

March 18, 2008

Dear North Dakota Citizen,

What follows is a preliminary report on North Dakota's Centers of Excellence program activities to date, pending an economic impact study detailing the Centers' direct and secondary effects on the larger state economy.

This report provides information about private sector investments, direct job creation and, when available, total payroll. However, the total economic impact and job creation of the program awaits a report by NDSU professor of applied economics Dr. Larry Leistritz.

This document covers the time period from the date each center first received state funding until Dec. 31, 2007. The North Dakota Department of Commerce received comprehensive annual reviews from each Center by the end of February. Using these reviews, this document outlines the background, history, governance and preliminary economic impact of the whole Centers of Excellence program. It also describes the purpose of each center, status, private-sector partners, job creation and highlights. In order to reflect the maturing of the program over time, we organized Centers into three categories: Centers that are operational, in the early stages, and those that are under development.

The Commerce Department takes its role of monitoring this program very seriously. We have worked to provide a report that is simple, thorough and concise in order to allow policy makers and the public to effectively evaluate the progress and status to date of this important long-term program to encourage economic growth and diversity.

Sincerely,



Shane Goettle
Commissioner
North Dakota Department of Commerce

Preliminary
North Dakota
Centers of Excellence
2007 Annual Report

John Hoeven, Governor
Shane Goettle, Commerce Commissioner
William Goetz, Chancellor of ND University System

Centers of Excellence Commission Members

Mark Nisbet, Chairman
Kathy Gaddie
Tim Hennessy
John Q. Paulsen
Pam Kostelecky
Duaine Espegard

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Introduction

In 2005, the Hoeven Administration proposed and the Legislative Assembly passed authority for a Centers of Excellence concept to combine education and economic development across the state at North Dakota's 11 public colleges and universities.

What follows is a preliminary report to date on North Dakota's Centers of Excellence program activities, pending an economic impact study detailing the Centers' direct and secondary effects on the larger state economy. It provides information about private sector investments, direct job creation, and when available, total payroll. However, the total economic impact and job creation of the program await a report by NDSU professor of applied economics Dr. Larry Leistritz.

The concept behind a Center of Excellence is simple: Partner our campuses with business. Invest in the infrastructure and research capacity at our state's colleges and universities and then unleash our world-class students and scientists to find ways to commercialize new ideas into products, skills and services that can create and attract new businesses and career-path jobs.

These hubs of research and technology provide a nucleus for business clusters across our state. They represent a new force for economic growth. This model is new to North Dakota but the first Centers of Excellence program originated more than 50 years ago in California and spawned the world-famous cluster of technology research, innovation and business concentration known as the Silicon Valley.

Today, this model is being aggressively pursued across America. Centers of Excellence are engines of new economic activity in North Carolina, Texas, Connecticut, Massachusetts, Oregon, California, and Minnesota. The state of Utah, a relatively small state like North Dakota, has a Centers of Excellence program. Their research universities have produced the Jarvik artificial heart and CD-ROM technology.

In establishing this program, legislators spelled out a long-term vision with a 10-year time-frame for evaluation. This report shows the results to date of the state's investment in the Center of Excellence program.

The total state investment of \$23 million has been leveraged by nearly \$100 million in matching funds from the private sector and other sources -- more than twice the required two-to-one match. Eleven Centers have been approved by the Center of Excellence Commission and received funds to date. They have helped attract funds to North Dakota's campuses for public-sector and private-sector projects dealing with renewable fuels development, energy workforce training and technology, aerospace, electronics, advanced manufacturing and other technical research and development areas.

Two Centers are fully operational, nine are in the early stages, three Centers are under construction and two Centers have been authorized for new funding but have not yet received funds.

Investments in the Centers of Excellence to date have resulted in 13 new or expanded businesses: three new spin-off companies, seven companies with a new presence in North Dakota, and three expansions of existing North Dakota companies. In addition, total job creation for the program is 3,500 jobs: 2,500 direct jobs projected; 500 new jobs already created with an estimated payroll of \$21 million; and 500 new jobs currently supported through partnerships and collaborative relationships with the Centers. The total impact of the Centers of Excellence initiative will be calculated by NDSU, and the results will be completed this fall.

Centers of Excellence Summary

Status of Projects:

Two Centers are operational

- University of North Dakota Center for Innovation
- North Dakota State University Technology Incubator

Nine Centers are in the early stages

- North Dakota State University Center of Excellence for Agbiotechnology
- University of North Dakota Unmanned Aircraft Systems Center of Excellence
- Valley City State University Institute for Customized Business Solutions
- UND Energy & Environmental Research Center National Center for Hydrogen Technology
- North Dakota State University Center of Advanced Electronics Design & Manufacturing
- Lake Region State College Dakota Center for Technology-Optimized Agriculture
- North Dakota State University Center for Surface Protection
- Dickinson State University Strom Center for Entrepreneurship and Innovation – Institute for Technology and Business
- Williston State College Petroleum Safety and Technology Center

Three Centers are under development

- North Dakota State University Beef Systems Center of Excellence
- University of North Dakota Center of Excellence in Life Science and Advanced Technologies
- Bismarck State College National Energy Center of Excellence

Two Centers have been authorized for new funding but have not yet received funds.

