



Hang time

The STS-65 crew achieved a record hang time on the International Micro-gravity Lab-2 flight. Photos on Page 3.



State visit

Prime Minister Apas Dzumagulov of the Kyrgyz Republic pays a visit to JSC. Photo on Page 4.

Space News Roundup

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No. 30

Boulders bash Dante II on way to volcano floor

A team of scientists from NASA and Carnegie Mellon University team watched breathlessly this week as the Dante II robot survived bombardment by boulders while climbing to the floor of the Mt. Spurr volcano in Alaska.

The eight-legged, tethered robot is exploring long-distance control techniques that could become invaluable tools in the exploration of other planets. Scientists at the Alaska Volcano Observatory also hope its descent into the active crater of Mt. Spurr, about 90 miles

west of Anchorage, could provide clues as to when the volcano will erupt again.

Guided by scientists in Anchorage using satellite and Internet connections, Dante II traversed terrain that ranged from 32 down to 22 and back up to more than 30 degrees. The ground underfoot the robot varied from a boulder-strewn field with small, 2- to 4-foot boulders, loose gravel and volcanic ash to more solid, icy-crust. It also encountered rocks its own size and larger.

This week's traverse followed a

route down a snow-filled gully, up and over a berm at the lower end of the gully, and down a boulder-strewn path. Along the way several decisions regarding the descent path had to be made as the robot explored what was fundamentally unknown territory, as it had been completely snow covered and unobservable until just the past few days.

The team in Anchorage relied heavily on a laser scanner mounted on top of Dante II's camera mast for three-dimensional, topographic maps

to steer and align the robot.

All of the robot electro-mechanical mechanisms except for one component, as well as the electronics, communications gear and satellite and land-line communications links, were performing well. The vehicle and sensor control software as well as the Virtual Environment Vehicle Interface software also performed nominally.

The robot was subjected to the hazards of the environment inside the volcano crater, including bombardment by rock fall. On Wednesday,

two three-foot diameter boulders were seen rolling toward Dante by a camera placed at the rim of the crater. The boulders were tumbling fast enough down the 30-degree slope to become airborne during most of their descent, and passed within a few meters of Dante, one in front and one behind the robot.

Project team members watching from the control station in Anchorage breathed a collective sigh of relief at the near miss.

Later that evening, however, a Please see DANTE II, Page 4

NASA helps reconfigure Delta Clipper

NASA has signed a cooperative agreement with McDonnell Douglas to reconfigure the Delta Clipper experimental vehicle using advanced lightweight materials and advanced auxiliary propulsion systems.

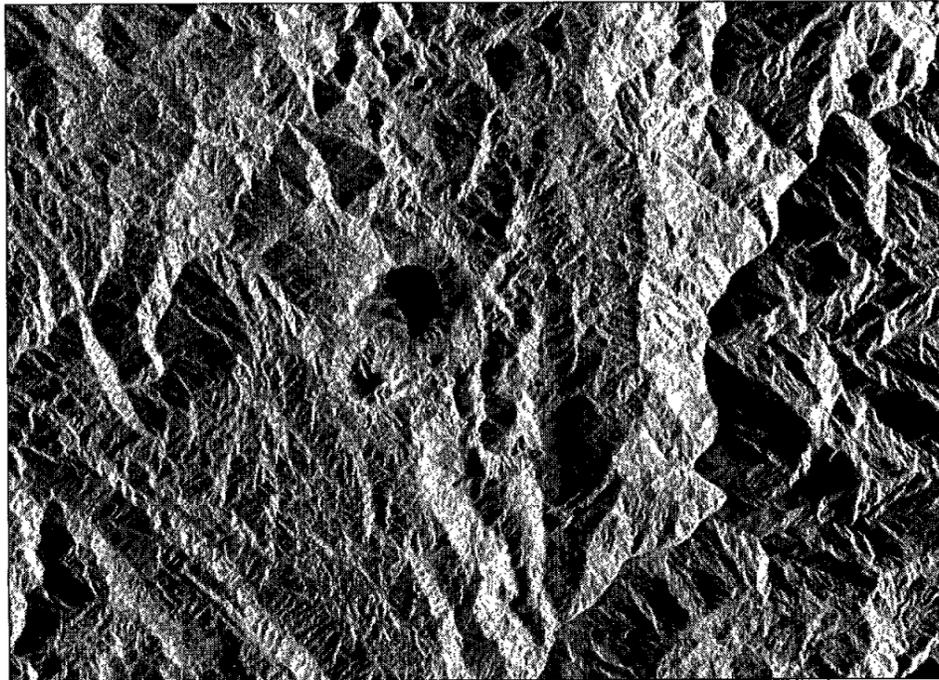
The agreement covers a 28-month period beginning this month at a total estimated government funding amount of \$17.6 million, with cost sharing by McDonnell Douglas of \$7.6 million.

The DC-X vehicle was originally developed by McDonnell Douglas Aerospace in Huntington Beach, Calif., under a Department of Defense contract. Designed and built in 19 months, it was test-flown five times in 1993 and 1994 and is currently undergoing repairs following minor damage on the last flight.

NASA is acquiring the DC-X from DoD to test new technologies needed to develop a reusable launch vehicle that could help achieve the agency's ultimate goal of gaining low-cost access to space.

The focus of Marshall Space Flight Center's DC-XA (Delta Clipper-Experimental Advanced) program will be the flight demonstration of an aluminum/lithium liquid oxygen tank, a graphite composite liquid hydrogen tank, a composite intertank, an advanced auxiliary propulsion system and other advanced technology components all replacing existing lower technology hardware.

The first flight of the Marshall-managed DC-XA is scheduled for the spring of 1996.



