North Dakota
DEPARTMENT OF COMMERCE

Centers of excellence & research excellence

annual report 2013

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State of
North Dakota
Office of the Governor

Jack Dalrymple
Governor

North Dakota's Centers of Excellence and Centers of Research Excellence programs are working to partner our state's research universities with private sector companies to generate jobs and new business opportunities.

The Centers program is designed to harness the intellectual resources, high-tech equipment and training capabilities of our colleges and universities to solve "real world" problems in partnership with the private sector. Currently, 98 companies are actively partnering with the established Centers of Excellence and Centers of Research Excellence. These partnerships have leveraged $204.3 million of matching funds for the state's investment of $53.4 million in the Centers.

Overall, the Centers program has had an economic impact of $691.1 million since its creation in 2005. As of June 30, 2013, the Centers program has produced just under $13 in economic impact for every $1 of state funds invested since its creation according to a 2013 North Dakota State University study.

The Centers program and its partners generate results, having created over 270 direct jobs this year with an estimated payroll just under $17 million. Salaries and benefits for these jobs averaged approximately $62,820 per job which is nearly 15 percent higher than the state average for the same period.

North Dakota must continue to aggressively pursue research in our state's targeted industries. The Centers of Excellence and Centers of Research Excellence are key factors in helping private sector businesses uncover promising new opportunities to keep North Dakota's economy growing and prosperous for future generations.

Sincerely,

Jack Dalrymple
Governor

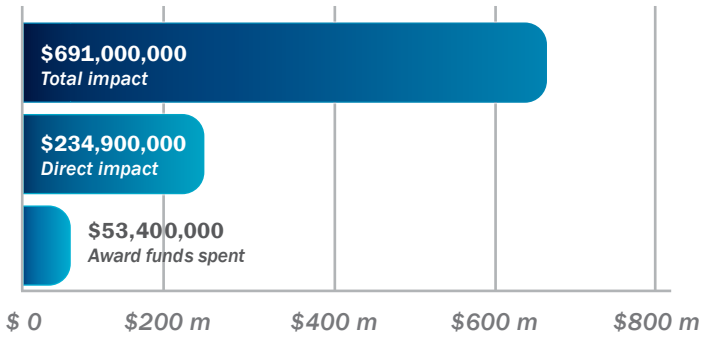
PROGRAM SUMMARY

The Centers of Excellence & Research Excellence are hubs of research and development on the campuses of North Dakota's colleges and universities, partnering with private companies to commercialize new products and services. The Centers explore research in the fields of energy, agriculture, life sciences, aerospace, manufacturing and electronics.

ECONOMIC IMPACT

The Centers of Excellence program has had **$691 million** in estimated total economic impact to North Dakota's economy. This includes a direct impact of **$234.9 million** generated by the Centers, grant recipients and their partners.

ECONOMIC IMPACT

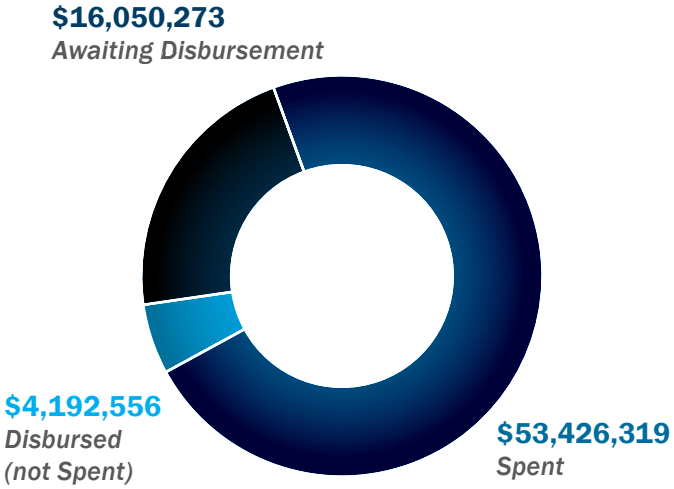


FUNDS INVESTED TO DATE

Since the first Centers of Excellence were approved by the State Legislature in 2003, a total of $73.6 million in state funds have been invested in **25** Centers of Excellence & Research Excellence and an additional **16** research, infrastructure and economic development projects. Of these funds, $53.4 million has been spent by the Centers and grant recipients as of June 30, 2013.

