

## Final Manned Mission Successfully Launched

Perhaps one of the most spectacular sights ever witnessed was the night launch of Apollo 17 on December 6.

The blastoff occurred some three hours past the scheduled time of 8:53 p.m. CST.

A liquid oxygen fuel tank on the third stage of the Apollo 17 Saturn rocket failed to pressurize automatically during the final stages of the first countdown.

Mission Control began pressurizing the tank but failed to do it in time to satisfy a computer sequence.

After much patience from Mission Control and the astronauts, the ignition of the Saturn V was successful and the last scheduled manned mission to the moon was underway.

A total of 72 twenty kilowatt Xenon searchlights and 2 sixty kilowatt Xenon searchlight banks producing approximately 225 foot candles of light was used for the launch.

Apollo 17 is only one and a third days short of the US spaceflight duration record of 14 days set in 1965 by Gemini VII, and is the sixth and final Moon landing in the Apollo program.

Two of the three-man Apollo 17 crew are setting up the fifth in a network of automatic scientific stations during their three-day stay at the Taurus-Littrow landing site.

In addition to erecting the scientific data relay station, Apollo 17 has the objectives of exploring and sampling the materials and surface features at the combination highland and lowland landing site and to conduct sev-

eral inflight experiments and photographic tasks.

The Taurus-Littrow landing site is named for the Tarus mountains and Littrow crater located in a mountainous region southeast of the Serenitatis basin.

Dominant features of the landing site are three rounded hills, or 'massifs' surrounding the relatively flat target point and a range of what lunar geologists describe as sculptured hills.

Apollo 17 is manned by Eugene A. Cernan, commander, Ronald E. Evans, command module pilot, and Harrison H. Schmitt, lunar module pilot.

Cernan previously flew in space aboard Gemini 9 and Apollo 10, while Apollo 17 is the first flight into space for Evans and Schmitt.

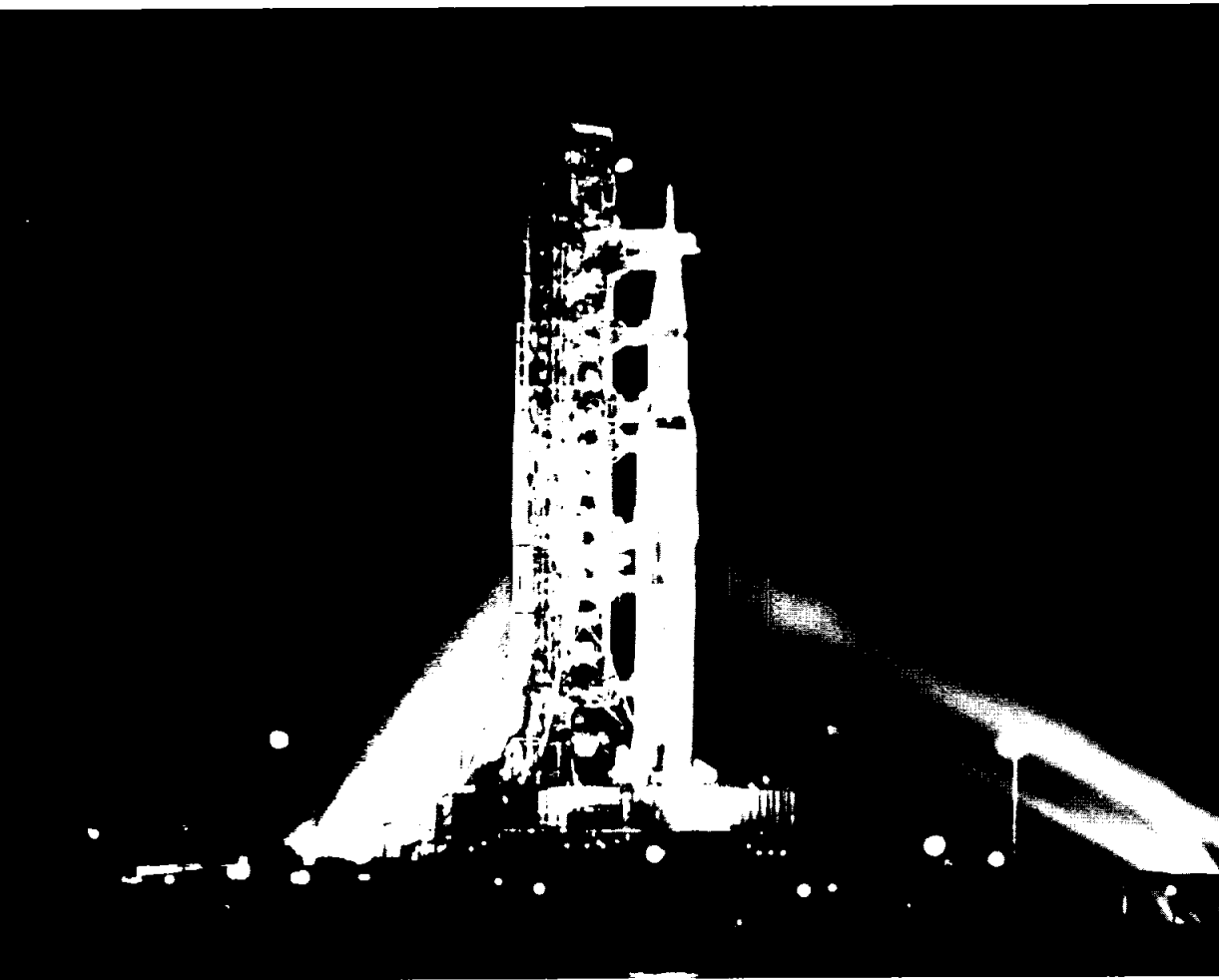
Civilian astronaut Schmitt is also a professional geologist. Cernan holds the rank of Captain and Evans is a Commander in the US Navy.

