



Space News Roundup

Vol. 31

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No. 48

Season's Greetings

*T*wenty years ago tomorrow, Johnson Space Center workers watched as the Apollo 17 capsule splashed down in the Pacific Ocean, ending what might be called the first "great era" of America's human space program.

This year, we completed an important milestone in the second great era — which on numerous occasions has married the human and robotic space flight programs — passing the 50th flight of the reusable space shuttle. Among the eight shuttle flights of 1992 was the historic maiden voyage of *Endeavour*, which renewed the faith of millions of Americans in NASA's "can-do" spirit and tenacity and indelibly etched in their minds a picture of three space-suited astronauts hand carrying a crippled satellite in *Endeavour*'s payload bay.

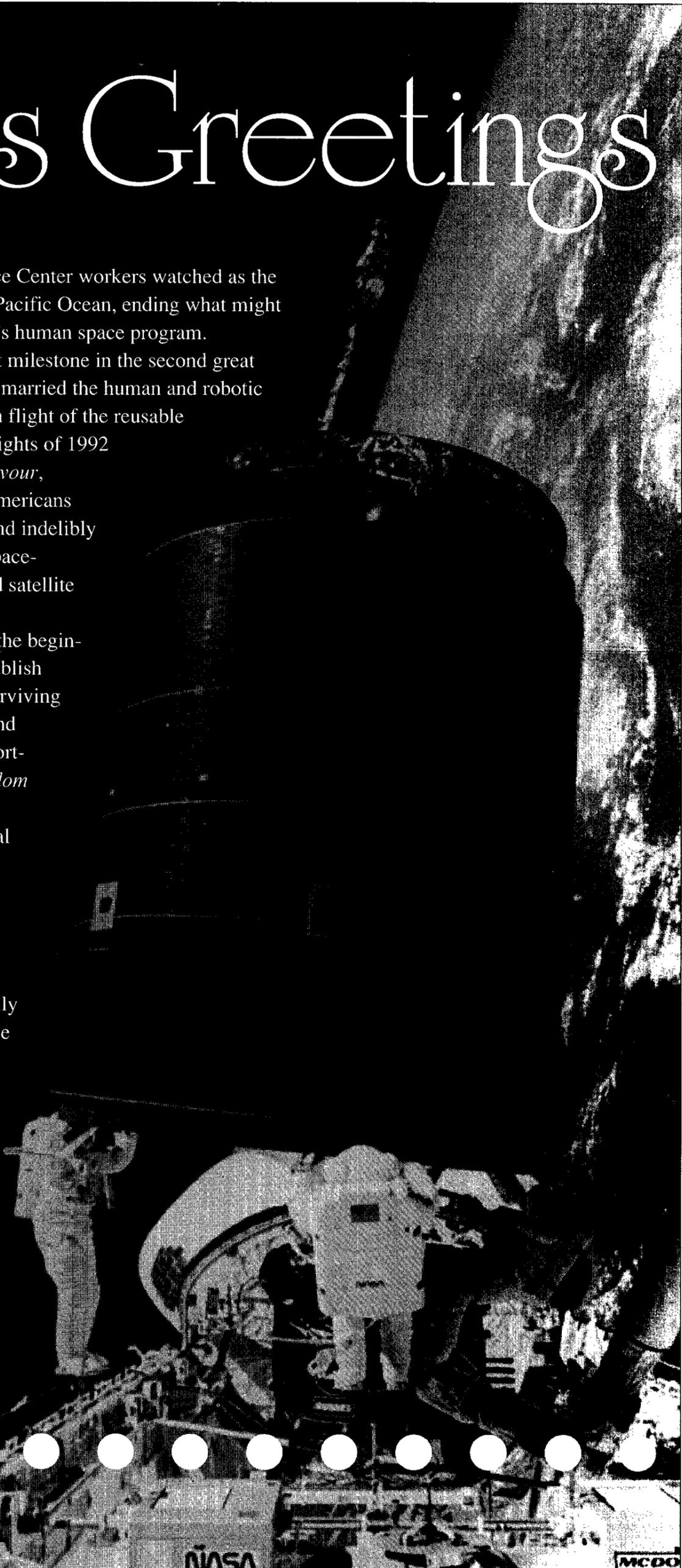
We also passed crucial milestones in the beginning of the next great era, which will establish a permanent human presence in space, surviving the latest budget battle over its funding and completing work on much of JSC's supporting infrastructure for Space Station *Freedom* training and operations.

In the coming year, we face a very real challenge of giving equal attention to safe, successful shuttle operations and to completing the design, building the hardware and developing the operating procedures for *Freedom*.

It won't be easy, but then nothing really worthwhile is. I'm sure that if we continue the great team effort that has gotten us where we are today, we can do it and do it well.

I'm glad to be back with you in Houston for the holidays and wish you and your families a happy season and a wonderful new year.

Aaron Cohen



JSC

Ticket Window

The following discount tickets are available for purchase in the Bldg. 11 Exchange Gift Store from 10 a.m.-2 p.m. weekdays. For more information, call x35350 or x30990.

New Years Eve Dance (Dec. 31, 7 p.m. - 1 a.m., Gilruth Center) — Includes cold cut dinner and entertainment. Tickets \$15 per person on sale until Dec. 29.

Houston Livestock Show and Rodeo Carnival Ride Tickets — Forty ticket sheet available for \$12, half price. Order tickets until Feb. 1. Tickets available for pick up in mid-January.

Space Center Houston — Discount tickets available: adult, \$7.50; child (3-11) \$4.50.

Metro tickets — Passes, books and single tickets available.

Movie discounts — General Cinema, \$4; AMC Theater, \$3.75; Loews Theater, \$4.

Entertainment '93 and Gold C coupon books, stamps, Walt Disney Club memberships also available.

