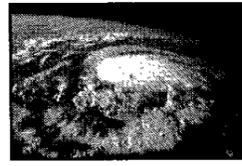




Emergency response

Drills, improvements around JSC prepare emergency teams for all types of potential mishaps. Story on Page 3.



That time of year

The Emergency Preparedness Office give tips for the 1996 hurricane season that begins June 1. Story on Page 5.

Space News Roundup

Vol. 35

May 31, 1996

No. 21

Astronauts complete 'grand slam'

Four rendezvous in one flight sets shuttle-era record

After successfully demonstrating a second technological marvel and completing a record fourth rendezvous on the same flight, the crew of the Space Shuttle *Endeavour* glided to Earth early Wednesday.

The 10-day-long mission featured 21 hours of precise formation flying with the Spartan 207 and PAMS-STU satellites, as well as an invitation to tea on the Mir Space Station "since you're in the neighborhood."

Endeavour touched down on Runway 33 at Kennedy Space Center at 6:09 a.m. CDT Wednesday. Commander John Casper, Pilot Curt Brown and Mission Specialists Andy Thomas, Dan

Bursch, Mario Runco and Marc Garneau were welcomed home at Ellington Field later that afternoon.

The fourth rendezvous with a trash can-sized Satellite Test Unit took place on Memorial Day as scientists—testing whether they could keep a satellite properly aligned using weights and magnets rather than propellant—were rewarded with a good laser lock.

"It was a fantastic day. We saw a satellite that was aerodynamically stabilizing," said Linda Pacini, project manager for the Passive Aero-

dynamically Stabilized Magnetically Damped Satellite. "They (the crew) said it was rock solid."

Four hours of precise laser measurements, which had not been achieved on the first two rendezvous with PAMS-STU, gave the scientists a third data source to add to the radar and video data collected on all three approaches. The laser imaging system was the most accurate data source for validating the aerodynamic stabilization process.



The Satellite Test Unit, part of the Passive Aerodynamically Stabilized Magnetically Damped Satellite is seen moments after its ejection from the cargo bay of *Endeavour*.

Blood drive breaks all records

JSC employee's responded in a big way last Thursday to the Onsite Blood Drive at Teague Auditorium.

In all, 300 employees donated whole blood, platelets and plasma—an all time high for the JSC program and nearly a six-fold increase over the January blood drive.

"The response was overwhelming," said event coordinator Dan Mangieri of the Human Resources Office. "I think it demonstrates the potential for JSC employees to make a difference in the community."

The big turnout was especially important in light of the Memorial Day holiday weekend, when blood supplies are typically in high demand and short supply.

"Words cannot express the importance of this response by JSC employees," said Stephanie Logsdon, manager of St. Luke's Volunteer Blood Donor Program. "St. Luke's had a heart transplant this weekend and implanted a heart assist device in another patient. Every platelet donated at the JSC Onsite Blood Drive was used and more than half of the whole blood donations have already been used in support of the hospital's patients."

Recent efforts to revitalize and promote JSC's Onsite Blood Drive focused on implementing several changes to the program, primarily aimed at making it more convenient to become a blood donor. Moving the Blood Drive to Teague Auditorium and keeping it open during lunch along with forming a committee dedicated to helping publicize the Blood Drive helped improve the number of donations received, Mangieri said. Donors also received free T-shirts, which seemed to provide an extra incentive. Many of the changes were the result of suggestions from employees who had been involved in past blood drives.

"This is an example of how examining a process and making changes by involving those closest to it—in this case the blood donors themselves—can have a tremendous impact on the overall success," Mangieri said.

The program promises additional adjustments for the next blood drive, scheduled for Aug. 15. Lessons learned from this blood drive include expanding screening stations to reduce waits. JSC organizers and St. Luke's thanked all the blood donors and others who helped organize the effort. Without them the big turnout would not have been possible, they said.



JSC Photos by Benny Benavides and Mark Sowa

Above: Bill West of Rockwell International carries the Olympic torch through the streets of Houston. Left: West and Paula Vargas of Taft Broadcasting were selected to carry the torch for one kilometer in Houston as it makes its way to the 1996 Summer Olympic games in Atlanta. The two JSC employees were chosen for the history-making opportunity because of their voluntary contributions in the community.

JSC tunnel system gets extensive rehabilitation

JSC's underground tunnel system is undergoing extensive renovation to improve utility distribution and provide a safe environment for employees who must work on the system.

"The underground tunnel has provided housing for the distribution of critical utilities and communications at JSC for 33 years," said Jim Hickmon, director of Center Operations. "The three and a half mile tunnel is undergoing a much needed rehabilitation."

The three-phase tunnel rehabilitation project, managed by Center Operations, began in 1995 and will be completed by the year 2000 at the cost of approximately \$14 million. The Phase I activity now in work focuses on improved ventilation, emergency/exit lighting, fire detection, emergency communications, electrical repairs, asbestos

abatement, structural repairs, steam pipe repair and replacement, as well as upgrading access and egress.

"Air intake pipes and large excavation sites have popped up at various locations around site," said Steve Campbell, project engineer for the tunnel rehabilitation project. "These are all a part of the new ventilation system for the tunnel."

The follow-on phases will complete structural repairs, upgrade critical utilities, remove unused and excess cable and provide redundancy for critical functions. The overall project is designed to provide JSC with a functional and reliable utility distribution system that can efficiently support current and future programs and meet life safety standards. For more information on the tunnel rehabilitation project, call Campbell at x33200.

Mir cosmonauts prepare station for more power

By Karen Schmidt

The Mir 21 cosmonauts conducted three space walks over the past 10 days to improve power and install science experiments outside the Russian Mir Space Station.

Mir 21 Commander Yuri Onufrienko and Flight Engineer Yuri Usachev were expected to venture outside Mir Thursday to attach German scientific experiments while Cosmonaut Research Shannon Lucid remained inside Mir to monitor the two space walkers.

Last Friday, the two cosmonauts spent six hours unfurling a solar array built jointly by the U.S. and Russia which was brought to Mir on STS-74 last November. Onufrienko and Usachev worked together to install six Y-connectors and unfurl more than 30 solar panels. The array is working perfectly and the only problems reported were the size of the arrays and the position in which the crew members had to work to crank the array open.

"The EVA was pretty exciting," Lucid said during a crew news conference Tuesday. "The thing that struck me when Yuri and Yuri went out and did their EVA was how big the station is. The first time I saw Yuri way out on that long pole and going out across nothing my heart went up in my throat."

A cargo boom or strela—attached to the core module—is used by the Russians to transfer equipment and people from one module to the next across the expanse of space without having to return to the core module.

Usachev mounted the solar array on the station's Kvant-1 module during a six-hour space walk last week. The procedure required the two space walkers to remove the array from the Docking Module where it had been stored and transport it to the Kvant-1 module. Onufrienko and Usachev positioned the array's cables so everything would be ready for the deployment.

