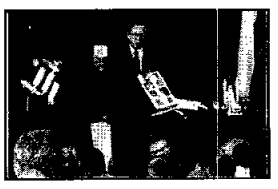
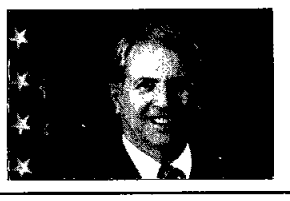
NASA
National Aeronautics and Space Administration
Lyndon B. Johnson Space Center
Houston, Texas



Traveling teachers

School to school, day after day, coast to coast, Spacemobiles carry NASA's message to schools. Story on Page 3.



Big news

NASA released an important statement on the roles and missions of its centers late Thursday. Roundup will cover the story fully Nov. 22.

Space News Roundup

Vol. 30 | November 15, 1991 | No. 44

Ten years ago, arm extended shuttle's reach

By Kelly Humphries

It was 10 years ago this week that STS-2 Pilot Richard Truly uncradled the space shuttle's robot arm for the first time, opening a bag of tricks that has helped NASA perform some of its most challenging tasks.

More than 75 people involved in that flight and subsequent remote manipulator system operations got together last Friday to celebrate the 10th anniversary of RMS operations and look ahead.

Ann Austin, who works for Rockwell in the analysis group that supports RMS flight control, was a NASA employee then and the person on console in Mission Control. She remembers the years of work by hundreds of people that went into that first use of the RMS more than any excitement the first time it was uncradled. The excitement didn't come until after the on-orbit tests were complete.

"You're really too busy doing a job to punctuate that with excitement about specific steps because after all we had to get the thing finished," she said. "It really is hard on console to allow yourself the luxury of doing anything but concentrating on what's going on, so when it was latched down and everything was swell, I think everybody said 'Yea, that's great.'"

The tests, while complex, had a pretty straightforward purpose to find out whether the gangly piece of Canadian-built machinery that wouldn't even lift its own weight on the ground could function in the microgravity and temperature extremes of low-Earth orbit.

"We could only check the system out end-to-end in orbit," Austin said, "so it was really the first time the whole system — the hardware, the software — was able to be checked in all of its modes."

That first flight, which checked arm's three modes of operation — manual, joint-by-joint and automatic — was the only time the arm's six degrees of freedom were not used to pick up a payload of some sort. The extensive series of tests, which was streamlined when a fuel cell malfunction shortened the entire mission to three days, tried out the human in the loop and checked for limits of operation.

Only a few problems were encountered, the most serious of which was a hardware failure in one joint during a backup mode test. The failure, which could have ruined the whole test sequence if it had occurred earlier, happened late in the series.

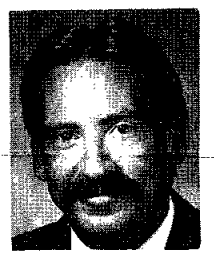
Austin said she looks with wonder at the well-organized displays that

Please see **ANNIVERSARY,** Page 4

Doug Cooke heads lunar, Mars program

Doug Cooke has been appointed manager of the Lunar and Mars Exploration Program Office at JSC, replacing Mark Craig who is expected to move to the Space Station Projects Office.

The program office, with a staff of 40 civil service and contract workers, is responsible for defining an outpost on the Moon and human missions to Mars.



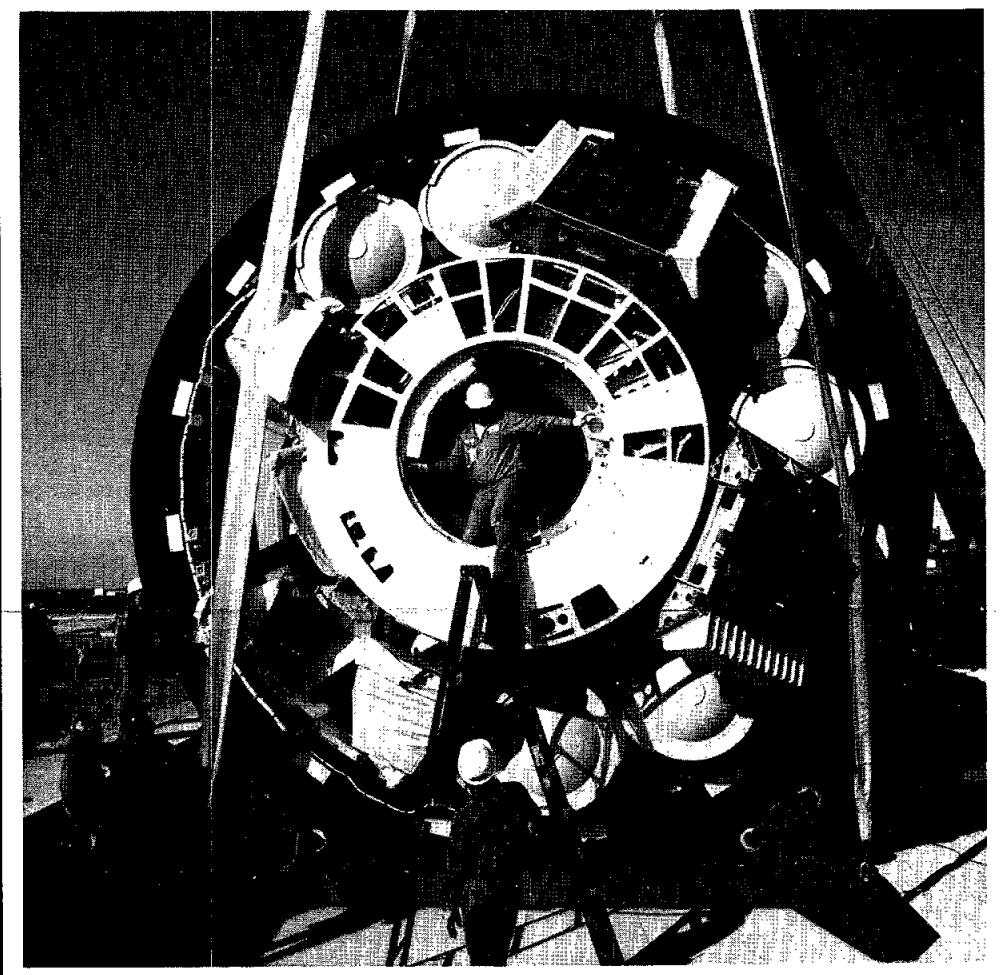
Cooke

Cooke, who has been deputy and acting manager of the office since its formation in February 1990, joined JSC in the Engineering Analysis Division in 1973 and has held progressively responsible positions in the Space Station and Space Shuttle Program Offices.

Before joining LMEPO, he was deputy manager of the Space Shuttle Engineering integration Office and deputy manager of the Lunar and Mars Exploration Office in the New Initiatives Office.

