



Space News Roundup

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No. 30

Atlantis, Columbia swap slots

By Kyle Herring

Space Shuttle *Atlantis* will move off the launch pad for repair or replacement of the flange seal on its external tank disconnect thereby allowing *Columbia* to return for the launch of the STS-35 Astro-1 mission in early September.

A third tanking test of the STS-38 hardware Wednesday morning confirmed a leak in the flange seal area between *Atlantis*' external tank disconnect and the tank itself. Based on the data from the test, Shuttle program managers elected to roll the orbiter back to the Vehicle Assembly Building to further study the leak.

Space Shuttle Program Director Robert Crippen said the umbilical on the external tank will be removed "to better understand" what is causing the leak in the flange area.

Columbia, which was awaiting the decision on whether *Atlantis* would fly the STS-38 Department of Defense flight first, now is scheduled to move from the Orbiter Processing Facility to the VAB next week for mating with its external tank.

The disconnect umbilical used to transfer liquid hydrogen and oxygen from the tank to the main engines was replaced on *Columbia* and its external tank after a leak was discovered in the cavity area during tanking for the STS-35 launch May 29.

Columbia now is outfitted with the disconnect from Space Shuttle *Endeavour*, under construction at Rockwell International's Palmdale, Calif., facility.

"I feel very confident that the *Columbia* is ready to go," Crippen said.

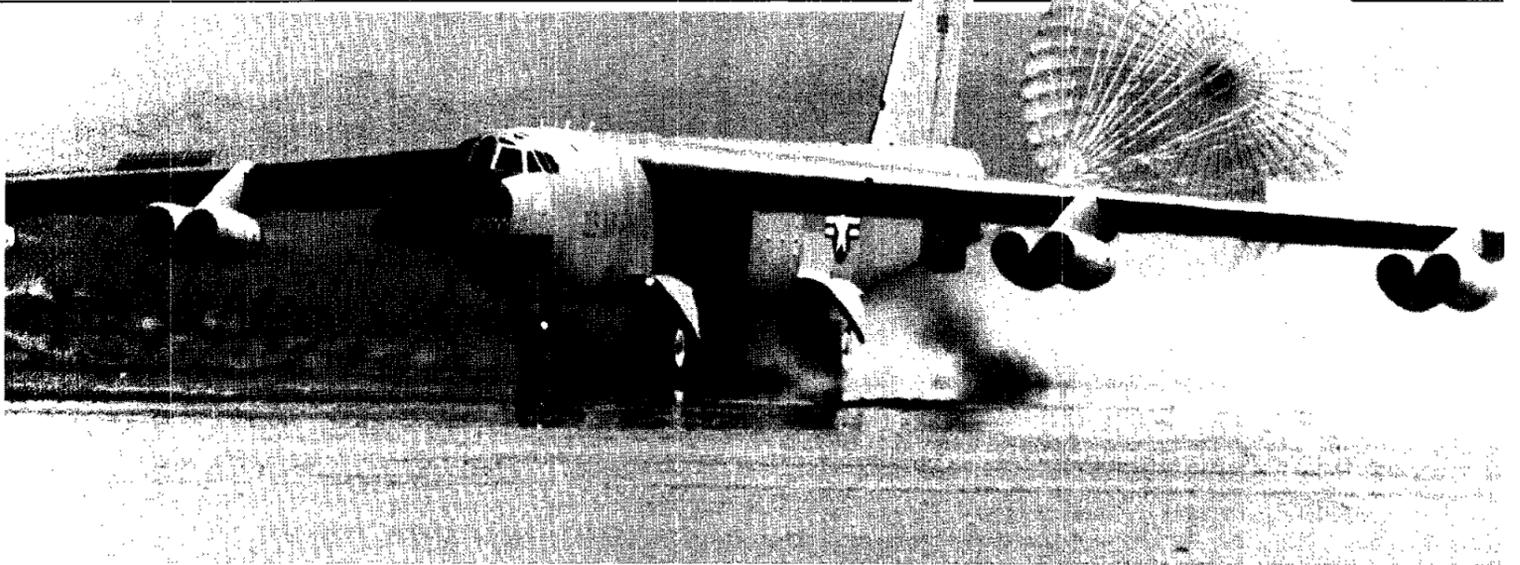
With the decision to roll *Atlantis* off the pad, only one Shuttle mission will be launched prior to the high-priority launch of *Discovery* carrying the Ulysses solar probe Oct. 5.

Dr. William Lenoir, associate administrator for space flight, said there was only one chance to fly two missions prior to the Ulysses flight.

"We're glad we tried" with the third tanking test, he said, "but we were not able to fix" the leak on *Atlantis* forcing the decision to roll back.

Following *Columbia*'s mission, *Atlantis* will be launched on the STS-38 DOD mission in early November.

At the Kennedy Space Center a board of investigation has been formed to investigate the damage of a reaction control system thruster on July 18. The thruster fell from a work platform and was dented during processing. A spare thruster was installed onto the pod being processed for *Discovery*'s next mission.



NASA Photo

NASA's B-52 test aircraft comes to a stop on Edwards dry lakebed.

Drag chute test glides to success

The Space Shuttle orbiter drag parachute system's first test last Friday coasted to a total success at Edwards Air Force Base, according to the project engineer.

Once certified, the chute will be incorporated into the orbiter fleet to help reduce tire and brake wear during landing and rollout following shuttle missions.

"The test was a complete success," said George Dawson, drag chute project engineer. "The actual deployment sequence was fantastic."

The tests are part of ongoing effort

to upgrade operational capabilities and flight safety of the shuttle fleet. The drag chute system is designed to supplement the normal system of brakes and help slow the vehicle's speed after landing.

The test Friday was the first of eight designed to certify the chute for use on the four Space Shuttle orbiters: *Columbia*, *Discovery*, *Atlantis* and *Endeavour*.

Endeavour, presently under construction at Rockwell International's Palmdale, Calif., facility, will have the drag chute system incorporated into

the vehicle. The remaining three orbiters will be modified with the drag chute when feasible during normal structural inspection periods.

Dawson said the series of tests using the NASA B-52 test aircraft will continue at one to two-week intervals until the certification program is completed and the data have been fully evaluated.

