

Hands-on data

Electronic Cuff Checklist attached to the forearm of a space suit will hold more than 500 pages of information. Story on Page 3.



Employees honored

Marilyn J. Bocking award for secretarial excellence was among the honors bestowed on JSC employees recently. Story on Page 4.

Space News Roundup

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KSC photo

The STS-60 crew stands in front of *Discovery* on the north side of Launch Pad 39A. Crew members, from left, Franklin Chang-Diaz, Sergei Krikalev, Charlie Bolden, Jan Davis, Ken Reightler and Ron Sega, will fly the first shuttle mission of 1994, deploying and retrieving the Wake Shield Facility and conducting experiments in the Spacehab module. STS-60 marks the first time a Russian Cosmonaut has flown on board an American spacecraft.

Discovery aims at first shuttle flight of 1994

by James Hartsfield

Preparations to launch *Discovery* on shuttle mission STS-60 are entering the home stretch at Kennedy Space Center's Launch Pad 39A, and, if all continues smoothly, the countdown clock could begin ticking at 3 a.m. Monday toward a 6:10 a.m. central time liftoff on Thursday.

The STS-60 crew is led by Commander Charlie Bolden. He is joined by Pilot Ken Reightler and Mission Specialists Jan Davis, Ron Sega, Franklin Chang-Diaz and Sergei Krikalev. The crew is set to depart for KSC early Monday morning for a Thursday launch. The flight of Krikalev, a Russian Space Agency cosmonaut, marks the beginning of a new era of cooperation in manned space travel. He will be the first Russian to fly aboard a U.S. spacecraft.

STS-60 will carry the Spacehab module aloft for its second flight carrying a host of experiments ranging from life sciences investigations to materials processing and crystal growth. On the third day of the flight, Davis will deploy the Wake Shield Facility, a cargo

developed by the University of Houston and NASA that will investigate the use of the ultra-pure vacuum in space as an environment for research in processing materials used in semiconductors.

Once released, the Wake Shield Facility will fly about 40 nautical miles from the shuttle for a little more

than two days before it is retrieved. After its retrieval by Krikalev, it will remain on *Discovery's* mechanical arm for several hours for further experiments before being berthed into the cargo bay for the trip home.

Other experiments in *Discovery's* bay will use six metal spheres to study the system currently used

for tracking space debris. A satellite designed by students at the University of Bremen also will be deployed during the mission.

The crew's awake hours will be during the daytime in Houston, with an average wake-up time of about 1 a.m. central and bedtime at about 5 p.m. central. With a Feb. 3 launch on time, *Discovery* would be scheduled to land at KSC at 11:39 a.m. central Feb. 11.



Crew enjoys cultural exchange

By Eileen Hawley

For the past year, the six-member crew of STS-60 has trained for its mission much like any other shuttle crew.

But the STS-60 crew had an additional challenge, that of learning to understand and respect each other's cultural heritage since one of its fellows will be the first Russian to fly on board a space shuttle. One manifestation of this was the need for a training plan that included lessons in English and Russian, but there were deeper underpinnings as well.

"For those of us involved," Commander Charlie Bolden said, "we think the joint scientific thrust is of most significance. What we are hoping to demonstrate is that two very strong formerly rival nations can in fact come together, work together toward a common goal, and achieve much more than either of the two of us could have achieved alone."

The Americans in the crew worked hard to accommodate the cultural differences, and tried hard not to be 'typical Americans'—"in our case, going along being satisfied not to learn the language, not to understand how the Russians got to where they are in their space program," Bolden said.

Bolden leads the crew that consists of Pilot Ken Reightler, Payload Commander Franklin Chang-Diaz,

and Mission Specialists Jan Davis, Ron Sega and Sergei Krikalev. While this will be Krikalev's first shuttle flight, he is a veteran of two Mir flights, Bolden said. "He is, I think, number two in the world for total time in space with 5- and 10-month flights on Mir." Sega, who is one of two principle investigators for the Wake Shield Facility payload, also is making his first shuttle flight.

The historic significance of STS-60 is not lost on its crew. "We will work as a crew together and continue previous cooperation" between the U.S. and Russia, Krikalev said. "In 1975, there was the Apollo-Soyuz docking mission, but this is the first time the crew will fly together on the same vehicle and soon an American astronaut will start training in Star City for a flight on the Mir station. So I think it is beginning of this kind of activity," he added.

At the time of the Apollo-Soyuz Test Project, the mission held extreme political significance and is an important part of this mission, too. But, Bolden said, "I would feel that our primary effort is geared toward pulling the two nations' bases of knowledge together in order to optimize what we're hoping to do in the future as far as space exploration is concerned."

Each crew member will have specific duties to perform to accomplish

the mission's primary objectives. Those objectives are to "fly the Wake Shield Facility, deploy it, rendezvous with it and bring it back to Earth," Bolden said. In addition, crew members will conduct experiments with the space habitation module, which is a pressurized module in the bay and conduct some joint U.S. and Russian science which includes metabolic studies, neurovestibular studies, Earth observations and some radio-biological effects studies.

Davis is ready to work on those scientific studies. "I'm excited about Spacehab," Davis said. "my first flight was a Spacelab module and I really enjoy doing science in space. That's one big advantage of being in microgravity and it will be interesting to see the differences between Spacehab and Spacelab."

The responsibility for integrating the payloads on this flight belonged to Chang-Diaz. "It has been quite a challenge putting this flight together, putting all these payloads integrated into one flight," he said. "We are using the orbiter in ways that perhaps it wasn't quite designed to do. In particular, in the collection of all the data. We have a full plate of different types of science activities, a very multi-disciplinary type of flight and everybody is very busy."

Please see STS, Page 4

Veteran NASA staffer dies

Richard A. Colonna, 60, a 35-year NASA veteran and manager of the White Sands Test Facility, Las Cruces, NM, died suddenly Monday while on a business trip to Washington, D.C.

Colonna's career—30 years spent at JSC—spanned the beginnings of manned space flight and his engineering and analysis work was integral to the creation and success of every U. S. manned space program to date. As WSTF manager, he was responsible for NASA's premier facility for testing, simulating and developing orbital propulsion systems for manned spacecraft and analyzing and testing material used in the construction of manned spacecraft.

"From Mercury through the space shuttle, Dick Colonna's work made him one of the pioneers of our business," Johnson Space Center Direc-

tor Dr. Carolyn L. Huntoon said. "He was one of the engineers whose expertise and dedication helped to bring successes and accomplishments to our nation's space program. We are saddened by his passing, but he will be remembered for his contributions."

