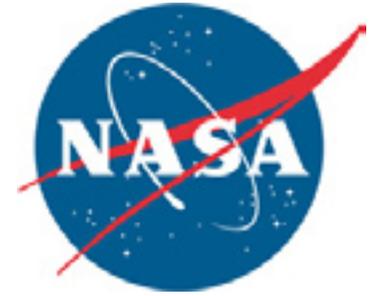


Spaceport News

John F. Kennedy Space Center - America's gateway to the universe

www.nasa.gov/centers/kennedy/news/snews/spnews_toc.html



INSIDE ...

Explorer School Symposium



Page 2

STS-130 crew returns



Page 3

NASA alums lay foundation



Page 6

Heritage: Delta IV provides durability



Page 7

STS-132 payload has international flair

By Linda Herridge
Spaceport News

Boeing's STS-132 payload flow manager, Eve Stavros, and NASA Mission Manager Robert Ashley, will be stationed on console in Firing Room 2 of Kennedy's Launch Control Center, watching with anticipation as space shuttle Atlantis soars into the sky from Launch Pad 39A.

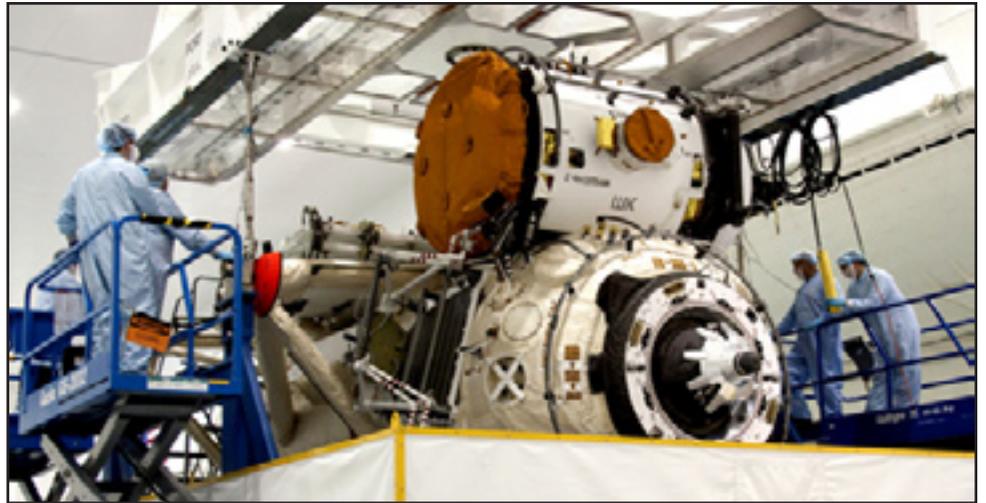
Stavros and Boeing's Checkout Assembly and Payload Processing Services, or CAPPS, team were instrumental in helping to prepare the Russian-built Mini Research Module-1, or MRM-1, and an Integrated Cargo Carrier for delivery to the International Space Station.

According to Stavros, planning and coordination to process the two major payloads began more than a year ago.

"This was a unique situation that required CAPPS, NASA, Johnson Space Center in Houston, Rocket and Space Corporation Energia, or RSC Energia, from Russia, and the European Aeronautic Defense and Space Co., or EADS Astrium, to work together to prepare the payloads for flight," Stavros said.

Ashley said another unique aspect of the mission is the fact that both of the primary payloads, the MRM-1 and the cargo carrier, were processed off-center for the most part.

"They arrived late in the flow to the Space Station



NASA/Gianni Woods

Technicians prepare to lift the Russian-built Mini Research Module-1, or MRM-1, out of its transportation container in Kennedy's Space Station Processing Facility for its move to the payload canister and transportation to Launch Pad 39A.

Processing Facility, about five weeks before the scheduled launch, for transfer to the launch pad and final orbiter integration activities," Ashley said. "The processing team met or beat every schedule milestone despite the relatively small size of the NASA and Boeing CAPPS teams working the mission, and the communication and logistical challenges."

The MRM-1 and associated hardware were transported from Russia aboard an Antonov Russian aircraft and arrived at Kennedy's Shuttle Landing Facility in December 2009. The payload and equipment were offloaded from the aircraft and transported to Astrotech's facility at Port Canaveral.

For the MRM-1, Boeing assisted with ground safety issues, provided critical operations training for RSC Energia workers and prepared for stand-alone

environmental testing at the launch pad. Boeing also coordinated delivery and setup of ground support equipment at the launch pad for testing operations and served as the main interface with the shuttle team to ensure payload schedule compatibility.

