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Spaceport News

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

Micro Aerospace Solutions takes up shop at SSPF

By Linda Herridge
Spaceport News

Kennedy Space Center's Center Planning and Development Directorate (CPDD) and International Space Station (ISS) Ground Processing and Research Directorate welcomed Micro Aerospace Solutions (MAS) of Melbourne as a new partner at the Space Station Processing Facility (SSPF) on April 1.

Amy Houts-Gilfriche, a partnership development manager in CPDD, offered the official welcome to MAS President Donald Platt.

"We are very happy to welcome you to the space center," Houts-Gilfriche said.

NASA signed an agreement with MAS on March 22 for use of an offline hardware processing laboratory and office space at the processing facility.

"We're very excited about using the facilities at Kennedy Space Center," Platt said. "We look forward to our partnership with NASA."

CPDD Deputy Director Tom Engler said it's a wonderful partnership for the center.

"We're looking forward to having MAS work with us and us with them as they provide all the small payloads and small satellites that they will work with at Kennedy," Engler said.

MAS is a small business established in 2000 that specializes in software, electrical and mechanical design engineering services. The company will use a suite of offices on the second floor and a "clean room" laboratory on the first floor near the facility's high bay to test and process a variety of small satellites and payloads for delivery to the ISS.

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NASA/Tony Gray

PaR Systems Inc. of Shoreview, Minn., signed a new partnership agreement with Kennedy Space Center to utilize Hanger N (shown here) and its unique equipment April 5.

PaR Systems signs up to use NASA's Hanger N

Spaceport News Report

Kennedy Space Center has signed a new partnership agreement with PaR Systems Inc. of Shoreview, Minn., for use of the Hangar N facility and its unique nondestructive testing (NDT) equipment. The facility is located on Cape Canaveral Air Force Station (CCAFS) adjacent to Kennedy.

Because of NASA's transition from the Space Shuttle Program to future commercial and government mission activities, this agreement allows NASA to preserve Hangar N's unique inventory of nondestructive test and evaluation (NDE) equipment and the capability for current and future mission spaceflight support. The government

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Inside this issue...

Program facilitates before problems arise

By Frank Ochoa-Gonzales
Spaceport News

NASA recently was named one of the best places to work in the federal government, in part because of its effort to attract and maintain a diverse workforce.

By definition, diversity is the inclusion of different people. And with different people come different ways of looking at things.

Sometimes, issues arise. As always, there is the right way to deal with them.

Whether the problems are serious or simple, Kennedy Space Center's Richard Rodriguez and the Office of Diversity and Equal Opportunity always are available to take them on.

NASA/Jim Grossmann

Equal Employment Opportunity specialist Richard Rodriguez helps resolve workplace disputes quickly and effectively through the use of the Alternative Dispute Resolution Program.

"It is important that individuals have a place they can go and express their concerns in the workplace," said Rodriguez, an Equal Employment Opportunity specialist who serves as the Equal Employment Opportunity Program manager at Kennedy. "Workers just don't have to 'deal with it,' if there's a problem, just say something."

Have a workplace problem?
Email Richard Rodriguez at **richard.rodriguez-1@nasa.gov**
or go to **http://odeo.ksc.nasa.gov**.

Whether a worker is having a tough time with a co-worker or a supervisor, Rodriguez said workplace disputes can be resolved quickly and effectively through the use of the Alternative Dispute Resolution Program. Confidentiality is maintained during this process.

The group, which promotes diversity and equal opportunity, gathers and provides information to those involved, opens avenues of communication, and identifies, evaluates and recommends solutions to these issues.

"When individuals (civil servants, applicants and in some instances contractor employees) feel they have been discriminated against or treated unfairly, they come to my office I interview them, and explain the process and options available to try to reach a resolution to the dispute, which is what usually happens.

"Often an employee just wants to talk out a problem without it becoming public, and our office is here to serve everyone equally."

Prospector answers LSP call

By Steven Siceloff
Spaceport News

Nano- and microsatellites built by students, businesses and research organizations can catch their own rides into space now that a California-based company is launching operational flights of a high-altitude rocket big enough to carry payloads high into the atmosphere.

Garvey Spacecraft Corp.'s Prospector 18 (P-18) has made four flights so far, including an operational mission last December that saw it carry a research payload for NASA's Ames Research Center and California Polytechnic State University (Cal Poly). The Long Beach, Calif.-based company is using the P-18 as a pathfinder for building a larger model that can reach orbit.

The development is important for NASA because it gives satellite builders a chance to fly high-altitude experiments before hitching a ride on a larger mission and rocket, said Garrett Skrobot of NASA's Launch Services Program who runs the CubeSat and Nanosat projects of the agency's ELaNa program, short for Educational Launch of Nanosatellites.

"Today, nanosat developers still depend on secondary ride opportunities to get to orbit," Skrobot said. "There are several operational issues with that approach. In response, with projects like this, we are taking the first steps with Garvey Spacecraft and other small launch vehicle developers to explore alternatives that could eventually lead to dedicated launch services that are tailored to the requirements of this market."

