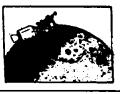
Merrn Christmas

NASA MANNED SPACECRAFT CENTER





Happy Hew Year

December 18, 1970

**VOL. 10 NO. 4** 

OVER 100 RECOGNIZED-

# MSC Employees Receive Awards

More than 100 employees of the NASA Manned Spacecraft Center were recognized in an award ceremony, Monday December 14 for their contributions to the Apollo 13 mission and the safe return of the astronauts following the explosion and loss of oxygen and electrical supplies aboard the spacecraft.

Apollo 13 astronauts Fred W. Haise, Jr., and John L. Swigert, Jr. received the NASA Distinguished Service Medals awarded them and Apollo 13 Commander James A. Lovell, Jr. at NASA Awards Ceremonies in Washington last month.

Ten persons received awards for contributions to last year's successful Apollo 12 mission.

MSC Associate Director Frank A. Bogart was master of ceremonies and Deputy Director Christopher C. Kraft, Jr. made the presentations to MSC employees of 47 Certificates of Commendation, and 73 Certificates of Superior Achievement. Ten Certificates of Appreciation were awarded to officials of contractor firms. One Group Achievement Award was made.

The awards ceremony was held in the MSC Auditorium, (Continued on page 4)

# **NAR Shuttle Study Modifications Include Structural Test Programs**

The NASA Manned Spacecraft Center has modified its space shuttle study contract with Space Division, North American Rockwell, Downey, Calit, to include a structural test program.

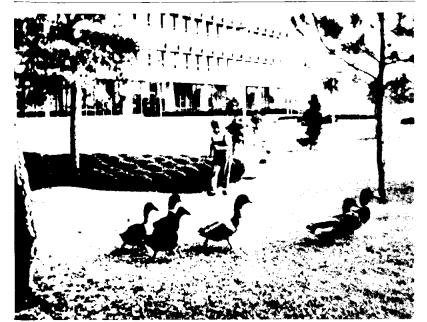
Estimated value of the fixed price modification is \$2 million. Total value of the contract is estimated at \$10.8 million. This includes \$8 million for definition and preliminary design studies; a \$500 thousand add-on to study

-EDITOR'S NOTE-

The ROUNDUP will not be published during the Christ-mas Holidays. The next issue mas Holidays. The next issue will appear on January 15, 1971. Deadline for ads will be January 7 and deadline for copy will be January 8. use of expendable second stages, and a \$300 thousand increment of Department of Defense funds to study requirements for the U. S. Air Force.

The contractor has been requested to establish a test program on cryogenic tank structure and insulation; high-temperature fasteners; static and dynamic seals; bulk insulation packaging and attachment; thermal protection; wing structure and fuselage structure. Work will be done at plants in Downey and Seal Beach, Calif. and at a subcontractor facility in

North American Rockwell is one of two aerospace firms making detailed studies of the space (Continued on Page 2)



to the Manned Spacecraft Center toured our facilities during the daily visitor program. This young fellow taking a workout with the perennial duck popu-lation at the Center could have been that visitor putting the open house program over the million mark. The Center is open daily to visitors from 10 a.m. to 4 p.m., Saturdays and Sundays included except for Federal Holidays.

A MESSAGE FROM
MSC DIRECTOR DR. ROBERT R. GILRUTH

We have come to the close of a difficult year.
Hopefully, we emerge surer of our abilities and more certain of our proper course in the years a-head.
After the dizzying triumph of two faultless lunar landings in 1969, we were sorely tested in 1970. For you men and women of the Manned Spacecraft Center, Apollo 13 must have seemed your most trying hours. I believe it was also your finest hour. The crisis of Apollo 13 was followed by the most painful experience, felt by MSC contractor and federal employees alike, of having to adjust to lowered priorities and shrinking resources.
There are signs that this downward trend is leveling off. I hope so. But one thing is certain.
This country's future was bound irrevocably to space exploration in the 1960s and as long as this is true the Manned Spacecraft Center and its people will have a vital role to play.

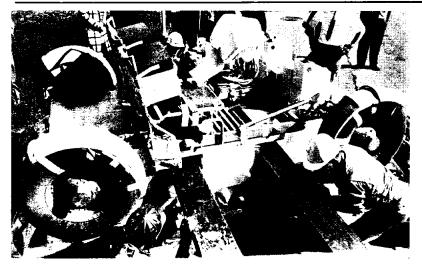
There are reasons to feel encouraged. In 1971 we will go to the moon two more times. With each succeeding lunar voyage the scientific payoff of the Apollo Program becomes greater and more apparent. Other exciting missions for the Manned Spacecraft Center are gaining momentum and direction. The launch of Skylab is now just two years away. We are embarked on an earth resources program which holds great potential for direct benefit to mam.

