

# Apollo X May Carry Color TV System

MSC officials last week described a color television system which may be flown on the Apollo X lunar orbit mission next month. They cautioned, however, that the system may not be ready in time for the flight.

The system uses a camera with an overall length, including lens,

## Conrad, Gordon, Bean Selected For Apollo XII

Charles Conrad, Jr., Richard F. Gordon, Jr. and Alan L. Bean last week were named Apollo XII prime crewmen. Their crew positions are commander, command module pilot and lunar module pilot, respectively.

Apollo XII is a lunar landing mission similar to the initial landing in Apollo XI, now scheduled for a July 16 launch. The second landing mission will be launched four to six months after Apollo XI.

Preliminary plans call for Apollo XII to land at a site other than No. 2, where Apollo XI will land. Two periods of lunar surface extravehicular activity totaling more than five hours are planned, and it is expected that the Apollo XII scientific package to be left on the moon will contain more experiments than are in the Apollo XI package.

The Apollo XII spacecraft—CSM 108 and LM-6—have already been delivered to Kennedy Space Center.

Apollo XII backup crewmen are David R. Scott, Alfred M. Worden and James B. Irwin. A support team is yet to be named.

The prime crew served as backup for Apollo IX. Conrad has flown two missions—Gemini V, and Gemini XI with Gordon. Apollo XII will be Bean's first mission. Scott flew in Gemini VIII and Apollo IX. Worden and Irwin have not yet flown in space but have been on Apollo flight crew support teams. Irwin commanded the test crew for the extensive thermal-vacuum testing of lunar module LTA-8 at MSC prior to the first manned lunar module flight in Apollo IX.

## College Who's Who Picks Two Co-ops

MSC co-op employees Patsy L. Randle of Computation and Analysis Division and Ronnie E. Lewis of Program Control and Contracts Division have been named to *Who's Who Among American Colleges and Universities*. Both attend Texas Southern University.

Listing in the directory is given college and university students whose academic standing, leadership in extracurricular activities, community service and potential are greater than average.

of about 18 inches. It is about four-and-a-half inches wide, about six-and-a-half inches high and weighs about twelve pounds. The system also includes a three-inch television monitor which can be mounted atop the camera or positioned at a convenient location in the cabin allowing the crew to see a black-and-white view of the picture they are transmitting to earth.

A decision to fly the color system on Apollo X will not be made until after the countdown demonstration test scheduled for the first week in May at NASA's Kennedy Space Center as a dress rehearsal for the Apollo X launch. Apollo Spacecraft Program Manager George M. Low said the decision at that time will be based on the quality of the televised picture and the availability of flight hardware. Since the development time for the equipment is very short, he said, there is a good possibility that it will not be installed in Apollo X.

If it is flown, the color TV system would be carried as an experiment on the command module in addition to the black and white TV system. The color equipment is not designed for use in the lunar module or on the lunar surface.

The color camera can be hand-held or mounted on brackets, and it is equipped with a zoom lens which can be adjusted for close-up or wide-angle views.

The system transmits a sequence of three black and white pictures, each seen through a different color filter, for every color frame. The sequences of black and white pictures are

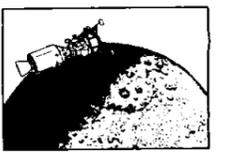
*(Continued on page 3)*

# ROUNDUP

NASA MANNED SPACECRAFT CENTER

HOUSTON, TEXAS

VOL. 8, NO. 13



APRIL 18, 1969



**BUSY CREW**—Apollo X crewmen Tom Stafford, John Young and Gene Cernan spell out for newsmen at Cape Kennedy the aims of their May 18 mission in which for the first time an all-up Apollo spacecraft will operate in lunar orbit. The mission will follow the profile and timeline of a lunar landing mission, but will stop short of an actual landing. "Snoopy," the LM manned by Stafford and Cernan will twice sweep within nine miles of the lunar surface while Young, alias "Charlie Brown," mans the command-service module in a 60-mile circular orbit.

## Apollo X to 'Sort Unknowns' Before Lunar Landing Flight

Snoopy and his master Charlie Brown next month will orbit the moon, if not in fact at least in name. For the Apollo X spacecraft call signs will be Snoopy and Charlie Brown during the lunar orbit rendezvous sequence.

While in the Peanuts comic strip Snoopy made a fantasy trip

to the moon atop his doghouse, in Apollo X the lunar module, manned by commander Tom Stafford and LM pilot Gene Cernan, will answer to the call Snoopy. Command module pilot John Young is Charlie Brown.

The choice of call signs for the three-way communications peri-

ods of Apollo X when the lunar module is manned was announced last week by the prime crew at a Cape Kennedy news conference. Apollo IX CSM and LM call signs were Gumdrop and Spider.

