

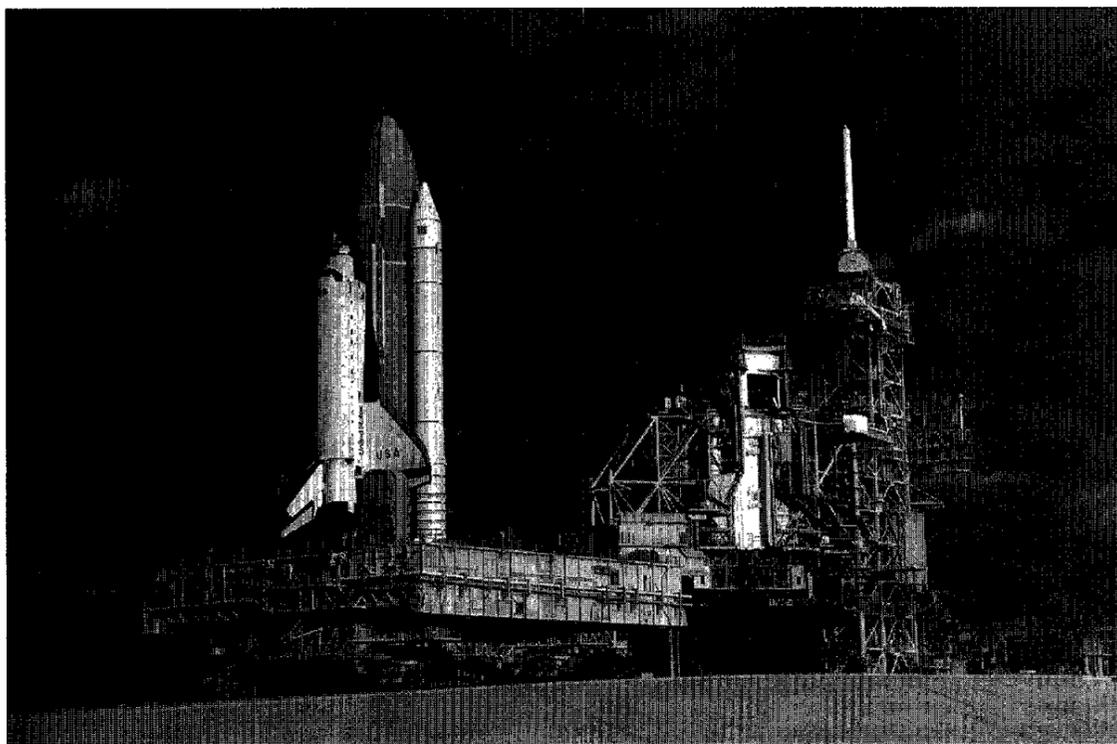


# Space News Roundup

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No. 5



**Columbia arrives at Launch Pad 39B amid darkening skies at Kennedy Space Center. The shuttle is slated for liftoff of STS-75 Feb. 22. Mission objectives include the reflight of the Tethered Satellite System and the third flight of the U. S. Microgravity Payload.**

NASA Photo

## JSC gets lead role in shuttle, station work

By Kelly Humphries

JSC has been formally designated lead center for both the Space Shuttle and International Space Station Programs, part of a move by NASA Administrator Daniel S. Goldin to follow through on recommendations from last year's Zero Base Review and implement NASA's Strategic Plan.

Acting Associate Administrator for Space Flight Wil Trafton officially notified JSC Director George Abbey last week that he now has full responsibility for implementing the shuttle and station programs, which includes chairing all shuttle Flight Readiness Reviews, starting with today's STS-75 review at Kennedy Space Center.

"This really brings a tremendous responsibility to the center," Abbey said. "There are going to be a lot of new issues. There are going to be a lot of new challenges. Challenges bring opportunities."

New responsibilities include assigning program managers for both programs and, this week, the JSC director reaffirmed Tommy Holloway as Space Shuttle Program director, and Randy Brinkley as International Space Station Program manager.

By May 1, a full implementation plan will be developed, outlining specific tasks associated with assuming lead center duties.

"We're fortunate in having very good people here that can take on

those tasks," Abbey said. "We must take care during the transition to maintain continuity and keep safety our number 1 priority."

The shift of program management to JSC follows a Jan. 24 senior management meeting in Washington, D.C. at which Goldin reiterated his intention to follow the Zero Base Review recommendations to change NASA Headquarters' role to one of concentrating on the "what" and "why" behind the agency's goals and objectives. Lead field centers are now responsible for determining "how" to implement programs in the most cost-effective manner.

The moves also support the NASA Strategic Plan, which establishes five main enterprises: Mission to Planet Earth, Aeronautics, Human Exploration and Development of Space, Space Science and Space Technology. JSC is the lead center for the Human Exploration and Development of Space.

During the coming months, a number of changes to the JSC organization structure will better position the center for its new responsibilities, Abbey said.

One key adjustment will be bringing up to speed the Space Operations Management Office led by John O'Neill, which was created following an October decision by Goldin to designate JSC as the

Please see **LEAD**, Page 4

## Columbia enters home stretch

Shuttle managers conducting final review today

As *Columbia* enters the home stretch of preparations toward the launch of STS-75 perhaps as early as Feb. 22, shuttle managers are holding a final Flight Readiness Review today.

A firm launch date is expected at the conclusion of the FRR.

This week, technicians at Kennedy Space Center's Launch Pad 39B completed the replacement of a fuel turbopump in *Columbia's* main engine No. 1, loaded propellants onboard for the spacecraft's orbital propulsion system and performed a helium leak check of the shuttle



*Columbia's* planned 14-day mission on STS-75 will be highlighted by the deployment and retrieval of the Tethered Satellite System-1 Reflight and operations of the United States Microgravity Payload-3. A series of press conferences on the mission is scheduled to be held all day Wednesday.

The briefings, which will be carried live on NASA Television, begin with an overview of STS-75 by Lead Flight Director Chuck Shaw starting at 8 a.m. CST. At 9 a.m. will be an overview of the Tethered Satellite System, fol-

lowed at 11:30 a.m. by a USMP-3 overview. At 1 p.m., a Please see **ATLANTIS**, Page 4

## Baker, Precourt to lead Mir docking missions

By Kyle Herring

Mike Baker will command STS-81, the fifth scheduled shuttle mission to dock with Russia's Mir Space Station and Charlie Precourt will command the sixth, STS-84.

On STS-81, set for December 1996, John Blaha will return from a five-month stay aboard the station and Jerry Linenger will take his place aboard the orbiting laboratory for five months. Linenger will return on STS-84 and be replaced aboard Mir by Mike Foale.

Other crew members named to join Baker, Blaha and Linenger on the STS-81 flight are Pilot Brent Jett and Mission Specialists John



Baker

Grunsfeld, Marsha Ivins, and Jeff Wisoff. The remainder of Precourt's STS-84 crew will be named later.

