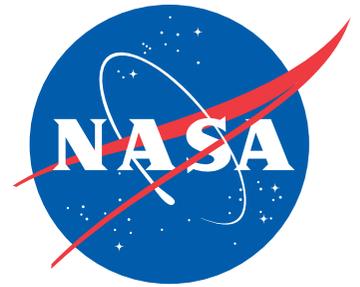


Spaceport News

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



Partnership paves way for modernization

By **Rebecca Regan**
Spaceport News

A facility full of platforms that once fit NASA's space shuttles like a glove is transitioning to make room for a new fleet of low-Earth orbit bound spacecraft.

Now called the Commercial Crew and Cargo Processing Facility (C3PF), the former Orbiter Processing Facility-3 (OPF-3) at Kennedy Space Center is not only going through major renovations to support the manufacturing of The Boeing Company's CST-100 spacecraft. It's also receiving international recognition as

an innovative approach for converting excess government buildings into next-generation commercial facilities.

"The agreement that we put in place to get OPF-3 turned over to Space Florida so that they could make it available to Boeing really set the stage for a model that can be used time and time again," said Bob Cabana, Kennedy's center director. "It just makes sense that if

we have facilities that we have absolutely no use for in NASA's Space Launch System or Orion programs, we ought to be able to find a way to bring other work into those facilities."

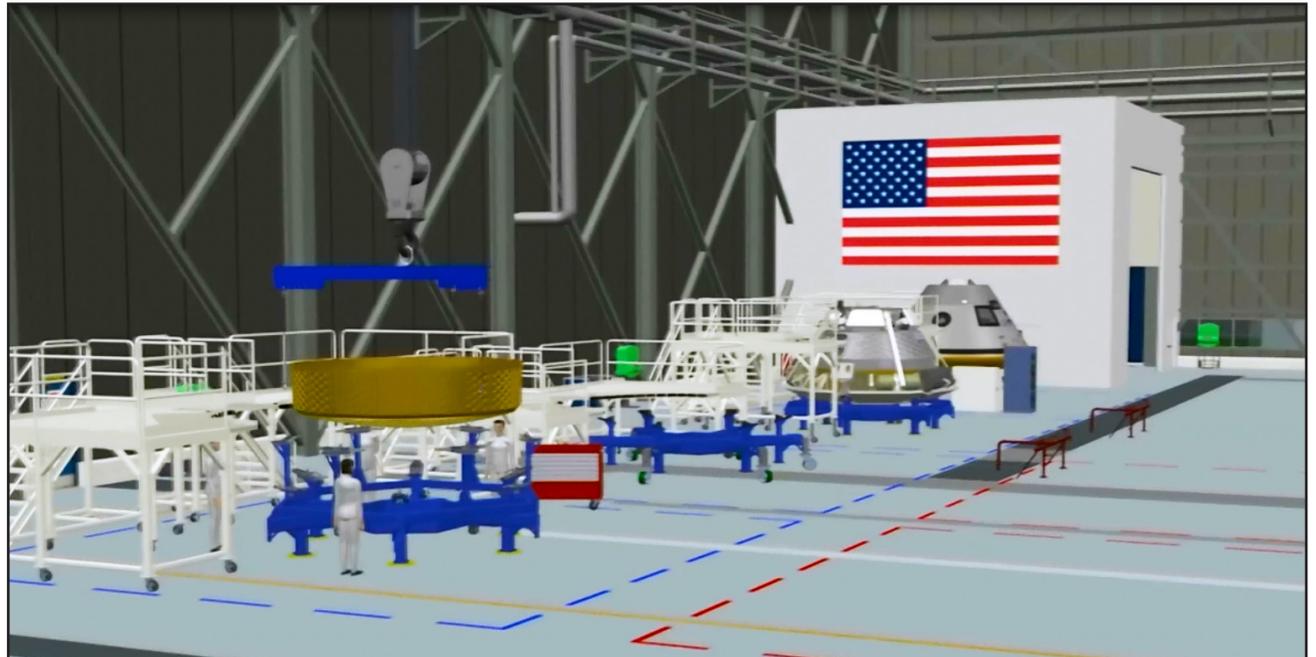
That land-use agreement is what garnered international attention from organizations such as CoreNet Global and the International Economic Development Council (IEDC). Within the past few months, both organizations,

made up of site selection consultants, real estate developers and property managers, gave Space Florida top honors for innovation in economic development. The agreement was honored with CoreNet's 13th Annual H. Bruce Russell Global Innovator's Award and the IEDC's Silver Excellence in Economic Development Award for the Igniting Innovation Capital Acceleration Showcase in the category of

"Special Event for Communities with Populations of 500,000 or more."