Stavros drew on previous international experience from her work on life sciences payloads for the European Space Agency in the Netherlands.

"Working with RSC Energia was an exercise in

See **STS-132**, Page 3



NASA/Kim Shifflett

STS-132 crew arrives at Kennedy

STS-132 Commander Ken Ham is greeted by Shuttle Launch Director Mike Leinbach upon his arrival at the Space Shuttle Landing Facility. The six veteran astronauts for space shuttle Atlantis' final planned mission arrived aboard four NASA T-38 jets by 7 p.m. May 10 to begin final prelaunch preparations.

NASA Explorer Schools students present projects

By Linda Herridge
Spaceport News

A pendulum swinging beneath a clock inspired fifth-grade students Shareena Dormevil and Yamilka Leon Lopez, from Robert L. Ford Middle School in Lynn, Mass., to test how a pendulum's mass, angle of release and length of string would be affected in a reduced or hyper gravity environment.

Lopez said they weren't nervous as they presented their project.

"We knew the data, and the other students were learning something new as well," Lopez said.

They were among 70 third- through ninth-grade students from 35 NASA Explorer Schools around the country who presented their research projects to their peers, NASA engineers, scientists and education specialists during the NASA Explorer Schools 2010 Student Symposium. Kennedy Space Center's Education Division hosted the

three-day event, May 5 to 8.

Center Director Bob Cabana welcomed the students and their teachers to the symposium at the Doubletree Hotel in Cocoa Beach, Fla.

Cabana told the students they should be very proud of themselves for being selected to participate in the symposium and hoped they would enjoy their time at Kennedy.

"Ask questions and learn. Do your best and don't give up," Cabana said.

Jo Ann Charleston, NASA chief of the Educational Programs Office at Glenn Research Center in Cleveland, Ohio, commended the students for working diligently on their research projects.

"It is awesome that students in middle school can be so involved and interested in NASA's research projects. This will help to mold you and prepare you for your destiny," Charleston said. "We want you to be part of our NASA family."

Charlotte Groty, a teacher from North Ridge Magnet School in Moreno



NASA/Kim Shifflett

At Kennedy's Educator Resource Center, students participate in a cleaning water activity during the NASA Explorer Schools 2010 Student Symposium. From left, are fifth-graders Samantha Escalon and Thiffany Yeupell from Dr. H. Rodriguez Elementary School in Harlingen, Texas, and Evan Gabriel from John B. Cary Elementary School in Richmond, Va.

Valley, Calif., brought fourth-grade students Josiah Wallace and Nathan Thornton to the symposium. They presented their class research project, "How T.O.Y.S. work in Microgravity."

"We have had tremendous opportunities because of NASA that we normally would not have," Groty said.

The Pendulums and T.O.Y.S. experiments were among several projects that were tested on NASA's Zero-G plane, either by the teachers, an astronaut or research specialist in order to gather research data.

Eighth-grade students Kelson Mills and Alex Ramirez, from Key Peninsula Middle School in Lakebay, Wash., tested creek water for their "Lunar Water Purification System" project. They and their classmates were challenged to design and build an efficient water recycling system that would work on a lunar base.

"We were able to take contaminated water and return it to its original form," Mills said during the presentation. "We drank the water after it was filtered. We had faith in our system."

During the event, the

students toured Kennedy, the U.S. Astronaut Hall of Fame, and participated in several educational activities and a career panel that featured Kennedy representatives from education, regional weather forecasting, various fields of engineering, analytical chemistry, navigational aids, gas and fluids engineering, and writing.

"I liked the tour of Kennedy and getting to ask engineers questions about space travel," Dormevil said.

The symposium also offered educator professional development opportunities for the teachers.

At the closing event, Acting Deputy Associate Administrator for the Office of Education Gregg Buckingham, and Charleston, recognized the teachers and students with certificates and medals.

"Teamwork is important," Buckingham said to the students. "It takes a team of people to do what we do here at Kennedy."

The agency has 200 NASA Explorer Schools with 10 project coordinators and four project assistants. They are supported by the National Science Teach-

More online

For more information about NASA Explorer Schools and other NASA education programs, visit: <http://explorerschools.nasa.gov> and www.nasa.gov/education.



