

AEROCOM

JOHN D. ODEGARD SCHOOL OF AEROSPACE SCIENCES
SUMMER 2011





A MESSAGE FROM THE DEAN

In 2000 the Leadership Team of the Odegard School built a strategic plan titled "Odegard 2010." This plan included strengthening the academic programs by growing the Masters and Ph. D. degree offerings, building a new Earth Systems Department for the new world of environmental sciences, and maintaining cutting edge technologies for all of the academic disciplines. The three biggest surprises that weren't listed in Odegard 2010 were: the extensive international training programs; the burgeoning programs in unmanned, or remotely piloted aircraft; and major cash infusions from the federal government, our incredible benefactors, and the State of North Dakota. Remember when John Odegard promised "that we wouldn't cost the State a cent." The State has now started to invest in our success.

The other amazing events that took place were almost expected, but still nevertheless equally spectacular; like the high resolution agricultural camera (ISSAC) on the International Space Station, the Mars Space Suit, the DC-8 and Citation II weather research jets, the vertical and horizontal launch spacecraft simulators, our networks, social media recruiting, iPod training media, the new east/west runway, and even a billboard highlighting the Odegard School on I-94 outside of the Twin Cities.

So what does Odegard 2020 hold in store for us? I would only guess more of the same. If it is at the cutting edge of new programs or technologies in Aviation, Atmospheric Sciences, Computer Science, Earth Systems Science, or Space Studies, you can be certain that the Odegard School will be at the forefront.

All of our academic programs are focused on the future. All of our training technologies, equipment, weather radar, simulators, and aircraft are new and state of the art. All of our faculty, staff, instructors, and mechanics are simply the best. It only stands to reason that our students, parents, and alumni are the best.

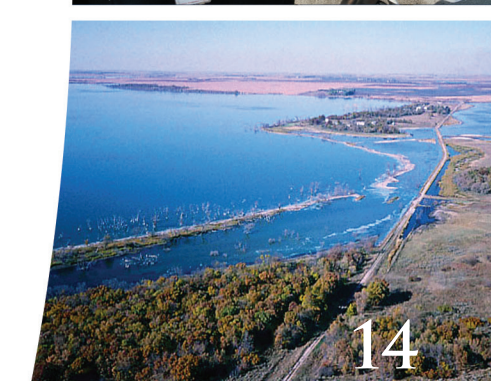
As your travels bring you close to Grand Forks, please plan to visit the Odegard School. You will be amazed at what the future holds for us.

Sincerely,
Bruce Smith, Dean

AEROCOM

JOHN D. ODEGARD SCHOOL OF AEROSPACE SCIENCES

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Cover: UND has been conducting atmospheric research flights in a Cessna Citation II research jet since 1981. Turn the page for more on their latest mission.

AEROCOM
John D. Odegard School of Aerospace Sciences

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JET-POWERED RESEARCH

UND ATMOSPHERIC SCIENTISTS
CHASE THUNDERHEADS IN
SEARCH OF NEW DATA.



JUAN MIGUEL PEDRAZA

Crammed full of computer gear and bristling with probes, the University of North Dakota's Cessna Citation II research jet is totally unique. There's isn't another research university in the country that operates such a platform, though a few schools have propeller-driven research aircraft.

"It gives us a certain notoriety," said Dr. Bruce Smith, dean of the UND John D. Odegard School of Aerospace Sciences. "Our research jet puts us in an elite bracket. It significantly enhances the reputation of our research effort. The visibility that it brings our Department of Atmospheric Sciences is huge, especially when we're recruiting."

UND's Citation II is a recently acquired 1981 model with low hours and an interior that was completely redone to house research instruments, computers, and their power supplies, notes Michael R. Poellot, Chester Fritz Distinguished Professor of Atmospheric Sciences and the long-time principal investigator for the jet.

"We started our airborne research program in 1977 with a turboprop aircraft, and we bought our first jet in 1979, a Cessna Citation II," said Poellot, who's been at UND since 1976 and involved in airborne research since his days in graduate school.

UND has been at the forefront of college-based airborne atmospheric research for nearly 30 years.

"Our first field mission in the jet was in 1981," Poellot said. "Our current aircraft is not new; it's a 1981 Cessna Citation II with fairly low time. It has a good lifetime left. It's undergone substantial modifications and certifications. It has a Part 91 general aviation certificate, which means it's in a restricted category: we can't fly passengers for a fee and we can't use it for flight training."

But don't let that "restricted category" fool you. This plane goes where few others aim to fly, notes chief pilot Wayne Schindler.

"Among the things we do is actually spend hours flying into clouds to take samples," Schindler said. "We also test for conditions that lead to ice formation on the wings."

THE JET IS MULTI-TASKED

"The jet provides two major contributions to our program: one is educational, the other is research," Poellot said. "We have students who work with us on the research programs, learn about instruments, and learn about taking airborne measurements. On the research side, it provides us another way of getting into airborne measurements in some of our areas of expertise, including cloud microphysics, aerosols, cloud electric fields, and thunderstorms."

The Cessna Citation burns an average of 1300 pounds (about 180 gallons) of jet fuel per hour. At today's prices that amounts to about \$1000 per hour.

But there's a big advantage when it comes to range and operational reach.

"The main advantage of the jet over the turboprop is that it can climb to higher altitudes and thus gives us a broader range of operational applications," Poellot said. "That's attractive to the federal agencies and private companies that contract with us."

An example is the six-week National Aeronautics and Space Administration (NASA) mission in Oklahoma that the jet departed for in mid-April this year.

"We have two big projects coming up - in Oklahoma in April through early June and one in Ontario next January-February. We've been contracted by NASA for both of these field projects," Poellot said.

During April and May of 2011, the Midlatitude Continental Convective Clouds Experiment will take place at a federal facility in central Oklahoma. This is a collaborative effort between the U.S. Department of Energy and NASA.

The campaign leverages the largest observing infrastructure currently available in the central United States combined with an extensive sounding array, remote sensing and on location aircraft observations, NASA ground validation remote sensors, and new radar instrumentation purchased with funding from the American Recovery and Reinvestment Act of 2009. This work is part of a NASA project to test instruments and methods for its weather satellite network that will be launched in a couple of years.

The main goal is to provide the most complete characterization data for convective cloud systems, precipitation, and their environment that has ever been obtained, providing details for the representation of cumulus clouds in computer models that have never before been available. These are the cloud systems that can generate thunderstorms and tornadoes.

"We're also involved with helping NASA to validate data they're collecting about tropical rainfall," Poellot said. "Before NASA puts its satellites up, they want to test how their instruments work. If you're using those satellite-mounted instruments to detect clouds and precipitation, you have to validate what they're seeing with what's actually in the clouds because the satellites are making measurements from out in space."

"They're taking these instruments and putting them on high-flying aircraft and looking at the clouds from that aircraft, which will act as a proxy for the satellite," Poellot said. "We'll be flying our Cessna Citation II through the clouds."

None of this can make any sense unless the data gathered aboard the Cessna Citation is collected, sorted, and analyzed. That's the job of

“THE JET PROVIDES TWO MAJOR CONTRIBUTIONS TO OUR PROGRAM: ONE IS EDUCATIONAL, THE OTHER IS RESEARCH.”



