



Boat rocking

JSC engineers are getting ready to float a full-scale mockup of the Crew Assured Return Vehicle. Story on Page 3.



Station-ery sim

Flight Control Room 2 was the site of the first bonafide paper simulation of Space Station Freedom. Photo on Page 4.

Space News Roundup

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JSC contributors can be sure of Combined Federal Campaign

JSC employees who contribute to the Combined Federal Campaign — and therefore to the United Way of the Texas Gulf Coast — can be sure that the local organization is not mixed up in the controversy surrounding the national campaign.

CFC officials past and present said this week that the United Way of the Texas Gulf Coast is a separate, autonomous organization from the United Way of America, with its own board of directors made up of local community leaders.

United Way of America President

William Aramony resigned last month after revelations regarding improper salary and management practices.

In a letter to "friends of the CFC," Bill Schwaneckamp, president of UWTGC, and Mary Koffend, 1991 CFC chair, said the local campaign took immediate action when the allegations concerning Aramony were brought to light. They expressed strong concerns to the national board and commended the board for its thorough investigation and timely action.

In the meantime, Schwaneckamp and Koffend wrote, UWTGC is not paying any dues to United Way of America. The board and its volunteers will reassess their continued relationship with the national organization when the investigation's findings are reported back to UWTGC.

JSC Acting Director Paul J. Weitz said his experience as 1990 CFC chairman makes him confident that the CFC and UWTGC are running the local effort efficiently and effectively.

"I worked closely with the administrative staff of the United Way of the Texas Gulf Coast during my year as Combined Federal Campaign chairman," Weitz said. "Those people, and the thousands of volunteers who work with them, are extremely conscientious. They are doing the best they possibly can to put the hard-earned money you donate to good use for those less fortunate. I strongly urge everyone to continue to support the CFC this year."

UWTGC's record was substanti-

ated by an OPM-administered audit in 1991, Weitz added.

UWTGC plays two roles in the CFC, as administrator and as a participant. Each year, UWTGC must apply to run the CFC, and is selected by the Federal Executive Board Policy Committee. UWTGC also must apply for eligibility to participate with the FEB.

"First and foremost, federal employees should remember that the Combined Federal Campaign is a campaign run by and for federal

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Americans favor strong space effort

By Brian Welch

Americans continue to support a strong civilian space program and list the space shuttle as one of the projects they most admire, according to the findings of a nationwide poll commissioned by Rockwell International Corp.

The poll found that over three-quarters of the American public approve of the space program in general, and a record number—63 percent—would approve of spending "whatever is necessary" to maintain U.S. preeminence in space.

The survey, conducted for Rockwell by Yankelovich Clancy Shulman, is based on telephone interviews with 1,006 randomly selected voters. It has a margin of error of plus or minus 3 percent. This is the 15th such poll sponsored by Rockwell over the last 14 years.

"Americans believe that the space program provides meaningful benefits for the country," said Yankelovich Senior Vice President Elizabeth Eilers, "and support for U.S. leadership in space is at an all-time high."

Support for the Space Shuttle Program is widespread, with 92 percent agreeing that the shuttle "is a remarkable achievement and a source of pride for the United States." When asked if the space program should continue to emphasize a human presence in space, 80 percent said yes.

Please see **AMERICANS**, Page 4



NASA Electronic Photo

STS-45 Commander Charlie Bolden and Mission Specialist Dave Leestma photograph the Kamchatka Peninsula in Asia from *Atlantis*' aft flight deck during their first day in orbit.

Atlantis crew 'oohing, aahing' over auroras

The STS-45 crew put on a cosmic light show that had everyone onboard *Atlantis* "oohing and aahing" as the Atmospheric Laboratory for Application and Science continued its studies of the Earth's atmosphere and its relationship to the Sun.

Ten minutes of black-and-white video showed flight controllers in the Mission Control Center at JSC and the Payload Operations Control Center at Marshall Space Flight Center the artificial aurora. The aurora was created Wednesday when Mission Specialist Mike Foale fired a Space Experiments with Particle Accelerators electron beam into the Earth's atmosphere.

