



Transporting and opening lunar core samples has changed since the Apollo era, but it's still a painstaking task. Story on Page 3.



Get ready to help NASA save money and protect the environment, because the dumpsters for recyclable paper are here. Photo on Page 4.

Space News Roundup

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No. 40

JSC main entrance to change

Road construction to begin next year

By Linda Copley

Plans are under way for a major redesign of the main entrance to JSC. Construction is expected to begin in mid-1990 and be complete by the spring of 1991.

The change is necessary due to the traffic expected after the planned mid-1991 opening of Space Center Houston, JSC's new visitor center. The state of Texas' planned three-year project to widen NASA Road 1, scheduled to begin in mid-1992, is expected to exert further pressure on traffic entering and leaving JSC.

Plans call for the entrances at Saturn Lane and NASA Road 1 to be relocated, along with Bldg. 100, the security center, to a site on Second Street opposite Rocket Park. The gate at Saturn Lane/Avenue E will be eliminated. Saturn

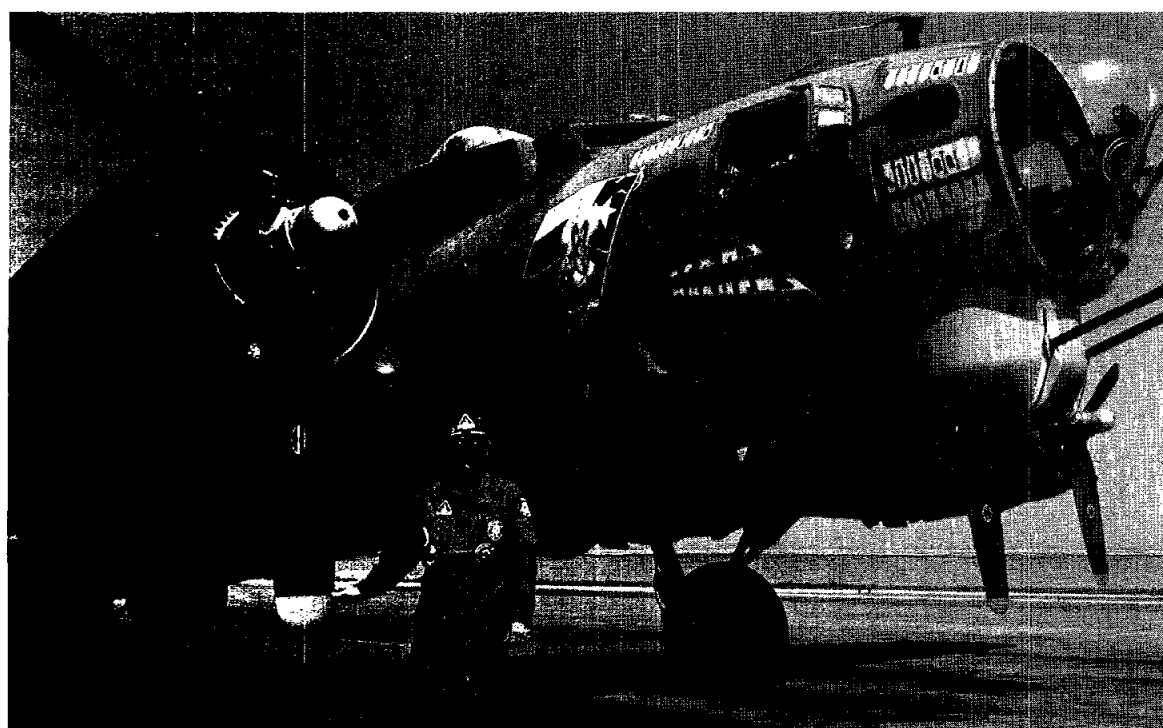
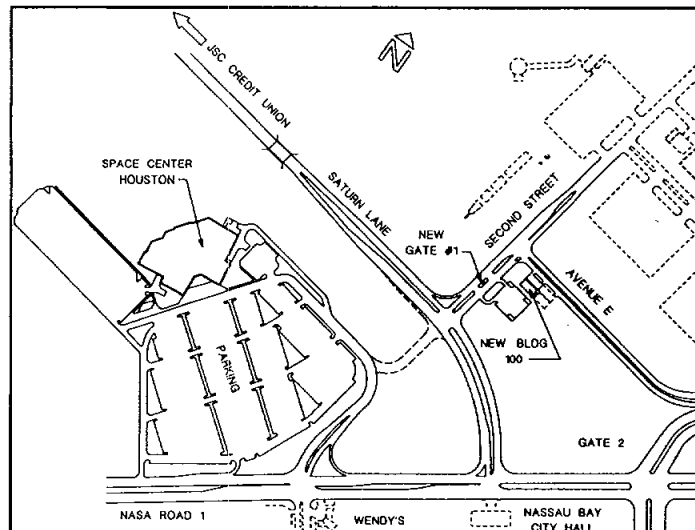
Lane will become a major thoroughfare connecting Bay Area Blvd. with NASA Road 1, thus eliminating Avenue E as it exists now.

"This represents the most significant restructuring of the roadway system servicing JSC since the center was built, said E.D. Carter, chief of the Facility Development Division.

"The benefits gained from these changes include a separation of visitor center traffic from JSC employee and contractor traffic, better public traffic circulation, a reduction in congestion at the NASA 1-El Camino (Real) intersection, the elimination of one JSC gate (Gate 3 by the JSC Credit Union), and better on-site traffic circulation," Carter added.

Saturn Lane will be extended, as a joint Metropolitan

Please see JSC, Page 4



JSC Photo by Mark Sowa

Everett Gibson shows off a World War II-vintage B-17 Flying Fortress. The plane will be just one of many vintage aircraft flying in this weekend's Wings Over Houston Airshow at Ellington Field.

Vintage aircraft volunteers

By Kelly Humphries

When the strain of planetary materials science in JSC's Solar System Exploration Division gets to Dr. Everett Gibson, he can take a break from the future by slipping into the past.

That's because Gibson, a 19-year NASA veteran, is flight engineer and load master on a World War II-vintage B-17 Flying Fortress.

If you're one of the 175,000 people expected to attend this

weekend's Wings Over Houston Airshow at Ellington Field, you may see him climbing into that B-17, the queen of the fleet for the sponsoring Confederate Air Force's (CAF) Ghost Squadron (a combination of the Gulf Coast Wing and West Houston Squadron).

You'll also see some of his volunteer efforts in action if you watch the U.S. Army's Golden Knights Parachute Team perform or visit the ground display of a B-1B

Strategic Bomber. Gibson donates his time as one of the CAF's military liaisons, seeking out military aircraft to have on display at the annual show.

Several other retired NASA employees and NASA contractor employees volunteer their efforts toward the show. William Bonefus, a retired NASA employee, is wing leader of the CAF's Gulf Coast Wing; Carl Huss of McDonald

Please see VINTAGE, Page 4

Galileo booster repaired

Atlantis ready; mission facing legal obstacle

By Kyle Herring

Atlantis with its Galileo planetary spacecraft payload and crew of five was cleared Wednesday by shuttle program officials to blast into space Thursday.

A problem with one of the two computers aboard Galileo's inertial upper stage (IUS) booster delayed the STS-34 launch date decision by one day, but not the five-day mission itself.

The IUS command and control computer, which had experienced bit errors, was replaced overnight Tuesday with a spare on hand at the Kennedy Space Center. The replacement computer was being checked out late Wednesday with no problems observed.