The fifth docking mission will carry the Spacehab double module providing additional middeck locker space for secondary experiments. During the five days of docked operations with Mir, the crews will transfer water and supplies from one spacecraft to the other. A space walk by Linenger and one of his Russian cosmonaut crewmates will be conducted during his stay on the

space station after *Atlantis* departs. The sixth docking mission, also carrying the Spacehab double module, will have *Atlantis*

docked with the station for five days transferring supplies and experiments between the two spacecraft in addition to the astronaut exchange.

Baker, 42, has flown three times on the shuttle—STS-43 aboard *Atlantis* in 1991, STS-52 on *Columbia* in 1992 and STS-68 on *Endeavour* in 1994. Most recently he was director at the Gagarin Cosmonaut Training Center in Star City, Russia.

Precourt, 40, has flown on two space missions including the first docking of *Atlantis* to Mir on STS-71 in 1995. His other mission was aboard *Columbia* in 1993. He currently is director of operations for NASA in Star City.



Precourt

Jett, 37, just completed his first shuttle mission, STS-72. Grunsfeld, 37, flew aboard

*Endeavour* on the STS-67 mission in March 1995. Ivins, 44, will be making her fourth flight. Most recently Ivins has supported launch and landing activities at KSC.

Wisoff, 37, flew on STS-57 on *Endeavour* in 1993, and with Baker on STS-68 aboard *Endeavour* in 1994. Blaha, 53, will complete his fifth flight into space. Linenger, 41, flew on STS-64 aboard *Discovery* in 1994. Foale, 39, flew on STS-45

aboard *Atlantis* in 1992, *Discovery's* STS-56 mission in 1993 and most recently on the Please see **PAYLOAD**, Page 4

## Students shadow JSC workers, learn teamwork tools

By Mae Mangieri

Through a community partnership with Fort Bend ISD, volunteers from JSC's Education Outreach Program with engineering, mathematical and aviation backgrounds helped to give senior high school students a "behind the scenes" look at their unique space-related careers.

Sixteen students interested in aerospace careers made the one-hour drive from Sugar Land to JSC last month to spend the day shadowing "real" aerospace professionals. The 14 employees who volunteered to host the students represented the International Space Station Program Office, Mission Operations Directorate, Engineering Directorate, Flight Crew Operations Directorate and the Space and Life Sciences Directorate.

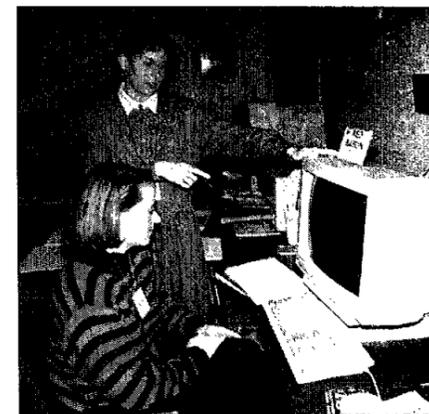
The students spent the day involved in various activities with their host employees such as attending meetings, creating computer generated graphics and visiting interesting sites such as Mission Control and space station and shuttle mock-ups. But with all the activities and sites JSC has to offer, Kelly Marshall, a senior at Dulles High School, found JSC's most interesting experience to be "all the teamwork that actually goes on behind the mission."

Marshall, an honor student who has been accepted to attend college at both the United States Air Force Academy and West Point, spent the day with Michelle Munk, an aerospace engineer in the Flight Mechanics Division. Not only did the employee take the student behind the scenes to see demonstrations of equipment an aerospace engi-

neer uses, she also offered some real-life advice, "College teaches you how to think and you don't necessarily have to have all the right answers when you get out to your job," Munk said. "You just have to be a good team worker and know where to find the right answers."

The students were part of Fort Bend ISD's Future Quest Program, a one-day program which permits seniors to shadow a professional in a career field of their choice. The goal of the program is to give students a better understanding of a career's work environment and the importance of attitude, dress and business etiquette.

Employees interested in hosting a student for similar career investigation events can call JSC's Education Outreach Program at X32929 for more information.



JSC Photo by Andrew Patnesky

Michele Munk works with Fort Bend ISD student Kelly Marshall on the "Red Baron," a graphics workstation in the Flight Mechanics Laboratory.

JSC

## Ticket Window

The following discount tickets are available for purchase in the Bldg. 11 Exchange Store from 10 a.m.-2 p.m. Monday-Thursday and 9 a.m.-3 p.m. Friday. For more information, call x35350 or x30990.

**JSC Rodeo Lift-off Party:** 5 p.m. Feb. 16 at the Gilruth Center featuring the Original River Road Boys. Tickets cost \$5.

**Space Center Houston:** Discount tickets, adult, \$8.75; child (3-11), \$7.10.

**Movie discounts:** General Cinema, \$4.75; AMC Theater, \$4; Sony Loew's Theater, \$4.75.

**Stamps:** Book of 20, \$6.40.

**Gold C books:** \$10.

**Entertainment 96 books:** \$30.

**JSC history:** *Suddenly, Tomorrow Came: A History of the Johnson Space Center.* Cost is \$11.

**Metro tickets:** Passes, books and single tickets available.

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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 NASA badge or yellow EAA dependent badge. Classes tend to fill up two weeks in advance. Payment must be made in full, in exact change or by check, at the time of registration. No registration will be taken by telephone. For more information, call x30304.

**EAA badges:** Dependents and spouses may apply for photo identification badges from 7 a.m.-9 p.m. Monday-Friday; and 8 a.m.-4 p.m. Saturdays. Dependents must be between 16 and 23 years old.

**Stamp club:** Meets at 7 p.m. every 2nd and 4th Monday in Rm. 216.

**Aerobics:** Classes meet at 5:30 p.m. Monday, Tuesday, Thursday and Friday and 9:30-11 a.m. Saturdays. Cost is \$35 for 11 weeks. For more information call Jill Hill at 480-0509.

**Women's self defense:** Martial Arts training for women only from 5-6 p.m. Tuesdays and Wednesdays. Cost is \$25 a month.

**Weight safety:** Required course for employees wishing to use the weight room is offered from 8-9:30 p.m. Feb. 22. Pre-registration is required. Cost is \$5.

**Exercise:** Low-impact class meets from 5:15-6:15 p.m. Mondays and Wednesdays.

**Aikido:** Martial arts class meets from 5-7 p.m. Wednesday. Cost is \$25 per month. New classes begin the first of each month.

**Ballroom dancing:** Cost is \$60 per couple. For additional information call the Gilruth Center at x33345.

**Country and western dancing:** Beginner class meets 7-8:30 p.m. Monday. Advanced class meets 8:30-10 p.m. Monday. Cost is \$20 per couple.

**Fitness program:** Health Related Fitness Program includes a medical examination screening and a 12-week individually prescribed exercise program. For more information, call Larry Wier at x30301.

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## Dates & Data

### Today

**Astronomers meet:** The JSC Astronomical Society will meet at 7:30 p.m. Feb. 9 at the Lunar & Planetary Institute, 3600 Bay Area Blvd. For more information call Chuck Shaw at x35416.

**Cafeteria menu:** Special: baked meatloaf. Total Health: baked potato. Entrees: chicken fajitas, ham steak, pork and beef eggrolls, steamed fish, Reuben sandwich. Soup: seafood gumbo. Vegetables: stewed tomatoes, seasoned spinach, cut corn, macaroni and cheese.

