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Spaceport News

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

Curiosity heads for Mars

By Steven Siceloff
Spaceport News

NASA's Mars Science Laboratory (MSL) is taking a toolbox to Mars that any researcher would be proud of. A drill, metallic brush and even a laser are part of the gear set the MSL rover, called Curiosity, is taking to the Red Planet in the most ambitious effort yet to discern exactly what is on the surface.

The spacecraft launched Nov. 26 atop an Atlas V rocket at 10:02 a.m. It will take more than eight months for MSL to fly the 354 million miles on its path to Mars. Landing is expected in early August 2012.

Although calling the mission Mars Science Laboratory might suggest it will stay in one place, but Curiosity actually will travel some 12 miles inside Gale Crater during its 23-month mission. The size of a car or small SUV, the rover weighs nearly a ton and its scientific payload is 10 times more massive than the instrument sets taken to Mars by previous rovers.

See **MSL**, Page 2

CLICK ON PHOTO *NASA/Bill White*

NASA's Mars Science Laboratory (MSL) spacecraft, sealed inside its payload fairing atop an Atlas V rocket, clears the tower at Space Launch Complex 41 on Cape Canaveral Air Force Station in Florida. MSL lifted off from at 10:02 a.m. EST Nov. 26, beginning a 9-month interplanetary cruise to Mars. For more on the mission, click on the photo.

Mobile launcher makes trek to Pad 39B

By Steven Siceloff
Spaceport News

The mobile launcher made the longest trip of its young life Nov. 16 to begin a two-week series of structural tests at Launch Pad 39B at NASA's Kennedy Space Center.

In anticipation of launching NASA's Space Launch System heavy-lift rocket later in this decade, engineers wanted to check the mobile launcher, or ML, in a number of categories ranging from how it would behave moving atop a crawler-transporter to how well its systems mesh with the infrastructure at pad B, which has undergone extensive renovations during the past year.

"We have the time and will be able to gain significant knowledge that will assist in the development of the ML," said Larry Schultz, ML project manager. NASA's 21st Century Ground Systems Program is overseeing the mobile launcher's construction and modifications.

The ML began its 9-hour move at about 9:15 a.m. The trip covered about 4.2 miles from a work site beside the Vehicle Assembly Building to the launch pad.

Schultz said the team would get

See **ML**, Page 3

Inside this issue ...

Cabana, NASA leaders testify before Senate Subcommittee

By Melanie Carlson
Spaceport News

Kennedy Space Center Director Robert Cabana, along with NASA Administrator Charles Bolden, Johnson Space Center Director Michael Coats and Marshall Space Flight Center Director Robert Lightfoot, testified in a hearing before the U.S. Senate Subcommittee on Science and Space on Nov. 17.

Chaired by Sen. Bill Nelson of Florida, the subcommittee hearing on "NASA's Human Space Exploration: Direction, Strategy and Progress" was held to discuss NASA's plans for human exploration, including the programs, projects and activities for developing the Space Launch System heavy-lift rocket, Orion spacecraft and (related) ground support. NASA was given the opportunity to articulate the agency's goals for human exploration and how they complement International Space Station support and use, technology development, international collaboration and commercial activities.

NASA Television image

Kennedy Space Center Director Bob Cabana testifies in a hearing before the U.S. Senate Subcommittee on Science and Space on Nov. 17.

During the hearing, Cabana spoke about future plans at Kennedy. He told subcommittee members, "As we transition to the future, we have focused on providing a strong institutional core that is more efficient, cost effective and capable of supporting multiple programs. Key steps in making this happen include reducing our footprint and replacing aging infrastructure with greener technologies, partnering with federal, state and commercial entities and reorganizing our work force to better support future operations."

Cabana next outlined for members the various programs and projects at the center and their accomplishments.

To date, through Kennedy's Planning and Development Office, approximately 80 partnership agreements have been signed or are in discussion, the most notable being between Space Florida and the space center for use of the Orbiter Processing Facility-3 for commercial operations.

Cabana also noted that restructuring and modernization of Launch Pad 39B is under way in preparation for the Space Launch System. The pad is being redesigned to support the Orion Multi Purpose Crew Vehicle (MPCV).

He also told members of the subcommitee that the 21st Century Ground Systems Program will focus on building a true multi-user launch complex.

"Investments in 21st Century focus on development of the ground systems that not only support the Space Launch System and Multi Purpose Crew Vehicle, but provide a common infrastructure for other government and commercial users," he said.

