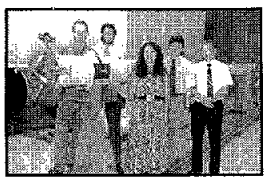
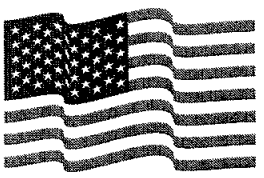
National Aeronautics and Space Administration
Lyndon B. Johnson Space Center
Houston, Texas



Space study

The SPIFEX experiment studies the effects of shuttle plumes in space. Story on Page 3.



Celebrating unity

American Heritage Day activities get under way today at Teague Auditorium. Schedule on Page 4.

Space News Roundup

Vol. 33 | July 15, 1994 | No. 27

Managers assume safety responsibility

By Kelly Humphries

Safety will be given the highest priority in the coming months as JSC Director Dr. Carolyn Huntoon and her top managers begin to take personal responsibility for helping the center achieve its goal of zero reportable safety incidents.

"This is a team effort that will require every organization to participate," Huntoon said. "It is an exciting challenge for JSC to become a center of excellence for occupational safety and health."

Huntoon kicked off the new, aggressive safety management program this week following a centerwide review of JSC's safety policies and procedures that illuminated several opportunities for improvement.

"We cannot relax our diligence in this area," Huntoon said. "and we must make sure that our concern for safety extends to all employees."

Astronaut Dave Walker led a review team, comprised of people from across the center as well as outside experts from the Navy, Kennedy Space Center and local chemical companies.

"We talked to people at all levels and we visited essentially all of the facilities that conduct hazardous operations," Walker said. "We found that while the statistics showed us to be in good shape, there were some trends that led us to believe management accountability needed to be strengthened and that communication needed to be improved."

Under Huntoon's initiative, all center managers will take direct responsibility for safety in their organizations. The overall effort will be coordinated by an executive safety committee led by JSC Deputy Director George Abbey, and each directorate will create a safety committee that mirrors the executive committee and is given full authority for executing the plans.

"We found that people were supportive of the concept of improving and enhancing safety and health, but that additional management priority had to be devoted to it to actually make that happen," Walker said. "The key to making it work is involvement from the top all the way down the management chain."

Charlie Harlan, director of JSC's Safety, Reliability and Quality Assurance Office, said he fully supports the new effort, and that SR&QA will continue to facilitate the safety process and serve as the source of information on regulations and requirements.

"There has been too much reliance on us in the past to be responsible for safety in all of the center's work areas, even though we've had policies requiring that the line organizations be accountable," Harlan said. "Now a strong signal is being sent to all organizations that safety is their responsibility."

Huntoon initiated several immediate actions to promote safety:

- A center director's "hot line" will be established to facilitate direct communication between all employees and JSC's leaders on safety and other issues;
- Comprehensive emergency preparedness plans are being given a

Please see **PLANS**, Page 4

Senate reflects support

By Jeff Bingham
Legislative Affairs Specialist
NASA Headquarters

The NASA appropriations for next fiscal year is moving briskly through the various congressional hoops needed to make it official. Though still somewhat less than requested by the President, the total NASA budget appears likely to be slightly above the $14 billion mark. Within that amount, the requested $2.1 billion for the space station seems to be on the strongest footing enjoyed by the space station program in recent years.

The overwhelming vote of confidence given by the House of Representatives on June 29 has set the stage—and the tone—for the upcoming Senate debate, now expected sometime next week. Last year's vote of 215-216 marked the low point in congressional support for the space station. Conversely, last month's solid vote of 155-278 is the strongest showing yet.

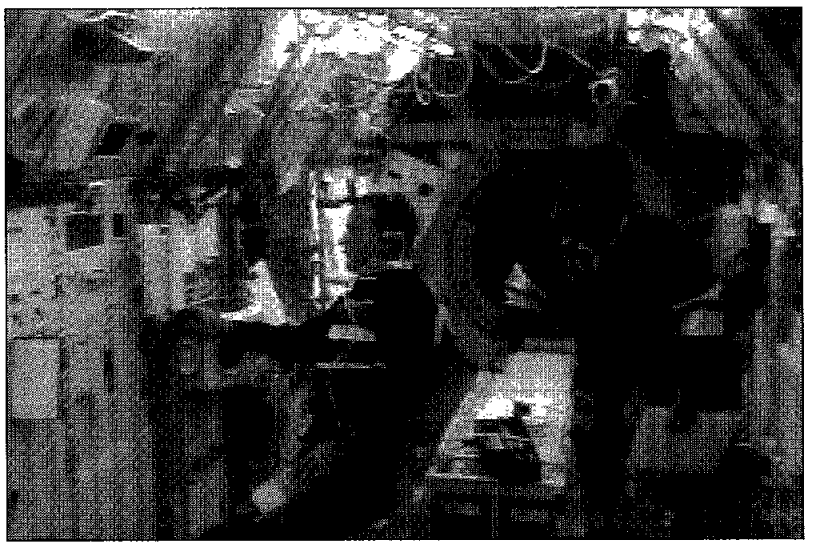
For the first time, a majority of both parties supported the station; an additional 10 freshman members switched to support of the station, giving the program a clear majority among the newer members of Congress; more members representing black and Hispanic constituencies supported the station, and more of them were active participants in the debate than has been the case previously. As NASA Administrator Daniel Goldin said the night of the vote, it represents the emergence of a "new coalition" of support for the nation's space program and for the space station in particular.

Virtually all the members are the same as were there last year, since no election has intervened since then. Yet 122 of them changed their positions and voted for the space station this year. So what made the difference?

There was clearly some positive impact from the fact that it was now President Clinton's space station. There is absolutely no doubt that the President's strong and visible support for the space station, actively articulated and promoted by Vice President Gore, was a major factor, especially among the Democrats. But more Republicans supported the station this year as well, so the appeal was obviously broader than one of supporting the President's position.

There were a great many factors

Please see **VOTE**, Page 4



NASA Electronic Photo

INTERNATIONAL SCIENCE—Mission Specialist Rick Hieb, left, and Japanese Payload Specialist Chiaki Mukai work in the Spacelab module on board *Columbia.* The seven-member crew is conducting more than 80 experiments representing 17 different nations during the 14-day mission.

Work hours respond to employee needs

JSC will implement a variable work day program in October to help employees meet the demands of juggling professional and personal commitments.

"I believe this Variable Day Schedule will go a long way toward creating a balance between the workplace and family demands we all face daily," said Center Director Dr. Carolyn Huntoon. "This represents a significant change in the way JSC does business, but I believe it will have a very positive effect on all of us."

The Variable Day Schedule is one of several new initiatives resulting from recommendations made by employees in focus group meetings, Q+ teams, the Suggestion Program, the AFGE employee union and the Federal Women's Program. A number of alternative work schedules were considered before the Variable Day Schedule was selected.

"This program offers employees flexibility while retaining the management controls we need to allow JSC to meet its mission responsibilities," Huntoon said.

JSC employees not currently on an irregular tour of duty will be transferred to the Variable Day Schedule unless they specifically decline to participate and remain on their present tour of duty, or their position is excluded from participation by their supervisor for business reasons. On the Variable Day Schedule employees will work 40 hours per week, but have the option of varying the length of their work day on a daily basis. Employees may arrive at work anytime between 6-9 a.m., and depart between 3-6 p.m. However, with the exception of their lunch break, employees must be present for duty during "core hours" — from 9 a.m.-3 p.m. Monday through Friday — unless excused by their supervisor.

Supervisors may require employees to work outside core hours to support specific requirements. and

Please see **PROGRAM**, Page 4

Flight studies life, materials in space

Columbia roared into space at 11:43 a.m. CST July 8 beginning a 14-day mission exploring the behavior of materials and life in the microgravity environment of space.

The crew is passing the half-way mark of its mission today studying how simple organisms and plants react in the absence of gravity. Inside the NIZEMI facility, a slowly rotating centrifuge microscope exposes the organisms to various levels of gravity. Information gathered during and after the mission will help scientists better understand how animals develop in microgravity and the role gravity plays in the behavior and development of organisms on Earth.

The astronauts also are using the European Space Agency Biorack to study how a variety of specimens evolve through several stages of their lives.

The effects of microgravity on crew members also was observed with Hieb reporting that he had exceeded the maximum height allowance for astronauts.

"I seem to have grown about an inch or so, so I am now too tall to fly in space," Hieb said. Hieb and Payload Specialist Chiaki Mukai are charting their heights on a daily basis as part of Canada's Spinal Changes in Microgravity experiment.

Earlier this week, Commander Bob Cabana and Mukai spoke briefly with several Japanese government officials.