NASA Photo

This image, taken by the Spaceborne Imaging Radar C/X-Band Synthetic Aperture Radar during April's STS-59 flight of *Endeavour*, shows a little-known volcano area about 65 miles southeast of Medellin, Colombia. The volcano can be seen near the center of the image.

SRL-1 images show lost city, volcano

NASA has released three new images taken during the first flight of the Space Radar Laboratory during April's STS-59 mission.

The images, acquired by the Spaceborne Imaging Radar C/X-Band Synthetic Aperture Radar, are of a little-known volcano in northern Colombia, the lost city of Ubar in southern Oman, and the buried Chicxulub impact crater in the Yucatan Peninsula, Mexico.

The volcano image is at the center of an area about 65 miles southeast of Medellin, Colombia. A conspicuous dark spot is a lake at the bottom of an approximately 2-mile-

wide volcanic collapse depression or caldera. A cone-shaped peak on the bottom northeast rim of the caldera appears to have been the source for a flow of material into the caldera.

This is the northern-most known volcano in South America and because of its youthful appearance, is considered dormant rather than extinct. The volcano's existence confirms a fracture zone proposed in 1985 as the northern boundary of volcanism in the Andes Mountains.

The SIR-C/X-SAR image reveals another, Please see SRL-1, Page 4

Maneuvers complex for SRL-2 flight

By Eileen Hawley

Endeavour is ready to launch the second Space Radar Laboratory mission into orbit following the agencywide flight readiness review that concluded Thursday at Kennedy Space Center.

The FRR followed the two-day terminal countdown demonstration test during which the six STS-68 crew members and mission managers practiced the launch countdown sequence. The countdown dress rehearsal ended successfully about 10 a.m. CDT Wednesday with a simulated firing of *Endeavour's* main engines.

When *Endeavour* launches at 5:54 a.m. CDT Aug. 18 on its planned 10-day mission, it will carry several instruments to observe and map the Earth's surface as part of the Space Radar Laboratory complement. The payload consists of the Spaceborne Imaging Radar-C/X-Band Synthetic Aperture Radar and the Measurement of Air Pollution from Satellite. The SRL complex previously flew on STS-59 in April.

The six-member crew—Commander Mike Baker, Pilot Terry Wilcutt and Payload Commander Tom Jones and Mission Specialists Dan Bursch, Jeff Wisoff and Steve Smith—will operate in two shifts providing 24-hour Earth observations.

"The choreography involved is pretty complex," Baker said. "While other missions have rendezvoused with or deployed things, we are carrying this big payload that takes up the entire cargo bay and timing of the data takes between the orbiter and the ground, and engine firing maneuvers are extremely critical."

During SRL-1, the crew performed a record number of Please see SRL-2, Page 4



Gutierrez leaves NASA, Air Force

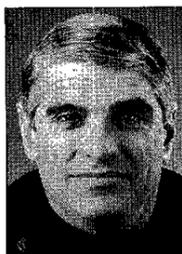
Shuttle veteran to join Sandia National Laboratories in Albuquerque

Astronaut Sidney M. Gutierrez will leave NASA effective Aug. 8 and retire from the Air Force to join Sandia National Laboratories located in his hometown of Albuquerque.

At Sandia National Laboratories, he will be the manager for strategic planning and development. His retirement from the Air Force as a colonel is effective October 1.

A member of the astronaut class of 1984, Gutierrez has flown twice on the space shuttle, most recently in April as commander of *Endeavour's* STS-59 mission to use sophisticated radar equipment to map the Earth's surface measuring environmental changes and atmospheric pollution.

His first mission in June 1991 aboard *Columbia* on the STS-40 mission was dedicated to the study of the human body on the first Spacelab Life Sciences flight. Between his first and second flights, Gutierrez worked in the Mission Control Center as the communications link between the flight control team and the shuttle, and served as chief of the Astronaut Office's Operations Development Branch.



Gutierrez

"Sid has been a valuable asset to this agency," said David C. Leestma, director of Flight Crew Operations. "His career here is a perfect example of how important a member of the astronaut corps is in preparing others for space flight as well as being a crew member."

Prior to his first mission, Gutierrez held various technical assignments at NASA including shuttle flight software verification and development; recertification of the main engines, main propulsion system and external tank after the Challenger accident; and action officer at NASA Headquarters.

Gutierrez has logged more than 4,500 hours flying time in approximately 30 different types of aircraft, including the F-15, F-4, F100 and T-38.

Gutierrez accumulated 488 hours in space on his two shuttle missions.

Born in Albuquerque, Gutierrez, 43, graduated from the Air Force Academy in 1973 with a bachelor of science degree in aeronautical engineering. He received his masters degree in management from Webster College in 1977.



JSC Photo by Jack Jacob

Astronaut Sid Gutierrez is hosed down following his last flight in a NASA T-38 training aircraft. The culprit behind the nozzle is Gutierrez's eldest daughter, Jennifer, who got an assist by her brother, David, and sister, Katherine. Fellow STS-59 crew member Jay Apt also was on hand.

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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.

EAA Luau: 7:30-midnight, Aug. 27, Gilruth Center, includes social period, baked ham dinner, entertainment, dancing. Cost: \$17.50 per person.

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 \$13.75.

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

Space Center Houston: Discount tickets: adult, \$8.75; child (3-11), \$7.10; commemorative, \$9.55.

Metro tickets: Passes, books and single tickets available.

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

Stamps: Book of 20, \$5.80

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

Upcoming events: Texas Renaissance Festival

JSC

Gilruth Center News

Sign up policy: All classes and athletic activities are first come, first served. Sign up in person at the Gilruth Center and show a NASA badge or yellow EAA dependent badge. Classes tend to fill up two weeks in advance. Payment must be made in full, in exact change or by check, at the time of registration. No registration will be taken by telephone. For more information, call x30304.

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

Weight safety: Required course for employees wishing to use the weight room is offered from 8-9:30 p.m. Aug. 10 and 25. Pre-registration is required. Cost is \$5.

