

# Space News Roundup

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No. 4

## JSC experiment puts the spin in Spacelab

By Kari Fluegel

*Discovery's* crew is going for a spin in the Spacelab module during STS-42 — literally.

Amid the experimental racks in the orbiting laboratory is a rotating chair used as the primary tool in an international investigation of the effects of microgravity on the human orientation system.

The Microgravity Vestibular Investigations, led by JSC Senior Scientist Millard Reschke, is a cooperative effort joining 20 investigators representing major universities and research facilities from five countries.

"As long as NASA's priorities remain for a manned presence in space and for the

space station and for perhaps for trips to the Moon and Mars, it's necessary to study man's adaptability to a new environment," Reschke said. "Space represents a unique new environment to most human beings."

Past space-based research has demonstrated that the body's systems adapt to microgravity in unique and varying ways.

The vestibular system, which is involved in the control of fine, skillful movement, uses the stimulus of gravity and the motion-detecting organs in the inner ear to provide input to the brain for orientation. In the absence of gravity, however, input from the sensors is changed, prompting the nervous

systems to develop a new interpretation of the stimuli.

The human body, according to Reschke, does not have five sensory systems but seven — the sixth indicating if and how fast a person is spinning and the seventh indicating if the individual is tilted relative to gravity, and when an individual's motion along a straight line starts or stops. In the absence of gravity, the seventh system no longer provides tilt information.

All the sensory systems are integrated in the brain to coordinate the individual's reactions to various stimuli. When one sensory system is disrupted, a motion sickness-like

response may be triggered.

"Typical responses include motion sickness, vertigo, a disruption in the postural equilibrium or a disruption in the fine skillful movements a person makes," he said.

MVI will provoke interactions among the vestibular, visual and proprioceptive systems to measure the perceptual and sensorimotor reactions so scientists can study the changes that are keys to the adaptation process.

For the investigations, the STS-42 crew members will be placed in a rotating chair with a helmet assembly outfitted with accelerometers to measure head movements and

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## Metrication group plans first meeting

The newly formed JSC Metrication Committee will weigh in next week with its first scheduled activity under the official JSC metric transition plan approved in November.

The committee, chaired by Joe Maloy of the Engineering Directorate, will begin to address its first task — developing detailed directorate-level transition schedules. The schedules will communicate requirements agreed to in the JSC Metrication Plan and should be in place by the end of March. The schedule calls for JSC to complete as much institutional transition as possible by fiscal year 1997.

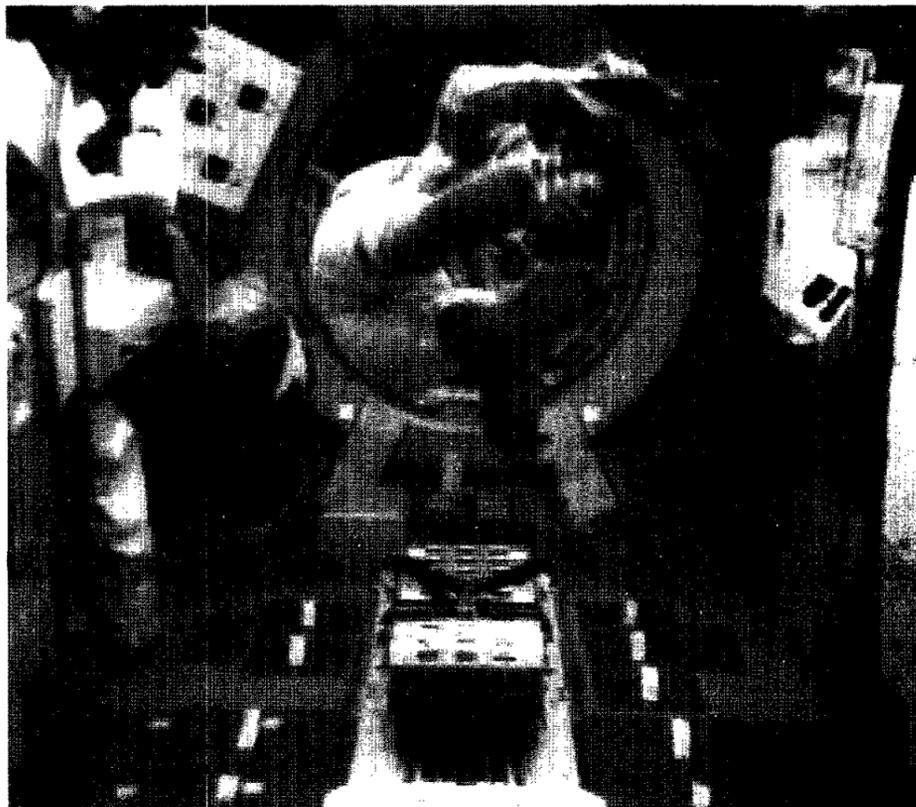
"President Bush's recent trip to Japan is a reminder than in a world of European Community '92 and international trade agreements, metric capability means economic competitiveness on a national level for the United States," Maloy said.

It was awareness of such competition that led Congress to enact the Omnibus Trade and Competitiveness Act of 1988 that requires NASA and other agencies to lead the way for public conversion, Maloy added.

The committee's first meeting will be from 2:30 to 4:30 p.m. Jan. Tuesday in Bldg. 13, Rm. 156.

The committee first will try to "change JSC employees' workday thinking from inches and gallons to meters and liters."

Other committee members are G.E. Van Zandt, AH; G.E. Huff, BD3; J.D. Powell, DP3; J. Woodfill, IA121; E.S. Smith, KC; J.E. McGhee, PT2; B.R. Sheegog, SP4; R.J. Etchberger, BD311, L.R. Neu, CC5; J.E. Pouzar, JA111; M.A. Prebilsky, ND58; and T. Estes, White Sands



NASA Photo  
STS-42 Payload Specialist Roberta Bondar floats above the International Microgravity Laboratory's sled device during Spacelab activation. The sled is being used as part of the Space Adaptation Syndrome Experiments, measuring changes in the otolith organs that provide humans with a sense of up and down.