Cabana also discussed the Commercial Crew Program. Established to provide a commercial space transportation system to take U.S. astronauts to the International Space Station, this effort will reduce our dependence on Russia and "allow us to focus our energy on exploration beyond our home planet," Cabana explained.

Finally, Cabana told subcommittee members the agency's Launch Services Program (LSP), based at Kennedy, "continues to provide the bridge to space for NASA's science missions by procuring and managing commercial launch services." He also noted that LSP will manage the upcoming launch of the Mars Science Laboratory.

"The Kennedy Space Center is moving forward. The potential exists for a revitalization of Florida's Space Coast through further development of the 21st Century Ground Systems Program, the growth of commercial crew services and the continued accomplishments of the Launch Services Program. We are committed to the success of these programs and the success of NASA's future exploration in space."

From **MSL**, Page 1

"This is a vehicle on Mars, cruising around, drilling into rocks, chipping away at stuff to see what that planet's made out of," said Omar Baez, the launch director of the MSL mission. "And even if it didn't do that, if it just cruised around Mars and took pictures, the value in that is tremendous."

Curiosity will be the fourth NASA rover to touch down on Mars since July 1997, when the Pathfinder probe and its skateboard-sized Sojourner rover bounced onto the surface and began several months of analysis that suggested early Mars was a lot like Earth, with water at the surface and a thicker atmosphere.

Curiosity will survey the Martian Gale Crater in search of the answers to one of the most intriguing questions of modern science.

"The hope is that we can land there, and basically, unlock the secrets of an environment that existed there a few billion years ago on Mars that was potentially a place that life could have survived," said Ashwin Vasavada, MSL deputy project scientist.

Gale Crater is a 96-mile-diameter crater with a 3-mile-high sediment mountain in the middle of it. Pictures taken from Mars orbit shows layers of minerals and soils in the crater that make up a picture like the colored bands on the walls of the Grand Canyon on Earth.

"What's special about Gale is it has the thickest package of sediment that we've been able to identify on Mars, so it represents a lot of time and hopefully we'll get some idea about what has happened over time," said Pamela Conrad, MSL deputy principal investigator.

Researchers may be able to look at images from inside the crater and see a history book of Martian geology.

But there's more to Curiosity than pictures. A laser on the rover will vaporize tiny segments of rocks so an instrument on board can find out what they are made of. A drill at the end of the rover's 7-foot-long arm will pull samples that can be tested in one of the rover's analytical tools.

"The MSL rover is essentially like a geologist in a self-contained laboratory and the capabilities that exist are probably the next best thing to sending a human to do the same job," said Wanda Harding, MSL's mission manager for the Launch Services Program.

Because of its ambitious mission, the Curiosity rover was designed for a more powerful energy source than solar arrays, the technology used on the previous rovers. The Department of Energy built for NASA a nuclear-powered electrical system instead, called a multi-mission radioisotope thermoelectric generator, or MMRTG. It has no moving parts, but converts heat from a small core of plutonium into about 110 watts of electricity around-the-clock all year.

"Having this important change and novel power supply will enable us to make important measurements every day, all year," Conrad said.

NASA also takes extra precautions because of the power supply, including working with other federal agencies to ensure its safety on Earth and during launch.

"The way the RTG is encased, this thing's in a safe, for all intents and purposes," Baez said. "We really do take that extra step in making sure that this material is safeguarded and won't harm the planet."

Mars has been a focus of Earth's attention since it was first seen in the night sky by the ancients. Every astronomical invention from telescopes to early space probes were used to find out more about the planet.

Curiosity and its builders and research team expect to add their own wealth of information to what is known about the red planet.

"Twenty years from now I think they'll look back on this and consider this a true landmark mission, a great stepping stone for human exploration beyond Earth orbit," Harding said. "It will certainly be one for the history books."

LEGOs allow kids to 'Build the Future' at Visitor Complex

By Stephanie Covey
Spaceport News

"Curiosity" drove across the Kennedy Space Center Visitor Complex on Nov. 23 before the launch of NASA's Mars Science Laboratory (MSL) mission.

The rover won't miss its flight to the Red Planet. It was a programmable LEGO robot that was part of the LEGO "Build the Future" event designed to inspire children and the young at heart about the current Mars mission and future space exploration.

The event, part of the Space Act Agreement between NASA and LEGO, is designed to inspire students of every age to consider an education and careers in science, technology, engineering and mathematics, or STEM.

Jack, 9, built a wall out of LEGO bricks before deciding it could be turned into a space shuttle.

"I love space. I went to Space Camp and I really like LEGOs," he said.