"What the Apollo X mission is going to do," said commander Tom Stafford, "is tie together all the knots that we have had in the past, sort out all the unknowns and actually pave the whole way for the lunar landing mission. We'll do everything exactly as the landing mission except the final descent, landing on the surface and the ascent into orbit. We are working with the Apollo XI crew as a team, really."

Apollo X is scheduled for a May 18 launch from Kennedy Space Center Launch Complex B for an eight-day lunar orbit mission with an all-up Apollo spacecraft stack. Apollo Spacecraft Program manager George Low describes Apollo X as "doing everything that we did in Apollo IX, only in lunar orbit."

During the seven-and-a-half hour period of the Apollo X rendezvous sequence when Snoopy will be as far away as 350 miles from Charlie Brown, command module pilot John Young will be prepared to maneuver in to rescue the LM.

"John is not up there waiting for us to come back," said lunar module pilot Gene Cernan. "He's up there spring-loaded within seconds after our burn

*(Continued on page 4)*

## Impressions of Space Flight



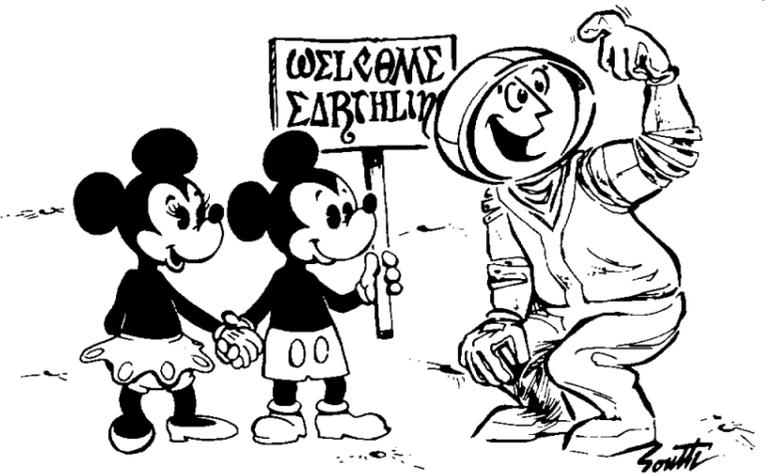
**FLOORSHOW**—MSC Educational Programs Office Spacemobile lecturer John Scott West must have really turned on the students at Kearney, Neb. junior high school with his space lecture there last November, for he got in the mail this collection of paintings and posters from the school several weeks after his visit. West is one of four Spacemobile lecturers covering an eight-state region stretching north to the Canadian border.

### Inventorying the Sixties



**MANPOWER CONFEREES**—MSC Co-op employee Thomas Thigpen of Apollo Applications Program Office (inset) speaks during a panel discussion at the March 31-April 2 Minority Manpower Resources Conference at the Rice Hotel and Texas Southern University. In the large photo, left to right, are Texas Southern University School of Industries dean Dr. B. A. Turner, conference host; Plans for Progress administrative coordinator James F. Grogan; Barbara Lerdon of MSC Employee Development Branch; Arkansas AM&N College president Dr. L. A. Davis, luncheon speaker, and United Negro College Fund president Dr. S. J. Wright. The Conference brought together people of varied backgrounds and responsibilities to discuss the theme, "Inventorying the Sixties and Projections for the Seventies," with special emphasis on ethnic minority involvement.

### THE ASTRONUTS (filched from TRW Systems Group)



## Two MSC Physicians Take Part in Tektite I

Two physicians of the MSC Spaceflight Biotechnology Specialty Team Tuesday took part in the surfacing of four Tektite I marine scientists at St. John, Virgin Islands, after spending 60

days living in an ocean floor habitat.

Drs. Craig Fisher and S. L. Kimsey assisted in gathering biomedical measurements on the four as they were brought to the surface to spend 19 hours in a decompression chamber before exposure to topside atmosphere. Fisher was scheduled to dive to the 50-foot deep habitat Tuesday morning and make the ascent with the scientists.

Tektite I, aimed toward measuring man's ability to conduct ocean floor research while isolated submerged for long periods, is a joint Navy-Interior Department-NASA-Coast Guard-General Electric program. Members of the MSC Medical Research and Operations Directorate have been taking part in Tektite I since pre-dive medical activities began early this year. The four scientists made the dive to the habitat in Great Lameshur Bay February 15.

The pressurized ascent and 19-hour decompression period necessary for the men was due to the extended stay while breathing a high-pressure oxygen-nitrogen mix. A sudden return to sea-level atmosphere without decompression could cause "bends."

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

### Straight Talk from your Credit Union

Payroll deduction is the easy way to save—the money never gets to your pocket, and it is a painless way to build savings.