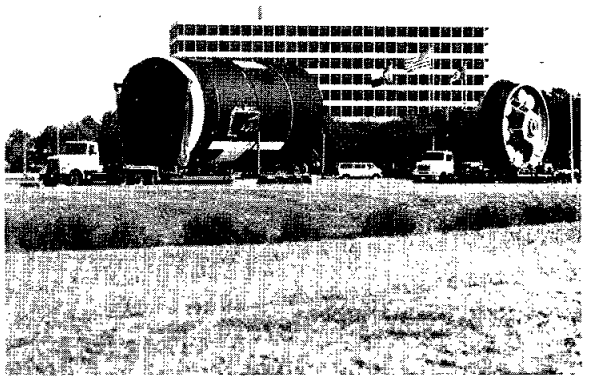
Craig, who has managed LMEPO since its formation, is on special assignment to support definition of the 90-day orbiter-space station integrated system. Pending Headquarters' approval, he will be reassigned to the Space Station Projects Office.

Craig joined JSC in Engineering in 1967. He has been assistant and acting manager of the System Engineering and Integration Office, Space Station Program Office, and manager of the Lunar and Mars Exploration Office and deputy manager of the Mars Rover Sample Return Project.



JSC Photos by Mark Sowa

NEW HOME — It was an all-day job, but JSC workers managed to move the Skylab trainer to its new home at Space Center Houston on Saturday. Heavy hauling and rigging contractor Spacetech Services made the move with cranes leased from Phillips Crane and Rigging Co. COD's Program Transportation Section supervised. Top: A worker emerges from the trainer after a post-move check. Bottom: Trailers carrying the trainer roll past Bldg. 1.



Atlantis set for Tuesday night launch

By James Hartsfield

Atlantis is scheduled to launch at 5:51 p.m. CST Tuesday on STS-44, a 10-day mission that will deploy the Defense Support Program satellite and carry out a host of military observation and radiation detection experiments.

Shuttle managers cleared *Atlantis* for the launch after a final review of mission preparations on Nov. 7. With a launch Tuesday at the beginning of the two-and-a-half hour launch window, DSP will be deployed at about 12:10 a.m. Wednesday. Atlantis would land at Kennedy Space Center at 1:27 p.m. Nov. 29.

The STS-44 crew — Commander Fred Gregory, Pilot Tom Henricks, Mission Specialists Jim Voss, Story Musgrave and Mario Runco Jr., and Payload Specialist Tom Hennen - is scheduled to depart JSC at 3 p.m. Saturday for Kennedy Space Center. Following DSP deployment, two military Earth observations experiments, M88-1 or Military Man in Space, and Terra Scout, will be operated by Hennen.

Other highlights of the flight will include a battery of medical investigations by the crew in preparation for extending the length of shuttle flights next year, including using the Lower Body Negative Pressure device almost daily. The LBNP is a bag-like device that fits around the body from the waist down and simulates the effect of gravity on body fluids by using low air pressure.

At Launch Pad 39A this week technicians closed out work with the DSP and peformed a final test countdown for the inertial upper stage, the solid rocket booster that will propel DSP to its final geosynchronous destination. The launch countdown for *Atlantis* is scheduled to begin at 11:01 p.m. Saturday.

Work continued to prepare *Discovery* for a January 1992 launch carrying the International Microgravity Laboratory-1. Preparations are currently under way in *Discovery*'s cargo bay to install IML-1.

Computer-aided training experts to meet

JSC hosting discussion of advances, possibilities

By Kari Fluegel

Computer technology's latest advances will be in the spotlight at JSC next week when experts from around the world meet to discuss the maturing field of intelligent computer-aided training.

The schedule for the 1991 Conference on Intelligent Computer-Aided Training, set for Wednesday through Friday at the Gilruth Center, includes presentations, demonstrations and panel discussions about a technology that is just now venturing out of the laboratory, said Dr. Bowen Loftin, chairman of the conference program committee.

"The conference will demonstrate a technology that is finally mature enough to be able to impact the real world," he said. "We've arrived and are now making an impact in the operational environments of the military, NASA and the commercial industry."

Loftin characterizes conference presenters as a "blue ribbon list of people" in the field of intelligent computer-aided training. Fifty-five papers are scheduled to be presented with 18 speakers included in the program.

Loftin added that attendance is expected to be double what was anticipated when the conference was in the early planning stages.

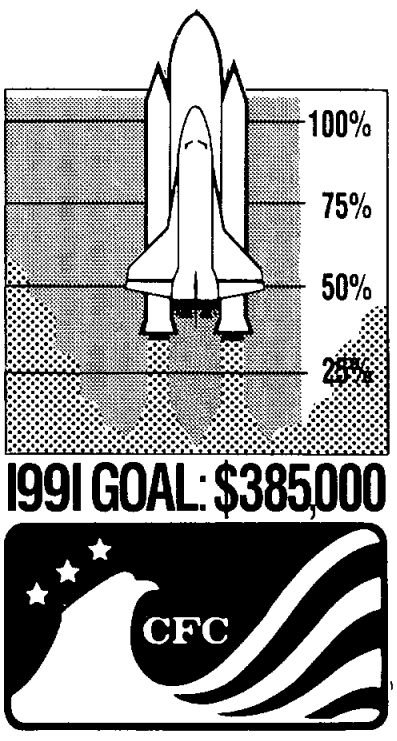
One of the many highlights, Loftin said, will be two consecutive presentations about training in the next decade. Frank Hughes, chief of the Space Station Training Office, will discuss "Training Challenges for 2000 and Beyond" at 9:40 a.m. Wednesday, followed by Dr. Beverly Wolf of the University of Massachusetts at Amherst discussing "Training Technologies for 2000 and Beyond" at 10:20 a.m.

Two other highlights will be Dr. Chris Dede of George Mason University and Tom Edwards, deputy chief of staff for training at the U.S. Army Training and Doctrine Command.

Dede will be the keynote speaker at the Wednesday night dinner set for 6:30-8 p.m. and will discuss "Artificial Realities, Virtual Communities and Knowbots." Edwards will provide the address for the Thursday luncheon set for 12:30-1:30 p.m. and will discuss "Intelligent Systems Technology to Meet Army Training Requirements."

Also during the conference a variety of intelligent computer applications will be demonstrated, including virtual reality. Exhibitors from NASA, the University of Houston-Clear Lake, Computer Sciences Corp., Virtual Prototype, Cognitive Systems Inc., MITRE, V.I.

Please see **ICAT**, Page 4



NASA suspends indicted contractor

NASA has suspended federally indicted Collins Commercial Avionics, Cedar Rapids, Iowa, a division of Rockwell International, from further government contracts.

The suspension, announced Nov. 8 by Assistant Administrator for Procurement Darleen A. Druyun, follows a 15-count indictment, returned in the U.S. District Court in Cedar Rapids charging Rockwell International, one Collins employee and one former Collins employee with defrauding NASA for several years on production and repair of Space Shuttle equipment. The indictment charges the two employees and other unnamed individuals with conspiracy, mail and wire fraud and false claims.

