



A team of JSC engineers has been working for almost a year on ways of conserving energy. Story on Page 3.



Many employees are getting new badges as the need for their secret security clearance ends. Photo on Page 3.

# Space News Roundup

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## New manifest retains near-term sequence

NASA issued an updated mixed fleet manifest Tuesday, providing the latest schedules for the space shuttle and expendable launch vehicles.

The sequence for near-term shuttle flights is nearly identical to the March update, with only minor adjustments to the schedule. The shuttle schedule for the remainder of 1991 has STS-48, the Upper Atmosphere Research Satellite mission, being accelerated to September and STS-44, the Defense Support Program, planned in December.

In 1992, eight shuttle missions are planned. STS-42 and the International Microgravity Laboratory-1 mission, will lead off the year, followed by STS-45 and Atlas-1, STS-49 and the Intelsat reboost mission, STS-50 and U.S. Microgravity Laboratory-1, STS-46 and Tether Satellite System/European Retrieval Carrier-1, STS-47 and Spacelab J, STS-52 and Laser Geodynamics Satellite II/U.S. Microgravity Payload/CANEX-2, and STS-53, a Department of Defense mission.

Highlights in 1992 will include the first flight of the Space Shuttle *Endeavour* on STS-49 and the return of *Columbia* to flight status on STS-50, the first 13-day extended duration mission of the shuttle program. Several missions in 1992 will feature international collaboration and flights of foreign payload specialists, including a European and a Canadian on STS-42, an Italian on STS-46, a Japanese on STS-47 and a Canadian on STS-52.

Astro-2 has been added to the

manifest in September 1994. This August manifest projects out through fiscal year 1997, which ends September 1997. Among the missions planned in that time frame are shuttle assembly and utilization flights to complete the man-tended configuration of Space Station *Freedom* and to begin using the facility, a second visit to the Hubble Space Telescope, Atlas-5, Spacelab E-2 and Spacehab-8/U.S. Microgravity Payload-8.

Two ELV launches remain in

1991—the NOAA-1 weather satellite on an Atlas E rocket and the Extreme Ultraviolet Explorer on a Delta II vehicle. Five ELV launches are planned in 1992, including the joint U.S.-Japan Geotail mission in July and the Mars Observer in September. The Expendable Launch Vehicle manifest has been modified by the delay of the GOES I/J missions to December 1992 and August 1993, respectively. The ELV manifest now includes flights through September 1997.

## Atlantis in spotlights' white glare

By James Hartsfield

Dress rehearsals complete, *Atlantis* is in the spotlights' glare as preparations escalate toward a possible Sept. 12 launch of STS-48, a mission to put the Upper Atmosphere Research Satellite aloft.

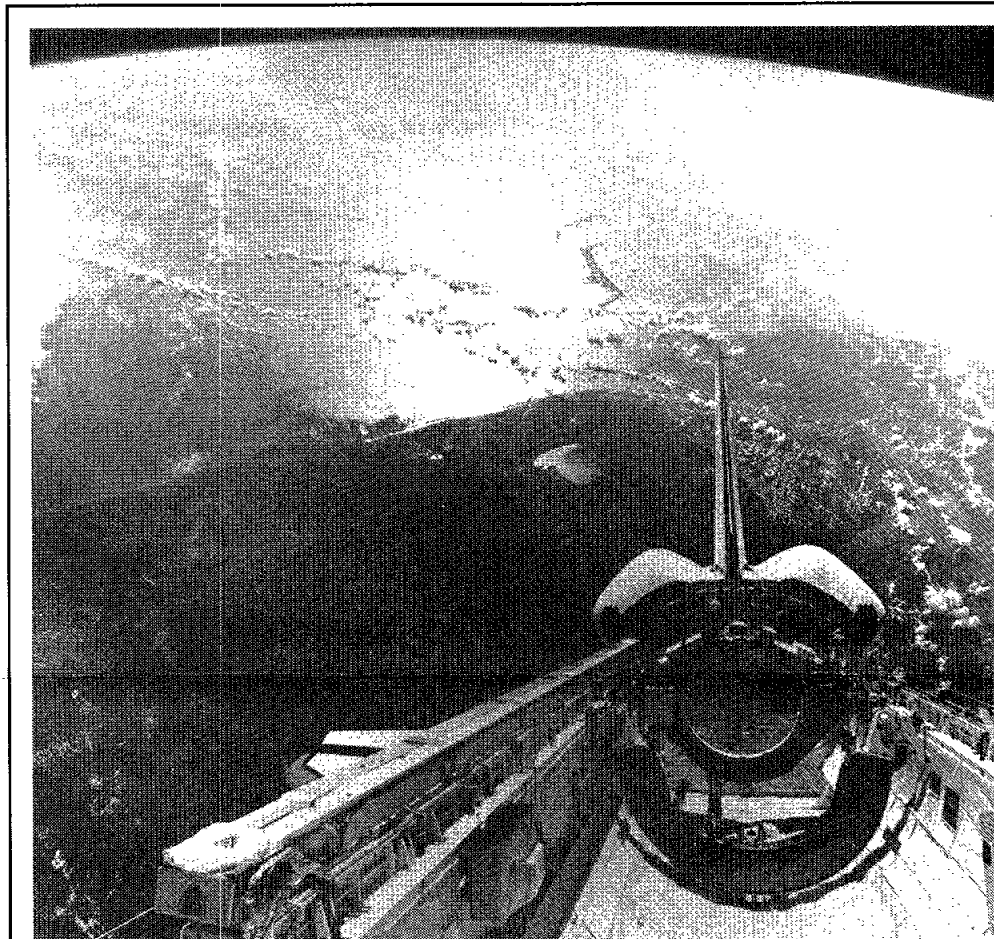
The STS-48 crew traveled to Kennedy Space Center on Sunday to participate in the terminal countdown demonstration test. The mock countdown, a warm-up for all involved in the launch, came to a smooth conclusion Tuesday.

Shuttle managers plan to hold a flight readiness review, a final status check of all preparations for launch and the ensuing mission, Thursday and Friday at KSC. Following that review, an official launch date will be announced.

Work on *Discovery* at Launch Pad 39A this week has centered on fueling the spacecraft's orbital propulsion systems with hypergolic propellants that ignite on contact with one another. Also, a master timing unit, which assists in timing and synchronizing the flight control computers, was removed and replaced after a fault was seen during standard testing.

Elsewhere at KSC, post-flight inspections are under way on *Atlantis*, now in Bay 2 of the processing hangar. All cargo has been removed from the orbiter's payload bay, and leftover hypergolic fuels are being drained from the spacecraft. *Atlantis'* fuel cells are being removed and will be sent back to the manufacturer for testing.

