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

Orbital portable

An updated portable computer will bring the latest lap-top technology into the crew compartment during STS-29. Story on Page 3.

New ponds?

Recent heavy rains temporarily added several natural ponds to the three man-made ponds in the central JSC courtyard. Photo on Page 4.

Space News Roundup

Vol. 29 | January 27, 1989 | No. 4

NASA anti-drug plan to include random testing

NASA employees at JSC and throughout the country received notices Thursday of the agency's new Drug-Free Workplace Program that will offer a helping hand to drug abusers and include some drug testing.

The program will not be instituted earlier than March 21, said Bob Hall, chief of the Programs and Policy Office within the JSC Human Resources Office.

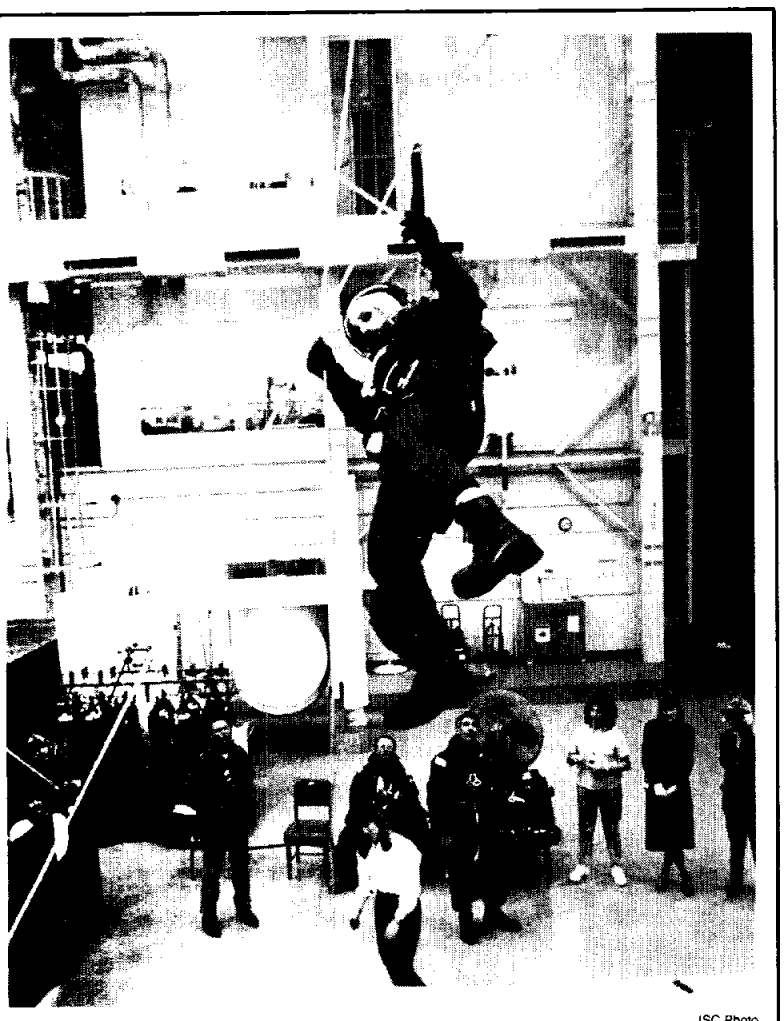
"NASA isn't implementing this program because there's been evidence of a serious drug abuse problem within the agency, but rather to comply with a presidential executive order which requires it," Hall said. "The focus of the program is education, awareness, counseling and rehabilitation rather than punishment. Confidentiality also will be a key aspect."

Five different types of testing will be a part of the program: testing where an employee volunteers in order to show support for the program; testing due to reasonable suspicion of an employee as a drug abuser; testing following an accident or unsafe practice by an employee where drug use may be implicated; follow-up testing of a former drug-abusing employee for one year after their completion of rehabilitation; and random testing of only a select group.

At JSC, random testing will apply to only about 475 of the center's 3,500 civil servants. Those 475 are individuals in certain positions with access to classified information and with jobs vital to safety and mission success, Hall said. Such positions include, for example, flight directors, flight controllers, pilots, test directors, test conductors, security professionals and heavy equipment operators.

Under random testing, 10 percent of those 475 employees will be tested annually. Employees in that group will receive a letter at least 30 days prior to the beginning of the program notifying them that they are subject to random testing. A special briefing will follow for that group, explaining

Please see **RANDOM,** Page 4



JSC Photo

HANGING TOUGH—STS-29 Mission Specialist Jim Bagian rappels down the side of the Full Fuselage Trainer in Bldg. 9A during a recent post-landing emergency egress exercise. Bagian, one of several astronauts who have been instrumental in the development of crew systems hardware, climbed out the top of the Shuttle mock-up before descending.

Cold weather solid rocket firing succeeds

Full-scale test completes verification of redesign

The final full-scale firing of a redesigned solid rocket motor (SRM) last Friday capped a "long and arduous" verification of the new design, SRM Project Manager Royce Mitchell said.

The cold-weather firing, designed to verify the motor's low-temperature limit, appears to have provided a faultless conclusion to certification of the new SRMs, said Mitchell, who works at Marshall Space Flight Center.

"This was a good day for us and a good day for all those involved with the Space Shuttle," Mitchell said at a post-test briefing. "The bottom line is that we don't see any indication of any anomaly. We're extremely pleased with what we can see of the hardware and from the quick-look data."

The final test motor, designated Qualification Motor-8 (QM-8), was fired in the afternoon at a snowy Morton Thiokol test site west of Brigham City, Utah. The average temperature of the solid propellant at the time of ignition was at its planned 40 degrees Fahrenheit, a temperature reached only after more than a month of special 25 degrees Fahrenheit refrigeration. The motor's outer skin reached a low temperature of 29 degrees.

Heaters on the three field joints, case-to-nozzle joint, aft end ring and igniter were turned on 12 hours before the firing. By ignition, the field joints were warmed to between 85-88 degrees; the case-to-nozzle joint had warmed to 77 degrees; the igniter to 77 degrees; and the aft end ring stood at 72 degrees. The chilly propellant and skin temperature made QM-8 "by far the coldest motor ever fired in the manned space program," Mitchell said.

"This test was conducted under extreme conditions beyond those ever expected for a launch, and that means

Please see **SOLID,** Page 4

Crews prepare *Discovery* stack for roll out

Discovery has been mated to the external tank (ET) and solid rocket boosters (SRBs) and the STS-29 Shuttle stack is scheduled to head for Pad 39B at 11:01 CST Monday.

