



Hurricanes are now in season, but JSC is prepared to weather the possible storms. Story on Page 3.



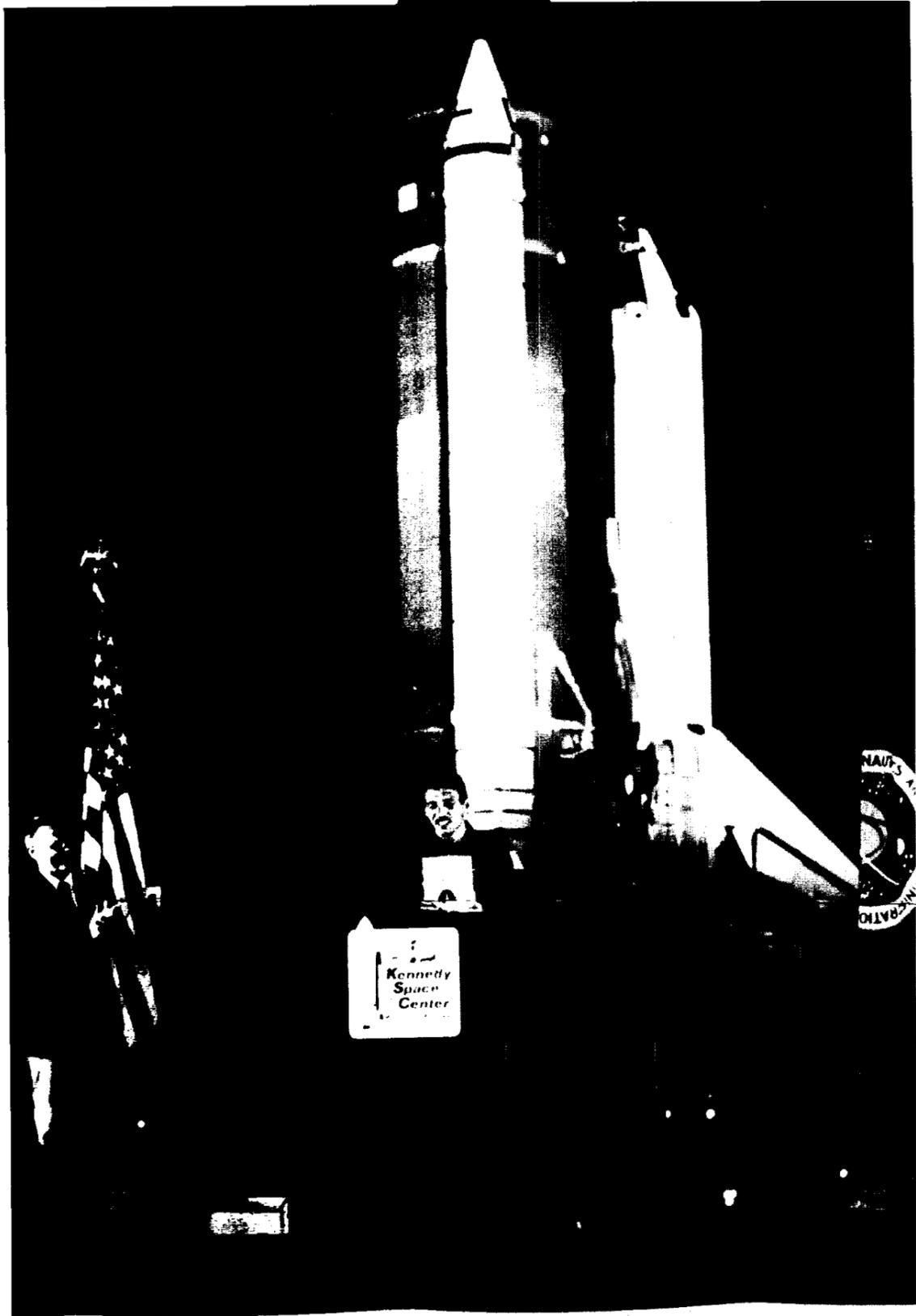
The crew of STS-26 steps up their training as the return to flight moves ever closer. Photo on Page 4.

Space News Roundup

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Discovery rolls out to pad 39B

By James Hartsfield

After a heralded Independence Day unveiling, *Discovery* is now firmly on the launch pad at Kennedy Space Center, primed to return America to space in early September.

The Shuttle stack emerged from Kennedy's Vehicle Assembly Building (VAB) shortly before midnight central time on Monday, and was greeted by a throng of jubilant spectators as it began a march to Pad 39B accompanied by the strains of the national anthem.

Excitement, anticipation and pride were evident as the cheering crowd released pent-up emotions. Awash in floodlights, *Discovery* crawled slowly and deliberately past the ceremonies as representatives of the crew, Kennedy and NASA Headquarters let their thoughts flow freely.

"The mark of a great nation, of its greatness, is that it can rise again from adversity. And with *Discovery*—rise again we shall," STS-26 Mission Specialist Dave Hilmers said. "What more fitting present could we make to our country on the day of its birth than this? America, the dream is still alive."

Hilmers gratefully accepted a book filled with signatures from more than 15,000 KSC workers. With obvious emotion, he detailed their achievements. "You haven't given this book or this Shuttle to just the five members of the crew. Indeed, you've given it to all Americans," Hilmers said. "What an incredible privilege it is for those of us on the crew to be entrusted with this magnificent machine. Because of your hard work and diligence, we know our journey into space will be a safe one. We'll be taking a part of each one of you with us when we make that flight."

The signatures will fly aboard STS-26, Hilmers promised. "For over two years now, each one of us has had a dream that one day a Shuttle would

once again make its way to the launch pad to return Americans to space," he said. "And for over two years each of you has labored with incredible intensity to make that dream a reality. We on the crew pledge to you: We're going to strive with every ounce of our devotion, every ounce of our strength, to successfully complete the mission you've already begun."

