

National Aeronautics and Space Administration



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KSC NEWS

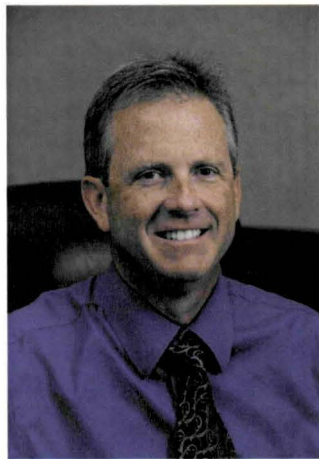
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Dr. Ray Wheeler, NASA's acclaimed plant physiologist, studies ways to grow crops for deep space travel, which can be applied to controlled-environment agriculture on Earth. Wheeler was recently recognized by the USDA for his outstanding contributions in horticulture. See pages 6-7 to learn more.

tech transfer

Fueling Economic Growth Through Technology Transfer



David Makufka
Manager, Technology Transfer Office

In October 2011, the White House released a presidential memorandum titled “Accelerating Technology Transfer and Commercialization of Federal Research in Support of High-Growth Businesses.” It emphasized the importance of technology transfer as a driver of successful innovation to fuel economic growth, create jobs, and make U.S. industries more competitive in a global market.

In response to this memorandum, NASA developed a 5-year plan for accelerating its own technology transfer activities. This plan outlines key objectives for enhancing NASA’s ability to increase the rate, volume, and quality of technology transfers to industry, academia, and other Government agencies. By doing so, we are increasing the economic impact and public benefit of Federal technology investments. In addition, NASA established technology transfer as a key element of one of its Agency High Priority Performance Goals: “Enable bold new missions and make new technologies available to Government agencies and U.S. industry.”

What does this mean to you? In the broadest sense, NASA defines technology transfer as the utilization of NASA’s technological assets – technologies, innovations, unique facilities and equipment, and technical expertise – by public and private sectors to benefit the Nation. So, if your job involves developing new technologies, writing new software, creating innovative ways to do business, performing research, or developing new technical capabilities, you could be contributing to Kennedy Space Center’s (KSC) technology transfer activities by creating the technological assets

that may one day be used by external partners. Furthermore, anytime you provide technical expertise to external partners, you’re participating in technology transfer.

The single most important step you can take to support the technology transfer process is to report new technologies and innovations to the Technology Transfer Office. This is the critical first step in fueling the technology transfer pipeline. This is also a requirement for all Federal employees (see NPD 2091.1B) and most NASA contractors. Detailed information on when, where, and how to report new technology is provided on the following page.

In addition, it’s important that all detailed-oriented discussions about technology between NASA and external partners are documented or that they occur under formal agreements such as Space Act Agreements and Nondisclosure Agreements. Our office can assist you in putting these agreements into place, protecting NASA’s interests, and providing the means to accurately measure the Agency’s technology transfer activities.

Technology transfer is everyone’s responsibility. We need your help to ensure that NASA remains the leader in Federal technology transfer, and that the great work done at KSC provides the maximum economic and societal benefit to the Nation. For more information, visit our website at: <http://technology.ksc.nasa.gov/index.htm>. ■

New NASA Tech Portal Now Available

To accelerate the transfer of technology from NASA to American businesses, the Agency has created a Technology Transfer Portal.

NASA’s Technology Transfer Portal provides an Internet-based, one-stop front door to intellectual property assets available for infusion into the U.S. economy. NASA’s Technology Transfer Program transfers the results of research and development to the U.S. economy via licenses, patents, and intellectual property agreements, often resulting in innovative products and businesses. The use of NASA technology spurs job growth and helps the U.S. maintain its economic competitiveness while improving our everyday lives.

“One of NASA’s highest priority goals is to streamline its technology transfer procedures, support additional Government-industry collaboration and encourage the commercialization of novel technologies flowing from our Federal laboratories,” said NASA Administrator Charles Bolden. “One way NASA can streamline and increase the rate of aerospace technology transfer is through tools like NASA’s Technology Transfer Portal.”

To access NASA’s Technology Transfer Portal, visit: <http://technology.nasa.gov>.

New Technology Reporting

What is a New Technology Report?

- A New Technology Report, or NTR, is used to document and report inventions, discoveries, significant improvements, and techniques, products, processes, and software programs that are innovative or unique.

Why is it important to report new technology?