"Commander (Charlie) Bolden reports the phaser is working and in operation," added Mission Specialist Dave Leestma in a reference to one of the weapons used by the starship *Enterprise* in the television series *Star Trek*.

"We're seeing your beam, reported CAPCOM Jim Halsell. "We're all hiding under our consoles down here."

Scientists on the ground measured the intensity of the artificial auroras and those of natural auroras with the Atmospheric Emissions Photometric Imaging instrument. By comparing the artificial and natural auroras, they hope to learn more about the complicated interaction of Earth's magnetic field and atmosphere with solar particles that produce the brilliant light displays.

"We've got everybody oohing and aahing," reported Payload Commander Kathy Sullivan as she and Payload Specialist Dirk Frimout observed the natural auroras Wednesday.

The aurora observations involved just two of the 14 experiments that make up the challenging mission to investigate the interactions of the Earth's atmosphere and the Sun.

Atlantis lifted off from Kennedy Space Center's Launch Pad 39B at 7:13 a.m. CST Tuesday, delayed one day by gaseous hydrogen and oxygen leaks that were detected during the initial attempt to fill the

Please see **ATLANTIS**, Page 4



JSC pre-integrated truss team earns station award

A JSC team that developed the concept of a pre-integrated truss has become the first group of civil servants to receive the Space Station Freedom Award of Merit.

Engineering's Structures and Mechanics Division Space Station Freedom Pre-Integrated Truss Concept Development Team earned the award for its analysis of five alternatives to assembly of the space station framework in orbit. The effort came as the Freedom program searched for an assembly method that was less costly and complex, required fewer shuttle launches and space walks, and needed less maintenance.

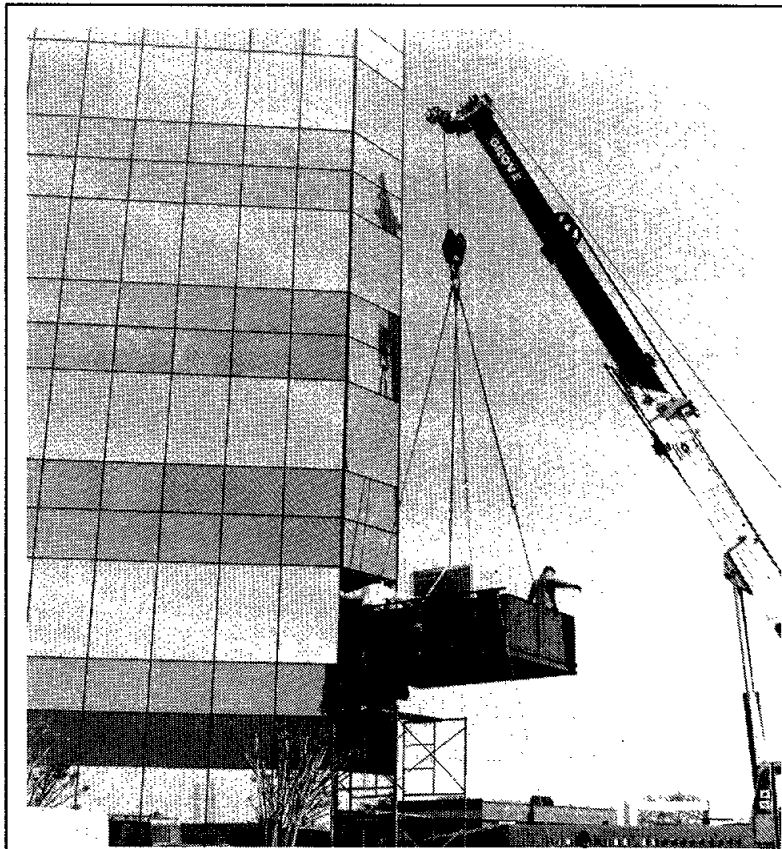
The concept that rated highest — and was adopted for the restructured space station program in 1990 — was a ground-assembled truss with pre-integrated and ground-checked systems that could be berthed together in space over the nose of the orbiter. A simplified, rail-mounted mobile trans-

porter system also was part of the concept.

Team members included Reginald B. Berka, Edgar O. Castro, Gregg A. Edeen, Allan D. Gist, David A. Hamilton, Jon B. Kahn, Kornel Nagy, Timothy E. Pelischek, Steven L. Rickman, Irene E. Verinder, Donald C. Wade and Clarence J. Wesselski.

