

# Soaring Above

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OSU leads way into new territory with graduate program in unmanned aircraft systems



OSU is the first university to set up a graduate program in unmanned aircraft systems.

Located within the School of Mechanical and Aerospace Engineering, the program's doctoral and master's degrees merge the latest of a host of disciplines into a curriculum on the cutting edge of a booming realm of engineering. Established in 2011, the program gives students the opportunity to tackle the latest problems in the advancement of such systems and participate in the development of new ones.

"Unmanned aircraft systems" is the broad term for robotic aircraft of all sizes that can fly around and perform a wide variety of tasks, from patrolling the skies in foreign conflicts or finding disaster victims at home.

"Because of the complexity of these systems, there's a need for a program allowing students to perform research and development," says one of the founding faculty members, professor **JAMEY JACOB**. "Many of our graduate students have been working on UAS research for years. This lets them get recognition for it."

The public learned of the technology's usefulness in war in coverage of Predator and Reaper drones' use in Iraq and Afghanistan, as well as in other nations where the United States has targeted terrorists, such as Yemen. But their potential applications are even broader.



**OKLAHOMA GOV.  
MARY FALLIN**

“Aerospace is one of the most important sectors of Oklahoma’s economy, supporting over 150,000 jobs around the state and accounting for more than \$12.5 billion in industrial output each year. Unmanned aircraft systems represent the fastest growing part of the aerospace sector. For that reason, Oklahoma is committed to becoming the number one place for UAS testing and business in the country.”

Many believe unmanned aircraft will eventually allow search and rescue workers, tornado forecasters and firefighters to collect data from the planet’s most dangerous situations more effectively, at lower costs and without endangering the lives of first responders or pilots. In the hands of firefighters, UAVs could locate the advancing edges of wildfires, helping them set up their defenses. Or a UAS equipped with infrared technology could help rescuers find victims under rubble after an earthquake.

Then, there’s agriculture. Weather research. Pipeline and bridge inspection. The potential for these systems are limited only by the imaginations of researchers and their needs. And this degree program puts OSU firmly at the front of such work while benefitting the growing industry. It provides businesses

with qualified graduates who can help with research, develop testing for and evaluate new models — skills that have been in somewhat rare supply previously.

“We are already a one-stop resource for UAS R and D [research and development],” Jacob says. “Our goal is to expand the program by increasing resources with new laboratories, development, facilities and hardware. That will give us unmatched capabilities to serve students, government and industry.”

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The potential for economic development in states such as Oklahoma remains unclear but seems promising. Congress has given the FAA a deadline of 2015 to create regulations to outline operational guidelines for civilian uses of UASs. Some projections indicate the industry may generate \$13.5 billion per year over the next five years and \$80 billion per year by 2025.

That has Oklahoma policymakers and leaders' attention. The state was selected in June 2012 for the Department of Homeland Security's Robotic Aircraft for Public Safety Program to test small, unmanned aircraft for civilian uses such as disaster response.

Oklahoma has several assets that could bring the industry to the state, and OSU is a big part of that. OSU's University Multispectral Laboratories at Fort Sill remains the only place in the country for commercial testing of UAS technology.

"From a one-of-a-kind test range in Lawton to the nation's only UAS graduate program, to a cohesive statewide support system led by our governor, we are poised to lead the nation in this burgeoning field," says **STEVE MCKEEVER**, OSU physicist and vice president for research and technology transfer, who also serves as Oklahoma's secretary of science and technology. "As UAS stands to provide immense benefits to our citizens, our research in this area is a true fulfillment of the land-grant mission."

At the policy level, Oklahoma has its ducks in a row to attract industry. The state offers aerospace firms incentives including cash back for jobs created, tax credits and a unique aerospace-specific tax incentive. And Gov. **MARY FALLIN** is firmly behind promoting the state as a global hub for UAS research.


"Aerospace is one of the most important sectors of Oklahoma's economy, supporting over 150,000 jobs around the state and accounting for more than \$12.5 billion in industrial output each year," Fallin states in a press release. "Unmanned aircraft systems represent the fastest growing part of the aerospace sector. For that reason, Oklahoma is committed to becoming the number one place for UAS testing and business in the country."

Naturally, the opportunities for students to do amazing research are as limitless as the industry's possibilities. OSU's UAS students work on design, analysis and flight-testing, as well as sense and avoid systems needed for the industry to develop. Their projects range from flight inspection systems and bird-size UAVs to small copters, and their projects include work for the FAA and Air Force.

One doctoral student, Thomas Hays, says the program has a huge emphasis on flying aircraft as opposed to just writing the computer codes the machines need to operate.

"Other programs will still be running designs through computer codes while we are out flying our aircraft," Hays says. "We design so many aircraft — that keeps us current while also honing new skills."

**JAMES COMBS**, believes his master's degree from the program (completed last summer) makes him a good candidate for jobs in the industry.

"Because of these opportunities, I already have a lot of experience dealing with tough and real problems," Combs says. 

 **MATT ELLIOTT**

