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NASA Partners with Leading Technology Innovators to Enable Future Exploration

Recognizing that technology drives exploration, NASA has selected four teams of agency technologists for participation in the Early Career Initiative pilot program. The program encourages creativity and innovation among early career NASA technologists by engaging them in hands-on technology development opportunities needed for future missions.

NASA's Space Technology Mission

Directorate created the ECI to enable a highly collaborative, joint-partnering work environment between the best and brightest NASA early career innovators and leading innovators in industry, academia and other government organizations.

"Continued investment in technology is a requirement for the success of NASA's current and future missions," said Michael Gazarik,

*See **Technology Innovators** on page 2*

NASA, Boeing Team Win Innovation Award at Composites Exposition

For innovative work on composite rocket fuel tanks, NASA and the Boeing Co. received the Combined Strength Award for composites excellence recently at the Composites and Advanced Materials Expo in Orlando, Florida.

CAMX is the largest composites industry trade show and conference held in North America. The Combined Strength Award -- the organization's top award -- was

given to the Composite Cryotank Technologies and Demonstration project. The project culminated this past summer at NASA's Marshall Space Flight Center when the 18-foot- (5.5-meter-) diameter cryotank -- one of the largest composite rocket fuel tanks ever built -- was tested under launch-like conditions.

"We are honored to receive this distinguished award," said John Vickers, Composite Cryotank

*See **Innovation Award** on page 3*

Marshall Center Marks Disability Awareness Month

October is Disability Awareness Month and team members at NASA's Marshall Space Flight Center are invited to hear Milton Anthony, a motivational speaker, deliver a message of resilience and hope on Oct. 29 at 10 a.m. in Building 4203, Room 1201.

Anthony was nearly killed in 1982 following a bombing by a rival motorcycle gang. The attempt

on his life left him completely blind with ocular prosthetics, severely hearing impaired and a triple amputee. This was a life-changing event that compelled him to completely reverse the course of his life in a positive direction.

This event is sponsored by Marshall's Office of Diversity and Equal Opportunity.

Technology Innovators *Continued from page 1*

associate administrator for Space Technology at NASA Headquarters. "Investing in the future leaders in space technology in partnership with the nation's leading innovators is part of our overall portfolio strategy for mission success."

Teams selected for the ECI pilot program and their topic areas are:

- High-Speed Video Imaging with Disruptive Computational Photography Enabling Technology, submitted by NASA's Stennis Space Center with partner, Innovative Imaging and Research of Mississippi. The team will develop and demonstrate a system for high-speed, 3-D, High Dynamic Range imaging. Video imaging will be performed at the chip level using computational photography, providing NASA with advanced visualization technologies to meet future needs.
- Lightweight Integrated Solar Array and Transceiver, submitted by NASA's Marshall Space Flight Center with partner, NeXolve, to build and demonstrate a deployable solar array and integrated transceiver system. The technology represents a novel approach to developing a lighter weight, higher power technology solution for future spacecraft energy needs.
- On-Orbit Autonomous Assembly of Nanosatellites, submitted by NASA's Langley Research Center with external partner Cornell University, Ithaca, New York. The team will develop advanced autonomous docking hardware based on Halbach magnetic array technology. Reliable autonomous rendezvous

and docking techniques provide enabling technologies for future mission needs.

- Integrated Display and Environmental Awareness System, submitted by NASA's Kennedy Space Center with Orlando area partners Abacus Technology and Purple Rock Scissors, and the Florida Institute of Technology of Melbourne. The team will develop a wearable computer with an optical heads-up display providing augmented reality data and communications, enhancing real-time operations on the ground and in space.

NASA's Space Technology Mission Directorate received 28 proposals from NASA early career teams for the ECI pilot program. Selected proposals will refine their plans and negotiate agreements with partner organizations. Projects will be funded up to \$1 million per year for a period of up to two years.

NASA's Space Technology Mission Directorate is building, testing and flying the technologies needed for the aerospace missions of tomorrow. The directorate continues to solicit the help of the best and brightest minds in academia, industry and government to drive innovation and enable solutions in important technology thrust areas. These planned investments are addressing high priority challenges for achieving safe and affordable deep-space exploration.