The Award of Merit, administered by the Manned Flight Awareness Program, is designed to emphasize efforts that enhance the development and performance of Space Station Freedom such as improvements in design, services, productivity, error identification and correction, or preventive action.

The award consists of a special certificate, a letter of commendation and a Space Station Freedom pin, and is presented by an astronaut, the administrator for the Office of Space Flight or the director of the Space Station Program.



JSC Photo by Benny Benavides

Powerful computer joins station team

A powerful new addition to the Space Station Freedom team moved into facilities near JSC last week.

Workmen moved a new IBM 9021 mainframe Model 580 computer that will serve as host for the Space Station Freedom Software Support Environment and Master Object Database Management System onto the second floor of the Lockheed SSE Facility at 1150 Gemini.

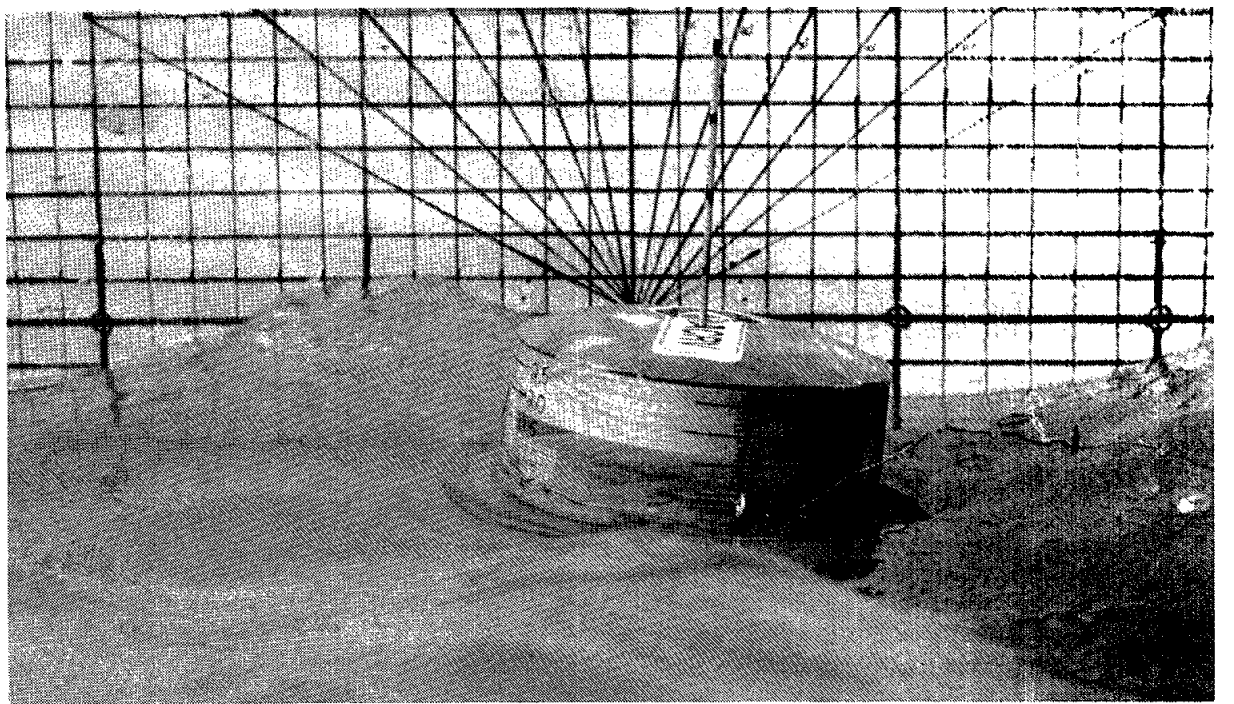
According to Frank Barnes, Lockheed's SSE Program director, the computer will support the SSE, MODBM and the Flight Table Data System, which provide the tools, procedures and documentation the space station work packages need to develop Freedom's software.

The state-of-the-art mainframe uses 256 megabytes of main storage and 48 parallel channels to process more than 80 million instructions per second.