CLICK ON PHOTO *NASA/Kim Shiflett*

Kids of all ages attended LEGO "Build the Future" at the Kennedy Space Center Visitor Complex on Nov. 23. The event is designed to inspire children and the young at heart about the current Mars mission and future space exploration. For more information, click on the photo.

Jack wants to be an engineer or a basketball player when he grows up. He likes LEGO bricks because "you can build anything out of the plastic pieces."

Jim Wood, an engineering student from the University of Central Florida, worked on the "Build the Future" event as part of his co-op experience at Kennedy.

"The cool thing about LEGO bricks is that they are an educational tool," said Wood. "We played with them when we were kids, and now they can be used to encourage children and adults to study and pursue careers in STEM."

Miles, 8, made a rocket and launch pad with his brother CJ,11, during their Thanksgiving holiday vacation from Georgia. The boys said they love visiting Kennedy so much that they always have annual passes.

"My dad wanted to go to the VAB (Vehicle Assembly Building)," said Miles. "I saw a LEGO sign and thought it looked pretty awesome. I figured CJ and I could build something pretty cool."

Wood said he looks forward to watching the adults revert to their inner-child, allowing their imaginations to run wild.

Children of all ages are encouraged by volunteers to build the future of space exploration with the LEGO bricks. Their creations were put on display in the Hubble Annex in the IMAX theater. Most participants build rovers, space ships, space habitats and even robots, but the most interesting designs were a Barbie-inspired space community, a satellite and a town hall.

The MSL "Build the Future" event is the fifth event LEGO and NASA put together at Kennedy. Future plans include inviting students from specific school groups to focus on particular educational objectives, as well as hosting LEGO events around future launches at Kennedy.

From **ML**, Page 1

its first look at the information after the move is complete.

Rising 400 feet above the rocky crawlerway, the mobile launcher is substantially different from the mobile launcher platforms that carried space shuttles to the launch pads for 30 years. The dominant feature is the ML's tower, a 355-foot-high gray, steel tower reminiscent of the ones that serviced the Saturn V rockets headed to the moon in the 1960s and 70s.

In fact, not since 1975 has a launch structure as tall as the ML stood at either of Kennedy's pads.

The ML had been moved once before, but not very far. It was repositioned at its worksite beside the Vehicle Assembly Building in October 2010.

Although it was originally envisioned to host a slim rocket, the structure's design is flexible enough that it can be modified to support the Space Launch System, or SLS, a rocket that is in the same lifting category as the Saturn V.

Modifications will include strengthening the supports in the base and widening the exhaust port the rocket will stand over. The ML's exhaust port now is a 22-foot square. It will be made into a 60-foot-by-30-foot rectangle.

Swing arms will be added to the tower in the 2015 time frame to provide fueling and venting, along with electrical and communication links, to the different stages of the rocket. A crew access arm also will be added to reach out to NASA's new Orion spacecraft at the top of the rocket. Even with the modifications, the structure will be lighter than the shuttle's mobile launcher platform.

The tower was built atop a 47-foot-tall base of steel that is 165 feet long and 135 feet wide. Altogether, the ML weighs in at 6.75 million pounds.

Launch Pad 39B has undergone its own staged makeover since it last hosted a space shuttle. The pad's launch tower, which was specifically built for the shuttle, was removed recently, and workers refurbished the pad's network of cables and plumbing.

The tests of the ML will determine whether any of the support fittings at the pad need to be realigned, while also assessing future changes needed to the pad to permit the ML to perform its work of preparation and launch.

The launch pad still has plenty of modifications to work through, including a likely redesign of the flame deflector and refurbishment of the flame trench. Unlike other pad designs at Kennedy, pad B is envisioned to be flexible so it can host several different kinds of rockets, including the SLS and commercial boosters and spacecraft.

After two weeks at pad B, the ML will be moved back to its worksite. Many of the structures that will be added to the ML will see their designs tested first at NASA's Launch Equipment Test Facility at Kennedy. The laboratory is built so full-sized segments of ground support equipment can be evaluated under realistic conditions.

Once the ML has been outfitted with its swing arms and other modifications are completed, it will be taken again to the pad for more testing. The ML is scheduled to carry an SLS heavy-lift rocket to the pad in 2017, ahead of the rocket's first test mission. That flight, without an astronaut crew, is intended to evaluate the design before the rocket and spacecraft are used to take astronauts deeper into space than ever before.

