

Spaceport News

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

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



Ride-out team keeps eye on storms

By Linda Herridge
Spaceport News

There's a special team of about 200 workers who stay on site when a strong tropical storm or hurricane threatens or impacts Kennedy Space Center and Cape Canaveral Air Force Station.

During Tropical Storm Fay, the Hurricane Ride-out Team remained at the spaceport and Tuesday, it began planning for the potential impact from Hurricane Hanna as it heads for the east coast of Florida.

These brave workers are called into action when HURCON IV (the arrival of 50-knot/58 mph winds within 72 hours) is declared by the Kennedy Center Director and the 45th Space Wing Commander.

The designated ride-out personnel are relieved of their normal duties so they can attend an emergency management briefing at the Kennedy Training Auditorium. They receive updates on the storm, general safety guidelines and what



NASA/Jack Pfaller

A member of the Hurricane Ride-Out Team, a group of emergency personnel at Kennedy Space Center, monitors effects from Tropical Storm Fay in front of the Operations Support Building I in the Launch Complex 39 Area. The storm passed over the center Aug. 20 and stalled offshore, bringing with it heavy rain and tropical storm force wind. Kennedy closed Aug. 19 because of Fay and reopened for normal operations Aug. 22.

they can and cannot bring back with them. They then are released back to their supervisors before preparing their homes for the storm.

The workers return to their ride-out locations at Kennedy and CCAFS at pre-determined times and locations to ride out the storm, or until they are released to evacuate or relocate to another spaceport facility.

"NASA appreciates the selflessness of the ride-out team to stay on board and assist in keeping our center maintained and running during such critical times," said Tim Moore, NASA acting emergency manager. "We realize they are needed by their families and we

Stay informed

Kennedy workers can check with the center's hurricane information phone line for the latest information by calling 321-861-7900 or 866-572-4877. Center storm updates also will be available online at the agency's emergency operation center Web site at www.nasa.gov/eoc

appreciate their work and dedication during such difficult times. We also appreciate their families and we know it takes away from them during times of need."

The ride-out team's responsibilities during a severe storm include monitoring and watching the condition of flight hardware and payloads, and the facilities they are in. They report everything they observe to the Emergency Operations Center, or EOC, located in the Launch Control Center, so it can be logged and followed-up on after the storm.

Ride-out team members monitor electrical, mechanical and environmental systems, fuels and HVAC, as well as many other systems. Carpenters, fire and security personnel also remain on the center. The ride-out team, comprised of

See **Ride-out team** Page 8



for NASA

Tropical Storm Fay flooded the roadside canals and surrounding grounds. In the background is the Vehicle Assembly Building.

Workforce Florida assists all during transition

By Linda Herridge
Spaceport News

A first-of-its-kind Space Act Agreement with the Brevard Workforce Development Board (BWDB) will help to bolster support for Kennedy Space Center's work force during the transition from the Space Shuttle Program to the Constellation Program.

Also, Wyle Aerospace Group Vice President George Hauer was appointed to the Workforce Florida Inc. board of directors. Hauer is one of 27 new board members appointed by Governor Charlie Crist, and is the only board member from Kennedy. Workforce Florida is the state's chief work force policy organization and principal architect in the efforts to meet Florida's current and future employment needs and challenges.

"It is an honor to be appointed to the Workforce Florida board of directors," Hauer said. "This appointment enables the aerospace work force in Brevard County and throughout the state to have a voice in how work force strategies are designed and implemented. These strategies are important to assure retention of Kennedy's skilled workers and prepare them for the future."

Andra Cornelius is Workforce Florida's vice president of Business and Workforce Development Opportunities. She said the organization is delighted to welcome Hauer to the board, especially because aerospace is and will be a critical area of focus.

"We believe his input will be



for NASA

Training is given around Kennedy aboard the Brevard Job Link Express Bus that has several computer work stations. Workforce Florida aims to bolster support for Kennedy Space Center's work force during the transition from the Space Shuttle Program to the Constellation Program.



for NASA

The Brevard Job Link Express bus makes stops at various locations around Kennedy Space Center.

invaluable given the imminent space shuttle to Constellation transition and Workforce Florida's focus on retaining shuttle workers in the state's aerospace industry, and transitioning those who aren't retained into other in-state, high-value industries," Cornelius said.