The announcement followed two days of meetings to determine the readiness of the vehicle and payload for the launch. Wednesday's announcement clears the way for the launch to occur on the first day of a 41-day window. Liftoff Thursday could occur during a 10-minute period beginning at 12:29 p.m. CDT.

The mission still faces a legal hurdle, however. A hearing in U.S.

District Court in Washington, D.C., next Tuesday is expected to determine whether an injunction preventing the launch will be granted.

Galileo gets its electricity from a pair of radioisotope thermoelectric generators (RTGs) that convert heat produced by the decay of plutonium 238 dioxide.

Three public interest groups—the Foundation on Economic Trends, the Christic Institute and the Florida Coalition for Peace and Justice—have filed suit to block the launch because of concern about the release of radiation from the RTGs in the event of an accident.

Meanwhile, close out of the aft compartment on Atlantis was completed late Wednesday. This activity included final inspections, removal of non-flight protective covers, removal of platforms and taking photos.

The pad was cleared of all non-essential personnel for final ordnance operations that were conducted Thursday. The pad was cleared while the ordnance devices were connected and checked.

Please see ATLANTIS, Page 4



NASA seeking proposals for space station 'lifeboat'

By Kari Fluegel

NASA released a request for proposals (RFP) Tuesday for definition studies on a new vehicle that would serve as a lifeboat for Space Station Freedom.

The Assured Crew Return Vehicle (ACRV), previously known as the Crew Emergency Return Vehicle (CERV), will be continuously berthed at the space station for crew return to Earth in case of medical emergency or other contingencies that cannot be supported by the space shuttle.

The RFP, with a Nov. 16 deadline for proposal submission, encourages the use of existing technologies for a simple and reliable vehicle. The vehicle will be part of an Assured Crew Return Capability (ACRC) system that requires a spacecraft reliable enough to be maintained at Freedom for long periods before use.

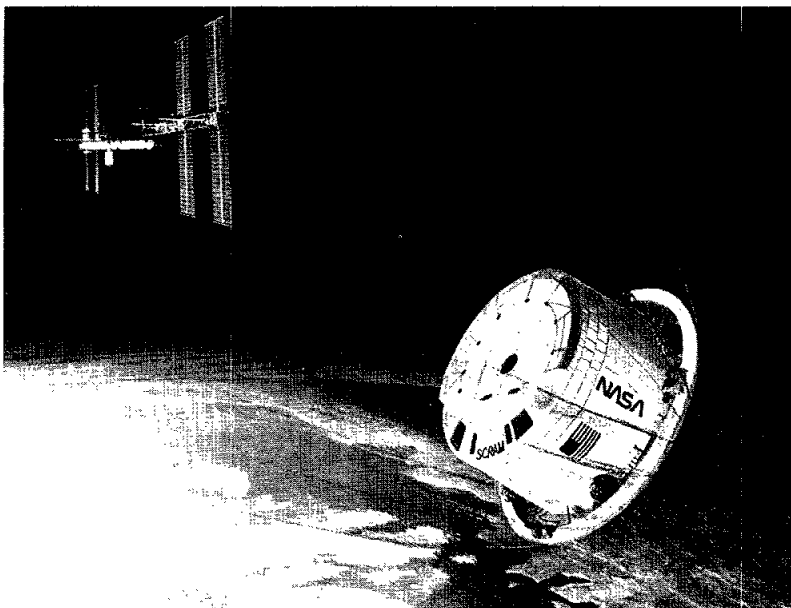
The ACRV system, the first manned

spacecraft since the space shuttle to be designed at JSC, will be managed by the CERV Office in JSC's New Initiatives Office.

A number of vehicle shapes have been considered during the NASA feasibility studies. The Shuttle Crew Return Alternative Module (SCRAM)—a short cylinder attached to a concave disk—is a vehicle concept similar to the Viking probe that traveled to Mars. The Discoverer concept is a scaled-up, often-flow design similar to the return vehicle used by the Department of Defense. Also studied were Apollo- and Gemini-type systems and a lifting body design under analysis at Langley Research Center.

Since the beginning of the manned space program, NASA has been dedicated to assured crew return capability for its space vehicles. In the

Please see NASA, Page 4



NASA Illustration

The Shuttle Crew Return Alternative Module (SCRAM) above is one of four concepts being studied for the Assured Crew Return Vehicle (ACRV). The SCRAM concept was designed by George Zupp of JSC's Advanced Programs Office.

Crew flight assignments score 'firsts'

By Jeff Carr

Astronaut crew assignments have been made for five space shuttle missions in late 1990 and early 1991, establishing several "firsts."

They include the first assignment from the astronaut class of 1987, the first U.S. Coast Guard astronaut to fly, the first European Space Agency (ESA) astronaut to be named as a mission specialist, and the first black woman to be selected for space flight.

The crew of STS-41, set for October 1990, will be commanded by Navy Capt. Richard N. Richards. Marine Lt. Col. Robert D. Cabana has been named as pilot. Mission specialists are Navy Capt. William M. Shepherd, Coast Guard Cmdr. Bruce E. Melnick, and Air Force Maj. Thomas D. Akers. Melnick and Akers will become the first of the astronaut class of 1987 to

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JSC

JSC

Ticket Window

The following discount tickets are available for purchase in the Bldg. 11 Exchange Gift Store from 10 a.m. to 2 p.m. weekdays.

General Cinema (valid for one year): \$3.50 each.
 AMC Theater (valid until May 1990): \$3 each.
 Sea-Arama Marineworld, Galveston (valid until Oct. 15): adults, \$8.15; children \$5.10.
 Sea World (San Antonio, year long): adults, \$17.25; children \$14.75.
 Texas Renaissance Festival (open weekends Sept. 30-Nov. 12): adults, \$8.95; children \$4.95.
 Texas Renaissance Festival bus trips (Oct. 14 and Nov. 4), departs JSC at 8 a.m. and returns 5:30 p.m.: under age 5, \$6; ages 5-11, \$9; adults \$12.
 Deep sea fishing (rescheduled for Oct. 22, leave Galveston Pier 19 at 7 a.m., returns 7:30 p.m.): \$20 to ride, \$45 to fish.

JSC

Gilruth Center News

Sign up policy—All classes and athletic activities are first come, first served. To enroll, you must sign up in person at the Gilruth Recreation Center. Everyone will be required to show a badge or EAA membership card. Payment must be made in full at the time of registration. Classes tend to fill up four weeks in advance.

EAA badges—Dependents and spouses may apply for a photo I.D. 6:30-9:30 p.m. Monday-Friday.

Defensive driving—Course is offered from 8 a.m.-5 p.m., Oct. 16 and Nov. 18; cost is \$15.

Taekwondo/Hapkido—Learn the Korean art of self-defense, mental and physical discipline. Tuesday and Wednesday classes begin Oct. 3; cost is \$40 a month.

Weight safety—Required for use of the Rec Center weight room. Classes will be 8-9:30 p.m. Oct. 25; cost is \$4.

Aerobics and exercise—Both classes are ongoing; cost is \$24.

Ballroom dance—Professional instruction in beginning, intermediate, and advanced ballroom dancing. Classes are on Thursdays, 7-8:15 p.m. for beginning and advanced and 8:15-9:30 p.m. for intermediate, starting Oct. 5; eight-week course is \$60 per couple.

Intercenter run—The 10-kilometer and 2-mile races for the annual Fall Intercenter Run will be held throughout October. Runners may submit their times at the Rec Center.

October softball tournament—A men's open "C" softball tournament will be held at the Rec Center Oct. 28-29. Limited to 12 teams; entry fee is \$95. Deadline is 6 p.m. Oct. 26.