- Minot State University Great Plains Knowledge and Data Center
- University of North Dakota Center of Excellence for Biomedical Device Research, Development, and Commercialization

Four of the existing Centers have been approved for follow-on funding for either expanded or new projects, which has not yet been received. These include North Dakota State University Center for Agbiotechnology; North Dakota State University Center for Surface Protection; University of North Dakota Unmanned Aircraft System Center of Excellence; and Lake Region State College Dakota Center for Technology-Optimized Agriculture.

Funding:

- \$23 million in state funding has been leveraged with \$100 million in private sector support for a total investment of \$123 million.

Private Sector Partners:

- A total of 72 private sector partners are participating in the Centers of Excellence program.

New Businesses:

- 16 new or expanded businesses
- 12 new companies have been created to date as a result of the Centers of Excellence (five spin-offs and seven companies with a new location in North Dakota)
- 4 companies have expanded as a result of the Centers of Excellence program.

Jobs:

- Total direct, supported and projected job creation is 3,500
- 2,500 new direct jobs are projected
- 500 new direct jobs have already been created, with annual payroll of \$21 million (average salary: \$42,000)
- The Centers currently support another 500 new jobs through partnerships

Economic Impact:

- Preliminary economic impact data is provided by some of the Centers in their individual summaries. However, NDSU will use data assembled by the Department of Commerce from the Centers of Excellence to calculate the total economic impact of the program. The economic impact study will be completed by this fall and presented to the Legislature.

Centers of Excellence at Work:

A closer look at a few of the Centers provides greater insight into some of the promising work to support new start-ups, generate private-sector driven research, and provide workforce support for North Dakota businesses that are hungry for trained talent.

- The Center for Innovation at UND and the NDSU Technology Incubator are housing a combined 30 projects and supporting more than 200 jobs.

- Canola research at the NDSU Center of Excellence for Agbiotechnology will help North Dakota canola growers increase revenues by up to \$66 million per year at current planting levels. This is the equivalent of 400 direct high-paying jobs.
- A partnership between the NDSU Center for Advanced Electronics Design and Manufacturing (CAEDM) and Appareo Systems resulted in three projects involving building of prototypes for seven unique printed circuit boards for initial market opportunity analysis. Appareo indicated that CAEDM is the first partner able to keep up with the fast pace of product development and prototyping.
- Valley City State University's Institute for Customized Business Solutions has provided customized training resulting in the creation of 100 jobs at Eagle Creek Software and two jobs at Volt for total payroll of nearly \$4.4 million.
- Marvin Windows & Doors has been able to retain their jobs and business activities in a downward, contracting industry with assistance from the NDSU Center for Surface Protection.
- Dickinson State University's Strom Center for Entrepreneurship and Innovation has provided support for 95 jobs with \$2.2 million in total payroll at Killdeer Mountain Manufacturing (KMM), the Center's primary private sector partner.

Background

North Dakota legislators authorized funding for several pilot Centers of Excellence projects in the 2003 session before authorizing the full program. Those were the UND Center for Innovation in Grand Forks, the NDSU Center for Technology Enterprise and the NDSU Beef Systems Center of Excellence in Fargo. The Beef Center obtained its required private sector match in 2006, which only then allowed it to receive the previously authorized state funds.

In 2005, the Legislature approved Senate Bill No. 2032 expanding this concept into the Centers of Excellence in Economic Development program. It was proposed by Governor Hoeven and included in a package of initiatives advanced by House Majority Leader Rick Berg and the interim Economic Development Committee. The package called for a \$50 million state investment over multiple biennia to be leveraged on a 2-to-1 basis with private sector and federal dollars.

The Legislature approved \$20 million for the initiative in the 2005-07 biennium, which launched 11 different Centers throughout the state. These Centers are operating or under development at North Dakota State University, University of North Dakota, Bismarck State College, Lake Region State College, Valley City State University, Williston State College and Dickinson State University.

Management and Oversight of Centers of Excellence

The Centers of Excellence project is overseen by a Commission comprised of members from the State Board of Higher Education and the North Dakota Economic Development Foundation. The Centers of Excellence Commission manages the application process and makes funding recommendations for projects.

North Dakota Economic Development Foundation:

Mark Nisbet, Chairman, North Dakota Principal Manager for Xcel Energy, Fargo

Kathy Gaddie, dealer operator of Ryan Chevrolet, Minot

Tim Hennessy, Regional president for U.S. Bank in Western North Dakota, Bismarck

State Board of Higher Education members:

Duaine Espgaard, retired regional president, Bremer Financial, Grand Forks

John Q. Paulsen, retired executive vice president of MeritCare Medical Group, Fargo

Pam Kostelecky, president and general manager of Sax Motor Co., Dickinson

Selection Process

Each proposed Center must complete an extensive application and approval process. The Centers of Excellence Commission reviews each proposal first, recommends whether or not it should be funded and stipulates any conditions for funding.

The Centers of Excellence Commission approves proposals based on the extent to which they meet the following criteria:

- Uses university or college research to promote private sector job growth, expansion of knowledge-based industries and development of new products, high-tech companies, or skilled jobs.
- Promotes commercialization of new products and services;
- Fosters and practices entrepreneurship;
- Creates high-value private-sector employment opportunities in the state;
- Provides public-private sector involvement and partnerships;
- Leverages other funding;
- Increases research and development activities that involve federal funding;
- Will become financially self-sustaining; and
- Establishes and meets deadlines for acquiring and expending all public and private funds specified in application.

