Diversifying the economy through partnerships and collaboration

UND AND GRAND FORKS ARE AT THE EPICENTER OF THE EXPANDING UAS INDUSTRY

“One of the reasons we’re able to thrive is being able to rely on the education our UAS pilots are getting from UND,” said Matt Dunlevy, President and CEO of an expanding local start-up company, SkySkopes. Dunlevy’s company is using UAS in a variety of applications from precision agriculture to asset inspections in the Bakken Oil Patch.

NURTURING ECONOMIC DIVERSITY
UND has been a leading force in the development of Unmanned Aerial Systems and training, partnering with public and private entities to further the capacity and application of this fast-emerging technology. The University’s role in UAS has been a draw for aeronautics companies such as Northrop Grumman and General Atomics, both new tenants at Grand Sky who now call North Dakota home. UND’s new Institute for Unmanned and Autonomous Research will open the door for more critical partnerships with the private sector as this industry continues to take shape. “[Around 2005] UAS technology was starting to take off, and the Air Force was the main user of that emerging technology. North Dakota was looked at as a possible test site (for that technology), and part of that was because we had a renowned aviation school at UND,” said Tom Ford, Base Realignment Impact Committee and County of Grand Forks.

GROWING NEEDED TALENT
Creating new knowledge is at the heart of any institution of higher learning. In keeping with our mission of teaching, research, creative activities and service, UND continues to diversify interests in the UAS industry through pilot training, sense-and-avoid technology, wildlife management research, policy development and even entrepreneurship.

LEVERAGING STATE FUNDING
The University of North Dakota successfully utilized the State’s matching grant program to share the University’s vision for investment in UAS. Robin Hall underscores how UND has been able to leverage state funds with private dollars to advance research and development of a new industry for the benefit of the State of North Dakota. This is just one example of how leveraging the state’s investment to attract private donations has positively impacted the University, and the community.
Unmanned unleashed
UND brings together campus innovation and research in Institute for Unmanned and Autonomous Research

When UND President Mark Kennedy arrived on campus last year, he saw the same potential in the expansive North Dakota airspace as John D. Odegard did when he launched UND’s leading aerospace program in 1968. And like his predecessor, Kennedy saw the ability to integrate disciplines across the campus to build upon the unmanned leadership initially advanced by UND’s John D. Odegard School of Aerospace Sciences (JDOSAS).

“Thanks to efforts of the Odegard School and UND Center for Innovation, we have over a decade of leadership in unmanned aerial systems (UAS) with a string of ‘firsts’ (listed to the right) But competition for leading this exploding field is growing, and we must step up to a new level,” President Kennedy said.

He brought a plan to UND’s Vice President for Research and Economic Development Grant McGimpsey to build on UND’s strengths in flight, testing and entrepreneurship, while expanding research that addresses the critical need to capture, secure and analyze the voluminous amounts of data generated by unmanned and autonomous systems. The plan also recognized two additional and important facets of the unmanned ecosystem: development of national policy on UAS and the need to drive innovation leading to next-generation autonomous technologies. The plan calls for catalyzing UND’s strengths and expertise through the Institute for Unmanned and Autonomous Research (IUAR).

“The establishment of the IUAR will help UND maintain our leadership role and expand our impact to include the UAS data supply chain and autonomous systems,” McGimpsey said. “The IUAR will also be critical in helping UND address the Grand Challenges laid out in its current Strategic Plan.”


Partnerships in progress
The IUAR is still just an idea, but will assemble quickly in the next few months when an executive director is hired to coordinate UAS and autonomous research activity across the University, drawing on not only faculty in UAS but also in biology, business, computer science, engineering, law, medicine, math, psychology and beyond, and reaching out into the community, state and nation.

It is currently structured to focus on several areas: Flight, Applications, Data Supply Chain, Cybersecurity and Policy, with each area to be led by a UND faculty member or members. An additional Entrepreneurship focus will be led by UND’s Center for Innovation.

“The broadly based research centered on unmanned and autonomous technologies and their impact on society offers opportunities for engagement by nearly every field of study,” President Kennedy said.

The institute’s governing board will comprise key stakeholders in the state’s UAS ecosystem and will be complemented by a corporate advisory board to be led by UND alumna and Packet Digital and BetLink CEO, Tert Zimmerman.

Grand Sky — whose tenants include aeronautics giants Northrop Grumman and General Atomics — will be an important partner in the research and innovation accomplished through the IUAR. The institute’s integrated research could encourage such companies to expand their footprint in Grand Forks beyond flight testing into data analysis and more.

“That would enhance the number of jobs in the region,” McGimpsey said. “It will also attract more companies to Grand Sky that aren’t necessarily flying planes or UAS, but want the information you can get from them. The private sector component of this will be a driver of the IUAR.”

McGimpsey also expects close working relationships with the state and federal government, including the military. “The Grand Forks Air Force Base is a very important partner and driver in all aspects of UAS and autonomy, including workforce development, training, and a wide variety of research areas,” he said.