Winter softball—League sign ups will be held Oct. 10-11.

Men's and mixed flag football—Sign ups will be held Oct. 12-13.

JSC

Swap Shop

Swap Shop ads are accepted from current and retired NASA civil service employees and on-site contractor employees. Each ad must be submitted on a separate full-sized, revised JSC Form 1452. Deadline is 5 p.m. every Friday, two weeks before the desired date of publication. Send ads to Roundup Swap Shop, Code AP3, or deliver them to the deposit box outside Rm. 147 in Bldg. 2.

Property
 Sale: Kemah country home, 1.33 acres, 3-2-2, work shop, 2-CCP, deep well, high-eff. AC, \$85,000. 334-1883.
 Sale: Lot in Kemah for home bldg., 111' x 180', some trees, \$7,300. 334-1883.
 Lease: Baywind II condo, 2-2 split, W/D, FPL, wet bar, approx. 1,050 sq. ft., \$450/mo. x31058 or 486-5119.
 Lease/Sale: Oakbrook, 3-2-2, \$750/mo. plus dep. or \$79K, conv. mort. only. Matt, x34285 or 486-7260.
 Sale: New Heritage Park, 3-2-2, upgraded ins. and out, \$70,000. OBO. 996-1990.
 Sale: 60 acres, 3 mi. from Kames City, TX, on Hwy. 80, 50 mi. from San Antonio; El Campo, TX. 2-story house on 1.5 lots, many fruit trees. 783-9164.
 Lease: Univ. Trace condo, 1 BR plus study, W/D, dishwasher, fans, microwave, \$395/mo. plus dep. 488-1454.
 Sale: Rayburn country resort wknd./vacation home, 2-1, den w/galley kit w/built-ins, den, dng./kit has cath. ceiling, cig. w/glass bk wall, 32' deck, \$45,000. OBO. 326-2190.
 Sale: Seabrook, 3-2-2, new AC, heater, carpet, roof, ceramic and quarry tile, many upgrades, approx. 1,800 sq. ft., all brick, formals, lg. den w/FPL, never flooded, redwood deck w/spa, \$69,500, assume at 97/8%, must qual., \$0 down. Richard, x30271 or 474-9334.
 Lease: Univ. Trace condo, 1-w/study, W/D, pet OK, sec. sys., ceiling fans, \$425/mo. Dennis, x32037 or 480-6744.
 Lease: 4-2-5-2 Heritage Park, new home, formals, 2,500 sq. ft., fen. yd., \$925mo. plus \$925 dep. x39863 or 996-8536.
 Lease: Piper's Meadow, immac. 3-2-2A, FPL, drapes, fenced, all new paint and carpets, \$825/mo. 486-0315.
 Sale: League City, 2.06 acres, near schools, city water and sewer avail., owner fin., \$39,900. 554-6695.
 Sale: Heritage Park, 3-2-2 home, new paint ext., spa, lg. deck, FPL, Stainmaster carpet, 10.5% assum., near pool, tennis courts, elem. school, \$69,500. x36619 or 996-0289.
 Sale: Big Bend area, getaway, hunting, 160 acres, \$140/acre, CFD 20% down, 9% for 5 yrs. 337-4051.
 Sale: Kirkwood South, custom 2-story, 2,400 sq. ft., 4-2-5-2, formals, fam. room, FPL, study, ex. cond., lg. lot, \$79,900. 488-5210.
 Rent: Large furn. condo Xmas in Puerto Vallarta, \$325/wk. Lisa, 283-5740 or 480-3859.
 Sale: Pearland, 4-2-5-2, 2-story home on lg. dry lot, 9% assum. FHA loan, window coverings throughout, formals, sprinkler sys., many extras. 997-1824.
 Lease: Sycamore Valley/Ellington AFB, 3-2-2, FPL, dining, ins. util. room, miniblinds, fenced, \$650/mo. 482-6609.
 Rent: Lake Travis cabin, priv. boat dock, CA/C and heat, fully equipped, accomm. 8, wkly./

diy., rental, \$325/\$75, after 9/1. 326-5652.
 Trade: Custom canyon view, 6 yr. old, Austin stone, 4-3, want sim. age, qual., w/in 20 mi. of JSC. 471-8795 or 333-6083.
 Lease: Univ. Trace condo, \$450/mo., new carpet, 2-2, W/D connec., avail. Nov. 1. 528-1884 or 480-1340.

Cars & Trucks
 '70 TR-6, needs restoration, \$1,500. OBO. Glenn, x30454 or 532-3013.
 '78 Cadillac Fleetwood, under 60K mi., \$3,300;
 '81 Chevy Citation, 72K mi., \$4,000. 482-3697.
 '87 Mustang GT, T-tops, 5-spd., cruise, AM/FM/cass., all power, 180mph speedometer, Saleen-Strut tower support, low mi., \$9,999. 488-2965.
 '79 Chevy Malibu Classic, very good cond., \$1,200. Earl Rubenstein, x34807 or 326-2354.
 '84 Honda Accord LX, auto., air, cruise, stereo, 45K mi., \$6,500. 482-8262.
 '85 35' Mallard motor home, loaded, low mi., \$36,000. 337-4051.
 '88 Taurus sedan, burgundy, 6 cyl., PW, PS, PL, sun roof, oversized tank, rust prev., grocery net, 22K mi. 332-1553.
 '80 Datsun 200SX, new tires, good paint, manual, 5-spd., copper 2 tone, 62K, PS, PB, AM/FM, AC, ex. cond., \$2,100. Jay, x38379 or Lynda, x38945 or 554-4412.
 '77 Chevy Caprice Classic, does not run, good tires, new carb., \$300. 480-3909.
 '88 Pulsar, 5-spd., AM/FM/cass., AC, T-tops, int. blue, like new, 37K, \$9,750. OBO. Stacy, (409) 938-1697.
 '80 Porsche 924, cherry red, mag wheels, runs well, \$3,750. OBO. x33597 or 482-3432.
 Go-Cart, Dingo 8hp, good cond., \$450. OBO. 554-2375.
 '72 Fiat Spyder convert, blue, int./ext. ex. cond., stereo, new eng., brakes. 488-2941.
 VW dunebuggy, candy apple red street vehicle, tagged, has insp. sticker, full back seat, front bucket, manual custom int., \$1,700. Joyce, 333-6064 or 337-5909.
 '73 MG Midget, parting out, new rad., good motor or \$150 all. 333-4734.
 '74 MGB-GT, 1800cc, dual SU carbs, elec. OD, AC, \$2,500. Lamar, x37064 or 538-4615.

Boats & Planes
 '82 Wellcraft 18' bowrider XLS, V-8 I/O, runs like new, Sportsman trlr., \$4,900. x37432 or 480-7213.
 22' Columbia sailboat, fix-kool, roomy cabin, head and sink, 3-sails, 6hp motor, docked in CL, \$1,900. OBO. x31588 or 488-1326.
 Hobie 16, multi-colored sails, custom sail box, galv., trlr., many extras, stored indoors, like new, \$2,100. 538-1148.
 30' Trojan, fiberglass, 4kw Onan, AC, new head, elect. range w/oven, refrig. w/freezer, twin 318, one needs work, \$9,500. 280-8796.
 18' Snipe day-sailer and trlr., no sail, fair cond., \$250. 333-6594 or 333-3725.
 18.5' Larson power boat, 90hp Evin. OB, Sportsman galv. trlr., good cond., \$2,000. 474-2200.
 21' Southwind sloop, sleeps 4, main and 2 jobs, life jackets, cushions, \$1,100. OBO. 282-3022.