At the launch pad, Tracking and Data Relay Satellite-D (TDRS-D) awaits.

Discovery was moved from the Orbiter Processing Facility to the Vehicle Assembly Building (VAB) for mating with the ET and SRBs early Monday morning. The 400-yard move had been postponed 24 hours due to bad weather.

After arrival in the VAB, a small nick was discovered in *Discovery's* right outboard main landing gear tire. The tire was changed without incident prior to hoisting the vehicle vertically for mating. Repairs also were made to thermal protection system tiles on the landing gear doors after the Orbiter's arrival in the VAB.

STS-29

The Shuttle Interface Test, a check of all electrical and mechanical connections between the Shuttle components, will be conducted during the weekend.

TDRS-D, attached to the Inertial Upper Stage that will boost it to a 22,300-mile-high orbit, was taken to Pad 39B inside the payload canister Jan. 10. By that evening, TDRS-D and its IUS had been placed in the pad's Payload Changeout Room and customary checks of its health had begun.

One computer was removed from the IUS prior to the payload's move to the pad due to a problem caused by an excessive sensitivity to noise. A second, redundant computer was removed at the pad Jan. 11 to allow confidence tests. Both computers are scheduled to be reinstalled this week.

During the past week, TDRS-D has been loaded with hydrazine, the propellant it will use for stabilizing jets and to nudge it to its proper location. The satellite and its booster stage are scheduled to be installed in *Discovery's* payload bay Feb. 1, one day after the Shuttle's arrival at the pad.

Launch of STS-29 remains targeted for Feb. 23, but officials still are assessing what impact delays in rollout to the pad may have on that date. A firm launch date will not be announced until the STS-29 flight readiness review (FRR), a meeting of program managers and officials scheduled for Feb. 7-8 at Kennedy, has been concluded.

Other worlds

Voyager 2 to provide first close-ups of Neptune

[Editor's note: A decade has passed since NASA launched its last interplanetary probe, Pioneer Venus 2. This year, the Space Shuttle will play a large role in the resumption of America's unmanned exploration program, launching both Magellan and Galileo and deploying Hubble Space Telescope. This is the conclusion of a two-part article on how JSC space scientists view the year ahead.]

Space Science

By James Hartsfield

Spacecraft have mapped Venus in the past, although not with the detail Magellan will provide late this year. Probes have visited, photographed and analyzed Jupiter up close, but not to the degree Galileo will after its October launch and six-year journey.

But no spacecraft has ever flown close to Neptune. So this August, when Voyager 2 actually passes closer to Neptune—less than 3,000 miles from its surface clouds—than any previous fly by of any other planet, it will illuminate for the first time what has only been a speck in the sky to the largest telescopes on Earth. Exploration dominates NASA's efforts in 1989, and the Neptune encounter will be exploration in its purest form.

Neptune, the seventh planet, is a giant gas ball orbited by two moons in the chill reaches of space. That could almost summarize mankind's knowledge of it.

"We should see some pretty spectacular things when we go by," said Faith Vilas, a JSC space scientist. "It will be so much more than we've ever known about the planet ... it's literally going to open up a whole new world."

Vilas will pay special attention to Voyager's information. As a graduate student at the University of Arizona in 1984, she was among seven co-discoverers of thin, partial rings believed to be around Neptune. Voyager may confirm that discovery. As it passes Neptune, Voyager also will attempt to analyze the makeup of its atmosphere, clock windspeeds and check for a magnetic field.

The veteran traveler also will pass close to the largest of Neptune's moons, Triton, to study it. "And it's very possible it could discover some new moons," Vilas added. Neptune will be Voyager 2's final planetary encounter.

Please see **SPACE,** Page 4

NASA Illustration

The Space Shuttle *Discovery* flies in formation with Hubble Space Telescope in this artist's concept of how the orbital observatory will look after deployment in December.

JSC

Dates & Data

Today

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

Saturday

Cystic fibrosis benefit—A bowl-a-thon will be held at 3:30 p.m. Jan. 28 at Alpha Bowl on Bay Area Blvd. to benefit the fight against cystic fibrosis, the number one genetic killer of children. Anyone with sponsors obligated to donate per pin can bowl three games free. Door prizes will be presented. For more information, call Barbara Svehla at 282-2569 or 996-8426.

Monday

Cafeteria menu—Entrees: beef chop suey, Polish sausage with German potato salad, breaded cutlet (special). Soup: French onion. Vegetables: okra and tomatoes, peas, whipped potatoes.

Tuesday

Cafeteria menu—Entrees: Salisbury steak, shrimp creole, fried chicken (special). Soup: split pea. Vegetables: mixed vegetables, beets, whipped potatoes.

Wednesday

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

Thursday

Space achievement award—Rear Adm. Richard Truly, NASA associate administrator for space flight, will receive this year's Rotary National Award for Space Achievement at an awards banquet beginning at 7 p.m. Feb. 2 at the Hyatt Regency Hotel in downtown Houston. A reception will be followed by dinner at 8 p.m. and the program at 9 p.m. Tickets are $200 a plate and are available by calling Charles Hartman at 480-6167, or John Francis at 333-5986.

Cafeteria menu—Entrees: beef stroganoff, turkey and dressing, barbecue smoked link (special). Soup: chicken noodle. Vegetables: lima beans, buttered squash, Spanish rice.

Feb. 3

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

Feb. 4

Young people's concert—The Bay Area Houston Symphony League will present its annual Young People's Concert featuring the Houston Symphony Orchestra at 10:30 a.m. and noon Feb. 4 at the Webster Intermediate School Auditorium. Gisele Ben-Dor, assistant conductor for the Houston Symphony, will conduct the program, entitled "Wild, Wild West." Tickets will be on sale at the Clear Lake and LaPorte Chambers of Commerce and Randall's supermarket on El Dorado Blvd. For more information, call 474-5866 or 486-5242.

Feb. 10

Picnic ideas due—The deadline for entries in the 1989 JSC Picnic theme contest is Feb. 10. The winner will receive a $75 savings bond, a picnic T-shirt and two picnic tickets. Send ideas to Picnic Theme Contest, Sandy Perry, Code FR. For more information, call Perry at x35239.