In presenting the book, KSC Director Forrest McCartney said *Discovery*, with about 220 modifications, is the best prepared Orbiter ever to leave Kennedy's processing buildings. "The feeling of all of us is that we'd like to go along on that flight," McCartney added. "We can't be with them in orbit, but we can be there in spirit. This has come about because of hard work over many long, long months by the team, and I want to emphasize the team effort, not only at Kennedy, but

at Marshall and Johnson as well."

Deputy Director of Shuttle Operations Robert Crippen said the roll out of

Discovery was a fitting tribute to America on Independence Day. "This is what I call a happy Fourth of July. This is a proud day for the Kennedy Space Center, for NASA and for the entire United States of America," Crippen said.

The ceremonies ended with the national anthem, playing as *Discovery* moved away from the VAB on its 4.2-mile journey to the pad.

The Shuttle arrived at the launch pad at about dawn, and was properly locked in place before 8 a.m. central time. The cars of KSC employees, who had been granted special passes for the day, formed a steady procession past the pad until noon. Shortly afterward, the Rotating Service Structure was moved into place, obscuring the Shuttle.

This week, workers at the pad are connecting ground support equipment

Please see *Discovery*, Page 4



STS-26
The Return to Flight

Discovery begins its crawl to the launch pad, STS-26 Mission Specialist Dave Hilmers accepts a book containing the signatures of the more than 15,000 Kennedy Space Center workers who helped prepare the Space Shuttle for launch. The book will be carried into orbit by the crew.

Shuttle on pad encouraging

JSC reacts to sign of upcoming return to flight

After two and a half years of work without a flight, JSC employees say the sight of *Discovery* on the launch pad today is a light at the end of the tunnel, growing in brilliance.

"I'm looking forward to that feeling we haven't had in a couple of years, that feeling you have when you're flying, that feeling that makes it all worthwhile," Kerry Soileau, a flight dynamics officer, said Tuesday. "It's kind of like coming out of a tunnel."

JSC has been closing in on the return to flight, STS-26, for months. But no flow chart, calendar or view-graph can match the motivation and anticipation generated by visible evidence—a spacecraft poised on the launch pad, awaiting its crew.

"It's getting more exciting now, and

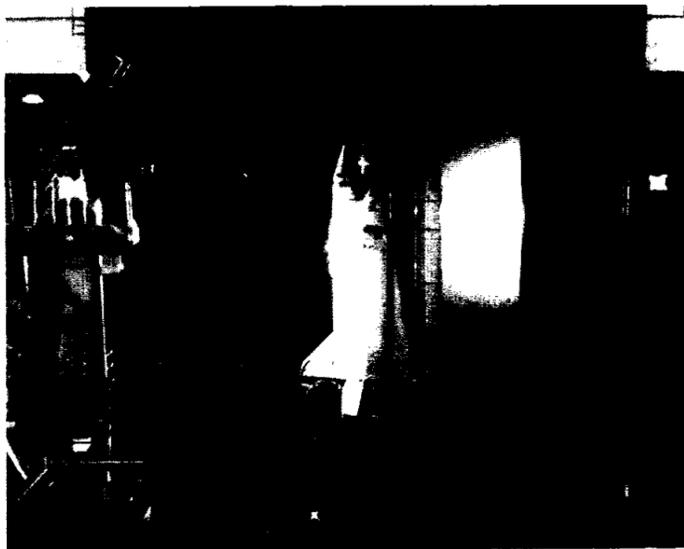
I think it will grow every day," said Cathy Donahoe, a member of the reconfiguration management support staff. Donahoe worked with payloads before her present assignment, and she is familiar with Kennedy Space Center, she said. "I know the people at KSC are just ecstatic. The Shuttle is a beautiful sight when it's on the pad with the lights shining on it. Things are really going; we're getting closer. To me, the big step will be the FRF (flight readiness firing)."

Brent Bradley, a proximity operations analyst, said he is pleased with the thoroughness of the Shuttle's preparation, but glad much of the work is over. "It's finally come through. Now you can feel that light ... we're ready to get back into space."

JSC Director Aaron Cohen said the months of work in readying *Discovery* for its return to flight are now visibly nearing fruition, and among the results is confidence in the success of the coming mission.

"Most of us here at JSC had to watch the roll out on television," Cohen said. "But I'm sure we all felt the same pride and excitement as the folks at KSC when that beautiful vehicle started toward the pad."

"We have good reason to be proud, because the people at this center have worked extremely hard the past two years doing everything they could to make sure that vehicle and the STS-26 mission are as safe as possible. I'm confident we have succeeded."



JSC employees and visitors watched video replays of *Discovery*'s roll out on Tuesday afternoon.

NASA Photo

Dates & Data

Today

Oxychem 4x2 mile relay—Male, female and mixed teams will compete at the San Jacinto Monument at 7 p.m. July 26. Those who wish to sign on with a team must do so by today. Entry fee is \$4. Call Patrick Chimes, x32397, for information.

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

Saturday

Olympic gymnastic finals—Gymnastics finals for the Seoul Olympics will be Saturday and Sunday at the Summit. For the men's optional finals, 2 p.m. Saturday, tickets are \$3.50; for the senior women's individual finals, 8 p.m. Saturday, tickets are \$4.50; and all-day tickets for the junior women's optional finals and senior men's and women's finals Sunday are \$8.50. Tickets are available through the JSC-EAA in Bldg. 11.

Astros vs. Mets—Tickets for field-level seats to see the Houston Astros play the New York Mets at 12:50 p.m. Saturday in the Astrodome are on sale through the JSC-EAA in Bldg. 11 for \$7.

Monday

Macintosh users meet—The NASA Area Macintosh Users (NAMU) will meet at 7 p.m. in the RSOC cafeteria at 600 Gemini. Admission is free, and anyone interested in Macintosh hardware and software is welcome.

Pressure Systems Week—Pressure Systems Week, with a theme of "Pressure in the Home" begins Monday and will continue with daily one-hour presentations on the safe handling of pressure containing devices in the home through Thursday. Presentations will be given at 10 a.m. in the Boeing FEPC MIC room and at 2 p.m. in Bldg. 350, Rm. 130 on Monday; at 10 a.m. and 2 p.m. in the Rec Center Rm. 204 on Tuesday; at 10 a.m. in the Bldg. 226N Learning Center and 2 p.m. in Bldg. 7, Rm. 141 on Wednesday; and at 10 a.m. and 2 p.m. in Bldg. 9, Rm. 113 on Thursday.