Cycles
 '80 CB 750 custom Honda, good cond., \$1,050.

Today
Cafeteria menu—Special: Salisbury steak. Entrees: fried shrimp, deviled crabs, ham steak. Soup: seafood gumbo. Vegetables: buttered carrots, green beans, June peas.

Saturday
Wings Over Houston—The Confederate Air Force will present its fifth annual Wings Over Houston Airshow Oct. 7-8 at Ellington Field. Vintage planes will be flown, aerobatic acts will perform and static aircraft displays will be open for public inspection. Gates will open at 8 a.m. for static displays; aerobatic acts begin at 10 a.m. Tickets are \$8 for adults; \$4 for children ages 6-11. For more information, call 531-9461.

Monday
Columbus Day—Most JSC offices will be closed in observance of the Columbus Day holiday.
CLAUG meets—The Clear Lake Apple Users Group (CLAUG) will meet at 7 p.m. Monday at Clear Lake Park Bldg., 5001 NASA Road 1. For more information, call x35591 or 488-1135.

Tuesday
Cafeteria menu—Special: turkey and dressing. Entrees: baked meat- loaf, liver and onions, barbecue spare ribs. Soup: beef noodle. Vegetables: Spanish rice, broccoli, buttered squash.

Wednesday
MAES luncheon—The monthly luncheon for the Society of Mexican American Engineers and Scientists will begin at 11:30 a.m. at Mamaca's

on the Bay Restaurant, 18206 Egret Bay Blvd. Contact Frank Moreno, x31208, for information.

Cafeteria menu—Special: Spanish macaroni. Entrees: broiled fish, tamales with chili. Soup: seafood gumbo. Vegetables: ranch beans, beets, parsley potatoes.

Thursday
COD chili cookoff—The Center Operations Directorate (COD) will hold a chili cook-off beginning at 4 p.m. Oct. 13 at the Gilruth Recreation Center. All JSC employees, contractors and family members are invited. Tickets, which include refreshments, are \$2.
Cafeteria menu—Special: chicken fried steak. Entrees: beef pot roast, shrimp chop suey, pork chops. Soup: navy bean soup. Vegetables: carrots, cabbage, green beans.

Oct. 13
Sausage burn—The Houston Section of the AIAA Young Member Committee will host a "Sausage Burn" beginning at 5 p.m. Oct. 13 at the Gilruth Recreation Center. All young members and anyone interested in joining AIAA are invited. For more information, call Hiram Thompson, 282-8243.
Cafeteria menu—Special: tuna and noodle casserole. Entrees: broiled codfish, fried shrimp, baked ham. Soup: seafood gumbo. Vegetables: corn, turnip greens, stewed tomatoes.

Oct. 19
NCMA luncheon—The Space City Houston chapter of the National

Contract Management Association (NCMA) will meet from 11:30 a.m.-1:30 p.m. Oct. 19 at the Gilruth Recreation Center. Alfred Fernandez, chief executive officer of Etc Technical & Professional Services Inc., will speak on training for transportation and disposal of hazardous or explosive materials. For reservations or more information, call Liz Aldrige, x38518, or Shannon Romine, 282-1770.

Oct. 20
Galileo overview—The Houston Space Society will sponsor a program entitled, "Galileo: A Closer Look at Jupiter," at 7:30 p.m. Oct. 20 in the Atlantic Room, University Underground, University of Houston. Debbie Jackson, a JSC Flight Activities Officer, will discuss the upcoming mission. For more information, call 520-6924.

Oct. 24
BAPCO meets—The Bay Area PC Users Group (BAPCO) will meet at 7:30 p.m. at the League City Bank and Trust. Contact Earl Rubenstein at x34807 or 326-2354, or Ron Waldbillig at 337-5074 for information.

Oct. 31
Quality, productivity conference—The sixth annual NASA/Contractors Conference on Quality and Productivity will be Oct. 31-Nov. 1 at the Von Braun Civic Center in Huntsville, Ala. This year's theme is "Partnership for Continuous Improvement." NASA Administrator Richard Truly is to announce the 1988/89 NASA Excellence Award for Quality and Productivity.

Hexanon f-1.4x50mm, f-3.5 35-70mm zoom, Tokina f-3.5 28-85mm zoom, flash, UV haze filters, cases, very good cond., \$300. 482-8262.

Pets & Livestock
 Female lab, 1.5 yrs. old, black, all shots, spayed. Liz, 487-3223.
 Male Cocker pup, 9 wks., buff, housebroken, no papers, \$100, wormed, all shots. 332-7912.

Wanted
 Want roof rocks for Taurus, ski or windsurfer type. Walt, x35939.
 Want child's playhse., wood/tough plastic; boy's quality clothes 4T-up; little Tyke's, Fisher Price toys, all good cond. Mary, 484-6630.
 Want Bay Forest home, 4 BR, pref. sale by owner. 996-1990.
 Want wrought-iron patio set. x36796.
 Want Yamaha jog scooter, '86 pref., also scooter tires, 2.75-10-4pr. Fred, 488-8111 or 944-0493.
 Want washer and/or dryer. Vince, x31470 or 532-1789.
 Want tickets for A&M T.U. game, alumni side (West). Bill, x31339 or 534-4780.
 Want reas. priced treadmill, sail for 12' boat, carpet steam cleaner and press. washer. Don, x38039 or 333-3313.
 Keyboard synthesist seeking members to form Pop/Rock band. Eddie or Susan, x32858 or 534-3649.
 Want 2 or 4 O.U.-Texas tickets. John, 280-1500 x3078 or 488-0989.
 Want late model beer light, all brands considered. Walt, x35939.

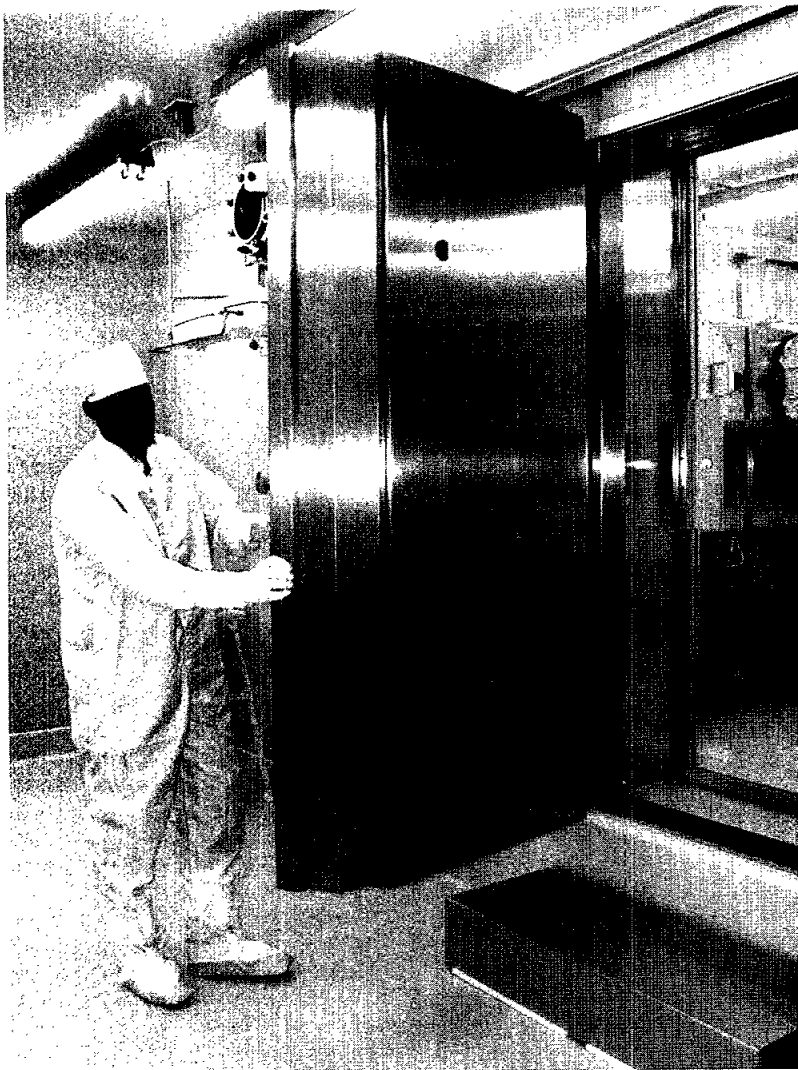
Musical Instruments
 Antique '29 baby grand piano, Primrose model, ex. cond., \$3,200. Turner, x38578.
 Ovation elec. solid body guitar w/hardshell case, \$175. 333-4734.
 Lester baby grand piano, 5', ex. cond., \$1,395. 282-1727 or 273-4098.