CENTERS OF EXCELLENCE INVESTMENT

$73.6 million awarded through June 30, 2013



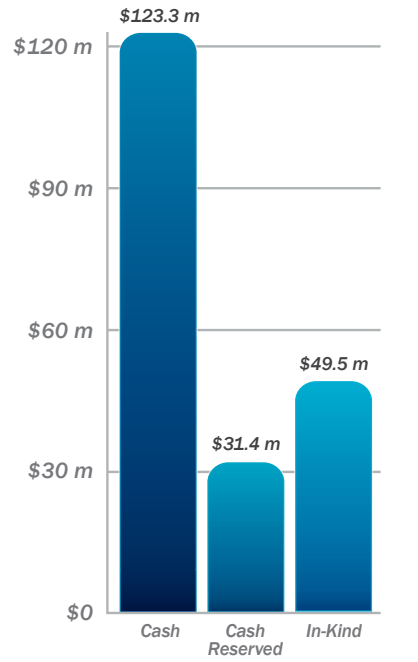
The Centers of Excellence Program has contributed to the creation or expansion of 21 businesses. This includes ten new spinoff companies, five companies that expanded to North Dakota, and six North Dakota companies that have expanded within the state.

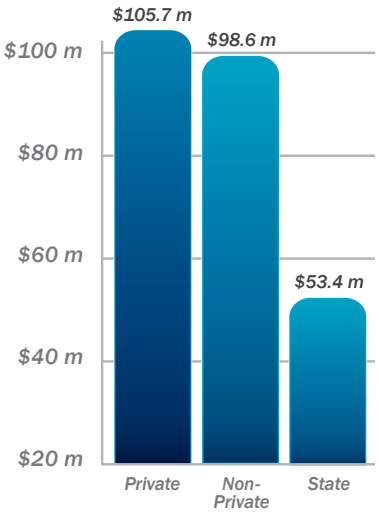
MATCHING FUNDS

As of June 30, 2013 the Centers and grant recipients have obtained over **$204 million of matching and leveraged funds.** When comparing matching and leveraged funds received across all programs to award funds spent, a ratio of 3.8:1 is realized

Centers of Excellence and Centers of Research Excellence require a $2 of matching funds for every $1 invested by the state. These two programs have realized a ratio of 4.3:1. Base realignment, enhancement and limited deployment cooperative airspace project funds do not require matching or leveraged funds but have realized a ratio of 1.99:1.

MATCHING & LEVERAGED FUNDS RECEIVED





JOBS IMPACTED

Centers report job creation information annually. Only jobs existing as of June 30, 2013, with written verification of creation due to Center activities are included in this report. As of June 30, 2013, the Centers and their private sector partners have created or contributed to the creation of 270 jobs with an estimated payroll or $17 million. These numbers do not include jobs that were reported in 2012 from Centers that are no longer required to report to the Centers of Excellence Commission.

During the 2013 fiscal year three Centers requested to have their post-award monitoring discontinued as they had met the minimum reporting requirement and had been sustainable without state funding for several years: the University of North Dakota (UND) Energy and Environmental Research Center's National Hydrogen Technology Center, the Bismarck State College National Energy Center of Excellence and the Williston State College Petroleum Safety and Technology Center. These Centers reported a total of 363 jobs as part of their last functional review in 2012.

Three Centers were approved by the Legislature prior to 2005 and have been voluntarily reporting to the Centers of Excellence Commission for over six years: the UND Center for Innovation, the North Dakota State University (NDSU) Technology Incubator and the NDSU Beef Systems Center. These Centers reported a total of 369 jobs in 2012.

GRADUATING CENTERS

Three Centers have graduated from the Centers of Excellence program, reaching the end of their monitoring period and sustaining operations without state funding: National Energy Center of Excellence at Bismarck State College, Williston State College Petroleum Safety and Technology Center, and the National Center for Hydrogen Technology. As three of the earliest established Centers of Excellence, each has been instrumental in the development and success of the Centers of Excellence & Research Excellence program across the state. As they graduate, these Centers will no longer be required to obtain matching and leveraged funds in relation to any grants, nor report to the Centers of Excellence Commission on their impacts related to economic and job growth.

Williston State College Petroleum Safety and Technology Center

The Williston State College Petroleum Safety and Technology Center (PSTC) trains workers for the oil and gas industry while working closely with its industry partners to develop and maintain state-of-the-art training programs. The Center focuses on hands-on training sessions designed to help oil and gas production professionals work safely and efficiently.