Scuba class—A five-week class begins at the Rec Center and will meet

from 6:30-9:30 p.m. each Monday and Wednesday. Initial fee is \$45, and an additional \$80 will be due at the first class.

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

Tuesday

Cafeteria menu—Entrees: smothered steak with dressing (special), shrimp creole, liver and onions, beef stew, navy bean soup. Vegetables: buttered corn, rice, cabbage, peas.

Wednesday

Professional secretaries to meet—The Clear Lake/NASA Area Chapter of Professional Secretaries International will have a social and dinner beginning at 5:30 p.m., and a regular meeting following at 7 p.m. Featured speaker will be Dr. Paul Fine from the Baylor College of Medicine on "What's New in OB-GYN." Cost of dinner is \$9, and anyone interested is welcome. For reservations, call Mary Todd, 282-3942.

Cafeteria menu—Entrees: salmon croquette (special), chicken pan pie, baked perch, roast beef, seafood gumbo. Vegetables: mustard greens, Italian green beans, sliced beets.

Thursday

Brown bag seminar—The JSC Employee Assistance Program (EAP) will sponsor a brown bag seminar at 11:30 a.m. in the Bldg. 30 Auditorium featuring UH-CL Industrial Psychologist Dr. Bob Cummins speaking on "Communication with Co-workers." For more information, call x36130.

"Candida" opens—The play "Candida" will be presented by the JSC-EAA and the University of Houston-Clear Lake as part of the Houston Shaw Festival nightly Thursday through July 17, July 23-24 and July 28-29 in the UH-CL Bayou Theatre. Tickets for a special preview performance Thursday are \$3; all other tickets are \$5 for NASA employees and contractors. For information, call 488-9334.

Cafeteria menu—Entrees: stuffed cabbage (special), ham and lima beans, beef tacos, beef and barley

soup. Vegetables: ranch beans, Brussels sprouts, cream style corn.

July 15

Cafeteria menu—Entrees: Salisbury steak (special), ham steak, deviled crabs, fried shrimp, seafood gumbo. Vegetables: buttered carrots, green beans, June peas.

July 16

Spaceweek parade—At 9:00 a.m. July 16, the 1988 Spaceweek Parade will travel on NASA Road 1 from Clear Lake Park west to the JSC main gate. The Houston Space Society will sponsor marching bands, VIP cars, displays and floats (including the Apollo space suit mock-up float). For details call Spaceweek headquarters at 480-0007.

Spaceweek fun run—A 5-kilometer Spaceweek Run will be at 7:30 a.m. July 16, at the Rec. center. For details, call 532-1254.

Model rocket gala—More than 100 model rockets will be flown in honor of Apollo 11's 19th anniversary behind JSC's Saturn V at 1:30 p.m. on July 16, or July 17 in case of rain.

Spaceweek banquet—The keynote speaker for the Spaceweek National Banquet at 6:30 p.m. Hobby Airport Holiday Inn will be Donald Fink, editor-in-chief of Aviation Week and Space Technology. For more information, call 480-0007.

Posters displayed—Space posters will be displayed in conjunction with Spaceweek in Houston public libraries, various other area libraries and at the Burke Baker Planetarium near Herman Park in Houston July 16-24. Observatory tours of the museum are scheduled for the same days. Call Caroline Summers, 526-1763, for more information.

JSC-EAA river raft trips—Ticket sales will continue through July 11 for two JSC-EAA trips to raft down the Guadalupe River July 16. A day trip for \$27 and an overnight trip for \$69 are offered. For more information, call x35350.

July 18

Noon lectures—A noontime Spaceweek lecture series featuring daily speakers on space-related topics is planned July 18-22 in Houston. For details, call 480-0007.

Evening lectures—An evening Spaceweek lecture series with films on

space-related subjects and displays is planned at 7:30 p.m. July 18-21 in the INNOVA building in Houston. Confirmed speakers include: Gerry Griffin, president of the Greater Houston Chamber of Commerce, and John Getter of Channel 11. "Gas Stations in Space" will be discussed by Lockheed engineer Larry Freezen, and JSC Planetary Scientist Dr. Wendell Mendell will speak on "Space Exploration and Beyond." For more information, call Joey Carignan at 480-0007.

Boeing tours—Guided tours of Boeing Corp.'s Flight Equipment Laboratory, 1045 Gemini, may be scheduled by reservation from 2-3 p.m. July 18-22. Visitors will see preparation of flight equipment used on Space Shuttle missions. Call Julia Sorrels at 280-2023 for more information.

JSC lectures—A noontime lecture series will be hosted by JSC engineer Larry Abbott and Dr. Kumar Krishen in the Bldg. 2 auditorium from noon to 1 p.m. July 18-22.

July 19

Spaceweek medical symposium—"Advances in Medicine from Space Exploration: Gifts from the Future" will be the topic of a free public symposium 10 a.m.-12:30 p.m. July 19 in the Bldg. 2 auditorium.

July 20

Spaceweek lecture—Ed Donoly, chairman of Air Products and Chemicals for Commercial Development of Space Industry, will discuss U.S. competitiveness with Europe and Japan, and the use of space resources for the creation of "new wealth" from noon to 1:30 p.m. July 20 at the Houston Club.

Men's Open C toumey—This is the final day of registration for a Men's Open C softball tournament planned July 23-24 at the Rec Center. Entry fee is \$95.

July 23

Space environment—"Environmental Interpretation of Manned Flight and Space Photography" will be the topic of Astronaut Mary Cleave's Spaceweek discussion and slide presentation at 2 p.m. July 23 at the Armand Bayou Nature Center. Call Laura Lehtonen, 474-2551, for details.

Clown's play—The JSC-EAA will sponsor a special children's Clown's play,

a new version of Jack and the Beanstalk, at noon July 23 in the Satellite Theatre at UH-CL. Tickets, available at the Bldg. 11 Exchange Store, are \$2 for ages 18 and under, \$3 for adults. For more information, call Susan Starkweather, x36608.