On *Endeavour*, in Bay 1 of the processing facility, tests are continuing in preparation for the newest shuttle's first flight. Tests during first-flight preparations are among the most rigorous tests a shuttle orbiter goes through.



NASA Photo

Space Station Advanced Heat Pipe Radiator Element-II works its heat dissipating magic in the payload bay of Atlantis during STS-43.

## SHARE-II returns double data

By Pam Alloway

Researchers who worked with a heat pipe experiment that flew on the Space Shuttle *Atlantis* recently got more than they bargained for on STS-43.

Not only did they get good data that has expanded their knowledge about the operation of heat pipes in microgravity, researchers also got double the amount of data they expected.

"There was a total of about 50 hours of operational data collected during the mission," said Steve Glenn, Space Station Heat Pipe Advanced Radiator Element-II

project manager. "The 50 hours is significant because we only had about 25 hours of data take time originally allocated to us. But, as a result of the smoothness of the mission, we were able to get additional time."

Two heat-dispersing radiator panels were in *Atlantis'* cargo bay. They were powered by natural cycles of evaporation and condensation of the fluid inside. On STS-43 the fluid used was ammonia. The two experimental heat pipes were designed as a means of dissipating the heat produced

Please see **SHARE-II**, Page 4

## Next mission holds global significance

By Kelly Humphries

The gentle release of the Upper Atmosphere Research Satellite will be an exciting and important spearhead to NASA's Mission to Planet Earth, according to the STS-48 crew.

"We're extremely pleased to be a part of this mission," Commander J.O. Creighton said. "It's important for NASA, it's important for the country, in fact it's important for the entire world."

Creighton and the rest of the crew — Pilot Ken Reightler and Mission Specialists Sam Gemar, Jim Buchli and Mark Brown — are scheduled to lift off aboard *Discovery* at 5:57 p.m. CDT Sept. 12 on a five-day mission to deploy the 14,419-pound satellite that will investigate global atmospheric changes.

With 10 instruments to carry out the first systematic satellite study of the Earth's stratosphere, mesosphere and lower thermosphere, UARS is expected to compile an extensive database needed to understand ozone depletion and the theorized "greenhouse effect" global warming trend.

"This satellite is just the beginning of many things to come in our Mission to Planet Earth," Reightler added. "That's an incredibly important aspect of our job and I think you'll see that it will increase our knowledge of how our Earth works greatly and add to our understanding of how everything fits together."

The mission also will feature the first planned night landing on Kennedy Space Center's Shuttle Landing Facility runway, and Creighton said he feels he's up to the task.

"There's a little higher degree of risk landing at night than in the daytime, and that's true of a normal airplane just like the shuttle because you don't have the depth perception," Creighton said. "Consequently, we have done almost all of our landing practice at night. Both Ken and I feel confident that we can put it right on the money when the time comes."

The launch will take place in daylight, with *Discovery*

Please see **STS-48**, Page 4



**DISCOVERY**

## Kranz says MOD faces 'great challenge'

Budget cutbacks, expanding responsibilities loom

By Jeff Carr

Mission Operations Directorate leaders met with all MOD hands in Teague Auditorium last Friday to review the state of the shuttle and space station programs and to outline strategies and priorities for operations of the future.

MOD Director Gene Kranz described as "a great challenge" and "a top priority," the need to sustain quality in engineering and operations for the space shuttle in the face of substantial budget cutbacks over the coming years.

Kranz expressed his confidence in the "strong staff and dedicated people" of MOD to meet the challenge of forging a new era of operations. "We can leave a legacy of safe and successful operations at a reduced cost."

He noted that the reductions would clearly impact the current level of civil servant staffing in MOD and other shuttle program organizations, but that most would be absorbed through normal attrition and relocation to space station.

On the evolution of Space Station *Freedom* operations since the recent rebaseline, Kranz challenged, "It is time to stand and deliver on the space station program. The conceptual work is done, and we now have systems that can be implemented."

He likened the value and necessity of the space station for future space exploration to that of the Gemini program for Apollo.

"Gemini provided the confidence and the learning ground we needed (to go to the Moon). We will be establishing a prototype for future

operations," Kranz said.

In addressing center strategic planning, Kranz spoke frankly about the need to redefine contractor roles and relationships to deal with staffing limitations while meeting the demands for expertise by all the programs.

MOD Deputy Director John O'Neill introduced the concepts of Total Quality Management as a means of coping with change through increased productivity and effectiveness. O'Neill encouraged MOD employees to apply the principles of TQM to "move our organization as close to our full potential as possible."

The briefing was part of a continuing series designed to address key concerns of MOD employees and provide up-to-date information about the status and future of their organization.



JSC Photo by Jack Jacob

**ASIAN ACTION** — Students from Kim's Karate School demonstrate their skills during last week's Asian Pacific American Program in Teague Auditorium. The demonstration was part of a cultural program that included ethnic dances, music and traditional bridal costumes. The cultural program followed a panel discussion of human resources management as it relates to attaining excellence in space activities, featuring leaders in the field from JSC and many area aerospace contractors.

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# Ticket Window

The following discount tickets are available for purchase in the Bldg. 11 Exchange Gift Store from 10 a.m.-2 p.m. weekdays.

- General Cinema (valid for one year): \$4.
- AMC Theater (valid until May 1992): \$3.75.
- Loews Theater (valid for one year): \$4.
- Astrworld (valid 1991 season): season, \$44.94; child less than 4-feet, \$10.12; one day, \$15.85; Waterworld, \$8.15.
- Seaworld of Texas (valid 1991 season): child (3-11), \$12.25; adult, \$17.25; (2-day) child \$15.95; adult, \$21.95.
- Six Flags (valid until Nov. 17): adult (1 day) \$15.95, (2-day) \$20.95; child under 4 feet, \$14.95.
- Country and western dance (7 p.m. Sept. 14, Gilruth) \$15 per person.
- Puerto Vallarta trip (Nov. 7-11, includes air fare, four nights lodging, fiesta): \$475 per person, double occupancy; \$100 deposit due Sept. 1.
- Astros vs. Cincinnati Reds (7 p.m. Sept. 21, Astrodome): \$9.
- Deep sea fishing (7 a.m.-7 p.m., Sept. 21, includes bait, tackle): \$45 to fish, \$20 to ride.

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# Gilruth Center News

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

**Defensive driving**—Course is offered from 8 a.m.-5 p.m., Oct. 12 or Nov. 16. Cost is \$15.

**Aerobic dance**—High/low-impact classes meet from 5:15-6:15 p.m. Tuesdays and Thursdays. Cost is \$24.

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

**Weight safety**—Required course for employees wishing to use the Gilruth weight room. The next classes will be from 8-9:30 p.m. Sept. 5 and Sept. 18. Cost is \$5; preregistration required.