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Gilruth Center News

The Gilruth Center will be closed Dec. 25-26 and Jan. 1-2 for the Christmas and New Years holidays.

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

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

Defensive driving — Course is offered from 8 a.m.-5 p.m. Jan. 9. Cost is \$19.

Weight Safety — Required course for employees wishing to use the Gilruth weight room is offered from 8-9:30 p.m. Jan. 6. Pre-registration is required; cost is \$5.

Aerobics — High/low-impact classes meet from 5:15-6:15 p.m. Tuesdays and Thursdays. Cost is \$32 for eight weeks.

Exercise — Low-impact class meets from 5:15-6:15 p.m. Tuesdays and Thursdays. Cost is \$24.

Bench aerobics — Class meets from 5:15-6:15 p.m. Mondays and Wednesdays. Cost is \$32 for eight weeks; participants must provide their own benches.

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

Country and western dance — Beginning class will meet from 7-8:30 p.m. Mondays beginning Jan. 4. Intermediate classes will meet from 8:30-10 p.m. Mondays. Cost is \$20 per couple.

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

Intercenter Run Shirts have arrived and are available at Gilruth.

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Dates & Data

Today

Cafeteria menu — Special: fried chicken. Entrees: fried shrimp, baked fish, beef stroganoff. Soup: seafood gumbo. Vegetables: okra and tomatoes, buttered broccoli, carrots in cream sauce.

Monday

Cafeteria menu — Special: meat sauce and spaghetti. Entrees: franks and sauerkraut, sweet and sour pork chop with fried rice, potato baked chicken. Soup: cream of potato. Vegetables: French beans, buttered squash, lima beans.

Tuesday

BEPC caroling — The Black Employment Program Council is hosting a Christmas caroling event for patients at St. John's Hospital Dec. 22. A rehearsal is set for 11:30 a.m. to 12:30 p.m. Dec. 21 at the Gilruth Center, Room 206. All those interested in participating are welcome. For more information, contact T. Martin at x34502 or Norfleet Williams at 282-3669.

Cafeteria menu — Special: smothered steak with dressing. Entrees: beef stew, liver and onions, shrimp Creole. Soup: navy bean. Vegetables: buttered corn, rice, cabbage, peas.

Wednesday

Astronomy Seminar — JSC Astronomy seminars will host an open discussion luncheon meeting from noon to 1 p.m. Dec. 23 in Bldg. 31, Room 129. For more information, contact Al Jackson at 333-7679.

Cafeteria menu — Special: salmon croquette. Entrees: roast beef, baked perch, chicken pan pie.

Soup: seafood gumbo. Vegetables: mustard greens, Italian green beans, sliced beets.

Thursday

Cafeteria menu — Special: stuffed cabbage. Entrees: beef tacos, ham and lima beans. Soup: beef and barley. Vegetables: ranch beans, Brussels sprouts, cream style corn.

Dec. 25

Most JSC offices will be closed for the Christmas holiday.

Dec. 28

Cafeteria menu — Special: hamburger steak. Entrees: beef Burgundy over noodles, fried chicken. Soup: cream of chicken. Vegetables: buttered corn, carrots, green beans.

Dec. 29

Cafeteria menu — Special: turkey and dressing. Entrees: baked meatloaf, liver and onions, barbecue spare ribs. Soup: beef noodles. Vegetables: Spanish rice, broccoli, buttered squash.

Dec. 30

Astronomy Seminar — JSC Astronomy seminars will host an open discussion luncheon meeting from noon to 1 p.m. Dec. 30 in Bldg. 31, Room 129. For more information, contact Al Jackson at 333-7679.

Cafeteria menu — Special: Spanish macaroni. Entrees: broiled fish, tamales with chili. Soup: seafood gumbo. Vegetables: ranch beans, beets, parsley potatoes.

Dec. 31

Cafeteria menu — Special: chicken fried steak. Entrees: beef pot

roast, shrimp chop suey, pork chops. Soup: navy bean soup. Vegetables: carrots, cabbage, green beans.

Jan. 1

Most JSC offices will be closed for the New Year's Day holiday.

Jan. 3

Cafeteria menu — Special: tuna and noodle casserole. Entrees: broiled codfish, fried shrimp, baked ham. Soup: seafood gumbo. Vegetables: corn, turnip greens, stewed tomatoes.

Jan. 4

Cafeteria menu — Special: meatballs and spaghetti. Entrees: wieners and beans, round steak with hash browns. Soup: chicken noodle. Vegetables: okra and tomatoes, carrots, whipped potatoes.

Jan. 5

Cafeteria menu — Special: fried chicken. Entrees: beef stew, shrimp Creole, sweet and sour pork chop with fried rice. Soup: beef and barley. Vegetables: stewed tomatoes, mixed vegetables, broccoli.

Jan. 6

Cafeteria menu — Special: Swiss steak. Entrees: fried perch, New England dinner. Soup: seafood gumbo. Vegetables: Italian green beans, cabbage, carrots.

Jan. 7

Cafeteria menu — Special: stuffed bell pepper. Entrees: turkey and dressing, enchiladas with chili, wieners and baked beans. Soup: cream of chicken. Vegetables: zucchini squash, English peas, rice.

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. Ads may be run only once. Send ads to Roundup Swap Shop, Code AP3, or deliver them to the deposit box outside Rm. 147 in Bldg. 2. No phone or fax ads accepted.

Property

Sale: 2-story, 4-2 house, detached garage, needs lots of repairs, \$25K. 286-7404.

Sale: Univ Green, patio home, 3-2-2, 1800 sq ft, lg lot, Home-Shield insurance, new carpet, cathedral ceiling, FPL, \$96.5K. Huey, x38495 or 480-9544.

Sale: Clear Creek Village, 4-2-5-2D, 2500+ sq ft, formals, den, wetbar, exercise/game-room, \$113.9K. 326-4464.

