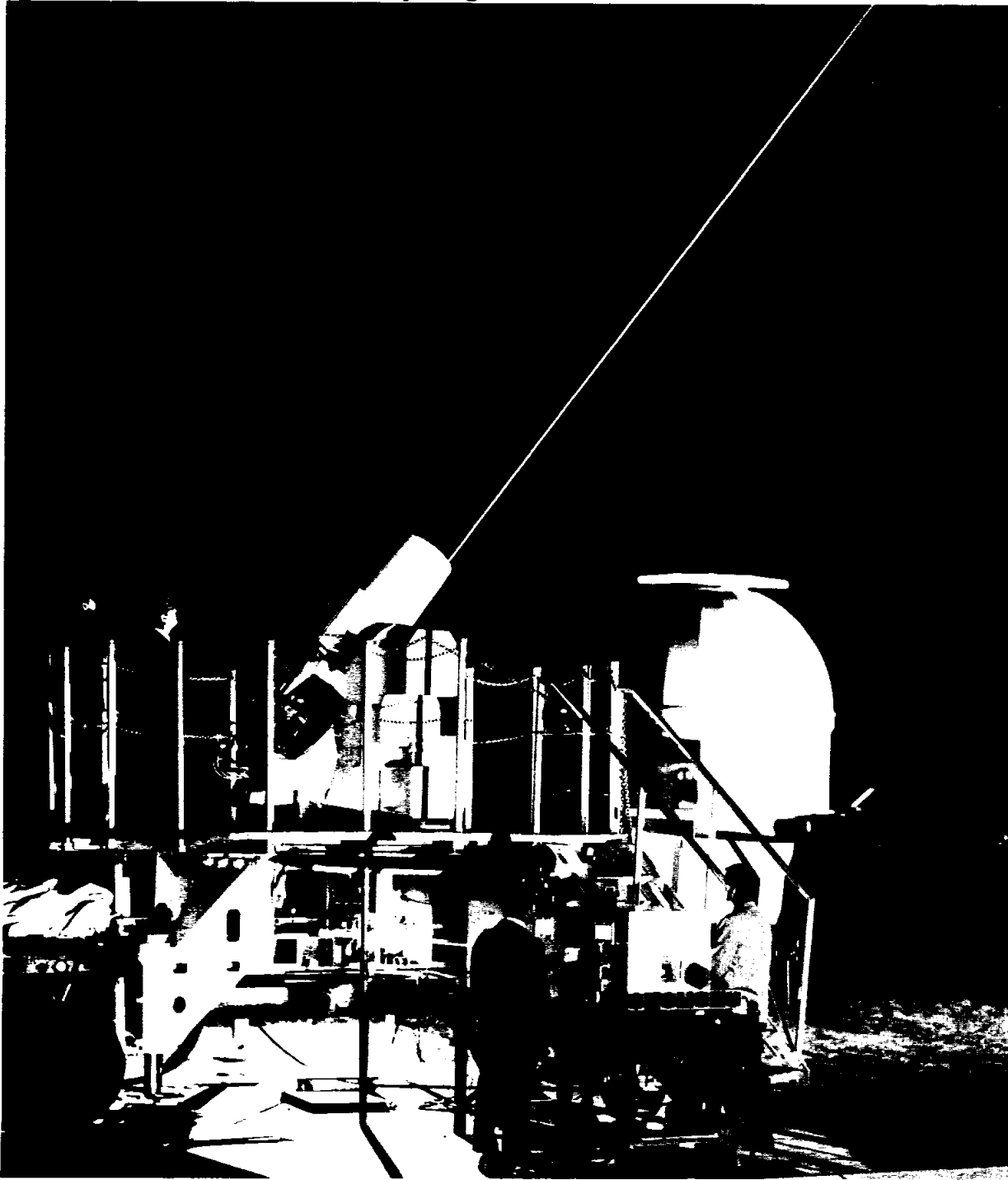
An F-51 Mustang, one of the country's outstanding fighter aircraft of World War II, will be wrung out by North American Rockwell's Bob Hoover, and J. W. Fornof of Houma, La. will gyrate about the sky in his Grumman F8F Bearcat.

Dick Schramm, the Flying Professor, will put his Piper Cub through some erratic daisy-cutting maneuvers while reading his copy of *How to Fly*. The

woman's touch is provided by past Women's Aerobatic Champion Mary Aikins flying her bright-red Pitts Special in a routine of precision aerobatics.

The Air Show gates open at 9 am each day, with the aerobatic portion starting at 2 pm. Admission is free, but parking is \$2 per vehicle. Spaceland Airpark is on FM 1266 between Dickinson and Kemah.

### Say Again, Please



**LASERPHONE**—Beams from a modulated argon laser at NASA Goddard Space Flight Center recently were the carrier for messages sent to geodetic studies satellite Explorer XXXVI. The tests were part of a program to develop extremely long-distance communications systems for the future. One aim of the tests is to determine the effects of the earth's atmosphere on a modulated laser beam. Explorer XXXVI has received several laser transmissions and verified their receipt to ground stations by telemetry.

