National Aeronautics and Space Administration

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October Calendar

13, 21, 28 **Influenza (Flu) Vaccine Days.** Oct. 13, 11:30 a.m.-noon. Oct. 21 and 28, 11:30 a.m.-12:30 p.m. Flu vaccines will be offered each week in Bldg. E-2 Chesapeake Room until supplies are exhausted.

15 **Science on the Shore**
Oct. 15, 5-6 p.m. WFF Visitor's Center. "Balancing Wildlife Management with Aviation Safety at Wallops" Featuring a presentation by Brian Scharle, Wildlife Biologist for the USDA. Come learn about the partnership between Wildlife Services and NASA and what is being done to protect aviation safety at Wallops Flight Facility. Admission is free.

16, 17, 18 **Annual Field Station Friends Weekend**
Oct. 16-17. Chincoteague Bay Field Station. Activities include boat trips, research trips led by university faculty, kayaking, Living Shoreline restoration, and a beach BBQ! Pre-registration is required, visit: www.cbfieldstation.org.

22 **Bill Wrobel guest bartends at the Rocket Club**
Oct. 22, 5-7 p.m. Tip proceeds will go to CFC.

NEXT LAUNCH!
The MUSIC mission, which will launch a Terrier-Improved Malemute, is scheduled Nov. 16-20, with a window of 7-9 a.m.

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A 30-million-cubic-foot balloon prepares for lift-off with the High-Altitude Student Platform payload Sept. 7. Photo Credit: NASA/Jeremy Eggers

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The Wallops Island Access is published monthly by the Wallops Office of Communications and Optical Systems Group. To submit photographs or articles, email wff-information@mail.nasa.gov.

#ReturnToLaunch

Major repair work at Mid-Atlantic Regional Spaceport Pad 0A is now complete.
Photo Credit: NASA/Patrick Black

Update on pad repairs from Virginia Space

September 30, marked the completion of the major repair work at the Virginia Space – MARS Launch Pad-0A, located on NASA's Wallops Flight Facility. This is a significant milestone in support of Orbital ATK resuming cargo resupply service with the upgraded Antares launch vehicle to the International Space Station for NASA. The rebuild effort restored to flight readiness the facility and all systems that were damaged during the October 28, 2014 launch mishap. This work included repairs or replacement to the Deluge, HVAC, Fire Alarm, Electrical systems, Controls, Liquid Fueling Facilities and any damaged structures. The work was completed as scheduled, and within the overall budget while keeping a small management reserve for final system performance testing, which started September 25, 2015.

What's up @NASAWallops?

Wallops supports NOAA's SHOUT mission

WALLOPS ISLAND — Wallops Flight Facility supported the National Oceanic and Atmospheric Administration's Sensing Hazards with Operational Unmanned Technology (SHOUT) from Aug. 24 to Sept. 7.

The mission used a NASA Global Hawk to build on earlier collaborative storm research led by NASA and was also designed to put the unmanned aerial system into operational use as a weather forecast observations tool.

Flying over Tropical Storms Erika and Fred, the Global Hawk collected data on temperature, moisture, wind speed and direction. The real time data was tied into National Weather Service forecast models at the National Hurricane Center.

NASA's Global Hawk, based at NASA's Armstrong Flight Research Center in Edwards, California, provides a unique vantage point for weather observations because it flies higher and longer than any manned aircraft. It allows data collection from 60,000 feet, an altitude nearly twice as high as manned aircraft, to the ocean surface. It can gather weather data continuously for up to 24 hours.

SHOUT is funded in part by the Disaster Relief Appropriations Act of 2013, passed by Congress in the wake of the devastating Hurricane Sandy.

The Global Hawk prepares for take off August 26, 2015, on a mission that will take it over Tropical Storm Erika. Photo Credit: NASA/Allison Stancil

Museum workshop highlights science and engineering missions

WALLOPS ISLAND — Museum educators from seven states participated in a Small- to Medium-sized Museum Workshop at NASA's Wallops Flight Facility Aug. 19-21.

The program is designed to provide participating museums access to the latest NASA science, technology, engineering and math (STEM) content, and awarded a $2,000 honorarium to participating museums for their projects.