Mike Poellot has been a faculty member at the University of North Dakota since 1976 and is currently Chester Fritz Distinguished Professor and Chair of the Department of Atmospheric Sciences. Poellot is the principal investigator, or PI, for the aircraft, charged with overall supervision of the aircraft's missions. His field research experiences began with the GATE project as a graduate student in 1974. He participated in several radar field campaigns in the 1970s and numerous deployments with the UND Citation research aircraft since its acquisition in 1980. Recent work has focused on thunderstorm anvil cirrus clouds and on arctic stratus clouds. Past research includes observations of jet contrails and studies of the suitability of cumuliform clouds for cloud seeding.



Dr. David J. Delene received his Ph.D. in Atmospheric Sciences from the University of Wyoming in December 1998, a M.S. in Geophysics from Michigan Technological University in August 1995, and a B.S. in Applied Physics from Michigan Technological University in May 1993. He has worked with the aerosol group of the federal government's Climate Monitoring and Diagnostics Laboratory. Past research includes surface, balloon, aircraft and rocket based measurements of atmospheric particles and cloud microphysics. Field research has taken Dr. Delene to such interesting places as Alaska, Hawaii, New Zealand, West Africa and Saudi Arabia.



Dr. Cedric (Tony) A. Grainger received his Ph.D. from State University of New York -Albany in Atmospheric Sciences in 1973, a M.S. degree in meteorology from Montana State University in 1968, and a B.S. degree in Physics from Montana State University in 1966. He has been involved in numerous research programs dating back to the Bridger Bowl experiment in the early 1970s. He has been at the University of North Dakota for over 20 years, much of that time being involved with various aspects of cloud physics and weather modification research.

FACULTY ASSOCIATED WITH THE UND CESSNA CITATION II

research scientist Dr. David Delene.

“I prepare and program the instruments,” Delene said. “I wrote the software that collects and analyzes all the data we produce on our research mission. Before each mission I make sure that the instruments are configured correctly, and also I make sure that the processing software will work.”

When he flies aboard the Cessna, Delene runs a pre-flight checklist just like the pilots do. And there's very little time for sight-seeing. Delene and his student assistant are busy facing several racks of computers, routers, and multi-channel data streams, making sure everything is running according to a very detailed plan.

“The data come in as raw voltages and we convert that into usable information, such as temperature, humidity, and wind speeds,” Delene said. “We also have programs that do quality assurance on the data to make sure it's all right. I developed a program that has about 190,000 lines of code using six different computer languages that we use to process the data produced by the instruments on this airplane. Parts of this program are dedicated to specific instruments on this airplane. We record all the data from the airplane together, then we process the information from each instrument, one at a time.”

“The data come in two types, analog, that is, voltages, and serial, or digital, data, and we process both of them,” Delene said. “We have a 32 channel analog-to-digital converter and 16 serial, or digital, data streams. Not all of that capacity is being used all the time.”

This doesn't come cheap.

“This next deployment includes operations expenses for the airplane, starting April 20 for six weeks, into early June,” Poellot said. “The total cost, paid for by NASA, will be a little over \$500,000. We're doing a similar project in Ontario in January for winter snowfall. It'll also cost about \$500,000.”

KEEPING BUSY, PAYING THE BILLS

“There are other ways to keep the aircraft busy,” Poellot said. “One thing we're doing is testing an instrument for Goodrich Sensor Systems. They're developing a system to detect hazardous flying conditions, especially in terms of icing and high concentrations of ice crystals. We're collecting flight test data for them, flying their instrument aboard the Citation.”

The Citation is operated as a cost center - no state dollars go into it, Poellot notes.

“So we have to keep it busy, because there are crew salaries, fuel, insurance, etc., to pay,” Poellot said. “We've got to keep it busy enough to pay the bills. We'll even do missions that don't carry a specific scientific interest for us.”

Over the history of the UND airborne atmospheric program, missions have ranged as far as the Marshall Islands and the African continent.

“We've done a lot of fascinating missions,” Poellot said. “There's been a lot of climate-related research, and work for the National Science Foundation, the Federal Aviation Administration, NOAA, a lot of federal big-ticket types of things, and few private companies like Goodrich, as well as Airbus-related projects dealing mostly with icing

conditions over the ocean.”

RELIABLE RESEARCH PLATFORM

“The airplane is now part of NASA's aircraft catalog,” Poellot said. “There's a blanket purchase agreement in place, so if a NASA program manager wants to use our Citation, it's already pre-approved. We're working on becoming a Department of Energy-approved research platform, which will make us more available to some of their programs.”

WHO FLIES THIS BIRD?

“Wayne Schindler is specially qualified to fly this type of airplane on the kinds of research missions we do; we needed someone experienced in flying a jet aircraft,” Poellot said. “Wayne also is experienced in flying in weather. Such a pilot brings a different understanding to the table than most pilots would have. Wayne also is an experienced airline pilot who also happens to be a licensed aircraft mechanic.”

THE STUDENT CONNECTION

The UND research jet also is programmed into the Odegard School's teaching mission.

“Our research aircraft gives students a chance to become involved in several different ways,” Poellot said. “We have them involved in analysis, that is, helping to analyze the data produced aboard the aircraft. The students process the data that we collect on these projects and they work with faculty on some of the research grants. For example, Andrea Neumann, one of our graduate students, will be flying for the whole mission in Oklahoma, helping to get the data

processed. She'll be helping to run the systems aboard the aircraft, then she'll take a first quick look at the data and then look at it again when we're on the ground, to see what's working and what's not.”

Students, he says, play a key role.

“Students are fully integrated into the operations of this research platform. If ever we have an extra seat available, we'll take a student along and let them help run the instruments as a way of getting some exposure to this type of research. We never have any trouble finding a student who wants to go along on these research flights.”

TECHNICAL DETAILS

The UND-owned and -operated Cessna Citation II is an atmospheric research platform.

The Citation II is a twin-engine fanjet with an operating ceiling of 43,000 feet (13.1 km). The turbofan engines provide sufficient power to cruise at speeds of up to 340 knots or climb at 3,300 feet per minute. These high-performance capabilities are accompanied by relatively low fuel consumption at all altitudes, giving the Citation an on-station time of 3-5 hours, depending on mission type. Long wings allow it to be operated out of relatively short airstrips and to be flown at the slower speeds (140 kts) necessary for many types of measurements. The Citation is certified for flight into known icing conditions.

The cabin measures approximately five feet in diameter and more than 16 feet in length. The minimum flight crew is pilot, co-pilot, and

mission scientist or data system operator. Two additional seats are available for scientific observers.

A series of structural modifications have been made to the basic airplane, including pylons under the wing tips for a variety of probes in the undisturbed air flow away from the fuselage; a gust probe for wind measurement; hard points on the fuselage for instrument mounting; a port for dropsonde release; and air inlet ports for air sampling inside the pressurized cabin.