### Remote C

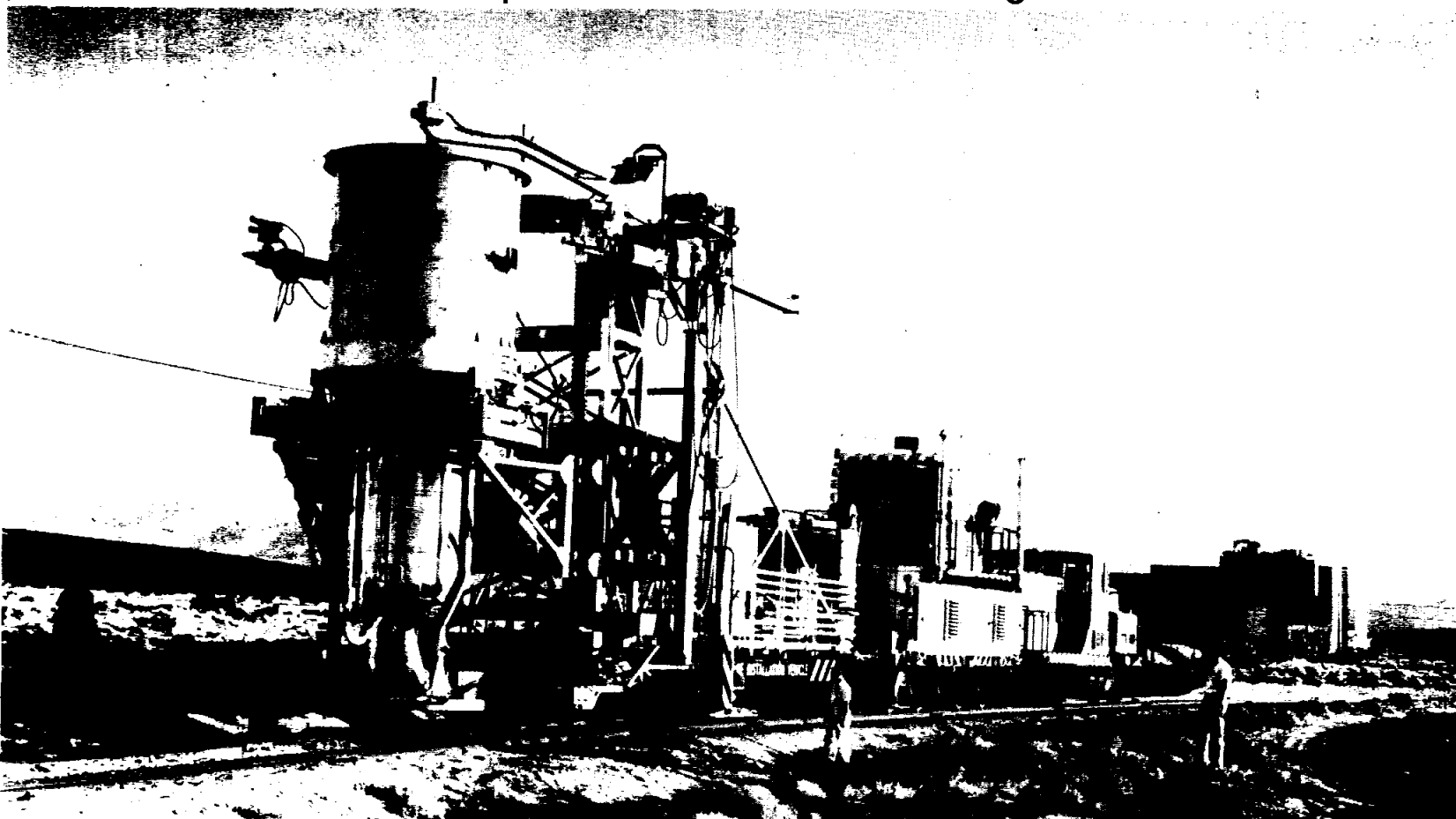


**LAUNCH PREPARATIONS**—Stratoscope II, a three-ton 36-inch aperture of to 80,000 feet to photograph the planets Jupiter and Uranus and celestial Atmospheric Research Scientific Balloon Station at Palestine, Texas, and v payload was recovered for preparation for another mission.

# PHOTO ROU

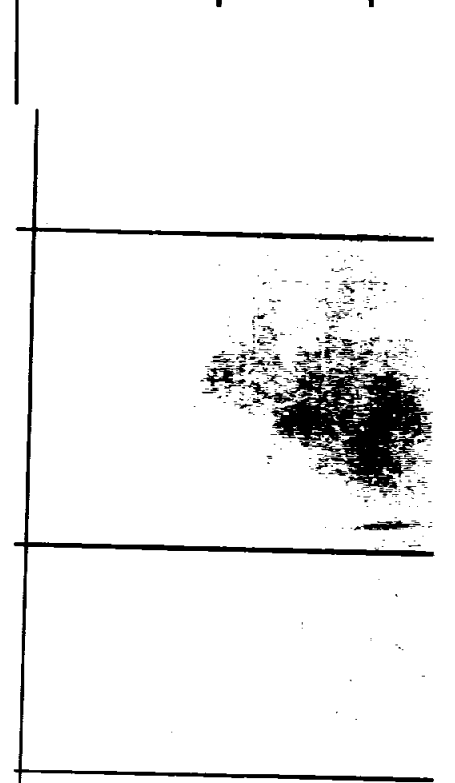
*...the space*

### Developmental Nuclear Rocket Engine



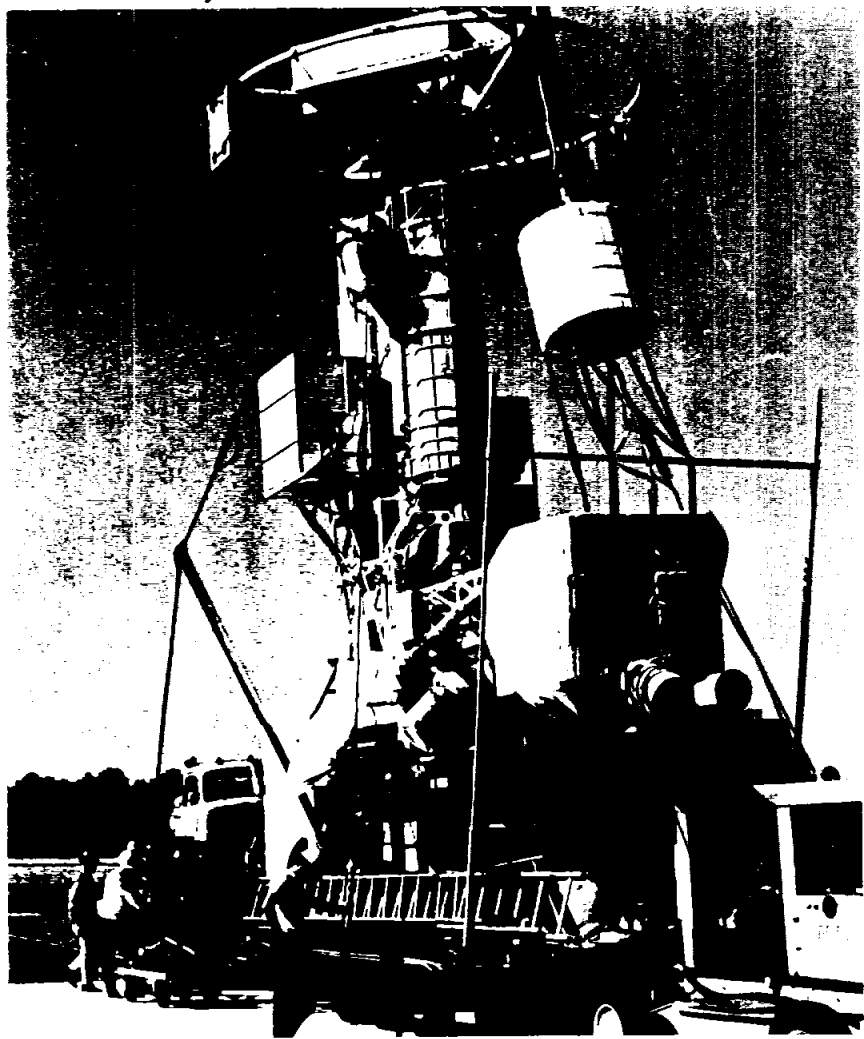
**COLD FLOW TEST**—The first ground experimental nuclear rocket engine, (XE) assembly travels by rail to the Jackass Flats, Nev. Engine Test Stand No. 1 for cold flow experiments. The cold flow assembly is identical to the design used in powered tests but contains no fissionable material and produces no nuclear reaction. The NASA-AEC tests are to verify the test stand for "hot" engine testing, to investigate engine startup under simulated altitude environment and to checkout operating procedures.