Miscellaneous
 Collection of U.S. Comm. plate block stamps, compl. 1963-1984, \$425. x34397 or 333-1485.
 Grayco baby stroller, \$25; car seat, \$10. x31058 or 486-5119.
 Sofa, \$300; Grandfather clock, \$60; 4 din. chairs, \$50; typing table, \$25; table lamp, \$20; desk lamp, \$10; Kenwood amplifier, \$75; Sankyo cass. deck, \$75; record changer, \$45; 13" color TV, \$125; phones, \$5-\$75; bedside clocks, \$5-\$10; misc. items. 482-3697.
 Top-line water purification sys., used 1 mo. x32181.
 Multicolor rabbit jacket, med., very good cond., \$35. x32181.
 Toyota part, eng. igniter for '82 Tercel, \$40. Liz, 487-3223.
 Two radial tires, new cond., P175R-13, \$40. Matt, x34285 or 486-7260.
 Wedding dress, veil, white, sz. 9/10, \$175. OBO. Helen, x58413 or 554-2728.
 Tow bar for V.W. Beetle, \$50. x30454 or 532-3013.
 Sears office refrig., 6 cu. ft., 4 mos. old, \$150. Dorothy, 482-1505.
 Child's rocking horse, \$30. 482-1505.
 Sz. 4 women's half slip petticoat for wedding dress, BO. x36796.
 Antiques: 2 seed sowers, sewing machine,

sm. spinning wheel, walking plow. 783-9164.
 Steeplecase desk, good cond., \$35. Mary, 484-6630.
 Men's slacks, never worn, sz. 34, women's dresses, 2-pc. suits, 7, 9, 11, also blazers. 488-1454.
 Ariens riding mower, 8hp, B-S, eng., 6-yrs.-old, 6-V, 30" blade, batt. charger, \$600. x35096 or 488-2540.
 Raytheon marine radar, needs work, \$195. 280-8796.
 SSB marine radio, Konel model KR 1153SB, not working, \$95. 280-8796.
 Miyata touring bike, 15-spd., rack, headlight, \$125; office chair, \$25. 484-4926.
 Craftsman '88 lawnmower, 20" cut, rear bag, 3hp, \$125. OBO; Craftsman 3hp gas edger, \$100. OBO; surfbld., 59" Hurricane, tractor, tri-1in, \$300. OBO. Richard, x39271 or 474-9334.
 '86 Texas duck stamp print, matted, framed, \$225. 480-3729.
 Piano voice instruction Mon.-Thurs. day/even. 534-0084.
 Motorcycle helmet, Bell Pro-Star, red/white/blue w/visor, like new, \$90. x31588 or 488-1326.
 Evinrude O/B motor 6-gal. gas can, \$25; int. doors w/hardw., \$10; humidifier, \$10; ent. light fixture, \$20. x38178 or 482-5837.
 Ladie's Python western boots, 6B, \$60; custom kingsz. spread, \$35; rowing mach., \$15; Sunbeam elec. razor, \$10. John, x38178 or 482-5837.
 Beer Kegerator (home unit), works perf., holds 16 gal., \$300. Madeline, 480-2817 or 482-0554.
 Corvette silk 15" round pillow, \$12; solid brass 10" windsurfer, \$15. Steve, 488-8716.
 Firestone Supreme tires (2), P205/70R14, 30K mi., \$10/ea. Chuck, x31701.
 Carpet, 11x11, brn. tones, \$20. 482-1535.
 New windows, doors, light fixtures, bargain priced. Don, x38039 or 333-3313.
 5hp '89 Ariens var. spd. rear-drive mower w/rear bag, side or rear dischg., only 3 hrs. use, \$295. Jerry, x38922.
 Kyosho rem. con. car, javelin, 4-wheel drive w/Futaba rem. con. unit, batt. power-pck. incl. Fred, 488-8111 or 944-0493.
 Lg. set Amber Sharon Cabbage Rose depression glass, ex. cond., will sell pieces, BO. Alison, x34314 or 532-1228.
 New Epson elec. memory typewriter, \$150. OBO. Valerie, x38385.
 Double bed, Simmons extra firm, \$75; free-standing fiberbd. wardrobes, like new, \$50/ea.; TV table sets, sim. cane tops, \$35/ea. Bob, 283-5469 or 484-0898.
 Free sod (grass), you roll. 332-0365.
 Stereo AM/FM receiver-amp., Sansui G-6000; 65W per channel, 4 speaker outputs, many extras, \$100. Cree, x38370.
 2 thermostat controlled 13K BTU 120V Quasar window unit AC's, 1 yr. old, \$450/ea., \$800 both. OBO. Youree, x37246 or 538-3055.
 Sears FXC 5000 exer. bike, ex. cond., \$35. 474-2200.
 West Bend 5100 exer. rowing mach., ex. cond., \$35. 474-2200.
 Pool, 12'-diam. 3'-deep, w/ filter pump, chemicals, skimmer, \$150. OBO. x34401.
 Round-trip airline ticket to Los Angeles, 19/22 Oct. '89, \$200. OBO. Ed, x32566 or 333-1563.

Photographic
 Konica FS-1 35mm auto (AE) camera,

JSC Photos by
Pam Alloway
and
Jim Townsend



Air Force Staff Sgt. Larry Olsen opens the foot-thick steel door to the vault at Brooks Air Force Base where 117 pounds of lunar samples are kept in nitrogen-filled cabinets.

STRAIGHT TO THE CORE

Scientists unlock vault at Brooks Air Force Base to retrieve core samples that reveal Moon's past

By Pam Alloway

In 1976, a caravan of vehicles escorting two modified buses loaded with lunar samples snaked out of Houston.

The entourage, accompanied by armed guards, slowly crawled over railroad tracks and wound around bumps. It took about 10 hours to reach San Antonio's Brooks Air Force Base, the caravan's destination and the new home for its precious cargo—117 pounds of lunar samples.

Much has changed since that chilly day in February 1976 when a portion of the Apollo lunar samples was moved to Brooks for safekeeping. Buses are no longer required, nor is a snail's pace. Yet officials and technicians still use great care in handling each sample on the rare occasions one is returned to JSC.