During their 75 hours on the lunar surface, Cernan and Schmitt will conduct three seven-hour periods of exploration, sample collecting and emplacing the Apollo Lunar Surface Experiment Package (ALSEP).

Four of the five Apollo 17 ALSEP experiments have never been flown before.

The crew's mobility on the surface at Taurus-Littrow is again enhanced by the electric-powered Lunar Roving Vehicle (LRV). Attached to a mount on the front of the LRV is a color television camera which can be aimed and focussed remotely from the Mis-

*(Continued on Page 2)*



APOLLO 17 LIFTOFF—A total of 72 twenty kilowatt Xenon searchlights and 2 sixty kilowatt Xenon searchlight banks producing approximately 225 foot candles of light was used for the launching of Apollo 17 from complex 39 at Cape Kennedy. This was the first mission to require a nighttime launch of the giant Saturn 5 launch vehicle.

## MQF on Loan to USAF

The first home for Apollo 11 returning moon explorers has been loaned to the U.S. Air Force.

The Mobile Quarantine Facility (MQF) used to return Astronauts Neil Armstrong, Michael Collins and Edwin Aldrin in July 1969 from the Pacific recovery ship to the Lunar Receiving Lab at MSC is now on loan to the U. S. Air Force for another quarantine mission.

An outbreak of the contagious Lassa Fever has been encountered in the West African nation of Sierra Leone by members of the U. S. Public Health Service team from the Center for Disease Control, Atlanta, Georgia, currently there studying Lassa Fever and rendering assistance to the local population.

In the event members of the team from the USPHS contract the fever, the MQF will be used to transport them back to the United States.

Lassa Fever is a contagious disease which involves several body systems and has a high mortality rate. Intensive supportive medical care including cardiac monitoring and cardiovascular support are required for Lassa Fever victims. The MQF provides the capability for using such systems and avoids many quarantine problems.

The MQF unit was picked up by a Military Airlift Command C-141 aircraft from Ellington Air Force Base on October 20, 1972.

Aeromedical transportation of Lassa Fever victims requires isolation/life support systems that only the MQF can currently provide for use in a C-141 aircraft.

Training in the operation of the MQF was provided to MAC medical personnel by NASA MQF engineers here at MSC.

The MQF is pre-positioned at the 58th Aeromedical Evacuation Squadron, McGuire AFB, New Jersey until movement to Sierra Leone is required.

The MQF was developed in response to the requirement established by the Interagency Committee on Back Contamination. The return to Earth of lunar material created concern in the scientific community on the uncertainty of the type or existence of any pathogen on the lunar surface that might be introduced in to the environment of Earth.

Outwardly the MQF resembles a travel trailer. All the systems are self-contained and designed to biologically isolate at least six people with adequate living facilities.

Most of the MQF functional system are powered by electricity. This power is supplied either by external sources or on board sources, a diesel powered auxiliary power unit and a battery powered emergency system.

Four units were built for the Apollo lunar program and three were used, one each on Apollo 11, 12 and 14.

## LLTV Aircraft Now Retired

"I think it does an excellent job of actually capturing the handling characteristics of the lunar module in a landing maneuver. It's really a great deal different than any kind of aircraft that I've flown . . ." Neil Armstrong, the first moon walking astronaut told newsmen in mid-June of 1969, just after he had completed a training flight in the Lunar Landing Training Vehicle (LLTV) at Ellington Air Force Base.

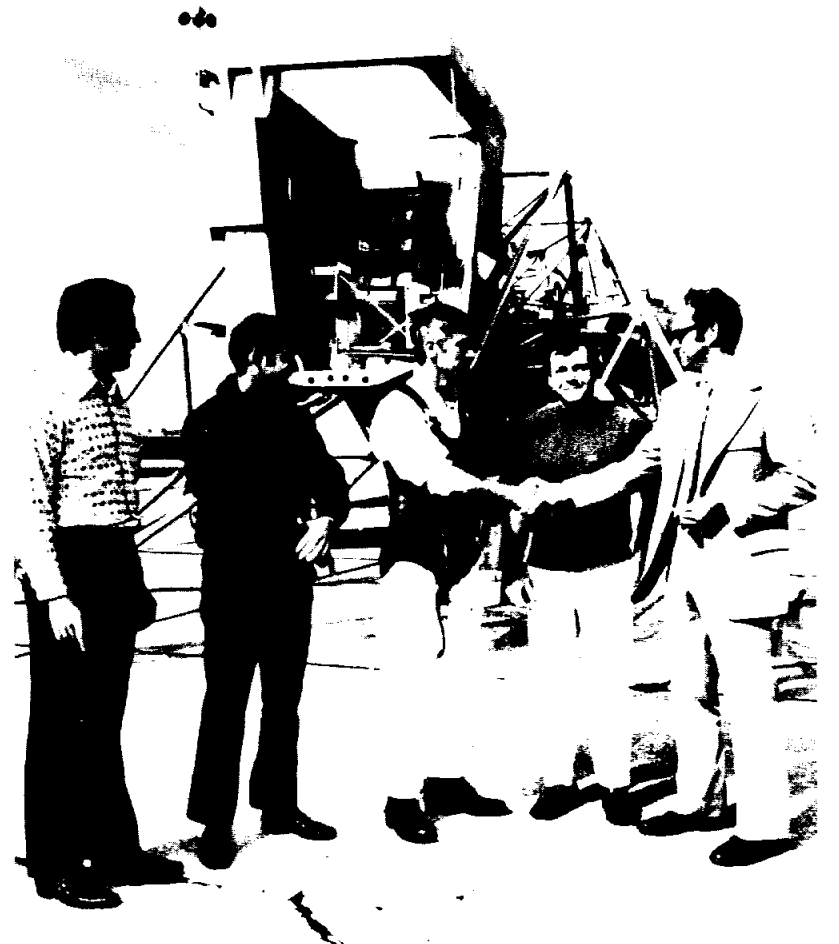
Now the vehicle has been retired. The final flight of the LLTV was piloted by Eugene Cernan on November 13, 1972. This was his 46th flight in the LLTV.