Hauer said he will work closely with Kennedy, local aerospace con-

tractors and the BWDB, to be sure all needs are heard and appropriately acted upon.

The BWDB is the space coast's local arm of Workforce Florida. Its mission is to facilitate and be the catalyst for work force development activities that are responsive to the employment and training needs of Brevard County. The board includes volunteers who represent key industry sectors, economic development and education.

BWDB President Lisa Rice said Hauer has been very active with the Aerospace Career Development Council that the organization formed more than a year ago.

"When the Workforce Florida board needed an aerospace representative I quickly recommended Hauer as a person who would understand the need for growing world-class

talent in Florida and especially in our local region," Rice said.

The Space Act Agreement signed by Kennedy and the BWDB in June was the foundation document used by both organizations to partner with state and local community leaders in the joint goal of preparing Brevard County's highly skilled work force for the transition.

The agreement offers the work force opportunities for lifelong learning and job training. It also allows for increased availability of the Brevard Job Link Express bus at various locations around the center.

Kennedy's Human Resources Director Tracy Anania serves as an ex-officio liaison to the local work force board.

Rick Springfield, Survivor highlight concert series

By Kate Frakes
Spaceport News

"We set sail on this new sea because there is new knowledge to be gained and new rights to be won, and they must be won and used for all people . . ."

In 1962, John F. Kennedy declared the need for space exploration. Fifty years after its conception, NASA's accomplishments are a prominent presence in history.

In celebration of NASA's 50th Anniversary, Kennedy Space Center

Want to go?

For more information or to purchase tickets, call (321) 449-4400 or visit www.kennedyspacecenter.com.

Visitor Complex is hosting a live, festival-style concert series. For three Saturdays, beginning Oct. 18, the symbolic Rocket Garden will provide the backdrop for the music icons.

Reminiscent of the 1980's and

the movie "Rocky III," the popular rock band Survivor will kick off the celebration with their hits like "Eye of the Tiger" and "Is This Love."

As the first Canadian rock band to have a number one hit in the United States, The Guess Who earned its recognition in 1970 with the song "Raindrops Keep Fallin' on My Head." The band will appear on Oct. 25, performing its other well-known songs such as "American Woman" and "These Eyes."

Topping off the series on Nov. 1, Rick Springfield will per-

form his famous 1980's pop-rock songs. Springfield is known for his song "Don't Walk Away" and his Grammy Award-winning single "Jessie's Girl."

Following the concert series events, the second annual Space and Air Show at Kennedy Space Center will be Nov. 8 and 9. The show will feature the precision and power of the world famous U.S. Navy Blue Angels.

All of the events are free with a Commander's Club annual pass.

Motion capture technology touts efficiency

By *Steven Sicheloff*
Spaceport News

Three people clad in black spandex suits studded with small white balls move around a room cloaked in black while computers use special lights to record every motion. This is the latest effort to ready NASA's Kennedy Space Center to assemble and process Constellation rockets and spacecraft for flight.

There's a network of carefully placed plastic sticks that form what could be mistaken for the skeleton of a large tent. In fact, it is the exact dimensions of the pressure vessel of an Orion, the capsule under development to take teams of astronauts into orbit and to the moon.

The three people in black move around inside the plastic frame, carefully handing rectangles of PVC pipe and bailing wire back and forth.

This is how the techniques for assembling the Orion spacecraft are devised, not by trial-and-error inside a multi-million-dollar capsule, but by computer in a virtual world where no one can drop a life support system on their toe or wrench their back while moving equipment inside.

The technology is known as motion capture, and it is the same process used by video game creators and filmmakers to realistically animate characters.

"By using the motion capture or virtual reality, we can reduce the cost of prototyping," said Bob Mills of United Space Alliance or USA. "Nothing replaces hands-on, but this is very close."

The actors and capsule frame are just the beginning of the process. After recording scores of movements, programmers add virtual



NASA

A United Space Alliance technician, right, hands off a component of the Orion crew module mock-up to another technician inside the mock-up. The technicians wear motion capture suits that aim to improve efficiency of assembly processes and identify potential ergonomic risks for future Orion crews.



NASA

Motion capture team project manager Jon Squitieri attaches a retro-reflective marker to a motion capture suit worn by a technician who will be assembling the Orion crew module mock-up. The work is being performed in United Space Alliance's Human Engineering and Modeling and Performance Lab in the RLV Hangar at Kennedy Space Center.

weight to the loads the actors are carrying.