But perhaps the most far-reaching event of the year just passed may be the clear emergence of the space shuttle as the keystone of virtually all future efforts in space. I like to think that a versatile, economical shuttle may make the "manned versus unmanned" arguments of the '60s seem as irrelevant in the '70s as competition of passengers versus triely vant in the '70s as competition of passengers versus triely vant in the '70s as competition of passengers versus triely vant in the '70s as competition of passengers versus

unmanned" arguments of the '60s seem as irrelevant in the '70s as competition of passengers versus freight.

But in any event, the Manned Spacecraft Center will be busy and needed. So may I wish you and your families a very Merry Christmas and a challenging New Year.

Sincerely,



LRV ARRIVES AT MSC — The one-g Lunar Roving Vehicle trainer for the Apollo 15 mission arrived at the Manned Spacecraft Center December 16 via truck. The LRV was shipped from the GM Delco Electronics Defense Research Center, Goleta, California on Monday. Technical Service Division personnel are shown uncrating the vehicle near Building 5 at the Center.

OVER THE
HOLIDAYS
DRIVE CAREFULLY
AND BE COUNTED IN '71

Merry Christmas

### Area Teenager's Christmas Ball Set

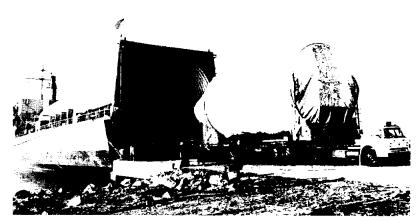
The first annual Christmas Ball for teenagers with KILT's Michael presenting "The Best On Record" will be held Wednesday, December 23 beginning at 8 p.m.

The Christmas Ball will be held in the Grand Ballroom of the Nassau Bay Resort Motor Hotel under the sponsorship of the Catholic Youth Organization of St. Paul's Church. For additional information call 474-4734.

### **Shuttle Study**

(Continued from Page 1)

shuttle transportation system. A similar study by McDonnell-Douglas Corporation, St. Louis, Mo. is monitored by the Marshall Space Flight Center.



TEST VERSION OF SKYLAB WORKSHOP — Transporter carrying full-scale non-flight version of Skylab orbital workshop is maneuvered into position for loading aboard USS Point Barrow at Seal Beach, Calif. Ship is scheduled to have arrived at National Aeronautics and Space Administration's Michoud Assembly Facility in New Orleans yesterday. There the vehicle, called the Dynamic Test Article, will be loaded aboard a NASA barge for shipment to Manned Spacecraft Center (MSC) in Houston, arriving here January 6. McDonnell Douglas Astronautics Company, Huntington Beach, Calif. converted a Saturn S-IVB stage into the structural simulation of actual Saturn Workshop in which crews of astronauts will live and work for periods of up to 56 days in earth orbit. Acoustic and vibration testing will be done at MSC and stage then will be shipped to NASA's Marshall Space Flight Center for static structural testing. Test vehicle is 50 feet long, 21.7 feet in diameter and weighs 27½ tons on transporter. Skylab is scheduled for 1972 launch as nation's first space station.

IF MCC COULD NOT SUPPORT APOLLO 14-

# Emergency Control Center Prepared To Take Over Flight

Many precautions are taken in the Mission Control Center for preserving the integrity of the facility in support of spaceflight in Earth orbit and beyond.

But, what if for some unknown reason a massive failure occurs that is unavoidable and the Houston control center is unable to continue its support?

This is when the EMCC (Emergency Mission Control Center) would come into the picture with a preselected team of flight controllers to initially take over control of the flight.

The EMCC is contained within an enclosure approximately 30 by 45 feet located above and overlooking (through a glass window) the Manned Space Flight Network operation center at the Goddard Space Flight Center, Greenbelt, Maryland.

This enclosure is partitioned off into four rooms. The larger is the Mission Control Room (MCR) and it contains ten (10) consoles for flight controllers to conduct the mission. Other rooms are the Management Observation Room (MOR), Launch Support Room (LSR), and a document room with tables, desks and file cabinets.

Computer support will be supplied by the Goddard Real Time System (GRTS). Two IBM 360-75s in the GRTS will be utilized. One will interface with the GSFC computer processors (CPs) to process the trajectory data for orbit determination (OD), and the other will be used for maneuver computation. The latter will use the Manned Spacecraft Centers' EMCC program.

Nine of the consoles in the MCR are identical, having a single key set and TV tube with 15 TV channels available for presentation to the controllers computer printout data on the mission. The tenth console has two keysets and controls for three overhead TV monitors. In addition there is a console in the computer room that

is available for use by the flight controllers and can be patched to the MCR.