Masato Yamano, president of Japan's space agency, NASDA, offered greetings to both Cabana and Mukai. Mukai also spoke with Makiko Tanaka, minister of science and technology and Yohei Kono, Japan's vice prime minister and minister for foreign affairs.

Columbia is performing well on its 17th spaceflight. No problems are being tracked by flight control teams although a drop in temperature on the supply water nozzle used to dump excess water from the orbiter is being evaluated by flight controllers. In the meantime, excess water is being dumped through the flash evaporator system.

Covey retires from JSC

Veteran shuttle commander Dick Covey retired from NASA July 11 following a 16-year career as an astronaut.

He is joining Calspan Services Contracts Division, an operating unit of Space Industries International, Inc., as director of business development in Houston.

Selected as a member of the astronaut class of 1978, Covey has flown four times on the shuttle. He flew twice aboard *Discovery* on STS 51-I and STS-26, once on the STS-38 mission of *Atlantis*, and *Endeavour*'s STS-61 flight.

His first flight was STS 51-I in August 1985. His second mission was STS-26 in September 1988 the first shuttle mission following the *Challenger* accident. The STS-38 mission was a dedicated Department of Defense flight in November 1990.

Covey most recently commanded STS-61 in December 1993 to service and repair the Hubble Space Telescope.

"Dick's dedication to this nation's space effort is an asset we will miss," said Dave Leestma, director of Flight Crew Operations.

Readdy to lead Russia efforts

By Kyle Herring

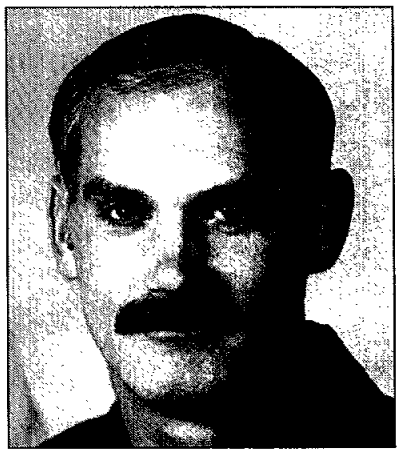
Astronaut Bill Readdy will replace Ken Cameron as NASA's manager of operational activities at Star City, Russia.

As director of operations, Russia, Readdy will work with Russian trainers, engineers and flight controllers to support the training of astronauts at Gagarin Cosmonaut Training Center, Star City, and to enhance continued cooperation between NASA and Russia's Space Agency.

Readdy's primary responsibilities will include the support of U.S. astronauts and their families currently living in Star City. He also will monitor the current training program as well as develop a syllabus for shuttle crews training to dock with the Mir space station. In addition, he will establish and maintain the operational relationships required to help develop plans and procedures which support the long-term, joint operations between NASA, RSA and Star City.

Readdy will join fellow astronauts Norm Thagard, and Bonnie Dunbar, who have been training in Star City since February as the prime and backup crew members for a three-month flight aboard Mir. Thagard is scheduled to be launched aboard a Soyuz spacecraft March 1, 1995. Following a three-month stay, the crew of STS-71, which will include Dunbar as a mission specialist, will dock *Atlantis* to Russia's Mir space station. STS-71 will be the first of up to 10 shuttle visits that will be made

Please see **CAMERON**, Page 4



Bill Readdy

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.

Splashdown Party: The Apollo 11 Anniversary Splashdown Party will be held from 4:30-7:30 p.m. July 21 at the Gilruth Center. Tickets are on sale through July 15. Cost is $3 per person.

Schlitterbahn Trip: Tickets available for July 23 trip to Schlitterbahn water park in New Braunfels. Day trip is from 7 a.m.-9:30 p.m. Cost is $45 for adults and $40 for children 3-11 years. Cost includes transportation, rides, attractions and buffet meal.

Ringling Bros. & Barnum & Bailey Circus: Tickets available for 11 a.m. circus performance July 16. Cost is $13.50 for lower level seats.

Astros Tickets: Tickets available for Aug. 10 Astros vs. San Diego Padres game. Game is at 7:05 p.m. Cost is $12.75 for field level seats. Last day to purchase tickets is July 27.

Six Flags: Tickets available for one-day weekend and weekday admission. Cost is $20.95 for weekend and $16.75 for weekday. Two-day admission, either weekend or weekday, is $27.25.

Seaworld of Texas: Discount tickets: adult $20.95; child (3-11), $14.25.

Fiesta Texas: Discount tickets: adult $18.95; child (4-11) and seniors (55+), $14.25.

Splash Town: Discount tickets, $11.05.

Waterworld: Discount tickets, $10.50.

Astroworld: Discount tickets: adult $19.95; children under 54 inches tall, $17.75.

Moody Gardens: Discount tickets for two of three different attractions: $9.50

Space Center Houston: Discount tickets: adult, $8.75; child (3-11), $4.75; commemorative, $9.55.

Metro tickets: Passes, books and single tickets available.

Movie discounts: General Cinema, $4.75; AMC Theater, $4; Loew's Theater, $4.50.

Stamps: Book of 20, $5.80

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

JSC

Gilruth Center News

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

Weight safety: Required course for employees wishing to use the weight room is offered from 8-9:30 p.m. July 26. Pre-registration is required. Cost is $5.

Defensive driving: Course is offered from 8:15 a.m.-3 p.m. Saturday. Next class is Aug. 6. Cost is $19.

Aerobics: High/low-impact class meets from 5:15-6:15 p.m. Tuesdays and Thursdays. Cost is $32 for eight weeks.

Exercise: Low-impact class meets from 5:15-6:15 p.m. Mondays and Wednesdays. Cost is $24 for eight weeks.

Aikido: Martial arts class meets from 5-7:30 p.m. Tuesdays and 6:15-8:15 p.m. Wednesdays. Black Belt class from 6-8 p.m. Fridays, requires instructor permission. Cost is $25 per month. New classes begin the first of each month.

Country Dancing: Classes meet Mondays. Beginners class meets from 7-9 p.m.; advanced class meets from 8:30-10 p.m. Partners are required. For additional information, contact the Gilruth Center at x33345.

Softball Tournament: The "Moonwalk" softball tournament is July 23 & 24. Entry fee is $100 and registration deadline is July 20. For additional information, contact x33345.

Golf Lessons: Lessons for all levels. Cost is $90 for six weeks. For additional information, contact x33345.

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

Dates & Data

Today

American heritage — American Heritage Day will celebrate JSC's global community from 3-8 p.m. July 15 inside and adjacent to Teague Auditorium.

Lunar story — Author Andrew Chaikin will appear from 6:30-8:30 p.m. July 15 at Jeremy's Bookshelf to discuss his book Man on the Moon. For additional information, contact the bookstore at 486-8028.

Cafeteria menu — Special: tuna noodle casserole. Total Health: steamed salmon steak. Entrees: steamed salmon steak, roast beef, baked chicken, steamed fish, Reuben sandwich. Soup: seafood gumbo. Vegetables: French cut green beans, cauliflower with cheese, green peas, black-eyed peas.

Saturday

Star gazing — The JSC Astronomical Society and Challenger 7 Memorial Park are hosting an evening of star gazing beginning at dusk through 10 p.m. July 16. For additional information, contact Bill Williams, 339-1376 evenings.

Scholarship banquet — The Society of Mexican-American Engineers and Scientists will host its 11th annual scholarship banquet at 7 p.m. July 16 at the University of Houston Hilton Hotel. Richard Tapia of Rice University will be the featured speaker. For additional information, contact Mike Ruiz, 483-8169 or Ponte Moreno, 333-6753.

Monday

Spaceweek lectures — The Galveston Bay Section of the Institute of Electrical and Electronic Engineers will host a noontime seminar on "Technology Transfer and Commercialization at JSC." Featured speaker is Hank Davis of JSC's Technology Transfer and Commercialization Office. For additional information, contact Cliff Mason, 335-6897.

Cafeteria menu — Special: breaded cutlet. Total Health: crispy baked chicken. Entrees: baked chicken, beef chop suey, smoked sausage and German potato salad, French dip sandwich. Soup: cream of broccoli. Vegetables: okra and tomatoes, peas, navy beans, baby carrots.

Tuesday

Spaceweek lectures — The Galveston Bay Section of the Institute of Electrical and Electronic Engineers will host a noontime seminar "When a Comet Hits a Planet, Shoemaker-Levy 8 at Jupiter." Speaker is Paul Schenk of the Lunar and Planetary Institute. For additional information, contact Cliff Mason, 335-6897.

Cafeteria menu — Special: fried chicken. Total Health: vegetable lasagna Entrees: Salisbury steak, steamed pollock, vegetable lasagna, French dip sandwich. Soup: split pea and ham. Vegetables: mixed vegetables, French cut green beans, pinto beans, vegetable sticks.