Proposals must include detailed documentation of private-sector participation and the availability of \$2 in matching funds for each \$1 of state funds. Matching funds may include dollars raised in collaboration with private-sector partners and other funding entities and may include cash and in-kind assets with itemized value. Private sector participation may be established through equity investments or through contracts for services with private sector entities. In making recommendations, the commission, board, foundation, and budget section will give major consideration to the portion of the matching funds provided in cash by the private sector.

Each approved proposal is passed to the North Dakota Economic Development Foundation Board, the State Board of Higher Education and the Legislature's Budget Section for approval.

Accountability

A Center must use the funds to enhance capacity and infrastructure and leverage state, federal, and private funding sources. A Center may not use the funds to supplement funding for current operations or academic instructions or to pay indirect costs. Each Center is allowed only one round of funding per biennium.

The Centers of Excellence Commission is responsible for monitoring the Centers with assistance from the North Dakota Department of Commerce. The process includes an in-depth annual review of each Center and report on the results to date. Additionally, the Centers provide Commerce quarterly reports on major developments, timelines and substantial variations from their proposal.

Operational Centers of Excellence

The North Dakota State University Center for Technology Enterprise in Fargo and the University of North Dakota Center for Innovation in Grand Forks were funded prior to the creation of the Centers of Excellence Commission. They received funding direct from the legislature and therefore the Centers of Excellence Commission has no jurisdiction over them.

These two projects are not required to complete the annual review, but voluntarily submitted to Commerce status reports of their key activities.

UND Center for Innovation

Prided as the first North Dakota Center of Excellence, the Ina Mae Rude Entrepreneur Center opened in January 2005 and supports North Dakota entrepreneurs by assisting in the launch of new ventures, commercialization of new technologies and securing access to capital from private and public sources. In 2003, the Legislature allocated \$800,000 to support the Entrepreneur Center at the Center for Innovation.

Funded: October 2003

Total Match: \$3.5 million

Highlights:

- Since January 2005, the Center for Innovation has assisted in the creation of 144 jobs with an estimated total payroll of \$6.95 million from 46 businesses.
- The Center is currently housing 22 businesses and has incubated 24 businesses in the past three years.
- The Center has created the development of angel funds around the state engaging more than 70 angel investors.
- The Center hosts the Dakota Venture Group, the nation's first student-run venture fund which has a triple-bottom line function of investment return, entrepreneur finance education for students, and funding new ventures in North Dakota including syndication with angel investors.
- The Center has been ranked number nine out of 900 entrepreneurship programs in the nation in 2007 by Entrepreneur Magazine and Princeton Review and has received five National Awards for Excellence in innovation and entrepreneurship. The Center is one of ten incubators worldwide designated as a "Soft Landings International Incubator" by the National Association of Business Incubators because of assistance to companies to expand internationally.
- \$2.75 million, or 64 percent, of the funding for the technology incubator was from private sector business people supporting the next generation of emerging entrepreneurs. The building is owned by a university-affiliated foundation under the trusteeship of successful entrepreneurs which provide financial stability.
- The building's communications technology was enhanced in 2006 with a \$165,000 HUD grant.
- Two profile companies for 2007 were Datacom International, which has operations at the incubator and in Cooperstown, N.D.; and Ntractive, a top five winner of the InnovateND competition, which uses the server room of the incubator. Both companies received a majority of their start-up funds from angel investors.

NDSU Technology Incubator

The NDSU Technology Incubator, originally called the Center for Technology Enterprise, houses businesses doing research and development while offering students an opportunity to participate in cutting-edge research and provide higher paying jobs. Located in the North Dakota State University Research and Technology Park, the Technology Incubator received \$1.25 million in funding from the North Dakota Development Fund in 2005.

The Technology Incubator currently houses eight tenants. The incubator staff offers support in a variety of technical areas such as developing business and marketing plans, equity or debt finance planning, commercialization services, forming strategic alliances, and strategic planning. The clients include Appolis Mobile Business Solutions, Bobcat, Fargo-Moorhead Angel Investment Fund, Feed Management Systems, Intelligent InSites, Inc., NDSU RFID and Wireless Sensor Laboratory, Pedigree Technologies, and Precision Partners.

Funded: November 2004

Total Match: \$6.15 million

Highlights:

- The technology incubator opened the doors of its 52,600 sq. ft. building in March 2007.
- The incubator's 88 employees (eight tech incubator employees and 80 tenant employees at an estimated \$3.8 million total payroll) provided services to 21 companies in 2006-2007 alone. They also provided ongoing due diligence, deal-flow generation and administrative services as part of in-kind support to the F-M Angel Investment fund.
- Bobcat®, an anchor tenant of the Technology Incubator, employs 22 people in its research and development facility at the incubator.

Early Stage Centers of Excellence

**North Dakota State University
Center of Excellence for Agbiotechnology**

Purpose of Center

The NDSU Center of Excellence for Agbiotechnology concentrates on the long-term research, development and outreach needed to improve technology, increase farm income and support growth of oilseed agriculture in North Dakota. The Center is focused on encouraging commercial issues and the final stages of commercialization of traits in grains and oilseeds for food and non-food uses. The Center will make available conventional and deregulated biotechnology lines of soybeans and canola with unique oilseed traits that have potential as biofuels, specialty lubricants and health care products.