The High Altitude Launch Service contract paid for the December mission and another mission, scheduled to launch June 15. This flight will test the CP9/StangSat payload; a spacecraft being built by Merritt Island High School; Cal Poly's payload; a Rocket University experiment that is a product of Kennedy Space Center; and another research payload from Ames and a new lightweight nanosat carrier system.

The satellites in mind for the rocket are 4-inch squares that weigh about two pounds. Previously, they were carried inside a rectangular box fitted on larger rockets and sprung free into orbit once the main payload was deployed.

With a rocket fitted to the small satellite needs, though, more experiments and hardware also can be flown at a lower cost. The rocket's flight profile can be adjusted to meet specific needs of a research payload.

Photo courtesy of Kevin Baxter/
Friends of Amateur Rocketry Inc.

The Prospector 18 suborbital reusable launch vehicle takes off last year during its first contracted launch performed for NASA's Launch Services Program.

NASA/Kim Shiflett

Tom Engler, right, deputy director of Kennedy's Center Planning and Development Directorate (CPDD), and Amy Houts-Gilfriche, CPDD partnership development manager, welcome Don Platt, president of Micro Aerospace Solutions (MAS) to the Space Station Processing Facility on April 1.

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In addition to testing verification software for the space station, electronic systems, inertial sensors and software systems for small satellites, MAS will work on propulsion-related testing for different types of rockets.

MAS is lead avionics integrator and software developer for NASA's Sunjammer small satellite mission that is scheduled to launch no earlier than 2014. The company is providing all flight software and verification, avionics system design and integration and engineering support as the primary subcontractor to L'Garde Corp. of Tustin, Calif.

Sunjammer will demonstrate a first-of-its-kind solar sail for propulsion in space.

Among other projects, MAS also is primary software developer and integrator for several biology-related payloads that will fly on the space station.

Platt said having access to the unique facilities and test capabilities at the center is a great benefit to the company and its customers.

"We're here to help make this partnership successful," Engler said.

CPDD Technical Integration manager Cliff Hausmann said the center also is interested in the future growth potential.

"We look forward to years of partnership," said ISS Ground Processing and Research Director Josie Burnett. "It's exciting to have an additional customer who will be working with payload and space station customers."

From **HANGAR N**, Page 1

retains ownership of the facility and equipment, which enables PaR Systems to utilize it now and NASA to use it for future spaceflight projects.

"Kennedy Space Center continues to work with the commercial community to find inventive ways to use our unique facilities and equipment," said Kennedy Director Bob Cabana. "We look forward to this new partnership with PaR Systems and its contributions to America's space program."

Under a 15-year lease agreement, PaR Systems will operate and maintain the facility at its own expense to perform nondestructive evaluation testing and other related aerospace, marine and industrial products services. The company will immediately access the facility to begin work.

Hangar N can inspect large structures as well as small commercial and aerospace parts. Its location at CCAFS allows PaR to provide support to NASA's Space Launch System and Orion programs and to commercial launch customers.

Kennedy's business project development team and the Economic Development Commission of Florida's Space Coast worked with PaR Systems to establish the agreement.

PaR Systems is a privately held business specializing in process automation, robotic solutions and services for critical applications in demanding environments. Initially, eight PaR employees will be based at Kennedy to perform the work.

Additional support will be provided by PaR's LaserUT Center of Excellence in Fort Worth, Texas, and its Robotics Headquarters.

More online

For more information about PaR Systems, go to **http://www.par.com.**

ISS leaders review NASA Docking System design

Spaceport News Report

NASA's International Space Station (ISS) Program held a review April 2-4 of the docking system that spacecraft could use for future missions to the space station, including the companies working with the agency's Commercial Crew Program (CCP).

Plans call for the NASA Docking System (NDS) design, pictured at right, to be made available to all U.S.-based crew-carrying spacecraft docking with the space station in the future. The docking system will be able to transfer power, data, commands, air and communications between the two craft as they orbit the Earth.

CCP's three Certification Products Contract (CPC) contractors -- The Boeing Company, Sierra Nevada Corp. (SNC) Space Systems and Space Exploration Technologies (SpaceX) -- will be able to look at the results of the review and provide feedback on how they plan to incorporate the NDS into their spacecraft.

CLICK ON PHOTO *For NASA*

International Space Station Program team members check out NASA's Docking System (NDS) design mock-up on Sept. 2, 2010. The NDS could be incorporated into Commercial Crew Program (CCP) partner spacecraft for future missions to the station. For more on CCP developments, click on the photo.

Tour, briefings enlighten transit experts

By Bob Granath and Rebecca Regan
Spaceport News

NASA/Dimitri Gerondidakis

The Commercial Crew and Cargo Processing Facility (C3PF) at Kennedy Space Center is going through major renovations to support the manufacturing of The Boeing Company's CST-100 spacecraft as shown in this Dec. 20, 2012 photo.