Wednesday

Spaceweek lectures — The Galveston Bay Section of the Institute of Electrical and Electronic Engineers will host a noontime seminar "Return to the Moon/Humans to Mars." The speaker is John Connolly of JSC's Planetary Projects Office. For additional information, contact Cliff Mason, 335-6897.

Cafeteria menu — Special: stuffed bell pepper. Total Health: stuffed bell pepper with creole sauce. Entrees: fried catfish with hush puppies, stir-fry chicken and rice, wieners and beans, Reuben sandwich. Soup: seafood gumbo. Vegetables: buttered rice, Italian green beans, corn O'Brien, peas and carrots.

Thursday

Apollo anniversary — A 25th anniversary splashdown party is planned from 4:30-7:30 p.m. July 21 at the Gilruth Center. Cost is $3 per person. Tickets may be purchased at the Bldg. 11 Exchange Store through July 15. Requests for specially designated reunion areas should be made to x34322.

Spaceweek lectures — The Galveston Bay Section of the Institute of Electrical and Electronic Engineers will host a noontime seminar on "Spacecraft Development in the Next 25 Years." The speaker will be Harry Erwin of JSC's Systems Engineering and Integration Division. For additional information, contact Cliff Mason, 335-6897.

Cafeteria menu — Special: barbecue smoked link. Total Health: roasted turkey breast. Entrees: turkey and dressing, beef stroganoff, chopped sirloin, French dip sandwich. Soup: tomato Florentine. Vegetables: Lima beans, buttered squash, Spanish rice, oriental vegetables.

Friday

Spaceweek lectures — The Galveston Bay Section of the Institute of Electrical and Electronic Engineers will host a noontime seminar on "Clementine Explores the Moon." The speaker will be Paul Spudas of the Lunar and Planetary Institute. For additional information, contact Cliff Mason, 335-6897.

Cafeteria menu — Special: meat sauce and spaghetti. Total Health: spaghetti noodles with turkey meat sauce. Entrees: rainbow trout, liver and onions, been cannelloni, pork and shrimp egg roll, Reuben sandwich. Soup: seafood gumbo. Vegetables: steamed broccoli, breaded okra, cut corn, black-eyed peas.

JSC

Swap Shop

Swap Shop ads are accepted from current and retired NASA civil service employees and on-site contractor employees. Each ad must be submitted on a separate full-sized, revised JSC Form 1452. Deadline is 5 p.m. every Friday, two weeks before the desired date of publication. Ads may be run only once. Send ads to Roundup Swap Shop, Code AP3, or deliver them to the deposit box outside Rm. 147 in Bldg. 2. No phone or fax ads accepted.

Property

Lease: CLC Univ Place TH, 1327 sq ft, 2-2.5-2, high eff A/C, FPL, W/D, refrigerator, no pets, $850/mo. 488-1036.

Lease: El Lago, Pebblebrook condo, 1-1, miniblinds/verticals, W/D, upstairs unit, 650 sq ft, $375/mo. Jim, 532-2218.

Sale: LC 3-2-2, approximately 1600 sq ft, no approval assumption, 8% FHA. 334-1072.

Sale: Camino South 4-2-2, 1.5 story, near schools, fenced, lg trees, new appliances, $89k. 282-3479 or 532-1112.

Sale: Fairmont Park duplex, 2568 sq ft, ea unit 2-2, utility room, appliances, fenced, ex cond, $87k. 474-5610.

Sale: Pasadena 4-2-2, both formals, new roof/vinyl floors, 2100 sq ft, $78.5k. Cindy Cole, 479-6489 or Tamela, x36155.

Sale: Pasadena Parkgate 3-2-2 brick, lg pool, FPL, $84k. Sheila, 487-2061.

Sale: Baywind I condo, 2-1.5-2 spaces, ex cond, ground floor, W/D, new D/W, $35k, fin avail. Tom, 333-3992.

Lease: Friendswood, Wedgewood Village, 3-2.5-2, both formals, FPL, WB, ceiling fans, fenced, fruit trees, no inside pets, $795/mo. 482-0874.

Lease: Pipers Meadow, lg 3-2-2A, huge family room, fenced, deck, high efficiency A/C, FPL, garage door opener, $800/mo + dep. x31275 or 486-0315.

Rent: Heritage Park 3-2-2, 1700 sq ft, new floor/carpet and A/C, new paint and roof. Sonny, x38533 or 474-4198.

Sale: '83 Redman MH, 14' x 70', 2-2, CA/H, vinyl siding, skirted, ex cond. Linda, 283-0311 or (409) 925-4862.

Sale: Oakbrook West, 4-2-2, completely updated, nice trees, $94.5k. Denise, x31846 or 486-5146.

Sale: LC Bay Ridge, 3-2-2, brick, 1550 sq ft, fenced, inside util, new ext paint, $59k, assumable 8%. 286-4774.

Sale/Lease: LC Newport, 4-2-2, 1660 sq ft, brick, $68k or $850/mo. 282-3130 or 332-4366.

Lease: Galveston Seawall condo, furnished, min 6 mo lease, $450/mo. x30737.

Sale: Pasadena, 4-2-2, both formals, 2100 sq ft, new roof/vinyl floors, $78.5k. Cindy Cole, 479-6489 or Tamela, x36155.

Sale: Webster Sterling Knoll, 3-2.5-2, FPL, formal DR, wet bar, lg lot, cul-de-sac, $77.9k. 332-6409.

Lease: 2-story duplex TH, 2-2.5-1, 1500 sq gt, FPL, huge master BR, 11' deep closet, balcony, fenced patio, cov 2nd car parking, $795 + dep. 452-3361.

Sale/Lease: Friendswood Heritage Park, 4-2-2, 1950 sq ft, lg cov deck, new tile floor/ext paint, lg LR, DR, new ceiling fans, $81.9k or $900/mo. x33748 or 996-1408.

Cars & Trucks

'63 Oldsmobile Super 88, 4dr, hard top, recently painted, two tone, maintenance documentation, $1800. x34466.

'90 Ford F350 Dually Supercab, 7.3L diesel, 58k mi, new paint/tires, $13.5k. Daisey, (409) 925-2944.

'87 Alfa Romeo Spider Veloce, 36.5k mi, cream ext, leather, pwr, A/C, garged, $83k OBO. Tim, x32519.

'94 23' Sportsman RV, loaded, $13k OBO. x36609 or 554-2532.

'83 Thunderbird, 58k mi, A/C inop, engine good cond, $2k. x48856 or 486-0127.

'79 Volvo 244DL, 4 dr, auto, PS/PB, sunroof, new brakes, A/C needs repair, $1k. Karl, x48407 or 992-8574.

'90 Toyota Tercel, ex cond, red, blk/gray int, 5 spd, AM/FM/cass, A/C, 2 dr, 56k mi, 1 owner. $4.5k. 534-2667.

'88 Ford Tempo, blk, 4 dr, pwr door locks, auto, A/C, AM/FM, new engine, $3k. 481-0695.

'79 Toyota Supra, new alternator/oxygen sensor/brakes, 2 new tires, $800. Terry, 474-5639, beeper 698-9875.

'89 VW Fox GL Sport, 4 dr sdn, 5 spd, A/C, stereo tape, 66k mi, red ext/gray blk int, ex cond, $3.5k. 341-9222.

'90 Pontiac Sunbird LE, 2 dr coupe, red ext/gray int, 5 spd, A/C, tilt, stereo tape, ex cond. new tires, $3.7k. 341-2222.

'54 Chevrolet PU, $3.5k. 282-3479 or 532-1112.

'84 Cadillac, 2 dr, A/C, $2.3k. Tom, 559-1075.

'86 Custom Ford van, ex cond, 60k mi, $7.5k. x30122.

'86 Nova, 4 dr, sunroof, AM/FM/cass, 5 spd, no A/C. $900 OBO. Dave, x36027.

'84 Nissan 300ZX, blk ext, ex cond, $3.2k oBO. x30737.

'92 Dodge Shadow, 4 dr, wht, auto, A/C, $5.3k. 337-3222.

'84 Nissan 300ZX Turbo, 2 seater, one owner, garaged, 73k mi, leather, digital dash, $4.5k. x34723 or 326-4968.

'87 Hyundai Excel, 4-dr htchbk, 4-spd manual, 101l mi, A/C, AM/FM/cass, $1k. Sarah, 486-2164 or 559-1327.

'88 Ford Mustang LX, 5-spd, 4 cyl 2.3, 2-dr htchbk, wht, new timing belt/2 tires, $2k OBO. x33607.

'88 Porsche 944 Turbo S, blk/tan, 60k mi, 247hp, polished wheels, new tires, $15k. 863-7245.

'86 Hyundai Excel GLS, 2-dr htchbk, A/C, sunroof, needs minor work, $850 OBO. 639-4144.