Lease: El Dorado Trace, lg 1 BR, all appl, incl W/D, FPL, 2 balconies, \$425/mo + dep., no pets. Karen, x45530 or 488-0056.

Lease: South Bend/San Jac College, 3-2-2, formal dining, FPL, fenced, no pets, gas util, \$695/mo. 482-6609.

Lease: Pipers Meadow, 3-2-2, carpets, drapes, FPL, fenced, built ins, \$825. 538-3352.

Sale: Clear Lake Shores, 3-2-3, new ext/int work, FPL, fenced, trees, 900 sq ft garage, boatslip, low \$120's. 538-1849.

Sale: Heritage Park, 3-2-2A, fenced, new paint, carpet, tile, miniblinds, cul-de-sac, \$61.5K. 326-5216.

Rent/Sale: 2-2 condo, W/D, furn or unfurn. Kathy, 532-4628.

Sale: Wooded lot, 90' x 135' near Taylor Lake, can finance, \$45K. Don, x38039 or 333-1751.

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

Sale/Lease: LC, Countryside, 4-2-2, fenced, cul-de-sac, cov deck, \$775/mo, no pets or \$69.9K assumable FHA. x38843 or 332-6153.

Sale: Dickinson, 4-3-2D, study, game rm, screened porch, lg kit w/Jennaire kit, new ceramic tile, util rm, trees, \$129.9K. Coy, x39282 or 335-0641.

Cars & Trucks

'84 Nissan Sentra XE, 4 DR, auto, AC, AM/FM/cass, ex cond., \$2750. 996-0152.

'85 CJ-7 Laredo, \$5.9K; 4 motorcycle helmets, best offer; desk w/bookcase, \$85. 474-4742.

'65 Jaguar Mark 10, saloon, 4.2L straight 6, AC, no rust, auto, \$6K. 862-1199.

'86 5 4 x 4 King Cab Nissan PU, AM/FM/cass, blk, ex cond, \$6.5K; '59 Chevy PU for parts or restoration. 334-2335.

'86 Toyota MR2, 5 spd, alum alloys, ex cond, 61K mi, wht, \$4.9K. 480-3881.

'71 Camaro SS, orig motor/trans, \$4K. Mike, 334-4397 or Dera, x34984.

'78 Porsche 928, brwn w/leather int, auto, ex cond, 75K mi, \$8.5K OBO. Bill, x39980.

'86 Toyota MR2, new clutch, tires, AC, AM/FM/cass, sunroof, 5 spd, pwr windows/locks, needs eng, \$2.8K. 280-8822.

'85.5 Porsche 944, 5 spd, AM/FM/cass, AC, sunroof, tint, alarm, new tires, 74K mi, ex cond, \$8.1K. 480-4833.

'79 Fiat Spider, good cond, \$2250. 283-6532 or 486-0581.

Ford C-6 auto transmission, recently removed from 429 CJ, works well, \$100. Don, 855-1510.

'82 Ford F150 PU, bedliner, new int, 6 cyl 300 eng, w/3 spd/OD trans, \$2.5K. Bobby, 534-2668.

'87 Honda Accord LX, blue, 5 spd, AC, cruise, tilt, elec sunroof, one owner, good cond, \$4K OBO. Gloria, x31891 or 538-2283.

'85 Lincoln Town Car, ex cond, 75K orig mi, 282-4849 or 409-925-7839.

'85 Ford Van, new paint, captains chairs, auto, ex cond. 472-6323.

'84 Nissan 300ZX, 5 spd, dk gray, t-tops, all main records, ex cond, 94K mi, \$5.5K OBO. Nelson, 282-5229 or 334-1008.

'90 Toyota Celica GTS, 5 spd, loaded, one owner, elec sunroof, AM/FM/cass/CD, 10 spkr stereo, 35K mi, \$13K OBO. Lisa Biehl, 479-9702.

'78 Chevy Silverado PU, 454, 400 AT, PS/PB, AC, camper shell, 171K mi, \$1.5K. Mark, x38013 or 992-4132.

'48 Crosley w/handbuilt body, body good, eng not running, appraisal and pics avail, \$1.8K. 333-3254.

'78 Volvo 264 GL, 6 cyl, auto, under 100K mi, one owner, new tires, brakes, electrical, seat covers, runs good, \$1.8K. Gary, 283-5781 or 480-9716.

'91 Honda Prelude SI, 5 spd, AC, cruise, elec sunroof, PS/PW/PM, tilt, tint, spoiler, AM/FM/cass, alarm, alum wheels, 11K mi, one owner, \$14K. 282-4303 or 998-8821.

'77 MG Midget, new tires, new top, new paint, good for parts, \$450 OBO. Brian, 743-7298 or 534-2358.

Boats & Planes

'16 RMC V-bottom w/galv trlr, '72 model 115 HP Johnson O/B, \$2.5K OBO; '65 model 60 HP Johnson, \$225 OBO. Bobby, 534-2668.

'61 Beeline, 16' all mahogany boat, hull only. 947-2025.

Audovisual & Computers

286 12MHz 2MB no HD or monitor, \$200; 2 SMC ethernet card, 16 bit, \$100/ea. Mike, x37525 or 996-0099.

Logitech Trackman portable serial mouse for IBM PC and compatible portable systems, \$55. Laurie, x35590.

60 MB HD, contr, ex cond, \$65; DOS sw, orig discs & doc; Total Word V1.2, \$25; Publish It, \$15; Quatro Pro V2.0, \$25; Turbocad, \$20; Calendar Creator, \$10; Dr. Dos V6.0, \$20. Charlie, 488-4412.

Cassio CT-615 elec kybd, stand, stool, ac adapter, carrying case, sustain pedal, was, \$300, now \$225. 481-6928.

IBM PC-XT clone, 30 MB HD, 5.25" FD, 640K, DOS 3.30, 2400 baud int modem w/sw, monitor, printer, game port, \$400 OBO. x30712 or 992-3849.

