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KSC NEWS

tech transfer

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Dr. Jackie Quinn, NASA environmental engineer and **Dr. Kathleen Loftin**, NASA materials chemist study ways to clean up and protect the environment. See pages 6-7 to learn more.

Photo credit: Anthony (Tony) Gray, QinetiQ North America

KSC's Commitment to NASA's Research &Technology

David Collins
Center Deputy Chief Technologist and Chief of R&T Management Office

KSC recently established a new organization to more effectively allow for center-wide focus on research and technology, and to emphasize the importance that KSC places on innovation and development. The Center Research and Technology (R&T) Management Office provides a more visible R&T program office that will serve external partners, KSC directorates and other NASA centers. The organization is responsible for leading R&T requirements and budget calls for all R&T funded efforts on the center. It also will manage the R&T portfolio, the center resources supporting R&T requirements and technology transfer.

As an agency, NASA is reenergizing its R&T programs by placing greater emphasis on technology development and advancing innovative ideas from concept to flight in order to reposition NASA on the cutting edge and to help meet the nation's needs for support of future NASA missions in science and exploration.

The Office of the Chief Technologist (OCT) is responsible for coordination and tracking of all technology investments across the agency. Each NASA center has its own Center Chief Technologist (CCT). Karen Thompson is KSC's Chief Technologist and serves as the primary point of contact for advanced technology development. Karen is responsible for managing the center's internal technology investments and assisting with long-range planning, making sure that the center's R&D investments are well-integrated, strategic and opportunity-driven. Karen is supported by the Research and Technology Management Office and chairs the KSC R&T Management Board (RTMB, see page 3).

The new organizational structure establishes a clear distinction of program roles and responsibilities of KSC directorates performing R&T. The hope is that this will lead to a higher likelihood of R&T infusion into programs. This will be due to harmonious project teaming arrangements and development progression from low Technology Readiness Level (TRL) through middle and higher TRL, while looking for technology gaps, overlaps and synergies among the agency's technology programs.

The R&T Management Office performs program management, technology integration, technology transfer and partnerships, CCT staff functions, RTMB management, program analysis, technology strategy, and university outreach, and manages the Small Business Innovative Research Program (SBIR) and Small Business Technology Transfer Research Program (STTR). The SBIR and STTR programs provide an opportunity for small, high-technology companies and research institutions to participate in government-sponsored research and development. Annually, NASA issues a solicitation highlighting its key technology needs and missions.

More than 200 KSC employees are working on R&T activities, making it necessary for KSC to manage R&T as a major focus area. The new KSC R&T Management Office is making great strides in R&T activities and is positioned to enhance and grow opportunities for the center. ■

In this edition you will read about the Research and Technology Management Board (RTMB). I want to commend these board members for their passion for enabling KSC employees to fulfill a vital role in performing research and technology development to help NASA achieve our missions.

— Karen Thompson, KSC Chief Technologist

The Research and Technology Management Board

With NASA's increased emphasis on research and technology (R&T), Kennedy Space Center (KSC) strongly relies on the KSC R&T Management Board (RTMB) to ensure that the center is consistent in its commitment to R&T development. The RTMB is comprised of representatives from all technology-related directorates

The goals of the RTMB are to enhance and increase current R&T efforts and ensure they support KSC's core missions, and to understand, proactively pursue and aggressively support R&T areas assigned by NASA. Chaired by KSC's Chief Technologist Karen L. Thompson, the RTMB provides strategies for R&T development at the center and reviews and approves proposals for R&T projects. The RTMB works to ensure that KSC is working across all Technology Readiness Levels (TRLs) so that we are involved in emerging technology development areas and infusion of technologies to address mission needs—and development areas in between.

The RTMB meets weekly or as necessary to review proposed technologies for alignment with the KSC Mission, the Office of the Chief Technologist, NASA and administration policy. On a case-by-case basis, the RTMB also identifies R&T areas arising from KSC activities that indirectly align with KSC's core mission and directly align with a researcher's experience or high level of expertise. The RTMB also stays cognizant of progress of all R&T efforts.