Defensive driving: Course is offered from 8:15 a.m.-3 p.m. Saturday. Next class is Sept. 10. 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 p.m. Tuesdays and Wednesdays. Cost is \$25 per month. New classes begin the first of each month.

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

Volleyball registration: Registration for Mixed "C" volleyball is Aug. 16. Registration for mixed "B" women's and men volleyball is Aug. 17. For additional information, call x33345.

Basketball registration: Registration for men's basketball is Aug. 18. For additional information, call 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.

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Property

Sale/Lease: Friendswood, Heritage Park, 4-2-2, 1950 sq ft, large LR/DR, ceiling fans, \$80k or \$900/mo. 333-7070.

Lease: Barringerway Condo, 2-1, W/D hookup, pool, ex cond, no pets, \$495/mo. 486-2048.

Sale: Friendswood, 4-2-2, 1/3 acre, landscaped, 2100 sq ft, assume 7% fixed, \$125k. Mark, x38013 or 992-4132.

Sale: Forest Park East, Friendship Section, 6 cemetery spaces, near chapel, all privileges, \$5.9k. 488-7852.

Lease: CLC, 1 BR condo, W/D conn, FPL, appl, carpet, avail 7/15. Jim Briley, 244-4632 or 488-7901.

Lease: Baywind I, 1st floor 2-2.5, condo, W/D, no pets, \$550/mo + \$300 deposit, avail Aug 2. 996-8301.

Sale: Country Briar 3-2-2, 1440 sq ft. whirl pool, \$77.9k or \$76.9k w/o realtor. Bill G., x47517 or 487-7059.

Sale: House on Lake Livingston, 3-1.5-2, completely refurbished. 996-9690.

Rent: University Trace condo, 1BR, 832 sq ft, FPL, W/D, \$450/mo or \$35k. 286-1934.

Sale: Hunt at Terinqua Ranch, 160 acres, \$15k; 40 ac near lodge, \$5k OBO. Jim, 474-5610.

Rent: CLC University Trace condo, 2-2.5-2, W/D conn, 2 story, FPL, avail 8/16. x34698 or 474-3685.

Lease: Clear Lake Shores, 2-1-1, covered patio, W/D conn, refrig, \$700/mo. 538-1849.

Sale: Webster, Sterling Knoll, 3-2.5-2, FPL, FMD, wet bar, cul-de-sac, \$77.9k. 332-6409.

Sale: Meadowbend, LC, 2 story, 3-2.5-2, 2200 sq ft, FPL, lg deck, CAH & ceiling fans, \$85.9k. Gloria, x31891 or 486-2114.

Lease: Green Acres, Webster, 1700 sq ft, 3-2-2, no inside pets, \$925/mo w/equal dep, avail Sept. 482-1685.

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

Sale: Middlebrook, 4-2-2, 2050 sq ft, FPL, CAH, landscaped, make offer. 486-6639.

Rosewood Memorial Cemetery, 4 lots, \$395 ea. 244-0250 or 941-3262.

Lease: Galveston Seawall condo, 1BR, 6 mo lease or more, \$395/mo. 483-0737.

Sale: Santa Fe/Alta Loma, house, 3-2, 2000 sq ft, 2.5 acre, FPL, den, pool. 409-925-1468.

Sale: Santa Fe/Alta Loma, 2.5 unimproved acres. 409-925-1468.

Cars & Trucks

'83 Ford Thunderbird, good cond, 54k mi, \$1.5k. x48856 or 486-0127.

'85 Mustang GT, ex cond, new tires, new paint, 87k mi, \$3,750. Kevin, x36618.

'88 Mitsubishi Mirage, good cond, \$1.9k. 480-2188.

'84 Chevy PU, blue/silver, A/C, new trans/tires/alb/batt, rebuilt carb, auto, \$2.5k. x32677 or 814-2838.

'78 Chevy Blazer, 107k mi, auto, A/C, radio/cass, ex cond, \$2k OBO. Ed, 481-4889.

'88 Chevy S-10 Sport 4x4, 3/4 ton ext'd cab, 4 spd auto, PS/PB, 93k mi w/35k mi on rebuilt eng, \$3k OBO. Dan, x46289 or 337-1849.

'86 Nova, sunroof, AM/FM/cass, 4 dr, \$900 OBO.

Dave, x36027 or 480-4984.

'85 Suburban, dual A/C, tint, 100k mi, good cond, \$5k. 480-8608.

'81 Chevy Caprice Classic, 4 dr, A/C, good tires, \$1.2k. Alex, x35385 or 992-3876.

'88 Eagle Premier, clean, runs good, 4 dr, \$2.5 OBO. 332-1585.

'77 Chevy Caprice, runs good, \$800. 554-7806.

'82 Corvette, collectors edition, ex cond, all original. 532-2218.

'85 Porsche 944, ex cond, red. 532-2218.

'88 Honda Accord LXI, ex cond, all main records, \$6.8k. Renee, 488-2122.

'88 Ford Tempo, silver, 2 dr, A/C, cass, tinted windows, \$2.4k. 282-3172 or 332-6588.

'82 Datsun 280ZX, \$1.8k. x40125 or 488-7032.

'82 GMC 1/2 ton, PU, \$2.4k. x40125 or 488-7032.

'79 Ford PU, 6 cly, stepside, rebuilt motor, auto, A/C, needs paint, \$1.5k OBO. 445-6240.

'84 Nissan 300 ZX Turbo, two seater, 73k mi, leather, very clean, \$4.5k. x34723 or 326-4968.

'87 Caprice Estate station wagon, 150k mi, A/C, 308 eng, ex cond. Terry, 474-5639 or 698-9875 beeper.

'90 Olds Calais, 2 dr, 2.5L engine, 73k mi, well maint, ex cond, \$4.9k OBO. 649-3371.