The aircraft is designed to perform a wide range of atmospheric and meteorological measurements. These include cloud microphysical measurements made with an array of probes such as the Cloud Droplet Probe (CDP), 2D-C Optical Array Probe, High Volume Particle Spectrometer (HVPS)) mounted on the wing-tip pylons and a Cloud Particle Imager (CPI) mounted on the fuselage. These probes measure concentrations and sizes of particles from one micrometer to several centimeters in diameter. In addition, there are probes to measure both liquid water content and icing rate.

WHY A JET?

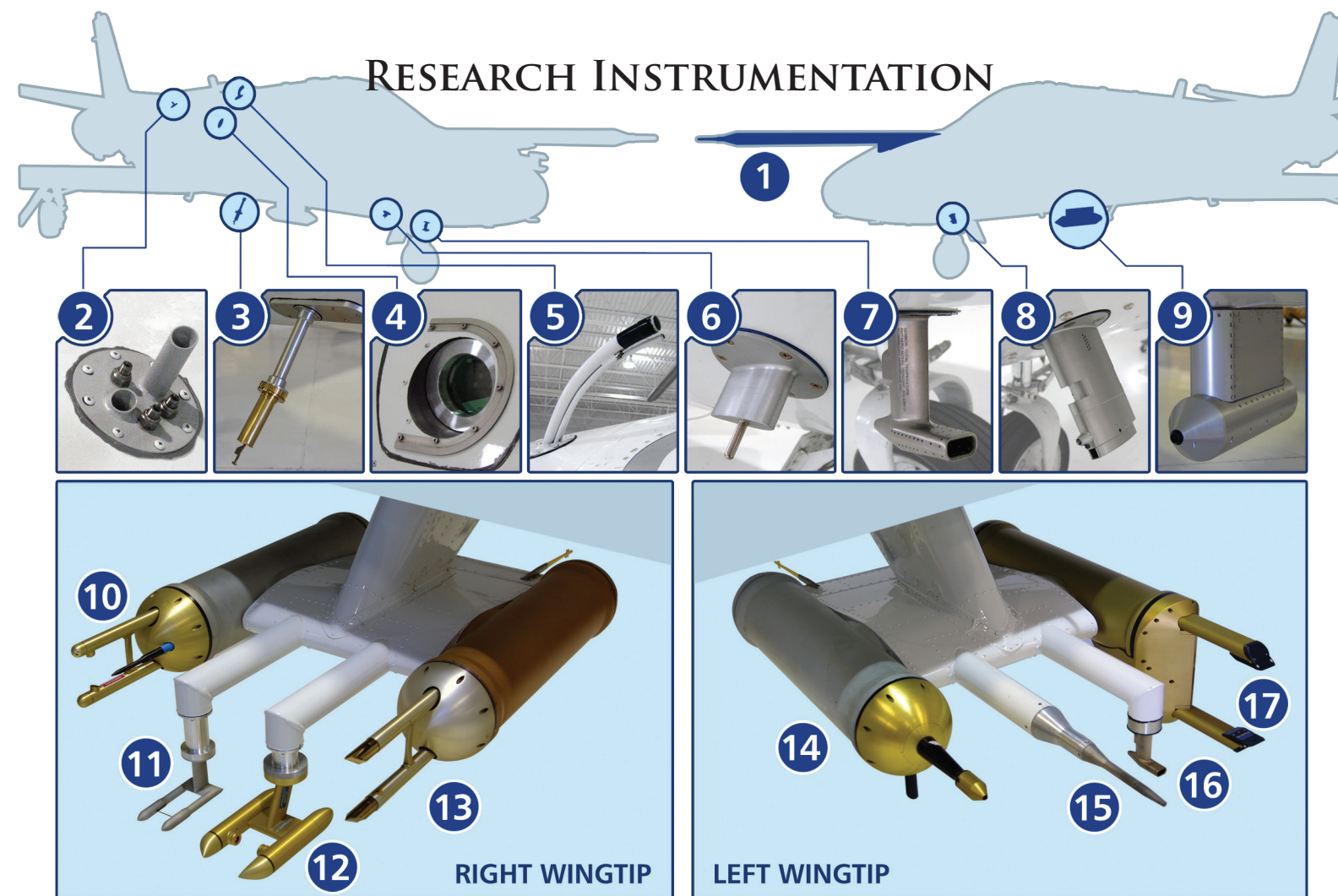
For UND scientists involved in atmospheric research---from cloud

particle studies to the physics of big storm systems---nothing beats getting data right at the source: high up.

A lot of data are gathered by more traditional means. Basic ground observation and note-taking still occupy a place in atmospheric research, which includes meteorology, or weather science, and climatology. Various radar systems scan the atmosphere and produce the dynamic maps that now show up as apps on cell phones and tell us about approaching storm systems. Weather balloons have been going up daily for decades to gather atmospheric data.

Weather and climate satellites with optical and infrared cameras and many other types of sophisticated sensors scan the atmosphere from above. They give us a systematic global bird's eye view that scientists use to predict weather and map global climate change. Computer models help sort through the trillions of bits of data gathered daily by all of these observation methods.

But nothing homes in on the action like an airplane right in the clouds.



1. GUST PROBE

- Measures the motion of the air (gusts) relative to the airplane

2. EXHAUST

- Outside air that is ducted into the cabin instrumentation (see #5) is routed back outside via these exhaust ports

3. NEVZOROV HOT WIRE LWC/TWC PROBE

- Uses a Hot-Wire sensor element to measure both Liquid Water Content and Total Water Content of the air in concentrations from 0.003 to 3 g/m³

4. OPTICAL INSTRUMENT PORT

- Window for side-looking remote sensing instruments

5. INTAKE

- Brings outside air into a tube that runs through the cabin
- Instrumentation in the cabin measures and records the characteristics of this air
- The air then exits the cabin via the exhaust outlet (see #2)

6. ICE DETECTOR

- Uses a vibrating sensing element to detect icing conditions
- Accumulation of ice increases the sensing element's mass, changing the resonant frequency of vibration

7. TAT (Total Air Temperature) PROBE

- Provides accurate outside air temperatures at high speeds and flight altitudes

8. TAMDAR (Tropospheric Airborne Meteorological Data Report) PROBE

- Measures icing, turbulence, temperature, pressure, winds aloft, and relative humidity
- Designed by NASA and AirDat to be installed on commercial airliners, vastly increasing the amount of real-time weather data available

9. CPI (Cloud Particle Imager)

- Uses a three laser system to sample cloud particles from 2.3 microns in diameter and larger (A human hair is about 100 microns (micrometers) wide)

10. CIP (Cloud Imaging Probe)

- Records the shadow images of cloud particles on a 64 element diode array
- Measures the size and shape of particles from 25 microns to 1.55 mm

11. LWC (Liquid Water Content) PROBE

- Uses a Hot-Wire sensor element to measure the liquid water content of the air

12. CDP (Cloud Droplet Probe)

- Measures cloud droplet sizes from 3 microns to 50 microns

13. 2-D CLOUD PROBE

- Measures the size, shape, and concentration of cloud particles
- Samples particles from 50 microns to 1.6 mm in diameter

14. UHSAS (Ultra High Sensitivity Aerosol Spectrometer)

- Uses laser light to measure the size of particles in the atmosphere
- Samples particles from 60 nanometers to 1 micron in diameter