- Reporting new technology is required for all NASA civil servants and most NASA contractors.
- It is the first step in supporting NASA's Technology Transfer mission to benefit U.S. industry, the economy, the technical community, and society as a whole.
- It is the first step in the patent application process.
- It can lead to employee recognition, awards, royalties, and publication in *NASA Tech Briefs* and *NASA Spinoffs*.
- NTRs are now part of NASA's Agency High Priority Performance Goals for technology development and are reported to Congress each year.
- Even technologies not thought to have commercial application should be reported.

When should I report an NTR?

- Ideally, an NTR should be submitted anytime after the development has reached a Technology Readiness Level (TRL) of 3–5, i.e., the period spanning from the proof-of-concept stage to the completion of prototype development.
- You don't need to wait until the technology has been implemented or used in operations.
- An NTR should be submitted before a technical paper is published or any other public disclosure of the new technology is made.
- Software-related NTRs should be reported before software is released to external entities through the Software Release Process.
- Better late than never!

How do I submit an NTR?

- Submit the NTR through the easy-to-use, online NTR system at <https://ntr.ndc.nasa.gov/>.
- For further information or assistance, contact:

Megan Victor
KSC Technology Transfer Office
(321) 867-9724
E-mail: Megan.E.Victor@nasa.gov

What Information Is Needed?

- ✓ Problem/idea that is motivating development
- ✓ Technically complete and easy-to-understand description of innovation
- ✓ Unique or novel features and results/benefits
- ✓ Potential commercial applications
- ✓ Previous or contemplated disclosure/publication
- ✓ Development history
- ✓ Technology origin

Keep a record, with accurate dates, of innovations and disclosures in a laboratory notebook to make filing NTRs easier.

Software Company Expands Possibilities for Command and Control System Design

Command and Control Technologies Corporation (CCT) recently celebrated 15 years in business in Brevard County providing command, control, and data acquisition solutions to Government and commercial customers throughout the United States. The company, started in 1997 by former engineers and managers from Kennedy Space Center (KSC), had the objective of developing a software middleware product that would significantly reduce the time and cost associated with developing command and control systems for space launch, range safety, and related markets. In order to accomplish this, CCT entered the Florida/NASA Business Incubation Center and licensed an early-stage software product from KSC that would give the company a jump start in developing their finished product.

Today the Command and Control Toolkit (CCTK) is used by both Government and commercial customers. The product provides the framework for command and control applications out of the box, with an adaptable and open architecture that makes it efficient and cost-effective. From integrating unique or legacy sensors to providing mission-specific displays, CCTK can be adapted and deployed quickly at significantly lower cost than new system development. CCTK incorporates open systems approaches and industry standards for supervisory control and data acquisition (SCADA) to leverage the availability of commercial off-the-shelf compo-

nents. Options for CCTK provide features such as a real-time geographic information system, radar interfaces, telemetry acquisition and simulation interfaces, GPS tracking and time acquisition, and web-based display capabilities.

Recently CCT returned to its space system roots by supporting the Mid-Atlantic Regional Spaceport at Wallops Island, VA. CCT was contracted to provide the Universal Ground Control System (UGCS) at Launch Pad 0A, which is being developed for NASA as a multiuse pad for liquid oxygen (LOX)/RP-1 launch vehicles. The integrated control system being provided by CCT is based on the CCTK product line and industry-standard hardware. The system provides data acquisition, control, and process automation for all major pad systems. The system controls and automates LOX and RP-1 handling and loading, environmental control system operation, high-pressure gas operations, automated sequencing of the water deluge system, and provides supervisory control of the vehicle transporter/erector. The system also integrates interactive pad system simulation and remote, web-based monitoring capabilities. The UGCS is designed to be vehicle-independent, allowing the pad to be reconfigured for multiple launch vehicles. Orbital Sciences Corporation has selected CCT products as a key element in the launch control system for their new Antares launch vehicle. This vehicle will be the first to use Pad 0A at Wallops for resupply missions to the International Space Station.

CCT's success with CCTK has afforded the company the opportunity to expand its product line into new markets. CCT has developed cutting-edge products in the areas of telemetry acquisition and simulation that are supporting military, civilian, and NASA programs throughout the country. CCT's TelSim product provides a high-fidelity, model-based telemetry simulation capability unlike any other on the market. TelSim is used at test and launch ranges as well as in fielded missile defense systems to simulate the telemetry streams from launch vehicles, missiles, and aircraft, thereby providing thorough testing and training scenarios for system operators.

CCT continues to expand and improve the capabilities of CCTK and related products to incorporate the latest advancements in hardware, software, and sensor technology. For further information on CCT and the company's technology offering, visit their website at www.cctcorp.com or follow them on Facebook to get the latest news on product improvements and availability.



