

Engineer recounts decades developing unmanned aerial vehicles for all kinds of uses

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UCI engineering alumnus Douglas Thorpe has designed and manufactured more than 30 different types of drones, including this P4000, which sells for about \$30,000 and is primarily used by the military for reconnaissance missions. Other drones his company makes are much larger, weighing a couple thousand pounds and boasting 27-foot wingspans.

On an overcast morning in late May 1976, Douglas Thorpe '82, then a UC Irvine freshman, was on his way to school when a small plane fell out of the sky. The single-engine Beechcraft Bonanza crashed in an

empty field near campus, killing everyone on board. Thorpe was first on the scene, and what he saw changed his life.

"The doomed plane flew past my car as I was driving to class," Thorpe recalls. "There were four souls on board. The [injuries they] suffered left an emotional scar on me. I was just 18 at the time and very impressionable. I became very fearful of flying after witnessing firsthand how bad things can go."

A mechanical engineering major, Thorpe eventually became interested in [unmanned aerial vehicles](#) – UAVs, or drones – because they could save lives.

For more than three decades, he's designed, developed and manufactured more than 30 different types of remotely operated flying machines. His drones weigh anywhere from 5 to 1,600 pounds and perform all kinds of tasks, including military reconnaissance and modern-day prospecting – searching for gold and [oil deposits](#) by flying over hard-to-reach terrain.

"In professional flying, there are missions that are simply dull, dirty or dangerous and ... can end a person's life. That's what makes drones so exciting to me," says Thorpe, a 2014 recipient of the UCI Alumni Association's Lauds & Laurels Distinguished Alumnus award. "You don't have to put someone's life in jeopardy anymore."

The owner of drone manufacturer Thorpe Seeop Corp. in Mesa, Ariz., he has produced and sold more than 30,000 commercial UAVs, aerial targets (used to train anti-aircraft crews) and remote-control model airplanes. "If you placed each airframe end to end, the line would stretch over 27 miles – the distance from Aldrich Park to Catalina," Thorpe says. "That's a lot of little planes."

He's designed little planes that are both propeller-driven and turbine-

powered, that both take off from runways and are ejected from missile launch tubes via military aircraft.

His creations have been employed in agriculture, flying low over fields to release fertilizer, herbicides or even pest-eating insects on organic farms. They can improve irrigation by scanning crops with infrared cameras to see if they're suffering from water stress – in advance of such symptoms as wilting.

"There have been drones working on farms, especially overseas, long before Amazon proposed using them for its same-day delivery service," Thorpe says. "In the near future, drones will be flying on virtually every farm in the United States."

Mining companies enlist his drones to scour topography in search of everything from gravel to gold deposits. They've also been utilized to hunt for new sources of oil and natural gas.

These endeavors can be extremely risky for pilots, Thorpe notes.

"If you're looking for gold or silver, you have to follow the contours of topography," he says. "You might have to fly 200 feet above ground. That might sound like a lot, unless you're [near] a mountain or your engine goes out and you have no time to recover."

In addition, his drones have been employed by the military for jobs such as surveying target areas and identifying potential ambushes. "It's a big deal to see what trouble is up ahead," Thorpe says.

His company produced a half-scale Pioneer drone for training during the 1990-91 Gulf War. The Navy flew the full-size, 14-foot-long Pioneer on surveillance missions, using infrared cameras to provide real-time images of targets to field commanders up to 115 miles away.

"Iraqi fighters quickly learned that if they saw one of these little airplanes circling, bad stuff would happen, so they would surrender to the drone," Thorpe says. "It saved lives on both sides." Because of its unique role in modern warfare, a Pioneer RQ-2A UAV is on display at the Smithsonian National Air & Space Museum.

As drones become more sophisticated and ubiquitous in modern society, they've raised myriad concerns, particularly regarding safety and privacy. In June, for instance, the Federal Aviation Administration restricted unauthorized use of drones near airports, and the National Park Service announced that it will ban them on the 84 million acres of land it manages, out of concern for wildlife and visitors. (The NPS will, however, allow UAVs for search and rescue operations, fire safety and scientific study.)

Because he designs commercial and military drones, Thorpe is already subject to much tighter FAA regulations than model airplane hobbyists.

"I could fly a model plane in Aldrich Park, but if it's a commercial drone taking aerial photos, suddenly the FAA gets involved," he says. "The difference isn't the technology but the UAV's purpose. I've never flown a model plane in my life."

The problem, Thorpe says, is that many people confuse commercial drones with the recreational model airplanes they see buzzing around public parks.

"A model airplane is not a drone. That's a little plastic quadcopter that has four spinning propellers. You have hobbyists who attach GoPro cameras to them, and some might even snoop on the neighbors. That misuse of technology goes on, just as it always has," he says. "But that's not our customer. They're using drones for industrial reasons or missions such as assisting firefighters in mapping out fires in national parks."

Before he got into the drone business, Thorpe figured he'd build boats, not planes. During his four years at UC Irvine, he lived on a 27-foot Ericson sailboat in Newport Beach.

"It was like living in an RV or a camper shell," he says. "But I had a beautiful commute between UCI and Newport Beach each day." He even made friends with legendary actor John Wayne, whose yacht, the Wild Goose, had a berth nearby on Lido Peninsula.

After completing his coursework at UCI, Thorpe got a job at a boat building company in Washington state that required a lot of travel.

"I was flying coast-to-coast working with retailers, boat shows and customers. To treat my fear of flying, understanding friends got me flying sailplanes, small airplanes and helicopters, and my anxiety disappeared," he says.

Thorpe left the boat factory to work at Hughes Helicopters in Culver City, then launched his own business in 1985, making model planes that he sold through hobby shops. The company evolved into Thorpe Seep to focus solely on commercial UAVs.

Currently under development is a unique drone called the Spinwing, a conversion aircraft that takes off and lands vertically, like a helicopter, but can fly as a fixed-wing plane. It's speedier than traditional helicopters and has a greater range. Thorpe hopes such vehicles will one day be used to transport emergency responders to accident sites, reducing the time it takes to reach patients and perhaps increasing their chances of survival.

These days, Thorpe travels frequently between his homes in Arizona and Huntington Harbour. He loves to fly and can foresee a day when passengers will climb into individual aircraft like the Spinwing and be

flown to their destination.

"There won't be an air crew on board. Everything will be automated," he says.

As technology takes the place of human pilots, Thorpe doesn't worry about sci-fi scenarios in which drones evolve to the point they take over, unleashing mayhem on the planet.

"There will still be a human who is ultimately responsible," he predicts. "People will always make command decisions and control these machines."

Provided by University of California, Irvine

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