

# NASA satellite records largest ozone hole on record

Earthwatch

Preliminary results from NASA's Total Ozone Mapping Spectrometer onboard the Nimbus-7 satellite show that the 1992 Antarctic ozone hole is the largest on record.

The previous surface area covered by low total ozone values, less than 220 Dobson Units, typically has reached near 7.7 million square miles. Last Wednesday, the surface area covered reached 8.9 million square miles, an increase in size from 1991 of approximately 15 percent.

By comparison, the surface area of the North America continent is 9.4 million square miles. Antarctica has 5.1 million square miles.

Since the mid-1980s, the region covered by

low total ozone values begins to grow in early August. The region covered usually reaches its greatest extent in early-October. This is the fifth year since 1986 that large seasonal ozone reductions over the Antarctic have been observed.

The minimum total ozone value on Sept. 23 was 131 Dobson Units. A record low of 111 Dobson Units was set on Oct. 6, 1991, near the South Pole. A Dobson Units level of

100 equals a layer of gas one millimeter thick at its surface. The lowest 1992 value probably will not be observed for several weeks, report scientists at NASA's Goddard Space Flight Center.

Scientists believe man-made chlorine is the primary cause for ozone hole formation. This year's hole also may have been affected by the continued presence of sulfuric acid droplets in the upper atmosphere created by the eruption of Mount Pinatubo in the Philippines in June 1991.

Goddard scientists noted that middle stratospheric temperatures, recorded by the National Oceanic and Atmospheric Administration's National Meteorological Center, were colder than normal. These colder temperatures would contribute indirectly to larger ozone losses.

Further research is required to determine the role of these phenomena with respect to the low total ozone values seen this year, according to Goddard scientists.

Ozone, a molecule made up of three atoms of oxygen, comprises a thin layer of the upper atmosphere which absorbs harmful ultraviolet radiation from the sun. "Ozone hole" is a term used to describe a large area of intense ozone depletion that occurs over Antarctica typically during late-August through early-October and breaks up in mid-November.



JSC Photo by Andrew Patnes

The STS-52 crew — from left, Payload Specialist Steve MacLean, Mission Specialists Tammy Jernigan, Bill Shepherd and Lacy Veach, Pilot Mike Baker and Commander Jim Wetherbee — meets the news media in JSC's Bldg. 2. *Columbia* is scheduled for launch around Oct. 22. Shuttle managers will meet Tuesday for a final flight readiness review, following which an official launch date will be announced. This past week, technicians at Kennedy Space Center exchanged one of *Columbia*'s three main engines due to imperfections in a weld on the engine's nozzle. The welds on *Columbia*'s other engines were double-checked and found to be in good shape.

# **Blackshear earns Hughes Award**

### Honored for contributing to advancement of women

Donna Blackshear of the Administration Directorate received the Virginia B. Hughes Equal Opportunity Award on Wednesday for her contributions toward the advancement of women at JSC.

JSC Acting Director Paul J. Weitz presented the award, sponsored annually by the Federal Women's Program, at the Gilruth Center. The award ceremony capped two days of workshops that looked at managing



and role model for women in terms of achieving both personal and career success by demonstrating outstanding personal performance.

The selection was made by the 10-member Federal Women's Program working group.

"It was a difficult decision from the five people that we had this year," said Federal Women's Program Manager Pam Adams. "Even though they were not selected as the recipient, they deserve recognition for all of their contributions to women here at JSC." This year's other nominees were Harvey

# Veteran crew likes mixture of experiments

The veteran crew of the upcoming STS-52 mission to deploy Laser Geodynamics Satellite-II and test a new system for control of the space shuttle's robot arm is ready to begin its challenging grab-bag of technology evaluations.

Commander Jim Wetherbee; Pilot Mike Baker; mission specialists Lacy Veach, Bill Shepherd and Tammy Jernigan; and Payload Specialist Steve MacLean traveled to Kennedy Space Center on Thursday to participate in the countdown rehearsal, which

ends today.

"We are doing a little bit of everything and that makes us happy," Wetherbee said. "We go into space to work and collect data and bring it back and come up with questions, not always answers. And that's good because it will keep us thinking in the future, it will keep us advancing."

The international flight includes not only a Canadian payload specialist and a set of Canadian experiments that will look at machine vision systems, but the Italian-built LAGEOS-II satellite that will help scientists on the ground measure the drift of Earth's crustal plates, a French-built experiment called Materials for the Study of Interesting Phenomena of Solidification on Earth and in Orbit, the European Space Agency's Attitude Sensor Package and a host of materials processing and release it from *Columbia*'s payload bay on Flight Day 2.

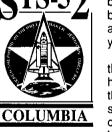
From its initial 296 kilometer (160 nautical mile) orbit, LAGEOS-II will be boosted to an elliptical transfer orbit and then its final 5,900-kilometer (3,185 nm) orbit by two booster firings. Scientists on the ground will bounce lasers off the satellite's reflectors to measure the movement of tectonic plates and map variations in Earth's surface gravity. These precise measurements are

expected to corroborate measurements being taken by LAGEOS-1, launched by NASA on an expendable launch vehicle 16 years ago.

"It just astounds me that the LAGEOS satellite can help measure the speed of the drift of the continental shelf to an accuracy of 4 centimeters a year," Wetherbee said.

After releasing LAGEOS-II, the crew will turn its attention to U.S. Microgravity Payload-1, a collection of materials processing experiments that includes MEPHISTO, a joint French Space Agency, French Atomic Energy commission and NASA look at the behavior of metals and semiconductors as they cool and solidify; the Lambda-Point Experiment, which will study fluid behavior in microgravity; and the Space Acceleration Measurement System; which will measure and record low-level

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conflict and change, using stress positively and improving memory skills. About 300 men and women attended the workshops.

Blackshear, who came to JSC in 1981 as

a Presidential Management Intern after graduating from Harvard's Kennedy School of Government, is the manager of the Exploration Program Resources Management Office.

She earned the Hughes Award for being a mentor

#### Blackshear

Hartman of the Human Resources Office, Alice Lee of the Safety, Reliability and Quality Assurance Office. Carla Lattier of the

Office of the Comptroller and Denise Baisden of the Space and Life Science Directorate.