15. PITOT/STATIC TUBE

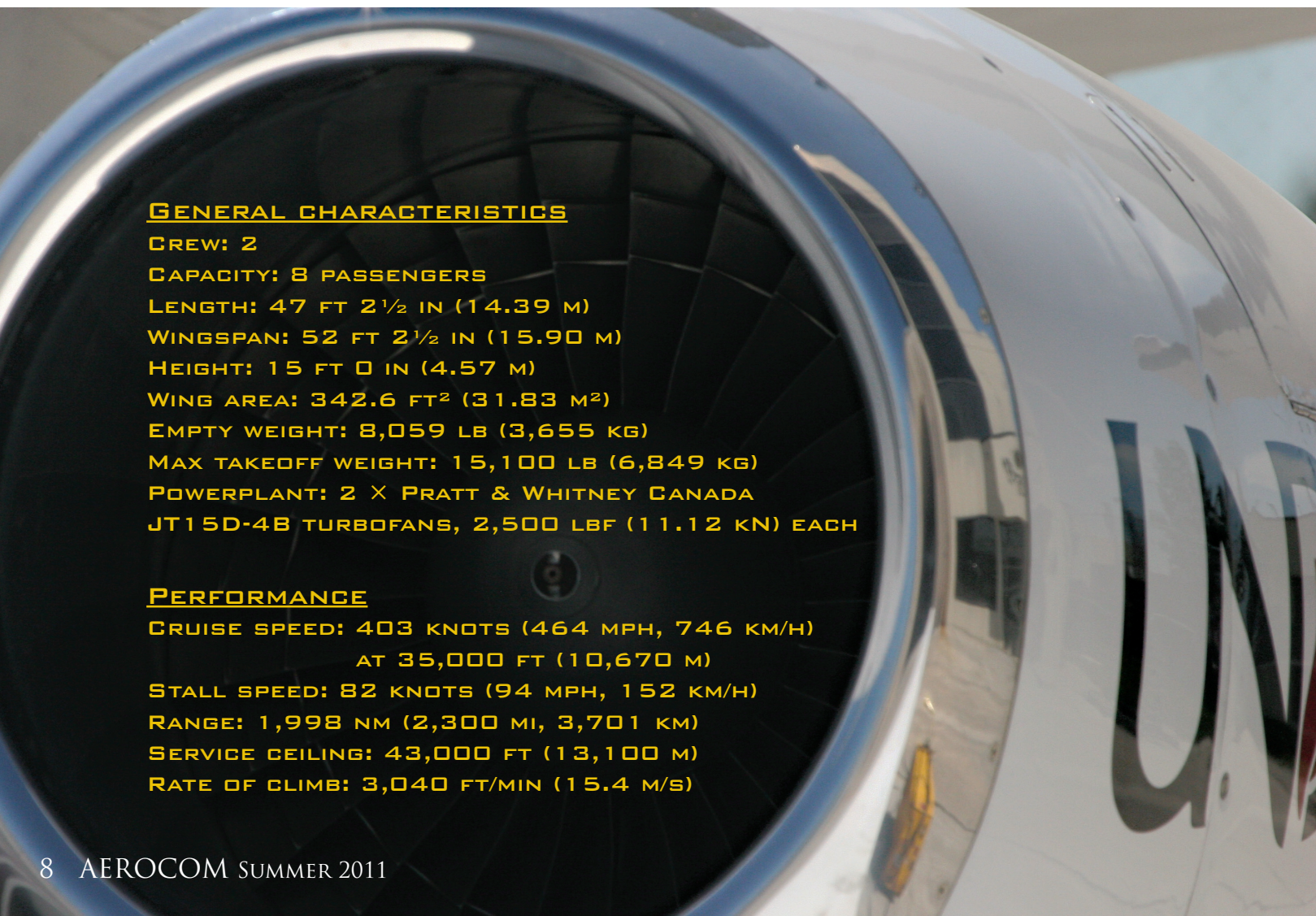
- Measures airspeed for research data, independent of normal aircraft flight instruments

16. TAT (Total Air Temperature) PROBE

- Provides accurate outside air temperatures at high speeds and flight altitudes

17. HVPS-3 (High Volume Precipitation Spectrometer)

- Measures the size, shape, and concentration of precipitation-size particles
- Samples particles from 150 microns to 1.92 cm in diameter



GENERAL CHARACTERISTICS

CREW: 2
CAPACITY: 8 PASSENGERS
LENGTH: 47 FT 2 1/2 IN (14.39 M)
WINGSPAN: 52 FT 2 1/2 IN (15.90 M)
HEIGHT: 15 FT 0 IN (4.57 M)
WING AREA: 342.6 FT² (31.83 M²)
EMPTY WEIGHT: 8,059 LB (3,655 KG)
MAX TAKEOFF WEIGHT: 15,100 LB (6,849 KG)
POWERPLANT: 2 X PRATT & WHITNEY CANADA JT15D-4B TURBOFANS, 2,500 LBF (11.12 KN) EACH

PERFORMANCE

CRUISE SPEED: 403 KNOTS (464 MPH, 746 KM/H)
AT 35,000 FT (10,670 M)
STALL SPEED: 82 KNOTS (94 MPH, 152 KM/H)
RANGE: 1,998 NM (2,300 MI, 3,701 KM)
SERVICE CEILING: 43,000 FT (13,100 M)
RATE OF CLIMB: 3,040 FT/MIN (15.4 M/S)

CAMPAIGN UPDATE

BEECHCRAFT AIRPLANE DONATED TO UND'S AVIATION PROGRAM

Crosby, N.D., businessman and longtime aviator Gary Hanisch recently helped the University of North Dakota boost its world-class aircraft fleet.

Hanisch, a retired banker who's been flying airplanes since his early twenties, donated a Beechcraft Bonanza F-33 to UND for use as transport. The aircraft is valued at \$175,000.

"This is really great for us because it means we are able to provide air service for the University without taking any aircraft out of training service," said Josh Christianson of the UND Aerospace Foundation, which accepted the donation from Hanisch on behalf of UND's John D. Odegard School of Aerospace Sciences. UND operates the world's largest private (non-military) fleet of training aircraft.



"We used that pressurized airplane for a lot of community work, including getting folks who needed special care down to Rochester in the days before that kind of transportation became highly regulated," said Hanisch, who now lives in Bismarck. "For example, we once flew a fellow down there who needed a heart transplant."

Hanisch, a personal friend of the late John D. Odegard, founder of UND's world-renowned aerospace school, said he's closely followed the successes of UND's aviation program.

"The main reason we did this was because of the friendship with John and the growth of the Odegard School since its beginning," remarked Hanisch.

Odegard's widow Diane was on hand at the school when Hanisch and his wife Helen came to officially donate their airplane.

Hanisch, who started flying lessons in December 1956 and has been flying steadily ever since, said he and his dad bought their first airplane--a Cessna 172--the following year. Over the years, Hanisch--whose son Paul received his private pilot license, commercial pilot license, instrument rating, and multi-engine rating at UND flying the family's own airplane--has operated a number of aircraft, including the first fuel-injected Beechcraft V-Tail Bonanza model up to the much larger twin engine Cessna 414.