Match

COE Funds Distributed: \$2 million
Amount of Match Received-to-Date:
\$10.75 million
Anticipated Total Match: \$11 million

Approved: March 8, 2006

Funded: May 2006

Private Sector Partners

Monsanto Co., ADM, Inc.

Project Summary and Highlights

- The Center's canola research is helping to increase oil content, yields and oil per acre; reduce risks; and improve profits for North Dakota canola producers. Economic modeling shows that the value of the work to date would result in an increase to North Dakota canola growers of \$20-\$66 million per year at current planting levels. This is the equivalent of 400 direct high-paying jobs.
- On Oct.1, 2007 the first canola crushing and biodiesel plant in North Dakota held its ribbon cutting. The plant is owned by ADM, located in Velva and employs 85 people. In addition to the ADM plant, three others are underway due to the canola advantage that North Dakota holds in the fast-growing biodiesel sector. Research at the Agbiotechnology Center of Excellence will help North Dakota farmers grow the crops necessary to support these plants. These plants are projected to have an employment base similar to the ADM plant and are projected to employ 255 high-paying technicians, professionals, and skilled laborers.
- The work conducted at the Center of Excellence in Abgiotechnology demonstrates to Monsanto and ADM the Center's ability to work collaboratively with private sector companies to identify elite canola lines adapted to North Dakota's growing conditions through field and lab evaluations. Results of research to date include new seed lines that are 4.2 percent higher in yield, 3.2 percent above top checks in oil percentage, and 12 percent greater than top checks in oil/acre. Plans are being formed for the distribution of seed with the first release to occur in 2009, followed by the release of elite germplasm in subsequent years.

- Demonstration projects are being orchestrated by Mansanto to advance and increase new canola lines in the counter-season to include breeding in Chile.
- NDSU's five employees at \$216,000 total payroll are currently helping employees of the Minot North Central Research Extension Center with breeding efforts in the Minot region.

**University of North Dakota
Unmanned Aircraft Systems Center of Excellence (UAS COE)**

Purpose of Center

The Unmanned Aircraft Systems Centers of Excellence (UAS) will serve as a conduit between private industry and UAS researchers and will capture the attention of civilian industries with the research and development of UAS technologies and applications. The Center will promote commercialization of new UAS-related products and services and help attract new UAS-related business ventures to North Dakota.

Match

COE Funds Distributed: \$1 million
Amount of Match Received-to-Date:
\$4.2 million
Anticipated Total Match: \$4.2 million

Approved: March 8, 2006

Funded: May 2006

Private Sector Partners

AAI/Aerosonde, American Crystal Sugar Company, Appareo Systems, Boeing, Cirrus Design, Composite Engineering, Diamond Aircraft, Frasca International, General Atomics, General Dynamics, Hamilton Sundstrand, Ideal Aerosmith, Killdeer Mountain Manufacturing, LaserLith Corporation, Lockheed Martin, Mayo Clinic, Microsoft, Micro Systems Technology, Northrup Grumman, Raytheon, Science Application Int'l Corporation, SEO Precision, Alion

Project Summary and Highlights

- The Center's ability to partner with more than 20 private companies interested in the UAS industry helped attract Berkeley, Calif., based Laserlith Corporation to establish a presence in Grand Forks. Laserlith is projecting to create up to 100 manufacturing jobs. The Center employs 23 jobs at \$1.7 million total payroll.
- High-tech prototype systems created at the Center have been tested and flown on Lockheed Martin's Sky Spirit UAS and Raytheon's Cobra UAS.
- The UAS attended and presented at 11 national and international conferences on UAS industry development.
- The Center submitted a SBIR grant proposal to the USDA to help pursue a UAS deployed biosensor project.
- The United States Air Force Battle Lab funded a \$3.76 million contract to research the potential of using gang phased array radar to measure the UAS sense and avoid issue.
- The UAS has collaborative working relationships with the Department of Homeland Security/Customs Border Protection and the North Dakota National Guard in Fargo through which 410 public sector UAS industry related positions have recently been established in North Dakota.

**Valley City State University
Institute for Customized Business Solutions (ICBS)**

Purpose of Center

The goal of the Institute for Customized Business Solutions is to produce industry-ready enterprise software consultants for jobs in North Dakota. The Center develops customized coursework and training programs targeted at the specific needs of its business partners. Graduates from these training programs have the skills needed to pursue career opportunities in high-demand technology fields. The Center's Enterprise Application Model (EAM) is a unique approach to high-end information technology services used to attract, grow, and create information technology businesses to meet national demand for high-quality, reasonable costs in enterprise IT services.