## No official STS-42 homecoming planned

JSC is not planning the usual official homecoming ceremony for the crew of STS-42 because of the staggered return schedule caused by extensive post-flight medical examinations for some crew members.

Rather than holding multiple ceremonies — if the landing is at Edwards Air Force Base in California as planned, crew members will return at several different times — the routine post-flight employee briefing in Teague Auditorium will double as a welcome home for the whole crew.

The STS-42 employee briefing is tentatively scheduled for 3 p.m. Feb. 10. That date could change based on the final duration of the flight and other post-flight schedule items.

Employees and the public will be allowed to greet the crew members as they arrive at Ellington Field's Hangar 990, but without the benefit of an orchestrated ceremony. Arrival times will be listed on the Employee Information Service, x36765, when they become available.

## Discovery crew begins IML-1 work

By Kelly Humphries

The Space Shuttle *Discovery* thundered into orbit Wednesday morning, beginning a seven-day odyssey of microgravity science and multinational cooperation.

Lift-off from Kennedy Space Center's Launch Pad 39A was at 8:52 a.m. CST, 59 minutes after the opening of the window. The launch was delayed by concerns about a brief abnormal fuel cell reading, indications that there might be an unacceptable risk of lightning in the area and advancing high clouds.

If the mission goes as planned, landing will be at 10:04 a.m. CST Wednesday at Edwards Air Force Base in California.

After the launch team had resolved each concern in what KSC Director Bob Crippen called a "very professional, safe count," *Discovery* and its crew began their ride to a 57-degree inclination, 163 nautical mile orbit.

Preparations to activate the Spacelab module and begin the first International Microgravity Mission's research began shortly after the crew was given the "go" for orbit operations.

The crew quickly transformed the shuttle and Spacelab module into an orbiting laboratory that will perform some 42 experiments designed with contributions from more than 200 scientists in 14 countries. Many of the investigators gathered at the Spacelab Mission Operations Control facility at Marshall Space Flight Center, where they will work closely with the crew sharing information, monitoring data and taking advantage of unexpected research opportunities.

The crew split into its two shifts soon after launch when the red team — comprised of Mission Specialists Bill Raddy and Dave Hilmers and Payload Specialist Ulf Merbold of the European Space Agency — began its

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## Hubble finds massive black hole

### Hole could hold 2.6 billion Suns

Astronomers report they have found intriguing evidence that a black hole — 2.6 billion times more massive than the Sun — exists at the center of the giant elliptical galaxy M87.

Images taken by NASA's Hubble Space Telescope show that stars become strongly concentrated toward the center of M87, as if drawn into the center and held there by the gravitational field of a massive black hole.

The results were reported at the 179th meeting of the American Astronomical Society in Atlanta by Dr. Tod R. Lauer, National Optical Astronomy Observatories, Tucson, Ariz.; Dr. Sandra M. Faber, University of California, Santa Cruz; Dr. C. Roger Lynds, NOAO, and other members of the HST Wide Field/Planetary Camera Imaging Team.

Lauer emphasized that the HST images alone do not prove conclusively the black hole's presence.

"It looks like a 'duck' but we haven't heard it 'quack' yet," he said.

Follow-on HST spectroscopic observations are needed to measure the velocity of stars orbiting within the

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### Young star clusters also found

NASA's Hubble Space Telescope has provided intriguing new clues to cataclysmic events in the history of a peculiar galaxy some 200 million light-years from Earth.

Astronomers have discovered about 50 bright objects at the center of galaxy NGC 1275 that appear to be young massive globular star clusters. The discovery is surprising because most globular clusters are among the oldest objects in the universe. In fact, these clusters are used as a benchmark for estimating the age of the universe. It may lead to a better understanding of how galaxies evolve and interact through the process of collisions and mergers.

"Such objects have never before been seen," said Dr. Jon Holtzman, of Lowell Observatory, Flagstaff, Ariz., who led the observing team that made the discovery.

The paper was presented by Holtzman; Dr. Sandra M. Faber, University of California, Santa Cruz; Dr. Edward Shaya, University of Maryland; Dr. Tod R. Lauer, National Optical Astronomy Observatories, Tucson; Dr. Edward Groth, Institute for Advanced Studies, Princeton; Dr. Deidre Hunter, Lowell

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NASA Photo  
This high-resolution Hubble Space Telescope Wide Field/Planetary Camera view showing young globular clusters at the core of galaxy NGC 1275 is unusual because most globular clusters are made up of old stars.

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## 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.

EAA Houston Lifestock Show & Rodeo (Feb. 16-March 1, Astrodome): \$9.

EAA Sesame Street Life (11 a.m. Feb. 8, Summit): \$7.50.

EAA Corpus Christi Dog Race Bus Trip, Feb. 22-23, \$70 per person.

EAA Mardi Gras Ball, Feb. 15, \$15 per person.

EAA JSC Picnic, May 2.

General Cinema (valid for one year): \$4.

AMC Theater (valid until May 1992): \$3.75.

Loews Theater (valid for one year): \$4.

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## 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. The next classes will be from 8-9:30 p.m. Jan. 29, and Feb. 6. Cost is \$5.

**Defensive driving** — Course is offered from 8 a.m.-5 p.m. Feb. 29 and March 21. Cost is \$19.

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

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

**Aikido** — Martial arts class meets Tuesdays and Fridays. Cost is \$35 per month.

**Flag football** — Men's Saturday flag football registration will begin at 7 a.m. Feb. 4. Non-badged teams will sign up at 4:30 p.m. Feb. 7. For more information, call x30304.