OMEGA SCHOLARSHIP ENDOWMENT HAS A MULTIPLIER EFFECT

The Odegard Mission of Excellence in Global Aviation Scholarship Endowment established in 2010 will provide scholarship dollars for ambitious, capable and dedicated aviation students that simply lack the financial means to achieve their dream of an aviation degree.

The UND Aerospace Foundation will match contributions 1:1 designated to this endowment, which doubles your gift. If you work for a matching gift company such as those listed, the UND Aerospace Foundation will match your employers match too. Now you've quadrupled your gift!

To contribute to the OMEGA Scholarship Endowment, or for more information on matching gifts contact Josh Christianson, UND Aerospace Development Director at 701-777-4637 or joshc@aero.und.edu

MATCHING GIFT COMPANIES

Is your employer one of these? If not, check with your HR Office to see if your employer has a matching gift program.

Boeing	GE
Cessna	General Mills
Delta Airlines	Goodrich
Alaska Airlines	Northrop Grumman
Horizon Air	Raytheon

ODEGARD SCHOOL PASSES \$8.5 MILLION MARK TOWARDS CAMPAIGN GOAL

We are pleased to announce that two recent significant gifts have pushed the Odegard School over \$8.5 million raised towards its \$20 million goal within the North Dakota Spirit Campaign. North Dakota Spirit – the Campaign for UND was publicly announced in October of 2010 with a cumulative goal of \$300 million. The goal is spread among students, programs, faculty and facilities across campus and in each college.

Si and Betty Robin made a gift to build the Si and Betty Robin Research Laboratory at the John D. Odegard School of Aerospace Sciences which will provide dedicated space for student and faculty to conduct aviation-related research. The Robins own and operate Sensor Systems which designs and manufactures over two hundred and fifty types of antennas that are used by the majority of aircraft throughout the world including Airbus, Cessna, Boeing, General Atomics Aeronautical Systems, Northrop Grumman, and Honeywell.

A gift from long-time supporter and benefactor James Ray will construct a Helicopter Hangar within the Odegard School's Flight Operations facilities at the Grand Forks International Airport. The new hangar will be built south of the current James Ray Line Hangar on the east side of the airport. The 15,000 square foot structure will include hangar and office space. Relocating the helicopter program in a dedicated building provides increased efficiency of launches and a safer airport ramp environment. This also allows their current space to be utilized by the fixed-wing program.

These new facilities represent significant investments in the reputation, capabilities and growth of our programs.

NORTH
DAKOTA
SPIRIT
THE \$300 MILLION CAMPAIGN FOR UND

North Dakota Spirit is
PASSIONATE

Scholarships spark the fire of a UND education for many ambitious students who might not otherwise have the opportunity. When you support the North Dakota Spirit campaign, you provide critical funding for student scholarships, and make invaluable experiences affordable and rewarding.

Share Your Spirit: spirit.UND.edu | 800.543.8764
UNIVERSITY OF NORTH DAKOTA FOUNDATION | UND THE UNIVERSITY OF NORTH DAKOTA



A Bright Future

Juan Miguel Pedraza

The smile was glued on Erika Hiddinga for the better part of her first airplane ride. That was a three hour commercial airline trip when she was 12, about 10 years ago. Hiddinga, in the home stretch of a five-year double-major in commercial aviation and aviation management at the University of North Dakota, said she was hooked right then and has been passionate about flying ever since.

The Rochester, Minn., native who was born in Laramie, Wyo., says that passion drove her to UND, a school well known among aviation enthusiasts for its stellar training program.

“UND has a such a major reputation, it’s the No. 1 school,” said Hiddinga, who recently made the elite grade of certified flight instructor (CFI) at UND. “That plus the fact that you can get a

liberal arts degree, instead of just getting a pilot’s certificate, is what made me decide to come here. It’s been terrific for me.”

Hiddinga still smiles eagerly when the talk is about airplanes, flying, and anything else to do with aviation.

“I just love it,” she said. “When I was 16, my parents bought me an introductory flight in Rochester, it was an hour-long flight during which I saw my house. I thought it was very cool and it reaffirmed that’s what I wanted to do. So I came up here to UND and got right into it.”

Despite the long days and the time commitment, Hiddinga says it’s all worth it.

“Now that I’m a flight instructor and get paid for flying and accumulating hours, I realize that all that work paid off,” she said. “Now, after building up some hours flight instructing, I plan to go with a regional airline and build up more hours.”

Eventually, she’s looking at logging at least 1,500 hours in the cockpit so she can pursue another long-time ambition: join the National Transportation Safety Board (NTSB) as an accident investigator.

“You have to build up a lot of hours before you can apply to the NTSB,” said Hiddinga, who plans to obtain an aviation mechanics ticket--what’s called an “Airframe and Powerplant”, or A&P, certificate--along the road to the NTSB. “I’ve always been interested in criminology, too. I think doing accident investigations would be right up my alley. It’ll take a couple more years in school for the aviation mechanics part of it.”

Flight instruction at UND involves the country’s largest civilian fleet of training aircraft--about 140, including airplanes, helicopters, and simulators, both here at UND and at the University’s satellite aviation training facilities at Crookston, Minn., Phoenix, Ariz., and Spokane, Wash.--and about 230 CFIs.

This level of training resources clearly puts UND ahead of the pack, notes Dr. Bruce Smith, dean of the UND John D. Odegard School of Aerospace sciences.

For Hiddinga, who earned a scholarship to train in UND’s jet passenger plane simulator, that level of commitment to students was a key factor in her success. Now as a flight instructor at UND, she plans to put all that training to excellent use with the next generation of student pilots.

“We have to provide training for students both on the ground and in the air,” she said. “On the ground, you go through the regulations, maneuvers, and the proper set-ups; in the air, you go through the maneuvers and learn cockpit procedures. We really do a lot of training on the ground prior to flight and we do a lot of simulator work, as well. We want to make sure that students understand everything and that they’re able to use those skills in the cockpit. For me as an instructor, the important thing is to maintain safety and performance standards and make sure that students are up to those standards.”

Bottom line is that Hiddinga would handily recommend UND’s aviation program to anyone considering a flight training program.

“This is such a great program because not only do you become an aviator, but you get a worthwhile degree, as well,” she said. “Once you’ve been here awhile, it’s kind of a family. You get to know everyone and it’s kind of a fun atmosphere. Everything is very well organized and set up well, and they’ve got good scholarship programs.”

As she heads toward a career in the airlines with her UND aviation diploma, Hiddinga sees a bright future ahead.

STUDENTS IN THE FIELD AND SKY.....

Devils Lake, North Dakota, is a typical small North Dakota town with a very atypical problem. The adjacent lake, from which the town takes its name, has been flooding since 1993. In an unprecedented and dramatic fashion, the lake has risen nearly 30 feet since 1992, and for the past 18 years the community has struggled to survive against the ever-rising lake. Many state and federal agencies have worked tirelessly to prevent the City of Devils Lake from flooding; however, their successful efforts to prevent the catastrophic flooding of Devils Lake have come at an enormous cost. Since 1994, approximately \$1.2 billion has been spent on infrastructural mitigation and other projects around Devils Lake.