Match

COE Funds Distributed: \$1 million
Amount of Match Received-to-Date:
\$5,007,743
Anticipated Total Match: \$5,007,743

Approved: March 8, 2006
Funded: May 2006

Private Sector Partners

Eagle Creek, Volt

Project Summary and Highlights

- Eagle Creek expanded to more than 100 employees in Valley City after ICBS provided customized training along with two jobs created at Volt for total payroll of nearly \$4.4 million. The local economy realizes additional benefits from an increase in housing starts, increased rental income, and increased sales of consumer and durable goods.
- A 17-member advisory council of regional industry leaders was formed to identify IT talent needs, shape the business plan, and identify growth opportunities for the Institute.
- The Institute has influenced and supported an effort at VCSU to add SAP and Microsoft business process management software applications to the Business Information Technology and CIS curriculum. VCSU students have gained valuable experience and enhanced their ability to meet the needs for these skills in North Dakota businesses.
- The Institute has established partnerships with local Microsoft Partners and Microsoft to provide training for employees of Microsoft's Partners on Dynamics CRM and other products. The institute has also established a partnership with Alliance Pipeline to provide training to their employees on their new implementation of SAP. The Institute expects to support 150 jobs through 2010 as a result of the curriculum changes and new partnerships.

UND Energy & Environmental Research Center National Center for Hydrogen Technology (NCHT)

Purpose of Center

The 15,200-square-foot facility constructed as part the National Center for Hydrogen Technology allows the EERC to build on its existing experience and expertise to be a leader in the development of our nation's hydrogen economy.

Designated as the National Center for Hydrogen Technology (NCHT) by the Department of Energy, this Center of Excellence is conducting technology research, development, demonstration and commercialization projects for the production and use of hydrogen as a practical fuel. In partnerships with private sector partners, the EERC is leading the way to develop the hydrogen gas station of the future, to produce hydrogen from fossil and renewable fuels, and to use hydrogen in combustion engines and turbines. Working with private companies to develop and commercialize hydrogen technology will provide future employment and economic development opportunities in North Dakota.

Match

COE Funds Distributed: \$2,500,000

Amount of Match Received-to-Date:

\$33,958,886

Anticipated Total Match: \$36,458,886

Approved: December 5, 2005

Funded: February 2006

Private Sector Partners

TXU Generation Company, Air Products and Chemicals, Inc., Xcel Energy, MN Corn Research Council, ND Corn Utilization Council, Basin Electric Power Cooperative, Pratt & Whitney Rocketdyne, Inc., BMC Construction, North American Coal Corporation, Siemens Power Generation, Inc., SGL Carbon Group, IdaTech, Great River Energy, Rio Tinto, Diversified Energy Corporation, Advanced Biomass Gasification Technologies, Inc., Biomass Energy Solutions, Inc., Xethanol Corporation, Westmoreland Coal Sales Company, Agricultural Utilization Research Institute, ePower Synergies, Catacel Corporation, Franklin Fuel Cells, United Technologies, Chippewa Valley Ethanol, Resurface Coporation, Stelios Arvelakis, Electric Power Research Institute, Porvair plc., Energy Conversion Devices, Inc., ThermoChem Recovery International, Inc., Clean Earth Solutions, Inc.

Project Summary and Highlights

- The NCHT is working with the North Dakota Corn Utilization Council to create a new business to commercialize a technology to produce fertilizer from North Dakota resources. The commercial system is anticipated to be under construction in North Dakota within two years.
- The EERC has added 17.25 jobs at \$944,823 total payroll to lead in the development of our nation's hydrogen economy.
- Pratt & Whitney Rocketdyne established a presence in North Dakota after realizing the advantages of working in North Dakota through the leasing of corporate office at the EERC and is currently pursuing a demonstration of its

technology in western North Dakota. This is in part of the EERC actively pursuing relationships that will allow existing companies to locate in North Dakota.

- The EERC has licensed one of its gasification systems to Advanced Biomass Gasification Technologies, Inc. (ABGT). Five gasification systems, including two for ABGT, have been, or are being, constructed for commercial deployment. All five are utilizing North Dakota manufacturers in their construction, resulting in manufacturing job growth in North Dakota. The EERC is spinning off a new company to focus on a variety of manufacturing opportunities in the region.

North Dakota State University
Center of Advanced Electronics Design and Manufacturing (CAEDM)

Purpose of Center

The Center of Advanced Electronics Design and Manufacturing (CAEDM) is performing market-driven research and development on wireless machine sensors utilizing new global wireless standards, manufacturing robotics, advanced electronics and electronic materials, testing and RFID technologies and systems

Match

COE Funds Distributed: \$3,000,000

Amount of Match Received-to-Date:
\$6,000,000

Anticipated Total Match: \$7,987,708

Approved: December 5, 2005

Funded: February 2006

Private Sector Partners

Crane Wireless Monitoring Solutions, Appareo Solutions, Aldevron, Pedigree Technologies, Bobcat Company, Alien Technology

Project Summary and Highlights

- A relationship with NDSU and Crane Wireless Monitoring Solutions on government (Department of Defense, DoD) projects enabled the transition of NDSU-Crane micro sensor fabrication methodology to Killdeer Mountain Manufacturing (KMM) in Killdeer, ND. Over the last year, KMM has manufactured hundreds of micro sensors to use in military qualification tests.
- CAEDM's projects with Crane Wireless Monitoring Solutions (WMS) resulted in a supply agreement with Crane WMS and Phoenix International (PI) was formed for PI to provide contract manufacturing for WMS's commercial line of wireless sensor networking equipment. PI completed its first order in December 2007.
- A partnership with Appareo Systems resulted in three projects involving building small quantities of prototypes for seven unique printed circuit boards for initial market opportunity analysis. Appareo indicated that CAEDM is the first partner able to keep up with the fast pace of product development and prototyping. Appareo's *ALERTS* (Aircraft Logging and Events Recording for Training and Safety) product was recently cited as the "Aviation Week & Space Technology 2007 Product Breakthrough of the Year."
- Aldevron, LLC and CAEDM launched a project aimed at developing an automated robotic system and process that will enable Aldevron to achieve higher production rates with reduced variability between samples.
- Doosan Infracore, former Bobcat Company, teamed up with CAEDM on six projects since May 2006 to investigate advanced electronics that improve the introduction of new products into their manufacturing process.
- CAEDM personnel assisted Pedigree Technologies in the early phase of a major Federal (DoD) contract opportunity that Pedigree won and attributed to significant additions to the Pedigree workforce.

