Fly Days: More than show and tell

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CAMP GRAFTON SOUTH, N.D. — David Dvorak used a hand-held remote-control device to maneuver the BTE Super Hauler from one end of the makeshift runway to the other.

"How many knots?" he asked.
"Fifteen. Twenty. Twenty-three."

David Dvorak a student at UND uses radio control to taxi a Unmanned Air Vehicle around the runway at South Grafton Army Base on Tuesday. Tests on these UAVs will be done throughtout the week. Herald photo by Dustin Finkelstein.

"The wind's too strong. We'll have to shut her down," he replied. "I feel pretty bad, but safety is the number one priority."

The UND mechanical engineering senior and a dozen colleagues were trying Tuesday to launch what looked like an overgrown model airplane — a 48-pound, 10-foot-by-12-foot Unmanned Aerial System — for the first time. While the take-offs and landings were being done manually by a remote control device, the plane is designed to fly on its own, controlled by a computer program on the ground.

Wind velocity would have been 18 knots (about 20.7 mph) or lower before the mechanical and electrical engineering students would have been comfortable sending the Super Hauler on its maiden flight.

They'll have another opportunity, either Thursday or Friday, as long as the wind isn't too strong.

They're participating in UND's John D. Odegard School of Aerospace Sciences Fly Days at

Camp Grafton South, a North Dakota National Guard training facility between Tolna and New Rockford, N.D.

Earlier in the day, the students flew a six-pound UAS that is designed for agricultural applications. The CropCam works like a high-performance power glider, using a digital camera to take aerial photographs.

John Nordlie, a research assistant with the Regional Weather Information Center at UND, took the controls and manually landed the CropCam UAS when it was about one foot off the runway.

"Just because of the wind. I probably didn't have to," he said.
A few minutes earlier, the small plane was flying at 40 knots (41 mph) about 900 feet into the air, when it came to a near dead stop midair, indicating a wind speed of 40 knots.

The larger Super Hauler is designed to carry payloads as large as 30 pounds.

This week's Fly Days is more than a show-and-tell experience.

"This is the first day UND has flown its own UAS," said Bob Concannon, UND's UAS curriculum coordinator. "Our goal is to lead the way, lead the nation, in UAS development."

The school is working to get the UAS system approved for the nation's public airspace. A Federal Aviation Administration official is at Camp Grafton South this week, monitoring the program's progress.

"The UAS in the NAS," Concannon said, referring to the National Air Space.

One of UND Aerospace's goals with its UAS program is to assist the FAA in research, Concannon said.

This week's testing is being done at Camp Grafton South because the air above the compound is federally restricted air space. The National Guard is hosting the event.

UAS training

UND Aerospace has applied for FAA certificates of authorization for UAS use in 11 areas outside of Grand Forks. Each is a 10-mile-by-10-mile square.

NAS authorization for UND Aerospace could be approved within a matter of weeks.

One area targeted is the inactive Safeguard Anti-Ballistic Missile Site near Nekoma, which borders the Langdon Area Wind Center, a new 159-megawatt, 106-turbine wind farm.

Concannon said UAS planes or helicopters could be used to inspect the 250-foot-tall towers or blades that extend another 60 feet into the air.

Another target is Stump Lake, which could host water-related aerial monitoring.

The school also is applying for NAS authorization in Mercer County, where UAS could help the federal Bureau of Land Reclamation search for sink holes in previously mined land.

The brains of both UAS models is the MicroPilot autopilot system that automatically stabilizes the vehicle by controlling speed, altitude, direction and other vital components of unmanned flight.

"It's a pretty big day," said Richard Schultz, chairman of UND's electrical engineering department.

A team of UND engineering students work on the BTE Super Hauler, an Unmanned Air Vehicle at South Grafton Army Base. Students will be testing these UAVs all week for their efficiency in taking pictures and hauling payloads. Herald photo by Dustin Finkelstein.

His department is trying to determine whether:

- The MicroPilot system works in the UAS aircraft.

- The payload placed in the aircraft will fly.

- The automated surveillance system will broadcast, or deliver, coordinates and other information to remote sites.

The payloads include:

- Precision agriculture applications, which involve an agricultural camera that can determine, for example, whether certain portions of a field are lacking the proper amount of fertilizer.

- Remote sensing infrared applications, such as measuring the temperature of sugar beet piles.

- Reconnaissance and surveillance imagery, which could aid law enforcement in surveillance.

- Detect-sense-and-avoid applications, which could help to prevent in-air aircraft collisions.

Dvorak, who is from St. Cloud, Minn., said the 48-pound UAS probably could have flown Tuesday. But the students erred on the side of caution.

"You don't want to take any chances with the wind," he said. "The first flight is mostly getting a feel for it. We'll try again. As long as the weather cooperates, it'll be a success."

Paul Lindseth, associate dean of academics at the Odegard School of Aerospace Sciences, said this week's milestone is significant, in that it helps to mark the 40th year of UND's aviation school.

"You have to wonder, 40 years from now, will we be conducting mostly unmanned flight training, or manned? I suspect it will be both."

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