July 26

Lunch and learn—Stefan Roesler from the Department of Mechanical Engineering, University of Stuttgart, West Germany, will be in the Bldg. 3 cafeteria 11:30 a.m.-12:30 p.m. for a "Lunch and Learn" meeting sponsored by the American Institute of Aeronautics and Astronautics' Thermophysics Technical Committee. Anyone interested is welcome to attend. For information, call Adul Hye, 333-6515.

Aug. 4

Ballroom dancing class—Professional instruction in beginning, intermediate and advanced ballroom dancing begins and will continue each Thursday for eight weeks at the Rec Center. Advanced class meets 7-8:15 p.m. Beginning and intermediate class meets from 8:15 p.m. Cost is \$60 per couple.

Aug. 6

Children's lunch—A luncheon theater for children, featuring the Texas Mime Theater, jugglers and a clown, will be sponsored by the JSC-EAA at noon in the Rec Center. Tickets are \$2.50 for adults and children at the Bldg. 11 Exchange Store. For more information, call Susan Starkweather, x36608.

BAGSUG meeting—The Bay Area GS Users Group (BAGSUG) will meet at 2 p.m. at the Thomas Avenue Baptist Church. For more information, call Demetrius Roberts at 476-0069 after 4:30 p.m.

Aug. 26

SEDS conference—The Texas area chapters of the Students for the Exploration and Development of Space will sponsor an international conference at the Nassau Bay Hilton through Aug. 28. The conference will feature JSC tours, a space career exposition and several well known speakers from the space industry. For more information, call Peter Lange, x30850.

JSC

Swap Shop

Property & Rentals

Lease: Friendswood/Heritage Park, 3-2-2, 1,600 sq. ft., FPL, cul-de-sac, fans. Rob, x32575 or 482-4588.

Sale: Pasadena/So. Houston, 3-1.5-2 brick, carpet, miniblinds, drapes, appl., fenced, near schools, ex. cond., \$47,900, assum. 8.5% loan, \$338/mo., \$18,900 equity, \$5,000 down, owner finance remainder. 941-5908.

Rent: mobile home lot, \$85/mo., \$50 dep. Baker and Kinne, Bacliff. 488-1758.

Sale: College Station, mobile home, 2 mi. south of Texas A&M off Wellborn Road. Terry White, x35111 or 332-5177.

Rent: Egret Bay, The Villas, 2-1.5-2 CP, FPL, large kitchen, all appl., microwave, fans, view of water, sec. gate, \$500/mo. Mike, 333-4149 or 280-8566.

Sale: Lake Conroe/Harbor Point waterview lot, near boat launch. 486-9648.

Sale: League City/Kemah area, near Hwy. 518, 3-2, carport/garage, all elec., deep well, 1.33 acres, \$86,000. 334-1883.

Sale: Kemah, 111' x 180' lot, near Hwy. 518, \$8,200. 334-1883.

Lease: Lake Livingston waterfront house, 3-2, fully furnished, covered deck, pier, fishing, skiing, swimming, weekend & weekly rates. 482-1582.

Sale: Heritage Park, 3-2-2, new school, \$58,000 or assume 24-yr., 11.5% loan, low down pmt., \$658/mo. 996-0702.

1975 double-wide mobile home, 3-2, air/heat, ex. cond., \$14,900. Dick, 280-7411 or 332-3678.

Rent: Galveston Victorian Gulf-front condo, sleeps 6, fully furnished, 2 swimming pools, 3 whirlpools, 2 tennis courts. 480-5270.

Sale: Friendswood repossessed wooded lot, on cul-de-sac, near shopping and schools, \$17,225. Frank, x30891.

Cars & Trucks

'80 Datsun, 210, brn., 2 new tires, eng. in good cond., \$7K mi., \$950, OBO. Jim, 280-7335 or 488-4820.

'87 Toyota van, front and rear A/C, auto. overdrive, bed, ex. cond., \$13,800. 474-3181.

'84 Mazda, 626 Mod., ex. cond. 488-7861.

'81 Honda Accord, 4 dr. sedan, auto, A/C, AM/FM, 1 owner, new brakes, muffler & starter, 100K mi., \$1,999. 474-3507.

'78 23' Prowler travel trailer, sleeps 6, full bath, gas or elec., A/C, ex. cond., \$3,800. (409) 948-0113.

'84 Camaro Z28, cruise, tilt, tint, stereo, ex. cond., \$7,800. Chris, x30225.

'79 Camaro, new paint, black/red int., new

tires, ex. mech. cond. 280-7625 or 486-7590.

'82 Cutlass Supreme, V6, A/C, AM/FM radio-cass., rebuilt trans, ex. cond., \$3,500, OBO. 481-0440 or 280-1213.

'77 26' Winnebago Chieftan, low mi., O'Nan power, A/C, bath/shower, self-contained, sleeps 6, \$8,500. 944-2984.

'88 Chevrolet Beretta, never driven, A/C auto. trans., cruise, AM/FM radio, front & rear carpeted floor mats, (KX option package 3 w/auto. trans). Debra, 931-1651.

'85 35' Mallard motor home, loaded, low mi., \$37,000, OBO. 337-4051.

'81 Pontiac Phoenix, AM/FM, PS, PB, 80K, \$900. 532-1223.

Cycles

Bataros moped, made in Holland, max. spd. 28 mph, 530 mi., \$200. Samouco, x35053.

'86 Kawasaki KX500 dirt bike w/leathers, boots, helmet, Oakley goggles & belt, \$1,800, OBO; Suzuki RM250 dirt bike, \$350, OBO. 944-3231.

Boats & Planes

12' Jon boat w/5.5hp Johnson, gas tank, \$350. x36563 or 996-7406.

'85 27' Newport sailboat, fully equipped, looking for three partners to lease my boat, \$130/mo. plus insurance. Rob, x32575 or 482-4588.

16' Del Magic Infinity Hull w/200hp Evinrude, \$2,950, or partial trade for car. 486-9648.