- Alien Technology's Fargo manufacturing plant has been accessing the Center's specialized electronics fabrication and testing equipment for process and quality control.
- NDSU added two employees at \$157,000 total payroll as a result of the Center.

Lake Region State College
Dakota Center for Technology-Optimized Agriculture (DCTOA)

Purpose of Center

The role and vision of the Dakota Center for Technology-Optimized Agriculture is to become the premier center for technological applications in North American agriculture. This Center will support the creation of spin-off technologies that will generate new jobs and support entrepreneurship in North Dakota agriculture. The technology-optimized products generated by this Center will help North Dakota farmers and ranchers lower input costs, increase profitability and increase net margins.

Match

COE Funds Distributed: \$450,000
Amount of Match Received-to-Date:
 \$749,892
Anticipated Total Match: \$900,000

Approved: December 5, 2005

Funded: February 2006

Private Sector Partners

Agri ImaGIS, Inc., TotalCrop Farming Systems, Verdi-Plus

Project Summary and Highlights

- ‘Answer farm’ trials are underway to test and demonstrate the effectiveness of variable-rate placement of crop nutrients. A 2008-09 soybean trial is currently under development, but hasn’t been implemented. Two additional answer farms will be recruited as a result of funding from the North Dakota Centers of Excellence initiative to develop a towed-hose manure injection tool.
- The DCTOA and the private sector partners are continually exhibiting at local and regional trade shows to create awareness and readiness for the cutting-edge technologies it employs.
- DCTOA partner TotalCrop Farming Systems, Inc. has expanded its operations by adding an employee and opening another office in Washburn, N.D.
- DCTOA partner Agri ImaGIS Technologies, through its web-based imagery server, has been able to dramatically expand the services offered to customers and created two full-time employee positions. These two positions, along with the jobs created at LRSC and in Washburn, bring the total payroll to \$154,866.
- DCTOA has supported one start-up, Verdi-Plus, based out of Woford, N.D.
- DCTOA has secured a working commitment from three new firms since receiving funds. These are: Airborne Data Systems, Farmers Edge Precision Consulting, Inc., and Verdi-Plus, Inc.

North Dakota State University Center for Surface Protection

Purpose of Center

The Center for Surface Protection is focused on market-driven research to address industrial problems for North Dakota companies. Research on surface protecting coatings will enhance the durability of manufactured products. The Center is creating, designing and developing inorganic soft and hard coatings to meet industry needs.

Match

COE Funds Distributed: \$2,000,000

Amount of Match Received-to-Date:

\$1,734,592

Anticipated Total Match: \$4,000,000

Approved: March 8, 2006

Funded: May 2006

Private Sector Partners

Marvin Windows & Doors, Gramada Industries, Akzo Nobel Aerospace, Tecton Products (continuing Negotiations)

Project Summary and Highlights

- Gramada Industries hired an engineer in July 2007 and is in the process of expanding staff due to the high workload from the CSP project. Plans include hiring an engineering intern and potentially another full-time engineer in 2008. Gramada is contemplating additional research projects with the CSP.
- The need for continued research created five jobs at NDSU at \$335,000 total payroll. The hiring of an additional Research Scientist at NDSU is scheduled for Spring 2008.
- A successful initial project between CSP and Marvin Windows and Doors has resulted in another request for testing experiments. Discussions regarding long-term research programs with NDSU are underway, and the company is focusing on retaining North Dakota jobs and business activities as a result of their involvement with the Center for Surface Protection.
- COE funding facilitated interactions with SEO Precision and General Dynamics that led to discussion regarding potential gun barrel coatings project.
- CSP personnel gave presentations at the European Coatings Expo in Nuremburg, Germany and the International Coatings Expo in Toronto.

Dickinson State University
Strom Center for Entrepreneurship and Innovation – Institute for
Technology and Business

Purpose of Center

The Strom Center for Entrepreneurship and Innovation – Institute for Technology and Business is focused on promoting economic development through entrepreneurial strategies to help technology-based businesses start or expand in rural North Dakota communities. By focusing on the commercial application of technology, the Institute identifies new technology-related opportunities and helps businesses adapt and implement new technologies and leadership strategies for economic growth.

This Center works to identify issues and develop solutions involving supply chain transparency, a customized manufacturing leadership program including employee communication and advanced manufacturing technology through a partnership with Killdeer Mountain Manufacturing.