Launch Pad 0A at Wallops Flight Facility, VA. Pad systems are controlled by an integrated system designed and built by Command and Control Technologies Corporation and powered by Command and Control Toolkit.

NASA Explores Collaboration Opportunities

Kennedy Space Center and the Florida Space Institute (FSI) (<http://fsi.ucf.edu/>) have joined forces to identify and establish mutually beneficial research and technology development partnerships between KSC and various Florida universities.

FSI, a consortium of Florida public and private universities, is committed to space research, development, and education activities within Florida through collaboration with Federal laboratories, as well as to the development of Florida's space economy in the civil, defense, and commercial sectors.

To implement these goals or collaborations, FSI invited Karen Thompson, the Center Chief Technologist, and other KSC research and technology (R&T) leaders to meet with faculty members from central Florida universities at the University of Central Florida (UCF). The event was intended to stimulate new ideas for future collaborative opportunities, and discuss KSC's vision for the future of R&T and how the expertise of university faculties can be leveraged to support that vision. This event, officially dubbed *Space Day*, was held February 21, 2012, at the UCF Fairwinds Alumni Center.

Mike Lester, KSC Technology Development Partnership Lead, declared that the meeting was very successful and will open the door to more detailed discussions between KSC researchers and faculty members in a number of technology development areas.



Karen Thompson
KSC Chief Technologist



Dr. Alan Stern
Director, Florida Space Institute



You are cordially invited to attend

SPACE DAY

Research and Technology (R&T) leaders at NASA's Kennedy Space Center (KSC) will share their vision for the future and how the university faculty can leverage their expertise to support that vision.

Tuesday, February 21, 2012
8:30 am - 12:40 pm

University of Central Florida
Fairwinds Alumni Center, Ballroom AB

Introductory and closing remarks will be provided by:

- Dr. Alan Stern, Director of the Florida Space Institute
- Ms. Karen Thompson, KSC's Chief Technologist

RSVP to Sreeta Malek by February 15
E-mail: Sreeta.Malek@ucf.edu Phone: 1-800-613-4889, Press 2

Sponsored by the
Florida Space Institute



All in the Details: Ray Wheeler Investigates How to Grow Plants in Space

When it comes to growing plants in space, it's all in the details, according to Dr. Ray Wheeler, lead for advanced life support activities in the Surface Systems Division at NASA's Kennedy Space Center in Florida.

"These details may seem trivial to some, but there are many things to consider when looking at developing plant growth systems for deep space travel, or even on the International Space Station," Wheeler said.

Cost, power required, growth time, failure rates, and liabilities must all be considered, according to Wheeler. "It's much more than just planting seeds in soil and monitoring their growth."

Wheeler, who is a plant physiologist, began his career at Kennedy in 1988. His research focuses mainly on lighting and carbon dioxide concentration effects on plant growth and development, and the use of hydroponic techniques for production systems.

From modest beginnings inside Hangar L at Cape Canaveral Air Force Station in the 1980s and 90s, Wheeler's Advanced Life Support team of scientists and researchers has come a long way.

Currently, Wheeler oversees several Advanced Life Support activities at the Space Life Sciences Laboratory. These include wastewater processing, air trace contaminant control, solid waste management, and food production for space habitats.

In the area of food production for space habitats, Wheeler's research seeks to determine the practicality of the "grow as you go" method for growing crops for deep space travel and involves testing light-emitting diodes, or LEDs, in different spectral combinations to achieve the desired result in plants.



VEGGIE plant units

As a matter of fact, Wheeler said using LED lights to grow plants was an idea that originated with NASA as far back as the late 1980s.

"There is evidence that supports the idea that fresh foods – such as tomatoes, blueberries, and red lettuce – are a good source of antioxidants," Wheeler said. "How they are grown and then consumed in space could have a positive impact on people's moods and could protect against radiation in closed environments."

Wheeler said the very efficient red and blue LED lights are really all that plants need in order to grow. In addition, ultraviolet exposure may increase antioxidant properties and red pigments in leafy crops. In the future, the lab will begin testing white LEDs as well, in order to provide a broader-spectrum light source that will allow the crew to see the full color of the crops.

Currently, a new spaceflight experiment, called the VEGGIE plant chamber, is occupying Wheeler's time as he works with engineers and collaborators to get the unit flight-certified for use on the International Space Station.

Developed through a Small Business Innovative Research Program, VEGGIE is a simple, low-cost plant chamber that has a flat panel LED light and is collapsible for transport and storage.