Information systems conference—JSC and the University of Houston-Clear Lake will co-sponsor an all-day conference entitled, "Information Systems for Project Management: Coordinating Large, Complex Computing Systems," on Feb. 22 at the Westin Oaks-Galleria in Houston. Brenda Dervin of Ohio State University will give the keynote speech on "Making Information Systems Work: The Human Dimension." Cost is $125 per person, or $100 for university and federal employees. Registration deadline is Feb. 10. Federal employees should call Glen Van Zandt, x33069, to register. For more information call 488-9433.

Feb. 13

Softball registration—Registration for spring softball leagues will be Feb. 13-17 at the Rec Center. NASA-badged teams will sign up at 7 a.m. each day. Non-badged teams will sign up for all leagues at 5:30 p.m. Feb. 17. The sign-up days for the various leagues are: Feb. 13, men's C and D recreational; Feb. 14, men's C; Feb. 15, men's A and B; Feb. 16, men's A; Feb. 17, women's open and Friday special. For more information, call x30304.

Feb. 15

Lunar pole conference—A Lunar Polar Probe Conference designed to formalize plans for the development, funding and launch of a small satellite to explore the polar regions of the Moon will be conducted March 11-12 at the Nassau Bay Hilton. The conference is sponsored by the National and Houston Space Societies, Milwaukee Lunar Reclamation Society, University Space Society, New Orleans Space Society, Space Studies Institute, Space Frontier Foundation, ETM Inc. and Third Millenium Inc. Speakers will include Dr. Wendell Mendell of JSC. Registration is $15, and banquet reservations are $25. Deadline for advance registration is Feb. 15. For more information, call 643-6373.

Feb. 23

Call for papers—The American Society of Quality Control (ASQC) is seeking innovative papers written on subjects such as applications in quality and productivity or the use of data systems for improving quality and productivity and competitiveness. The papers will be presented at the second annual South Texas Quality, Productivity and Data Systems Conference, Feb. 23-24 at the University of Houston's Hilton Conference Center. For consideration, and a brief abstract and biographical sketch, both less than 300 words each, a one page outline and a photograph to South Texas Q&P Conference, Attn. Eugene Berger, Box 890506, Houston, 77289. For more information, call Berger, 333-0967.

JSC

Ticket Window

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

General Cinema (valid for one year): $3.50 each.

AMC Theater (valid until May 31): $2.95 each.

Sea World (San Antonio, year long): adults, $17.25; children $14.75.

Rodeo—The Judds (Feb. 19, 4 p.m., Astrodome): $8.50.

Rodeo—Crystal Gale (Feb. 20, 7:45 p.m., Astrodome): $7.50.

Rodeo—Larry Gatlin (Feb. 24, 7:45 p.m., Astrodome): $8.50.

Rodeo—Reba McEntire (Feb. 26, 7:45 p.m., Astrodome): $8.50.

Rodeo—Barbara Mandrel (March 4, 7:45 p.m., Astrodome): $8.50.

Rodeo—Alabama (March 5, 4 p.m., Astrodome): $8.50.

Harlem Globetrotters (2 p.m. Feb. 4, Summit): $8.

The Arkansaw Bear (Feb. 18, 7 p.m., Bayou Theatre, UH-CL): $3.

Pericles, Prince of Tyre (April 22-28, 8 p.m., Satellite Theatre, UHCL): $4.

JSC

Swap Shop

Swap Shop ads are accepted from current and retired NASA civil service employees and on-site contractor employees. Each ad must be submitted on a separate full-sized, revised JSC Form 1452. Deadline is 5 p.m. every Friday, two weeks before the desired date of publication. Send ads to Roundup Swap Shop, Code AP3, or deliver them to the deposit box outside Rm. 147 in Bldg. 2.

Property

Sale: CLC, 3-2-2, one block from elem. school, backyard access for RV or boat, ex. cond., inside and out, $58,500. 488-2735.

Lease: "The Landing" waterfront condo, exercise rm., sauna, tennis, pavillion, boat slip, pools, 2 mi. from NASA, $575/mo., $95/util. 326-2221.

Sale: League City, 3-2-2, cul-de-sac, landscaped, $3,000 down, FHA 10% fixed assum. David, x35464.

Sale: Middlebrook, 3-2-2, study, FPL, wet bar, covered patio, large lot, ex. cond., FHA assum. 10%. 480-9363.

Sale: La Porte, 3-2-2, $2,000/down, FHA 9 1/2% fixed assum. x36957 or 471-6304.

Lease/Sale: Clear Lake, Middlebrook II, Havenhurst St., 3-2-2, 1,940 sq. ft., FPL, fence, new paint, detached garage w/door opener, ex. cond., assum. 9.25%, $78,900 or rent $700/mo. 480-3260.

Sale: Friendswood/Heritage Park, 4-2-2, FPL, corner lot, cul-de-sac, landscaped, ceiling fans, miniblinds, and other extras, less than 2 yrs. old. Dee, x32425 or John, 996-8975.

Sale: Seabrook, 75' x 100' heavily wooded lot w/view of Taylor Lake, all util. avail. 333-5821.

Sale: College Station, 3-1, 3 blks. from A&M campus, $500/down, assume fixed FHA 9.5%, $398/mo. total. 326-1278.

Sale: Pasadena/Deer Park, 1980 14' x 60' Redman mobile home, 2-1, covered patio deck, shed, skirting, $14,000 principle or VA, OBO. Jim, 280-2226 or Faye, 998-0719.

Sale: 4 Crystal Beach lots on Bolivar, each 50' x 100', sell one or more, reasonably priced. 921-7212.

Sale: 10 acres on FM 517 1/2 mi. west of Hwy. 146, barn, stocked ponds, concrete fence posts, util. and more. 484-7834.

Sale: 60 acres located 3 mi. from Karnes City, TX, on Hwy. 80, 50 mi. from San Antonio. 783-9164.

Sale: Friendswood/Sun Meadow Estates, wooded lot in estab. neighborhood, cul-de-sac, bordered by stream and golf course on 2 sides, approx. 245' deep and up to 86' wide, util. on site, $31,500. Doug, x32860 or 486-7412.

Sale: 2 plus study-2-2D, ideal residence for an executive or professional couple, luxury, low maint., 3 blocks from NASA, high nineties. 488-0397.

Lease: Friendswood/Wedgewood, 3-2-2, new paint, carpet, and tile, $550/mo. 485-1511.

Sale: Alvin area, 3-1-1, brown brick house, 25 min. from NASA, well estab. neighborhood, 2 blks. from high school, $43,000. Kay, x32251 or 331-3379.