Combined data and cybersecurity research in partnership with the Department of Defense and Department of Homeland Security could open up developments in counterterrorism, such as more secure control of UAS.

Return on investment
The strength of the IUAR will be compounded with a proposed UND investment of $3 million in NexusND. The statewide initiative developed by North Dakota University System (NDUS) Chancellor Mark Hagerott calls for more education-centered infrastructure and workforce in the state’s high-growth technology sectors: UAS, cybersecurity and high-performance computing (HPC)/big data.

“NexusND is a three-legged stool, and cybersecurity and big data are support mechanisms for realizing the dramatic economic diversification from UAS that we want to achieve,” McGimpsey explained.

The goal of most UAS missions is gathering data with sensors and cameras. To maximize the opportunity offered by UAS, UND needs the hardware, software and people to handle that data.

“You generate a lot of ‘ones and zeros’ when you fly UAS sensor missions, but the ones and zeros don’t mean anything until you’ve crunched them and converted them into actionable and meaningful information,” McGimpsey said.

Investment in NexusND and the IUAR will bring a significant return on investment. Research funding, company attraction, job creation, opportunities for UND students and economic diversification are all expected outcomes of a vibrant research institute.

“The concept of the IUAR is very exciting. It is representative of the efforts of so many members of the UND and greater North Dakota communities over the past 12 years,” McGimpsey said. “It is high time that we recognize and build on those efforts through the creation of the IUAR.”

UND’s UAS Firsts in the Nation
• JDOSAS was an early UAS adopter. In 2006, it garnered support from both the Department of Defense and the State of North Dakota to fund Centers of Excellence for UAS. This was followed by a ‘first in the nation’ undergraduate degree in UAS and a string of groundbreaking research projects that have informed FAA policy and educational innovations.
• The UND Center for Innovation has helped to establish UND as the home of a growing number of small UAS companies. In collaboration with the Grand Forks Air Force Base, the City and County of Grand Forks, the State of North Dakota and congressional representatives, UND helped bring Grand Sky to Grand Forks. Grand Sky is a first-of-its-kind UAS business park, now home to major government contractors Northrop Grumman and General Atomics.
• North Dakota is home to the first-in-the-nation and one of only six FAA UAS test sites, an important partner to UND’s UAS operations. Along the way, UND established the first UAS Research Ethics and Privacy Committee to review projects to ensure that these operations are consistent with UND’s core values.
• Most recently, the JDOSAS opened Robin Hall, a first-in-the-nation collegiate building devoted to UAS research and instruction.

Read more stories about UND at blogs.UND.edu/und-today

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Daniel Patrick Moynihan opined, “If you want to build a world class city, build a great university and wait 200 years.” Our visionary ancestors built a university on the Dakota frontier in 1883 that has contributed greatly to the wonderful state we have today. Investing in the University of North Dakota continues to offer opportunities for a brighter future for our citizens.

**NURTURING ECONOMIC DIVERSITY**

Today we are in a soft patch because agriculture and energy markets are both in a slump. Investing in UND is the best path to diversifying our economy so we are not as dependent on the price of oil and wheat. UND’s aviation school helped spark the birth of North Dakota’s unmanned industry. Our unmanned aviators, engineers and entrepreneurs are diligently pursuing the goal of making the Red River Valley the Silicon Valley of drones, with recent investments by Northrop Grumman and General Atomics just the start. The North Dakota Geological Survey’s Wilson M. Laird Core and Sample Library located at UND played a role in helping to spark the recent oil boom. UND’s researchers are working hard to increase the amount of oil recoverable from Bakken shale, while reducing the cost and environmental footprint of doing so. UND is applying its unmanned and technical expertise to leverage the precision agricultural expertise of other universities as the lead university for a National Science Foundation funded Digital Agricultural Spoke.

**GROWING NEEDED TALENT**

Even during these challenging times, we face a skills deficit that constrains our growth. UND’s doctors, nurses, teachers, and lawyers are needed to address acute shortages, but so are our scientists, engineers and unmanned systems integrators. Two out of three MDs and eight of ten American Indian nurses in the state are graduates of UND. UND offers a wide range of programs online, enrolling nearly 3,000 students, providing lifetime learning opportunities throughout the state. Our online graduate business program is ranked #30 nationally by *U.S. News & World Report.*

**LEVERAGING STATE FUNDING**

For every state dollar supporting UND research, we attract six dollars in outside funds. UND’s more than $97 million in annual research expenditures funds high paid jobs in North Dakota and offers multiple opportunities for entrepreneurial spinoffs. UND fully utilized the state’s fundraising and maintenance matching programs, magnifying the impact of the state’s investment resulting in more scholarships and action on deferred maintenance. With state funding constrained, these matching programs are even more important.

**Research Expenditures – 2016**

- **State:** $13,241,428
- **Other Sources:** $83,893,210

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