**Country and western dancing**—Beginning class will meet from 7-8:30 p.m. Mondays, starting Sept. 9; intermediate class meets from 8:30-10 p.m. Mondays beginning Sept. 9. Cost of six-week course is \$20 per couple.

**Aikido**—Martial arts class meets Tuesdays and Fridays from 6:30-7:30 p.m. for four weeks starting Sept. 3. Cost is \$35.

**Volleyball camp**—Eight-week co-rec class teaches basic volleyball skills from 2-4 p.m. Saturdays starting Sept. 7. Cost is \$25 per person.

**Tennis**—Beginning tennis class meets 5:15-6:45 p.m. Mondays beginning Aug. 26; advanced beginner class meets 5:15-6:45 p.m. Wednesdays beginning Aug. 28. Cost is \$32 per person.

**Fiction workshop**—Six-week course meets from 6:30-8 p.m. Wednesdays beginning Oct. 2. Cost is \$80.

**Bowling**—JSC Men's League organizational meeting 7 p.m. Aug. 29, Alpha Bowl. League starts Sept. 5. For more information, call Roy Hatch, x32158.

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# Dates & Data

## Today

**Cafeteria menu** — Special: Salisbury steak. Entrees: baked scrod, broiled chicken with peach half. Soup: seafood gumbo. Vegetables: cauliflower au gratin, mixed vegetables, buttered cabbage, whipped potatoes.

## Monday

**Cafeteria menu** — Special: beef and macaroni. Entrees: ham steak, Parmesan steak. Soup: chicken and rice. Vegetables: green beans, carrots, au gratin potatoes.

## Tuesday

**"Beyond Excellence" workshops** — Dr. B.L. Sommer, an authorized presenter of Tom Peter's lecture series, will host two "Beyond Excellence" workshops Aug. 27 at the Gilruth Center. Workshop 1, "Leadership Through Creativity and Innovation," will be from 8:30-11:30 a.m.; Workshop 2, "Lead, Follow, or Step Aside — The Art of Negotiation" will be from 1-4 p.m. Civil service employees can receive training credit for attending. Registration will be handled the day of the workshop at the Gilruth Center.

**BAPCO meets** — The Bay Area PC Organization will meet at 7:30 p.m., Aug. 27, at the League City Bank and Trust, 303 E. Main, League City. Contact Earl Rubenstein, x34807, or Tom Kelly, 996-5019, for information.

**Cafeteria menu** — Special: Bldg. 3, chicken fried steak; Bldg. 11, Mexican dinner. Entrees: potato baked chicken, barbecue spare ribs. Soup: tomato. Vegetables: squash, ranch beans, Spanish rice, broccoli.

## Wednesday

**NMA meets** — The National Man-

agement Association will meet at 5 p.m. Aug. 28 in the Gilruth Center ballroom. JSC Director Aaron Cohen will speak. For more information, call Valerie Burnham, x34210, or Carol Turner, x34182.

**BANN meets** — The Bay Area NAFE (National Association of Female Executives) Network will meet at 11:30 a.m. Aug. 28 at the South Shore Harbour Country Club. Speaker will be Blanca Gutierrez, owner of Comedy Showcase, will speak on owning and operating a business. Cost of the dinner buffet and program is \$10 members and \$12 for nonmembers; and for the program only, \$3 for members and \$5 for nonmembers. To make reservation or for more information, contact Sharon Westerman 486-8972 by Aug. 23.

**Cafeteria menu** — Special: baked meatloaf with Creole sauce. Entrees: baked scrod, liver and onions, ham steak. Soup: seafood gumbo. Vegetables: beets, Brussels sprouts, green beans, whipped potatoes.

## Thursday

**Cafeteria menu** — Special: smothered steak with dressing. Entrees: chicken and dumplings, corned beef with cabbage. Soup: beef and barley. Vegetables: spinach, cabbage, cauliflower au gratin, parsley potatoes.

## Aug. 30

**Cafeteria menu** — Special: tuna and salmon croquette. Entrees: pork chop with yam rosette, Creole baked cod. Soup: seafood gumbo. Vegetables: Brussels sprouts, green beans, buttered corn, whipped potatoes.

## Sept. 2

**Labor Day** — Most JSC offices will be closed in observance of the Labor Day holiday.

## Sept. 5

**Blood drive** — The third on-site JSC Blood Drive of the year will be from 8-11:30 a.m. and 1-3:30 p.m. Sept. 5 at the Gilruth Center. Appointments are required; call Mary O'Rear, x36531, Helon Crawford, x34159, or Dan Mangieri, x33003. For more information, call Crawford.

## Sept. 10

**Hispanic Heritage Program** — The JSC Hispanic Advisory Committee and the Houston/Galveston Hispanic Employment Program Manager's Council will host the second annual Hispanic Heritage Program from 8 a.m.-4 p.m. Sept. 10 at the Gilruth Center. Astronaut Franklin Chang-Diaz will show slides, Ricardo Ampudia will discuss the free trade agreement with Mexico, and Edward Valenzuela will present a leadership workshop. Luncheon tickets are available for \$8. For more information, call Mike Ruiz, x38169, or Denise Navarro, 488-8806.

## Sept. 24

**BAPCO meets** — The Bay Area PC Organization will meet at 7:30 p.m., Sept. 24, at the League City Bank and Trust, 303 E. Main, League City. Contact Earl Rubenstein, x34807, or Tom Kelly, 996-5019, for information.

## Sept. 26

**BANN meets** — The Bay Area NAFE Network will meet at 6 p.m. Sept. 26 at the South Shore Harbour Country Club in League City. Melanie Rhodeback will discuss pay equity and the undervaluing of women's jobs. For more information, call Sharon Westerman, 486-8927.

# Swap Shop

## Property

Lease: Webster/Ellington, 2-1-condo, \$435/mo. Dave, x36156 or Eric, x38420.

Sale/Lease: Bay Glen, 3-2.5-2, 2-story, form LR/DR, family rm, \$115K or \$1.1K/mo, plus dep. 488-8632.

Rent: CLC, University Trace Condo, 1BR plus study, W/D, \$475/mo. x34742 or 480-2417.

Sale: CLC townhouse, Heritage lane, 2-2, \$60K. 333-4689.

Sale: LC, Newport 5-2-2, patio, fenced backyard, no MUD tax, \$72.5K. Galen, x38857 or 332-8837.

Lease: CLC, 3-2.5 2 story townhouse, 2 car covered parking, W/D hookup, must provide refrig, avail 10/1, \$650/mo. 283-5718 or 283-1950.