Researchers are invited to present their R&T proposals before the RTMB. Researchers also may contact Carolyn Mizell, the Strategic Integration Manager, to schedule a meeting (carolyn.a.mizell@nasa.gov). The RTMB also encourages researchers to collaborate with others within KSC, with other NASA centers and with academia and industry.

Current Board Members

Chief Technologist	Karen Thompson
Deputy Chief Technologist	David Collins
AD – Center Planning and Development Office	Robert Hubbard
EX – Education and External Relations	Grace Johnson
FA – Commercial Crew Program	Carol Scott
GG – Chief Financial Officer	Irma Granell
GP – Ground Processing	Jan Corbin
IT – IT and Comm Services	Benjamin Bryant
LX – Ground Systems Development & Operations	Phil Weber
NE – Engineering and Technology	Patrick Pilola
PA – Public Affairs	Todd Arnold
SA – Safety and Mission Assurance	Ron Gillett
TA – Center Operations	Phil Scarpa
UB – ISS Ground Processing & Research	Jose Nunez

Research and Technology Management Board: back row – Grace Johnson (EX), Benjamin Bryant (IT), Patrick Pilola (NE), Phil Scarpa (TA), Irma Granell (GG); front row – Paul Schallhorn (VA), Ron Gillett (SA), Jose Nunez (UB), Karen Thompson (Chair)

The Impact of NASA's Remediation Technologies

The KSC Technology Transfer Office continues to successfully market the award-winning technologies of NASA environmental engineer Dr. Jackie Quinn to the environmental remediation industry (see pages 6-7 for more on Dr. Quinn and her lab). With 11 separate licenses signed with industry partners, the commercial use of these technologies continues to grow.

One of the companies, Toxicological & Environmental Associates Inc., (TEA), was the first licensee of two of Dr. Quinn's technologies, the Emulsified Zero-Valent Iron (EZVI), in 2003, and the Activated Metal Treatment System (AMTS), in 2010.

Louisiana-based TEA commercialized EZVI and developed an efficient manufacturing process that produced large volumes (2,500 gallons/day) of stable and reactive emulsion in order to service larger remediation projects treating dense nonaqueous phase liquids (DNAPLs). EZVI removes DNAPLs from groundwater once it is injected into the contaminated site. TEA implemented the use of EZVI in a number of states and countries, including Arkansas, California, Illinois, Florida, Louisiana, Massachusetts, North Carolina, South Carolina, Tennessee and West Virginia, as well as in Ontario, Canada and Australia. EZVI has been used at various industrial sites and has achieved remarkable DNAPL reduction.

The AMTS technology, developed to extract and treat polychlorinated biphenyls (PCBs), consists of a solvent solution that contains a catalyzed zero-valent metal. The extracted PCBs react with the microscale, activated metal and are degraded into benign by-products. TEA, through the University of Central Florida, conducted laboratory treatability studies on a variety of PCB-contaminated materials, including paint, concrete and sludge, achieving over 90 percent in reductions.

TEA is currently working with another NASA licensee to conduct a field pilot test of the AMTS technology, in conjunction with state and federal regulators, at a site in the northeastern United States during 2013. NASA is also partnering with TEA under a Space Act Agreement for deployment of an extraction system to remove PCBs from sediments and treat them with an AMTS component.

Both of these innovative technologies are engineered to be used as *in situ* remedies, using reductive dechlorination processes to target and destroy DNAPLs in the subsurface (EZVI), and PCBs in paints, construction materials, soils and sludges (AMTS). NASA's Technology Transfer Office continues to seek new licensees of the technologies throughout the United States.

For more information about EZVI or AMTS, contact Greg Booth, Ph.D. (gbooth@remquestonline.com), or visit the TEA websites, at www.teainconline.com or www.remquestonline.com. ■

James Captain removing AMTS paste from surface

EZVI being transferred into injection tote

KSC Partners with Rollins College

By Anna Heiney, Abacus Technology

Kennedy Space Center' Technology Transfer Program is getting help transferring innovative space technologies to the marketplace, thanks to a new partnership between KSC and Rollins College in Winter Park, Florida.

Under a new Space Act Agreement, a small team of MBA students and faculty advisors from the school's Center for Advanced Entrepreneurship will analyze patented NASA technology, then provide NASA's Research and Technology Management Office with recommendations for potential licensees and marketing strategies, as well as insight gathered from industry experts.