"Funding received from the Department of Commerce through the Centers of Excellence Program aided in the development of the PSTC Center that will leave a legacy for future businesses to utilize for decades in the future," Russell Rankin with Statoil and Chair of the Northwest Advisory Board said.

A construction project is underway for a new building to be located adjacent to the Petroleum Safety and Technology Center. The new building will be used to prepare individuals for careers in the petroleum industry. The building includes classrooms, offices, conference rooms and a new reception area. This will allow students easy access to $2 million in donated equipment for hands-on training.

The program serves over 350 students each year and has been involved in 1,132 training sessions serving 11,200 participants. Of the businesses served, 99 percent were satisfied with the training and responsiveness in meeting their needs.

Photo courtesy of National Energy Center of Excellence at Bismarck State College

National Energy Center of Excellence at Bismarck State College

The National Energy Center of Excellence (NECE) at Bismarck State College (BSC) offers 12 nationally recognized energy industry degree and training programs and has been designated by the Department of Energy as the National Power Plant Operations Technology and Education Center. On-campus students use the Center's world-class, state-of-the-art lab equipment designed to prepare the next generation of energy industry employees. Online students have access to high-quality online simulations, animations, discussions and real-time lab sessions in a flexible environment built for those who cannot attend on-campus courses.

"The Center of Excellence funding was instrumental in the construction of the National Energy Center of Excellence facility at BSC. This investment in energy education provides an opportunity for students to receive an exceptional education in North Dakota. BSC greatly appreciates the COE funding and support," said Kari Knudson, vice president of BSC National Energy Center of Excellence.

Curriculum is developed with input and feedback from advisory boards which consist of local and national industry experts, ensuring that students who complete an energy degree at BSC are prepared with the training and education they need to enter the workforce. Energy companies are able to recruit students from the NECE, offering them internships or job opportunities once the student is prepared to enter the workforce.

The NECE continues to work with energy companies to recruit local talent to fill the workforce needs no matter where a company is located, as energy students are located throughout the US. BSC also provides non-credit industry training opportunities to companies who are seeking to develop the skills of their existing workforce.

Students in all programs at the National Energy Center of Excellence are in high demand, whether they're studying to be lineworkers, power plant operators, instrumentation and control technicians, refinery operators, mechanical maintenance technicians, oil and gas operators, or are enrolled in any of the other energy programs, including the bachelor's degree in energy management.

National Center for Hydrogen Technology

The National Center for Hydrogen Technology® (NCHT®) combines 60 years of expertise in hydrogen systems to take a lead role in developing all aspects of the hydrogen economy in concert with industry and government partners.

Photo courtesy of EERC

"Funding through the North Dakota Centers of Excellence allowed for the development of world-class infrastructure that has attracted over $60 million of technology research development and demonstration to the Energy & Environmental Research Center, exposing many national and international clients to our great state of North Dakota," said Gerry Groenewold, director of the University of North Dakota Energy & Environmental Research Center (EERC).

The EERC has a long history of developing, testing and integrating modular technologies for the production and utilization of hydrogen. Specifically, the EERC has unique world-class experience in hydrogen production from fossil fuels as well as renewable fuels, development of on-demand hydrogen fueling systems from a variety of fuels, gas separation and purification through conventional and advanced methods, and utilization of hydrogen via direct combustion and in fuel cells.

With the tremendous success of the NCHT program, the new "Fuels of the Future" facility was constructed to allow for additional demonstration of hydrogen and fuel-related technologies. This new facility provides critical space for larger demonstration systems that will eventually house a new biomass gasification system.

Since the National Center for Hydrogen Technology® was formed in the fall of 2004, the University of North Dakota Energy & Environmental Research Center (EERC) has received contracts totaling more than $60 million in hydrogen and hydrogen-related funded projects with more than 85 partners worldwide.

CENTERS OF EXCELLENCE COMMISSION MEMBERS

The Centers of Excellence Commission oversees the administration of Centers of Excellence, Centers of Excellence Enhancement Grants, Centers of Research Excellence, Base Realignment Grants, and Limited Deployment Cooperative Airspace Projects (LDCAP).

The Centers of Excellence Commission, with assistance from the North Dakota Department of Commerce, oversees the post-award monitoring of all Centers and grant recipients. The process includes quarterly updates, site visits, third-party audits and an in-depth annual review of each award. All grant recipients are required to complete at least six years of post-award monitoring. One objective of the post-award monitoring activities is to measure the progress of an award against the results proposed in its respective application for funding. Another objective of the post-award monitoring activities is to ensure grant recipients are spending award funds in compliance within the scope of their project and in accordance with program requirements. Centers and grant recipients that demonstrate progress and compliance with program requirements are funded in stages according to their respective Centers of Excellence Commission-approved budget.