Sale: Crockett, TX, 3-2-1, half acre lot with lg trees, on paved Hwy FM2022, remodeled w/carpet, kitchen, DR, 2 LR, \$28.5K. (713) 943-2208.

Sale: Lake Conroe, three lots w/26 ft trlr, septic tank, util, \$15K. 664-9472.

Rent: Tranquility Lake, 1BR, W/D, FPL, fans, CP, Ken, 484-4842.

Lease: Pipers Meadow, 3-2-2, high ceiling, FPL, split BR, \$795 plus deposit, 486-5527.

Sale: 55 plus acres, Brenham/Chappel Hill, FM frontage, water, elec, metal shed, fenced, pecan trees, hay, \$125K. 283-0484 or 334-5007.

Lease: Heritage Park, 3-2-2 ceiling fans, W/D conn, microwave, refrig, \$675/mo. x38875 or 538-1887.

Sale/Lease: Nassau Bay, 3-2-2, FPL, den, deck, 2200 sq ft, \$115K; Nassau Bay, 4-2.5-2, FPL, lake waterfront, 3000 sq ft, avail Oct 1, \$2K/mo. Phil, x37892 or 333-9518.

Sale: LC Bayridge, 3-2-2, no MUD tax, assume, no approval, never flooded, \$60.9K. 992-3876.

Rent: Lake Livingston, waterfront house, 3-2, central A/H, fully furnished, covered deck, pier, fishing, swimming, skiing, ex cond, wkly/wknd rates, 482-1582.

Rent: Bacliff, 2-1-0, 900 sq ft, fence, carpet, miniblinds, \$300/mo. Gary, 482-4584.

Sale: two water view lots near NASA, \$38.5K ea; bayfront lot on Toddville, \$110K, can finance. Don, x38039.

## Cars & Trucks

'84 Nissan 300ZX 2 plus 2, auto, A/C, gray, stereo, \$5650 or consider partial trade. x30092 or 481-3637.

'85 Chevy Cavalier, 4 dr, 4 cyl/2.0L, 70K mi, good cond, clean engine, ex interior, \$2.9K. 488-5522.

'76 Coup deVille Cadillac, silver, 63K mi, clear title, \$2K. (409) 938-4793.

'83 Camaro Z28, red w/blk int, P/W, A/C, auto, 4 wheel disc brakes, good cond, \$3.5K OBO. Jim, 474-9461.

'84 Camaro, power, air, IROC accessories, metallic gray, 65K mi, \$3.1K. Rogers, x38851 or 944-7042.

'86 Cadillac Sedan DeVille, ex cond, fully loaded, 56K mi, \$8595 OBO. Johnson, 480-0903.

'88 Chevy Beretta GT, 45K mi, warr, V6, loaded, ex cond, \$6.9K or trade for 4WD Jeep. Steve, 333-7371.

'81 Oldsmobile Omega, wht, 106K mi, A/C, runs well, good cond, \$1.9K. Joe, x32845.

'81 Diesel Rabbit, 5 spd, A/C, 150K mi, runs, needs work, \$700. 992-5740.

'84 Monte Carlo, blu/blu, good cond, V8, loaded, \$3K. Bruce, 482-5468.

GMC PU, auto, A/C, 62K mi, no rust, fresh 350, garage kept, drives nice, \$1750 OBO; Porsche 914 Targa, slope nose, 175hp Mazda rotary eng, polished wheels, low profile tires, wht, 135 plus top spd, quick, \$3.5K

OBO. x30565.

'85 Nissan Pulsar, ex cond, sun roof, anti-theft device, exp tape and stereo sys, \$2995. Eddie, 286-4253

'79 Olds 98, ex cond, new tires/shocks, good cond, BO. 283-5692 or 673-2622.

'89 Chevy S-10 Blazer, 4WD, all pwr, A/C, cass, 37K mi, ex cond, \$10.7K OBO. 280-0928.

'91 Dodge Custom Van, metallic gray, 9K mi, dual air, two stereos, color TV w/VCR, Nintendo hookups, in floor ice chest, cruise, tilt, auto, P/W, P/L, roof rack, shades, 35 gal tinted windows, security sys, loaded, \$16.5K OBO. 331-9329.

'74 Concord MH, 25 ft, one owner, A/C, generator, \$4.9K. 946-6814.

'84 Buick Electra LTD, V8, all pwr, one owner, 79K mi, ex cond, \$3.6K. Susan, x38723 or 334-1455.

'85 Lincoln Town Car, 54K mi, ex cond, \$6950. 644-2616.

'79 Honda Civic, A/C, 4 spd, manual, 75K mi, looks gross, but runs great, \$995 OBO. Glenn, 282-4294 or 280-8580.

'84 Ford 150 PU, V8, auto, A/C, AM/FM/cass, camper, 73K mi, good cond, \$3.8K OBO; '82 Toyota Tercel, standard, A/C, new brakes, good cond, \$1575. 337-5482

'87 Mazda RX-7 turbo, factory and after options, one of a kind, \$11.3K OBO. 762-8859.

'78 VW Rabbit, diesel, 45 plus MPG, high mi, \$1.2K or trade for electronic test equipment. Kent, 532-2163.

'86 Honda Prelude SI, low mi, new Michelins, tint, custom pinstripes, loaded, ex cond. Wayne, x36617 or 488-8884.

'89 GMC Suburban, loaded, dual air, ex cond. 852-8622.

'82 Toyota Celica GT, 5 spd, A/C, P/S, cruise, good cond. x39335 or 487-8499.

## Cycles

'89 Kawasaki Ninja, 600 cc, blk w/red trim, 10K mi, \$2850. Max Kilbourn, x38127 or 482-7879.

Honda Trail 70, Suzuki 400 T/S, both need work, \$75/ea or \$125 both. Scott, 480-3377 or 474-4014.

Two, 10 spd bicycles, \$75 OBO. Diana, x33443 or 538-1040.

16 in boys bike, good cond extra tire, \$30; 13 in Honda stainless steel wheels, ex cond, BO; skate board ramp, \$75. 486-0677.

'79 Yamaha 1100XS Special, full windjammer fairing, AM/FM/cass stereo, shaft dr, disc brakes, new inspection/battery, recent tires, 15K mi, \$1.2K OBO. x34787 or 643-1121.

'88 Suzuki RM 250, ex cond, extras, \$1550 OBO. 332-1879.

Bianchi race bike, 21 in, Shimano indexed, less than 100 mi, gel seat cover, purple and fast, \$250 OBO. Scott, 282-3985 or 286-3922.

26 in Schwinn Thrasher boys bike, \$50. 283-5465 or 332-1725.