Pulsar windsurfer 4.5 meter gastra sail, beginner and intermediate board, \$400. Mark, 474-2214.

Lasar sailboat, w/trailer, extra centerboard, rudder and battens, \$1,000. Paul, 480-8357.

Audiovisual & Computers

Commodore 1541 disc drive, \$75, SCM TP-1 ltr. qual. printer w/interface, \$80; VIC-20 keyboard/recorder, \$35. Sprake, 474-5532 or 326-2794.

256k RAM chips 120ns, were \$200, now \$155 each bank, 8 left; 256k RAM chips 100ns, were \$250, now \$200 each bank, 4 left. Mark, 333-7347.

Epson FX80 printer, parallel I/F, text and graphics, ex. cond., \$175. Ted, x30621 or 474-2214.

Household

King size waterbed w/6-drawers storage base, \$175. Janet, 474-2622.

Bedroom set, kingsize bed, chest, dresser w/ mirror, night stand, ex. cond., \$450. 474-3181.

GE single wall oven, 25 3/4" wide x 25 1/4" high, matching GE stove top, 21 1/4" x 30", turquoise, both ex. cond., \$65 each or \$100 for both. 941-5908.

Sofa & chair, brown, \$250; wood coffee & end table, \$60; dinette w/4 chairs, \$100; wardrobe chest, \$40; 2 small desk lamps, \$10; 3 small throw pillows, beige, \$5, ex. cond., Vanessa, 280-7375 or 554-4960.

Contemporary couch and matching arm chair, chestnut w/dark brown trim and ribbing, \$295; white antique bookcase headboard and footboard w/bed frame, \$50, OBO. 538-4357.

Couch, mauve, makes into queen size bed, ex. cond., \$225; glass silver trim end table, \$5; antique night stand, \$20. Lorraine, 480-3377, ext. 58.

4 director's chairs, brown, \$10 each. Gaudiano, x38320.

Tappan microwave, ex. cond., \$45. x38607.

Antique Victorian buried walnut bed, 6' high headboard, Civil War period, ex. cond., \$500. 480-7838.

2 large unusual carved chairs, \$250 ea.; beautiful rose colored antique window bench, \$200; old footstool, \$12; large antique French chair w/matching footstool, \$125; antique wood high chair, \$25. 488-5564.

Kitchen table w/2 chairs, \$45; TV stand on rollers, \$20; director's foldup chair, \$10. 488-5564.

2-piece sectional sofa, light brown, ex. cond., \$200; coffee table, square, wood, \$25. 487-1883.

Full size bed, Sealy Posturepedic mattress, ex. cond.; full size bedspread w/matching curtains, peach & grey, new; dresser w/mirror, brown. Alzena, 280-7635 or 996-9033.

Sofa & love seat, dk. blue w/sm. rust & beige print, ex. cond., \$400, OBO; rust colored ginger jar lamp, \$20. 486-8865.

Sofa sleeper, \$150; love seat, \$50; coffee table, \$50; 2 end tables, \$50 ea.; dinette table w/4 chairs, \$100. Michele, 282-3271.

Sears washer and dryer, avocado green, \$125 for both. 479-1004.

Wanted

Need babysitter for 1-year-old in our CLC home, Monday through Friday, light housekeeping, begin in Aug., ref., please. 480-9545.

Lawn and tree service, painting, misc., reasonable rates. 280-7328 or 482-1745.

Want lady to keep 1 school-aged child, 2 toddlers and do housework in my Bacliff home. Lou Ann, x31777 or 559-1207.

Want German tutor for our 2 yr. old boy in

our CLC home, 2 sessions/wk. x35145.

Want to trade 10,000 elec. organ for land, car, truck, or boat of equal value. OBO. 337-4051.

Want non-smokers to participate in van pool. Braeswood and South Post Oak to NASA area. Richard, x37557.

Musical Instruments

Buescher tenor saxophone, good cond., w/ case, \$240. Karl, 944-8717.

Lowrey Coronation organ, full size, two 5-octave keyboards, 2-octave bass, 40 stops incl. chimes, ex. finish., \$800. 480-3110.

Pets & Livestock

Free kittens, 6 wks. old. Tomas, 282-4702.

Free, 4 year-old Fox Terrier. x30693 or 554-7306.

Free, 2 tabby cats, 1.5 yrs. old, spayed, shots, male is black & white, female is gray, brown & white. 480-5890.

Free, male dogs, healthy, all shots, mutts, 1 yr. old, 25 lbs., Benji stunt doubles. 482-1745.

Cocker puppies, blond, male & female, 6 wks. old on July 8, \$50. 480-0790 or 333-9353.

Lost & Found

Bicycle lost from Mission Control Center. 332-1473.

Miscellaneous

Apache camping trailer, sleeps 4, canvas top, alum. cover, \$500. Gaudiano, x38320.

Ruger .22 mag. rifle with 3x9 variable scope, sling, gun case and ammo., \$175., ex. cond. 996-6090.

Man's Seiko 14K gold nugget watch, new, \$850. 482-1582.

Ford AM/FM/cass. radio, can connect 4 speakers, \$40. Samouco, x35053.

B&W enlarger, dryer and access., \$175; hand power tools. Janet, 474-2622.

Baby stroller, \$15; oak/glass table/4 chairs, \$65; sm. 3-sp. ceiling fan, \$20; portable home spa, \$25; clarinet, CCISD approved, \$100. Sprake, 474-5532 or 326-2794.

Brunswick air hockey table, 5' 8" x 2' 8" playing surface, \$200; TV/FM outside antenna, \$10. x38493 or 482-8941.

Liquor carrying case w/access., new, \$30; Juicerator w/citrus juicer attach., new, was \$150, now \$75; Zenith 17" color TV w/stand & cable conv., \$250. 488-9790.

42 gal. oceanic fish tank, hexagon, wood base, access., 3 mos. old., \$400, OBO; Magnavox all in one phase-conv. machine; \$100. 480-0007.

'69 Firebird or Camaro parts, r.h. door, \$50; 2" x 4" x 8" wood, \$100. 480-0007.