Joseph Fries, WSTF Deputy Manager, has assumed duties as acting manager.

"Dick brought a rare combination of technical brilliance, broad aerospace managerial experience, a nationwide network of professional colleagues, and immense personal drive and insight to share with all of us here at WSTF," Fries said. "We'll really miss both his laughter and leadership, but hope to continue to pursue his vision and goals for our facility."

Details on memorials and services are pending.



Colonna



Lee

Speakers salute Black History Month

By Kelly Humphries

Two high-profile speakers will highlight JSC's observance of 1994 National Black History Month and its theme of "Empowering Afro-American Organizations: Present and Future."

Sheila Jackson Lee, at-large council member for the City of Houston, will speak at the 11 a.m. Feb. 9 kick-off luncheon in the Gilruth Center ballroom.

Dr. Benjamin Chavis Jr., executive director of the National Association for the Advancement of Colored People, will be the keynote speaker for the main program at 1 p.m. Feb. 25 in Teague Auditorium.

Lee became the first black female

at-large council member in Houston in 1990 after working as an associate judge in Houston's Municipal Court. A licensed attorney for 17 years, she chaired the city's Committee on Human Relations, which reviewed the state of race relations in Houston and suggested ways to revise the City Council's structure to help it reflect more accurately the varied social and ethnic makeup of the city. She chaired 11 hearings around the city to secure input from citizens that was used by the committee.

Lee sits on a variety of community boards, including the Texas Gulf Coast United Way, and is a member of the city-wide task force "Crack

Down on Drugs."

Chavis, a native of North Carolina, became executive director of the NAACP in April 1993, at 45 he is the youngest person ever to hold the position.

A minister of the United Church of Christ, Chavis was executive of the church's Commission for Racial Justice at its national offices in Cleveland. Under his leadership, the commission sponsored "Freedom Rides" to Alabama and Chicago to ensure voting rights and mobilize voters.

In the 1970s, Chavis was among the "Wilmington Ten" that were convicted in a case growing out of a civil Please see OBSERVANCES, Page 4



Chavis

JSC

Ticket 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.

Rodeo Carnival — Package includes 35 carnival ride tickets, five 2-for-1 game coupons and one 2-for-1 food or drink coupon. Cost is \$12. Packages may be ordered until Feb. 1.

Houston Rodeo — A limited number of tickets are available for selected performance. Cost is \$9 with a limit of four tickets per badged employee.

Moody Gardens — Discount tickets for two of three different attractions: \$9 Entertainment '94 Coupon Books — Bay Area/Galveston/Downtown or FM 1960/Downtown: \$30 each, \$1 off first book for civil servants. Gold C Books: \$8 Space Center Houston — Discount tickets: adult, \$7.50; child (3-11), \$4.50; commemorative, \$9.95.

Metro tickets — Passes, books and single tickets available.

Movie discounts — General Cinema, \$4.50; AMC Theater, \$3.75; Loew's Theater, \$4.

Stamps: Book of 20, \$5.80.

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 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 6:30-9 p.m. Monday-Friday. 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. Feb. 8. Pre-registration is required. Cost is \$5.

Defensive driving — Course is offered from 8:15 a.m.-3 p.m. Saturday. Next class is Feb. 5. 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. Cost is \$24 for eight weeks.

Aikido — Martial arts class meets from 5-7:30 p.m. Tuesdays and 6:15-8:15 p.m. Wednesdays. Black Belt class from 6-8 p.m. Fridays, requires instructor permission. Cost is \$25 per month.

Stamp club — JSC Stamp Club will meet from 7-9 p.m. every other Monday. For more information, call Dianne Kerkhove at 554-2764

Fitness program — Health Related Fitness Program includes a medical examination screening and a 12-week individually prescribed exercise program. For more information, call Larry Weir at x30301.

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

Sale: Taylorcrest, 4-3-2.5D, 3200 + sq ft, pool/spa, water view, island kit, balconies, \$290k, 4% co-op. Richard x30271 or 326-4963.

Rent: Winter Park, CO, fully furn condo, 2-2, sleeps 6. 488-4453.

Rent: Condo Basalt, CO, 3-3.5, \$130 dly/\$800 wkly. 505-527-2480.

Sale: Meadow Green, 4-2.5-2, 2.9k sq ft, lg deck, both formals, wet bar, FPL, \$133k. 486-5246.

Sale: Pearland, SouthWyck, 4-2.5-2, 2 story, game rm, formal DR, beveled glass front dr, sec sys, ex cond. 831-1791 or 997-1664.

Sale: Friendswood/Heritage Park, 3-2-2, 1850 sq ft, jacuzzi, both formals, FPL, ceiling fans, fenced, \$89.9k. 996-5076.

Sale: Clear Lake Shores, 3 BR, located 1 blk from Clear Lake, assum, \$89.7k. 538-1849.

Lease: Webster, 2-2 condo, W/D, FPL, cov carpet, \$550/mo, \$300 dep, avail now. 495-6021.

Rent: Wolf Creek, furn, 2 BR, sleeps 6, no smoking/pets, dly/wkly/mo or longer. Bob, x30825 or 998-7372.

Lease: Clear Lake area condo, W/D, cov parking, \$435/mo. 482-9381.

Sale: LC waterfront marina TH, 2-2, \$99.5k. Steve Brody, 202-358-0889 or 703-532-3415.

Sale: Chambers County, 25 x 210 lots, util, Barbers Hill ISD, financing. 488-5058.

Sale/Lease: Egret Bay Villa condo, 1-1-2 CP, W/D, FPL, sec gate, patio, \$450/mo. 335-1451.

Sale: CLC Middlebrook, 3-2-2, lots of glass. x32252.

Sale: Sagemont, 3-2-2, both formals, new roof, \$72k. Ben, x34339 or 481-1439.

Sale: Lake Livingston, Point Blank, Tx, 3-2, lg wooded lot. John, 235-2342.

Sale: April Sound timeshare Memorial Day wk, plus 1 unsched wk/yr, \$5k. John, 235-2342.

Rent: Lake Travis cabin, priv dock, CA/H, fully equipped, accom 8, \$325/wkly/dly. 474-4922.

Sale: Baywind II condo, 1 BR, FPL, W/D/refrig, new carpet, \$27k. Steve, x49625 or 486-8047.

Lease/Sale: CLC Baywind II condo, 2-2, all appl, W/D, FPL, \$525/mo + dep, avail now. Gilbert, 333-4306.

