National Aeronautics and Space Administration

Island Access

Global Hawks

UAS flies final HS3 missions over hurricanes, tropical depressions

Page 6

Antares

Next launch scheduled for October 24

Page 4

Wallops Research Park Update

Project on schedule

Page 5

October Calendar

7 **Board game night @ F-3**
5-8 p.m. Games include Trivial Pursuit, Taboo and Cranium

9 **Speaker Series: A. Thomas Young**
6:30 p.m. The UVaClub of the Eastern Shore is honored to be hosting U.Va. alumnus A. Thomas Young, former director of NASA's Goddard Space Flight Center, for the inaugural event in their speaker series.

9, 12, 23, 30 **Thirsty Thursdays at the Rocket Club**
Opens at 4:30 p.m. Enjoy discounted specialty drinks.

16, 30 **Wallops Farmers' Market**
Final Days!
11 a.m.-1 p.m. in parking lot "E" at the Chincoteague Bay Field Station, featuring Shore Beef & BBQ, fresh fruits and veggies, exotic jams, jellies and butters and much more.

17, 30 **Wallops Movie Night**
"How to Train Your Dragon 2," Rated PG. Family Movie Night & Dessert Social in the Rocket Club. Bring your favorite fall dessert to share; Social starts 6:30 p.m. Movie begins at 7 p.m. and doors open at 6:45 p.m. The Rocket Club Snack Bar will be open for refreshments.

What's inside

3 **What's up @ Wallops?**
Balloon program test successful, VAULT instrument flies

4 **Antares launch scheduled for October 24**
Mission will be fifth in the last 18 months

5 **Wallops Research Park construction update**
First phase of project on schedule for completion by end of the year

6

Global Hawk departs
HS3 mission concludes with new NOAA mission on the horizon

7 **Wallops beach restoration completed**
Sand dune planting scheduled for December 2014

8 **Fall Balloon Campaign**
Final mission will wrap up in New Mexico

on the COVER
The Global Hawk is escorted to the D-1 Hangar after it arrived at Wallops Aug. 27, 2014.
Photo Credit: NASA/Brea Reeves

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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.

What's up @NASAWallops?

Balloon program successfully tests internally mounted antenna system

WALLOPS ISLAND — The 1/20th scale ExaVolt Antenna (EVA) test was held in the north side high bay area of building F-7 during the week of Sept. 22-27 at Wallops.

Science teams from the University of Hawaii, Ohio State University and University of Delaware were present to test the scientific merit of the EVA concept.

EVA's design is based on a novel application of toroidal reflector optics using a super-pressure balloon surface and a feed-array mounted on an inner membrane to create an ultra-large radio antenna system with a synoptic view of the Antarctic ice sheet below it. George Washington University provided the analysis of the balloon structure while BPO provided management for the development of the balloon design, testing, analysis, and balloon fabrication.

The test was concluded successfully with science teams reporting good data.

The ExaVolt Antenna was tested in a 1/20th scale super-pressure balloon. Photo Credit: NASA/Patrick Rogers

VAULT instrument flies on sounding rocket to study solar heating

WALLOPS ISLAND — Most things cool down when they get farther away from a heat source, but not the sun's corona. NASA wants to figure out why that is and turned to a tried and tested platform to collect the data: a sounding rocket-based telescope.

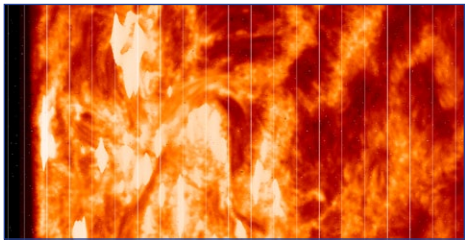
The Very high Angular Resolution Ultraviolet Telescope, or VAULT, was successfully launched on a NASA Black Brant IX sounding rocket at 2:07 p.m. EDT, Sept. 30, from White Sands Missile Range in New Mexico.

The 1,184-pound payload flew to an altitude of 179 miles before descending by parachute and landing at White Sands.

