



**Special delivery**

The postman only chimes on the quarter hour in Bldg. 32. Story on Page 3.



**Weather report**

JSC's weather forecasters give employees a look at their new operations area in Bldg. 30. Photo on Page 4.

# Space News Roundup

Vol. 31

June 26, 1992

No. 26

## \*U.S., Russia agree to collaborate in space

*Cosmonauts to fly on shuttle; astronauts, shuttle to visit Mir*

By Kelly Humphries

NASA Administrator Daniel Goldin says agreements signed by President George Bush and Russian President Boris Yeltsin last week will pave the way for cosmonauts to fly on a space shuttle mission and for astronauts and the shuttle to visit the Mir space station.

"Our children and their children will look upon yesterday and today as momentous events that brought our peoples together," Goldin said.

The cosmonauts will fly on STS-60, a Spacehab flight scheduled for October 1993. American astronauts would visit Mir in 1993

and 1994, and in 1994 or 1995 a space shuttle would rendezvous and dock with Mir once Russian and American companies work out the technical details, Goldin said.

"There are many, many other possibilities," for cooperation, Goldin said, "but we decided we are going to start slow and get to know each other. The key to it all is the building of bridges between the American space agency and the Russian space agency."

Goldin and Yuri Koptev, the director general of the Russian space agency, signed the first contract between NASA and NPO-Energia, last Thursday.

The one-year, \$1 million contract is for the study of applications of Russian space technology to the Space Station *Freedom* program, and will initially cover three general areas:

- The possible use of the Russian Soyuz TM manned spacecraft and the Progress transport spacecraft in the Space Station *Freedom* program. Of immediate NASA interest is the potential applicability of the Soyuz craft as an interim Assured Crew Return Vehicle.

- The possible use of a Russian automated rendezvous and docking system known as

APAS. This system is now used with the Russian MIR space station currently in orbit and has the potential of serving as a universal docking system.

- The possible use of the MIR space station for long lead-time life sciences experiments in support of the Space Station *Freedom* program.

The formal contract ratification follows a series of technical meetings and negotiations over the past three months between NASA officials and their Russian counterparts at NPO-Energia.

Please see **RUSSIA**, Page 4



The STS-50 crew arrived at Kennedy Space Center on Monday in preparation for launch aboard *Columbia* on the first United States Microgravity Laboratory mission. From left are Mission Specialist Carl Meade, Payload Specialist Larry DeLucas, Payload Commander Bonnie Dunbar, Commander Dick Richards, Mission Specialist Ellen Baker, Pilot Ken Bowersox and Payload Specialist Gene Trinh.

## \*Columbia crew begins science laboratory flight

By James Hartsfield

Despite a poor weather forecast, *Columbia* found the sun Thursday and lifted off at 11:12 a.m. CDT beginning the longest space shuttle flight ever.

Weather forecasts the day before launch had called for only a 50 percent chance of acceptable conditions during the two and a half hour launch window for STS-50. The crew had to wait five minutes for rain showers to dissipate at the shuttle launch facility.

The STS-50 crew — Commander Dick Richards, Pilot Ken Bowersox, Mission Specialist Bonnie Dunbar, Ellen Baker and Carl Meade, and Payload Specialists Larry DeLucas and Gene Trinh — arrived at KSC Monday morning in preparation for the launch. The crew maintained a split sleep cycle during its stay to be ready for around-the-clock operations aboard the United States Microgravity Laboratory-1 module.

*Columbia's* countdown went smoothly except for two troubleshooting operations. Early in the week, two of three Tactical Air Navigation units on the spacecraft were replaced. In addition, technicians reentered the engine compartment late



Please see **LAST**, Page 4

## \*Goldin speaks out on *Freedom*, plans JSC visit today

America needs a laboratory in space — Space Station *Freedom* — so scientists can learn how to protect the health of humans living and working for long periods in space and improve the quality of life on Earth, NASA Administrator Daniel S. Goldin told the National Space Club on Wednesday.

"We can light up the sky with the inspirational work of Space Station

*Freedom*, or we can stand by and watch the greatest technological bonfire of the century if it's canceled.

"We've waited long enough. To keep the next generation of benefits from space flowing back to Earth, America must have a permanent presence in space," Goldin said. "We need Space Station *Freedom* and we need it now."

Goldin will be at JSC today to present special awards to the people who played key roles in the Intelsat VI extravehicular recovery effort on STS-49. He, Acting Deputy Administrator Aaron Cohen and JSC Acting Director Paul J. Weitz are scheduled to present the awards to more than 200 people at 2 p.m. in Teague Auditorium.

The recipients of the specially designed commemorative certificates are all JSC and contractor employees who were selected by their organizations for their extraordinary contributions in developing the alternate space walk plans and procedures for the Intelsat recovery.

NASA Honor Awards also will be presented to the crews of the STS-44, STS-42, STS-45 and STS-49 missions, and NASA World Class Performance Awards will be handed

to representatives from Lockheed Space Operations Co. and Rockwell International.

In Wednesday's speech, Goldin said that despite 30 years of space flight doctors still know very little about how the body reacts in space, since no NASA mission, except Skylab, has lasted more than 14 days. The data from Mir is woefully

to representatives from Lockheed Space Operations Co. and Rockwell International.

In Wednesday's speech, Goldin said that despite 30 years of space flight doctors still know very little about how the body reacts in space, since no NASA mission, except Skylab, has lasted more than 14 days. The data from Mir is woefully

Please see **GOLDIN**, Page 4

## \*Bldg. 100 ready to pass torch to new Bldg. 110

By Kyle Herring

Security operations in Bldg. 100 will cease permanently Thursday and will be relocated to the new badging office at Bldg. 110 beginning the following Monday.

Visitors requiring temporary badges or car passes on Thursday must go to the Bldg. 1 badging office.

The transfer of badging and decal operations also marks the move of checkpoints for entrance onto JSC property.

Beginning July 6, Saturn Lane becomes a public road eliminating the need for a security checkpoint at the Credit Union entrance on Avenue E.