The SSE Project team includes Lockheed, PRC, Loral and SAIC.

Rocking the BOAT

Homemade wave tank, models pave way for full-sized tests of Assured Crew Return Vehicle



The date is September 30, 1999. The space shuttle stands poised on the launch pad at Kennedy Space Center ready for the final baselined assembly mission for Space Station Freedom.

The cargo for this flight, known as Mission Build-17, is the key to making the orbiting laboratory truly self-sustaining.

Tucked in the payload bay is the Assured Crew Return Vehicle, which will be docked to the top of the station and allow up to eight people rapid escape from the facility in the event of an emergency.

The shuttle can undock and return to Earth leaving an international crew of four to man the orbiting outpost conducting experiments in life and materials sciences.

By Kyle Herring

The date is March 12, 1992. At JSC, a group has assembled to christen a BOAT. This BOAT won't set sail, as it were, until next month in the Weightless Environment Training Facility.

BOAT, which stands for Bouyant Overdesigned ACRV Testbed, is a test article for the space station rescue vehicle. It is designed for three phases of testing during the next several months ending with water testing at the Offshore Technology Research Center at Texas A&M University.

The test article was designed and built here by a large group of engineers and technicians from across the JSC family for a fraction of the cost of having it built outside.

"We figure it would have cost about \$50,000 for the design work and another \$150,000 to \$200,000 to have it built elsewhere," said Brian Kelly, ACRV Project Office lead on the BOAT test. The total cost of the in-house project was \$45,000.

The key to the success and low cost of the design and development was teamwork between NASA offices not particularly used to working together closely on one project, including assistance from the safety people who "saved us a lot of time and effort," said Bob Ess, principle investigator for the project from Engineering's Navigation, Control and Aeronautics Division's Aeroscience Branch.

In addition to the ACRV Project Office, employees from the Systems Engineering; Navigation and Control and Aeronautics; Structures and Mechanics; Man-Systems; Medical Sciences and Technical Services Divisions took part in designing and building the BOAT. Also, the Procurement Office

eased the process of working with Texas A&M for use of the OTRC.

"All of those offices were part of the team from the very beginning," Kelly said.

The full-scale, weight-representative test article will undergo three phases of egress and flotation testing during the next two months. Phase 1 begins immediately and consists of dry-ground evaluations of personnel validating egress procedures. Phase 2 will be divided into unmanned and manned testing in Bldg. 29's WETF. This phase is planned to begin later this month.

The final test phase is scheduled for late April and May at Texas A&M using a high-fidelity wave machine that was built to test platform design and stability for off-shore oil rigs. NASA will be one of the first big clients to use the OTRC, Kelly said, and will concentrate on open-water crew rescue simulations under a variety of sea-state conditions. The OTRC, which consists of 48 computer-controlled hydraulic actuators that create and control the wave state, will allow the team to evaluate the ACRV testbed under controlled conditions.

"In the ocean we can't control the wave state and safety is a concern for the early testing," he said.

The BOAT was conceived during a meeting about a year ago when several people joked about using Waterworld's facility near Astroworld for such testing because its wave pool could generate "sea-state" conditions.

Further analysis demonstrated that the device would come too close to the bottom of that pool, and the Waterworld idea was scrapped.

"Waterworld was agreeable, but our folks doing the analytical modeling said we would get within a foot or foot and a half of the bottom. That was too close," Kelly said.

It was about this time that Ess proposed a home-built wave tank and test article to at least demonstrate the concept could work.

Ess, along with then co-op Scott Tamblin, built a wooden sub-scale wave tank in his driveway. The wave generation unit was built using an old washing machine motor. Four eight-inch-diameter BOAT test articles were built for use in the sub-scale tank by Paul

Romere who works in the same branch as ESS. Both cost a fraction of what a typical test article would have cost.

The wave tank cost less than \$1,000 and the BOAT sub-scale test article cost less than \$100. By comparison, the wave tank would have cost about \$30,000 and the test article about \$400 if produced commercially.

Ess said he began sketching a picture of the wave tank and bought a used transmission for a washing machine. The home wave tank was 24 feet long, four feet wide and two feet deep.