Sale: Friendswood/San Joaquin, 3-2.5-2, 2-story, sec sys, deck, approx 2400 sq ft, \$109.9k. Roger, x31947 or 996-7454.

Rent: Arkansas cottage, Blue Mt Lake, furn, 4 ac, \$250/wk, \$50/day. x33005 or 334-7531.

Cars & Trucks

'82 Chevy PU, 3/4 ton, 3 spd, 71k mi, enclosed bed, new bat, luneup, oil chg, \$1.9k. 339-1176.

'85 Subaru GL station wagon, 5 spd, 74k mi, \$1.2k. Jeff, 333-7010 or 482-5393.

'87 Nissan Pulsar, new eng, ex cond, \$3.5k. 333-6277 or 339-3562.

'84 Nissan 300ZX, 5 spd, silver w/T-Tops, 87k mi, runs well, \$4.2k. x39045 or 488-2676.

'92 Isuzu Rodeo, 17.7k mi, AC, cruise, cass, 5

spd, roof rack. x39120 or 992-7283.

'75 Mercury Montego, wht, 4 dr, auto, runs fine, \$400 OBO. 333-6449.

'89 Chevy Celebrity Euro-Sport, pwr wind/locks, 85.5k mi, \$4.5k. Danny, x49674 or 326-5754.

'70 Chevy PU, straight 6, 3 spd, \$500. x44265 or 554-5006.

'84 BMW 318i, new eng, \$4.7k. Kelso, x35483 or 480-2997.

'66 Ford Mustang, red w/blk inter, A/C, wood steering wheel, \$3.2k OBO. Eddie Pompa, x38813 or 489-7778.

'87 Cadillac Sedan Deville, 116k mi, ex cond, new AC, leather, \$6k. x38785 or 409-945-8787.

'77 Mercury Marquis, 2 dr, P/S, P/B, P/W, AM/FM, V-8, new tires, \$750 OBO. Faye, 470-1455.

'86 F-150 Super Cab, good cond, bed liner. \$4.9k. 339-1176.

'77 Olds Delta 88, one owner, \$700. 488-1537.

'78 Porsche 928, brn w/leather int, auto, ex cond, 75k mi, \$8.5k. Bill, x48889.

'90 Ford Ranger XLT P/U, 5 spd, A/C, AM/FM/cass, low mi, \$5.5k OBO. 461-4898 or 280-9086.

'90 Mercury Topaz GS, 47k mi, P/W, AM/FM/cass, ex cond, \$5.5k. x49854 or 554-6167.

'88 Pontiac Fiero, 5 spd, 4 cyl, red w/gray int, ex cond, \$3.2k OBO. x38265 or 482-5871.

'83 Ford Ranger Custom PU, rebuilt eng, Neg. x34109.

Boats & Planes

'18 CC Searay, 135 hp Merc, 70 hrs, SSP, alum P, 3D Hum, VHF, Bimini, full instr, console cov, \$13.5k. Scott, x49854 or 554-6167.

U.S. Yachts 22' sloop w/4.5 hp o/b, 2 sails, galley, sleeps 5, ex cond, \$5k. Russ x45979 or 332-1769.

'18 VIP Vison, 1.5 yr old, 130hp/OMC/I/O, trlr, all accessories, ex cond, \$9.9k. Jennifer, x38668 or 286-0507.

Voyager hand-held LORAN w/case & antenna, \$150. 331-3954.

Share hanger Ellington, highwing or sm low wing, \$125/mo; King hand-held aircraft radio, \$425. Hugh, x31714 or 554-5412.

22.5' Searay Cuddy cruiser, 228 hp Merc, new Alpha one I/O, VHF, 6" color Furno DF, rigged for offshore, \$8.5k. Mark, x38013 or 992-4132.

Cycles

'82 Goldwing Interstate 1100, ex cond, \$3k. 488-6526.

'81 Kawasaki 750 LTD, ex cond, \$1.7k. x37724 or 997-0309.

Bianchi Premo racing bike, 51 cm, blk, 12 spd, ex cond, \$175 OBO. Mary, x31911.

TEAC 5-disc rotary CD player w/10 key remote ctrl, new, \$175. 333-2335.

AM/FM stereo rcvr w/Bass Reflex spkrs, 25 wpc, \$75; Samsung VCR remote, 4 heads, special FX, \$150. x36851 or 332-8017.

GateWay 386-33 MHz computer, 8 MB RAM, 120 MB HD, 15" Crystal scan monitor, TI Micro Laser Plus printer, \$2995. 486-7111.

IBM compatible 486/DX33, 120 MB HD, dual

JSC

Dates & Data

Today

Cafeteria menu — Special: meat sauce and spaghetti. Total Health: spaghetti noodles with turkey meat sauce. Entrees: rainbow trout, liver and onions, beef cannelloni, pork and shrimp egg roll, Reuben sandwich. Soup: seafood gumbo. Vegetables: steamed broccoli, breaded okra, cut corn, black-eyed peas.

Monday

Cafeteria menu — Special: turkey and dressing. Total Health: herb flavored steamed pollock. Entrees: breaded veal cutlet, beef chop suey, steamed pollock, beef cannelloni, French dip sandwich. Soup: beef and barley. Vegetables: Brussels sprouts, mixed vegetables, egg plant casserole, winter blend vegetables.

Tuesday

Blood drive — McDonnell-Douglas hosts a blood drive from 8:30-11:30 a.m. Feb. 1 at 16055 Space Center and from 1:15-4 p.m. at 13100 Space Center. For information, contact Jennie McQuillon, 212-5042 or Teresa Esquivel, 212-5036.

Technology transfer — A three-day conference on "Dual-Use Space Technology Transfer" begins Feb. 1 at Gilruth Center. For more information contact I-Net, at 286-2102.

Cafeteria menu — Special: pepper steak. Total Health: barbecue chicken. Entrees: baked lasagna, pork chop and fried rice, turkey a la king, baked chicken, French dip sandwich. Soup: black bean and rice. Vegetables: breaded squash, steamed spinach, baby carrots, navy beans.

Wednesday

Astronomy seminar — The JSC Astronomy Seminar will meet at noon Feb. 2 in Bldg. 31, Rm. 129. For more information, call Al Jackson, 333-7679.

Toastmasters meets — Space-land Toastmasters Club meets at 7 a.m. Feb. 2 at the House of Prayer Lutheran Church. For additional information, contact Dale Denais at x30432 or Steve Shields at x31941.