"Everything really worked well and the entire team effort was the reason," he said.

The next scheduled test is Aug. 2 or 3. All tests will use the B-52 aircraft piloted by former astronaut Gordon

Fullerton. Each separate test will use different drag chute deployment speeds, ranging from 140 to 200 knots. Typical orbiter landing speeds range from 180 to 225 knots.

The drag chute test program is managed by JSC. Also participating in the program are Rockwell, which designed the drag chute system; Irvin Industries, Santa Ana, Calif., which designed the parachute; and the Boeing Airplane Co., Seattle, Wash. Ames-Dryden incorporated the drag chute system into the tail section of the B-52 for the test program.



Photo by Jack Jacob

ASTP crewmembers, from left to right, Alexei Leonov, Tom Stafford, Valeriy Kubasov and Vance Brand inspect the Space Station *Freedom* mockup during their visit to JSC Tuesday.

Astronauts, cosmonauts relive ASTP

Astronauts and cosmonauts who made history shaking hands in space reunited at JSC this week to observe the 15th anniversary of the Apollo-Soyuz Test Project.

Astronauts Tom Stafford, Deke Slayton and Vance Brand and cosmonauts Alexei Leonov and Valeriy Kubasov met in Houston Tuesday as part of a three-center tour commemorating the 1975 mission that demonstrated common docking capability.

"As we reflect back on Apollo-Soyuz and review the histories of our two countries, there are two times in the past we worked together with warm relationships," Tom Stafford, Apollo commander, said during a press conference. "The first was during World War II when we were allies and the second was during the Apollo-Soyuz Test Project."

"To us it was a symbol that there were two countries with two absolutely different languages, two different units of measurements and two different political philosophies, yet we set forth a common goal. We worked toward it and it was carried out with a superb effort."

Please see **ASTP**, Page 4

Freedom maintenance study recommends actions

By James Hartsfield

A seven-month scrutiny of exterior housekeeping required aboard Space Station *Freedom* found an average of more than five spacewalks per week will be needed to keep the station in shape and has led to a list of 100 recommended actions that can reduce the amount of maintenance. External Maintenance Task Team co-chairmen Dr. Bill Fisher and Charles Price said last week.

Fisher, an astronaut, and Price, chief of JSC's Robotic Systems Development Branch, said the study showed almost 3,300 hours per year of space-

walks would be needed to maintain *Freedom* as it is currently designed and planned to operate, even in the years prior to its manning and completed construction. But, by implementing changes centering on increasing the amount of maintenance that can be done with robots and streamlining the tedium of human repairs, the number of spacewalks per week may be reduced to one, the study determined.

In tandem with the Fisher-Price study, the results of a review by an External Maintenance Solutions Team, led by Bill Simon, deputy manager of the Space Station Projects Integration

Office at JSC, were presented. The solutions team made an independent review of the spacewalk time that would be required and, using many of the Fisher-Price recommendations, searched for ways to reduce maintenance time.

The solutions team's findings paralleled the Fisher-Price report: more than 3,500 spacewalking hours per year now projected may be reduced to below 500 per year by implementing the recommendations.

Richard Kohrs, deputy associate administrator and program director for Space Station *Freedom*, said he is not

surprised by the extensive spacewalks found in the studies.

"In my program experience, with these studies, when you really dig into them the first month or so, the numbers really go up. And then you start the detailed assessment, the 'What can I do to improve this,' and the numbers come down. We're finding that in the EVA study here, and we're also finding that in the weight and power scrubs we have under way in space station," Kohrs said. "We got the same effect in the Shuttle Program, the same effect in the Apollo Program. At this point, about five years from launch, it isn't

surprising."

Although the changes recommended by Fisher-Price and followed up on by the solutions team can reduce the amount of annual spacewalk time in the years after the station is built, problems remain in dealing with the amount of maintenance required for the time *Freedom*'s parts are assembled in orbit.

The study showed more than 940 maintenance tasks would be needed in the 30 months prior to the station's permanent manning.

"We think that, currently, is the most Please see **GROUP**, Page 4

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): \$3.75 each.

AMC Theater (valid until May 1991): \$3.50 each.

Sea World (San Antonio, year long): adults, \$17.25, (2-day, \$21.95); children (3-11) \$14.75, (two-day, \$18.95).

Astroworld (valid 1990 season): season, \$39.95; regular, \$15.97; children, \$9.21; Waterworld, \$8.15; two-day—AW/WW, \$18.47.

JSC

Gilruth Center News

Sign up policy—All classes and athletic activities are first come, first served. To enroll, you must show badge or EAA card and pay at the Gilruth Recreation Center. Classes tend to fill up four weeks in advance.

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

Defensive driving—Course is offered from 8 a.m.-5 p.m. Sept. 15 and Oct. 13; cost is \$15.

Weight safety—Required for use of weight room. The next class will be from 8-9:30 p.m. Aug. 8 and Aug. 23; cost is \$4.

Aerobics and exercise—Both classes are ongoing.

Ballroom dance—Classes begin Aug. 2 and meet every Thursday for eight weeks. Beginning and advanced classes meet 7-8:15 p.m. Intermediate class meets 8:15-9:30 p.m. Cost is \$60 per couple. Special Summer Beg. I and Beg. II classes will be held on Tuesdays, beginning July 31. Cost is \$60 per couple.

Mixed Volleyball—Registration will be held on July 31. The league will meet on Monday and Friday nights. NASA badged teams will sign up first.

Fall Basketball—Registration for basketball leagues will be Aug. 1-2. This season's leagues will consist of a Wednesday B, Thursday C, and Tuesday C. NASA badged teams will sign up first.

Country & Western—Dance lessons begin Sept. 10 and will be held every Monday for six weeks. Cost is \$20 per couple.

JSC

Technical Library News

This new publication is available in the JSC Technical Library, Bldg. 45, Rm. 100.

The Case! Debris from Upper-Stage Breakup, American Institute of Aeronautics and Astronautics.

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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. No phone or fax ads accepted.