NASA/Kim Shifflett

Students participate in a heavy-lift activity using balloons, paper clips, paper cups and tape during the NASA Explorer Schools 2010 Student Symposium at Kennedy's Educator Resource Center. From left, are sixth-graders Christopher Hayward from Phenix City Intermediate School in Alabama, and Jaycob Wade from Johnson Magnet School for Science, Technology, Engineering and Math in San Diego, Calif., and third-grader Zachary Lopez from Vintage Magnet School in Sepulveda, Calif.

ers Association and NASA education project specialists from Oklahoma State University.

Each year in the spring, more than 1,000 students complete research investigations focused on NASA missions or research interests and present their projects on NASA's Digital Learning Network. From these entries, the top school projects are competitively selected by their peers to participate in the symposium.

Priscilla Moore, an education specialist at Kennedy, said, "NASA's Explorer Schools Program promotes and supports the agency's content and programs into science, technology and mathematics curricula in fourth- through ninth-grade classrooms across the country."

Crew shares 'phenomenal view' of STS-130 mission

By *Rebecca Sprague*
Spaceport News

Space shuttle Endeavour's STS-130 crew members supplied the International Space Station with a spectacular sight of the universe. On April 28, they provided insight into their 13-day mission with the Kennedy Space Center team that prepared their vehicle and hardware for flight.

Center Director Bob Cabana kicked off the crew return event by introducing Commander George Zamka, Pilot Terry Virts, and Mission Specialists Kathryn Hire, Stephen Robinson, Nicholas Patrick and Robert Behnken.

Cabana asked Zamka, who also has piloted Discovery, "Hard giving up that seat wasn't it?"

Zamka replied, "Yes, sir. Sure was."

"I was telling him the hardest thing I did was on my last flight when I had to get out of Endeavour's seat," Cabana said. "That was my spaceship . . . and I didn't want to give it up."

The crew members then described their impressive mission, from their predawn launch to nighttime landing. They paid special attention to the international collaboration between three space agencies -- NASA, the Japan Aerospace Exploration Agency, or JAXA, and the Russian Federal Space Agency, or Roscomos -- to accomplish all of their tasks.

"We had 11 people up there, all from different parts of the world," Virts said. "It was wonderful to all get together and really kind of celebrate the international aspect of the International Space Station. This is where it really comes together, at least for us crew types."

It took three spacewalks totaling more than 18 hours for the crews to attach their biggest payload -- the Tranquility node and the cupola. Patrick mentioned some things we might take for granted while working here on Earth.

"Finally we could take off our suits after about 10 hours of being in them



NASA/Jim Grossmann

The crew of STS-130 returned to Kennedy on April 28 and shared stories and insight of their 13-day mission to the International Space Station. The astronauts signed autographs and took pictures with workers.

. . . have something to eat, stretch our fingers and scratch our noses," Patrick said.

Installation of Tranquility helped pave the way for more science to be conducted in the U.S. portion of the station. Up until this mission, Hire said, environmental control systems, water recovery systems,

air revitalization systems, oxygen generation systems, the toilet, the COLBERT treadmill and the weight lifting machine took up a lot of space in lab areas.

Hire also described opening the windows of the cupola for the first time.

"It sure was great the first time that we opened that shutter on that big

seventh window there . . . the one that's round in the center that looks right down at the surface of the Earth. Through the other six windows, we can look around and see the International Space Station," Hire said. "Just a phenomenal view . . . just such a panoramic view that we've never had before."

From STS-132, Page 1

international diplomacy," Stavros said. "Boeing CAPPS served as the main interface to Russian workers to ensure they understood Kennedy's practices, regulations and operations as they were preparing the MRM-1 for the mission."

The cargo carrier was processed by EADS Astrium workers, also at Astrotech's facility, for its second flight to the station. The carrier first flew on the STS-127 mission in July 2009.

Inside Kennedy's Space Station Processing Facility, CAPPS workers processed the Space to Ground Antenna, or SGANT, and assembled and performed electrical tests on the flight support equipment. They delivered the integrated assembly to EADS Astrium for installation on the cargo carrier.

Boeing workers also performed the hardware ready for flight process, and packaged and delivered six batteries to EADS Astrium.

Before Atlantis rolled from its orbiter



NASA/Gianni Woods

A technician determines the weight and center of gravity of the Integrated Cargo Carrier in Kennedy's Space Station Processing Facility before its move to the payload canister and transportation to Launch Pad 39A for the upcoming STS-132 mission to the International Space Station.

processing facility to the Vehicle Assembly Building, CAPPS workers installed a Power Data Grapple

Fixture on a sidewall carrier in the shuttle's payload bay. The grapple fixture will be transferred to the

station for future use on the Zarya control module.