A temporary checkpoint will be located on Avenue E near Third Street in front of Bldg. 1 during the morning rush hour allowing JSC-registered vehicles passage on site.

At other times, Avenue E will be barricaded to prevent through traffic between Second Street and Third Street.

Road widening construction at Saturn Lane and Second Street has begun in earnest and, according to Grady McCright, deputy director of Center Operations, traffic patterns will require adjustment on almost a daily basis until the work is completed in early September.

Please see **TRAFFIC**, Page 4



Construction of the new Bldg. 110 is complete inside and out, and security personnel will begin moving into the new badging building on Thursday.

JSC Photo by Robert Markowitz

## \*Astronaut Creighton to leave NASA, Navy

By Barbara Schwartz

Astronaut John O. Creighton will retire from the U.S. Navy and leave NASA July 15 to work in the Commercial Airplane Group of the Boeing Co. in Seattle beginning on Sept. 1.

Now a Navy captain, he will work as a production test pilot and as an instructor pilot in the customer support area.

Creighton, who was selected for the astronaut program in 1978, is a veteran of three space shuttle missions. He piloted STS-51G, in June



Creighton

JSC

## Ticket Window

The following discount tickets are available for purchase in the Bldg. 11 Exchange Gift Store from 10 a.m.-2 p.m. weekdays. For more information, call x35350 or x30990.

EAA New Braunfels River Raft Trip (8:30 a.m.-10 p.m. July 11, includes transportation, 2-3 hour raft trip, barbecue dinner): \$36. Ticket sales end July 1.

Fiesta Texas Park (San Antonio): adult, \$19.50; child 4-11, \$13.55.

Sea World (San Antonio): adult, \$18.90 (child free with paying adult); child 3-11 \$13.55.

Astroworld, \$16.95 and \$14.95 (child under 54 inches), \$44.95 (season pass) and Waterworld, \$9.50.

Six Flags, \$16.95 (one-day) and \$22.95 (two-day).

Movie discounts: General Cinema, \$4; AMC Theater, \$3.75; Loews Theater, \$4.

Stamps, Walt Disney Club memberships also available.

JSC

## Gilruth Center News

**Sign up policy** — All classes and athletic activities are first come, first served. Sign up in person at the Gilruth Center and show a badge or EAA membership card. Classes tend to fill up four weeks in advance. For more information, call x30304.

**EAA badges** — Dependents and spouses may apply for photo identification badges from 6:30-9 p.m. Monday through Friday. Dependents must be between 16 and 23 years old.

**Weight Safety** — Required course for employees wishing to use the Gilruth weight room is offered from 8-9:30 p.m. June 30, July 15 and July 28. Cost is \$5.

**Defensive driving** — Course is offered from 8 a.m.-5 p.m. July 11, Aug 1 and Aug. 29. Cost is \$19.

**Aerobics** — High/low-impact classes meet from 5:15-6:15 p.m. Tuesdays and Thursdays. Cost is \$32 for eight weeks.

**Exercise** — Low-impact classes meet from 5:15-6:15 p.m. Mondays and Wednesdays. Cost is \$24.

**Aikido** — Martial arts class meets Tuesdays from 6:15-8 p.m. Cost is \$15 per month.

**Softball tournament** — Moonwalk Men's Open C Softball Tournament will be July 25 and 26. Cost is \$95 per team; deadline for registration is 7 p.m. July 23.

**Fitness program** — Health Related Fitness Program includes medical examination screening, 12-week individually prescribed exercise program. Call Larry Wier, x30301.

JSC

JSC

## Dates & Data

### Today

**Intelsat VI awards** — NASA Administrator Daniel Goldin, Acting Deputy Administrator Aaron Cohen and JSC Acting Director Paul J. Weitz will present awards to individuals who played key roles in STS-49, and the to the crews of STS-42, STS-45 and STS-49 at 2 p.m. June 26 in Teague Auditorium. All employees are encouraged to attend.

**Cafeteria menu** — Special: barbecue link. Entrees: deviled crabs, broiled codfish, liver and onions. Soup: seafood gumbo. Vegetables: buttered corn, green beans, new potatoes.

### Monday

**Cafeteria menu** — Special: chili and macaroni. Entrees: barbecue sliced beef, parmesan steak, spare rib with kraut. Soup: French onion. Vegetables: ranch beans, English peas, mustard greens.

### Tuesday

**Cafeteria menu** — Special: corned beef hash. Entrees: meatballs and spaghetti, liver and onions, baked ham with sauce. Soup: split pea. Vegetables: buttered cabbage, cream style corn, whipped potatoes.

### Wednesday

**Cafeteria menu** — Special: barbecue link. Entrees: cheese enchiladas, roast pork and dressing. Soup: seafood gumbo. Vegetables: pinto beans, Spanish rice, turnip greens.

### Thursday

**Cafeteria menu** — Special: chicken fried steak. Entrees: roast beef with dressing, fried perch, chopped sirloin. Soup: beef and barley. Vegetables: whipped potatoes, peas and carrots, buttered squash.

### July 3

**Independence Day** — Most JSC offices will be closed in observance of the July 4 Independence Day holiday. Cafeterias will be open under their mission support schedules.

### July 6

**Cafeteria menu** — Special: meat sauce and spaghetti. Entrees: franks and sauerkraut, sweet and sour pork chop with fried rice, potato baked chicken. Soup: cream of potato. Vegetables: French beans, buttered squash, lima beans.

### July 7

**Expert systems workshop** — JSC's Software Technology Branch and IBM Corp. are sponsoring a series of workshops on verification and validation of knowledge-based systems at the Gilruth Center. The next workshops will be from 8 a.m.-4:30 p.m. July 7, 9, 14 and 16. For more information, call Chris Culbert, 283-8080; Bebe Ly, 283-8072; David Hamilton, 282-3857; or Scott French, 282-8346.

**Cafeteria menu** — Special: smothered steak with dressing. Entrees: beef stew, liver and onions, shrimp Creole. Soup: navy bean. Vegetables: buttered corn, rice, cabbage, peas.