"What we did together collaboratively with NASA was come up with a template that works well," said Frank DiBello, Space Florida president. "It cut a lot of new ground in terms of how to transfer excess NASA property to the private sector and we became an agent for

See **C3PF**, Page 2



CLICK ON PHOTO

Photo courtesy of The Boeing Company

This artist conception is what The Boeing Company's CST-100 spacecraft processing is expected to look like in Space Florida's Commercial Crew and Cargo Processing Facility (C3PF) at Kennedy Space Center with work stations on a clean floor.

Human Spaceflight

In the last edition of Spaceport News, we highlighted the handover of space shuttle Atlantis from NASA to the Kennedy Space Center Visitor Complex. In this edition, learn about the work that NASA and Kennedy Space Center are doing to keep the spirit of human space exploration rolling.

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Robotic explorers may usher in lunar 'water rush'

By Steven Siceloff
Spaceport News

The American space program stands at the cusp of a "water rush" to the moon by several companies developing robotic prospectors for launch in the near future, according to a NASA scientist considering how to acquire and use water ice believed to be at the poles of the moon.

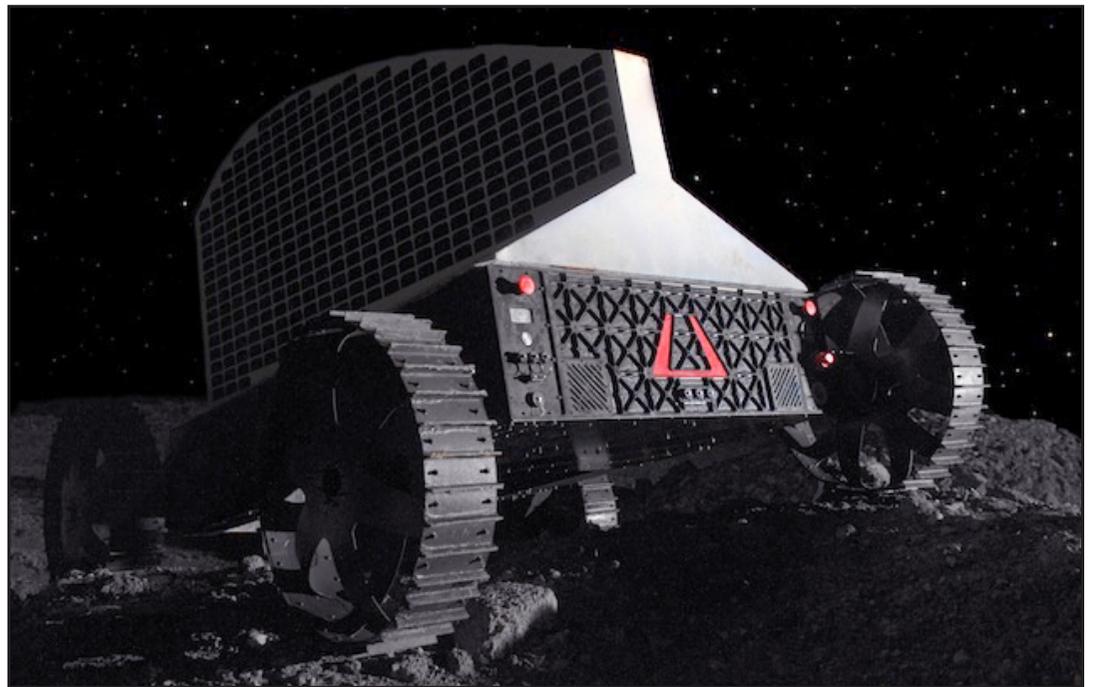
"This is like the gold rush that led to the settlement of California," said Phil Metzger, a physicist who leads the Granular Mechanics and Regolith Operations Lab, part of Kennedy's Surface Systems Office. "This is the water rush."

Collecting the water, or at least showing it can be collected, is where the Pittsburgh-based Astrobotic Technology comes in. The small company signed on in April for the third phase of a Small Business Innovative Research deal that continues research work to develop technologies NASA may need to harvest space resources in the future.

The company already is far along in its development of a rover that will work on its own. There already is a deal in place with SpaceX to launch a lander and rover on a Falcon 9 rocket in October 2015. Astrobotic is competing against several other companies for the Google Lunar X-Prize, an award worth up to \$30 million funded by the Internet search engine company.

"Our intent is to land on the surface of the moon in October 2015 and find water," said John Thornton, president of Astrobotic.

Water already on asteroids, the moon or Mar-



NASA image

Astrobotic Technology is developing a rover that operates on solar energy provided with side-facing panels. The solar panels are set vertically because the rover will operate at the lunar poles where the sun appears closer to the horizon.

tian moons represents a potential bonanza to NASA's exploration plans because the resource can be put to use in so many critical ways for astronauts venturing into deep space. Water, made of hydrogen and oxygen molecules, can be turned into everything from breathing air to rocket fuel, not to mention the chance to filter it clean and drink it.