While much has been done to accurately determine the costs and potential solutions to Devils Lake flooding, UND Earth System Science and Policy graduate student **David Barta** has focused his thesis on making them cheaper. Barta's work grew from his realization that the amount spent protecting the City of Devils Lake has already surpassed the cost of relocating the entire city. This led him to question how these socioeconomic decisions were being made within the current political process and what factors could be manipulated in order to better illustrate the long-term costs involved in mitigating a long-term climate hazard like Devils Lake flooding.

"The problem with Devils Lake (City) is that it's built in the cyclical confines of the Lake," said Barta. "That's not to say that moving the city is the answer to the problem, but rather an alternative against which we can assess the effectiveness of the policy decision paradigm. Relocation carries a big price tag, but benefits from the elimination of flood risk. Building dikes and other infrastructural mitigation is a cheaper one-time cost, but it doesn't eliminate the risk of future flooding from increased lake levels. This is especially problematic because the

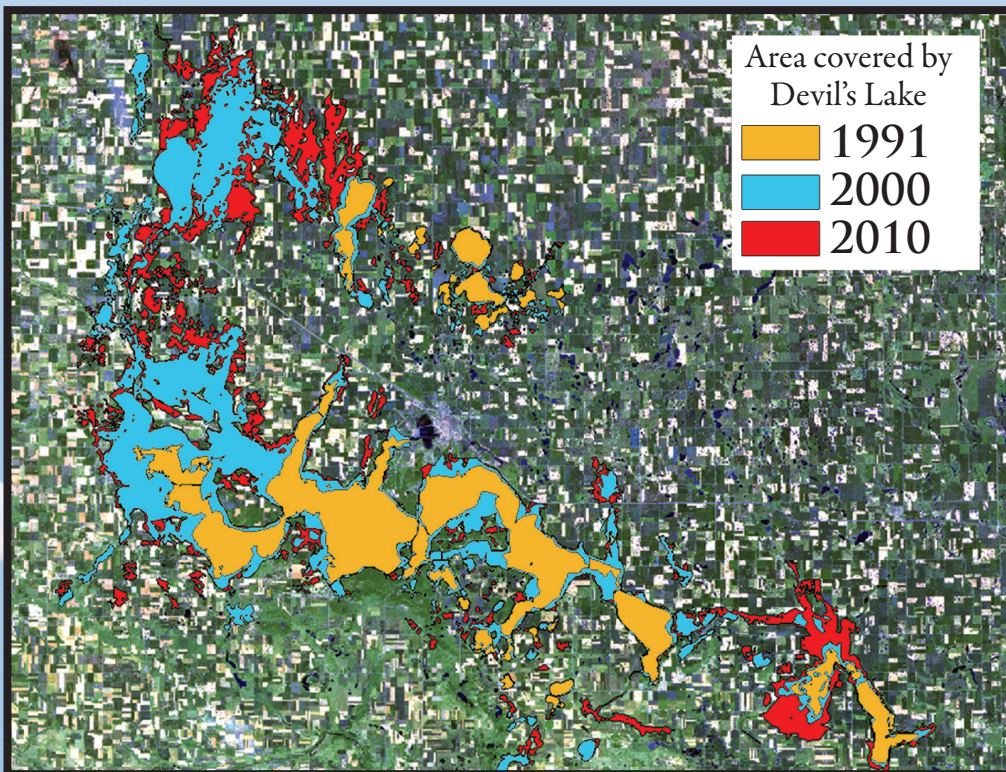
uncertainties surrounding the magnitude and duration of the lake level rise have increased the annual costs of mitigation enormously, so much so that relocating a city of 10,000 people has become cheaper in the long-term. This is something we should try to avoid."

Based heavily in economic theory, Barta's thesis hopes to identify methods that could be used to more accurately ascertain the contemporary value of future annual mitigation expenditures, as weighted by the likelihood of lake level rise and the future value of capital. This would allow policy makers a greater ability to compare the costs of alternatives from a long-term perspective, and hopefully, lead to more sustainable and resilient decision making.

Driven by the desire to allow decision makers a better perspective, Barta stresses the importance of utilizing past experience for the benefit of future generations. "It's easy to look at the past and say what could be done better. The people helping Devils Lake have done an outstanding job. Yet, with a few changes and a little different perspective they could have done everything cheaper, making it easier to get needed funds and saving a great deal of worry. What I'm hoping to do is use the past to allow us to make better, more efficient decisions in the future."



David Barta is a Graduate Student with the Earth System Science and Policy Department. Questions about his research can be sent to him at david.barta@und.edu.



JDOSAS NOTES

The UND Aerospace Foundation has received the International Organization for Standardization ISO 9001:2008 certification on Oct. 26, 2010. ISO 9001:2008 is a stringent internationally recognized standard of quality management. This ISO certification is significant to The UND Aerospace Foundation because it depicts their continual commitment to delivering top quality services.

UND Aerospace graduated five students from the nation's first Unmanned Aircraft Systems area of study at commencement on Saturday, May 21st. "Unmanned aircraft are having a profound impact on aerospace," said Bruce Smith, dean of UND Aerospace. "We're on the leading edge of UAS development. We now have 44 students signed up as majors and 78 students signed up for our UAS introductory course."

University of North Dakota aerospace engineer and researcher Pablo de Leon is part of a unique mission to test a UND planetary exploration suit, the NDX-1, at a remote military base in Antarctica. The team departed for the Antarctic base from an Argentine Air Force site in mid-March. This "Spaceward Bound Mission" unites UND, NASA, and the Argentine Air Force at Marambio Base on Seymour Island, Antarctica.



BE THERE!

SATURDAY, SEPTEMBER 17, 2011 at 12:10 PM
TARGET FIELD

Join students, faculty, staff, alumni and friends of UND as we cheer the Minnesota Twins on to a victory against the Cleveland Indians.

Be there to:

- See who's throwing out the first pitch
- Hear the Varsity Bards sing the national anthem and lead the seventh-inning stretch
- Join in on other great game day events

Who's throwing the first pitch



For more information UND.edu/twins



UND and me
Dave St. Peter
Minnesota Twins President
B.A. in Communication
The University of North Dakota



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UND Aerospace merchandise headquarters