Technicians, security personnel and lunar lab officials visit the small storage site every six months to check the building and equipment, drill base security guards and purge the stainless steel lunar storage cabinets with fresh nitrogen gas. During a recent visit, the group had an added responsibility—returning two lunar core samples from Apollo 16 that had remained undisturbed for 13 years. Only twice before had anyone roused any of the samples from their pristine hibernation at Brooks, once in September 1979 and again in 1982. Only one unopened lunar core sample remains at Brooks.

Brooks Air Force Base is in San Antonio's southeast corner. Home to about 3,000 military and civilian personnel, Brooks also houses 117 of the 841.6 pounds of lunar samples returned by Apollo astronauts.

No work on the samples is conducted at Brooks. No tours are taken through the Brooks storage bunker.

The bunker, also known as Bldg. 950, once held the base's munitions. Its nearest neighbors is the base's guard dog kennel.

NASA officials placed a portion of the samples at a remote storage site to ensure the survival of pristine samples for future study. The building underwent interior renovations and cleaning before receiving the special occupants. The vault and anterooms are Class 10,000 clean rooms requiring visitors to dress in dust-free clothing. The Air Force maintains the building and surrounding area, checks the lights and monitors temperature readings.

During the mid-September trip to Brooks, Lockheed technicians Jack Warren and Ron Bastien opened the building, turned on equipment and hooked up one of two liquid nitrogen tanks they had brought from Houston. Each tank holds about 80 gallons of liquid nitrogen. Using a specialized monitor, Warren and Bastien analyzed the water and oxygen content in the lunar storage cabinets and checked the system.

Before they entered the vault, they had to open a foot-thick steel door and a separate glass door that are kept locked with frequently changed combinations. The two-party combinations prevent either NASA or the USAF from opening the doors without cooperating.

Warren and Ed Cornitius, a Lockheed technical support supervisor, diligently unscrewed 60 bolts from the "manhole cover" on one of the three cabinets. Slowly, they removed a core sample from one of the cabinet's shelves and moved it onto a preparation table. Only two of the 3 1/2-foot cube cabinets contain samples, said Jim Townsend, Solar System Explo-

ration Division technical coordinator and a regular visitor to the Brooks site. The third is empty, he said.

Special care was made to carry the sample horizontally and avoid disturbing the core's layers, Townsend said. Security personnel and Townsend confirmed each sample's number and noted its relocation on NASA inventory records.

"It's important to minimize vibration and shock, anything that would disturb the core," Townsend said. "The objective is not to allow the sample to flow and disturb the layers."

In that respect technicians handle core samples even more delicately than lunar rock specimens, Townsend said.

Crushed and fused material compose the "soil" layers that slowly built up on the moon's surface as successive meteorite impacts made craters, casting out sheets of material. Each layer consists of soil from a different place and contains a record of exposure to the Sun.

The Apollo astronauts collected 35 core samples, some that went as deep as 10 feet. Collected both in drive tubes and by deep drilling, they are stored in core tubes which are placed in individual stainless steel tubes that resemble small dumbbells. The oldest layers, at the bottom of several cores, were deposited about 500 million years ago and contain evidence about the Sun's past behavior.

During the recent Brooks trip, Warren placed each sample in a Teflon bag. Bastien then heat sealed it and Cornitius placed it in a foam-padded locker. The lockers were left in the vault, the doors closed and the liquid nitrogen tank set on high purge overnight to remove air impurities.

Bob Gaffney, chief of JSC's Security

Operations Branch and Bob Nooney, security specialist, watched every movement in the vault. Staff Sgt. Larry Olsen, the Air Force officer assigned custodial duty of Bldg. 950, two San Antonio police officers and Air Force reservists provided additional security.

"Anytime you open up the vault doors and go into a container, we have to be there to escort the samples," Nooney said. "We have to assure NASA that all security systems are operating properly."

The next day the seemingly simple task of moving the samples from the vault floor into the trunks of two cars parked outside was instead a complex and slow process. Bastien and Warren loaded the lockers on a specially padded cart and carefully loaded each one into the trunk of the car that would carry it back to JSC. Additional foam packed around the lockers provided an extra cushion.

"When you come out here you need to bring everything, all the equipment, with you," Cornitius said. "We have a loading plan that begins 30 days in advance of a trip."

Warren, a Lockheed test conductor and systems specialist, began working at JSC in 1966. He was the technician who opened the first "rock box" following Apollo 11. He also was among those who made the original trip to Brooks in 1976. He knows every nook and cranny in the small building. He was one of the technicians who spent many hours cleaning everything from the vault door to overhead piping before the samples were moved.

Details surrounding work with the Brooks samples have changed over the past 13 years, Warren said.

"Very few people go into that building now compared to that first trip,"

Warren said. "But we didn't know what to expect back then."

Bastien, an electro-mechanical technician with Lockheed, has traveled to Brooks on lunar sample related trips since 1980.

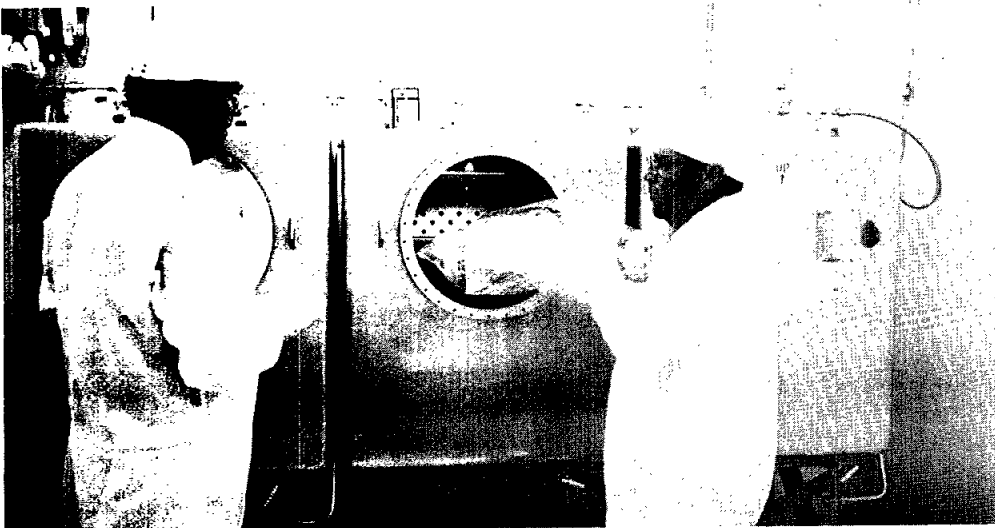
At JSC, technicians will take x-ray pictures through the metal core tubes before pushing the core material out of the tube into a horizontal receptacle, said Dr. John Dietrich, lunar sample curator. The soil then reveals its history, millimeter by millimeter as technicians examine, photograph, then carefully slice off sections of the soil before placing the sections into separate containers. A strip along the length of each core is left intact and embedded in plastic as a permanent record of the structure.

It takes four to six months to dissect and describe one core section in preparation of the sample's distribution to investigators, Dietrich said. He estimated it would be the end of 1990 before both of the recently returned core samples were ready to be released to the principal investigators.

Larry Haskin, chairman of Washington University's Earth and Planetary Sciences Department and a former JSC division chief, was one of several scientists who requested the core samples be opened.

"These samples are from the only location where two samples, or three in this case, have been taken that close together," he said. "One question we have is—do we see the same soil layers in two samples taken from the same general area?"

Lunar and Planetary Sample Team (LAPST) scientists allocate lunar material to principal investigators, matching samples with research projects to make the most effective use of this precious resource.



