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Tracking and Flying a Drone When GPS Fails

There are two ways to determine where your drone is: by keeping it within line of sight, or with GPS tracking. The first option has the obvious problem of limiting range, which is why so many consumer—and virtually all commercial and military—drones use GPS to determine their exact location. But, GPS can potentially fail, and it's always a good idea to have emergency redundancies. That's why University of Washington researchers have developed a method for tracking drones without GPS.

Researchers at the University of Washington tested a new method that gives aircraft a backup system in case GPS fails. (📷: UW Autonomous Flight Systems Laboratory)

We rely so heavily on GPS because it's accurate, ubiquitous, inexpensive, and historically reliable. If that were to change for some reason, drones all around the world would be, quite literally, lost. That could be caused by issues with the network of GPS satellites, or with the GPS receiver. The tracking method developed by the researchers

utilizes the GPS transponder already on the aircraft, but works even if all of the GPS satellites somehow fall out of the sky.

Normally, that transponder sends out consistent transmissions with the aircraft's GPS coordinates. But, it will continue sending those transmissions even if it can't actually determine those coordinates. This system uses a ground station to triangulate the transponder's location based on those transmissions, and then sends that location back. With a modified on-board autopilot system, a drone can then use that location data to continue navigating, just like it would if it were still receiving GPS coordinates. The downside of the system is that a ground station needs to be in range, but the researchers are now looking into the possibility of using cell phone towers to provide the same functionality.