Homegrown designs sprout for Commercial Crew Program

By Rebecca Regan
Spaceport News

CLICK ON PHOTO NASA/Jim Grossmann

Ed Mango, program manager for NASA's Commercial Crew Program (CCP), updates media Nov. 22 on the progress of Commercial Crew Development Round 2 (CCDev2) activities in which seven aerospace companies are maturing launch vehicle and spacecraft systems designed to take astronauts to the International Space Station. The goal of the program is to drive down the cost of space travel as well as open up space to more people than ever before by balancing industry's own innovative capabilities with NASA's 50 years of human spaceflight experience. For more information, click on the photo.

The expression goes, "Necessity is the mother of invention." And right now there is a need for NASA and the United States to have reliable access to low Earth orbit from homegrown sources. So, NASA's Commercial Crew Program and a number of American-led private companies are working together on new and innovative plans to do just that.

For example, when NASA astronauts journey to the International Space Station again after being launched from Cape Canaveral, Fla., they could do so atop the same vehicle that rocketed the agency's Curiosity rover toward the surface of Mars this weekend.

The United Launch Alliance (ULA) Atlas V rocket is just one viable spaceflight system being matured for CCP media learned during a program update from NASA's Kennedy Space Center and facilities tour on Nov. 22.

Andy Aldrin, director of business development for ULA, said the company's goal is to make the Atlas V safe for astronaut crews without altering its proven design and successful track record.

"The idea is that we'll fly the same vehicle with the addition of an emergency detection system," Aldrin said in the Atlas Spaceflight Operations Center (ASOC) on Cape Canaveral Air Force Station (CCAFS) where another Atlas V is being processed for a military launch next February.

Six other aerospace companies, including Alliant Techsystems Inc. (ATK), Blue Origin, The Boeing Co., Excalibur Almaz Inc., Sierra Nevada Corp., and Space Exploration Technologies (SpaceX), are working on launch vehicle and spacecraft designs under CCP's Commercial Crew Development Round 2 (CCDev2) activities.

Ed Mango, CCP's program manager, said he's pleased with the innovative solutions each company is bringing to the table to drive down the cost of space travel. Mango said each company has a real shot at taking crews to the space station or other low Earth orbit destinations around the middle of the decade.

"It's like you're trying to climb a mountain and there's three or four ways to get to the top the mountain," Mango said. "One guy might be higher at one point in the climb, but he's got a tougher road ahead of him. Another guy might be taking the long way around the mountain, but it might be an easier way to get to the top."

An example of one of the innovating solutions Mango is referring to is Boeing using spin-form technology rather than traditional welding to manufacture its CST-100 spacecraft or developing a land landing system to reduce salt water from compromising the integrity of the spacecraft during ocean landings.

"Boeing is working to provide a safe and affordable crew transportation system to NASA," said Chuck Hardison, the production and ground operations manager of The Boeing Co.'s Commercial Crew Transportation System in Kennedy's Orbiter Processing Facility-3 (OPF-3). The company is leasing OPF-3, the Processing Control Facility (PCC) and Space Shuttle Main Engine Shop to design, manufacture and integrate its capsule capable of carrying up to seven astronauts into space.

On Space Launch Complex-40 on CCAFS, media received a status update on SpaceX, which is busy preparing for the launch of its Falcon 9 rocket and Dragon capsule under NASA's Commercial Orbital Transportation System (COTS) Program. The goal of the program is to take cargo to the space station.

For CCP, though, the company is working to make those same systems safe for human travel. Scott Henderson, director of mission assurance for SpaceX, said one such safety measure under discussion is a launch abort system that would push astronauts away from the launch pad in the event of an emergency, which is different than the traditional pull system of NASA's Apollo and Space Shuttle Programs.

It's the freedom to develop those solutions, and at a necessary pace that provides Mango with the confidence to enable NASA's astronauts transportation to-and-from the International Space Station within the next five years and help open up space to more people than ever before.

NASA/Jim Grossmann

Chuck Hardison, the production and ground operations manager of The Boeing Co.'s Commercial Crew Transportation System, talks to media about plans to take NASA astronauts to the International Space Station in Orbiter Processing Facility-3 (OPF-3) at Kennedy Space Center on Nov. 22.

NASA/Jim Grossmann

Scott Henderson, director of mission assurance for Space Technologies Corp. (SpaceX), talks to media Nov. 22 about making its Falcon 9 rocket and Dragon capsule safe for humans at Space Launch Complex-40 on Cape Canaveral Air Force Station, Fla.