**Soccer** — Mixed Saturday soccer registration will begin at 7 a.m. Feb. 5. Non-badged teams will sign up at 4:30 p.m. Feb. 7. For more information, call x30304.

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

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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/Lease: Egret Bay villa, on the water, 1 BDR, FPL, ceiling fans, W/D, microwave, ice maker, free boat w/ purchase, \$43K or \$600/mo. Sean 283-9323 or 996-7693.

Sale: Friendswood, Wedgewood Village, 3-2-2, lg master BR, \$62.9K. Janet, x35000 or 482-4358.

Sale: Countryside, 3-2.5-2A, 2 story, corner lot, covered deck, util rm, \$66.9K. 554-7623.

Rent: Heritage Park, new section, 3-2-2, \$850/mo; CLC townhouse, 2-2-2-2, 2 story, mirrored accents, gray carpet, FPL, patio, \$750/mo. 289-6777.

Lease: 145/Fuqua, 3-2-2, \$595/mo. Minh, 333-6806 or 484-2456.

Sale: Friendswood, 2 lots, 0.95 acre, all util, \$32K/\$37K or \$59K/both. Ron, 996-9724.

Sale/Lease: Condo, 3-2-2, 1400 sq ft, pwr boat slip, tennis ct, exer rm, pools, yacht club, sec, \$750/mo plus \$140 level util or \$69.9K, conventional or finance (20% down); The Landing townhouse, 3-2-2CP, 2000 sq ft, util rm, 2 FPL, wet bar, boat slip, exer rm, \$1400/mo, all bills pd plus boat slip, 8.75%, assum \$56K equity or refinance. Ed Volick, 280-5801 or 326-2221.

Sale: 3-2-2, C/AH, near LaMarque schools. x38976 or (409) 938-4365.

Sale: Lake Livingston, Westwood Shores lot, \$6.5K OBO. x30032 or x31834.

Sale: Egret Bay Villa condo, 1-1-2-CP, W/D, FPL, boat ramp, pool, assum low equity. 773-7982 or 335-1336.

Rent: Galveston condo, furnished, sleeps 6, Seawall Blvd/61st St, pools, cable TV, wknd/wkly/dly. Magdi Yassa, 333-4760 or 486-0788.

Sale: Shore Acres, 2 lots, \$3.2K/ea or reduced for both. Frank, x34185 or 471-2934.

Sale: Baywind II condo, 2-2-2, split design, fans, dishwasher, range, refrig, W/D, FPL, \$38K. Bill, x39376 or 487-4537.

Rent: Arkansas Lake cabin, furnished, screen porch, accom 8, \$250/wkly, \$50/dly. 338-2517.

### Cars & Trucks

'89 Chevy Cavalier Z24, 5 spd, loaded, sunroof, 28K mi, \$8.2K. x36104 or 286-1032.

'84 Ford LTD SW, w/wood grain, auto, loaded, new tires, 302 eng, 103K mi, \$1.2K OBO. Joan, x33474 or 554-6433.

'78 GMC 1/2 ton PU, auto, A/C, 2 gas tanks, 45K mi, needs body work, \$2K OBO. Janet, 283-8214 or 482-0765.

'91 Toyota Tercel, 2 dr, std, A/C, 3K mi, \$8K. Bob, x32193 or 326-3984.

'86 Plymouth Voyager LE, loaded, ex cond, \$5K. Tom, x31252 or 482-2425.

'87 Plymouth Voyager, good cond, \$4.9K OBO; '87 Mazda SE5, long bed PU, w/bedliner, good cond, \$3.9K OBO. 935-6164.

'77 Chev Nova Concours, V8, new paint, ex cond, \$875. 997-9119.

'87 Honda CRX hatchback, 5 spd, A/C, AM/FM/cass, 37K mi, ex cond, \$6K. 335-8539 or 992-5958.

'85 Honda Civic wagon, 5 spd, blue, rebuilt carb, A/C, major tune-up, new CV joints/boots, windshield, AM/FM/cass, 100K mi, \$2.3K. 991-6503.

'89 Chev Cavalier Z-24 sport coupe, 2 dr, 5 spd, V6, A/C, alum wheels, 21K mi, ex cond, \$9.2K. Jeff, x36609 or 554-2532.

'90 Mitsubishi Eclipse GS turbo, ex cond, all pwr, 5 spd, CD player, alarm, 26K mi, \$13.5K. Chuck, x35971 or 932-9554.

'80 Cadillac Sedan de Ville, ex cond, \$2.9K. 486-7471.

'85 Toyota Cressida, auto, 4 dr, loaded, 31K mi, ex cond, \$8K. Harold, x31159 or 488-1804.

'88 Jeep Comanche, P/S, P/B, A/C, AM/FM/cass, 4.0L, 5 spd, 43K mi, ex cond, \$6.5K. Ken, x32566 or 485-7368.

'88 Cougar, leather int, loaded, ex cond, \$8.5K. x39357 or 486-5203.

'66 Mustang, good cond, \$1.7K OBO. Stacy, x32475 or 332-1585.

'80 Olds Cutlass LS, 4 dr, black/gold, auto, A/C, 95K mi, \$950 OBO. John, x39130 or 332-4851.

'79 VW pop top camper, rebuilt eng/brakes, \$3250. David, 929-7120 or 332-9044.

'86 Chevy Cavalier, AM/FM/cass, A/C, auto, tinted windows, sunroof, 2 dr, ex cond, 64K mi, \$2.9K. Marc, x32689 or 286-8510.

'78 Porsche 928, brwn w/leather int, auto, 75K mi, \$8.9K. Bill, x39980.

'85 Chevy Cavalier, 4 dr, 2.0L, auto, 75K mi, new tires/brakes, ex cond, \$2.4K. 488-5522.

'80 Toyota Tercel, 90K mi, ex cond, \$1.6K OBO. 286-9069.