### Shape of Space



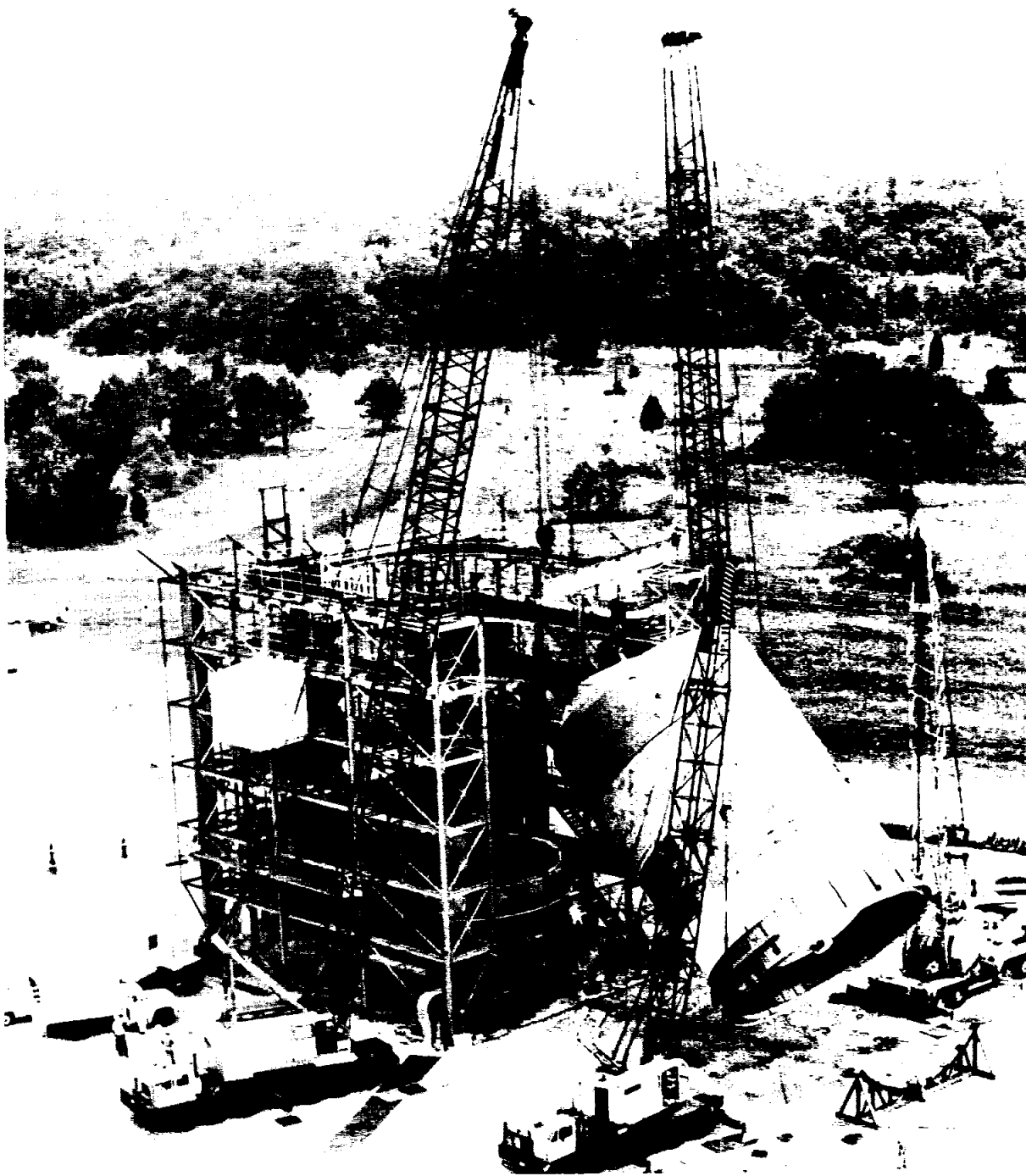
**MARS LANDER**—A metal cone traveling atmosphere is tested at NASA Ames Re the optimum shape for a Mars lande fartherest to the left is the bow shock wa the vehicle. Black lines are reference

Observatory



ical telescope, is prepared for launch under a balloon for an overnight flight ebulae. Statoscope II was launched May 18 from the National Center for as recovered the following day 30 miles northeast of Nacogdoches, Texas. The

Workhorse Stage That Will Never Fly



LIGHTER WEIGHT—A lightweight S-II stage test article is hoisted into a new NASA Marshall Space Flight Center structural test position where it will undergo cyclic loadings and offloadings of supercold propellants to qualify the lighter weight stage for future Saturn V flights. The test series is one portion of a three-part S-II structural test program.

NDUP

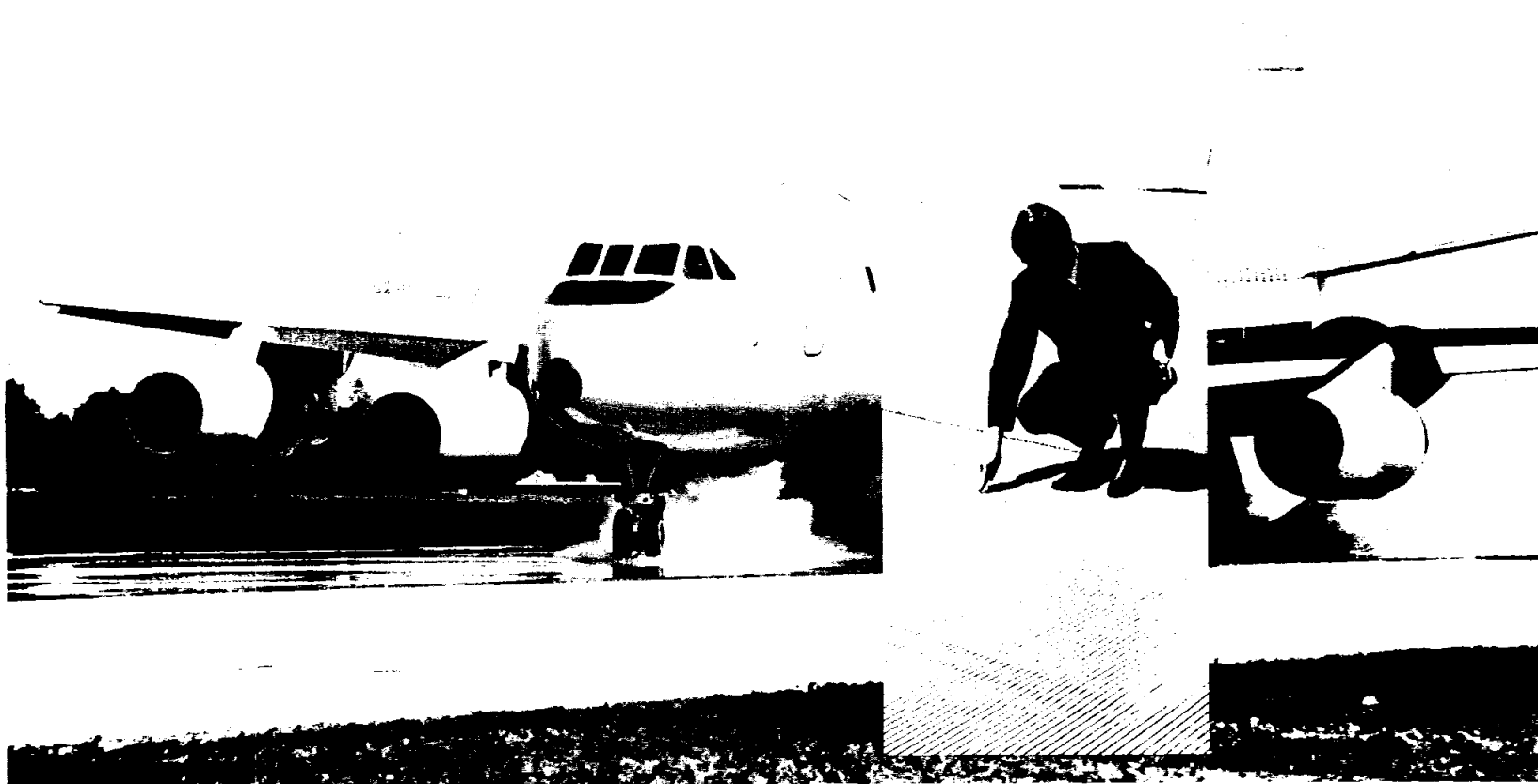
program in pictures

ircraft to Come?



g at sonic speed in a simulated martian search Center in a program to determine vehicle. The slightly curved black line ve, and a turbulent wake extends behind grid lines.