The VAULT instrument, referred to as VAULT 2.0, was refurbished with new electronics and an imaging detector to capture images more frequently than before. While in space, VAULT 2.0 observed light emitted from hydrogen atoms at temperatures of 18,000-180,000 degrees Fahrenheit.

"That's the temperature range where the action is," said Angelos Vourlidas, the principal investigator for VAULT 2.0 at the Naval Research Laboratory in Washington, D.C. "These are the temperatures where the heating of the sun's atmosphere – the corona – really takes place."

Understanding how the corona heats remains one of the great, unanswered questions of the sun. The solar surface itself is only about 10,500 degrees, but further up in the atmosphere, the temperatures rise to millions of degrees Fahrenheit – the opposite of what one typically expects when moving away from a heat source. Something heats up that corona, and VAULT 2.0 was watching.



During a 15-minute flight on Sept. 30, 2014, VAULT captured images of an active region on the sun — seen in bright flashes of light on the left — seeking to understand what helps to heat such magnetically intense regions. The white lines represent where different images were linked together. Photo Credit: NASA/VAULT

Preliminary results show that all payload systems performed as planned and the science instrument successfully gathered multiple sun exposures. The VAULT payload was recovered after the test.

Next Antares launch scheduled for Oct. 24

WALLOPS ISLAND — The Wallops Range, NASA's only owned and operated launch range, is scheduled to conduct a range readiness review Oct. 15 in advance of the next Antares rocket launch from the facility.

Orbital's Antares rocket is scheduled to launch Oct. 24 at 7:52 p.m. EDT with its Cygnus spacecraft, which will carry some 5,050 pounds of cargo to the International Space Station (ISS).

The vehicle will lift-off from Virginia's Mid-Atlantic Regional Spaceport Pad 0A at NASA's Wallops Flight Facility.

Cargo resupply by U.S. companies ensures a national capability to deliver critical science research to the space station, significantly increasing NASA's ability to conduct new science investigations aboard the only laboratory in microgravity.

The mission, dubbed Orbital CRS-3, is the fourth Cygnus cargo mission to the ISS and the fifth Antares launch in the last 18 months.

The two-stage Antares space launch vehicle uses a liquid-fueled first stage powered by two Aerojet Rocketdyne AJ26 engines and a solid motor ATK CASTOR 30XL upper stage to boost Cygnus into orbit. The powered launch sequence will last about ten minutes from liftoff through the separation of Cygnus from the launch vehicle.

Orbital Sciences employees conduct testing on the Cygnus Cargo Spacecraft in late September prior to transport to V-55 at NASA's Wallops Flight Facility for spacecraft fueling. This Cygnus will deliver more than 5,000 pounds of cargo to the International Space Station. Photo Credit: NASA/Patrick Black

This mission is the first to use the larger, more powerful CASTOR 30XL second stage motor.

People interested in viewing the launch may check out recommended viewing sites at ***this link***. The link also provides download information for the "What's Up at Wallops" mobile app, which provides information on upcoming launches from Wallops as well as useful tools, such as a compass that points in the direction of launch.

County supervisors receive update on Wallops Research Park construction

WALLOPS ISLAND — The Accomack County Board of Supervisors toured the Wallops Research Park Sept. 22 to check out construction work first-hand and to receive an update on progress.

"Viewing progress from ground level as tons of soil are being transported with massive pieces of construction equipment was exhilarating," said Julie Wheatley, Wallops Research Park manager.

The Wallops Research Park is an economic development effort between the Commonwealth of Virginia, Accomack County and the Chincoteague Bay Field Station to foster growth in business, research and educational activities in the area, particularly those related to the core activities at NASA's Wallops Flight Facility.

The project is on-budget, on-time and on-track for completion by the end of the year, said Bill Remington, senior engineer and project manager for the Wallops Research Park construction.