Turbo Graphics 16 game system plus three games, \$85. Greg, 554-6200.

Pets & Livestock

AKC male Rottweiler, 2.5 yr old, \$200. Sean, 283-9323.

Mini-lop and fuzzy lop rabbits, Gailo, 554-6200.

AKC Boxer pups, weaned by Christmas, gentle, \$250. 922-7045 or 474-2660.

AKC Golden Retriever pups born 11-17, 5 males, 3 females, dew claws removed, shots, hips certified, \$225/ea. Mike, x33030 or 338-2257.

Young sorrel filly, halter broke, leads well, \$550. 554-6138.

2.5 yr old male Dachsund, AKC reg, \$75. Shirley, 335-1607 or 335-0641.

AKC Labrador pups, mother/father on premises, \$200 negotiable. Karen, x31385 or 947-2025.

Musical Instruments

Ibanez Roadstar II guitar, Peavy stereo chorus amp, misc effects, Wah-volume pedal, \$400. Jeff, x38424 or 331-7166.

Kawai R-50e digital drum machine, midi capable, loaded. Richard x31120 or 998-1280.

Hammon organ, 1946 CV model, 2 tone cabinets, Leslie speakers; Rickenbacher 4001 Bass guitar, 1976 stereo model, ivory body w/rosewood neck; Epiphone Acoustic guitar, solid top, good cond. Troy, 332-6735.

Complete electric guitar setup, Telecaster Copy, includes both a practice amp and a small portable amp, for a beginner, \$350. Kevin, 480-0014.

Classical Yamaha guitar, \$300. 283-5465.

Martin D-12/28 12 string acoustic guitar, \$1K. 992-2306.

Lost/Found

Lost 6 spd Raleigh bike, missing and feared stolen from Mission Control Center. If you see it, call Jon Axford, x37671.

Household

Panasonic 19" color tv w/remote, cable ready, \$150; gravity exercise machine w/boots, \$100; Teac cass deck, \$100; oak stacking tables, \$25. Debbie, x33164 or 480-7429.

Litton microwave oven, 650 W, 0.8 cu ft, \$75. 992-5958 or 335-8539.

Brass and white full sz bed hdbd, 2 wooden twin sz hdbd. 326-2307.

Broyhill cherry dining table, 4 chairs w/matching china cabinet, \$500. Cindy, x39451 or 480-1954.

Twin comforter, bed skirt, pillow shams,

mauve, lavender, seafoam green, offwhite, \$30. Shawn, 472-7526.

Dinette, brass and beveled glass table w/4 multi-pastel uphol brass chairs, ex cond. Fisher, 480-2584.

Full sz GE elec dryer, good cond, \$50; lg refrig freezer, Mont. Wards, good cond, \$125. x37933 or 409-925-1258.

China cabinet, buffet, table/chairs, blue Qn Anne settee, Remington Rand elec typewriter, 282-4849 or 409-925-7839.

Wht wicker chair w/removable rockers, ex cond, \$50. Tom, x36309 or 474-9747.

Full sectional couch w/Qn sz bed and recliners at the ends, \$950, China cabinet, \$350. 487-1419.

Contemporary sofa and matching chair, \$125. Terry, 283-6646 or 554-6631.

Couch/chair, \$300; group marble inlay tables, \$100/ea; stereo/radio record changer, \$75. 488-3588.

Wanted

Want van pool riders from NW Houston to NASA. Wendell, 333-6050 or 466-3203.

Want the loan of a garden tiller for one time use. 332-7167.

Want witnesses to a hit and run incident in the JSC Federal Credit Union parking lot on Thurs, 12-3 between 11:30-11:45 am. A gray '87 Honda Accord LX was hit by a lt colored vehicle, anyone who witnessed this incident, call x30857, leave message if no answer.

Want 55 gallon or higher aquarium. Ernest, 282-2746.

Want old watches, will pay top dollar for Rolex, working or not; want old fountain pens, Parker, Waterman, Carter, Wahl-Eversharp, paying top dollar. 334-3392.

Want cheap work/school car. 486-4700.

Want Payload and Experiment patches/decals from STS-44 Terra Scout; STS-52 Lageos-II; USMP-1, Canex, LBNP, etc. Andrew, 280-0647.

Want roommate to share house in Clear Lake, no pets or smokers, \$300/mo + util, avail Jan 1. Jeff, 335-4320 or 480-1242.

Want photographic copy stand for copy work, with or without lights. Mike, x38169 or 482-8496.

Want shotgun, Rossi Stagecoach, 12 gauge. Larry, 333-6028.

Want Honda lawn mower less than 4 yrs old. Don, x38039 or 333-1751.

Want Nordic Track ski exerciser; baby crib in ex cond. 334-2335.

Miscellaneous

Glass door, sliding patio type, 6' wide, \$75; Levelor miniblinds to fit 25 and 30, solid glass windows 4' x 5'. Charlie, x34754 or 554-7116.

2 cocktail dresses, 1 navy blue, 1 blk, sz 12, \$30; 1 semi formal mauve/lace/taffeta, was \$250, now \$125; 1 mauve quilted coat, \$30. 534-6252.

Ladies sapphire/diamond cluster ring, \$75; wicker picnic basket, \$20/ea; space-maker can opener, 3 spd mixer, waffle

maker. Debbie, x33164 or 480-7429.

Ski package to Breckenridge, CO, includes roundtrip air Houston-Denver, ground transportation, one-week lodging, daily breakfasts, Jan 16-23, 1993, \$750. 992-1552 or 283-5310.

Children's Playschool desk w/chalkboard, top, magnetic board, underneath, good cond, \$15. x35188.

Wht camper shell for Toyota LWB, ex cond, \$75 OBO. Linda, 925-4862 or 480-5132.