Whether there are rocket boosters arriving by rail or barge, motors and space station supplies by truck, or satellites and spacecraft by plane, Kennedy Space Center is bustling with new spaceport activities. U.S. Federal Highway Administration (FHWA) and Florida Department of Transportation (FDOT) representatives learned March 27 that Florida's Space Coast is a hub for intermodal space transportation.

During a day of briefings and tours hosted by Space Florida, an aerospace economic development agency, the transportation group learned how the state is working to grow and diversify its aerospace industry.

"We serve as the state's spaceport authority, just like an airport or seaport authority," said Frank DiBello, president and chief executive officer of Space Florida. "We are also responsible for development and growth of the aerospace industry in the state."

DiBello noted that although the citrus industry and tourism are key components of Florida's economy, there are 11,638 aerospace companies in the state with 132,140 employees bringing in more than $17.7 billion in revenue.

If all goes as planned, Kennedy and Cape Canaveral Air Force Station, which sits adjacent to the space center, will become multiuser spaceports, and could be the launch sites for new commercial markets in low-Earth orbit, as well as NASA missions to deep-space destinations such as Mars or asteroids.

"In the next 25 years you will see a significant increase in the amount of activity that is going on in low-Earth orbit," DiBello said. "People will be going up there to look at things, to do research, to move things around, to refuel them, to fix them, repair them, refurbish, all kinds of activities up there, including adventure tourism."

Trey Carlson of the Center Planning and Development Directorate at Kennedy presented elements of NASA's master plan to the FHWA and FDOT representatives. Carlson, who is Kennedy's master planner, said the agency currently is studying how best to use the facilities available at the center.

"Kennedy-built infrastructure is what has enabled us to do the great things that have defined our national pride," Carlson said. "It allowed us to achieve a manned lunar landing with the Saturn V launching from LC-39. We then transformed the center at the end of the Apollo Program for the Space Shuttle Program, leading to the construction of the International Space Station."

Carlson explained that Kennedy is, once again, making great strides to transform as it evolves from a historically government-only launch facility to a multiuser spaceport for both government and commercial customers.

"We are in a period of transition again," he said. "We now are developing a spaceport that supports both NASA's Space Launch System and other commercial operations."

The Space Launch System is an advanced, heavy-lift rocket that will provide the capability for human exploration beyond low-Earth orbit. At the same time, NASA is working in partnership with the nation's aerospace industry to develop space transportation systems that can launch astronauts safely to the International Space Station.

"Our motto now is 'a new way of doing business for a new generation of explorers,' " Carlson said.

The transportation group then traveled to Kennedy's Shuttle Landing Facility before heading to the Commercial Crew and Cargo Processing Facility (C3PF) to talk with representatives from NASA, The Boeing Company and Space Florida about the ongoing work to modernize the former orbiter processing facility for commercial space activities. FDOT helped fund part of Space Florida's work at C3PF.

"We removed almost 1,200 tons of steel and other material from this facility in about four months, 93 percent of which was recycled," said Mark Bontrager, Space Florida vice president of Spaceport Operations. "All of that infrastructure just wasn't useful anymore. It was designed for the shuttle, and now we're embarking on the next phase of commercializing this facility during the next few months."

By giving the facility a sleek, clean-floor look, companies that are partnered with NASA's Commercial Crew Program (CCP), such as Boeing with its CST-100 spacecraft, could begin manufacturing and processing for flights planned to launch around the middle of the decade.

The group's last stop was Space Launch Complex-40 at the Cape, where SpaceX already is launching cargo vessels to the space station for NASA and is planning to launch crews in the future. Just a mile and a half away, at Space Launch Complex-41, Boeing's CST-100 and Sierra Nevada Corp.'s Dream Chaser would launch crews atop a United Launch Alliance Atlas V rocket.

"Today, we're actually spending a significant amount of money to fly our astronauts on a non-U.S.-based vehicle," said Gennaro Caliendo, CCP's partner manager for Boeing. "It's effective, very safe, it works, but it's just not what we want to do as an agency, it's not what we want to do as a country. We want to bring that capability back here."

Young women focus on STEM careers

By Bob Granath
Spaceport News

A group of 30 students from Florida's Putnam and Volusia counties recently participated in a presentation by a panel of women who work at Kennedy Space Center. The 11- to 13-year-old middle school scholars are part of Delta Academy, and the 14- to 18-year-old high school students are part of Delta GEMS. Both are African-American women's mentoring programs.

The group took part in a space and science demonstration program at Kennedy's Center for Space Education, followed by a panel presentation on making career choices and encouraging interest in science, technology, engineering and mathematics (STEM).

According to Lalita Thomas, an advisor from Putnam County, young women are given the chance to hear about different career paths. It is part of the Professional African-American Women's Tour that takes place during March each year through the Delta Academy/GEMS program.

"This is a great opportunity for the students to be exposed to different career choices," she said.

The Delta Academy/GEMS approach focuses on helping students form a "road map" for college and career planning. One step down that path was hearing from three NASA professionals who provided insights and encouragement to the students to work hard toward whatever their career choices may be.