Boats & Planes

'85 Aqua Sport Express, 175 hp Evinrude, Bimini top, depth finder, VHF radio, runs great, \$8k. 471-0322.

'93 Aqua Sport, center console, 115 hp Evinrude, runs/looks good, \$2.5k OBO. 332-1585.

Wet Jet brand wave runner, 432 cc engine, 2-person watercraft, Sportsman galv trailer, \$4k neg. Judy, x33626 or 559-2331.

Aluminum canoe, 17' hvy duty, ex cond, \$300. x35180 or 326-3706.

'93 Bass Tracker 17' Fish Magna, 60 hp, like new, 2 fish finders, Bimini top, \$8.5k. 534-3046.

Cycles

'80 Kawasaki 440 LTD, ex cond, 7,672 mi, 2 helmets, med & lg, \$1k. Susan, x31892 or 332-6141.

Touring bike, 21 speed, Shimano brakes, good condition, \$100. Gary, 480-4990.

'90 Cannondale Mountain bike, black, 16" frame, \$250 OBO. Valerie, 554-6317.

Audiovisual & Computers

386 DX 25 MHz computer, 4 MB RAM SVGA monitor & card, 90 MB HD, 1-3.5" & 5.25" FD, DOS 6.0 incl, \$600 OBO. Chad, x35796 or 482-9263.

KLH 386 notebook 2 MB RAM, 40 MB HD, 1.44 MB FD, weak display, \$230; Memorex 8086, 640K, 20 MB HD, 720K FD, VGA, Samsung paper white monitor, \$95; Canon BJ10SX bubble jet, new w/case, \$220. Kelly, x36818 or 488-8194.

Two Commodore C-64 computers, 2-1541 FD, cassette drive, MPS-801 printer, Nap Amber monitor, games, \$200. L.G. Kaigler, 326-1946.

IBM ThinkPad 750 486 33 MHz, co-processor incl, 170 MB HD, 2.44 MB FD, monochrome, DOS 6.3, \$2.8k. Trent, x47498.

Atari Mega 2ST w/AT spd for 286 compatibility, 2 MB RAM, 80 MB HD, Midi software, Word Perfect, CAD 3D w/stereo glasses, color/BW monitors, 2400 baud modem, \$500. Stacey, x32649 or 338-4983.

JSC

Dates & Data

Today

Cafeteria menu — Special: baked chicken. Total Health: roast beef au jus. Entrees: deviled crab, Creole baked cod, baked chicken, beef cannelloni, Reuben sandwich. Soup: seafood gumbo. Vegetables: seasoned carrots, peas, breaded okra, steamed cauliflower.

Monday

NMA Class — The Texas Gulf Coast Council of the National Management Association will host a 10-hour "Successful Money Management Seminar" from 6-9 p.m. Aug. 8, 15 and 22. Cost to attend is \$50 per couple for members, \$75 for non-members. For additional information, contact Richard Hergert, 280-0444.

Cafeteria menu — Special: hamburger steak. Total Health: vegetable lasagna. Entrees: beef Burgundy over noodles, barbecue smoked link, vegetable lasagna, steamed fish, French dip sandwich. Soup: cream of chicken. Vegetables: buttered corn, steamed spinach, vegetable sticks, navy beans.

Tuesday

Cafeteria menu — Special: turkey and dressing. Total Health: roast turkey. Entrees: baked meatloaf, barbecue spare ribs, liver and onions, baked chicken, French dip sandwich. Soup: black bean and rice. Vegetables: steamed broccoli, California vegetables, breaded squash, savory dressing.

Wednesday

Toastmasters meet — The Spaceland Toastmasters Club will meet at 7 a.m. Aug. 10 at House of Prayer Lutheran Church (Bay Area Blvd. and Reseda). For more information, call Darrell Boyd, x36803.

PSI meets — The Clear Lake/NASA Area chapter of Professional

Secretaries International meets at 5:30 p.m. Aug. 10 at the Holiday Inn on NASA Road 1. For additional information, contact Elaine Kemp, x30556 or Diana Peterson, x33077.

Blood drive — McDonnell-Douglas will host a blood drive from 8:30-11:30 a.m. and from 1-3:30 p.m. in the rear parking lot at 13100 Space Center Blvd. For additional information, contact Teresa Esquivel, 212-5036.

Cafeteria menu — Special: Mexican dinner. Total Health: ground turkey tacos. Entrees: Parmesan steak, beef cannelloni, catfish and hush puppies, steamed fish, Reuben sandwich. Soup: seafood gumbo. Vegetables: peas and carrots, ranch beans, mustard greens, Spanish rice.

Thursday

Blood drive — Loral will host a blood drive from 7-11:30 a.m. Aug. 11 at Loral Bldg. 1, 1322 Space Park Drive and from 1:30-4:30 p.m. at Loral Bldg. 11, 1816 Space Park Drive. For an appointment, call 335-5030.

Cafeteria menu — Special: smothered steak. Total Health: steamed pollock. Entrees: chicken and dumplings, corned beef and cabbage, broccoli cheese quiche, steamed fish, French dip sandwich. Soup: navy bean soup. Vegetables: steamed cabbage, cauliflower au gratin, buttered carrots, lima beans.

Friday

Cafeteria menu — Special: baked meatloaf. Total Health: light macaroni and cheese. Entrees: baked scrod with Hollandaise, broiled chicken, pork and beef egg rolls, steamed fish, Reuben sandwich. Soup: seafood gumbo. Vegetables: stewed tomatoes, seasoned spinach, cut corn, macaroni and cheese.

Aug. 16

Blood drive — Loral will host a blood drive from 8-11 am. Aug. 16 at Loral Bldg. 3, 3700 Bay Area Blvd., and from 1:30-3:30 p.m. at Marina Plaza, South Shore Harbour. For an appointment, call 335-5030.