**Boats & Planes**

'75 bass boat, 16' fiberglass Oachita w/85hp Johnson, Holsclaw tilt trlr, depth finder, ex cond, \$1650. x34784 or 482-5190.

'86 Southern Skier, 351 PCM I/B, low hrs, new int, stereo, Magnum trlr, \$8950. Ralph, x34736 or 772-6506.

19' Citation, Deep V Bowrider, 125hp Volvo I/O, new seats/upholstery, motor in ex cond, 3 props, depth finder, \$2.5K OBO. 332-5065.

**Cycles**

'74 Yamaha 650, unattach windjammer, \$650 OBO. Gerald, 479-7940.

'90 Yamaha 100 RT, ex cond, less than 50 hrs, red/blk, \$900. x35961 or 532-2050.

'84 Honda Interceptor 500, ex cond, \$1.6K; '88 Yamaha YZ 125, ex cond, \$1.2K. Andy, 333-6671 or 332-9105.

'84 Suzuki RM250, boots/helmet, good cond, \$500 OBO. Kathi, x30123 or Bud, 480-8674.

**Audiovisual & Computers**

Star SG-10 dot matrix prtr, 9 pin, ex cond, manual, \$90. 335-2465 or 332-4302.

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## Dates & Data

### Today

**UNIX group meets** — The JSC UNIX Systems Administration Group will meet at 2 p.m. Jan. 24 in Bldg. 12, Rm. 246. Jerry Ivy of Control Data Corp., will demonstrate implementation of the Kerberos UNIX network authentication system. For more information, call Mark Hutchison, x31141.

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

### Monday

**Cafeteria menu** — Special: hamburger steak. Entrees: beef Burgundy over noodles, fried chicken. Soup: cream of chicken. Vegetables: buttered corn, carrots, green beans.

### Tuesday

**Metrication meeting** — The newly formed JSC Metrication Committee will have its first meeting at 2:30 p.m. Jan. 28 in Bldg. 13, Rm. 156. The committee will begin discussion of its work to develop detailed transition schedules, required by the end of March under the JSC Metrication Plan. For more information, call Joe Maloy at x30451.

**Cafeteria menu** — Special: turkey and dressing. Entrees: baked meatloaf, liver and onions, barbecue spare ribs. Soup: beef noodles. Vegetables: Spanish rice, broccoli, buttered squash.

### Wednesday

**AIAA/IEEE seminar** — The local sections of the American Institute of Aeronautics and Astronautics and the Institute of Electrical and Electronics Engineers will present a special seminar on "Space Activities in the College of Engineering at the University of Houston" from 10:30 a.m.-12:30 p.m. Jan. 29 at the Gilruth Center. For reservations to the free seminar, call Frankie Hap, 333-6064.

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

### Thursday

**Lunch and learn** — The American Institute of Aeronautics and Astronautics' Ground Testing and Simulation Technical Committee will present a lunch and learn meeting at 11:30 a.m. Jan. 30 in the Bldg. 3 cafeteria. JSC's Jeanne Crews and Eric Christiansen will describe the JSC Hypervelocity Impact Testing Facility. For more information, contact S. Arepalli at x35910.

**Cafeteria menu** — Special: chicken fried steak. Entrees: beef pot roast, shrimp chop suey, pork chops. Soup: navy bean soup. Vegetables: carrots, cabbage, green beans.

### Jan. 31

**Cafeteria menu** — Special: tuna and noodle casserole. Entrees: broiled codfish, fried shrimp, baked ham. Soup: seafood gumbo. Vege-

tables: corn, turnip greens, stewed tomatoes.

### Feb. 12

**PSI meets** — The Clear Lake/NASA Area Chapter of Professional Secretaries International will meet at 5:30 p.m. Feb. 12 at the Holiday Inn on NASA Road 1. STS-44 Commander Fred Gregory, Pilot Tom Henricks, Mission Specialist Story Musgrave, Mario Runco and Jim Voss, and Payload Specialist Tom Hennen will present a PSI banner flown aboard the shuttle. For more information, call Cynthia Thomasen at x30599, or Pat Woolcock at 754-2570.

### June 1

**Fuzzy logic workshop** — JSC and the University of Houston-Clear Lake will host the third International Joint Technology Workshop on Neural Networks and Fuzzy Logic June 1-3, 1992 at the Gilruth Center. For more information, call Carla Armstrong, x39071.

### May 1

**AIAA China trip** — The Houston Section of the American Institute of Aeronautics and Astronautics and the Chinese Society of Astronautics are jointly sponsoring an International Space Year Commemorative Tour of Chinese Space Facilities from May 1-15. All AIAA members, applicants and their spouses are eligible. Cost is \$3,085 double occupancy. For more information, call Jim McLane, 488-0312.

## Swap Shop

Apple IIc ext dr, mouse, 1200/300 modem, 12" moni, SW, \$450. 538-1479.

Microsoft Flight Simulator v1.02, orig program disk, manual, runs on Mac Plus/Mac SE, \$15. 488-5522.

New Atari computer 800 XL, \$50. 486-8266.

IBM PC clone, 30 MB HD, 5.25" and 3.5" floppies, CGA video, 640K RAM, amber moni, AT-style kybd, \$200. 286-5431.

Quasar portable 11" color TV, \$50; Realistic VCR, \$50, both good cond. Stephanie, x49810 or 554-4186.

Phonetics, Sensaphone home moni sys, senses pwr failures, high or low temp, BO. 481-6942.

Laser 128EX Apple IIe/IIc compatible sys, kybd/CPU, RGB moni, 2nd DD, Canon NLQ prtr, joystick, SW, \$450. Bill, x39020 or 991-0361.

New Onkyo auto turntable, was \$199, now \$99. Tom, 282-5236 or 777-2342.

Technics AM/FM/stereo receiver, BO. Walt, 559-2764.