For more information about NASA's Space Technology Mission Directorate, visit [here](#).

Innovation Award *Continued from page 1*

Technologies and Demonstration project manager at Marshall. “Through this project, our government and industry team has brought new energy and direction to composite tank technology development.”

The project, funded by NASA’s Space Technology Mission Directorate’s Game Changing Development Program, used innovative manufacturing and design techniques to build the largest composite liquid hydrogen fuel tank built out of autoclave.

According to CAMX, this new award recognizes “the cutting-edge innovations and innovators that are shaping the future of composites and advanced materials in the marketplace.” The entries were judged on concept and design, value, impact, production and delivery collaboration. CAMX highlighted the collaborative effort between NASA and Boeing on this project.

“Receiving an award from the largest audience focused on composites and advanced materials gives us great pride,” said Dan Rivera, program manager for CCTD at Boeing. “I’d like to congratulate our strong NASA and Boeing team.”

Technologies developed during this project have the potential to enable the production of composite



John Vickers, project manager for the Composite Cryotank Technologies and Demonstration project at Marshall, accepted the Combined Strength Award from the Composites and Advanced Materials Expo in Orlando, Florida. The award was given to NASA and the Boeing Co. for work on one of the largest composite cryotanks ever built and a smaller 8-foot- (2.4 meter-) diameter tank, shown behind Vickers. (NASA)

tanks that weigh 30 percent less than metal tanks used by most rockets today, and have potential cost savings of 25 percent. This would allow heavier payloads to be launched to orbit more affordably, which would greatly benefit NASA’s deep space exploration missions.

Marshall Team Members Volunteer During Combined Federal Campaign

On Oct. 15, NASA’s Marshall Space Flight Center team members, from left, Earl Pendley, Amy Floyd and Bruce Tiller rolled up their sleeves to serve homeless and recovery program participants a hot meal at the Downtown Rescue Mission of Huntsville. The event was in support of the 2014 Combined Federal Campaign -- a workplace charity campaign for federal employees that raises millions of dollars each year. The rescue mission is a non-profit organization serving the economically disadvantaged population in the greater Huntsville area. (NASA/MSFC/Emmett Given)

*See **CFC Volunteers** on page 4*



Marshall Scientists to Take Questions via Twitter about the Partial Solar Eclipse

On Oct. 23, from 5-6 p.m., NASA's Marshall Space Flight Center scientists Mitzi Adams, Sabrina Savage and Alphonse Sterling will be taking questions about the partial solar eclipse on the [NASA Marshall Twitter account](#) using the hashtag #askNASA.

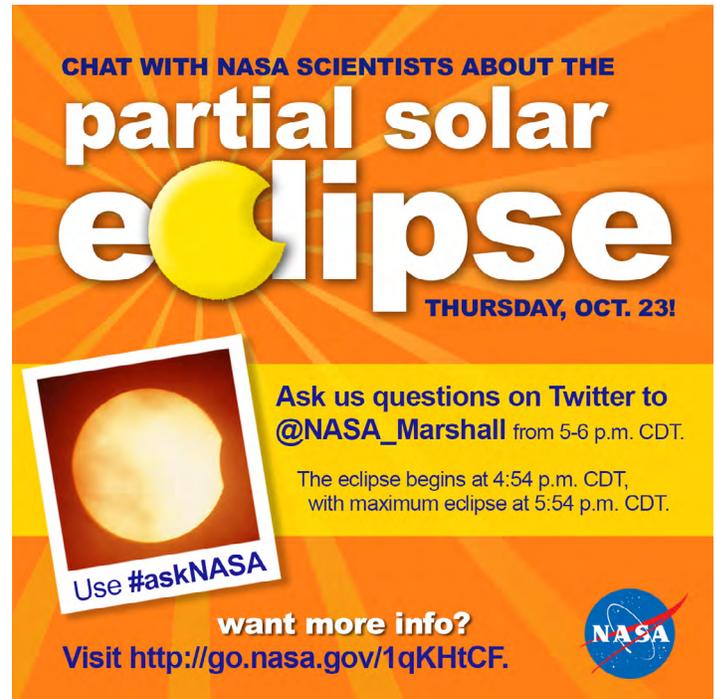
At approximately 4:54 p.m., the eclipse will begin, with maximum eclipse occurring at 5:54 p.m. The partial eclipse will end after sunset in Huntsville at 6:54 p.m.