#### physiological experiments put together by various American companies and academic institutions.

The primary payload is the LAGEOS satellite, a two-foot-diameter sphere made of brass and aluminum and covered with 426 reflectors. After Jernigan checks out the satellite and its Italian-built deployment system, she will

acceleration.

"This is really the only place in the known universe where we can see and study this phenomenon," Shepherd said of MEPHISTO, which requires temperatures of only 2.17 degrees Kelvin.

Next, Veach and MacLean will work Please see STS-53, Page 4

### Nicholson earns Gilruth Trophy

Space Shuttle Program Manager Leonard Nicholson received the 1992 Gilruth Trophy at Thursday night's fifth annual Spaceflight Banquet hosted by the North Galveston County Chamber of Commerce

The award, named for JSC founding director Robert Gilruth, recognizes U.S. space program leaders.

The 54-year-old Dickinson resident began his career at JSC in 1963, immediately after receiving a master's degree in mechanical engineering from West Virginia University.

During the 1960s, Nicholson worked as an aerospace engineer in JSC's Spacecraft Integration Branch, senior engineer in the Earth Resources Office, and technical assistant to the manager of the Advanced Missions Office.

In the 1970s, he became technical assistant to the Apollo Program manager, and manager of the Shuttle Payload Integration and Development Program in the STS Operations Office.In 1982, he served as technical assistant to the JSC director.

Nicholson became the manager for NSTS Integration and Operations in 1985, and in 1989 he became deputy director of the Space Shuttle Program. Recently, he was named manager of the shuttle program.



Leonard Nicholson

# Mars Observer begins journey, deploys booms

The Mars Observer spacecraft partially deployed its two science booms Tuesday and began science operations Thursday.

Mars Observer rose from its Cape Canaveral Air Force Station launch pad at 12:05 p.m. CDT Friday. Mars Observer spacecraft is more than 1.3 million kilometers (820,000 miles) from Earth, traveling at a speed of about 12,600 kilometers per hour (7,900 miles per hour) with respect to Earth.

The first boom carrying the

gamma ray spectrometer was successfully deployed at 6:20 p.m. CDT. The command to partially extend the 6-meter (20-foot) boom to 1.6 meters (5 feet) took three minutes and 36 seconds. The second deployment to partially extend the magnetometer boom occurred at 8:45 p.m. CDT. Deployment lasted 10 minutes and the 6-meter (20-foot) boom was extended to 4.3 meters (14 feet).

Both booms will remain partially Please see MARS, Page 4 JSC

# **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. For more information, call x35350 or x30990.

Texas Renaissance Festival (9 a.m.-6 p.m. weekends Oct. 3-Nov. 15): adult, \$9.25; child (5-12): \$5.55. Festival bus trip (Oct. 24, Nov. 7): One-day trip; adult, \$15; child (ages 5-12), \$10; child (under 5), \$7.

- Wings Over Houston Air Show (Oct. 3-4 at Ellington Field): one-day; Adult, \$7; Children 6-11, \$2.
- Deep Sea Fishing Trip (Oct. 17): \$45 to fish, \$20 to ride.
- Metro tickets --- Passes, books and single tickets available.
- Fiesta Texas Park (San Antonio): buy one, get one free. Adult, \$19.50; child 4-11, \$13.55.

Sea World (San Antonio): adult, \$18.90 (child free with paying adult); child 3-11, \$13.55.

Astroworld: \$16.95 and \$14.95 (child under 54 inches), \$44.95 (season pass) and Waterworld, \$9.50.

Six Flags: \$16.95 (one-day) and \$22.95 (two-day).

Movie discounts: General Cinema, \$4; AMC Theater, \$3.75; Loews Theater, \$4. Stamps, Walt Disney Club memberships also available.

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## **Gilruth Center News**

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

EAA badges — Dependents and spouses may apply for photo identification badges from 6:30-9 p.m. Monday through Friday. Dependents must be between 16 and 23 years old.

- Required course for employees wishing to use the Gilruth weight Weight Safety --room is offered from 8-9:30 p.m. Oct. 8. Pre-registration is required; cost is \$5.

Defensive driving — Course is offered from 8 a.m.-5 p.m. Oct. 10. Cost is \$19. Aerobics - High/low-impact classes meet 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.

Aikido - Martial arts class meets Tuesdays from 6:15-8 p.m. Cost is \$15 per month.

Fitness program --- Health Related Fitness Program includes medical examination screening, 12-week individually prescribed exercise program. Call Larry Weir, x30301

Fiction Workshop — A five-week fiction workshop will be offered from 6:30-9 p.m. Wednesdays at the Gilruth Center beginning Oct. 7. Cost is \$80.

Volleyball workshop — A volleyball workshop will be offered Saturdays from Oct. 3 -Nov. 21. A women's session will be held from 12-2 p.m., and a men's session from 2-4 p.m. Cost for the six-week course is \$25.

Intercenter Run - JSC runners may now participate in the fall Intercenter Run competition among NASA centers. Participants may run or walk a two-mile or 10-kilo-meter course and turn their times into the Gilruth Center. All eligible participants will receive a free T-shirt.

#### JSC

#### 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.

#### Property

Lease: Oakbrook, 4-2.5-2, on golf course, no pets, 6 mo. lease, also avail furn, \$900/mo. 488-7860.

147 in Bldg. 2. No phone or fax ads accepted.

Sale: Eld Dorado Trace condo, 1-1.5-1CP. appl, patio, balcony, FPL, fans, assummable, low equity. Barbara, 488-3383.

Lease: Univ Trac condo, 1 BR/study, W/D, DW, fans, all elec, balcony, exercise room/pool on property, \$475. 282-4616 or 488-2946.

Rent: Breckenridge, CO, ski house, sleeps 12, house overlooks Breckenridge ski area. 303-482-9124

Lease/Option: Nassau Bay, 1400 sq. ft., 2-2.5, patio, pool, new kit appl, \$69.9K. x36665 or 333-9733.

Sale: League City, mobile home, 14' x 72', one owner, must be moved, good cond, all alum, 2-2, cent A/H, \$10K. Betty, x37242 or 943-7221

Sale: Lux French country estate, 4-3.5-3D, 3478 sq. ft., located on 5.7 ac, another 5.3 acre avail, \$365K. x39250 or 996-8471.