Some recent accomplishments as of Oct. 4 include:

- Water, sewer and stormwater utilities are 75 percent completed
- Park Road and access roads are 65 percent completed
- More than 50 acres are cleared for pad development sites are 100 percent completed
- More than 100,000 cubic yards of soil has been excavated and used as on-site fill, about 40 percent completed
- Trees were sent to the lumber mill, brush chipped into mulch, concrete used as fill, soil reused on site, and honeybees relocated
- NASA Service Road has been relocated

Upcoming milestones in October include:

- Complete up to 90 percent soil excavation and fill
- Complete water, sewer, pump station and stormwater utilities
- Set up temporary concrete batch plant for taxiway concrete
- Complete Park Road paving and ditching
- Begin Mill Dam Road improvements
- Install broadband and begin electrical utilities

"Being part of a project of this scope, which provides fertile ground for exponential job creation and increased revenues, is profoundly gratifying," Wheatley said.

Members of the Accomack County Board of Supervisors and other county officials visited Wallops Sept. 22 to receive an update on Wallops Research Park construction progress. The project is scheduled for completion by the end of 2014.

Global Hawk completes three-year mission from Wallops

WALLOPS ISLAND — The Hurricane and Severe Storm Sentinel (HS3) mission wrapped-up its three-year mission at NASA's Wallops Flight Facility when NASA Global Hawk 872 returned Sept. 30 to its home base at Armstrong Flight Research Center in California.

The goal of the HS3 mission was to investigate the processes that underlie hurricane formation and intensity change in the Atlantic Ocean basin. With flights over the Atlantic Ocean, Caribbean Sea and Gulf of Mexico, scientists examined how a storm forms and looked for conditions that favor (or promote) rapid intensification of tropical cyclones.

From the Global Hawk Operations Center-East at Wallops, the HS3 team was able to gather data on Hurricane Cristobal, Tropical Storm Dolly and Hurricane Edouard in 2014.

"2014 was probably our best year in the mission," said Scott Braun, HS3 principal investigator from Goddard Space Flight Center. "We were able to fly over the three systems in various locations in the Atlantic Ocean basin. For the research

The Global Hawk sits on the tarmac of the D-1 Hangar at the Wallops Range Airfield.
Photo Credit: NASA/Brea Reeves

NASA Global Hawk 872 is seen at sunrise on final approach to Wallops Flight Facility Sept. 19 following a flight over Hurricane Edouard. The Global Hawk departed Wallops Sept. 18 on a 24-hour flight to observe Hurricane Edouard as part of the Hurricane and Severe Storm Sentinel (HS3) mission. The photo was taken from the T-34 chase plane, which is used to observe the nearby airspace as the unmanned Global Hawk descends and lands at Wallops. The chase plane is also used when the Global Hawk takes off from Wallops. Photo Credit: NASA/Rich Rogers

team, Hurricane Edouard was the perfect storm as we were able to fly over it multiple times as it became a tropical storm, intensified to a category three hurricane and then dissipated as it moved into the north Atlantic."

HS3 brought several NASA centers together with federal and university partners.

"Approximately 180 people deployed to Wallops annually supporting HS3," said Marilyn Vasques, HS3 project manager from NASA Ames Research Center. "The team appreciates the excellent support provided by the Wallops staff during these past three years."

In addition to the science flights, the HS3 team supported media, educators and students with visits to see Wallops operations. Nearly 60 people participated in the media/education day Sept. 11, which included presentations about the project and tours of the Global Hawk and the operations center.

The departure of the Global Hawk Sept. 30 may not bring an end to Wallops support of hurricane research using the high-flying unmanned aircraft. NOAA announced at the media day a three-year experiment, called Sensing Hazards with Operational Unmanned Technology, or SHOUT, that will analyze the Global Hawk observations to determine if they can help improve weather forecasting of storms at sea. NOAA also is taking this opportunity to determine what the cost of operating the Global Hawk would be if it were to become part of NOAA standard operations.

The first flight by the NASA Global Hawk in the NOAA experiment will take off during hurricane season 2015 over the Atlantic Ocean. The Global Hawk will fly over severe storms off the coast of Alaska in October and November 2015, and tropical storms in the Pacific in 2016. Wallops may be the home of the 2015 Atlantic flights.