And about creature comforts—boats, campers, airplanes—the MSC Credit Union will help one float a loan for them, probably at quite a savings in interest.

Plan ahead for vacations by salting away money at the Credit Union for that trip to New England or to the Pacific Northwest.

### Do your share for Freedom!

### Organized Secretaries



**HEAD CHAPTER**—The newly-formed Clear Lake Chapter of the National Secretaries Association tomorrow will swear in this board of officers at a chapter installation luncheon at the Lakewood Yacht Club. Left to right: Chapter president Dixie Cummings, recording secretary Alice Bishop, vice president Reva Bartlett, corresponding secretary Joanne Fischer, director Yvette Crane and treasurer Virginia Thompson of MSC Procurement Division Office. NSA international first vice president Helen White of Dallas will install the officers.

## Your Job in Focus

### Merit Promotion Changes

The US Civil Service Commission recently issued a new Federal Merit Promotion Policy for Government-wide application. To implement the new Commission policy, NASA Headquarters has developed a promotion plan which will apply to all NASA Centers. The plan will include information on NASA policies concerning promotions and the competitive procedures that are to be followed in filling positions which provide an immediate or potential promotion for employees.

The proposed plan is presently being reviewed by management officials, employee organizations, and a representative sample of employees to obtain their views and comments. To meet Civil Service Commission re-

quirements, the promotion plan must be published by July 1, 1969.

### Bond Tax Loophole

Employees who have purchased bonds for their children as educational funds are reminded of a special tax savings advantage. Bonds which are purchased in a child's name, either alone or with a parent as a beneficiary, become an outright gift from parent to child. The Federal income tax liability can be shifted to the child by filing a Federal return in his name at the end of the first year of bond purchases, listing the increase in bond value as income to him.

This initial return establishes the intent, and no further returns need to be filed as long as the child's total annual income is less than \$600; and no tax will be due if the bond interest, plus other income, comes to less than \$900 (\$600 personal exemption plus \$300 standard deduction).

Assuming that the child never exceeds this \$900 income figure in any year, the total interest accruals on his bonds will be tax free when he cashes them for his education. As protection for the taxpayer, a copy of the initial return establishing the intent should be retained for possible proof in later years that the interest has been reported.

### Friendswood Lions

### Shift Meet Time

MSC employees who live in Friendswood may be interested in joining the Friendswood Lions Club which meets the first and third Mondays at 7:30 pm. The club shifted from early morning meetings to make club membership available to more people.

Call Dave Myles at 482-7039 or Byron Richards at 482-3033 for further information about this service organization.

# Roundup Swap-Shop

(Deadline for Swap-Shop classified ads is the Friday preceding Round up publication date. Ads received after the deadline will be run in the next following issue. Ads are limited to MSC civil service employees and assigned military personnel. Maximum length is 20 words, including name, office code and home telephone number. Send ads in writing to Roundup Editor, AP3. Ads will not be repeated unless requested.)

### FOR SALE/RENT—REAL ESTATE

Large heavily-wooded corner lot with view over Taylor Lake, half block to park and docks. 591-4632.

Tiki Island waterfront lot with boat slip. Ready to build on. Morris, 482-7775.

4 bdr on wooded lot Baywood, Seabrook, 2000 sq. ft., quiet street, pier privileges. \$26,000; equity, assume 6 1/4% loan or owner finance. Stamps, GR 4-2374.

Beach house for sale or rent. West Galveston Island. All electric. Lovely Gulf view. One block to water. Green, 932-3486.

10-acre tract 3 miles from Wimberley. Paved road, creeks oak trees, low down payment. Davis, 877-1155 or 422-5627.

Seabrook-Baybrook, 1 1/2 story, 4-2-2, near schools, 1950 sq. ft., equity \$3500 or offer, balance \$19,000, \$193/month, 7 1/2% loan. R. Bossen, 474-3430.

Lot in Avalon Beach, Florida (close to Pensacola). Eston Meade, 487-0870.

Clear Lake City 2 bedrooms, mirrored bathroom with sunken tub, fireplace, fenced, landscaped, \$156/month, 6 3/4%. Burton, 488-3751 after 5.

One-bedroom efficiency duplex, furnished, \$75/month, gas and lights extra. Four blocks north Pasadena Plaza, single man only. Dorsey, 944-5349.

Rent Clear Lake City 3 bedrooms, 2 baths, carpeted, 2-car garage, available at once, \$200/mo. Alber, 944-3592.

Sell or rent Seabrook (Miramar) 3-2-2, brick front, central A/H, carpeted, fenced, 1600 sq. ft., 5 1/4%, mid-May occupancy. Culling, 474-2167.