While here, participants worked to develop new and enhanced exhibits to share Goddard's unique science and engineering programs at Greenbelt and Wallops, focusing on middle school students and families.

"Wallops is an excellent location for showcasing Goddard's latest accomplishments in engineering and science because it shows how engineering is integral to Goddard's missions and projects," said Amanda Harvey, workshop project manager for Goddard.

Virginia Space Coast Scholars return for final Summer Academy of 2015

WALLOPS ISLAND — The Virginia Space Coast Scholars (VSCS) program returned Aug 10, for the second and final weeklong Summer Academy session of 2015, with 42 students. The first session had 42 students and ran July 27-31.

Designed through a collaborative program of the Virginia Space Grant Consortium and NASA, VSCS is funded by the Commonwealth of Virginia's General Assembly to provide free, unique two-phased experiential learning for qualifying high school sophomores interested in pursuing science, technology, engineering and mathematics (STEM) careers.

The first phase is an on-line program presented January - April where students learn about NASA earth and space science missions and develop project management skills. Based on performance in this phase, select students are invited to the second phase: a residential Summer Academy at Wallops where they work on an engineering design project with NASA mentors.

Visit www.vsce.spacegrant.org for more information on the program.

Dr. Greg Guzik, Louisiana Space Grant Consortium director, conducts a final check on the High-Altitude Student Platform payload prior to launch Sept. 7 from Fort Sumner, N.M. Photo Credit: NASA/Jeremy Eggers

Fall Fort Sumner balloon campaign continues

WALLOPS ISLAND — Mars-bound microbes, student experiments, and cosmic ray measuring equipment and are just some of the items getting a lift to near-space courtesy NASA's scientific ballooning program.

Three of four scheduled NASA scientific balloon flights have launched to date during the the program's annual campaign in Fort Sumner, New Mexico, which began Aug. 31.

"NASA's scientific balloons offer access to altitudes key to scientific research in heliophysics, astrophysics, planetary and earth sciences," said Debbie Fairbrother, NASA's Balloon Program Office chief. "The depth and breadth of missions that have flown during this campaign really show the versatility of balloon-based research platforms."

The first balloon flight of the season took to the skies Sept. 4 to test a number of balloon system technology developments. The 30-million-cubic-foot balloon lifted the primary payload as well as three missions of opportunity, to include a test of Glenn Research Center's Autonomously Navigated paragliding Experimental Lander.

Next, in partnership with the Louisiana Space Grant Consortium, the balloon office launched the High-Altitude Student Platform (HASP) payload Sept. 7. HASP carried 12 student experiments built by college students from across the nation to an operational altitude of 120,000 feet during a successful mission that ran more than 24 hours.

"Programs like HASP are key to educating, training, and inspiring the next generation," said Fairbrother.

After a number of weather delays, the third flight of the season carrying Langley Research Center's Radiation Dosimetry Experiment lifted off Sept. 25 on an 11-million-cubic-foot balloon.

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Space technologies receive test drive with Oct. 7 launch

WALLOPS ISLAND — Although ground tests are often acceptable, some technologies need a test drive before being integrated into space vehicles.

Suborbital rockets, also called sounding rockets, are valuable tools in qualifying technologies for flight and providing the test drive that is needed.

NASA flew a test flight of a modified Black Brant sounding rocket motor, launch vehicle and spacecraft systems as well as sub-payload ejection technologies during a suborbital mission Oct. 7, 2015, at 7:07 p.m. from Wallops Flight Facility, Virginia.

The launch was seen by residents in the mid-Atlantic region, as far away as New York, mid-Pennsylvania, and Connecticut.

The flight's primary objective was to characterize the reformulated Black Brant motor performance in a two-stage configuration.

During the flight of the two-stage Black Brant IX sounding rocket, NASA tested a section of the payload fabricated using near net shape (NNS) technology from the agency's Langley Research Center in Hampton, Virginia, and three different materials through a Cubesat experiment developed by Orbital ATK of Magna, Utah.