The HS3 mission is funded by NASA Headquarters and overseen by NASA's Earth System Science Pathfinder Program at NASA's Langley Research Center. The HS3 mission also involves collaborations with partners including the National Centers for Environmental Prediction, Naval Postgraduate School, Naval Research Laboratory, NOAA's Unmanned Aircraft System Program, Hurricane Research Division and Earth System Research Laboratory, Northrop Grumman Space Technology, National Center for Atmospheric Research, State University of New York at Albany, University of Maryland - Baltimore County, University of Wisconsin, and University of Utah. The HS3 mission is managed by the Earth Science Project Office at Ames.

For more information on HS3, visit the ***HS3 Hurricane Mission*** website.

Post-Sandy Beach Restoration Project wraps up at Wallops

WALLOPS ISLAND — The post-Sandy Beach Restoration Project wrapped up Sept. 27 at Wallops Island following some 70 days of dredging activity off the coastline.

In all, 339 dredging trips delivered 650,000 cubic yards of sand to the island filling in an approximate 13,000-foot-long section of the beach.

"The restoration of the Wallops Island Shoreline is necessary to provide storm damage reduction for approximately $1.2 billion of federal and state assets that support nearly $100 million annually in programs as well as the $1.9 billion International Space Station Cargo Resupply Mission," said Paul Bull, deputy division chief of facilities management.

Sand dune plantings are scheduled for December 2014.

The United States Army Corps of Engineers managed the project, and Weeks Marine Inc. of New Jersey constructed it.

At left, an aerial photo of the Wallops Island beach that began at the beginning of the Summer. Above, the post-Sandy Beach Restoration Project completed Sept. 27, 2014.
Photo Credits: NASA/Patrick J. Henderson

Fall balloon campaign wrapping up with Center-centric mission

FORT SUMNER, N.M. — Seven of eight scientific balloon missions have launched from Fort Sumner, New Mexico, since the fall balloon campaign began Aug. 9, and preparations are underway for the final mission.

The remaining mission pairs the Wallops-built Wallops Arc-Second Pointer (WASP), capable of highly precise pointing to the sub-arc-second level, with the Observatory for Planetary Investigations from the Stratosphere (OPIS) instrument, built at Goddard Spaceflight Center's Greenbelt campus.

"High-altitude balloons offer us a unique, low-cost platform to carry out our planetary observations," said Terry Hurford, principal investigator for OPIS, during an interview earlier in 2014. WASP/OPIS "provides us with a unique opportunity to build a capability that we can leverage for future opportunities."

The WASP/OPIS team was flight ready as of press time, however weather — including an intense hailstorm with whiteout, high winds, and horizontally-blown hailstones at least 0.5 inches in diameter — continues to be a challenge. The campaign window extends until about Oct. 15.

At the onset of the campaign, the balloon team knew 2014 was a strong El Niño year and the weather could be dynamic. After a week of preparations and another week of rough weather, the campaign began Aug. 9 with the successful launch of the High Altitude Student Platform 2014 (HASP 2014), the ninth in the series of the collaborative efforts between the Louisiana State University/Dr. Greg Guzik, the NASA Balloon Program Office (BPO), and the Columbia Scientific Balloon Facility (CSBF).

The WASP/HySICS mission was launched Aug. 18. The HySICS instrument provided improving radiometric accuracy of Earth and spectral observations for climate measurements. Photo Credit: NASA/Balloon Program Office

The flight of HASP 2014 carried payloads from nine educational institutions a flight time of 8 hours, 40 minutes to an altitude of 124,400 ft., exceeding all pre-flight objectives.

The next mission was the Aug. 18 launch of WASP with the Hyper-Spectral Imager for Climate Science (WASP/HySICS) for the Laboratory for Atmospheric and Space Physics, University of Colorado, Boulder. The HySICS instrument is improving radiometric accuracy of Earth spectral observations for climate measurements. The WASP and HySICS science teams reported excellent instrument performance and successful collection of very high quality science data after the 8 hour, 54 minute flight to an altitude of 122,100 feet.