Sale: Nassau Bay TH, sunroom opening 30 deck, 3 rm master suite incl jacuzzi tub, all new appl, new floors, new paint in/out, 2 car garage. 333-9618. Sale: South Shore Harbour, Perry Home Model 2798, ranch, 4 BR, library, oversize bath and kitchen, \$159.9K. x32896 or 538-1443.

cond, \$6.2K. x33631 or 538-1813. '59 Chevy PU, \$900; '80 Chevy Van, \$1,250. 334-2335.

'85 Gold Nissan 300ZX, orig owner, t-tops, new tires, good cond, 89K mi, \$5.8K. John, x31882. '85 Toyota MR2, loaded, custom wheels,

car phone, 80K mi, \$5K., without car phone, \$4850. Marc, 333-2693. '84 GMC S-15 Serria Ext Cab PU, V6, auto

w/overdrive, AC, AM/FM/cass, no rust, runs good, \$3K OBO. x38749 or 409-938-8643.

'85 Pontiac 6000 LE. 4 DR, all pwr, cruise, AC, ex interior, \$2995. 943-5416 or 992-3022

'89 Ford Tempo, fully equipped, low miles. Robert, 472-6323 or Tamela, x36155.

'89 Jeep Wrangler Islander, red w/grey soft top, 5 spd, AC, PS/PB, 70K mi, ex cond, \$9.2K. Rob, x30762 or 992-4507.

'84 S10 Blazer, 5 spd, 4x4, AC, Tahoe pkg, new motor, clutch, warr, \$3.8K OBO. Darryl, 476-5035.

'90 Isuzu LS SpaceCab PU, 2.6L, 5 spd, PS/PB, pwr windows/locks, cruise, alarm, 40K mi, ex cond, \$7,750. Mark, x35597 or 538-3001.

'78 Porsche 928, 75K mi, brown w/leather int, auto, ex cond, \$8.5K OBO. Bill, x39980. '80 Olds Cutlass LS, 4 dr, 62K mi, good

cond, \$1.2K. 554-6138. '89 Ford Ranger XLT, red w/matching Brahma shell, AC, AM/FM/cass, 4 cyl, ex

cond, 27K mi, \$6.2K. x35057. '86 Jeep CJ-7 Renegade, 38K mi, 6 cyl, 5 spd, tilt, PS/PB, ext range tank, recent soft top/bikini top. \$5.5K. x332813 or 286-8456. '81 Chevy PU, ex cond, 29K on rebuilt eng, needs AC repair, \$2,950. Bill, 482-1562.

#### Today

Cafeteria menu - Special: tuna and noodle casserole. Entrees: liver and onions, deviled crabs, roast beef with dressing. Soup: seafood gumbo. Vegetables: whipped potatoes, peas, cauliflower.

#### Saturday

Fall Star Party - The JSC Astronomical Society and the Challenger 7 Park are sponsoring a free Fall Star Party from dusk to 10 p.m. Oct. 3. Telescoped, movies and other activities will be available. The event is open to the public and will be held at Challenger 7 Park off NASA 1 West, For more information, contact Bill Williams at 339-1367.

#### Monday

NSS meets — The newly formed Clear Lake Area chapter of the National Space Society will meet at 7:30 p.m. Oct. 5 at the Gilruth Center, Rm. 222. Mission goals for the chapter and participation in the Mars Mission Texas project will be discussed. For more information. call Marianne Dyson at 486-4747.

Windows seminar — JSC's Information Systems Directorate will host a Microsoft Windows 3.1 technical seminar from 12:30-4:30 p.m. Oct. 5 in the Gilruth Center ballroom. For more information, call Dianne Robinson at x37595

Cafeteria menu — Special: breaded cutlet. Entrees: beef chop suey, Polish sausage with potato salad. Soup: French onion. Vegetables: okra and tomatoes, green peas.

#### Tuesday

STS-47 briefing — The crew of STS-47 Spacelab-J mission will brief employees at 2 p.m. Oct. 6 in Teague Auditorium. All employees are invited.

**Dates & Data** 

Cafeteria menu - Special: fried chicken. Entrees: Salisbury steak, shrimp Creole. Soup: split pea. Vegetables: mixed vegetables, beets, whipped potatoes.

#### Wednesday

Astronomy Seminar - JSC Astronomy Seminars will host a luncheon meeting from noon to 1 p.m. Oct. 7 in Bldg. 31, Room 129. Guest speaker will be Dr. Karl Henize discussing "Slow Motion Meteors Observed by Geodss.' For more information, contact Al Jackson at 333-7679.

Toastmasters meet — The Spaceland Toastmasters Club will meet at 7:15 a.m. Oct. 7 in the Bldg. 3 cafeteria. For more information, call Darrell Boyd at x36803.

Cafeteria menu - Special: stuffed bell pepper. Entrees: fried catfish with hush puppies, braised beef rib, barbecue plate, wieners and beans, shrimp salad. Soup: seafood gumbo. Vegetables: corn O'Brian, rice, Italian green beans.

#### Thursday

Cafeteria menu — Special: barbecue smoked link. Entrees: beef Stroganoff, turkey and dressing. Soup: chicken noodle. Vegetables: Lima beans, buttered squash, Spanish rice.

#### Oct. 9

Cafeteria menu - Special: meat sauce and spaghetti. Entrees: baked scrod, liver and onions, fried shrimp. Soup: seafood gumbo. Vegetables: green beans, buttered broccoli, whipped potatoes.

#### Oct. 10

Space Center Houston — JSC and

contractor employees who have obtained vouchers for visits to Space Center Houston may visit the new visitor center Oct. 10-12. Voucher holders must attend on the day indicated or trade their vouchers with other employees. Retirees may obtain vouchers by calling the NASA Exchange manager at x38970.

#### Oct. 12

Columbus Day - Most JSC offices will be closed in observance of the Columbus Day holiday.

#### Oct. 14

Astronomy Seminar - JSC Astronomy seminars will host an open discussion luncheon meeting from noon to 1 p.m. Oct. 14 in Bldg. 31, Room 129. For more information, contact AI Jackson at 333-7679.

#### Oct. 15

Lunch and learn - The American Institute of Aeronautics and Astronautics Materials, Structures and Dynamics Committee will present a lunch and learn session at 11:30 a.m. Oct. 15 in Lockheed Plaza I, Room 12C. James Visentine of JSC's Structures and Mechanics Division will present "A **Tutorial Review of Space Shuttle** Glows." For more information, call Steve Scheer at 333-6186, or Gillian Shepard at 333-6239.