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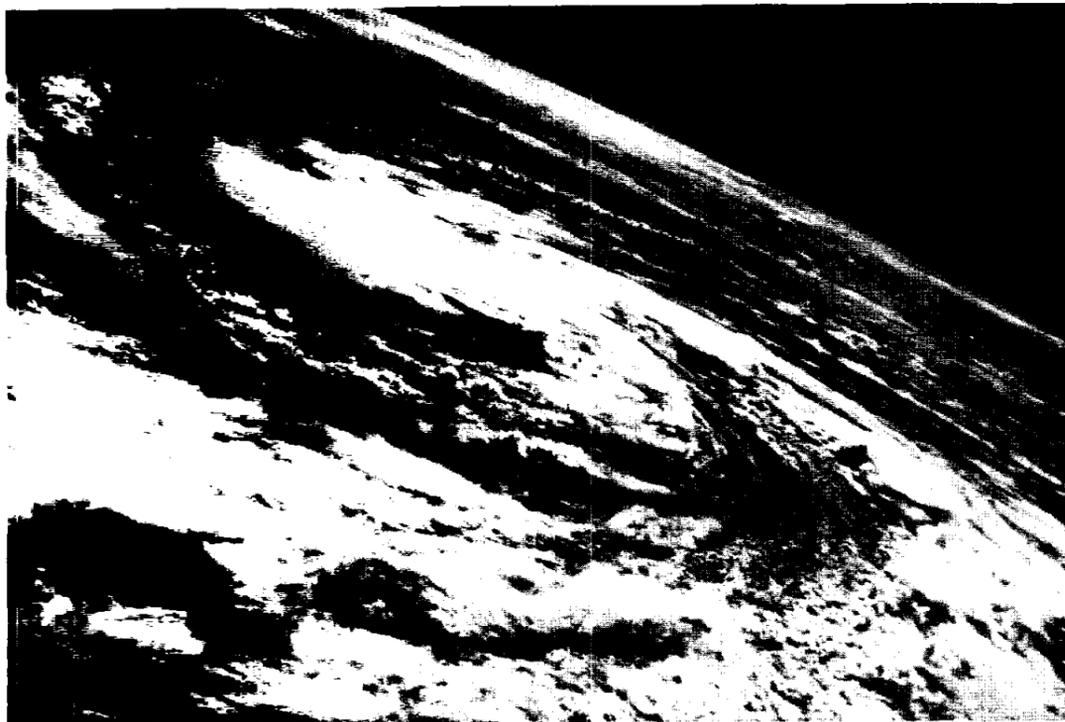
AM/FM clock radio/phone, \$35. 996-1791.

Used carpet, spruce green, 22' x 20', dark brown, 11' x 12, lime green, 10' x 16', good cond., \$2 yd. x33640, 486-2414.

Friedrich room air conditioner, 8,000 BTU, ex. cond., \$125; Gaffers and Sattler A/C compressor and condenser coil (outside unit), 3-ton, \$75. John McNeely, x38178 or 482-5837.

HURRICANES

JSC is ready to weather the storm



Hurricane Gladys in the Gulf of Mexico in 1968, photographed from Apollo 7 in a 99 mile-high orbit.



Jerry Jones, hurricane team manager for logistics support, shows off some of the many emergency supplies stored at JSC.

By James Hartsfield

On the Texas Gulf Coast hurricanes are a certainty of life, a certainty that keeps JSC in a constant state of readiness.

Locked away in JSC's warehouses, waiting patiently for the inevitable, are cases of flashlights, tens of pairs of rubber boots and lengths of rope, plus a myriad of rainsuits, drinking cups, pocket knives, candles, water bottles, ice chests, first aid kits and everything else that may be needed. A special trailer sits loaded year-round with hurricane protection material, plywood for broken windows, tarpaulins and other emergency supplies.

The center has been hit by only one hurricane in its history—Alicia in 1983. But every June 1, the annual opening day of hurricane season, storm defense plans here are taken to action Level 1, a state of continual preparation, said Everett Shafer, Security Division chief and interim emergency planning coordinator.

Protecting JSC during a hurricane mainly involves security and plant engineering personnel and their contractors, who go into action Level 2 whenever a hurricane threatens, opening a Hurricane Command Post in Bldg. 30 at the discretion of Center Operations Director Ken Gilbreath. If the threat of a hurricane becomes great enough, JSC Director Aaron Cohen will decide when the center should be closed and all non-essential personnel evacuated. Evacuation of the center is Level 3 of severe weather preparations.

But even before the center is closed,

hurricane planning personnel urge supervisors to adopt liberal leave policies for their staffs, allowing them time to complete personal preparations at their homes. When an order is given to close the center, all employees are responsible for securing their individual work areas.

Securing an area includes unplugging computer terminals and covering them with special plastic bags provided for storm protection, raising venetian blinds, caring for classified and other important materials and closing all doors. The care of electronic equipment will be done on a greater scale than it was for Alicia, Shafer said. "That's one thing that has become a lot more prominent in the past couple of years. In preparing your office for departure, it's one of the things that is fairly common throughout the center now which hasn't always been there," he explained.

Employees need to know how to prepare their offices for a storm before a hurricane threatens, and they should have the necessary supplies on hand. Don't wait until it's time to secure the office and then call plant engineering for instructions or supplies, said Keith McQuary, hurricane plan manager and chief of plant engineering.

"If I could emphasize any one thing, that would be it," McQuary said, "because my office is inundated with calls about what to do. If people know what to do, they can save us a lot of trouble. We're extremely busy when we're securing the center and coordinating last-minute efforts. We really don't have time to take calls from individuals

asking what to do."

When a storm threatens, employees will be kept informed about weather conditions, as well as appropriate plans and procedures, McQuary said. Each JSC entity has a designated emergency planning representative (EPR), and available information will be given to them for distribution or broadcast via the center's closed-circuit television system. It also may be obtained by calling a recorded message at x33351.

All center employees should educate themselves about hurricanes in general and the weather terminology associated with them, as should all Gulf Coast residents, Shafer said. Every EPR has at least one copy of the JSC Emergency Preparedness Plan, Annex B (JSC-O5900) which details hurricanes and severe weather procedures.