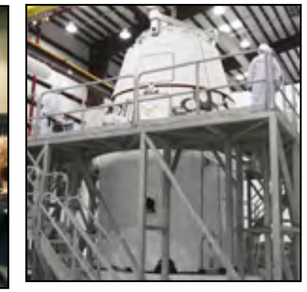
Scenes Around Kennedy Space Center

NASA

STS-135 Mission Specialist Rex Walheim paid a visit to Kennedy Space Center on Nov. 15 and signed items for workers in the Headquarters lobby.

CLICK ON PHOTO NASA/Gianni Woods

Pre-calculus, engineering and physics students at Timber Creek High School in Orlando, Fla., listen to Kennedy Space Center Deputy Director Janet Petro speak on work being done at the center during an education outreach event on Nov. 16 in the school's Performing Arts Center. Students also had the opportunity to view a FIRST Robotics robot in action and learn about Kennedy's Educate to Innovate (KETI) LEGO Mindstorm activities. For more about the Interdisciplinary National Science Project Incorporating Research and Education Experience, or INSPIRE, click on the photo.



NASA/Kim Shiflett

The Space Exploration Technologies Corp. (SpaceX) Dragon capsule is placed atop its cargo ring inside a processing hangar at Cape Canaveral Air Force Station in Florida on Nov. 16. Later, the combination will be attached to the top of a Falcon 9 rocket on Space Launch Complex-40 for the company's next demonstration test flight for NASA's Commercial Orbital Transportation Services (COTS) program.

CLICK ON PHOTO For NASA

Miguel Rodriguez, Kennedy Space Center deputy director for Management, Engineering and Technology, presented Dr. Luz Calle, lead scientist and principal investigator at NASA's Corrosion Technology Laboratory, with the Great Minds in STEM "2011 Outstanding Technical Achievement - Government" Award during the 23rd Annual Hispanic Engineer National Achievement Awards Conference (HENAAC) in Orlando, Fla., on Oct. 7. For more on HENAAC, click on the photo.

CLICK ON PHOTO NASA/Randy Beaudoin, VAFB

Technicians install the avionic shelf on the Pegasus XL rocket at a Pegasus booster processing facility at Vandenberg Air Force Base, Calif., on Nov. 21. The avionics contained in this module will issue the guidance and flight control commands for the rocket. The Orbital Sciences Corp. Pegasus rocket will launch the Nuclear Spectroscopic Telescope Array (NuSTAR) into space. After the rocket and spacecraft are processed at Vandenberg, they will be flown on Orbital Sciences' L-1011 carrier aircraft to the Ronald Reagan Ballistic Missile Defense Test Site at the Pacific Ocean's Kwajalein Atoll for launch. The high-energy X-ray telescope will conduct a census for black holes, map radioactive material in young supernovae remnants, and study the origins of cosmic rays and the extreme physics around collapsed stars. For more information, click on the photo.

CLICK ON PHOTO NASA/Dimitri Gerondidakis

Technicians install the shuttle orbiter galley (SORG) in the middeck of space shuttle Discovery inside Orbiter Processing Facility-1 at Kennedy Space Center on Nov.15. After Discovery's final mission, STS-133, the SORG was removed and sent to a United Space Alliance lab in Houston where it was cleaned and deserviced.
For more information on transition and retirement of the shuttles, click on the photo.

NASA

Each year the Disability Awareness and Action Working Group (DAAWG) partners with the Equal Opportunity Office and the Education office to provide a mentoring opportunity like no other. Each October members of the Kennedy work force volunteer to mentor students and job-seekers about opportunities at the space center. Beth Smith, program specialist for the education department, said the disability mentoring day is a great way to inspire students to consider careers in science, technology, engineering and mathematics (STEM) and it also provides managers with new perspectives and students' fresh ideas.

Health of American alligator focus of annual workshop

By Linda Herridge
Spaceport News

Critter-cam, temperature sensors and blood, urine and tissue tests are just a few of the innovative tools being used to study alligators around Kennedy Space Center and the Merritt Island National Wildlife Refuge (MINWR), located inside the space center. In order to determine just how healthy the environment is, a group of scientists and researchers from the U.S., Japan and South Africa convened at Kennedy on Nov. 10 to share their research findings during the fourth annual Alligator Study Workshop.

Opening speaker and moderator Dr. Louis Guillette, a professor at the Medical University of South Carolina (MUSC) in Charleston, said that studying alligators as eco-bellweathers is very important at Kennedy.

"At the level of the DNA or hormones, alligators are almost identical to humans, making links between them possible," Guillette said. "These predators are environmental sentinels that warn us of environmental concerns."