The letter of suspension states that they altered other employees' time cards by adding hours not

Please see **COLLINS**, Page 4

JSC

Ticket Window

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

General Cinema (valid for one year): $4.

AMC Theater (valid until May 1992): $3.75.

Loews Theater (valid for one year): $4.

Entertainment '92 (coupon book): $26 for FBA members' first book; $27 for all others.

JSC

Gilruth Center News

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

Defensive driving — Course is offered from 8 a.m.-5 p.m. Dec. 14 and Jan. 11. Cost is $19.

Aerobic dance — High/low-impact classes meet from 5:15-6:15 p.m. Tuesdays and Thursdays. Cost is $32.

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

Weight safety — Required course for employees wishing to use the Gilruth weight room. The next class will be from 8-9:30 p.m. Nov. 21. Cost is $5; preregistration required.

Aikido — Martial arts class meets Tuesdays 6:30-7:30 p.m and Fridays 5:15-6:15 p.m. Cost is $35 per month.

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

Because of the Thanksgiving, Christmas and New Years Day holidays, Space News Roundup will not be published Nov. 29 or Dec. 27. Some deadlines will be affected.

Around Thanksgiving, the deadline for Swap Shop ads to be published in the Nov. 22 Roundup will be 5 p.m. Wednesday, Nov. 13. The deadline for Dec. 6 Swap Shop ads will be 5 p.m. Wednesday, Nov. 27.

Around Christmas, the deadline for the Dec. 20 Swap Shop will be 5 p.m. Wednesday, Dec. 11, and the deadline for Jan. 3 Swap Shop ads will be 5 p.m. Tuesday, Dec. 24.

The deadline for receipt of information to be published in the Dec. 6 Dates and Data calendar will be 5 p.m. Friday, Nov. 22.

The deadline for Jan. 3 Dates and Data items will be 5 p.m. Friday, Nov. 20.

Normal Swap Shop deadlines, which are 5 p.m. Friday two weeks before the desired date of publication, will resume following the holidays.

Normal Dates and Data deadlines, which are 5 p.m. Wednesday, eight working days before the desired date of publication, also will resume after the holidays.

JSC

Dates & Data

Today

Software Technology Expo — JSC's Software Technology Branch will host an exposition of software technologies, including virtual reality, from 10 a.m.-4 p.m. Nov. 15 in Bldg. 12, Rms. 166, 170 and 258. The showcase is open to all badged NASA and contractor employees. For more information, call Carla Armstrong at x39071.

Health Fair — The JSC Human Resources Office will sponsor a one-day Health Fair from 9 a.m.-4 p.m. Nov. 15 in the Gilruth Center ballroom. Health care representatives will present their 1992 benefit packages to assist employees in making open season changes. Open season runs from Nov. 12-Dec. 9. For more information, call x45194.

HSS meets — The Houston Space Society will present a lecture by Valery Aksementov, Moscow Aviation Institute's life sciences, at 7:30 p.m. Nov. 15 at Houston Studios, 707 Walnut, Suite 212. Aksementov will discuss "How to Keep Your Cosmonaut Comfortable." For more information, call Clifford Carley, 923-7221.

Cafeteria menu — Special: barbecue link. Entrees: deviled crabs, broiled codfish, liver and onions. Soup: seafood gumbo. Vegetables: buttered corn, green beans, new potatoes.

Monday

Cafeteria menu — Special: chili and macaroni. Entrees: barbecue sliced beef, parmesan steak, spare rib with kraut. Soup: French onion. Vegetables: ranch beans, English peas, mustard greens.

Tuesday

Human-Rating Workshop — A four-day workshop hosted by Systems Engineering Division will be Nov. 19-22 at the Harbor Square Annex. The workshop will focus on defining human-rating, determining the human-rating criteria/-process and resolving issues preventing a uniform approach to human-rating and safety. Attendance is limited. For more information, call Mary Cerimele, x36621, or Charlotte Garner, 333-6616.

Lunch and learning session — Doug Holland of JSC's Man-Systems Division will speak on "The NASA Electronic Still Camera Project" at 11:30 a.m. Nov. 19 in the Bldg. 31 conference room (rm. 129). For more information call Kam Lulla at x35159.

Brown bag lecture — A "Free Enterprise" brown bag lecture will be held at 11:30 a.m. Nov. 19 in the training room on the eighth floor of Lockheed Plaza 5. For additional information call Charles Campbell at 333-6107.

Cafeteria menu — Thanksgiving Dinner Special: ambrosia salad, turkey with savory dressing, giblet gravy, cranberry sauce, Italian green beans almondine, candied yams with marshmallows, roll and butter, apple and mince cobbler, coffee, tea or 12 oz. soda, $3.05, Bldgs. 3 and 11 cafeterias.

Wednesday

Computer training — The 1991 Conference on Intelligent Computer-Aided Training sponsored by NASA/JSC and the Intelligent Training Branch of the U.S. Air Force, Armstrong Laboratory and RICIS/University of Houston-Clear Lake will be held Nov. 20-22 at the Gilruth Center. The registration fee for industry employees is $175. NASA/JSC employees interested in attending this conference should contact Jane Kremer at x32601. Pre-registration should be complete by Nov. 15. To register by mail, phone or fax contact Software Engineering Professional Education Center in Houston, phone 282-2223.

NAFE meets — The Bay Area National Association of Female Executives Network will hold a program at 6 p.m. Nov. 20 at the South Shore Harbour Country Club on "Collectibles, a Creative Approach to Networking." Mary Lou Seymour and Mary Helmreich will speak at the program which will include a dinner buffet at 6:30. The cost of the buffet and program is $10 for members and $12 for non-members. The charge for only the program is $3 for members and $5 for non-members. For more information or to make a reservation contact Sharon Westerman at 486-8927.

Hispanic engineers meeting — The Texas/Bay Area chapter of the Society of Hispanic Professional Engineers will meet at 11:30 a.m. Nov. 20 at Lakewood Yacht Club in Seabrook. For more information, call 282-4294.

Logistics engineers meet - Richard Lamb, staff assistant to the assistant vice president of engineering, Brown and Root Inc., will speak on "Availability Engineering as it Applies to the Construction Industry" at the Houston chapter of the Society of Logistics Engineers meeting Nov. 20 at the University of Houston's central campus. Social hour and dinner at 5:30 p.m.-6:45 p.m. Cost $6-$12. The presentation will be at 7 p.m. at Melcher Hall, room 213. For reservations contact Lee Graham at x30913, Dennis Wise at x33661, Ken Zingrebe at 283-5693 or Mike Elliott at 333-6710. Reservations should be made no later than Nov. 15.