Smith-Corona elec typewriter, \$40. 992-5958 or 335-8539.

4' x 18" concrete culverts, 4, \$90; 2 4-way traffic lites, one for parts, one to restore, extra lenses, \$90; front head light for locomotive, \$50; ping pong table, fold up type, all access, \$75; exercise trampoline, 4' dia, \$50. Mike, x34318 or 559-1457.

Elec water heater, \$100; AT&T 6300 computer, \$250; Kenmore elec dryer, \$90; Rickenbacher Bass guitar, \$375; full sz elec dart board, \$400. 339-1957.

55 gal oceanic aquarium w/stand, complete setup, \$275. Vince, 334-2965.

Blue fox coat, ex cond, \$225. 333-7504.

Heirloomed wedding dress w/head piece

Trivia Strikes Back

Long, long ago in a Public Affairs Office far, far away, two Space News Roundup associate editors were forced to produce a Page 3 feature without warning. In desperation, the rebel forces stole ideas from the great trivia masters of the universe and created the mighty SNR Trivia Challenge.

Despite cries of opposition and pleas of mercy from their co-workers, the Roundup editors have continued their search for the strange and bizarre questions from the Humid planet of JSC. This offering, similar to the evil Death Star, has enough questions to destroy an entire afternoon.

May the farce be with you.

The answers are on Page 4, and for those of you who don't want to see the answers until next week — don't look.



1. Name the four ships.

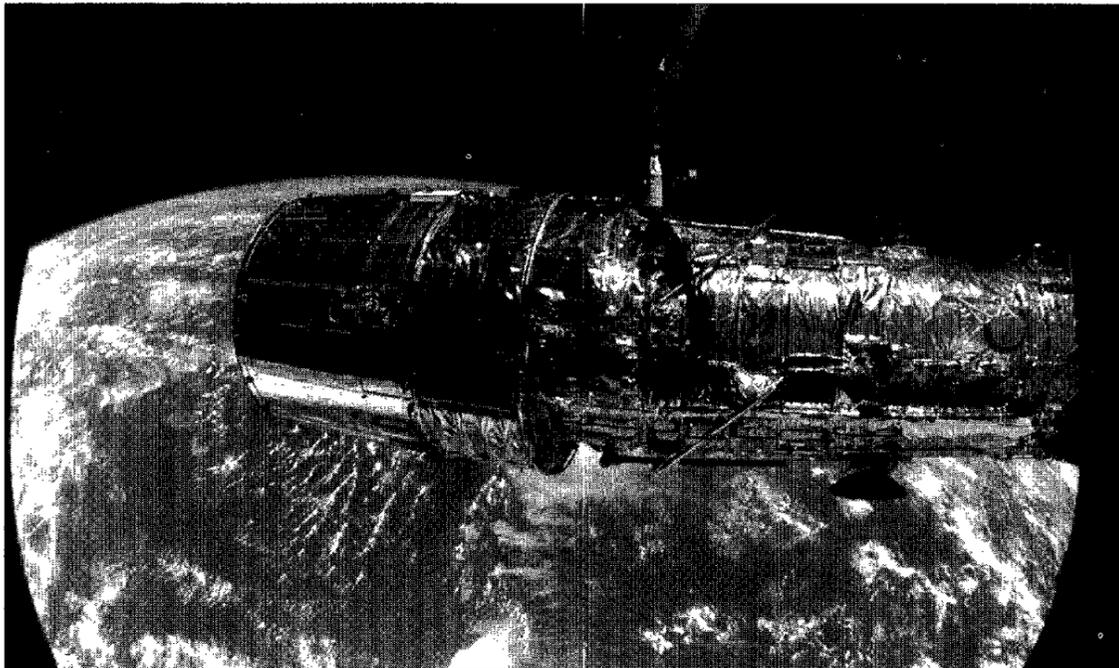
2. What was the first all-rookie shuttle crew?
3. What was the first all-veteran shuttle crew?
4. What does Sputnik mean?
5. Name all the Moon walkers.
6. Counting this year's astronaut candidates, which branch of the armed forces has provided the most current astronauts?
7. How many astronaut candidates are currently in training?
8. At which NASA center did Administrator Daniel Goldin begin his aerospace career?
9. What do Bogalusa, La.; Jacksonville, Fla.; Baton Rouge, La.; Liberty, Texas; Victoria, Texas; and San Francisco, Calif. have in common?
10. What does the simulator at Space Center Houston say when you actually land the shuttle?
11. How many cars make up a Space Center Houston tram?
12. Which ocean did the first American manned orbital spacecraft land in?
13. What did Tom Stafford and Gene Cernan call their Gemini IX rendezvous target, whose aerodynamic shroud got snagged?
14. What is the name the shuttle mockup at Space Center Houston?
15. With the current manifest, who will be the first American woman to fly in space four times?
16. Who will be the first man to fly on the shuttle five times?

17. Counting Daniel Goldin, how many individuals have been NASA administrators? Acting administrators don't count.
18. What did STS-49 Commander Brandenstein tell the Mission Control Center after the successful capture of the Intelsat satellite?
19. What colors are on the canopy of the shuttle drag chute?
20. What four signatures were on the plaque mounted to the leg of the Apollo 11 lunar module?
21. To verify Galileo's premise about equal falling speed for two masses, Dave Scott dropped a hammer and a feather on the moon. What kind of feather?
22. What astronaut has flown with the most number of different individuals?
23. Which president signed Executive Order No. 10849 establishing the NASA seal and meatball?
24. How many foreign payload specialists flew on board space shuttle orbiters in 1992?
25. What countries did they represent?
26. How many rookies made their first space flight in 1992?
27. What is the payload for STS-58?
28. Astronauts Dan Brandenstein and Robert "Hoot" Gibson commanded the space vehicle "Endeavour." Who commanded the space vehicle "Endeavor"?
29. Who was positioned where for the Intelsat satellite grab?