Guillette said that by studying alligators, we can establish if there are contaminants or environmental stressors at Kennedy that could be a concern for human health or wildlife management.

NASA physical scientist Lynne Phillips from the Environmental Management Branch of Kennedy's Center Operations, along with Carlton Hall and Russ Lowers with Innovative Health Applications (IHA), and Guillette coordinated the workshop. Phillips said that the alligator project is a good example of the collaborative nature of the ecological program at the center.

Photo courtesy of Russ Lowers, Innovative Health Applications

An adult alligator suns himself recently along a canal at Kennedy Space Center.

CLICK ON PHOTO *NASA/Gianni Woods*

Dr. Louis Guillette, with the Medical University of South Carolina in Charleston, presents an overview of American alligator research during the Fourth Annual Alligator Study Workshop, Nov. 10, at the Merritt Island National Wildlife Refuge. The refuge is located at Kennedy Space Center. For more on the work of Guillette, click on the photo.

Many of the presentations focused on studies of trace elements in alligators residing in waters around the center. Other presentations included egg-hatching survival rates and foraging patterns. This data was compared to other study locations including Lake Apopka and Lake Woodruff National Wildlife Refuge in central Florida, and Guana Lake in northeast Florida.

Guillette's opening presentation, "Ecotoxicology and Biology of the American Alligator at MINWR – An Overview," revealed that these local American alligators have elevated concentrations of various heavy metals and flame retardant (PCB) residues in their tissues when compared to reference populations at Lake Woodruff and Lake Apopka.

"Neonatal and juvenile alligators display altered thyroid function, as measured by thyroid hormone concentrations in the blood," Guillette said. "Although this alteration did not preclude growth under controlled lab conditions, it did alter growth patterns."

Although the linkage between a high-iodine diet and thyroid-altering PCBs needs further study, altered thyroid activity is present.

"The American alligator has strong site affinity, and this species is providing important local data on environmental quality," Guillette said. "However, continued loss of freshwater habitats could have a significant adverse effect on population stability and growth."

Russell Lowers, an aquatic biologist with IHA, shared research results about the variation in nest temperatures of alligators found at Kennedy.

Lowers said that in order to get an understanding of the alligator population, an initial check of the environment included a hatch-out study of alligator eggs, tissue and urine collection, and a home-range study beginning in 2006.

"We have currently captured, measured, tagged and released about 994 alligators with an overall average size of 8.2 feet in length at Kennedy and the wildlife refuge," Lowers said.

Over time, some of the alligators are recaptured and just like a doctor's checkup, their blood is analyzed for evidence of many components, including sex and stress hormones, heavy metals, PCBs, and other contaminants that could be endocrine disrupters.

For the alligator hatching study, special temperature sensors were placed at three levels in nests to determine if more males or females are being produced. Lowers said this is done because the temperature in an alligator nest dictates if the offspring will be male or female. Warmer nests (over 88.7 F) produce more males and cooler nests produce more females.

Data gathered from 10 nesting sites in 2011 indicated that the average temperature of viable nests at Kennedy was 89.1 F. The average number of eggs in a nest is about 36.

"Nests are a fragile environment being affected by sun, rain and the compost material that they are laid in," Lowers said. "If the temperature goes above 95 degrees (F) or below 82 degrees (F) for a few days, it was found that the animals will die. There were three entire nests that died due to high temperatures during the study."

Lowers said study data of 48 nests from 2006 to 2011 reveals that Kennedy and MINWR have an average overall yearly success rate of 78 percent. Hatch-rate studies are done because the female alligator will offload contaminants into her eggs, affecting the growth and possibly killing embryonic development within the eggs.

Between April 2010 and April 2011, researchers from the Department of Biology at the University of Florida in Gainesville, in collaboration with IHA and NASA aquatic biologists and National Geographic's Remote Imaging Department, attached critter-cams to nine alligators at various sites around Kennedy and six alligators at Guana Lake to observe and compare foraging strategies such as prey capture and success rates using point-of-view video footage. Each camera collected six to eight hours of video during each deployment.

According to James Nifong, a Ph.D. student at the University of Florida, the critter-cam units collected about 88 hours of usable video data that revealed, on average, an alligator attempts to capture prey once every 1.5 hours with a 50 percent capture success rate. Attacks occurred more often during sunrise hours, with an average of 2.5 attacks per hour.

Nifong said that the alligators mainly used a sit-and-wait tactic fully submerged in the water.