Cafeteria menu — Special: Mexican dinner. Total Health: steamed pollock. Entrees: broccoli cheese quiche, catfish and hush puppies, spare ribs and sauerkraut, steamed fish, Reuben sandwich. Soup: seafood gumbo. Vegetables: Spanish rice, pinto beans, peas, broccoli.

Thursday

Russian speakers — Practice Russian language skills from 11 a.m.-1 p.m. Feb. 3 in the Bldg. 3 cafeteria. For more information, call Jack Bacon, x38725, or Amy Mendez, x38066.

Cafeteria menu — Special: hamburger steak with onion gravy. Total Health: spicy new potatoes. Entrees: corned beef, cabbage and new potatoes, chicken and dumplings, meat ravioli, French dip sandwich. Soup: broccoli cheese and rice. Vegetables: navy beans, cabbage, cauliflower, green beans.

Friday

Cafeteria menu — Special: tuna noodle casserole. Total Health: broiled chicken breast. Entrees: deviled crabs, broiled pollock, liver and onions, broiled chicken with peach half, Reuben sandwich. Soup: seafood gumbo. Vegetables: Italian green beans, cauliflower au gratin,

steamed rice, vegetable sticks.

Feb. 5

NSS meets — The National Space Society Southwest Regional Conference begins at 9 a.m. Feb. 5 at the Ramada Kings Inn on NASA Road 1. Astronaut Story Musgrave is the featured speaker. For more information, contact Rich Kolker at 286-6070.

PSI seminar — The Clear Lake/NASA Area chapter of Professional Secretaries International will host a seminar from 8 a.m.-2 p.m. Feb. 5 at San Jacinto College South Campus on "Developing Positive Working Relationships." For information contact Elaine Kemp, x30556 or Diana Peterson, x30390.

Feb. 9

Astronomy seminar — The JSC Astronomy Seminar will meet at noon Feb. 9 in Bldg. 31, Rm. 129. For more information, call Al Jackson, 333-7679.

PSI meets — The Clear Lake/NASA Area chapter of Professional Secretaries International meets at 5:30 p.m. Feb. 9 at the Holiday Inn on NASA Road 1. For additional information, contact Elaine Kemp, x30556 or Diana Peterson, x30390.

Toastmasters meets — Space-land Toastmasters Club meets at 7 a.m. Feb. 9 at the House of Prayer Lutheran Church. For additional information, contact Dale Denais at x30432 or Steve Shields at x31941.

Feb. 10

Russian speakers — Practice Russian language skills from 11 a.m.-1 p.m. Feb. 10 in the Bldg. 3 cafeteria. For more information, call Jack Bacon, x38725, or Amy Mendez, x38066.

FD, MS DOS 6.2 & Windows 3.1. int modem, SoundBlaster sound card, 2 Labtec spkrs, 1 C/H model Mach 3 joystick & Microsoft mouse, \$1.5k OBO. Ed, 337-5392.

Panasonic phone answering mach, \$50; Panasonic phone answering mach w/voice day/time stamps, \$75; NCI Telecaption mach (VR100) \$50. Tom, 282-5236 or 480-7276.

Epson JX-80 color printer, \$125; Panasonic KX-P11092/9-pin printer, \$35; Panasonic KX-P1124/24-pin printer, \$65. 334-1934.

Panasonic 240, 4 channel stereo reel-to-reel tape deck, \$75; Sony TC2035D stereo cass deck, \$50; both \$100. Burt, x30856 or 332-2671.

SEGA Genesis game, Jungle Strike, \$40. Ron, x30887.

AT&T Model 382/310 Univ Sys V computer w/terminal, 32-bit WE 32100 chip, 10 MHz, 72 MB HD, 5.25" FD, 2 MB RAM, 6 RS-232C, serial ports, cart tape dr, \$300 OBO. Lore, x38477.

Kenwood TS-520S HF xcvr, 160-10 m, no WARC, \$300; Regency 10 m xcvr, AM/FM/USB, \$125. Steve, x41099 or 286-3440.

Technics Direct drive, auto turntable straight arm P-mount, Audio Technica cartridge, \$25. Ken, 333-7167.

Photographic

Celestron Ultima 8 telescope, complete factory pkg w/Astrophotography pkg & 35mm Nikomat, \$2.2k. 713-641-3919.

Musical instruments

Peavey 115 bass spkr enclosure w/15" Scorpio spkrs, \$190. Jim Bates, x31347 or 944-4687.

Pets & Livestock

Whippet, male, AKC, brindle, 1 yr old, all shots, neut, \$300. Doug, x48851 or 486-7412.

Zebra Finches w/seed, \$8 ea. Richard x39409.

Miniature Schnauzers, one wht female, 1yr old w/papers & kennel, was, \$350, now \$100; one wht male, 3yrs old, w/papers, allergic to flees, free. x31888 or 477-6115.

Free puppies. x35107.

Lost & Found

Lost: man's tie clasp, gold color, alligator clip. Earl Rubenstein, 480-1998.

Household

GE cooktop, white, \$20; stove vent hood, wht, \$10; var light fix, cheap. Jim Bates, x31347 or 944-4687.

Kitchen chairs, 4 w/cane back, chrome legs, \$35; file dwr, \$10; laundry hamper, \$10; two capt chairs refin non-matching, both \$40; sm refin phone table w/dwr, \$10; elect one burner hot plate, \$5. 488-5564.

Mahogany DR set, table w/2 leaves, pads, 5 chrs, buffet, china hutch, \$800. Brad, x30453 or Lisa, 474-5609.

Rattan table, 42" glass, four chairs; brass day bed w/trundle; TV/mw carts; computer desks w/hutches & printer stand; new daybed/twin bedding & pillows; child's desk/chair. 996-8365.

Rocking chair, \$15; 2 wing chrs w/ottoman, \$60 ea; 2 school desks, \$10; bunk beds w/matt, \$60; 2 bar stools w/cushions, \$17 ea; men's 12 spd bike, \$70; lg oval school table \$80. 486-1888.

Brass bed, qn sz, Sealy Posturepedic firm matt & box spring, rails, headboard, footboard, was \$600, now \$250 OBO. x31219 or 409-943-4627.

Litton microwave oven, autocook, \$75 OBO. Helen, x38413.

Black shelf, IKEA, 6.5' tall, 31.5" w, 6 movable shelves, \$80. 332-5949.

Vacuum cleaners, 1 Hoover self-propelled & 1 Hoover Dial-A-Matic w/attach, ex cond. 286-8822.

Kenmore electric dryer, \$75. 538-1347.