A Black Brant IX suborbital sounding rocket is launched at 7:07 p.m., Wednesday October 7, 2015. Photo Credit: NASA/Allison Stancil

The machined and welded construction process for most sections of conventional rockets is expensive, adds weight and has a high degree of risk. The NNS technology provided by the Game Changing Development (GCD) program within NASA's Space Technology Mission Directorate's (STMD) will test a new fabrication method on the most forward section of the rocket.

The effort could bring significant value to a wide range of aerospace and defense products — including launch vehicles, spacecraft, aircraft and marine vehicles — with an estimated 40-60 percent mass savings, increased technical performance and reduced maintenance over traditional materials.

The launch was supported through NASA's Sounding Rocket Program at Wallops. NASA's Heliophysics Division manages the sounding rocket program.

Educators and NASA leadership gather for the ribbon-cutting ceremony of Wallops' new Educator Resource Center Sept. 2. Photo Credit: NASA/Patrick Black

Three major activities highlight modernization at Wallops

WALLOPS ISLAND — Three ceremonies conducted in late August and early September highlighted major activities at NASA Wallops aimed at modernizing the facility.

NASA officials joined local civic leaders for a groundbreaking ceremony for the new Wallops Island Fire Station Aug. 28.

The new station will be a state-of-the-art, 16,900-foot, LEED-Silver facility that replaces the current island fire station, which has been in a "temporary" facility since 1986. The new facility is being built on north Wallops Island and will provide better service to the U.S. Navy while also ensuring quick response times to the launch pad areas.

On the same day as the fire station groundbreaking ceremony, NASA announced the award of a $5.6 million contract for building a new Mission Launch Command Center at Wallops. The new 14,174 square-foot facility will serve as the hub for interfacing with and controlling rockets, their payloads and associated launch pad support systems during flight operations at Wallops.

"The current command center, built in the 1950's, has served us well over the years, but doesn't have the capacity to meet the needs and requirements for advancing our nation's goals and objectives in space," said Bill Wrobel, Wallops Flight Facility director.

Today, launch missions from Wallops embrace the facility's traditional role in testing new technologies along with enabling research and scientific investigations, in addition to taking on larger-scale operations using small- and medium-class solid- and liquid-fueled rockets.

Finally, leaders gathered again Sept. 2 for a ribbon-cutting ceremony for Wallops' new Educator Resource Center (ERC), which is adjacent to the Visitor Center.

The ERC provides a vital service to educators in the region, helping them bring STEM topics into the classroom.

"The Goddard Office of Education has had a long history of working with K through 12 and higher education teachers across the Maryland, Virginia, and Washington, D.C., metropolitan areas to promote NASA-unique STEM opportunities," said Nancy Abell, Goddard Space Flight Center's Associate Director. "We're looking forward to strengthening our impact across the Eastern Shore with the addition of our ERC here."

CARE II launches from Norway

ANDENES, NORWAY — NASA's Sounding Rocket Program Office successfully launched a Black Brant XI rocket from Andoya Rocket Range, Norway, Sept. 16, 2015, carrying 37 rocket motors and a multi-instrument daughter payload into the ionosphere.

The mission for the U.S. Naval Research Laboratory was designed to study the generation of plasma wave electric fields and ionospheric density disturbances by the high-speed injection of dust particles.

A primary sensor for the Charged Aerosol Release Experiment (CARE II) was the two SuperDARN CUTLASS radars that view the ocean north of Norway.

CARE II is a follow-on to the CARE I rocket experiment conducted from Wallops Island Virginia in September 2009. The Principal Investigator is Dr. Paul Bernhardt/Naval Research Laboratory.

CARE II lifts-off from Andoya Rocket Range, Norway, Sept. 16. Photo Credit: NASA/Chris Perry

i am goddard

Phil Lewis

WALLOPS ISLAND — The very first computers had just arrived when Phil Lewis applied for a job at Wallops in 1967.

The massive GE-625/635 mainframes filled a 50-square-foot, climate-controlled room that included two huge printers and 15 magnetic tape memory drives cased in tall cabinets. Data from suborbital rocket launches were keypunched into IBM cards, and the jobs were brought in on trays filled with computer cards.