"We can spin the (computer) model and see what the best angle is," Mills said.

The programmers can substitute any other component as designs evolve and study the impacts on workers right away. If the weights are too great or

call for technicians to make severe movements, it can be found out while engineers have a chance to modify the design so it doesn't stress the workers.

The process has already been used at Kennedy to plan the placement of plywood sheets in front of the crawler tracks.

The lab at Kennedy was developed under United Space Alliance's Constellation Independent Research & Development activities to support a variety NASA's exploration projects. The Orion mock-up is a proof of concept to demonstrate the lab's capability. All the data from the tests will be

provided to the Constellation Program.

Mills, who is part of USA's Human Engineering and Modeling and Performance Laboratory, called on Peter Vocci's cutting-edge team at the New York Institute of Technology to help with the project.

"We are going to try to eliminate as many problems (with Orion processing) up-front as possible," Vocci said.

For Vocci, who recalled watching on television as NASA's first capsules rocketed into orbit, the chance to work on the next-generation spacecraft added a new level of reward.

"To be asked to work on a project such as this just makes it that much more exciting," Vocci said.

It will be several years before the first operational Orion capsule begins assembly and processing operations at Kennedy.

"You have projections and expectations, but you never really know until you start doing it," Vocci said.

Scene Around Ken



NASA/Amanda Diller

Technicians observe as the Wide Field Camera 3, or WFC3, is rotated to vertical in the Payload Hazardous Servicing Facility. The WFC3 will be transferred to the Super Lightweight Interchangeable Carrier. WFC3 is part of the payload on space shuttle Atlantis' STS-125 mission for the fifth and final shuttle flight to NASA's Hubble Space Telescope. Launch of Atlantis is targeted for Oct. 8 at 1:34 a.m. Eastern.