"Using these resources is the key to making space travel and habitation affordable and sustainable – we are starting to learn how to live

on another planetary surface," said Rob Mueller, a senior technologist in Kennedy's Surface Systems Office.

"It's a really interesting resource when you start to think about how to explore beyond Earth and to use the resources that are already in our solar system," Thornton said. "This is the first step toward harnessing the resources in the solar system for exploration and sustained

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accomplishing that change."

Before Boeing's CST-100 will take up residency inside C3PF and the adjacent Space Shuttle Main Engine Facility in the summer of 2013, both will undergo demolition and modernization phases. For the past month and a half, workers with Hensel Phelps Construction Co. of Orlando, Fla., have been busy carefully bringing down the shuttle's old processing stands to make way for a clean-floor factory-like concept.

"With the removal of legacy Space Shuttle Program infrastructure, the building will be transformed into a clean factory system layout for spacecraft production and refurbishment," said Chuck Hardison, Boeing's manager of CST-100 Production and Ground Systems.

"We'll have defined factory positions to support different phases of the spacecraft being built."

Boeing is one of three companies working with NASA's Commercial Crew Program during the Commercial Crew Integrated Capability (CCiCap) phase to develop integrated spacecraft and launch vehicle systems that could be called on to fly Americans to and from low-Earth orbit in the future. The CST-100 is designed to launch atop a United Launch Alliance (ULA) Atlas V rocket from Cape Canaveral Air Force Station's Launch Complex 41, a little more than 7 miles away from C3PF.

"If you can be building your spacecraft close to the point of launch, you gain significant advantage in the marketplace," DiBello said.

Hardison said the CST-100 will be covered by a protective container and transported to the launch pad atop a KMAG transporter, much like NASA's critical satellites are taken to their launch vehicles prior to launch.

Besides being based near the launch site, DiBello said there's another reason the Space Coast was a natural choice for Boeing to locate its commercial spaceflight operations at Kennedy. The company anticipates putting about 550 uniquely skilled engineers and technicians here back to work.

"We expect it to be a very bustling place at full operations," Hardison said. "When we're in the full operational services phase, we expect to see a large increase in the number of people working here."

While work to house Boeing's spacecraft is ongoing, the com-

pany is busy developing the support equipment, tooling and control systems that will be needed for the production and manufacturing phases. The Processing Control Center (PCC) also will be readied to support CST-100 ground and mission operations and a program office for Boeing. Meanwhile, Kennedy is continuing to work with Space Florida to attract more companies to lease excess facilities and equipment at the center.

"We believe in the next decade, apart from support of NASA's space exploration program, that there will be an era of increasing commercial activity in space," DiBello said. "The kind of work that's going on here in support of commercial crew will enable other commercial players to get into low-Earth orbit operations."

Kennedy's potential bright for energy research

By *Steven Sicheloff*
Spaceport News

Kennedy Space Center's future is not limited to space thanks to a technical, engineering and scientific infrastructure that could serve a variety of industries at the same time the center goes about its traditional spaceflight work.

"There's a lot of potential for Kennedy and the workforce to be engaged with commercial partnerships," said Robert Hubbard, Partnership Development manager at Kennedy. "We have a lot of great technologies developed in-house that can be used to help advance partner technologies. This is great news to many, because this means that we now have the opportunity, more so than before, to make available our lab capabilities, our expertise and licenses to utilize our technologies."

Officials at the energy consortium say Kennedy has dozens of unique features that make it ideal for research work, along with the technical workforce and cutting-edge researchers needed.

"Kennedy has thought of itself as an aerospace-focused place, but those skills have a broad applicability for other things," said David Mandernack, project director at Space Coast Energy Consortium.

For example, Kennedy's work preparing rockets and spacecraft for flight includes handling super-cold propellants, such as hydrogen and oxygen safely, along with hypergolic chemicals that are toxic and call for special accommodations.

The center also has an extensive testing apparatus and a stable of unique lifting equipment. There are a number of laboratories at

the center, too, including a host of engineers who are experts at running tests on machines and components without destroying them.

Areas commonly considered for technological research at Kennedy tend to focus on energy-related ideas, such as bio-fuels, advanced batteries, hydrogen storage, solar arrays and panels, super-conducting magnets and turbines for generating power from the wind or other natural sources.

"The energy industry has a real need for integrated engineering expertise, which Kennedy has a lot of," said Mike Aller, president of the Space Coast Energy Consortium.

For example, Cella Energy already signed an agreement to continue the development of its hydrogen storage material and systems at Kennedy. Cella is currently working out of Exploration Park, a commercial development area at

Kennedy under development to house a diverse collection of private companies.

Kennedy also is home to two solar farms built by Florida Power & Light that have established a path for future partnerships to follow.

Also, an engineer who worked for United Space Alliance at Kennedy, Jim Fletcher, developed a portable solar panel that unfolds on a trailer to create electricity in remote areas or after storms that knock out power. Fletcher is perfecting the design now with an eye on putting it into production.