Property

Sale: Pebblebrook condo, 1-1, FPL, all appls., assume 9.8% low equity. x37426 or 326-5200.
Sale: Piper's Meadow, 3-2-2, lg. lot, low util., assume \$69K plus equity. 486-1187.
Rent: CL townhouse, 2-2.5, fans, appl., miniblinds, sec. sys., cov. parking, avail. Sept., \$575/mo. x38126 or 488-2094.

Sale: Lot in LC, off 646, 5 acre, \$35K. 332-4774.
Sale: Dickinson, 4-2-2D, 2,800 sq. ft., open concept, FPL. x31466 or 534-3932.

Rent: Rm. in house, util. pd, free maid, \$270/mo. Eric, x38420 or 484-9179.

Sale: 60 acres, 3 mi. from Karnes City, 50 mi. from San Antonio; 2-story house in El Campo, TX, fruit trees on 1.5 lot. 783-9164.

Sale: LC, 4-2-2, 2-story, new roof, AC, furnace, dishwasher/oven, near NASA, \$65K, mil nego. Karl, x31236 or 554-6180.

Lease: 2-2.5-2CP condo, split level plan, W/D incl., 5 min. from NASA, \$500/mo. 480-0035.

Sale: Lot #29 LLV, paved st., water, sewer, elec., priv. ramp, deer lease. \$2K and assumed pmls. x36171.

Sale: Meadowgreen, 4-2-2, 2-story, Victorian, 2,100 sq. ft., ex. cond., \$17,500. Glenn, 282-4294 or 280-8580.

Rent: Bellaire, 3-1, CA/H, remod., hdwds., stor., fenced, avail. mid Aug., \$625/mo. 488-2664.

Sale: Dickinson Plantation Estates, 4-2-2, 1.5-story, over 1,900 sq. ft., ex. cond., \$75K. 337-2009.

Sale: Friendswood, 3-2-2 w/Gunite pool, new deck, 2K sq. ft., new paint/carpet, fans, \$88,500. x34902 or 996-9128.

Sale: New Heritage Park, 3-2-2, CA/H, fans, FPL, formal DR/LR, near NASA, FHA, no app., assum. loan, 71K. 480-2870 or 282-2633.

Rent: 1 BR condo, oceanfront, sleeps 4, Sarasota, Fla., Aug. 11-18, \$500 plus \$100 dep. 438-0201.

Rent: Egret Bay Villas, 1-1-2 condo, avail. 8-1, FPL, fans, W/D, \$550/mo. plus equal dep., refer. req. 461-4629.

Trade: Lot in Westwood Shores, near Lake Livingstone, valued at \$9,500, trade for car, PU or trav. trlr. of equal value. 554-6841.

Sale: Gaiv. Bay, 3-2, CA/H, formal DR, deep wr. lot w/concrete bulkhead, pier, \$145,000. 225-0547 or (409) 744-6107.

Sale: Friendswood, Wilderness Trails Subdiv., lg. res. lot. 996-9157.

Cars & Trucks

'88 Chev. Suburban-Scottsdale, car phone, Dualair, low mi., loaded, \$16,700. 333-5848.

'81 Oldsmobile station wagon, good cond., \$1K. 332-4774.

'88 GMC PU, AC, loaded, 18K mi., \$11,200. Roland, 920-7273.

'89 Chev. Cavalier Z24, 2-dr. coupe, white/blue int., loaded, \$9,300, OBO. 472-0232.

'70 Pontiac Firebird, good cond., \$1,750, OBO. Larry, x31235 or 482-6357.

'85 Toyota Supra, sunroof, loaded, ext. warr., ex. cond., \$7,750. Dale, 283-5356 or 481-0046.

'85 Buick Electra Park Ave., 4-dr., fully equipped, new tires, ex. cond., \$6,600 mi., \$6,450. 482-1535.

'78 custom Chev. van, loaded, ex. cond., orig. owner, \$2,900, OBO. 480-0719.

'81 Datsun 310 GX, 2-dr. hatchback, AM/FM cass., AC,

sunroof, ex. cond., \$1,400. 332-3580.

'87 Chrysler la Baron GTS Turbo, loaded, sunroof, \$8,150. Rick, 283-1988 or 996-8961.

'86 Cherokee Jeep, 4-dr., 5-spd., Pioneer pkg., \$8,700. (409) 935-4400.

'86 Hyundai Excel, 4-dr. sedan, auto., \$3,200. 335-4314 or 499-4056.

'86 Mazarati 425 bi-turbo, 29K mi., \$13,500. Roy or Irene, 480-9612.

'87 Ford Bronco II, lugg. rack, 5-spd., \$5,900, ex. cond. 486-7276.

'88 Mits. Precis RS, 3-dr., 5-spd., new batt., 34K mi., ex. cond., \$4K. Barbara, 488-4102 x202.

'80 Jeep CJ5, 64K mi., new eng., new Cepek wheels/tires, much more, \$5K. Mike, 996-9440 or 282-4180.

'87 Pontiac Firebird, V8, T-tops, loaded, warr., \$7,500. 283-7320 or 334-3185.

'85 Bronco II, Eddy Bauer pkg., 5-spd., 4-wheel drive, ex. cond., \$5,900. 326-1278.

'74 Mercury Capri, V6, 4-spd., air, AM/FM, good cond., low mi., \$1,500 or trade for sm. PU in sim. cond., x36585 or 532-1812.

'88 RV Holiday Rambler 29', 5th wheel; '88 3/4 ton Chev. tow vehicle. 282-4057 or 332-2089.

'83 V-45 Magna, low mi., ex. cond., \$1,500 or trade for PU. x34663 or 475-0872.

'85 Charger, 52K mi., 5-spd., \$2,500, OBO. x31833 or 534-6073.

'84 Mazda, ex. cond., AM/FM cass., \$5K. Rick, 283-1988 or 996-8961.

'80 Toyota Corolla liftback sport coupe, 5-spd., AC, low mi., good cond., \$2,350; '80 Pontiac Phoenix, liftback, V6, auto., AC, \$1,950, sell one, not both. x30092 or 481-3637.

Cycles
'82 Harley Davidson Sportster XLH, elec. start, ex. cond., low mi., new batt., \$2,875. x30092 or 481-3637.