### Monday

**Cafeteria menu:** Special: Italian cutlet. Total Health: roast beef au jus. Entrees: chicken a la king, enchiladas with chili, vegetable lasagna, steamed pollock, French dip sandwich. Soup: split pea and ham. Vegetables: Brussels sprouts, oriental vegetables, buttered carrots, lima beans.

### Tuesday

**Cafeteria menu:** Special: stuffed cabbage rolls. Total Health: roasted turkey. Entrees: turkey and dressing, country style steak and hash browns, beef ravioli, baked chicken, fried cod fish. Soup: tomato Florentine. Vegetables: Italian blend, okra and tomatoes, corn coblette, navy beans.

### Wednesday

**Toastmasters meet:** The SpaceLand Toastmasters Club will meet at 7 a.m. Feb. 14 at the House of Prayer Lutheran Church. For more information call Jeannette Kirinich x45752.

**MAES meets:** The Society of Mexican American Engineers and Scientists will meet at 11:30 a.m. Feb. 14 in the Bldg. 3 Cafeteria executive dining room. For more

information call Michael Ruiz at x38169.

**Astronomy seminar:** The JSC Astronomy Seminar will meet at noon Feb. 14 in Bldg. 31, Rm. 129. An open discussion meeting is planned. For more information, call Al Jackson at 333-7679.

**Cycle club:** The Space City Cycle Club will meet at 5 p.m. Feb. 14 at the Grumman Bldg. at Ellington Field. For more information call Mike Prendergast at x45164.

**PSI meets:** The Clear Lake/NASA Area Chapter of Professional Secretaries International will meet at 5:30 p.m. Feb. 14 at the Holiday Inn on NASA Road 1. The focus of the meeting is to orient new members and future members. Chapter members will present an overview of the goals and missions of PSI and the benefits of membership. For more information call Elaine Kemp at x30556.

**Cafeteria menu:** Special: pepper steak. Total Health: stir fry pork with rice. Entrees: liver and onions, stir fry pork with rice, steamed fish, western special, Reuben sandwich. Vegetables: steamed broccoli, yellow squash, macaroni and cheese, vegetable sticks.

### Thursday

**Blood drive:** Barrios will host a blood drive from 8-11 a.m. Feb. 15 at 1311 Gemini. For more information call Tom Hanson at 47473.

**Directors' meet:** The Space Family Education board of directors, which sets policy for the JSC Child Care Center, will meet at 11:30 a.m. Feb. 15 in Bldg. 45 Rm. 712D. For more information on this open meeting call Gretchen Thomas at x37664.

**Awards banquet:** The Rotary National Award for Space Achievement Foundation will host the 10th annual awards banquet at 6:30 p.m.

Feb. 15 at the Hyatt Regency in Houston. Former Kennedy Space Center Director Robert Crippen will receive the National Space Trophy. For more information call Charles Hartman at 480-6167.

**Cafeteria menu:** Special: chicken fried steak. Total Health: baked potato. Entrees: beef tacos, steamed pollock, baked chicken, catfish special. Soup: navy bean. Vegetables: spinach, cut corn, breaded okra, pinto beans.

### Friday

**Rodeo Lift-off party:** A Rodeo Lift-off party is set for 4:30 p.m. Feb. 16 at the Gilruth Center's old pavilion. The Original River Road Boys will provide country and western music. Tickets cost \$5 and include beer, wine, soft drinks, hot dogs and chicken wings. Gates open at 4:30 p.m. with the band starting at 5 p.m. Tickets are on sale at the Exchange Store through Feb. 15.

**Cafeteria menu:** Special: tuna noodle casserole. Total Health: baked potato. Entrees: steamed salmon steak, baked chicken, fried cod fish, ham steak. Soup: seafood gumbo. Vegetables: French cut green beans, cauliflower with cheese, green peas, black-eyed peas.

### Feb. 20

**Blood drive:** Krug Life Sciences will host a blood drive from 8-11:30 a.m. and 1-3 p.m. Feb. 20 at 1290 Hercules. For more information call Jackie Reeves at x41437.

### Feb. 21

**Scuba club meets:** The Lunarfinns will meet at 7:30 p.m. Feb. 21 at Redfish Restaurant under the Kemah/Seabrook Bridge, Seabrook Side. For more information call Fred Toole at x33201.

## 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 AP2, or deliver them to the deposit box outside Rm. 181 in Bldg. 2. No phone or fax ads accepted.

### Property

Sale: Clear Lake City, Oakbrook, 3-2-2, quiet cul-de-sac, large lot, ex cond, \$87k. 488-4069.

Sale: Alvin, 3 - 4-2-2, large cul-de-sac lot w/trees, pool w/spa, updated, \$82.7k. x36549 or 331-3017.

Sale: Bayridge subdivision, cul-de-sac street, new roof, \$55k obo. James, 286-1934.

Sale: Webster condo, 2-2-2CP, new A/C, solar screens, kitchen/bath upgrade, w/BFP, ceiling fans, W/D conn, \$38.5k. 280-0285.

Sale: Tomball area wooded lot, 1+ acres, paved streets, electric/water, restricted residential, clear running stream, \$8k. 333-4609.

Lease: Egre Bay condo, 2-2-2CP, split plan, W/D, FPL, fans, good cond, \$525/mo + dep. 486-8551.

Lease: Meadow Green, 2-2-5-2, 2 story on cul-de-sac, FDRM, fans, cond cond, \$900 mo + dep. 486-8551.

Rent: Bacliff Villas, 4-1-5-1, clean & cozy, fenced back yard, \$575/mo + \$300 dep. 488-0664.

Rent: Arkansas cottage, overlooking Blue Mt Lake & Mount Magazine, furn, w/massive FPL, antiques, \$50/dly or \$250/wkly. Corcoran, x47806 or 334-7531.

Rent: Beach house, Crystal Beach, Galveston County, fully furnished, ocean view, sleeps 10, cable/TV, FPL, wkend/wkly. 486-1888.

Rent: South Lake Tahoe cabin, sleeps 8, 3-2, modern kitchen, W/D, cable TV/VCR, microwave, \$75/night. x41065 or 326-2866.

### Cars & Trucks

'93 Plymouth Laser, 4 cyl, auto, A/C, AM/FM/cass, moon roof, ex cond, \$7.5k. tom x32572 or 992-2544.

'91 Chevy S10 truck, std, 5 spd, 4 cyl, A/C, AM/FM/cass, 47k mi, \$4.8k obo. x37149 or 409-925-2291.

'89 Ford Escort wagon, good work/family car, runs great, \$2k. James, 286-1934.

'92 Pontiac Sunbird SE convertible, loaded, 4 cyl, auto, very clean, good cond, \$9.2k. x36228 or 409-848-1615.

'93 Ford Mustang GT, black, 5 spd, PW/PL, 40k mi, ex cond, \$12.5k. 337-7528.

'90 Olds Silhouette Van, 7 pass, white w/blue-grey interior, V6, auto, PW/PL, \$7,450. 409-744-3584.