Hubbard said he hears roughly three proposals a month for clean energy partnerships, though some are farther along than others. He said Kennedy is best equipped to help a company move its technology from early concept levels to a point where it can be demonstrated effectively.

"I think it is great that people outside of the gates

are seeing we have capabilities well outside of just processing spacecrafts and payloads," Hubbard said.

Hubbard said researchers at Kennedy are eager to share their expertise with companies and help them through evaluation and testing, assistance with developing new devices, and design and handling techniques.

When asked about how the Kennedy research community feels on enabling commercial partnerships, "I think the words they'd probably use are 'we are excited about this direction,'" Hubbard said. "It gives them a chance to see the technologies they're developing with space application in mind, used outside NASA."

Mandernack pointed to the machinery at the Launch Equipment Test Facility, or LETF, which is capable of putting huge devices under the weight of hundreds of tons to see how they would hold up. NASA uses the

LETF to analyze support equipment for rockets, but a company could rent the area to test equipment destined for use in the ocean.

Aller said the energy consortium already has heard from large and small businesses, along with companies that fall in between.

Tim Franta, project manager for the Space Coast Energy Consortium, said that if they can get companies to come in for one test it may entice them to come back for additional testing in the future.

"Within my office, the Center Planning and Development Directorate, we are pushing the envelope and doing things that have never been done at Kennedy before," Hubbard said. "Industry is starting to see we can operate outside of the mode we've operated under for many years and foster an environment that is commercial friendly."



CLICK ON PHOTO

Kennedy Space Center offers many unique features for trying out ideas for energy production. A solar farm built on Kennedy property has provided clean energy since 2010.

NASA file 2010

Scenes Around Kennedy Space Center



CLICK ON PHOTO

NASA/Tim Jacobs

The first stage of the Atlas V rocket that will carry the Tracking and Data Relay Satellite-K (TDRS-K) into orbit arrives Nov. 6 at the Atlas Spaceflight Operations Center hanger at Cape Canaveral Air Force Station to begin processing. Launch of the TDRS-K aboard an Atlas V rocket is planned for 2013 from Space Launch Complex 41. The TDRS-K spacecraft is part of the next-generation series in the Tracking and Data Relay Satellite System, a constellation of space-based communication satellites providing tracking, telemetry, command and high-bandwidth data return services for spacecraft and expendable launch vehicles including the International Space Station and NASA's Hubble Space Telescope.



CLICK ON PHOTO

NASA/Dimitri Gerondidakis

Crawler-transporter 2 picks up a shuttle-era mobile launcher platform at Launch Pad 39A on Nov. 6. Moving up and down the ramp to the pad's surface, the Ground Systems Development and Operations Program at Kennedy Space Center is testing how well the systems work while carrying a load.



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NASA/Ben Smegelsky

The Black Employee Strategy Team (BEST) host a KSC BEST Bake Sale Fund-raiser on Nov. 14 to raise money for a scholarship in memory of Evelyn Johnson, a founding member of BEST and former deputy director of the KSC Equal Opportunity Office. Desserts included homemade contributions from senior managers.

NASA Employees of the Month: November



NASA

Employees for the month of November are, from left, Sonia S. Miller, Center Operations; Susan M. Barth, Ground Processing Directorate; Arun Arora, Engineering Directorate; Elisa A. Artusa, Engineering Directorate; and Joy Squires (EOQ), Information Technology and Communications Services. Not pictured are Jeannie Ruiz, Ground Systems Development and Operations; Joyce C. McDowell, Procurement Office; Ronald B. Driggers, Safety and Mission Assurance Directorate; Bryan G. Onate, ISS Ground Processing and Research Project Office; and Leah Y. Gibson, Launch Services Program.

Humanity's desire to explore keeps rolling

By Rebecca Regan
Spaceport News

The spirit to live and work in low-Earth orbit and explore well beyond where we've ventured before is alive as NASA forges ahead with three major human space-flight endeavors that will continue to build off the successes of their predecessors.

Space agency leaders talked about NASA's vibrant future in the days leading up to the handover of space shuttle Atlantis from the place it called home for more than 30 years to its new exhibition facility next door at the Kennedy Space Center Visitor Complex.

"We have not been standing still for the last year," said Bob Cabana, director of Kennedy Space Center. "We've gotten commercial cargo to the International Space Station and we have focused on what it takes to explore beyond our home planet once again."

The move of Atlantis came a little more than one year after its final launch to the space station. Now, like its fellow space-flown orbiters, Endeavour on the West Coast and Discovery in the Northeast, Atlantis is destined to motivate and inspire a new generation

here in the South.

"We're planning for the future, we're flying every day up on station and making a lot of good progress," said Bill Hill, assistant deputy associate administrator of NASA's Exploration Systems Development in Washington, D.C.