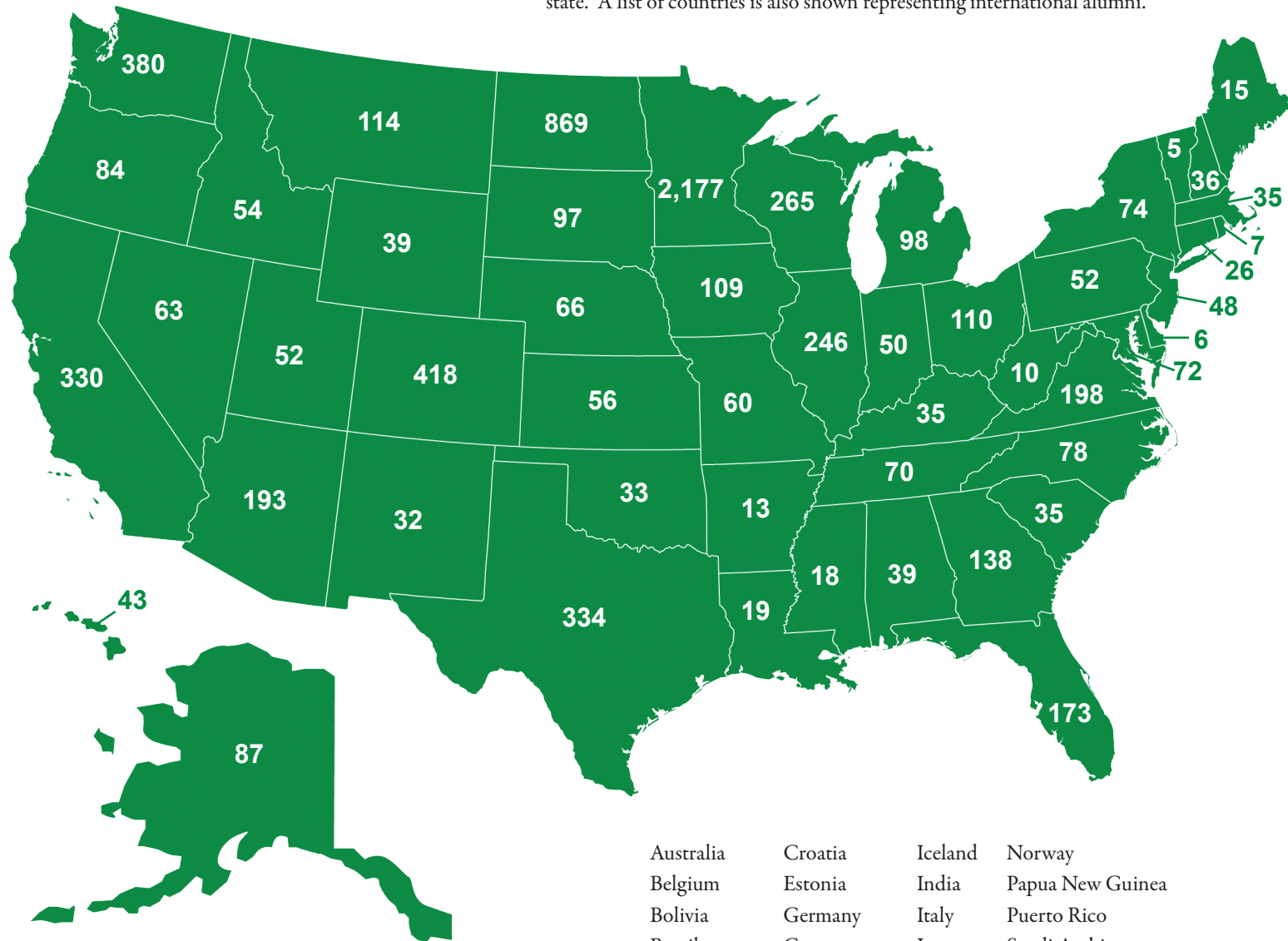
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ALUMNI PROFILE

Throughout the world you can find Odegard School Alumni

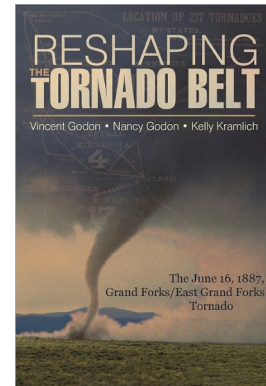
This map indicates the number of UND Aerospace alumni living in each state. A list of countries is also shown representing international alumni.



- | | | | |
|-----------|-----------|---------|------------------|
| Australia | Croatia | Iceland | Norway |
| Belgium | Estonia | India | Papua New Guinea |
| Bolivia | Germany | Italy | Puerto Rico |
| Brazil | Greece | Japan | Saudi Arabia |
| Canada | Guam | Mexico | St Lucia |
| China | Hong Kong | Nigeria | Sweden |

AERONews

UND Atmospheric Science Alumni Publish Book: Reshaping the Tornado Belt



Vincent Godon, '91, Nancy (Jeurissen) Godon, '91, '95, and Kelly (Kramlich) Serr, '08, published *Reshaping the Tornado Belt*, a book about a tornado that devastated Grand Forks, East Grand Forks, UND, and the surrounding area in June 1887. The book not only details the tornado, but also digs into the history and important people who helped build Grand Forks, East Grand Forks, and UND. It dispels the myth that a tornado has never struck Grand Forks or East Grand Forks, and it provides an interesting story that weaves together the regional development and rivalries of the time. Vince and Nancy reside in Grand Forks, and Kelly lives in Aberdeen, South Dakota. Learn more about *Reshaping the Tornado Belt* at www.reshapingthetornadobelt.com.

UND & Corsair Engineering team up for training on nation's first four-year UAS degree

Students pursuing a UAS major at UND are using the ScanEagle UAS as an example platform to learn mission employment and operational techniques through the use of high-fidelity simulation. The ScanEagle simulator was created jointly by Corsair and the aircraft's manufacturer to accurately represent the experience of flying the real aircraft. Experience with this level of training and technology will keep UND students ahead of the curve as they look to launch their careers in the UAS industry.

The collaboration teams UND with a highly innovative corner of the private sector. Corsair Engineering is a top developer of advanced training systems. UND is utilizing the Web-based Interactive Multimedia Instruction (IMI) developed by Corsair Engineering. The IMI is part of Corsair's industry leading Integrated UAS Learning Environment that also includes a Learning and Training Management System, high-realism simulators, hands-on practical exercises and actual flight training to dramatically enhance training effectiveness and retention.

Together the team forms a strong foundation to provide students with top tier training.

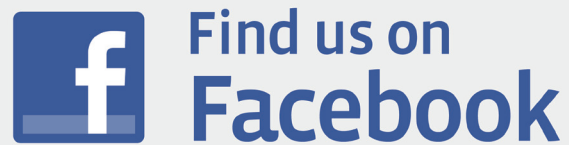
"At UND Aerospace, it has always been our mission to provide the highest level of aviation education," said Dick Schultz, director of UND Aerospace Flight Operations. "Utilizing the most advanced equipment has always yielded the best results, which is why the ScanEagle was an obvious choice as our training platform."



"UAS is the next evolution of the aerospace industry. This partnership will allow our students to begin their careers at the forefront of this emerging industry," said Mark Hastings, chief UAS pilot with UND Aerospace Flight Operations.

The first group of eight students completed academics and flight training on March 4, 2011. During the eight-week sessions students spend three hours per day, five days a week in the ScanEagle simulator progressing from basic flight operations to advanced sensor techniques and emergency procedures, and finally, to mission employment scenarios.

"We are eager to capitalize on feedback from our first semester of students and industry employers as our graduates move into their careers, we're constantly looking for ways to make this course and program the best possible value for the students," said Hastings.



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Be sure to check out what is happening at your alma mater and become a "fan."