Child care center book fair and speaker — The JSC Child Care will sponsor a bookfair 11:30 a.m. to 1 p.m. and 4-5:30 p.m. Nov. 20-23. Sally Jordan from Jeremy's Bookstore will speak on "Making Reading Aloud to Your Child, Fun for You" from 7-8:15 p.m. Nov. 20.

Computer technology review — A computer technology review hosted by the Digital Equipment Corp. will be held Nov. 20 in the University of Houston-Clear Lake's Atrium in the Bayou Bldg. The review will begin with opening remarks at 8 a.m. followed by technical breakout sessions from 9 a.m.-5 p.m. A round-house reception and demos will be held from 5-7 p.m. There is no charge for NASA personnel and aerospace prime employees. For more information contact Lori at 953-4903.

Cafeteria menu — Special: barbecue link. Entrees: cheese enchiladas, roast pork and dressing. Soup: seafood gumbo. Vegetables: pinto beans, Spanish rice, turnip greens.

Thursday

Project Management Series — Software Cost Engineering operations, models and tools will be discussed at the Nov. 21 session of the Project Management Series 1991-1993 in the University of Houston-Clear Lake Bayou Bldg. Rm. 2-504. NASA employees should contact Jane Kremer, x32601, to register.

Cafeteria menu — Special: chicken fried steak. Entrees: roast beef with dressing, fried perch, chopped sirloin. Soup: beef and barley. Vegetables: whipped potatoes, peas and carrots, buttered squash.

Friday

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.

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. 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

Rent: Heritage Park, FPL, new carpet/paint, fenced yard, $795/mo. 280-1505 or 992-2156.

Sale: Camino So, 3-2-2, formals, FPL, det garage, remodeled, $66K, assume VA loan, $12.5 eq. 480-4535.

Rent: Taos, N. M., ski area house, near town, mountain view, sleeps 4, wkly rental. 532-2082.

Sale: Pipers Meadow, 3-2-2, FPL, fans, fenced yard, blinds, $825/mo. Mike, 282-3156 or 286-6254.

Sale: Baywind II condo, 2-2-2, parking, W/D, stove, refrig, FPL, fans, $39K. 480-8753.

Sale: Egret Bay condo, 2-2, covered parking, appli, FPL, fan, patio, pools, boat ramp, storage, $39.5K. 333-9281.

Sale: El Dorado Trace condo, 1-1.5-CP, appli, patio, balcony, FPL, fans, designer wallpaper/carpets, assum. Jeane Wright, 991-0237 or 761-3622.

Sale/Lease: Sun Valley, near Almeda Mall, 3-2-2, 1300 sq ft, wht brick, C/A, gas built ins, wood parquet/ceramic tile floors, $55K or $500/mo. Jim McCoy, x30568.

Lease: Meadowbend, 3-2-2, FPL, fenced yard, community pool/tennis, avail Jan 15, 1992. Jim, x35852 or 474-7747.

Rent: Heritage Park, 3-2-2, 1700 sq ft, new carpet/paint, $700/mo. Sonny, x38533 or 474-4198.

Rent: Baywind II condo, 1 BR, new carpets/paint, FPL, W/D conn, $400/mo. 486-6683.

Lease: Pipers Meadow, 3-2-2, FPL, blinds, cath ceil, fans, blinds, appli, $785/mo. x31826 or 480-9436.

Lease: Pipers Meadow, 3-2-2, brick, FPL, new carpet/paint, $780/mo. 488-0145.

Cars & Trucks

'79 BMW 320I, needs work; '79 Grand Prix, good running cond, needs reverse for auto/trans. 488-2946.

'89 Subaru XT-6, auto, A/C, cruise, loaded, 14K mi, 5 yr/60K mi warr, $8.5, will take boat or older car as part trade. 332-3775.

'85 Chevy Cavalier, 4 dr, 4cyl/2.0L, auto, 72K mi, new tires/brakes, ex cond, $2.7K. 488-5522.

'80 GMC Jimmy, 2WD, 350 V8, auto, red/wht w/red int, 95K mi, good cond, $2K. Steve, x30441.

'53 Chevy PU, orig equip, $1.9K OBO. 534-6750.

'65 Chevy Impala coupe, red, rebuilt 283/V8, new tires, A/C, 120K mi, good cond, $3K OBO. 333-7828 or 286-5743.

'78 Pontiac Grand LeMans, 98.5K mi, A/C, Sharp AM/FM/cass, new tires, new inspection, good cond, $900 OBO. Rich, x38519 or 996-7630.

'90 Plymouth Lazer, red, loaded, auto, cloth inr, A/C, 35K mi, 7 yr/70K mi factory warr, $8.9K. 332-3775.

'85 Ford Bronco II, 4 x 4, V6, A/C, P/S, P/B, cruise, tilt, sunroof, ex cond, $5.4K. 532-1673.

'90 VW Jetta GL, loaded, 35K mi, ex cond, $7995; '74 VW Super Beetle, new eng/pain/in/brakes/sticker, 28MPG, $2995. 333-6963.

'75 Buick LeSabre, 4 dr, A/C, P/S, P/B, good cond, $1195. 332-2265.

'73 Ford Thunderbird, ex cond, $1K. 337-4245.

'78 Porsche 928, brn w/leather int, auto, ex cond, 75K mi, $8.9K. Bill, x39980.

'90 Cherokee Jeep, 4.0 Liter, 2WD, 15K mi, manual trans, 4 dr, A/C, ex cond, $10.9K. 486-4806.

'90 Chrysler LeBaron convertible, 17K mi, 6 cyl, red w/wht top/int, ex cond, $14.5K. 333-7774 or 334-3739.

'66 Ford Fairlane 500XL, 390 eng, red int/ext, 62K mi, new tires/exhaust, A/C, P/S, good cond, $4.7K. 554-2879.

'82 Cadillac El Dorado. x37599 or 774-4321.

'89 Cutlass Sierra, 4 dr, 6 cyl, pwr access, cass, blk w/gray int, ex cond, $7990. 497-6401.

'84 Dodge Ram Charger, A/C, P/S, P/B, auto, posi-track, AM/FM/cass, 67K mi, good cond, $3.9K. 333-2395

'91 Eagle Talon Tsi AWD w/ anti-lock, loaded, tint, CD, alarm, take over payments OBO. David, 280-8693.

'72 VW Bug, rebuilt eng, new paint, orig equip, $1.8K. 559-2053.

Cycles

'87 Kawasaki Ninja 750R, blk/gray, ex cond, 6K mi, $3K. Frank, 486-6418 or 480-0828.

Boats & Planes

'78 j36' Islander Freeport sloop: new engine (parts, labor warranty to 3/92); new trans; new upholstery; new electronics (full warranties 1-3 yrs); new bottom; new lighting; 3 sails; 2 TVs; h/c press water; marine a/c, heat; Zodiac dinghy; EPIRB; engine spares; etc. Redone throughout. $64,500. James, x34934 or 554-4353 after 5 p.m.