Some of that progress is coming from the commercial rocket and spacecraft providers who are working through partnership phases with NASA to pick up where the shuttles left off, with plans to launch American astronauts to the station from U.S. soil in mid-2017.

"We really have two goals," said Ed Mango, manager of NASA's Commercial Crew Program.

"One is a public purpose in which we're trying to help industry create a capability so that they can go anywhere in low-Earth orbit with a United States-led capability. The second is a NASA purpose in which we safely fly our scientists, astronauts and engineers to and from the space station as often as possible."

Through the program's newest phase, called the Commercial Crew Integrated Capability initiative, three American companies are working to bring their integrated transportation systems one step closer to manufacturing and flying.

"Competition is helping to keep all of our partners wanting to meet our requirements, wanting to transport NASA crew and wanting to do it for the least amount of cost," Mango said. "All of the analysis that we've done indicates that having one contractor would cost about twice the price."

NASA's Space Launch System (SLS) and Orion spacecraft also are on track

for a test flight in 2017. The heavy-lift rocket and spacecraft will take the agency's astronauts deeper into space than ever before. Hill said SLS is designed to be an evolvable system, going from a 70-metric-ton to a 130-metric-ton lift capability.

"What we're finding is there are only a handful of missions that we can conceive that we'll need the 130-metric-ton and that's primarily going to Mars, which is our ultimate destination," Hill said.

NASA still is working out the details of when and where Orion and its crew will travel first, Hill said, but Mars is a logical destination for the future, especially with the ongoing success of the Curiosity rover currently exploring the Red Planet.

"Until a human has set foot somewhere, you really haven't been there," Cabana said. "You know, that's exploration, that's in our DNA, our drive to explore and to go beyond what we know."

To support the myriad of anticipated customers and missions, NASA's Ground Systems Development and Operations Program is busy upgrading and modifying Kennedy's existing infrastructure, including the Vehicle Assembly Building, Launch Pad 39B, the mobile launcher and crawler-transporters.

"We're preparing Kennedy facilities to truly be that multiuser spaceport of the future," Cabana said. "We have the real estate, the facilities and the technical expertise. What was once science fiction, we're now making a reality for both commercial crew and cargo and government crew and cargo to low-Earth orbit and beyond."

Meet the new faces of NASA's low-Earth orbit programs

Ed Mango
NASA
Commercial Crew Program



"For the next two years our three partners, Boeing, SpaceX and Sierra Nevada Corp., are going to be designing and testing their integrated systems. By 2016 or so we're going to be starting to fly test missions to orbit, checking out these systems and making sure these vehicles are going to work as planned. And by 2017, we'll have at least one company that will be ready to go take crew to the International Space Station."

Mark Sirangelo
Sierra Nevada Corp.



"We believe that the shuttle has finished its mission and finished it proudly. Like the shuttle, our Dream Chaser is a piloted runway lander and in many ways is its natural continuation. Through our ongoing partnership with NASA we hope to see the amazing spirit and energy of the shuttle program now moving over to help our spacecraft become one of the vehicles to bring the U.S. back to human orbital flight."

Pete McGrath
Boeing



"Our basis is on Gemini, Mercury, Apollo, all the way through shuttle, Skylab, space station. We've basically worked on every human spaceflight system with NASA. So, with that we draw a lot of heritage and knowledge of what it takes to really certify and build systems for humans."

Tim Hughes
SpaceX



"SpaceX will be working closely with NASA to ensure that what we're doing will satisfy all NASA safety requirements. We recognize the criticality of being 100 percent right, 100 percent of the time as we move to manned spaceflight."

Josie Burnett
NASA ISS Ground
Processing and Research



"Commercial crew will enable us to bring up a seventh crew member to the International Space Station, and with that extra crew member we'll be able to expand the ability to do more research on the station, which is what its intended purpose is."

"What was once science fiction, we're now making a reality for both commercial crew and cargo and government crew and cargo to low-Earth orbit and beyond."

Bob Cabana,
Center Director

Celebration honors 40th anniversary of Apollo 17

By **Bob Granath**
Spaceport News

On Nov. 3, the Astronaut Scholarship Foundation hosted a dinner at the Radisson Resort at the Port in Cape Canaveral celebrating the 40th anniversary of Apollo 17. The gala featured spacecraft commander Eugene Cernan who, along with lunar module pilot Harrison Schmitt and the late Ronald Evans, flew the mission that concluded NASA's Apollo moon landing program.

Apollo 17 began on Dec. 7, 1972, with the first night launch in the history of America's human spaceflight program. A Saturn V rocket carrying Cernan, Schmitt and Evans lifted off from the Kennedy Space Center lighting up the Florida skies en route to the moon. Four days later, Cernan and Schmitt touched down in the moon's Taurus-Littrow highlands.