In the Quest for Safer Bad-Weather Landings



GROOVY—A NASA Convair 880 jet transport touches down on a specially prepared water-covered runway at NASA Wallops Station, Va. to determine the effects of runway grooving on braking during takeoff and landing on dry, wet, flooded and slush-covered runways. The test grooves (inset) run across the runway and are one-quarter inch deep, one-quarter inch wide and one inch apart. Aircraft and ground instrumentation record results of tests in the various conditions.

**JIM THRIFT SAYS:  
get in the race...  
against WASTE!**



**JOIN THE  
COST REDUCTION TEAM**

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

## CSC Updates Women's Program

The Civil Service Commission has issued a blueprint for the new Federal Women's program which outlines steps being undertaken by the Commission, and presents criteria for a six-point agency action program to assure equal opportunity for women in every aspect of Federal employment.

"The joining together of all Federal programs for equal employment opportunity supports this country's objectives of overcoming prejudice and promoting equality of opportunity without regard to irrelevant considerations such as race, color, religion, sex, and national origin," CSC Chairman John W. Macy, Jr., said in a letter to Federal agencies giving details of the Federal Women's Program.

Development of the Federal Women's Program provides a positive step in implementing Executive Order 11375, recently issued by President Johnson, Macy said. The Executive Order reflects a "needs to reinforce existing programs for women in Federal service," he explained.

"Some doors to Federal employment which have been informally closed to women will now have to open," Macy said in reporting the following related Commission activities underway to provide broader opportunities for women in the Federal service:

- A continuing review is being made of qualification requirements to insure appropriate credit for volunteer community and professional work.
- Efforts to modernize the examination structure continue to include the design of appropriate examinations for all levels of job opportunities.
- Federal positions are undergoing continuing analysis to determine shortage areas of particular interest to women.
- Agencies are being encouraged to expand training programs to make increased use of existing training authorities in order to update the skills of women entering or reentering the Federal service, as well as those currently employed.

## Flight-Critical Item



**LABELSE**—Ann Gerdes of the MSC Manned Flight Awareness Office shows astronaut Paul Weitz the new labeling used for shipment of Apollo flight hardware to make handling and shipping people aware of its special handling requirements. An educational program is under way among airline freight and trucking management and shipping employees to acquaint them with the importance of careful handling, safe delivery and the high cost of replacing damaged components.

## Your Job in Focus

### Employee-Management Cooperation

MSC recognizes the right of employees to join or refrain from joining any employee organization which does not assert the right to strike against, or advocate the overthrow of the Federal Government. This right may be exercised freely and without fear of penalty or reprisal. Currently, three employee organizations are represented at MSC. The AFGF (American Federation of Government Employees), the NFFE (National Federation of Federal Employees), and the Pattern Makers Association.

### Vets Can Mix Job, Schooling

Under an executive order recently signed by the President, Vietnam era veterans may be employed in civil service jobs while they complete their education under the G. I. Bill.

Eligible for the program are veterans whose military service has been performed since August 5, 1964, and who have completed less than one year of education beyond high school.

Under a special Transitional Appointment authority, veterans who meet all requirements of the job may be converted to a career-conditional or career appointment after a year of successful job performance combined with the required educational progress.

Jobs to be filled by the veterans concerned will be in the first five grades of the General Schedule or at comparable salary ranges in other pay systems.

No new jobs will be created for returning veterans. They will be hired to fill vacancies as they arise.

In signing the Executive Order on February 9, President John-

son said the program will provide "a special opportunity to Vietnam veterans to further their education while working in the public interest."

He expressed hope that the plan will serve as a model to private employers and to State and local governments.

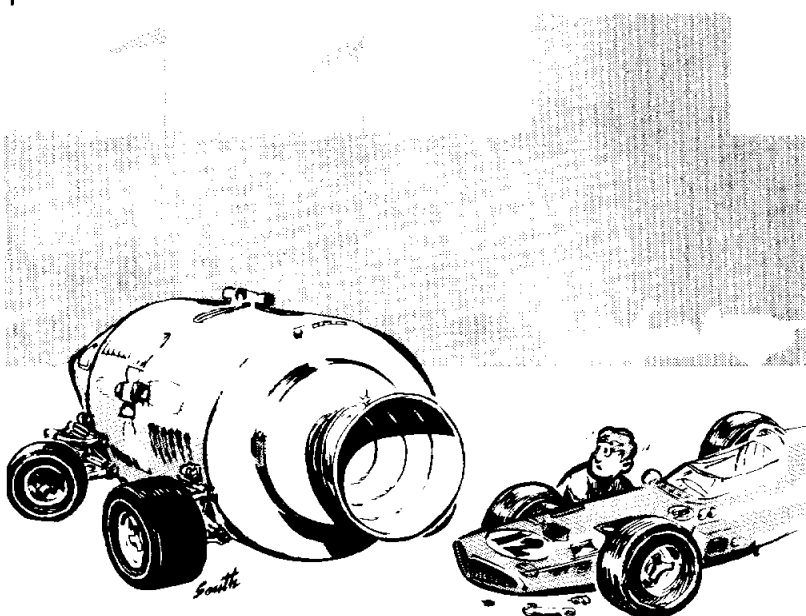
### Personnel Policies

There are several personnel directives which govern personnel policies, actions, and procedures at MSC. They include the Federal Personnel Manual which provides personnel policies, the Civil Service Handbook X-118 which establishes qualifications standards, and the Civil Service Classification Standards, followed when classifying positions and determining proper grades.

Distribution of these manuals to the Center is limited, but they are available in the Personnel Office, and employees and supervisors are encouraged to refer to them when the need arises.

## THE ASTRONUTS

(filched from TRW Systems Group)



## 'ONLY A GALLON' -

# Flammable Solvents Are Potential Bombs

The cry, "Fire in the paint locker!" aboard ship can be a moment of crisis for the vessel and her crew. And no less so, a fire in an MSC shop or laboratory caused by carelessly used or improperly stored flammable liquids can be a moment of crisis.

At least in the lab there is someplace to go other than over the side into the water.

Some 15 percent of industrial fires and explosions are caused by flammable liquids, the more volatile of which liberate heat ten times faster than wood construction.

A flammable liquid is one which has a flash point below 140° F, where vapors mix with air to form an ignitable atmosphere. For example, isopropanol—a favorite in electrical labs—has a flash point of 53° F. Acetone, used as a chemical lab solvent, gives off flammable vapors at any temperature above zero. Most alcohol derivatives fume at room temperature — 70 to 80° F.

Others are methyl ethyl ketone (MEK) 30°; toluene, 40°; and ether—used extensively in Bldgs 13, 15 and 16—still exhales flammable fumes at -20° F.