Stavros said the CAPPS team also performed their customary function of installing both payloads into the payload canister for delivery to the launch pad, followed by supporting installation into Atlantis' payload bay.

During the 12-day mission, Commander Ken Ham, Pilot Tony Antonelli and Mission Specialists Garrett Reisman, Michael Good, Steve Bowen and Piers Sellers will attach the MRM-1 to the Earth-facing port

of the Zarya control module. The module will increase Russian research capabilities with the addition of experiment workstations.

It also will serve as a docking port for Soyuz and Progress vehicles and provide additional space for cargo storage.

The Integrated Cargo Carrier will be temporarily removed from the payload bay and attached to the mobile base of the station's robotic arm to support the transfer of exterior cargo to the space station.

Scenes Around Kennedy Space Center



NASA/Cory Huston

Vernice Armour, America's first female fighter pilot, spoke to Kennedy workers April 27 in the Training Auditorium. Armour shared her seven steps to success called the "From Zero to Breakthrough" model, which has been featured on Oprah, CNN, Tyra Banks and NPR.



NASA/Troy Cryder

Goddard Space Flight Center hosts a Safety and Mission Assurance and Engineering Job Showcase May 6-7 for Kennedy workers at Operations and Support Building II. The Workforce Transition Office also opened three new locations to assist Kennedy employees: Operations Support Building I, Room 1119A, open Tuesdays, noon to 4 p.m.; Central Industry Assistance Office, Building N6-1009, open Wednesdays, noon to 4 p.m.; and NASA Shuttle Logistics Depot 1, Room 415-B, open Thursdays, noon to 4 p.m. For more information, go to <https://hrapps.ksc.nasa.gov/voice>.



NASA/Amanda Diller

Pratt & Whitney Rocketdyne engine technicians install a high-pressure oxidizer turbo pump on space shuttle main engine No. 2062 in Kennedy's Space Shuttle Main Engine Processing Facility. The engine, or SSME, is the last one scheduled to be built at Kennedy before the end of the Space Shuttle Program. In front of the engine, from left, are Dan Bode, Teryon Jones, Barry Martin and Jessica Tandy. Behind the engine, from left, are Ryan Mahony and Ken Burley.



NASA/Amanda Diller

Workers enjoy a buffet to celebrate the Mexican culture during the 5 de Mayo Fiesta at KARS Park II. Attendees also danced, listened to music and played games.



NASA/Jim Grossmann

Workers gather at the Training Auditorium during the National Day of Prayer Observance on May 6. Attendees enjoyed a praise and worship band.

Spaceport News wants your photos, ideas
Send photos of yourself and/or your co-workers in action for possible publication. Photos should include a short caption describing what's going on, with names and job titles, from left to right. Also, if you have a good story idea chime in. Send your story ideas or photos to: KSC-Spaceport-News@mail.nasa.gov



NASA/Jim Grossmann

Ronald Griffin performed on several saxophones during the annual Mother's Day Tea at the Child Development Center on May 7.

Bricks keep memories of Kennedy workers alive

The Astronauts Memorial Foundation and the Florida chapter of the NASA Alumni League are not only taking steps to remember those who've taken part in America's space program, they're also creating the path.

This path, also called the SpaceWalk of Honor at the Kennedy Space Center Visitor Complex, is made of engraved bricks that the co-sponsors have made available to workers.

The SpaceWalk of Honor encircles the reflective ponds adjacent to the Space Mirror Memorial and is in front of the NASA Educator Resource Center, or ERC.

"The effort shows we support the space program and are very proud of our contribution," said Harold Zweigbaum, of the NASA Alumni League. "We hope these bricks can leave a lasting memory."

The bricks, sold to only RCA and Boeing Co. workers during the program's inception 15 years ago, offer everyone a chance to be recognized as a supporter of the space program. Now, anyone who has contributed to the success of the space program has the opportunity to make a lasting impression of that effort while contributing toward future space endeavors.

Funds from the bricks are split between the two non-profit groups.

The NASA Alumni League distributes their portion to a college scholarship fund and Brevard County high school robotic teams, including the Kennedy-sponsored "Pink Team."

"We are very proud of all Brevard County's robotic teams," Zweigbaum said. "Our students must be given the tools to stay ahead of the rest of the world if we are to



NASA/Jack Pfaller

The SpaceWalk of Honor encircles the reflective ponds adjacent to the Space Mirror Memorial and is in front of the NASA Educator Resource Center, or ERC.