Sagecroft 3-2-2, brick colonial, carpeting, drapes, paneled den, central air-heat. Assume \$16,172 loan for \$2500 equity. L. R. Loper, HU 7-1124.

### FOR SALE/AUTOS

66 Olds Delta 88, 4-dr. hardtop, full equipped, new tires, excellent condition, one owner, \$1800. C. C. Kraft, HU 2-7357.

62 Corvair Monza 2-dr. bucket seats, 4-speed, new tires, good second car. Charlie Duke, 877-1389.

66 Simca GLS, 1000, 4-dr., full financing can be arranged. \$775. Consider trade. Floyd Turner, 733-7667.

64 4-dr. Buick Special, factory air, P/S auto, new muffler, shocks, brakes, good rubber, 55,000 mi., E. Simon, 488-4043.

65 4-dr. Olds F-85, factory air 3-sp, new muffler, shocks, brakes, good rubber, 38,000 mi., runs perfect, E. Simon, 488-4043.

65 MGB—will sell motor, new transmission etc, or I will buy intact front end, (hood, fenders, radiator). Cox, 944-6077.

65 VW sedan, sunroof, radio, 46,000 miles. Runs great, \$800. Clyde Paulk, MI 5-7315.

68 Dodge Charger, air, A/T, P/S, P/B, vinyl top, 383 V-8, 14,000 miles, still in factory warranty, \$28,500. HU 2-1664.

68 Pontiac Firebird, a/c, power steering, radio, automatic floor shift, 350 H.P., low mileage, \$2660. Christine Young, 738-2057.

Cadillac 63 4-door hardtop fully loaded white with black interior, low mileage, excellent condition, \$1395. Oczkowski, WA 6-8994.

Buick Wildcat 66 4-door hardtop fully loaded, \$1995. Oczkowski, 926-8994.

58 MGA, wire wheels, motor, brakes, etc. Recently overhauled. No rust, needs upholstery and top, \$250. O. L. Pearson, 488-5019.

63 Chevy-II, 4-door, automatic transmission, factory air, seat belts, transistor radio, new motor, muffler, brakes. Frances Broughton, 483-6161.

65 T-Bird convertible full power and air, good condition. \$1400 or best offer. J. P. Vincent, Alvin 658-5637.

63 white Ford "300" fordor, \$700. Air, automatic, 57,000 miles. Excellent condition, original owner. 946-1426 after 5.

61 Corvair, air, automatic, clean, 58,000 miles, Monza 4-dr, \$400 or best offer. C. R. Price, 488-3685.

Will fly persons anywhere they want, on weekends, for cost. Blankenship, 944-0750.

1965 Allstate Mo-Ped, motor in good shape, \$50. Dana Murphy, 479-1942.

Fly with no-profit Skyrovers, Inc. at La-

### FOR SALE/MISCELLANEOUS

Parte. Student pilots welcome. 172-\$/hr, 182-\$8/hr, J3-\$4.50/hr., \$12.50/mo. dues. 488-3872 or 944-5635.

Lone Star 16 sailboat, trailer, many extras, all in excellent condition. E. Simon, 488-4043.

17' Regal Lancer outboard cabin cruiser, 1964 60-hp Johnson O/B, Wards tilt trailer, extras, \$875. Gene Krause, 932-3420.

Learn to fly with Aero Club. Cessna 150 \$7/hr wet; C-172 \$9/hr and K-Bonanza \$16/hr. Instructor \$5/hr. Ward, 877-3187.

Roberts Model 770 4-track stereo recorder w/2 mikes and input-output patch cards, good condition. E. B. Walters, MI 9-2838.

Albatross, fiberglass, 15 ft., 64-in. beam, centerboard, main and jib sails 125 sq. ft., galvanized trailer, \$1,150. Maloney, HU 2-7688.

Will fly up to three persons at cost to log time, share 8 to 10 cents/mile. M. von Ehrenfried, 591-4163.

GE Super Trimline 400 portable stereo; one year old, \$50. John Hirasaki, 591-2297.

York air compressor and clutch assembly for automobile system. W. Brenton, 488-4372.

Dalmation puppies, ready late April, four male, five female. AKC registered. Ch. sire, Int. Ch. Lineage. Granger, GR 1-3405.

Early-American orange-brown tweed chair and one-half matching ottoman, good condition, \$75. Jim McBarron, 591-3778.

Early-American wingback four-cushion length couch, sound condition, needs to be reupholstered, \$75. Jim McBarron, 591-3778.

Early-American Sprague and Carlton hard rock maple coffee and two matching end tables, all three pieces for \$75. Jim McBarron, 591-3778.

Remington Model 721, 300 HCH, rechambered to 300 Weatherby, restocked in fancy walnut, 2 1/2 to 8 scope—\$200. Bouldin, 487-1488.