## Boats & Planes

'75 Century Resorter IB skiboat w/trlr, mahogany dashboard, deck inlays, good cond, recent rebuilt transmission, low hrs on Chrysler 440/360hp, \$4.2K. x31366 or 480-2350.

14 ft Fiberglass boat, 18hp Evinrude, w/galv Sportsman trlr. 326-2895.

'77 17 ft ski barge fishing boat w/trlr, 70hp Evinrude, front and aft decks, depth finder, good cond, \$3K OBO. Jeff, x32894 or 480-8914.

'79 16 ft Bojo ski boat, 115 Evinrude, ex cond. 941-1512.

'84 36 ft Carver aft cabin motor yacht, gal-

ley down, dinette up, twin 350 Crusaders, gen, Marine A/C, Bimini w/full enclosure, \$79.9K. 474-7171.

'84 20 ft Sea Ox, center console, 225hp Johnson, VHF radio, LCD depth finder, Bimini top, SS prop, 2 extra props, \$9.2K. Matt, x34285 or 486-7260.

Ultralight airplane, Rotec Ralley 2B, 3 axis control, requires no license to fly, 75 ft take-off/landing distance, \$2750 OBO. Dan, 335-2724 or 286-9745.

'88 Larson DC204 center console, 20 ft, dual axle trlr, 200hp Evinrude, Loran, video recorder, VHF, downrigger, assume note, no down. 333-6821 or 332-9932.

**Audiovisual & Computers**

Lloyds record player, AM/FM radio, two speakers, \$25. 946-7587.

XT Clone, turbo, 5.25 and 3.5 FD, graphics, monitor, SW, \$475; Panasonic KX-P1124, 24 pin printer, 3 way paper feed, fast spd, 5 fonts, \$125. 333-7090 or 796-0032.

Apple 2 computer, 1FD, 80 col, SW, \$300. Steve, 333-7371.

HP-41CV calculator, \$50. Peter, 282-5332.

Toshiba 1000 laptop computer w/carrycase, 640KRAM, 640KRAM disk, 128K RAM-DOS, 1, 720K floppy, some SW, \$400. x38192.

FZ1 8 voice/digital sampling synthesizer, 2 MRAM, 3.5 floppy, 16 bit sampling, full MIDI, incl case, library of sounds, sample vision SW for IBM, \$1.2K or trade for test equipment. Kent, 532-2163.

**Musical Instruments**

Antique upright piano made in Germany, needs work, \$400 OBO. 925-4376.

5 piece set of Ludwig drums, 22 in bass, 13, 14, 16 in toms, Avedis Zildjian cymbals, heavy duty hardware gloss, blk, ex cond. Wayne, 282-4349 or 480-3157.

Conn tenor saxophone w/case, good cond, was \$900, now \$500. x34161 or 996-9178.

Story and Clark console piano, pecan wood, ex cond. x39335 or 487-8499.

## Pets & Livestock

Free female calico cat, 2 yrs, spayed, all shots. 332-0478.

Free Persian kittens. 244-9874 or 333-9742.

Free 3 mo old female lab/retriever mix, had shots. Sarah, 486-2164 or 559-1327.

Free puppy blk lab/chow mix, 13 wk female, shots, 2 left. 929-7208.

Free kitten, 554-7012.

Shelty puppies, Lassie look, good bloodlines, AKC, \$275. Bob, x34409 or 393-1670.

Red tail boa, 6 ft long, w/5'x2'x2" wood tank, stand, habitat, cedar branches, etc, \$375. James, 282-4565.

Free kittens, 6 weeks, gray, brown tabbies; free female Maine coon cat, fixed and declawed. 283-9397.

## Household

Antiques, table, kitchen 2 drwr, \$120; music box, tables, elephants, apartment sz washer, \$200. Stan, 339-1152.

Girls BR furniture, matching dresser, mirror, chest/desk combo, chair, good cond, \$200; dbl bed, mattress springs, \$25. 333-2322.

Kirby vacuum cleaner, model Heritage II w/shampoo and all accessories, ex cond, \$299. 244-5113 or 481-9579.

Imperial heavy duty commercial freezer, 19.3 cubic ft, \$1.2K OBO. 474-4734.

Bedroom set, king sz semi motion waterbed on a 6 drwr pedestal, headboard w/lighting, bedding w/comforter, dresser w/mirror and night stand, \$800 OBO. 532-3507.

Whirlpool apartment sz W/D, ex cond, \$400 OBO. 554-6907.

Queen sz waterbed, full motion, w/htr, satin sheet set, \$75; sm night stand, \$10. 283-1142 or 486-4975.

Kenmore heavy duty lg capacity, washer, good cond, \$75. 482-8827.

'85 Kenmore washer, ex cond, was \$100, now \$60; golf clubs w/cart, pull down seat, was \$30, now \$15. (409) 849-3791.

13 in Zenith color remote TV, \$150; ladies 14K, 2 ct cluster ring, will sell 1/2 appraisal price. 480-5469.

Antiques, refinished 48 in sq oak dining table, w/6 lg fluted legs, dated 1902, \$295; one pair oak T-back chairs, \$60; one pair oak press back cane bottoms w/spindle backs, \$145. x30021 or 479-7947.

Two companion oriental rugs, 9' x 12' LR rug, and 12'x3' runner. 282-3967 or 488-3341.

Blue floral Early American sofa, \$100. 480-3424.

Queen sz sleeper sofa, good cond, \$65. Barbara, 282-2879 or 482-1106.

Supersingle waterbed, all bedding, padded rails, liner, htr, \$100. 538-2127.

Mauve camelback sofa, ex cond, \$450. 486-1121.

Kenmore tan electric dryer, good cond. Eric, 244-5393 or 339-3278.

Electric dryer, \$120; king sz oak waterbed, \$120; brown sofa, \$50. Steve, x38867 or 486-9654.

Matching sofa and chair, \$400; leather recliner, \$125; mens sm shorts, \$30; mens diving fins, \$20. 992-2304.

Sofa bed, dinette set, stereo, coffee and end tables, sz 40L suits, answering machine, luggage, karate gear, wet suit, games, books, BO. 333-5179.

Stratford sleeper sofa, rust color, good cond, \$170. Mike, x34710.

Walnut BR set, full sz bookcase head/foot board, lg 5 drwr chest

# Fighting energy waste

## JSC gears up for energy battle



Photo by Benny Benavides

JSC's energy conservation coordinators, John Lu (left) of Center Operations' Facilities Development Division, and Dennis Klekar, of the Plant Engineering Division, review plans for reducing the center's energy use.

By Kyle Herring

Johnson Space Center's new energy managers are asking all employees to help the center meet stringent energy conservation guidelines by 1995 and 2000.