### July 8

**Astronomy Seminar** — The Astronomy Video Tape Series continues during the weekly JSC Astronomy Seminars. "Our Dynamic Sun" with Dr. Eric Priest will be shown at noon July 8 in Bldg. 31, Room 129. For more information, contact Al Jackson at 333-7679.

**Cafeteria menu** — Special: salmon croquette. Entrees: roast

beef, baked perch, chicken pan pie. Soup: seafood gumbo. Vegetables: mustard greens, Italian green beans, sliced beets.

### July 9

**Cafeteria menu** — Special: stuffed cabbage. Entrees: beef tacos, ham and lima beans. Soup: beef and barley. Vegetables: ranch beans, Brussels sprouts, cream style corn.

### July 10

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

### July 11

**Power outage** — A total electric power outage is planned from 8 a.m. July 11 to 8 p.m. July 12 in Bldgs. 1, 2, 3, 4S, 13, 14, 15, 16A, 17, 18, 39A and 110 to allow for preventive maintenance. For more information, call William Gieck at x333135.

**Star party** — The JSC Astronomical Society will host a public star party from dusk until 10:30 p.m. July 11 at Challenger 7 park, if the sky is clear. Observations of the Moon, Jupiter and Saturn are planned. For more information, call John Erickson at 335-4278.

### July 14

**AIAA fair** — The American Institute of Aeronautics and Astronautics Houston Section will host an International Space Activities Awareness Fair from 9 a.m.-5:30 p.m. July 14 at the Gilruth Center. Participants are expected to include representatives of agencies or companies from six continents. For more information, call Chris Burmeister at 333-6866.

## 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. Ads may be run only once. 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: Orlando timeshare, Vistanta Resort, 2 BR, sleeps 8, 1300 sq ft, 2nd floor, screened porch, \$9.9K. Phil, 283-5648.

Rent: Lake Travis cabin, C A/H, private boat dock, accoms 8, wkly/dly, \$425/85. 474-4922.

Lease: League City, The Landing, 3-1-5-1, fenced, miniblinds, no pets, \$600/mo + dep. 486-9811.

Rent: Kissimmee, FL 2 BR condo, 1 mi to Disney World, all amenities, sleeps 4, rental good thru 10/1/92, not a time share, will sell for \$500 OB. Diane, 283-5618.

Rent: Cancun, Mexico, beach-front condo, maid service, can be traded for other resort locations of your choice, \$450. x33185.

Sale/Lease: Clear Lake, Baywind II condo, 1-1, FPL, refrig, W/D conn, \$27.9K/425. x31114 or 486-0898.

Rent: Galveston beach house, D/W, C/A, furnished. Ed Shumilak, x37686.

Sale: Hilltop Lakes Resort, 80 x 120 ft lot, golf, fishing, \$6K OBO. Charlie, 554-6201.

Rent: furn 2 room eff apt in waterfront home near NASA, paid util, ref, avail Jul 1, \$425/mo + dep. Sue, x32767 or 532-1725.

Rent: Condo timeshares, bargain rates, stay almost anywhere, anytime, 474-2857.

Lease: Piper's Meadow, 2-2-2, blinds, fans, gar dr opener, fenced, \$700/mo + dep. Tracy, x32526 or 486-3946.

Lease: Piper's Meadow, 3 BR w/study, DR, 2 car gar, fenced, refrig, W/D, \$860/mo. Jon, 661-3430.

Sale: San Leon, 2 waterview homes, presently rented. 339-1152.

Lease: Webster/Ellington, 2-1 condo, W/D conn, \$450/mo. Dave, x38156 or Eric, x38420.

Rent: Galveston condo, Seawall Blvd & 61st St, furn, sleeps 6, wkly/dly/mly, Magdi Yassa, 333-4760 or 486-0788.

Sale: South Shore, 4-2.5-2A, both formal, FPL, energy eff, gas, cul-de-sac. Tim, x31456 or 538-1596.

Lease/Sale: Nassau Bay TH, remodeled, 4-2-2, master dn, gar, deck, 2-story den, \$1290 negotiable, 1-3 yr lease or \$119.9K. Jerry, x38922 or 488-5307.

### Cars & Trucks

'79 Pontiac Firebird, 20K mi on new 301 V8, A/C, ex cond, \$2750 OBO. 488-6610.

'80 Mitsubishi Galant LS, auto, pwr locks/windows, cruise, AM/FM/cass warr, 29.7K mi \$11,750 nego. 484-9233.

'82 Mazda RX7, 73K mi, AM/FM/cass, sunroof, new paint, 486-4579.

'87 Mazda RX7 turbo, red, new tires, low mi, \$7,900. x36213 or 488-7137.

'86 Toyota PU, eng ex cond, body needs work, \$1.2K. Youm, 283-4813.

'85 Honda Accord LX, 4 DR, AM/FM/cass, AC, pwr windows/locks, 5 spd, pwr steering, cruise, 130K mi, runs good, \$3150. 482-5624.

'82 Proscche 928, 5 spd, sunroof, leather int, CD player, ex cond, \$12.3K. 409-948-1022.

'79 Ford F-100 PU, 3 spd, 6 cyl, runs good, \$1850. 480-7714.

'83 Datsun 280ZX 2+2, low miles, loaded, \$4500. Rick, x37301 or 326-3860.

'79 Honda Accord, new rotor, batt, axle, need motor. 286-6984.

'92 Pontiac Firebird, 305 V8, 3K mi, loaded, tinted windows, alarm sys. Donald, 472-7345.

'90 Ford XL-250, 3/4T PU, 6 cyl, 5 spd, O/D, loaded, 29K mi, ex cond, \$9950. 946-7587.

'81 Cutlass Supreme, ex cond, new headliner, PS/PB, tilt, A/C, mech sound, \$2500. 337-5853.

'86 buick Park Avenue, 4 DR, wht w/blue int, good cond, auto, cruise, PB/PS/PW and locks, \$5500. 332-4942.

'82 Mercury Marquis, 100K mi, good cond, \$1250 OBO. 332-7024.

'91 RV Hyline Travel Trlr, 32 ft, self contained, full screened in awning, \$11K OBO. Charlie, 554-6201.