"I was in the 10th or 11th grade when I first started thinking about a career," said Ledlyne Heriscar, an electrical systems engineer in the Communications and Tracking Branch of NASA Engineering and Technology. "My suggestion is to think about what you'd like to do and find out what you need to study for that kind of job."

She said that having a mentor -- a wise and trusted teacher or counselor -- was a key help in getting her ambitions pointed in the right direction.

"When I was in my sophomore year of high school, my math teacher really encouraged me," Heriscar said. "She knew I liked the subject and suggested I consider engineering."

Heriscar went on to earn a bachelor's degree in electrical engineering from the University of Central Florida and went on to the University of Miami where she received a master's in industrial engineering. She now has worked at Kennedy for nine years, with both the Space Program Operations contractor United Space Alliance and NASA.

NASA/Jim Grossmann

Delta Academy/GEMS program participants are hands-on during a science demonstration at Kennedy Space Center's Center for Space Education on March 29.

Kim Carter, a Business Office supervisor and program analyst in NASA Information Technology and Communications Services, agreed that mentors can play an important role in setting a direction for a career.

"You need mentors," she said. "I knew in high school, there is no way I can make all the decisions on my own. I had to depend on others, and many of my teachers helped me along the way."

Benita Desuza, a lead program specialist in NASA Education Programs and University Research, said there may be times of discouragement but urged the women to persevere.

"Know what you want to do and don't let obstacles stop you," she said. "If you are struggling in a subject (in school), get a tutor. Don't let that define you."

Desuza, who earned a bachelor's degree in business from Jackson State University, praised the Delta GEMS program.

"GEMS does a great job encouraging interest in math and science," she said.

Heriscar added that concentrating now on academic subjects needed to prepare for a chosen career will be worthwhile.

"Develop good study habits now and that will pay off in the future," she said.

NASA/Jim Grossmann

Middle and high school students from Florida's Putnam and Volusia counties recently participated in science demonstrations at NASA's Center for Space Education at the Kennedy Space Center. The students are part of Delta Academy and Delta GEMS, an African-American women's mentoring program.

Scenes Around Kennedy Space Center

NASA/Kim Shiflett

Kennedy Space Center Director Bob Cabana shares his optimism during the unveiling of NASA's "Best Places to Work in the Federal Government" plaque. The agency ranked No. 1 in the "large agencies" category, those which have more than 15,000 employees. The annual rankings are produced by the Partnership for Public Service and Deloitte, and measure how federal employees view their jobs and workplaces.

NASA/Dimitri Gerondidakis

A technician inside the Operations and Checkout Building high bay at Kennedy Space Center practices a procedure to repair cracks on the agency's Orion Exploration Flight Test 1 crew module during a dry run. During proof pressure testing on the vehicle, the spacecraft sustained three cracks in the aft bulkhead. A team composed of Lockheed Martin and NASA engineers designed a set of brackets to repair the area, as well as tooling to fix the cracked structure.

NASA/Tim Adams

Kennedy Space Center protocol officer Pam Adams receives an honorary knighting by Ron Hungerford, royal regent of the Royal Rosarians, during a ceremony March 20 in St. Petersburg, Fla. Presiding over the presentation is Gayle Whitehurst, prime minister for the organization. The Royal Rosarians are a 101-year-old community service organization whose members travel around the world as goodwill ambassadors from Portland, Ore., known as the "City of Roses." The Royal Rosarians also expressed appreciation for her work supporting a recent observance at Kennedy's visitor complex during which the Royal Rosarians planted a rose bush in recognition of space center employees.

For NASA

Flames consume trees and brush at Kennedy Space Center on April 2 after lightning struck April 1 at about 5 p.m. The fire consumed 2,200 acres and did come close to NASA facilities, but fire breaks prevented any fire damage. Twelve employees and about 50 campers were evacuated from NASA facilities, including KARS Park I on April 2.

NASA/Tim Jacobs

Former astronaut Jerry Ross shared his experiences as an astronaut and signed his book, "Spacewalker," with employees in the OSB II, Fifth Floor Conference Room, on March 29. A veteran of seven space flights, Ross has more than 1,393 hours in space, including 58 hours and 18 minutes of extravehicular activity on nine spacewalks. He was the first human to be launched into space seven times.

NASA/Dimitri Gerondidakis

Debris litters Kennedy Space Center the day after a storm with strong winds and tornadic activity blew through the Space Coast on March 25.

NASA/Dimitri Gerondidakis

Visitors to the Tico Warbird Air Show near Kennedy Space Center take time March 22 to learn about the work the agency is pursuing and plans for future exploration. The NASA booth provided guests with information about the Ground Systems Development and Operations, Launch Services and the Commercial Crew programs, all based at Kennedy. Models of spacecraft and rockets, including the Space Launch System, were on display.

Education specialists explore 'Museum in a Box'

By Linda Herridge
Spaceport News

Science teacher April Lanotte from NASA's Aeronautics Research Mission Directorate (ARMD) placed a marshmallow Peep in the shape of a gingerbread man inside a small vacuum chamber at Kennedy Space Center's Educator Resource Center (ERC) and turned on the switch.