Aug. 21

Chorus auditions — The Bay Area Chorus will hold auditions for the Fall 1994 season from 3-5 p.m. Aug. 21 at Clear Lake Presbyterian Church, 1511 El Dorado Blvd. For an appointment, call 684-6030.

Aug. 25

Blood drive — Krug Life Sciences will host a blood drive from 8:30-11:30 a.m. Aug. 25 in the parking lot at 1290 Hercules. For information, call Beth Brumley, 212-1204.

Blood drive — Barrios Technology will host a blood drive from 12:30-3:30 p.m. Aug. 25 at 1331 Gemini. For more information, contact Tom Hanson, 244-7473.

Sept. 5

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

Sept. 6

NMA Courses — The JSC chapter of the National Management Association will offer a professional development course "Challenging People to Succeed" from 5-7 p.m. Tuesdays from Sept. 6 through Nov. 8. For more information, call Jovan-Justine Love, x39319.

Sept. 7

NMA Courses — The JSC chapter of the National Management Association will offer a professional development course "Leadership Development" from 5-7 p.m. Wednesdays from Sept. 7 through Oct. 19. For information, call Jovan-Justine Love, x39319.

Swap Shop

Stereo speakers, 3 way-Utah; 10" woofer, ex cond. Mark, x38013 or 9921-4132.

Automobile stereo w/ four speakers, \$15. Tony, x35966.

Commodore 128, 2-printers, 2 DD, mouse, modem, joystick, \$250; 286 40 MB HD, EGA monitor, keyboard, \$200. x34997 or 488-3527.

Photography

View camera, 4x5" Calumet, rail type in ex cond, w/lenses, film holders, carry case, etc. \$550 OBO. Steve, x37152 or 992-7049.

Musical Instruments

Peavey Bass sprk enclosure w/1- 15" speaker, \$140 OBO. Jim, x31347 or 944-4687.

Yamaha 6 piece maplewood custom drumset w/ildigian symbols, \$1,650; Remo Rotor Toms, \$95; Fender Telecaster made in U.S.A. to '52 specs, blonde w/black pick guard, incldis Fender amp \$750. x35180 or 326-3706.

Drum set, ex cond, \$650; clarinet, needs new mouthpiece, \$200. Tracie Lemons, x32123 or 409-763-3013.

Boss 4-track recorder w/4 channel mixer, \$100; Yamaha RX-17 drum synthesizer, \$75. Jim, x36926 or 554-5375.

Pets & Livestock

For stud, AKC reg. Red Doberman. 485-0900.

Free dogs, male terrier mix, neut; female, terrier mix. Dawn, x32304 or 554-2690.

Lost & Found

Lost prescription sunglasses, tortoise shell frame, brown lenses, in soft brown case, lost 7/14/94 in or between bldg. 30, 12, & 1. Penn, x30515.

Household

Bedsprings, full, \$35; queen, \$45. Mark, x38013 or 992-4132.

Matching loveseat & recliner, new \$500 ea, sell \$300/both. Linda, 244-9658 or 486-6873.

Huge rocker recliner, \$295 OBO; sz bed set, \$125 OBO. John, 280-9112.

Lg cap Wards microwave, \$75 OBO; Frigidaire, 20 cu ft refrig, \$25 OBO. John, x32353 or 992-8177.

Country Blue sect sofa, 2.5 yrs, ex cond, \$600. 997-6306.

Waterbed, super-single sz, semi-motionless, solid oak country style 4-poster, 6 drwr underbed storage unit, sheets, ex cond, new \$500, best offer; recliner, rust velvet, Stratolounger, \$50 OBO. Lindy, x30963 or 479-4702.

Couch & love seat, brown w/gold stripe, \$150; fold-out qn sz couch/bed, new, \$295. Ray, x33954 or 487-4889.

Antique 48" x 48" solid oak table, ex cond, \$350; 4 drw chest of drws, refinished white/w rollers, 38" T x 24" W x 23" D, \$45; Walton indoor exercise bicycle, ex cond, \$45. 488-5564.

Full sz ex firm matt/boxsprings w/frame, \$200; Nordic track exerciser, ex cond, \$75; coffee table, cherry wood, w/glass insert, ex cond, \$300. DeeDee, x39268 or 559-2408.

Antique white iron bed, \$225; antique oak rocking chair, \$125; antique brass, full sz bed, \$150; magogany desk, 7 drwr, \$125; antique table inlaid

oak & Pine, circa 1910, chairs, \$125; English ornate pull table, chairs, \$550. 488-3588.

Trundle bed, twin sz, \$125. 480-2188.

Kenmore gas dryer, full sz, white, \$100. Dennis, 282-4104 or 532-2060.

Baby bed, mattress, Simons, ex cond, \$220; stroller, \$25. Don or Janyce, 488-0601.

Matching couch & chair, \$75; coffee table, \$20. Joe, x41096 or 326-5184.

Country sofa, med blue w/tiny peach flowers, \$300; oak entertain center, \$150. Gloria, x31891 or 486-2414.

Office chair, brown w/vinyl back, fabric seat, rubber casters, \$25; chair mat, clear w/grippers, 45" x 52". \$30. 286-0319.