At the base of the plant chamber is a reservoir containing porous fabric in which water can be added. Self-contained soil packets of plant seeds with time-release fertilizer pellets can be placed on the fabric so that the roots can take hold. The chamber's collapsible walls can be raised to allow for space as the plants grow.

"We've tested lettuce and radishes, and it works quite well here in the lab," Wheeler said. "But to make it to the space station, the plant chamber needs to pass safety reviews and meet low power usage and low mass requirements."

Other innovative plant growth concepts in which Wheeler is involved include controlled environment agriculture concepts that would be transferable to terrestrial applications, such as "vertical agriculture" in urban settings, and growing plants using different intensities of LED lights to achieve different results.

In 2010 and 2011, Wheeler participated in the Desert Research and Technology Studies (Desert RATS) near Flagstaff, Arizona, as part of a supplemental food production study. He and his colleagues placed LED lighting in a circular pattern around the atrium of a two-story habitat demonstration unit. Red and green leaf lettuce, mizuna (a leafy vegetable in the mustard family), radishes, and basil were planted inside the atrium and exposed to the LED lights as they grew.

“The plants grew well, and some were even consumed by the crew living in the habitat, which wasn’t planned,” Wheeler said. “But we were happy that they were interested in eating some of the fresh greens.”

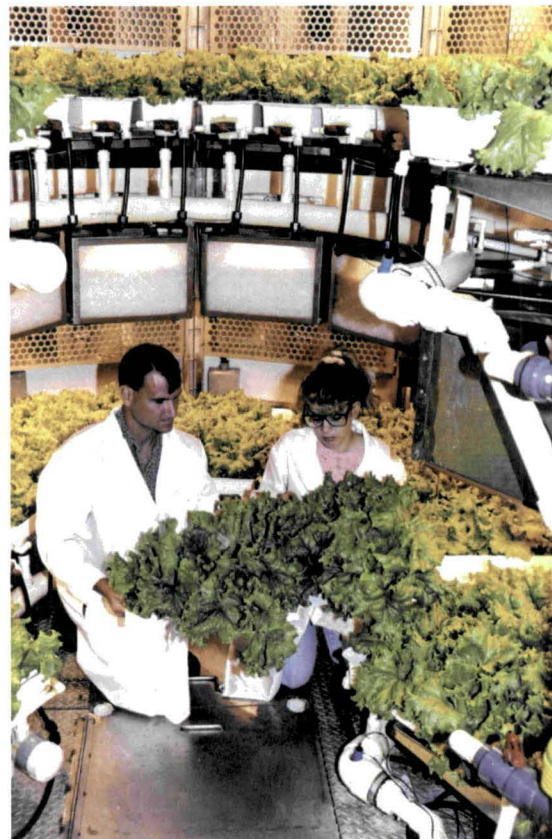
Earlier work at KSC to develop hydroponic growing techniques with potatoes “spun off” a new cultivation approach for the seed potato industry, and Wheeler did consulting work with the Frito-Lay Company in the mid-1990s to help assess a large-scale, controlled-environment production facility for seed potatoes.

As the Kennedy Space Center prepares its facilities to support a variety of commercial launch vehicles and NASA’s future space exploration efforts, Wheeler is hopeful that life sciences research and payload development can continue their long tradition at Kennedy.

“I work with the best colleagues you could want in a profession, and I think they are a great asset to the Center,” Wheeler concluded.

Wheeler is the author or co-author of more than 200 scientific papers, and he has presented more than 60 invited talks since 1989. He is the recipient of a NASA Exceptional Scientific Achievement Medal. He holds or has held adjunct or courtesy appointments at the Florida Institute of Technology, the University of Florida, the University of Central Florida, Utah State University, Cornell University, Texas A&M University, and the University of Arizona.

Wheeler also serves as a vice chair of the Life Sciences Commission on the International Committee on Space Research, or COSPAR. He will travel to Mysore, India, in July to chair a session and give a lecture during COSPAR’s international conference. ■



Lettuce plants in Hangar L chamber

Wheeler Recognized by USDA

Dr. Ray Wheeler has been selected as the 2012 Benjamin Y. Morrison Memorial Award Lecturer by the USDA’s Agricultural Research Service (ARS).

“This year’s notice was a real surprise, and I’m honored to receive the nomination,” Wheeler said.

Wheeler will present his lecture during the annual meeting of the American Society for Horticultural Science this summer in Miami. He will speak to his peers in the industry with a presentation titled “Controlled Environment Research: A Forgotten Discipline with Emerging Opportunities.”