'86 20' bass buggy pontoon boat w/trlr, 35hp Mercury, less than 70 hrs, access, elec start, Hummingbird LCR 2000 depth recorder, 2 6/gal tanks, new batt, deluxe pkg, $5.5K OBO. 282-3167 or 992-3351.

16' Prindle catamaran, trlr, sail tube, trap harnesses, (sails, trampoline, boom, all 1 yr old) $1.5K; 14' Sunfish w/trlr, $500. x37848 or 331-4535.

18' Prindle, dbl trapeze, new sails, ex cond, $2.5K; 22' 4 Gulf Coast sailboat, main jib/spinnaker, new upholsetry, ex cond, $2.5K. Greg, x32259 or 474-7634.

16' Cobia Tri hull, 70hp Johnson motor, SS prop, power winch. (409) 935-9250.

'75 Classic Century Resorter I/B skiboat w/trlr, mahogany deck inlays and dashboard, low hrs on Chrysler 440/360hp and Velvet drive trans, all ski access, $4K. x31366 or 480-2350.

Audiovisual & Computers

Sony 19" color TV, no remote, not cable ready, programmable stations, needs outdoor antenna, $100. 332-4405.

Tandy 1000 w/color moni, DMP 30 dot Matrix printer, DeskImate SW, games w/joystick, misc other SW, $500. 332-4405.

Apple IIe, SW, 128K RAM, 2 drives, moni, docu/manuals, printer card, mem exp card, 80 char disp, $800 OBO. 486-4019.

Montgomery Ward 25" color TV, digital tuner, nice wood cab, good cond, BO. 554-2320.

Onkyo turntable, new, $110. x36515.

IBM PS/2 80286, 30MB HD, 12 MHz, 80287 math co processor, 1MB RAM, 1.44MB floppy, 360K 5.25 floppy, enhanced kybd, mouse systems mouse/2-3 button, 14" VGA moni, parallel/serial port, 2 expansion slots, Windows 3.0 w/other word processing, spreadsheet, $850 OBO. Tony, 286-7613 or 286-5079.

C-128 computer w/2 DD, color moni, joy sticks, WP, games, educational SW, etc, w/manuals, $300. 332-3335.

Casio business organizer, scheduling system SF-8000 w/64K RAM and typewriter style kybd, $150. Vince, x33105.

TI Travelmate LT286/45 laptop computer, VGA, 640K RAM, 40MG HD, DOS 5.0, mouse, Windows 3.0, case, $1350. John, 747-3977.

Atari 1040 ST computer, w/SC 1224 color moni, mouse, joystick, 3.5" 720K DD, and 5.25" 360K DD, IBM compatible, $350 OBO. Jody, 282-3155.

Musical Instruments

King Cornet model 603, ex cond, $150. 332-0164.

Pets & Livestock

Rabbits, pet and show quality, $7/up. Gailo, 554-6200.

Persian cat, cream, 1 1/2 yrs old, CFA registered, neutered and declawed, ex health, $170 OBO. Katie, x33185.

AKC labrador puppies, blk mother/chocolate father, $175. Karen, x31385 or 947-2025.

Free AKC springer spaniel, male 9 mo, papers. Tami, 326-1106.

Juvenile Brazilian rainbow boas, $225. 326-1483.

Cairn terrier, Toto dog, male, 4 yrs, $150; Basenji congo barkless dog, female, 10 mo $100. 941-4390.

Household

Ethan Allen wingback loveseat, $150; girl's dbl dresser/twin hdbd, wht w/blue, green trim, $150; student desk/chair, $75; wht wicker empress chair, $50; 2 deck chairs, $10/ea. Jim Bates, x31347 or 944-4687.

Antique dressing table w/trifold mirror, WWI era, ex cond, $275 OBO; 4 piece colonial BR set, chest, night table, hdbd, frame, ex cond, $150 OBO. Dan, 488-9602.

Antique ceiling lights, 4/lighst, blue, $100; Peruvian llana wall hanging, lg w/figures woven into hanging, $75. 488-5564.

Sectional w/ recliner and sleeper sofa, tan, corner table, 3/yrsold, ex cond, $800. Lisa, 929-7194.

New Kenmore electric dryer. 282-4705 or 280-8449.

Entertainment center/bookshelf, L-shaped, 6' 10" long, 14" wide, dark walnut finish, $50 OBO; colonial style lamp, dark finish w/antique brass trim, $50. 532-3515.

Smoked glass octagon 48" dinette set w/4 padded cream arm chairs, $250. Ellen, 488-5627.

Contemporary LR suite, sofa and loveseat, plush beige w/flamestitch design, oak trim; recliner, brown w/blue, ex cond, $250/all. x34722 or 996-1105.

Stereo cabinet, 24" x 42", dbl glass drs, $60. Mark, x30131 or 488-0056.

Upright freezer, wht, 21 cu ft, $200. Mike, 283-5520 or 332-7654.

Leather look recliner, brown, ex cond, $75. x32188 or 488-5944.

Kitchenaide dishwasher/portable, w/butcher block top, $250; blk lacquer king sz waterbed, w/bookcase hdbd, heater, $200; queen sz waterbed, drwrs on pedestal, heater, $100. Kim, 333-4046.

Wanted

Want used dbl wide mobile home, 3-2, can assum payments. 339-1337.

Want microwave oven in good cond, preferably a Sharp, $100; also stereo w/speakers, $50 w/tape deck, $75. Jackie, 333-7207.

Want lens for autofocus Nikon 4004 or Minolta SLR 35mm, also backgrounds or photographic lights. 943-1952.

Want flash attachment for Cannon AE-1 camera, does not have to work. 333-6533.

Want female roommate, Nassau Bay area apts, near to water, $300, bills paid. Julia, 335-1063.

Want nonsmoking roommate, 3BR home, Webster, furnished or unfurnished. x34368 or 280-0802.

Want 250cc or bigger motorcycle in $500-$600 range, must be street legal and dependable. Kevin, 283-0309 or 244-5447.

Want nonsmoking roommate to share CL house, near to I 45/NASA, $250/mo util incl. 333-7772 or 480-6980.

Want fly tying equip and materials. Jay Legendre, 333-2976.

Miscellaneous

Radio for Jeep Cherokee, AM/FM stereo, $35. Jim Bates, x31347 or 944-4687.

Sears Pelux rowing machine, low mi, was $350, now $100 OBO. Max Kilbourn, x38127 or 482-7879.

Ladies and men's clothing, suits, dresses, pants, jackets, szs 7-8, 9-10, and 34 men's sz. 488-2946.