Trailer, utility or boat, 4 wheel, 2200 cap, \$155. B. Wood, 591-2373.

Boston Terrier puppies AKC champion sired, beautiful markings, 1 male, 1 female. Shots, wormed, 7 weeks, \$55. M. Owens, 877-2872.

Siamese kittens, purebred, no papers, part seal part blue. Born Feb. 28. \$5. Sandra Burdsal, 733-8384 after 5.

2-piece sectional sofa and chair, fabric worn; sofa—\$25, chair—\$20. Jane Cherry, 488-1351.

Coleman Model 425C 2-burner gasoline stove, \$9. New \$5 Craftsman 8" combination saw blade, \$3. J. Rippey, 877-1859.

8D golf \$3. New Titleist golf balls \$9/doz, 44 range and 15 plastic balls, \$6. J. Rippey, 877-1859.

Free puppies, small/medium size, born 4/4. G. O. Miller, 932-5973.

8MM movie camera, Tower T-185, 3-lens turret, F1.8 lens, exposure meter—\$10. Ralph Hodge, 591-2152.

Bosax three-way high-fidelity speaker system. Cost \$250, sell \$100. Heathkit four-way high fidelity speaker system, \$90. G. Smith, 591-4761.

RCA color television, large screen, 7 years old, still has good color picture, \$75. G. Smith, 591-4761.

Piano, upright, excellent tone and action, restyled case and recently restrung, \$150. S. Klampe, 877-4170.

Modern Kroehler love seats (a pair), blue upholstery, \$125. S. Klampe, 877-4170.

Electric adding machine, \$35; 7x35 binoculars, \$20. Pair gold-leaf carved frame Spanish mirrors, \$40 both. Antique mantle clock, \$35. MI 9-2569.

Boat 1965 17' Dorsett, 120-hp Mercruiser I/O, excellent condition with trailer \$2600. Stan Freden, 877-1866.

Order registered German Shorthair Pointer puppy, due first week in May. Rod Reining, 946-6396.

17' fiberglass tri-hull boat, walk-through windshield, 100-hp Mercury, tach, 18-gal. tank, trailer, \$2200. S. A. Roosa, 877-2867.

Sauna bath heater, electric, stainless steel, 6000 or 9000 watts, complete with all controls. \$600 value, sell for \$199. Campagna, 591-2974.

Accordion, student model, 120 bass, excellent condition, \$80. Braun, 488-0020 after 5.

10 ft. aluminum Jan Boat, 3 seats. As new condition, \$49. R. Rose, 877-4200.

Two 6-gal Merc outboard tanks, 2-blade alum prop for 80-110 hp, battery w/case, anchor, make offer. Bays, 591-2413.

Plush bedroom carpet, plus separate pad, excellent condition, \$35. J. Cohen, HU 8-3171.

Rug—nylon, 12x15, turquoise. Does not require pad. Originally \$60, \$30. 488-0354.

Black western saddle, complete with bridle and blanket. \$50. 488-0354.

Canopy double bed, antique white French provincial, \$40. Ralph D. Hodge, Nassau Bay 591-2152.

\$160 professional shoe skates with case, sterling silver plates, black size 9 1/2, new condition \$50. Horton, 474-2102.

AM/FM stereo with reverb and tape jack plus ext. speaker, 40-watt amp. and select tuning with albums \$200. Horton, 474-2102.

Ham radio SSB transceiver model SBE-34, good condition, \$225. D. Cook, 946-4462.

AKC—registered Boston Terrier male puppy (7 weeks old), championship blood line, small stock. R. K. Stewart, 487-2623.

Cosco baby stroller, good condition, \$10; Relax-a-cizer, 4-cord set, \$75. Kenyon, 534-2354.

Four used 8.85x15 WSW tires \$2 each. Donnell, 877-1746.

Tektronix Oscilloscope: solid-state audio oscillator, CRT for 5-inch scope, 12V/20 A regulated power, RCA RF signal generator. R. Lang, 488-0149.

Full blond wig, practically new, reasonable. Dorothy Holloway, 877-2328 after 5.

Lightweight boat trailer (500 lb. max), needs work, \$45. Cotton sails (main 15 1/2'x 10', jib 14 1/2'x6'), \$10. Carr, 877-3359.

Char-glo kitchen barbecue grill (gas), \$85 (\$170 new). Car-top luggage rack, \$5. 12-w Heathkit preamp, \$20. Carr, 877-3359.

Are you interested in establishing your own part-time business? No investment, unlimited potential. Dick Moore, 488-2204.

A-100 Suzuki, 1500 miles, \$250. Bill Campbell, 488-3635.