According to Pat Simpkins, Kennedy’s Director of Engineering and Technology, Wheeler’s selection for this award is an indication of both Wheeler’s excellence in the discipline and Kennedy Space Center’s unique place in the area of space life sciences and plant physiology.

“He’s worked hard to establish this capability in the space industry for Kennedy, and we all applaud this great accomplishment,” Simpkins said.

The ARS established the lecture award in 1968 to honor the memory of Benjamin Y. Morrison (1891–1966). Morrison was the first director of the USDA’s National Arboretum in Washington, D.C., and was a pioneer in horticulture.

According to ARS Lecture Coordinator Kim Kaplan, the lecture award recognizes scientists who have made outstanding contributions to horticulture and other environmental sciences. It is also used to “encourage the use of these sciences for the production of horticultural crops or to preserve and enhance the natural beauty of landscape plants,” Kaplan said.

Kennedy’s Chief Technologist Karen Thompson said Wheeler is acclaimed throughout NASA as the Agency’s top scientist in plant physiology.

“Wheeler also is recognized worldwide for his expertise,” Thompson said. “This award is yet another testament to his accomplishments and is truly a high honor.”

Wheeler said, “During my presentation, I hope to point out the commonalities between using crops for life support systems in space and emerging terrestrial interests in controlled-environment agriculture and vertical farming concepts.” ■

New Technology Report (NTR)

Technology Title: **Portable Intravenous Fluid Production Device for Ground Use**

Inventors: **Philip J. Scarpa and Wolfgang K. Scheuer**

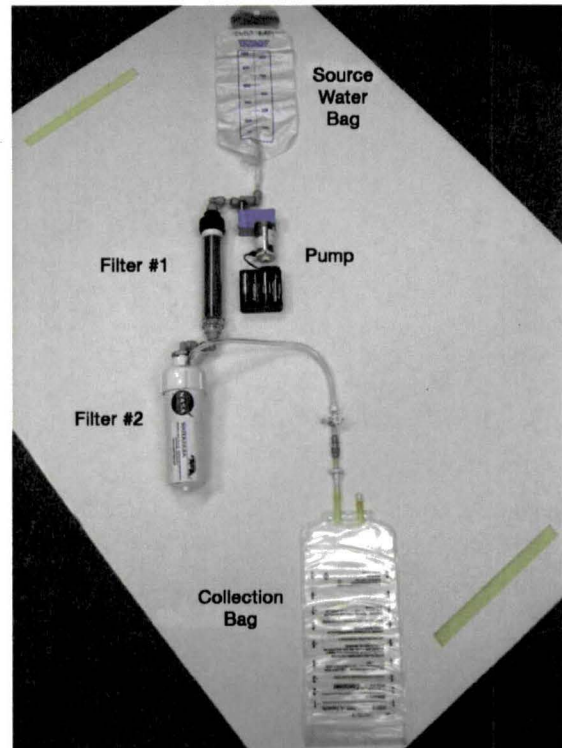
Case #: **KSC-13598**

What it is: A small, portable, lightweight, easy-to-use, high-output device that, within minutes, converts regular drinking water into medical grade water suitable for use in intravenous (IV) fluids. Drinking water is pumped through two small filters, which results in the production of sterile, ultrapure water that meets the stringent quality standards of the United States Pharmacopeia for Water for Injection. The device weighs 2.2 lb (1 kg) and measures 10 × 5 × 3 inches in its storage configuration.

Why it is needed: Treatment of several medical conditions requires intravenous fluids. Limitations on mass, volume, storage space, shelf life, transportation, and local resources can restrict the availability of such important fluids. These limitations are expected during extended space exploration missions and in remote or austere environments on Earth. Current IV fluid production requires large factory-based processes. Easy, portable, on-site production of IV fluids can eliminate these limitations. Based on experience in developing a similar device for spaceflight, a device was developed for ground use.

How it might be used: Worldwide use is expected in medical activities in environments that have limited resources, or limited storage or resupply capabilities, such as those found in military field operations, humanitarian relief efforts, submarines, and cruise ships.

Tech transfer status: A provisional patent has been obtained. ■



Q&A

From time to time, our legal team receives questions about copyrights and other matters regarding intellectual property that KSC employees may encounter in their daily work. Here is a sampling of those questions and our answers.

What is copyright?

Copyright is a legal principle, based in the U.S. Constitution, that provides for the protection of original works of authorship fixed in a tangible medium of expression. Once a copyright is established, the owner has the exclusive right to reproduce the work, create derivative works, distribute copies of the work, perform the work, and display the work.