Meanwhile, Lucid's research continues with the majority of the work taking place in the Priroda module.

Please see **MIR**, Page 6



JSC Photo by Robert Markowitz

Gardner-Zemke employees set forms for an air exhaust structure as part of the tunnel rehabilitation project. The first phase of the \$14 million renovation includes improving ventilation with air intake pipes. Other upgrades include lighting, fire detection, emergency communications, electrical repairs, asbestos abatement and structural repairs.

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.

Astroworld: One day pass cost \$17.25.

Fiesta Texas: One day pass cost \$17.25.

Six Flags: One day pass cost \$17.25.

Sea World: Adult tickets cost \$24.50, Children (3-11) cost \$17.25.

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

Movie discounts: General Cinema, \$4.75; AMC Theater, \$4.50; Sony Loew's Theater, \$4.75.

Stamps: Book of 20, \$6.40.

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

Metro tickets: Passes, books and single tickets available.

Upcoming events: Caribbean Getaway Sept. 13-20. Cost is \$559. Deposit of \$200 due July 8. Mexico Cooper Canyon Trip Nov. 6-12. Cost is \$995. Deposit of \$200 due Sept. 6.

JSC

Gilruth Center News

Sign up policy: All classes and athletic activities are first come, first served. Sign up in person at the Gilruth Center and show a 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.

Golf instruction: Group Golf Clinics throughout spring and summer at Clear Lake Golf Club. Sign up at Gilruth.

Fitness Challenge: 1996 Fitness Challenge runs to Aug. 31. Employees are eligible to win \$100 gift certificates. For more information call Larry Wier at x30301.

Defensive driving: One day course is offered once a month. Cost is \$25. Interested employees should call the Gilruth.

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

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. June 13. 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 6:15-7:15 p.m. Tuesday and Wednesday. Cost is \$25 per month. New classes begin first of each month.

Aerobics: Class meets from 5:15-6:15 p.m. Monday, Tuesday and Thursday. 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. Advance 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.

JSC

JSC

Dates & Data

Today

Cafeteria menu: Special: tuna noodle casserole. Total Health: broiled chicken breast. Entrees: deviled crabs, broiled pollock, liver and onions, broiled chicken with peach half, Reuben sandwich. Soup: seafood gumbo. Vegetables: Italian green beans, cauliflower au gratin, steamed rice, vegetable sticks.

Monday

Cafeteria menu: Special: Italian cutlet. Total Health: herb flavored steamed pollock. Entrees: barbecue beef spare ribs, steamed pollock, baked chicken. French dip sandwich. Soup: black bean and rice. Vegetables: California mix, okra and tomatoes, vegetable sticks, ranch style beans.

Tuesday

ABWA meets: The American Business Womens Association, Clear Lake Area Chapter will meet at 5:30 p.m. June 4 Bay Oaks Country Club. For more information call Nancy Hutchins at x34006.

Cafeteria menu: Special: spaghetti with meatballs. Total Health: baked potato. Entrees: stir fry beef, liver and onions, beef cannelloni, ham steak French dip sandwich. Soup: split pea. Vegetables: winter blend mix, seasoned cabbage, breaded squash, lima beans.

Wednesday

Toastmasters meet: The Space-land Toastmasters will meet at 7 a.m. June 5 at the House of Prayer Lutheran Church. For more information call Jeannette Kirinich x45752.

Astronomers meet: The JSC Astronomy seminar will meet at noon June 5 in Bldg. 31, Rm. 129. An open discussion meeting is planned. For more information call Al Jackson at x35037.

Cafeteria menu: Special: smoked barbecue link. Total Health: roast porkloin. Entrees: cheese enchiladas, roast pork and dressing, baked chicken, steamed pollock, Reuben sandwich. Soup: seafood gumbo. Vegetables: Italian green beans, Spanish rice, turnip greens, peas and carrots.

Thursday

Warning system test: The site-wide Employee Warning System will under go its monthly audio test at noon June 6. For more information call Bob Gaffney at x34249.

Cafeteria menu: Special: chicken fried steak. Total Health: roast beef with gravy. Entrees: steamed pollock, lasagna with meat, steamed pollock, catfish, French dip sandwich. Soup: cream of turkey. Vegetables: whole green beans, butter squash, cut corn, black-eyed peas.

Friday

Cafeteria menu: Special: fried chicken. Total Health: vegetable lasagna. Entrees: pollock hollandaise, beef stroganoff, vegetable lasagna. Vegetables: steamed broccoli, carrots vichy, Italian zucchini, breaded okra.

June 12

MAES meets: The Society of Mexican American Engineers and Scientists will meet at 11:30 a.m. June 12 in the Bldg. 3 Cafeteria executive dining room. For details call Michael Ruiz at x38169.

June 13

NPM meets: The National Property Management Association will meet at 5 p.m. June 13. For more information and meeting location call Marie-France Smith x39309.

Airplane club meets: The Radio Control Airplane Club will meet at 7:30 p.m. June 13 at the Clear Lake

Park Community Bldg. For details call Bill Langdoc at x35970.

Cultural Exhibits: Stop by the Bldg. 3 cafeteria from 11 a.m.-1 p.m. June 10-14 to view exhibits of JSC employees artistic renditions.

June 11

Cultural Exhibits: Stop by the Bldg. 3 cafeteria from 11 a.m.-1 p.m. June 10-14 to view exhibits of needle works made by JSC employees. Examples of weaving, knitting, quilt-making and clothesmaking will be shown.

June 12

Cultural Exhibits: Stop by the Bldg. 3 cafeteria from 11 a.m.-1 p.m. June 10-14 to view exhibits of antiques and other collectibles of JSC employees. Examples of table fans, vintage bicycles, antique telephones and several others exhibits will be featured.

June 13

Cultural Exhibits: Stop by the Bldg. 3 cafeteria from 11 a.m.-1 p.m. June 10-14 to view exhibits of creations and hobbies by JSC employees. Exhibits of woodworking; bird house creation; ceramics arts; bicycle making; scuba club; sailing club; and amateur radio club will be featured.

June 14

Cultural Exhibits: Stop by the Bldg. 3 cafeteria from 11 a.m.-1 p.m. June 10-14 to view displays from earlier in the week plus an extensive collection of Native American artifacts and vintage automobiles.

Astronomers meet: The JSC Astronomical Society will meet at 7:30 p.m. June 14 at the Lunar & Planetary Institute 3600 Bay Area Blvd. For more information call Chuck Shaw at x35416.

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: Wooded lot 90' x 135', Taylor Lake Estates near JSC, \$39.5k, can finance. Don, x38039 or 333-1751.

Sale: Clear Lake condo, 1-1, W/D, FPL, good cond, close to NASA. Ruben, x47119 or 486-0817.

Sale: Freeway Manor house, 4-1.5-CP, 1200 sq ft, Pasadena school district, fans, covered patio, garden, grape vines, \$49.9k. Ruby/Cecil, 944-5944.