A group of 13 Area Protection Teams from plant engineering brace the grounds of JSC for a storm, checking buildings, picking up loose objects outside and tying down any possible hazards. Most of the area teams' preparations are done before or while the center is evacuated.

Those who will remain at the center are the members of the Hurricane Rideout Team, made up of personnel from security, plant maintenance, contractor organizations and various other offices. Members will be stationed at strategic locations throughout JSC.

During the height of the storm, the

rideout team takes shelter. "At that time, we don't try to make any repairs because of the danger," McQuary explained. But as soon as the storm abates, the team begins cleaning up, assessing damage and making repairs. One of their primary responsibilities is to secure the abandoned facilities in the wake of a storm.

"Once the storm has passed, we record all the damage and start assigning our contractors to work areas. And if it is like it was during Alicia, assignments are based more on grounds of who has time to do what rather than on jurisdictional areas," he said. "Everybody just pitches in and goes to work." Most workers in plant engineering report to work as soon as possible after a storm, he added.

Center personnel will be notified via commercial radio and television about when JSC will reopen for business. "We plan to restore as much of the center as possible as quickly as we can immediately after the storm," McQuary said. "But it depends on the amount of damage."

JSC's efforts in preparing for hurricanes paid off during Alicia, keeping damage as small as possible from that Category 3 hurricane, on a scale of Categories 1-5. "The experience showed that the plan worked very well, and I'm not aware of any major changes in the plan as a result of it. But there was some fine-tuning," Shafer said. Still, Alicia cost JSC about \$2.3 million. Hurricanes are serious business, he added.

"Alicia was a 3, and if there's a 4, I don't look forward to riding it out," he said.



JSC bought two customized high-water trucks, shown off by maintenance worker Raymond Hansen, after experiences with flooded streets during Alicia.



Maintenance workers Noel Tucker, left, and Jim Carson check supplies in the center's hurricane protection trailer.

JSC Photos by Sheri Dunnette

Deep Space Network to support Phobos mission

NASA to provide precise tracking data for two Soviet spacecraft to Mars

The USSR's Phobos 1 spacecraft, scheduled to be on its way today, is headed not only for a landing on the tiny Martian moon Phobos but also for a radio rendezvous with NASA's Deep Space Network (DSN).

Phobos 1 and Phobos 2, scheduled for next week, each carry 100-pound landers designed to analyze the 17-mile-long, potato-shaped moon, and the DSN's role in the mission is to provide essential tracking data to permit their landing on Phobos. The DSN then will shift to enabling a key scientific goal of the mission, to track Phobos very precisely. The DSN's 230-foot dish antennas in California, Spain and Australia, as well as a Soviet radio telescope in the Crimea will be

used. The landings, and the special DSN tracking, are expected to begin in April 1989.

Scientists are interested in the orbit of Phobos because it appears to be decaying. They believe tidal forces, the unequal attraction of gravity between different parts of two bodies, are making the moon spiral very slowly toward Mars and eventual destruction. Optical tracking is barely accurate enough to detect this phenomenon. Only active radio tracking, with a spacecraft on the site, can measure the orbit's decay rate.

The Deep Space Network, developed and operated by NASA's Jet Propulsion Laboratory over the past three decades, has built up unique expertise in determining the distance,

within yards, and the velocity of spacecraft billions of miles from Earth.

During the passage of Comet Halley in 1986, JPL and Soviet scientists cooperated to pin down the location of the comet's nucleus for the European spacecraft Giotto by precisely locating the Soviet Vegas spacecraft while they were photographing the nucleus, then reckoning from known camera locations and angles to find the target for Giotto's later flyby.

This time, U.S. scientists will use a radio-astronomy technique called very long baseline interferometry (VLBI), which employs widely spaced, paired ground antennas, as well as doppler and range tracking to pinpoint the position and motions of the moon

Phobos.

The Deep Space Network will receive telemetry, including images and other scientific measurements, from the two landers, but its principal responsibility will be the ranging and VLBI measurements. These will be complicated by the moon's rapid rotation once every 7 hours, 37 minutes and the fact that the lander antenna will be fixed, rather than tracking the Earth. Scientists expect to be able to track lander and moon for only about 17 minutes out of each rotation period, without the DSN's worldwide facilities, this would be still further reduced. Lander telemetry, like that from the Phobos orbiters, also will be collected by Soviet receiving stations.

Between October 1988 and year's end, Phobos project and DSN scientists will check the VLBI technique under space flight conditions. Hardware was checked at the Goldstone tracking site in April.

Then, after the Phobos spacecraft go into Mars orbit in late January, precise tracking by the DSN will help first Phobos 1 and then Phobos 2 edge down very close to the moon's orbit so that the manifold scientific operations can begin.

The Phobos mission involves more than three dozen experiments, with scientists representing nations of Eastern and Western Europe as well as the United States and the U.S.S.R. participating.



JSC Photo by Keith Meyers

ROAD TO STS-26 — Three members of the STS-26 crew jog down the backroads of JSC during a break from simulations for their upcoming mission. From left to right are Mission Specialist Pinky Nelson, Pilot Dick Covey and Commander Rick Hauck.

'Positive change' seen in NASA's safety attitude

An ad hoc committee, assembled to review safety risk management in the National Space Transportation System program, has completed its report, finding that there has been "a positive change in attitudes" by NASA and its contractors towards safety.

"Roles and responsibilities have been clarified, safety risk assessments have improved measurably, and the commitment to safety over schedule is freely articulated," the report states. "The new launch decision management system is thorough

and provides for a healthy redundancy of safety reviews and oversight."

The six-member committee, composed of both government and independent safety experts, found no significant system safety issues that would adversely impact the STS-26 launch. Progress on the part of NASA and its contractors in improving safety and implementing earlier recommendations is detailed in the report.

The findings update an earlier report by the ad hoc committee published in August 1987.

Quality Assurance Division name change reflects goals

JSC's Quality Assurance Division has been reorganized and renamed the Quality Assurance and Engineering Division to more accurately reflect its responsibilities and priorities.