North Dakota Economic Development Foundation Members

A. Mark Nisbet, Chairman
North Dakota Principal Manager
Xcel Energy, Fargo

B. Tim Hennessy, Vice Chairman
Regional President
US Bank, Bismarck

C. Jim Traynor
Director of Client/Channel Management
Intelligent InSites, Fargo

State Board of Higher Education Members

D. Kathy Neset
President
Neset Consulting, Tioga

E. Terry Hjelmstad
Retired School Administrator
Minot Public Schools, Grand Forks

F. Don Morton
Senior Director
Microsoft, Fargo

The following pages detail new awards approved in Fiscal Year 2013. For details on previously approved Centers of Excellence and Centers of Excellence Enhancement Grants, visit www.NDCentersOfExcellence.com.

CENTERS OF RESEARCH EXCELLENCE SUMMARIES

In 2011, the Centers of Excellence program sharpened its focus on research, development and commercialization activities. The program was retitled "Centers of Research Excellence" and is now only accessible by UND, NDSU or related nonprofit foundations working in partnership with the private sector. Many of the criteria for approval are similar. However, under Centers of Research Excellence matching funds requirements, a Center must obtain $2 of matching funds for every $1 of state funds. Of the $2 of matching funds, at least $1 must be cash, of which at least $0.50 must be from the private sector.

The 2011 Legislature allocated $5 million for new Centers of Research Excellence. As of June 30, 2013 the Centers of Excellence Commission has approved six new centers. Two centers, the Center for Technologically Innovative Processes and Products and the Center for Life Science Research and Applications were approved during the 2012 Fiscal Year. The Commission approved three new Centers in Fiscal Year 2013 and a second award to the Center for Technologically Innovative Processes and Products.

Center for Technologically Innovative Processes and Products
North Dakota State University

Award: $320,000 **Launch Date:** August 2012
Spent: $53,696 **Matching & Leveraged Funds Received:** $112,258

Award: $1.01 million **Launch Date:** Not yet launched
Spent: $0 **Matching & Leveraged Funds Received:** $0

The Center will collaborate with private sector partners to perform research and development aimed at identifying new materials and process that will generate higher quality, lower production costs and improved profit margins. These outcomes may lead to new or improved products, new markets and new technologies for future product development.

Center for Avian Therapeutics for Infectious Disease
University of North Dakota

Award: $700,000 **Launch Date:** June 2013
Spent: $588,829 **Matching & Leveraged Funds Received:** $1.3 million

The Center will collaborate with Avianax to perform research and development focused on the use of goose antibodies as therapeutics for viral diseases of companion animals and livestock. The research and development activities are aimed at completing the work necessary to seeking a conditional license from the USDA, the first step for commercialization of an animal health product.

Center for Gas Utilization
University of North Dakota

Award: $300,000 **Launch Date:** Not yet launched
Spent: $0 **Matching & Leveraged Funds Received:** $0

The Center proposes to develop a polygeneration facility that will utilize natural gas currently being flared in North Dakota to produce electricity, liquid fuels and carbon dioxide. This effort will evaluate and demonstrate the ability to produce electricity and methanol from natural gas.

Center for Biobased Materials Science and Technology
North Dakota State University

Award: $1.13 million **Launch Date:** Not yet launched
Spent: $0 **Matching & Leveraged Funds Received:** $0

The Center will collaborate with private sector partners in the development and pre-production manufacturing of materials—polymers and composites—using raw materials derived from renewable resources. These bio-based materials will be studied and benchmarked against current products based on petrochemical raw materials.

BASE REALIGNMENT GRANT SUMMARIES

The 2011 Legislature allocated $3 million for Base Realignment Grants which are to be used for infrastructure and economic development projects or programs to accommodate growth in proximity to, or at, the Grand Forks Air Force Base. Between July 1, 2012 and June 30, 2013 the Centers of Excellence Commission approved two Base Realignment Grants.

Enhanced Use Lease for Grand Forks Air Force Base III
University of North Dakota Center for Innovation Foundation

Award: $434,300 **Launch Date:** November 2012
Matching & Leveraged Funds Received: $127,295

This grant provides the funds necessary to make a formal application to the US Air Force to obtain an Enhanced Use Lease at the Grand Forks Air Force Base. Specifically, the funds will be used for the completion of the formal proposal to Air Force, which includes a land use plan, build-out analysis, utility surveys, parking and circulation plan, building concept plans, a property survey and an appraisal.