Murray 10-spd. bike, nev. used, minor parts missing, \$120. x36135 or 480-7196.

Red Honda Spree scooter, low mi., ex. cond., \$425. 333-5848.

'84 Yamaha YZ125, ex. cond., \$600. 480-9698.

'84 Honda VT500 Ascot, ex. cond., \$850. 480-9698.

'82 Yamaha XT 250 Enduro, new tires, low mi., ex. cond., helmet incl., \$625, OBO. x31144 or 282-6613.

Boats & Planes

'79 Ventura bass boat, 16' tri hull, 115hp Merc., tilt/trim, trolling motor, good cond., \$2,500. Roland, 920-7273.

17' Bonita, cen. console, VRO, T&T, galv. trlr., loaded, VHF marine, TCRID1, \$7,900. x37786 or 482-3742.

'88 Carson D.C. 204, cen. console, '88 Evin. 200hp XP, EZ-loader tandem trlr., loaded for offshore fishing, 333-6821 or 326-3474.

15' bass boat w/trlr., 50hp motor, new tires/batt. x36171.

Aircraft propeller, Sensenich 74DM6-0-58, fits some Beech, Piper PA-18, PA-22, PA-28 series, \$900. 538-2299.

12' Jon boat, fiberglass, ex. cond., trlr., \$250; util. trlr., needs work, BO. Bob, x30825 or 921-1715.

'87 VIP 1950SS Victory ski boat w/'88 165hp Merc. Mark Price, 474-2094.

16' Hobie Cat, 2 sets of sails, harnesses, traps, trlr. opt., BO over \$900. John, x38988 or 482-6364.

17' O'Day day sailer, mahog. trim, bunge boards, dacron sails, spinnaker, motor mount, running lgs., trlr., \$950; Mariner 4hp long shank OB. ex. cond., \$300. x32864 or 486-8411.

12' fiberglass sailboat, 2 sails, 14' alum. mast, trlr., good cond., \$600. Dave, (409) 925-7822.

'85 22' Pursuit, cen. console, 175hp Yamaha OB, T-top canvas, trlr., ex. cond., \$16,500. Frank, 333-4073.

'86 Sea Ray Monaco, 19'6", 175hp IO, new bottom

JSC

Dates & Data

Today

Pressure Systems Week — Presentations will be at 9 a.m. and 3 p.m. July 27 at Ford Aerospace, Rm. 206. For more information contact O.T. Lewis, x35710.

Cafeteria menu — Special: Salisbury steak. Entrees: baked scrod, 1/4 broiled chicken with peach half. Soup: seafood gumbo. Vegetables: cauliflower Au Gratin, mixed vegetables, buttered cabbage, whipped potatoes.

Monday

Cafeteria menu — Special: beef and macaroni. Entrees: ham steak, Parmesan steak. Soup: chicken and rice. Vegetables: green beans, carrots, Au Gratin potatoes.

Tuesday

Cafeteria menu — Special: Mexican dinner. Entrees: potato baked chicken, barbecue spare ribs. Soup: tomato. Vegetables: squash, ranch beans, Spanish rice, broccoli.

Wednesday

JSC Astronomy Seminar — The seminar will be an open discussion meeting from noon-1 p.m., Aug. 1, in Bldg. 31, Rm. 129. For more information call Al Jackson, x33709.

Cafeteria menu — Special: baked meatloaf with Creole sauce. Entrees: baked scrod, liver and onions, ham steak. Soup: seafood gumbo. Vegetables: beets, Brussels sprouts, green beans, whipped potatoes.

Thursday

Users Group meeting — Texas Regional Encore Users Group will hold its next meeting from 8 a.m.-8 p.m. Aug. 2 at the Gilruth Center. Representatives from Encore Computer Corp. as well as users from around Texas and JSC will

be in attendance. Advanced registration is required. The cost is \$10. Contact Gil Glastetter at 282-3314 M.S. U06C for schedule of events.

Cafeteria menu — Special: smothered steak with dressing. Entrees: chicken and dumplings, corned beef with cabbage. Soup: beef and barley. Vegetables: spinach, cabbage, cauliflower Au Gratin, parsley potatoes.

Aug. 3

OMV Wake — Orbital Maneuvering Vehicle program cancellation party will be held Aug. 3 at 4407 Peridot. For more information contact Ben, x32381.

Cafeteria menu — Special: tuna and salmon Croquette. Entrees: pork chop with yam rosette, Creole baked cod. Soup: seafood gumbo. Vegetables: Brussels sprouts, green beans, buttered corn, whipped potatoes.

Aug. 4

MAES Scholarship Banquet — The Society of Mexican American Engineers and Scientists (MAES) will hold its Annual Scholarship Banquet at the University of Houston Hilton. Contact Frank Moreno for details at x31208.

Aug. 8

JSC Astronomy Seminar — The seminar will be a Rice University videotape featuring Dr. J. Imbrie—"The Climate Spectrum Over a Range of Periods From One Year to 10,000 Years" from noon-1 p.m., in Bldg. 31, Rm. 129. For more information call Al Jackson at x33709.

Aug. 9

JSC/NPMA meeting — The JSC National Property Management Association meeting will be held at Gilruth. Social hour at 5 p.m. and dinner at 6 p.m. Audrey Schwartz, Co-op student

in New Initiatives Programs office at UHCL, will be guest speaker. For more information contact Sandra Pierce at 282-4151.

Aug. 11-12

Fourth Southwest Space Activist Conference — The Houston Space Society will host the fourth Southwest Space Activists' Conference at the University of Houston, Law Center, Teaching Unit 2. Registration is \$10; an effectiveness workshop is \$5. For further details call 639-4221.

Aug. 15

JSC Astronomy Seminar — The seminar will be a Rice University videotape featuring Dr. J. Wisdom—"Chaos in the Solar System" from noon-1 p.m., in Bldg. 31, Rm. 129. For more information call Al Jackson, x33709.

Aug. 22

JSC Astronomy Seminar — The seminar will be an open discussion meeting from noon-1 p.m., in Bldg. 31, Rm. 129. For more information contact Al Jackson, x33709.