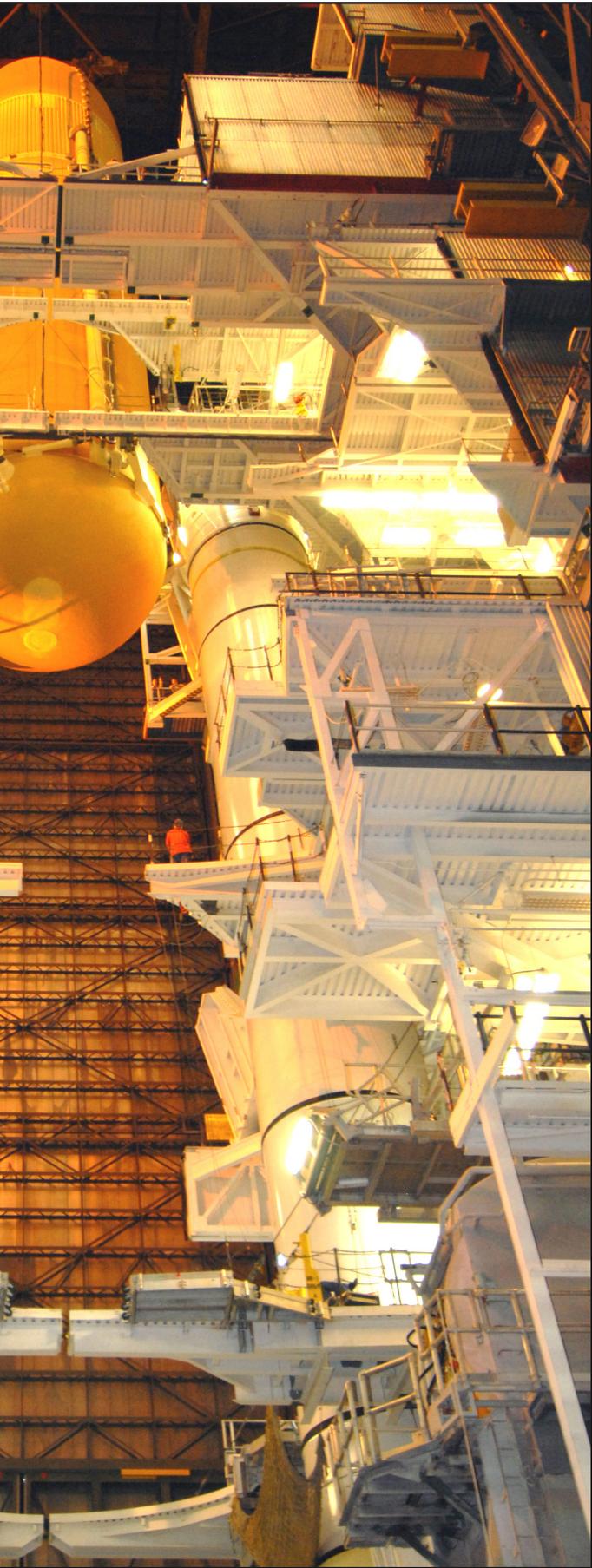
NASA/Dimitri Gerondidakis

Inspectors test repairs on the wall in Launch Pad 39A flame trench in late August. Workers sprayed a heat-resistant concrete called Fondue Fyre into steel grid structures that were welded to the wall of the flame trench.



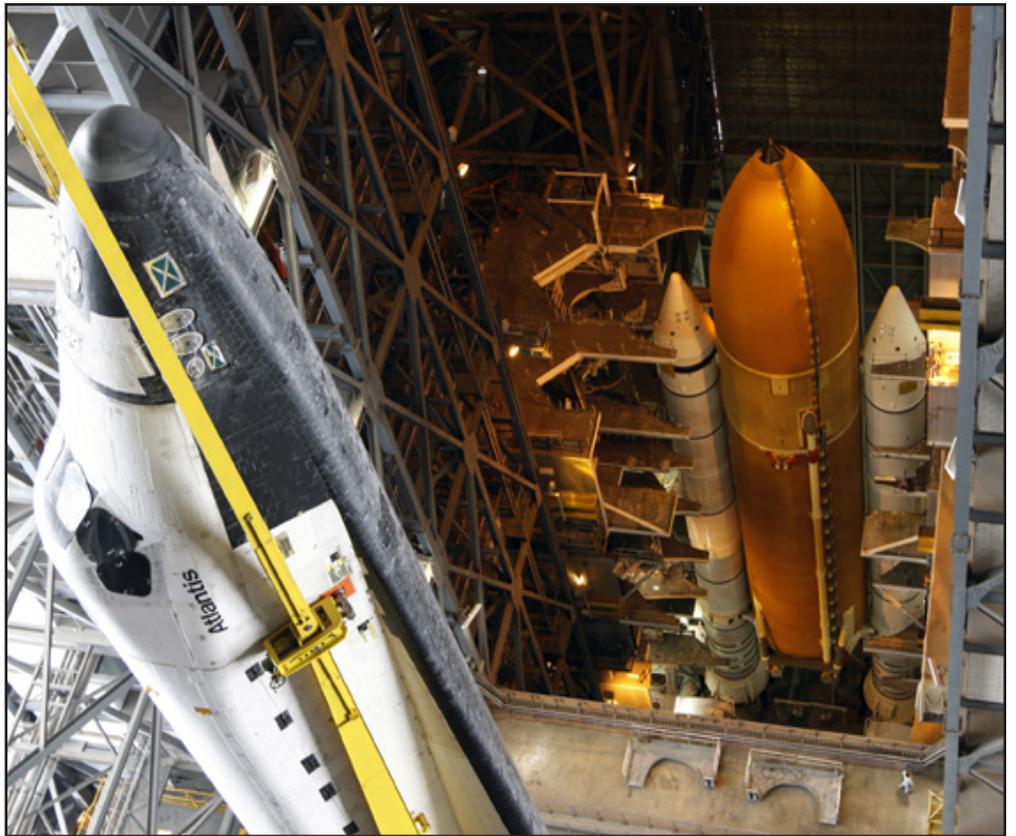
External fuel tank, ET-129, is lowered between the solid rocket boosters in the Vehicle Assembly Building. The external tank-booster stack will be used on the STS-126 mission. The STS-126 mission will deliver a Multi-Purpose Module to the International Space Station. Launch is targeted for Nov. 10.

