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Hurricane Katrina

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Robot chopper documents Katrina's power

'Flying camera' may be ready for next hurricane season

By Marsha Walton
CNN

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BILOXI, Mississippi (CNN) -- "And let's go out over the motel roof so we can get the seams ... go out a little further... alright that's good, hold there."

Kevin Pratt communicated with the other members of the helicopter flight team to shoot the best angles of video of two Katrina damaged structures.

What was unique about this flight? The four-person crew was on the ground, while the camera-carrying, 10-pound robotic aircraft flew around the buildings.

Headed by University of South Florida robotics professor Robin Murphy, the team documented damage to multistory buildings hit hard by the hurricane.

Portable robotic vehicles can be used most effectively when traditional equipment is too large or too expensive to get into a disaster area. Murphy used ground based robots in New York at the World Trade Center, after the 9/11 attacks, in areas too treacherous for humans or dogs.

One target provided a unique scenario for forensic and investigative engineers. It was a close-up look at a casino barge that broke loose in the Gulf of Mexico, moved more than half a mile in the storm surge, and came to rest next to a motel.

"Not only are we getting that bird's-eye view, but that elevation. We can get up close to the building, go up its sides, look in through windows, focus in on cracks, and seams," Murphy said.

While scientists have used robotic vehicles for many years on land, in the air, and



The use of robotic vehicles is new to most first responders and emergency operations centers.

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underwater, the technology is new to most first responders and emergency operations centers.

"What really has been the convincing point for the emergency response community and the civil and mechanical communities who focus on structural damage has been seeing the data; once you have seen the data it becomes very compelling," Murphy said.

The National Science Foundation is funding this post-hurricane research, primarily for civil and structural engineers.

"So, they'll be looking at two things, one, did the structure hold up? Did it fail in unpredictable ways? We also expect them to give us very important feedback on what data they need to collect in the future," Murphy said.

Elizabeth Matlack, director of the National Center for Biodefense Communications at Jackson State University, watched the robotic chopper at work along the beach in Biloxi.

With much of her work in Mississippi tied to homeland security, she said it takes the right approach to introduce this, or any new technologies to government officials.

"I think the key is showing the right people that it has practical application, and that it's not just some crazy way to play with technology, not just some way to generate revenue," Matlack said.

Scott Nacheman, a structural engineer and former firefighter, viewed many of the images captured by the robotic aircraft on a computer hundreds of miles away. He said the benefits could be more immediate than structural analysis. The robots could save lives.

"You don't want to rush into an operation and compromise the safety of the responders," Nacheman said.

"So being able to use unmanned vehicles and other devices to assess the conditions you are up against, in a more rapid manner, definitely will be a large benefit to saving lives," he said.

From his experience as a firefighter and as a structures specialist with urban search-and-rescue teams, Nacheman said a crucial consideration for all new technology is its ruggedness in the field.

"It is going to be submerged, it is going to be dragged through debris piles, and the equipment has to survive and still has to perform in that environment," he said.

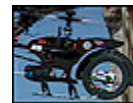
Chandler Griffin, who built the robotic aircraft and is CEO of the company Like90, said the Biloxi experience was a good reality check for future field work.

"If you're a developer, you can dream up things on paper, you can draw it all day long, but you actually need to fly it within 10 feet of a building, with wind shear, environmental conditions, noise and debris. All you can do is learn from doing that and so I'm very happy that we've been able to do this," he said.

The camera on board the helicopter provides both high resolution still and video images.

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"We are carrying a still camera that has a video downlink so that we can actually see through our eyepieces what the camera is seeing so that we can frame the shots. And then we have a remote control to trigger the camera," Griffin said.

That real-time video can be uploaded to a Web site, so experts far from the disaster or investigation scene can do a quick analysis, and even request specific shots or angles from the crew on site.

Murphy said she expects robotic helicopters like these will be available to search-and-rescue teams for between \$5,000 and \$10,000, and hopes some may be in the field as early as the next hurricane season.

"This could be something that could be used by real first responders, real structural and civil engineers, and real insurance adjusters, it's not just an idea that is five years away," she said.

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