The dangers of keeping "only a gallon" of these solvents are often overlooked. But mixed with the air of a 10x20x10 room, a gallon becomes an ignitable, usually explosive, mixture. The

inherent hazard potential prompts the MSC Safety Manual to spell it out: "Flammable liquids will not be used for cleaning purposes."

In spite of hazards, flammable liquids can be used safely at MSC if operations are first given a hard look and these questions answered:

- Will a non-flammable solvent do the job? Often, the increased cost will be cancelled out by the reduced hazard. Industry can concoct nontoxic, nonflammable solvents for specialized uses.
- How much flammable liquid is really needed on hand? Keep quantities to a minimum, not a can per man.
- Are storage containers the safest available?

## CU Statements Sent Members

The MSC Federal Credit Union supervisory committee April 10 distributed to all members statements of account as a part of the annual audit.

Members who did not receive their statements or who have changed addresses should contact Blanche R. Henderson, chairman, MSC Federal Credit Union, P.O. Box 58081, Houston, Texas 77058.

# 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

Five acres of land off Manville Highway on Country Road 101, MI 5-0188.

Dickinson— $\frac{3}{8}$ -acre waterfront with private boat slip, high-rise, 2 bedroom, 2 years old, furnished drapes, carpet, paneled, gas built-ins, airconditioners, ready to move in. Very nice through. \$14,500. Don White, 534-5058 Dickinson offer 5, or Jean White, HU 8-0210—ext. 51.

8-month old French Provincial in Baybrook: 4 bedrooms, separate dining room and living room, large family room w/fireplace, kitchen and dinette, utility room and separate two-car garage with fenced backyard. Refrigerator, washer, dryer and miscellaneous furniture included, central air/heat, located on court, away from main traffic and apartments. Cost \$25,000—equity and assumption. Dave Peterson, GR 4-3681 after 5.

Fairmont Park, 10315 Belfast Rd., beautiful all brick excellent condition, 3 bedrooms, 2 baths, large paneled den, central air, detached 2-car garage, all electric kitchen, cedar fence, near schools, equity. 6% loan. M. P. Frank, GR 1-2948.

3-2-2 brick in Beverly Hills, central air & heat, carpeted, drapes, paneled family room, built-ins, low equity and 6% VA loan, payments \$148/mo. R. Kalishek, 946-0577.

Heavily wooded corner lot, 90 x 200 ft., Oak Hollow subdivision in Dickinson. Most surrounding area lots already developed. Good price. Don Wade, MI 9-0554.

Clear Lake City, 4-2-2, family room, central air & heat; cul-de-sac. Membership in recreation center included, available about June 30, Lease \$245. RE 3-7667.

House for lease: 3-1-1, brick, air, carpet, large trees fenced yard. 20x20 patio (10x20 covered and screened). One block from elementary and Jr. High schools. Convenient to shopping centers. Twenty minutes from NASA. Available end of May. \$135/mo. Dewey Hydrick, 944-3809 after 5.

House in Galveston Sea Isle addition for rent, perfect vacation spot. 2 bedrooms, living room, kitchen, and 2 baths, swimming pool, tennis court, fishing pier, rent boats and restaurant, 2 blocks from beach, \$100 a week or \$15 per day. Mary Campbell, 946-4949 after 5.

12-rm. 3000-sq. ft. older home, everything, 20x36 den, 3 bdrm., 2 bath,  $\frac{1}{2}$  acre, trees, best location, finance. League City, Virginia Law, 932-3537.

Cabin for sale: 20'x20' in San Leon, Texas. One block from water. HO 8-6127 or HU 2-3062.

Furnished cottage apartment for rent. One or two adults, Bay View, community pier, quiet, nice yard, carport, one-half mile north of Houston Yacht Club, monthly rental or lease. R. Hill, GR 1-4305.

Lot in Anchor Beach, Florida, Eston Meade, HU 7-0870.

For rent, 4-2-2, brick, central air/heat, fenced, landscaped yard, walk to elementary school, completely carpeted, all built-ins. \$225/mo., lease option available. John Tuffy, HU 2-1326.

Beautiful home sites— $\frac{3}{4}$ -acre minimum, landscaped, large trees, private street, established nice neighborhood, restrictions, city water, 10 minutes from MSC, League City. R. M. Dickerson, 932-4338 after 5:30.

Sagemont 4-2-2 Spanish brick, paneled den, fireplace, built-ins, carpets, drapes, fenced yard. Equity and assume 6% loan. Bill Burlingame, HU 7-2303.

Beautifully wooded waterfront lot for a hideaway cottage on navigable part of Clear Creek. Size 62'x170'. Shell road in front with access to free boat launch. All utilities and sewer available. \$4000. Minimum down \$1000. Remainder financed at 7%. A. C. Chance, 591-3457 after 5.

4 bdr, 2 bath, brick for rent. Double garage, paneled family room and paneled baths, central air/heat, walking distance 2 schools & complete shopping. F. Morton, HU 8-0850, ext. 2179 or GR 4-3400 evenings.

## FOR SALE—AUTOS

67 Mercury Cougar, has A/C, radio, power steering disc brakes, 320-HP, luggage rack, 11,000 miles, original cost was \$4300 and will sell for \$2800. R. H. Bendler, 488-3852.

57 4-door Dodge Custom Royal, power steering, power brakes (new lining and seals) 4 new retreads, air conditioned (1963 Mark IV custom), runs good, looks rough, \$195 cash. Muhly, GR 1-3762.

67 GMC half-ton fleetside, lwb, white, 292, 6 cyl, std trans, air less than 15,000, \$2,000. J. W. Bohannon, 944-5868, 6-7 p.m.

60 Ford two-door hardtop, automatic shift, power windows, good tires, good mechanical condition, excellent transportation at low cost. Blue books \$350; sell for \$295. Ullman, HU 2-1176 after 5:30.

59 Hillman Minx station wagon, stick shift, four good tires, makes 25 miles to the gallon, not beautiful, but will get you there and back inexpensively. \$150. Ullman, HU 2-1176 after 5:30.

63 '98" Oldsmobile 4 door, clean, low mileage, cold air, R&H, 8-way power seat, nylon upholstery, carpet, excellent VSW tires, remote control outside mirror, other luxury items. Gold with white top. Has damaged right rear quarter panel and deck. Blue Book wholesale is \$950 plus. My price is \$595 or trade for clean ski rig. L. Wright, 877-3059.

62 Chevrolet Bel Air, 6 cyl., 4 dr., air conditioning, automatic transmission, good tires. Priced reasonable. C. W. Leaverton, GR 9-3759.

65 Impala, 4-dr sedan, factory air, power steering, excellent condition, \$1425.

60 Fury Plymouth convertible, new top, seat covers and paint, good mechanical condition. \$395. Phyllis Morton, 946-4752.

65 Mustang convertible, white w/black top and red interior, excellent condition, good graduation gift. Lou Paletz, 591-3054.

62 Falcon, 2-dr, 6-cylinder, standard transmission, better than average, \$300. L. I. Wind, 932-2798, League City.

65 Malibu, new tires, heater, radio, air, stereo redeck, \$1350. Delores Herron, 944-0471 after 5.

60 T-Bird new tires, AC PS & PB, all in good condition, no rust, good paint & chrome, runs perfectly, \$600. W. J. Wagoner, SU 2-2627.