"These 'second-tier technologies' are patented and they have merit, but it's hard to aggressively market them with so many technologies ahead of them in the queue," explained Jeff Kohler of QinetiQ North America, who leads a team supporting NASA's technology transfer activities at Kennedy. Through the new partnership, "NASA gets the benefit of an extra boost for some technologies we could only passively market, and the students get the experience of working with real-world technologies."

When NASA contacted the school to explore the possibility of such a partnership, the concept sounded promising to Cari Coats, executive director of Rollins' Center for Advanced Entrepreneurship at the Crummer Graduate School of Business. She believed a model the school was applying in another partnership also would work well for collaboration with Kennedy.

"NASA sources the technology and Rollins College sources the students and faculty," Coats said. "We create a path to market, determine how the technology can be commercialized, and create a business plan."

The partnership kicked off in September with a pilot project in which the Rollins team evaluated and created a commercialization plan for the inductive position sensor developed by NASA's Robert Youngquist and Stephen Simmons of Easi. The sensor was developed to support measuring the depths of very small defects on the space shuttle orbiter windows. It could be beneficial anywhere volume is tight but high sensitivity is needed over a range of positions, including medical, optical, machining, and automotive uses.

The Rollins team comprises professor Dr. Peter McAlindon, advisor Sergie Albino, and four student participants, all of whom brought previous technical or business experience to the project. Two of the students, Carlos Capiro and Pankaj Patil, work with major defense contractors and have engineering backgrounds; the other two, Jason Goldberg and Steven Madow, came into the project with extensive business experience, one in information technology and the other in web development.

"First, we really had to understand how this technology fits with all the other technologies out there," McAlindon said. "Then we called people in the field who know all about sensors, to help us identify holes in the market and where this technology can be applied."

These subject-matter experts helped narrow a list of "prospects"—specific markets and individuals to target for possible commercialization opportunities. Finally, the team considered packaging—the best way to get a prototype of the technology into the hands of companies who potentially could license it.

"If you can show someone the technology, it works a lot better than sharing papers or formulas," McAlindon said. "They all want technical specifications and ask to actually see a sensor. So the students took a prototype and built a custom housing, and made it so you can attach it to whatever you're working on and see how it performs."

The Rollins MBA team presented its commercialization plan to NASA at the school's Winter Park campus Dec. 6, at the close of the fall term.

The Research and Technology Management Office will use these results to pursue opportunities with industry. Typically the agency licenses the patent to a company that develops it into a saleable product. Royalties NASA earns through these sales are used toward further technology development. ■

NASA representatives and Rollins College MBA team members gather for a group photo Dec. 6. From left are Pete McAlindon, professor, Rollins College; Lew Parrish, QinetiQ North America; Robert Youngquist, NASA; Jim Nichols, NASA; Sergie Albino, advisor from Caveat Engineering; students Jason Goldberg, Steve Madow, Pankaj Patil and Carlos Capiro; and Jeff Kohler, QinetiQ North America

Quinn, Loftin Share a Passion for Preserving the Environment

By Linda Herridge, Abacus Technology

You could say that NASA environmental engineer Dr. Jackie Quinn is on a mission to do her part to help clean up the environment, a mission that began more than 10 years ago at Kennedy Space Center in Florida.

"I am a nurturer by nature," Quinn said. "I want to look out for everyone and everything."

Quinn, along with NASA materials chemist Dr. Kathleen Loftin and three co-inventors from the University of Central Florida (UCF), are best known in the environmental remediation world for developing the original Emulsified Zero-Valent Iron (EZVI) technology.

EZVI currently is one of the few available methods used to treat the source of unwanted substances known as dense nonaqueous phase liquids (DNAPLs) in groundwater. These liquids are denser than water and do not dissolve or mix easily in water.

During the Apollo program years, rocket engine parts were cleaned with chlorinated solvents, which are heavier than water. It was discovered that as the liquids sank into the ground, they could become harmful to the aquifer, which often is a source of drinking water.

Quinn teamed with researchers at UCF in 2000 to conduct the first phase of the research and development of EZVI. During phase two in 2001 and 2002, the first field demonstration was successfully performed at Launch Complex 34 on Cape Canaveral Air Force Station (CCAFS) under the U.S. Environmental Protection Agency's Superfund Innovative Technology Evaluation Program.