Sale: Clear Lake, Oakbrook West, 2 story, 4-2.5-2, pool w/jacuzzi, custom cabinetry, carpet allowance, warranty, \$121.9k. x38275 or 480-4634.

Rent: House off Fuqua & Monroe, 3-1, \$450/mo. Mike, x38169 or 482-8496.

Rent: League City, Pecan Forest, 3-2-2, FPL, very clean, no pets, \$850/mo. 554-6200.

Sale: Custom home on 6 acres, split floor plan, large den, gameroom, appliances, Corian counter-tops, 30 x 50 metallic workshop. 409-925-6519.

Lease: University Green, patio home, 3-2-2, close to park/tennis courts, good cond. \$875 mo. 486-8551.

Sale: 130 cleared acres, 5 pastures, 15 mi East of Tyler, house, hay & horse barns, divide, all amenities. 488-5058.

Rent: House W. Bay Area Blvd, 3-2-2 w/formal, cul-de-sac, large backyard, \$750 mo. 661-8509.

Sale: University Trace condo, 1 BDR + study, new carpet/paint, all appliances. 333-3925.

Sale: Webster, 2-2-2CP condo, upstairs flat w/new A/C, kitchen and bath upgrades, WBFPL, full size W/D conn, \$37.5k. 280-0285.

Lease: Barringer Way condo, 2-1, W/D conn, pool, storage area, ex cond, no pets, \$495/mo. 486-2048.

Rent: Duplex type 3 BDR apt, Kemah waterfront area, appliances, W/D, prefer mature adult, no large dog, \$500, bills pd. 334-3779.

Lease: CLC, 1BDR condo, W/D, FPL, security alarm, cov'd parking, new carpet/blinds, tennis, exercise room, avail now. Jim Briley, 244-4632 or 488-7901.

Sale: El Dorado Trace condo, 2-1, W/D, security system, cov'd parking, pool, storage room, 2nd story. 286-7014.

Rent: Beach house, Jamaica Beach, West Galveston, 2nd row beach, all amenities, sleeps 5-7, weekend/weekly rates. 488-6796 or 409-737-5017.

Rent: Arkansas cottage in the woods overlooking Blue Mt Lake & Mount Magazine, furnished, FPL, \$50/dly or \$250/wk. Corcoran, x47806 or 334-7531.

Rent: Beach house, Crystal Beach TX, Galveston Co, furnished, cable TV, ocean view, weekend/weekly. 486-1888.

Rent: Galveston condo, Seawall & 61st St, furnished, sleeps 6, cable TV, daily/weekend/weekly. Magdi Yassa, 333-4760 or 486-0788.

Cars & Trucks

'91 Jaguar Sovereign, dark metallic blue/blue, ex cond, 83k mi, loaded, \$13k. 992-3014.

'88 Cadillac Fleetwood, loaded, electric, non-

smoker, ex cond, 61k mi, 1 owner, \$8.9k. 331-0249 or 244-9737.

'84 Saab Turbo 900, needs work, runs, 150k mi, \$1.5k. 334-3779.

'90 Pontiac Sunbird convertible, loaded, ex cond, \$6k. Dave, x36027.

'90 Chevy Caprice Classic, 2-tone blue, 4 dr, 305 auto, cruise/tilt, P/L, AM/FM/cass, A/C, very clean, 72k mi, \$5,795 nego. Pat, x30021 or 479-7947.

'87 Buick Park Avenue, 3.8L V6, auto, cruise/tilt, powered, new A/C/tires/shocks & struts/fuel pump, 129k mi, \$3,995 obo. Ginger, x38493 or 332-7908.

'84 Pontiac Fiero SE, red, 4 cyl, auto, loaded, sunroof, 1 owner, 85k mi, good cond, \$2.2k. x48609 or 326-2441.

'92 Ford Aerostar XL van, new tires, A/C, P/L, P/W, alarm, ex cond, \$7.9k. 335-9134.

'91 Toyota PU, 48k mi, white w/black trim, 5 spd, big tires/chrome wheels, bed liner, ex cond, \$6,850. x47097 or 486-4663.

'87 Nissan 200 sx, red, 2 dr, 69k mi, ex cond, \$3.5k. x40007 or 334-1206.

'82 Mercury Lynx wagon, clean, runs good, A/C, \$500. 996-9365.

'90 Mustang GT convertible, auto, alarm sys, CD, low mi, orig owner, ex cond, \$14.5k. 334-3066.

'92 Mazda Miata convertible, ex cond, black, loaded, removable hardtop, new tires, 40k mi, \$12,998. x41408 or 486-5793.

'93 Custom Chevy van, fully loaded, 4 capt chairs & bed, dual A/C, wood trim & jack for TV, gray cloth seats, ex cond, \$14.3k. 333-3988.

'92 Chevy Lumina, Euro 3.4, black w/grey interior, sport instrumentation, ex cond, w/Delco Bose, AM/FM/cass, alarm, 1 owner, \$8k. Ron, x33196.

'86 Jeep Cherokee, honey brown, 4 WD, high miles, new shortblock, A/C, new tires, runs great, needs cosmetics, \$6.5k obo. Cynthia, x39267.

'94 Toyota Tercel, 2 dr, AM/FM/cass, A/C, 4 spd, tinted windows, 18k mi, ex cond, \$7.5k. 996-8425.

'84 Mazda RX-7 GSL-SE, black/red, 5 spd, sunroof, AM/FM/cass, good cond, \$2,950. 318-0412.

'95 Ford Ranger XLT supercab, air bag, 5 spd, A/C, AM/FM/cass, low miles, \$14.5k nego. 282-9334.

'91 Isuzu PU, 5 spd, 72k mi, A/C, alarm, cruise, CD, bed cover, mags, tint, \$4.8k. 992-0782.

'91 Chevy Beretta, blue, low mi, reg maintenance, ex cond, \$6.8k firm. Dan, 482-7550.

'83 Dodge van, custom interior, good camper, chrome mag wheels and orig incl, \$2.2 obo. Ken, x31496 or 286-7583.

'86 Honda Civic, 4 dr sedan, white, 5 spd, ex cond, \$2,850 obo. Mark, x35597 or 554-5156.

'94 Pace Arrow motorhome, ex cond, 34', 8.8k mi, Chevy 454, 2 A/C, queen, open kitchen, recliner, \$57.5k. 282-0317.

Boats & Planes

Goldwing home built single place airplane, 450 Cuyana engine, pusher, canard design, on trailer, assemble in 20 minutes, \$5k. x47010 or 470-6093.

'92 Kawasaki 750 Super Sport Waverunner, trailer, life vest, \$3.5k. 488-2184.

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

'90 Jet-n-Cat, oversized jet ski, needs engine, 650 Yamaha, trailer. x47010 or 470-6093.

