



More Trivia

Take the annual trivia challenge and test your knowledge. Quiz on Page 3. Answers on Page 4.

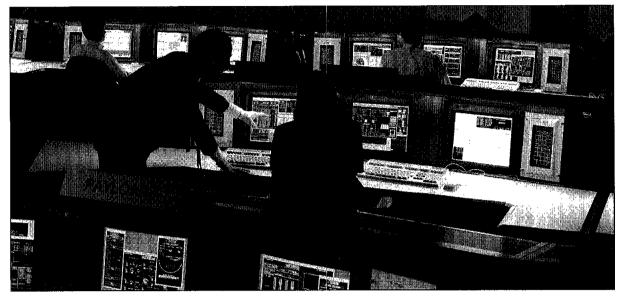


Joint effort

Space station hardware arrives in Russia as part of joint U.S./Russia cooperative activities. Story on Page 4.

pace News Roundup

December 30, 1994



Above: Use of commercial hardware and workstation operating systems will offer unprecedented flexibility in flight control operations. The new system will allow the new MCC to control both space shuttle or space station missions with equal ease.

Left: Independent work stations have replaced the circuit boardby-circuit board systems of the current Mission Control Center. The new MCC will control its first shuttle flight in the summer of

Old, new meet in **Mission Control**

By James Hartsfield

Mission Control, Houston, is moving—albeit only a few hundred yards—but the change will move the famous manned space flight control facility from the 1960s into the 21st century and beyond.

Mission simulations began Dec. 20 in the new version of Mission Control Center. The simulations usher in a drastic change in the tools and costs associated with manned space flight control. The new control center eliminates the NASA-unique equipment and massive hardware orientation of the current MCC, replacing it with a modular, software-oriented design that uses standard, commercially available equipment.

The new MCC, developed at a cost of about \$250 million, is planned to begin actual operations for control of shuttle flights this summer, and the current mission control then will be slowly phased out, eventually relinquished to history.

"A shuttle mission is the end result of a journey, and the first step in that journey is the first simulation," said John Muratore, chief of JSC's Control

Center Systems Division. "The first simulation in the new MCC means that we now have enough capability and reliability in the facility to start using it for real work. It's no longer under development. It's now moving into operation.

The new MCC's design offers an unprecedented flexibility in flight control operations, allowing the facility to be changed from controlling a shuttle to controlling any other spacecraft at almost the speed of simply choosing a different function from a computer menu. The commercially available equipment and up-to-date technology used in the new MCC will greatly reduce maintenance costs for the facilitv as well.

Unseen by most who are familiar with television views of the current mission control is the support equipment for the control room, a first floor completely filled with, by today's standards, obsolescent mainframe computer equipment. A staff of about 80 is required around the clock during shuttle missions to operate the equipment, and maintenance on the cur-

Please see **NEW**, Page 4

Honeycutt takes Kennedy Space Center helm

Former JSC employee named to replace Crippen as center director

Jay Honeycutt takes the helm at Kennedy Space Center, becoming its sixth director following his appointment by NASA Administrator Dan Goldin.

"Jay has been an accomplished member of NASA's human space flight team for many years," Goldin said. "He understands spacecraft processing, launch operations and flight operations, and I believe he will make an exceptional director of this vital field center."

Honeycutt succeeds Robert Crippen, who is leaving the agency

Jan 21.

"I am very pleased that Jay will be succeeding me as center director," Crippen said. "He has made major contributions to KSC and the agency as director of shuttle management and operations while at KSC. In particular, he has greatly improved the efficiency of the shuttle team. I know he will carry on the KSC tradition of safety and excel-

Honeycutt began his career at Redstone Arsenal in Huntsville, Ala. in 1960 and joined NASA in

1966. In 1967, he became chief, Vehicle Simulation Section in the Flight Operations Directorate at JSC. He later became the assistant chief of the Flight Training Branch in 1969 and chief in 1974. In 1976 he was promoted to assistant to the director of Flight Operations. He became the technical assistant to the associate administrator for the space transportation system at Headquarters in 1981 and moved back to JSC as assistant to the director, Space Shuttle Program, in

Before moving to his present job at KSC in 1989, he served in a number of management capacities including manager, STS integration and operations and special assistant to the associate administrator for space flight at NASA Headquarters. From 1987 to 1989 he was deputy manager of the shuttle program.

During his career, he has earned a number of significant awards including two NASA Exceptional Service Medals and NASA's Outstanding Leadership Medal.



Jay Honeycutt

Hubble observations challenge theories on evolution of galaxy

Observations made with the Hubble Space Telescope are challenging long-held beliefs about the age of the galaxy.

Astronomers using the telescope as a "time machine" have obtained the clearest views yet of distant galaxies that existed when the universe was a fraction of its cur-

The results suggest that while elliptical galaxies developed quickly into their present shapes, spiral galaxies that existed in large clusters evolved over a much longer periodthe majority being built and then torn apart by dynamic processes in a restless universe.

Those estimates for the age of the universe do not allow enough time for the galaxies to form and evolve to the maturity seen at an early

"This is compelling, direct visual evidence that the universe is truly changing as it ages, as the Big Bang model insists," said Alan Dressler of the Carnegie Institution HUBBLE SPACE TELESCOPE

epoch by the telescope.

in Washington, DC. "Though much of the quantitative work can be done best with large Earth-bound telescopes, the Hubble Space Telescope is providing our first view of the actual forms and shapes of galaxies when they were young."

A series of long exposures, taken by three separate teams, traced galactic evolution in rich clusters that existed when the universe was approximately one-tenth, one-third, and two-thirds its

Key findings identified by the scientists include the long-sought population of primeval galaxies that began to form less than one billion years after the Big Bang, and a "cosmic zoo" of bizarre fragmentary objects in a remote cluster that are the likely ancestors of the Milky Way Galaxy. A series of pictures, showing galaxies at different epochs, offers the most direct evidence to date for dynamic galaxy evolution driven by

Please see IMAGES, Page 4

Discovery on schedule for STS-63

By James Hartsfield

Discovery will begin 1995 on the move and on schedule toward a out the recently replaced auxiliary

Feb. 2 launch on shuttle mission STS-63, a mission that will include a rendezvous and flyaround of the Russian Space Agency's Mir space station.