As education specialists looked on, the fluffy candy gradually started to inflate and then began to shrink back until it was shriveled and distorted.

"This is why astronauts need to wear pressurized suits high in the Earth's atmosphere and in space," Lanotte said, "and using a vacuum chamber is one of the easiest ways to demonstrate temperature, pressure, density and human survival at high pressure altitudes to children."

Lanotte, who is an Albert Einstein Distinguished Educator Fellow, was at the ERC on March 19 to train Kennedy education specialists and Kennedy Educate to Innovate volunteers in the directorate's first NASA center training of the updated Museum in a Box education program.

NASA/Jim Grossmann

Inside Kennedy Space Center's Educator Resource Center, science teacher April Lanotte displays the Museum in a Box that contains activities and learning materials for K-12 students. Lanotte, who is an Albert Einstein Distinguished Educator Fellow working in NASA's Aeronautics Research Mission Directorate, was at Kennedy on March 19 to train education specialists and Kennedy Educate to Innovate program volunteers in the series of lessons and activities.

During her two years as a distinguished educator fellow with NASA, Lanotte is helping to shape education programs by offering guidance and insight to the agency.

"I came to NASA as a science teacher with a love of space science," Lanotte said. "Now I am producing NASA content and helping to deliver it to other teachers and students. I can't imagine a better fellowship experience anywhere."

The series of hands-on lessons and activities are tied to K-12 National Science Standards and teaches physical science through aeronautics. Topics include forces and motion, Bernoulli's Principle, propulsion, history of flight, and other flight-related concepts.

"The activities and experiments in the Museum in a Box give students a real sense of why they're learning the basic science principles and how they could apply them to a career in the future," Lanotte said.

NASA/Jim Grossmann

Inside the Educator Resource Center, science teacher April Lanotte demonstrates one of the Museum in a Box experiments to a group of education specialists and Kennedy Educate to Innovate program volunteers during a training session March 19.

During the training session, education specialists received background material, step-by-step instructions and worksheets, and participated in some of the hands-on activities designed for different grade levels.

Laura Baker, an ERC program manager from Oklahoma State University, said Museum in a Box provides many new ideas and activities to enhance the current K-12 education program.

"We already have incorporated some of the activities into existing programming," Baker said. "It will help to further involve students and teachers in science, technology, engineering and mathematics studies."

Baker said the ERC staff is very excited to add the new content to programs already in place.

Crawler-Transporter sports new bearing assemblies

By Bob Granath
Spaceport News

For more than a year, NASA's crawler-transporter (CT) 2 has been undergoing a major tuneup in the Kennedy Space Center's Vehicle Assembly Building (VAB). Recent work has included preparations to install upgraded components that will enable the crawler to carry the greater loads anticipated with the agency's new rocket designed to take astronauts beyond low-Earth orbit for the first time since the early 1970s.

The crawler-transporter modifications are part of NASA's Ground Systems Development and Operations (GSDO) Program efforts to upgrade Kennedy's infrastructure to support the 21st-century spaceport. Earlier CT modifications were checked out during an extensive test drive to Launch Pad 39A last November. In February, the crawler returned to the VAB's high bay 2 for further work.

"The next step is to remove and replace the roller bearing assemblies," said Mary Hanna, CT project manager in the Vehicle Integration and Launch Branch of GSDO. "We've already begun the process of removing the treads and jacking two of the crawler corners four feet off the ground to remove the old assemblies."

Hanna noted that CT-2 will play a crucial role in future launch operations at Kennedy.

"These upgrades are designed to make sure the crawler will support us for another 50 years," she said. "Many of the older parts were wearing out from years of use."

The crawler-transporters were an integral part of the Apollo and Space Shuttle programs. For more than 45 years, the crawlers were used to transport the mobile launcher platforms and the Apollo-Saturn V rockets and, later, space shuttles to the two launch pads at Launch Complex 39. At the end of 2011, engineers began modifying CT-2 to ensure its ability to transport launch vehicles currently in development, such as NASA's Space Launch System (SLS), which will send the Orion spacecraft carrying humans to new destinations in the solar system. The new rocket will have the heaviest lift capability and be the most powerful to date.

The current work is being supported by NASA's Test and Operations Support Contract by Jacobs Technology Inc., NASA's Engineering Support Contract by QinetiQ Inc., both at Kennedy, as well as Mammoet Inc. of Houston and L&H Industrial Inc. of Gillette, Wyo.

NASA/Kim Shiflett

Mary Hanna, in GSDO's Vehicle Integration and Launch Branch, describes modifications being made to crawler-transporter 2 to NASA Administrator Charlie Bolden during his visit to the Kennedy Space Center last August. Hanna is the crawler-transporter project manager overseeing upgrades to the mammoth vehicle.

"L&H is producing the rollers, shaft assemblies, sleeves and other hardware needed," Hanna said. "Altogether, that will amount to about a half-million pounds of steel being delivered here at Kennedy."