Allweld 12', 48" wide, galvanized trailer, '92 8Hp Mercury, \$1.6k firm. Sean, x46170 or 996-7693.

Audio Visual & Computers

486 DX2-66, 8Mb mini-tower 14" SVGA, \$695; Compaq 386, 4Mb 14" VGA, \$395; Pentium 75-100-133-166, 8Mb/635, Win 3.11 or 95+Office & other SW, \$899-\$969-\$1,129-\$1,359. Don, 333-1751.

CB radio 40 channel w/built in radio, Sears model, ex cond, make offer. Mike, 333-2335.

Montgomery Ward 4-head VCR w/remote, cable ready, 4-program recording, \$90; KPX-11241, 24-pin, 360dpi, dot-matrix printer, works great, \$85. Gus, x33425 or 286-3402.

Musical Instruments

Piano, spinet style by Gulbranson w/bench, blonde oak finish, perfect cond, \$1.4k. 996-8020.

Photography

RCA 8mm Camcorder, model PRO-808A, loaded, powered zoom, auto focus, full function, wireless remote, warranty, and more, \$420. 333-1465.

Pets & Livestock

Aquarium fish: large Clown Knife, \$75; African Rope fish, \$9; African and neotropical cichlids, \$5-\$10; 2 large sump filter system, \$500 both. David, x40211 or 488-4876.

Talking African Grey parrot, 4 yrs, w/2'w x 2'd x 5'h cage, toys, \$550. 334-4268.

Free, 2 mixed puppies, have had shots. Shelley, x37824 or 409-943-4168.

Male dog, black, part lab, neutered, shots, very friendly, needs good home. 337-3838.

Free beautiful gray furry kitten, 10 weeks. Debbie, x37797 or 996-1848.

Lost & Found

Found Rx glasses, in case, Bldg 30 parking lot, Laura Ashley frames. Tammy, x38210.

Household

California king size water bed frame, w/2 tier, 12 drawer storage areas, all hardware and wood planks to setup frame included, \$75. 334-4268.

Beige leather sectional couch, \$200; glass top coffee table, good cond, 332-9511.

King size waterbed mattress, semi-motion, \$25. Ray, x31484.

King size waterbed w/mirror headboard, heater and drawers for underneath storage, ex cond, \$300 obo. Dusty, 280-2026.

Couch, velour, brown, 8', ex cond, \$200 obo. Les, x34203 or 409-925-4607.

Breakfast table, 6 chairs, 2 leaves, great cond, \$150 firm. Eric, x31917.

King size waterbed, dark pine w/bookcase headboard, \$100; Pappasan chair w/cushion, \$75; over-hanging brass lamp, \$40; dark pine dresser w/mirror and nightstand, \$150 obo. Charlene, x30185.

Bedroom set, full size, antique green w/dresser, 5 drawers chest and 2 night stands, Italian design, great cond, \$950. Magdi Yassa, 333-4760 or 486-0788.

Apartment size wood oval coffee table, \$25; Bunn coffee pot, \$10; pair kitchen chairs w/wheels, \$20. x31057.

Contemporary entertainment center, whitewash finish, 2'x4'x6', accommodates 30" TV, drawers, trays, smoked glass doors, ex cond, \$250; exercise treadmill w/movable arm poles, \$30; wooden king size waterbed w/access, \$90. Gus, x33425 or 286-3402.

Antique brass and crystal chandelier, 6 lights, 67 crystals, new \$600 sell \$300. Tom, 333-3992.

Want Ads

Want non-smoking roommate to share 4-2, Friendswood, w/others, cable, W/D, microwave, VCR, gas grille, household privil. \$250 mo, all bills pd. Michael, x38169 or 482-8496.

Want roommate to share 4 BDR, 2 story house in Seabrook, separate phone, lots of space, \$400. 474-4742.

Want considerate, non-smoking housemate to share 3-2-2 w/bath and garage, Bay Glen/CLC, \$335/mo + \$200 dep, 1/2 util. Larry, x33168 or 488-7460.

Want non-smoking female to share 3-2-2 w/same, all utilities except phone, \$300 mo + \$350 dep. 322-8417.

Want housemate to share 3-2-5, 4-story waterfront townhouse near South Shore Harbour area, community pool, private hot tub/tanning bed, 2 bars, 2 decks overlooking canal, boat slip, lofted study, \$550 mo + 1/2 util. Terry, x39234 or 335-0113.

Want personnel for VPS1 vanpool, departing Braeswood Park and Ride at 6:50 am for JSC/offsite locations, 7:30 - 4:30. Susan Gaynor, 282-5447 or Al Ruder, x34997.

Want ride to and from work, willing to pay gas expense, Pasadena, Richey area, 7:30 a.m. - 4:00 p.m. x48871 or 472-5205.

Want carpool from Highway 6 or Katy for JSC/off-site locations. Mark, 333-8503 or 579-9540.

Want personnel to join VPS1 vanpool departing Meyerland Park and Ride at 7:05 am for JSC, vanpool consists of on-site personnel working 8 am - 4:30 pm shift. Don Pipkins, x35346.

Want canoe and single speed beach cruiser type bicycles. Gene, x38020 or 334-1505.

Want Nikon, Canon, Pentax cameras, lenses, accessories, working cond, to teach high school students, reasonable prices. Steve, x37152 or 992-7049.

Want low priced school/work car/truck, prefer Japanese. 272-7011.

Want bricks, any size or color, preferably free or at low cost, will haul. Steve, x37152 or 992-7049.

Want Wind Berg, "Pelican Wharf". x30626.

Want space memorabilia, flown items e.g. utensils, clothing, autographs on photos, covers, letters, relating to Mercury to Shuttle. Richard, 481-8080.