'79 Ford PU, 6 cyl, step side, rebuilt motor, auto, A/C, new tires, needs paint, $1.5k. 445-6240.

'85 Suburu Wagon, 5-spd, A/C, 133k mi, good cond, $1250. x40250 or (409) 925-7839.

'90 Mitsubishi Eclipse GS-DOHC, auto, A/C, loaded, ex cond, 43k mi, $9k. Tom, x45491 or 280-9105.

'90 Honda Prelude, red, 5-spd, 60k mi. x31384 or 487-2383.

'82 Toyota Cressida, loaded, new paint, 145k mi, ex cond, $3k; '83 Nissan Sentra, good cond, new tires, 100k mi, $2k. David, x45136 or 488-5888.

'93 Mazda 929, ivory/taupe, 13k mi, gold pkg, teakwood paneling, tint, alum wheels, loaded, $28.2k. 480-0903.

'91 Mustand GT, ex cond, $1k and take up note, has warranty left. x36973.

Boats & Planes

Ranger bass boat, 115hp Evinrude, trlr, runs good, $1k; 18' tandem axle utility trlr w/electric brakes, used once, $800. 337-5491.

'81 Hobie Cat, 16', white w/blue sails, sailbox, mesh trampoline, dbl trap, galv trlr, $1250. 996-5739.

'92 Baymaster 18'6", 115hp Johnson, detachable tongue trlr, garaged, ex cond, Motorguide salt water trolling motor, fish finder/depth sounder, $10.5k. Steve, x47698 or 482-3696.

Hydroslide Aerial 360 kneeboard, $60; Assault kneeboard, $65; protective bag, $15; Dacor scuba regulator XLE, never used, $90. Gregg, x31250.

8' sailing dingy, sails and oars, ex cond, $650. Robinson, x30454 or 532-3013.

16' Jon boat, 25hp Johnson, trolling motor, bass seats, $700. 282-4874.

Sunfish sailboat w/galv trlr, $700. x48121 or 488-7137.

'75 Glastron 15' ski boat, 70hp Johnson motor, good cond, $1200. 992-5226.

17' hvy-duty aluminum canoe w/2 paddles, ex cond, $300. x35180.

Wet Jet jet ski, 432cc engine, 2-person watercraft, Sportsman galv trlr, custom cov, $5k neg. x33626.

16' aluminum, semi-V, boat and trlr, $300. 282-2810.

Cycles

'93 Honda Nighthawk 250, black, low milage, ex cond, $2.3k. Lynda, x37031.

'90 CB-1 Honda 400cc, ex cond, 12k mi, Stage 1 jet kit, Kerker exh sys, $3.2k OBO. Rodney, x30286 or 474-5011.

His & hers 10-spd bikes, fair to good cond, need tires, $125 for both OBO. x39283.

Audiovisual & Computers

Rockton Hush intelligent sound processor: noise reduction, compressor/limiter w/manual or auto, ex cond, was $400, now $175. x30504.

Pace 1000B CB radio w/power mike, $40. 488-6521.

IBM XT/8088, color monitor, $200, x36228 or (409) 848-1615.

SAT I Study Guide for IBM XT and compatibles by Cliffs, $20. Dianne, x37595 or 488-1359.

IBM PS/1, 1MB RAM, 30MB HD, 1.44MB FD, mono VGA monitor, mouse. $300. Steve, x35665 or 474-9505.

19" color monitor w/high performance graphics card for Mac, $600. x32064 or 474-5279.

Two Epson matrix printers, used. 474-2339.

Car audio: Audio Control EQL Ser II, 13 band equalizer, gray, $125; Audio Control 2x5 crossover, $60; pair Kenwood 3.5 spkrs, $15; pair Rockford Fosgate 5.25 punch midranges, $50; JBL 4x6 plate spkrs w/titanium tweeters, $50; 2 cu ft finished spkr box for single 10" spkr, $30; carpeted truck box for pair 6x9 spkrs, $15. Brian, 996-8567.

Photographic

Paterson System 4 35mm developing tank, graduate, chemical jars, $20. x31966 or 488-5262.

Canon EOS 360 camera w/Canon EF 70-210 zoom lens, ex cond, 3 modes, $380. 332-4813.

Musical Instruments

Violin, model 13c, 1990, 3/4' body made in W. Germany, Glasser bow, case and music stand, $500. 488-5517.

Yamaha 6-piece maplewood custom drum set w/Zildigian symbols, $1650; Remo rotor toms, $95. x35180.

Wurlitzer spinet piano, $300. 326-2307.

'52 Fender Telecaster reissue, made in USA to 1952 specs, pro quality,blond w/blk pick guard, $800. x35180.

Kawai FS-660 kybd, 61 std keys, 100 tones, 50 patterns, programmable, $150 OBO. 482-5190.

Boston upright piano, good cond. x45035 or 334-4124.

Pets & Livestock

Spayed female cat, free. x39159 or 554-2332.

English Springer Spaniel puppies, parents AKC reg, liver & white, dew claws removed, tails docked, 1st shots, 6 m, 4 f, avail July 4, $200 ea. Karen or Chuck, 334-2078.

Four lg Angle Fish, 4-6" tall, blk/silver and orange/silver; one Plecostomus algae eater, 8" long, all $5 ea. Rick, 332-2866.

Breeding AKC reg, male, tiny Toy Poodle, apricot, stud fee, $300. Rick, 332-3866.

Small black Lab female, 1 yr old, all shots, free. 474-3653.

Blonde Cocker Spaniel mix female, 6 yrs old, spayed, shots; Border Collie mix, male, black and white, 2.5 yrs old, neutered, shots, free. x31891.

CKC reg Border Collie pups, M & F, under 7 mo old, papers, shot records, $175. x36814 or 554-2955.

Lost & Found

Found: daily planner/scheduler notebook, call and identify color and where it was lost. x35923.

Household

GE refrig, 17 cu ft, almond, approx 10 yrs old, works great. $150. 474-5609.

Serta Perfect Sleeper, full sz mattress-box spring set, good cond, $100. Fred, x31112.

Contemporary couch, off-white background w/gray-brown weave, extra long, $300 OBO. Helen, x30811 or 332-0441.

Pastel couch and lg matching chair, blue/pink/beige, $300 both. Dawn, 334-4808.

Qn sz soft-side waterbed, mattress/liner/heater, foundation and frame, ex cond, $100. Karl, x48407 or 992-8574.

Double bed, mattress, box spring, frame, $125; oak 6-drawer dresser w/mirror, $290. Steve, x38867 or 332-7335.

Baby crib/youth bed, ex storage, ex cond, was $650, now $200. 282-2731 or 331-0164.

Matching couch & lg chair, mauve, light green, blue and off-white, ex cond, $350. 334-4808.

Baldwin grandfather clock, ex cond, was $1.7k, now $875. x47068.

Dinette set, white/yellow, 60" table w/2 leaves, 4 chairs, $100. Frank, 282-3858.

All glass dining roomm table, lg race track design, was $2.3k, now $650. Connie, x42105 or 333-1169.

Whirlpool washer/dryer, good working order, 474-2339.

Wood coffee table, ex cond, $40. 282-3215.

Broyhill dinette set, 4 chairs, matching china hutch, light cherry, ex cond, $900; Qn Elizabeth brocade couch and 2 high back gold matching chairs, $1k; kg sz motionless waterbed, new, $200. Bill or Cindy, 485-0237.

Sofa, country blue w/tiny peach flowers, $300; oak entertainment center, $150; oak microwave cart, $30; dining table w/4 chairs, $125; 2 beige wing-back chairs, $75 ea. x31891.

Antique wood headboard and footboard, $60; w/mattress, $100; wood table w/4 chairs, $60 OBO. x38276.

Sleeper sofa, dk blue, $120. 484-1158.

Contemporary sofa & matching chair w/ottoman, pastel floral design, good cond, was $1800, now $600 for set, OBO. Debbie, 482-7344.

Four pc qn sz BR suite, dresser w/mirror, hdbd, chest, brn wood, woven look, $295. 286-4774.

Window A/C, approx 12k Btu, $275; gas dryer, $200. Rob, x38245.

Full sz bed w/frame, $80; 19" color TV, $50; dresser, $10; 12' surf rod/reel, $40. 282-4874.

Coffee table, 58" x 22" and end table, 29" x 22", oak finish, $75 for both. x38981 or 333-2476.

Baby crib, matching 4 drawer dresser w/built-in changing table, cherry, $275; 40" round oak pedestal kitchen/dining table, w/leaf to 58", 4 high back chairs, $275; wood toddler bed w/mattress, $50. 334-5259.

Working GE electric clothes dryer, wht, $35. x31149.

Qn sz pine panel bed, hdbd/ftbd/rails, washed finish, mattres, box spring, matching night stand, ex cond, $500; luxury sheets and comforter, best offer. x48145 or 992-3014.