Commodore Amiga 500 computer, 10845 color moni, Xetec HD, second floppy dr, A501 memory expansion to 1 MB, mouse master switch, 2 joysticks, SW, books, \$800. Steve, x37626.

Apple Image Writer II prtr, SW, Apple IIe compatible 10 MB HD, controller, \$250 OBO. Richard, 333-7074.

**Musical Instruments**

Electric organ, \$100 OBO. Stacy, x32475 or 332-1585.

'77 Fender Stratocaster, refinished, maple neck w/wht pick guard, EMG pickups, Kahler tremolo, hardshell case, \$600; Randall combo amp, RG-125-212, 200 watts, 2 channels w/foot switch, 2-12" celestians, \$600. Gary, x36482.

Wurlitzer spinet piano, built in heater, good cond, \$750. 486-0785.

**Pets & Livestock**

AKC chihuahua puppies, blk/wht, shots, wormed, dipped, \$150. Irv, x36461 or 534-3893.

Free, young male labrador, blk. Maria, x32608 or 474-3576.

Free, mixed breed puppies, miniature schnauzer/spitz, 4 females/1 male. Becky, x34430 or 482-9566.

Two dalmatians, 1 1/2 yr male, 2 yr female, \$100/both. Steve, 282-2739.

Cockatoo, hand trained, cage, \$350. 532-4628.

AKC toy poodles, apricot, 7 wks old, shots, \$200. Paul, 244-5339 or 998-0895.

**Household**

Solid wood BR set, full/qn sz hdbd, dresser w/mirror, chest, \$450; glass dining table w/4 chairs, \$125; custom made silk flower arrangements. Judith, x30071 or 332-0248.

Amana 20 cu ft refrig, almond, \$350 OBO. 486-1757.

Dinette set, dk brwn, table, 4 upholstered chairs, ex cond. 486-5247.

Hoover upright vacuum cleaner, bags, \$25. 482-1505.

Kenmore heavy duty 80 washer, 4 water levels, 5 water temp, 6 wash cycles, good

cond, \$145. Chuck, x35971 or 932-9554.

Living rm set, sofa, loveseat, chair, earth tones, 4 yrs old, \$220. 335-8539 or 992-5958.

Queen sz Futon, wht, frame, \$150. Rebecca, x37441 or 335-1314.

King sz maple bed, 2 nightstands, Somma cylindrical floatation mattress, no drainage necessary, ex cond, 5 yrs old, \$850 OBO; 3 ft x 6 ft desk, executive chair, \$150 OBO. Robin, 280-1118 or 479-7940.

Amara microwave oven, good cond, 18" W x 24" D x 14" H, \$35. 488-4069.

Ethan Allen couch, loveseat, early American, blue Chintz cushions, ex cond. \$1.2K OBO. 334-6112.

Two German-made fold out couches, make qn sz beds, lightweight, need reupholstering, \$100/both. John, x39130 or 332-4851.

**Lost & Found**

Found: Ladies wrist watch in parking lot near Bldg 1 before Christmas, describe and claim. Fran Smith, x31387.

**Wanted**

Want riders for vanpool, West Loop Park 'N Ride to NASA. Richard, x37557.

Want aluminum or fiberglass boat, 12 ft to 14 ft range, w/w motor and trlr. Gene, 334-1505.

Want guitarist, trumpet player, trombonist, saxophonist for original rhythm and blues band. x35506.

Want female non-smoker roommate to share 2-2.5-2 CLC condo, W/D, \$275/mo plus 1/2 util. Nancy, 286-3675.

Want female to play on mixed C softball team, experience desired, located in Bldg 1. x32077 or x35180.

Want 4" to 6" complete reflector telescope or comparable refractor telescope in ex cond for Suburban and field stargazing. Karl, x33031 or 333-4132.

Want dog house. Terry, x33814 or 486-9760.

Want tin or tin shot for casting toy soldiers. Tim, 333-6937.

Want mood ring. Janet, x35000 or 482-4358.

Want to trade/buy NASA and space related patches, pins, decals. Andrew, 280-0647.

**Miscellaneous**

Royal Dux porcelain pig, \$5. 282-3479 or 532-1112.

Browning Compound crossbow, ex cond, belt quiver, arrows, arrowheads, feathers need replacing, 190 lb pull, \$265 OBO. 488-9080, x3314 or 333-2435.

Free mature plants, you dig, Pittsפורums, Ligustrums, junipers. Michele, 482-9576.

Downfilled ski bibs, matching jacket, ladies sz 10, cream w/brwn trim, ex cond, \$70 OBO. x35444 or 326-2754.

Casio pocket vision TV, \$30; Sony Watchman, \$50, men's sz 12D Justin lizard western boots, \$75, 60 Lp's, Pioneer turntable Quartz lock, \$120. Pete, x33571 or 334-2963.

Chain link dog kennel w/gate, root, 6' by 6' by 6', ex cond, \$150; concrete blocks, 12 x 12 x 2, \$1.00/ea. 489-9337.

Jeep hardtop, factory blk, doors, blue/gray, BO. Rich, x34818 or 480-8335.

Sialom water ski, Cypress Garden "Profile", ex cond, \$75; ski vest, \$15. x34696.

Two carat diamond ring, unique band and diamond setting, \$1.9K. x36889 or 335-1656.

New fox jacket, wht, \$200; bowling ball, bag, \$25. 532-2158.

Edelbrook Performer RPM intake for Chev V8, Holly 4-bbl carb, 650 CFM, vacuum secondaries, BO; FT500 motorcycle eng, needs starter and ring gear on flywheel, use for parts, \$50 OBO. Terry, 282-3883 or 474-5639.

Wheel chair, ex cond, \$400 OBO. x34531 or 554-2790.

Lawn Boy mower, 19" cut, good cond, \$75. Andy, 333-6671 or 332-9105.