Safety is No Accident

May 1996

Hurricane season begins June 1

A publication of NASA's Johnson Space Center for Employees' Safety and Health

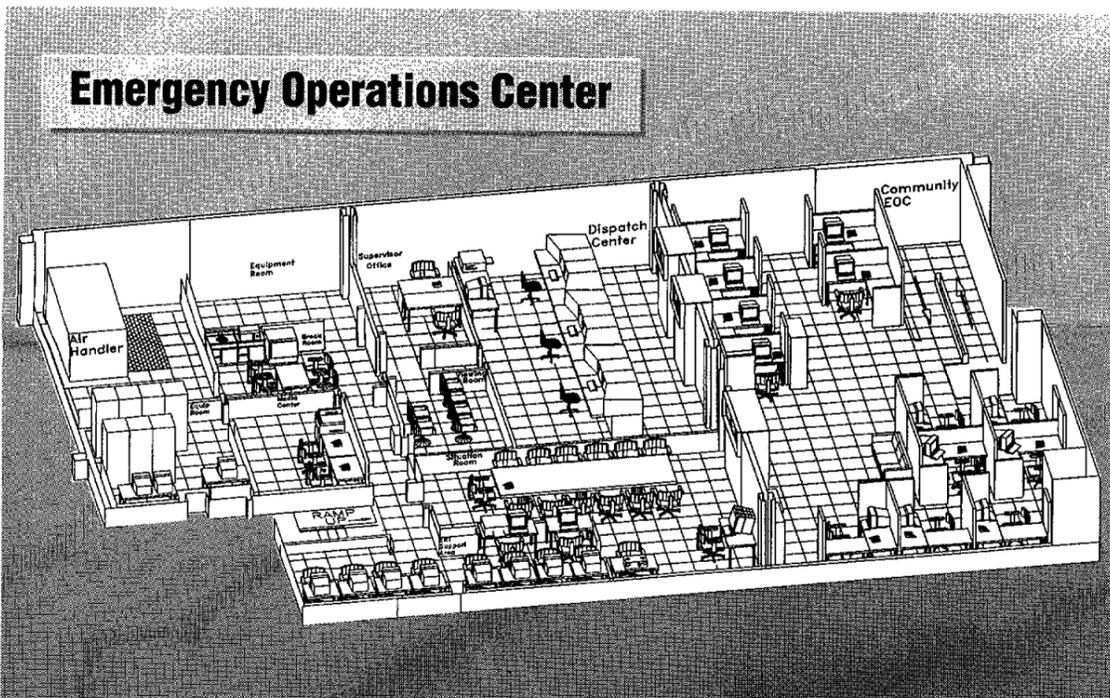
JSC employees must prepare for potential emergencies

Protecting the health and safety of people is the first priority during an emergency, according to JSC's Emergency Preparedness Manager Keith McQuary. "But emergency personnel can't be everywhere and do everything." "In a crisis, each individual must know how to respond," he said. "Knowing what to do is the best way to protect themselves and their family. Being responsible means being prepared. It could be the difference between life or death." In many, but not all cases, the simplest approach to protection is evacuation. "In the case of fire, an immediate evacuation to a predetermined area away from the endangered facility may be necessary," said McQuary. "In a hurricane, evacuation could involve the entire community and take place over a period of days. In some emergencies such as a tornado warning, or a chemical spill, the best means of

protection would be to take shelter within any available facility." Experience has shown that organizations and people who prepare for an emergency before it happens have the best opportunity of survival and to restore normal operations quickly. That's why practicing for an emergency is so important, McQuary said. JSC managers and employees conducted two exercises last month which are reported elsewhere in this issue on the *Safety is No Accident* page. The first exercise, on April 15, simulated an explosion during a manned test in Bldg. 32. The second exercise took place on April 22 and simulated an aircraft mishap at Ellington Field. "Highlighting the need for emergency preparedness when no emergency exists is not simple," McQuary said. "However, both exercises were very successful and highlighted the ability

of city and center organizations to coordinate response efforts and cooperate to achieve mutual goals—protecting employees from injury and restoring normal operations." An effective emergency program must be able to warn employees that a disaster is on the way. JSC installed an employee warning system last year to warn employees who are outdoors of danger from incidents such as tornadoes or a chemical release. The system also has a distinctive siren for conventional or nuclear attack, as mandated by law. The Image Services Branch has developed a video called *JSC Emergency Response Plan* to explain to employees how they will be warned of an emergency and how to protect themselves. Providing information on what to do in a crisis is as important as alerting people to the crisis, McQuary said. The JSC Emergency Operations

Center in Bldg. 30 allows center emergency personnel to coordinate response and recovery efforts and inform employees and the community about incidents. In a related area, JSC is putting the finishing touches on an upgraded, comprehensive, state-of-the-art EOC to be shared with community partners in the event of an emergency threatening the upper Texas Gulf Coast. In such a serious emergency, the EOC will be staffed by the JSC Emergency Response Team—JSC emergency preparedness manager and coordinator, Security, Fire Protection, Public Affairs, Plant Engineering, Medical and Industrial Hygiene, Communications and Environmental Services. The Hurricane Rideout Team—that includes a variety of employees from JSC—also will use the EOC whenever the Hurricane Command Post is activated by the Center Operations Director.



Emergency Operations Center

Drawing courtesy Lockheed Martin Space Information Systems

Just in time for the 1996 hurricane season, the new 4,000 square foot facility in Bldg. 30 features a computerized security operations center, an emergency response team support area, a weather console and a communication room for use by surrounding communities.

JSC builds new emergency center

By Karen Schmidt

A new state-of-the-art Emergency Operations Center is now up and running to support JSC emergency procedures from one location. Just in time for the 1996 hurricane season, the new 4,000 square foot facility in Bldg. 30 features a computerized security operations center, an emergency response team support area, a weather console and a communication room for use by the surrounding communities. "The new facility significantly strengthens the center's capability to respond to emergencies and to help ensure our employees' safety," said JSC Director George Abbey.

The center also has been equipped to accommodate the surrounding communities near JSC.

"If a storm or industrial accident threatens the area, we can offer a well-equipped, centrally located facility from which a coordinated response and recovery can be managed," said Abbey.

The new security operations center features a system that integrates JSC's security and fire protection functions into one computer system. It automatically monitors fire alarms, security entrances and external cameras. The system also features computer aided dispatch and automated event recording. When an employee dials the JSC emergency number, x33333, the computer displays the location on a screen. The security operations center is also capable of interpreting more than 140 different languages through a subscription service to provide the best possible emergency service to JSC's multicultural workforce.

Another new feature of the security operations center is a system for displaying emergency information messages over the JSC Television System to keep employees informed.

"JSC places a high premium on safety," said Keith McQuary, JSC emergency preparedness manager. "The new EOC allows JSC to strengthen safety further and extend it to include the neighboring communities and industries of the Gulf Coast area."

"More than one third of the new EOC is designated for community emergency personnel," McQuary said. The facility will be equipped with telephone and fax lines, radio connections, computers and extra ports, copy machines and partitioned offices.

"By sharing these resources, JSC hopes to further facilitate and expedite the crucial work done by community emergency teams," McQuary said.

The JSC Emergency Response Team also has a home in the new EOC. In the event of an actual emergency the ERT can coordinate efforts to reduce employee risk and initiate recovery operations. The ERT—responsible for incident management, employee and environmental safety—will have computers, phones, faxes and televisions to ensure information and resources are available and an emergency is handled as quickly as possible.

The new center also has a weather console to continuously monitor data from the Meteorological Interactive Data Display System at JSC.

"Whether there is a medical emergency, an explosion or a hurricane is about to make landfall, the EOC is geared to handle all types of emergencies at all levels," McQuary said.

Emergency team members train to ensure employee safety at JSC

Although JSC is doing its utmost to protect against serious accidents, the possibilities are still real and JSC's Emergency Response Team has trained extensively to handle any emergency situation.

Depending on the level of the emergency, several organizations must work together to coordinate the response, control a scene, remove the hazard, ensure employee safety and report the incident to appropriate authorities.