Enhanced Use Lease for Grand Forks Air Force Base IV
University of North Dakota Center for Innovation Foundation

Award: $160,000 **Launch Date:** Not yet launched
Matching & Leveraged Funds Received: $0

The US Air Force accepted the formal application for an Enhanced Use Lease of approximately 200 acres of land on the Grand Forks Air Force Base that was completed as part of the Enhanced Use Lease for Grand Forks Air Force Base III. As part of the term sheet signed by Grand Forks County and the US Air Force, additional studies and analyses will need to be completed including a traffic study, a utility plan, architectural controls, site survey and marketing/public relations. These funds will be used to offset the costs of the studies.

PROGRAM PARTNERS

AAG Aqua Advisory Group, Inc.

Access Energy, LLC

Aerosim

AgriImaGIS Technologies, Inc.

Aircraft Avionics

Akzo-Nobel Aerospace Coatings

Amity Technology

Appareo Systems

Archer Daniels Midland

Arkema Incorporated

Avianax

BenchMark Energy

Bobcat

Boeing/Insitu

BoldMethod

Bosh Global Systems

Caterpillar Remanufacturing Drivetrain

Charles Stark Draper Laboratory, Inc.

Chemera

Cogi

ComDel Innovations

Computer Modeling Group

ConocoPhillips

Continental Resources, Inc.

Corsair Engineering

CorsiTech/NALCO Champion

Crew Training International

Cutbank Creek Produce

Denbury, Inc. (formerly Encore, Inc.)

Draper Labs UAS Research and Development

Elder & Haas

FARRMS

FiberOn Products, Inc.

General Atomics Aeronautical Systems, Inc.

General Dynamics

General Electric

GeoOptics, Inc.

Glass Again, Inc.

Global Agricultura Solutions/ Global Green Refining

Goodrich

Hansaton Acoustics

Hess Corporation

Higher Plains Equipment

Infinity Development Partners

InnerGeo, LLC

Intraglobal Biologics

Invista

Jeffrey Donohoe Associates

Killdeer Mountain Manufacturing

Kurray Chemicals, Americas

L3 Com

LM Wind Power Service

Locata Corporation

Lockheed Martin International

Lord Corporation

Marathon Oil Corporation

Menon and Associates

Microbeam Technologies

Mid America Aviation

Monsanto

Next Healthcare

Noble Energy

North Dakota Farmers Market and Growers Association

North Star Farms

Northrop Grumman Corporation

NovaDigm Therapeutics

Nth Degree

Ogden Engineering and Associates

Pedigree Technologies

Phone Halo

Poudre Valley Environmental Sciences, Inc.

PPG

Presco, LLC

RapidEngines

ReconRobotics

Riverbound Farm

Rockwell Collins

Sanford Health/Sanford Research

Schiltz Goose Farms North

SeaTec

Shell Chemicals

Simlat

Sodexo Quality of Life Services

SpaceAge Synthetics

St. Mary Land & Exploration Co.

Starkey Laboratories, Inc.

StatOil

Summers Manufacturing, Inc.

Superior Edge

Technology Applications Group (TAG)

The Okori Group

Thompson Farm

Tiorco/NALCO Champion

Triton Systems, Inc.

UAII

URS Corporation

Whiting Petroleum Corporation

Wholesale Supply Company, Inc.

The companies in bold lettering have a presence in North Dakota.