### WANTED

Want to buy Lionel electric trains made before 1960. 932-4174 after 5.

Roomate to share 2 bdr. studio at Portofino along waterfront. Bob Cusick, 591-4445 after 5.

Need 4-bedrm hone, June, NASA area, owners only. Send particulars to Chuck Rice, Apt. 45, #1 Portofino Strip, Houston, x-2901.

A small used outboard motor, 3hp or greater for under \$100. John Erickson, HU 8-1901.

Desk chair. Maximum 22" wide to fit desk. Swivel, roll capability. Prefer black, brown. Stephen Jacobs, PR 4-9924 after 6.

Deep-freeze in good condition, up to \$60. M. Owens, 877-1710.

Ride needed to Ellington from Spacefield I area. Hours 8:30 to 5. Contact Toni, 7738 or Apt. 20B Spacefield I.

Want to buy child's swing set. Bill Gatlin, 932-3969.

Want to buy two-drawer filing cabinet for \$15 and adding machine in usable condition. LeAnne Williams, 643-9128 after 6.

Used 8" or 10" radial saw or table top saw and wood lathe. D. W. Heath, GR 3-9172.

Refined young lady wishes to share two-bedroom apartment. Villa Monterrey. Carport, patio, dishwasher, Lynda Chase, GR 2-7313, 944-8601.

## Apollo X Color TV

(Continued from p. 1)

reconstituted by a converter on the ground into a color picture which can be fed to US commercial TV networks.

The color camera was designed and built by the Westinghouse Electric Corporation, Baltimore, Maryland, using much of the same technology developed for the Westinghouse lunar TV camera—a black and white system. Cost of the color camera and its monitor is about \$40,000.

## Golfers Play 1st '69 Tourney

The MSC golf association held its first tournament of the 1969 schedule at Atascocita April 5 with 72 members playing. Ray Holladay won low gross honors with a 78 on the tree-lined, trap-infested course. He also had the low net score in the championship flight with a 67. Other championship flight winners were: Bill Chase 81-10, 71, and Jim Anderson 86-15, 71, tied for second, and Bob Kosinski, 86-13, 73, fourth.

First flight winners were: first, Bill Whipkey, 87-17 (70), second, Sam Glorioso, 92-19 (73), third Jim Smith, 96-20 (76), and fourth, Jim Barnett, 96-17 (79).

Second flight winners were: first, Bill Bridges, 99-25 (74), second, Dwayne Forsythe, 103-27 (76), and tied for third, Jim Fucci, 109-32 (77) and Charles Freiburger, 101-24 (77).

The Association will play its second tournament tomorrow at the Houston Executive Club. This is a make-up date for a tournament rained out March 15.

## Tennis, Anyone?

MSC tennis players are invited to take part in a "fun" doubles tourney tomorrow from 8:30 am to 12:30 pm at the Strawberry Tennis Center in Pasadena sponsored by the Tennis Patrons Association. A \$75 fee will cover entry and court-side coffee-and-donut refreshments.

TPA is planning for the May 10 weekend a trip to the T Bar M guest ranch in New Braunfels for tennis, horseback riding, hiking and other family activities. Call Herschel Jamison at 6387 for further information.

## MSC Nine Give Papers at AGU

Nine MSC scientists next week will present papers at the American Geophysical Union 50th annual meeting in Washington, D.C.

Heading the group will be Science and Applications Director Dr. Wilmot N. Hess whose paper deals with the electron accelerator experiment flown from NASA Wallops Station, Va. in January.

Lunar Receiving Laboratory curator Dr. Elbert King will present "Petrography and Chemistry of the Pueblito de Allende Meteorite." The meteorite impacted in northern Mexico in early February and King retrieved fragments for analysis in the LRL. (See February 21 Roundup.)

Others from the Science and Applications Directorate to present papers at the AGU meeting are: Drs. Robert Manka, James McCoy, John Pierson and Donald Robbins of Space Physics Division; Drs. John Annexstad, Donald Bogard and P. R. Brett of Lunar and Earth Sciences Division.

## Receives 20-Year Service Pin



RETIREES—Quality Engineering Office chief T. J. Adams pins a 20-year service pin on Jack Bernard of the R&QA Office as Bernard's wife observes. Bernard left MSC October 11 on a medical retirement and returned for the award ceremony.

## MSC Aircraft Flies Mexican ER Missions

A survey of selected natural resources sites is being conducted for the Mexican National Commission for Outer Space (CNEE) by NASA.

For the past two weeks, an aircraft of MSC's Earth Resources Division has flown over six sites selected by the Mexican government as part of phase three of a cooperative program entered into by the two governments in February 1968. The overall research program is designed to develop techniques for acquiring, interpreting, and using data to provide scientific and technical experience which would be useful in the development of earth resources survey techniques.