Adjoining the Mission Control Room is the Management Observation Room (MOR) which has TV plus loop monitor capability. The Flight Operations Director, Apollo Spacecraft Program Office and Department of Defense personnel will occupy this room.

In back of the MOR is the support area (LSR) with two keysets on two tables. Also available if needed will be three consoles in

the Manned Space Flight Network Operation Control area. These latter consoles would be open for systems support people and others.

Consoles in the MCR will be provided for Flight Director (FD), Spacecraft Communicator (CAPCOM), Retrofire Officer (RFO), Network Controller, Lunar Module (LM), Command and Service Module (CSM), Assistant Flight Director/Flight Activities Officer (AFD/FAO), Operation and Procedures/Instrumentation & Communications Officer (O & P /

INCO) Flight Dynamics Officer (FIDO), and Guidance Officer (GUIDO).

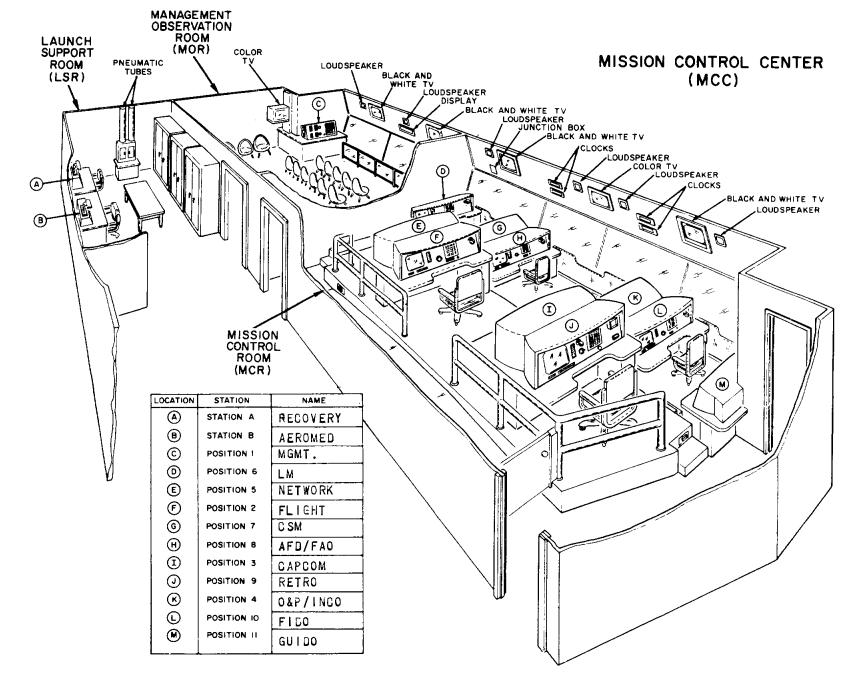
The Landing and Recovery Division personnel and aeromed will be located in the LSR.

With this setup at GSFC the flight control team would be able to provide return trajectory maneuvers direct or circumlunar return, transearth injection (TEI), midcourse corrections and retrofire in Earth orbit.

Should the need arise to place the EMCC in operation, a team

of flight controllers will be prepared to board an aircraft in Houston and be on their way to Greenbelt, Maryland to take over control of the flight from there. Within a matter of hours the EMCC could be operational and providing data to the crew of the spaceflight.

During a recent checkout of the facility at GSFC by flight controllers from MSC it was determined that the EMCC program was adequate and ready to support a manned spaceflight if needed.



## Credit Union Straight Talk

COMMITTEES ANYONE?

The nominating committee of the M.S.C. FEDERAL CREDIT UNION is looking for persons interested in serving on credit union committees. If you are interested, contact Jim DeMuth-ext. 5133.

ANNUAL MEETING

The 9th Annual membership meeting of the M.S.C. FEDERAL CREDIT UNION will be held January 15, 1971, 7:30 P.M., in the M.S.C. Auditorium, Bldg. 1.

There will be entertainment

from "Market Square." A grand door prize of an 18" Philco Color TV will be given away. Several smaller gifts will be given also. These are on display at the credit union office.

See you January 15th.

# Roundup Swap-Shop

(Deadline for Swap-Shop classified ad is Thursday of the week preceding Roundup publication date. Ads are limited to MSC civil service employees and assigned military personel. Maximum length is 15 words, including name, office code and home telephone number. Send ads in writing to Roundup Editor, AP3)

#### **AUTOS**

66 Tempest, 4-dr, 389 cu in engine, 4-speed transmission, pwr steering, tape deck 8 track, radio. air conditioning/heater, \$950. Statz, 482-7607

65 Rambler 660 Classic 4 dr sedan, factory air, PS/PB, new motor & transmission, xin cdtn. Alford, 939-2857.

69 Fairlane 500, 2 dr HT, pwr, air, auto, vinyl roof, new tires, \$2195. Wright, 488-2223. 62 Ford, air cond, pwr steering and brakes, uto, new tires, \$350. Dallas, 585-3794.