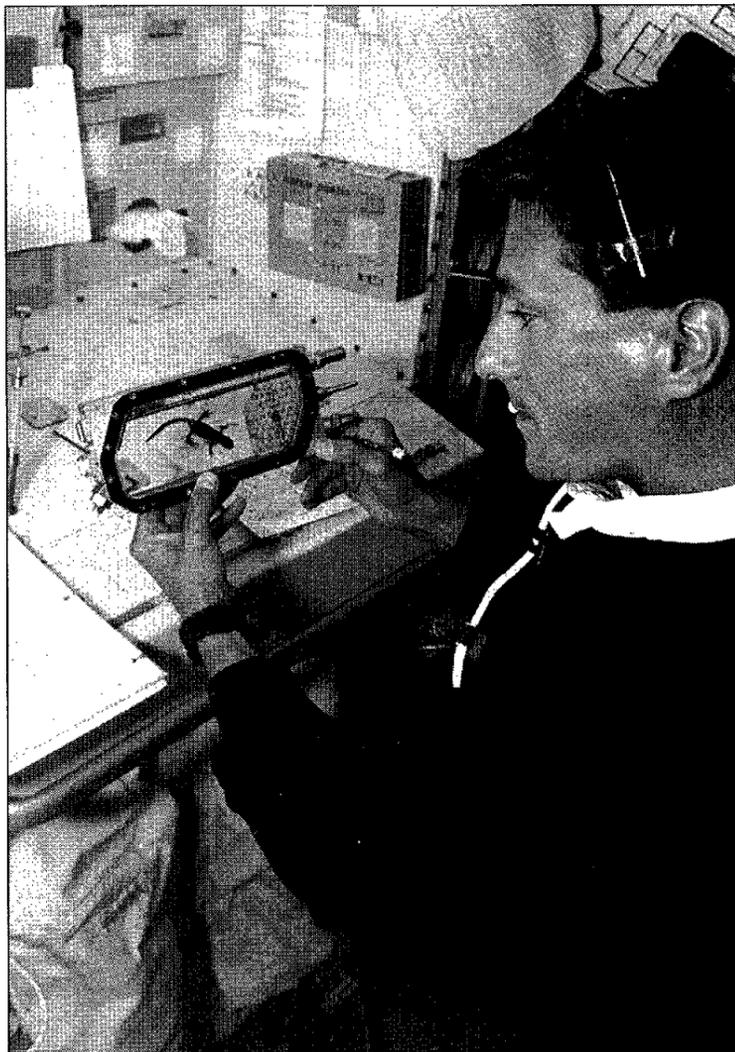
Round rattan dinette set, glass top, w/4 chairs, \$150. Carolyn, x35367.

Solid wood micro stand w/casters, \$30; electric organ, \$150; sunlamp on stand, \$25; phone ans mach, need work, \$10/ea. Donald, x33916 or 326-1817.

Waterbed, qn sz, lt oak w/ite shelf/heater, \$185. 996-8363.

Poolside furn, 4 chairs/2 chaise lounges, \$100/ all. 486-5679.

Oak veneer coffee table, \$50. Eric, x31917.



Stay: Fifteen Days

STS-65 crew advances international research

For nearly 15 days, six American men and one Japanese woman studied how plants, animals, fluids and solids react to microgravity on the second International Microgravity Laboratory flight.

Although scientists are still poring over their results, crew members reported that the flight was a model of international cooperation that can be applied to the operations of the International Space Station.

The STS-65 crew — Commander Bob Cabana, Pilot Jim Halsell, Payload Commander Rick Hieb, Mission Specialists Leroy Chiao, Don Thomas and Carl Walz, and Payload Specialist Chiaki Mukai — shared their impressions of the flight, as well as photos, film and video, with fellow JSC employees this week.

Left to right, top to bottom:

1) The European Space Agency-built Spacelab module that was home to the researchers is anchored in *Columbia's* payload bay as the shuttle flies over Africa. Lake Nyasa in Malawi can be seen clearly in the upper left hand portion of the photograph.

2) Thomas observes one of several newts that accompanied the crew and added to its complement by giving birth to embryos in weightlessness. The temporary home for the newts, the Aquatic Animal Experiment Unit, also contained Medaka and goldfish. The crew and scientists on the ground studied how smaller organisms such as the newts developed from embryos and hatched as part of an overall program looking at how animals develop in the space environment.

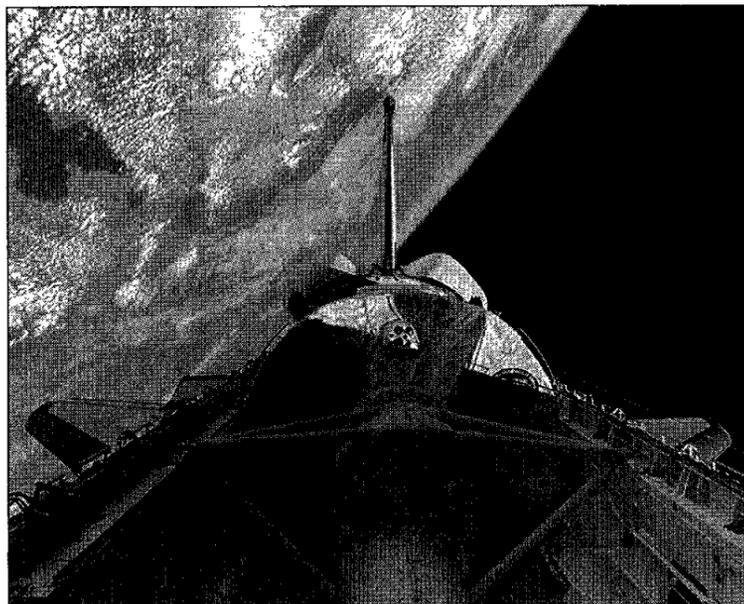
3) Mukai floats in front of the aft flight deck windows, displaying some bean sprouts growing in a cassette case. The Japanese physician took the sprouts along as a personal experiment in how plants develop on-orbit.

4) The entire crew poses for its in-flight portrait. From left are Hieb, Thomas, Mukai, Walz, Cabana, Chiao and Halsell.

5) Hieb, left, and Cabana take an air sample on one of the Biorack experiments in the science module.