Above: While Lockheed systems specialist Jack Warren, left, looks on, Ed Cornitius, technical support supervisor, takes special care to keep the lunar core sample horizontal while moving it out of its cabinet. Right: Lockheed technicians Jack Warren, Ron Bastien and Ed Cornitius, from left, heat seal the Teflon bag containing a lunar core sample that was returned to JSC in mid-September.



Atlantis gets clearance for Thursday launch

(Continued from Page 1)

If processing continues to go smoothly this weekend, the call-to-stations for the launch countdown will be at 7 a.m. CDT Monday at the launch site.

The crew for the mission, Commander Don Williams, Pilot Mike McCulley and Mission Specialists Shannon Lucid, Franklin Chang-Diaz and Ellen Baker, will travel from Ellington Field to KSC's Shuttle Landing Facility aboard NASA T-38 training aircraft Monday.

Following solid rocket booster

ignition, overall responsibility for the mission is transferred to JSC's Mission Control Center. Lead Flight Director for the STS-34 mission is Milt Heflin. The ascent phase will be conducted by Flight Director Ron Dittmore. He will also serve as flight director for the Orbit 1 team which will be on console from about 6:30 a.m. to 3:30 p.m. CDT.

The Orbit 2 team, led by Heflin, will be on console each day from around 2:30 to 11:30 p.m. CDT. The Orbit 2 team has primary responsibility for deployment of the Galileo

spacecraft on flight day one.

The Planning Team, led by Flight Director Bob Castle Jr., will be on console from about 10:30 p.m. to 7:30 a.m. CDT each day. The planning shift, which for the most part operates during the crew's sleep period, has the dual responsibility for monitoring the systems aboard *Atlantis* and updating schedules or coordinating any changes in the flight plan as may be dictated by real-time mission events.

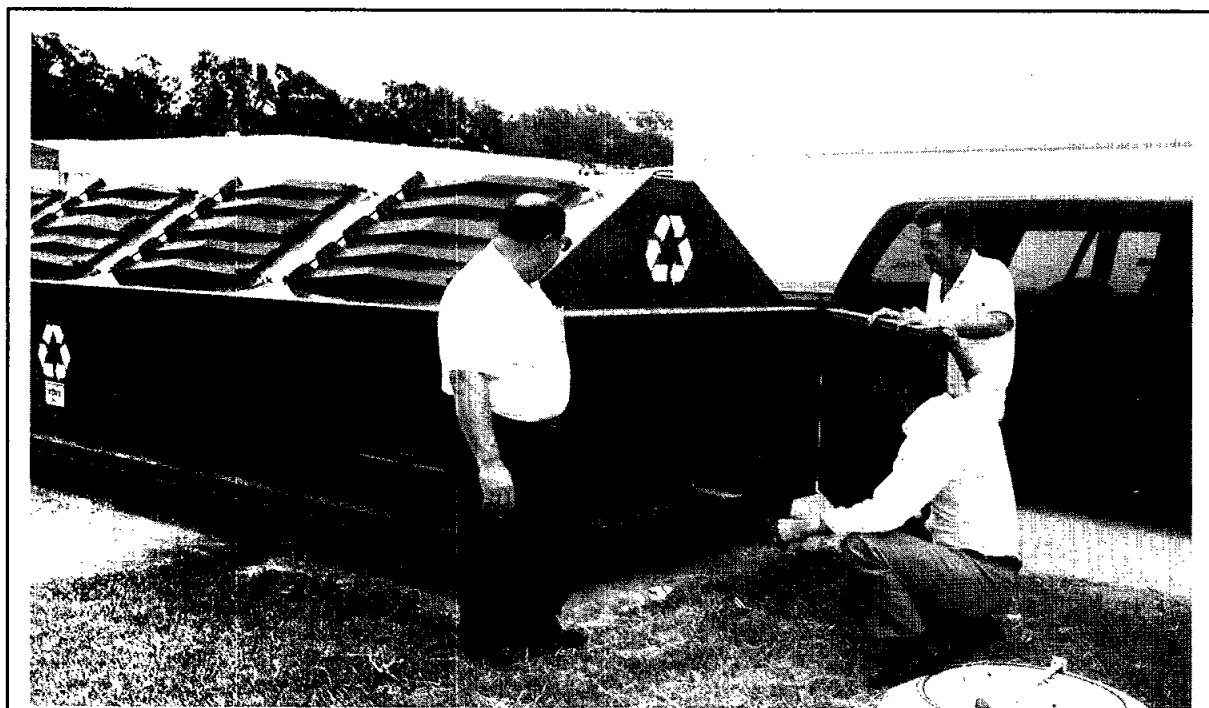
In other work at the launch site, *Discovery* was scheduled to be

transferred to the Vehicle Assembly Building (VAB) yesterday for mating tomorrow with its external tank/SRB stack for next month's Department of Defense mission. The orbiter transporter will be used to haul *Discovery* several hundred yards to the transfer aisle in the VAB. By using the transporter, the landing gears will be retracted for flight in the OPF versus in the VAB, thereby saving time in the transfer aisle.

Columbia is awaiting installation of its three liquid-fueled main

engines. The first engine was scheduled to be installed yesterday. Checks of the orbital maneuvering system, water spray boilers and power reactant storage and distribution system are also continuing.

The chin panel was removed so engineers could inspect the area for water intrusion following last week's inadvertent activation of the fire suppression system in the orbiter processing facility. No evidence of water was found and the panel was reinstalled Tuesday.



JSC Photo by Bill Blunk

DUMPSTER DROP—JSC received its first dumpsters for recyclable paper this week at Bldgs. 45 and 227. Phil Stallings (left) and Hector Gongora (center) of JSC's Printing Management Branch check out the 8- to 9-ton dumpster outside Bldg. 227 as Tom Rowe of Special Purpose Maintenance and Services supervises the installation. A 2- to 3-ton dumpster was installed outside Bldg. 45. The dumpsters are part of a pilot project designed to save money and protect the environment. Mike Scott, vice chairman of the JSC Recycling Committee, said the Bldg. 45 dumpster was filled in just two days, a response he termed "very successful."

Vintage airplanes coming to Ellington

(Continued from Page 1)

Douglas Corp. works transportation; Don McIver of Grumman Corp. is a supply officer; Diane Hess, Lewis Fisher, and James Williams of Rockwell International are members of the Gulf Coast Wing and assist with the airshow.

JSC's Aircraft Operations Division will display several planes at the show, including a T-38 astronaut training aircraft, a Shuttle Training Aircraft and the Superguppy out-sized cargo transporter.

Gibson was one of the many volunteers who spent thousands of hours completely dismantling and rebuilding the B-17 and raising the \$300,000 needed for the restoration.

He continues to spend one day each weekend and most evenings working on the airplane and airshow as "mental relief" from work.

The airplane was built in 1944, and used to drop life rafts in the Pacific during WWII. It became a radar picket plane during the Korean conflict, was used on the early warning line until 1956 and was acquired by the CAF in 1967. Of the 12,500 B-17s built during WWII, only 11 still fly and the Texas Raiders plane is the most authentically restored, he said.

"All of us have a sense that we're showing history," Gibson says. "You can't help but be proud. We worked three years on the restora-

tion of this airplane. Everybody said you'll never do it."

Gibson said he is proud to participate in the airshow because it is a community effort that brings an estimated two-thirds of a million dollars to the Houston economy. Proceeds of the show go to the CAF for maintenance of the 146-plane fleet, to the city for the use of Ellington and to local charities, he said.