Everything from using shuttle-technology ceramic paint to replacing light bulbs with more efficient models is being considered in the all-out battle to cut energy use. But energy consciousness and participation will be keys to the success of the effort, said members of an eight-person task force that has been working on the problem since December.

"The key will be at the division level," said Dennis Klekar of Center Operations' Plant Engineering Division, who has been named to coordinate overall energy reduction planning and implementation. "They are the ones who we're going to be asking to help with the guidelines."

While helping to enforce the energy conservation guidelines distributed at JSC last week, these division-level managers also will be asked to solicit additional energy conservation ideas from co-workers.

John Lu, energy conservation coordinator in the Facilities Development Division, said making the energy conservation plan work will require everyone's support.

The JSC Facilities Energy Conservation Task Force was formed as a

means of getting ideas across the two divisions. Since then, mechanical, electrical, construction and design specialists in the divisions have worked together to evaluate implementation measures for an overall energy conservation effort.

"The task force combines the expertise from both divisions," Lu said.

That expertise then is used in the evaluation of a study currently being conducted, Lu said.

The renewed push to reduce energy consumption comes on the heels of a new presidential order signed in April calling for all federal agencies to reduce energy consumption 20 percent by the year 2000 using 1985 as the base year.

This action follows one in 1988 requiring energy reductions of 10 percent per gross square foot of floor space by 1995.

"It's going to be a tough job," Klekar said, referring to the three year deadline to reach the first milestone. "But the division-level energy conservation managers are the people who are going to get us there."

At one point in the '70s, thermostats were locked in buildings to keep the temperature settings constant, but Klekar doesn't see JSC going to that extreme this time around.

"I don't favor locking thermostats because there are certain circumstances in which you might have to have the thermostats up or down," he said. "Hopefully those areas will be

identified so proper environmental control can be provided."

The first step in managing the energy conservation levels begins now with monitoring of lights and thermostats in buildings during the evening as part of the night load reduction plan.

Klekar plans to meet with directorate-level personnel to discuss the initial items that should be taken care of. Those individuals then can go to the division level and pass along the urgent message.

Before implementing any significant changes in existing buildings, Klekar said, the thrust of the energy reduction effort will be to find out how efficiently the buildings are operating.

"We have a handle on that, but the question is are they efficiently operating and then from there look into innovative changes that can be made," he said.

The responsibility for those types of design changes rests with the Facility Development Division.

Projects that require long lead time are planned and designed by the Facility Development Division and then implemented by the Plant Engineering Division. Through the task force, both organizations will work together to make necessary changes to reach the energy conservation goals.

But Lu said the task force's work won't be enough to reach the required reduction levels.

"Just Dennis' organization or just mine will not be able to get that kind

of number, but if we have everyone's cooperation and support we have a good chance of reaching the goal," he said.

Comparing the energy conservation effort to JSC's recycling push of a year ago, Lu said, "If you bring up the level of consciousness, you have a good chance. If you force it on people, you will not succeed."

Energy conservation is always in the forefront when new buildings are proposed or constructed on site, Klekar and Lu said.

Bldg. 4 South, under construction between the cafeteria and Bldg. 4, will incorporate features designed to minimize energy use.

A variable air volume conditioning system designed to put cool air where it is needed most; a white river rock roof to better reflect heat; double door entryways to retain air inside the building; and low emittance glass that is chemically treated to prevent heat from entering are advancements that should reduce energy waste.

This new building is a good example of a facility that has implemented energy conservation measures, Lu said.

Bldg. 46, primarily a computer facility, was designed with more energy efficient fluorescent fixtures that give out the same amount of light as the older ones without producing the same amount of heat.

Lu said another technological improvement that may prove to be worth-

while is a thick paint that includes very fine particles of ceramic and carbon steel that would be used to coat the top of some smaller, metal roofed buildings.

"Adding the carbon steel and ceramic changes the consistency of the paint to give it insulating characteristics," he said.

Development of the paint is an indirect spin-off from the shuttle's ceramic tiles which protect the orbiter from heat during the reentry phase of the mission.

The Facility Development Division is evaluating this paint for possible applications at JSC.

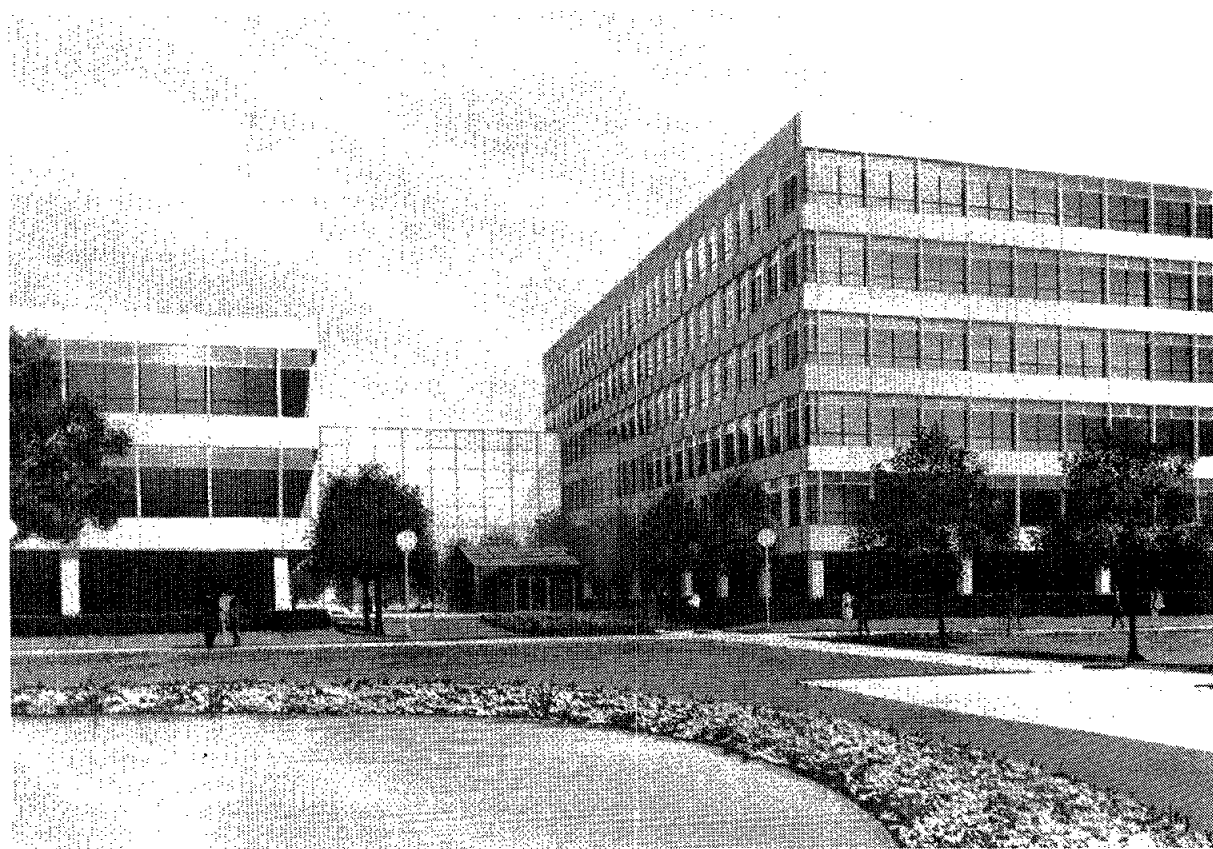
Klekar said he will propose using Bldgs. 45 and 46 as pilot plants to evaluate energy saving opportunities. If feasible, these opportunities then will be used to upgrade other buildings.

