Prepared by the North Dakota Legislative Council
staff for the Budget Section
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SUMMARY OF 2007-09 CENTERS OF EXCELLENCE APPLICATIONS - ROUND 1

AUTHORIZATION AND FUNDING

The 2005 Legislative Assembly approved Senate Bill No. 2032 establishing a centers of excellence program. The Centers of Excellence Commission created by the bill is responsible for the application process and for making funding award recommendations for commission-approved applications for centers of excellence. The applications that are being submitted to the Emergency Commission and Budget Section have been approved by the Centers of Excellence Commission, the Economic Development Foundation, and the Board of Higher Education.

The 2007 Legislative Assembly appropriated $15 million from the permanent oil tax trust fund to the Office of Management and Budget for centers of excellence grants and authorized the Office of Management and Budget, as directed by the Centers of Excellence Commission and with Emergency Commission and Budget Section approval, to borrow up to $5 million from the Bank of North Dakota for providing additional funding for centers of excellence, if the $15 million appropriated from the permanent oil tax trust fund is committed. Of the $15 million appropriation, up to $10 million is available for Budget Section approval at its first meeting after September 1, 2007, and up to $5 million and any unawarded funds remaining from the first year $10 million allocation is available for Budget Section approval at its first meeting after September 1, 2008.

2005-07 APPROVED APPLICATIONS

During the 2005-07 biennium, the Budget Section approved the following centers of excellence grants:

Round 1		
Bismarck State College	Energy Center of Excellence	$3,000,000
Lake Region State College	Dakota Center of Optimized Agriculture	450,000
University of North Dakota	National Center for Hydrogen Technology	2,500,000
North Dakota State University	Center for Advanced Electronics Design and Manufacturing	3,000,000
Total - Round 1		$8,950,000
Round 2		
Williston State College	Petroleum Safety Technology Center	$400,000
University of North Dakota	Center for Unmanned Aerial Vehicle and Simulation Applications	1,000,000
University of North Dakota	Center for Life Sciences and Advanced Technology	3,500,000
North Dakota State University	Center for Agbiotechnology: Oilseed Development	2,000,000
North Dakota State University	Center for Surface Protection	2,000,000
Valley City State University	Enterprises Applications Model	1,000,000
Total - Round 2		$9,900,000
Round 3		
Dickinson State University	Center for Entrepreneurship and Rural Revitalization	$1,150,000
Total - 2005-07 biennium		$20,000,000

2007 APPLICATION SUMMARIES

The schedule below summarizes the statutory **requirements and other considerations** contained in North Dakota Century Code Chapter 15-69 related to centers of excellence as well as additional information requested by the Emergency Commission in December 2005. Upon approval of the application by the Centers of Excellence Commission, the State Board of Higher Education, North Dakota Economic Development Foundation, **and Budget Section (after a recommendation by the Emergency Commission)**, an entity may be provided a funding award and be designated as a "center of excellence."

The 2007-09 centers of excellence applications approved by the Centers of Excellence Commission for Round 1 totaling $10 million are listed below, along with related statutory provisions and summary information for each of the applications.

Description	Project - Application Summary					
Emergency Commission Request No./Project	**1632 North Dakota State University - Agbiotechnology - Oilseed Development II**	**1633 North Dakota State University - Surface Protection**	**1634 University of North Dakota - Biomedical Device Research, Development, and Commercialization**	**1635 University of North Dakota - Unmanned Aircraft System**	**1636 Lake Region State College - Dakota Center for Technology-Optimized Agriculture**	**1637 Minot State University - Great Plains Knowledge and Data Center**
Center of excellence funding **request**	$2,000,000	$3,012,952	$3,240,905	$3,500,000	$402,000	$3,487,383
Proposed center of excellence funding **award**	$1,500,000	$2,000,000	$2,500,000	$1,500,000	$400,000	$2,100,000
Requirements A center must be an institution of higher education or a nonprofit university- or college-related foundation under the control of the State Board of Higher Education (Section 15-69-02(1)).	North Dakota State University	North Dakota State University	University of North Dakota	University of North Dakota	Lake Region State College	Minot State University
The institution or nonprofit foundation must be working in partnership with the private sector (Section 15-69-02(1)).	Monsanto Archer Daniels Midland	Praxair Surface Technologies Technology Application Group Sulzer Metco Marvin Windows and Doors Akzo Nobel	Enova Medication Technologies	Lockheed Martin Raytheon Boeing Northrup Grumman AAI Cirrus Design SEO Precision Killdeer Mountain Manufacturing Others	Agri Iama GIS Technologies AGVISE Laboratories Airborne Data Systems Farmers Edge Precision Consulting Packet Digital LLC Verdi-Plus	InfoTech - Minot Technology Center SRT Communications
Designation (Section 15-69-02(1)	Commercialization	Commercialization	Commercialization	Infrastructure and commercialization	Commercialization	Commercialization
How future maintenance and operational costs of any new infrastructure will be provided (Section 15-69-02(1))	N/A	N/A	N/A	No information provided	N/A	N/A
A center shall use funds awarded to enhance capacity, enhance infrastructure, and leverage state, federal, and private funds. A center may not use funds awarded to supplant funds for current operations or academic instruction or to pay indirect costs (Section 15-69-05(1)).	Funding will be used for salaries, operating expenses, and equipment for evaluating new canola lines; for testing oil content, quality, and other attributes of new germoplasm lines and species; and for analyzing potential cost-savings to growers, alternative premium strategies, and market competition.	Funding will be used for salaries, operating, equipment, and remodeling to conduct market-based research and development relating to gun barrel coatings; for legal costs, business plan development, marketing, and other activities relating to technology transfer; and to provide consulting services to partner organizations.	Funding will be used to hire research and administrative staff, support faculty, and graduate students at UND and NDSU and for equipment and operating costs to research, develop, and commercialize biomedical devices.	Funding will be used to hire personnel to build the infrastructure to promote research, development, and commercialization of unmanned aircraft systems (UAS) civilian industry. The center will focus on: 1. Education and training on the integration of UAS into civilian aviation industry. 2. Human factors flight performance research. 3. Research and development of UAS payload sensors.	Funding will be used for salaries, testing, and equipment components related to the development of a towed-hose slurry manure variable rate applicator and related soil and nutrient sensors and software.	Funding will be used for personnel costs, operating expenses, and equipment purchases to expand SRT's current production data center capabilities and to establish and operate a research and development facility at Minot State University to promote the development and advancement of knowledge-based businesses in the region.