COD Chili Cook-Off - The Center Operations Directorate will hold its fourth annual COD Chili Cook-Off at 4 p.m. Oct. 16 at the Gilruth Center. Public tasting begins at 7 p.m. The public is invited. Tickets at \$3 through Oct. 13, and \$5 after; contact COD personnel. For more information, call Ginger Gibson at x30596.

Want baby crib, double stroller, must be in

Want carpool from Heights to JSC. x35785

Want Bass guitar player, rhythm guitar

Want college quality microscope. Jesse,

Glass aquarium, at least 30 gal, OK if it

Mens medium full rip-curl wetsuit, good

leaks or is cracked. Judy, x33631 or 538-

cond, \$50; mens medium O'Neill windsurfing

jacket w/detachable sleeves, good cond, \$25.

Riding mower, 8HP, 40" cut, \$275; washer,

Southwest Airline frequent flyers round-trip

Tutoring service, exp teacher will provide

V.I.P. Holiday Resort certificates, 10 days,

Under counter G.E. microwave w/light, fan.

clock, \$50; sz 13 temporary spare on rim,

\$10; apt. size dryer, \$100; phone insert

Johnson alum propellers, 13 O.D. x 15"

2 Rt Airline tickets, Houston Hobby to

pitch, one new, \$35, one used, \$25; Singer

tutoring for students in grads K - 5. Rachel,

7 locations, valued at \$700, best offer. Lisa,

good cond. x38835 or 474-3931.

player for rock group. 474-4742.

332-6681 or 996-9641.

dryer, \$175/pr. 334-2335.

ticket, \$290. x31538.

x36088 or 332-6794.

modem, \$25. 332-0365.

vacuum cleaner, \$50. 332-9105.

Miscellaneous

1813

554-2320.

480-2464

or 861-6646.

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keyboard, DOS, Wordperfect, MenuWorks, other programs, \$450. 409-938-4793. IBM-XT, mono monitor, 640K, 360K FD,

modem, good cond, \$150. Joel, 894-8021. Sound Design stereo rack system w/turntable, 10 band equalizer, speakers, dual hi-speed dub cass deck, AM/FM tuner, \$90 OBO. 27" Sylvania stereo TV, best offer. Ray, 283-5824.

Juliette AM/FM/8 track stereo recorder w/turntable, spkrs, \$30 OBO; Juliette AM/FM/8 track stereo w/spkrs, \$20 OBO; Sony Betamax VCR, make offer. Ray, 283-5824.

Sega Genesis video game system w/2 games, \$100; Transend stereo w/2 cass decks, equalizer, turntable, tuner, spkrs, \$30. Joe, 538-3001.

Toshiba 19" color TV, \$150, Sanyo stereo w/phono and dual cass, ex cond, \$60. Gary, x39496 or 474-4156.

Tandy 1000, 384K, two 360K FD, mono, DOS, \$90; Tandy wide carriage daisy wheel printer, \$45, both \$120. 992-5958 or 335-8539.

Nintendo system w/Mario 1 and Duckhunt, \$40; Mario II, \$20; Mario III, \$25; Monopoly, \$30; Dragon Warrior II, \$35; R.C. pro am, contra, Dragon Warrior I, others \$10-15. Richard, 532-1673.

#### Pets & Livestock

Female kitten, dark gray/blk stripes, approx 3 mo old, indoor/outdoor, free to good home. Kelley, 283-5466.

AKC cocker spaniel puppy, born 5-10-92,

Queen sz sleeper sofa, 474-3517. Kign sz waterbed, headboard, new heater, new matt, comforter w/sheets, \$125. x31838 or 480-4226.

Sleeper sofa, floral print, earthtones, ottomans, \$75 OBO. Shelley, x37824.

Queen sz sleeper sofa, taupe, blue, brown terra cotta floral design, plush fabric, pillow avail

to look at onsite, good cond, \$75. x37763. Love seat, New Horizons Designer origi

nals, It. beige w/muted peach/green, lg floral print, wiocker trim, sides, back, good cond, \$75 OBO; wicker chair w/cushion, modern style, \$15 OBO. 486-9605.

Couch, 7' 10" Broyhill, modern style, striped/w/wide bands of cream/rust, w/smalle bands of black/gold, good cond, \$100 OBO. 486-9605.

China buffet, country French, off wht finish, \$350. 992-5745.

Persian carpet, 100% silk, handmade. 3.5 x 5.5, wall masterpiece, \$4K; Persian carpet, wool w/silk flowers, handmade 10 x 12, \$3.5K. 488-0345.

3/4 sz antique oak bed, \$45; 4 drwr desk, \$10; 36" pine table, \$30; end table, \$5; Victrola stand, \$35; Whirlpool vacuum, \$40; pine washstand, \$45; antique oak executive desk chair, \$30; all items BO. Stacey, 286-9921

Queen sz Simmons Beauty Rest matt, box spring, ex cond, \$150. 488-0189. Small china buffet/hutch, approx 72" x 17"

x 30", dark veneer, glass insets in top drs, bottom storage and 1 drwr, ex cond, \$100.

Janine, 283-7541 or 482-7550.

Sale: Lake Livingston, waterfront lot, 70 x 220, \$11K OBO, 332-7788.

Rent: Univ Trace TH, 2-2.5, appl, fans, FPL, 1 yr old carpet, new paint, \$650/mo. Steve, x38126 or 334-4065.

Rent: Galv condo, furn, sleeps 6, Seawall & 61st St, Wkend/wkly/daily rates. Magdi Yassa, 333-4760 or 486-0788.

Rent: timeshare condo anywhere in the world, \$575/wk. 262-3339 or 286-8417.

Sale: Alvin, 2-1-1, 5 acres, fenced, lg oaks/magnolias, barn, horse stalls, pecan/pear orchard, \$115K. Scott, 331-6847.

Sale: Clear Lake Shores, 5-2-study, family, dining, 2 car garage, 100 x 100 corner lot, \$92K. 334-2434.

Sale: Clear Lake Shores, waterfront, 3-2-2, 2 story, trees, boat slip, \$129K. 538-1849.

Rent: Continential Divide, winter park ski condo, sleeps 6-8, clubhouse, hot tub, free shuttle, 482-1369.