More info

For more information, contact Cathie Gray at 321-452-2887, ext. 5146, or go to www.amfcse.org/spacewalk.htm.

do so as a country."

The portion that goes to the Astronauts Memorial Foundation goes directly to technology education for teachers and maintaining the Space Mirror Memorial.

"We are very fortunate to receive these funds that help teachers," said Cathie Gray, of the Astronauts Memorial Foundation.

Each honoree also receives a personalized and numbered certificate suitable for framing.

The walkway eventually will be paved with 22,000 bricks, each inscribed with the name of an individual who has played an active role in the space program.



For NASA

NASA Alumni League President Tom Breakfield, second from right, checks out one of the robots created by the "Pink Team," which is sponsored in part by the SpaceWalk of Honor funds.

Remembering Our Heritage

Delta rocket family celebrates 50 years of durability

By Kay Grinter
Reference Librarian

In 1959, shortly after the creation of NASA, the new agency contracted with the Douglas Aircraft Co. for a new launch vehicle called Delta.

It used a modified Thor intermediate range ballistic missile as a first stage and two upper stages designed for the Vanguard program. The second stage, built by the Aerojet Corporation, utilized hypergolic fuels. The spin-stabilized third stage, built by the Alleghany Ballistics Laboratory, relied on solid propellant.

Intended as an interim launch vehicle, NASA assigned overall project management to the Goddard Space Flight Center in Maryland, under the guidance of Bill Schindler. Twelve Delta launches were planned until newer launch vehicles could be developed. Launch site operations were provided by a NASA/Douglas Aircraft team headed by NASA's Bob Gray.

Because a U.S. Air Force/Douglas Aircraft team still was launching Thor and Thor-based missions from Launch Complex-17 at Cape

Canaveral Air Force Station, a sharing agreement was worked out with NASA.

As might be expected with the merging of two experienced launch teams, there were differences of opinion on how to perform certain tasks, but these were amicably worked out.

Delta 1 was scheduled to launch in early May 1960, but several milestones were missed and some tests had to be repeated. After several false starts, liftoff came at 4:16 a.m. May 13 after a short delay to evaluate the high-altitude wind conditions.

Unfortunately, the second stage attitude control system malfunctioned, and the payload did not achieve orbit. The failure was, of course, a huge disappointment to all concerned, but the NASA/Douglas Aircraft team worked together, found the problem and corrected it.

A second launch, carrying a similar payload, was successful on Aug. 12 at 4:40 a.m. All systems operated properly, and the payload was injected into the desired orbit.

The payload for both Delta 1 and 2 was an inflatable balloon called Echo. The skin of the balloon was fabricated by the G.T. Schjeldahl Co. from mylar with a vacuum-deposited molecular film aluminum. It inflated to a diameter of 100 feet on orbit.

Echo acted as a passive communications satellite and was designed to reflect radio signals from one ground station to another.

It orbited Earth at an altitude of 1,000 miles. As a bonus, with its large size, it was illuminated by reflected sunlight and could easily be seen by Earthbound observers.

NASA alum John

Neilon was head of the Delta Project Office at Patrick Air Force Base and was the official interface with the Eastern Range. His job was to see that the range met NASA requirements and that, conversely, NASA met their rules and regulations, especially in the areas of safety and scheduling.

During launches and major tests, he was stationed in the apex of the blockhouse of Complex-17. As the test controller, his job was real-time coordination with the range regarding such things as weather and permission to launch.

"I personally recall wasting a lot of time watching it [Echo] go by," Neilon said, "and taking pardonable pride in knowing that I had a part in putting it there for all to see."

The successful launch of Delta 2 was the beginning of a string of 22 successful launches for Delta, an unheard of record in the early days of the space program.

In 1970, Gray transferred "across the river" to work on the Apollo Program, and Neilon took his job as director of Unmanned Launch Operations, or ULO.

"In my time with Delta, I participated in 119 launches and was launch director for 39," Neilon said.

Throughout the years, the Delta rocket, which started with the capability to put 100 pounds into low Earth orbit, grew and achieved greater capability under McDonnell Douglas, NASA and the Air Force with the addition of such things as strap-on solids for the first stage, increased thrust of the engines and larger payload fairings.