After a number of challenging weather days, the team successfully launched the Long-Duration Balloon (LDB) Systems Test flight to test and validate the functionality of a new balloon cap design, a new high-gain antenna, and a new solar power system using a rechargeable lithium-ion battery pack. There were also two payloads of opportunity on the flight, along with two student payloads.

The launch occurred Aug. 24,

Balloons continued on Page 11

MACRI representatives conduct kick-off meeting

WALLOPS ISLAND — Representatives of the Mid-Atlantic Coastal Resilience Institute took some initial steps and charted a pathway forward Aug. 28 during a kick-off meeting at NASA's Wallops Flight Facility on the Eastern Shore of Virginia.

All nine ***MACRI*** partners attended the meeting, the first since the formal designation of the group June 9.

MACRI is a multi-state, multi-disciplinary partnership dedicated to making coastal communities and habitats more resilient in the face of climate change through sound science and research informing public policy.

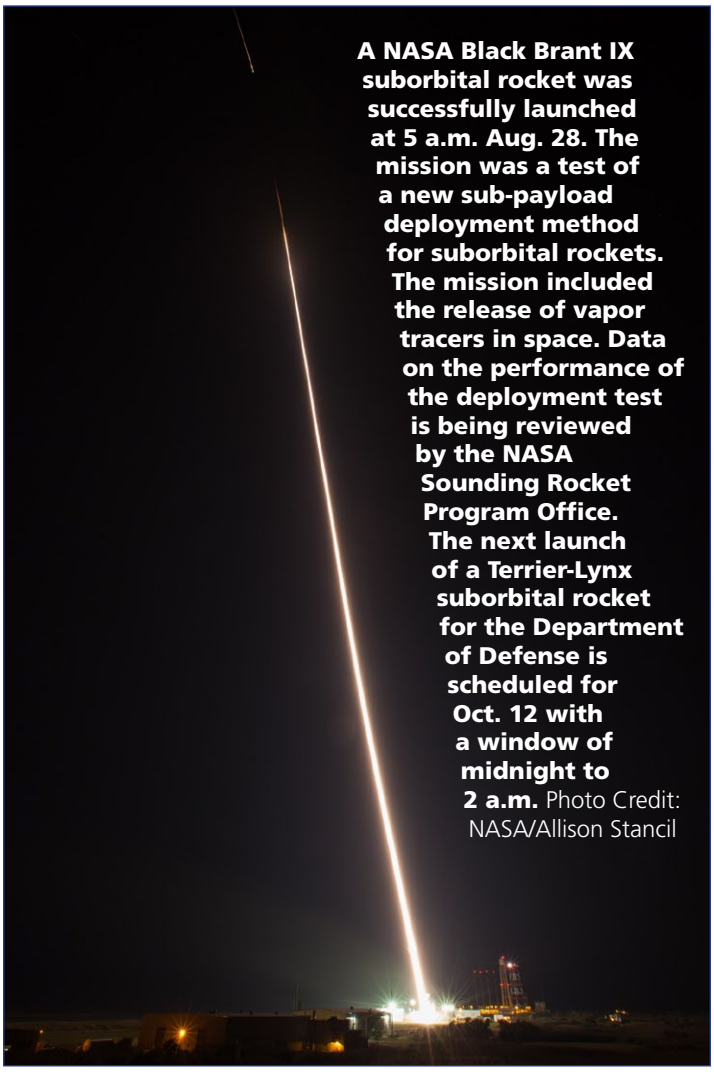
During the meeting, the group reviewed current coastal resilience research and outreach efforts by MACRI partners and also examined opportunities for collaboration and future studies.

In addition, the members established working groups to explore issues important to the development of a strategic plan for the organization. These working groups will meet independently and report at the next full organizational meeting, tentatively scheduled for January 2015.