Sale: League City, 3-1-1, near Civic Center, fenced yard, $37,500. x30810 or 488-0597.

Lease: Friendswood/Sun Meadow, 3-2-2D, $600/mo., no pets. 996-9157.

Sale/Lease: Friendswood, Forest Bend, 3-2-2, den, screened in porch, ceiling fan, new paint, assume 9.5% $515/mo. Nick, x31920 or 996-7917.

Sale/Lease: Baywind I condo, 2-2, new W/D and many extras, very nice. x31769 or 538-1878.

Sale/Lease: Nassau Bay, 4-2-2 townhouse, over 2,000 sq. ft., w/2 story den, deck, atrium, FPL, oversize garage, $950/mo. or $99,900. Jerry, x38922 or 333-9003.

Sale: Big Bend area hunting land, 160 acres, $150/acre, OBO. 337-4051.

Cars & Trucks

'81 Olds Cutlass 4 dr., V-6, A/C, stereo cass./radio, 95K mi., clean, no rust, runs good, $1,795. Yeo, 944-8186.

'79 Toyota pickup with camper shell, $1,100. 482-7910.

'79 Mercury Cougar, brown, 1 owner, well taken care of, auto., A/C and heater, AM/FM radio, $1,500. 332-4942.

'67 Ford Mustang Classic, 289 V-8, 3 spd., new paint (red), A/C, headers, mags, AM/FM stereo, new exhaust, runs great, $2,995, OBO. Mike, x38169 or 482-8496.

'83 blue Ford Mustang, auto., V-6, cruise, tilt, P/S, A/C, AM/FM stereo, ex. cond., $4,000. 333-1427 or 282-3800.

'76 Monte Carlo, AM/FM, heat, new brakes and tires, eng. overhauled, runs good, good work car or for student, $900. Roland, 477-6841, ext. 275 or 481-5606.

'86 Chrysler Fifth Avenue, fully equipped, low mi., like new, $10,300. 482-1535.

'85 35' Mallard motor home, loaded, low mi., $34,000. 337-4051.

'79 Caprice 4 dr., AM/FM, P/S, P/B, A/C, new trans., one owner, looks/runs great, clean, $1,500, OBO. Dunn, x38837.

'63 Olds Delta 88 Classic, V-8, 4 dr., lt. blue, auto. trans., P/S, P/B, radio, A/C, one owner, low mi., new tires, new battery, $2,950. Fred, x39109.

'87 Toyota MR2, 5 spd., loaded, sec. alarm, 7,800 mi. Jim, x34809.

'64 36' Holiday Rambler travel trailer, ex. cond., everything works, no leaks, must sell ASAP, $3,000, OBO or will trade for a truck and cash. Pepper, 333-6469 or 339-1337.

'29 Mercedes Replicar, still in kit, Ford frame, take a Mustang II or Pinto to build, was $8K, now $6,500, OBO. 484-7834.

'85 Bronco XLT, loaded, 5.8L, black/silver, tinted windows, low mi., ex. cond., must sell, $12,800, OBO. 332-7041.

'59 Mercedes Benz 220S, $3,000. David. x35464.

'87 Toyota custom van w/most options, ex. cond., no equity. 333-5821.

Cycles

'82 Yamaha 750 Virago, less than 5,000 mi., ex. cond., $950, OBO. Debbie, x31767 or 538-1624.

'79 Yamaha XS 750 Special, 1 owner, windjammer, AM/FM cass., new tires, lots of extras, $1,250, OBO. Rich, x34818 or 480-8335.

'87 Harley Superglide, showroom cond., 2,600 mi., $6,500. Michael, 282-5443 or 863-8710.

'80 Kawasaki Enduro 100cc, great cond., only 6,000 mi., street legal, dirt ready. Josh, 486-6567.

Boats & Planes

Ready to fly, R/C airplane (Aerobatic) w/motor (S.T. 60) and radio (Kraft 7 channel - 76 series), $275. Carlos, x38879 or 554-7727.

Trac 16' catamaran, great boat, must sell, 1 yr. old, extras incl., $3,000. Randy, x35459 or 335-1577.

Tri-Q experimental aircraft, 2 place, 140mph, 75hp, 300hr T.T. based at Houston Gulf Airport, cost $20K plus, will take, $12,500 or trade for fishing boat, lake property, etc. Wood, x37007.

Audiovisual & Computers

Original IBM PC, not a clone, 640K ram, 20MB harddisk, serial and parallel port, monochrome, ex. cond. Larry or Kathy, 996-5296.

King's Quest III, runs on IBM compatible computers, all orig. disks, documentation etc., bought new and barely used, $25. Doc Pepper, 282-3130.

IBM PC Jr., 2 disk drives, 512K, IBM color monitor, joystick, clock/calendar, printer port, software, plus 2nd PC Jr. computer and 2 extra keyboards, $595. Dave, x32750 or 333-4852.

Tandon floppy disk drive, $50; Segate ST 225 20MB HD, $200; Tecmar graphics master plus monitor, $500; 256K x 9, 150 NS Simm, $50. Mitch, 538-3150.

Commodore 64, disk drive, color monitor, dot matrix printer, software, desk and chair, $450; Colelovision set w/games, $75. Steve, x38867 or 486-9654.

Panasonic KX-P1092 printer, seldom used, $100. Jane, x37169 or 470-2744.

AT&T 6300 computer, 20 meg hard card, 2 floppy drives, math co-processor, mono screen, Epson FX80 printer, $1,100 or $900 less printer. Bill, x30039 or 554-2992.

Household

ESTATE SALE: Sofa & loveseat, television, microwave, dinette set, lamps, desk, baby items and more. Jan. 28 and 29, 9174 Kirby Rd.

Large heavy glass table w/4 chairs, $150. Kay, x32251 or 331-3379.

Technics cass. deck, like new, $75; amp, tuner, and 2 speakers, sounds great, all for $75. Richard, 486-6015.

Fisher MC 713 audio component dual cassette, equalizer compact stereo/2 way speakers. Eddie, x38486 or 948-2689.

Wm. Rogers 1847 silver plate, set of 55 w/extra pieces, service for 8, new. 783-9164.

Queen size bed, good cond., $100. Rick, x36156.