TI 5130 electronic calculator, $20; Panasonic KX-T1521 answering machine w/remote, $20; Cobra CP 2058 cordless telephone, $30; Sterns/Foster springs/matt w/frame, ex cond, $100; wht wicker chair, $25; custom macrame hanging table w/light, $50; Sun Dancer jogging mat, $10. x34741.

Travel trlr, 18', elec lift/brakes, sleeps 5, self contained, 3 burner stove/oven, new A/C, C/H, ex cond, $2.7K; elec treadmill, digital readout, $95; wicker glass top table, 2 chairs, $75; Sears baby changing table, $45; all wood dresser w/bookcase top, $125. 339-1152.

IBM full sz key-type elec typewriter, $60; typewriter stand, $10; tool boxes, $10/ea, lg barometer w/clock, $35. 488-5564.

Misc building materials, windows, moulding, hardware, etc. x38039.

Two silver show saddles, new, 15" seat, was $850/ea, now $450/ea. Michael, 286-1405.

Rowing machine DP, reverses to bench press, $50. Jackie, 333-7207.

Crystal Sabino figurines, collector quality, lg, med, sm szs, BO. Bob, x33149 or 488-7036.

Etienne Aigner full length leather coat, sz 10, ex cond, $150. 332-0164.

18' Seastar V-Hull galv trlr, 140hp OMC I/O; DR se,t wood/glass w/4 chairs; Kenmore W/D, refrig; free loveseat/chair; 20' Frolic travel trlr, trade for boat, sm chain saw, upholstery Singer machine and button maker. 532-1654.

Salom ski, for 125 lbs and under, $25. 488-5445.

'90 Upper Deck baseball cards, low # foil boxes, rookies incl J. Gonzales, D. Justice, J. Olerud, and K. Maas, $40. Floyd, 482-7005.

Four 4 lug chrome wheels w/ new 14" Bridgestone tires, $150; parts for Fiat Spider 2000, hard top, luggage rack, panels, etc; 2 new batt, 5 yr warr, $30, $35. 282-3822 or 991-0372.

Red Rider lawn mower, 8hp, w/grass catcher, $500. Donna, x37845 or 925-1229.

Bahama cruise vacation for 2, choose dates w/60 day notice, choice of 5 days/4 nights or 4 days/3 nights. $350. 474-7033.

30 gal extra high aquarium, top, underground filter, power filter, supplies, currently set up, stand, $100; Weatheby Vanguard, .270, fiberglass stock, $335. Charles, x37678 or 661-4789.

Golf clubs, Spaulding exec elite matched set, '75 mod new grips, ex cond, 2-pw, 1-4 wds, lg bag, $75. x32077 or 488-5944.

Wedding dress, sz 5, wht, $250. Kim, 333-4046.

Ruger .357 Mag, 6" brl, extra grips, leather case/holster, $200. Craig, x31348.

Insul glass garden windows, 60" x 32", $95; wood trim, BO; ShopSmith, '62 mod, w/ all tools and access, ex cond, $650. x38039 or 333-1751.

Miniature bottled water machine, $100 OBO; Everex 80286 machine, $1K; pre-school child learning system, $350 OBO; baseball card factory sets, unopened, $30/ea. Tony, 335-4299 or 482-4156.

"Hornet" R/C car, assembled, 30mph, 7.2 V batt, AC/DC recharger, transmitter, ex cond, spare parts, manual and original box, $175 OBO. 488-5522.

Movie slide projector screen, ex cond, $25; metal patio table w/2 chairs, good cond, $35. 339-1337.

On the Road

Spacemobile teachers inspire students from coast to coast

By James Hartsfield

For a teacher to reach a student, it often takes innovation, ingenuity and charisma, but for NASA's education specialists — nicknamed "Spacemobilers" — it also takes half a year spent on the road logging as much as 40,000 miles annually.

The Spacemobilers, NASA's traveling teachers who move from school to school, coast to coast, day after day, are a breed apart, said Jim Poindexter, who oversees a fleet of four Spacemobiles based at JSC.

Nationwide, NASA has 34 Spacemobiles operating in small groups based at all NASA facilities. The Spacemobiles are simply specialized vans packed with models, literature, lessons, space artifacts and a multitude of teaching aids, but the people who drive them are NASA's missionaries. They have fanned out across the United States annually to spark the imaginations of each new generation for almost 30 years.

"A Spacemobiler visits a new school every day. He stays in a different motel every night and each day he enters a new world," Poindexter said. "It's a tough job. Within 30 days, you'll either get hooked on it and stay with it or you'll leave the program."

The Spacemobilers are teachers like no others, but to qualify for the position one must have all the basic qualifications for a teaching assignment plus actual experience as a classroom teacher.

An average day begins with setting up a stageful of demonstrations of satellite communications, solar power, gravitational and orbital mechanics, spacesuits, principles of flight and more using from 1,000 to 1,500 pounds of equipment. All is unloaded from the Spacemobile and arranged on whatever stage is provided.

The work is done by the Spacemobiler, who is often greeted by his photo and biography tacked to a bulletin board at the school, said Angelo Casaburri, a veteran Spacemobiler for more than 11 years.

"Sometimes, even the local press is there. If it's a rural community, it's a big event; newspapers, radio, even television stations may be there," Casaburri said.

Assemblies start the day's activities and a program that crosses all curriculums.

"We're not just for the science teacher. We cut across the board. The teachers in social studies, language arts, math and history all see a lot of value in our presentations," Casaburri said.

The presentations cover NASA's story, but don't emphasize it as much as teach what flight and space are all about.

"I had one teacher tell me once, 'I don't want you to talk about anything we haven't taught them yet,'" Casaburri said. "I told her, 'Well, it will be an awful short program then, because I'm here to talk about the future.'"

Students interact heavily with the presentations, trying on a spacesuit, competing for answers or spinning to demonstrate centrifugal forces. And every presentation is as different as its presenter and audience.

"We don't have a script and we're not actors. Education won't work like that. You have to feel out the audience, what gets them excited and what peaks their interest," Casaburri said. "It's one thing to take a shuttle model and say the payload bay is 15 feet by 60 feet. But it's another to take ropes and send four kids out to hold them in a 15-foot by 60-foot rectangle and then make the whole student body stand inside."

After assemblies are finished, the Spacemobiler usually attends a few classroom sessions. The later sessions get more specific, depending on a teacher's request. Casaburri carries slide presentations on the Solar System, living and working in space, lunar bases, Space Station *Freedom*, Mars bases and a host of other subjects.

Day's end for a Spacemobiler may mean a driving to a new city, new motel and new school. Or, perhaps, staying in the same motel and city only to reach a new school the next day. Only one day is spent at each school because demand for the program is so great and the program's coverage is so broad.

"If you spend three days in the same motel, it feels like home," Casaburri said.

Why do this job? Why spend at least 160 days out of each year as a gypsy with a textbook?