Can ideas or facts be copyrighted?

No. Copyright is limited to specific expression of the ideas or facts. If there is only one way to express the idea (e.g., $3+3=6$), this fact cannot be copyrighted.

Copyright arises once the creative work is fixed in a tangible medium; for example, when an artist has completed a painting or a photographer has taken a picture.

Is the copyright owner required to place a copyright notice on the work?

No. The copyright arises when the expression is fixed in a tangible medium and no longer requires any particular notice or publication. Although not required, it is still advisable to use a copyright notice.

If the copyright is complete when the work is complete, why register the work with the Copyright Office?

Registration with the U.S. Copyright Office is a legal formality intended to make a public record of the facts of a particular copyright. Such registration, while not legally required, is required before an infringement suit may be filed in court. It is *prima facie* evidence of the existence of a copyright in the work. In order to receive statutory damages and attorney's fees, the copyright must be registered. Statutory damages do not require proof of actual damages and may exceed \$150,000 per copy for deliberate copying of protected works. Finally, the U.S. Customs Service will only act against illegal importation of a copyrighted work if the copyright is registered.

Do Government employees acquire copyright in works created in their official capacity?

No. There is no U.S. copyright available in works created by Government employees; however, the work may be eligible for foreign copyright protection.

How long does a copyright last?

In general, for works created after 1998, copyright extends for the life of the author/creator plus 70 years.

What is required to perform and make DVD copies of copyrighted music accompanying a video presentation?

Four different licenses would be required to use a copyrighted song as background music in a video presentation, to publicly perform the video, and to distribute DVD copies. A public performance license is required for the public showing of the video, a mechanical license is required to reproduce DVDs of the video presentation, a master use license is required to use a specific artist's version of the music, and a synchronization license is required for the use of the particular song you wish to sync with the video. Each of the licenses is most likely acquired from a different entity and will depend on who owns specific rights in the song you wish to use.

For more information on copyright or any other questions related to intellectual property, contact KSC's patent counsel, Randall Heald, at 321-867-7214 or e-mail Randall.M.Heald@nasa.gov. ■



Legal team (from left to right): Ginger Arrington, Amber Hufft, Dawn Feick, Randy Heald, Penny Chambers, and Shelley Ford

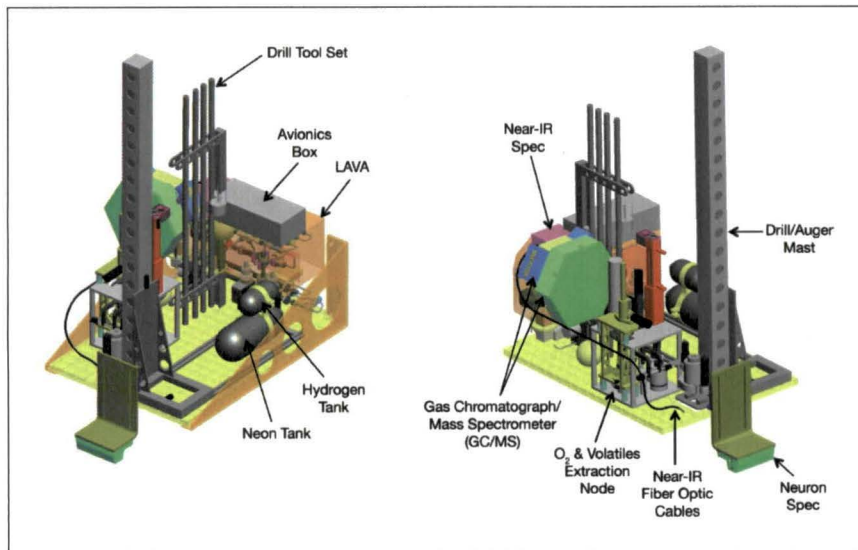
RESOLVE: Ground Truth for Polar Lunar Resources

For decades, scientists debated whether water ice exists on the lunar surface. In October 2009, data from the impact of the Lunar Crater Observation and Sensing Satellite (LCROSS) proved that the lunar surface contained water ice. However, the amount of water on the surface, its distribution, and its viability as a resource for space exploration are still in question.

To answer these questions about the availability of water and other valuable resources on the Moon, NASA is developing a payload termed RESOLVE (Regolith & Environment Science, and Oxygen & Lunar Volatile Extraction) in partnership with the Canadian Space Agency. RESOLVE's mission objective will be to land near a shadowed region of the Cabeus crater located at the Moon's south pole and collect data to determine if the water ice and other resources could be effectively used for human exploration systems.