Sale: Lake Livingston, 3-2, 14 x 80 MH, wooded lot, all util, 15 x 20 raised deck, private boat launch access, \$19.9K. Michelle, x36792 or 326-3447.

Sale: Dickinson, 3-2.5, on 2 acres, \$74.9K. Rick, x32695 or 559-2735.

#### Cars & Trucks

'85 Toyota 4-Runner, 4WD, 82K mi, ex

#### **Boats & Planes**

15' boat w/trlr, 55 HP Chrysler O/B, \$750. 334-2335.

Kneeboard/skurfer, 5'6" Fry tri-fin concave deck w/astrodeck & lease, ex cond, \$150. 554-2320

'92 Cajun Fish-n-Ski, 120HP Johnson O/B, 17" w/trlr, spare tire, cover, \$12K OBO. Jennifer, x39977 or 326-5206

Boston Whaler sailboat harpoon 4.6, galv trir, good cond, \$1,995. 337-4492.

G cat, 5 meters, sails and trlr, \$750. Gould, 474-4615.

'73 Boston Whaler Montauk, 85HP Johnson, ex cond, VHF radio, depth finder, custom cover. \$5.9K. A.J. Roy, x47474.

#### Cycles

Yamaha RZ350, Kenny Roberts replica, prof eng porting, Mikuni carburetors, pipes, K&N jet kit, Dunlop radials, incl bike cover/helmet, \$1.8K OBO. Hugo, 286-0432 or

91 Suzuki 1100 Katana, ex cond, \$6K negotiable, x38976 or 409-925-5230.

Boys 20" Huffy bicycle, blue, good cond, \$35. 532-1673.

#### Audiovisual & Computers

Apple IIc, ext drive, mouse, modem, 12" monitor, all software, \$375 OBO. Marc, 333-2693

PC, Leading Edge, 640K, mono monitor,

\$135. Tamela, x36155 or 998-8859. Mini-lops and fuzzy lops, show and pet quality. Gailo, 554-6200.

Cockapoo puppies, solid blk, females avail 10-5., \$50/ea. 996-0981.

#### Musical Instruments

Carvin guitar amp, 100W, all tube, 2 x 12" spkrs, combo style, \$375. Chuck, 283-8290. Beginner's Gemeinhart flute, \$175. 488-4915.

Bach silver strad trumpet, model 37, ex cond, \$600. Kathy, x39190 or 332-6305. Roland EP-7 digital piano, 76 velocity sensitve, weighted keys, sustain pedal, stand,

headphones, instruction books, \$675. x32813 or 286-8456.

Kawai 7' grand piano, GS-60, Polish Ebony, 2 yrs old, 10 yr full warr transferrable, \$13.5K OBO. Joe, 244-5731 or 946-8198.

#### Household

Lt. blue contemporary couch/love seat, \$350; dining rm table, 4 chairs, \$125. Dave, 484-6842.

Blk sofa, love seat, chair, \$400; 3 tables, \$400; entertainment center, blk lacquer, \$450. Lisa, 996-0042.

Sealy Postupedic queen sz matt, w/out box springs, ex cond, \$100, x31538.

Twin bed frames, 1 box spring, \$65. x31883. Keg refrig, 20 cu ft w/icemaker, all hoses, gas bottle, empty keg, \$275; King sz bed, ex cond, matt/box springs, matt cover, sheets, pillows, spread, hardwood frame w/brass brackets, \$225. Martin, 335-1607 or 337-2682.

Early American oak dining rm suite, table, 6 chairs, china cabinet, ex cond, was \$1.7K, sell \$1.1K. 283-5332 or 326-1390.

Litton microwave oven, 650W, 0.8 cu ft. \$100. 992-5958 or 335-8539.

#### Wanted

Want Singer and Bass player for Rock band, practice in LaPorte area. Chuck, 283-8290

Want small house, condo, garage apt, reasonable rent, by 1-15-92. 846-0696

Want vanpool rider, West Loop Park and Ride to NASA area. Richard, x37557.

Want '84 or earlier remote unit for Sears garage dr opener, working or not. 326-2307.

Want leftover garage sale items to donate to a worthy cause, clothes, teddy bears, books, etc. 335-1314 or 554-4092.

Want steel wheels for Ford Van, 8 lug x 16". Terry, x35026 or 554-6549.

Want 2 or 3 way, smallest sz refrig for camper. 332-0365.

Want 2-3 BR cheap rent house in Pearland, needed end of October, Lynda, 326-1746.

Want John F. Kennedy items, election buttons, magazines, posters, hats, will pay good price according to condition and rariety. 333-2435

Want winter vacation rental for 2, prefer Breckenridge/Summit area of CO or Red River, New Mexico for March 13-20, will consider other areas and dates. Janine, 283-7541 or 482-7550.

Want to buy ski apparel, sizes Mens XL, womens medium 7-9, boys 10-12, 332-5923.

Kansas City, Oct 15-18, both, \$250; ladies fox fur jacket, sz lrg, \$375; ladies mink jacket sz Irg, \$650; ladies full length leather coat, \$165. 488-2946.

3.8L V6 engine, car is shot, engine is not, best offer. Mike, x36145 or 538-4103.

7' oak pool table, 1" slate, all access, \$950; modern tripple dresser, \$100: matching night stand, \$25, 488-4915.

Oregon-Columbia bow, 25-40lb, hardcase, quiver, arrows, string release, \$400. 332-2318.

'71 Singer Touch & Sew w/wood cabinet, all attachments, ex cond, \$200. Judy, x30938.

15" 5-bolt mags w/serviceable Eagle GT tires, fits Ford, set of 4, \$300. Hugo, 286-0432 or 335-2552.

Refrig, \$140; Womens full face motorcycle helment, \$45; lrg desk w/file drawer, \$55; blue oriental style rug, \$15; weed eater, \$12. 286-8456.

Family camp stove, Irg 2 burner, for 9" pans, suitcase style w/storage space for extra fuel, \$20; Emerson digital clock radio w/snooze, \$10; General Motors AM/FM car radio, \$20; Men's 10lb bowling ball, Ebonite Rainbow, \$40. Ed, x36250.

Marlin Glenfield model 30, 30/30 w/4x32 scope, soft case, \$175; Fox Sterlingworth double barrel 12 ga. field grade, \$295. Wil, x37439 or 992-5473.