67 Mercury Cougar XR-7 with A/C, AM-FM radio, power steering, tiltaway wheel, Merc-o-matic transmission, walnut toned applique, courtesy lights, tinted glass. Will sell for \$2650. Cliff Bean, 522-7583.

33 Ford coupe, Oldsmobile running gear, very good mechanical condition except for transmission, spare motor with three-two carb setup, \$265 or will trade for good motorcycle, 250 cc or larger. Don Hoffpauir, 643-4951.

65 Chrysler convertible, all power equipment, A/C, clean, \$1,600. Buster, JA 8-5688.

55 Dodge 4-dr, good condition, good tires, motor and autotrans. \$225 or best offer. S. L. Owens, 932-3011 League City.

65 VW, new ww tires-brakes-engine, real sharp, will beat all prices. Coy C. Summers, 944-9002 after 5:30.

66 Dodge Polara, pwr steering and brakes, mechanically perfect, \$1500. Hogan, HU 8-3530 ext. 2836.

63 Chevy II, 4-dr., good condition, Bill Harris, 487-0106.

## FOR SALE—MISCELLANEOUS

16 ft. fiberglas boat, big two-wheel tilt trailer, 100-hp Mercury motor, canopy. MI 5-0188.

Mobile home for lease, furnished, air. Will relocate to your choice area, if on a long-term lease. Reasonable rent. Floyd A. Turner, RE 3-7667.

Racing bicycle, Atala Grand Prix model, handmade in Italy, 10-SPD, only 27 lbs, original cost \$140, sell \$65. Ron Hagood, WI 8-2870 Texas City after 6.

1955 MG-TF-1500 engine and transmission, engine needs minor repair, transmission in excellent condition. Sell both \$150. Ron Hagood, WI 8-2870 Texas City after 6.

Lone Star 16 sailboat with galvanized tilt trailer, 4 life jackets, masthead fly, bottom paint, tarpaulin, 3 $\frac{1}{2}$ -hp outboard, all in excellent condition for \$1600 firm. Ed Simon, 488-4043.

VW luggage carrier, canvas covered, heavy wire frame. \$30 new (Sears), sell for \$15. R. Kalishek, 946-0577.

Mobile Home, 1966, 60x10, 3 bdrm, owner being transferred overseas, \$3900 or \$500 and take up payments of \$75.39. Robert W. Thomas, 932-2654 League City.

8 foot Herron cab-over camper, sleeps four, butane stove and light, ice box, closet, etc. Jacks included, \$595. Also available: used and battered 1963 Ford, LB-WB, pickup truck with overload springs and 2 new 6-ply tires. Poor condition for camper, but good transportation, \$600. Take all for \$995 cash. Jim Derbonne, 534-3669.

Solid-oak bookcase headboard, footboard and frame for single bed, excellent condition, \$20. Richard E. Stanton, 932-2982.

8 mm movie outfit: camera is Kodak with automatic electric eye exposure control,

zoom lens, and case. Projector is Argus showmaster with variable speed forward, reverse, or single frame and zoom lens. Like new. Sell separately or 1st \$100 for both or make offer. Bob Lindemuth, 944-0741.

Zodiac calendar watch with day, date, month, and moon phase, works perfectly, \$20. Speidel Twist-O-Flex band, \$4 extra. Argus C-3 35 mm camera, works perfectly, \$15. Admiral 23" TV, \$35. Or \$65 takes all. Bob Lindemuth, 944-0741.

Trailmaster Honda 1965, 2300 miles, buddy seat, chrome rack, mirrors, helmet and gaggles, like new condition, adult rider, custom-made cover. \$250. Underhill 649-3021 after 6.

Upright piano, excellent condition, good tone, complete with bench, \$285. Also double bed with bookcase headboard, \$20. C. W. Leaverton, GR 9-3759.

Breakfast set, drop-leaf harvest table with mar-proof top. Has bench seats covered in heavy black Naugahyde, walnut finish, very good condition, \$45. R. Musgrave, HU 8-3966 after 5.

Collie pups: AKC, show quality, sable and white, \$50. Shots and dewormed. 15704 Seavale, Clear Lake City. Hooper, 488-4120.

Free puppies and kittens to persons who will provide good homes, various colors, real cute. Clark Neily, 932-2993.

2000-lb. cap, tandem wheel trailer \$200. 50 lbs of B-C type, dry chemical fire extinguisher powder, \$20. Delta floor-mount drill press,  $\frac{1}{2}$ " chuck '78. R. I. Lowndes, HU 8-3530 ext. 2025 or 534-5682.

Drafting machine—Bruning with 18" and 12" scales graduated both full & quarter. Excellent condition, used less than 1 yr. New \$120; asking only \$75. G. Gentry, HU 8-0405.

Comanche 250 available to qualified pilots. High speed, long range, IFR equipped. Cover 1000 nm nonstop at 155 knots plus. \$20/hr wet. Will sell  $\frac{1}{3}$  or  $\frac{1}{4}$  partnership. Days HU 8-4380, nights 932-3757 or 1796.

Bogen turntable, Model B50, stereo; 4 speeds with variable adjustment from 29 to 86 rpm; 4-pole motor; walnut base; \$20. R. Thompson, HU 7-2732.

General Electric mobile maid dishwasher, excellent condition, \$100. 877-2867.

Spanish-Mediterranean bedroom suit, good condition. 643-7147 after 6.

67 Zenith portable black and white TV, \$85. 1964 deluxe coppertone Kenmore washer \$70. Marilyn Garzon, MI 3-7237 after 5:30.

Kenmore portable dishwasher \$80. 30" gas range \$30. Range hood \$7. Ross Ferland, 877-1888.

Collie puppies: AKC, registered, champion bloodline, 5 females sable and white with black markings. \$50. Wormed, shots and house-trained. Six weeks old. Hooper, 488-4120.

Kenmore vacuum cleaner, 5 years old, good working condition, \$15. Boy's pitchback, good condition, \$5. Verby Balinas 946-3907 after 5.

17' Glaslon, 75-hp Johnson, two tanks, hard top, galvanized trailer, lights compass, anchor, line, etc. Ready for water, excellent condition. \$1125. Fred Hake, 932-4693.

Rent my Cessna 150 or Skyhawk, attractive rates. Act based at Clover Field. Neel Tilton, GR 9-1176.

Pair Danish modern arm chairs (\$15 each or both for \$25) or pair coral hast and hostess chairs. Make offer. All excellent condition just too many chairs for apartment. Mahogany tea table \$15. K. Keener, HU 8-1193 after 5.

Two Mustang bucket seats in excellent condition, light green, \$75 for both, Ray Durst, GR 4-2927 after 6.

Zenith 17-inch portable TV and stand, \$50, RCA washer, 7 years old, motor reworked, \$30, RCA electric dryer, 1 year old, \$75 or both for \$100. Delores Herron, 944-0471 after 5:30.

AKC Poodle pups; silver (1 each) male, female; black (1 each) male, female. R. E. Flaherty, HU 9-8410.

16' Winner Boat with trailer, 100-hp Evinrude motor, all electric controls, used less than 6 hours, red with black top and seats, perfect condition. Original cost \$3058. Will sell for \$1850. Can be entirely financed. Baker WE 5-3912 (La Marque).

