
Commercial drone research takes off at VCU

Professors Robert Klenke of engineering and William Shuart of environmental studies both incorporate drone usage and research into their classrooms



WRITTEN BY
Joe Forcier

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Christmas is just around the corner, and a lot of people, both children and adults, will probably unwrap a remote-controlled quadcopter that will provide hours of entertainment – at least until the batteries need recharging. As microprocessors and mounted cameras have become smaller, unmanned aerial vehicles, commonly known as drones, have skyrocketed in popularity.

But UAVs aren't just child's play. Researchers at VCU say the devices could be used in a

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One of Robert Klenke's students working in the lab. (Photo courtesy of Dr. Klenke)

range of beneficial ways, from inspecting bridges and searching for lost hikers to shooting documentaries and surveying land.

One of the university's leading researchers regarding this technology is Dr. Robert Klenke, a professor in the Department of Electrical and Computer Engineering. Klenke directs a program called the Collaborative Unmanned Aerial Vehicles group, in which students study, design, build and utilize UAVs.

“Currently, unmanned aerial vehicles are the most dynamic growth sector of the international aerospace industry,” Klenke said.

His collaborative has been operating for about two years. Each semester, about 20 undergraduates work in Klenke's lab alongside graduate students.

Klenke and his students are exploring many facets of UAV research, including innovative flight systems and the miniaturization of UAVs. One team of students, for example, plans to integrate a remote monitor system and joystick controls.

In the past, Klenke's students have worked with both multi-rotor and fixed-wing UAVs. But now they have included a hybrid capable of vertical takeoff and landing, or VTOL.

The VTOL project team uses a device that takes off as a multi-rotor vehicle and then flies around on fixed wings once it has reached optimal altitude. The vehicle then can land like a multi-rotor vehicle.

William Shuart, environmental technology coordinator at VCU, also is a pioneer in UAV research. While Klenke's group is oriented more toward designing and utilizing the equipment,



One of VCU's fixed-wing UAVs in flight. (Photo courtesy of Dr. Klenke)

'I think you're going to see more and more types of applications for UAVs,' says William Shuart of VCU Life Science.

Shuart's students take UAVs into the field and put the equipment to the test.

Over the summer, Shuart taught a course in which students planned a surveying mission utilizing a UAV, conducted the mission and analyzed the results, using both fixed-wing and multi-rotor aircraft.

"Our background is looking at environmental phenomena, so whether that's wetland analysis, vegetation health, height of vegetation," said Shuart, who also serves as director of information technology at the VCU Rice Rivers Center.

Multi-rotor UAVs have been both scrutinized and sensationalized. Flying a drone is easy to pick up, and when combined with lightweight cameras, the possibilities are endless.

Not only can you take vivid aerial videos and still photos for personal pleasure, but the technology offers a lot of potential commercial uses as well. For instance, bridge and radio tower inspections have always been tedious and dangerous, but drones outfitted with high-resolution cameras could carry out these inspections efficiently and safely. Companies such as Amazon have suggested using drones to deliver products to customers. And the devices someday might carry medicines to remote areas.

"I think you're going to see more and more types of applications for UAVs," Shuart said.

At the same time, some people fear that drones may invade their personal space and violate their right to privacy. In some cases, people have shot down UAVs that have flown over their property.

More advanced drones are used by the U.S. government to survey areas, and in the Middle

East, the military has used UAVs to track, attack and kill people it has deemed as terrorists. When Klenke first began conducting his research with UAVs, there was backlash at VCU because of the military use of drones.

Klenke said the UAV research done at VCU deals with surveying and reconnaissance. Under no circumstances are UAVs at VCU weaponized, he said. •