

# University of North Dakota



By Doug Marshall

The University of North Dakota has supported one of the world's premier collegiate aviation programs for over 40 years. Operating a fleet of more than 100 aircraft in five locations, UND Aerospace offers a rigorous academic program of study that underlies an intensive immersion into all aspects of aviation, annually producing 400-500 graduates who go on to rewarding careers in commercial aviation, air traffic control, airport and aviation management, flight education, space studies, atmospheric science and computer science. In the fall of 2009 UND began offering courses in first Bachelor's of Science in Aeronautics degree with a major in Unmanned Aircraft Systems Operations. Enrollment has more than met expectations and is anticipated to double in the next year.

The College of Aerospace Sciences partners with the School of Engineering and Mines, the School of Nursing and the Psychology Department in educating the next generation of pilots, engineers, software developers, human factors specialists, flight physiologists and airspace managers in multiple projects and programs devoted to the rapidly evolving world of unmanned aviation.



Since landing its first UAS-related research grant from the Federal Aviation Administration in 2005, UND has been awarded several additional grants and contracts for in-depth regulation studies, the development of data assimilation methodology for the agency's regulatory oversight of Certificates of Authorization or Waiver, and has provided subject matter expertise for the FAA's UAS modeling and simulation initiatives at their Technical Center in Atlantic City.

UND has obtained over 25 Certificates of Authorization to operate a variety of unmanned aircraft in more than 13 different locations, and has operated aircraft for research and development purposes (both airframe and payload designs) in the majority of those locations, providing data to the FAA and to the research community from the payloads carried as well as the operational challenges of operating unmanned aircraft in the national airspace. UND sponsored a COA in the Beaufort and Chukchi Seas, north of Barrow, Alaska, in support of the first marine mammal study utilizing an unmanned system (Insitu's ScanEagle UAS deployed aboard a ship specially outfitted for

that mission). Other COA operations have involved remote sensing of crops and payload development in North Dakota and Minnesota, and most recently UND successfully operated the Scan Eagle to monitor flooding of the Red River north of Grand Forks, providing near real time imaging and data to local disaster relief teams as well as the communities most directly affected by overland flooding.



UND personnel have served on the FAA's Small UAS Aviation Rulemaking Committee, the Arctic Monitoring and Assessment Program UAS committee, the ICAO/Commercial Aviation Safety Team's Common Taxonomy Team, and numerous other standards committees, as well as a Department of Defense Airspace Task Force and the UAS Steering Committee, Base Realignment Impact Committee, City and County of Grand Forks, which is assisting in the planning of the bed down of the U.S. Air Force's Global Hawk UAS in Grand Forks scheduled for 2010.



UND is a partner in a \$56 million contract with the U.S. Air Force to provide courseware and training modules for the MQ-1 and MQ-9 pilot training programs, and is under contract to the Air Force Research Laboratory in Mesa, Arizona to enhance understanding of human learning and instruction, develop methods to define training and readiness requirements and created strategies to evaluate and quantify costs, benefits, and fidelity trade space associated with remotely piloted aircraft

training, rehearsal, and exercise environments. Additional partnerships are in development for other DoD training programs and UND Predator Instructor Pilots are currently providing training for the U.S. Customs and Border Protection MQ-9 unit in Grand Forks.

UND has been designated as a Center of Excellence for Aviation Research by the Federal Aviation Administration and the State of North Dakota, and has been under contract since 2007 to the Department of Defense Federal Initiative, Joint Unmanned Aircraft Systems Center of Excellence at Creech Air Force Base, Nevada, in a project entitled: "Unmanned Aerial System Remote Sense and Avoid System and Airborne Payload Analysis and Investigation." The project is focused on the development of a ground-based sense and avoid mitigation strategy for the integration of UAS in the national airspace, utilizing a variety of radars and data fusion devices to detect non-cooperative targets.

UND currently owns and operates three types of small UAS and recently acquired the Boeing/Insitu Scan Eagle, a larger, more robust system that is being utilized in a wide range of research and development roles, from payload development and validation to radar and airspace management studies. UND's aviation professionals and qualified instructor pilots are routinely sought out for their opinions and expertise in the planning and execution of UAS training and operations, and are providing courseware and instruction support to the federal government and an ever-growing list of private industry organizations who have committed substantial resources to UAS development.

The capstone of all this effort has been the creation of a Center of Excellence for UAS Research, Education and Training, which

will serve the Department of Defense and other governmental agencies as well as the UAS industry. This Center combines the three existing Centers under the umbrella of one organization, with a Center Director and a full time professional staff that is devoted to UAS research and development, with a particular emphasis on pilot training and education. Supplementing this new Center is the world's first collegiate aviation degree program dedicated entirely to the unique field of unmanned aircraft, which provides classroom and practical education and training in every aspect of unmanned aviation, including systems design, integration and operation, remote sensing, C2 data links, human factors, regulations, management, operations planning and research, and UAS instructor techniques.

UND is prepared to lead the way in UAS research, education and training, and to be part of this exciting and fast growing industry.

Doug Marshall  
University of North Dakota