"JSC's emergency response team is prepared to handle all types of emergencies," said Keith McQuary, JSC's emergency preparedness manager. "Nearly all JSC organizations must come together, no one goes off to do their own thing."

Emergencies can involve Flight Crew Operations, Center Operations, Safety Reliability and Quality Assurance, Information Systems, Space and Life Sciences, the NOAA National Weather Service and the Office of Public Affairs.

JSC uses an Incident Command System similar to those found in large cities to control situations. A team member from each organization attends an initial 40-hour training session at the Safety Learning Center with certified HazMat experts. Any one of the team members can perform the duty of incident commander and coordinate operations in the event of an emergency. Team members maintain their certification each year with a refresher course.

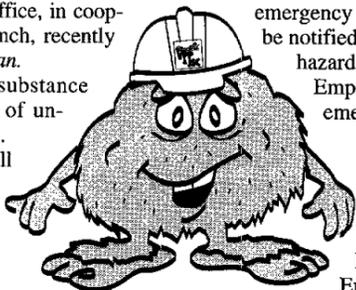
New emergency training video available

A new video is now available to help employees understand JSC's emergency warning systems.

The JSC Emergency Preparedness Office, in cooperation with the Imagery Services Branch, recently completed *JSC Emergency Response Plan*.

The plan deals with hazardous substance releases and spills. It is used in case of unscheduled hazardous substance releases.

The ERP describes how chemical spill emergencies or hazards will be responded to at the center, and provides information on how employees can protect themselves when there is an unscheduled release or spill.



The video condenses the JSC Emergency Response Plan into a 10-minute explanation of how to report a fire or emergency chemical release, and how employees will be notified of a fire in their building—fire alarm—or hazardous release or tornado in the vicinity—Employee Warning System. It also explains emergency responses to such incidents.

The video will be broadcast daily, June 3-7, at 9 a.m. and 3 p.m., on channel 43 of the JSC Television Distribution System. VHS videocassette copies of the program are available for loan by calling the Safety Learning Center at x36369 or the JSC Emergency Preparedness Office at x34249.



JSC Photo by Mark Sowa

The new Emergency Operations Center features a state-of-the-art computer system that can track any emergency call in any building at JSC. Pattered after the new Mission Control Center, the mini-Mission Control ensures employees safety around the center.

Ellington Field safety personnel practice emergency coordination

Last month, the JSC Emergency Response Team was put to the test in response to an emergency call from Ellington Field.

A T-38 jet trainer had attempted to take off but, due to a problem with the right main landing gear wheel which locked up, the aircraft departed the runway, cartwheeled and came to a rest on top of an airport taxiway sign and against an electrical circuit. Hundreds of gallons of jet fuel leaked from the plane before it burst into flames. Both crewmen suffered multiple injuries including second and third degree burns.

Fortunately, this was a drill scenario and not an actual emergency. The Aircraft Operations Division participated with the City of Houston's aircraft mishap simulation exercise in cooperation with an FAA requirement for commercial airports to conduct similar drills periodically.

"The mishap scenario was developed and written to spark a flurry of activity in a dynamic environment that involved a large number of participants," said John Starnes, JSC's aviation safety officer at Ellington Field.

On-site JSC security responded and assisted until Houston Airport Police were notified and arrived from Hobby Airport.

"The Ellington Field Fire Department played the most important part," Starnes said. "Not only was it their task to extinguish the fire, they also affected the rescue and administered emergency medical services until a NASA doctor arrived at the scene. Additionally, they acted quickly to keep the fuel contained by using booms and pads. The city responded with dump trucks and front end loaders as well to help ensure fuel did not enter any out flow streams. Years ago, containing fuel or any other hazardous material at a mishap scene would have been a very minor concern—if one at all. Not so today—it is a big concern."

One significant problem was found with the early notification process. The Public Affairs Officer who is responsible for managing the public release of on-scene information was not connected to the crash net, the system that notifies personnel of a mishap. This vital link is being corrected.

"In addition, we found out how easy misinformation regarding a mishap could develop," said

Judy Rickard of the Aviation Safety Office at Ellington Field. "For example, there was misinformation regarding how many people were actually on board the mishap aircraft, the extent of their injuries, and which victim went to which hospital.

"A lot of distractions from the task at hand were created by a barrage of phone calls from the general public wanting details of the mishap, and pilots wanting to know if they could use the airport or if the mishap had caused the airport to be closed," Rickard said.

Knowing the aircraft must be removed quickly, Starnes began work long before the aircraft was released by the fire chief to JSC. A crane was called and had to be given specific information such as weight of the aircraft and the type of surface it would be lifted from.

"The more you tell people who are responding what they are rolling into—the better they can do," Starnes said.

Photographs were taken of everything—all angles of the aircraft, victims, debris scatter pattern—everything visible, to be used by the

mishap board. Maintenance and quality assurance personnel were consulted to ensure no further damage was caused. The aircraft logs and records were immediately impounded for the investigation. The aircraft was put under security watch while records and forms would be poured over to see if previous problems with the aircraft had been noted or reported.

Participating in the drill with the City of Houston provided the Safety Office an opportunity to go through their aircraft mishap plan, finding areas that needed attention and which were on target in the case of a real disaster. The simulation covered all aspects of a true mishap, from notification to forming a mishap board.

Jack Nickel, chief of the Aviation Safety Office, observed the exercise from the Air Traffic Control Tower. "The drill helped us identify problem areas, causing us to make changes where needed," Nickel said.

In evaluation meetings with the City of Houston and HPD, other areas of improvement were identified. "It was a valuable lesson in that we are now more prepared to handle a disastrous mishap, but hope that we never have to," Nickel concluded.



JSC Photos by Benny Benavides

Above: Ellington Field firefighters check out victims during a T-38 mishap drill. Below: Joe Gerky, an aircraft equipment specialist in the Aircraft Maintenance and Engineering Branch checks on T-38 victim, Terry Lampkins a quality assurance technician at Ellington Field. Victims were told to simulate injuries to be able to better analyze emergency operations. The Aircraft Operations Division participated in a City of Houston's aircraft mishap simulation exercise last month. Emergency personnel from Ellington Field Fire Department, Houston Police, City of Houston Department of Aviation and JSC were able to critique their skills and cooperative efforts in case of an actual emergency.



Hazard chemical awareness helps ensure safety

By Jody Licatino

A large number of the buildings at JSC house laboratories and offices together and JSC safety officials are urging all employees to learn about the possible dangers of hazardous chemicals in their work areas.

"Of the many health and safety concerns facing the JSC work-force, chemical hazards are by far the most pervasive," said Steve Hulka, senior industrial hygienist for Kelsey-Seybold. "Experience has shown that an employee who is better versed on the hazards of a chemical is more likely to be protected."

The hazard communication rule, known as HazCom "Right to Know," became effective on May 25, 1986, and requires employers to develop, implement and evaluate a written compre-

hensive hazard communication program. JSC has a program in place that requires employees to take a Hazard Communication/First Responder Awareness Level Training course.