Safety, Reliability and Quality Assurance Director Charles Harlan said the reorganization will help channel the division's resources toward Space Shuttle Program flight activities and Space Station development.

The reorganization establishes a Flight Systems Quality Engineering Branch with responsibility for supporting hardware, avionics and software systems associated with the Shuttle and Station programs. M. Conley Perry is acting chief of the branch, which will work on systems development, test operations and problem

analysis projects in support of program requirements.

The Quality Engineering Branch is renamed the Institutional Quality Engineering Branch, and will provide expanded support in the area of JSC pressure systems certification, equipment metrology, and equipment calibration. In addition, the branch will provide analysis and support for nondestructive evaluation and manufacturing/quality processes and control. Irvin S. Alexander is branch chief.

The Requirements and Compliance Branch is abolished. Its duties will be assumed by the new Quality Assurance Branch, which will review all JSC procurements, solicitations and contracts for compliance with quality requirements and standards.

15,000 try to name orbiter

So far, 15,000 schools across the nation have responded to NASA's invitation to participate in the national competition to name the new Space Shuttle orbiter.

The new orbiter, currently designated OV 105, is being built to replace the *Challenger* and is scheduled to be completed in 1991.

To enter, U.S. students in kindergarten through 12th grade will form teams and research a name for the orbiter. The teams will prepare an interdisciplinary classroom project to support and justify the name selected. The name proposed must be of a sea vessel used in research or exploration. Entries must be mailed by Dec. 31.

Mark III supercomputer begins operation

The first module of the Mark III Hypercube parallel supercomputer, the third generation of hypercubes at the Jet Propulsion Laboratory (JPL), was placed on-line July 1.

The result of a five-year research and development effort at the JPL Center for Space Microelectronics Technology and the California Institute of Technology (Caltech), the Mark III represents the arrival of massively parallel supercomputing. Its first module contains 32 nodes, or processing units, which together have a peak speed of about 512 million floating point operations per second.

Three more 32-node modules will be added during the next nine months to form a 128-node hypercube with each single node having the power of 25 VAX minicomputers. The peak speed of the 128-node Mark III is 2 billion floating point operations per second. This performance makes it more powerful than conventional supercomputers such as the Cray 2.

Parallel computers are a solution to a fundamental limit on the speed of single computers. Because of the finite speed of light, a single processor is limited as to its ultimate speed.

To achieve a major speedup in problem solving, many single processors must be coordinated to work simultaneously on a single large problem, just as groups of workers subdivide the work and coordinate their efforts to complete a task too large for a single worker.

To work efficiently on a problem, a parallel computer must communicate its intermediate results among the many individual processors. The layout of the communication between the processors determines the "architecture" of the computer. A hypercube characteristically has 2, 4, 8, 16, etc., processors.

In addition to breaking the speed barrier, the parallel hypercube is about 10 times more cost-effective than a conventional supercomputer because

it is built with the same low-cost, mass-produced Motorola 68020 microprocessors and Weitek floating chips used in personal computers.

The hypercube architecture also is scalable so that a 10-fold performance increase can be obtained by increasing the number of nodes by a factor of 10. New massively parallel machines are envisioned to exceed today's performance by a factor of 1,000.

The Mark III is the third generation of hardware in the Caltech/JPL Hypercube development. Four commercial firms are now selling second-generation hypercube technology and there are about 100 hypercube installations worldwide.

The Mark III Hypercube is operated by the Caltech Concurrent Supercomputer facility, which is the first supercomputer facility dedicated to massively parallel machines. The facility also operates other commercial parallel computers.

Private production plant eyed for advanced solids

NASA has been notified that two privately owned production facilities will be proposed as sites for development of the Space Shuttle advanced solid rocket motor. These sites, in Alabama and Utah, will be considered along with a government-owned site to be identified later by NASA.

NASA's acquisition plan for development of the new Shuttle solid rocket motor calls for interested firms to propose how they would design, build and operate appropriate production and testing facilities. Proposals will be required to include a government-owned, contractor-operated facility on a government site, plus a private-financing option for construction of that same facility.

The upcoming NASA request for proposals also will permit companies to submit one optional proposal for a

privately owned rocket facility, to be located at a site of the company's choice.

Firms intending to pursue the latter option were required to advise NASA of their plans and identify the intended private site by May 31.

The two responses received were:

- Hercules, Inc., Magna, Utah, and Atlantic Research Corp., Gainesville, Va., who responded as a joint venture with a proposed site eight miles west of Montgomery, Ala.

- Morton Thiokol Inc., Brigham City, Utah, with a proposed site at the firm's Promontory Point, Utah, facility.

To follow through with their plans to propose a privately owned production facility, each organization must conduct facility design studies and an environmental analysis of the potential impact of locating the facility at the specified

site. The environmental impact assessment data must be submitted as part of the optional proposal for incorporation in the government's environmental impact statement effort.

When the official request for proposals is issued, a government site will be specified as a tentative location for all companies to use as a common basis for proposals. The option of submitting an additional proposal for a privately owned facility is now open only to Hercules-Atlantic Research and Morton Thiokol.

A NASA site selection board is currently considering three potential government-owned locations for the rocket motor facility. They are at Kennedy Space Center, Stennis Space Center and at a Tennessee Valley Authority property known as the Yellow Creek site, in northeastern Mississippi.

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Editor Kelly Humphries
Asst. Editor . . . James Hartsfield

Discovery rolls out to launch

(Continued from Page 1)

to the Shuttle components; conducting pad validation tests to check connections between the launch pad and the vehicle; and completing the Shuttle Interface Test, a check of connections between the Shuttle elements, by conducting a purge test of the cavity between the external tank and the Orbiter 17-inch feed line.

The next major milestone for STS-26 will be the Flight Readiness Firing (FRF), a 20-second test firing of the Shuttle's main engines scheduled for late this month. The final full-duration firing of a redesigned solid rocket motor (SRM) before flight, Production Verification Motor 1 (PVM-1), also is scheduled this month and will test a motor with severe intentional flaws.