'88 Ford Ranger XLT, 41K, ex cond, 6 cyl, \$5800 OBO. Terry, x33814 or 486-9760.

'74 VW Bug, 1600cc rebuilt eng, code alarm, tint windows, starting system/brakes need work, \$4000 OBO. Bob, x38615.

'79 Vogue 33' motorhome, orig owner, amenities, \$25K negotiable. 474-3612.

'89 Toyota PU, extended cab, V6, 5 spd, 48K mi, ex cond, \$7.1K. x34794.

'82 Nissan 200SX, loaded, 97K, good cond, \$1650. Michael, x37371 or 480-3329.

'82 Mazda RX7 GSL, 73K mi, AM/FM/cass, sunroof, new paint, 486-4579.

'87 Mazda RX7 turbo, red, new tires, low mi, \$7,900. x36213 or 488-7137.

### Boats & Planes

14' extra wide John boat w/new galv trlr, comp w/15HP Johnson O/B, depth finder, trolling motor, livewell aerator, seats, \$1275 OBO. David, x37812.

17' Classic Wood, lap strake constr, 65HP Mercury, Sportsman trlr, \$2K. Bill, x35420 or 326-1020.

Windsurfer, Mistral Malibu w/mast, boom, sail, \$450; aluminum mast, \$50; Windsurfing Hawaii mast base, \$30. Rick, x37301 or 326-3860.

17' Dolphin sailboat, sloop w/main and jib, accessories, trlr, ex cond, \$1650. 474-4136.

25' McGregor sailboat, trlr, radios, engine, \$5500. Kevin, 486-6411 or 480-8828.

16' Invader, walk-thru windshield, 115HP Evinrude, ski equip, McClain trlr, new registration, ex cond, \$3950. 482-5837.

### Cycles

26" Motobecane 10 spd racing bicycle, \$550. Chuck, 282-8200.

\$75 OBO. 486-1102 or 282-5239.

Schwinn Sierra mountain bike, 15 spd, Shimano components, good cond, \$300 OBO. Allen, x31188.

Raleigh Rapide 10 spd bike, good cond, \$75 OBO. Walt, x36353.

'85 Honda Elite 80cc scooter, ex cond, wht, 32K mi, 100 mi/gal, \$750 OBO. Nina, x34771.

'86 Yamaha 700 Maxim-X, one owner, 72K, garaged, \$2650. 482-5837.

### Audiovisual & Computers

HP-425 scientific RPN calculator, \$85. Carol, x34279 or 286-7619.

Pioneer turntable, fully auto model PL-L800, PLL direct drive, linear tracking graphite tone arm, all manuals, access, packing, \$40. Tom Clark, x49842.

Atari 520ST keyboard, CPU, disk drive, monitor, ST Basic, games, disks, manuals, \$200. 480-3478.

Apple II computer, int/extl FD, BO. Walt, x36353.

Notebook computer, 386SXL, 25 MHz, 4MB RAM, 7 lbs. 80 MB HD, SCSI interface, VGA, AC and car adapters, case, manuals, \$1719. 482-8672.

Pioneer receiver, 4 spkrs, nonworking Sanyo turntable, \$75; Lobo Max-80 computer, 64K, CP/M or DOS OS, 8" drive, some software, \$75; Hayes Smart-modem, \$50; Epson FX-80 printer, \$75; Gorilla mono monitor, \$25, all hardware manuals. Ronnie, x32539 or 538-1649.

Borland Paradox 3.5 database, \$175 OBO; Quattro Pro 3.0 spreadsheet, \$100 OBO; Norton Anti-Virus, \$50 OBO; all complete w/manuals, registration cards. Martin, x45338 or 488-0949.

Photographic

Canon AE-1 Program 35m camera w/50mm lens, 70-210mm zoom lens, motor drive, Sun Pack flash, filters, case, \$400. 480-3387.

Darkroom equip, Bessler-23C enlarger, color head adaptable, timer, bulk loader, \$400. Eileen, 282-3812 or 280-9346.

Nikonos V underwater camera, 35mm lens, 17mm lens, wide angle viewfinder, SB-103 strobe, needs repair and chord, Ikelite substrobe-S, full set macro tubes, framers, UR/Pro filter, hard case, \$875. Kevin, 480-0828 or 486-6411.

### Pets & Livestock

Need AKC male boxer to breed w/female in 2-4 mos, you get pick of litter. 474-2660.

Persian kittens, blk, blue, wht, cream, grand champion bloodline, \$225-\$400; stud service, championed males, blk, cream, fee nego. Kristy, x31468 or 286-0146.

Jack Russell Terrier, female, 7 mos old, all shots, AKC eligible, \$175. 334-7006.

### Musical Instruments

Rickenbacker bass guitar, wht w/blk hardware, ex cond, both orig, Seymour Duncan pickups, \$550. Chuck, 282-8200.

Yamaha PSR-48 keyboard, 100 voices, 100 rhythms, good piano sound, MIDI, custom drummer, \$300. Mike, x30758 or 480-5903.

5 pc drum set w/hardware \$200. x35180 or 326-3706.

Yamaha upright piano, 46", less than 3 yrs old, \$3.9K negotiable. Lam or Irene, 480-3743.

### Household

Kenmore 1.7 cu ft refrig, was \$100, now \$50. 488-6610.

Refrig, ex cond, 3 yrs old, \$250. Frank, x37717 or Kimberly, 286-3513.

Sofa bed, \$375; kitchen table, \$100; VCR \$70; TV stand, \$35; full sz bed, \$100; 2 bar stools, \$5/ea; exercise bike, \$60; standing lamp, \$20; vacuum, \$50. Rick, x37301 or 326-3860.

1916 RCA Victrola record player, good cond, \$250; drop leaf table w/4 chairs, center storage, English walnut, \$750. 333-6943 or 409-948-3039.

Lg solid oak dining table, seats 6, cushioned chairs, \$250. Kimberly, 283-5166 or 534-2815.

Living rm furn, sofa, chair, ottoman, coffee table, end table, 2 lamps, \$250 OBO; 40 channel CB radio w/antenna, \$40; solid wood coffee table, \$50; dog pen, 6 x 3 x 6, \$50. Terry, x33814 or 486-9760.