Phillips said the team approach in these studies allows Kennedy to do more with less and is part of the ecological program culture to maximize the value of knowledge that can be gained for everyone concerned with ecosystems and human health and safety.

Photo courtesy of Russ Lowers, Innovative Health Applications

A baby alligator emerges from its shell in a nest recently at Kennedy Space Center.

ERT officers win overall award in SWAT competition

By Linda Herridge
Spaceport News

NASA Kennedy Space Center's Emergency Response Team (ERT) officers placed first overall at the 2011 SWAT Roundup International. This is a first for Kennedy.

The competition was held Nov. 7-11 at the Orange County Sheriff's Office Training Facility in Orlando, Fla.

Kennedy's team represented NASA and competed with about 60 other teams from around the country and the world, including Russia, Hungary, Brazil, Kuwait and Germany.

Kennedy Chief of Security and Special Agent Mark Borsi said that the center's ERT has prepared for and participated in the event for many years, but this year was special.

"Under Captain Aaron Murray's capable leadership, we were able to score high in all five events, and that's what it takes to win first place and also why it is so difficult," Borsi said. "This competition allows the Kennedy ERT to associate and compete with, as well as learn from, the best teams, bringing back the skills needed to keep the center safe in the event of a critical emergency."

Murray and seven ERT officers, all with Space Gateway Support, competed in five categories during the five-day competition.

These included hostage rescue, the Pricher Scramble (obstacle course and moving target shoot), officer rescue, tower scramble (rappel and engage an assigned target), and the grueling obstacle course.

"I've always felt that Kennedy's ERT officers do the best that they can," Murray said. "Ultimately, all of the competing teams are like one big family."

Teams competed each day in a different event and also participated in workshops and training classes led by world-class instructors from the U.S. and other countries, including a dignitary protection class and a tactical commander class.

For their efforts, Kennedy's ERT received a trophy and SWAT Roundup rings, as well as praise from Kennedy's Center Director Bob Cabana and NASA Administrator Charlie Bolden.

Murray said, "This recognition is a wonderful achievement for NASA and Kennedy."

Microgravity target of current plant experiments

By Stephanie Covey
Spaceport News

Plants are critical in supporting life on Earth, and with help from an experiment that flew onboard space shuttle Discovery's STS-131 mission, they also could transform living in space.

NASA's Kennedy Space Center partnered with the University of Florida, Miami University in Ohio and Samuel Roberts Noble Foundation to perform three different experiments in microgravity.

The studies concentrated on the effects microgravity has on plant cell walls, root growth patterns and gene regulation within the plant Arabidopsis thaliana. Each of the studies has future applications on Earth and in space exploration.

"Any research in plant biology helps NASA for future long-range space travel in that plants will be part of bioregenerative life support systems," said John Kiss, one of the researchers who participated in the BRIC-16 experiment onboard Discovery's STS-131 flight in April 2010 and a distinguished professor and chair of the Department of Botany at Miami University in Ohio.

The use of plants to provide a reliable oxygen, food and water source could save the time and money it takes to resupply the International Space Station (ISS), and provide sustainable sources necessary to make long-duration missions a reality. However, before plants can be effectively utilized for space exploration missions, a better understanding of their biology under microgravity is essential.

Kennedy partnered with the three groups for four months to provide a rapid turnaround experiment opportunity using the BRIC-16 in Discovery's middeck on STS-131.

And while research takes time, the process was accelerated by Kennedy Space Center as the end of the Space Shuttle Program neared.

Howard Levine, a program scientist for the former ISS Ground Processing and Research Project Office and the science lead for BRIC-16, said he sees it as a new paradigm in how NASA works spaceflight experiments. The rapid turnaround is quite beneficial to both NASA and the researchers, saving time and money.

Each of the three groups was quite impressed with the payload processing personnel at Kennedy.

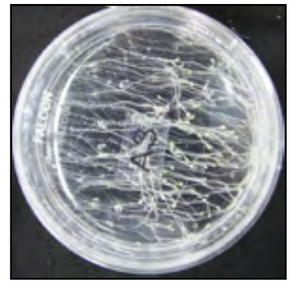
Kiss said the staff at the Space Life Sciences Lab at Kennedy did an outstanding job and that the experienced biologists and engineers were extremely helpful with such a quick turnaround. Kiss and his group published a paper on their intitial findings of plant growth in microgravity in the October 2011 issue of the journal Astrobiology.

They found that roots of space-grown seedlings exhibited a significant difference compared to the ground controls in overall growth patterns in that they skewed in one direction. Their hypothesis is that an endogenous response in plants causes the roots to skew and that this default growth response is largely masked by the normal gravity experienced on the Earth's surface.