Currently in Kennedy Space Center's shuttle processing hangar bay 2, Discovery will be rolled to the Vehicle Assembly Bldg. on Wednesday to

be hoisted vertical and attached to the STS-63 fuel tank and solid rockets. It is scheduled to be moved to Launch Pad 39B around Jan. 11.

DISCOVERY

Last week, technicians closed out the engine compartment, checked

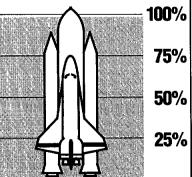
> power unit two, and began close-outs of the crew cabin. Also, the payload bay doors were closed with the Spacehab-3 module and Spartan 204 satellite ready for flight. Other work included final tests of the orbital maneuvering system and reaction control system.

> Elsewhere, the main engines were installed in

Endeavour in preparation for a March launch on STS-67 carrying the Astro-2 telescope package aloft. Other activities included checks of a signal conditioner on the right orbital maneuvering system pod and servicing of the water spray boilers.

Also at KSC, Atlantis is being readied for the first docking between a space shuttle and Mir on shuttle mission STS-71 in June. Last week's work on Atlantis included troubleshooting of the flash evaporator system, draining residual propellants from the reaction control system and checks of payload bay floodlights. Leak tests of the main propulsion system plumbing also were completed.

Shuttle processing work took a break during the holidays with no activity since Dec. 23. Work on the orbiters will resume on Tuesday.







CFC concludes

JSC employees responded to the call, donating \$458,832.16 to this year's Combined Federal Campaign, boosting the grand total a full percent over last year's contributions.

Ten organizations gave more than 100% of their 1994 goals. Three organizations gave over 200%.

The Engineering Directorate contributed the largest dollar amount, with \$124,439.76 or 104 percent of its goal. The Mission Operations Directorate contributed the next largest amount, \$87,417.72 or 121 percent of its goal.

Winners of the five Continental airline tickets whose names were drawn from employees contributing one-hour's pay per month or more were: Tim Adams, NS4; Carrie Ash, BI; Lee Graham, OA; Greg Oliver, DM; and Kathy Thornton, CB.

Ficket Window

The following discount tickets are available for purchase in the Bldg. 11 Exchange Store from 10 a.m.-2 p.m. Monday-Thursday and 9 a.m.-3 p.m. Friday. For more information. call x35350 or x30990.

Moody Gardens: Discount tickets for two of three different attractions: \$9.50 Space Center Houston: Discount tickets: adult, \$8.75; child (3-11), \$7.10. Metro tickets: Passes, books and single tickets available.

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

Stamps: Book of 20, \$5.80

JSC history: Suddenly, Tomorrow Came: A History of the Johnson Space Center,

Gilruth Center News

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

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

Weight safety: Required course for employees wishing to use the weight room is offered from 8-9:30 p.m. Jan 10 and Jan 26. Pre-registration is required. Cost is \$5. Defensive driving: Course is offered from 8:15 a.m.-3 p.m. Saturday. Next class is

Dec. 17. Cost is \$19. Aerobics: High/low-impact class meets from 5:15-6:15 p.m. Tuesdays and

Thursdays. Cost is \$32 for eight weeks. Exercise: Low-impact class meets from 5:15-6:15 p.m. Mondays and Wednesdays. Aikido: Martial arts class meets from 5-7 p.m. Tuesdays and Wednesdays. Cost is

\$25 per month. New classes begin the first of each month Tennis league: A fall tennis league may be started if there is sufficient interest. Contact the Gilruth Center at x33345.

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

Ballroom dancing: Ballroom dancing classes begin Jan 5th. Cost is \$60 per couple. For additional information call the Gilruth Center at x33345.

Fitness program: Health Related Fitness Program new class begins Jan 9, includes a medical examination screening and a 12-week individually prescribed exercise program. For more information, call Larry Wier at x30301.

Dates & Data

Today

Cafeteria menu: Special: tuna noodle casserole. Total Health: baked potato. Entrees: steamed salmon steak, baked chicken, fried cod fish, ham steak. Soup: seafood gumbo. Vegetables: French cut green beans, cauliflower with cheese, green peas, black-eyed

Saturday

Bike Club: The JSC bicycle club will meet at 8:00 a.m. Dec. 31 at the Bike Barn for a 25-mile ride. For more information call Juliette Wolfer at x38459.

Monday

New Year Holiday: Most JSC office will be closed in observance of the New Year holiday.

Bicycle Club: The JSC bicycle club will meet at 8:00 a.m. Jan. 1 at the Bike Barn for a 40-mile ride. For more information call Juliette Wolfer at x38459.

Tuesday

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

Wednesday

Astronomy seminar: The JSC Astronomy Seminar will meet at noon Jan. 4 in Bldg. 31, Rm. 129. An open discussion meeting is planned. For additional information, call Al Jackson at 333-7679.

Toastmasters meet: Spaceland Toastmasters meets at 7 a.m. Jan 4 at House of Prayer Lutheran Church on Bay Area Blvd. For additional information, contact Darrell Boyd, x36803.

Bicycle Club: The JSC bicycle club will meet at 5:30 p.m. Jan 4 behind the Grumman Bldg. at Ellington field for a 1- to 2-mile ride. For more information call Juliette Wolfer at x38459.

Cafeteria menu: Special: stuffed bell pepper. Total Health: baked potato. Entrees: stir fry chicken & rice, wieners & beans, fried fish, western special, beef, chicken sausage, Reuben sandwich. Soup: seafood gumbo. Vegetables: buttered rice, Italian green beans, corn O'Brien, peas and carrots.

Thursday

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

Friday

Cafeteria menu: Special: meat sauce and spagnetti. Total Health: baked potato. Entrees: rainbow trout, liver and onions, beef cannelloni, ham steak, fried cod fish, Reuben sandwich. Soup: seafood gumbo. Vegetables: steamed broccoli, breaded okra, cut corn, blackeyed peas.

Bicycle Club: The JSC bicycle club will meet at 8:00 a.m. at Krogers in League City for a 50 mile ride. For additional information call Juliette Wolfer at x38459.

Jan. 8

Bicycle Club: The JSC bicycle club will meet at 8:00 a.m. at the Bike Barn for a 14- or 35-mile ride. For more information call Juliette Wolfer at x38459.

Jan. 9

Total Health: The first Health Related Fitness course of the year begins Jan. 9. For additional information, contact x30301 or x30302.