The first flight in the development of the research vehicle to simulate the final portion of the descent and hover of the lunar module was made on October 30, 1964, by the 1-ate Joe Walker at the Flight Research Center. Nearly 200 flights were made with the LLRV before the program was transferred to the Manned Spacecraft Center in the early part of 1967.

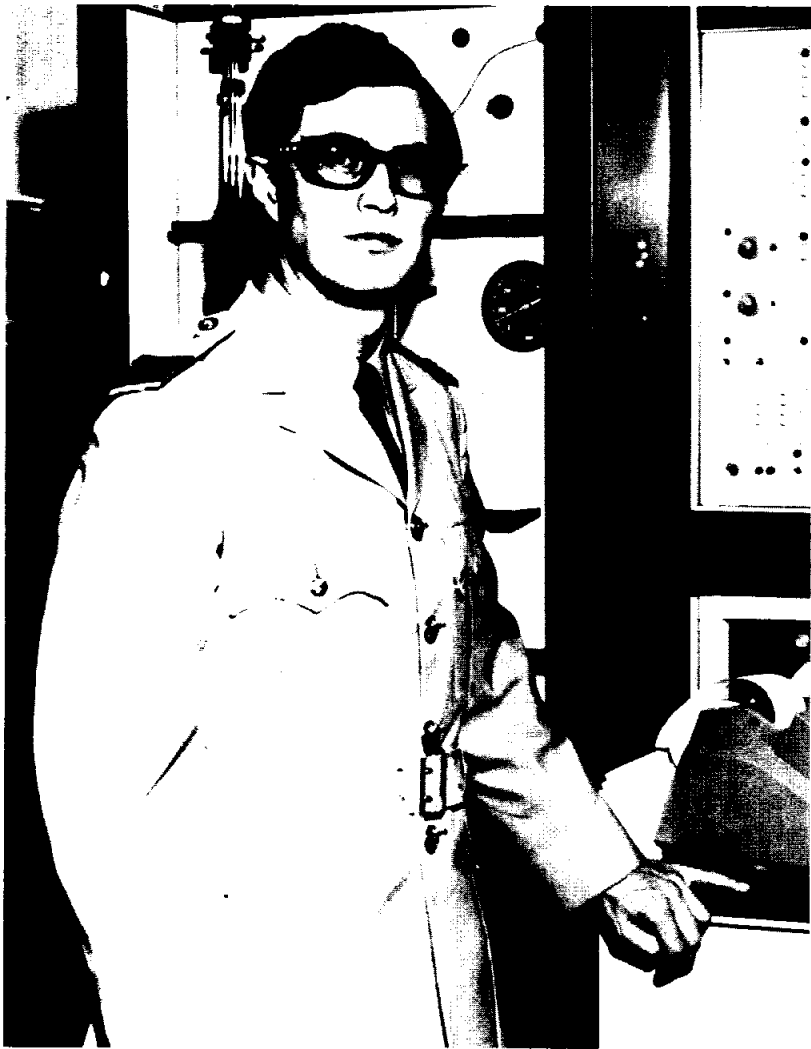
In mid-1966, NASA/MSC ordered three Lunar Landing Training Vehicles which were modified versions of the LLRV, with deliveries commencing in December 1967. First flight of the LLTV was October 8, 1968, at Ellington AFB.

All prime and backup commanders of Lunar Landing missions

*(Continued on Page 3)*



LAST LLTV FLIGHT—Charles Haines, LLTV Program Manager, congratulates Astronaut Eugene A. Cernan (center) after the Apollo 17 commander completed the final flight in the Lunar Landing Training Vehicle at Ellington AFB on November 13, 1972. Others standing in front of the LLTV (left to right) Charles Hayes and Roger Zwieg, flight directors for LLTV; and Jere Cobb, instructor pilot.



**MEDICAL OFFICER**—Squadron Leader Michael W. Whittle has begun a two-year tour of duty with MSC. He is the first of several foreign aerospace doctors who will work with U. S. scientists on Skylab.

## Apollo 17 Launch

(Continued From Page 1)

son Control Center. Cameras which are being operated by Cernan and Schmitt, will further record the characteristics of the landing site to aid in post-flight geological analysis.

Data on the composition, density and constituents of the lunar atmosphere, a temperature profile of the lunar surface along the command module ground track and a geologic crosssection to a depth of 1.3 kilometers (.8 miles) are being gathered by instruments in the service module Scientific Instrument Module.

**Channel 8 (KUHTV) will broadcast uninterrupted coverage of the lunar EVAs. Each EVA, scheduled for December 11, 12 and 13, will have a duration of 7 hours.**

Evans will operate the SIM bay experiments and mapping cameras while Cernan and Schmitt are on the lunar surface.

During transearth coast, Evans will leave the spacecraft to recover film cassetts from the mapping cameras and the lunar sounder.

Lunar surface touchdown by the lunar module will be at 1:55 p.m. CST December 11, with return to lunar orbit scheduled at 4:56 p.m. CST December 14.

After jettisoning the lunar module ascent stage to impact on the Moon, the crew will use the service propulsion system engine to leave lunar orbit for the return to Earth.