The survey began April 9 and will conclude about April 20.

The NASA aircraft (a Lockheed P3A) flew over the sites which will cover several disciplines and are located in the vicinity of Mexico City. Equipped with camera, radar and imagery systems, the aircraft flew at varying altitudes gathering data for use by Mexican scientists.

The sites and their locations are: geology, El Dorado; geo-

thermal, Ixtlan; hydrology, Toluca Valley; agriculture, Chapin-go; hydrology/agriculture, Papaloapan Basin; and oceanography, Veracruz.

The Mexican scientists taking part in the program spent several months at MSC and at other locations throughout the US attending classes and learning about NASA's Earth Resources

### Speakers Give Outdoor Lectures

Dr. John Reid of Lockheed Space Physics Department supporting MSC Space Physics Division April 29 will speak on "Solar Radiation and the Lunar Environment" at the Hermann Park Miller Outdoor Theater in Houston. The program is at 8 pm.

Miller Outdoor Theater is adjacent to the Burke-Baker Planetarium.

Dr. John Dietrich of Lunar and Earth Sciences Division Tuesday spoke on lunar surface features at the Theater. Prior MSC speakers at the series include James Sasser on lunar photography and Dr. Elbert King on lunar geology.

### Apollo X Sorts Unknowns

(Continued from page 1)

misfires to come and get us, because you don't wait maybe a rev or an extra couple of hours. The lunar module does not have the consumables to wait that long for someone to come and get you."

"We've often thought of tying a 350-mile steel clothesline be-

tween the two vehicles just to make sure," quipped Cernan. "but we've certainly given that up."

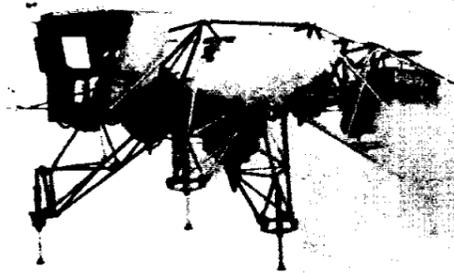
Apollo X will spend more than 61 hours in lunar orbit, and the transearth flight time will be just over 53 hours.

Touching on the culinary aspect of Apollo X, Cernan said, "There's something about eating with a spoon that automatically makes the food taste just a little bit better to me than sucking it out of a paper bag." Each Apollo X crewman will have a daily "wetpack" meal of beef, turkey or ham with potatoes which can be eaten with a spoon—much the same type of meal as was carried aboard Apollo VIII for the lunar orbit Christmas meal.

Apollo X will fly the identical trajectory and timeline that will be flown on the July 16 Apollo XI lunar landing mission, except for the final descent and landing. Snoopy twice will approach to within nine miles of the lunar surface in a rehearsal of prelanding maneuvers and timelines.

Lunar orbit operations with the lunar module will fill in some of the few remaining gaps in the lunar landing goal. The final steps—descent, landing and lunar surface EVA, and ascent back into lunar orbit—will be taken about July 20.

The Credit Union  
needs YOU  
as a member



BACK IN AIR—Harold Ream of MSC Aircraft Operations Office hovers Lunar Landing Test Vehicle (LLTV) No. 2 over Ellington AFB in an initial test flight after a four-month hiatus in LLTV flights following the crash December 8 of LLTV No. 1. The April 7 low-level flight was the first of a series of 12 flights aimed toward qualifying changes in the LLTV and in flight procedures before the vehicle is used for training Apollo lunar landing crews.

## Lunar Landing Trainer Resumes Test Flight Program at Ellington

Flights of the Lunar Landing Training Vehicle (LLTV) last week resumed at Ellington AFB.

During a flight of five to six minutes April 7, three takeoffs and landings were made by test pilot Harold E. "Bud" Ream of Aircraft Operations, a veteran of more than 35 lunar landing vehicle flights. LLTV #2 hovered close to ground—about 50 feet—to check the basic systems of the LLTV and examine the handling and flying characteristics of the vehicle with an increased thruster output in the attitude control system. Thruster level had previously been 60 pounds. Since the crash of LLTV #1 on December 8, the level of thrust has been increased to 90 pounds. A total of 16 attitude thrusters are positioned on the LLTV with eight in reserve status as a backup system.

At takeoff LLTV #2 had about 735 pounds of hydrogen peroxide fuel in its tanks. Each time the LLTV landed, some 200 pounds of fuel were burned off through two 500-pound lift rockets. This reduction in weight in increments provided an opportunity to check the flying characteristics of the LLTV at varying weights. LLTV #2 flew twice before the December 8 accident suspended LLTV flight operations.

Twelve flights are scheduled for the flight test program with a flight scheduled about every three days prior to making the vehicle available for Apollo crew training.