Centers of Excellence	University, College or Related Foundation	Launch Date	Awards	Match & Leveraged Funds Received
Beef Systems Center of Excellence	NDSU	Oct 2007	$800,000	$2,000,000
Center for Advanced Electronics Design & Manufacturing	NDSU	Feb 2006	$3,000,000	$14,390,109
Center for Advanced Technology Development and Commercialization	NDSU	Nov 2012	$3,900,000	$68,573
Center of Excellence for Agbiotechnology: Oilseed Development	NDSU	Aug 2009	$3,500,000	$12,000,000
Center for Biopharmaceutical Research & Production	NDSU	May 2012	$5,015,000	$6,262,266
Center for Innovation	UND	Jan 2005	$800,000	$3,565,000
Center for Integrated Electronics Systems	NDSU	June 2009	$2,050,000	$4,237,867
Center for Sensors, Communications & Control	NDSU	Jan 2011	$2,800,000	$1,221,697
Center for Surface Protection 2	NDSU	May 2006	$4,000,000	$9,262,465
Center of Excellence in Life Sciences & Advanced Technologies	UND	March 2007	$3,500,000	$4,005,265
Center of Excellence for Passive Therapeutics	UND	June 2009	$2,650,000	$6,554,467
Center of Excellence in Space Technology & Operations	UND	June 2009	$1,000,000	$235,200
Dakota Center for Technology Optomized Agriculture 2	LRSC	June 2010	$850,000	$2,301,638
Enterprise University*	VCSU	May 2006	$1,000,000	$5,140,039
Entrepreneurial Center for Horticulture	DCB	June 2011	$400,000	$925,660
Institute for Technology & Business	DSU Strom Center	Oct 2006	$1,150,000	$5,204,972
National Center for Hydrogen Technology	UND	Feb 2006	$2,500,000	$58,606,463
National Energy Center of Excellence	BSC	Feb 2006	$3,000,000	$7,292,000
NDSU Research Technology Incubator	NDSU	March 2007	$1,250,000	$5,307,600
Petroleum Research, Education & Entrepreneurship Center	UND	June 2009	$3,000,000	$7,197,913
Petroleum Safety & Technology Center	WSC	May 2006	$400,000	$1,183,044
SUNRISE BioProducts	UND	June 2009	$2,950,000	$3,954,943
Unmanned Aircraft Systems Center of Excellence 2	UND	May 2008	$2,500,000	$17,187,052
Enhancement Grants				
Certificate Programs for Full Motion Video & Activity-Based Intelligence Analysis	UND	June 2011	$746,000	$0
Grand Forks Air Force Base Realignment Business Transition Enhancement Grant	UND	June 2011	$200,000	$172,269
Law Enforcement Small UAS Training	UND	May 2012	$230,000	$74,970
Materials & Nanotechnology Centre Enhancement Grant	NDSU	Sept 2011	$1,000,000	$0
North Dakota UAS Airspace Initiative Enhancement Grant	UND	March 2011	$100,000	$6,516
Research 1 Expansion Enhancement Grant	NDSU	Jan 2011	$4,000,000	$3,613,348
UAS Research, Education & Training Enhancement Grant	UND	June 2010	$2,754,000	$1,357,961
UAS Software & Curriculum Development Enhancement Grant	UND	March 2011	$600,000	$192,803
V2 Aerospace	UND	Sept 2011	$370,000	$43,820
Centers of Research Excellence				
Center for Avian Therapeutics for Infectious Diseases	UND	June 2013	$700,000	$1,301,551
Center for Biobased Materials Science and Technology	NDSU		$1,132,500	$0
Center of Gas Utilization	UND		$300,000	$0
Center for Life Sciences Research & Applications	NDSU	Nov 2012	$1,350,000	$0
Center for Technologically Innovative Processes & Products	NDSU	Aug 2012	$1,331,250	$112,258
Base Realignment				
Airspace Integration Team – UAS National Test Site	UND	Nov 2012	$500,000	$123,753
Enhanced Use Lease (EUL) for Grand Forks Air Force Base III	UND	Nov 2012	$921,050	$127,295
Enhanced Use Lease Phase IV	UND	July 2013	$160,000	$0
Global Hawk Sensor Operator Part Task Trainer	UND	Dec 2011	$878,204	$11,406,988
Integrating UAS into the National Airspace, Phase II	UND	Dec 2011	$255,440	$150,102
Joint Distributed Common Ground System	UND	Dec 2011	$125,706	$46,191
Limited Deployment Cooperative Airspace Project				
Automatic Dependent Surveillance-Broadcast Miniaturization Program	NDSU	Nov 2011	$1,300,000	$2,911,292
Limited Deployment Cooperative Airspace Project	UND	Oct 2011	$2,700,000	$4,658,649
GRAND TOTALS			**$73,669,150**	**$204,367,999**

**Enterprise University concluded its operations and returned $200,545.51 of its original $1 million Centers of Excellence Award to the North Dakota general fund.*

The Centers of Excellence program is a key component of North Dakota's technology-based economic development strategy. It has generated significant economic benefits by leveraging the research and intellectual capabilities of the state's universities and colleges with the resources of private sector companies.

Total economic impact:
$691 million

Nearly **$4** raised for every **$1** of awarded funds spent

21 businesses created or expanded

98 private sector partners

www.NDCentersofExcellence.com