The course is designed to inform employees of the hazardous chemicals that they may come in contact with and to provide them with as much information as needed to do their jobs safely.

Four key elements in the JSC HazCom program are: labeling, material safety data sheets, the hazardous materials inventory, and employee training.

Other measures to ensure hazard chemical safety include labeling of hazardous material containers. These labels include the name of the hazardous material, hazard warnings and the

name of the manufacturer or supplier. Temporary use containers are also labeled.

To ensure employees' safety, supervisors are responsible for maintaining copies of Material Safety Data Sheets for each hazardous chemical used by their employees. All chemicals coming on site must be accompanied by a data sheet.

New data sheets are submitted to the Hazard Communication Office of Environmental Health Services which is the central repository. New data sheets are assigned a number and a copy is returned to

the initiator. Employees or supervisors may obtain data sheets by calling Margaret Mundine at x37512 or submitting a written request to Mundine at Mail Code SD23.

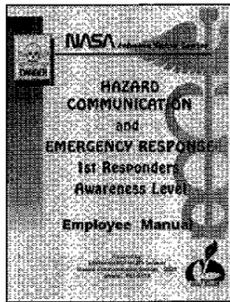
The HazCom standard also requires that JSC conduct an annual inventory of all hazardous materials used on site. Each area where hazardous materials are used maintains an up-to-date inventory of these materials.

"It is important to remember that some office items such as toner cartridges are considered hazardous materials and should be reported on this inventory," Hulka said.

Environmental Health Services coordinates an annual site-wide hazardous materials inventory and distributes copies of this report to all affected organizations.

Employees who would like to take the Hazard Communication/First Responder Awareness Level Training Class can call the Hazard Communication Department of Environmental Health Services at x37424 to register for the class.

This course is approximately one hour in length and is offered twice a month.



JSC Photo by Mark Sowa

City of Houston firefighters search for victims of a simulated explosion in Bldg. 32. To practice preparedness measures, the Crew and Thermal Systems Division's Systems Test Branch, simulated the explosion in Bldg. 32 just last month. The scenario simulated an oxygen manifold explosion and fire in vacuum Chamber B with 10 victims suffering varying degrees of injuries. The exercise required cooperation from Houston Fire Department, the JSC Clinic, Manned Test Medical Support, the Environmental Health Office, JSC Security and Emergency Preparedness.

Drill exercise keeps employees aware

Oxygen explosion simulation critiques facility managers

Just last month, to practice preparedness measures, the Crew and Thermal Systems Division's Systems Test Branch simulated an explosion in Bldg. 32 where large chambers are used for thermal vacuum testing.

The drill scenario simulated an oxygen manifold explosion and fire in vacuum Chamber B with 10 victims suffering varying degrees of injuries. It required cooperation from Houston Fire Department, the JSC Clinic, Manned Test Medical Support, the Environmental Health Office, JSC Security, and Emergency Preparedness.

"These drills ensure that we are prepared to effectively respond to emergencies," said Executive Safety Committee Chairman Jim Wetherbee. "Appropriate training will help make JSC a safer place to work."

Martin said that after the fire alarm sounded, the building was emptied in approximately five minutes and the "injured" were found and removed in approximately 20 minutes. Because of simulated smoke, it was necessary to abort the control room 90 seconds after the explosion. A remote manual depressurization of the chamber was successfully completed.

The safety manual requires this area to prepare for emergencies, but it is the division's choice to perform drills every 90 days.

"We are trying to practice an annual drill such as the one last month which involves site-wide personnel," Martin said. "With this drill in particular, we wanted to go beyond our test area and allow JSC emergency personnel to be a part of that exercise."

The drill provided exercise practice for coordinating actions between HPD and JSC, as well as evacuation training for building personnel and verification practice for fire wardens and facility managers. Each area is reviewing the lessons learned and refining their procedures. These lessons learned will be distributed to all JSC Facility Managers in the near future.

The Crew and Thermal Systems Division was commended by the Executive Safety Committee for its initiative and dedication to providing a safer workplace for their employees.

"It was a wonderful drill and we had excellent participation by the emergency response teams," said Steve Martin, test director of the Manned Vacuum Chamber Test. "They deserve a pat on the back."

Data shows tether produced triple expected current

Early findings from the tethered satellite are revamping space physics theories.

Numerous space physics and plasma theories are being revised or overturned by data gathered during the Tethered Satellite System experiments on STS-75 in March.

Models, accepted by scientists for more than 30 years must be rewritten. This assessment follows analysis by a joint U.S.-Italian Tethered Satellite investigating team.

During STS-75, a tether system was being unreeled to nearly 13 miles above *Columbia's* payload bay. Just short of the full distance, its tether broke. Nevertheless, the science instruments, which had been operating during the five hours of deployment operations, sent a flood of readings that were received and

recorded by scientists on the ground.

"Even the quick-look made to date reveals that this data harvest is rich in content," said Nobie Stone, NASA TSS-1R mission scientist at NASA's Marshall Space Flight Center.

"Perhaps the most significant finding," Stone said, "is that tether currents proved to be up to three times greater than existing theoretical models predicted prior to the mission. With the amount of power generated being directly proportional to the current, this bodes well for technological applications."

"Reversing the direction of current flow puts the system into an electric-motor mode," Stone explained. This harnessed energy could furnish thrust for reboosting a space station, satellite or shuttle in a decaying orbit.

"Traditionally, the primary source of power for long-term space platforms has been solar arrays," Stone said. "Those cells can only produce power when exposed to sunlight during the two-thirds of each 90-minute orbit when a space station, for instance, is not on Earth's dark side. However, a tether system might provide a constant source of energy," he noted. "It is very efficient and might serve as an effective back up power system."

Other revelations from the mission include observations of the satellite's thrusters interacting with the ionosphere while moving in orbit. Stone said that, when the thrusters were fired to adjust the satellite's spin rate, the neutral gas emitted became ionized.

The tethered satellite researchers noted

that, at that point, "a sudden jump" took place in the level of current flow, while the satellite's potential (voltage) dropped several hundred volts. They traced this effect to the small amount of gas, released from the thrusters, becoming ionized in the vicinity of the satellite. A greater, more efficient current flow was observed. "The effect of neutral-gas ionization is not taken into consideration by existing theoretical models of current collection in the ionosphere," Stone said.

Also, for the first time ever, the high voltage plasma sheath and wake of a high-voltage satellite moving rapidly in the ionosphere was measured. "This is virtually impossible to study in a laboratory and is difficult to model mathematically," Stone said.

CTAP offers summer sessions

JSC's Career Transition Program has a new special topic seminar, "Communications Anxiety," scheduled for June and has enhanced existing seminar offerings.