Bicycle Club: The JSC bicycle club will meet at 7:00 p.m. Jan. 9 at the Clear Lake Park meeting room. For more information call Juliette Wolfer at x38459.

Jan. 14

Bicycle Club: The JSC bicycle club will meet at 8:00 a.m. Jan. 14 at the Bike Barn for a 25-, 40- or a 65-mile ride. For more information call Juliette Wolfer at x38459.

JSC

Property

Sale: Baywind I condo, 2-1.5-2, carpet, W/D. new dishwasher, immediate occupancy, 1st floor, financing avail, \$35k. Tom, 333-3992.

Sale: Baywind II condo, 1-1, new carpet/paint, W/D, fridge, dishwasher, FPL, \$23k, 486-8047.
Rent: El Dorado Trace, 2-2, furn, balcony,
W/D, FPL, \$675/mo + elec. 333-8126 or 488-

Sale: Santa Fe/Alta Loma, 2.5 acres, ready to build, mineral rights, \$20k. 337-1311. Lease: Egret Bay condo, 2-2-2, W/D, FPL,

ceiling fans, pet neg. \$520/mo. 337-7573.

Rent: Baywind I condo, 1-1-1, appli, ceiling fans, #380/mo + deposit. Bill, 332-3649.

Rent: Taos, NM, house, handy to town & Ski Valley. 486-5679.

Rent: Winter Park, Co, 2-2 condo, furn, sleeps 6, 488-4453. Sale: Camino South, 3-2-2A, pool, FPL, new

carpet, reasonable. Mike, 480-0336. Sale/Lease/Trade: House near 290 & 1960, new carpet/heatpump/paint, \$65k. x31265 or

Sale: Bayridge sub, LC, 3-2-2, lg yard, brick, cul-de-sac, \$55k. James, 286-1934. Rent: Remodeled mobile home, new carpet,

water/trash paid, available 1/1/95, \$350 + dep, \$25 application fee. 334-1991. Rent: Galveston condo, furn, sleeps 6, Seawall Blvd & 61st, cable TV, weekends/wkly/dly rates. Magdi Yassa, 333-Seawall

Lease: Galveston Seawall condo, furn. 24 hr security, cable TV, \$410/mo. x30737. Sale: Rockport, TX, 3-2-2D, modular home,

new septic sys, new A/C, irrigation well, appli, Handicap accessible, \$72.5k. x34507. Rent: Lake Placid mobile home on Guadalupe river, near New Braunfels & Seguin,

sleeps 6, winter, \$65/ntly/\$350/wkly. 326-3706. Rent: Room in Clear Lake home, private bath, garage, \$300/mo + 1/2 utilis, 286-8434.

Sale: Property, 1.9 acs, Point Blank, TX, 7 min from Lake Livingston, 326-2307. Lease: 1 BR condo, Baywind II, CL, W/D con-

nections, FPL, \$435/mo + \$435 dep. Charli, Rent: Tranquility Lake condo, 1-1, new full sz

W/D, new A/C, FPL, \$450/mo. 333-2173.
Sale: Taylor Lake Estates, residentail lot 90' x

135', wooded waterfront subdiv, owner finance, \$42.5k/obo. Don, x38039 or 333-1751.

Cars & Trucks

4760 or 486-0788.

'67 Pontiac Firebird, convertible, red, blk intr, A/C, restored, \$12.5k. 977-5533 or 515-5290. '84 Cutlass Supreme station wagon, 80k mi,

mil, ex cond, \$16k/obo. James, x31064 or 334-

'82 Cadillac Sedan deVille, ex cond, leather, loaded, 21k mi actual, \$6.9k/obo. Rich, x41089

w/gray vinyl top, \$3.9k. 554-2790. '83 Mazada truck, 7' bed, AM/FM/cass, tool

box, recent paint job, \$950/obo. 286-9727. '85 Astro Cargo style van, custom int, V6, towbar luggage rack, PS/PB, AM/FM/cass, AC,

'78 Toyota Celica, \$700. 479-5977. '86 Chevy S-10, \$500, 479-5977.

new tires, \$4.2/obo. Steve, x30671. '88 Chevy S-10 Blazer, 2 dr. blk/silver, A/C. auto, tow pkg, Tahoe pkg, power, AM/FM/cass, 86k mi, \$6k, x48788 or 488-6925.

\$3k. Daniel, x33345 or 335-8405

'91 Ford Tempo GL, A/C, AM/FM, pwr, low mileage, \$5.3k. x38981 or 333-2476.

4 dr, A/C, AM/FM/cass, ex cond, \$6.5k. x48779 or 432-0742. '77 Chevy Luv PU, A/C, tool box, 30k mi on

new engine, \$1.1k. Danny, x47184 or 992-3827. Weber conversion, yellow/blk, \$1.9. Mark,

'91 Ford Escort LX, auto, blue/gray, 54k mi, \$4.5k. Sherry, x32064 or 474-5636.

owner, ex cond, \$9.8k, 482-7546.

AM/FM/cass, ex cond, \$4995. x35180 or 326-

'72 Chevy Caprice, 62k mi, 400-4 bolt main engine, Turbo 400 trans, ex cond, \$800/obo. Mark, x39419 or 335-0112. '85 GMC Safari mini-van, 89k mi; '87 Saab

x39012 or 992-5285. '94 Eclipse, 5 spd, 4 cly, 45 mpg, payoff loan under \$12k. 534-2521.

'78 Ford T-Bird, needs tags & inspection sticker, \$500. David, x33653 or 337-6439

kept & always covered, w/helmet & cover, \$1,950. Keith, 484-4349.

Ladies 24" Schwinn bicycle, 10 spd, Caliente model, red, new cond, \$50. x31446 or 474-

'93 Trek 1400 Road bike, men's 50 frame, ex cond, \$450/obo, 831-4316. Bicycle helmet, Brancale sport, \$20. 333-

Raleigh 16" frame, 21-spd men's hybrid road bike, ex cond, \$100/obo. x49695 or 480-5906. Honda Passport motor scooter, 70 cc, \$225.

Boats & Planes

'94 Seadoo XP w/cover, hvy duty trailer, vests & access. \$6k/obo. 333-6610 or 333-0404

'86 Celebrity, 19', 230 hp Mercruiser I/O, full instrumentation & canvas, Sportsman trailer, ex cond, \$11,750. Charlie, 488-4412.