Technicians from Jacobs are performing the work of removing the crawler treads prior to Mammoet jacking and cribbing the corners. L&H then will remove the old roller bearing assemblies and inspect the structure and integrity of openings to see if any repairs are needed. If there are, they will take place prior to installing the new assemblies.

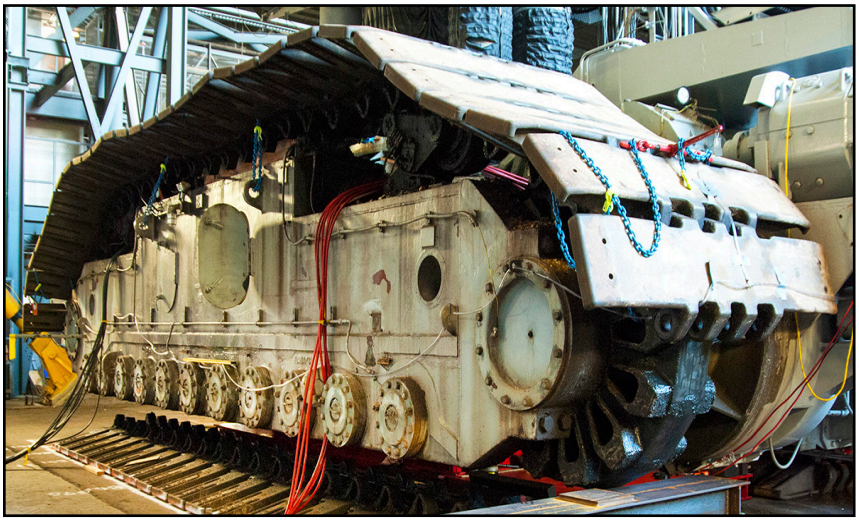
"We expect the installation to begin in August," Hanna said. "Testing should take place near the end of this year."

Present modifications represent a redesign and upgrade to the roller bearings and assemblies to be installed on CT-2.

"There weren't many changes needed, but the new assemblies will help the crawler carry the heavier load," she said. "The newer system will also be better lubricated and that should provide a longer operational life."

"The current schedule calls for all modifications to CT-2 to be complete in early 2016," Hanna said. "Testing will include picking up the new mobile launcher and moving it into the VAB later that year. We'll then move it all to Launch Pad 39B in late 2017."

The SLS rocket is scheduled to launch from Pad 39B in 2017 on a mission around the moon.



NASA/Charisse Nahser

Technicians in the Vehicle Assembly Building (VAB) are jacking crawler-transporter 2 four feet off the floor to facilitate removal of the roller bearing assemblies. The lower portion of the track has been removed, remaining on the VAB floor and the top part secured in place. After inspections, new assemblies will be installed.

Corrosion lab fights 'silent menace'

By Cheryl Mansfield
Spaceport News

While NASA engineers and scientists must constantly concern themselves with the challenges humans face living in the harsh environment of space, one of the harsh environmental effects of life on Earth is the focus of a group at Kennedy Space Center. The spaceport's location near the Atlantic Ocean presents numerous opportunities to both study and attempt to solve the destructive effects of corrosion.

"The Spaceport has the most aggressive corrosion environment among all government facilities for which data is available except for ships at sea," explained Luz Marina Calle, founder and technical lead for the space center's Corrosion Technology Laboratory. "The naturally corrosive conditions at Kennedy are exacerbated at the launch pads by the exhaust of rocket boosters.

"NASA's Corrosion Technology Laboratory at Kennedy has the facilities and staff to perform corrosion testing -- accelerated, as well as long-term -- and to develop new corrosion control and prediction technologies," said Calle.

For NASA

Luz Marina Calle, lead scientist and principal investigator at NASA's Corrosion Technology Laboratory, was presented with the National Association of Corrosion Engineers International Fellow Honor.

Far from being a unique problem besetting the space center and coastal communities, the effect of corrosion on equipment, facilities and infrastructure is a worldwide problem being confronted by experts from around the globe under the banner of National Association of Corrosion Engineers (NACE) International. NACE International draws on expertise from its more than 30,000 members in nearly 100 countries. At a recent conference in Orlando, Fla., the organization honored Calle's efforts in the field by recognizing her technical achievements and for establishing the corrosion technology laboratory and continuing to lead its work.

Calle was presented with the NACE International Fellow Honor, an award given in recognition of distinguished contributions in the fields of corrosion and its prevention. She joins other recipients who form a broad-based forum of technical and professional leaders to serve as advisors to the association.

While the average person may only be confronted by the corrosion problem on a small scale around the home, everyone is affected by the larger problem in the form of deteriorated highways and bridges, power plants, pipelines, military assets and installations, and many other public and private resources. The costs of repair and replacement of these facilities are carried by taxpayers and consumers. The worldwide costs of corrosion have been estimated at $1.4 trillion annually. In 2010, the Department of Defense estimated that corrosion costs it more than $22.9 billion annually. Finding new and better ways to head off or treat the problem becomes the more cost-effective approach.