Two mirrors, 3' x 8": one mirror, 3' x 4"; two beveled mirror strips, 4" x 8", all mounting hdw, \$135 OBO. Rob, x38061 or 486-1804.

Sears lg capacity electric dryer, all cycles, \$75. Fran, 282-5266.

Sears microwave, 750 watt, \$100. 280-0502.

Bedroom dresser, 3 lg drws, 3 sm drws, & matching mirror, make offer. x38278 or 334-7258.

Scandinavian 2 pc blue sectional sofa, \$100. 333-7010 or 482-5393.

Wanted

Want riders for van pool, West Loop park and ride to NASA/contractors. Richard, x37557.

Want van pool riders from Sugarland, Westwood park & ride, to JSC area via HOV. Alice, x35234.

Want M/F non-smoker roommate(s) to share spacious LC 4-2.5-2, neg. x31456 or 538-1596.

Want non-smoking room mate to share 3 BR house in Seabrook, \$300/mo + 1/2 util. Steve, x41105 or 532-1405.

Want room mate, 3-2-2, 2 rms 1/2 garage w/opener, prefer female. John D., x49673 or 484-7890.

Want non-smoking room mate to share house, off Egret Bay, \$200/mo + util. Rick, x47373.

Want non-smoker to share ride from Sugarland to JSC, 7:30 am to 4:00 pm. x41150.

Want non-smoker to rent furn rm in Seabrook, W/D & kitchen usage, avail Jan 1st. 474-3581.

Want room mate to share 3 BR home, \$250/mo + util. 291-9243.

Want Igloo dog house for lg dog. Bill, x32720 or 485-0237.

Want non-smoking female room mate to share house in Pipers Meadow, \$365/mo all util incl. x47485 or 286-3101.

Miscellaneous

Pres & First Lady Gold membership, \$900; ladies'ski boots sz 8, Salomon SX-81, \$100. x35753 or 337-2002.

Raichle RX60 men's ski boots, sz 9-1/2. \$60; ski jacket, sz XL. \$30; Hotfingers gloves, sz M, \$10; 52" Reflex poles. \$10 OBO. 333-7552 or 286-6620.



All in the Wrist

Inch-thick computer will keep 500 pages of data at space walkers' gloved fingertips

By James Hartsfield

On Earth, they've gone from desktops to laptops to palmtops, but in orbit, the latest garb may soon be a "wrist-top" computer that will allow space walkers to track a hectic schedule when they are a long, long way from the office.

The Electronic Cuff Checklist will attach to the forearm of a space suit and can hold more than 500 pages of information, including graphics and even photographs, to display on a 3-inch by 4-inch screen. And at its thickest point, the battery-powered unit is only an inch deep, said Joey Marmolejo, Project Engineer for the checklist in JSC's Crew and Thermal Systems Division.

The standard checklist now worn by space walkers is a printed notebook, usually 25-50 pages long, worn on the cuff of the space suit during an extravehicular activity. Switching to an electronic form holds many benefits, Marmolejo explained.

"We're already moving toward larger, more complicated EVAs as, for example, on STS-61," he said. "That means bigger checklists, and the volume of information will increase even more as we move toward constructing the space station. An electronic medium is a much more efficient way to access large amounts of information."

The unit is basically the same size as the printed checklist now used. But, unlike the current checklist, the Electronic Cuff Checklist will have the capability to be altered during a flight.

"Information can be loaded into the

checklist on orbit from a laptop or other computer carried on the shuttle," Marmolejo explained. "That allows you flexibility to cover real-time changes in plans, such as occurred during the Intelsat mission. Such flexibility will be a necessity for the long-term operation of the space station."

During the Intelsat recovery mission, STS-49 in May 1992, crew members and

ground controllers worked together to develop an alternative—and ultimately successful—plan to recover the wayward communications satellite. The plan resulted in extensive alterations to the EVA checklist and included diagrams important to the positioning of three astronauts who grabbed the satellite by hand.

The Electronic Cuff Checklist's flat screen has a resolution roughly equivalent to that of a standard television set — 320 by 240 pixels — that will allow it to complement newly added shuttle equipment such as the Electronic Still Camera. Photographs taken with the camera or transmitted from the ground could be loaded into the checklist to assist with unexpected space walk work

that has to be planned on the spot.

The screen is touch-sensitive and designed for easy operation when wearing bulky space suit gloves. The device has been developed quickly with NASA Headquarters advanced program funding, beginning with an early feasibility unit in 1992.

"We did a lot of homework in putting this

checklist together," Marmolejo explained. "For instance, we originally had 24 different concepts for how to access information. Following an evaluation by six crew members, we finally decided on splitting the screen into a

field of six, what we called a sextant approach."

The six different touch-sensitive screen buttons allow instant access to various categories of information, including airlock, generic payload operations, mission-specific payload operations, space suit malfunctions, normal EVA status and orbiter operations. Whenever a user pushes a button, the next level of menu information is displayed. For example, after pushing the airlock button, the user would

see a menu of categories including depressurization, depressurization malfunctions, egress, ingress and repressurization. After pushing the "REPRESS" button, the user would see a detailed checklist of operations that need to be completed.

No matter what is displayed on the screen, the astronaut always has instant access to special functions.

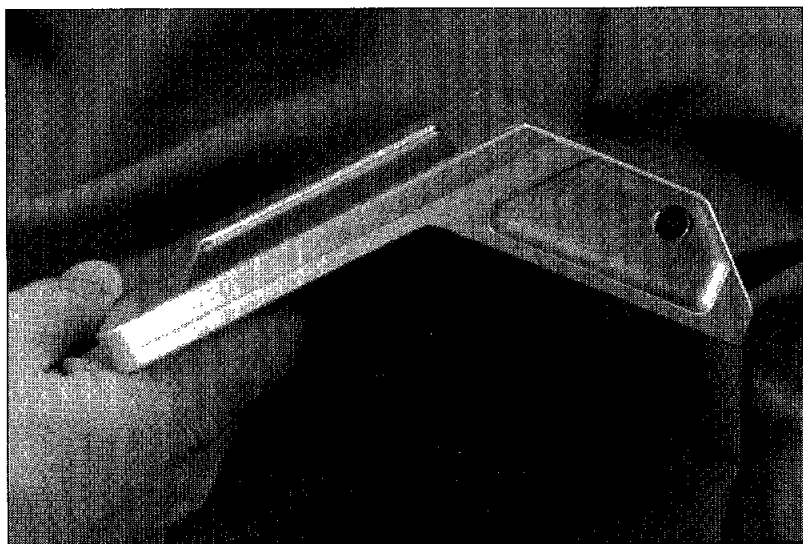
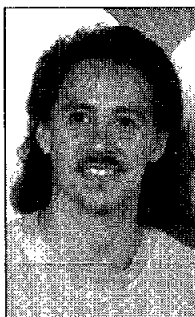
"A touch and hold feature built into the unit allows ready access to a number of special functions, including an emergency page," Marmolejo said. Other features include a mission elapsed time clock and an EVA elapsed time clock, he added.