Dropleaf table, \$150; cedar chest, \$145; dining table, 4 chairs, \$200; wicker changing table, \$40; antique kitchen table, \$50; Hoosier cabinet, aquarium, \$40. 339-1152.

Hand made, 15 yr old, 8' Henry Don sofa w/duck feather stuffing, needs reupholstering, \$150 negotiable; drop leaf kitchen table, 2 chairs, \$50; 6 x 4 ft dark wood bookcase, \$20. x38373.

Wanted

Want to buy used Boy Scout packs and clothing, 326-2307.

Want British motorcycles, BSA, Norton, Triumph. 282-5570 or 585-6267.

Want ride from Hwy 3 and Pineloch to NASA. x37942 or 280-8741.

Want m/f roommate to share lease on 2-2 apt, 1 mi from NASA, \$310 + 1/2 util, avail 8/1. Tom, 333-7820 or 286-5136.

Want cheap work car, minor repairs ok. Phil, 280-2239 or 333-1017.

Want students to join a Russian language class taught by Rice Univ professor, beginning/ intermediate level w/at least a few months exp. Rick, x36042 or Keith, x38024.

Want singer for rock band, varied influences, everything from Johnny Rivers to Nirvana, no metal, some blues, must be able to practice twice a week and gig 1 or 2 wknds/mo. Chuck, 283-8290.

Want motorhome to rent, July 10-16 for business related trip. x36435 or 474-2857.

Want responsible single female to share house in Sunset Meadows, 2-story, 3-4/2.5-2, pool, playground, parent w/child OK. Cindy, 992-4657.

Want motorhome to rent, July 10-16 for business related trip. x36435 or 474-2857.

Want responsible single female to share house in Sunset Meadows, 2-story, 3-4/2.5-2, pool, playground, parent w/child OK. Cindy, 992-4657.

Want responsible single female to share house in Sunset Meadows, 2-story, 3-4/2.5-2, pool, playground, parent w/child OK. Cindy, 992-4657.

Want responsible single female to share house in Sunset Meadows, 2-story, 3-4/2.5-2, pool, playground, parent w/child OK. Cindy, 992-4657.

Want responsible single female to share house in Sunset Meadows, 2-story, 3-4/2.5-2, pool, playground, parent w/child OK. Cindy, 992-4657.

Want responsible single female to share house in Sunset Meadows, 2-story, 3-4/2.5-2, pool, playground, parent w/child OK. Cindy, 992-4657.

Want riders for van from Loop 610/ Braeswood to JSC and offsite contractor facilities. Ed, x36124.

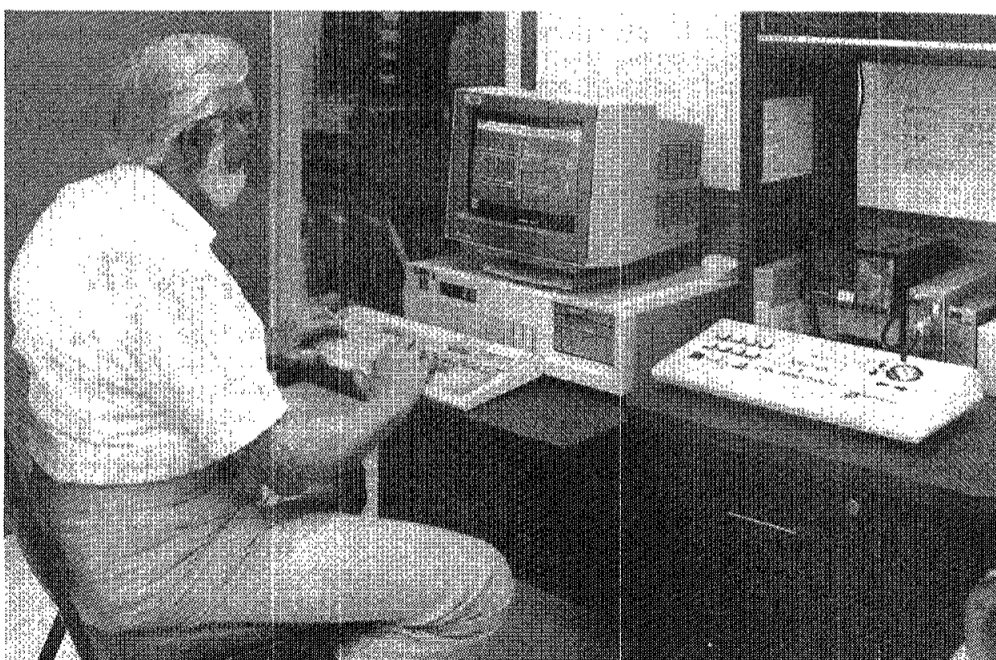
Want apt/condo, move in Aug/Sept, consider 1-2 BR in Clear Lake area. Phil, 280-2239 or 488-7090.

Want female roommate, nonsmoker, to share a 3-2.5-2 house in Lakeside, \$370/mo incl util + 1 mo dep. Ann, 282-3790.

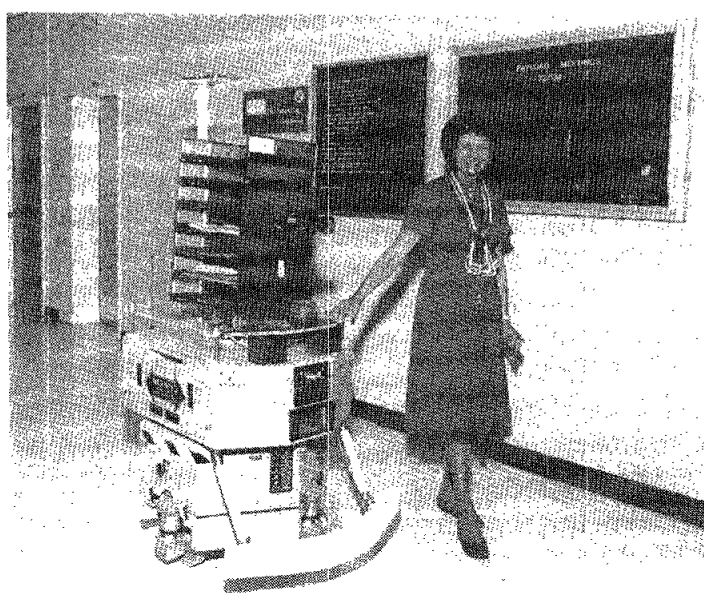
Want car/vanpool from Heights to JSC. x35785 or 861-6646.