12-ft Hotpoint refrigerator, top freezer, coppertone. \$45. 4'x7' Brunswick Monarch pool table comp. \$350. 5 pc dinette set, tubular steel, like new. \$45. Antique round oak dinette and 4 captain chairs, \$125. Bar stools and other assorted antique furniture and clocks. R. E. Pryor, GR 4-2350.

Air conditioners, one 5,000—BTU other 10,000—BTU. Both 110-V window units. \$40 each. Stan Beckner, 932-3456 League City.

Hi-fi cabinet, pre-amp, amp, changer, 12" speaker and corner enclosure. \$300 original kit price, \$125 for the works. Stan Beckner, 932-3456 League City.

19' fiberglas, inboard-outboard, 158 hp V-6 Buick engine, ski rig, depth finder, trailer, good condition. John Mullins, 932-4359, League City.

All porcelain compact kitchen Dwyer E 60-RE (Series 60) 63" wide 25" deep, 87" high, unit consists of 8-burner electric range, 2 separate oven burners, deep bowl sink, faucets, 5.3-cu. ft. refrigerator & freezer, lights, appliance outlets, 12-cu. ft. of storage space in overhead porcelain cabinet, additional storage area under sink, used approx. 9 months. Cost \$628.29 new, want \$300 cash. Muhly, GR 1-3762.

Porta-crib type baby bed and mattress, \$15. Net-type play pen (portable), \$7. Tyke-bike (3-wheel), \$3. Toy pedal-type fire engine w/ladders, \$7. Toy wheelbarrow, \$3. Childs electric organ & bench, \$10. John R. Lancaster, HU 8-2783.

Framus 12-string guitar and case, excellent condition, \$100. Bill Gravett, MI 4-4468 or LaPorte GR 1-3284.

Gold 9'x12' carpet with pad \$15. Hanging lamp, white with gold trim and chain \$20. Two electric space heaters \$10 each. Modern green sectional, total length 12' \$225. Mark Thomas, 944-8184.

RCA TV, VHF-UHF, 23" walnut console, excellent condition. \$90. John Richardson, 946-7587.

1965 Honda 50 Super Sport \$110. Go-cart, \$30. W. Gray, GR 4-2002.

ET-Mag wheels (4) new 15 in, for Corvette with disc brakes, \$115. D. M. Jolly, 591-2568.

Young, tender, fryer rabbits, 50 cents a pound live, average four pounds ea. Also brood does and stud bucks. H. F. Kline, ID 3-5190 after 6.

Chain-link fence, 360 feet long, 2 gates, 39 posts. Remove it yourself for \$90. Mark Heath, 482-3052.

Registered quarter horse, Blocky Mucho, out of dam Bar V. Hoitey Taitey; sire — Mucho Rey. Quarter horse and saddle, \$300. Gibson, GR 9-1217.

14-ft. ply-wood boat, 45 hp Mercury electric, big-wheel trailer, \$275. Willoughby, GR 4-2135.

Sears 18,700 BTU 220v airconditioner, used 4 months, \$200. Large self-defrosting Frigidaire, \$50. Hal Bishop, HU 3-5331. (No home phone).

66 Honda 450 cc, helmet included \$600 or trade for car or boat of equal value. C. B. Kirkpatrick, 944-7989 after 6.

Complete mobile rig. (Manuals included): Heath HW-12 80-meter transceiver, \$87. Heath HP-13 D. C. power supply 12V, \$52. HS-24 mobile speaker, \$6. GH-12 PTT & vox mike, \$6. RM-75 Newtronics resonator & bumper mount mast, \$27. Extra heavy-duty SS spring, \$7. Heavy link bumper mount, \$6. Total value: \$191. Sell all for \$149. S. C. Puckette, MO 8-3201.

Motorcycle, 250cc, 1967 Sears, 1000 miles, perfect condition, 4 speed w/80 mph capability. Cost \$555, 10 months ago, will sell for \$350 including new Buca helmet. John May 591-2474.

English Pointers—AKC reg. champion stock, breeder of nations No. 1 pointer of 1967. \$75 or trade for something of equal value. Rita Heywood, Dickinson 534-3979.

Hydroplanes, 10 ft. racing hulls, with or without controls, \$35 and \$25. Steve Heywood, Dickinson 534-3979.

Ladies hearing aid eyeglasses, gold trimmed like new, cost over \$400 one year ago. \$75. Rita Heywood, 534-3979.

57 Chev. 2 dr. sedan parts cheap, also Chev. 283-327 dual-quad manifold complete with linkage, \$50. Don Heywood, Dickinson 534-3979.

Delta Band Saw with 1-hp ball-bearing motor, good condition, \$65. Sears shaper with or without 1-hp motor, extra cutting heads. \$35 without motor, \$50 with. Delta drill press,  $\frac{1}{2}$ -hp ball-bearing motor, variable speed,  $\frac{1}{2}$ " Jacobs chuck, on metal stand, \$50. L. Wright, 877-3059.

Man's diamond ring (seven diamond cluster set in flourentine) \$195. Glenda Garrett, 946-9587.

AKC Cocker puppies, 6 weeks old, parti-colored, champion sired—very nice. Repeat of breeding that produced champion. Emily K. Roberts, 946-6176.

Free: 5 kittens, 4 weeks old. D. R. Scott, 591-2175.

## Trimble Speaks To AAS-ISA

MSC Deputy Director George S. Trimble May 28 will address a joint meeting of the American Astronautical Society and the Instrument Society of America. Trimble will speak on the "NASA-Industry Partnership."

The meeting will be at the Nassau Bay Motor Hotel starting at 6 pm with hosted cocktails, a buffet dinner (\$3.50/person) at 7, and the program at 8.

## Toastmasters Seek Members

Talking on one's feet or conducting a meeting for some people are not always the easiest tasks in the world.

The MSC Toastmasters, meeting each Wednesday at 6 pm at the Ramada Inn on NASA Road 1, offer an opportunity to improve public speaking ability and to learn to keep meetings focused on the subject.

Don Hampton at HU 3-7679 has information about membership in the MSC Toastmasters.

## EAA Sponsors Rollerskate Party

The MSC Employee Activities Association June 16 will sponsor a rollerskating party from 1 to 7 pm at the Gulfgate Roller Rink.

Tickets at \$.20/person (includes skate rental) are available from the following persons/buildings/extensions: Mary Lopez 12/2761, Kitty Cornish 30/3128, Carol Hopper 16/2401, Wanda Slack 45/3937, Helen Ragsdale 2/3885, and Edi Quinn 4/5558.

## Sign up for SAVINGS BONDS

### WANTED

Wanted: TV, Hi-fi components, working or not; also self-propelled lawn mower, edger, sailboat. Don Frisbee, 946-7193 Houston.

Will share driving or ride. Freeway Manor to MSC, 8 to 4:30. Don Frisbee, 946-7193.

Single girl to share apartment with same. Kathy Corley, 944-0854.

Wanted: carpool or will pay for ride from Pasadena (Huntington Addition) to Ellington Monday thru Friday, 8 to 4:30. Don Jackson, 483-7511.

Dolphin Sr. sailboat wanted, should be in good condition with trailer. Earl K. Smith, 877-1140 (Kemah).

Ride wanted for the summer from Bayside Terrace, LaPorte, to Bldg. 416 8-4:30. Etta Richards, 471-0368.