If it's been a good day, "the kids are hanging on you when you leave. They don't want you to go," he explains. "Sometimes it's like fishing. You get them hooked on a topic and you're reeling them in — that's a good feeling."

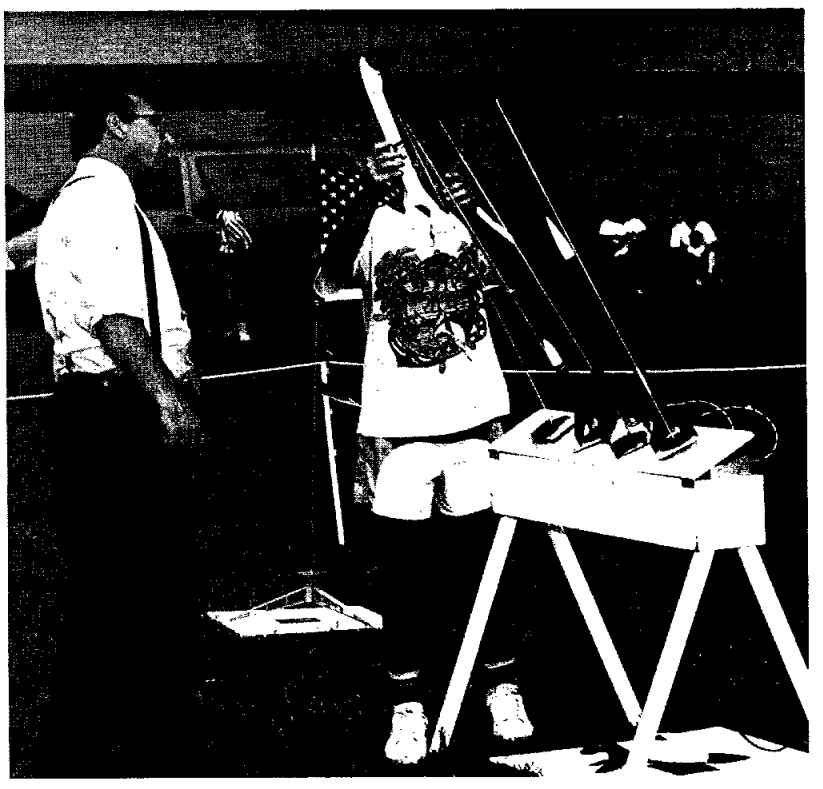
When not traveling from school to school, the Spacemobilers present workshops for teachers, sometimes at their home centers, sometimes on the road.

"The emphasis now is switching a lot toward teachers. If you reach one teacher, you've reached 100 or more kids," Poindexter said.

The rewards are realized only in the time it takes a generation to mature, but for the Spacemobilers some rewards come earlier.

"You get thank you letters. The teachers may write them and the kids may write them as well. I've gotten giant ones in the shape of a Space Shuttle or a tomato. Once I got a long cash register tape, signed by every kid in the school — it must have been about 600 names," Casaburri said. "You're on the cutting edge for a teacher. The kind of equipment you use to teach is innovative. There are only 34 lecturers like you in the world, so you have to write your own curriculum."

"I've talked to students who have been out of school for 10 or 20 years, and they may not remember all of the details or what the person's name was, but they almost always remember that a Spacemobile came to visit their school," Poindexter added. "It's something that sticks with people."



Top: Spacemobiler Angelo Casaburri helps a student don a space suit as part of his presentation. Center: JSC's Spacemobile team consists of, from left to right James Pratt, Casaburri, Shirley Herbst, Charles Anderson and Gordon Eskridge. Bottom: Casaburri oversees a student preparing a rocket for launch. Left: To demonstrate what its like to live in space, Casaburri straps a student in a shuttle sleep restraint.

JSC Photos

X-29 one of most successful X-planes in history

The X-29, an unusual research aircraft built to investigate the feasibility of a forward-swept wing design, made the last flight in its high angle of attack research program recently at NASA's Ames-Dryden Flight Research Facility, Edwards, Calif.

The X-29 is being hailed as one of the most successful X-planes in history. The flight test program, which began in December 1984, not only recorded the most flights by an X-series aircraft (374), but also proved that multiple advanced technologies could be integrated into a single piloted research aircraft.

The unusual configuration of forward-swept wings coupled with movable canards reduces aerodynamic drag by up to 20 percent at transonic speeds, according to Ames-Dryden X-29 Project Manager Gary Trippensee. He also noted that the design gives pilots excellent control response up to a 45-degree angle of attack. Angle of attack describes the angle of an aircraft's body and wings relative to its flight path.

At angles of attack up to 45 degrees, the X-29's forward swept wing has better-than-expected control and maneuverability. Designing these same high angle of attack qualities into new high-performance aircraft could give military pilots an advantage in maneuverability.

NASA research pilot Steve Ishmael, who flew the X-29 on its first NASA flight, believes data from the program can be important to designers of future aircraft.

"The X-29 has shown that a forward-swept wing on a transonic fighter will have at least the equivalent performance of a rearward swept wing — maybe better in certain areas — and it can be an excellent design alternative in high performance airplanes," said Ishmael. "When an aircraft is being designed, the location of the wings influences the design of the rest of the aircraft. The forward swept wing presents a greater design latitude and there's no penalty to pay in performance."

The first X-29 completed 254 research missions to measure the plane's performance and handling qualities. The second aircraft flew up to 67 degrees angle of attack to investigate handling and control characteristics. This second phase of research also evaluated the military utility of thedesign.

The program also studied other advanced technologies such as variable camber flaperons (combined flaps and ailerons), rear-mounted strake flaps for pitch control and an advanced flight control system to integrate control surface functions for stable flight.

JSC Phot by Bob Walck

HAMMING IT UP — Astronaut Ken Cameron shows Cosmonaut Musa Manerov the airlock of the Full Fuselage Trainer in Bldg. 9. Manerov, center, and Boris Stepanov, left, deputy chief editor of the Soviet Radio Magazine, were in Houston for an amateur radio convention. Manarov holds world records for the longest space flight — a full year aboard the Mir space station — and longest overall stay in space adding his two flights together, the largest number of space walks, the longest single space walk, and the largest number of ham radio contacts from space.

NMA to host strategic planning panel session

JSC Director Aaron Cohen and the National Management Association will host a strategic planning panel session to discuss the future of the space program Dec. 4 at the Gilruth Center.

Panel members are Cohen; Max Engert, deputy director of Engineering; John O'Neill, deputy director of Mission Operations; Carl Shelly, deputy manager of the Space Station Project Office; and Lyn Gordon-Winkler, manager of the Project Planning and External Affairs Office, with Associate Director Dan Nebrig serving as moderator.

The free panel session will be from 6:30-8 p.m. and will be open to all JSC employees.

Prior to the panel discussion, NMA will host a social hour beginning at 5:30 p.m. Hors d'oevres and beverages will be provided. Cost for non-members will be $5.