Aug. 28

BAPCO meeting — The Bay Area PC Organization will have its next meeting at 7:30 p.m., at the League City Bank and Trust. For more information call Earl Rubenstein, x34807, or Tom Kelly, 996-5019.

Aug. 29

JSC Astronomy Seminar — The seminar will be a Rice University videotape featuring Dr. P. Olson—"Geodynamical Consequences of Core-Mantle Interaction" from noon-1 p.m., in Bldg. 31, Rm. 129. For more information contact Al Jackson at x33709.

paint, eng. overhaul, low hrs., ex. cond., skis/vests incl., \$7,800. Stephen, 333-1534.

Audiovisual & Computers

Wyse Model WY-30 terminal w/green display monitor, instr. booklet, \$75. x36135 or 480-7196.

TI 99/4A computer w/game and/or business cartridges, \$40. 534-3893.

IBM XT computer, Taxan hi res color, 640K, IBM 30 MB disk, loaded w/HW-SW, \$1,275. x30092 or 481-3637.

Fischer audio CD player, \$200; round brass base, glass top coffee table, \$100; Slaughterhouse Five VHS video, \$10. x30003 or 644-3137.

286 AT PC, 20 MEG HD, 5 1/4 floppy w/1.2 meg, 2400 Baud modem, enh. kybd., monitor, SW, \$1,200, nego. 332-1985.

AT 80386 SX 16 MHz VGA monitor, 3.5 & 5.25 high den. floppies plus 40 meg HD, 1 meg RAM, \$1,800. x31367 or 996-1410.

Zenith URT 9850 Beta video player/rec., 58 video cass., ex. cond., \$175, OBO. Irma, x35178 or 437-5028.

PC XT clone, 640K, 20 MHD, FD, co-proc., monochrome, SW, \$700. 282-5301 or 333-2263.

Apple II plus comp., monitor, new printer w/NLQ, 2 disc drves, modem, SW, all connec., \$500. Don, x34205 or 488-8105.

2 Compaq 286 E's, 70 meg HD, 1.2 meg floppy, w/CGA graphics, 101 kybd., \$1,600/ea. 339-1337.

Tandy 1000 TL, high res. color monitor, 20 meg HD, 3.5 and 5.25 floppies, enh. kybd., \$1,400. 484-4262.

AT&T 6300, IBM compat, 640K RAM, 30 meg HD, 1 floppy drive, CGA graphics, SW. David, 280-2266 or 332-3072.

TI-99/4A comp. w/mem. exp., serial/parallel ports, speech synthesizer, many cartridges, manuals, \$75; GE 13" color TV/monitor, \$40; Radio Shack TRS-80 modem II, \$30. Tom Clark, x39842.

Musical Instruments

Bundy clarinet, case, ex. cond., \$275. Ethel, x36148.

Flute, 1 yr. old, \$250. 332-4780.

Casio CZ101 synthesizer, Roland MT32 multi-timbral tone gen., both are full MIDI. Bob Schaf, x34468 or 486-7687.

Yamaha ME-10 synthesizer/organ, incl. amp. spkrs., ex. cond., \$725. Jesse, 280-5914 or 486-5220.

King trombone w/stand, \$250 (new MSRP \$515). David, x37073 or 482-0699.

Les Paul shaped guitar, \$250; acoustics: 12 str Fender, \$450 & 6 str Ovation, \$450 w/cases; 50 W amp, \$75; distortion pedal, \$45. david, 488-8105.

Conn alto sax, good cond., \$225. x36481.

Pets & Livestock

AKC chihuahua pups, shots, wormed, dipped, \$100-\$200/ea. 534-3893.

Free kittens, 6 wks., long hair, trained. 334-4995.

Free 1 yr. old male dog, about 30 lbs., blk./white; domestic handfed blue & gold Macaws & bear-eyed cockatoos. Donna, 283-5453 or 337-3838.

Siberian Husky pups, AKC/pedigree, shots, wormed, females, \$150. 488-5009 or 482-6504.

Sheltie pups, 8 wks. old, sable/white, males, \$150, fem., \$180. 771-1012.

Persian/Himalayan kittens, CFA reg., assorted colors, \$200-225; stud serv., CFA grand champion blue Persian, pick of litter or nego. fee. Kristy, x30439.

Free 1 yr. old blk. fem. outdoor dog, Lab/Cocker/Setter, shots, spayed, Ursula, 283-4116 or 996-9415.

Baby cockatiels, handfed, sweet grays, pieds. Linda, 484-7834.

Free to good home, 1 yr. old, brn./gray and white long hair cat, neutered, shots, 474-4132.

Arabian show mares, purebred, 6 yrs. old, \$1K; 7/8, 3 yrs. old, \$900, OBO, both are gray w/Fayhan bloodlines.

Connie, x36903.

Dachshund pups, AKC, shots, wormed, father mini from champion, mother sm. stand., pups are red, \$250. Bob, x39710 or 946-1434.

Household

Dinette, smoked round glass, 4 chairs, brn. corduroy cushions, ex. cond., \$200. x37426 or 326-5200.

Illusions queen sz. w



On the Move

JSC taxi service keeps center rolling along

By Barbara Schwartz

Moving the equivalent of the population of Baton Rouge, La., from meeting to meeting is a formidable task for any transportation organization, but the JSC taxi service does just that, driving center employees as far as the moon.

On an average day, JSC's fleet of station wagon taxis and a shuttle bus carry more than 850 passengers an average of 1,355 miles, said Joel Walker, chief of the Transportation Branch.

In a year's time, the number of passengers equals the population of Iceland or Baton Rouge, and the daily mileage, which is equal to a trip to Washington, in a year's time is more miles than a trip to the moon.

Of the 150 general purpose vehicles in Center Operations' Transportation Branch, the 12 taxis and four shuttle buses are probably the most visible to employees.

Only one bus is used for the 30-minute roundtrip from on-site buildings in the mall area to Lockheed Plaza. The other three are used for "specials" which can carry anyone from a touring dignitary to teachers who come to JSC each summer to become students themselves. Most recently the specials made 25 roundtrips to the Brown Convention Center during the Economic Summit.

The goal of the transportation service is to get people where they want to go in the least amount of time, Walker said.

