# CSU Drone Center helps students reach new heights

## Age of Drones

**by Don Ireland**

Attending college and working with drones is a reality for students enrolled at Colorado State University in Fort Collins. As the evolving, emerging field of drone technology continues to surge internationally, the CSU Drone Center offers students a flight plan into the future for the rapidly-growing, multi-billion-dollar drone industry.

"Drones are here to stay," said Christopher Robertson, director of the CSU Drone Center, which will celebrate its third anniversary this summer. "Drones are not going away anywhere. They're creating a whole new industry, a need and desire for skills and jobs. There will be a need for drone pilots, repair technicians, programmers, systems engineers, program administrators and mechanics. The landscape of aviation will change in the next 5 to 10 years because of unmanned aircraft."

Projections say the sale of drones, formally called small Unmanned Aerial Systems (sUAS) by the Federal Aviation Administration, should exceed $20 billion worldwide this year, with forecasted double-digit growth in the next few years. A Business Insider report cites drone use has grown rapidly in five main areas: agriculture, construction and mining, media and telecommunications, law enforcement and insurance. Insider Intelligence predicts total drone global shipments to reach 2.4 million by 2023 – increasing at a 66.8% compound annual growth rate.

Robertson said the drone center, which is funded but CSU's Office of the Vice President of Research and hosted by CSU's College of Engineering, focuses on three main areas:

1. Support research. If someone is conducting research in another field – for example, agriculture – they may consult with the Drone Center to see how a specially-equipped drone could be used to study planted fields and gather data. Utilizing an unmanned aircraft is less expensive than hiring a helicopter or small plane commented Robertson.
2. Industry support and research. Companies consult with the center if they are contemplating the creation of their own drone program or, for limited projects, enlist CSU for certain work.
3. Education. Although there are several learn-to-fly programs available online, CSU offers in-person instruction and hands-on training with dozens of drones.

Those who take classes at the CSU Drone Center can train to obtain their FAA Part 107 certificate (required for all commercial sUAS pilots); hands-on training; opportunities for engineering, agricultural and natural resource majors learn to build and fly small unmanned aircraft, experience – including how to integrate sensors and electronic platforms into drones; building drones; working with drone-acquired data sets and flight training. The university doesn't currently offer degrees for drones; they are included in the curriculum for other programs.

The center owns many styles and models of drones. They range from those that can be held in one hand to others that are more than a yard long. Some drones are the traditional quadcopter models, which have four or more propellers. There also are fixed-wing drones, which resemble model airplanes but include one or more propellers. Some drones weigh less than a pound while payload-carrying models exceed 30 pounds. "We offer internship opportunities, classroom support and projects for students, along with a variety of drones," according to Robertson.

Although drones have been used for decades by the military, the era of using drones for business and industrial operations is relatively new. "It depends on what you need them for," Robertson said. "One of the biggest things has been, for the average person with a limited amount of training, to access the dimension of flight. Once you see the world from a higher elevation and gain that bird's-eye view, it gives you all kinds of ideas because manned aviation is inaccessible by the average person." To the average person, having a drone equipped with a camera means they can photograph their house from the air or take aerial videos of their vacation.

Robertson, who was a sergeant with the Colorado State University Police Department for 20 years before stepping into his current position, said he saw the value and importance of using drones at his former job. As a member of the Larimer County Search and Rescue, Robertson and his colleagues were one of the first to use a drone to help find a missing person at Rocky Mountain National Park. "Drones can be put into service within minutes, while it could take hours to get a manned airplane or helicopter involved," he said, noting many police and fire departments are incorporating drones into their operations.

Drones equipped with various devices can help monitor air pollution up to 400 feet above the ground. Others can determine the heat of a transformer mounted to a utility pole, potentially eliminating the need for someone to climb a ladder to accomplish the task. Similarly, a drone can provide close-up imagery of a tower or power lines, saving time and eliminating potential risks for a human-conducted physical inspection.

Construction companies are using drone photos to keep their staff informed on a project while also using them for supply planning and other factors related to a work site. Drone use for mapping and modeling also has been growing, according to Robertson.

Large companies, including Amazon, UPS and others, are experimenting with drone package deliveries in various places, domestically and overseas. The FAA recently changed some of its regulations, opening a potential path for future deliveries in the United States. "Will we see home deliveries by drones? I think we will but it will take a few years," according to Robertson. He noted a Chinese company has developed a prototype flying taxi-type unmanned vehicle to transport people (think of a George Jetson-style flying car). "I don't think many people here are ready for that yet," he mused.


COURTESY OF CSU DRONE CENTER

*Christopher Robertson, director of the CSU Drone Center, conducts a pre-flight inspection of a $5,000 DJI Matrice 600, a 22-pound professional drone with broadcast quality.*