In the "Communications Anxiety" seminar, employees will learn remedies for communications anxiety and how to increase visibility by effectively expressing personal accomplishments. Employees also will learn helpful anxiety counter-measures and receive specific examples of what to say in career and networking situations.

The basic CTAP career seminar has added "electronic age" resume techniques and "web" tools for career information. The "Starting a Business" seminar has an additional wealth of information on sources, home businesses, franchises, finding and evaluating a business idea and more.

CTAP is a confidential, contractor-run service for civil servants wishing to explore a variety of career-related topics. Call CTAP at x34300 for details about the new "Communications Anxiety" seminar and other seminars that are available. Civil servants are welcome to drop by and visit the CTAP in Bldg. 45, Rm. 308.

Volunteers still needed for open house in August

Volunteers will be needed to work exhibits as well as assist and provide information to visitors during the open house scheduled for Aug. 24.

In addition, Jesse Gilmore has taken on the duties of open house representative for the YA organization on the Open House Planning Committee.



FCOD CHILI COOKOFF—
Above: From left, John Maca of the Simulator Operations and Technology Division and Alan Vaughn of Hughes Training check out the chili of Johnny White of Hughes Training during the FCOD Chili Cookoff held earlier this month. The 1995 astronaut candidates, now astronauts after graduating this month, form a live pyramid as part of the competition during the chili cookoff. Winner of best chili went to the Barney team sponsored by the Space Station Program Office.



Photos by Dale Martin

Gulf Coast civil servants honor JSC employees

Seven JSC employees were among those recognized recently at a Gilruth Center banquet for their accomplishments and performance at work and in the community through volunteer activities.

The Federal Executive Board and the Federal Business Association honored the employees along with workers from other local federal agencies.

The six employees who received FBA awards certificates were: Sue Garman, Joe Atkinson, Heidi Glaisyer, Sandra Ogden, Bettye Solcher, Rose Flores, and John Stencil.

Atkinson was selected from all of the nominees in the Length of Service Category for his nearly 47 years of service to the government.

JSC workers selected to gain college skills

Human Resources recently announced selections for the JSC Project Increased Qualifications Program.

Three JSC employees were selected for the FY97 Project IQ Program. The participants selected this year are Jannette Reed of the Human Resources Office and Alice Sley and Cara Walker of the Engineering Directorate.

The Project IQ program provides undergraduate college opportunities to selected employees during duty hours. It helps employees improve skills and qualifications and be more productive in their present jobs. This two-year program gives participants the opportunity to attend college courses during regular duty hours up to eight hours per week.

Awards banquet set

The Clear Lake Council of Technical Societies will hold its annual awards banquet at 5:30 p.m. June 14 at the Gilruth Center.

Awards will be presented to individuals in several categories including society awards, technical person of the year, technical educator of the year and technical administrator of the year. Students from Pasadena Independent School District will display winning science fair exhibits. The featured speaker is Astronaut Franklin Chang-Diaz.

Tickets cost \$10 and reservations are due noon June 10. For more information call Marcia Taylor at x30195.

Endeavour to ferry to California for modifications; will fly again in '97

(Continued from Page 1)

gave them some good-natured ribbing about the duration of their flight:

"It hardly seems worth the effort to go up in space for only 10 days," she chided.

As the end of STS-77 grew near, Thomas, a native of Australia, and Garneau, a Canadian, each received special greetings. South Australia Premier Dean Brown called Thomas with congratulations as the shuttle passed above Brown's office in Adelaide, Australia, Thomas' hometown. Later, Canadian Prime Minister Jean Chretien called Garneau to congratulate him on the mission and the joint Canadian Space Agency and

NASA experiments that were conducted.

Earlier in the flight, the crew had successfully deployed the Spartan free-flyer, which in turn deployed the Inflatable Antenna Experiment, the first inflatable structure in space since the Echo balloons of the 1960s. Reducing the size and weight of spacecraft components again was the goal.

"Pretty fantastic," Casper said as the silver, tennis court-sized antenna unfurled with the Earth as a backdrop.

"The parabolic antenna has sort of a rippling to it, almost as if it were in a wind," Runco reported as scientists on the ground tried to see whether it had inflated properly.

"In the end, it really took on the shape that we thought it would," said Project Manager Steven Bard. "No matter what, after looking at the data we will have learned a lot."

Bard said inflatable equipment could be important to future spacecraft because it costs less, weighs less, takes up less space and is potentially more reliable during deployment in space.

After Spartan shed the balloon antenna, Casper and Brown rendezvoused with the free flyer and Runco tucked it back in the payload bay with the robot arm.

Throughout the flight, the crew tended experiments in the commercial Spacehab

module that ranged from studies of how aquatic organisms developed in the Aquatic Research Facility to growing large crystals important to electronic devices in the Commercial Float Zone Facility.

The fourth mission of 1996 launched on time at 5:30 a.m. May 19 and landed at 6:09 a.m. CDT Wednesday. It was *Endeavour's* last flight until December 1997, when it will be launched on the STS-88 mission, the first delivery of U.S. hardware for the assembly of the International Space Station. *Endeavour* will be ferried to Palmdale, Calif., in August for eight months of major modifications in preparation for station assembly missions.

'Mir crew very comfortable with each other' Lucid says

(Continued from Page 1)

"Everything that we have been doing is going along fairly well," Lucid said. "I don't see anything that will be a real show stopper. The equipment in Priroda is checking out very well."

Lucid completed verification testing of the Microgravity Isolation Monitoring facility last week and began transferring data to scientists this week.

"The feedback that I have had from the ground has been that the scientists are very excited," Lucid said. "They are very interested in the results we have gotten so far."

MIM will be used to characterize the Mir environment during science operations by isolating experiments from vibrations caused by motion by the cosmonauts.

Last week, Lucid also set up and verified the Microgravity Glovebox experiments and performed several life science experiments including sessions that will study the changes in the neurovestibular and the human immune system.

Halfway through her planned 140-day mission, Lucid reported her relationship with her fellow crew members is going well.

"We laugh a little more together

now than we did in the very beginning because we are more comfortable with each other and we understand each other.

"I enjoy working with the experiments that we have. I find it very rewarding and very interesting. I also enjoy looking out the window and looking at the Earth. It has been very rewarding on a long space flight to be able to see the changes that are taking place on Earth, especially the northern hemisphere as the seasons change. We have been able to see the lakes and the rivers and the ice breaking up and see every-

thing turn green."

In Russia, Astronaut John Blaha spent the majority of last week in final training sessions for the U.S. experiments he will conduct during his stay on Mir. Scientists also took muscle and skeletal measurements of Blaha for comparison after his stay on Mir. Blaha will replace Lucid on the Mir during STS-79. Backup Jerry Linenger spent time training on Mir systems and U.S. experiments while Mike Foale underwent water survival training in the Black Sea. Jim Voss spent the majority of last week learning about the Soyuz transport module.

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.

The Roundup office is located in Bldg. 2, Rm. 181. The mail code is AP2.

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