The magnitude of this eclipse, or the fraction of the sun's diameter covered by the moon, will be 44 percent. The obscuration, or the fraction of the sun's area occulted by the moon, will be 32 percent. The sun will be in the constellation Virgo, with Saturn low on the horizon after sunset, and Mars will be farther to the east.

In addition to the social media conversation, the Von Braun Astronomical Society is partnering with the U.S. Space & Rocket Center from 5 p.m. until sundown, for the observance of the partial solar eclipse. During this free event, members of the community can join astronomers in the Davidson Center for Space Exploration parking lot to discuss the phenomenon and observe the solar eclipse through telescopes.

CFC Volunteers *Continued from page 3*

The Downtown Rescue Mission received plenty of support from the Space Launch System Program Office, whose members volunteered at the mission. Standing from left are Andy Schorr, Earl Pendley, Allison Young-Chambers, Jeff McCaleb, Amy Floyd, Bruce Tiller, Beverly Toney, Leigh Martin, Tamika Johnson, Van Strickland, Ann Ullery and Teresa Scogin. Sitting from left are Stephanie Lacy-Conerly and Monique Joe. (NASA/MSFC/Emmett Given)



CHAT WITH NASA SCIENTISTS ABOUT THE
**partial solar
eclipse**
THURSDAY, OCT. 23!

Ask us questions on Twitter to
@NASA_Marshall from 5-6 p.m. CDT.

The eclipse begins at 4:54 p.m. CDT,
with maximum eclipse at 5:54 p.m. CDT.

Use #askNASA

want more info?
Visit <http://go.nasa.gov/1qKHtCF>.



There will be visible-light viewing telescopes to see any sunspots, and special telescopes with hydrogen-light viewing in order to see the prominences or explosions at the edge of the sun. The telescopes are equipped with filters for safe viewing of the sun. Attempting to look directly at the sun without such special filters is harmful to the eyes.



Marshall Engineer Jim Miller Keeps NASA Spaceships Healthy

By Tracy McMahan

As spacecraft travel millions of miles away from home in deep space, they will have to operate for a long time, perhaps for years. How is a spaceship's health determined and, equally important, how does one maintain good health on a system that's far from Earth? How do you know everything on a spacecraft will continue to operate properly?

"These questions are answered by experts specializing in diagnostics and prognostics," said Jim Miller, an engineer in the Engineering Directorate's Spacecraft and Vehicle Systems Department at NASA's Marshall Space Flight Center. Miller should know because he has spent 55 years answering these questions. He develops sensing systems and algorithms -- the "brains" of the spacecraft -- that not only control how the systems work, but also determine when systems wear out and even predict when and how they might fail. This information is critical for keeping crews safe during spaceflight and will be even more critical as NASA travels farther away from Earth.

"Jim is a tremendous leader and role model for our team," said Dwight England, the assistant branch chief for Marshall's Integrated System Health Management and Automation Branch, which Miller supports. "His insights and experience are invaluable as is his passion for advanced technologies for future space missions."

Miller started his career at NASA's Langley Research Center in 1959, but soon left to serve in the Army at Redstone Arsenal. In 1963, he joined the Astrionics Laboratory at the Marshall Center where he helped develop the avionics systems to send the Saturn rockets on the Apollo lunar missions. Since then he has worked on numerous spacecraft, including Skylab, the space shuttle and the Hubble Space Telescope. He has received more than 60 awards for his work including one from legendary rocket pioneer Dr. Wernher von Braun, who was Marshall's first center director.