Deadline to make reservations for the social hour is noon Nov. 26. Contact Valerie Burnham, x34210, or Rudy Balciunas, x33017. Reservations are not needed to attend the panel session.

Employees may donate leave they can't use to employees in need

For some employees, the holidays bring the problem of finding enough leave to visit family or prepare for gatherings. For others, the end of the leave year brings just the opposite, the problem of too much use-or-lose leave.

The Human Resources Management Branch is reminding employees with use-or-lose leave this year that they do have an alternative — donate the leave to one of the approved recipients in the voluntary leave transfer program.

The leave transfer program is designed to help employees who are out of leave and are experiencing a medical emergency or who must take time off to care for a member of their immediate family who is ill.

"A donation of annual leave can go a long way toward making a fellow employee's holiday a new year look a lot brighter," said Human Resources' Natalie Saiz.

The deadline for making leave donations depends on how many scheduled work hours you have left in the leave year. There should be at least as many scheduled work hours remaining as you are donating. For example, if there are only 40 hours of scheduled work hours left in the leave year for you, you may donate only 40 hours even through you may have 60 hours of use-or-lose leave remaining. Donors should send a request to donate leave early so that it can be processed in time by the Human Resources and Payroll offices.

Other guidelines state that you may donate only half of the amount of annual leave you would normally accrue in a year, and that you may not donate to your immediate supervisor.

Donated leave does not have to be use-or-lose leave; however, it must be accrued annual leave. Advanced, unearned annual leave, sick leave and compensatory time may not be donated.

Requests to donate leave should be submitted on a JSC form 1097A to the Human Resources Management Branch, Code AH7.

This leave year ends Jan. 11, 1992. If you have any questions regarding voluntary leave transfer, talk to your Human Resources representative or call x33001.

Workshop to eye human rating standards

The Engineering Directorate's Systems Engineering Division will host a four-day human rating workshop Nov. 19-22 at the Harbor Square Annex across from the South Shore Harbor Conference Center in League City.

The workshop's objectives include: defining human rating; determining human rating criteria; and resolving issues preventing a uniform approach to human rating and safety.

The first day will include presentations by speakers from Martin Marietta, General Dynamics and Rockwell. John Young, JSC's special assistant for engineering, operations and safety, also will be a presenter.

During the remaining three days, six working groups will define the human rating process; environmental control, life support systems and man machine interfaces; structures-mechanical systems; operations-ground support; propulsion and power; and avionics and mission software.

Information from the workshop will be consolidated into a booklet, said Mary Cerimele, one of the workshop organizers. The information also will be forwarded to NASA Headquarters to assist in the development of a uniform Human Rating Standard for all NASA and its contractors.

Only 150 people will be allowed to register for the first day. More space will be available for the working groups. There is no charge for the workshop which is designed for NASA and contractor employees.

For registration information contact Charlotte Garner at 333-6616. For workshop content information contact Cerimele at x36621.

Collins suspended from federal contracts

(Continued from Page 1)

actually worked, and billed NASA for work that was not performed under NASA contracts. The fraudulently inflated vouchers were then sent to NASA for payment.

Collins and the two individuals named in the indictment will be excluded from doing business with the government pending further legal proceedings and investigations.

NASA also put Rockwell International on notice that it is continuing its investigation into this matter. Druyun said that if adequate evidence becomes known which indicates corporate involvement or negligent disregard on the part of Rockwell International in these activities, additional appropriate action will be taken.

If convicted on all counts, Rockwell could face a maximum penalty of $7.5 million in fines, and the two individuals could each face 30 years in prison and a $1.5 million fine. The matter was investigated by agents from NASA's Office of Inspector General and the Defense Criminal Investigative Service and by auditors from the Defense Contract Audit Agency.

Last '91 blood drive moves to '92

The 1992 JSC Blood Drive will be kicked off Jan. 9 at the Gilruth Center.

The final 1991 opportunity scheduled for Nov. 26 has been rescheduled for Jan. 9, creating four opportunities for employees to give blood next year.

Besides the January date, the 1992 Blood Drive dates are June 4, Sept. 1 and Nov. 24.

Many off-site contractors also will have the opportunity to donate blood at various times throughout the year.

Anniversary celebrates arm's first operation

(Continued from Page 1)

RMS flight controllers have now. The emphasis leading up to the first two flights was on making sure the shuttle itself worked.

"We had just lists of the parameters to look through, so it was just very basic information," she said. "In order to evaluate different options, we had to get a programmer to actually change the program real-time."

In spite of these obstacles, the crew, the arm's builders and the flight control team worked together to complete most of the priority one flight test objectives, she said.

Among the organizations that were pivotal to that first test's success, she said, were the National Research Council of Canada, NASA's counterpart at the time; SPAR Aerospace, which built the arm with the help of several subcontractors; Rockwell International's Downey, Calif., plant which provided hardware for attachments to orbiter and responsible for software functional requirements; Draper Laboratories, which helped develop the software; Kennedy Space Center workers who tested and installed the arm; IBM, which provided the software; McDonnell Douglas and Ford Aerospace.

And even though there have been changes on console since that first flight, one of the people at the party who had reviewed all 25 flight summary tapes reminded her that it is remarkable how little has changed in the way the arm actually moves.

"The arm capabilities that had been designed into the system in the first place are still those that we're using. It still looks like the same arm, which means that the capabilities were well designed," she said.

"We certainly never envisioned it being man-rated. Never envisioned it carrying an astronaut to grab onto things or to spin it up. Never envisioned it scraping things or tapping on antennas or busting ice off the orbiter. Never envisioned a flyswatter on the end of it. But knowing the clever people who use what they have available to them when the need arises, it's been neat to watch all the uses it's been put to."

She said many of the people who worked on making the shuttle's robot arm a reality are now working on a new challenge, a Mobile Servicing System on Space Station *Freedom* that will have still another degree of freedom and be able to move about on the station's truss.

"STS-2 was the first step in a whole staircase of accomplishments, so we're anticipating the next 10 years to be quite remarkable, too."

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.

Dates and Data submissions are due Wednesdays, eight working days before the desired date of publication.

Editor .....Kelly Humphries
Associate Editors .....Pam Alloway
Kari Fluegel

ICAT expo

(Continued from Page 1)

Corp., the Southwest Research Institute and elsewhere will demonstrate applications and support technologies.

The demonstrations will be operating from 11 a.m.-6:30 p.m. Wednesday, 10 a.m.-7 p.m. Thursday and 9-11 a.m. Friday.

A limited number of people wishing to test NASA's virtual reality system will be required to sign up for a specific test time, Loftin said.

The conference is sponsored by JSC, the Intelligent Training Branch of the U.S. Air Force's Armstrong Laboratory and UHCL.

Conference participants may register at the door from 4-6 p.m. Tuesday or each day during the conference. Registration is not required to attend the demonstrations.