After the laboratory phase of EZVI development was completed, the injection methods for field-scale deployment became the focus. Quinn said injection technologies have evolved over the years and have helped strengthen the viability of EZVI.

In 2004, Quinn was honored with the Society of Women Engineers Technical Achievement Award. EZVI won NASA's Government Invention of the Year and Commercial Invention of the Year awards in 2005.

Quinn, Loftin, and the group received an Award for Excellence in Technology Transfer from the Federal Laboratory

James Captain, Robert DeVor, Jackie Quinn and Kathy Loftin

Consortium for Technology Transfer in 2006 and were inducted into the Space Technology Hall of Fame during the 23rd National Space Symposium in 2007.

The team was recognized as Laureates of the Tech Museum for the global humanitarian impact of the EZVI technology.

Lew Parrish, a senior technology transfer specialist with QinetiQ North America in Kennedy's Technology Transfer Office, said that a total of nine licenses have been granted to nine companies and two U.S. patents have been issued for the EZVI technology.

"EZVI is one of the most licensed and recognized technologies in NASA's history," Parrish said.

Currently, EZVI's patent is licensed to several companies that are producing their own versions of the technology. These are, A+ Environmental Solutions LLC in Santa Cruz, Calif.; Huff & Huff Inc. in Oak Brook, Ill.; RNAS Inc. in Brooklyn Center, Minn.; Bio Blend Technologies in Cantonment, Fla.; Terra Systems Inc. in Claymont, Del.; Toxicological & Environmental Associates (TEA) Inc. in Baton Rouge, La.; and Weston Solutions Inc. in West Chester, Pa.

Quinn said that EZVI also is in use at Port Canaveral, several locations at CCAFS, in 17 U.S. states, and in France and Japan.

"I like to see our work have an impact on everyday life," Quinn said. "Our passion is to make things better for the environment."

According to Quinn, the Environmental Protection Agency continues to monitor the success of EZVI at Marine Corps Recruit Depot Parris Island in Beaufort, S.C., as part of a long-term efficacy study conducted in concert with the Department of Defense.

Not ones to rest on their laurels, Quinn and Loftin are now working on several new technologies they hope will make a positive impact on the environment. One will help remediate sediment systems containing polychlorinatedbiphenyls (PCBs), while another will treat PCBs found in paint, caulking material, and concrete.

Licensees TEA and BioBlend will work together to demonstrate the Activated Metal Treatment System (AMTS) on older brick and concrete facilities in Massachusetts this year. Greg Booth, with TEA, said the *in situ* approach will be used to remediate construction materials contaminated with PCBs.

Loftin notes the prevalence of PCBs in industrial paints, adhesives, and transformer oils that were in use before 1979 when PCBs were banned from production in the U.S. PCBs bioaccumulate over time and are linked to numerous health issues.

Another technology, the Green PCB Removal from Sediment Systems (GRPRSS), debuted last May at Battelle's International Conference on Remediation of Chlorinated and Recalcitrant Compounds. A test of this green remediation technology is planned at a private industry site in Louisiana this year.

Loftin currently is working on a green solvent replacement technology and process for cleaning equipment and hardware that doesn't contaminate or have a long-term impact on the environment. Research on this new technology is ongoing at the center's Applied Chemistry Lab and is being funded by the Ground Systems Development and Operations Program managed at Kennedy.

"We are looking for a minimal negative impact on the environment," Loftin said.

"In the future, as we move into new programs, my hope is that we energize our efforts to be more environmentally positive," Quinn said. "Every effort to be more environmentally conscious does make a difference."