Furthermore, MACRI partner University of Delaware volunteered to host the group's first technical meeting, with the goal of examining extension of the Delaware Coastal Flood Monitoring System to the Maryland and Virginia Atlantic coasts.

"It's a wonderful first step with all these different organizations getting together, bringing what we bear as single entities together into a partnership that will allow us to look at sea level rise and climate change in a totally different light," said Jill Bieri, director of the Virginia Coast Reserve of the The Nature Conservancy, speaking about the benefits of MACRI during the signing ceremony June 9.

MACRI members include NASA's Goddard Space Flight Center, U.S. Fish and Wildlife Service, U.S. Geological Survey, Chincoteague Bay Field Station of the Marine Science Consortium, University of Virginia, University of Maryland, University of Delaware, Virginia Institute of Marine Sciences, and The Nature Conservancy.



A NASA Black Brant IX suborbital rocket was successfully launched at 5 a.m. Aug. 28. The mission was a test of a new sub-payload deployment method for suborbital rockets. The mission included the release of vapor tracers in space. Data on the performance of the deployment test is being reviewed by the NASA Sounding Rocket Program Office. The next launch of a Terrier-Lynx suborbital rocket for the Department of Defense is scheduled for Oct. 12 with a window of midnight to 2 a.m. Photo Credit: NASA/Allison Stancil

Three Eastern Shore community leaders participated in a panel for Women of Leadership on the Eastern Shore at Wallops Flight Facility. From left, Dr. Juliette Bell, president of University of Maryland Eastern Shore; Wanda Thorton, supervisor for District 1 of the Accomack County Board of Supervisors; and Dr. Linda Thomas-Glover, president of Eastern Shore Community College. They discussed themes involving charactor, courage and commitment in their personal lives and careers. Photo Credit: NASA/Jamie Lee Adkins

NASA's Balloon Program Office is showing visitors at the 43rd Annual Albuquerque International Balloon Fiesta, happening through Oct. 12, how NASA uses enormous, helium-filled balloons to conduct scientific investigations.
Photo Credit: NASA/Patrick Rogers

Balloons continued from Page 9

achieving with a mission duration of 6 hours, 38 minutes flying to an altitude of about 123,000 feet.

Multiple attempts to launch the Jet Propulsion Laboratory (JPL) Remote mission were thwarted by weather, delaying launch to Sept. 14. The JPL Remote mission measured profiles of over 40 chemical species throughout the stratosphere to improve understanding of stratospheric chemistry and ozone layer stability and provide validation for the NASA Earth-Observing System Aura satellite. The 23 hour, 14 minute flight at about 126,000 ft. was an operations and science success.

The following week was a banner week for the campaign. The launch team in Fort Sumner took full advantage of the break in the weather and conducted three successful major launches in successive days Sept. 24-16: a first for the balloon program.

• **Sept. 24:** the X-CALIBUR mission from Washington University in Saint Louis launched to flight-test a pointing system and hard X-ray polarimeter for a future long-duration balloon flight. With a mission duration of 7 hours, 40 minutes at about 126,000 ft., the mission was a success with the detector functioning properly and the team gaining valuable experience with operating the pointing system.

• **Sept. 25:** the Balloon Observation Platform for Planetary Science (BOPPS) from the Johns Hopkins Applied Physics Laboratory soared for 18 hours, 53 minutes at altitudes as high as 128,000 ft. The science team was successful in making planned daylight and nighttime observations, as well as observing additional targets of opportunity.

• **Sept. 26:** the Gamma-Ray Polarimeter Experiment (GRAPE) from the University of New Hampshire launched. GRAPE was designed to study the nature of gamma-ray bursts, some of the most energetic events in the universe. The 18 hour, 51 minute flight at altitudes up to 130,000 feet allowed the science team two hours of observation of their prime objective – the Crab Nebula – and an additional 16+ hours at float before termination.

NASA's Wallops Flight Facility manages the Agency's scientific balloon program. Visit the ***Scientific Balloon office website*** for more information.