Delta launch capability also was established at Vandenberg Air Force Base in California, giving the Delta



NASA file/1998

A solid rocket booster is lifted for installation onto the Boeing Delta 7326 rocket that launched Deep Space 1 at Launch Complex-17A, Cape Canaveral Air Station, Fla., in 1998.

rocket the ability to launch payloads into high-inclination orbits without flying over inhabited areas.

Now launched by United Launch Alliance, the Delta rocket can lift 40,000 pounds to low Earth orbit in its Delta IV Heavy configuration. The Delta launch log has reached 348 liftoffs and counting.

Included in that log are some notable missions, including Telstars 1 and 2; Ariel 1, a joint scientific satellite of the United States and the United Kingdom; numerous scientific satellites called Explorers; Deep Space 1; both the Mars Global Surveyor and Pathfinder missions; and most recently, the GOES-P environmental satellite.

Fifty years after the launch of the first interim vehicle, Delta missions still are being launched from Complex-17, as well as Complex-37.

"People always ask what the most important mission was," Neilon said, "The trite, but correct, answer is 'the one you are working on right now.'"

In 2011, NASA has several missions planned for launch on Delta rockets: the Aquarius mission, the first-ever global mapping of salt concentrations in the ocean surface; the National Polar-orbiting Operational Environmental Satellite System Preparatory Project mission, or NPP, to measure Earth's atmospheric and sea surface temperatures, humidity sounding, land and ocean biological activity, and cloud and aerosol properties; and the Gravity Recovery and Interior Laboratory mission, or GRAIL, to determine the structure of the lunar interior from crust to core and to advance understanding of the thermal evolution of the moon.



NASA file/1996

Build-up of the Delta II expendable launch vehicle that carried the Mars Global Surveyor is shown at Launch Complex-17A, on Cape Canaveral Air Station in December 1996.

2010 DuPont Challenge Science Essay Competition



NASA

Student winners of the 2010 DuPont Challenge Science Essay Competition are honored at the Kennedy Space Center Visitor Complex on April 30. The DuPont Challenge, which began in 1986, honors the memory of the heroes of the Challenger accident and all who work to encourage the next generation to explore the frontiers of science.

Upcoming events . . .

- May 17-31 Virtual Job Fair; For more information, go to VOICE @ https://hrapps.ksc.nasa.gov/voice/KSC_Virtual_Job_Fair.pdf
June 24 KSC On-Site Job Fair; in the SSPF and OSB II (Featuring local and national, private and federal employers. Must register on launchnewcareers.com to participate; For more information, visit VOICE at https://hrapps.ksc.nasa.gov/voice.
June 25 Off-Site Job Fair; Radisson in Cape Canaveral. Must register on launchnewcareers.com; For more information, visit VOICE at https://hrapps.ksc.nasa.gov/voice.

Looking up and ahead . . .

Table with 2 columns: Date/Status and Launch/CCAFS details. Includes entries for May 14, May 20, May 26, May 17, Nov. 17, Nov. 22, Jan. 22, 2011, Aug. 5, 2011, Aug. 15, 2011, Sept. 8, 2011, and Oct. 14, 2011.

WORD ON THE STREET

Have you ever met an astronaut? Did you ask him or her a question? And if not, and you could meet an astronaut, what would be the first thing you asked?



No. I'd like to know what's going through their mind during launch and when they experience zero G.

Bennett Wight, with Abacus Technologies Corp.



Yes. I asked him how it felt to re-enter the Earth's atmosphere after deorbiting.

Cory Williams, with Brevard Achievement Center



No. I would ask for a vivid description of what it was like to be weightless and if they got motion sickness.

Christa Casleton, with NASA



No. I would ask what goes through their head right before the shuttle launches.

Kim Nickerson, with URS Corp.



Yes. I asked him what his biggest challenge was when he got back to Earth.

Barbara McCormack, with CNC International Computers and Consultants, Inc.



John F. Kennedy Space Center

Spaceport News

Spaceport News is an official publication of the Kennedy Space Center and is published on alternate Fridays by External Relations in the interest of KSC civil service and contractor employees.

Contributions are welcome and should be submitted three weeks before publication to the Media Services Branch, IMCS-440. E-mail submissions can be sent to KSC-Spaceport-News@mail.nasa.gov

Managing editor Candrea Thomas
Editor Frank Ochoa-Gonzales
Copy editor Rebecca Sprague

Editorial support provided by Abacus Technology Corp. Writers Group.
NASA at KSC is on the Internet at www.nasa.gov/kennedy
USGPO: 733-049/600142