UC-developed fire drone to reduce risk

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A new unmanned aerial vehicle (UAV) developed at the University of Cincinnati will provide eyes in the sky and timely information for the nation's firefighters to prevent forest-fire fatalities.

A group of nearly 20 students in the UC College of Engineering (COE) worked on a project called SIERRA (Surveillance for Intelligent Emergency Response Robotic Aircraft) and created a UAV — that can fly over forest fires providing workers below with global positioning through Google Maps. It can send images, video, data and a projection of a fire's course.

The five-pound UAV, with a 54-inch wingspan, can fly as low as 500 feet above flames, sending fire personnel radio waves containing valuable information without the expense of a helicopter or other pricey form of manned aircraft.

"The data provided will give us altitude and use mathematical algorithms to predict the fire's path," said Balaji Sharma, 27, a SIERRA member and mechanical engineering graduate student.

Another SIERRA member cited cost-efficiency as a prime advantage to using the unmanned drone.

"The UAV will provide the cheapest eyes in the sky," said Robert Charvat, SIRREA team leader and COE graduate student. "Same surveillance at one one-hundredth of the price of a helicopter."

UAV surveillance will keep firefighters in the loop while keeping them out of the danger zone, Charvat said.

Forest fires are a starting point for the technology. In the future it could be used to monitor traffic, sporting events, provide police surveillance and be used in land plotting, Charvat said.

"The UAV can fly on its own or from remote control from the ground," Charvat said. "If we told it to fly to Mason and back, it would."

Marcus UAV, Inc. built the drone, which costs $10,000 per unit to create, said Manish Kumar, SIERRA co-supervisor and an assistant professor of mechanical engineering.

SIERRA has received $10,000 from a NASA grant and $10,000 from UC to conduct research, Kumar said.

The UAV showed positive results when field-tested Nov. 5 over a controlled fire at a 37-acre burn site at Coopers Rock State Forest, W.Va.

"The West Virginia Division of Forestry and SIERRA were both able to learn from each other at the burn site," said Ted Meyer, a member of SIERRA and a UC fourth-year aerospace engineering student. "They learned how to operate our technology and we learned how a real-life fire works."

Firefighters can use the UAV's information to plan, predict and attack the forest fire, Meyer said.

In 2007, Cohen started the groundwork for the project and was later joined by Charvat, who pushed the project into development in fall 2010.

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