The people at the store where he bought the washing machine motor were skeptical when he told them what the unit was for. "They didn't think it would work as a wave machine," he said.

But the home unit did work and eventually Ess and his coworkers moved it to Bldg. 220 for further testing. Using the small wooden BOAT test articles, they developed restraining devices that would keep the unit

from contacting the side of the wave tank.

"This is a perfect example of these people using their own ingenuity for the benefit of the

overall project," Kelly said.

The sub-scale BOAT and wave tank testing enabled Lead Designer Stephen Munday, to arrive at the design of the full-scale testbed now undergoing testing.

"The Man Systems Division brought us in to help in the design to make sure the test article would be dynamically correct," Munday said.

The total quality management (TQM) aspect runs through this whole process, Kelly said.

"This has involved people from across the center," he said, and would have cost more and taken longer had they not been involved.

As the chief designer, Munday also had responsibility for ensuring the BOAT could simulate three different types of ACRV.

By changing the skirt configuration and moving the center of gravity, the BOAT can simulate an Apollo-type spacecraft SCRAM (Station Crew Return Alternative Module) allowing water to cover the heat shield, and a SCRAM in which the heat shield is protected from the water.

Munday also has acted as the focal point

for coordinating the BOAT activities between the various divisions. "It has actually worked very well," he said.

Laurie Weaver, principle investigator on the BOAT project for the Man-Systems Division, said while there were "learning pains between the organizations" because of having different ways of doing things, "it has been extremely successful; it worked out better than I thought."

Following the early development came the design and requirements from other areas including Man-Systems.

Weaver was involved early on while flying test runs aboard NASA's zero-G aircraft, the KC-135.

"We flew aboard the KC-135 to demonstrate a crew's ability to get into the ACRV" during an emergency.

That proved "pretty negotiable," she said, so everyone began concentrating on getting out after splashdown or touchdown of the vehicle on Earth. "We realized we needed to concentrate on the design of the interior for egress," she said.

The word "overdesigned" in the Bouyant Overdesigned ACRV Testbed simply means the extra mass that was required in the design to better approximate real vehicle handling characteristics. The testbed weighs about 9,500 pounds.

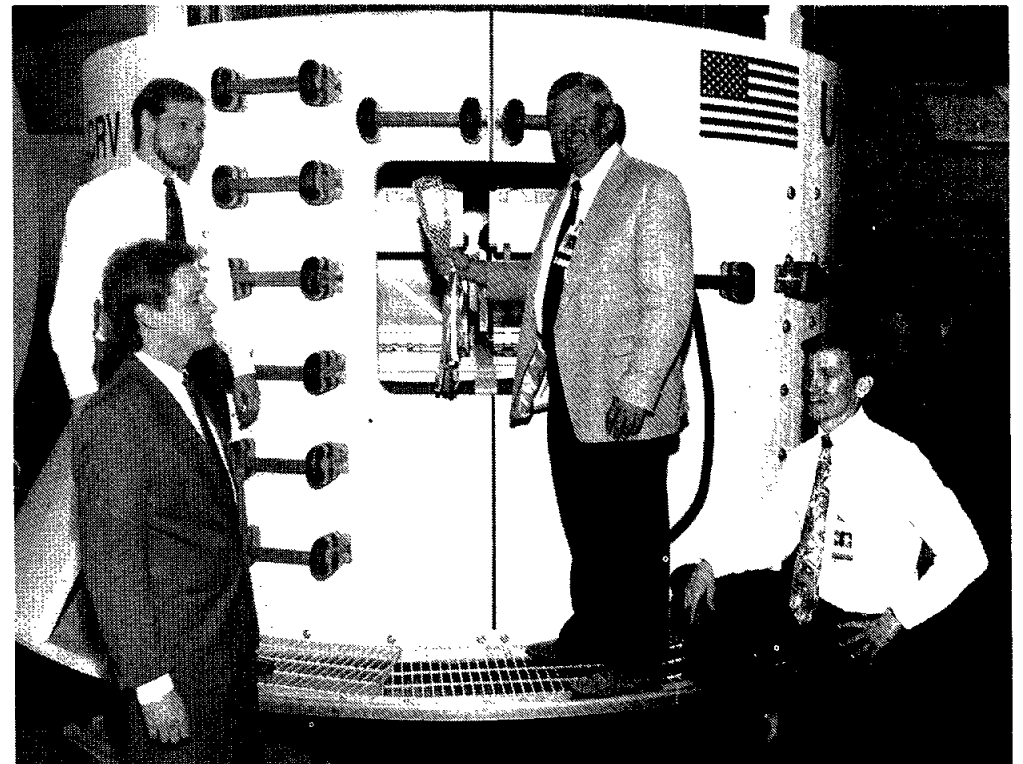
"We have a two-pronged purpose to the testing," Kelly said. One is to create a database of vehicle handling characteristics to assess the vehicle's dynamics on the water. The second is to identify requirements for a water egress by a crew given such a landing, Kelly said.