Because construction at Ellington is taking up 67 acres of parking, he recommends that visitors take the Park & Ride service being provided by Metro. Gates open at 8 a.m. Saturday and Sunday; aerobatic acts begin at 10 a.m.

Crew announcement includes partial assignments

(Continued from Page 1)

fly in space. The crew of *Atlantis* will deploy the space probe Ulysses on its way to a major solar science harvest in polar orbit around the Sun.

Navy Capt. Michael L. Coats will command the crew of *Discovery* on STS-39, an unclassified Department of Defense mission scheduled for November 1990. The pilot will be Air Force Maj. L. Blaine Hammond Jr. Mission specialists are Gregory J. Harbaugh and Air Force Maj. Donald R. McMonagle. Previously assigned as mission specialists for the flight are Air Force Col. Guion S. Bluford Jr., Richard J. Hieb, Ph.D., and Charles Lacy Veach. During the eight-day

mission, the crew will deploy, rendezvous, and retrieve the free-flying Infrared Background Signature Survey (IBSS), a sensor experiment to gather data on a variety of infrared, visible, and ultraviolet sources.

Kathryn D. Sullivan, Ph.D., and C. Michael Foale, Ph.D., have been named as mission specialists for the Atmospheric Laboratory for Applications and Science (Atlas-01) mission, STS-45. In March 1991, the crew of *Columbia* will spend nine days in orbit conducting studies of the Sun and of the Earth's atmosphere in efforts to better understand the effect of solar activity on the Earth's climate and environment.

Atlas-01 payload specialists Michael L. Lampton, Ph.D., of the University of California at Berkeley, and Byron K. Lichtenberg of Payload Systems Inc. were named in 1984. Additional crew members will be announced later.

In another partial crew assignment, Navy Cmdr. Robert L. "Hoot" Gibson has been named to command the crew of STS-46. NASA astronauts Jeffrey A. Hoffman, Ph.D., and Franklin R. Chang-Diaz, Ph.D., plus Claude Nicollier, a European Space Agency (ESA) astronaut assigned to NASA, have been named to fly as mission specialists. During their seven-day mission, the crew of *Atlantis* will

deploy the European Retrievable Carrier (EURECA), an ESA-sponsored free-flying science platform that will be retrieved and returned to Earth eight months later. This first flight of the EURECA features five multi-user facilities serving some 45 principle investigators in the materials and life sciences. In addition, the crew will demonstrate the Tethered Satellite System (TSS), a joint project between NASA and the Italian space agency, Agenzia Spaziale Italiana (ISA). The Shuttle-attached TSS will provide for the deployment, operation, and retrieval of a data gathering probe through the use of a tether system which provides constant physical and elec-

trical connection and radio communication between the probe and the shuttle. Additional crew members will be named later.

Mission specialists also have been named to the STS-47 crew for Spacelab-J, a joint venture between the United States and Japan to conduct experiments in life sciences and materials processing. Air Force Lt. Col. Mark C. Lee, N. Jan Davis, Ph.D., and Mae C. Jemison, M.D., will fly aboard *Discovery* on that mission in June 1991. Jemison, assigned as a mission specialist, becomes the first black woman to be selected for a space flight. Other crew members will be named later.

NASA seeks station 'lifeboat' proposals

Vehicle to continue dedication to assured return

(Continued from Page 1)

Mercury and Gemini program flights, the first orbit's trajectory assured the return of the spacecraft. Apollo missions were flown on lunar "free return" trajectories where the spacecraft could circle the Moon and return to Earth automatically. During Skylab missions, an Apollo spacecraft was

docked at the facility whenever crew members were aboard.

NASA will award two parallel contracts providing for a \$1.5 million, six-month effort to prepare final ACRC system requirements, to assess feasible configurations and to examine cost, risks and schedules.

The contracts also will include a

one-year \$4.5 million option that, if exercised, will provide for systems definition and preliminary design of the ACRC system. The contracts (basic contracts plus options), with a potential value of \$6 million each, will support efforts leading to initiation of full-scale development of a vehicle in 1992.

JSC employees earn 'bright idea' awards

JSC Director Aaron Cohen recognized more than 35 center employees for their "bright ideas" in award ceremonies held Sept. 25.

Recognized for their "Productivity Improvement/Cost Reduction Ideas" were Carlos Ortiz-Longo and Steven Rickman, with certificates; Harold Ferrese, and teammates Michael Goza and Catherine Plowman, with small Eagle Awards; and Ortiz-Longo, James Smith, Jr., Luther Palmer, James Milhoan, and Donald Tillian, with large Eagle Awards.

Cash awards for suggestions were given to: Rex Boyce, \$750; Peter Cerna, \$602; Delores Marshall and Irwin Smith, \$250; and Norman Lamb and D. Leigh Allen, \$125.

NASA Tech Brief Awards brought \$150 awards to the team of Winston Goodrich, Edgar Castro, Margaret Grimaldi, Timothy Pelischek, Clarence Wesselski, Bruce Becker, Jon Kahn, and John McManamen. Similar awards were given to the team of Frederic Dawn and Joseph Kosmo; Theresa Buckley; Jonette Stecklein; Richard Juday; the team of Bobby Bragg and Eric Dimpault-Darcy; Brian Morris; Reginald Berka; Paul Baffes; Joseph Chandler; and Philip Sheridan.

Patent Application Awards for \$250 were given to the team of Bragg and Dimpault-Darcy, and to Kosmo. And finally, Kosmo was also recognized by Cohen with two separate Space Act Awards worth \$250 each.

Special mission hours set

Special hours will be in effect for JSC's Space Center Blvd. gate and both cafeterias during the upcoming mission, STS-34.

Beginning the evening before launch, now scheduled for Thursday, the Space Center Blvd. gate will be open 24 hours. The main gate on

NASA Road 1 will remain open 24 hours as usual.

The Bldg. 11 cafeteria will open half an hour early on weekdays during the mission, from 6:30 a.m.-2 p.m. The Bldg. 3 cafeteria will open half an hour early on weekends, from 6:30 a.m.-4 p.m.

JSC main entrance changes

(Continued from Page 1)

Transit Authority (Metro)/JSC project, across the southwest corner of JSC to a point on NASA Road 1 directly in front of Nassau Bay City Hall. The four-lane, concrete curb and gutter roadway will provide public traffic with a direct route from NASA Road 1 to Bay Area Blvd. and adjoining areas to the north.

"This long-awaited thoroughfare was brought about by the combined efforts of JSC management, Metro, city of Houston, and the Clear Lake Area of Commerce," said Don Holick, staff architect in the Facility Planning

Office.

"Not only will the general public have better access to areas abutting JSC, but employees and contractors will have a much easier time with their commute during the long period of time required for the widening of NASA Road 1."

"This project is one of several for the Clear Lake area sponsored by Metro to increase mobility," said Holick. "The widening of Bay Area Blvd. from the Gulf Freeway to Saturn Lane is already under way and Metro's engineers will be completing the Saturn Lane plans by May 1990."

Space News Roundup

The Roundup is an official publication of the National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, Texas, and is published every Friday by the Public Affairs Office for all space center employees.

Fire Prevention Week

Fire Prevention Week, Oct. 8-14, will be observed at JSC with instructional fire safety video broadcasts on NASA Select.

"Fighting Fires with Portable Fire Extinguishers," "Fire: Countdown to Disaster," and "Employee Evacuations and Actions for Survival" will be shown.

The broadcasts can be seen at 9 a.m. on Tuesday and Thursday, and at 2 p.m. on Wednesday and Friday.