Summer instructions for first year clarinet and second year coronet students, evening or week-end. Marie Wilmeth, Alta Loma 925-2793.

Small light-weight boat, 8 to 12 feet, price commensurate with condition. D. E. Stullken, 877-4108.

Need ride from Kress off Eastex Freeway to MSC, between the hrs of 8 and 4:30 Bldg 45. Will share expenses. M. Y. Gomez, WA 3-6916 or HU 3-2563.

Anyone driving to or through Denver in the next few weeks who could take our small dog. Mark Thomas, 944-8184.

Girl's bicycle, 26", will pay up to \$15. H. F. Erickson, MI 9-0396.

Will share driving from Gilbert Apartments, 7925 Gulf Freeway, to MSC 8 to 4:30 shift. Leota White, MI 3-3141.

## Educational Boost



**COLLEGE BOUND**—Tommy D. Squires and Deborah C. Carr receive 1968 scholarships from NASA Exchange Council-MSD chairman Jack C. Heberlig in a recent presentation ceremony. Deborah is a senior at Fidelity Manor high school in Galena Park and will enter North Texas State University this fall. She is the daughter of Clifton Carr of Mail and Records Section-ASD. Tommy, the son of Minna Lo Squires of Procurement and Contracts Division, is a senior at Dickinson high school and will enter Lamar State College of Technology. Deborah has an older sister attending NTSU under a Jones Foundation scholarship. Exchange Council scholarships pay up to \$600 per academic year for four years.

## XB-70 Flights Evaluate SST Vibration Damping

NASA will begin a new series of flight tests late this spring to evaluate methods and equipment designed to dampen out inflight structural vibrations in the XB-70 research airplane. Information obtained from the tests will be used to determine the potential value of similar systems under consideration for use in the supersonic transport.

The SST systems would be used to improve the smoothness of the passengers ride and to lengthen the fatigue-life of the airplane's structure.

Small exciter vanes designed to induce structural vibrations of a known frequency and amplitude and a separate system to dampen or suppress these vibrations have been installed on the XB-70. On-board instrumentation equipment will measure the vibrations. During flight, vibrations induced by either the vanes or natural turbulent air will be damped by the system and an evaluation made concerning the effectiveness of the system.

Four primary flight conditions will be flight tested: Mach 0.4 (290 mph) at 15,000 feet altitude; Mach 0.9 (610 mph) at 30,000 feet; Mach 1.6 (1050 mph) at 40,000 feet; and Mach 2.4 (1585) at 60,000 feet. Other flight conditions will also be examined.

The system to damp the vibration is an elastic mode control system referred to as ILAF, identically located acceleration and force. It incorporates a series of accelerometers located near the leading edge of the XB-70's right and left elevon control surfaces. These acceler-

ometers sense the structural vibrations or disturbances and transmit a signal to the computer portion of the airplane's control system. The computer then commands a response of the XB-70's control surfaces to suppress the vibration.

The XB-70 flight test program, a joint NASA-USAF effort, is managed by NASA's Flight Research Center. Installation of the new system as well as normal XB-70 maintenance was accomplished by North American Rockwell under contract.

## How to Build Weather Photo Ground Station

Instructions for building a \$500 ground station that can receive local cloud-cover pictures anywhere in the world from United States weather satellites passing overhead have been published by NASA.

A 66-page booklet entitled, *Constructing Inexpensive Automatic Picture-Transmission Ground Stations* says a reliable receiving station can be built from surplus parts for less than \$500 or purchased for as little as \$5,000.

The booklet is for sale as NASA SP-5079 for 50 cents.

## NASA, Grumman Sign LM Change Agreement

NASA has signed supplemental agreements with the Grumman Aircraft Engineering Corporation valued at approximately \$161,124,000 for changes in the Apollo Lunar Module contract.

## UofH Profs Brief On Curriculum

The University of Houston Mechanical Engineering Department Tuesday will present a briefing on the department's graduate curriculum and future plans at 2 pm in Bldg 30 auditorium.

Dr. Douglas F. Muster, chairman of the Mechanical Engineering Department, and Dr. C. J. Huang, associate dean of the Cullen College of Engineering, will conduct the briefing aimed at acquainting MSC and contractor employees with the UofH ME Department. Admission requirements will also be covered, and time allowed for a question-and-answer session.

Current and prospective mechanical engineering students are urged to attend the briefing provided by the Employee Development Branch. Further information can be got at Ext 7311.

The agreements formally incorporate into the Grumman contract some 250 changes previously authorized by NASA for modifications to flight and ground-test hardware, test programs, documentation procedures and mission requirements. They include changes recommended by the Apollo 204 Review Board to make the vehicle more fire-resistant, and they cover increased personnel costs resulting from program delays following last year's spacecraft fire at Cape Kennedy.

The supplemental agreements also modify the basis for determining fee in the cost-plus-incentive-fee contract, giving more weight to the quality of contractor performance as evidenced by flight results and placing less emphasis on delivery schedules.

The modifications bring the total estimated value of the Grumman contract since January, 1963 to \$1,580,000,000.

Grumman performs the majority of work on the Lunar Module contract at its Bethpage, New York facility with support from its field offices in Houston, White Sands and at the Kennedy Space Center.

## LIGHTWEIGHT CONCEPT—

## Clark Gets Contract For Apollo Soft Suit

NASA has awarded a \$301,000 contract to the David Clark Co., Worcester, Mass., for the design of a new Apollo soft suit.

The contract calls for the design, development and delivery of a prototype intravehicular pressure suit for test and evaluation for possible use by an Apollo crewman in the command module. MSC awarded the contract to Clark, supplier of the pressure

suits worn by Gemini crewmen, following non-competitive sole-source negotiations.

The Crew System Division of MSC is asking Clark to design a lightweight suit that will be less bulky than the one presently scheduled for use by Apollo crews who will perform lunar surface and extravehicular activities. In many ways the new suit concept is similar to the soft suit worn by astronauts Frank Borman and James Lovell during their 14-day Gemini VII mission, December 4-18, 1965.

Specifications call for the suit, a hybrid of the Apollo and Gemini pressure garments, not to exceed 20 pounds, to interface with existing suit hardware and interface with the couches in the command module.

Considerations are for the garment to be worn only in the command module during launch and reentry and for intravehicular utilization. The present Apollo extravehicular garment (manufactured by International Latex Corporation, Dover, Del.) will be worn during EVA portions of Apollo.

The new suit utilizes all safety requirements incorporated into the Apollo garments following the fatal spacecraft fire in January 1967. Such items as teflon-coated Beta fiber and aluminized kapton are among the many changes.

Delivery of the first prototype soft suit is scheduled for June 1968. It will be considered as a backup only to the current intravehicular suit made by ILC.

## Future Co-ops



**ACCEPTED**—Twelve graduating high school seniors are briefed on the MSC Junior Student Trainee program in which they will work at the Center this summer prior to entering college to major in engineering and sciences. After finishing their freshman year, they will take part in the regular MSC Cooperative Education Program. Seated, left to right, are Program Coordinator Barbara Lerdon of Personnel Division Employee Development Branch, Kenneth Parker, Dianne Wheatley, Pamela Bankston, Marva Hurt and Arthur Walker. Standing: John Wheadon, Eric Graves, Americus Hawkins, Harry Reynolds, David Mitchell, Donald Hicks and Reginald Sears.