"We will come up with an idea and see how much it will cost to implement, how much we expect to save and then put the system in and compare figures to what we are actually saving," he said.

Retrofitting new technologies in existing buildings such as the variable air volume handling system is comparatively easy with some major construction work required.

Another easy energy saving measure is replacement of fluorescent lighting with more energy efficient bulbs.

"Many people on site don't realize that since 1989 we have replaced more than 21,000 bulbs with more energy efficient fluorescent lamps," Lu said.



NASA Illustration

Various energy conservation features will be incorporated into Bldg. 4 South, under construction between the cafeteria and Bldg. 4 and shown here in an artist's concept.

### Energy cutting steps

- Close all doors between air-conditioned and non-air-conditioned spaces.
- Turn off all nonessential equipment such as copying machines at the end of each work day.
- Set area thermostats no lower than 76 degrees Fahrenheit in the summer and no higher than 70 degrees Fahrenheit in the winter.
- Turn off building lights at the end of each work day.
- Restrict the use of air-conditioning during irregular work hours.
- Turn off personal workstations, data terminals and printers at the end of each work day.

# First thrust vectoring flight sets stage for more

NASA's F/A-18 High-Alpha Research Vehicle maneuvered in flight for the first time using a specially designed thrust vectoring system last month.

The successful test sets the stage for research flights over the next two years that could make future jet fighters safer and easier to fly at very high angles of attack.

Angle-of-attack or "alpha" is the term for the angle of an aircraft's body and wings relative to its actual flight path. When "alpha" increases during tight turns and maneuvers, control surfaces may not generate enough force for the

pilot to maintain stability and control.

The F/A-18 HARV has three spoon-shaped paddles around the exhaust nozzle of each of its two engines. The nozzles deflect, or vector, engine thrust in different directions to maneuver and stabilize the aircraft. Thrust vectoring should give the plane better control at alphas up to 70 degrees.

The July 15 flight at Ames-Dryden Flight Research Facility is part of a continuing NASA program aimed at developing better methods to predict and control air flow over aircraft designs. The goal is to enhance aircraft control-

ability at high angles of attack.

NASA officials believe the flight also was the first time a three-axis vectoring system was controlled entirely by pilot input to a computerized flight control system during flight. NASA research pilot Edward R. Schneider called the flight "very smooth." He said the thrust vectoring control system was "more responsive" to commands than expected and control of the aircraft felt "very crisp."

During the system's first aerial test, the paddles — made of Inconel steel and able to withstand exhaust temperatures

of nearly 2000 degrees Fahrenheit — were moved by the aircraft's modified flight control system into the exhaust plume up to a maximum of 10 degrees. This amount of movement by the paddles raised the nose of the aircraft to 20 degrees.

Over the next six months, the F/A-18 HARV is expected to fly research missions at up to a 70 degree angle-of-attack with the thrust vectoring system. During previous flights in the program, the aircraft was limited to 55 degrees.

The F/A-18 flight program at Ames-Dryden is part of an integrated high

angle-of-attack research and technology program conducted jointly by Langley Research Center, Ames Research Center and Lewis Research Center.

The thrust vectoring system and control laws that operate it through the computerized flight control system were designed and built by McDonnell Aircraft Co., St. Louis. The software and hardware for the aircraft's computerized flight control system was developed by General Electric Corporation's Aircraft Control System Division, Binghamton, N.Y.

## New service parking permit to be required

A new parking permit is being introduced for contractors who need to use government and service vehicle spaces after Sept. 1, according to JSC security officials.

Company signs and permits previously used for company or personal vehicles will no longer be honored with the advent of the new NASA Service Vehicle Parking Permit.

Government vehicles will be the only vehicles authorized to park in such spaces without a permit.

The move was spurred by an increasing number of company and personal vehicles being used for contract-related purposes that has outstripped the available spaces.

The new permits will be issued in Bldg. 100 to designated company officials and will allow contractor employees to park company vehicles in government vehicle spaces only when on official JSC business, such as courier service or pickup or delivery of large items.

The JSC taxi or shuttle services should be used for routine meetings or similar visits to JSC buildings.

Any questions should be directed to Charlyne Minick at x34068.



**BADGE CHANGE** — Hanan Dabis, left, a structural engineer in Center Operations' Architectural-Civil Office, accepts a new badge from Security's Debra Griffin in Bldg. 45. Dabis is one of many JSC employees whose need for security clearance is ending as the center's involvement in Department of Defense missions wanes. The rebadging process will continue Monday through Wednesday in the Bldg. 1 lobby from 8-11:30 a.m. and noon-4:30 p.m., and at Ellington Field's Bldg. 273 from 8-11:30 a.m. and noon-4 p.m. Thursday. After Thursday, employees will have to go to Bldg. 100 to replace their badges. Affected employees have until Sept. 15 to make the change.

JSC Photo by Kim Murray

## Galileo controllers plan December try to deploy antenna

By Pam Alloway

A third attempt to free a jammed antenna on the Galileo Jupiter probe was unsuccessful, but scientists and engineers said Wednesday they will try again in December.

Galileo's high-gain antenna failed to open properly April 11. It remains partially and asymmetrically deployed, said Galileo project officials who are basing their conclusion on an early analysis of the spacecraft telemetry data.

An earlier attempt to free the antenna in June by warming it in direct sunlight failed. Researchers then decided to try a different tactic.

After gathering additional information, researchers believed the antenna's balky ribs would open if a central support column were chilled enough to cause the proper amount of contraction. Officials believe the antenna's ribs are bound by friction to its central tower. Researchers hoped that contraction would release two of 18 ribs preventing the umbrella-like dish from opening.

The first unsuccessful so-called "cold soak" was attempted in July.