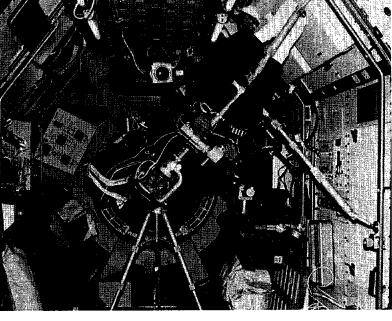
2 month old lawnmower, rear bagger, weedeater, rake, shovel, \$130 OBO; full sz refrig, \$160 OBO. Tim, 451-0478.

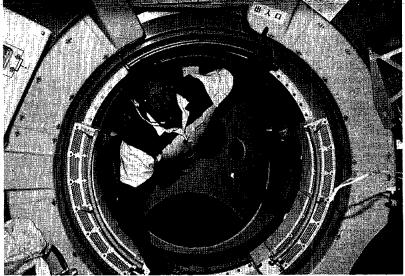
244 board feet of mahogany in 9 ea timbers, \$3.50 board foot, all or part. Gould, 474-4615.

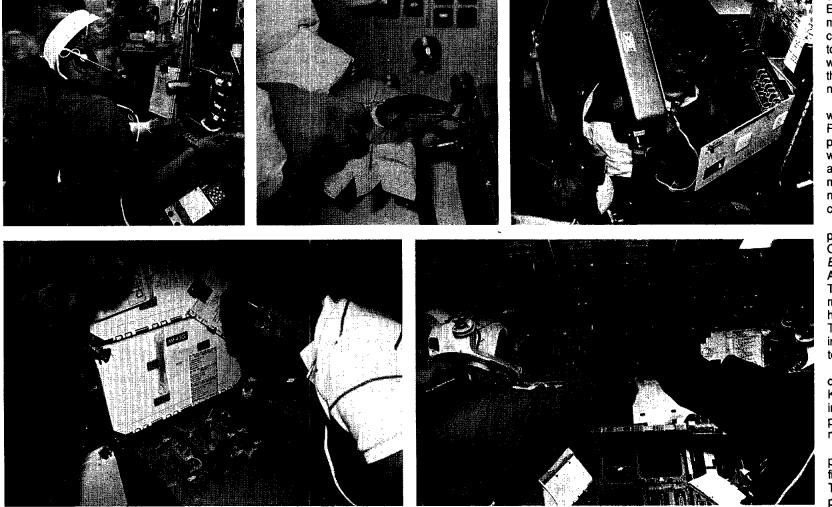
335-2552.

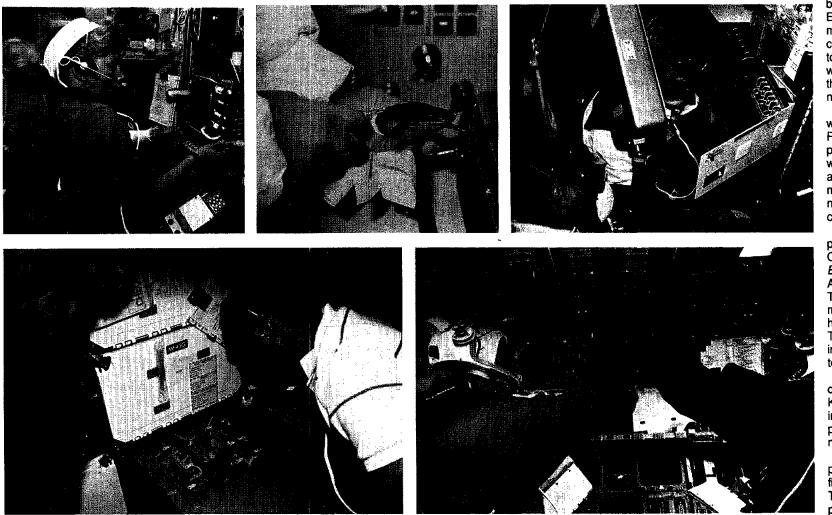


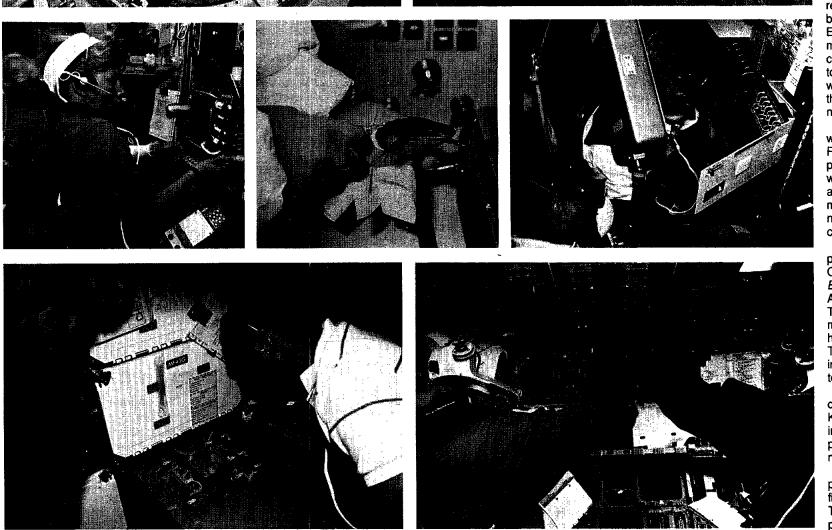












# **Photo** Frenzy

### **Spacelab-J crew** returns treasure trove of pictures

he crew of STS-47 took what may be a record number of photographs for a mission of its duration, documenting the important research of the first cooperative U.S.-Japanese science flight. A small sampling is displayed from top down, left to right:

1) The STS-47 crew poses for its on-orbit portrait in the Spacelab module. Clockwise from left are Mission Specialist Jan Davis, Commander Hoot Gibson, Pilot Curt Brown, Mission Specialist Mae Jemison, Payload Specialist Mamoru Mohri and Mission Specialist Mark Lee. In the

center is Mission Specialist Jay Apt. 2) Mohri communicates with students on Earth from the aft flight deck of *Endeavour*. The communications were an extension of the Space Shuttle Amateur Radio Experiment, in which crew members talked with "ham" radio operators.