Two development units were the first hardware to be built, one that used both toggle switches and a touch screen and another that used only a touch screen. Following the evaluations of these, a certification unit was built that was touch-sensitive only and smaller than the development units. A critical design review of the Electronic Cuff Checklist was completed last month. A unit suitable for a shuttle flight test will be built next and may be flown this year, Marmolejo said. The development team is targeting a possible flight experiment on STS-64 in September.

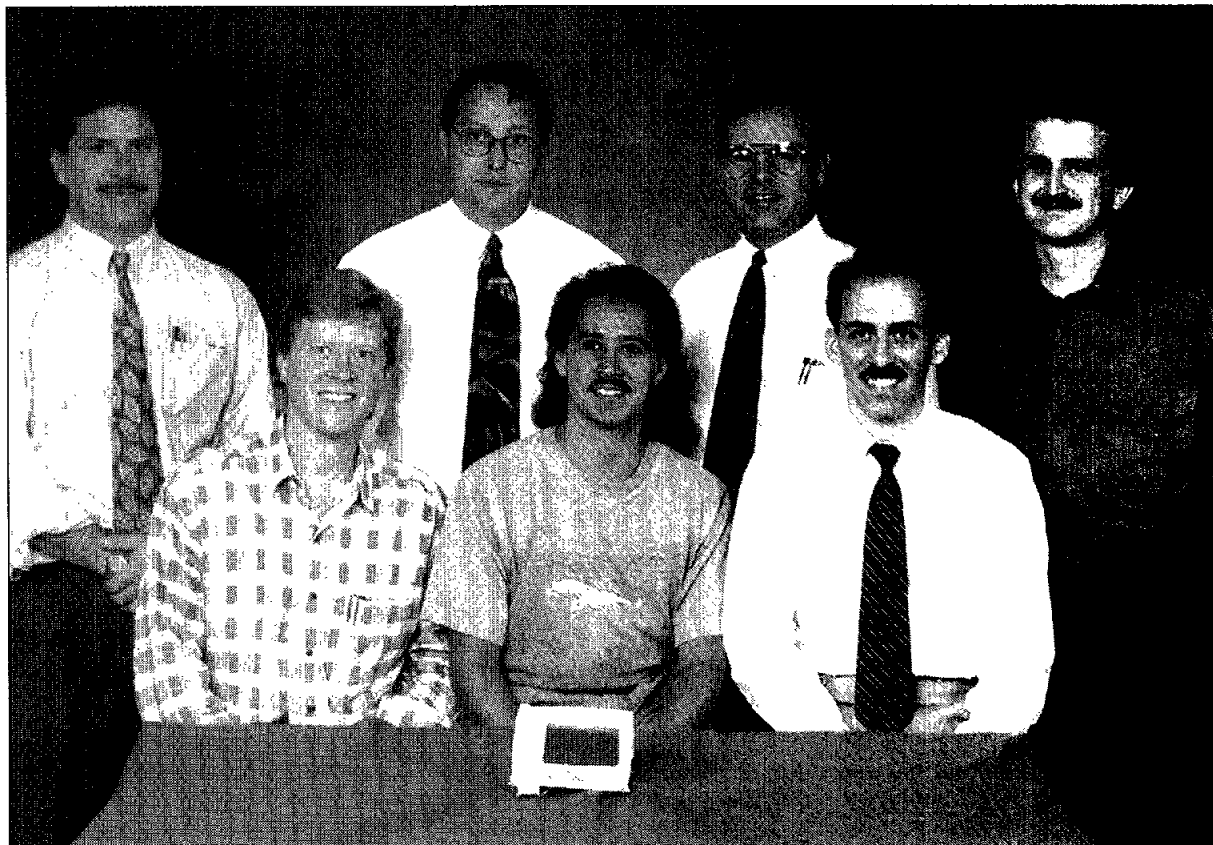
The checklist, with about two megabytes of memory, is powered by standard AA batteries and can operate up to 12 hours on one battery pack. Although an inch deep at its thickest point, the two-pound unit in most places is a half-inch thick or less. "And we hope to get it even smaller," Marmolejo added. □

Information can be loaded into the checklist on orbit from a laptop or other computer. Such flexibility will be a necessity for the long-term operation of the space station.

—Project Engineer Joey Marmolejo



MAIN MENU		
AIRLOCK	HUBBLE SPACE TELESCOPE	GENERIC PAYLOAD OPERATIONS
EMU MALS	NORMAL EVA STATUS	ORBITER OPERATIONS
STOPWATCH	PRIOR PROCEDURE	UNDO
MAIN	EMU	EV/IV



Top: Lockheed engineer Pat Hannock checks the fit and function of the new Electronic Cuff Checklist, designed to hold up to 500 pages of information, including photographs and diagrams. Above: The electronic checklist development team included, from left Steve Maignaud, Pat Hannock, Larry Walters, Project Engineer Joey Marmolejo, Buddy Brown, Paul Cottingham and Kent Vinson. Above left: Stripped of its fabric covering the electronic device's compact size and shape can be easily seen. Below left: The main menu for the Hubble Space Telescope servicing mission checklist would have looked like this.

JSC Photos

Van Laak receives AIAA award

James Van Laak, manager of integrated performance and risk management for the Space Station Program Office, received the American Institute of Aeronautics and Astronautics Aerospace Maintenance Award at a ceremony on Thursday in California.

In this position Van Laak is responsible for developing the capability to assess and manage all aspects of program performance and risk, including technical, cost, schedule and safety. According to the award nomination, "the survival of our system on-orbit will be due in large part to his creativity, tough management, and hard work."

The Aerospace Maintenance Award recognizes an individual who develops and implements new maintenance concepts and aids in the resolution of key aerospace issues. The award will cite "outstanding leadership in the definition of processes for and control of the resources for Space Station Freedom Maintenance Program." Van Laak received the award in conjunction with the Reliability and Maintainability Symposium held Jan. 27 in California.