NASA materials chemist Dr. Kathleen Loftin and NASA environmental engineer Dr. Jackie Quinn

NASA Inspires Museum of Science and Industry

In 2008, the Museum of Science and Industry (MOSI), a nonprofit, community-based institution and educational resource located in Tampa, applied for a NASA grant to develop an educational, simulated lunar-based exhibit at the museum. In 2010, MOSI was awarded a $1.2 million grant to create its exhibit. MOSI's educational team—Anthonette Carregal, Vice President of Education; Tony Pelaez, Director of Education; Dave Conley, Vice President of Exhibits; and Dr. Judith Lombana—collaborated on development of an interactive moonbase exhibit. MOSI met with KSC's Chief Technologist Karen Thompson and presented its proposal for the exhibit. Thompson was excited about the proposal and introduced MOSI to Mike O'Neal, a recently retired NASA explorations strategist, who could provide guidance to the MOSI team. O'Neal became the liaison helping MOSI ensure that the exhibit aligned with NASA's interest and research.

The premise of "Mission: Moonbase" is to simulate a permanent lunar base in the year 2070 that is built near the south pole of the Moon, where it is believed there are large reservoirs of frozen water available within the rocks, as well as some highlands that can experience long periods of sunlight. Moonbase will contain an extensive network of capabilities to support its colonists, including an operations center to oversee the base's activities, a launch and landing facility, food production, and mining of resources.

MOSI wanted to create an exhibit that would get people excited about the space industry and encourage young people to think about pursuing education and careers in science, technology, engineering, and math (STEM). In order to do this, MOSI's expert team incorporated current research to create an engrossing, hands-on educational and interactive experience in which participants discover what it takes to live and thrive in a harsh environment. The exhibit challenges visitors to solve problems and learn what it takes to live on the moon, as well as have attendees participate in teams that accomplish tasks to maintain the Moonbase.

To design the interactive exhibit, MOSI asked NASA, "What do you need to live and work on the Moon?" O'Neal helped answer that question by bringing the MOSI team to KSC. The team toured several laboratories at the center and learned about space-related technologies and the lunar environment. They met with engineers and scientists in the chemistry, corrosion, electrostatic, life sciences, and regolith operations laboratories. The tour of KSC and discussions with experts provided MOSI with information on the complexity and hazards of living on a lunar base. During their tour, the team learned about hydroponics and growing food in space, the operation of lunar rovers, and the properties of regolith (or moon dirt). MOSI was now in a position to create the exhibit's initial design.

After a series of meetings and brainstorming sessions, and under further guidance from KSC, MOSI began building the final exhibit in the "Kids in Charge! Children's Science Center" section of the museum. The final exhibit was completed in December 2012, and representatives from NASA were invited to the exhibit's grand opening at MOSI.

Lauren LaBorde, a visitor to the lunar outpost, Mission Moonbase adjusts a valve at one of the interactive zones.

Guests to the museum now have the ability to participate in NASA's vision for living on worlds beyond Earth. Through an interactive experience, participants in Mission: Moonbase feel like they are members of a lunar outpost where they discover what is needed to thrive and maintain human habitation in a harsh environment. This immersive, eye-opening, and fun experience incorporates science, technology, engineering, and math as guests experience the challenges of operating a lunar base. The exhibit consists of various zones or pods that help the guests organize the information on primary topics of off-world habitation. These include an entry pod that would simulate taking off from earth and landing on the moon. After landing, guests enter a series of zones that includes Operations – to successfully balance the supply and demand infrastructure to sustain life and run a colony; Robotics – to engage with the primary workers or robots; Habitation – to produce food, medicine, and other necessities; Resources – to live off the moon by mining and processing minerals; and Lunar Surface – to experience the parameters of the unique environment in a safe and educational way.

Mission: Moonbase encompasses a 2,500-square-foot area and is designed for individual MOSI guests to experience at their own pace. The Moonbase is ideal for school group visits where students can spend several hours in the exhibit learning about what it takes to live on the moon. Mission: Moonbase at MOSI is being funded, in part, by NASA and is part of MOSI's plan to continually improve their guest experience and support the future of STEM.

To read more about MOSI and the Museum of Science and Technology in Tampa, visit their website at http://www.mosi.org/what-to-do/mission-moonbase.aspx. ■

Partnership Guide for KSC Employees Working Research and Technology Projects

The Research & Technology (R&T) work done at KSC often requires an innovator to seek a partner with unique capabilities/resources to help complete a project or further develop a technology. Internal and external NASA funding calls also require the innovator to work with a partner on a proposed project. Some of the questions often asked by these innovators when seeking or working with partners are:

- How do I find a partner?
- If I have a partner in mind, how do I implement the partnership?
- If I have an interested partner, how do I seek funding?
- How does NASA handle the intellectual property (IP) that is derived from the joint development partnership between NASA and the external partner?
- How do I deal with an inquiry from an external entity?