Antique hump back steamer trunk, 34L x 21W x 284, has 95% HDW/ trim, $195; elect. dust collector for furnace, H/P, "Edison", w/pressure switch, 800-1600 CFM, was $380, now $150; Greco baby stroll-a-bed "Elite", 6 mo. old., $40; dehumidifier "White/Westinghouse" 21H x 12 x 12, 20 pts/24 hr, auto. shutoff, used 4 mo., $99; mirrors, gold-veined (2), 45 x 91 1/2, $100/ea. Doug, x32860 or 486-7412.

Jenny Lind crib w/mattress and bumper pad, $100; child's car seat, $25. Keith, 486-9173.

Multitech VHS remote control, 2 wk-4 event programmable, $125. Eddie, x38486 or 948-2689.

Bedroom set, headboard and frame, 6 drawer dresser w/mirror, 2 night stands, $150. Everett, x36224 or 488-6024.

Queen size sofa sleeper, oatmeal and tan w/light oak trim, ex. cond., $250. M. Connealy, 484-3360.

Queen size bed, box spring, mattress, frame, $55; metallic hanging light fixture, $25; portable TV stand, $20; Wilson tennis racquet, wide head, $20; chess set, board and storage box (Mexico), $45; 11 yr. old. Zenith solid state TV, $35; complete double bed, $75; still in box-Steco car stereo, $25. Wes, 280-0457.

Sears Kenmore 19 cu. ft. upright frost free freezer, ex. cond., like new, was $500, now $275. Tony, 280-1564 or 482-4156.

Stereo console w/Akai cass., turntable., Sansui AM/FM tuner, $200, OBO. 486-0157 or 282-2815.

48" dinette pedestal table and two Captain's chairs, ex. cond., $100. John, x38178 or 482-5837.

Queen size mattress and box spring, frame, headboard, sheets, $300. 282-3201 or 554-4256.

G.E. washer and elec. dryer, $150/each. 332-4780.

Dinette set, oak, chrome, glass table top, 48" dia., recently recovered seat cushions, $200, OBO. 486-6859.

Sharp, 13" Linytron color TV, cable-ready, remote, sleep-timer, like new, $175. Kumar, x37125.

Queen size mattress, box springs, and frame, $80; round table w/4 chairs, $30; rectangular table, $25; swivel rocking chair, $20. 482-2138.

Wanted

Two roommates (non-smokers) to live in my 3-2 home in Friendswood, cable, W/D, microwave, VCR and all household privileges incl., no dep. or lease to sign, $225/mo., all bills paid. Mike, x38169 or 482-8496.

Want 1970-71 Dodge Challenger right front fender. Michael, 282-5443 or 863-8710.

Riders wanted for van pool, South Post Oak and Braeswood to NASA area, no smoking. Richard, x37557.

Want camper top for small pickup. x39006.

Want ideas for lectures, seminars, stories, photographs relating to Apollo program for Apollo 20th anniversary celebration. Send one page synoposis, name, mail code, phone number to: Space News Roundup, Apollo Anniversary Issue, AP3.

Want orig., full size space shuttle mission stickers for missions STS-1 and 51-D (Discovery). Patrick, 282-3544.

Want 287-8 math Coprocessor for IBM compatible computer, will pay $100. 554-6628.

I need 12 people who would like to order a door size poster entitled "Astronaut Mickey" $8/ea. Bill, x39210.

Spaceweek National headquarters needs a reliable vehicle for staff and volunteers as 20th Apollo 11 anniversary activites are developed. A charitable donation or loan can be discussed by calling 480-0007.

Photographic

EOS 35-70mm zoom lens, like new, $90. Gary, x33745 or 480-9716.

Konica TC-X camera and lens, $150; Soligor lenses: 75-260mm zoom, $90; 28mm f/2.8, $40; 135mm F/2.8, $40. x30577.

Pets & Livestock

Stalls and/or pasture for rent on 15 acres in Dickinson, pasture, $35/mo., stall partial rent, $55/mo., stall full board, $85/mo. 534-2806 or 333-7098.

Kittens, pretty Siamese, grey, black and white, need good homes. 783-9164.

Baby lovebirds, $25/ea. 331-9441.

Beautiful gold cat, male, 1 yr. old, very affectionate, neutered, shots incl., feline leukemia, needs good home, x34618 or 333-4587.

Beagle pups, AKC registered, $100/ea. 280-1259 or 996-8938.

31/32 Grey Arabian mare, 4 yrs. old., show prospect, $750. Myron, x39419 or 482-8647.

Horse pasture and stalls for rent, Friendswood area, $50/mo., for partial board, $125/mo. for full board. Myron, x39419 or 482-8647.

Musical Instruments

Kimball Spinet piano, 15 yrs. old., ex. cond., $900, OBO. Rich, x34818 or 480-8335.

6 string acoustic guitar by Sigma w/case and books, $125; 6 string acoustic guitar by Hondo w/case and books, $125. Richard, 486-6015.

Hammond B-3000 w/Leslie tone cabinet, full console, beautiful cond., $6,000. 482-8262.

Conn trumpet, good cond., $150. Alan, x34424 or 480-6221.

Miscellaneous

Sears garage door opener transmitter (19,000 codes) for your car, $20; receiver to work with any garage door opener and two transmitters, $40. Mitch, 538-3150.

Gas-powered Weedeater, $30; Hutch dirt bicycle, $30; locking desk, large size, $25; bar stool, leather, $4; Old Smokey, $5, OBO. Wayne, 480-3157.

Aquarium (30 gal. oceanic) w/light and stand plus all access., $250. Carlos, x38879 or 554-7727.

Puegot 102 Mopet, less than 50 hours on it, $250; Commodore computer, disk drive, printer, cass. backup programs, $300. 282-3827 or 554-5514.

'79-'81 Honda new A/C car compressor, $200, OBO. Vincent, x30874 or 333-1316.

Pretty quilts and quilt tops. Lee, 783-9164.

Car-top carrier, durable plastic, approx. 20 cu. ft., beige, lockable, $50. Dave, x32510.

Set of four 15" white spoke wheels and tires for Chevy pickup, includes chrome center caps and locking lug nuts, $40. Terry, x35026 or 554-6549.

Centrifugal pump, 1.5hp, teel, 2" inlet, higher pressure range, water/mud/etc., $125. 280-8796.

Exercising/workout equip., half price, used 3 times, $75. 280-8796.

Coin collection, thousand foreign coins and currency of hundred countries, items sold separately below list prices. 554-3622.

Window blinds, 4" wide vertical fabric slats, earth tone colors, nine sizes, $25 ea. Lee, x33499 or 333-2343.