Above: Lockheed robotics engineer Bill Cravers makes an adjustment to "Jasper" between mail runs. Cravers assists Project Engineer Don Rhoades with fine-tuning the robot's software. Jasper delivers mail to six branch offices seven times a day, and, in a year of service, has proven extremely reliable. Right: Sharon Williams, secretary for the Robotics Systems Technology Branch in Bldg. 32, loads mail into the Mail Delivery Robot. Below: Rhoades works on the personal computer in his office that is used to track and command the robotic mailman. A television monitor displays the view from a camera mounted on the robot, and a map of the building on the computer displays its current location. Bottom: Connie Alexander, a counselor who heads the Employee Assistance Program on the first floor of Bldg. 32 and is blind, can tell where the robot is by listening for music from its stereo and a chime clock. She's affectionately named her mechanical coworker "Jasper."



JSC Photos by Benny Benavides



# Computerized Courier

## Mail delivery robot a living laboratory for studying how machines, humans interact

By James Hartsfield

In Bldg. 32, neither snow, nor rain, nor heat, nor gloom of night stays a certain courier from the swift completion of his appointed rounds, and about all that could be a very rare software glitch.

In fact, this mailman makes seven rounds a day, never gets sick, never gets tired, is never daunted by sometimes taunting coworkers, just heads down the hall, complete with soft music playing from an implanted AM/FM cassette stereo.

It's a robot. To its project engineer, robotics engineer Don Rhoades and the other engineers in the Robotics Systems Technology Branch, it is known as the Mail Delivery Robot. But by the branch's neighbors in the Employee Assistance Program, it's been affectionately dubbed "Jasper." As it cruises along from stop to stop, day after day, it is paving the way for future robots that may explore the solar system.

"The idea is to study the interaction between humans and robots, study various robotic navigation techniques and see just how reliable a robotic device can be when it's used day after day," Rhoades explained.

By taking the robot out of the laboratory and into open hallways to encounter not only robotics engineers but a wide variety of JSC employees and visitors, Rhoades has created a living laboratory for studying robot and human interaction.

"One thing about this robot that is unique is that most robots on the market today require some type of modification to a building for navigation, like a wire in the floor, an ultraviolet strip, or bar codes on the wall. This one uses strictly a coordinate system of the building. It keeps up with how many times the wheels and steering gears have turned, and it allows us to operate without any modifications to the building."

Jasper the Mail Delivery Robot has been delivering the mail to the first floor offices of the Automation and Robotics Division in Bldg. 32 for a year. And it's proven extremely reliable, without any major failures, Rhoades said. The robot became operational in March 1991, after a Cybermotion robot base was refurbished and a Navmaster navigation turret was mounted to it. Bill Craver of Lockheed and Rhoades wrote a special software package for the PC at the robot's control console in Rhoades' office.

"We started out the project just driving the robot around the building, and then somebody came up with the idea of, 'Why not make it practical by letting it deliver the mail?'" Rhoades said.

Jasper's home is a stall in the lobby of Bldg. 32, where it plugs itself into its battery charger at the end of the day. On each run, Jasper heads first to the branch office, where mail is placed in its trays. Then it makes six stops at various offices around the building, announcing its arrival with a beep. With the five minutes it waits in the branch office, and two minutes waiting at each mail stop, the total run takes about 25 minutes. "All we have to do in the morning is turn it on and load the software, then it's automatic all day long," Rhoades said.

Jasper's equipped with six ultrasonic sensors, two in front, two in back, and one on either side. They track the walls and any obstacles, and continually correct its navigation. An infrared beacon helps it align with its battery charger when it plugs in. A video camera transmits the images in front of Jasper back to a monitor in Rhoades' office, using an antenna specially designed for it by

the Tracking and Communications Division. And the onboard computer has two-way communications with a PC in Rhoades' office, displaying its status and location on a map of the building. Commands are sent to the robot via the PC.

A special airbag bumper in front of the robot acts as a backup to the ultrasonic collision avoidance system. Designed by Raul Zepeda in the Crew and Thermal Systems Division, it stops the robot with the slightest touch in case it runs into an obstacle. If the ultrasonic sensors detect an obstacle in its path that it can't swerve around, Jasper beeps and patiently waits. If after a few minutes, the obstacle hasn't cleared, it shuts down.

When the robot shuts down, it phones home. A remote command transmitted to an auto dialer dials a pager that Rhoades wears, and gives the message, "Your Mail Delivery Robot has shut down. Please take the necessary action."

"This pager works all over JSC," Rhoades said. "But, of course, it doesn't tell me who or what it bumped."

Thus the human interaction study — after a year of service, Rhoades said most employees in the building no longer take notice of the robot as it makes its rounds. "It's just like somebody walking down the hall," he said. "The only ones that notice it now are people who may be coming into the building that haven't seen it before,

*The idea is to study the interaction between humans and robots.*

— Don Rhoades



especially if they come in right at the top of the hour, when it starts up for its routine run and heads out of the lobby with no one around."

At first, some employees were apprehensive of the robot. Others were a bit intimidated, Rhoades said. "And there's a band of disrupters who play with it a little. It's been real entertaining for them," he added. "Some make it stop and beep for a while."

One Bldg. 32 first-floor tenant who had special problems with Jasper was Connie Alexander, the counselor who heads the JSC Employee Assistance Program and is blind.

"It was very disturbing at first," Alexander explained. "It's run times weren't consistent, it ran so quietly I couldn't tell if it was coming or going, and it ran down the center of the hall."