61 VW, needs engine work or good for parts. Razo 473-1387 after 5:30 pm.

63 - 327 Chev engine, 3/4 cam solid lifters boreout 60 ths, complete engine. Call 472-5231. 66 Chevelle convert, 4-on-the-floor manual shift, radio, A/C, 327 engine and peppy, good rubber, good cdtn. Merrifield, 591-2437.

70 BSA, Victor 441, 1,300 miles, perfect showroom condition, \$850 w/helmet.

65 Volkswagen, runs good, needs seat covers, \$600. Dr. Alexander, 591-3395 after 5 pm.

67 MGB Roadster, wire, radio, heater, wood wheel, tonneau, shop manual, Excellent. Avent,

52 Mercury, 2-dr hardtop, 80,000 miles, needs engine overhaul, \$150. Kilpatrick, HU2-1733. 55 MG TF-1500 (Classic Design), no engine or transmission. Body, top, and upholstery good, \$350. Hagood, 483-2385.

67 Dodge van, 6 cy!, heater, original paint,

good tires, clean, \$695. Morton, 946-4752. 64 Chev Bel Air V8, auto, air, P/S, R/H, very good cdtn, \$550. Cawley, 643-6920.

One owner 62 Chevy sta/wgn, 6-cyl., stan dard shift, low mileage \$325, Wright 877-3059 69 Roadrunner: A/C, P/S, A/T, radio, rear window defogger, spt. whis, polyglas, tinted glas, green w/tan interior, 30,000, one owner, \$2500. Blalock 932-3976.

63 TR-4 Triumph, wire whis, radio, heater, excel, cond., net top, \$800, Moser 686-1818. 60 Valiant sta wgn, A/C, new tires, \$225 Campbell 488-3635.

50 Dodge Coronet 440, well equipped, good cond. \$300 under NADA Retail. 944-5624.

### MISCELLANEOUS

Flute, Artly, good condition w/case, \$125 or best offer. Alfred, 932-2857.

Ski Rig complete 14' fiberglass Lone Star boat, 35 HP Super Seahorse motor, electric start, Road King tilt trailer fully equipped many extras, perfect condition, \$650 gets all. Alford, 932-2857.

Monolux Veriable power telescope 35, 30, 45, & 60 power with triped, \$25. Alford, 932-2857. Racing "Go-Cart" extra heavy duty dual motor mounts equipped with 10 Horse West Bend Engine, xln cdtn, \$175. Alford, 932-2857. 17-foot sq stern Ouachita cance and 3½ HP Johnson motor, both used very little, like new, \$275. Holzaepfel, 427-1657.

Snipe class sailboat and trailer, xin cdtn. \$900. Holzaepfel, 427-1657.

Two blande wigs, like new, cost \$35 will

sell for \$10. Wade, 877-1815.

Clarinet Bb, Selmar soloist, professional caliber instrument. Used 2 yrs by high school student, xln cdtn, original cost \$285, sell for \$200 Rubenstein, 877-3288.

Sassy, frisgy, tiger stripe boy kitten, 8 wks old, needs home and friend, Konraci, 877-3133. 65 Honda 305, low mileage, good cdtn, maintenance handbook, two helmets, \$375. Guess,

VW Radio in carton \$35. Like new tape recorder in attache case, cost \$219, sell for

Remington upright typewriter, \$27.50. Complete beautiful dining room suite, \$400. Call

1969 Johnson 20 hp outboard motor, 14 ft dw Quachita boat, motor stand extra prop and small trailer for short moving, all \$425 or best offer. Red men's 26" Bike w/ slim tires, rides smooth, \$12. Boy's lime color, Schwinn Ray, like new w/new tires, sacrifice for \$35. Call 877-4102.

Purebred white German Shepherd puppies, 7 wks old, males \$75, females \$65, Loftus, 591-2567. Christmas gifts, unusually lovely handcrafted ceramics, beautiful Christmas pieces, Bisque,

Greenware, will Customcraft. Ivers, 877-1257. Slide Trombone King Liberty model, top newly reconditioned, \$125. Glover, 944-4863.

Nikkormat FT with 50 mm F2.O auto Nikko lens and hard leather case and 52 mm UV filter, \$195. Nikkormat Right Angle Finder (new) \$15. Prinz 135 mm F3.5 auto lens for Nikon mount \$35. Niker compartment case \$15. Tripod \$12., or buy entire group of items for \$240. Marlo, 944-4319.