The LLTV is built by Bell Aerosystems Company of Buffalo, New York. Three LLTV's were contracted for and delivered at a cost of \$5.6 million in the latter part of 1967.

Prior to NASA's contracting for the LLTVs, two research

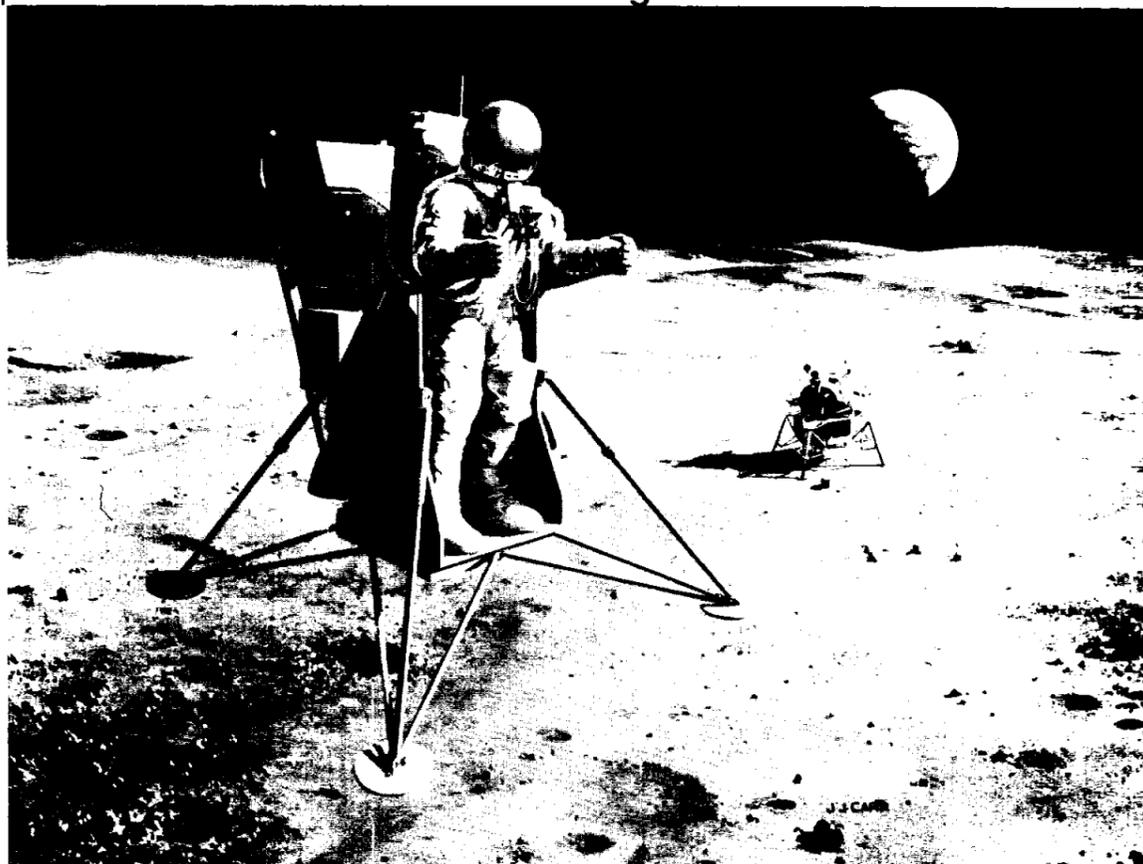
vehicles, similar in design were flown in a research program at NASA's Flight Research Center, Edwards, Calif. These were modified and shipped to Houston in December 1966. One of these, LLRV #1 was checked out and used for training purposes by astronauts until Neil Armstrong was forced to parachute to safety May 6, 1968, but the vehicle was totally destroyed when it crashed.

In the crash of LLTV #1 last December 8, Joe Algranti, Air-

craft Operation test pilot, successfully parachuted from the craft.

These wingless, free-flying vehicles are used to simulate the final 500 feet of the lunar landing. The vehicles use a combination of propulsion systems to sustain flight. Primary support for the vehicle is provided by a 4,200-pound thrust turbofan engine, modified for vertical flight and installed on a gimbal mounting behind the cockpit.

### Lunar Dragster



MOON HOPPER—This drawing shows one version of a one-man Lunar Flying Vehicle under study for lunar surface exploration. The moonscooter would have a range of 10-15 miles and its twin rocket motors would use residual lunar module descent stage propellants. Motorcycle-type handgrips control thrust and attitude. The vehicle could make up to 30 sorties from its base at the lunar module. Bell Aerosystems Company is doing preliminary design on the vehicle for MSC Advanced Missions Program Office.