9.9 hp Evinrude OB, \$3k. Carlos, 870-9512. Eipper MX Quicksilver ultralight airplane, new propeller & gas tank, newly rebuilt 447 Rotex engine. 333-6557 or 531-9630.

52 C-35 Bonanza, 3.5k hrs TT, 1k hrs SMOH, O SPOH, 1 FR, speed slope, windshield, hyd prop, \$24.5k. Danny, x47184 or 992-

Sovereign, 24', depth sounder, head stove, sleeps 4, electric start Johnson OB, \$7.9k/obo. Mike, 532-1240

Airslot 16" Wellcraft, 115 Mercury OB, '78

Seawind catamaran, VHF, DF, porta potti, stove, 9.9 hp Yamaha electric start, 16' beam, \$11k/obo. x37124 or 335-5357.

Audiovisual & Computers IBM 286 PS2 20 mb HD, 640 Kb ram, key-

Tektronix 4105 Graphics terminal & 4695 color printer, \$625/both; 3-TAB terminals,

CD player, Techniques SL-P310 single disc w/remote control, \$50. mark, 488-0056. Sony car Discman w/car kit & wireless

remote, \$200/obo. Thanh, x31464.

Macintosh SE 30, 40MB HD, 2MB RAM, ext eyboard, Apple Imagewriter II printer, mouse,

CSX-140 Citizen printer w/GSX color option.

Macintosh SE computer, 2MB memory, 20MB HD w/monitor, keyboard & mouse, \$250. Marv,

Infinity SM120 200w 3-way speakers, \$500/pr; Proton D1200 100w/channel power amp & Proton P1100 Preamp, \$350, \$800/all. Chris, 280-4394 or 474-7263.

Zenith VHS-C camcorder, batteries, charger, cables, std, VHS adapter, RF & switches, leather video bag, \$275/obo. x31694 or 481-

Musical Instruments Viola w/case & 2 bows, accessories, \$250 for

AKAI, 61 note Polyphonic full size Midi keyboard, ex cond, \$400/obo. P. Quinn, x38572 or

books, \$150, 488-6917. Percussion Plus snare drum, white head,

Lost ladies gold nugget bracelet around the vicinity of building 30, this is of a great personal value. Desiree, x37216.

Household

Super twin size waterbed w/heater & solid wood frame w/bookcase headboard, ex cond, \$65/obo. x31913 or 326-4003.

GE electric, auto sensor, \$100; dark pine furniture, sofa, leather recliner, chair, tables, twin bed, lamps, light fixtures, white twin canopy

bed, custom built walnut cabinet w/lighted bar. 474-3507 Sofa/loveseat w/table, \$225; full/qn sz bed/ frame, dresser/mirror & night stand, \$465;

chairs, & china cabinet, \$1650. Kim, 996-0152. Large "cushy" Papassan couch w/black cushion, new \$250 sell \$60, 488-6917.

Western style sofa, \$300/obo; Beautyrest mattress & box springs, \$450/obo; 5 drawer wood dresser, \$60/obo. 833-0963.

Waterbed, king sz, frame, ex cond, dismantled, \$50. Clovis, 282-4271 or 996-9646. Ceiling fans, 5: gas range; hot-water heater/ obo. 667-8216.

sell \$50/ea or 6/\$275, 8/\$350. 326-4617. GE 4-burner electric stove top, coppertone, w/ matching vent hood, exhaust fan & light, \$75/

both. Linda, 484-0987

Bar, approx 10' long, black 2-level top w/padded front, brass foot rail, several cabinets & drawers, \$400/obo, 482-4608.

Maytag W/D, large capacity, 2 spd, \$700/obo. PC rolltop desk, honey color, solid oak, new \$1.4k sell \$900; Lady Kenmore washer, 2 spd,

lg capacity, \$125; Panasonic microwave, 700watts, 1.5 cubic ft, \$75. 334-3998. Sectional 3-piece sofa, cream cloth covering, rectangular glass top coffee table, cream stone legs, \$750/both. Donald Thompson, 334-3998.

Futon, ex cond, \$100; sofa/sleeper, good \$175; Chair & ottoman, \$20; kitchen table & 6

chairs, \$75. Mark, x37370. Queen size waterbed w/6 drawers, bookcase headboard w/mirror, heater/liner/rails, \$80 firm.

Bentwood rocker, dark walnut finish w/country blue cushion, \$50; 2 rattan Peacock chairs w cushions, & rattan round table, \$100/obo. 532-

Wanted

Want low priced school/work car or truck

Want personnel to join VPSI vanpool departing Meverland Park & Ride lot at 7:05 a.m. for JSC, vanpool consists of on-site personnel working 8 a.m./4:30 p.m. shift, need 2 -3 more. Travis Moebes, x45765 or Don Pipkins, x35346

Want personnel to join VPSI vanpool, West Loop Park & Ride lot at 6:50 p.m. to NASA/ Contractors. Richard Heetderes, x37557 or Ed Rangel, x36124.

Want roommate, N/S to share 2-2 apt w/ waterfront view, Tranquility Lake, \$350/mo. Sean, 333-6610 or 333-0404.

Want non-smoking roommate to share new LC house, no pets, \$350/mo, all bills pd. 332-

Want girls bikes w/training wheels, 1 for 7 yr old & 1 for 4 vr old, richard, 538-1854. Want Barbie Holiday Christmas ornament, '93

1st edition. Marty, x36540 or 532-4494. Want cycling equipment, bike computer that gives speed/time, distance, etc, need front & back lights, and other accessories. Coy,

Want art supplies, brushes, oils acrylics, easel board, tools, ets. Coy, x35410.
Want housemates, F/M or couple to share

house w/pool near NASA. 286-7227. Want non-smoking roommate, 4-2.5, country home in Alvin, able to tolerate Ig outdoor pets, \$350/mo. 244-6121 or 331-3963.

Want used working lawn mower, for NASA Pony baseball field. Bob Kelso, x35483 or 480-

Want canoe(s). Dave, x34774. Want non-smoker to share 4-2.5, Kemah

house, no pets, \$300/mo + 1/2 utilities & 1 month dep. Jeri, 333-7552.

Want reliable transportation to/from Brookwood elementary, 1st grader lives on Orchard Mountain Dr. Carolyn, x35562 or 286-9305.

Miscellaneous

Love seat, brown gold flower print, comtemporay, good cond, \$100; peddle & row exercise bike, 244-0250.