Shower sliding glass doors, size 31" x 72" each, silver alum., used only 3 mos., like new, was $306, now $125. Fred, x39109.

Wedding gown, veil, size 5, silk chiffon and lace accented w/seed pearls, have pictures, $300. x31876.

Chrome roll bar, $75; chrome cowboy bumper, new, $100; manual sunroof, $125; 2 high intensity lights, 2 wide angle lights, $40; 1983 Chevy 4x4 setup, $400, OBO. 996-0876.

Couch, good cond., neutral colors, $100; wedding gown, veil, lots of lace accented w/seed pearls, size 5, BO. x35744 or 333-9411.

Garage sale Sat., Jan. 28, 9 a.m.-5 p.m., student desk, '73 Chevelle, stereo, games, clothes, kitchen items, lots more. 1102 Newport Blvd., League City, 554-5900.

Utility car/boat trailer, single axle w/car ramps and spare tire, $500. Tony, 280-1564 or 482-4156.

Grandeur Noritake china, 8 pc. setting, 63 pieces total, perfect cond., $750, OBO. Dawn, 474-9274 or 480-0907.

Sunbeam heavy duty food processor, $35; remote control Toyota four wheel drive truck, $75; dusty pink prom or bridesmaid dress, size 14, $50. Stacey, x32649 or 480-9793.

Screened door w/double swing hinges, used, but plenty good, $10. 488-0397.

Golf clubs, Tour Model System II irons 1-9 PW, SW, new peripheral weighted, $185. 554-5514 or 282-3827.

3/4 Stratavarius copy violin, $250; mini-14 rifle w/extras, $300; 2 4 or 3 pc. suits, $80; new 14" spare wheel and tire for Chevy, $20. Jim, 280-2226 or 487-4552.

New mink jacket, was $1,800, now $1,000; portable Mr. Meat Smoker, in carton, 15 lb. meat capacity, $15. 921-7212.

Old records, some 33 1/3 rpm albums, some 45 rpm singles, many from 50's and 60's. 331-9441.

Model AR-4D antenna rotator w/solid state electronics, $75; 1.5KW 28 VDC motor/generator set, $200. 921-7212

Infant car seat, $10; Bentwood rocker, $10; large chrome lamp, $10; dustbuster, $5, OBO. Wayne, 480-3157.

Full dresser w/black formica top and full size headboard, $65; rowing machine, $40. 481-5594.

Advanced lap-top to fly on STS-29

Update brings latest technology into crew cabin

By James Hartsfield

During the next mission, the STS-29 crew will test a lap-top computer with almost 60 times the memory and twice the speed of any portable computer yet flown in space.

The updated version of the Shuttle Portable Computer (SPoC) could prove a boon to crews facing reams of non-critical information during flights. The new computer, called the Payload and General Support Computer (PGSC), will bring the latest technology into the Shuttle's crew cabin.

The PGSC is an advanced version of the SPoC, a lap-top that has flown on every mission since STS-9. Both are modifiied off-the-shelf computers built by GRiD. But while SPoC represents 1980 technology, the PGSC is 1988 technology, said Lou McFadin, project manager in JSC's Avionics Systems Division.

SPoC offers a miniaturized version of the global orbital tracking map that is the flight control room's central display; readouts of mission elapsed time, time to acquisition and loss of signal; and Greenwich mean time. On the portable computer's flip-up display, the map shows current position, day and night cycles, Earth observation points and tracking coverage boundaries, both by satellite and ground stations. The portable computer also offers a backup source for calculating deorbit targets, to be used only in a dire emergency and a complete loss of communications with the ground. These functions, plus limited other programs, fill the SPoC's 384K bubble memory.

But the PGSC, a GRiD computer featuring a 20-megabyte hard disk, can run all SPoC software with a tremendous amount of room to spare for other programs, including word processing and possibly a computerized flight data file. In addition, the PGSC has a built-in 3.5-inch floppy disk drive that could revolutionize data gathering from payloads.

"It has the latest technology available in portable computers. In August 1988, the first model delivered by GRiD to Houston came to JSC," McFadin said. McFadin and his team worked on several modifications that readied the computer for flight.

The PGSC has an 8-megabyte Random Access Memory (RAM), about 16 times that of the SPoC. Despite its expanded capability the PGSC, on average, uses only half of the electricity required by the SPoC, and it can run for at least 10 minutes on battery power, said Bob Tucker, of the SPoC team, another JSC team at work on SPoC and PGSC software. The battery power will allow the crew to move the computer from place to place without turning it off, Tucker said.

On STS-29, the PGSC will fly in place of a second, backup SPoC normally aboard the Shuttle. Mission Specialist Jim Bagian will have the lead in performing a detailed test objective (DTO) during the mission to evaluate the new computer.

As part of the DTO, the PGSC will be compared with the SPoC while both computers are running the same software. "For a majority of the time that they're on orbit, both computers will be running," Tucker said. "The main purpose is to see if the hardware works well in zero-G. Where we go from there ... the possibilities are endless."

Those possibilities include a computerized version of the Flight Data File (FDF), a 25-book, 2,500-page file aboard the Shuttle that holds vital information covering all aspects of a mission. With an electronic version the crew could access that information over the computer, said Mark Dean, who is developing the program.

A computerized FDF could save the crew valuable time by providing easier access to needed information. To put it simply, that would mean less flipping of pages. The information also can be more conveniently arranged.

"On a page, there are boundaries. But on a computer screen, there really aren't. You can easily scroll in all directions," explained Dean, a systems development programmer in the Orbit Procedures and FDF Section. "Also, we can vary the size. One small screen could zoom to fill the main screen."

One portion of the FDF—extracted from the Reference Data Book, basically a directory of where each item aboard the Shuttle is stowed—could be accessed more quickly on a computer. The reference book is never completed until after the final item has been stowed aboard the Shuttle, and the PGSC could make updating the directory an easy task.

"Updates to it could be put on a floppy disk, and it could be fed to the hard disk after they're on orbit," Dean said.

Dean estimated that a computerized FDF would take only about 5 megabytes of memory space, but such electronic data will never replace the unbreakable printed page on Shuttle flights. "We're not trying to replace it. We're just looking at other ways to supplement and present it in the future," Dean said. Still, for Space Station *Freedom,* an electronic FDF may be the main source of such information.

Another portion of the FDF for STS-29, parts of the Orbit Operations Checklist detailing the activities required during pre- and post-sleep periods, will be available on the PGSC. Bagian will use the electronic file during those periods as part of the test.