Egress data gathered under various sea states will be used by the ACRV Project Office in helping determine whether a land or sea touchdown is the best course to take.

"The tests will help determine which landing mode is more feasible," he said. This will include the assessment of the type of parachute to use based on the G constraints on the human body.

While the BOAT testing is under way, co-worker Brian Ross is busy creating computer simulations of the hydrodynamic process for use in future programs that may require similar testing.

To demonstrate their faith in the workmanship, Ess, Munday and several others involved in the BOAT project will serve as the living test subjects for the egress tests in the WETF and at Texas A&M. □



JSC Photos by Robert Markowitz

Top: A small, wooden scale-model bobs in the wave machine constructed in Bob Ess' driveway. The grid behind the model measures the angle of the model's flotation. Above: Beth Grimaldi and a test dummy lie inside the full-sized BOAT as Jay Estes, left, and Ess look on. Right: A BOAT is christened; from left are Principal Investigator Bob Ess, Lead Designer Stephen Munday, New Initiatives Office Deputy Manager Jerry Craig and ACRV Project Office Lead Brian Kelly.

Rogers earn Woman of Year honors

JSC's Kitty Rogers has been elected Woman of the Year by the Clear Lake Area Chapter of the American Business Women's Association.

Rogers, manager of the Space Shuttle Program Administrative Office, was selected on the basis of her work achievements, education, community activities and participation in the association.

She joined JSC in 1964 as a secretary for the Landing and Recovery Division and was promoted to the administrative field in 1980. In 1988, she became a supervisor to manage the SSPAO.

Rogers has chaired several ABWA committees and was chapter president in 1990.

McHenry, Finney receive key station assignments

Erich McHenry of the Space Station Projects Office and David Finney of the Flight Crew Operations Directorate recently

received two key space station-related assignments.

McHenry has been appointed manager of the Avionics Office within the Space Station Freedom Projects Office.

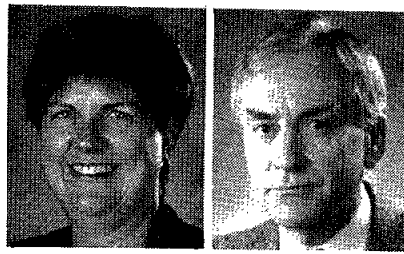
Finney has been appointed chief of the FCOD Space Station Support Office.

McHenry joined JSC in 1963 as an aerospace engineer in the Flight Operations Division. Since then, he has

received increasingly responsible positions, such as chief of the Spacecraft Software Division and deputy director of the Mission Support Directorate.

Most recently, he was Engineering's associate director for engineering development and test support to the Space Station Projects Office.

Finney, who joined JSC in 1987 in the Aircraft Operations Division, has been acting chief of the office since June 1991. He was named deputy chief of the office in 1989.

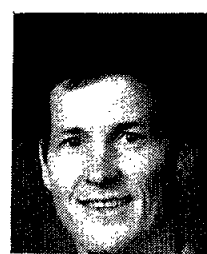


Rogers

McHenry



Finney



Stoltzfus



Cochennic

JSC

People

White Sands engineer earns testing society's merit award

Joel Stoltzfus of the White Sands Test Facility recently received the 1992 Award of Merit from the American Society for Testing and Materials.

Stoltzfus, projects director in the WSTF Laboratory Office, earned the society's highest honor for his work on a committee looking into Compatibility and Sensitivity of Materials in Oxygen Enriched Atmospheres, and for his coordination of symposia on the subject during the past two years.