JSC

People

Smith honored for research

James Smith of JSC's Structures and Mechanics Division is the recipient of the 1994 Abe M. Zarem Award for Distinguished Achievement.

The award is presented annually to students pursuing advanced degrees in the categories of either aeronautics or astronautics.

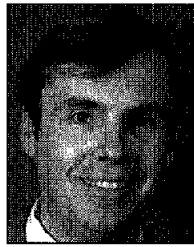
Smith accepted the award in the astronautics division at the recent Aerospace Sciences Meeting and Exhibit of the American Institute of Aeronautics and Astronautics.

The prize recognized Smith's paper "Hypervelocity Impact on Shielded Plates." The paper was the product of research Smith conducted while pursuing a Master's degree in Mechanical Engineering at Rice University.

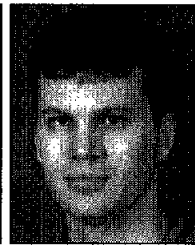
Krishen elected IEEE Chairman

Kumar Krishen, Chief Technologist at JSC was elected 1994 Chairman of the Institute of Electrical and Electronics Engineers, Galveston Bay Section.

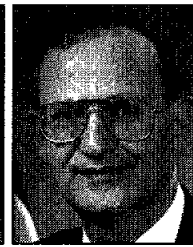
"Our focus is to serve the needs of our



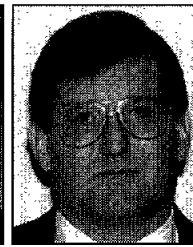
Van Laak



Smith



Krishen



Gish



Way

members and advance the field of electrotechnology and photonics through unique contributions of our members," said Krishen. The IEEE Galveston Bay Section has more than 1100 members and "has excellent programs which include education, recognition of individual contributions, training and retraining through lectures, conferences and seminars, and general advancement of the professional," he added.

Gish gets procurement post

Randy Gish was appointed Deputy Director of Procurement replacing J. P. Harris, III who retired Jan. 3.

Gish most recently was chief of the Space Shuttle Procurement Division. He joined JSC in 1981 and holds a B.A. degree in Political

Science and a Masters degree in Public Administration.

Way receives Bocking award

Georgia Way recently has recently received the Marilyn J. Bocking award for secretarial excellence.

Way, secretary to the chief of the Procurement Support Division, was recognized for her efforts in supporting the 30 civil service and support personnel in the division, and assistance in coordinating the NASA/Industry Conference, NASA Minority Business Resource Advisory Committee and the Procurement Management Review meetings.

She is "an outstanding professional administrator and executive secretary" according to the award nomination.

Mission Control viewing hours

The Mission Control Center viewing room will be open to JSC and contractor badged employees and their families during portions of the STS-60 mission.

Based on a Thursday launch, employees will be allowed to visit the MCC Friday from 11:30 a.m.-2:30 p.m. and 5-7 p.m.; and Sunday from 1-5 p.m.; Feb. 7 from 11:30 a.m.-2:30 p.m.; Feb. 8 from 11:30 a.m.-2:30 p.m. and 5-7 p.m.; Feb. 9 from 11:30 a.m.-2:30 p.m. and Feb. 10 from 11:30 a.m.-2:30 p.m. and 5-7 p.m.

There will be no scheduled viewing hours on Feb. 11 due to the planned landing.

Employees must wear their badges and escort family members through the regular public entrance on the northeast side of Bldg. 30. Children under 5 will not be permitted. No flash photography or loud talking will be permitted at any time.

Because of the dynamic nature of shuttle missions, viewing hours may be changed or canceled without notice. For the latest information on the schedule, call the Employee Information Service at x36765.

Ethics courses set to begin

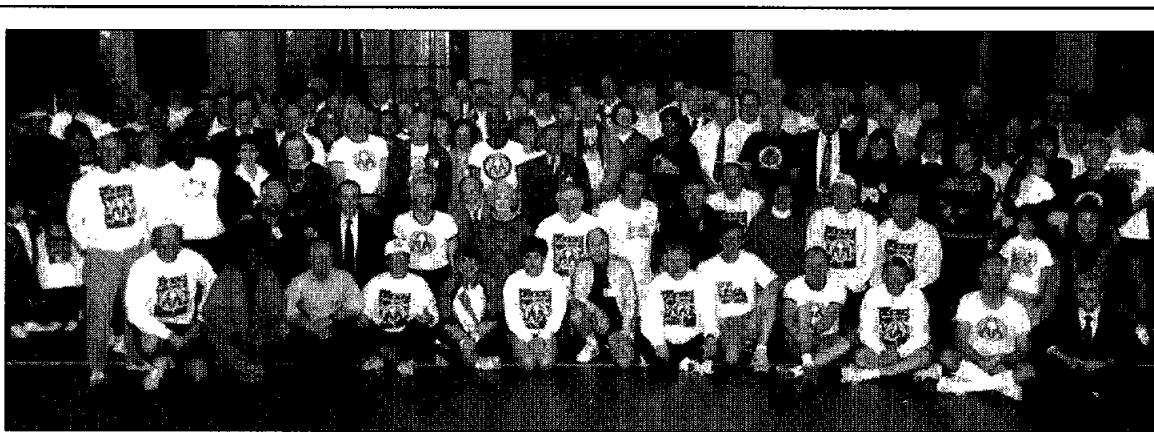
This year's annual ethics training classes will begin Feb. 17 for employees who have filed public or confidential financial interest statements or were contracting officers or procurement officials in 1993.

Three sessions will be held on each of eight Thursdays through May 12 in the Bldg. 30 auditorium. About 120 employees will be scheduled alphabetically for each class and notified several weeks in advance of their scheduled date. A JSC attorney will be present to answer questions at all training sessions.

The ethics training classes provide an overview of the standards of conduct adopted by NASA last year as part of a move to standardize the ethics rules followed by all executive branch employees.

The basic ethical principles are: that public service is a public trust and employees must put in an honest effort in the performance of their jobs; that employees may not use public office for private gain; that preferential treatment is not to be given to private organizations or individuals; that employees may not misuse government property, resources or inside information; that employees must disclose fraud, waste and abuse; that employees may not have financial interests that conflict with the performance of their duties; and that employees may not accept gifts from contractors or others seeking to do business with NASA.

For more information, contact the JSC Legal Office at x33021.