6) Chiao and Thomas work in tandem to support the IML-2 investigations. As Chiao places samples in one of the Biorack centrifuges, Thomas works in the glovebox where samples for Biorack and the slow rotating centrifuge microscope called NIZEMI are prepared.

7) Walz enters the Spacelab module by way of the tunnel connecting it to *Columbia's* crew cabin. Walz, a member of the Blue Team that worked graveyard shift hours by Houston standards, was in charge of orbiter systems while Chiao and Thomas worked in the science module. On the Red Team, Cabana and Halsell kept the orbiter systems working well while Hieb and Mukai concentrated on the IML-2 investigations. □



NASA sounding rockets to study ionosphere with Brazil

NASA will conduct with Brazilian space agencies a joint campaign to study the Earth's space environment over the magnetic equator starting this month.

From Aug. 15-Oct. 20, the Goddard Space Flight Center's Wallops Flight Facility will launch 33 rockets from the Centro de Lançamento de Alcântara launch range in the north-eastern state of Maranhão, Brazil.

The campaign will help scientists better understand the unique properties of the Earth's ionosphere at the equator and is an integral part of the International Equatorial Electrojet Year. The project has been named the Guara Campaign after a beautiful species of bird native to the equatorial region of Brazil.

The ionosphere interests scientists because it acts like a mirror, reflecting high frequency radio waves, carrying currents that affect power systems on the ground and disturbing satellite transmissions that must pass through it.

According to NASA campaign scientist Dr. Robert Pfaff Jr., the Earth's magnetic field lines, which are parallel to the Earth's surface at the equator, affect the physics and electro-dynamics of the equatorial ionosphere. This creates a variety of natural phenomena, including spectacular "eruptions" and turbulence in space, as well as intense currents or "electro-jets."

The location where the field lines are exactly horizontal to the Earth is

known as the magnetic equator. The Alcântara launch range is within one degree of the magnetic equator.

The sounding rocket campaign will investigate the electro-dynamics and irregularities in the ionosphere and mesosphere along the magnetic equator and will study their relationship with the neutral atmosphere and winds. The experiments primarily will measure electric fields, currents, electron densities, neutral winds and ionospheric instabilities.

Suborbital sounding rockets provide the only means possible to take direct measurements in some regions of the Earth's atmosphere. The sounding rocket experiments during the Brazilian campaign require simultaneous measurements taken by

ground-based scientific instruments, including backscatter radar, magnetometers and ionosondes. These instruments will be provided by scientists from the Brazilian Space Agency, Instituto Nacional de Pesquisas Espaciais.

More than 50 U.S. and Brazilian scientists will participate in the Guara campaign, supported by teams of approximately 300 engineers, technicians and staff.

NASA plans to fly a Brazilian science experiment as part of one of the payloads. The Commission for Space Activities of the Federative Republic of Brazil will provide launch support services to NASA.

The rockets are divided among four experimental groups.

Between Aug. 15 and 27, four Nike-Orion sounding rockets and 20 Viper 3A small meteorological rockets will explore the interactions between small-scale turbulence and large-scale tidal motions and waves in the middle atmosphere. From Sept. 1-20, four Black Brant VC sounding rockets will study the equatorial electrojet. Four Nike-Tomahawk sounding rockets will release barium and trimethyl aluminum chemical to study the winds and electric fields in the ionosphere from Sept. 21-Oct. 6. The final launch will be a Black Brant X sounding rocket carrying experiments to measure the density and electric field turbulence associated with large depletions (or bubbles) that occur in the ionosphere at night.

Reinvention success stories video to air

A videotape record of Vice President Al Gore's recognition of the agency's reinvention success stories and heroes during a June visit to NASA Headquarters will be replayed on the JSC Television Distribution System this month.

The video, which will air on Channel 6 at 11 a.m. on Aug. 5, 8, 10 and 12, also shares the new NASA strategic plan with employees. Gore cited the vision statement and several of the goals in his remarks.

"The event was exceptionally well-executed, and it represented an exhilarating high point for all of us at NASA," NASA Administrator Daniel S. Goldin said.

NMA hosts money management seminar

The Texas Gulf Coast Council of the National Management Association will host a 10-hour "Successful Money Management Seminar" from 6-9 p.m. Monday, Aug. 15 and 22. Cost is \$50 per couple for members, \$75 for non-members. For details, contact Richard Hergert, 280-0444.



STATE VISIT — JSC Director Dr. Carolyn Huntoon explains the functions of the trainers and mockups in Bldg. 9 to His Excellency Apas Dzhumagulov, Prime Minister of the Kyrgyz Republic and Mrs. Dzhumagulov. Next to Dr. Huntoon is the prime minister's translator. The Prime Minister and his party visited JSC July 18 as part of his visit to the Houston area for meetings with American energy companies. The Kyrgyz Republic is located in the Commonwealth of Independent States.

JSC Photo

Thunderstorms spawn fireworks in atmosphere

Scientists have recorded spectacular bursts of red and blue light extending upward from electrical thunderstorms to altitudes as high as 60 miles and in some cases through the ozone layer into the upper atmosphere where auroras occur.

The unusual flashes occurred over thunderstorms in the Midwest between June 28 and July 12 during a NASA-sponsored investigation into the phenomenon. To capture the images, principal investigators Davis Sentman and Eugene Wescott, professors at the Geophysical Institute with the University of Alaska, used special low-light-level cameras aboard two jet aircraft flown out of Oklahoma City.

"The flashes look like the Fourth of July, like Roman candles with fountains," said Sentman. "The video footage we received far exceeded our expectations." Previously, the two had captured black and white photo images of the flashes providing the first proof the flashes actually existed.

Using two aircraft for triangulation and with improved camera systems designed by Project Engineer Daniel Osborne the team was able to identify two distinct kinds of flashes, described as sprites and blue jets.