3) Mohri follows a flickering target light with his eyes as part of the Comparative Measurement of Visual Stability in Earth and Cosmic Space experiment. He is in a slant inverted position, one of several used to study head and eye movements in microgravity.

4) Apt responds to a crewmate's question during a shift handover in the Spacelab-J science module. In the background are Jemison and Davis, his coworkers on the STS-47 blue team.

5) Lee, who also served as payload commander, floats through the tunnel that connects the Spacelab module to Endeavour's crew cabin. Lee is pointing to a sign in Japanese that translates to "EXIT-ENTRANCE" during a televised tour of the shuttle and its research facilities.

6) Jemison levitates among the experiment racks that kept the crew busy for seven days in the Spacelab module.

7) Davis talks to scientists in the Payload Operations Control Center at Marshall Space Flight Center as she works with the Free Flow Electrophoresis Unit in the Spacelab module.

8) One of the four female frogs that donated eggs to the Spacelab-J crew receives attention from a crew member in the glove box facility. The Frog Embryology Experiment returned more than 100 tadpoles that were conceived and hatched in zero-gravity to study how embryos develop in weightlessness. So far, the majority of the tadpoles appear to be developing normally.

9) Brown, left, and Lee repair a water leak in Spacelab Experiment Rack 10 using an in-flight maintenance procedure developed by the POCC with the cooperation of flight controllers at JSC. The repair allowed several materials processing furnaces, which needed a functioning coolant loop, to complete their experiments. 10) Davis and Brown oversee the progress of some of the 180 female Oriental Hornets carried aboard Endeavour as part of the Israeli Space Agency Investigation About Hornets. The crew also carried out an in-flight maintenance repair that reduced high humidity in the ISAIAH middeck locker. The hornets' ability to build their combs in the direction of gravity was being tested in microgravity. 11) Gibson, left, and Brown power down Endeavour following landing at Kennedy Space Center. The two are in the midst of a series of checklist procedures to complete the eight-day mission. The STS-47 crew will present more photos, video and film during a postflight briefing for employees at 2 p.m. Tuesday in Teague Auditorium. All employees are encouraged to attend.

# Brandenstein earns prestigious awards

Astronaut Office Chief Dan Brandenstein recently received two prestigious awards for his work as the commander of the STS-49 mission to capture and repair the Intelsat VI satellite.

Brandenstein was presented the Ivan C. Kincheloe Award for test pilot of the year.

The award, presented Saturday at the Society of Experimental Test Pilots Annual Awards Symposium and Banquet in Beverly Hills, Calif., recognized his piloting and leadership on STS-49.

Test pilots from 20 countries attended the symposium, and Brandenstein presented a technical paper on the STS-49 rendezvous.

Brandenstein also will receive the 1993 Haley Space Flight Award presented by the American Institute of Aeronautics and Astronautics for

### Engineering trio receives quality award

Three Engineering Directorate workers received the JSC Quality Partnership Award last month for their contributions to product assurance for Space Station Freedom Integration, Test and Verification Environment development.

Robert Ling, Deborah Buscher and Susan Morgan of the Flight Data Systems Division accepted the award from JSC Acting Director Paul J. Weitz last week.

The trio's work ensured the maintenance of software development folders that provide data needed for the on-going Freedom software reliability analysis and helped McDonnell Douglas Space Systems Co. workers compile the testing log that contributed to the ITVE quality process control and reliability study.

They also arranged for the McDonnell Douglas resources to perform the product assurance work and initiated a software complexity study to improve the quality of the code structure. Throughout the process, they emphasized the need to practice risk management in ITVE development.

By example, Ling, Buscher and Morgan drove home to their Engineering coworkers the importance of software product assurance, setting the standards for Central Test Facilities, Central Software Facilities and Central Avionics Facilities.

The JSC Quality Partnership Award is presented twice a year by JSC's Safety, Reliability and Quality Assurance Office. It recognizes individuals outside SR&QA who play key roles in helping JSC employees and support contractors reach a common goal of excellence.

### Public Affairs sets up SCH point of contact

JSC's Office of Public Affairs has

"outstanding leadership and bravery during the maiden voyage of the Endeavour space shuttle mission."

The award will be presented Jan. 12, 1993, at the AIAA's Aerospace Science Meeting and Exhibit in Reno, Nev.



#### **McCluney earns STS-47** plaque hanging honors

Kevin McCluney, the ascent/ entry Maintenance, Mechanical, Arm and Crew Systems officer for STS-47, earned the honor of hanging the mission plaque in Flight Control Room 1 at the end of the flight.

McCluney represented the entire

MMACS team, which was recognized for its work in maintaining orbiter tire pressures and overseeing crew in-flight maintenance work. The team tracked tire pressures based on thermal conditions relative to the orbiter's attitude, forestalling the need to maneuver and disturb sensitive microgravity experiments. It also helped the Payload Operations Control Center at Marshall Space Flight Center in developing repair procedures for several experiments.

"This flight had several IFMs critical to the success of Spacelab experiments and the MMACS/IFM team performed superbly during time-critical situations," said Lead Flight Director Milt Heflin.

#### Former JSC worker dies

Douglas Broome Jr., 55, deputy director for NASA's Solar System

Exploration Division in Washington, D.C., and a former JSC employee, died Sunday.

He began his career at Lang-

ley Research Center as an in 1959, designing power systems for the early Mercury spacecraft.

During the 1960s at JSC, Broome worked on the Apollo program in various engineering management positions. He moved to NASA Headquarters in 1974 to manage a number of environmental programs, later serving as chief of the Small Explorers Branch and the Observatories Development Branch He was directly responsible for the Hubnble Space Telescope program, and worked with the HST science



Brandenstein

community to develop computer software that now minimizes the affects of spherical aberration, an error discovered in HST's main mir-

McCluney

ror after launch.

Stokes is top secretary

Karen Stokes, secretary for ISD's Software Technology Branch, recently earned the Marilyn J. Bockting Award for Secretarial Excellence.

She was honored for having "provided the highest quality of service to the Software Technology Branch.'

### NASA Alumni League plans third conference

More than 4,000 participants are expected to attend the third annual conference and exposition, "Space Exploration '92," sponsored by the NASA Alumni League, Oct. 26-29 at the South Shore Harbour Resort and Conference Center.

Almost 50 exhibitors are registered including the first international exhibitors, said Conference Host Robert F. Thompson.