Match

COE Funds Distributed: \$1,150,000
Amount of Match Received-to-Date:
\$185,750
Anticipated Total Match: \$4,524,843

Approved: June 14, 2006

Funded: October 2006

Private Sector Partners

Killdeer Mountain Manufacturing

Project Summary and Highlights

- 75 supervisors attended the first course in the customized entrepreneurial leadership program in fall 2007 which is being tested at Killdeer Mountain Manufacturing (KMM). The second course will be offered in spring 2008 and will be offered to other manufacturers and businesses in the area.
- The Center reported that they have facilitated 95 new jobs at \$2,247,171 total payroll through their partnership with KMM. The Center has supported KMM's expansion in the areas of hiring, accounting, human resources, information technology and leadership development.
- Boeing Corporation recommended implementing an expanded and customized leadership program. As a result, a certificate program in entrepreneurial leadership has been developed which is in the beginning process.
- For KMM to expand their business, stay competitive and continue to grow, DSU is developing a 2+2 Engineering Program in cooperation with NDSU.

**Williston State College
Petroleum Safety and Technology Center**

Purpose of Center

The Petroleum Safety and Technology Center is enhancing the region's quality of life by focusing on new technologies to create higher paying, skilled jobs. To meet the critical workforce needs of the Oil and Gas industry in the Williston Basin, new oilfield technologies are co-developed and applied. A new training site, located on the WSC campus, will offer hands-on experience with an actual rig to advance methods and educate individuals on the latest technologies used in the oilfield industry.

Match

COE Funds Distributed: \$400,000

Amount of Match Received-to-Date:

\$889,687

Anticipated Total Match: \$918,128

Approved: March 8, 2006

Funded: May 2006

Private Sector Partners

Hess Corporation, Marathon Oil, Key Energy, Halliburton Energy Services, Nabors Well Services, Schlumberger, Sun Well Services, Vetco Gray, Nabors Drilling, Nance Petroleum, Weatherford Services, Baker Oil Tools, Capital Safety, GC Products, Williston Fire and Safety, Hickman Sales and Service, Stewart and Stevenson, Interstate Powersystems, Modern Machine, and Howard Supply.

Project Summary and Highlights

- The Center reported that the first class for training was offered in November 2007.
- Several new oilfield companies are participating in a safety training program offered by the Petroleum Safety and Technology Center to address the growing workforce needs of the oil industry. It is projected that 1200 people will be hired through 2010 to fill the industry need. Other companies are donating equipment and services to assist the project.
- The Center reported that private sector partners Sun Well Service and Eagle Operating each created one new job so far with a combined payroll of \$88,220.

Centers of Excellence Under Development

NDSU Beef Systems Center of Excellence (BSCE)

Legislation in 2003 authorized the Beef Science Systems Center to create a model for developing an integrated meat processing industry; to enhance North Dakota State University's animal sciences research, training and outreach capabilities; and to provide training, education and outreach opportunities to the wide variety of people involved in the beef business including youth and adult audiences. The center takes a 'pasture to plate' approach with the expertise represented it encompasses experts in a variety of disciplines involved in beef cattle production and meat science.

The purpose of the Center is to create a model for a coordinated meat processing industry that could be implemented in other parts of the state, region or country. The Center also looks to enhance NDSU's ability to provide leading research in the effects of genetics, management and nutrition regimens on carcass merit; quality and sensory characteristics; food safety and nutrition on resulting meat products; evaluate new and emerging technologies in slaughter, fabrication, further processing and value added meat products; and provide data on meat and meat marketing.

The Center was approved in 2003 and funded in 2006. Construction on the facility started in August 2007 and is anticipated to be completed in May 2008.

Match

COE Funds Distributed: \$800,000

Total Match: \$2 million

Funded: October 2007

Private Sector Partners

North Dakota Natural Beef, LLC.

**University of North Dakota
Research Foundation – Center of Excellence in Life Science and
Advanced Technologies (COELSAT)**

Purpose of Center

The Center of Excellence in Life Science and Advanced Technologies is focused on commercializing research innovations into high-value products that are developed and made in North Dakota.

Match

COE Funds Distributed: \$3,500,000

Amount of Match Received-to-Date:

\$3,712,200

Anticipated Total Match: \$10,465,000

Approved: March 8, 2006

Funded: March 2007

Private Sector Partners

PCL/Perkins & Will, UNDRF/BORDERS, Avianax, Alion Science and Technology, Ideal Aeromsmith, Novadigm, Laserlith, Sunrise Renewable Company

Project Summary and Highlights

- Avianax is a North Dakota startup company and Sunrise Renewable Company is forming a presence in North Dakota as a result of entrepreneurship at the COELSAT.
- UNDRF/BORDERS is a North Dakota company successful in creating four jobs at \$180,00 total payroll and anticipates 120 jobs at \$525,000 total payroll to be created between corporate partners and UNDRF by 2009 as a result of continued partnerships.
- Avianax and Aldevron are partnering on research projects that require a source of avian eggs. Schiltz Foods and Farms of South Dakota brought geese to North Dakota and formed Schiltz Farms in Tolna, N.D. Three employees have been hired and 12 to 14 more employees are projected.

**Bismarck State College
National Energy Center of Excellence (NECE)**

Purpose of Center

This world-class facility will combine energy workforce training with environment research while advancing the use of coal-combustion products to serve as a one-stop training and education facility. Partnerships with the North Dakota energy industry allow the facility to meet the demands of the 21st Century workforce by building a pipeline of multi-skilled workers with an industry-driven approach.