Cernan, along with other astro-

nauts in attendance, reminisced about the mission. Schmitt was unable to attend due to a scheduling conflict.

"If Apollo 17 was looked at as a success, don't look at me, look at these guys," Cernan said pointing to 10 Apollo astronauts on the stage with him and to former and current space program employees in the audience. "We built upon everything they did."

NASA Administrator Charles Bolden also had high praise for the achievements of the Apollo astronauts and those who supported the program.

"We built on your legacy and we continue to learn from it," he said. "Your exploits inspire and shape the future of exploration. We're striving to do the things today to inspire and motivate the new generation of explorers who all want to step up and follow in your footsteps."

A geologist, Schmitt was the first

American scientist-astronaut to fly in space. He helped train earlier Apollo crews in prospecting for lunar soil and rock samples.

At the conclusion of the third and final moonwalk, Cernan looked back on three years of lunar exploration and expressed hope for the future.

"I'd like to just (say) what I believe history will record that America's challenge of today has forged man's destiny of tomorrow," he said. "As we leave the moon at Taurus-Littrow, we leave as we came and, God willing, as we shall return, with peace and hope for all mankind."

During the trip back to Earth, on Dec. 17, Evans performed a spacewalk that lasted one hour and six minutes to retrieve panoramic and mapping camera film cassettes from the SIM bay. Apollo 17 splashed down in the Pacific Ocean on Dec. 19, with the crew of the USS Ticonderoga recovering the astronauts and spacecraft.



CLICK ON PHOTO NASA/Kim Shifflett

Eugene Cernan speaks to guests gathered for the Astronaut Scholarship Foundation's dinner on Nov. 3 celebrating the 40th anniversary of Apollo 17. Listening at left is Buzz Aldrin, lunar module pilot on Apollo 11, the first moon landing mission.

A veteran of Gemini 9 and Apollo 10 and 17, Cernan believes his last spaceflight opened the way for future exploration.

"Apollo 17 was not the end," he said during the ceremony. "Apollo 17 was just the beginning of a whole new era in the history of this country and the history of spaceflight."

From **ASTROBOTIC**, Page 3

presence beyond Earth."

Not having to launch those resources from Earth would dramatically cut the price tag for exploration, plus lower the risks involved for the crews as they venture into deep space on missions to an asteroid or Mars.

"There have been studies that have shown you can reduce the mass of a mission to Mars by a factor of somewhere between three and five if you get propellants from the space environment rather than launching them all from Earth," Metzger said.

Thornton said the fact that a number of companies are developing plans and building machines to go to the moon shows that the potential is real.

"If we were doing something really big and no one else was trying to do it, then it might not be that big," Thornton said.

Apollo astronauts found

no signs of water ice as they walked on the surface of the moon near the equator from 1969 to 1972, nor were there any signs in the soil and rock samples they brought back to Earth. However, several probes within the last 15 years found one indication after another that frozen water not only exists on the moon, but is abundant.

"None of these have been ground-proofed yet," Metzger said. "We really need to get vehicles on the surface of the moon prospecting to characterize those deposits, like how do they vary spatially, how do they vary with depth?"

A big question now is whether water ice on the moon is a powder akin to what skiers experience on a mountainside or is it completely solid like an ice cube, or did water seep down between granules of soil and freeze to produce rocks as hard as granite.

It wouldn't surprise lunar researchers to find cases of

all three as robotic prospectors explore the surface.

"Our best guess is it's going to be the ice," Thornton said. "Probably small little pieces of ice mixed in with the regolith."

Of course, there's more to exploration than knowing what questions to ask. There's also the issue of inventing technology that allows a robotic landing cheaply enough that a private company can pay for it, developing a rover heavy enough to drill or dig into the moon's surface without lifting itself off the ground in the low gravity, not to mention the matter of keeping the rover warm and powered in areas of the moon that are shadowed and surviving the lunar night.

Metzger has been pleased with what he has seen from the company so far.

"They're doing excellent work, their excavator is progressing well," Metzger said.

Thornton said exchang-

ing a modular digging element on the rover for a drill and instruments was not particularly difficult, and is an option for prospecting on the moon.

"The excavation chassis is a perfect fit for a mission to the moon in terms of scale, mass and power. We took out the excavation part and dropped in a drill and instruments," Thornton said.

Astrobotic will test its rover and tools in the bin of simulated lunar soil that Kennedy uses for its annual Lunabotics Mining competition to prove the vehicle is up to the challenges of operating on the moon.

"You have to be able to go to the moon with some confidence that your vehicle's going to be able to get around and to dig in the soil," Thornton said.

While NASA is excited about the chances to use a new resource for deep space exploration, Astrobotic wants to use the robotic prospector to start

mapping where the biggest water deposits are, along with other helpful chemicals, and then use the information to develop ways to extract the materials from the moon and put them to use. There are no plans to return water or other lunar samples to the Earth, Thornton said.