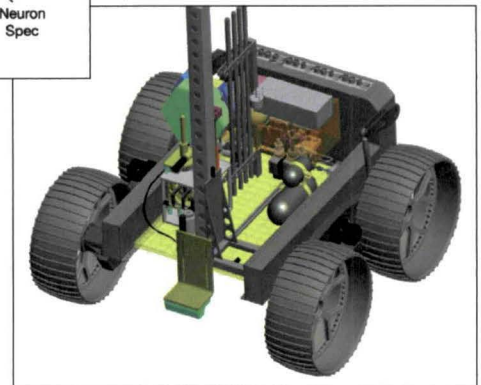
The RESOLVE system consists of a rover-mounted payload, which comprises various prospecting instruments:

- Neutron Spectrometer (NS) – locates areas of high hydrogen concentration to ensure that an appropriate sample of the regolith is being collected
- Near-Infrared (NIR) Spectrometer – assists in prospecting by identifying any surface volatiles and providing mineralogical context
- Sample Acquisition Subsystem (SAS) – provided by the Canadian Space Agency (CSA); acquires a one-meter-deep sample of regolith
- Oxygen & Volatiles Extraction Node (OVEN) – consists of a reactor subsystem that will gradually heat samples collected by SAS to 150 °C
- Lunar Advanced Volatiles Analysis (LAVA) – identifies and quantifies gases evolved from samples heated in the OVEN



RESOLVE payload

The RESOLVE Ground Demonstration Unit is currently being assembled and integrated on a few rover platforms, including NASA and CSA platforms, for field demonstration and testing. The testing will be done at a lunar analog site on the slopes of Mauna Kea in Hawaii, in the summer of 2012. By the fall of 2013, the RESOLVE design team will begin hardware flight certification tests. A launch of the RESOLVE system is planned for a May-June time frame in 2015 or 2016, depending on the capability for delivery of a lunar payload. ■



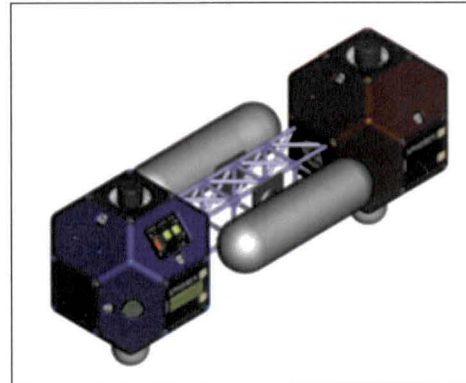
RESOLVE integrated with CSA rover

Launch Services Program's Research and Technology Projects

The Launch Services Program (LSP) funds a number of research and technology projects to improve space launch technologies. The long-term goal of LSP is to reduce the overall costs and improve the performance of space launch technologies. Toward that effort, LSP recently funded the ISS SPHERES Fluid Slosh Experiment, External Payload Carrier, and Composite Fairing projects.

ISS SPHERES Fluid Slosh Experiment

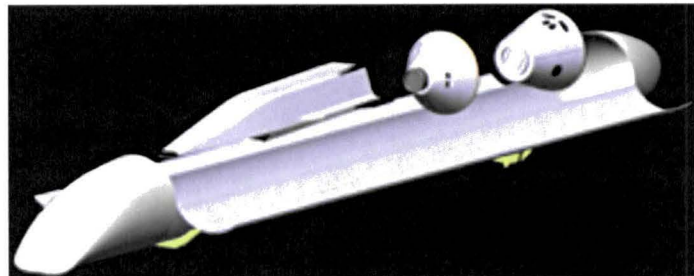
The Launch Services Program and the Office of the Chief Technologist's Game Changing Development Program are pursuing research on liquid slosh behavior in microgravity on board the International Space Station. The objective of this work is to acquire long-duration, low-gravity slosh data to calibrate computational fluid dynamics (CFD) models of low-gravity coupled fluid-vehicle behavior. Increased emphasis is being placed on using CFD predictions of fluid slosh to plan missions that use cryogenic upper stages; however, little actual data on on-orbit fluid slosh behavior is available to anchor the modeling methodologies. This project's purpose is to establish an initial microgravity slosh dataset to fill this gap. ■