Kennedy Space Center



NASA/Jack Pfaller

rocket boosters for mating on the mobile launcher platform in high bay 3. The tank will be mated to space shuttle Endeavour for the STS-126 mission to deliver the Logistics Module to the International Space Station. Launch is



NASA/Dimitri Gerondidakis

Space shuttle Atlantis is moved across the I-beam toward the waiting external fuel tank and twin solid rocket boosters in high bay 3 in the Vehicle Assembly Building. Atlantis has been mated to the tank-booster stack on the mobile launcher platform.



NASA/Amanda Diller

Kennedy Deputy Director Janet Petro talks with with Brig. Gen. Susan Helms, center, at the 2008 Women's Equality Day breakfast on Aug. 26.

Spaceport News wants your photos

You are encouraged to send unique story ideas and exciting photos of workers in action for possible publication. Photos should include a short caption with the names and job titles, from left to right. Send e-mail to KSC-Spaceport-News@mail.nasa.gov.

What goes up must come down . . . softly

By Elaine M. Marconi
Spaceport News

NASA won't send anything into space that needs to return -- without a parachute.

The idea of a piece of cloth helping a human float to Earth like a feather in the breeze dates back to the first known drawing of such an invention by Leonardo da Vinci in the 15th century. Many inventors kept busy during the next 200 years trying to perfect a method of sailing back to earth safely.

In 1797, Andrew Garnerin performed the first recorded parachute jump. His parachute, when opened, had a canopy that resembled a huge umbrella. Garnerin also was the first parachute designer to place air vents in the canopy to reduce oscillations and uncontrollable swinging. The rest -- as they say -- is history.

Today, parachutes play a major role in NASA's space program. Without them, the safety of returning astronauts and the reusability of important equipment would be impossible.

Inside the Parachute Refurbishment Facility at NASA's Kennedy Space Center, United Space Alliance Manager Terry McGugin and Engineer Dave Hillebrandt head up an expert team of technicians who maintain and refurbish parachutes, keeping them in exceptional working condition for future use.

Hillebrandt also is lead engineer for the Constellation Program's Ares 1 rocket parachute development project.

The Ares 1 parachute recovery system consists of three types of parachutes: a small pilot chute that pulls out the drogue chute, a drogue chute that slows descent and maneuvers the booster into a vertical position, and three main parachutes that slow the booster more, carrying it to a gentle splashdown.

Hillebrandt watched as the first Ares 1 drogue chute test was performed at the Yuma Proving Grounds in Arizona. The recovery system successfully brought a 46,000-pound-plus load of equipment and sensors, slowly and safely back to Earth -- a significant milestone for the Constellation Program.

"It was really a complex test,"



NASA

Parachutes for the Ares rockets are being prepared for packing in the Parachute Refurbishment Facility at Kennedy Space Center. Ares 1 is an in-line, two-stage rocket that will transport the Orion crew exploration vehicle to low Earth orbit. The Ares 1 first stage will be a five-segment solid rocket booster based on the four-segment design used for the shuttle. As with the shuttle, this booster will fall away when spent, lowered by parachute into the Atlantic Ocean where it can be retrieved and reused.

Hillebrandt said.

When asked how the Orion Crew Exploration Vehicle parachutes compare to the booster chutes, Hillebrandt says it's all in the weight. Boosters have three main chutes, weighing 2,000 pounds each, whereas capsule chutes only weigh 350 pounds each.

Although similar to the space shuttle's parachute system, the Ares recovery system is designed to be much larger and stronger because of the heavier weight of the first-stage rocket and because of a higher separation altitude of 189,000 feet above sea level.

Both the Ares parachutes and the ones for the space shuttle are processed in the parachute facility. Hillebrandt and his team work on every aspect of the Ares parachutes in the building which covers 18,000 square feet and is bigger than two side-by-side basketball courts.

The building is mainly used to process space shuttle parachutes. After NASA's retrieval ships, Liberty Star and Freedom Star, carefully recover the space shuttle solid rocket booster parachutes from the water, they're transported back to the refurbishment facility at Kennedy Space

Center. The chutes are stretched out on an 11,000 square-foot outdoor deck where the suspension lines are untangled.

Next, the chutes are hung by hand onto L-shaped hooks attached to a monorail system that carries them into a monster-sized washer. After hours of sloshing in a 25,000-gallon tank to cleanse the fabric of debris and minerals, the monorail moves the chute into a mammoth dryer. When the drying cycle is complete, the monorail snakes its way through the building for the next processing step -- repair and re-pack.