Sprites are blood red flashes that appear with bluish tendrils dangling from the bottom of some. The flashes last only a few thousandths of a second and the researchers also recorded radio noise that coincides with the sprite flashes. When the recorded signals are played through a speaker, they "pop," a sound that differs from normal lightning discharge signals.

The sprites have been recorded on a TV spectrograph and will be analyzed to determine their atomic and molecular source. Since they are associated with thunderstorms and lightning, scientists suspect the flashes may be a form of electrical discharge. If so, they could present a concern to high-altitude aircraft.

Blue jets are flashes that appear in narrow beams, sprays, fans or cones of light which give off a blue or purple hue. "To the eye, they resemble material ejected from a high explosive source, the tracks of atomic particles, or rays in a cloud chamber," Wescott said.

Child Care Center offers tuition assistance

The JSC Child Care Center is offering "scholarships" for children whose parents or guardians can't afford the center's tuition, and applications are due Aug. 19 for assistance starting in September.

Guidelines and applications for the program are now available in the reception area at the Child Care Center, or by calling x34734.

Scholarships will partially decrease the

tuition required for qualifying applications for three months. Emergency assistance also will be available in special situations.

Any parent or guardian with a child enrolled at the center or who has accepted a slot is eligible to apply for tuition assistance. Initial qualification will be based on gross family income. The amount of assistance that can be provided will depend on donations made to

Space Family Education Inc., the non-profit corporation which operates the center, and fund-raising activities.

A Tuition Assistance Review Committee will recommend which applications should be approved for tuition assistance, and an amount to be distributed based on available funds. The committee's recommendations will be officially approved by the SFEI board of directors.

SRL-1 images help scientists monitor volcanoes, study archeological site

(Continued from Page 1)

older caldera further south in Colombia, along another proposed fracture zone. Although relatively conspicuous, these volcanoes have escaped widespread recognition because of frequent cloud cover that hinders remote sensing imaging in visible wavelengths.

Four separate volcanoes in the Northern Andes nations of Colombia and Ecuador have been active during the last 10 years, killing more than 25,000 people, including scientists who were monitoring the

volcanic activity. Detection and monitoring of volcanoes from space provides a safe way to investigate volcanism. The recognition of previously unknown volcanoes is important for hazard evaluations because a number of major eruptions this century have occurred at mountains that were not previously recognized as volcanoes.

The image of the lost city of Ubar on the Arabian Peninsula adds new detail to information about the ancient city discovered in 1992 with the aid of remote sensing data.

This image, and ongoing field investigations, will help shed light on a little-known early civilization.

Archeologists believe Ubar existed from about 2800 B.C. to about 300 A.D. and was a remote desert outpost where caravans were assembled for the transport of frankincense across the desert.

The actual site of the fortress of the lost city of Ubar, currently under excavation, is near a great wadi, or dry streambed. The fortress is too small to be detected in this image, but tracks leading to

the site, and surrounding tracks, are prominent. The tracks have been used in modern times, but field investigations show many of were in use in ancient times as well. Mapping of the tracks on regional remote sensing images was a key to recognizing the site as Ubar in 1992.

The radar image of the southwest portion of the buried Chicxulub impact crater is providing data for scientists who believe the crater was formed by an asteroid or comet which slammed into

the Earth more than 65 million years ago. It is this impact crater that has been linked to a major biological catastrophe where more than 50 percent of the Earth's species, including the dinosaurs, became extinct.

The 110- to 180-mile crater is buried by 1,000 to 3,000 feet of limestone. The exact size of the crater is currently being debated by scientists. Scientists are using the SIR-C/X-SAR imagery to study wetland ecology and help determine the exact size of the impact crater.

Dante II reaches crater floor

(Continued from Page 1)

one-foot diameter boulder came tumbling down the slope from the north-east wall of the crater and hit the robot on the inner rear left leg. At the time, Dante was using the leg to provide primary support in conjunction with the other leg of the inner frame, and was placing approximately 450 pounds of downward force on the leg.

The force of the impact knocked the leg out of the support position and away from its foothold, and the other three legs of the inner frame had to instantly provide additional support. Operators quickly lowered the outer frame of legs to provide more. The impact did not appear to do any physical damage to the struc-

ture of the robot.

The team planned to move Dante closer to the center of the crater to gather additional science information, and attempt to provide additional imagery of the crater floor. The region has been continually covered by the plume of the volcano since a 1992 eruption.

Dante II evolved from the earlier Dante robot which tried over the 1992-93 New Year's holiday to descend into the live Antarctic volcano Mt. Erebus. That mission ended with the robot only 21 feet into the crater when the fiber optic cable, which was its communications lifeline, kinked and broke due to physical and temperature stress conditions.

Space News Roundup

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Editor Kelly Humphries
Associate Editor Kari Fluegel
Associate Editor Eileen Hawley

SRL-2 looks at home planet

(Continued from Page 1)

maneuvers to keep the orbiter properly positioned for Earth observations. According to Baker, the STS-68 crew members may exceed that record as they record changes in the global environment.

"I think this is probably one of the most important things we can do in space," Baker said. "Looking at our planet and understanding our planet, how it works and how man affects the environment is extremely exciting."

During the flight, not only will crew members gather data useful in helping scientists understand the planet, but that data will increase understanding of the data that is received. According to Baker, that improved interpretation of data will allow

researchers to learn even more about the nature of our planet and how humans affect the environment.

An on-time launch of *Endeavour* will result in a landing at KSC about 10:30 a.m. CDT Aug. 28.

With *Endeavour* ready for launch, technicians continue to process *Discovery* and *Atlantis* for their upcoming missions.

Discovery should roll over to the Vehicle Assembly Bldg. on Monday as work continues toward its early September launch. In the Orbiter Processing Facility, *Atlantis*, undergoing main propulsion system leak checks and forward reaction control system interface testing, is targeted for launch on a 10 day mission in late October.