Stoltzfus also is one of the primary instructors for a Standards Technical Training Course that is offered at JSC.

Cochennic top secretary

Michelle R. Cochennic, secretary for the Flight Training Branch in the Mission Operations Directorate's Training Division, recently received the Marilyn J. Bocking Award for Secretarial Excellence.

Cochennic earned the honor for leading the secretarial group that produces the instructional briefings, training manuals and workbooks for the branch, which is a hub of activity in the shuttle crew training process.

She was cited specifically for her ability to combine secretarial talent with negotiating skills to ensure that the office's tasks are accomplished on schedule, and for fostering a "can do" atmosphere in the office.

Mission Control viewing room hours adjusted

The Wednesday launch of STS-45 has changed some MCC viewing room hours for JSC and contractor badged employees and their families.

Based on the Tuesday launch, employees will be allowed to visit the MCC today, from 11:30 a.m.-2:30 p.m. and 5-7 p.m.; Saturday and Sunday, from 1-4 p.m.; Monday, from 11:30 a.m.-2:30 p.m. and 5-7 p.m.; and Tuesday, from 11:30 a.m.-2:30 p.m.

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.

ISD wants to know how well it's doing

The Information Systems Directorate is seeking feedback from JSC computer users to help in its effort to continually improve service.

When an ISD technician visits a worksite, he or she leaves a customer satisfaction feedback card. Users are asked to complete the card rating areas such as overall service, quality of work, response time, personnel knowledge level and attitude. After completing the card the user can simply drop the card at any center mail pickup point. No envelope is necessary.

The response is entered into a database and recommendations are made allowing ISD to monitor trends and identify potential problem areas.

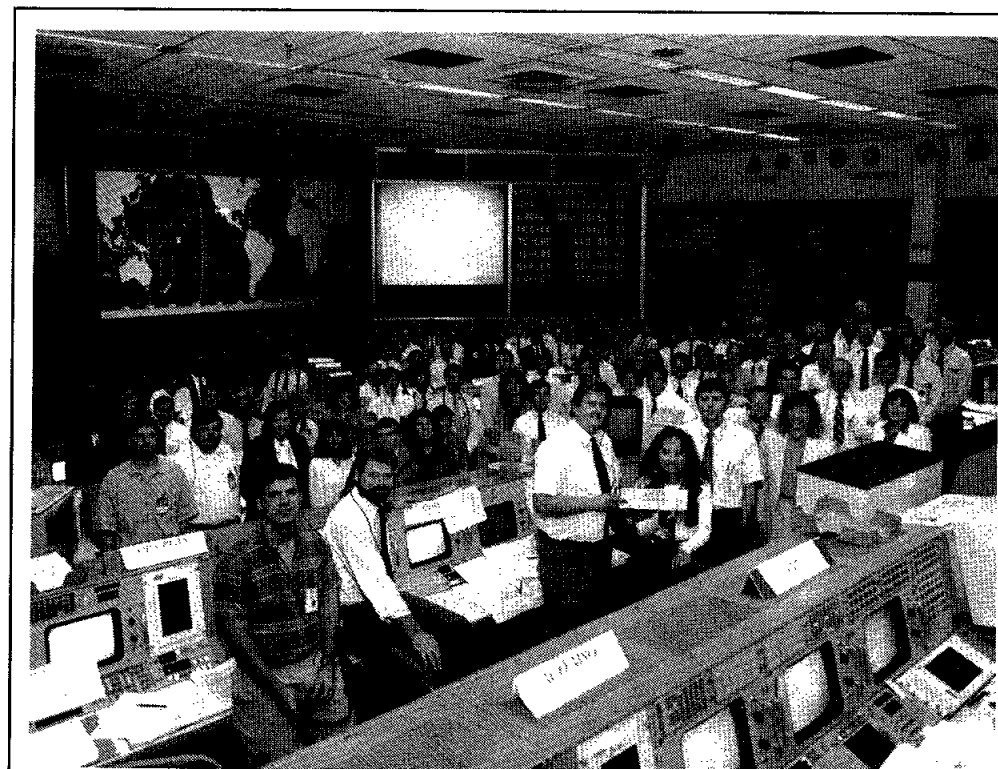
Atlantis flight may be extended to gather more atmospheric data

(Continued from Page 1)

shuttle's external tank Monday. Tuesday's launch was delayed 13 minutes when clouds encroached on return to launch site visibility.