Whirlpool refrig, 10 cu ft, frost free, almond, icemaker, approx 8 yrs old, $125. Sylvia, x45509 or 337-3222.

Wanted

Want canoe or kayak, etc; also want mature peach-faced male love bird; want cherry wood entertainment center, curio cabinet, Japanese antiques. 482-0874.

Want low or zero down, no approval assumption home and/or land anywhere. 482-0874.

Want non-smoking roommate to share LC 3-2-2, private bath, $325/mo + 1/3 utilities. Rob, x41027 or 538-1449.

Want Simons Juvenile or Childcraft furniture, dresser, chest, desk, bed in natural or similar color. Sahri, 486-6691.

Want Mantis tiller, bullfrogs or known source for bullfrogs. 337-5392.

Want STS-59 and STS-51 buttons. Ernie Edge, x31984.

Want housemate to share new Kemah 4-2.5-2, non-smoker, no pets, $350/mo + 1/2 util + dep. Jeri, 333-7552.

Want child's play gym, double seat bike trailer. x30746 or 480-1682.

Want non-smoking, female roommate to share LC, Meadowbend 3-2.5-2, no pets. $350/mo + 1/3 util. x31891.

Want used Girl Scout and Brownie uniforms in good cond, szs 8 - 12. Kay, 480-3261 or 488-5298.

Want someone to translate Italian letters on occasion. Faith, 482-0482.

Want 32"x60" door; dbl stroller; 2-seat bike trlr. Alan, x41073 or 480-6221.

Want set of metal TV trays. x34100.

Want van pool riders from Sugar Land, SW Houston to Clear Lake JSC area. Alice, x35234.

Want tailgate for '87 Nissan PU, prefer medium metalic grey. 771-0955.

Want to rent/lease 2+ BR condo/TH/house w/enclosed garage by 8-1-94, non-smoker, no pets, carpenter. Howard, 480-7409 or 486-6183.

Want Borland Turbo-Vision software, latest ver. 554-6629.

Want Nordic Track Challenger, Sequoia or Pro model. Paige, x35518 or 474-9448.

Miscellaneous

Sony color TV, 12", $80; RCA portable VCR w/camera, $200; Zenith stereo w/speakers, $25; JVC single disc CD player w/remote, $50; B&D 12" elec weed trimmer, $15; 20" Murray lawnmower, $50. Kyle, x38653 or 474-3366.

Brother word processor, $225; blk-laquered ash veneer on particleboard, qn sz platform bed w/headboard, $250; sm writing desk, $75; full sz car cover, $50. x36186 or x35046.

Black wood stand for 35" TV, VCR compartment w/glass doors, $120. x35590 or 991-0821.

Roll of steel reenforcing wire, 5' x approx 50". $10; steel screen security door, outside std 36" x 80" front door, dbl lock w/deadbolt, $25. Mike, 484-0987.

Kolcraft tot booster car seat, $8; decorative table, 24" diam, 18" high, $15; mini food chopper, $10. 480-3424.

Persian carpet, 100% silk, hand made, 3.5' x 5.5' wall piece, $2500; '26 gold $10 coin, mint cond, $1250. 338-4031.

Hot tub w/cov, ex cond, needs motor, best offer. Jeff, 337-2784.

Ruger Security Six, stainless steel, snub nose revolver, ex cond, $250; S&W 9mm, mod 39, semi auto, nickel plated pistol, ex cond, $300. 998-0407.

S&W 617 stainless .22, 4.5" BBL, $275; Ruger Mark I Bull Barrell .22, 5" BBL, $175; Colt Ace .22 LR, $450; Ruger Stainless Black Hawk, 4.625" BBL, .357, $275; exercise bike, peddle only, $30; exercise bike, peddle/row, $45. x40250.

New sterling silver jewelry, very reasonable. 554-6138.

Lawn Boy grass trimmer, 15" cut, 30cc, tap advance, $39. x34116.

O'Neil wet suit, XXL, ex cond, $120; cargo hutch, desk, chair, $400. Bill, 554-6242.

Water lilies, tropicals & hardies, assorted bog plants, $1 to $25. 337-5392.

Boy Scout Black Bull sleeping bag, good cond, $100. 326-2307.

Yakima roof racks for cars with rain gutters, 2 bike mounts, ex cond, $160. x31966 or 488-5262.

Original piano sheet music of early '40s, LP records; original Broadway casts, classical, folk singers, $1 ea, inventory avail. Earl Rubenstein, 480-1998.

Kenmore commercial upright freezer, $100 OBO; Unisonic answering machine, $20; Wagner power roller, $25. Kelly, 996-8410.

Lg upright freezer, $200; Weed Eater, hard to start, $25; soda dispenser, needs work, $150. Mike, 39491 or (409) 925-2330.

Celestron Ultima binoculars, 10X50 astronomical quality, ex cond, $175. Cliff, x40230 or 534-4145.

Two Pres and First Lady Charter Gold memberships, $495 ea. 338-1913.

Plastic weight set, 110 lb, $10; twin bed headboard, $20; assorted dishes and bowls. Terry, 474-5639.

Camper for full sz PU, sleeps 4, ex cond, needs refrigerator, $600. John, x39164 or 339-2825.

Two stereo tape players w/radio, $50 ea; maple Magnavox console stereo; brown vinyl sofa and love seat w/oak arms and legs, $25; rocking love seat, brown w/maple arms, $100. x34354 or (409) 935-4944.

Coleman gas generator, 4000 W, com'l duty, new, $420; Sears Lifestyler rowing/workout machine, $59; Sony TC-355 stereo tape recorder, $85. Walt, 326-1406.

No. 73 computer brain for '86/'87 Nissan Maxima, $100. Anne, x48169 or 426-6392.

Prime goose down sleeping bag, 84" long, -20°F, $80; lg Camp Trails backpack, alum frame, belt, $50; Bear Hunter LH compound bow, arrows, sight, $85. Walt, 326-1406.

Spirit FlexStep stair climber, $400; Sears Lifestyler multifunction gym, $150; DP Ultra Gympac, wall and bench unit, $300. Liz, x34652 or 328-3840.

Complete 33 pc set of Star Trek: The Next Generation action figures, $400 OBO; NASA Space Shuttle press kit collection, STS-1 through STS-61; NASA and contractor publications. Andrew, x34312 or 280-0647.

Lubrilon engine treatment, $10/qt. Brian, 996-8567.

Air resistance bike w/computer, ex cond, $125 OBO. x36973.

Maple roll top desk, $125; new Minimax exercise machine, $160; Pilot stereo sys w/synthesizer, amp equalizer, play/record cass, turntable, dual 100W speakers, $100. 480-0903.

Tow bar for VW Bug, ex cond, $45; Tasco shooting scope and stand, $50. Robinson, x30454 or 532-3013.

30 gal aquarium, stand, access, $200; Muyata 12-spd bike, $150; alum frame windows, $20 ea; glass top coffee table, $50. Gerry, 474-7432.

Garden Mark gas-pwr lawn edger, $75; Craftsman elec string trimmer, $25 or both for $90. 326-5150.