"If it would take you an hour to get from one place to another, and we can get you there in 30 minutes, we've saved your salary for that half hour," he said.

Dispatcher's records show that 92 percent of the people who use the taxi service are picked up within ten minutes, and keeping JSC on the move is a team of six dispatchers and more than a dozen drivers.

"The best thing we can do to help response time is to fill the taxi. We try to schedule four

riders at a time," said Bonnie Redford, project manager for the taxi and dispatch services under a contract with W.D. Services.

A good memory is the key to being a good dispatcher, Redford said. If the dispatcher can remember the location of the drivers, which direction they are travelling and how many people already have been scheduled for a particular taxi, she can arrange the most convenient pickup in the least amount of time.

Lenora Byrne — who has been a dispatcher for one and a half years, and before that, a driver for more than five years — says she prefers dispatching because she enjoys the hectic pace.

About the only time it is slow is during holidays, she said. The day after Thanksgiving and Christmas week are the slowest. Summer is the busiest season, and the peak hours are 9-11:30 a.m. and 2-3:30 p.m.

Working alongside the dispatcher is an operator who answers the incoming calls on a phone system that uses lights instead of bells or buzzers. The telephone ringing is too distracting to the dispatcher.

Both the dispatcher and the operator use headsets and foot pedals to leave their hands free to write and move the magnetic markers on a wall map that keeps track of the drivers.

Green markers, numbered for the different drivers, indicate taxis enroute from one location to another. They are flipped to a red side when the drivers are taking a break, having lunch or otherwise out of service.

As each call comes in, the operator writes down the time of the call, the departure point, destination, the requestor's name, and the number of extra passengers on a dispatch log form. The dispatcher then writes down the taxi number and notifies the driver about the assignment. Time is recorded again when the driver picks up the passenger.

Each form has 27 spaces for requests and with more than 800 calls a day, the dispatcher is often working three full pages of requests

at any given time, Byrne said.

With so many requests, air time for dispatching is valuable; therefore, the dispatchers and drivers use CB number codes to signify everything they do.

"Four, ten ninety-eight, thirty-six," a typical transmission, translated means that driver four has finished his assignment and is located at Bldg. 36.

Bob "Billy Bob" Sanchez is driver four, and he has been driving taxis at JSC for 14 years, first as a civil servant and then for three different contractors since October 1983. For three of those years, he worked as a dispatcher, but Sanchez prefers driving.

There is too much pressure on the dispatcher to do all the scheduling for the taxis, the shuttle, the specials, the drivers' breaks and lunches, and to do it without keeping people waiting, he said. He prefers the slower pace of driving.

Still, Sanchez does the dispatching every day from 4 to 5 p.m. so he can close out the books and make sure that all drivers return safely.

Sanchez also trains all new drivers. Each new driver rides in the front righthand seat the first day or two while Sanchez shows them the routes, discusses safety, teaches them the code system and explains other transportation rules and regulations.

On the third day, Sanchez sits in the righthand seat and helps write down assignments, uses the radio and provides direction if the driver heads the wrong way. The fourth and fifth days, they handle it on their own.

Sometimes new drivers want to pick up a passenger who is not assigned to them. They soon learn not to interfere with the dispatcher and to only pick up the assigned people. Sanchez says some learn the hard way by making mistakes, but they all soon fall into the routine.

Since he has been driving so long, Sanchez knows most of his passengers and good

naturedly jokes with them as he picks them up and delivers them to their destinations.

"I can go to the Riverwalk in San Antonio or go to Seawolf Park and someone will come up and say, 'Hey, Billy Bob, how's it going?'" he said. "I just light up. I can't help it."

In addition to the usual transportation of passengers, there is always something new and different happening. Sanchez has driven specials for John Travolta, Darth Vader and C3PO from "Star Wars," Scottie from "Star Trek," politicians and heads of state. He now lets the newer drivers operate the specials.

Drivers also takes the vehicles in for servicing and washing. They occasionally perform a courier service, sometimes taking documents into Houston to expedite obtaining a passport or to the various consulates to get visas for employees who find out at the last minute they must go on overseas travel.

Walker says it has been difficult trying to balance all the variables and come up with the best service possible while working within the new budget constraints. This presents a real challenge since half the calls are for off-site transportation, which takes longer, he said. The branch also has seen an increase in the number of specials requested.

The transportation branch does much more than provide the taxi and shuttle service. The branch also is responsible for shipping and receiving, from something as small as a few documents to large jobs like shipping hazardous fuels or full-scale mockups.

The branch's other responsibilities include ticketing and writing travel orders, moving office supplies and furniture and providing a special crew of about ten riggers who move heavy (over 5,000 pounds) or very large equipment.

"It's always something different," Walker said. "The shipping is hardly repetitive and then you've got the vehicles, the travel office, the rigging crew and the program support, so you have got a real variety."

"That's why I like my job — the diversity."



Above left: Billy Bob Sanchez approaches Bldg. 1 on one of his many daily trips around the center. Left: Operator Tina Hower, left, and dispatcher Lenora Byrne use magnetic markers to keep track of drivers. Right: Sanchez performs routine maintenance on his taxi.

JSC Photos by Bill Blunck

Annual commendations presented to 111 employees

More than 100 JSC employees will be recognized for their contributions to the center and space program at the annual JSC Honor Awards Ceremony at 2 p.m. today in Teague Auditorium.

A reception will follow in the auditorium lobby for recipients and their guests.

The 111 individuals receiving certificates of commendation are: Irvin S. Alexander, Institutional Quality Engineering Branch; Gay R. Alford, Man-Systems Division; John W. Allen, Human Resources Management Section A; Daniel H. Anderson, Solar System Exploration Division; Howard T. Ashley, Lunar and Mars Program Development and Control Office; Denise L. Baisden, Medical Operations Branch; Thomas A. Baugh, Mission Operations Procurement Branch; John H. Beall, Central Budget Office; Elizabeth S. Beck, Prime Contract Resources Office; Willie S. Beckham, Jr., Mission Management Office; and Donna M. Blackshear, Lunar and Mars Program Development and Control Office.