Transearth injection will be at 5:32 p.m. CST on December 16. Command module splashdown in the Pacific, southeast of Samoa, will be at 1:24 p.m. CST December 19. There the spacecraft and crew will be recovered by the USS Ticonderoga.

## NEBA Insurance Offers Security

NEBA Group Life Insurance costs less than 44 cents per thousand per month, according to Roy C. Aldridge, President of MSC's NEBA chapter.

NEBA offers Group Life Insurance and Travel Accident Life Insurance coverage to permanent employees, co-ops and detailees both military and civilian. Coverage for dependents (spouse and children) is available also.

For the Group Life Insurance, no medical examination is required if an eligible employee applies within 90 days of the employment date.

If application is made after the 90 day period, evidence of insurability satisfactory to the

Home Life Insurance Company must be submitted and approved.

For additional information regarding the Group Life Insurance or the Travel Accident Life Insurance Plan, call extension 5410. Booklets explaining the benefits are available.

## NASA Road 1 Has Blue Star Marker

NASA Road 1, the only highway into the Manned Spacecraft Center area, is now a Blue Star Memorial Highway, landscaped with oleander, dwarf crepe myrtle, flowering pomegranate and Pampas grass.

A year ago, NASA Road 1 was dedicated to those men who had given their lives in war for this country.

The Blue Star Marker, located on a side road leading to the main gate of the Space Center, receives close inspection from many of the 650,000 annual visitors, many of whom are from other countries.

The Nassau Bay Garden Club has been actively engaged in beautifying Road 1 for five years.

## Exercise Classes For Women Held At Ellington AFB

An exercise class held each Monday and Wednesday in the Base gymnasium at Ellington Air Force Base has been opened to MSC female employees.

Classes are held from 9 a.m. to 10 a.m. under the instruction of Mrs. Frankie Lozito.

Persons interested in taking the exercise class should contact Mrs. Elaine Schurr at 332-2962.

## Employees Received Flight Program Awards

MSC Director Christopher Kraft recently presented 39 MSC Certificates of Commendation and 69 Superior Achievement Awards to Center employees in recognition of their efforts in the manned space flight program.

Also, seven Group Achievement Awards were made to specialized engineering teams at the Center.

Receiving group awards were the Earth Resources Aircraft Program Team, Personnel Management Team, Nonflammable Materials Development Team, Skylab Apollo Telescope Mount Thermo-Vacuum Test Team, Skylab Medical Experiment Altitude Test Team, Skylab Vibration and Acoustic Test Team, and the Space Shuttle Program Definition and Preliminary Design Team.

MSC Certificates of Appreciation were presented to two firms in the aerospace industry—TRW, Inc. and Dynalectron Corporation.

Astronaut Karol Bobko accepted the NASA Exceptional Service Medal for his participation in the 56-day Skylab Medical Experiment Altitude Test, and MSC

Equal Opportunity Programs Office chief Carlos Garza received the NASA Equal Employment Opportunity Award.

Two non-NASA awards were also presented at the ceremony. The Federation Aeronautique Internationale (FAI) Diplome d' Honneur went to MSC Crew Systems Division for notable contributions to progress in aviation and astronautics, and the Geological Society of America Exception Service Certificate went to Apollo 15 and 16 crews for exceptional service in the science of geology during their exploration of Moon.

**Salt some away.**



Take stock in America. Buy U.S. Savings Bonds

## ROUNDUP

NASA MANNED SPACECRAFT CENTER HOUSTON, TEXAS



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.

Editor: Janet Wrather Photographer: A. "Pat" Patnesky



**GETS THE JOB DONE**—In spite of being a deaf-mute, Fred Clifton handles his job as Electronic Systems Technician efficiently. Clifton is employed in Flight Telecommunications at Lockheed.

## Christmas Project For Needy Black Families Underway

For the second consecutive year, black MSC employees will sponsor "It's a Family Affair," a Christmas project to aid needy black families.

Last year, \$594.05 was collected from MSC employees, allowing the group to purchase food and toys for 22 black families.

Also, \$50 was donated to an established family center in Houston for the purchase of shoes for needy children.

Officials who organized the project are Joseph Fuller, Howard Renfro, Quarence Fain, Joan Jackson and Linda Williams. These persons, along with others have set the fund-raising goal at \$1,000.00 for 1972. The deadline for donations is December 15.

If this year's goal is met, more families will be reached through the efforts of "It's a Family Affair."

## NASA Requests Closed Circuit Television System

A request for closed-circuit Color Television System (CTS) for use in Space Shuttle training has been issued by NASA.

The Request for Proposals (RFP) was released recently by the Manned Spacecraft Center in Houston.

According to the work statement which accompanied the proposal bid, the system "will be used in the generation of out-the-window visual scenes for Shuttle-related simulation and procedures development and crew training."

Contractor bids on the CTS are due at MSC by December 11. A firm-fixed-price contract is called for, and eligible bidders will include only those who qualify as small concerns.

The contractor will be responsible for development and fabrication of a system including camera head, control unit, synchronization generator, encoder and color TV monitor.

## Join the Payroll Savings Plan.



Sock some away.

Take stock in America. Buy U.S. Savings Bonds

## Roundup Swap-Shop

Swap Shop advertising is available to MSC and on-site contractor personnel. Articles or services must be offered as advertised, without regard to race, religion, sex or national origin. Ads should be 20 words or less, including home telephone number. Name and office code must accompany, but need not be included in, ad copy. Typed or printed copy must be received (AP3 Attn: Roundup) by Thursday of the week before publication.

### MISCELLANEOUS

30-30 Marlin Carbine rifle model 93, collector condition. \$200. 483-3018 or 337-1839.

Tires, (3), A78-13 Firestone Delux champs, belted, hbcp (2), 1 wheel, all from 67 Toyota, \$35. 471-4305.