Another area that offers promise using the PGSC is in gathering information from and monitoring payloads, now done with internal payload hardware. While only Orbiter-related information will be stored on the computer's hard disk, information concerning payloads can be stored on floppy disks.

In fact, the PGSC already is expected to be an integral part of an upcoming middeck experiment that will fly on STS-30, said Jeff Hanley, one of several Payload Operations Branch technicians working on the idea.

Information could be fed directly into the computer, to be placed on a floppy disk programmed prior to flight by the payload customer. "It will allow the crew to see temperatures, pressures and so forth on the middeck," Hanley said. "When the PGSC is plugged into the payload, the crew can look at the data and perhaps enhance what they're getting out of it."

Displays may include graphic representations of what is going on inside an experiment, and a future program may allow the PGSC to monitor the performance of a payload and automatically make corrections if anything is awry. Customers are excited about the possibilities, Hanley said.

"They look forward to being able to take advantage of not only the computing power of the machine, but also the much greater memory capability," he said. And the 1.44-megabyte floppy disks should allow plenty of room for almost any payload's requirements, he added.

On STS-30, the PGSC will gather data from a fluids crystal growth experiment, designated FEA-2, in the middeck. "The PGSC is pivotal to the performance of the experiment," Hansley explained. "If you don't have it plugged into the experiment, you'll lose the data."

Such operations will be available for middeck and cargo bay payloads, Hanley added.

"It's really going to enhance our ability to do science on the middeck," said Mary Cleave, STS-30 crew member. "It will give us more of a chance to interact with experiments and further prove the value of having a person available to work with a payload. Right now, most experiments are very automated."

Other possible applications of the PGSC include a star map. "It would display navigational stars that are available and their positions," Tucker said.

Another program may allow the crew to "toggle" between displays, allowing, for example, the deorbit program to run in one window at the same time as the world map is in another window.

"The PGSC gives us the latest technology and the possibility of future applications we might not have even considered yet," Tucker said.

NASA Photos

Members of a team working on the Payload and General Support Computer (PGSC) display the PGSC and supporting hardware that will fly on STS-29. The team, which spans various areas of JSC, includes, from left: Paul Sanders, Bob Tucker, Felix Balderas, Taeko Brown, Mark Dean, Damon Hooten, Dan Harrison, Mike Chappell, Yvette Fairchild and Lou McFadin.

JSC to manage Reusable Reentry Satellite project

By Kari Fluegel

Plans for an unmanned Reusable Reentry Satellite (RRS) will come a step closer to the drawing board when aerospace companies present their proposals for the vehicle that could significantly expand NASA's capability to investigate a weightless environment.

The RRS, to be called LifeSat when carrying life science payloads, will be placed into Earth orbit by an expendable launch vehicle, reserving the Space Transportation System for activities requiring crew presence.

A request for proposals issued Jan. 10 calls for the design of an almost completely reusable spacecraft that could be processed and readied for reflight in two months, allowing for several flights each year.

Designs are expected to be derivatives of the often-flown Department of Defense Discovery satellite or of the Gemini/Apollo vehicles of the 1960s, calling for a vehicle roughly six-feet in diameter and weighing more than 2,000 pounds with a useful payload of 500 pounds.

Used primarily in the fields of life sciences and material processing, the RRS would fly experiments in a variety of orbits including those providing high doses of radiation for periods up to, and perhaps beyond, 60 days.

Upon completion of the flight, the RRS would reenter and make a soft landing at a designated ground-site where scientists and engineers would have immediate access to the experiments.

Contracts for the design studies to begin this summer will be awarded to two vendors at a cost of $1 million each. The project will be managed by JSC and could be flown as early as 1993, if future development efforts are approved.

Five international agencies in addition to NASA have expressed interest in participating with the RRS and are expected to conduct parallel study efforts. Agreements for the international coordination are being formulated.

The commerical community also has expressed an interest in the RRS because of its unique orbits, flight duration, autonomous operations and the dedicated and easily scheduled nature of the entire system.

JSC Photo

HEAVY RAIN—There was a new "pond" between Bldg. 1 and the Bldg. 3 cafeteria on Jan. 18 when a downpour at JSC temporarily backed up the center's drainage system. An estimated 2.76 inches of rain fell in the area in less than 2 hours, according to Steve Sokol of JSC's Spaceflight Meteorology Group. The rain caused minor flooding along many low-lying sidewalks, which drained quickly after the rain ended.

Truly to receive National Award for Space Achievement

Rear Adm. Richard H. Truly, NASA associate administrator for space flight, will receive the Rotary National Award for Space Achievement next week in Houston.

Truly was selected "for his 20 years of distinguished career contributions to the U.S. Space program, first as an astronaut and then as an administrator. In that time, Adm. Truly has made exemplary contributions to the operational achievements of the Space Shuttle program, to the recovery activities following the loss of *Challenger* and to the current NASA effort to regain preeminence in space exploration."

The award, featuring the National Space Trophy permanently housed in JSC's Bldg. 2 visitor center, will be presented at the annual awards banquet at the Houston Hyatt Regency Hotel on Feb. 2. Donald E. Fink Jr., editor-in-chief of Aviation Week & Space Technology, will be the keynote speaker.

JSC's Charles A. Biggs, chief of the Public Services Branch, will be one of the first four recipients of a new Stellar Award presented each year in four categories to Americans who have worked at least 10 years in their fields and applied their expertise to the space program for five years. Biggs is the recipient in the field of news and information service.

Other Stellar Award recipients are Robert Sieck, Shuttle launch director at Kennedy Space Center; Dr. Alexander Dressler, chairman of the Department of Space Physics and Astronomy at Rice University; and Col. Roger G. DeKok, former special assistant to the president for national security affairs with the National Security Council.

Charles H. Hartman, chairman of the award foundation, said the competition for this year's Space Trophy was formidable. Truly, who was chosen by ballot by the foundation's national board of advisers, will join Dr. Maxime Faget and Congressman Don Fuqua on the award honor roll.

"I think he's an excellent choice," Hartman said. "He has spent a lot of his life in the space program and has contributed a lot to it."

Solid rocket cold test completes series

(Continued from Page 1)

we will be able to open our launch windows for temperature and other conditions at the Cape," he said. "We feel very comfortable with it."

Having colder propellant means the rocket will generate less energy as it burns, Mitchell explained. Prior to the test firing, the coldest temperature of solid propellant during a launch was 52 degrees. Based on that experience, the launch constraint for a cold bulk propellant is 56 degrees.