In last week's second "cold soak" experiment, Galileo turned away from the Sun for 50 hours. However, scientists and engineers believe Galileo did not achieve temperatures cold enough to contract and release the antenna's stuck ribs.

Officials are making plans for Galileo to perform another cooling turn in December when the probe is farther away from the Sun. These cooling turns are part of a series of steps project officials believe will ultimately assist in the deployment of the antenna. Each step gives scientists and engineers valuable data that will be used in designing additional plans to free the spacecraft's jammed antenna.

For the next two months, the Galileo flight team will concentrate on the final preparations for Galileo's Oct. 29 encounter with the asteroid Gaspra. This will be the first spacecraft asteroid encounter. Because of the antenna problem, downlink will be delayed until Galileo's next flyby of Earth in December 1992.

Galileo's high-gain antenna is not essential for mission operations until the spacecraft is in orbit around Jupiter in December 1995, project officials said.

## Workshops will examine leadership, negotiation

JSC employees will have a chance to go "Beyond Excellence" at a pair of Tuesday workshops presented by one of author Tom Peter's disciples.

Dr. B.L. Sommer, an authorized presenter of Peter's excellence series, will discuss psycho-geometrics, dealing with difficult people and enhancing human interaction skills. Sommer also will relate Martin Seligman's work on optimism and pessimism, and teach ways of overcoming past negative conditioning.

Workshop 1, "Leadership Through Creativity and Innovation," will be from 8:30-11:30 a.m. Workshop 2, "Lead, Follow or Step Aside — The Art of Negotiation," will be from 1-4 p.m. Both workshops will be offered in the Gilruth Center ballroom.

All JSC civil service and contractor employees are invited to attend as their workloads permit. Upon arrival, each participant will receive a registration form and course packet. Civil service employees will receive training credit from the Human Resources Development Branch.

Three shuttle bus routes have been established to convey participants, and a van will make the rounds of outlying buildings. For a full schedule, check JSC Announcement 91-114.

The workshops are sponsored by the Federal Women's Program. For more information, call Pam Adams at x33761.

## STS-48 crew describes mission as 'nice blend'

(Continued from Page 1)

using a direct-insertion ascent to reach a 292 nautical mile, 57-degree inclination orbit, said Lead Flight Director Al Pennington. After a circularizing orbital maneuvering system engine burn, the shuttle will be in a 305 nm orbit, ready to set UARS adrift on flight day three. After Brown — the prime remote manipulator system robot arm operator — releases UARS, the satellite's small thrusters will boost UARS to a planned 320 nm orbit.

Pennington said the crew and flight controllers will be poised for a quick space walk should one be needed, because UARS' batteries can last only 4.5 hours if the solar array is not deployed. They're trained to make a contingency space walk to deploy the solar array or the high-gain antenna, or to release the payload retention or robot arm latches manually.

EVA crewmen Gemar and Buchli have received extensive training. "It's not a planned EVA," Buchli said, "but should something happen on our prime payload

that would require Sam and I to go out and fix it, we're prepared to do that."

In addition to making overall mission decisions, third-timer Creighton will track orbiter systems, work with the mission's detailed test objectives, the Investigations into Polymer Membrane Processing mid-deck experiment and Air Force Maui Optical Site calibration.

Reightler, a first-time space flier, will work orbiter systems, DTOs and the Protein Crystal Growth experiment, and serve as the intravehicular crew member supporting any space walk. He's also the backup on the robot arm.

Gemar, making his second flight, is the prime payload crewman for UARS. A potential space walker, he'll work with the Physiological and Anatomical Rodent Experiment, Shuttle Activation Monitor, Cosmic Ray Effects and Activation Monitor and several detailed supplementary objectives.

"We've got some interesting secondary payloads," Gemar said, "that will capitalize on some of our unique flight characteris-

tics, the fact that we're going to a high altitude and a high inclination."

Buchli, on his fourth flight, will be the lead EVA crewman and flight engineer, back up Gemar on the prime payload, and work with the Middeck 0-Gravity Dynamics Experiment (MODE) that will involve building and testing a scale model of a space truss structure.

"I think this is probably a very nice blend of our manned space program and remote sensing, coupled into a mission that's quite important," Buchli said.

Brown, making his second flight, will operate the arm and work with a new electronic still camera that is designed to take digital photographs that can be transmitted back to Earth immediately.

"I have a lot to do with the electronic still camera, which is going to be a real breakthrough not only for NASA, but for the media, in relaying real-time detailed high-quality images to the ground. We're excited to see how that works out," Brown said.

## SHARE-II researchers look to next experiment

(Continued from Page 1)

by electronics equipment and crew members on a space station.

Shuttles are cooled by the mechanical pumping of fluid through radiators. SHARE-II is a prototype for a more reliable cooling system for space station.

The two heat pipes operated continuously for 16 hours at a constant heat load on STS-43. That surpassed the original plan for a maximum data take of about six hours.

During STS-43, two 22-foot long heat pipes flew. One was based on upgraded STS-29-vintage technology that used arterial heat pipe concepts. This heat pipe, designed and built by Grumman Aerospace Corp., also was referred to as the monogroove heat pipe.

The other heat pipe used a graded-groove design based on axial groove concepts. It was built by Lockheed Missiles and Space Co. along with LTV Missiles and Space Co.

Both units were twice as long and had 10 times the performance capabilities of any previously flown heat pipe hardware, said John Cornwell, SHARE-II principal investigator.

Researchers reported that the arterial or monogroove heat pipe performed well throughout the STS-43 flight demonstrating all design modifications incorporated following STS-29. The graded groove version operated well at low heat loads but was unable to consistently operate at higher heat loads.

That doesn't mean the graded groove heat pipe failed, researchers quickly point out. It means researchers have additional information to use toward designing future cooling systems.

"The objectives of this flight demonstration were to find the operational limits of the heat pipes," said Glenn. "So the fact that one heat pipe had some trouble in certain areas doesn't mean the experiment failed, but rather that we did accom-

plish our objectives by defining the operational limits of that particular heat pipe."

SHARE researchers are now analyzing the data collected during STS-43 and looking ahead at future projects.

Glenn said JSC researchers and their counterparts with the space station Work Package 2 prime contractor McDonnell Douglas will meet at JSC next week to discuss plans for a follow-up experiment.

The follow-up experiment is called Two Phase Integrated Thermal System. Using information gathered from SHARE I and II, TPITS will attempt to show the working relationship between a thermal bus and radiator panels. The SHARE flight experiments demonstrated only radiator panel operation.

"The heat pipes for TPITS probably will be a little bit different in design that what flew as SHARE," Glenn said. "We'll continue to use the data collected from the SHARE experiments for future space station or large space structure application."

## Space News Roundup

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