Bike Avocet seat, \$20; Profile aerobars, \$60; roof rack for vehicles w/rain gutters on roof, \$50. 333-8126 or 488-1327.

Bridal slip, white, semi-full, sz 6, zipper back: cruise to Bahamas w/stops in Ft. Lauderdale & Orlando, 7 nights/8 days, \$398. Jennifer, x32417 or 286-9204.

Rockets vs Pacers tickets, Jan. 7, sec 208, row K, \$22.50/ea. x34841.

Table saw, 10", Sears Deluxe computer controls. Richard, 538-1854. White wedding dress, sz 8, long sleeves, long

train & beaded bodice, new \$680 sell \$400/obo. Trailer hitch for Jeep Wrangler, Draw Tite mode, \$50. John, x31114 or 486-0898.

Tropical plants, all in permanent pots, Ig to small sz, various kinds, \$15 and up. Bob x33149. Italian leather brief case; mens solid gold link

bracelets; contemporary glass punch bowel set; Lladro-clown car cover; silver/turquoise bolo. x38278 or 334-7258. Computer desk, \$30/obo; sparkling water/ juice carbonation unit, \$30/obo; 31 volume Funk

& Wagnalls encyclopedia, index & dictionary, \$75/obo. Tony, x47401 or 482-4156. Fleer 1988, '88 Donruss, '89 Donruss, '90 Donruss, '90 Score, '90 Bowman, '91 Donruss unopened factory sets, \$100 for all 7 sets; 9

1909-1911 Tobacco baseball cards, \$100. Tony, x47401 or 482-4156. Set of 4 Chevy wire spoke hubcaps w/locks,

\$95/obo. Mike, 484-0987. Matches set of teardrop-shaped blue topaz in 14k gold basket settings, 6.61 carat pendant & 8.13 carat combined wt pierced earrings, \$600.

Tim, x35824 or 992-4360. Savage rifle model #840, 30-30 cal bolt action, \$125; Westerfield 12 gauge pump shot-gun, \$175; Winchester model #1400 semi-auto

12 gauge shot gun, \$275. Jim, 991-0533. Day-timers planner w/zipper notebook, 8.5 x 11 sz, desk paper punch, notebook paper punch, fillers thru Sept '95, \$75; telephone

Rope bracelet, 14k diamond cut, 7" long, 3 mm wide, \$70; 14k twist knot earrings, \$40. Eric, x31917.

answering machine \$25, Eric, 482-3662.

Stationary bike, Aerobic Poynte 25c Bollinger. 446-1584. Adult handicap three wheel lark, new battery w/battery charger, new \$1.8k sell \$800/neg.

Lorene/Mickey, 244-9802 or 489-8069. Exercise equipment, rowing machine, \$95; stair climber, \$365. 328-3840.

Ladies silver fox fur jacket, ex cond, \$300. Linda, 484-0987. Fisher Price sandbox, red/yellow/blue, lid, good cond, \$20, 992-1768

Wieder wt bench w/stair stepper, \$150/obo; men's Huffy mt bike, 10 spd, \$100/obo; Nissan bedliner, \$40; blk poly 2 compartment tool box for PU, \$50/obo; oak entertainment center, \$35/obo. 244-6121 or 331-3963.

Artist aluminum easel, \$75; autograph AG 100 projector, \$120; north light w/stand, \$45; electric flush stapler, \$25. x30446 or 338-2625. Child's Scooter w/hand brakes winte white

tires, \$25; steel belted radial tire P205/75R15 w/wheel, mounted, \$55. 488-2283. Aquirium, 200 gal, salt-water ready, coral, pwr

heads, Ehim & many accessories, \$600/obo. Mark, x39419 or 335-0112. '88 Carmaro car bra, \$60; car cover w/alarm,

\$80; 4-Kenwood front & rear car speakers, 2-4x6 & 2-6x9, \$100. Maria, x39425 or 485-9532. Sears Lifestyler 2808 treadmill, 1,25 hp, 8 mph, auto inclune, new \$450 sell \$300/obo.

Madame Aleander dolls, Gone wthe the Wind/Scarlet 14"; Elise bride 16", w/original boxes/obo, 337-5392.

Tektronix scopes, Classic 531 in ex cond, CA, B, & 53/54 G Preamps, scope cart, 5103N stroage scope, \$300/all. 479-3297.

Michelle, x31109 or 474-7263.

ex cond, wood grain siding. Granny, 334-4485. '86 Mercury Cougar, red, \$1.2k. 998-1280.
'92 Mazda Miata MX-5, red/blk, B-pkg, 24k

or 480-8335. '83 Cadillac Sedan deVille, power, dark blue

auto, maroon, \$3.5k/obo. 707-1710.

'87 Chevy S-10 Blazer, 4 spd, std, 100k mi,

'88 Chevrolet Celebrity, V6, A/C, ex cond.

'85 Saburu wagon, 5 spd, A/C, 133k mi, good cond, \$800. 244-0250. '91 Toyota Camry, blk, 5 spd, tinted windows,

'79 Alfa Romeo Spyder Veloce, 90k mi,

'88 Chevy Suburban Silverado, loaded, 1 '85 Porsche 944, black, 5 spd, sunroof, A/C,

'85 Nissan Sentra, 5 spd, A/C, 2 dr, silver/gray, 140k mi, \$1.5k/obo. 332-2571. 75 F-350 Ford truck, \$500/obo. 338-9962.

900 Turbo, 79k mi, both well cared for. Dennis,

785 Honda Interceptor 500, ex cond, garage

'85 Glouster 20', sailboat w/trailer, sails & '91

Sportsman trailer, \$2.2k/obo. 334-4361.

board, 3.5 diskdrive, printer, desk, \$200. x33187

Four-track Midi sequencer, \$65. P. Quinn,

pad manuals, Word 4.0, Excel 2.2, dBase Mac, Mac Bible, \$550. 480-6262 or 486-4455.

Magdi Yassa, 333-4760 or 486-0788. 335-2968.

Photographic

all/obo. x31694 or 481-8561.