'90 Pontiac Bonneville LE, white, 4 dr, 3.8 V6, auto, power, alarm, extras, ex cond, \$5,995. x38519 or 776-9754.

'90 Pontiac Sunbird convertible, auto, A/C, PS/PB, PW/PL, AM/FM, \$6.5k. Dave, x36027.

'88 Ford Mustang convertible LX, white, new top, good cond. Rosanne, 326-2167.

'79 Porsche 911, white/brown, A/C, 100k mi, \$10.9k. Steve, 486-8047.

'89 Dodge Ram Charger, 318 V8, loaded, very clean, runs great, \$5.5k. Mike, x33838 or 998-7780.

'90 Mercury Cougar, 6 cyl, auto, 64k mi, loaded, sunroof, JBL CD stereo, power, new tires, garage kept, \$7.5k. x32827 or 538-2152.

'79 Datsun 280ZX Coupe, 5 spd, A/C, 97k mi, \$1.7k. 280-8608.

'83 Mercedes 300 SD, ex cond, low mileage, \$10.5k. 488-3588.

'89 Plymouth Grand Voyager Se minivan, 7 pass, V6, auto, AM/FM, cruise/tilt, 75k mi, lt blue, ex cond, \$6.5k. x35034.

'84 Honda Accord LX Hatchback, auto, A/C, 76k mi, great cond, \$2,650. 486-4701.

'81 Chevy Berlinetta Camero, ran great, needs fuel pump, PS/PB, tilt, PW/PL, A/C, body in good cond. x30331.

'90 Pontiac Grand Prix, \$700. 480-0667.

### Boats & Planes

Procraft bass boat, 15', 85 hp Evinrude, stainless steel prop, 12/24 trolling motor, depth finder, 2 live wells, garage kept, very clean, \$2.5k. David, 478-2974.

Sunfish sailboat in good cond on Lake Placid 1 block off I-10 at Sequin, \$300. x35180 or 326-3706.

'91 Cajun Fish & ski, 17.5' w/'92 120 Hp Johnson, depth finder, trolling motor, galvanized trailer, \$8.5k. 479-2851 x6658 or 471-8221.

'85 Chris Craft Sportsman, 31', twin Mercuriser engine, shower, toilet, refrigerator, low engine hrs, good condition, \$35. obo cash only. 339-1197.

'74 Islander, 36', fresh bottom, no blisters, 33Hp diesel, updated interior, \$29k. 334-5120.

### Cycles

'93 Suzuki GSX-R600, clean, fast, well maintained, matching helmet, black/blue, \$4.2k. 326-4613.

### Audiovisual & Computers

IBM ThinkPad 755c (9545 Log) color notebook computer w/20MB memory, 540 mb HD, 10.4" color LCD, TV tuner, & accessories, \$3.4k. 282-7257.

Packard Bell 486 DX 33 MHz, 130MB HD, 4MB RAM, 14" SVGA monitor, 3.5"+5.25" FD, modem, mouse, key board, software Win 3.1, MS Works, DOS 6.0 w/documentation, \$1k. Sheila, 488-7354.

Technics complete stereo sys, 130 w/ch amplifier, multi-CD player, dual-cassette deck, AM/FM tuner, graphic w/equalizer, universal remote, 260W Fr speakers, 40W sur speakers, cabinet, \$950. 332-6178.

IBM XT 286 w/mounted, ex working cond, 6.22 DOS, \$125. 488-7318 or 763-0663.

Magnavox combination amplifier/tuner/record player/cassette deck w/remote, \$125; Magnavox 5 compact disc changer, \$75. x30122.

Word processor, IBM PS2 model 50 w/monitor, 286 Processor, 1MB HD, \$175. x37834 or 488-6820.

### Musical Instruments

Electric guitar, Peavey Predator AX, new \$375 make offer. 544-6200.

### Pets & Livestock

Society Finches, 8 weeks, \$5 ea. Nancy, 996-8567.

Dog, part German Shepherd/Rockwieller, 1 yr old. David, x34153 or 338-8783.

### Household

Full size futon bed frame only, \$30. Kurt, x30291.

8' hade-a-bed sofa, black fabric w/small accents, custom made, \$125. 326-4316.

Mike or Brenda, 538-3435.

Kitchen/harvest table, 8', ash, trestle style, side benches, custom made, \$125. 326-4316.

Bedroom set, full size, antique green w/dresser, 5 drawers, chest & 2 night stands, Italian design, great cond, \$1.1k. Magdi Yassa, 333-4760 or 486-0788.

King size waterbed w/lighted & mirrored headboard, semi-motionless mattress, side rails, \$250; queen size waterbed w/bookcase headboard, semi-motionless mattress, side rails, \$75. x38279 or 482-9231.

Antique table, 45" x 60", \$550; antique babybed, \$225. 488-3588.

Formal dining table w/6 chairs, Queen Anne style, cherrywood, ex cond, \$1k obo: oak coffee table, ex cond, \$50 obo. 882-0405.

Coffee/end tables, limestone/marble base, bevel glass top, \$200 obo. 334-7639.

2 Futons w/covers, \$100 & \$75, both for \$130. Sheri, x33095.

Computer desk w/oak finish, \$30. Sheila, 488-7354.

White metal bunkbed, no mattress, \$85. 409-925-7765.

Black stand for 35" TV w/VCR compartment & smoke window, \$95 obo. x35590 or 991-0821.

Microwave oven, Westinghouse, 700 watts, \$75. x47188 or 334-3961.

Coffee table, oriental style, \$350; antique oak dining table & 5 pressed back ornate chairs, extra leaves, ex cond, \$1.1k; antique 3 drawer chest, 1860 period, walnut, \$350; small 2 drawer Mahogany end table, \$20; TV cart, \$20; decorator chair, \$20; 4 cushioned office chairs, \$25 ea; several office items; full size quilt w/deer picture, \$45. 488-5564.

Sears gas dryer, \$200. 554-6200.

Duncan Pyle, mahogany dining suite, 6 chairs & china cabinet, \$1.5k. 996-0152.

Microwave, Panasonic, rotating table, 1 cu ft, 700 watts; Whirlpool, 29" oven; Amana Corning Ware stove top, all in ex cond. John, 326-2461.

Country style, 9 piece, living room set includes, love seat, couch, swivel chair, \$600; wood oak dining set, w/6 chairs, \$500. 332-2721.

Children's Race Car bed, mattress, 3 drawer chest w/hutch, \$200. x32264 or 488-5962.

Formal dining table w/4 chairs, \$150 obo; blue sofa, love seat & chair, good condition, \$250 obo; 19" color TV w/remote, \$150; vacuum cleaner, \$20; old Panasonic VCR, \$20. x31622 or 480-2870.

Super single waterbed includes headboard, 6 drawers in base, mattress & heater, \$100 obo. x37066 or 286-4255.

### Wanted

Want personnel to join VPSI vanpool departing departing South Braeswood Park & Ride lot, 6:50 a.m. for JSC & Offsite locations, 7:30 - 4:30 shift. Susan Gaynor, 282-5447 or Al Ruder, x34997.

Want fixer upper house, from \$10.k - \$50.k. 992-5080.