"The rapid turnaround was quite challenging, but it was a lot of fun," said Anna-Lisa Paul, research associate professor in the Department of Horticultural Sciences at the University of Florida. "The ability to conduct robust, replicated science in a time frame is comparable to the way we conduct research in our own laboratories, which is fundamentally a very powerful system."

Paul's research and that of her colleague Robert Ferl, professor at the University of Florida and co-principal investigator on the BRIC-16 experiment, focused on comparing patterns of gene expression between Arabidopsis seedlings and undifferentiated Arabidopsis cells, which lack the normal organs that plants use to sense their environment - like roots and leaves. Paul and Ferl found that even undifferentiated cells "know" they are in a microgravity environment, and further, that they respond in a way that is unique compared to plant seedlings.

Elison Blancaflor, associate professor at the Samuel Roberts Noble Foundation, discovered that plant genes encoding cell-wall structural proteins were significantly affected by microgravity.



Arabidopsis seedlings

"This is exciting because this research has given us the tools to begin working on designing plants that perform better on Earth and in space," Blancaflor said.

Blancaflor has now extended his findings from BRIC-16 to generate new hypotheses to explain basic plant-cell function. For example, the BRIC-16 results led the Noble Foundation team to identify novel components of the molecular machinery that allow plant cells to grow normally.

According to Levine, plants could contribute to bioregenerative life support systems on long-duration space missions by automatically scrubbing carbon dioxide, creating oxygen, purifying water and producing food.

"There is also a huge psychological benefit of growing plants in space," said Levine. "When you have a crew floating around in a tin can, a plant is a little piece of home they can bring with them."

NASA/Amanda Diller

International Space Station employees based at Kennedy Space Center participate in the "ISS Is Alive" employee recognition barbecue celebration at Kars Park II on Nov. 17.

NASA honors workers with 'ISS is Alive' BBQ

International Space Station employees based at NASA's Kennedy Space Center in Florida participate in the "ISS Is Alive" employee recognition barbecue celebration at Kars Park II.

NASA and The Boeing Co. hosted the celebration to thank the employees based at Kennedy who were involved in building the largest, most complex international scientific project in history and the largest venture in space to date.

The station has hosted human life, work and research in space for more than 10 years. Boeing is the prime contractor to NASA for the space station. In addition to designing and building all the major U.S. elements, Boeing also is responsible for ensuring the successful integration of new hardware and software -- including components from international partners -- as well as for providing sustaining engineering work.

NASA/Amanda Diller

NASA and The Boeing Co. hosted the celebration to thank the employees who were involved in building the largest, most complex international scientific project in history and the largest venture in space to date.

NASA/Amanda Diller

International Space Station Ground Processing and Research Project Office Director Josie Burnett, third from left, and Associate Director for Engineering and Technical Operations Russell Romanella, right, are presented plaques and CDs of the song "ISS Alive," written and recorded by the Panama Band, during the "ISS Is Alive" event at Kars Park II on Nov. 17.

Looking up and ahead . . .

*** All times are Eastern**

2012

Under Review	Launch/CCAFS (SLC-40): SpaceX Falcon 9, Dragon C2/C3; Launch window: TBD
No Earlier Than Jan. 19	Launch/CCAFS (SLC-37B): Delta IV, WGS 4; Launch window: TBD
No Earlier Than Jan. 23	Launch/Wallops Flight Facility (Pad 0A): Orbital Sciences Corporation, Taurus II, Launch window: TBD
February	Launch/CCAFS: Atlas V, MUOS; Launch window: TBD
No Earlier Than Feb. 3	Launch/Kwajalein Atoll: Pegasus XL, NuSTAR; Launch window: TBD
No Earlier Than Feb. 23	Launch/Wallops Flight Facility (Pad 0A) Orbital Sciences Corporation, Cygnus/Taurus II, Launch window: TBD
No Earlier Than April 27	Launch/CCAFS (SLC-41): Atlas V, AEHF 2; Launch window: TBD
June	Launch/CCAFS SLC-37B): Delta IV-Heavy, NROL-15; Launch window: TBD
No Earlier Than June 12	Launch/CCAFS (LC-41): Atlas V, Tracking and Data Relay Satellite-K (TDRS-K); Launch window: TBD
No Earlier Than Aug. 23	Launch/CCAFS (LC-41): Atlas V-401, RBSP; Launch window: TBD

John F. Kennedy Space Center

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