Lowrey electric piano w/bench & lots of music

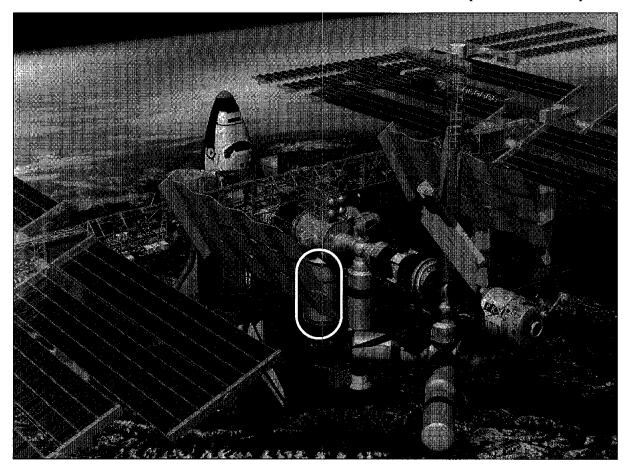
chrome body, ex cond, \$85. 488-2283. Lost & Found

Cargo student desk w/hutch & char, \$375. Bill, x36650 or 554-6242.

Broyhill Queen Anne dining table, pad & 6

Samsung 13" color TV/VCR combo with remote, ex cond, \$200/obo. 480-5906.

King sz bed, frame, mattress, mattress pad, box springs, bedding, \$500. Dave, 532-2101. Waterford, balloon wine/fruit, Corina pattern, a



The Night before Trivia

1. What is the purpose of the International Space Station module circled?

was the night before deadline and all through Bldg. 2, Not a brain cell was

stirring, there was nothing new.
The nooses were hung outside

the Roundup office with care, In the hopes that the editor soon would be there.

He made new writers take over this task,

Without benefit of food, or even a flask.

We pulled all the files; we opened the drawer.

There had to be more trivia from NASA lore.

On the information highway we crashed and we burned,

How much more trivia can one person learn?

On Windows, On Word, On Quark and MS Mail,

This is our only chance, we'd better not fail.

The deadline passed, the writing was done;

So read through and answer, we hope you have fun.

See pictures for questions 1, 79, 80 and 81.

- 2. Which planet has the widest range of surface temperature?
- 3. How many American candidates will be in the astronaut class of 1995?
 - 4. What does CEOSH stand for?
- 5. When is the next full moon?
- 6. Who was the oldest astronaut at flight time to go into space?
- 7. What was the name of the first bug in space?

- 8. What city was the birthplace to the most current astronauts?
- 9. Which mission featured the first live TV coverage of a spacecraft returning to Earth (including parachute descent)?
- 10. How big is the Vehicle Assembly Bldg. at KSC?
- 11. How many women have flown on the shuttle? (Bonus: How many flights have they flown on?)
- 12. What is the origin of the word "rocket"?
- 13. Who wrote Suddenly Tomorrow Came?
- 14. JSC accountants can be found in Bldg. T-585 in FMD. What does FMD stand for?
- 15. Who became the 200th person in space?
- 16. Who are the flown astronauts whose last names have only three letters?
- 17. Which unapproved spacecraft name was used by Capcom over the air to ground communication loop?
- 18. What astronaut has his own echo?
- 19. What was the first highschool student experiment sent into space on board a shuttle?
- 20. Who is JSC's Executive Assistant?
- 21. Who was the first flown "hog" in space?
- 22. Who was the real pilot for the crash sequence in the opening of the Six Million Dollar Man television series?
 - 23. What is the largest known

volcano in the solar system?

24. Besides the Eagle what other aircraft went to the Moon with Neil Armstrong and Buzz Aldrin?

25. In which state was Dr. Carolyn Huntoon born?

26. What are the three branches of JSC's Public Affairs Office?

27. Which astronaut spent two weeks on a game show?

28. When was the last snowfall at JSC?

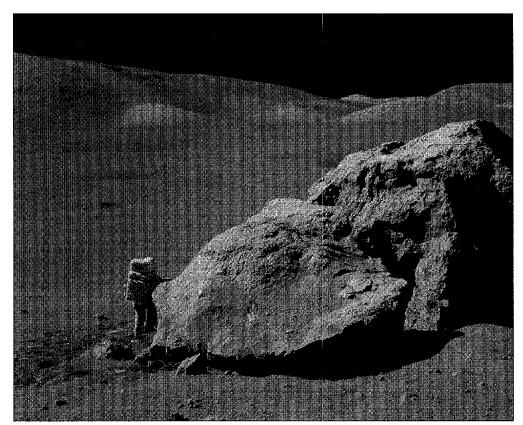
29. Which mission transmitted the first color photographs of the Earth?

- 30. Who is the only flown astronaut who was born in Cameroon, Africa?
- 31. Which mission marked the first use of Mission Control Center?
- 32. Who was Marilyn J. Bockting? 33. Who is ultimately responsible for your safety?
- 34. What Hollywood stars were invited to the roll out of the orbiter used for approach and landing test?
- 35. What was the name of the orbiter?
- 36. What does LDR stand for?
- 37. How long has there been a SNR? Where was the first one published?
- 38. How many American spacecraft have visited Saturn? What are their names?
- 39. Name two members of Congress who have buildings named after them at JSC?
- 40. What is the nickname for the vibration lab in Bldg. 49?
- 41. In the cult classic "Santa Claus Conquers the Martians" what is the name of the NASA rocket

development engineer that helps save the day?

- 42. What is Standard Form number 63?
- 43. Flags for three Baltic nations which the U. S. did not recognize as part of the Soviet Union were flown during the Apollo era. Name the nations.
- 44. What is Pluto's atmosphere made of?
- 45. Astronaut word play. Who would you find on the beach?
- 46. What was the name of the recovery ship for Apollo 10?
- 47. Where is the manned maneuvering unit (MMU)?
- 48. Where was the WETF located prior to Bldg. 29?
- 49. What does the Safety Office consider a "close call"?
- 50. Who is the head of Technology Transfer at JSC?
- 51. What is an EMU?
- 52. How many EMUs are stored on the orbiter for flight?
- 53. How many moons does Uranus have?
- 54. How much was Alan Shepard paid for being the first American in space?
- 55. What is the name of the NASA television satellite?
- 56. Who's name and number is listed on the first level SNR's telephone call processing tree?
- 57. What building houses the Space Lab Trainers?
- 58. What does the acronym ETA stand for?