Because of a particularly good load of the super cold hydrogen and oxygen that combine to make electricity and water for *Atlantis* operations, mission managers early on began discussing the possibility of extending the planned eight-day flight to nine days. Flight controllers told the crew Thursday that if power usage continues at its current level and *Atlantis* continues to operate nearly flawlessly, the shuttle would be in position to extend one day for added scientific observations.

The planned KSC landing time is at 5:25 a.m. CST Wednesday. A one-day extension would have *Atlantis* landing at 5:20 a.m. CST Thursday. A welcome home celebration for the crew is planned outside Ellington Field's Hangar 990 about 8 and a half hours after a landing at KSC, or 8 hours and 45 minutes after landing if it is shifted to Edwards Air Force Base in California.



JSC Photo by Benny Benavides

STATION SIM—Space Station *Freedom* operations came one step closer to reality last Friday with the first all-day paper simulation in the Mission Control Center. Simulation Supervisor Jerry Swain said the exercise conducted by the Mission Operations Directorate's Space Station Training Division tested two full mission control teams with four cases. Operations Directors Andy Algate and Jenny Stein led their teams through malfunctions designed to test both individual systems and operations concepts, and served as a motivational opportunity for inexperienced controllers to work in an operations center. The next sim is planned for October.

Lace up your running shoes, its time for Intercenter Run

JSC employees and contractors are lacing up their running shoes once again for the NASA-wide Intercenter Run.

The agencywide competition is held twice a year during the months of April and October, with winning

honors going to the center with the highest percentage participation. JSC won the 10 km in October and Goddard Space Flight Center won the two-mile.

To participate, individuals run or walk a 10 km or two mile course and

report their times in the Gilruth Center Recreation Office. The course may be run as many times as desired, but the highest individual time should be reported. The race is scored in age groups by order of finish.

All participants receive a free

Intercenter run T-shirt. The competition is open only to NASA civil servants and NASA badged contractor employees.

Maps of the race route and additional information is available at the Gilruth Center.

Space News Roundup

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Editor Kelly Humphries
Associate Editor Kari Fluegel

CFC administrative costs among lowest in country

(Continued from Page 1)

employees, and is regulated by the Office of Personnel Management in Washington, D.C., and Congress," Koffend and Schwane-kamp said. "Our CFC's administrative costs for 1991 were 5.6 percent of the total dollars raised. These costs are shared equally by all participating non-profit agencies and are monitored by the Federal Executive Board Policy

Committee."

UWTGC administrative costs are among the lowest in the country, Koffend and Schwane-kamp said, with more than 90 cents of every donated dollar being used locally to address our community's critical problems. Some 350 community volunteers decide which programs receive funding and carefully monitor the use of the funds.

Americans give space program high marks

(Continued from Page 1)

In the wake of the *Challenger* accident, Americans seem to have a realistic view of the risks of space flight. "Americans seem to accept a certain level of risk inherent in manned space flights," Ellers said, "and, even if an accident should occur, would prefer to handle the problem rather than abandon the shuttle program altogether."

Among the new initiatives for the 1990s, missions to study the Earth's environment are the most popular

among Americans. Environmental monitoring drew strong support from 91 percent of the respondents. Joint space missions with other nations had the support of 77 percent, while the National Aerospace Plane program had a 70 percent favorable rating. Construction of a permanently manned space station had the support of 68 percent of the respondents, while human flights to Mars had 60 percent and a permanent lunar settlement had 49 percent.

When asked what goals or bene-

fits of the space program are most important, 92 percent said scientific and medical discoveries. Increased understanding of the Earth's climate and environment drew strong support from 88 percent of those surveyed. Even the goal that drew the least support, "putting the U.S. ahead in space exploration," drew 67 percent approval. "Nearly equal in importance, these goals have remained at consistently high levels since they began to be tracked," Ellers said.