The Ares parachutes are even bigger. To understand the colossal size of them, imagine a cluster of three brightly-colored canopies that cover more than two acres and is from end-to-end, 325 feet long.

Kevlar makes these new parachutes stronger and lighter than their nylon predecessors. Although the chute is bigger, it still fits into the same-sized container and weighs less.

The canopy's open-spacing design, originally invented by Garnerin, is still being used. Today's canopy consists of strong strips of

material sewn together in a lattice-work design, which looks similar to pie-crust top. This design allows the wind to flow through the blossoming canopy, stabilizing the entire stack.

The strength needed for the suspension lines to support a more than 200,000 pound object from an elevation of 189,000 feet is tested by the refurbishment team on several tensile-strength machines.

Technicians work on gigantic sewing machines to repair the fabric and 165 foot long suspension lines, while 3,500 square feet of table top accommodate the careful folding and packing of the parachutes for the next flight -- or in the case of Ares, the next test.

"This is a monumental feat," said McGugin about the size and scope of the work being done at the facility.

The parachute recovery system is scheduled to fly in 2009 on the first Ares 1 test flight. The two-stage rocket will be topped by a simulated Orion crew vehicle.

In the future, the Ares 1 rocket will carry the Orion capsule with four to six astronauts into orbit and deliver supplies to the International Space Station.

Satcom 2R among 1983's great run

By Kay Grinter
Reference Librarian

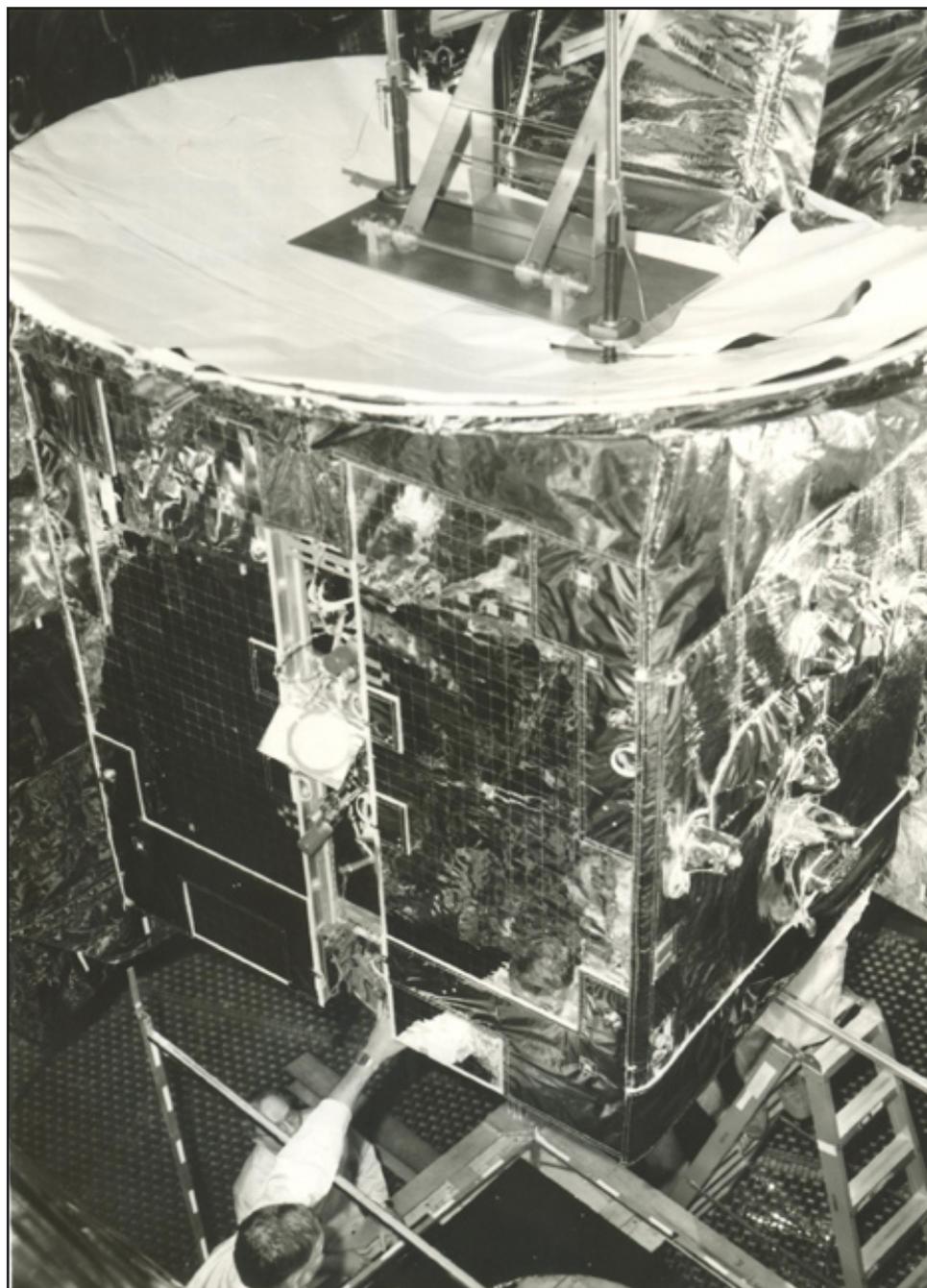
The year 1983, was a very good one for NASA. Four space shuttle missions and 11 expendable vehicle launches were accomplished with no failures. Every launch was a success.