Want maternity clothes, size 4. 996-0152.

Want roommate, professional non-smoker, male, share 3-2-2, Clear Lake, use of swimming pools/tennis courts, \$400/mo bills pd. Joseph, 480-1670 or 474-6359.

Want homestate to share 3-2.5, 4 story waterfront townhouse w/1 other person, amenities include community pool, private hot tub & tanning bed, 2 bars, 2 decks overlooking canal, boat slip, shared study & enclosed garage, \$595 mo + 1/2 utilities. Terry, x39234 or 335-0113.

Want a petti coat between sizes 3 - 8. x41773 or 485-7292.

Want outboard motor 10 - 4Hp. x31600 or 482-1461.

Want 2 Alan Jackson Rodeo tickets for Wednesday, February 28, 1996. x32264 or 488-5962.

Want Alto Saxophone, Selmer Paris model. x41770 or 559-2365.

Want good used tractor, 30+Hp, less than \$2k. 946-6814.

Want Wilton cake decoration supplies, pans, tips, equipment, good condition. Sherry, x30561 #6.

Want baby furniture, preferably white, nice used baby items. Alyson, x49657.

Want antique music box w/disc (not cylinder) movement, size of discs to be approx 12" dia. 482-6041.

Want intermediate or advanced male ballroom dancing partner for classes at Gilruth Center, at least 5'9" tall, age preferable 30-45 years, non-smoker. Anette, x33709.

### Miscellaneous

Peavey SP-4 DJ speakers, \$800; Junior fog machine, \$200. Jimmy, 337-5583.

Men's London Fog jacket, full length, 1 ea, bone color, sz 42R; 1 ea navy blue, sz 40R, both have removable liners, \$50 ea. Sam, 332-3168.

'90 Viking popup camper, sleeps 5, weighs, 850 lbs, garage kept, \$2k. 482-5393.

Murray lawn tractor 10Hp w/30" cut, \$450. x35546.

Men's sport coats, known brands, sz 46, 1-rust colored hopacking; 1 - straw-colored silk; 1 - tan corduroy w/leather elbow patches, \$50 ea. x36663 or 474-5601.

IBOC Mongoose Composite road bicycle, Shimano 105 STI shifters, \$850. x34221 or 338-1248.

Snorkel gear, weight belt & weight, mask, snorkel & fins, \$110. x33903 or 488-6521.

4 factory Pontiac wheels, 14" x 6", ex condition, \$200. x33903 or 488-6521.

Mixed firewood, \$55 cord. 946-6814.

Rabbit cage w/removable under tray, ex cond, indoor model, all accessories & supplies, \$45. Bob, x33149.

Wedding dress, beautiful, white, S/S, size 3/5, ex condition, w/petticoat & veil, new \$550 sell 225; wetsuit, size large, full-length, ex condition, \$100. 882-0405.

Electric fence, \$35; weight bench; Wildcat 4.0 BBS software, \$30. 286-4952.

Convert-a-crib, converts from crib into youth bed & chest of drawers, white w/pastel drawer markings. 486-5959.

Golf clubs, new Mercury woods w/graphite shafts, #1,3,5,7, \$160 or \$40 ea; new Mercury Irons, 3-PW, \$140; Demos available. Larry, x49103 or 922-1696.

Nordic World Class exercise equipment, ex condition, low usage, \$800; wedding set, .25 carat w

# Double Jointed

## Weightless Environment Training Facility installs new underwater robot arm

By Karen Schmidt

**A**s JSC turns its attention to the International Space Station, equipment must be upgraded to support training for long-duration missions. The Weightless Environment Training Facility has done just that, and is reaching farther to develop new training aids for the astronauts who will support space station.

Last month, a new WETF Remote Manipulator System, or WRMS, passed its operational readiness inspection, taking weightlessness training to new depths. The new arm replaces a 10-year-old arm that had reached the end of its life cycle due to corrosion and other old age problems. While the old arm was revolutionary in its day, the new design offers enhanced mechanical, structural and control capabilities.

"The new WRMS is primarily titanium and is resistant to corrosion in the pool's water and chemicals," said Carolyn Fritz, project engineer in the Flight Crew Support Division. "The new arm is volumetrically similar to the remote manipulator arm on the orbiter. It was designed for a tip load of 200 pounds, that is four times the capacity of the old arm."

Even with the new tip load, the new arm weighs 300 pounds less than its older counterpart.

"For crew training purposes, it was necessary to design the arm so that it was volumetrically no bigger than the arm on the orbiter," said David McMahon, mechanical design engineer from Johnson Engineering in charge of the structural design of the arm.

"This was very challenging since the flight arm is designed to operate in microgravity and cannot even pick itself up (on the ground). This necessitated a lightweight design with joints that could produce high torque from a small package."

The project began in October of 1992 with a team from the Flight Crew Support Division and Johnson Engineering. The team chose several software packages to aid in the design process.

"The group chose a well-integrated design system, resulting in a very efficient design process that was one of the keys to the project's success," McMahon said.

To optimize weight savings, the team began designing the new arm from the tip of the arm and worked its way back toward the shoulder. A simple design and easy maintenance were major goals of the team and were accomplished with welded segment for the structural elements and a modular design for each joint.

The structural design began with the development of a loads program to calculate joint forces and torques. The team determined this was not an easy task since the arm moves in and out of the water during operation and changes the loading of the arm. Using finite element analysis and the calculations

from the loads program the team designed lightweight modules that could be welded and post machined to provide accuracy. Because there are fewer nuts and bolts, the arm can be quickly taken apart and serviced.

"The overall design has significantly fewer pieces than the older version. We feel we have succeeded in producing a design that is elegant in its simplicity," said McMahon. "The new arm can be serviced in an estimated fourth of the time of the old arm."

Fritz and McMahon, with the help of John Haas, developed the mechanics of the arm. The arm is hydraulic and uses magnetically coupled resolvers for position feedback. Each joint is designed differently to optimize performance. The hydraulic fluid works at 3,000 pounds per square inch and is water soluble.

"The difficult part of the project was coming up with a combination of actuators suitable to the WETF environment," said Haas, Johnson Engineering's mechanical engineer.

Actuators are devices that control the fluid power to the rotary motor.

"The wrist uses helical planetary rotary actuators, the elbow incorporates a linear actuator connected to a four bar link arrangement, the shoulder pitch joint directly connects two structural elements and the shoulder yaw joint uses a rotary vane style actuator," Haas said.