Byrds 4 CD anthology, \$20; Craftsman wood bandsaw, \$200; JET wood bandsaw, \$300; JET 6" wood jointer, \$275; Kenmore elec dryer, good cond, \$50. Rick, x39125 or 334-3401.

# Pioneering Space Exploration



**Editor's note:** This is the second episode of a four-part serialization of the new JSC Strategic plan, "Pioneering Space Exploration: The JSC Strategy." This portion of the plan looks at how JSC will do business differently, implement new approaches to major programs and build in quality. Next week: Providing access to space, and living and working in space.

To promote a long-range exploration perspective in our planning process, the senior staff considered an illustrative Moon and Mars exploration scenario to examine the roles JSC will play in the future. This straw man scenario, based on the Synthesis Group report, "America at the Threshold," allowed the senior staff to assess required elements, capabilities, technologies, and possible options as well as resource, schedule, and other challenges inherent in JSC's taking the leadership role in human space exploration.

One of the most significant understandings that emerged from these straw man scenario discussions was the criticality of linking all our programs and projects in support of space exploration. Exploration cannot be viewed simply as another specific program. Exploration is not a program. For us, it is an orchestrated process or sequence of steps designed to probe and use space for the benefit of all citizens of the United States and the Earth. The space shuttle, Space Station Freedom, settlement of the Moon and missions to Mars are all part of the ongoing exploration process, an integrated multi-program process that is the U.S. space program.

In the sections that follow we detail the specific steps we intend to take in the areas we've identified as crucial to our success during the 1990s and into the next century. Each area is a vital link in the overall exploration process. The areas are treated somewhat separately in the text to highlight specific initiatives that are the enabling capabilities for achieving our mission as NASA's leader in human space exploration.

## Doing Business Differently

JSC has a marked record of success. To ensure that we maintain that record, we must pursue our future with a renewed gusto and commitment to finding new and even better ways of conducting our business. By adopting an interconnected, evolutionary approach to our work, we can better define long-term organizational roles and responsibilities and balance the program management, engineering, operations, and science roles of the center. This new approach will also enable us to streamline our management, fine-tune our expertise, and improve those processes critical to our program activities.

**We will better define long-term organizational roles and responsibilities and balance the program management, engineering, operations and science roles of the center.**

## Find Synergies in Current Programs

Finding synergies in our current programs will allow us to combine common support functions and to recover resources where there is overlap. To accomplish this, JSC will:

- Identify shuttle operations where efforts can be combined and made more efficient within JSC and implement changes as appropriate.
- Identify areas of consolidation, clearly define roles and responsibilities, and set priorities in our orbiter sustaining engineering efforts.
- Identify opportunities to shift and consolidate functions between NASA centers and their contractors to reduce resource requirements across the agency.

- Promote consolidation of shuttle and space station operations at the appropriate time.
- Consolidate hardware and software development, flight certification, management of government-furnished and crew equipment, and information and data systems across all our activities.

- Establish cross-functional process analysis teams to streamline and improve the quality of our critical program activities.

## Implement New Approaches to Major Programs

Programs that involve people actually living and working in space will demand entirely new approaches to how we think about programs, how we develop them, and how we operate them. Our current and future work offers JSC an opportunity to develop and refine new approaches to the multi-program, long-term operations challenges inherent in the exploration process. To implement these new approaches, JSC will:

- Manage and organize major programs on the basis of long-term ownership and the evolution of sustaining operations.

- Strive to clearly define program interfaces between centers and contractors and emphasize simple standardized interfaces between technical elements.

- Use common systems elements, including ground support systems, across major programs.

- Build on existing hardware and capability rather than treating new programs as stand-alones.

- Apply risk management strategies that make the most effective use of our resources to achieve acceptable levels of risk.

- Ensure wherever possible that our development processes and systems for any future program are designed and built to be used in effective sustaining operations.

## Keep Our Civil Service Work Force on the Leading Edge

By shifting and consolidating our tasks, we can increase the number of civil servants who are available to work on our exploration-related activities. JSC is committed to making our in-house requirements

definition and project management capabilities stronger. To accomplish this, JSC will:

- Consolidate functions, shift personnel and resources, and continuously improve our performance on current activities to create a civil service work force wedge dedicated to new exploration roles.

- Give the people who comprise this wedge opportunities to develop enhanced technical expertise and project management skills by defining, developing, and building in-house projects that fit within the scope of JSC's strategy for the future.

Emphasize the critical role civil servants must play early in the life cycle of a project to ensure final delivery of a better, less-expensive product.

## Cultivate Our Partnerships with the Contractor Community

The JSC community of contractors is the largest segment of the JSC team. Our contractor partners are integral and invaluable to the success of our mission. To tap the expertise, innovation, and unique capabilities of these partners and to best use the collective creativity of our total team, we must effectively involve our contractors in the exploration process. To achieve this, JSC will:

- Clarify the roles and responsibilities of civil servants and contractors to make the best use of our team during the entire life cycle of a project or program.
- Define contractor tasks and management responsibilities to permit and facilitate the transfer of appropriate functions,

including some aspects of major program sustaining operations, to a government-owned, contractor-operated mode, if this is to the advantage of the government.

- Eliminate, wherever possible, barriers to consolidating services and economies-of-scale in procurement processes.

- Use incentives to promote quality, productivity and cost efficiency in our contracts.

- Simplify statements of work to allow contractors to meet NASA requirements in the most cost-effective manner possible, which may mean using industry rather than NASA standards, systems and processes. Use existing contractor reporting systems when possible.

- Examine pre-contract specifications and documentation requirements to make sure they are truly necessary to the successful implementation of the contract.

## Build In Safety, Reliability, and Quality Assurance

Given the importance of safety, reliability, and quality assurance (SR&QA) to our overall mission, we must promote a culture at JSC that instills in every individual the responsibility for ensuring that quality is continuously built into everything we do. We cannot rely on testing and inspection alone as effective mechanisms to assure quality assurance. Quality and reliability must be goals during the entire life cycle of a project or program. To accomplish this, JSC will:

- Involve SR&QA specialists early in the system engineering process to influence design decisions that will ultimately result in high reliability systems.