Match

COE Funds Distributed: \$3,000,000
Amount of Match Received-to-Date:
\$4,761,784
Anticipated Total Match: \$7,342,000

Approved: December 5, 2005

Funded: February 2006

Private Sector Partners

Archer Daniels Midland Co., Basin Electric Power Cooperative, Great Northern, Headwaters, Montana Dakota Utilities, North Dakota Biodiesel, Red Trail Energy, Tesoro

Project Summary and Highlights

- The hardware and software system WebLab©, developed by BSC, is incorporated in the curriculum for Power Plant Technology and Electric Power Technology to allow students to control energy technology laboratory equipment via the Internet. Students build hands-on skills and experience as they take control of the power generation and distribution system of a model city.
- Private sector partners work alongside BSC to refine the instructional curriculum for energy technology to assure it reflects the work performance demands of the 21st Century energy industry. Six private sector companies have provided job shadow opportunities for BSC students at North Dakota energy facilities since 2006.
- BSC, in conjunction with the State Workforce Investment Board, ND Department of Commerce, Job Service ND and institutions of higher education, continues to pursue grants for energy education and training initiatives to build infrastructure and capacity for energy technologies that demonstrate positive economic impact.
- The Center reported that 35 of the 92 full time jobs created at Blue Flint Ethanol, Red Trail Energy and ADM in Velva are graduates of BSC training.
- Over the next 10 years, the Center reports that 728 new jobs are projected as the new or expanded facilities become operational including 3,350 projected energy construction jobs through the year 2014.

Centers Authorized for New or Additional Funding

The Centers of Excellence Commission has authorized six centers for new or additional funding in the 2007-2009 biennium, but funding has not yet been distributed. Total funding for the six projects will be \$10 million, with matches up to \$37 million if authorized by the Legislative Budget Section and Emergency commission.

Over the next five years, these projects are projected to create up 1,032 direct jobs and 1,639 indirect jobs in North Dakota. Two of the projects will initiate new Centers of Excellence. The other four provide additional funds for existing Centers.

Minot State University – Great Plains Knowledge and Data Center

Amount Approved: \$2.1 million

Anticipated Match: \$4.2 million

Private Sector Partners: InfoTech- Minot Technology Center and SRT Communications, Inc.

The goal of this Center is to promote the development and advancement of knowledge-based business in the region through two key facilities: a production data center and a research and development center.

UND – Center of Excellence for Biomedical Device Research, Development and Commercialization

Amount Approved: \$2.5 million

Anticipated Match: \$5 million

Private Sector Partner: Enova Medical Technologies

The Center of Excellence for Biomedical Device Research, Development and Commercialization will serve the state by providing research, development and commercialization resources for a range of biomedical devices. The Center will manufacture the biomedical devices which represent a high value, low volume industry that is well suited to North Dakota. Over time, the Center will conduct multiple, concurrent projects for various biomedical companies and cities to help attract economic development opportunities throughout the state and region.

NDSU - Center of Excellence for Agbiotechnology: Oilseed Development II

Amount Approved: \$1.5 million

Anticipated Match: \$5.58 million

Private Sector Partners: Monsanto, Archer Daniels Midland

The NDSU Center of Excellence for Agbiotechnology focuses on the improvement of canola to meet the growing demand of bio-fuel and the evaluation of products for

commercial use. This project will expand the Center by developing drought tolerant and reduced shattering lines of canola that are adapt to acres south and west of the traditional canola growing region.

NDSU – Center for Surface Protection

Amount Approved: \$2 million

Anticipated Match: \$4 million

Private Sector Partners: Praxair Surface Technologies, Technology Application Group, Sulzer Metco, Marvin Windows & Doors, and Akzo Nobel

The Center for Surface Protection is focused on working with private sector partners to address new materials development, industrial product issues, and provides technical services in the form of testing. Research is focused on hard and soft coatings as they are created, designed, and developed. The new coatings systems proposed will demonstrate improved corrosion, erosion, and wear properties relative to the current state-of-the-art coatings systems.

UND – Unmanned Aircraft System Center of Excellence

Amount Approved: \$1.5 million

Anticipated Match: \$3 million

Private Sector Partners: Lockheed Martin, Raytheon, Boeing, Northrop Grumman, AAI, Cirrus Design, SEO Precision, Killdeer Mountain Manufacturing

The UAS Center of Excellence will focus on the areas of education and training for the integration of UASs, flight performance research for pilots and ground station cockpit environments, and research and development on UAS payload sensors. This Center will further promote the commercialization of new products, testing and evaluation of new civil UAS systems and services, as well as promote private sector job growth throughout North Dakota.

Lake Region State College – The Dakota Center for Technology – Optimized Agriculture (DCTOA)

Amount Approved: \$400,000

Anticipated Match: \$843,400

Private Sector Partners: Agri ImaGIS Technologies, Inc.; Agvise Laboratories; Airborne Data Systems, Inc.; Farmers Edge Precision Consulting, Inc.; Packet Digital, Inc.; Verdi-Plus

The role of the Dakota Center for Technology-Optimized Agriculture is to expand the current program of the Center by addressing the need to harness emerging data-based, site-specific control technologies for agronomic knowledge of soil profiles, crop needs and the use of manure nutrients. Site-specific data and controllers will be coupled to towed-hose manure slurry application tools.