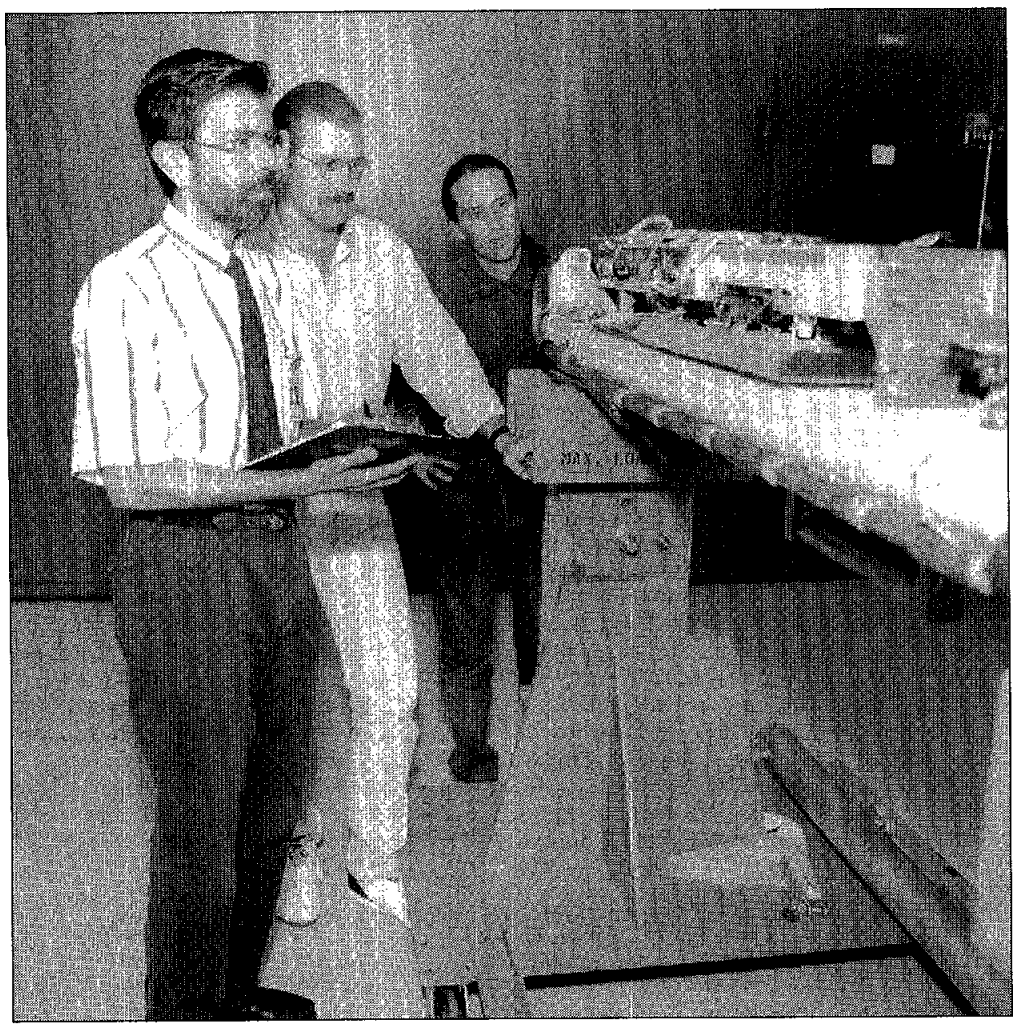
Life and *National Geographic* magazines from '69, Apollo 8 and Apollo 11 fligth coverage. Fred, 333-2166.

D&P integral weight lifting/exercise sys w/separate sit up platform, ex cond, $400. x31158.

Beautiful wedding gown, beaded bodice, cut work and lace on train, lg bow in back, $400. 332-7468.

Charcoal grill, 2 bar stools, slide projector. x31883.

75 gal Oceanic aquarium, pimp/filter/light, $350 nego. Ted, x36844 or 484-6862.



Plume Potential

Remarkable extension to shuttle's robot arm will teach engineers about jet firings

By Kelly Humphries

A team of JSC scientists and engineers is making final preparations for an ambitious experiment set to fly on board *Discovery* in September.

The Shuttle Plume Impingement Flight Experiment, or SPIFEX, will measure shuttle maneuvering jet plumes and their potential effect on solar arrays or other large fixtures during docking operations during shuttle/Mir or space station operations.

"In a vacuum, a jet plume acts differently than it does in the atmosphere," said George Parma, SPIFEX project manager. "We need to understand how a large area, like space station solar arrays, will interact with the pressure wave created by reaction control system jet firings."

The characteristics of the plume change as it gets farther away from the jet, Parma explained. There are near field, transition and far-field regions. Most of the ground data that has been collected on plumes is in the near field. It is more difficult to test the transition and far-field characteristics in a vacuum on the ground because vacuum chambers create reflections and background pressure that can skew readings. The only way to get that understanding and build accurate models of plume loads is through on-orbit experimentation and documentation.

"It would take a huge chamber, bigger than anything we've got," Parma said. A shuttle primary reaction control system jet firing would fill Chamber A (in the Bldg. 32 Space Environment Simulation Laboratory) instantly."

Parma led a team of about 100 civil service and Lockheed Engineering Technical contract workers who designed, built and tested the hardware that will be used on-orbit. Although the team was led by the Engineering Directorate, six other organizations helped, in particular Mission Operations, which helped design the test operations plan, and Center Operations, which fabricated the test equipment.

Planners working on the upcoming shuttle/Mir docking missions need information on the loads associated with jet firings quickly, and that need drove an ambitious schedule to complete the flight hardware. The program has maintained a quick pace since the original idea was put forth in 1991. Funding was received from the shuttle and space station integration offices about a year later and flight hardware was completed May 24, 1994. The SPIFEX hardware was shipped to Kennedy Space Center on June 27 and is being installed in *Discovery* this month. Launch of STS-64 is targeted for September.

JSC's Navigation, Control and Aeronautics Division is responsible for developing the plume models that are used by flight planners and will update those models based on the data returned by SPIFEX. Their models, in turn, are used by the Propulsion and Power Division and the Space Station Loads and Dynamics Working Group to calculate the pressure the jets will place on space hardware — in this case, space station solar arrays.

These "loads" are important because solar arrays have a large surface area that interacts with the pressure wave produced by the jets. The force of a plume can bend or damage the structure that holds the arrays in position. And force is not the only element of the equation, Parma said. The chemicals in the thruster exhaust gases, a combination of nitrogen tetroxide and hydrazine reactants, can interact harmfully with the silicon oxide-coated kapton of the solar. That's the main reason the tests need to use actual jets and the actual materials used on the solar arrays.

"This chemical reaction also has become a big concern when we dock to Mir," Parma said.

SPIFEX is a 33-foot-long extension to the shuttle's remote manipulator system with a "paddle" of sorts on the end. The paddle is loaded with sensitive instruments that will measure the near-field, transition and far-field effects of the RCS firings. The experiment also will use a Get Away Special canister in the payload bay to provide a cold-gas plume that will be used to calibrate the paddle instruments, and a Payload General Support Computer to record the data.

SPIFEX will take measurements of 86 separate test firings of the RCS system at 60 different locations most of them over nose, in front of the nose and at the rear of the shuttle near the left orbital maneuvering system pod. These positions are designed to provide readings on different portions of the plume.

"We're trying to map the plume and correlate it with our math model," Parma said.

SPIFEX instrumentation has three basic elements: the Load Measurement System, the Plume Impingement Characterization System, and the Position and Orientation Verification System.

The SPIFEX team had to develop a number of new capabilities for the shuttle's robot arm in order to accomplish its objectives. A forward pedestal had to be developed to deal with launch and landing loads for the extension, all power, serial computer data and video had to be sent through the arm's grapple fixture electrical connections, and some of the most complex arm operations ever performed had to be accommodated. Never before has the 50-foot-long arm been called upon to berth something as long and slender as the 33-foot SPIFEX extension.

"We are pushing this arm to do things it was never designed to do," Parma said.

It will take three astronauts working together to operate SPIFEX. One will run the PGSC, another will guide the robot arm and the third will manage the digital autopilot. Mission Specialist Susan Helms has been designated the primary crew interface for the experiment.

SPIFEX runs are scheduled on four different days as the astronauts also must work with the Lidar In-Space Technology Experiment, the Shuttle Pointed Autonomous Research Tool for Astronomy and the Robot Operated Materials Processing System, plus a number of secondary payloads. A total of 12 to 14 hours of plume impingement data is expected to be collected and stored in the PGSC. Some of that data will be transmitted to Earth for immediate analysis.

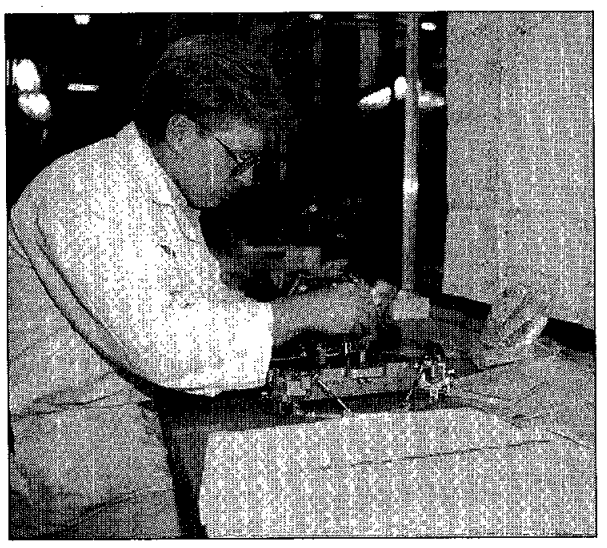
The data will be recorded initially by a Reconfigurable Data Acquisition and Control System, capable of grabbing 1,000 samples per second, then dumped through the arm's grapple fixture connections to the PGSC.