"Current technology development efforts in the corrosion technology laboratory target the development of smart coatings for corrosion detection and control, and the development of a new accelerated corrosion test method that correlates with long-term corrosion test methods," said Calle.

For NASA

Kennedy's corrosion laboratory played a role in the new Orlando Science Center exhibition, "Corrosion: The Silent Menace," by providing a case study from the space center for students to examine, as well as samples of six forms of corrosion to be hidden around the display to help students understand the different types of corrosion.

Kennedy's corrosion laboratory also recently played a role in the new Orlando Science Center exhibition, "Corrosion: The Silent Menace," that opened in March. The lab provided a case study from the space center for students to examine. The exhibit presents "The Case of the Cracked Crawler Treads," using issues NASA faced involving deterioration of the "shoes" on the crawler-transporters -- the mechanical giants that were used to carry the Apollo Saturn V rockets and the space shuttles to the launch pad.

The lab also provided samples of six forms of corrosion to be hidden around the display to help students understand the different types of corrosion. The exhibit includes a video in which Calle and other professionals in the field describe their experiences and how they were inspired to join the effort to fight the corrosion problem.

"The interactive exhibit is geared toward children to introduce them to the field of corrosion," explained Calle. "Being a contributor to the exhibit furthers NASA's commitment to educational outreach activities."

Courtesy of Orlando Science Center

At the exhibit's grand opening, actor LaVar Burton joined 13-year-old Gaily, a middle school student from Orange City, Fla., at the Careers in Corrosion video kiosk. Burton has been a corrosion spokesman for the U.S. Department of Defense since 2009 and narrated a series of its videos on the subject. For more information on the Orlando Science Center's exhibit, "Corrosion: The Silent Menace," click on the photo.

Angry Birds Space takes roost at visitor complex

By Linda Herridge
Spaceport News

Five…four…three…two…one…was the countdown chanted by young and old alike, as a flock of animated birds descended on the Kennedy Space Center Visitor Complex officially opening the new Angry Birds Space Encounter attraction on March 22.

Amid excitement and fanfare, NASA astronaut Don Pettit, Spaceperson and Angry Bird character Super Red helped bring the popular digital game to life by slingshotting plush birds at the entrance to the new attraction.

Bill Moore, chief operating officer of the visitor complex, said that while there is a lot of history at the visitor complex, it's also about the future.

"Today we're doing something a little different, but we're still talking about space," Moore said. "Angry Birds Space Encounter is both a fun and educational experience."

NASA/Kim Shiflett

NASA astronaut Don Pettit uses a giant slingshot to launch a plush Angry Bird character toward the entrance to the new Angry Bird Space Encounter attraction during the grand opening ceremony, March 22, at the Kennedy Space Center Visitor Complex. Standing behind Pettit is Space Red, one of the Angry Bird Space characters.

Visitors can come face-to-face with Angry Birds Space characters, including Super Red, Lazer Bird, Space Bomb and Incredible Terence, as they follow their kidnapped eggs into an intergalactic wormhole, encounter Space Pigs and discover their superpowers.

Kennedy's Associate Director Kelvin Manning said Angry Birds Space is an awesome addition to the visitor complex.

"This game will help to ensure the next generation of explorers will have that interest in space exploration, as well as the fundamentals of science, technology, engineering and mathematics," Manning said. "I'd like to tell kids that science can really be this cool."

Describing one of six interactive games inside the 4,485-square-foot exhibit, Manning said mastering launching the Angry Birds into the right trajectory to hit the big targets could translate to using orbital mechanics to land spacecraft on a distant planet or fast-moving asteroid in the future.

"We do all of this with the goal of making life better on Earth," Manning said.

NASA and the visitor complex partnered with Finland-based Angry Birds creator Rovio Entertainment to bring the beloved animated mobile app game to life. It is the first interactive Angry Birds attraction to open in the United States.

Entertainment Design Group Inc. in Austell, Ga., developed, built and installed the Angry Birds Space Encounter attraction.

Dan Mitchell, who is Rovio's director of location-based entertainment, said he is extremely excited to have fans take part in the Angry Birds Space Encounter.

"Our partnership with NASA and the visitor complex has really been a great experience for us as a way to bring our brand from the digital world to the physical world," Mitchell said. "The interactive games will encourage children to explore science, technology, engineering and mathematics."

Pettit spent a total of 12 months on two separate missions aboard the International Space Station and launched Angry Birds Space floating in zero gravity.

"When you're in space, because we're human beings, we like to have a little fun," Pettit said. "This fun allows us to work and cope in a serious environment."

Pettit said part of having fun on his last mission was being able to make some videos dealing with trajectories using Angry Birds in space to escape.