In addition to developing sensing systems to monitor space vehicle health, Miller is an expert in space solar energy. He did foundational research on many of the solar energy systems that power today's spacecraft, and has represented Marshall and NASA as the featured speaker on the subject for events in Huntsville and as the keynote speaker for the European Space Agency's first "Generators in Space." One of his fond memories is briefing Dr. Edward Teller, who is internationally recognized for his pioneering work on nuclear energy but



Jim Miller, center, is presented with an award recognizing his 55 years of government service by Tony Clark, left, manager for the Engineering Directorate Resources Management Office, and Helen McConnaughey, right, manager for the Marshall Spacecraft and Vehicle Systems Department. (NASA/MSFC/Fred Deaton)

also was a strong advocate for solar energy.

"My career has been rewarding," Miller said. "When we were just starting out in the Saturn years, everything about space exploration was new, and we worked long hours, breaking new ground in relatively new technical fields. During my early career, I spent a considerable amount of time at the Kennedy Space Center supporting Saturn launches and got a lot of 'fingerprints' on early spacecraft and launch hardware." His recent projects include work on composite structural health monitoring, the commercial crew launch program, and the habitat concepts for the deep space missions.

"The farther away from Earth you travel, the more you need integrated systems health management with built-in diagnostic and prognostic capabilities," explained Miller. "These systems provide the way to tell that a spacecraft is in good health and is operating as planned or if something needs to be repaired."

Miller earned his bachelor's degree in electrical engineering from Tennessee Technological University in 1959 and his master's in electrical engineering from the University of Alabama in Huntsville in 1970. He was a 1974 Sloan Fellow at Stanford University in Palo Alto, California. He enjoys mentoring young engineers and has this advice: "Don't just view that you work for NASA; but consider yourself a vital part of NASA."

McMahan is a public affairs officer in the Office of Strategic Analysis & Communications.

NASA and USAID Bring Climate Change Tools to Lower Mekong

NASA and the U.S. Agency for International Development announced a five-year project that will promote the use of satellite imagery to help Asia's Lower Mekong region better predict and cope with floods and other natural disasters and increase resilience to the negative effects of climate change.

SERVIR Mekong, funded by USAID and NASA and implemented by the Asian Disaster Preparedness Center and its partners, will help governments and other key decision-makers in Burma, Cambodia, Laos, Thailand and Vietnam take advantage of publicly available satellite imagery, geospatial data and maps to make more informed decisions on issues such as water management, land use planning, disaster risk reduction, infrastructure development and natural resource management.

SERVIR Mekong is one of four SERVIR hubs currently operating across the developing world. SERVIR -- an acronym meaning "to serve" in Spanish -- connects USAID's development network in data-poor environments with NASA's science, technology and extensive satellite data. Together with leading regional organizations in Africa, Asia and Latin America, SERVIR has developed 43 climate change adaptation and mitigation products to provide information, tools and training to more than 30 countries.

"With the addition of this new member of the SERVIR family, we continue to develop a network of regional hubs around the world," said Dan Irwin, SERVIR program director at NASA's Marshall Space Flight Center. "SERVIR works to strengthen the capacity of governments to use satellite information and geospatial technologies for improved decision-making."

Operating as a regional hub, SERVIR Mekong will promote collaboration between technical institutions in the region and develop analytical tools, services and products that are tailored to the needs of the Lower Mekong region's decision-makers. These decision-makers include government officials and disaster management professionals as well as regional institutions, planning agencies and development partners.

"Use of the best available science and technology is essential to safeguarding this region's vital



SERVIR-Mekong joins SERVIR-Eastern, Southern Africa, SERVIR-Himalaya and continuing activities in Mesoamerica as part of the SERVIR network. (NASA)

ecosystems and the goods and services they provide to society," said Michael Yates, director of USAID's Regional Development Mission for Asia. "Under SERVIR Mekong, Asian scientists, NASA scientists and others will work hand-in-hand to develop tools to build resilience and address some of the region's greatest challenges."

SERVIR Mekong will bring tools to bear on the challenges of the Lower Mekong region, which are similar to those in other regions. In Bangladesh, for example, where climate change has altered rainfall patterns and disrupted formerly predictable flood cycles, a new satellite-based flood forecasting system developed by the SERVIR hub based in Nepal is helping communities and supporting agencies design measures to better protect lives, homes, crops and livestock.

More information on SERVIR is available [here](#).

Watch the [latest video](#) about SERVIR, narrated by former NASA astronaut Mae Jemison.