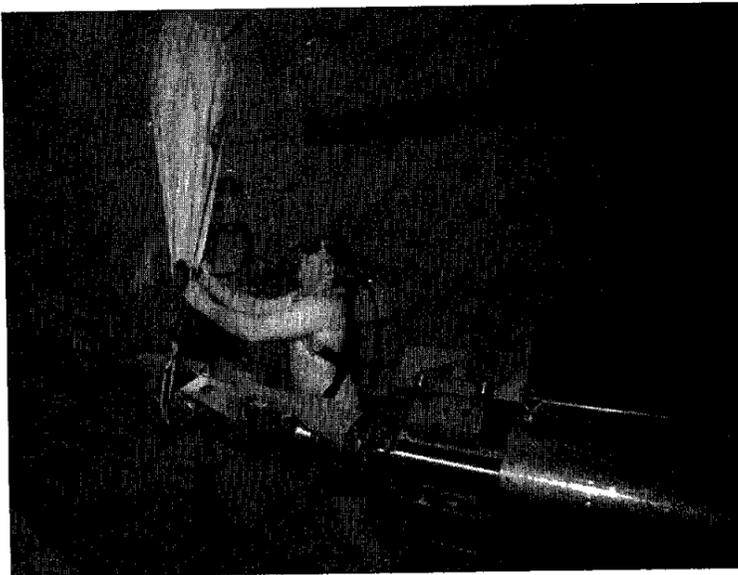
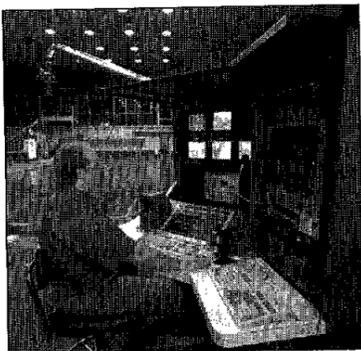
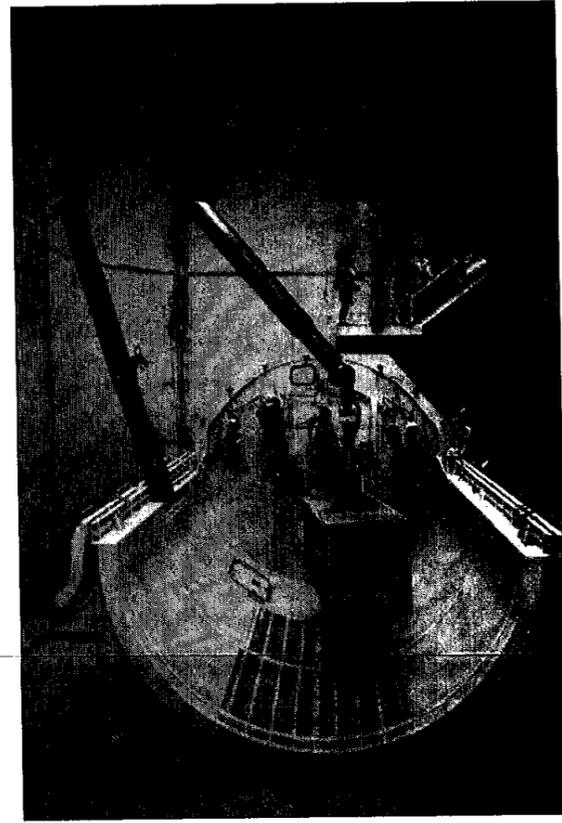
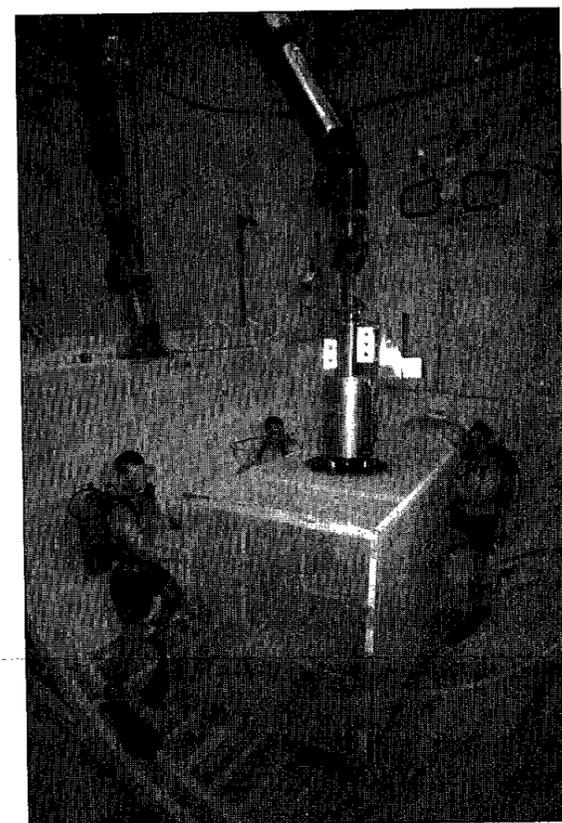
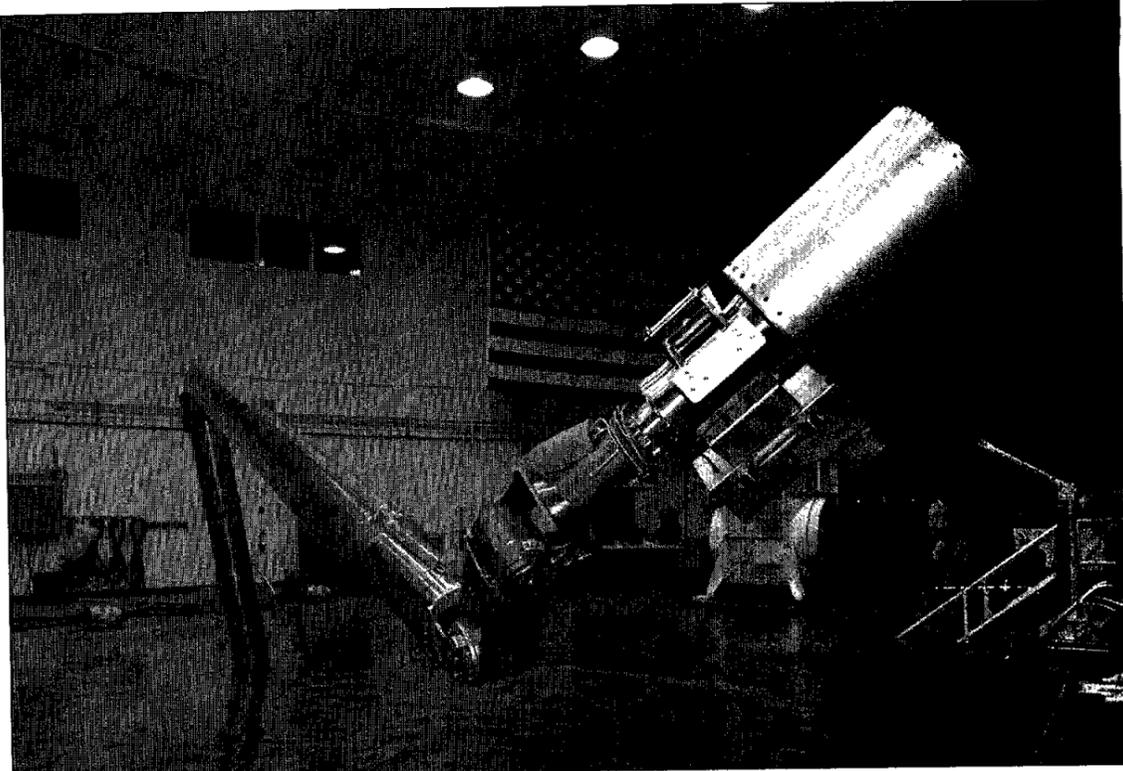
"The wrist and shoulder yaw actuators are integral structural members housing the associated bearing assemblies."