To aid the matter, a stereo was added to Jasper, playing music whenever its in motion. Also, his path was changed to move down one side of the hallway, and it adheres to a schedule of one run each hour between 9 a.m. and 3 p.m. And a chime clock that strikes the hour to announce the beginning of each mail run was added.

"I only have a problem with it now when it isn't running on schedule. With the chimes, I always know when it is about to start and where it's going," Alexander said. "It's been really interesting. I'm still cautious about it. I dare say there are not a lot of blind people who work with robots — it's been unique." Alexander, in fact, coined the name Jasper for the robot "for no specific reason; I just called it that once," she said.

Jasper has more improvements in store: a voice system that will allow it to announce its arrival at each stop with a human voice and, when required, request — "courteously, at first," Rhoades said — that people blocking his path move; and a system that will automatically pan the onboard camera toward passers-by. In the Bldg. 9 Robotics Lab, an identical robotic base is being outfitted with sensors, range-finders and artificial intelligence that will allow it to maneuver through the unknown.

"It will be able to enter a building and draw its own map," Rhoades said. □

# JSC inventors receive awards for patent grants

Thirty-three of JSC's creative minds were honored last week at the fifth annual JSC Inventor's Luncheon.

The awards were presented by Robert Kempf, NASA associate general counsel for intellectual property, and Dan Nebrig, JSC associate director.

Kempf said patents are important to NASA because they foster further commercial development of the

agency's experimental, research, developmental and engineering activities and assure that the results of those activities are put to practical, beneficial use.

"However, we should not lose sight of where it all begins — through the personal dedication, creativity and often times plain old hard work of individuals such as those being recognized here today," Kempf said. "The type of contribu-

tions being recognized here today, and most importantly the people responsible for them, is the best evidence I know of that NASA is indeed an investment in the future.

The inventors were recognized for receiving patents for their JSC inventions, and presented with plaques that depicted the first pages of their patents.

Among those honored this year was Dr. David Wolf, who was

named NASA's Inventor of the Year for 1991 for his work on the a new class of horizontally rotating tissue culture systems, known as bioreactors.

Other recipients included: Jimmy D. Bradley, Christopher J. Cerimele, Burton G. Cour-Palais, Jeanne Lee Crews, Hatice S. Cullingford, Frederic S. Dawn, Peter M. Fantasia, Thomas J. Graves, Richard D. Juday, Jon B. Kahn,

Steven L. Koontz, Joseph J. Kosmo, Kumar Krishen, Leo G. Monford Jr., Brian G. Morris, Dennis R. Morrison, Wayne L. Peterson, Andrew J. Petro, Robert D. Ried Jr., Brian Ross, Michelle A. Rucker, Richard L. Sauer, William C. Schneider, Philip L. Sheridan, Michael Stagnaro, Joel M. Stoltzfus, Scott A. Swan, William E. Thornton, Wallace C. Tuthill, Richard T. Walter, Dennis L. Wells and George A. Zupp.

## Employees' children earn scholarships

The sons and daughter of three JSC employees will receive up to \$4,000 toward college as winners of 1992 JSC Exchange Scholarships.

This year's winners are Karl Josef Fulbright, the son of Ben E. Fulbright of Mission Operations' Operations Integration and Verification Branch; Christi Lynette Grizzoffi, the daughter of Diane L. Grizzoffi of Mission Operations' Space Station Operations Division; and Mark Davin Perantie, son of Thomas M. Perantie of Administration's Space Shuttle Program Control Office.

Fulbright is a 1990 graduate of South Houston High School who has completed two years at San Jacinto College and a summer program at Berklee College in Boston. He plans to enter University of North Texas in July as a jazz studies and education major.

Grizzoffi is a May 1992 graduate of J. Frank Dobie High School and is planning to attend Baylor University as a pre-med major.

Perantie, a May 1992 graduate of Clear Lake High School, plans to major in electrical engineering and computer science at the University of Oklahoma.

The NASA Exchange-JSC Scholarship program began in 1967 and provides up to \$1,000 a year for four years for the dependents of JSC employees to attend any college or university.

Winners are selected on the basis of their overall scholastic achievement, the extent of their financial need, and the breadth and substance of school and community activities.

## Mission Control viewing room, cafeteria hours

The Mission Control Center viewing room will be open to JSC and contractor badged employees and their families during portions of the 13-day STS-50 mission.

Employees will be allowed to visit the MCC today, from 11:30 a.m.-2:30 p.m.; Saturday and Sunday, from 1-4 p.m.; Monday, from 11:30 a.m.-2:30 p.m. and 5-7 p.m.; Tuesday and Wednesday, from 11:30 a.m.-2:30 p.m.; Thursday, July 2, from 11:30 a.m.-2:30 p.m. and 5-7 p.m.; Friday, July 3, Saturday, July 4, and Sunday, July 5, from 1-4 p.m.; Monday, July 6, from 11:30 a.m.-2:30 p.m. and 5-7 p.m.; and Tuesday, July 7, from 11:30 a.m.-2:30 p.m.

Employees must wear their badges and escort family members through the regular public entrance on the northeast side of Bldg. 30. Children under 5 will not be permitted. No flash photography or loud talking will be permitted at any time.

Because of the dynamic nature of shuttle missions, viewing hours may be changed or canceled without notice. For the latest information on the schedule, call the Employee Information Service at x36765.

Special cafeteria hours also will be in effect during the mission.

The Bldg. 3 cafeteria will be open from 7 a.m.-4 p.m. weekdays, except launch day, and from 11 a.m.-4:30 p.m. weekends and holidays. The Bldg. 11 cafeteria will be open from 6:30 a.m.-2 p.m. weekdays, except launch day, and 7-10 a.m. weekends and holidays.



JSC Photo by Benny Benavides

**WEATHER REPORT**—Meteorologist Doris Rotzoll shows Flight Director Phil Engelauf around the new operations area for shuttle weather forecasters. The National Weather Service's Spaceflight Meteorology Group showed off its new operational area in Bldg. 30, Rm. 239 last week.

## Clean out refrigerators

# Power outage to affect many JSC buildings

All electric power will be cut off to 12 JSC buildings July 11 and 12 to allow technicians to perform essential preventive maintenance and ensure the reliability of high-voltage electrical switching gear.