It was the beginning of the computer revolution that swept the nation and the world, and Lewis was determined to be a part of it at NASA. That determination led him into a career that has spanned nearly five decades starting as a computer operator and retiring in August 2015 as a range control center supervisor.

Lewis, a soft-spoken fourth generation Eastern Shore native, was born and raised in Onancock near the Chesapeake Bay. In the winter of 1967, he drove the 22 miles to what was known then as Wallops Station to fill out a job application, though there were no openings at the time. While waiting for an opportunity, he pursued service to his country by joining the Army National Guard.

That summer of '67 was full of life changes for Lewis. He completed boot camp and advanced training with the Guard then returned home to find that a position had opened at Wallops. He got the call and began working at Wallops the next day. With his career launched, he proposed to his high school sweetheart and married her within a month.

At Wallops, Lewis learned computer programming from the bottom up, starting with FORTRAN. Without a formal college degree, he actively pursued training programs and taught himself.

In those early days, Lewis' office could run 10 jobs on a busy day, with three computer operators and a supervisor. Within a few years the office moved to three shifts working a 24/5 week and they still could not keep up with the work. Things have changed a lot since then. Today, work is accomplished on PCs, taking just four hours to do what took a week to complete nearly 50 years ago on a mainframe computer.

Phil Lewis, Range and Mission Management Office at Wallops, recently retired from NASA after 48 years of service Photo Credit: NASA/Anne Garcia

Lewis' career has been as challenging and dynamic as the computer technology he's worked on during the years. His projects have included post-flight radar and telemetry data from NASA aircraft and rocket missions along with satellite launches for the Air Force. His highlights were working on data from Minotaur rockets launching scientific payloads and the Antares mission to resupply the International Space Station. "To see how far we've gone, over 48 years, it is unbelievable!" Lewis said.

"Most everything over the years here has been fun and it's kept me on the Eastern Shore where I was raised and where I wanted to stay," said Lewis. "I still have no wants of leaving here for more than three days!"

His advice for the next generation? "I've not sat still, never been satisfied with where I was. When you have spare time, go ask somebody if they have anything else you can do or something else you can learn."

Wallops celebrates Women's Equality Day

WALLOPS ISLAND — The Women of Wallops celebrated Women's Equality Day with a brown bag lunch focusing on the national theme, "We're all in this together," Sept. 2, in Bldg. E-2 Chesapeake Room.

Sandy Bowden, Wallops Resource Analyst, and Karen Downing, recently retired from the Navy Sea Systems Command at Wallops, shared stories about key points in their careers and gave tips for successful careers during the event.

"Ethics is the strongest part of succeeding," said Downing, "If people can't believe what you say, you won't succeed. And never stop learning!"

Lisa Johnson, Wallops EEO director, led the discussion. "I am excited about our Women's Equality Day event because it provided our employees the opportunity to be inspired by others' career journey," said Johnson. "I truly was invigorated by the presenters. In keeping with the 2015 national theme, I do believe that "We're All in This Together."

The Women of Wallops brown bag lunch was part of a national program to celebrate Women's Equality Day.

Karen Downling, left, recently retired from the Navy Sea Systems Command and Wallops, gave tips for successful careers during Wallops Women's Equality Day event with panel moderator, Lisa Johnson, right, looking on. Photo Credit: NASA/Anne Garcia

Supermoon breaks through the clouds for late night show

The moon is seen Sept. 27, 2015, at the peak of the lunar eclipse. Photo Credit: NASA/Aubrey Gemignani

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RaD-X measured cosmic ray energy at two separate altitude regions in the stratosphere, which will in turn be used to validate Langley's Nowcast of Atmospheric Ionizing Radiation for Aviation Safety (NAIRAS) model. The NAIRAS modeling tool will be used to help enhance aircraft safety as well as safety procedures for the International Space Station.

The final flight of the Fort Sumner campaign includes additional technology developments and missions of opportunity. Another parachute deflation test will be conducted as well as tests for an azimuth rotator and enhanced telemetry systems.