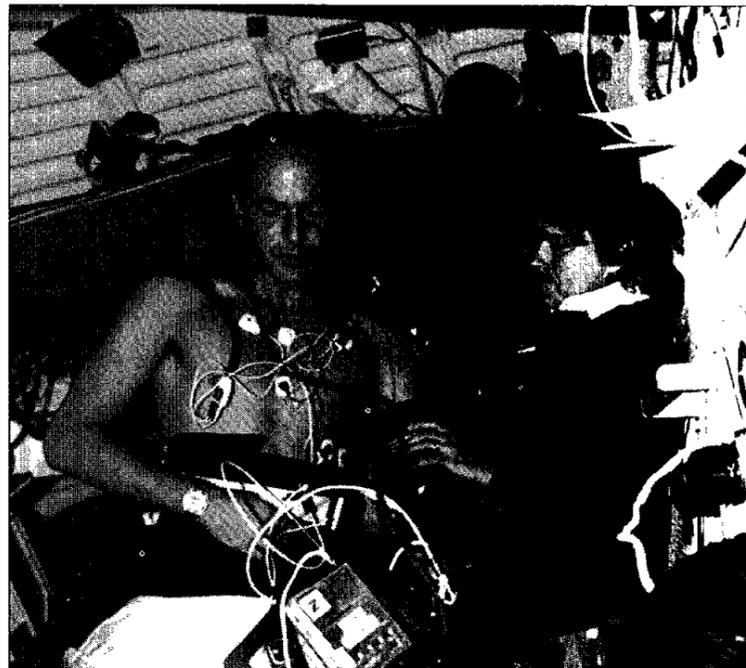
30. How many shuttle flights will it take to build Space Station Freedom?
31. What date is the anniversary of three shuttle launches since the return to flight?
32. What is orbital velocity for the Moon?
33. How many countries are in the European Space Agency? (Two extra credit points if you can name them.)
34. Who was honored with the Oscar that flew on STS-45?
35. What astronauts received Emmys?
36. What song was played to the STS-50 crew when it broke the shuttle duration record?
37. Who said "The human element is the foundation of our manned space program. When it's powered and running it knows no redline limits. It's infinitely flexible and it has a resilience and reliability and strength that no mechanical system can match. We call that machinery a team and we power it with spirit."
38. How many seats are in the large format theater at Space Center Houston?
39. On March 6, the KC-135 crew broke the NASA record of 78 parabolas in a single flight. What is the new record?
40. Who is the White Sands Test Facility manager?
41. Bungee cords, Velcro, lassos, fish hooks, magnets and harpoons were suggested by the general

- public as solutions for what on-orbit problem?
42. What is "definitely an E ticket"?
43. What was the first delivery for the Ace Moving Company?
44. What are the names of the two cosmonauts training at JSC for STS-60?
45. How many kilometers are in one nautical mile?
46. Who are the next two astronauts scheduled to go EVA?
47. What three men went to the Moon twice?
48. If a fire broke out at Bldg. 25, when would firefighters arrive at the scene?
49. Which astronaut wrote the book "How Do You Use the Bathroom in Space"?
50. Who sang "I was walking on the Moon one day?"
51. What satellite, including transponder, is NASA Select carried on?
52. Which orbiter can carry the least amount of payload weight to orbit?
53. Who is Mighty Dog?
54. When will Galileo arrive at Jupiter?
55. How many flights are currently scheduled for 1993?
56. What were the Apollo mission technique notes written by Howard Tindall known as?
57. What does the acronym HERCULES stand for?

58. Who were the backup payload specialists for IML-1?
59. Besides the Bldg. 31 vault, where are the bulk of the pristine lunar samples stored?
60. In which city does the Langley Research Center reside?
61. How many federal holidays are there?
62. Swap Shop ads are limited to how many words?
63. What is the form number for the "Application for Leave"?
64. Not counting Apollo-Soyuz, who was the first non-American to fly on a U.S. spacecraft?
65. What shuttle astronaut holds the record for the most EVA time?
66. How many technical and weather delays did John Glenn have before *Friendship 7* was launched?
67. Who described the moon as "A very dark and unappetizing place"?
68. Who described the moon as "It has a stark beauty all its own. It's much like the high desert of the United States"?
69. Who said "I felt red, white and blue all over"?
70. Who are the three astronauts in the simulation scene of "To Be An Astronaut"?
71. Why can't you see stars from the Moon's surface?
72. How many Saturn V's flew?
73. What is the number of the main runway at Ellington Field?



74. Name the crew members for STS-61, the Hubble Space Telescope revisit mission.



75. How long is an LBNP soak treatment?

Hubble uncovers strongest evidence yet of protoplanets

NASA's Hubble Space Telescope has uncovered the strongest evidence yet that many stars may form planetary systems.

Dr. C. Robert O'Dell of Rice University, Houston, and colleagues have used Hubble to discover extended disks of dust around 15 newly formed stars in the Orion Nebula star birth region 1,500 light-years away.

Such disks are a prerequisite for the formation of solar systems like Earth's, according to astronomers.

"These images provide the best evidence for planetary systems," O'Dell said. "The disks are a missing link in our understanding of how planets like those in our solar system form. Their discovery establishes that the basic material of planets exists around a large fraction of stars. It is likely that many of these stars will have planetary systems."

Hubble Space Telescope's detailed images confirm more than a century of speculation, conjecture and theory about the genesis of a solar system.

According to current theories, the dust contained within the disks eventually agglomerates to make planets. Earth's solar system is considered a relic of just such a disk of dust that accompanied the sun's birth 4.5 billion years ago.

Before the Hubble discovery, protoplanetary disks had been confirmed around only four stars, Beta Pictoris, Alpha Lyrae, Alpha Piscis Austrini and Epsilon Eridani.

