

Unmanned hurricane plane based on Delmarva

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NASA researchers at Wallops Island are looking at how hurricanes form and intensify



(Photo: Jay Diem/The (Salisbury, Md.) Daily Times)

A mass of clouds – a weather system likely to become a tropical storm or [hurricane](https://www.wtop.com/story/news/local/2014/08/07/forecasters-lower-hurricane-estimate-season/13750465/) ([/story/news/local/2014/08/07/forecasters-lower-hurricane-estimate-season/13750465/](https://www.wtop.com/story/news/local/2014/08/07/forecasters-lower-hurricane-estimate-season/13750465/))– swirled just off the Cape Verde Islands near Africa.

Thursday afternoon, it was called Invest 91 L but eventually, if it strengthens, it will be named Edouard.

So Thursday night, a team of scientists went in for a closer look. Lt. Commander Jon Neuhaus handled the aircraft controls as scientists prepared to deploy instruments and monitor the data coming in.

The plane, a sleek, white aircraft originally developed for military use, has wings that are so long, it looks like a glider. Those wings carry a large portion of the fuel needed to get the plane to the coast of Africa, deploy instruments and collect data, and then return to the Delmarva Peninsula, 35 miles south of Delaware.

It can stay in the air for more than 28 hours, has impressive climbing stats – it reaches close to its cruising altitude of 60,000 feet above Earth in 30 minutes, and can do things that other planes can't because of its "very impressive capabilities," said Chris Naftel, the NASA project manager.

The reason: The plane is autonomous, meaning that Neuhaus and the scientific team are at Wallops Island in an operations center filled with computers the entire time the plane is flown and data is collected.

"I'm sitting in the forward operations room," Neuhaus said. In front "it's the real cockpit of the airplane ... it's just like flying."

He monitors the engine, flight speed and other critical features that pilots pay attention to in flight. The only drawback, he said, is he can't smell or hear things that might tip off a pilot to a problem or a need to adapt. The plane, called a Global Hawk, carries more than half its weight in fuel, he said.

From the NASA Flight Facility at Wallops Island in Virginia, the plane takes off and heads directly over the ocean, flies east to the target and then follows a series of precomputed passes above the forming hurricane.

Specialized weather sensors – about the size of a paper towel roll holder – collect temperature, humidity, and wind speed and direction data. Another instrument looks at the cloud layers and a third picks off temperature and water vapor data.

Pilots are typically limited to the time they can stay in the air. But the autonomous Global Hawk can stay aloft 25 to 26 hours and spend better than half that time collecting scientific data, said principal investigator Scott Braun.



HS3 Project Manager Marilyn Vasques and HS3 Deputy Project Scientist Paul Newman track operations in the payload operations room at Wallops Flight Facility on Thursday. The HS3 mission uses NASA's unmanned Global Hawk aircraft to study the formation of hurricanes in the Atlantic Ocean. (Photo: Jay Diem/The (Salisbury, Md.) Daily Times)

Braun and co-principal investigator Paul Newman, study hurricanes from the inside out.

Hurricanes that form off the Cape Verde Islands can be especially problematic for the Middle Atlantic because they are often strong storms that have time to develop.

State Climatologist Dan Leathers, in an earlier interview, said that the worst of the storms we've seen in Delaware have most often formed in the late summer and early fall off the Cape Verde Islands. Superstorm Sandy had its beginnings there.

The Global Hawk project is a partnership between NASA researchers and the National Oceanic and Atmospheric Administration. The project is called the Hurricane and Severe Storm Sentinel mission, with the idea of sending the autonomous plane over tropical systems to gather continuous weather data.

The project adds to satellite data that weather forecasters already use, and the data collected by manned Hurricane Hunter aircraft that fly into storms.

"Satellites provide crucial information in broad swaths," said Robbie Hood, director of NOAA's Unmanned Aircraft System Program and lead scientist for the Global Hawk experiments. "Flying a Global Hawk with weather observing sensors over a storm is like putting the storm under a microscope."

Hood said it will let forecasters and scientists see clearly inside a storm, capture changes in speed and intensity and fill in gaps in the other available data.

Among the interests of Braun and Newman are how dust from Africa's deserts impacts the formation of hurricanes.

Already this season, the Global Hawk flew over another unnamed storm – Invest 90 L, which meteorologists felt had a low probability of formation into a hurricane.

That storm, he said, had high levels of dust from the Sahara Desert.

Newman said it appears that the dust – which can be seen in satellite images – may make it difficult for systems to form into full-blown tropical depressions, storms and hurricanes. For one thing, he said, they absorb water droplets and dry out the clouds.

"It pretty much sequesters it," he said.

Invest 90 L "was almost completely surrounded by dust ... That dry, dusty air is going to change" the way the system develops.

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