These and other questions will be answered in the Partnership Guide being developed by the R&T Management Office. The Partnership Guide will provide information and general guidelines on the best practices and resources available to help you seek partners effectively, establish partnership agreements, and protect NASA IP, and will also include other general dos and don'ts for working with non-NASA entities.

Hetal Miranda, Lead, Technology Integration & Partnership Development

The Partnership Guide will be available to all KSC employees in early summer 2013. If you have a suggestion or questions on the guide, contact Hetal Miranda, hetal.miranda@nasa.gov or Michael Lester, gregory.m.lester@nasa.gov. ■

Biological Experiments Travel to Space Station

By Jose Camacho

Experiments studying the effects of extraterrestrial environments on biology are of great importance these days since long-duration space flight is on the horizon.

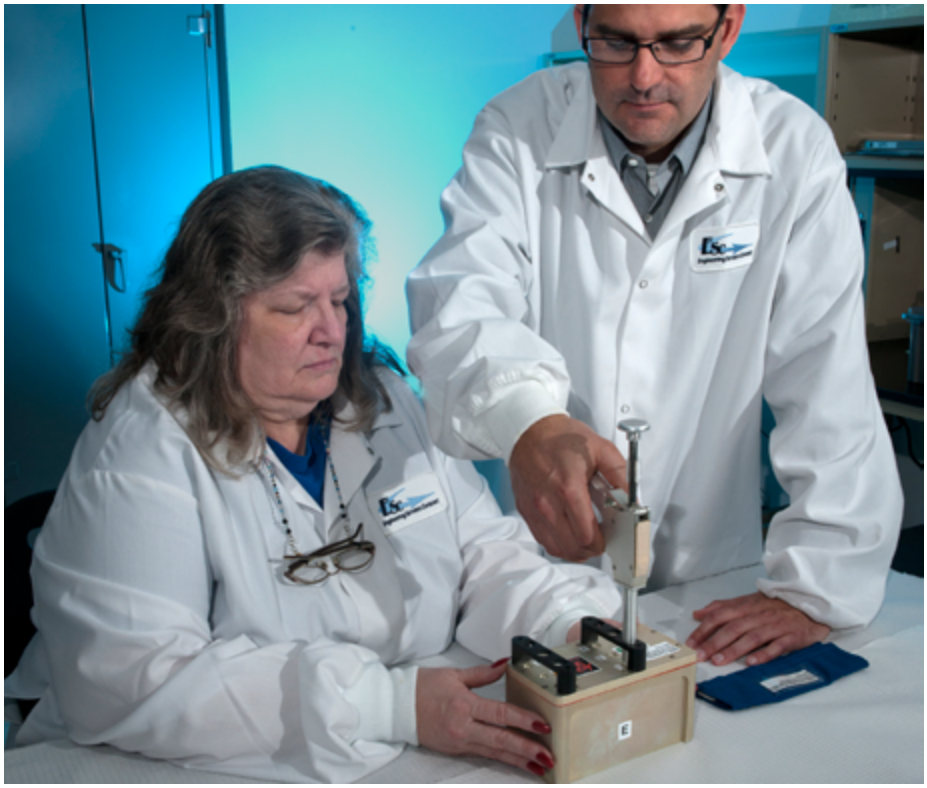
In March, two new experiments launched aboard SpaceX CRS-2 to the International Space Station (ISS). The first experiment, designed by Dr. Anna-Lisa Paul at the University of Florida, investigated how undifferentiated plant cells respond to the space flight environment at a molecular level. The second experiment, designed by Dr. Simon Gilroy at the University of Wisconsin-Madison, seeks a better understanding of how space flight affects gene expression related to oxygen-limiting conditions in plant seedlings.

The experiments traveled in NASA's unique Biological Research In Canisters (BRIC) Petri-Dish Fixation Units (PDFU), a compact storage system housing experiments to study the effects of space flight on small specimens. The BRIC-PDFU hardware with its three levels of containment provides the capability to conduct experiments in a single piece of hardware, eliminating the need of a glove box.