Unlike these previous observations, Hubble has observed newly formed stars less than a million years old which are still

contracting out of primordial gas.

Hubble's images provide direct evidence that dust surrounding a newborn star has too much spin to be drawn into the collapsing star. Instead, the material spreads out into a broad, flattened disk. These young disks signify an entirely new class of object uncovered in the universe, O'Dell said.

Hubble can see the disks because they are illuminated by the hottest stars in the Orion Nebula, and some of them are seen in silhouette against the bright nebula.

However, some of these protoplanets are bright enough to have been seen previously as stars by ground-based optical and radio telescopes. Their true nature was not recognized until the Hubble discovery.

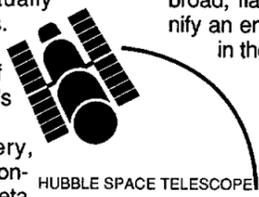
Each protoplanet appears as a thick disk

with a hole in the middle where the cool star is located. Radiation from nearby hot stars "boils off" material from the disk's surface at a rate equal to about one-half the mass of Earth per year. This material is then blown back into a comet-like tail by a stellar "wind" of radiation and subatomic particles streaming from nearby hot stars.

Based on this erosion rate, O'Dell estimates that a protoplanet's initial mass would be at least 15 times that of the giant planet Jupiter.

Many of the youngest and hottest stars in the Milky Way Galaxy are found in the Orion Nebula. The nebula is on the near edge of a giant molecular cloud which lies immediately behind the stars that trace the sword of the constellation Orion the Hunter.

Nearly half the 50 stars in this part of Orion have protoplanetary disks.



HUBBLE SPACE TELESCOPE

NASA unveils new, high-flying Perseus today

NASA will unveil a high-flying, unpowered atmospheric research aircraft called Perseus today in Manassas, Va.

When Perseus starts to fly science missions in 1994, it will gather data to improve knowledge on the atmosphere at very high altitudes, including the possible effect of exhaust emissions from next-generation supersonic airliners.

"Perseus is going to be a valuable new tool for many areas of atmospheric research, especially understanding the processes that control stratospheric ozone levels, so NASA and industry can produce future supersonic transports that are both environmentally safe and economically competitive," said NASA Administrator Daniel S. Goldin.

Perseus, designed and built for NASA by Aurora Flight Sciences Corp. of Manassas, is the first aircraft designed specifically for atmospheric science. It will carry up to 110 pounds (50 kilograms) of instruments to a maximum altitude of 82,000 feet (25 kilometers).

Much of Perseus' technology derives from sport aviation and the record-breaking Daedalus human-powered aircraft design, which had excellent aerodynamic performance. The plane is made of lightweight composite materials, much like sail planes or gliders.

Perseus' engine is based on the 4-cycle, 4-cylinder Rotax engine that powers ultralight aircraft around the world, but is highly modified to burn a mixture of gasoline and oxygen diluted by recirculated exhaust gas. Aurora developed the engine under a \$500,000 NASA Small Business Innovation Research grant.

Perseus also is breaking new ground in other technologies like the onboard computer which will guide many of its flights using preprogrammed flight plans. The autopilot will keep track of the plane's location via signals from the Global Positioning System constellation of navigation satellites.



Arnold Aldrich and Yuri Semenov sign an agreement to continue studies on the use of the Soyuz TM capsule as a "lifeboat" for Space Station Freedom.

Soyuz 'lifeboat' passes first test

NASA, NPO-Energia agree to continue study

NASA and NPO-Energia officials signed an agreement last Friday that eventually could lead to the use of the Soyuz TM capsule as a means of returning Space Station Freedom crews to Earth in an emergency when the space shuttle is not docked at the orbiting laboratory.

Arnold Aldrich, NASA's associate administrator for space systems development, and Yuri Semenov, general director and general designer of NPO-Energia, signed the agreement in a ceremony at Space Center Houston.

The agreement came after a group of NASA and Russian officials completed two weeks of meetings at JSC to discuss the feasibility of using the Soyuz TM capsule as an interim Assured Crew Return Vehicle for astronauts aboard the space station.

No technical problems were identified during the review that would prevent the Soyuz from being adapted to dock at Space Station Freedom during the early phase of permanently manned operations.

Phase B of the study would identify the

design modifications necessary as well as evaluate operations planning for the interim ACRV. A follow-on to the present study contract could be negotiated by February 1993. Information from the Phase B study is needed for engineers to know whether to go ahead with the project. The study team would complete its recommendations by late 1993. The final decision on using the Soyuz would be made by NASA and Congress.

"Many configurations have been analyzed to support the space station, and the Soyuz TM with its three-person capability may provide an interim solution to allow an early permanently manned capability for Freedom," ACRV Project Manager Jerry Craig said.

The working group meetings continued efforts between NASA and NPO-Energia that began earlier this year when the two entered into a study contract.

A number of the Russian participants in the working group sessions were previously involved with the Apollo-Soyuz Test Project during the 1970-1975 time period. This was their first visit to JSC since that time.

Endeavour crew returns home after rehearsal

By James Hartsfield

The STS-54 crew completed a dress rehearsal countdown along with the KSC launch team Wednesday, and managers will meet Tuesday for a final review of mission preparations prior to the flight.

Commander John Casper, Pilot Don McMonagle, and Mission Specialists Greg Harbaugh, Susan Helms and Mario Runco — returned home Wednesday afternoon to continue training and enjoy the holidays.

Work at KSC remains on schedule for a Jan. 13 launch of *Endeavour's* third flight, but an official launch date will be announced following Tuesday's flight readiness review meeting.

This week, the electrical and mechanical functions of *Endeavour's* main engines were tested; the inertial measurement units were fine-tuned; and the crew cabin and engine compartment were cleaned for flight. Also, payload controllers performed a full check of all connections between the Tracking and Data Relay Satellite-F and inertial upper stage in *Endeavour's* cargo bay. Batteries will be installed in the IUS today. Flight batteries will be installed in *Endeavour's* solid rockets during the weekend.

