Drones must learn to navigate populated areas

January 7 2015, byScott Mayerowitz

In this Oct. 8, 2014 photo, undergraduate researcher Christopher Rios uses Google Glass to control a drone in mechanical engineering professor Ahmed Mahdy's classroom at Texas A&M Corpus Christi, in Corpus Christi, Texas. (AP Photo/Pat Sullivan)

For drones to make it to the big time, they will need to learn to get

around in towns and cities—without falling on car hoods or crashing into pedestrians.

Technology has advanced to the point where hobbyists can fly the unmanned aircraft with their iPhones. But nobody has yet developed a successful system for the devices to sense and avoid other objects like trees, streetlights, buildings and even other drones.

That ability to be fully autonomous will be critical before legions of drones can buzz over our neighborhoods.

Similar technology does exist. Commercial jets, for instance, are able to detect other planes in the sky and warn pilots of mountains in their path. The problem is how to make the detection system small, light and cheap enough to work on drones.

Military drone-maker Aurora Flight Sciences, of Manassas, Virginia, is trying to tackle the challenge using echolocation, which sends out sound waves and detects the echo reflected by obstacles. It's similar to sonar on a submarine or the way bats fly around in the dark.

Other companies are using optical sensors to search for obstacles. But those systems have challenges, including not working well in darkness or fog.

Researchers around the world—both academics and at private companies—are trying to overcome the problem.

In the United States, much of the work is being done at six government-approved drone test sites, all of which are connected with universities. They are among the few spots in the country where unmanned aircraft can be legally flown to test what works and what doesn't.

In this Oct. 8, 2014 photo, undergraduate researcher Christopher Rios uses Google Glass to control a drone in mechanical engineering professor Ahmed Mahdy's classroom at Texas A&M Corpus Christi, in Corpus Christi, Texas. (AP Photo/Pat Sullivan)

"This is a large sandbox right now," says Ahmed Mahdy, a computer scientist professor at Texas A&M University's Corpus Christi campus, one of the test site operators.

One of his students is tacking a related problem: What happens if a drone needs to make an emergency landing?

His solution combines image recognition and tracking software that would allow drones to identify the big letter H—in a circle—that is used to signal helicopter landing pads. If a drone loses contact with its controller over a big city, it would presumably be safe to land on a

helipad.

Autonomous drones might work for some situations, but many uses will still need human pilots.

Mahdy's classroom—really a warehouse-like lab space—lets students test ways to ease the job of those humans. One is experimenting with using brainwaves to fly the aircraft, though it seems to take too much effort. The pilot requires a lot of training, must focus entirely on flight commands and gets easily exhausted.

College junior Amiz D'Austri has modified an Oculus headset to let him control a drone. The device—which looks like ski goggles with a small TV screen blocking the view—is normally used to put video game players into the action, creating an augmented reality.

D'Austri has customized the headset and placed a camera on the drone, allowing him to fly the aircraft with just slight head movements. All he sees through the goggles is a real-time view from the drone.

In this photo taken Oct. 9, 2014, an unmanned surveillance aircraft is launched by a team from Texas A&M to test an array of sensors, at the remote Charles R. Johnson Airport in Port Mansfield, Texas. For drones to make it to the big time, they'll need to learn to get around in towns and cities _ without falling on car hoods or crashing into pedestrians. (AP Photo/Valley Morning Star, David Pike)

A few desks over, sophomore Christopher Rios puts on a pair of Google Glass and demonstrates one option.

"OK glass, take off," he says as a small drone with four rotors takes off.

Rios tilts his head forward slightly and the drone advances. He then tilts to the left and the drone moves to the left. A small screen within the glasses feeds him live video from a tiny camera on the drone.

Then he shows off: "OK glass, flip."

On cue, the drone turns upside down.

Then, with three words—"OK glass, land"—the flight is over.