OPTECKS/OTTOFLY

Optecks takes flight with drone technologies

I looked down at the bare floor in a Tulsa laboratory of a company called Optecks and saw a large drone suddenly appear before me. Its rotors were still.

"Arm," I said. The blades started spinning.

When I said, "take off," the drone lifted off the floor and ascended right through the ceiling of the lab.

"Land," I said, and the drone came back into view and slowly descended to a landing on the floor.

A crowd of people that surrounded me saw nothing but a man wearing a visored helmet talking into space.

Welcome to an augmented reality demonstration developed by Optecks' vice president of Software Engineering, Ussama Naal. The drone appeared only on the display of the helmet I was wearing, so there were no ceiling tiles harmed by the demonstration.

Optecks is developing its patent pending "near eye" display optics that allows the user to see objects over a wide range of angles, or field of view (FOV), and the software to display 3D images. These developments are just two of the many innovations created by Optecks.

The company does custom design, prototyping and manufacturing of products such as display projection optics and fully integrated hardware and software for an autonomous and automated drone system.

Using Optecks' patented systems, drones can perform high resolution inspections of objects like transmission towers or along manufacturing assembly lines.

Optecks was founded by Hakki Refai, Ph.D., and Badia Koudsi, Ph.D., and became a Texas Instruments DLP authorized design house in 2014. Koudsi serves as the company's president, while Refai is chief technology officer.

Koudsi earned her Ph.D. at the University of Oklahoma and is an electrical and computer engineer. Refai's background is in display and imaging systems.

The pair recently gave me and a team from the Oklahoma Center for the Advancement of Science and Technology (OCAST) a tour of their lab at OU's Schusterman Center in Tulsa.

Prominent among the drones, optical table and electronic equipment in the lab was a segment of a transmission tower that rose about eight feet off the floor.

"We are developing a 3D scanner for cell towers based on drones," Koudsi said. "That scanner can provide a CAD file format including all the dimensions of the tower."

Koudsi showed how a drone would fly around a tower, recording precise measurements and revealing any rust or decay, making it easier for crews to provide necessary repairs and upgrades.

A suite of vision systems mounted on the drone allow it to maintain an optimum distance from a scanned object to allow the scanning system to operate at the highest possible resolution. The sensors also allow the drone to detect, identify and avoid obstacles in the environment such as support wires for towers, trees or machines along an assembly line.

"Currently, to measure the cell tower, a crew member needs to climb the tower and measure it manually," Koudsi said. "Our patented system will provide a full inspection of the cell tower for maintenance and also provide all the dimensions for upgrade or modifications of the cell phone tower."

Optecks owns six issued or provisional patents on technologies under developments. A spinout company called Ottofly was created in 2017 to complement the development work of autonomous drones at Optecks.

"In order to achieve our 3D scanner based on drones, we had to develop a full drone operating system to fly the drone autonomously to accomplish the scan," Koudsi said. "We found a large demand from companies who want to build drone applications using the platform."

A large poster on a wall in the lab shows potential applications for the Optecks/Ottofly technology that includes turbine inspections, cell phone towers, emergency oil and gas inspection, surveying, electrical tower inspections and agriculture.

"We work on projects based on customer requirements," Refai said. "We custom design optical systems, which is very hard to find off the shelf. We design display and imaging systems mostly for companies that are developing new products."

The Ottofly software package allows users to quickly and confidently develop automated and autonomous drone applications without the need of deep knowledge of drones.

The company's research has been aided by four Oklahoma Applied Research Support (OARS) grants from OCAST totaling $1.1 million, along with student interns provided by OCAST's Intern Partnership cost-share program.

"The ecosystem here in Oklahoma, including OCAST, i2E and the University of Oklahoma, is very attractive to entrepreneurs," Koudsi said. "These organizations provide continuous help in every aspect for startups."

Read the article in the 2-9-18 Oklahoman

Watch the video

Go to the Optecks website