Also, Kenneth L. Brown, Mechanical Systems Safety Branch; William C. Brown, Control/Propulsion Section; Ivan D. Browne, Solar System Exploration Division; Susan H. Burns, Teleoperated Robotics Section; William L. Burton, Jr., EVA Branch; Marianne C. Campbell, Telecommunications Section; Beth D. Caplan, Lunar and Mars Program Development and Control Office; William R. Chase, Project Integration Office; Charles E. Chassay, Spacelab and Middeck Integration Office; John H. Chisler, Mission Operations Business Management Office; Patricia A. Cobb, Space Shuttle Integration and Operations Budget Office; Alvin M. Cornelius, Procurement Operations Branch; Jan M. Cox, Institutional Network Section; and Betty G. Craig, Data Systems and Aircraft Operations Procurement Branch.

Also, Bonnie S.L. Cruz, Orbiter and Shuttle Integration Procurement Branch; Kelley J. Cyr, Lunar and Mars Program Development and Control Office; Izella M. Dornell, Space Shuttle Integration and Operations Budget Office; Judith E. Durand, Space Shuttle Program Control Office; Glenn M. Ecord, Metallic Materials Section; Richard N. Fitts, Systems Division; James R. Gauthier, Payload Support Integration Section; Robert L. Giesecke, Project Development Office; Teresa Gomez, Astronaut Selection Office; Phyllis F. Grounds, Systems Development Section; Linda J. Ham, Mission Operations Directorate; Ben R. Hand, Ground Support Equipment; Roy E. Hatch, Data Integration Office; and Garland D. Hector, Operations Integration and Verification Branch.

Also, James M. Heflin, Jr., Flight Directors Office; Walton P. Henry, Mockup and Trainer Section; Huey L. Hernandez, Systems and Software Engineering Office; Rosie S. Hernandez, Mission Operations Directorate; John P. Herrmann, Environmental Services Office; James A. Hickmon, Logistics Division; Bruce R. Hilty, Flight Design and Dynamics Division; John C. Hooper III, Systems Branch, Propulsion and Power Division; Friedrich Horz, Solar Systems Exploration Division; Kathleen T. Hosea, Flight Management Office; Donald F. Hughes, Thermal Systems Branch; George A. Jarrell, Mechanical Systems Safety Branch; Lonnie W. Jenkins, Systems Branch, Propulsion and Power Division; Richard T. Jennings, Medical Operations Branch; Harry T. Johnson, Laboratories Office, White Sands Test Facility; Josephine J. Jue, Service Center section; Sam A. Kamen, Payload Integration Office; Edward A. Kasper, Control Center Projects Section; and Kaylene F. Kindt, Data Systems Branch.

Also, Carl L. Kotila, Project Integration Office; Thomas F. Krenek, Aircraft Operations and Material Procurement Branch; William A. Langdoc, Crew Station Branch; Cheevon B. Lau, Operation Integration Processes Section; Ronald B. Lentz, Space Shuttle Operations Assessment Office; Barry M. Levitan, Project Engineering Branch; Rodney L. Lofton, Project Integration Office; Cynthia N. Major, Space Shuttle Support Office; Jane T. Malin,

Advanced Automation Section; C. Stokes McMillan, Flight Evaluation Office; Thomas M. McPherson, Spacelab and Middeck Integration Office; Frank Moreno, Flight Production Management Office; John F. Muratore, Reconfiguration Management Division; Tri X. Nguyen, Flight Systems Design Engineering Office; and Thomas E. Ohnesorge, Operations Integration and Verification Branch.

Also, Gregory T. Oliver, Flight Design and Dynamics Division, Thomas M. Perantie, Space Shuttle Operations Assessment Office; Duane L. Pierson, Biomedical Operations and Research Branch; Elvin B. Pippert, Jr., Flight Activity Branch; James H. Ragan, Flight Equipment Section; Jose F. Rangel, Aircraft Maintenance and Engineering Branch; Katherine T. Rauch, Configuration Engineering Office; Raymond J. Rector, Avionics Systems Engineering Office; Howard L. Renfro, Space Shuttle Program Control Office; Michael L. Richardson, Space Shuttle and Space Station Freedom Payloads Projects Office; Edward J. Ripma, Quality Assurance and Engineering Division; Thomas O. Ross, Mechanical Design and Analysis Branch; and Abelino B. Sanchez, Project Planning and External Affairs Office.

Also, Humberto Sanchez, Communications Section, Training Division; Merri J. Sanchez, Astronaut Office; Mark D. Schmalz, Communications Performance and Integration Branch; Jean E. Schmidt, Software Technology Branch; Walter Scott, Jr., Systems Branch, Propulsion and Power Division; Richard S. Serpas, Payload Safety Branch; Joyce R. Simmons, Legal Office; Richard E. Simms, Mission Integration Office; Robert L. Spann, Project Development Office; John F. Stanley, Solar System Exploration Division; Jane M. Stearns, Data Integration Office; and Boyce E. Sterling, Technical Services Division.

Also, Eugene B. Stewart, Flight Crew Operations Business Management Office; Teresa R. Sullivan, Exchange Operations; Nancy E. Tengler, Loads and Structural Dynamics Branch; Jerry T. Van Horn, Space Shuttle Production Assessment Office; Faith Vilas, Solar System Exploration Division; Rodney O. Wallace, Flight Systems Design Engineering Office; James V. West, Flight Analysis Branch; Deborah A. Wetterstrom, Project Support Resources Office; Charles D. Wheelwright, Crew Interface Analysis Section; Kelly S. Whippo, Flight Production Management Office; Richard D. Whitlock, Lunar and Mars Program Development and Control Office; Donald L. Wiley, Mechanical and Propulsion Systems Section; and Patrick O. Wilson, Instrumentation and Processor Applications Branch.

Phone system expands

Growth at JSC has depleted the pool of 483-telephone numbers and has necessitated the adoption of a new prefix for future expansion.

Five thousand numbers ranging from 244-5000 to 244-9999 will be brought on line, as needed starting Monday, to cover JSC's and Ellington Field's telephone needs.

In addition, all Ellington numbers will undergo a block prefix change this weekend to 244-9600 to 244-9899.

Local JSC or Ellington callers will dial 4-plus the last four digits, while the federal telephone system prefix will be 521-plus the last four digits.