The team also had to decide how the arm would operate. Using two 486 PCs and two programmable logic controllers, the team developed a graphical user interface that allows the operator to select modes at the click of a mouse.

"Once a mode is selected, a pair of flight-like hand controllers is used to control the arm," said Rusty Crawford, project lead and control system engineer from Johnson Engineering. "The system also includes switches, indicators, a hydraulic pump and emergency shut down. A real-time Windows-based engineering simulation and modeling application was used to develop control schemes and allowed real-time changes."

Most of the new arm's parts were contracted out for fabrication with the help of the Manufacturing Materials and Process Technology Division and Johnson Engineering. As parts came in, the team assembled, tested and installed components. With certification complete, the team is now looking at its next project, the Space Station Remote Manipulator System that will be developed for the new Sonny Carter Training Facility.

"The best part of the project is that we came in under budget and gave the taxpayer good value for their money," Haas said. □



Top to bottom, left to right:

1) The WRMS demonstrates that it has the ability to operate out of the water, increasing the ease of maintenance.

2) Three of the WRMS team members don scuba gear to check out the arm's ability to grapple a test article. From left are John Haas, David McMahon and Rusty Crawford.

3) The trio watches as the arm lifts the test article in the underwater payload bay mock-up.

4) Rusty Crawford mans the WRMS control panel in Bldg. 29.

5) Rusty Crawford attaches a lift bag to the WETF Remote Manipulator System. The bag is used to help remove the underwater arm from the water for adjustments and maintenance.

6) The WRMS team poses with its creation. Front row, from left: Crawford, McMahon, Haas and Fred Robinson. Back row, from left: Mike Schattel, John Costales, Carolyn Fritz, Mo Ahmadian and Benny Matusek.

# NASA helps invent revolutionary X-ray instrument

A three-year collaborative effort by NASA, industry and university researchers has resulted in the development of an instrument which can generate the world's most intense source of commercial X-rays.

Capable of generating beams that are more than 100 times the intensity of other conventional X-ray sources, the new instrument is expected to lead to improvements in biotechnology research and have a wide variety of applications.

The revolutionary invention was developed by researchers at Marshall Space Flight Center, X-Ray Optical Systems Inc. in Albany, N.Y., and the Center for X-Ray Optics of the

State University of New York.

"This new optical instrument provides something never before possible: a capability to control the direction of X-ray beams," explained Walter Gibson, professor of physics at the University of New York.

At the heart of the instrument is a new type of optics for X-rays called "Capillary Optics."

"The X-rays are controlled by reflecting them through tens of thousands of tiny curved channels or capillaries, similar to the way that light is directed through fiber optics," Gibson said. "Thus, we are able to concentrate the beams to suit the particular needs of the intended research or medical procedure."

Researchers at Marshall are using the newly developed X-ray instrument to determine the atomic structure of proteins which are the targets for drug design.

"Our current research efforts focus on many difficult public health problems such as cancer, AIDS and heart disease," said Daniel Carter of Marshall's Laboratory for Structural Biology. We expect this new technology to significantly accelerate the ability of researchers to gather the information necessary to design entire families of highly effective, disease-fighting drugs."

"As a result of working with NASA and the State University of New York at Albany, we

have developed X-ray optics which will provide important commercial benefits to a broad range of industries," said David Gibson, president of X-Ray Optics. "Many commercial applications of this new technology are possible, including better manufacturing control for semiconductor circuits, medical imaging, and improved forensics."

The high intensity X-ray beams will permit scientific and medical research to be performed in less time with higher accuracy. In some cases the research was not feasible in standard X-ray laboratories. Also, the instrument could permit the use of smaller, lower cost and safer X-ray sources.

## New external tank ready for testing

A new super lightweight external tank took an important first step toward flight Feb. 1 with the arrival of a special test article at NASA's Marshall Space Flight Center.

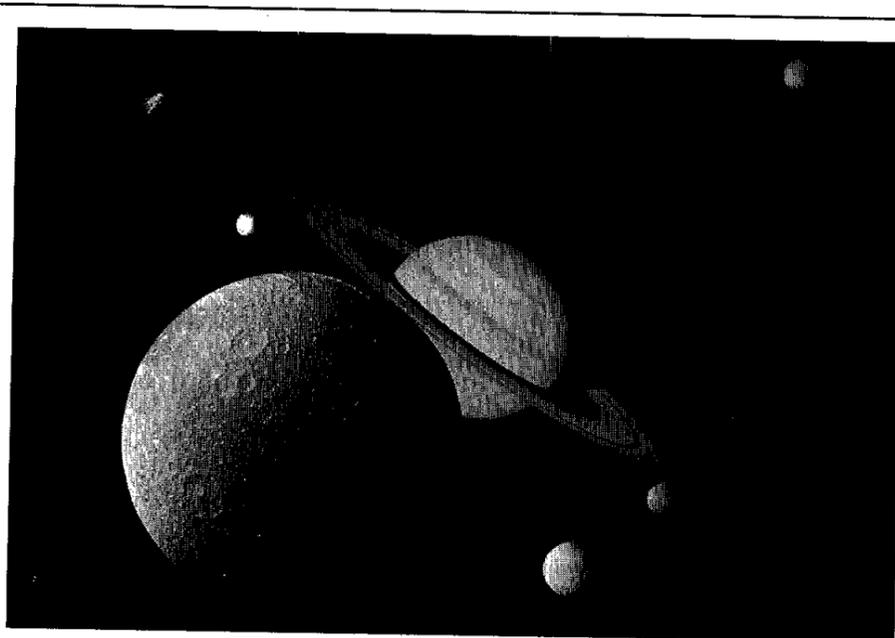
The Aluminum Lithium Test Article arrived at Marshall by barge for testing at the center's structural and dynamic test stand. Over the next six months, the test article will undergo pressure and other tests to simulate the launch environment to verify the structural design of the tank.

"This is a significant milestone for the Super Lightweight Tank program," said External Tank Project Manager Parker Counts. "We're excited about testing the special segment at Marshall and making a significant move toward flight certification and eventual first flight."

While the test article is only 40 feet long, compared to the 154 feet of an external tank, its diameter of 27 feet is the same. It also includes a new structural design. The test article is essentially a modified segment of the aluminum lithium liquid hydrogen tank with a liquid oxygen tank dome at one end.

The new external tank will be the same size as the current one but will be approximately 7,500 pounds lighter. "Each pound we can take from the external tank is one more pound we can take to orbit. This becomes especially important when launching the International Space Station into its proper orbit in 1997," Counts said.

The super lightweight tank will be constructed of aluminum lithium which is a lighter, stronger material than the metal alloy currently used. Taking advantage of the high strength, lower density properties of aluminum lithium, the walls of the hydrogen tank will be manufactured in an orthogonal waffle-like pattern.



This montage of Saturn, Dione, Tethys, Mimas, Enceladus, Rhea and Titan is just one of the many images available at the new Planetary Photojournal home page.