Misc antiques, metal butter churn, 35, old hand irons, \$6. pitcher pump, \$20. iron pot, \$8. 471-4305.

Tricycles, 10" & 12", and ride-in fire engine, \$4 ea, 471-4305.

Beautiful gas logs, never unpacked, \$80. new, must sacrifice, intend burning wood. Also 24 inch bike, Polly, 488-0192.

Superelectrostatic Headphones, like new, cost \$105. sacrifice for \$60, warranty, Jones, 944-1321.

Shotgun, Remington Wingmaster, 12 gauge model 870, full choke 30" barrel w/ ventilated rib, \$100, 483-5070.

Surf board, \$40, winter surfing special, wet suit, long legs, sleeveless, \$20. 334-2993.

Twin fin surfboard, 6 ft long, \$50, Morris, 481-3900.

Ham rig, including 75 meter transceiver, pwr supply & antenna setup, \$159, 481-3900.

Lgr Mini-bike, 5 full horsepower w/ torque converter & motorcycle tank, \$149, 481-3900.

1pr lrg Advent speakers, walnut cabinet, xlt cndn, \$75 ea, sold as pair, 488-3966.

Lovely oriental 4 panel screen heavily covered, \$350, 649-2569.

Gold tufted bench prft & very unusual, \$50. Italian provincial chest of drawers, \$65, 649-2569.

6 x 9 Heritage Shag rug, gold tone, xlt cndn, \$35, 488-6439.

Ham station, 175 watt meter transceiver, spker, pwr supply, 50' mast, antenna wire, coax, spare tubes, manual, 481-3900.

71 Johnson, 9-5 hp motor, mint cndn, \$265, 334-3259.

Allied 5 band radio, nw cndn, \$35. 334-3259.

Japanese made windproof lighters, new, 50 cents ea, GR 2-6910, no calls Friday eve or Sat.

4 Goodyear Ployglass E-60-15 tires, about 25 mi on tires, \$30. ea, 433-7551 aft 5 p.m.

26" girl's bike, Sears 3-speed, li new, used only 1 mo, \$35. 941-0574.

Sears Silverstone Chord organ, 40 button, 2 keybds w/ bench, immaculate, 1 yr old, \$195. 941-0574.

132 piece Siam Bronzeware, w/ Tekwood chest, direct from Thailand, serving for 10, \$75, 941-0574.

Motorcycle helmet, Avanti size, 7 three-eights, full coverage w/ bubble face shield, \$10, Coan, 488-1028.

Stenotype, \$50, double-wall insulated doghouse, lrg enough for Collie, Shepherd, \$15, White 554-4472.

Schwinn Pixie bike for boy or girl up to 7yrs w/ training wheels, 9 x 18 beige rug-nylon w/ pad, Wade 333-2964.

World Book Set 1970, \$125. like new, 482-6122 aft 4:30.

Lrg swing set, \$19. child's picnic table, \$2 tricycle, \$2 946-4311.

Clarinet, Buffet Masters model, prft cndn, professional quality, \$225, Don, 333-2359.

### HOUSEHOLD ARTICLES

Authentic Mexican furnishings, hdboards, desks, cabinets, etc, 2305 NASA 1, 474-2102.

Magnavox color TV w/ 23" screen & mahogany cabinet, good cndn, \$70. Shields, 422-8404.

Heater, gas space, li new, was \$45, now \$27.50 Fischer, GR 2-6910. No calls Friday eve or Sat.

New Grandfather clocks, German Movement, Westminster Chime, special design solid walnut case, guaranteed, Moon dial, \$325, TF dial \$300, 488-2797.

RCA const auto changer stereo record player: gd buy at \$15. Park 481-1255.

Upright Thompson piano: gd cndn, xlt for beginners, \$150, 488-4190.

Youth bed, mattress, and springs, \$35. baby crib, mattress and spring, \$15 stroller \$6 prft cndn, 554-5698.

G.E. range, li nw, over-sized oven & 3 storage drawers. White, \$100, 474-4228.

Double bed (mattress, box springs, hd-board) \$20, Backus, 538-1691.

Lrg chrome dynette set, table extends from 48" - 72" gd cndn, \$35, 471-3298.

Beautiful teakwood carved screen also lrg carved chest, pr French victorian chairs, 649-2569.

### VEHICLES

69 El Camino, p/u, a/c, p-s, a-1, 307 Eng blu w/ bic interior, priced at wholesale, Nov book, \$1700, 482-2816.

71 Honda 350 CB, 4,000 mi, xlt cndn w/ xtrcs, \$600, Richard, 482-7898.

70 Maverick, auto, ps, air, radio, 27 k mi, gd cndn, \$1575, NADA retail, \$1,725, 944-5624.

70 Yamaha 80, xlt cndn, 2,300 mi, li new, \$250, 482-7029.

70 Triumph Trophy 250cc Scrambler modl, great cndn 600 mi \$380, Gillen, 334-2993.

Eldon battery motorized car w/ recharger, 1 yr old, \$20, 481-2854.

66 Ford sta wgn, 10 passenger, 390 V-8, radio, air, powr str and br, luggage rack, \$700, 333-2269.

18' Travelmaster Trailer, self-contained, sleeps 4, li new, \$1900, La Marque 935-6218 fat 5 p. m.

VW air conditioner, \$70, 554-3843 aft 5:30 p.m.

SAAB air conditioner complete w/ all hardware, \$80, 482-7960.

Set of Mag wheels, 14" x 7" rims, fits GM cars, full polished oval slots, all hardware incl, li nw, \$125, York, 488-2188 aft 5 p.m.