- 59. What is its purpose?
- 60. Where is the ETA located?
- 61. Which astronaut went on to manage the New Orleans Saints?
- 62. What probe visited Pluto?
- 63. How many contractor abbreviations are listed on page ten in the 1994 JSC phone book?
- 64. What building was built for only a single purpose?
- 65. What were the first women astronaut candidates called?
- 66. What year did NASA first start testing women to become astronauts?
- 67. What was the name of the first satellite the U.S. attempted to launch?
- 68. What sort of airplane was modified to become The "Super Guppy?"
- 69. How many U.S. flags were planted on the moon?70. What organization can be
- found at mail code ZS8?
 71. What date is STS-63 sched-
- uled to be launched from Florida? 72. What four moons of Jupiter are known as the Galilean satellites?
- 73. What country will Norm Thagard be launched from next?
- 74. What is the real name of the technical library in Bldg. 45?
- 75. How much propellant was consumed per second by the Saturn V rocket engines?
- 76. Why is it likely that you would talk like Mickey Mouse on Jupiter, Saturn, Neptune, and Uranus?
- 77. What is the ARRPCS? 78. What is it used for?



79. What changes did Alan Bean make when he painted this lunar rock?



80. From what vantage point was this picture taken? 81. What terrain is visible?

Program to study plants' perception of environment

A joint government research program may result in the development of plants that can withstand drought, unseasonable temperatures, salinity in the soil, and other adverse growth conditions.

Supported by NASA and the National Science Foundation, this collaborative program, called the Research Network on Plant Sensory Systems, will foster interactions among scientists that will increase human understanding of how plants sense and respond to various environmental signals, such as light, temperature and gravity.

The program includes the award-

ing of nine science grants totaling more than \$5 million over five years. The program also was selected as NASA's ninth Specialized Center of Research and Training, continuing a program dedicated to space life sciences begun in 1990.

Plants are vital to the existence of humans. From providing oxygen to breathe, to foods for meals, plants are a renewable resource upon which human existence depends.

The results of the research supported by this joint program will contribute to the long-term health of the environment and humans.

Plants, unlike animals, have not

developed specific organs that see, hear, and feel various environmental stimuli. They can not move to avoid adverse environmental conditions. Yet, plants respond to various environmental stimuli and survive significant fluctuations in environmental conditions. Many plant species have evolved to take advantage of the specific environments in which they live.

In extremely harsh seasonal conditions, some plants are able to shut down certain functions and preserve only the bare minimum set of functions required to survive until more suitable growing conditions exist. There also are some indications

that common mechanisms might be operating in plants' perception of and response to different environmental signals.

How plants perceive and respond to the environmental signals is one of the major unanswered questions in biological sciences. Recent advances in biotechnology provide scientists an unprecedented opportunity to find answers to this longstanding question.

The nine research projects awarded grants were selected based on their scientific excellence from 35 applicants. All nine projects will focus on the question of how plants perceive environmental signals and how those signals bring about growth and development of plants. An additional objective of the grants is to enhance opportunities for university students to receive research training in multidisciplinary and collaborative activities.

Awards under this program are exclusively for ground-based research. If research requires a microgravity environment for concept verification it will be considered for flight opportunities by the Office of Life and Microgravity Sciences and Applications at a later date on a competitive basis.

Images of an evolving universe

(Continued from Page 1)

explosive bursts of star formation, galaxy collisions, and other interactions that ultimately created and then destroyed many spiral galaxies that inhabited rich clusters.

The astronomical equivalent of digging through geologic strata on Earth, Hubble can peer across a large volume of the observable universe and resolve thousands of galaxies from five to twelve billion light-years away. Because their light has taken billions of years to cross the expanding universe, these distant galaxies are "fossil evidence," encoded in starlight, of events that happened long ago.

Ground-based observations have not been able to establish which of several competing theories best describe how galaxies formed and evolved in the early universe. Though the largest ground-based telescopes can detect objects at great distances, only Hubble can reveal the shapes of these remote objects by resolving structures a fraction of the size of our Milky Way Galaxy. This capability allows astronomers for the first time to discriminate among various types of distant galaxies and trace their evolution.

"Our goal now is to look back further than twelve billion years to see what we are sure will be even more dramatic evidence of galaxies in formation," Dressler said.



Lockheed employees check out the prototypes of the solar arrays sent to Russia in November and December.

Panels support joint efforts

Solar panel modules destined to augment existing power supplies on Russia's Mir space station are in Russia, marking the first delivery of U.S. space station flight hardware in support of joint U.S./ Russia space efforts.

The hardware shipments each consisted of 45 solar panel modules developed for the Mir cooperative solar array project, an effort that brings together NASA's advanced photovoltaic technology with Russia's proven structures and mechanisms.

The program objective is to augment Mir's power by replacing an existing degraded array with the new, jointly-developed array. The power from the new array, and a second all-Russian array, is needed to extend the lifetime of the Mir and support experiments conducted at the station by U.S. astronauts.

Each panel module consists of 80 solar cells. One panel measures approximately 51 inches long by 17 inches wide, and is capable of generating about 80

Eighty-four of the modules will be integrated with Russian-made frames in 42 hinged pairs. After the modules are installed in the frames, the completed array will be shipped back to the U.S. to be readied for launch. The complete six kilowatt joint array will be taken to the Mir Space Station during STS-74, scheduled for flight in

New MCC is world's largest fiber network

(Continued from Page 1)

rent mission control must be done on a circuit board by circuit board basis. For that maintenance, specialists who know the old equipment in such circuit by circuit detail are always on hand because similar equipment was long ago purged from the commercial

The new MCC uses workstations interconnected via a local area network, doing away with the older mainframe approach and bringing it in line with the systems most commonly in use today. Manufacturers can maintain the equipment on a modular basis, pulling out and replacing entire workstations rather than intricate parts, a change that will reduce the maintenance personnel required for mission control by about 180 positions as the current control center is phased out.

In part, the greater capability and lower costs of the new MCC are benefits gained by NASA from an industry the space program helped create.

"In the 1960s, as late as 1963, 90 percent of all of the electronic chips, computer chips, in the U.S. were bought by NASA and the Air Force," Muratore explained. "The industries supporting NASA at that time went on to use that technology to revolutionize consumer electronic products. By using more easily maintained and more capable commercially available equipment in the new MCC, we are reaping a harvest from seeds planted by NASA in the Apollo era."