## Planetary images now available

One of the world's most popular photo collections—images of the planets produced by the U.S. space program—went online in a central location this month as part of a joint project between NASA and the U.S. Geological Survey.

NASA's Planetary Photojournal, accessible on the Internet via the World Wide Web, enables access to NASA's archive of planetary images for viewing and use by the public, scientists, educators and publishers.

"This Web site opens a fresh window on the planets and what we have learned from them," said Wesley Huntress, associate administrator for space science. "Communication is the final and probably the most important step in the scientific process. Using some of the same computer technology that helps us generate new discoveries, this partnership with the USGS will allow us to share this knowledge with people everywhere."

"The new system currently provides access to images residing in collections at the Jet Propulsion Laboratory and at the

USGS in Flagstaff, Ariz., along with captions and other information such as mapping data," said Sue LaVoie, a member of the development team at JPL.

The site features thumbnail and browse-size versions of the images for viewing and provides user-friendly digital downloading of images in a variety of formats and sizes.

Access is provided not only to the most popular images but to the entire primary image data sets from various space missions. Links are provided to commercial vendors for ordering hard copies of photographs, slides, CD-ROMs and other imaging data products from the collection. Other links in the new system allow users to jump to and browse other space image data collections, LaVoie said. Pointers and links to other sites, such as space mission home pages, also are featured.

Addresses for the new NASA Planetary Photojournal are:  
<http://www.pdsimage.jpl.nasa.gov/PIA>  
<http://pdsimage.wr.usgs.gov/PIA>

## West becomes NASA chief information officer

Ronald West has been named chief information officer at NASA Headquarters effective March 3.

West will succeed John Lynn, who has announced his intention to retire after 40 years of government service. The CIO reports directly to the administrator and is responsible as an integrated agency focus for the development of information resource management strategies, policies and practices.

These encompass strategic planning; standards in computing, networking, and security; establishment of system and information architectures and incorporation of life-cycle management concepts into information technology acquisitions and management. In addition, the CIO serves as the senior official for Information Resource Management.

## O'Connor leaves NASA

Space Shuttle Director Bryan O'Connor announced last week that he will retire this month.

In making his announcement, O'Connor released the following statement.

"The current transition under way in the shuttle program management presents an occasion for me to leave NASA without causing a significant disruption.

"It has been an honor and privilege to work with the dedicated men and women who work on the shuttle program. It has been their exceptional work that has allowed 49 safe and successful missions since the shuttle's return to flight."

## AIAA seeks papers for technical symposium

The American Institute of Aeronautics and Astronautics is seeking papers to be presented at the 21st Annual Technical Symposium to be held May 23 at the Center for Advanced Space Studies.

The theme of this year's symposium is "New Frontiers Through Technologies, Process and Paradigms."

Abstracts should be 250 words or less and must be double-spaced. Electronic submission, demonstrations and exhibits of hardware are encouraged. Presentations will be limited to 20 minutes. Vu-graphs or 35mm slides are preferred with handouts available.

Abstracts should be submitted with a NASA Form FF427 and a paper/author information sheet to Charles Teixeira, Mail Code EA63, email at [cteixeir@gp903.jsc.nasa.gov](mailto:cteixeir@gp903.jsc.nasa.gov). For information call Teixeira at x34647.

# Lead role means JSC must assume national perspective

(Continued from Page 1)

space operations lead center. O'Neill is the functional manager for agency space operations and for space operations facilities and systems, including worldwide space networks, mission and network control facilities, mission control facilities, data processing and planning systems and telecommunications systems.

The Space Operations Management Office has been concentrating initially on near-term cost-saving opportunities and planning and negotiation of streamlined and

consolidated space operations services across the agency. The overall goal is to develop cost effective mission services and strive toward a set of common services to support human, deep space and low-Earth orbit robotics missions.

"We're going to have to rely on a lot of people who are not just at this center, but who are contributing and making those programs happen at Kennedy, Marshall and Stennis," Abbey said. "We'll have to rely on them to do their part, and I think we have a very good working relationship with the

other center directors."

Another new JSC organization will be the Extravehicular Activity Projects Office, which will serve as the agency's lead for all space walk activities and provide services through agreements with the shuttle and station programs. The small office will be led by Don McMonagle, with Milt Heflin as his deputy.

Abbey said reductions in JSC's civil service and contractor work force are still going to be necessary, but that as the center takes on new responsibilities the losses may be offset to some degree, particularly as the

station program's Headquarters employees become part of JSC's base.

"This move reflects a lot of confidence and trust in the Johnson Space Center team and clearly causes us to have a perspective that's different than we've had in the past," Abbey concluded.

"We've had a perspective that's been more center oriented and, in taking on this responsibility, we have to take on more of a national perspective, a perspective that is more programmatic and looks at what's good for the country and for NASA."

## Atlantis rolls to VAB this month

(Continued from Page 1)

briefing will cover the latest findings from the Commercial Protein Crystal Growth experiment, scheduled to fly again on STS-75.

The STS-75 crew—Commander Andy Allen; Pilot Scott Horowitz; Payload Commander Franklin Chang-Diaz; Mission Specialists Jeff Hoffman, Claude Nicollier and Maurizio Cheli; and Payload Specialist Umberto Guidoni—will meet the press in a briefing beginning at 2 p.m.

A Feb. 22 launch date would lead to a 2:18 p.m. CST liftoff of *Columbia* on STS-75.

Meanwhile, work also is under

way at KSC to ready *Atlantis* for the third Mir docking mission, STS-76. Currently aimed at a mid-March launch, preparations this week included tests of the orbiter docking system and installation of the main engine heat shields.

The payload bay doors on *Atlantis* are scheduled to be closed for a final time prior to the flight on Wednesday, and the orbiter is planned to be rolled to the Vehicle Assembly Bldg. to be mated with the STS-76 solid rockets and fuel tank on Feb. 20.

Elsewhere, *Endeavour* is in KSC's Bay 3 processing hangar being prepared for a mid-May launch on STS-77.

## 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.

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Editor ..... Kelly Humphries  
 Managing Editor ..... Karen Schmidt

## Payload specialists get nod

(Continued from Page 1)

STS-63 mission in February 1995. Roger Crouch and Gregory Linteris have been selected to fly as payload specialists on the 1997 Microgravity Science Laboratory mission.

Crouch is the lead microgravity scientist in NASA's Office of Life and Microgravity Sciences and Applications. The 55-year-old Crouch was an alternate payload specialist for STS-42, the first International Microgravity Laboratory mission.

Linteris is a mechanical engineer at the National Institute of Standards and Technology in Gaithersburg, Md., where he is responsible for advanced fire suppressants.

NASA has designated Paul Ronney of the University of Southern California to serve as a backup to Crouch and Linteris. As an alternate, Ronney will undergo the same training as Crouch and Linteris and will be ready to fly if needed.

The 16-day Spacelab mission is scheduled for *Columbia* on STS-83 in the spring of 1997. Crouch and Linteris will conduct more than 25 investigations in microgravity sciences, such as fluid physics, combustion science and materials science. Ronney will be crew interface coordinator in the Spacelab Mission Operations Control Center at Marshall Space Flight Center.