"The beauty of sending a robot is they don't demand a return ticket," Thornton said. "Once we know where the water is and what form it is in, we can develop systems to produce it in useable quantities. Water is a critical resource because you can drink it, breathe it and use it for rocket fuel."

There are a great many questions to answer before astronauts can count on the moon, an asteroid or Martian moons as fuel and air depots, but Metzger and Thornton said the answers are within reach.

"That's the reason to go, because we don't know the answer," Thornton said.

Society of Physics Students tours operations labs

By Linda Herridge
Spaceport News

Inside the Granular Mechanics and Regolith Operations Laboratory in the Engineering Development Laboratory (EDL) at Kennedy Space Center, research physicist Dr. Phil Metzger described lunar excavators and soil processing technologies to a small group of Society of Physics students Nov. 8.

Meanwhile, in a labora-

tory in the Operations and Checkout Building, chemical engineer Dr. Mary Coan and aerospace engineer Katherine Brewer explained components of the Regolith and Environment Science and Oxygen and Lunar Volatiles Extraction (RESOLVE) rover to another group of physics students.

These students were among the 800 graduate and undergraduate members of the Sigma Pi Sigma

Physics Honor Society who descended upon the center for a drive-by tour of the Vehicle Assembly Building, Launch Complex 39, Shuttle Landing Facility and the Industrial Area.

"The students were very engaged and many were actually taking notes as we talked," Metzger said. "I kept asking them questions that they could figure out on their own, and I was pleased at how often they got the correct answers just by reasoning it out."

Brewer said she had fun watching the college students look at the RESOLVE hardware and understand the magnitude of what this mission is working to achieve on the moon.

"Hopefully, we passed on our excitement about working at Kennedy and inspired them to believe that they could be the physicists of tomorrow working on future NASA research and devel-

opment projects," Brewer said.

Justin Provance, a physics student in his senior year at Marquette University in Wisconsin enjoyed the tour.

"It was very cool to see the development in progress rather than just reading about it," Provance said.

Maria Russert, from Georgia State University said, "It's pretty awesome."

In the Applied Physics Laboratory, lead physicist Dr. Bob Youngquist demonstrated some of the unusual technologies that were developed for the Space Shuttle Program. Included in his presentation were an orbiter window inspection technique, an ultrasonic leak detector device and an orbiter tile drying system.

These inventions caught the attention of physics graduate student Samuel Sekwao from the University of Illinois at Urbana and

Champagne. Sekwao, who currently is working on his doctorate, said he was enjoying everything he had seen so far.

"There are some interesting things here," Sekwao said of the technologies.

Inside the Electrostatic and Surface Physics Laboratory at the EDL, senior research scientist Dr. Carlos Calle and members of his team presented four technologies: dust mitigation, regolith derived heat shields, Differential Electrostatic Spectrometer for Mars rovers, and an LED-based lighting system for long-duration human missions.

"The students were keenly interested in all of the projects that we described to them," Calle said. "We showed them some of the regolith heat shield coupons that we made, and tested and demonstrated the dust mitigation technology."



CLICK ON PHOTO

NASA/Cory Huston

Research chemist Mary Coan describes components of the Regolith and Environment Science and Oxygen and Lunar Volatiles Extraction (RESOLVE) rover to a group of Society of Physics students inside a laboratory in the Operations and Checkout Building at Kennedy Space Center on Nov. 8.

Cryogenics testbeds training Rocket U students

By Linda Herridge
Spaceport News

Heritage propellant technology and hardware from NASA's Space Shuttle Program are helping a group of engineers at Kennedy Space Center develop engine design and system test requirements experience for the Project Neo Liquid Propellant Testbed of the Engineering Directorate's Rocket University (Rocket U).

At the testbed in the Flight Vehicle Support Building near the Shuttle Landing Facility (SLF), engineers Kyle Dixon and Evelyn Orozco-Smith recently checked the buildup of the Neo test fixture and an Injector 71 engine that uses super-cooled propellants, liquid oxygen and liquid methane.

Dixon and Orozco-Smith are systems engineers and Neo project leads in the Rocket U.

They and about seven other cryogenics, avionics, electrical and ground processing engineers have been working on the design and assembly of the Neo testbed as part of Rocket U's training program.

According to Dixon, Neo is in the design review process and systems engineering phase.



NASA/Frankie Martin

Engineers and Rocket University project leads Kyle Dixon and Evelyn Orozco-Smith check the buildup of the Neo test fixture and an Injector 71 engine that uses super-cooled propellants at the Neo Liquid Propellant Testbed inside a facility near Kennedy Space Center's Shuttle Landing Facility.

"We've been writing the systems engineering requirements and building on our expertise to design a test fixture," Dixon said. "The phase one goal is to fire an engine with about 3,000 pounds of thrust."