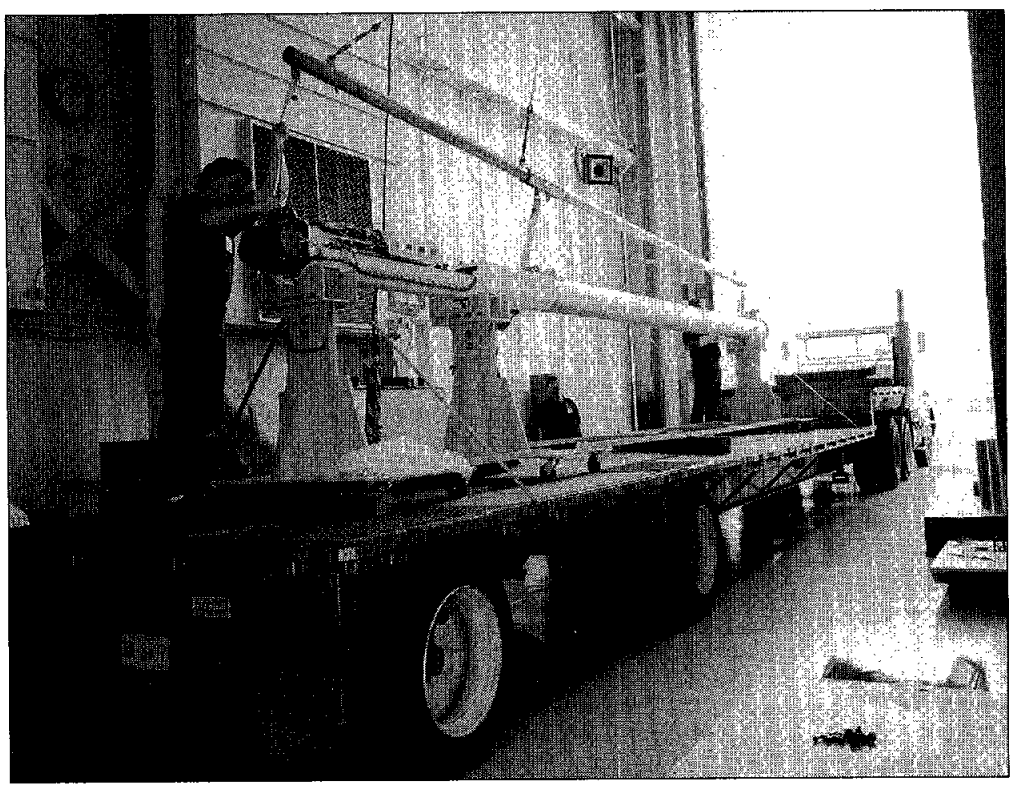
Color video images will be recorded before each jet firing to greatly improve understanding of exactly what position and orientation the arm was in relative to jet when the firing occurs.

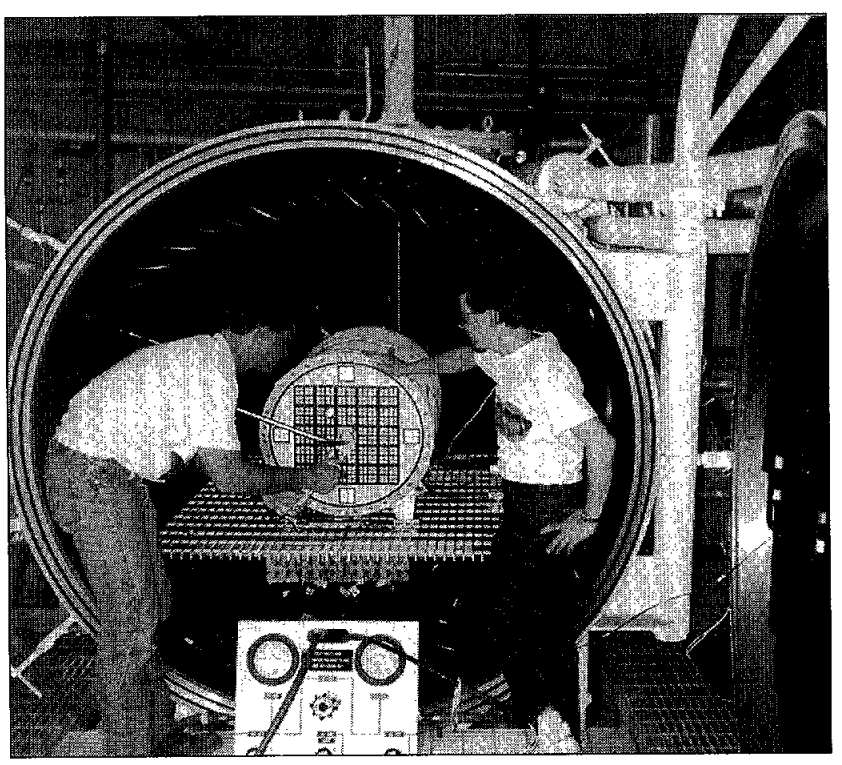
With the addition of the 33-foot extension, the arm becomes an eight-jointed manipulator that will be driven by a computer software package called Magic by its developers in the Automation and Robotics Division. ❑

Above: From left, Rodney Rocha, Steve Fitzgerald and Ricardo "Koki" Machin inspect the SPIFEX experiment arm.
Right: Larry Zelkie assembles the LMS load cell lockout assembly.
Below: Chris Hansen assists riggers secure SPIFEX for transport.
Bottom: GB Tech workers Mike Kocurek, left, and Scott Borge of JSC's Propulsion and Power Division, work on the Getaway Special Canister that will be used to calibrate the SPIFEX instruments.

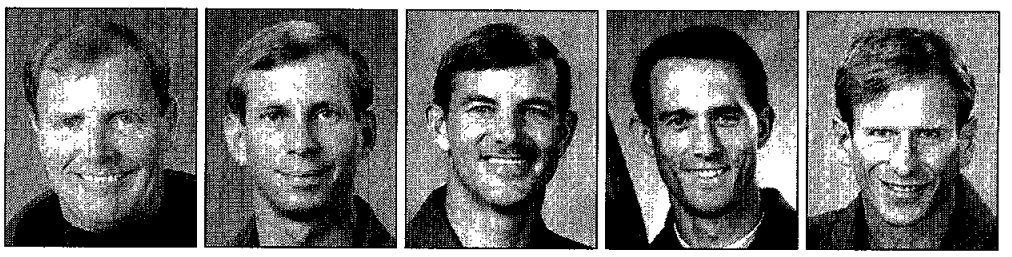
JSC Photos







Walker to lead second Wake Shield mission



Walker Cockrell Voss Newman Gernhardt

By Kyle Herring

Shuttle veteran Dave Walker will command STS-69 to deploy and retrieve the Wake Shield Facility in mid-1995.

Joining Walker on the flight deck will be Pilot Ken Cockrell. Jim Voss was named payload commander for the mission in August 1993. Named to the flight as Mission Specialists are James Newman and Michael Gernhardt.

The primary objective of the mission, the ninth for *Endeavour*, will be to deploy and retrieve the Wake Shield Facility first flown on STS-60 in February 1994.

STS-69 will mark the second flight of the Wake Shield Facility. The WSF is designed to evaluate the effectiveness of using this free-flying experiment to grow semiconductors, high temperature superconductors and other materials using the ultra-high vacuum created behind the spacecraft near the experiment package.

The mission also will include the Office of Aeronautics and Space Technology's free flyer containing several space technology experiments. The OAST Flyer will be deployed from the shuttle. A small experiment called the International Extreme Ultraviolet, Far Ultraviolet Hitchhiker designed to study ultraviolet emissions also will be part of the payload complement.

Walker will be making his fourth flight aboard the shuttle. His first mission was as pilot of STS 51-A aboard *Discovery* in November 1984. During that mission, two communications satellites were deployed and two others retrieved and returned to Earth. His second mission was as commander of STS-30 in May 1989 to deploy the Magellan spacecraft that continues to study the surface of Venus. Walker's third flight was STS-53 in December 1992.The primary goal was to deploy a classified Department of Defense payload.

Most recently, Walker, 50, has been the Flight Crew Operations Directorate's primary liaison to the space station program as Chief, Station Exploration Support Office.

STS-69 will be the second shuttle mission for 44-year-old Cockrell.

His first flight was STS-56 in April 1993. The mission focused on better understanding the effects of solar activity on the Earth's environment using a series of instruments in the payload bay that made up the Atmospheric Laboratory for Applications and Science-2.

Prior to this assignment, Cockrell has been serving as a spacecraft communicator in Mission Control during launch and landing.

Voss, 44, will be making his third shuttle flight. He first flew on STS-44 in November 1991 to deploy a Defense Support Program satellite and to conduct Military Man in Space experiments. He also flew on STS-53, a dedicated Department of Defense mission.

Newman, 37, also will be making his second spaceflight. He previously flew as a mission specialist on STS-51 in September 1993. The mission included deployment of the Advanced Communications Technology Satellite and deployment and retrieval of a science platform to study ultraviolet emissions. Newman also conducted a spacewalk to test tools and techniques for use on future missions.