Maple crib and mattress, good condition \$17. Myers, 488-0810 after 5 pm.

Washing machine, GE, \$65. Sewing machine, Singer \$50. Liddell, 471-4448.

1969 Cimatti, 160 cc, 5000 miles, superb condition. Two helmets and shop manual included, \$275 Hagood 483-2385.

Peterson car seat \$5; stroller 2-seater \$10; crib w/mattress, pad, and sheets \$20. Kenyon, 932-5925.

Sailboat, 22' Santana, sleeps four, Dacron sai's, x'n cdtn, \$4100 in equity, best offer. Dr. Sales 877-2755.

Gibson (Kalamazoo) electric bass and bass reflex amp & speaker, includes strap, cord, and case, new, just right for Christmas, \$250. Verrengia, 681-1872 after 5.

TV Sterec-radio combination Hi-Fi. AM-FM multiplex, walnut finish. Call 474-3930.

1970 Hondo 175 w/2 helmets, less than 600 miles, still in warranty. Most sell. David, 488-1280 after 6:30 pm.

Two Goodrich radials, FR70-14, white sidemo old \$30 each. Two Sears Steelbelted Radials, 195-14, white sidewalls, 10 mo ald, \$25. One Goodrich Nylon 7.75-14, black \$10. Call 488-2240 after 5:15 pm.

1969 Honda Super Hawk, CB77E, 305CC,

6200 miles, helmet, tools, \$425. Singleton, 488-5995.

Aria classical guitar \$45, folk guitar \$35, Kneissl Risenslalom skis 175cm \$40, Koflach ski boots 6xn, 7xn \$20 each. Ong 877-2981. 3-piece fruitwood bedroom suite with matt-

ress, \$125. Law 944-7596. Exercycle deluxe model like new \$25. 23-in. B&W TV marginal operation \$25. Stephens

481-0095. RCA Whirlpool washer, late model \$50. Moran

Thorens TD-124, 4-speed stereo turntable w/ Shure M7D cartridge, auto cutoff, tone arm balance control, walnut base \$50 Engel 482-

Full size table tennis table, good cond. \$15 Glover 877-3384.

H.O. gauge train set, on 4x8 plywood land scaped layout. \$35 Cawley 643-6920.

Bassinet. 4 mos. old, perfect cond. w/hood, pad and skirt \$10. Handley 482-7041.

Elec. sewing machine incl. attachments. make Brother, excellent cond. \$55. Bass 534-3890.

#### DID YOUR AD FAIL TO APPEAR HERE?

If you sent an ad to the ROUNDUP for publication and it did not appear in this column, it could be that you did not follow the directions above for submitting ads. Some editors may be clairvoyant, this one is not. Ads improperly submitted are consigned to file 13. EDITOR

B-flat clarinet, like new \$100. Chady 487-1502. Living room suite—couch & chair modern de sign, good cond. vinyl, \$25. Rodman 932-2897. Go-Kart, racing slicks, 4-HP Clinton engine, good opr. cond. 120 Overton 534-5139.

Coronado Chapparel Trailer, 61 by 12, 2bdrm, 1-bath, central A/H, \$100 and assume notes of \$105.85. Ruth Beck 488-4282 evenings. FREE Christmas puppies, heinz, med. size, mixed colors, beautiful, lovable, 8 weeks. M.

Harman Ext. 3305. Mahogany leather covered tops cocktail, lamp and end tables. Stiffel table lamps, brass, contemporary and venetian. Kroehler arm chair and 3-sec. sofa. Reclining lounge chair, green sim. leather. Meek 877-4408.

Large and small metal USAC missileman badges, new. Kruppenbacher 877-2227.

Elec. guitar, \$40 Jackson 645-3417.

### **RENTALS**

Furnished cottage, convenient location, ai conditioned, garage, storage building, \$100 per mo. Dickinson. Wiseman, 534-3802.

Remote cabin, lease by day or week, deep in Sam Houston National Forest, ideal base camp for hunting or just gettting away from it all. Leonard, 944-4997.

### REAL ESTATE

Tiki Island lot, bay-front on Jones Bay. Will consider second lien on assumption \$2,000 below present market value. Mandell, 877-2925. Seabrook, 4BR, 11/2 baths, fenced, drapes,

covered patio, fully carpeted. Poindexter, 474 Tiki Island water front lot with boat slip,

\$6,500. Morris, 482-7775.

4-2-2 antique white brick, Fairmont Park, lg. paneled family rm w/cathedral ceiling, new carport, new central air/heat, large lot, sell equity in 5% loan or lease. Tucker 471-4055.