In May, President Ronald Reagan announced that the U.S. government would facilitate the commercial operation of the expendable launch vehicle program. The increased commercial use of NASA's launch fleet and launch services conformed to this policy.

NASA alum Wayne McCall was chief of the Delta operations division in Kennedy Space Center's expendable launch vehicle operations in 1983 and recalled: "Eight of those 11 unmanned launches were on Delta vehicles, and all were from Launch Complex 17 on Cape Canaveral Air Force Station. Since there were two active Delta pads, there was no dead time. We kept the crew busy on both pads every day because while mechanical work was under way on one vehicle, systems work could be done on the other. The normal eight-week vehicle processing flow required between launches from a single pad could be reduced to four to six weeks."

Among the commercial satellites launched atop McDonnell Douglas-built Delta vehicles (167 and 172) were Satcom 1R and 2R, the first two entries in RCA's series of advanced, second-generation domestic communications satellites. Satcom 1R launched April 11, with Satcom 2R following five months later on Sept. 8.

After deployment, the



NASA file

The solid state RCA Satcom 2R satellite is positioned in a thermal vacuum chamber for simulated environment tests in Princeton, N.J. The satellite, which replaced Satcom 2 in 1976, was launched among the four space shuttle missions and 11 expendable vehicle launches in 1983.

Satcoms operated from geostationary circular orbit. Geostationary satellites hover over an assigned location above the equator, at an altitude of 22,240 miles. They are spaced around a circle some 165,000 miles in circumference.

The advantages of this orbit are that the location is high enough to permit coverage of vast areas of

the globe below, and the position can be maintained with minimal expenditure of on-board propellants. Because hundreds of fixed antennas on the ground must be carefully aimed at the satellite for good signal reception, it is important that it be "locked in" to its position.

One of the major services of the Satcom system was the relay of

television signals, and Satcom was the first system used by U.S. broadcast television networks - such as ABC, NBC and CBS - to distribute programming to local affiliate stations. At the end of 1978, there were 375 ground stations in the U.S. capable of transmitting and receiving satellite signals. This grew to 1,400 in 1979, and 3,000 by the end of 1980.

Remembering Our Heritage

Satcom 2R joined four other communications satellites in orbit - RCA-C through RCA-F - making a five-satellite RCA network that provided coverage to all 50 states. More than 4,000 ground stations had direct access to these communications satellites, which all carried 28 completely solid state C-band amplifiers in a configuration that gave 24 operating channels for television, voice and high-speed data transmission. This was a 50 percent increase capacity compared to earlier Satcoms.

The advanced Satcoms were the first to use an all-solid-state communications system. The advantages of the solid state amplifiers were higher reliability, much simpler power supply requirements and improved performance characteristics. Earlier RCA Satcoms used traveling wave tube amplifiers, then standard throughout the industry.

Satcom 1R and 2R used hydrazine resistojets for stationkeeping and orbit maintenance. Resistojets operate directly from spacecraft batteries or use rudimentary power processing.