An early inspection after landing at Edwards Air Force Base, Calif., showed *Discovery* sustained little damage during seven days in space on STS-53, and the Boeing 747 Shuttle Carrier Aircraft, with *Discovery* atop, left Edwards Tuesday to begin the trip to Florida. As of Wednesday, *Discovery* had been delayed at Kelly Air Force Base in San Antonio due to bad weather on the route to Florida. However, *Discovery* was expected to arrive at KSC, possibly via Mississippi, by today.

Total Quality Colloquium eyes systems approach

A NASA Total Quality Management Colloquium featuring a discussion of "Solutions Through a Systems Approach: Application to the Project Life Cycle" will be broadcast today on NASA Select television.

Langley Research Center's J. Milan Walters will host the colloquium from NASA Headquarters in Washington, D.C.

Employees who do not have access to a television monitor may view the program in Teague Auditorium.



1. Niña, Pinta, Santa María and *Endeavour*. (Easy question but we liked the picture.)
2. STS-2.
3. STS-26.
4. Traveling companion.
5. Neil Armstrong, Buzz Aldrin, Pete Conrad, Alan Bean, Edgar Mitchell, Alan Shepard, David Scott, Jim Irwin, John Young, Charlie Duke, Gene Cernan and Harrison Schmitt.
6. The Air Force.
7. Nineteen for NASA plus five international mission specialists.
8. Lewis Research Center.
9. All were in the list of 23 sites studied for the location of the Manned Spacecraft Center.
10. "Pretty landing. Very Pretty. Wow! That was excellent. Congratulations, you just landed yourself a space shuttle right on center line. You've done some flying before haven't you?"
11. Four.
12. The Atlantic Ocean.
13. The Angry Alligator.
14. Adventure.
15. Shannon Lucid.

16. Story Musgrave.
17. Eight.
18. "Houston, I think we've got us a satellite."
19. Red, white and blue.
20. Specifically, Neil A. Armstrong, Edwin E. Aldrin Jr., Michael Collins and Richard Nixon.
21. A Falcon feather.
22. Guion Bluford has flown with 21 different people.
23. Dwight D. Eisenhower.
24. Six. Roberta Bondar, Ulf Merbold, Dirk Frimout, Franco Malerba, Mamoru Morhi and Steven MacLean. Claude Nicollier flew as a mission specialist.
25. Bondar and MacLean, Canada; Merbold, Germany; Frimout, Belgium; Malerba, Italy; and Morhi, Japan.
26. Nineteen.
27. Spacelab Life Sciences-2.
28. David R. Scott.
29. Rick Hieb was on the starboard sill. Pierre Thuot was on the robot arm and Tom Akers was on a truss piece extended across the payload bay.
30. The assembly sequence currently includes 17 flights.
31. December 2 — STS-27, STS-35 and STS-53.

32. 5,600 feet per second.
33. Thirteen. Austria, Belgium, Denmark, France, Germany, Ireland, Italy, Netherlands, Norway, Spain, Sweden, Switzerland and the United Kingdom.
34. George Lucas.
35. Wally Schirra, Donn Eisele and Walt Cunningham received a special award for the first live TV broadcast in space during Apollo 7.
36. "Stay" by Maurice Williams and the Zodiacs.
37. Marsha Ivins at crew return ceremonies following STS-46.
38. There are 583 seats.
39. 101.
40. Richard Colonna replaced the retiring Rob Tillet in April.
41. The Intelsat retrieval.
42. Astronaut Sally Ride compared the shuttle launch to an E-Ticket ride at Disneyland.
43. The Satellite Business Systems SBS-3 satellite and Telesat Canada's Anki C-3 were deployed on STS-5.
44. Sergei Krikalev and Vladimir Titov.
45. 1,852 km in one nautical mile.
46. Greg Harbaugh and Mario Runco on STS-54.

47. Jim Lovell, Apollo 8 and 13; Gene Cernan, Apollo 10 and 17; and John Young, Apollo 10 and 16.
48. No time at all. Bldg. 25 is the fire station.
49. Bill Pogue.
50. Gene Cernan and Harrison Schmitt.
51. Satcom F2R, Transponder 13.
52. *Columbia*.
53. STS-53 Pilot Bob Cabana.
54. December 1995.
55. Eight.
56. Tindall-grams.
57. Hand-held, Earth-oriented, Real-time, Cooperative, User-friendly, Location-targeting and Environmental System.
58. Roger Crouch and Kenneth Money.
59. Brooks Air Force Base in San Antonio. Specifically Bldg. 950 but we'll give you credit if you said Brooks.
60. Hampton, Va.
61. Ten.
62. About 25.
63. Form 71.
64. Ulf Merbold on STS-9.
65. Jerry Ross.
66. Six.

67. William Anders during the Apollo 8 mission.
68. Neil Armstrong during the Apollo 11 mission.
69. Ed White remarking on the first American EVA during Gemini 4.
70. Charlie Bolden, Eileen Collins and Dan Bursch.
71. Standing on the surface of the moon during a lunar day is like standing in a snow covered field on a sunny day. The iris of the eye closes so the minimal light from the stars is not detectable. All the Apollo missions were scheduled during the lunar day. In the future, astronauts living on the moon during a lunar night, should be able to see the stars.
72. Thirteen — Apollos 4, 6, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17 and Skylab 1. Apollo 5, 7 and the remaining Skylab missions were launched on Saturn IBs.
73. 17.
74. Commander Richard Covey, Pilot Ken Bowersox and Mission Specialists Story Musgrave, Tom Akers, Jeff Hoffman, Kathy Thornton and Claude Nicollier.
75. Four hours.