### Wet suit, man's medium, reasonable. Jay,

946-0704. 22 Rifle for 16-yr old to perfect his target shooting. Sullivan, GR2-6093.

Male roommate to share 2 BR apt at Balboa in Nassau Bay. Arvey, 591-2996.

Used Piccolo. Fred, 944-8753. Motor bike in good condition. Size about 90

cc. Hooper 488-4120. Join car pool, Allen Parkway to MSC 8:30 to 5:00. Jean Ext. 3041.

### BOWLING

BOWLING STANDINGS Jimmy Warren Memorial League As of December 15

Achievers Pin Pounder Alley Oops Bit Pickers Bit Pickers
Real Timers
Roadrunners
Blitzers
Fabricators
Strikers
Chokers
Mixers
Hexes



FLIGHT CREW HEALTH STABILIZATION PROGRAM

SYNDICATED CARTOONIST John Hart of Hall Syndicate has put together a series of six posters which call attention to the Apollo 14 Flight Crew Health Stabilization Program. The program which places emphasis on providing close medical surveillance of the Apollo 14 crew and those persons with whom they work closely is designed to minimize possible exposure of the crews to disease or illness. Only those persons on a 'primary' contact list will be permitted access to the crew during the 21-days prior to launch. Those on the list of 'primary' contacts which includes wives, backup crew members and mission essential personnel will receive physical examinations and be urged to report all illnesses occuring in their families during the pre-launch

DESIGN/PLANNING-

## **Modular Space Station Study Proposal Requested From NAR**

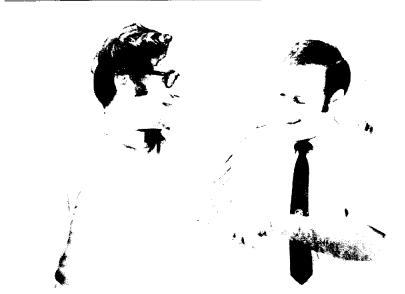
The NASA Manned Spacecraft cal miles. They will be designed Center requested a proposal this week from Space Division, North American Rockwell Corporation, Downey, California for design and planning studies of a modular space station.

Major effort of the extension study will be the preliminary design of an Earth-orbital station capable of accommodating a crew of six with an operational date of early 1978. The station also shall have the potential for growth up to 12 scientists and crew.

The station will consist of individual modules carried into space in the payload bay of a shuttle, assembled in orbit operating at altitudes of 240 to 270 nautifor an extended lifetime, subject to resupply of expendables and rotation of crews.

According to the Request for Proposal (RFP), the initial station includes a general purpose laboratory, the capability to support two research modules, crew quarters and a command and control area. The growth version will include additional crew quarters and laboratories for experiments in life sciences, astronomy, earth resources and physics.

A similar study contract with McDonnel Douglas will be directed by NASA's Marshall Space Flight Center in Huntsville, Alabama.



RELUCTANT TEXAS BOOSTER — Stephen Bales, flight dynamics officer from Flight Control Division wore the "Texas number 1" sweatshirt one day last week somewhat reluctantly. You guessed it.... he lost a bet, the Hogs didn't come through for him. This is only one of the indignities Bales suffered at the hands of Gary Renick a fellow FIDO. Renick "congratulates" Rales on his unwise selection. Bales on his unwise selection.

FOR THOSE IN THAT LAST MINUTE CHRISTMAS SHOPPING QUANDARY— H. P. Barnum III and Art Linkletter of "Life with Linkletter" suggest the coolest gift of all, U.S. Savings Bonds. So this Christmas do a little gift shopping where you bank. Buy Bonds. The present for the future. Take Stock

TO ELIMINATE 'POGO' EFFECT—

# **Apollo 14 Launch Vehicle Modified**

An "accumulator" device designed to suppress oscillation buildup during flight has been installed on the second stage of the Apollo 14 launch vehicle at the National Aeronautics and Space Administration's Kennedy Space Center, Fla.

Technicians have placed the accumlator in the liquid oxygen line of the center engine of the Saturn V's second (S-II-9) stage. The Saturn V launch vehicle program is directed by NASA's Marshall Space Flight Center, Huntsville,

Space agency officials made the decision to modify the liquid oxygen system after unusually high oscillations—sometimes called the "Pogo" effect — were recorded during the Apollo 13 flight on April 11.