Since last October, things have actually been a bit quiet for the Aerospace Alumni Advisory Board. However, we did have a very exciting fall meeting in Grand Forks during Homecoming 2010. At the Friday evening reception we unveiled our new AAAB logo and we recognized our AAAB past presidents with an original brick from Odegard Hall. We also recognized Jonathan Blumhorst who is the architect of our AAAB Facebook page and updated website. At our AAAB meeting on Saturday morning, we had sixteen Board members and guests in attendance plus six Board members calling in. During our meeting, we voted in our newest Board members who are Jennifer Storm '02 & '04 and Jay Bushouse '00.

We continue to work with the school on the six "Tracks" or curriculum focus areas and we have AAAB members assigned to support each Track. The six Tracks are; Aviation Safety and Security, Aviation Education and Training, Aviation Law and Policy, Commercial Aviation, Air Traffic Control and Business Aviation Management. The goal of each AAAB member assigned to each Track is to communicate on a regular basis with the faculty lead/point of contact to understand and support each Track as needed. Each team provides an update to the AAAB at each of our two meetings so we can keep current with the program.

We plan to hold our Spring Board meeting in the Twin Cities from 0800-1200 on Tuesday, May 10th. The meeting will be hosted by Goodrich at our Burnsville, MN facility. We will also have a dinner on Monday evening, May 9th for those Board members who make the

trip and arrive in time for dinner. We have a few new Board member candidates to consider for membership as well as a few changes in our Executive committee. I encourage all Board members to attend the meeting or to call in and join the discussion. Logistics for the meeting will be provided to Board members under separate cover.

As stated in previous AEROCOM updates, the AAAB is open to all Alumni who have an interest in serving in an advisory role to support the Odegard School. We welcome all Aerospace disciplines to join our ranks. If you have an interest in joining the Board, please send an e-mail to me at the address shown below with a brief description of your career experience since leaving UND. Please copy Josh Christianson at joshc@aero.und.edu and our AAAB Secretary/Treasurer, Rich Baker at leipzig06@comcast.net. Also, don't forget to look us up on Facebook!

As we look toward the remainder of 2011, we will continue to work to find ways to better support the Odegard School. We encourage faculty, students and Alumni to contact the Board and take advantage of the tremendous breadth of experience resident in our Board members. Many of our Board members travel to UND frequently and would welcome the opportunity to support faculty and students during those visits. We also look forward to opportunities to support the new UAS Center of Excellence. Any Alumni having an interest in this area should contact Josh, Rich or me as well.

Brian Gora ('83)
President, Aerospace Alumni
Advisory Board
brian.gora@goodrich.com
(President, Goodrich
Corporation, Sensors and
Integrated Systems Division)



ALUMNI ADVISORY BOARD MEMBERS

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Rich Baker '00 – vice president
Erin Olson '05 – secretary/treasurer
Kurt Jensen '79 – past president

Joel Aiken '92
Chad Anderson '98
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Andrew Miller '93
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John Odegard '89
Erin Olson '05
Rob Schermerhorn '86
Josh Shields '00
Corey Stephens '99
Justin Stimpson '01
Richard Stork '04
Joseph Stubbe '02
Jeff Swing '96
Nicholas Tomlin '94

June 9 Seattle, WA	UND Alumni Reception 6-9 PM Space Needle
July 25-29 Oshkosh, WI	EAA AirVenture
July 27 Oshkosh, WI	UND Aerospace Alumni & Industry Reception 6-9 PM, Hilton Garden Inn
September 16 Minneapolis, MN	UND Aerospace Alumni Reception
September 17 Minneapolis, MN	UND on Target with the Minnesota Twins Target Field
September 21-24 Hartford, CT	AOPA
October 10-12 Las Vegas, NV	NBAA 64th Annual Meeting & Convention
October 10 Las Vegas, NV	UND Aerospace Alumni & Industry Reception
October 17-23 Grand Forks, ND	UND Homecoming
October 21 Grand Forks, ND	UND Aerospace Alumni Reception 5-7 PM, Alerus Center
October 22 Grand Forks, ND	UND Aerospace Alumni Advisory Board meeting 8-11:30 AM, Odegard Hall Room 244
November 5 Chicago, IL	UND Aerospace Alumni Reception

upcoming EVENTS

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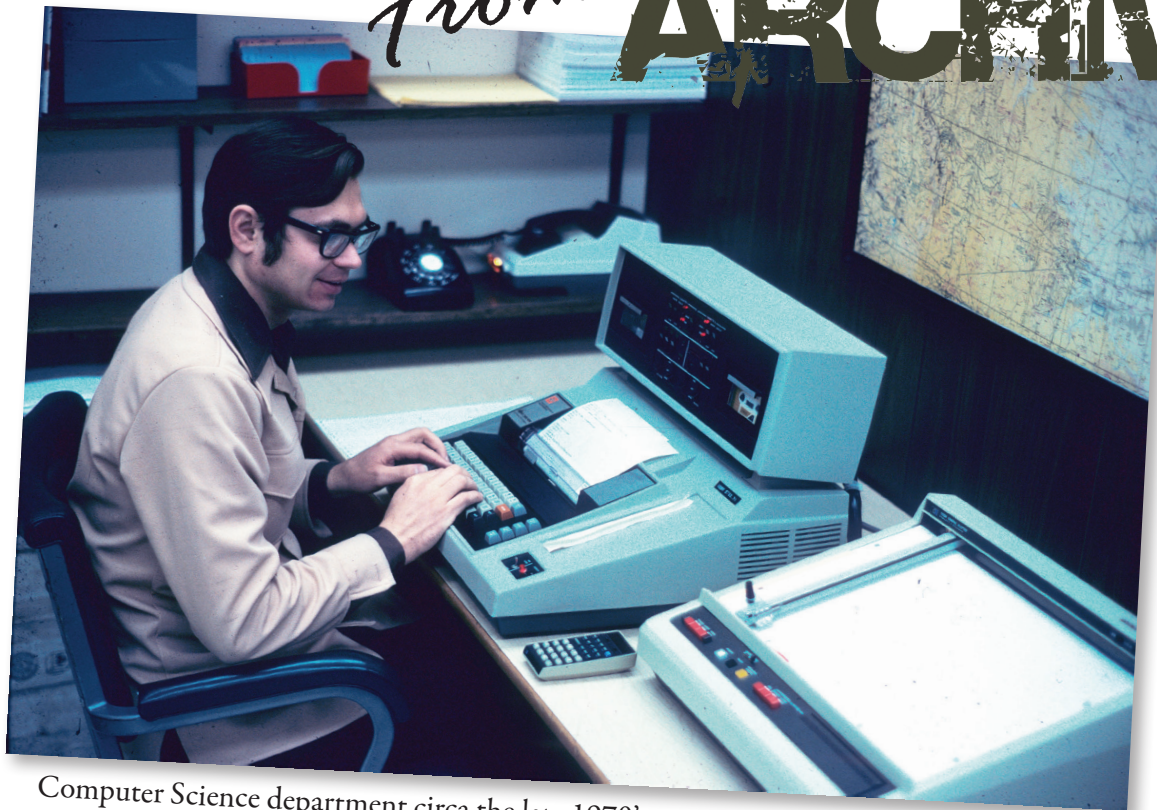
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Computer Science department circa the late 1970's.