JSC Photo by Robert Markowitz

DECADE OF FITNESS—The original class from JSC's Health-Related Fitness Program gathers on the Gilruth Center gymnasium floor for a 10th anniversary photo. The front two rows are members of the original class of 72; 80 percent of those finished the 12-week course. The rest are from among the 1,846 that have participated in the program since its inception. Program Director Larry Wier said that more than 40 percent of the original group still gets 90 minutes of aerobic exercise a week, and that those people have actually lowered their cholesterol and body fat while improving their aerobic capacity. In contrast, the rest of the JSC population has gained cholesterol and body fat and lost aerobic capacity as it has gotten older.

STS-60 crew mates learn about each other

(Continued from Page 1)

Davis will be the primary robot arm operator during deployment of the Wake Shield Facility, but Sega and Krikalev also will maneuver the arm to conduct experiments and retrieve the satellite.

The mission requires precision flying by Bolden and Reightler. "It's been fascinating," Reightler said. "I've learned a lot. It hasn't been a cakewalk. I can't wait to go up and do it."

For Krikalev the most interesting aspect of the STS-60 mission is flying on the space shuttle itself. "I have a long period of time flying on the Mir station and Soyuz vehicle," he said. "But this is a new vehicle, new hardware, new experiments, some similar, but flying a new vehi-

cle is interesting for every astronaut, every pilot."

During their pre-flight news conference, crew members discussed training for the upcoming mission and the objectives they hope to complete during the eight-day mission. Krikalev said he was surprised with the similarity of the U.S. and Russian training programs.

"We found a lot of different things," he said, "but I remember my first impression, what surprised me, was how similar (training) was."

"Being a cosmonaut is different than being an astronaut, we have learned," Bolden said. "There are a lot of things we do that are alike, but there are an awful lot of things we do that are drastically different."

"We were treated like any other

astronaut here," Krikalev added. "This was exciting for us because we feel we are among our colleagues and we were pretty much like our colleagues."

"I'm really looking forward to flying with Sergei," Davis said. "We've had a lot of fun training together, not only with shuttle activities and RMS (remote manipulator system) activities, but also teaching him baseball. It will be interesting flying with him and using his experience and insight."

The crew members believe they have benefited from the experience of working together. "The amount of experience represented (in this crew) is extraordinary," said Sega. "I feel I am a very, very lucky individual" to be a part of this mission."

Observances to celebrate empowerment

(Continued from Page 1)

rights demonstration involving school desegregation, and he served more than four years in jail. The conviction was overturned in 1980 by the U.S. Fourth Circuit of Appeals.

Chavis also served on the Clinton/Gore Transition Team for the Natural Resources Cluster, which

included the Departments of Energy, Interior and Agriculture, and the Environmental Protection Agency.

A limited number of luncheon tickets are available for \$8.50 each until close of business Feb. 4. Tickets may be purchased from Black Employment Council members Mary Broussard, 282-6840; Terry Gobert, x32849; Clarence

Ross, x45095; LeBarian Stokes, x38965; Johnnie Moore, x31762; Patricia Burke, x30601; Judith Stoval, x37735; Ulrica Kelly, 280-2261; or Maria Owen, 282-3791.

All JSC civil service and contractor employees are invited to attend as their workloads permit. For more information, call the Equal Opportunity Programs Office at x34831.

Organizations promote professionalism in secretarial career

JSC secretaries interested in achieving Certified Professional Secretary status may take advantage of CPS examination review classes being offered by the Human Resources Development Branch.

The courses will be taught by San Jacinto College faculty in Bldg. 45 at the central campus site beginning Feb. 8 and continuing through Nov. 15. The CPS examination is given twice a year, the first Friday and Saturday of May and the first Thursday and Friday of November. Applications for the

May test are due no later than March 1, and for the November exam by Sept. 1.

The class schedule is Accounting, 1-4 p.m. Feb. 8-April 5; Economics and Management, 1-4 p.m. April 12-May 17; Business Law, 3-6 p.m., July 7-July 12; Office Technology, 3-6 p.m., July 19-Aug. 23; Office Administration and Communication, 3-6 p.m., Aug. 30-Oct. 4; and Behavioral Science, 1-4 p.m., Oct. 11-Nov. 15.

JSC secretaries wishing to attend should submit a Standard Form 75 to Diana Peterson, CPS at

AH3 a few weeks before the date of the desired session. On-site contractor secretaries may attend, but must pay San Jacinto College directly.

For additional information on the CPS review course, contact the Human Resources Development Branch at x33077.

Secretaries also are invited to attend meetings of the Clear Lake/NASA Area Chapter of Professional Secretaries International, the world's leading professional association for secretaries.

PSI meets at 5:30 p.m. on the

Dual-use round table discussion set for Tuesday

Prominent dual-use technology experts from NASA and Texas will participate Tuesday in a round-table discussion open to all JSC and contractor employees.

The plenary session at 9:30 a.m. in Teague Auditorium is part of the "Dual-Use Space Technology Transfer Conference" being hosted by JSC at the Gilruth Center next week.

Among the expected participants in the free session will be Dr. Carolyn Huntoon, JSC director; Jim Kollaer, chairman of the Greater Houston Partnership chairman; Greg Reck, NASA associate administrator for advanced concepts and technology; Wayne Alexander, chairman of the Texas Aerospace Commission; Dr. George Kozmetsky, director of the IC2 institute and recent recipient of the National Technology Medal; and Kumar Krishen, JSC chief technologist.

"NASA is excellently posed to share its research and technology with the nation's industrial community," said Krishen. "This conference is intended to inform industry of our existing programs and available mechanisms for technology transfer."

The three-day conference begins at 7:30 a.m. Tuesday at the Gilruth Center. The conference will feature more than 30 exhibits and 100 papers devoted to promoting technology transfer from the space program to business and industry.

In Memoriam

Edward C. Ezell, supervisory curator of the Armed Forces History and Medical Sciences Division at the Smithsonian Institution's National Museum of American History, died at home on Dec. 23.

In addition to his study of military technology, Ezell worked as a historian for NASA at JSC from 1974 to 1982. During that time he co-authored two space project histories, *The Partnership: The Apollo-Soyuz Test Project and On Mars: A History of NASA's Explorations of the Red Planet*.

second Wednesday of each month at the Holiday Inn, NASA Road 1. The next meeting is set for Feb. 9.

The Clear Lake/NASA Area chapter is hosting a seminar on "Developing Positive Working Relationships" from 8 a.m.-2 p.m. Feb. 5 at the south campus of San Jacinto College. The seminar will focus on techniques for adapting basic behavioral style to be more effective in the workplace.

For additional information on joining PSI or attending the seminar, contact Elaine Kemp at x30556 or Diana Peterson at x33077.