But, if further examination proves QM-8 as successful as preliminary data indicate, the lowest possible temperature of propellant inside the rocket for a launch will drop to 44 degrees, he said. A propellant temperature that low would be virtually impossible given Kennedy Space Center's climate.

"Burn rates in QM-8 were as expected. There was no unusual cracking due to thermal stresses on the propellant, and no pieces of propellant came loose and created pressure as they exited through the nozzle. Everything went very close to how it was predicted," said Allen McDonald, Thiokol's vice president for space operations engineering. "It tells us we understand how this propellant burns and have it properly characterized."

QM-8 was the final test in a series of six full-scale firings of the redesigned SRMs. The firings have tested the design in extremes of heat as well as cold. One firing featured a rocket with severe intentional flaws in several critical areas, a check of back-up safety features in the redesign.

"The test program has been one of the most aggressive, most thorough and all-around highly complete test programs we've had," Mitchell said.

"It's clear now that the motor has the desired safety margins we put into it," McDonald added.

Although QM-8 will complete the SRM redesign certification, other solid test firings will continue. Periodic firing tests of the SRMs using Flight Support Motors will ensure that the rockets being manufactured retain high quality, Mitchell said. One such test is scheduled this year, and there may be two such tests each following year.

Also, several Technical Evaluation Motors (TEM), sets of pre-Challenger booster segments, will be test fired this year to evaluate the design modifications, he said. The first TEM firing is scheduled within two weeks.

Random drug testing applies to few employees

(Continued from Page 1)

how the program will be operated, Hall said.

NASA will not conduct drug tests of job applicants under the program.

Centerwide, an introductory briefing will be given to all employees to explain the new drug-free program. A second briefing then will be delivered to supervisors and managers. Those briefings probably will begin in March, Hall said.

NASA contractors, due to a law passed last year, also will be required to implement a drug-free program by March 18. But the majority of contractors already have such programs in place, with certain types of testing as a feature, Hall said.

"I really can't stress enough that NASA is not implementing this program because of a belief that there is a drug problem among our employees," Hall added. "The federal government as an employer is simply attempting to respond to a large and serious problem in today's society."

Space telescope to view 'guts' of galaxies

(Continued from Page 1)

From Neptune back to the inner planets, another high-interest body NASA scientists hope to receive information on this year is the Martian moon Phobos.

Phobos, an irregular, 16-mile long lump orbiting Mars, holds appeal as a possible link in a plan for manned exploration of the Martian system, said Doug Blanchard, chief of the Planetary Sciences Branch. NASA scientists have been invited to share in information from a Soviet probe scheduled to arrive at Phobos in April, and NASA's Deep Space Tracking Network will assist in communications.

"We need to find out whether Phobos is rock or ore," Blanchard said. At present, Phobos is believed to be composed of a material that could be rich in water and may have possibilities as a source of rocket propellants.

"If it's rock, it's interesting. The planetary science problem with Phobos is that it's clearly not of Martian origin. It may be a meteorite captured by Mars," Blanchard said. "But if its ore, if its makeup holds substantial amounts of water, it could have a direct bearing on future exploration."

The Phobos probe has suffered possibly serious malfunctions, but the Soviets may be able to repair them. "If they're fixed, it should give us a very interesting, close look at Phobos," Blanchard said.

More than just Venus, Jupiter, Neptune and Phobos, NASA will be prepared to take a closer look at the entire universe as 1989 nears its end. Hubble Space Telescope, the fruition of an idea that first came to light among astronomers in the early 1960s, will be in orbit.

Imagine a forest, with the trees shrouded by a thick fog that limits visibility to only seven feet in every direction. Then imagine the fog has lifted, and visibility is almost 50 feet in all directions. Hundreds more trees are visible; the forest takes shape. That's the difference Hubble will make, clearing the distortion of Earth's atmosphere from mankind's view of the universe.

The human race will be able to see seven times farther, in essence seven times as much of the universe, than it has ever seen before. And for other objects, Hubble will provide resolution comparable to a magnification almost 10 times greater than that of the most powerful Earth-bound telescope, making visible objects 50 times more faint than the most dim objects seen today.

"The high resolution will allow us to see, essentially, into the guts of other galaxies," said Karl Henize, senior astronomer in the Space Sciences Branch. And Hubble will allow astronomers to discover new galaxies, gauge their distances and determine their speeds.

There are high hopes that Hubble may allow scientists to measure the size of the universe. But, Henize cautions, results won't come quickly.

"Don't expect fantastic discoveries in the first six months. I'd expect that it will take years before major pronouncements or discoveries are made," Henize said. "But they will come."

Because of the time it has taken for them to travel to Earth, the images Hubble will pick up will be those from the past. And some of the light that enters Hubble may have been emitted from galaxies near the beginning of time, the beginning of the universe.

Based on this, astronomers also hope to eventually determine the age of the universe and a better glimpse of its birth.

More than these potent questions, however, everywhere Hubble looks it will see things as they haven't been seen before. It will search for planets near other stars; it will search for double star systems; it will see the objects of the solar system up close for as long as the viewer wishes.

"Its views of Jupiter may come close to the views Voyager gave us," Henize said. "But Voyager's views were a snapshot as it passed. With Hubble, we can look at it for an extended time."

Space News Roundup

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

Editor ..... Kelly Humphries
Assistant Editor ..... James Hartsfield

Best memorial is continued safety

Twenty-two years ago today, three of our colleagues lost their lives during a test of the Apollo 204 Command Module. Three years ago tomorrow, seven of our colleagues lost their lives while climbing toward orbit aboard *Challenger*.

As we remember their lives and their contributions to our lives, the space program and our country, we must also remember the most important lesson we learned from both of these tragedies:

Safe space flight is our primary goal.

The best memorial we could have given Gus Grissom, Ed White and Roger Chaffee was a successful series of landings on the Moon. We did that, but only after a long, painful reassessment of the Apollo program and its safety awareness.

This past year, we made a similar memorial to Dick Scobee, Mike Smith, Judy Resnik, El Onizuka, Ron McNair, Greg Jarvis and Christa McAuliffe when the Space Shuttle *Discovery* and her crew completed a safe return to flight.

There are serious risks involved in any endeavor as technically complicated as sending men and women into orbit or to the Moon. But we must be unflagging in our dedication to continued safe space flight operations. The future of our country, the world and, eventually, the human race, may depend on that dedication.

—The Editor