66 Impala 9 pass sta wgn, auto, air, ps pb, xlt cndn, clean, 334-3436 aft Dec. 8.

65 Pontiac Catalina sta wgn, V-8, auto, pwr str, air, radio, luggage rack, WSW, pwr rear window, nw paint, Smylie, 334-1768.

65 4-door Pontiac Catalina ac/radio, 5 radial tires, \$600, Roberts, 946-2826, aft 4 p.m.

61 Belaire Chev Sedan, ps, pb, air, gd work car, one owner, \$200, 946-4311.

71 Toyota Mark II Tudor HT, 10,800 mi, 4 spd, air, side malding, C-78 tires, \$2100, trade possible, need larger car or pickup, 482-6122 aft 4:30.

71 Hondas, 175 & 750, 485 & \$1350 trailer holds 3 bikes, \$250, or package deal \$1900, Stark, 534-6058.

70 Honda Minitrail 50, xlt cndn, \$165, Fuller, 946-0275.

70 Mustang, blue/white, pwr, air, auto V-8, \$1650, Robert, 483-2738.

69 Chrysler Newport 4-dr Sedan, vinyl top, loaded nw tires, must sell before Christmas, Ernie, 945-6189.

Cab-over camper, sleeps 6, gd cndn, nw stove, \$475, 945-6189.

65 Pontiac sta wgn Bonneville, ps pb, a/c, auto, clean, nw tires & battery, prft running cndn, \$750, Frank 337-1956.

72 Pinto wagon, squire pkg, auto, air, AM/FM stereo w/ tape, disc brks, lug rack, 1 owner, li new, \$2800, 481-2615.

### PETS

Cocker-poo puppies, beautiful curly black fur, prft for Christmas, \$25, 946-2172.

Precious pups, mother reg Lhaso, father

poodle, reasonable price, 1 male 1 female, ready Dec 13, 488-0192.

Beautiful English Setter, w/brown, Mimi, 041-0064.

Bay Quarter Horse Mare, 6 yrs old, 14 hands hi, \$300 plus saddle and extras, Harlowe, 482-7987 aft 4:30.

AKC Boxer puppies, brown w/ white markings, xlt bloodline, born Nov. 13, 1972 8 wks, \$100 ea, Richard, 783-5116.

Registered great Dane, black w/ white markings, 10 mos old, female, \$100, Walter 482-2816.

Puppies, 8 wks old, Beagle-Basset mix cute, vaccinated & wormed, males, \$10, females, \$5, Smith 471-1984.

AKC old English Sheepdogs, outstanding litter available Dec. 23, reserve your choice now, \$250-\$350, 482-2011.

Springer Spanish reg 1 yr female, \$10, Frank 337-1956.

Free male puppy, 6 mos old, pt boxer bull dog, loveable, playful, good pet fr young boy, will keep till Christmas, Edward, 333-2869.

### WANTED

Musicians who would like to get together for a session once or twice a mo just for fun, Bethune, ext 2391.

Dining rm furniture, prefer 6 chairs, table and lrg china cabinet, French Provincial style, 334-4305.

Chair for desk, prefer swivel type, 334-4305.

Ski clothes, ladies, sm, ski equip, boots, skis etc, Sanford, 488-4302.

Go-Kart frame, wheels, misc pts, have engine and wish to bld go-kart, Billie, 944, 3847.

Spanish or contemp 4-2 1/2-2 Oakbrook West or equiv, Bullock, 774-6602.

Wrecked, broken or basket case mini bikes or small motorcycles to 100 cc, 428-6122 aft 4:30.

### PROPERTY & RENTALS

House in Forest Bend, 4-2-2 Mediterranean model, drapes, shutters, shag carpet, fireplace, low equity, assume VA loan, 482-2816.

Spanish, 3 bedroom, almost new, appliances in warranty, 16815 Paint Rock Road by appointment only, Poindexter, 482-2973 or 334-1001.

El Lago, 3-2-2 plus study off of bdrm, den, formal living and dining rooms, fireplace, wooded lot, nw appliances and carpeting, Moser, 334-2060.

Wooded lot in section 5 of Point Aquarius, Lake Conroe, 334-2150.

Half-acre blding lots in Roman Forest, Section III adjoining Townhouse lakefront lot in Cape Conroe, all below current market price, Robert 471-4305.

Contemporary 4-2-2 bq pines Oaks, fence, shag, firepl, Timber Cove, 23,000 sq. ft., \$35,900, Holley 483-2391, nights, 334-2382.

3-2-2 1/2 Nassau Bay, lrg lot w/ Oak trees, patio, living and dining rooms, family rm w/ frpl, contemp, 33-2258.

Toledo Bend, prestige cabin, furnished, ideal location, \$13,000, Maxwell, 482-1015.

Oakbrook, 4-2-2 Traditional or Spanish, lrg master bdrm, sm yd, Abadie, 645-0866.

CLC Townhouse by owner, 3-2 1/2-2, 23,500, 0 per cent loan \$181. mo, no agents, 488-0730.

### BOATS

5 hp aircooled Eska outboard motor w/ tank and hose \$55 946-4311.

19 1/4 ft. Glastron 191 Sportsman opn fisherman, 115 hp Johnson, pwr tlt, depth finder and instruments. Tlt trailer w/ electric winch and disc brakes, \$3,500, 482-7960.

Sunfish, nw sail, rudder, rigging, hull 5 yrs old, \$250, Conrad, ext 2411.

## Fire Protection Devices Available In Exchange Store

Although a fire can occur any time, more home fires happen in December than any other month.

The presence of Christmas trees and decorations, the increase in food preparation, as well as cold weather and the general hectic pace, combine to increase the chances of a fire.

While fire prevention is the predominant goal, certain precautions can greatly reduce the risk should a fire occur.