While the oscillations resulted in an early shutdown of the stage's center J-2 engine, the

### **MSC Stamp Club** ${f To~Issue~3~Covers}$

The MSC Stamp Club has announced plans for issuing a set of spaceflight covers commemora-

ting Apollo 14 mission scheduled for launch on January 31, 1971. The set of 3 covers, for presentation to the club's worldwide membership, will be postmarked on dates of launch, lunar landing,

Texas. Each cover will bear the official inscription of the NASA Manned Spacecraft Center Stamp Club, and a four-color reproduction of the official mission insigna.

and splashdown, at Houston,

Non-members desiring to acquire this historic philatelic memento may write to MSC Stamp Club, Box 58328, Houston, Texas 77058, enclosing \$1.00 for each set of 3. A stamped self-addressed envelope must be furnished, and the request should be marked "Apollo 14 covers."

launch vehicle performed satisfactorily and met all mandatory and desirable flight objectives.

Apollo 13 flight evaluation indicated oscillations in the S-II liquid oxygen feed system caused the pressure in the "plumbing" of the center engine at one instant to drop below the minimum required, resulting in liquid oxygen pump cavitation. Cavitation, the creation of gas-filled spaces or bubbles in the liquid oxygen, reduced pump efficiency, and, in turn, engine thrust. When the center engine's thrust dropped off, it was automatically shut down.

Oscillations recorded on the S-II stage during the Apollo 13 flight were localized and were not passed on to the manned Apollo command module.

The accumulator installed in the Apollo 14 vehicle is a compartment or cavity located in the liquid oxygen line feeding the center engine. The compartment is filled with helium gas which acts as a cushion to the pressures of the fluid flowing through the line.

This dampening effect will cause that column of fluid to oscillate at a frequency different from that of the thrust structure and engines, and will in effect "de-couple" the propulsion system from the structural system, thus preventing the three respective systems from oscillating in rhythm. It is such rhythm oscillation, or "coupling," that causes the unacceptable buildup that occurred in Apollo 13. The accumulator, engineers say, "de-tunes" the several oscillations which have a natural and unwanted tendency to fall into the same rhythm.

In addition to the installation of an accumulator in the liquid oxygen line feeding the S-II center engine, three accelerationactuated modules will be installed on the center cross beam structure. These modules will act as a backup to initiate cutoff of the

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.

Look deep into my eye!"

center engine should excessive oscillation of the center beam structure start to occur.

For the Apollo 14 mission, another change has been made in the S-II stage—a redesign in the J-2 engine propellant utilization valve. Five J-2 engines power the S-II stage.

The valve controls the propellant mixture ration to the engine to provide high thrust when it is needed during the early burn period with higher stage weight, and lower thrust for more efficient operation during the later burn period.

The redesigned, pneumaticallyactuated valve replaces a motor driven valve and by-passes considerable onboard stage electronic circuitry. Its actuation command now comes directly from the vehicle instrument unit.

### **MSC Awards**

(Continued from Page 1) Building 1, at 3 P.M. Monday. EMPLOYEES NOMINATED FOR AWARDS

NASA Distinguished Service Medal (Apollo 13:)

Fred W. Haise, Jr., John L. Swigert, Jr.;

MSC Certificate of Commendation (Apollo 12):

Maj. Charles J. Tringali (presently assigned to USAF Space & Missiles Systems Organization, Los Angeles, Calif.);

Mission Planning and Analysis Division, Emil R. Schiesser;

Flight Support Division, James C. Stokes, Jr.;

Lunar Missions Office, John G. Zarcaro;

MSC Certificate of Commendation (Apollo 13):

Public Affairs Office, Brian M. Duff;

Flight Control Division, Arnold D. Aldrich, Melvin F .Brooks, Gerald D. Griffin, James E. Hannigan, Eugene F. Kranz, Glynn S. Lunney, Jones W. Roach, Milton L. Windler;

Mission Planning & Analysis Division, Ronald L. Berry, Carl R.

Astronaut Office, Vance D. Brand, Maj. Charles M. Duke, Jr., Thomas K. Mattingly, Comdr. John W. Young, Col. Thomas P. Stafford;

Flight Crew Support Division, Stanley Faber, Tommy W. Holloway, Riley R. McCafferty, John W. O'Neill;

Apollo Spacecraft Program Office, Aaron Cohen, Ronald W. Kubicki, James A. McDivitt, Scott H. Simpkinson, Owen G. Morris;

Engineering & Development Directorate, Robert P. Burt, Philip M. Deans, John B. Lee;

Systems Engineering Division, John R. Sevier, Jr.;

Information Systems Division, Arturo B. Campos;

Test Division, Sidney C. Jones, Jr., Donald D. Arabian;

Crew Systems Division, Robert E. Smylie;

Guidance and Control Division, John F. Hanaway;

Propulsion & Power Division, Richard B. Ferguson;

Flight Operations Directorate, Sigurd A. Sjoberg, Howard W. Tindall, Jr.;

Goddard Space Flight Center, Richard J. Augenstein, Dale W. Call, George A. Cassels, William A. Pfeiffer, Robert H. Plaumann, Robert L. Owen, Robert E. Spearing, Robert C. Taylor;

MSC Superior Achievement Award (Apollo 12):

LM Project Engineering Division, William C. Fischer, Daniel T. Lockard;

CSM Project Engineering Division, Jerry S. Lowe, Gary G.