Science @ Wallops

Climate Adaptation Science Initiative (CASI) at NASA Wallops Flight Facility: Science for the Future

By: Kay Rufty, Michael Bonsteel, and Tiffany Moisan

Wallops Flight Facility (WFF) is unique in that it is now the principal facility for NASA to implement suborbital research programs, houses a research airport that serves as a local civil emergency site, and includes fabrication, integration facilities, testing and evaluation facilities. However, WFF is not alone in its vulnerability to future sea level rise and other climate-induced changes. For example, while Wallops Island is home to over 1 billion dollars in NASA and Navy assets, the majority of its landmass is within the range of sea level rise predictions for the next 75 to 85 years. Similarly, WFF's critical role in providing potable water and wastewater treatment for its civil servants, contractors, and a number of tenants/partners could be hampered by climate change. The invaluable environmental services Wallops Island itself provides by protecting landward coastal regions from storms and by providing important habitat for large-scale bird migrations and nesting of threatened and endangered species could deteriorate over time if storm severity and erosion increase.

Climate-induced alterations to mean sea level, the frequency of nor'easters, hurricanes, precipitation, and storms, and potential threats to coastal ecosystems are all noted risks for WFF and its surrounding region. NASA GISS estimates that sea level is expected to change by ~1.0±0.5 m by 2100 and temperature is expected to increase by 1.5% to 6.5% from 2020 to 2080, with higher than average daily temperature in upcoming years. As such, there may be an increased risk of flooding of Wallops Island infrastructure in the future. In addition, changes in precipitation pattern will alter ground water levels and fresh water availability for the region, and storms and hurricanes will further stress the stability of ecosystems and sustainable agriculture in the region. Assessing the risk of inundation for Island facilities in a quantifiable way is necessary for informing any proactive facility planning activity that seeks to address these risks.

In order to create comprehensive climate risk assessments for its locations, NASA created the Climate Adaptation Science Investigator (CASI) program and a CASI group at WFF was organized. CASI brings together expertise from different disciplines within NASA, as well as outside government and academic organizations, to initiate development of long range climate change mitigation plans by raising awareness about climate change and its effects, identifying risks associated with this change, and establishing mitigation strategies for dealing with these predictions. CASI responds to the needs of the Master Planner and the broader Facilities Management Branch at WFF and NASA HQ by developing facility-wide strategies for adapting to climate change.

CASI at WFF is organized to address a variety of potential threats to Wallops Island, such as sea level rise, storm surge, lightning events, precipitation, and biodiversity in the ocean. One of the greatest threats based on Wallops Island being entirely exposed to the Atlantic Ocean is sea level rise and the compounding force of storm surges. As a means to visualize the affects of sea level rise on the Island, CASI created the first prototype for a Coastal Resilience Modeling Tool that displays a topographical map of Wallops Island and allows the user to choose from a selection of sea-level rise and storm surge scenarios. This allows the user to see how much of the island would be inundated under certain scenarios. Similarly, CASI has created a method to calculate the risk percentage of certain levels of sea level rise in coming years and to assign a monetary value to building loss associated with sea level rise.

Aside from sea level rise, CASI also addresses the effects of climate change on the ocean and on local weather. Because phytoplankton are the bottom of the oceanic food chain, the health of phytoplankton communities provides a rough assessment of the health of all other marine animals. The WFF CASI group created an algorithm to discern different phytoplankton communities from satellite data and to establish baseline concentrations values for these communities. Subsequent measurements of concentration and location of allow scientists to track how phytoplankton and other aquatic life are affected by climate change. CASI also makes efforts to better quantify storm events such as precipitation and lightning because they serve as a hazard to buildings as well as an impediment to Range operations. Cooperation with the Global Precipitation Measurement group to create statistical models to try and identify trends in the occurrences of lightning events around Wallops Island should provide a better understanding of this phenomenon and improve Range operations.

The WFF CASI strategy is to understand the risks involved in launch range operations in this climate sensitive local, while developing approaches to reducing these risks using improved observations and science-based risk analysis to support the facility's decision making and planning processes. Ongoing and future CASI efforts will dovetail with the goals of broader studies, such as those performed by the Mid-Atlantic Coastal Resilience Institute.