Gernhardt, 38, will be making his first shuttle flight. Prior to this assignment, Gernhardt has been detailed to flight software verification in the Shuttle Avionics Integration Laboratory. He also has worked on several extravehicular activity projects, including direct support for last year's mission to service the Hubble Space Telescope.

Based on the current flight manifest, STS-69 will mark the ninth flight of *Endeavour* and the 69th flight of the shuttle program.

Vote shows commitment

(Continued from Page 1)

involved. An intensive information effort by contractors and leaders of affected communities; a huge number of personal visits to uncommitted representatives by Goldin; focused attention to states like North Carolina, which voted 10-2 against the station last year and voted 2-10 in favor this year—a complete reversal.

Next, the House and Senate will confer to iron out any differences between the bill passed by the Senate and the one passed by the House, and report that result out as a conference report, probably the first week in September. When that report is adopted by both Houses, as it is almost certain to be, the bill will go to President Clinton for his signature.

Cameron will return to JSC

(Continued from Page 1)

to the Russian space station during the 1995-1997 time frame.

Readdy has flown on two shuttle missions, STS-42 in January 1992 and STS-51 in September 1993 — both aboard *Discovery*. On STS-42, Readdy participated in various scientific experiments carried out as part of the first International Microgravity Laboratory mission. As the pilot of STS-51, Readdy participated in the deployment of the Advanced Communications Technology Satellite, and the deployment and retrieval of the Astro SPAS.

Cameron also has flown twice on the shuttle. His first flight was on *Atlantis*' STS-37 mission in 1991 to deploy the Compton Gamma Ray Observatory.

His second mission was on *Discovery*'s STS-56 flight in 1993 to continue studies of the Earth's atmosphere as part of a series of missions called Atmospheric Laboratory for Applications and Science.

Cameron will return to JSC in Houston, and is expected to command another shuttle mission in the near future.

American Heritage Day

at the

Johnson Space Center

July 15, 1994 • 3-8 pm

Celebration Program

1-3:00 pm	Town Criers Herald the Start of Festivities
3:00 pm	Overture — *Outside in front of Building 1*
	Alabama-Coushatta Indians Direct from Livingston, Texas!
3:30 pm	Inside Teague Auditorium in Building 2
	Introduction — Estella Hernandez Gillette Acting Director of Equal Opportunity Programs
	Color Guard — Clear Creek High School
	Pledge of Allegiance — Children from JSC Child Care Center
	The Star-Spangled Banner — Preston & Ester Haynes
	Welcome —Dr. Carolyn L. Huntoon Director, Johnson Space Center
4:00 pm	Dr. John Q. Taylor King — Guest Speaker
4:30 pm	Mr. Rocky Bleir — Keynote Speaker
	Entertainers — *Outside Buildings 1 and 2*
5:15 pm	Mariachi Continental
5:45 pm	The Lockheed Music Makers
6:00 pm	Cash Flow — Rhythm & Blues Band
6:45 pm	Vietnam Culture Show
7:00 pm	Archana Dance Academy
7:15 pm	Hip Bones in Motion
7:30 pm	Ballet Folklorico Azteca de Houston

Astronauts! • Art Exhibits!! • Crafts!!! • Refreshments!!!!

Splash into Apollo fete

Today is the final day for JSC civil service and contractor employees to purchase tickets for the July 21 Splashdown Party at the Gilruth Center.

The party, in the tradition of the Apollo era "splashdown" parties, runs from 4:30-7:30 p.m. outside the Gilruth. Cost to attend is $3 per person and includes soft drinks and snacks.

Tickets for the event are on sale at the Bldg. 11 Exchange Store.

Employees and their families are invited to attend the party, which is not open to the general public. Special "reunion areas" also may be set aside for families or work groups to celebrate together.

Maps identifying the individual reunion areas will be posted at the party grounds.

For additional information on the splashdown party or to reserve a reunion area, contact Community Affairs, x34322.

Astronaut group visits JSC

The second of about six groups of prospective astronauts will be at JSC next week for orientation, interviews and medical evaluations.

About 120 of the 2,962 applicants will be interviewed through August for a chance to be among approximately 20 named as astronaut candidates. The second group of 20 includes Lila Anderson, Houston, TX; Merrill Blackman, JSC; Michael Bloomfield, Edwards AFB, CA; Daniel Burbank, Marstons Mills, MA; Kalpana Chawla, Sunnyvale, CA; Elizabeth Davies, California, MD; Jerome Elkind, Houston, TX; Toni Grobstein, Lakewood, OH; Richard Jennings, JSC; Robert Joslin, Patuxent River, MD; Charles Justis, JSC; Thomas A. L. Kashangaki, Silver Spring, MD; Stanley Love, Honolulu, HI; Edward Lu, Honolulu, HI; George A. Martin, Belleville, IL; Ray Simmons, Clifton, VA; Richard Stapp, Valley Lee, MD; Frederick Sturckow, Leonardtown, MD; Lori Tanner, NAS China Lake, CA; and Shannon Walker, Seabrook, TX.

Plans deal with worker safety

(Continued from Page 1)

high priority;

• Safety is being emphasized in all managers' performance plans;

• Safety awareness and management training will be mandatory;

• Drills, exercises and simulations to support training and the proficiency of JSC personnel in safety and emergency response situations will be emphasized;

• JSC facility managers will be given full responsibility and authority for ensuring the safety of their facilities and will be held accountable for their facilities; and

• A simpler mechanism for reporting close calls and tracking response to safety issues and violations is being put in effect.

MCC open for mission viewing

Shuttle watchers have the opportunity to view the STS-65 mission during visiting hours at the Mission Control Center.

The MCC will be open to employees from 11:30 a.m.-2:30 p.m. today. The MCC also will be open from 1-5 p.m. Sunday; and from 11:30 a.m.-2:30 p.m. and 5-7 p.m. Wednesday.

There will be no scheduled viewing hours on July 22 due to the planned landing.

For the latest information on the schedule, call the Employee Information Service at x36765.

Program benefits workers

(Continued from Page 1)

may exclude employees in positions where work is extensively schedule-driven.

Employees who elect to work more than their scheduled "first 40" hours will receive "credit hours" that may be used in lieu of sick or annual leave, much as compensatory time is used, subject to supervisor approval. Credit hours may be worked only when the employee has legitimate work to perform. Credit hours do not have an expiration date, but no more than 24 hours of credit time will be carried from one pay period to the next.

Employees in the Variable Day Schedule may earn comp time and/or overtime as applicable, in addition to credit hours.

Additional information on the new Variable Day Schedule will be provided to employees during training sessions beginning Aug. 1. Specific training also will be provided to time keepers on time and attendance reporting procedures. Training will be scheduled through training coordinators.

Contractors should direct questions to the appropriate technical monitor.

For additional information on the Variable Day Schedule, contact your Human Resources representative.

Hubble technology enhances women's health care

A new, non-surgical breast biopsy technique, based on technology developed for the Hubble Space Telescope, is now saving women time, pain, scarring, and trauma.

The new technique is replacing surgical biopsy as the technique of choice, in many cases. Performed with a needle instead of a scalpel, it leaves a small puncture wound rather than a large scar and is performed under local anesthesia. Radiologists predict that the new technique — known as stereotactic large-core needle biopsy — may reduce national health care costs by approximately $1 billion annually.

The new technique involves a NASA-driven improvement to the digital imaging technology known as a Charge Coupled Device. The CCDs are high tech silicon chips which, unlike photographic film, convert light directly into an electronic or digital image. This image can be manipulated and enhanced by computers.

For the last ten years, CCDs have been routinely used to observe stars, galaxies, and other astronomical objects in visible and ultraviolet light. In the breast imaging system, a special phosphor enables the new CCD to convert X-rays to visible light, allowing the system to "see" with X-ray vision. The thinned and highly sensitive CCD — which was not commercially available prior to Hubble's development — is now leading the field of digital breast imaging technology, according to medical specialists.

The technology breakthrough came when scientists at Goddard Space Flight Center developing the Space Telescope Imaging Spectrograph due to be installed on Hubble in 1997 — realized that existing CCD technology could not meet the instrument's demanding scientific requirements.

In response to HST requirements, Scientific Imaging Technologies, Inc. developed a more sensitive CCD and then applied its new knowledge to manufacturing CCDs for the digital spot mammography market. The result is a device that images suspicious breast tissue more clearly and efficiently than is possible with conventional X-ray film screen technology.

Currently, digital breast imaging is most often associated with stereotactic biopsies, but by mid-1995, full digital breast units should be available for routine mammographies. In the new non-surgical technique, the CCD is part of a digital camera system that "sees" the suspicious breast tissue which is extracted by a needle.

More than 500,000 American women undergo breast biopsies each year to determine if suspicious masses are benign. With the traditional surgical biopsy, recuperation is about one week and involves a significant amount of pain, suturing and scarring, doctors say.

NASA-JSC