In the new MCC, a total of 197

workstations can be used to control both the space shuttle in flight and the International Space Station to be launched in 1997. Currently, 204 workstations are required for shuttle flight operations alone. The number of equipment racks needed in the new MCC is half the amount in the current mission control. The networks in the new MCC are linked by 125,000 feet of fiber optic cable, making it the world's largest fiber data distributed interface network.

The majority of software packages used in the new MCC are standard, commercially available products as well. Only a "thin layer" of software that is inherently required to accomplish tasks unique to shuttle flight control has been developed by NASA. The software also makes use of intelligent systems to assist flight controllers in monitoring the health of the shuttle, although the flight controllers themselves are, as always, the primary mechanism for detection of malfunctions and attempts to resolve them.

Although the setting and tools are changing, the philosophy, discipline and the flight control positions themselves remain the same.

"The original mission control was a technological wonder of the world when it was built. Nothing like it had ever existed before. It was the first of its kind," Muratore said. "The new mission control is a wonder in the way we are applying technologies to a difficult and complex job. It is the

Answers to the annual NASA Trivia Challenge

(Continued from Page 3)

1. It is the only habitation module for the station. Russians will be able to reside in the old Mir. module, but current plans are for all astronauts to be housed together in the U.S.-built habitation module.

2. Mercury ranges from 467° Celsius to -183° Celsius.

3. Nineteen.

4. Center of Excellence for Occupational Safety and Health.

5. Never. Apollo astronauts brought back 842 pounds of rock during their missions. The last full moon was July 21, 1969

6. Vance Brand on STS-38 in 1990. He was 59 at flight time.

7. Arabella, the spider on Skylab 3.

8. Seven astronauts were born in Cleveland, Ohio. Ken Cameron, Gregory Harbaugh, David Low, Ronald Sega, Donald Thomas, Carl Walz and Mary Ellen Weber.

9. Apollo 9 on March 13, 1969. 10. The Vehicle Assembly Bldg, is the second largest building (by volume) in the world. The United Nations Secretariat Bldg. could fit though its door. There is room on the roof for the Astrodome and most of its parking lot. and room inside for three Empire

State Buildings 11. There are 22 women who flew on 43 flights.

12. The 14th century Italian historian Muratori (no relation to

John Muratore) used the word rocchetta, referring to an implement used in spinning thread, to describe the shape of the weapons introduced by the Arabs.

Henry C. Dethloff. 14. Financial Management

15. Steve Smith on STS-68. 16. Mark Lee, G. David Low, and

17. As Gemini 3 launched, Gordon Cooper said, "You're on your way, Molly Brown," confirming a name that was not supposed to be

18. Richard Richards.

19. Eighteen-year-old Todd Nelson of Rose Creek, Minn., devised an experiment to check the effects of weightlessness on insect flight. Dozens of moths, houseflies, and honeybees were orbited on STS-3

20. Susan Garman.

21. Mark Garneau on STS-41G.

22. Bruce Peterson, NASA test pilot. He was injured in May 1967 in a crash which became the opening sequence of the television show. He did not acquire superhuman capabilities from bionics

23. Olympus Mons on Mars, is three times higher than Mt. Everest and covers an area the size of

24. The Lunar module for Apollo 11 carried a piece of the fabric and propeller of the Wright Brothers first plane which flew at Kitty Hawk.

25. Louisiana.

26. News and Media Services, Education and Information Services

27. John Glenn was on Name That Tune in 1957

28. February 1, 1994. 29. Apollo 10, May 1969.

Patrick Baudry on STS-51G.

31. Gemini 4.

32. Marilyn Bockting started as a secretary in 1963. She was promoted to Administrative Officer before she retired in 1979. The award was named after her due to her advocacy in professional secretarial devel-

33. You, according to CEOSH (see question 3)

34. The cast from the original Star Trek series.

35. Enterprise.

36. Labor Distribution Record.

37. The first issue was published in 1961 at Langley Research Center.

38. Three: Pioneer 11 (1979),

Voyager 1 (1980), Voyager 2 (1981). 39. Jake Garn and Olin Teague. 40. Shake and Break

41. Wehrner von Green 42. Memorandum of Call (stan-

dard phone message notes) 43. Latvia, Lithuania, and Estonia.

44. Methane, 45. Robert Cabana,

USS Princeton. 47. In storage

48. Bldg. 260, it consisted of a large tank.

49. It is when an accident hap-

pens or could happen but no one gets hurt.

50. Hank Davis

Extra-vehicular mobility unit.

52. Two, unless there is a scheduled EVA, then it's three

53. Fifteen, 10 of which were discovered by Voyager 2

54. Flight pay for the 15 minute trip came to \$14.38.

55. GTE spacenet 2. 56. Associate editor Karen Schmidt at x38784

57. Bldg. 36.

58. Environmental Test Article.

59. The ETA is an altitude chamber used to test many of the environmental systems on the orbiter prior to flight. It is now used to train the astronauts in EVA activities.

60. Bldg. 7.

61. Dick Gordon.

62. No probe has visited Pluto.

63. Eighty

64. Bldg. 46 houses the Cray computer. 65. First Lady Astronaut Trainees

(FLATS).

66. 1959, the project was kept secret for three years, then dropped 67. Vanguard, Dec. 6 1957, it

68. It was a Boeing Stratocruiser. 69. Six, one from each Apollo mis-

70. Space Flight Meteorology Group 71. February 2, unless you're in

blew up on the launch pad.

Houston, Launch is scheduled for 11:51 p.m. JSC time Feb. 1

72. Europa, Io, Ganymede.

Callisto.

73. Kazakhstan. 74. The JSC Scientific and Technical Information Center.

75. Three tons per second. The atmosphere is largely

composed of helium. 77. Atmospheric Repressurization Revitalization

Pressure Control System. 78. The ARRPCS provides breathing air to the astronauts in flight and it maintains cabin pressure and monitors carbon

monoxide. 79. Bean painted the name of Gene Cernan's daughter, Tracy, in the dust next to the area from which Cernan took samples during the Apollo 17 mission. Bean made the addition to his 1984 painting entitled "Tracy's

Boulder" after Cernan expressed regret for not having written her name in the dust when he was

80. The view looks toward Earth from inside the International Space Station cupola.

81. The Great Lakes region of North America.

Editor's note: The assistance of the Public Affairs Office staff and the External Affairs Librarian, Information Services in compiling this year's Trivia Challenge is gratefully acknowledged.