The new prefix does not change the 525 FTS prefix for 483 numbers.

New numbers required at Ellington will be assigned the 244 prefix, while the reclaimed 483 numbers will be reassigned at JSC after a six-month period.

Martin Marietta CEO to chair study group

Vice President Dan Quayle, acting upon the recommendation of NASA Administrator Richard Truly, appointed a chairman for the panel which will study the future of the national space program Wednesday.

Norman R. Augustine, chairman and chief executive officer of Martin Marietta Corp. in Bethesda, Md., since 1987, will lead the group officially titled "Advisory Committee on the Future of the U.S. Space Program."

This committee will advise the NASA administrator on overall approaches NASA management can use to implement the space program for the coming decades, according to Wednesday's announcement from the vice president's office.

The group's task statement calls for committee members to assess alternative approaches and make recommendations for civil space goals including such factors as appropriateness of planned activities, organizational balance and structure, adequacy of overall skill base of work force, balance between

roles of government and private sector, possible contributions by other government agencies, the need to maintain a strong research and development capability and assurance of mission success, the announcement said.

The committee will report its findings within four months. Other members of the 12-person committee will be appointed soon.

Augustine has had a "long and distinguished career in the aerospace industry, government and the engineering profession," according to the announcement from the vice president's office.

He began his career with the Douglas Aircraft Co. in California in 1958, eventually serving as chief engineer. Since then he has served in the Office of the Secretary of Defense, worked with LTV Missiles and Space Co. as vice president for advanced programs and marketing, became assistant secretary of the Army and, in 1975, served as under-secretary of the Army. He joined Martin Marietta in 1977.



Photo by Jack Jacob

Under the guidance of Tom Stafford, Alexei Leonov takes a turn in the commanders seat of the Full Fuselage Trainer.

ASTP crew celebrates anniversary

(Continued from Page 1)

Leonov and Kubasov echoed Stafford's thanks to the people who made the mission a success.

During their visit, the crew and members of their families toured the Space Station Freedom mockup, the Space Shuttle mockup, the Mission Control Center and the Weightless Environment Training Facility.

Kubasov also participated in the signing of an agreement between Gosteleradio (USSR television) and the producers of Houston Public Television's new children's space science series "The Spacewatch Club." The agreement finalizes arrangements for two television projects jointly produced by the Soyuz Society Gosteleradio, PBS and Spacewatch.

The reunion at JSC concluded with an evening reception sponsored by the Space Foundation.

Both the Soyuz and Apollo spacecraft were launched on July 15, 1975. Apollo lifted off about 7½ hours after Soyuz. On its 17th orbit, Soyuz maneuvered to the planned docking orbit about 138 miles above Earth. The successful rendezvous and docking was completed on July 17, 1975, when the Apollo spacecraft gradually piloted toward the orbiting Soyuz.

During the following two days, the crews accomplished four transfer operations between the two spacecraft and completed five scheduled experiments. While the two spacecraft were docked, the crews provided television views of their activities, the interior of the two spacecraft and demonstrated various aspects of space operations.

Successful Atlas-Centaur launch starts CRRES on its mission

The fourth time was a charm for the Combined Release and Radiation Effects Satellite Wednesday when its Atlas-Centaur rocket successfully lofted the satellite into orbit.

Atlas-Centaur-69, built by General Dynamics, lifted off on time at 2:21 p.m. from Cape Canaveral Air Force Station.

About 28 minutes later, CRRES separated from the rocket into a 217 by 22,236 mile orbit.

"Today's successful launch of the sophisticated scientific satellite known as CRRES marks an important step forward in the new way in which NASA is doing business with the private sector

for expendable launch services," said James R. Thompson, NASA deputy administrator.

"Although NASA maintained both direct and oversight and insight throughout the prelaunch and launch process for CRRES, my personal congratulations go out to General

Dynamics, and, in fact, to the entire industry/government team for placing CRRES into its proper orbit where it can now begin a string of strenuous scientific tasks."

CRRES, a joint project between NASA and the U.S. Air Force, holds 24 chemical filled canisters that will be

released starting this fall. Each canister will release barium, lithium and other chemicals in vapor form.

Ultraviolet rays from the sun will ionize the chemicals, creating large glowing clouds, about 60 miles wide, that will spread along the Earth's magnetic field lines.

Recommendations address Freedom maintenance needs

(Continued from Page 1) significant finding of our study," Fisher said, "and it's the largest challenge Space Station Freedom now faces."

Kohrs said the solutions team has not yet looked at reducing maintenance required during the assembly.

Major recommendations include:

- Develop a logistics plan to provide spare orbital replacement units (ORUs) — a generic name for anything from light bulbs to television cameras to thermal blankets that must be replaced when they break — onboard Freedom.

The spares would be on hand at the expected breaking time for various units and could be used in a program of preventive maintenance.

- Treat the station overall with a "facility approach" rather than a "mission approach." Such procedures would include not replacing some non-critical items that break and scheduling maintenance stand-downs when the station would be devoted to spring cleaning or refurbishing above all else.
- Make all ORUs compatible for either robots to change them or for

replacement to be done by hand.

- Decrease spacewalking "overhead," the five hours of time spent getting the crew, tools and ORUs to and from the worksite in order to perform one hour of work in space. The report includes several recommendations to this effect, including separate sets of tools and transportation so two astronauts can do independent tasks; requiring that all ORUs be replaceable by a single crew member in one hour or less, with rare exceptions; and making shapes and

connections as similar as possible.

- Implement an onboard collision avoidance system in the station's robots and a ground control capability for those robots. Collision avoidance would speed the accomplishment of a maintenance task using a manipulator by giving the robot an internal map of the work area, allowing it to know where it is and what it should and shouldn't touch on its own. Ground control would allow flight controllers to remotely perform some maintenance tasks independent of the crew.

The solutions team looked at these recommendations, provided others and took some a step further. Those included updating many of the maintenance requirements to design changes made in Freedom since the Fisher-Price study began, implementing other design changes to make many ORUs more reliable and reducing the total number of ORUs as much as possible.

"We will probably implement a majority of the recommendations," Kohrs said.