NASA Administrator Daniel Goldin will deliver the keynote address at the gala dinner and former NASA Administrator James Beggs will be the keynote speaker opening day. All eight center directors also will appear in a special panel discussion set for Oct. 28.

"In addition to this unprecedented participation by senior NASA officials. Space Exploration '92 will offer panel discussion by top political staff members, NASA and industry managers of the Space Station Freedom and Space Shuttle programs, Russian and U.S. executives on joint program plans and managers of the Space Exploration Initiative program,' Beggs said.

NASA employees will be able to take advantage of special daily conference registration fees. Those interested should contact their training coordinators no later than Oct. 9. The number of special registrations are limited, so employees are encouraged to make arrangements early.

Employees of government agencies, and private firms and organizations actively involved in the aerospace industry may attend the exhibits only free with proper identifications during normal exhibit hours.

#### JSC to offer course on organizational change

The role of leadership in leading and managing organizational change will be the focus of a two-hour course offered on the JSC television system.

"Changing the Essence: The Role of Leadership in Major Organizational Change Effort" will be offered from 10 a.m. to noon Nov. 2. JSC is offering the course in conjunction with the National Technological University, a consortium of 30 institutions.

The program will discuss choosing a change strategy, characteristics of fundamental change, leading the organization to a learning mode, leading a vision driven change effort and managing the transition state.

The program may be viewed on any convenient monitor. Seats also are available in Bldg. 45, Room 203 by contacting Sheryl Gates at x33074. For more information, contact Stacy Jackson at x31999.

## STS-52 crew has variety of duties on 10-day mission

### (Continued from Page 1)

together on the CANEX-II set of experiments that are led by the Space Vision System Experiment. SVS is a machine vision system for robotic devices such as the Canadian-built remote manipulator system designed to enhance human vision in the unfavorable viewing conditions of space. It will use all six payload bay cameras to develop a precise synthetic view of the Canadian Target Assembly, a pallet that Veach will put through a series of maneuvers on the

#### evaluates SVS performance.

"We'll also be using the Space Vision System to evaluate the structural dynamics of the robot arm to improve control algorithms and understand how to build better robot arms," Veach said.

The maneuvers the CTA is put through will evaluate all of the critical events expected in Space Station Freedom construction, MacLean said. At the end of the test, CTA will be discarded and tracked as it drifts away to reenter the atmosphere four days later.

the assembly of space station," MacLean said. "Canada has a major role to play with respect to the assembly of space station with the mobile servicing station."

Baker will be involved with a number of extended duration orbiter medical experiments during the 10-day flight, and Jernigan will perform intense exercise. Wetherbee also will participate in a Lower Body Negative Pressure test.

A host of other middeck experiments will look at plastics and composite spacecraft, shuttle glow, Earth atmosphere measurements and phase partitioning in liquids.

"Twenty years ago, we thought going up in space and doing experiments and coming up with things that made space pay for itself was going to be easy," Shepherd said. "We're finding out that's not the case. I'm very hopeful that if we keep banging on the door we're going to get it open and figure out what the material is, what the application is and what the process we need to invoke in



one of its solid rocket boosters, which was found to have a pinhole leak between two joint segments.



Stokes

set up an official point of contact to help JSC employees an organizations with special requests involving Space Center Houston.

Steve Nesbitt, chief of the Public Services Branch, is the designated point of contact for requests such as VIP visits and other official use of Space Center Houston facilities. Public Services personnel will process these requests, and employees and organizations are asked not take their requests directly to Space Center Houston. Nesbitt may be reached at x34241.

Discount tickets for JSC employees to visit Space Center Houston are available through the JSC Exchange Store in Bldg. 11.

Also this week, the Center Operations Transportation Section announced that JSC taxis will no longer pick up passengers at Bldg. 30S, the new Space Station Control Center. The pick-up and drop-off point for that building will be at Bldg. 12.

The change became necessary when the Space Center Houston tram routes became operational.

end of the robot arm while MacLean

"What we're striving to do is mirror materials for the external surfaces of space.

### JSC Clinic joins breast cancer awareness campaign

One out of nine women develop breast cancer in their lifetime. More than 46,000 American women will die of breast cancer in 1992.

Such alarming statistics are increasing awareness about breast cancer so that the JSC Clinic is joining the nationwide observance of National Breast Cancer Aware-

ness Month.

The campaign focuses on educating women and their families about the importance of early detection, the best opportunity to treat breast cancer successfully.

The JSC Clinic recommends a three step early detection program which includes regular mammograms, self-examination and regular check-ups.

Women should have an initial mammogram screening by age 40 and one every two years until age 49. After age 50, mammograms should be taken every year.

Self examinations should be done monthly, regardless of age, and physician examinations should be done at least every three years

until age 40 and every year thereafter.

Due to advances in early detection as well as improved surgical procedures, hormonal therapy and chemotherapy, the five-year survival rate for breast cancer patients has risen to 92 percent.

For more information, contact the JSC Clinic at x37783.

### Center Ops plans fourth annual Chili Cook-off

The Center Operations Directorate will hold its fourth annual Chili Cookoff starting at 4:01 p.m. Oct. 16 at the Gilruth Center.

Fourteen teams of COD personnel and support contractors are entered. Judges are JSC's Dan Nebrig, Harvey Hartman, Bill Kelly, Don Puddy, Charles Harlan and Lorna Onizuka, Al Lu of NASA Headquarters, Steve Phelps and Missy and Mike Murphy of Northwest Airlines, and Jim Thomasen of Lake Office Supply

Public tasting begins at 7 p.m.; tickets are \$3 through Oct. 13 and \$5 thereafter; they may be purchased from COD employees. Tickets include admission, a souvenir button, refreshments, a tasting kit, , entertainment and a door prize drawing.

Proceeds from the "People's Choice Worst Chili" monetary votes will go to Crimestoppers Bay Area.



The Roundup is an official publication of the National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, Texas, and is published every Friday by the Public Affairs Office for all space center employees.

### Mars Observer craft on its way

#### (Continued from Page 1)

deployed during the 11-month cruise to Mars. Once the spacecraft has entered orbitt in late August 1993, the booms will be fully extended.

The Titan III launch vehicle and Transfer Orbit Stage upper-stage booster appear to have performed well, although telemetry was not received from TOS during launch.