To build the test stand, Orozco-Smith said the team repurposed hardware from the Space Shuttle Program. These included tools, personal protective equipment, control panels from orbiter processing facilities and monitors.

A control trailer is being retrofitted to accommodate Neo systems requirements.

Nondestructive evaluation of the engine has been completed, and the engine hot fire analysis is in work.

Orozco-Smith said that two 1,000 liter Dewars, one for liquid oxygen and the other for liquid methane, have been received. Design of engine attachment components, plumbing, electrical systems and avionics software are under development.

Dixon said the first Systems Requirement Review was completed, and the next step is a Preliminary Design Review.

Phase one testing of the engine will be accomplished at the SLF midfield on the concrete pad previously used for cameras recording the Shuttle landings.

"After we accomplish the goals of phase one, the next goal, or phase two, is to eventually integrate the engine to a flight vehicle," Dixon said.

For now, Dixon and Orozco-Smith look forward to their first engine hot fire in late January 2013, collaborating with other centers to hot fire other articles next spring and continuing to expand the team's horizons.

Myers receives SWE's Emerging Leader Award

By *Brittney Longley*
Spaceport News

Harmony Myers, branch chief of Safety Engineering and Assurance in the Program Development and Operations Division of the Safety and Mission Assurance Directorate, at Kennedy Space Center, received the Emerging Leader award from the Society of Women Engineers (SWE) on Nov. 9 in Houston. She was nominated by the Central Florida Section of SWE for meeting difficult technical challenges in space safety, dedication to SWE leadership and education outreach to youth.

"I was very excited and honored to receive this award," Myers said.

The SWE is a nonprofit educational organization whose mission is to stimulate women to achieve full potential in careers as engineers and leaders, expand the image of the engineering profession as a positive force in improving the quality of life, and demonstrate the value of diversity.

"I have been involved with SWE

since 1998, when I was a collegiate member at the University of Central Florida," Myers said. "I became a lifelong member of SWE in 2001."

The Emerging Leader Award is given by SWE to honor a woman actively engaged in an engineering or technology profession, who has demonstrated outstanding technical excellence and significant accomplishments in her career as an engineer. In order to become eligible for the award, recipients must have had 10 to 15 years of engineering experience.

As a member, Myers participates in outreach for the organization by conducting hands-on experiments in science, technology, engineering and mathematics (STEM) fields to encourage youth, specifically girls, to take interest in those fields.

"I've led these workshops at Girl Scout events, the Sally Ride Festival, and many other outreach events," Myers said. "I've also been responsible for leading the team that organized and hosts these events."

Myers started her career in 2000



NASA

Harmony Myers, branch chief of Safety Engineering and Assurance at Kennedy Space Center, received the Emerging Leader Award, from the Society of Women Engineers on Nov. 9 in Houston.

at Kennedy as a reliability engineer for NASA contractor United Space Alliance (USA). While at USA, Myers performed various reliability and safety analyses on ground support equipment for the Space Shuttle Program. She also helped with design modification activities and operational process changes for all of the Space Shuttle Program requirements.

In 2005, Myers became a civil servant for NASA. Now, as the branch chief of Safety Engineering and Assurance, Myers is responsible for all activities that include safety and reliability analyses of ground support equipment and safety operations for future programs of NASA, including the Space Launch System and Orion

Multi-Purpose Crew Vehicle.

Maynette Smith, chief of the Payload Development and Processing Division, was Myers' supervisor at Kennedy.

"In her tenure with NASA, Harmony has made significant contributions both at the center and agency levels," Smith said. "She represents the future of NASA. Harmony has tireless dedication and talent."

Myers is currently on a detail at NASA Headquarters in Washington, D.C., as the executive director of the Aerospace Safety Advisory Panel (ASAP). As the executive director, Myers manages the operations of the panel, which advises the NASA administrator on the overall safety of the agency.

Myers has won several awards for her leadership, including the NASA Spaceflight Awareness Leadership Award, Central Florida Engineers Week Leadership Excellence Award and NASA's Most Effective Mentor Award, all in 2011. She also received the University of Central Florida Rising Star Award from the College of Engineering and Computer Science in 2010, the SWE Distinguished New Engineer in 2006, the SWE Regional Award for Outstanding SWE Counselor in 2005, and the Central Florida Engineers Week Young Engineer of the Year Award in 2003.

"I've always looked at the big picture and enjoyed making a difference," Myers said, "and that has always been a key driver to successfully leading the organization."

In celebration of Kennedy Space Center's 50th anniversary, enjoy this vintage photo . . .

FROM THE VAULT



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NASA file/1969

Exactly 50 years ago, the Saturn I (SA-3) flight lifted off Nov. 16, 1962, from Launch Complex 34 on Cape Canaveral Missile Test Annex. It was the third launch of a Saturn launch vehicle.



John F. Kennedy Space Center

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