The power outage in Bldgs. 1, 2, 3, 4S, 13, 14, 15, 16A, 17, 18, 39A and 110 will be from 8 a.m. July 11 to 8 p.m. July 12, said Keith McQuary, chief of the Center Operations Directorate's Plant Engineering Division.

During the weekend outage, there will be no lighting or air conditioning in the affected buildings. Occupants are asked to review their areas and take action to secure equipment that could be adversely affected by the outage.

All refrigeration equipment, with the exception of that in Bldg. 3, will be without power, so perishable foods should be removed. Ice and frost accumulations also should be removed from the freezers.

For more information, call William Gieck at x33135.

## Traffic changes may inconvenience some employees

(Continued from Page 1)

"We are going to do everything we can to minimize the impact on employees," he said.

Once completed, Saturn Lane will be four lanes from Bay Area Blvd., curving all the way to a new intersection with NASA Road 1 across from the Nassau Bay City Hall. Second

Street will be six lanes wide from its three-way intersection with the new Saturn Lane to a point across from Rocket Park.

"We recognize it will be somewhat inconvenient for employees," McCright said, suggesting that whenever possible while the road work is in progress, employees should enter

and exit through another gate.

"We recommend to all employees, if reasonable, to change their entry and exit habits" for the time it takes Metro to finish the road widening project, he said.

Security Specialist Debra Griffin said that the actual construction work will dictate traffic flow patterns and

traffic management on Saturn Lane, Second Street and Avenue E.

"We are planning to be flexible in order to maintain the best traffic flow patterns possible," she said.

At least one inbound and one outbound lane should be open at all times on Saturn Lane and Second Street, she added.

## Last-minute repairs help Columbia get off launch pad

(Continued from Page 1)

Tuesday to replace a temperature sensor in a liquid oxygen line for the main engines. Both operations were accomplished without stopping the countdown clock.

Next door, on Launch Pad 39B, preparations of *Atlantis* for a late July launch with the Tethered Satellite System continued. *Atlantis*

was powered down Wednesday for *Columbia's* launch and will now be repowered with preparations beginning in earnest. Earlier, the cargo bay doors were closed and the cavity between the orbiter and fuel tank was purged.

Elsewhere, in the bay 3 processing hangar, work continued to ready *Discovery* for a September launch

with the Japanese Spacelab. Technicians tested the Ku-Band antenna following a failure in the system during STS-49, the spacecraft's last flight; removed the three main engines for servicing; and completed tests of the electrical systems.

In the Bay 2 processing hangar, *Discovery* is in the midst of six months of upgrades and inspec-

tions prior to its next space flight, STS-53, a Department of Defense mission set for a November launch. Workers checked out *Discovery's* Ku-band antenna, tested the water spray boilers which cool the spacecraft's hydraulic power systems, inspected the main engine plumbing, and flushed the ammonia cooling system.

## Goldin says STS-50 is bridge to space station era

(Continued from Page 1)

inadequate, because their research capabilities just aren't there.

"Before astronauts can live on the Moon, or travel to Mars, or even spend months in orbit, we need to find out how to counteract the debilitating effects of zero and partial gravity. And the only place to learn about operating for long periods in space is in space," Goldin said.

In weightlessness, muscles deteriorate, there is a reduction of red and white blood cells, there is a loss of bone mass and sensory problems

with integrating information.

"The rate of bone loss in space is ten times as great," Goldin said. "On Earth, we call this osteoporosis. Twenty-million American women suffer from it. Finding how to counteract it could bring relief to those women."

In a country that focuses all too often on the short term, NASA is the one of the few agencies dedicated to our future, he said. About \$2 billion of NASA's budget is for space station.

"Sounds like a lot until compared

with the \$6.3 billion Americans spend on pet food each year, or the \$4.3 billion we spend on potato chips, or the \$1.4 billion for popcorn," Goldin added.

Goldin said the United States Microgravity Laboratory-1 mission, which contains first-class experiments to learn the molecular structure of viruses and diseases, illustrates the importance of Space Station *Freedom*.

"We'll be examining the structure of new drugs, blood cells, antibodies and enzymes that control bodily

functions. One experiment will try to find out what makes bacteria resistant to penicillin, so scientists can make 'tougher' penicillin against infections," he said.

During *Columbia's* 13 days in orbit, NASA also will grow "crystals" of proteins in the AIDS virus.

"Researchers will grow crystals of the proteins in the AIDS virus and its antibody. By understanding their molecular structure, we hope to speed the research for drugs that will interrupt the virus' vicious cycle of destruction," he said.

## Creighton to retire from Navy, become Boeing pilot in Seattle

(Continued from Page 1)

1985, on which communications satellites were deployed for Mexico (Morelos), the Arab League (ArabSat), and the United States (AT&T Telstar). He was commander of Department of Defense flight STS-36, launched Feb. 28, 1990. He also commanded STS-48 in September 1991, on which the Upper Atmosphere Research Satellite was deployed.

"I have thoroughly enjoyed my time at NASA and especially working with the outstanding people here. I

feel privileged to have flown on three shuttle missions—each unique and rewarding, but then comes a point when it's time to look for a new and different challenge. I am looking forward to returning to Seattle, where I grew up, and to beginning my new career at Boeing," Creighton said.

"Our loss is Boeing's gain—they're getting a terrific pilot and a seasoned aerospace pioneer," said Flight Crew Operations Director Don Puddy. "We will miss him but wish him continuing success as he pursues his new career."

## 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.

Dates and Data submissions are due Wednesdays, eight working days before the desired date of publication.

Editor ..... Kelly Humphries  
Associate Editor ..... Kari Fluegel

## NASA, Russia to cooperate in Earth orbit

(Continued from Page 1)

Located in a Moscow suburb known as Kaliningrad, NPO-Energia is a quasi-independent company of some 30,000 employees responsible for design and development of many of the key elements of the Russian manned space program.

Yuri Semenov, the chief designer of the Russian Buran space shuttle, is director of NPO-Energia.