The PIs and the KSC payload development team (consisting NASA and KSC contractor personnel) prepare the BRIC by first plating the seeds or cells onto a 60-mm petri dish and inserting it into a PDFU. The PDFU contains a separate chamber that holds fixative chemicals to preserve the experiment. Five PDFUs are then placed in the canister, which also holds a temperature data logger. Each PI will be assigned four canisters or 20 PDFUs. Two of the canisters will be launched and, as a ground control, two will remain at the launch site inside an environment chamber simulating launch and ISS environments.

All four flight canisters were loaded at L-24 hours on the SpaceX vehicle. Two canisters were launched in a temperature-controlled double cold bag (DCB) at +4 °C, and the other two were launched in a Cargo Transfer Bag (CTB) at ambient temperatures. Upon reaching microgravity, experiments in the CTB initiated. Likewise, the experiment launched in the DCB was initiated upon removal from DCB and allowed to reach ambient temperature.

Experiments ran between 7 and 10 days, at which time they were fixed. This is done with an Actuation Tool and Rod Kit. A rod is inserted into the Actuator Tool. The Actuator Tool is attached to the selected BRIC-PDFU canister lid and is used to mechanically force the fixative chemical into each of the petri dishes. The seedlings and/or cells are then frozen in the MELFI facility on board ISS and stored until they are ready to be placed back into the SpaceX capsule for the return trip to Earth. Once the BRIC are back in the lab, the PIs will analyze and compare the seedlings and cells from both sets of experiments (the ground control and the flown specimens). ■



Susan Manningroach, ESC project engineer, and Jose Camacho, NASA 's project manager for BRIC demonstrate using the Actuator Tool on the BRIC.

America Invents Act

A Time for Change

By Randy Heald, KSC Patent Attorney

The American Invents Act (AIA) made a number of significant changes in the American patent system. In particular, the previous system awarded patent protection to the patentable invention with the earliest date of conception. Before enactment of the AIA, an inventor could rely on his/her date of conception as the earliest date of invention. As a consequence of the AIA, the United States Patent and Trade Office (USPTO) is now obligated to award a patent to the patentable invention having the earliest, effective filing date in the USPTO. This change from first-to-invent to first-to-file went into effect on March 16, 2013. Unchanged is the requirement that any patent application filed in the USPTO be enabling, i.e., disclosure is sufficient for a person of ordinary skill in the art to make and practice the invention described without needing additional inventive steps.

How will NASA-KSC's procedures change to meet the new requirements in the AIA?

Future New Technology Reports (NTRs) submitted to NASA-KSC will be expeditiously evaluated to minimize the time until a recommendation is made on whether or not to seek patent protection. Once a recommendation to seek patent protection is made, immediate steps will be taken to prepare and file a provisional patent application in the USPTO.

KSC inventor(s) can assist the process by providing NTRs, if possible, with complete and enabling disclosures at the earliest practicable time, i.e., when the invention can be replicated without the need for additional inventive steps. Filing a patent application (provisional or utility) as early as possible maximizes the prospect of achieving patent protection, especially in areas of widespread development that may lead to independent inventors seeking patent protection for the same invention.

If a KSC patent application has an effective filing date even one day later than the effective date of an independent inventor's filing date for the same invention, the earlier date will prevail even if NASA conceived of and reduced its invention to practice before the independent inventor even began work!

It is important to note that a patent application normally protects only the disclosed embodiments and obvious variants. Often when KSC inventors solve problems, they only focus on what is considered the best or "preferred" embodiment of the invention. There may be alternative embodiment(s) worthy of patent protection that are not considered or reported. Enabling disclosures for the alternative embodiment(s) need to be included or at least referenced in the NTR in order to be captured in any resulting patent application. Many times, alternative embodiment(s) will have greater commercial potential than the initially identified preferred embodiment.

> *"It is important to understand that from March 16, 2013, onward, the process of identifying, evaluating, and protecting NASA-KSC's inventions will change."*
>
> *— Randy Heald, KSC Patent Attorney*

If a KSC patent application has an effective filing date even one day later than the effective date of an independent inventor's filing date for the same invention, the earlier date will prevail even if NASA conceived of and reduced its invention to practice before the independent inventor even began work!