MSC Superior Achievement (Apollo 13):

Astronaut Office, Capt. Eugene A. Ceran, Dr. Anthony W. England, Lt. Col. Joe H. Engle, Comdr. Ronald E. Evans, Comdr. Edgar D. Mitchell, Lt. Col. William R. Pogue, Maj. Stuart A. Roosa. Dr. Harrison H. Schmitt, Col. David R. Scott;

Flight Control Division, John W. Aaron, William C. Burton, Charles F. Deiterich, Harold M. Draughon, Charles L. Dumis, Edward I. Fendell, William E. Fenner, Neil B. Hutchinson, Robert H. Heselmeyer, Larry W. Keyser, Jack Knight, Jr., Seymour A. Liebergot, Harold A. Loden, W. Merlin Merritt, Jr., William L. Peters, Donald R. Puddy, H. David Reed, Kenneth W. Russell, Lt. Comdr. Joseph P. Kerwin, William M. Stoval, Jr., Larry W. Maj. Jack R. Lousma, Lt. Comdr. Strimple, Richard A. Thorson,

John A. Wegener, Briggs N. Willoughby;

Information Systems Division, Gary W. Johnson;

Crew Systems Division, James V. Correale, Edward L. Hays, Elton M. Tucker;

Guidance and Control Division, Cline W. Frasier;

Propulsion & Power Division, Bobby J. Bragg, William R. Hammock, Jr.;

Structures & Mechanics Division, James A. Smith, Jr.;

Landing and Recovery Division, Sheridan J. Berthiaume, Richard W. Blakley, Edward C. Bullock, Charles C. Filley, John E. Hoover;

Mission Planning & Analysis Division, Martin L. Alexander, Troy J. Blucker, Robert S. Davis, Charles A. Denham, Rocky D. Duncan, Quentin A. Holmes, Martin D. Jenness, Alfred N. Lunde, Robert E. McAdams, Charles W. Pace, Vernon S. Ritchey, Robert T. Savely, Walter Scott, Jr., Richard M. Swalin, Kenneth T. Zeiler;

Systems Engineering Division, Richard H. Kohrs;

LM Project Engineering Division, Donald M. Corcoran; John G. Presnell, Jr., John Vincze;

Flight Support Division, James E. Mager;

CMS Project Engineering Division, Robert E. Bobola, Jerry S. Lowe, Daniel A. Nebrig, William H. Taylor, Jr;

MSC Certificate of Appreciation (Apollo 12):

Robert E. Breeding, Hamilton Standard, Leonard F. Shepard, International Latex Corporation;

MSC Certificate of Appreciation (Apollo 13):

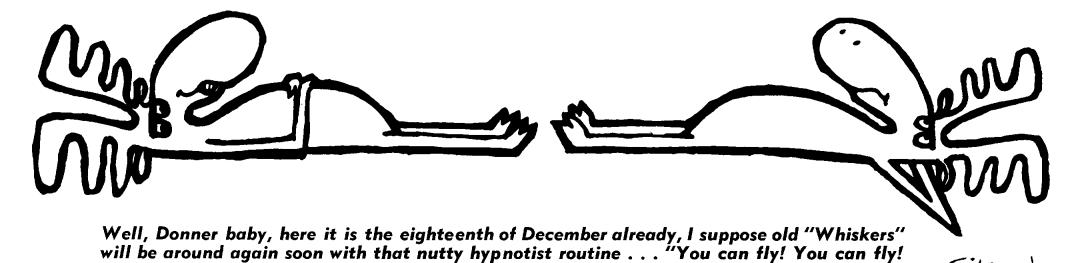
William R. Bischoff, Grumman Aerospace Corporation, Joseph G. Gavin, Jr., Grumman Aerospace Corporation, George W. Jeffs, North American Rockwell Corporation Donald J. Markarian, Grumman Aerospace Corporation, George B. Merrick, North American Rockwell Corporation, Gary E. Smith, Grumman Aerospace Corporation, Ralph H. Tripp, Grumman Aerospace Corporation; MSC Certificate of Appreciation

(Awarded 11/70): North American Rockwell Corporation, Tulsa Division, Carl A.

Hawthorne; MSC Group Achievement Award

(Apollo 13).

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