- Develop a cadre of SR&QA-oriented expertise to work from the beginning with new initiatives and new technologies to ensure that quality is built into every process and product.

- Stay up to date on industry standards and advocate their use in lieu of NASA-unique standards in those instances where equal or higher quality and reliability can be attained at a lower cost. Make it easier and less time consuming to use industry, military, and international standards.

- Apply quality management tools, such as concurrent engineering and integrated risk assessment, to achieve a total systems approach in our development organizations.

## Improve Our Service Base

In the not-so-distant future, service capabilities will become increasingly important as multiple exploration programs result in an increase in the number of contracts, new partnerships with other centers and agencies, and joint ventures with the academic and private sector. Because of this, we must improve the processes we use to administer and support our program management and technical and scientific functions. Improving these processes will require an innovative and resourceful team effort on the part of all our service organizations. To improve our service base, JSC will:

- Foster centerwide continuous improvement initiatives already under way such as those in the procurement and budget processes.

- Consolidate information systems and data bases and improve our accessibility to them.

- Investigate using fee-for-service practices in our service organizations and develop efficient methods to use these where practical.

- Encourage and facilitate the use of available commercial off-the-shelf technologies, systems, and processes. Develop a much-improved data base of what is available.



# Rotating chair spins crew for medical science

Results may help fight motion sickness experienced by one in three Americans on Earth

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visors that fit over each eye independently to provide visual stimuli.

The chair can be configured so that the subject is sitting upright, lying on the side or on the back and has three movement patterns: "sinusoidal" or travelling predictably back and forth over the same distance at a regularly varying speed, "pseudorandom" or moving back and forth over the varying distances at irregularly varying speeds, and "step" or constant speeds and beginning and stopping suddenly. Another test moves visual

cues while the subject remains steady.

The test sequences will add important information on the effect of microgravity on physiological responses including the eye's ability to track an object, the perception of rotation during and after spinning, function of the motion and gravity sensing organs in the inner ear, the interaction between visual cues and vestibular responses and sensory perception.

Crew members will be tested both pre-flight and post-flight to establish a comparison for the in-flight measurements.

Working with Reschke is a team of investigators from England, France, Canada, Japan and the United States, including Jerry Homick of JSC's Medical Science Division, and William Paloski, James M. Vanderploeg and Scott J. Wood, all of KRUG Life Sciences, Houston.

"It's the hope that with the results of these experiments we can understand more about the astronauts' adaptability to space and that we'll be able to provide additional information to those people suffering from maladies of motion sickness and vertigo on the Earth."

Reschke said that most people know at least one friend or family member that suffers from motion sickness, vertigo or other disruptions of the vestibular system. In fact, about one-third of the American population will experience problems of this kind sometime in their life, and 100,000 for the first time this year alone.

"We have a goal — to help our astronauts, and to take what we learn from this and other space flight experiments and to improve the quality of life for those who support our efforts," he said.



JSC Photo by Jack Jacob

**REMEMBERING KING** — Sylvester Turner, state representative and a candidate in the recent mayoral race, discusses the effects of the electoral process on the African-American community during the JSC Black Cultural Association's observance of the Martin Luther King Jr. holiday. Turner gave the keynote address at the Jan. 15 ceremonies in the Gilruth Center. Cleo Glenn Johnson, president of the Black United Fund of Texas, presented the Dr. Ronald E. McNair Scholarship to Jacqueline Johnson, a senior at the University of Houston majoring in pre-med. Johnson's organization provides a matching grant in support of the BCA scholarship.

## NASA lifts Collins suspension

NASA's Assistant Administrator for Procurement Darleen A. Druyun has lifted the contract suspension of the Collins Avionics and Communications Division (initially cited as Collins Commercial Avionics) of Rockwell International Corp., Cedar Rapids, Iowa.

The lifting of the suspension means the firm is again eligible to bid on and receive government

contracts. The suspension was imposed Nov. 8, following a 15-count indictment charging the firm and two people with mail fraud and submission of false claims. The workers allegedly altered time cards by adding hours not actually worked and then billed NASA for work which was not performed under NASA contracts.

The settlement agreement

between NASA and CACD requires the firm to enhance its efforts to educate and train its employees in proper time-keeping procedures and to emphasize the need for honesty and integrity in performing government contracts.

The agreement also provides for CACD management to review and monitor the firm's time keeping and verification system.

## IML-1 crew begins life, materials science work

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sleep period and the blue team — comprised of Commander Ron Grabe, Pilot Steve Oswald, Payload Commander Norm Thagard and Payload Specialist Roberta Bondar of the Canadian Space Agency — pressed on with experiment activation.

The first to be activated was Biorack, the European Space Agency package with 17 separate experi-

ments, three from the United States. Biorack will study the effects of both microgravity and radiation on plants, tissues, cells, bacteria, fruit flies, frog eggs and other biological samples.

Among life sciences experiments that scientists say might have direct application to people on Earth are the Microgravity Vestibular Investigations managed at JSC and the Back Pain In Astronauts experiment, which will look into the minor back

pain reported by more than two-thirds of all astronauts during flight.

Four crystal growth facilities, which will operate throughout the mission with a minimum of crew interaction, also began operations.

Seven Get-Away Special canisters in the payload bay — including one designed by students from Houston's Booker T. Washington High School — round out the science investigations.

## Black hole evidence found

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nucleus. High velocities would be evidence of a black hole and would provide astronomers with direct measurement of its mass.

M87 is at the center of a nearby cluster of galaxies in the constellation of Virgo, 52 million light-years distant, and contains more than 100 billion stars. One of the brightest galaxies in the local universe, M87 is visible in even small telescopes.