To help MSC employees protect families and homes, the Exchange Supervisor, in coordination with the MSC Safety Office, is making available home smoke detection units and home fire extinguishers, through the MSC Exchange store.

The home smoke detector utilizes the ionization principal recognized by fire protection authorities as an "early warning detection instrument recommended for life safety and high value property protection."

The unit is designed to detect the invisible products of combustion well in advance of heat or heavy smoke. The 85 decibel horn is loud enough to awaken most heavy sleepers through closed bedroom doors.

Since most home (or automobile) fires start small, prompt action with a small fire extinguisher can often prevent a disaster.

Dry chemical fire extinguishers can safely be used on electrical equipment. They burn liquids effectively and can be helpful when fighting small fires of combustibles such as wool, cloth and paper.

These fire protection items can be purchased at the MSC Exchange Stores located in the Building 3 and Building 11 cafeterias.

The prices are \$40.00 for the smoke detector and from \$10 to \$15 for the fire extinguisher, depending on type.

## LLTV Retired

(Continued From Page 1)

practiced lunar module-like landings in the LLTV at Ellington AFB. Astronaut pilots include Neil Armstrong, Charles Conrad, James Lovell, Alan Shepard, David Scott, John Young, Eugene Cernan, Richard Gordon and Fred Haise.

Flights in the earlier LLRV were made by Astronauts Frank Borman, Bill Anders, Edwin Aldrin and the late C. C. Williams.

Checkout flights with the LLRV and LLTV's were performed by NASA pilots at Edwards FRC and Ellington AFB.

## Chess Club Holds Rating Tournament

The MSC Chess Club is currently holding its December Rating Tournament. The event is a three-round Swiss system with rounds scheduled for the following Thursday nights: December 7, 14 and 21.

Cash prizes will be awarded to first and second place winners and classes B, C, D, and E unrated winners.

The tournament is taking place at building 336 Ellington AFB, with the games beginning at 7:30

p.m. Visitors and spectators are welcome.

The MSC Chess Club is a non-profit organization which meets every Thursday night, 7:30 p.m. at Ellington AFB.

There are currently about 50 members ranging from beginners to top class chess players. The club provides chess equipment for its members.

Membership is open to anyone. For more information, contact Alec W. Gallia at 483-7236 or 944-8338.



**ANNUAL CHRISTMAS CONCERT**—The annual Bay Area Chorus Christmas concert this year featured the BAC Chamber Singers and the Clear Lake Chamber Orchestra. Both groups are in the above picture

## Christmas Concert Held at MSC

The annual Bay Area Chorus Christmas Concert was held Sunday evening, December 3rd at the Manned Spacecraft Center auditorium.

Featured in this year's concert were the BAC Chamber Singers and the Clear Lake Chamber Orchestra.

The chorus and orchestra performed many traditional arrangements as well as some new renditions.

The highlight of the program was a medley of Christmas Carols in a special arrangement by Milton Pullen and Barbara Carter.

Mr. Pullen has been chorus director for three years while Mrs. Carter has been chorus accompanist since its inception seven years ago.

## Report on "Post-Apollo" Released

The Lunar Science Institute, which conducts advanced research under the sponsorship of an international consortium of universities, recently released an extensive report on "Post-Apollo Lunar Science."

The report, prepared following a July conference of distinguished lunar scientists at the University of California - San Diego, expresses concern that the vast quantities of information available as the result of Apollo moon landings may fall into disuse unless action is taken to continue processing data, handling rock samples, and sponsoring research projects.

"A reasonable return on our national investment in the Apollo program requires extensive study of the information and materials returned by the Apollo missions. It also requires additional accumulation of data leading to a precise definition of the problems to be attacked in the return phase of exploration," the paper says.

The report specifically recommends that the lunar sample processing and storage facilities be fully maintained after Apollo 17 to document and safeguard samples, and to offer assistance to scientists.

In addition, the scientists ask that funds be provided to continue operating the network of nuclear-powered scientific experiments placed on the surface of the Moon during the Apollo landings.

Although the report emphasizes that we must not fail to take advantage of information already gathered, it observes that only a fraction of the lunar surface has actually been investigated.

All 14 lunar landings made by the United States and the Soviet Union have been on the near side of the Moon. More than half of the sites selected by American scientists in 1967 have since been eliminated due to reductions in the budget for lunar exploration.

The most important regions left for investigation are the polar areas and the far side of the Moon, which is markedly different from

the side that faces the Earth.

The report recommends that the nation undertake several more modest lunar missions in the post-Apollo period so that gaps in our knowledge might be filled and so that future landing sites might be selected.

First priority for missions in the near future, the report says, should be given to a polar-orbiting satellite equipped with remote-sensing equipment. Less than 20 percent of the lunar surface has been explored from orbit so far.

The scientists say that additional seismic stations on the surface of the Moon would contribute substantially to the surface experiments network.

The study recommends that international cooperation be strongly encouraged as a means to accomplish further lunar exploration.

In addition to presenting recommendations for future activities, the Post-Apollo report summarizes the major discoveries made so far as a result of the Apollo program:

- mountains on the Moon are arranged in circles, unlike those on Earth, and extensive evidence indicates that the basins and surrounding mountains were formed about 4 billion years ago by the impact of meteorites as large as 1000 kilometers (600 miles in diameter);

- these lunar basins or seas were later filled in by volcanic eruptions;

- since 2.5 billion years ago the surface has remained much the same;

- the debris from uncountable large and small meteorites covers the surface of the Moon to a depth of a few meters (yards);

- solar winds striking the Moon have not changed noticeably in the past 5 million years, reducing the likelihood that they brought about the Ice Ages on Earth;

- the Moon's center of mass is about 2 kilometers (1.2 miles) closer to the Earth than the body's physical center;

- water never covered the sur-

face of the Moon;

- during the crystallization of lunar rocks, there was very little oxygen on the lunar surface;

- no form of life ever developed on the moon.