They are appropriate for spacecraft on which high propulsion efficiency, but low thrust, is required. The resistojets on these advanced Satcoms had a coiled wire heater that radiated to an annular heat exchanger surrounding the coil.

General Electric acquired RCA in 1986. The last Satcom satellite was placed in orbit in November 1985 and deactivated in February 2002.

From Ride-out team, Page 1

many different skill mixes, may be required to respond and take immediate action to deal with critical situations pertaining to flight hardware, payloads or facilities, as weather permits.

NASA, United Space Alliance, Boeing and other contractors stationed in the EOC follow the weather briefings every six hours and communicate with the leads in each facility, as well as Brevard County Emergency Management and Patrick Air Force Base. After a storm passes, the ride-out team waits for the "weather-safe" announcement from the EOC before proceeding outside for initial assessments. This only happens when

winds in excess of 58 mph have subsided for a sustained period of at least two hours or more.

"The ride-out crew are the special people who volunteer their time under difficult conditions to stay here to make sure the center is safe and then, after the storm is over, are prepared to come back in and get back to supporting NASA's mission," said John Cosat, Space Gateway Support emergency management chief.

As of presstime, Tropical Storm Hanna had delayed the rollout of space shuttle Atlantis' to Launch Pad 39A. If Hanna stays on track, then Atlantis will roll to the pad, most likely Saturday morning.

Two other tropical storms, Ike and Josephine, were churning in the Atlantic Ocean.

Submit speaker abstracts for PM Challenge 2009

Do you have a topic of interest to NASA program and project management stakeholders? Deadline for abstract submissions is Sept. 12. For more information, go to: <http://pmchallenge.gsfc.nasa.gov/speaker2009.htm>

Looking up and ahead

No earlier than Sept. 26	Launch/CCAFS: Delta IV, NROL-26; TBD
Target Oct. 8	Launch/KSC: Atlantis, STS-125; 1:34 a.m.
Oct. 18	Family Day at Kennedy Space Center
Target Nov. 10	Launch/KSC: Endeavour, STS-126; 9:31 p.m.
No earlier than Jan. 23, 2009	Launch/CCAFS: Delta II, STSS; TBD
No earlier than Feb. 10, 2009	Launch/CCAFS: Delta IV, GOES-O; TBD
Target Feb. 12, 2009	Launch/KSC: Discovery, STS-119; 7:36 a.m.
No earlier than March 2, 2009	Launch/CCAFS: Atlas V, LRO/LCROSS; TBD
Scheduled for April 10	Launch/CCAFS: Delta II, Kepler; TBD
Target May 15, 2009	Launch/KSC: Endeavour, STS-127; 4:52 p.m.
Target July 30, 2009	Launch/KSC: Atlantis, STS-128; TBD
Target Oct. 15, 2009	Launch/KSC: Discovery, STS-129; TBD
Target Dec. 10, 2009	Launch/KSC: Endeavour, STS-130; TBD
Scheduled for Jan. 26, 2010	Launch/CCAFS: Atlas V, SDO; TBD
Target Feb. 11, 2010	Launch/KSC: Atlantis, STS-131; TBD
Target April 8, 2010	Launch/KSC: Discovery, STS-132; TBD
Target May 31, 2010	Launch/KSC: Endeavour, STS-133; TBD

Spaceport News wants your photos

Send photos of yourself and/or your co-workers in action for possible publication. Photos should include a short caption, with names and job titles, from left. Send them to KSC-Spaceport-News@mail.nasa.gov.

WORD ON THE STREET

What do you think about the rash of storms that are headed our way?

at the O&C



"I'm a California girl and I'd take an earthquake any day. We just took our shutters down."

Chris Bills-Graham, subcontract program manager with Lockheed Martin

"It's part of living in Florida. You just have to be prepared and get essentials ready."

Eduardo Bertot, computer engineer with NASA IT



"I really don't mind . . . it's a little exciting. We just usually prepare for them."

Karen Marshall, security and training administrator with JPL

"It just slows down the guys working on Constellation. There's not much you can do."

Prentice Washington, technical assistant with NASA



"At home I maintain a box to keep important things in. It's a little more difficult at work."

Sheryl Bergstrom, manager with JPL



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, IDI-011. 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 InDyne, Inc. Writers Group.
 NASA at KSC is on the Internet at www.nasa.gov/kennedy
 USGPO: 733-049/600142