Early in this century astronomers discovered a gigantic plume or "jet" of plasma apparently ejected out of the M87 nucleus. Later, the jet and nucleus were found to emit strong radio and X-ray radiation. However, the nature of the central "engine" of this activity has remained a mystery.

In 1978, the late Peter Young, California Institute of Technology, leading a team of astronomers, announced that the central portions of M87 visible from the ground appeared to be dominated by the gravity of a massive black hole. Prior to HST, more recent ground-based

observational and theoretical studies have failed to confirm this picture.

Lauer, Faber, Lynds and co-investigators used the new images obtained with the HST Planetary Camera to explore the central structure of M87 much closer than is possible from the ground. The images show clearly that the stars become densely concentrated towards the center, forming a bright "cusp."

The central density of stars in M87 is 300 times greater than expected for a normal giant elliptical galaxy.

The black hole mass is estimated at 2.6 billion times that of the Sun, comparing the density of stars in the cusp to theoretical models computed by Peter Young a decade ago.

The search for super massive black holes in the cores of galaxies is one of the primary missions of the Hubble Space Telescope. By investigating active and quiescent galaxies, astronomers will have a better idea of the conditions and events which lead to the formation and growth of super-massive black holes

## Space News Roundup

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Editor .....Kelly Humphries

Associate Editor .....Kari Fluegel

## JSC, contractors share responsibility for Total Quality

Everyone who is a part of the JSC and contractor team must support the center's building Total Quality effort if it is to succeed, participants at the JSC/Contractor Team Excellence Forum were told Tuesday.

The half-day meeting in Bldg. 1 focused on the center's strategic planning and Total Quality efforts. The forum, a joint JSC/contractor effort supporting Total Quality throughout the JSC team, was co-chaired by Nebrig and Bob Young, president of Lockheed Engineering and Sciences Co.

JSC Associate Director Dan Nebrig welcomed more than 60 contractor and JSC attendees representing more than 25 contractor and 10 different JSC organizations.

John O'Neill, deputy director of JSC's Mission Operations Directorate and chairman of the effort to develop JSC's new strategic plan, emphasized that the plan will be a living document under the control of an executive council and will be implemented centerwide.

Wanda Thrower of JSC's Management Analysis Office told the group that JSC's plans to build on its problem-solving strengths as the Total Quality effort focuses on improving work processes.

Diane DeTroye of the Human Resources Development Office describ-

ed the center's Total Quality training plan. Since its inception last summer, the program has included 30 action workshops for managers, 16 workshops for Q+ teams, problem and work process analysis training for 125 corrective action and 21 work process improvement facilitators, "just-in-time" workshops for work process improvement teams and special training for directorate steering groups.

Stacey Menard of JSC and Dan Reid of Loral, co-chairs of the Q+ team in JSC's Safety, Reliability and Quality Assurance Office, described the efforts of the center's first Q+ team, focusing on the team's role as a partnership with management.

Their team has received 56 reports from employees of opportunities for improvement and developed a system to ensure that the originator of each report gets an answer. They emphasized that the Q+ team's role is to serve as a catalyst to put the Total Quality culture in place.

Nebrig and Management Analysis Office Manager Les Sullivan described Total Quality activities at NASA Headquarters and led a group discussion on developing an efficient Total Quality reporting and tracking system. Contractor representatives described the systems being used by their organizations and pointed out the lessons they've learned.

## Alumni League gives \$10,000 for scholars

The JSC chapter of the NASA Alumni League recently presented the NASA College Scholarship Fund, Inc. with a check for \$10,000.

Gerald D. Griffin, Robert F. Thompson and Jack C. Heberlig of the Alumni board presented the check to JSC Director Aaron Cohen and Bill Kelly, director of Administration and chairman of the scholarship fund.

The NASA College Scholarship Fund Inc. was established by Pulitzer Prize-winning author James A. Michener and his wife in 1982. Twenty-one recipients across the agency have received the scholarship

and other three students will be selected this year.

Dependents of NASA employees who are pursuing degrees in science or engineering are eligible and may call Mary O'Connell at x38970 for more information.

In related news, former NASA Administrator James M. Beggs has been appointed the new national chairman of the Alumni League.

Beggs, 65, who headed the space agency from July 1981 to December 1985, takes over from Robert C. Seamans Jr., former NASA administrator and Air Force secretary.

## Young globular clusters surprise

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Observatory and other members of the Wide Field/Planetary Camera Instrument Definition Team.

Holtzman's team did not expect to find young star clusters in NGC 1275 when it began observing with the HST Wide Field/Planetary Camera.

"We were looking for information to help us understand all the peculiarities in the galaxy, but instead we discovered yet another strange feature," Holtzman said.

Globular clusters are dense spherical collections of stars, containing 100,000 to 10 million stars packed in a region only about 100 light-years in diameter. More than 100 globular clusters orbit the Milky Way in a diffuse swarm. The brighter of these appear as "fuzzy" stars to the naked eye.

Stars within these clusters are very old, believed to have formed early in the history of the universe. Surprisingly, the clusters in NGC 1275 appear to contain young, hot stars. "Although young star clusters

are observed in other galaxies, none have been as massive and compact as those seen in NGC 1275," Holtzman said.

NGC 1275 has such a peculiar shape, some astronomers previously have suspected that it may be two galaxies — a giant elliptical galaxy and a smaller spiral galaxy — passing through one another. In fact, elliptical galaxies in general may result from the merger of several spiral galaxies. Holtzman suggested that the clusters may have formed as a result of just such a merger or collision. The fact that elliptical galaxies can contain a hundred times more globular clusters than spiral galaxies lends further support to the notion that galaxy collisions also create new globular clusters.

Holtzman and his colleagues plan to take longer exposures with HST to see if there are many more fainter clusters. He also plans to take pictures in ultraviolet light to help pin down the age of the clusters.