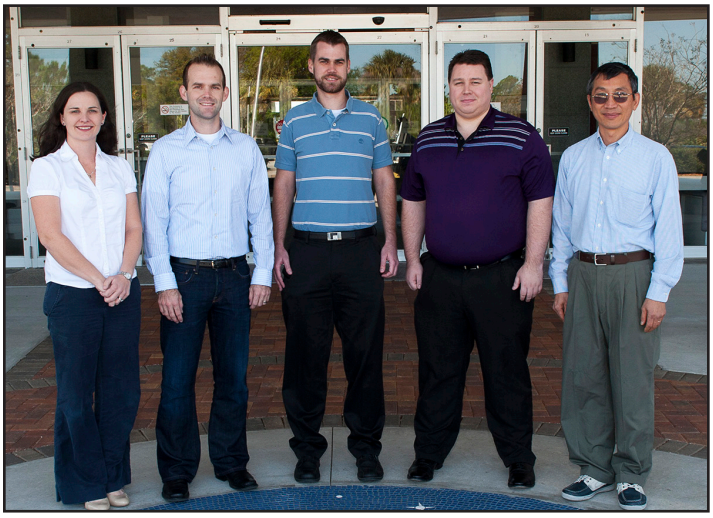
"While you're having fun doing this, there's a thread of math and science and engineering that gets worked into these games," Pettit said.

The opening of Angry Birds Space Encounter comes a few months before the visitor complex will celebrate the grand opening of the new home of Space Shuttle Atlantis on June 29.

NASA/Kim Shiflett

Children try out some of the interactive exhibits inside the new Angry Birds Space Encounter at the Kennedy Space Center Visitor Complex after the grand opening ceremony March 22.

NASA Employees of the Month: April



NASA

Employees for the month of April are, from left, Katherine L. Stresau, Engineering and Technology; Joseph A. Dant, Safety and Mission Assurance; Adam D. Milliken, Launch Services Program; Christopher L. Broadaway, Commercial Crew Program; and Dung H. Trang, Center Operations. Not pictured are James "Clete" Leagan, Information Technology and Communication Services; Polly J. Gardiner, Engineering and Technology; and Tony Derbyshire, Chief Financial Office.

Looking up and ahead . . .

**** All times are Eastern***

No Earlier than April 17
Mission: Orbital Sciences Corp. Test Flight
Launch Vehicle: Antares
Launch Site: Wallops Flight Facility, Va.
Launch Pad: 0A
Launch Window: TBD
Description: Orbital Sciences is scheduled to test its Antares rocket that will enable the rocket to eventually carry experiments and supplies to the International Space Station.

April 24
Mission: ISS Resupply
Launch Vehicle: ISS Progress 51
Launch Site: Baikonur Cosmodrome, Kazakhstan
Description: Progress 51 will carry supplies, hardware, fuel and water to the ISS.

May 28
Assembly Flight: 35S
Mission: Expedition 36/37
Launch Vehicle: Soyuz TMA-09M
Launch Site: Baikonur Cosmodrome, Kazakhstan
Description: Soyuz TMA-09M will carry three Expedition 36/37 crew members to the ISS.

Targeted for early June
Mission: ISS Automated Transfer Vehicle 4
Launch Vehicle: Ariane 5
Launch Site: Guiana Space Centre, French Guiana
Launch Pad: ELA-3
Description: The European Space Agency's ATV-4, also known as the "Albert Einstein," will deliver several tons of supplies to the ISS, docking with the Zvezda Service Module on the Russian segment of the station.

To watch a NASA launch online, go to **http://www.nasa.gov/ntv.**

NASA Spinoffs: Did you know?

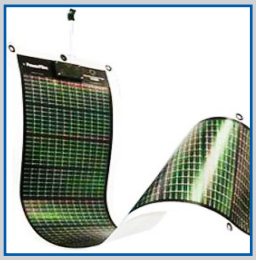
NASA didn't invent solar cells, but the agency did help keep the technology alive when it was considered uneconomical.

NASA's Jet Propulsion Laboratory has developed advanced photovoltaic conversion (PV) technology while cutting its costs. This basic principle of PV is used to provide power to nearly all man-made satellites. NASA pioneered PV power for spacecraft and has supported U.S. Department of Energy programs to expand terrestrial applications.

Glenn Research Center engineer Bernard Sater spent his spare time developing a solar concentrator that would use less silicon, making solar arrays cheaper. After retiring from NASA, Sater and his son formed Oberlin, Ohio-based GreenField Solar, and under a Space Act Agreement with Glenn, moved the technology toward commercialization. GreenField Solar now employs 30 people thanks to its NASA partnership.

The Jet Propulsion Laboratory spearheaded the Shuttle Radar Topography Mission, which created a high-detail global elevation map. The data sets were processed to produce shading models, which are now part of New York City-based Locus Energy LLC's commercial offerings. Locus Energy's solar power prediction packages help companies save millions of dollars in costs by avoiding expensive hardware.

NASA's thin film solar cells derived from amorphous silicon are gaining attention in a market dominated by mono- and poly-crystalline silicon cells. At Glenn Research Center, the Photovoltaic and Space Environments Branch conducts research focused on developing this type of thin film solar cell for space applications. Placing solar cells on thin film materials provides NASA with an attractively priced solution to fabricating other types of solar cells.



For more about NASA Spinoffs, go to **http://www.nasa.gov/spinoffs**.

Spaceport News

John F. Kennedy Space Center
Public Affairs Directorate

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