NASA-KSC may decide that there is insufficient interest in obtaining patent protection, or a patent application having an enabling disclosure cannot be prepared in a timely manner. In either case, NASA-KSC may choose to publish details of the invention(s) described in the NTR. If the details provide an enabling disclosure of a patentable invention, publication would constitute prior art to the work of any independent inventor that files an application after the date of publication. Technically, NASA-KSC's invention is considered to be in the public domain as of the date of publication and may be freely practiced by all parties. Notwithstanding, NASA-KSC itself still may file its own patent application for the published invention in the USPTO if it does so within one year from the date of publication. This effectively gives NASA-KSC a one-year grace period to consider whether there is any factor or combination of factors justifying filing of such a patent application, i.e., commercial worth and/or addition to NASA-KSC patent portfolio.

As will be readily apparent, the AIA intends to award patent protection, whenever possible, to the first applicant filing an enabling disclosure in the USPTO. This requires all parties at NASA-KSC to take the steps described above to ensure adequate protection is obtained for NASA-KSC inventions. ■

Randall M. Heald
1947-2013

On May 24th Kennedy Space Center (KSC) lost Randall Heald, our Patent Counsel for the past 12 years. During his time with us, Randy provided outstanding support to our office and KSC innovators assisting with the patenting and licensing of KSC technology to industry. We will miss Randy not only for his extensive legal expertise but also for his spirited conversations and gigantic heart. Farewell Randy. We will miss you.

KSC Innovation Expo 2012

Kennedy Space Center hosted its first Innovation Expo on Sept. 6 to provide the KSC workforce with an opportunity to communicate and nurture a creative culture that will lead to collaboration and further innovative technologies at KSC. The expo was open to all civil servants and contractor employees.

The Expo was made up of several components, which included:

- Kennedy Kick Start – a Center-wide innovation maturation program geared toward increasing exposure to ideas from any domain and increasing the chances those ideas will make a positive difference at KSC. As part of the Kennedy Kick Start, 11 projects received funding.
- Innovation Forum – a series of short talks that focused on an innovative idea worth spreading. Speakers had diverse backgrounds, which included the U.S. Navy, Disney, and Publix (among others), and spoke on a variety of topics with the themes of innovation and collaboration.
- Kennedy Showcase – featured exhibits from various KSC organizations to highlight capabilities and to promote innovative projects and processes currently in work.
- Solve It, KSC! – a networking event that included group ice breakers and problem solving.
- Expo Tours – included open houses and tours of facilities and labs across KSC. ■

KSC engineers exhibit their technologies

2012 Best of KSC Software

The 2012 Best of KSC Software Award is designed to recognize outstanding software developed by KSC teams for the purpose of serving the KSC mission. Software developed by civil servants and/or contractors is considered, providing there is a NASA intellectual property interest. Awards are grouped under two general categories: KSC Institutional and KSC Mission. Institutional software is designed to support and improve KSC business processes, and Mission software is designed to support and enhance KSC scientific and engineering mission. The 2013 Best of KSC Software competition will be held later this year. For information on this award program, contact Megan Victor megan.e.victor@nasa.gov. The 2012 Best of KSC Software Award winners were:

WINNER

Automated Utility Database Reporting and Information System (AUDRIS)

H. David Turner
Justin B. Gilman
Jennifer G. Ginsburg
Jonnie K. Street
William V. Payne
Michael W. Rector

RUNNER UP, Institutional Category

Access Level Management System (ALMS)

RUNNER UP, Mission Category

Regolith and Environment Science and Oxygen and Lunar Volatiles Extraction (RESOLVE) ■

Special thanks for assistance with photography: Anthony (Tony) Gray, and Rick Wetherington, QinetiQ North America, and John Hampton, SGT.

Kennedy Tech Transfer News

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Kennedy Tech Transfer News is the semiannual magazine of the Technology Transfer Office at NASA's Kennedy Space Center, Florida.

This magazine seeks to inform and educate civil servant and contractor personnel at Kennedy Space Center about actively participating in achieving NASA's technology transfer and partnership goals.

Please send suggestions or feedback to the editor.

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