Conceptual design of dedicated SPHERES slosh experimental platform

External Payload Carrier

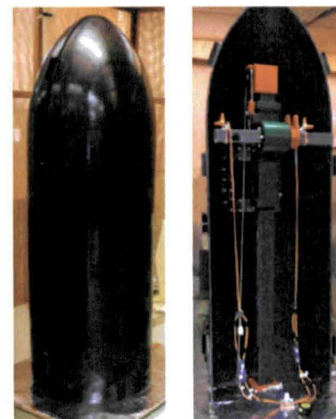
The Launch Services Program (LSP) and United Launch Alliance began the initial development of a novel suborbital research platform that uses solid rocket motor attach points to take advantage of excess performance on select Atlas V missions. The External Payload Carrier (XPC) fills a significant gap in capability between current sounding rockets and expendable launch vehicles and presents a new suborbital paradigm: suborbital heavy lift. Additionally, XPC provides a capability for the Aeronautics Research Mission Directorate to test both reentry aerodynamics as well as subscale hypersonic vehicles. ■



XPC

Composite Fairing

A composite fairing was constructed under Center Director Discretionary Funds to study how graphite composite fairings could attenuate magnetically induced lightning effects. The composite fairing was developed by a partnership with the University of Mississippi and Mississippi State University under direction of the Analex Corporation. LSP further funded a series of test-anchored, full-wave computational electromagnetic models, along with a novel application of a material with equivalent properties to address the electrical, geometrical, and boundary constraints for electromagnetic field determination in composite fairing cavity structures and fairings with acoustic blanketing layers. This project produced significant advancements in the characterization of electromagnetic fields in payload fairing cavities. ■



Composite fairings

KSC's James Fesmire Inducted into Space Technology Hall of Fame

James Fesmire, NASA's senior principal investigator in KSC's Cryogenics Test Facility, was recently inducted into the Space Foundation's Space Technology Hall of Fame. Fesmire was recognized for his work on the development of flexible aerogel insulation systems, which he conducted with the assistance of Aspen Aerogels, a Massachusetts-based company that designs and manufactures high-performance aerogel insulation.

Also inducted into the Space Technology Hall of Fame was the flexible aerogel technology itself. The induction took place at the 28th National Space Symposium in Colorado Springs, Colorado, in April 2012.

Fesmire received the Innovating Individuals Award for his achievements in the development of the flexible aerogel insulation systems. Aspen Aerogels received the Innovating Organization Award for its role in producing the systems for commercial use.

The Space Foundation, in cooperation with NASA, has administered the Space Technology Hall of Fame since 1988, inducting dozens of technologies and honoring hundreds of organizations and individuals who transform technology originally developed for space exploration into products that help improve the quality of life on Earth. Induction into the Space Technology Hall of Fame affords space technology innovators much deserved recognition. It also serves to make the public more aware of the benefits of space technology and encourage further innovation. ■



Fesmire, right, becomes Hall of Famer

Pittcon 2012

In March 2012, KSC's Innovative Partnerships Office (IPO) participated in the huge weeklong Pittcon technology conference in Orlando. While there, IPO employees met with other attendees and discussed KSC's licensing and partnership activities with laboratory equipment suppliers, scientists, researchers, and students. Over 20,000 suppliers and researchers from all over the world attended the conference alongside hundreds of exhibitors.

Working with IPO and KSC Public Affairs were researchers from Carnegie Mellon University, who exhibited the lunar rover SCARAB at the IPO booth. The SCARAB was a focal point for students and educators and a favorite of other conference participants. KSC's RESOLVE lunar regolith sampler unit also made an appearance at the conference and demonstrated its ability to fit inside the SCARAB.

Throughout the week, hundreds of conference attendees sought out IPO employees to inquire about NASA's technology transfer program and learn about technologies available for licensing from NASA. IPO distributed hundreds of *Spinoffs* booklets, the latest editions of the *Tech Transfer News* and *Innovation* magazine, and other technology-specific opportunity brochures. ■

National Aeronautics and Space Administration

John F. Kennedy Space Center
Kennedy Space Center, FL 32899
www.nasa.gov/centers/kennedy

www.nasa.gov

SP-2012-6-115-KSC

SAMPE

In coordination with NASA's Glenn Research Center and Langley Research Center, IPO exhibited at the Society for Advanced Materials and Process Engineering (SAMPE). They distributed information on KSC's materials technology, including aeroplastic, aerofoam, a flame-retardant polymer, and hydrogen-sensing tapes. SAMPE was held in Baltimore in May 2012. The conference attracted over 350 exhibiting companies and 5,000 attendees. ■

Kennedy Tech Transfer News

<http://technology.ksc.nasa.gov>

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Kennedy Tech Transfer News is the semiannual magazine of the Innovative Partnerships 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.