## Scout Sets Record For Successful Launches

Scout, the nation's smallest and lowest cost orbital launch vehicle, has set a new record for consecutive successful launches for NASA launch vehicles.

The four-stage, solid-propellant vehicle recently its 26th success in a row by orbiting NASA's Small Astronomy Satellite from Italy's sea-based San Marco platform off the east coast of Kenya, Africa.

Scout was conceived by NASA's Langley Research Center at Hampton Virginia, in 1958 to provide the nation with a reliable and economical launch vehicle for a variety of space tasks—orbital, probe and reentry.

LTV Aerospace is prime vehicle contractor and provides management, launch and support services.

Since its first launch in July, 1960, Scout has been used for a total of 81 missions for NASA and other U.S. agencies plus a number of foreign nations.

## Apollo 17 LRV To Travel Farther

The Lunar Roving Vehicle which was carried on the final Apollo mission will travel about 6 statute miles farther and will have a loaded weight of 60 pounds more than previous models.

Following the lunar landing scheduled for December 11, the vehicle will carry Apollo 17 astronauts Eugene A. Cernan and Harrison H. Schmitt to various locations in the Taurus-Littrow area of the moon, covering a total of 23 statute miles.

Astronauts John Young and Charles Duke rode nearly 17 statute miles in the Descartes region last March, while David Scott and James Irwin traveled just over 17 statute miles in the Hadley-Apennine area when the first LRV was used in August 1971.

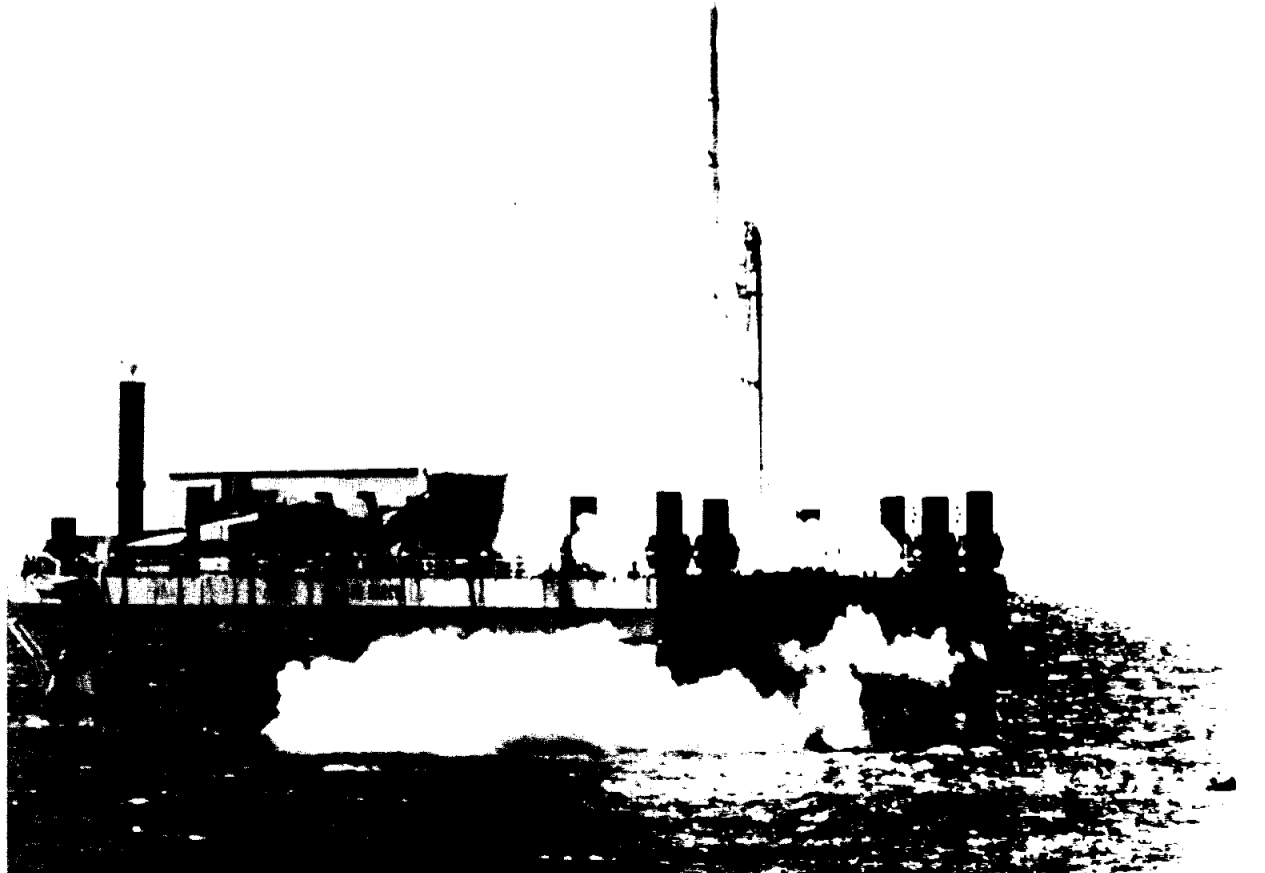
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**RECORD BREAKER**—Scout, the nation's smallest and lowest-cost orbital launch vehicle has a new record for consecutive successful launches for NASA launch vehicles. The four-stage, solid-propellant, Scout scored its 26th success in a row by orbiting NASA's small astronomy satellite (SAB) from Italy's sea-based San Marco platform off the east coast of Africa on November 16. Scout is produced for NASA by LTV of Dallas, Texas.