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Total matching funds anticipated ($2 of matching funds are required for each $1 of state funds) (Section 15-69-05(3)).	$5,580,000	$4,000,000	$5,000,000	$3,000,000	$843,400	$4,200,000
Major consideration In making funding recommendations and designation determinations, the commission, board, foundation, and Budget Section **shall give major consideration** to the portion of matching funds provided **in cash** by the **private sector** (Section 15-69-05(3)).	Private sector cash: ADM $80,000	Private sector cash: Akzo Nobel Aircraft Coatings $50,000 Other cash: Federal funds $633,050 Total cash $683,050	Private sector cash: Enova Medical Technologies $3,714,000 Other cash: City of Minot $745,000 Minot Economic Development 220,000 Total other cash $965,000 Total cash $4,679,000	Private sector cash $0 Other cash: Federal funds $1,850,000 Total cash $1,850,000	Private sector cash $0 Other cash: Local economic development $50,000 Federal funds 98,900 Total other cash $148,900 Total cash $148,900	Private sector cash $0 Other cash: $0 Total cash $0
Other considerations (Section 15-69-04(3)) In deciding whether to approve or disapprove an application, the commission **is to consider** whether the center will:						
Use university or college **research** to promote private sector **job growth** and expansion of knowledge-based industries or use university or college research to promote the development of **new products**, **high-tech companies**, or **skilled jobs** in this state	The center's activities will result in new technology that will increase farmers' yields, reduce risks, and generate additional profit; increase investment in processing; and enhance processing efficiency.	The center will research and develop new materials with its industry partners to create new products, jobs, and opportunities for companies that will benefit North Dakota.	The center involves both UND and NDSU staff and students, in partnership with private sector and community partners, to research, develop, and commercialize biomedical devices that have the potential to generate intellectual property, business opportunities, and skilled jobs.	The center will develop payload options and sensors, platform modifications, and ground-based cockpit innovations that will allow for the creation of new products and jobs in North Dakota. The ultimate goal of the center is to develop a flight training and aircraft manufacturing business package that will be based in Grand Forks.	The center identifies and develops, through collaboration with its private partners, software, hardware, and agronomic advice providing technological control of agriculture machinery for zone-specific applications.	The research and development facility at Minot State University will allow faculty, students, and community professionals to explore, discover, design, develop, and test new concepts and practices in technology and knowledge-based applications. Business services may include marketing research conducted by students to identify industry needs and new markets.
Create high-value private sector employment opportunities in this state	The center has the potential of allowing for the construction of two new processing plants which would result in the creation of 160 direct jobs, including technicians, professionals, and manufacturing personnel and 1,639 indirect jobs primarily in rural areas of western, north central, and southwestern North Dakota.	The center, in partnership with private sector, will conduct the research and development necessary for these private sector partners to expand their business and create new business opportunities that will lead to job creation within these businesses.	The center will initially create 6 jobs in Minot with the potential of employing 100 after two years with the development of a manufacturing plant to produce devices resulting from activity of the center. Potential jobs could total 200 by 2012.	The center's activities will lead to the creation of 40 high-paying private sector jobs relating to manufacturing, training, and service-related activities in North Dakota.	The center has created high-value jobs resulting from its research and development functions.	The center will facilitate the creation of 70 new high-technology knowledge-based jobs for industry partners by June 30, 2010.
Provide for public/private sector involvement and partnerships	A public/private partnership is identified.	A number of public/private partnerships are identified.	A public/private partnership is identified.	A number of public/private partnerships are identified.	A number of public/private partnerships are identified.	A number of public/private partnerships are identified.

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Leverage other funding	Federal funds will be pursued through demonstration projects. One is pending.	The center has opportunities to generate additional funding from a variety of sources.	Reference is made to the $5,000,000 total match referred to above.	Additional federal funds may be available for general aviation research.	Other funding and services have been secured from public and private sources and the center is seeking additional private sector funds for specific initiatives.	The center will leverage current and future investments received by InfoTech-MTC to create intellectual capital that will include new ventures and products. Center activity will also be supported by federal contracts secured by InfoTech-MTC.
Increase research and development activities that may involve federal funding from the National Science Foundation experimental program to stimulate competitive research	Activities of the center can be used to pursue funds from other granting agencies.	Obtaining enhanced infrastructure and capabilities resulting from this request will make the center more viable to acquire additional funds from these sources.	The center will generate numerous opportunities for research proposals to be submitted to federal agencies, including the National Science Foundation and EPSCoR.	The center will have opportunities for seeking additional funding from these and other federal sources.	The center has a number of grant applications pending and under development for accessing funds from these types of programs.	The center will be eligible to seek grant awards from these sources.
Foster and practice entrepreneurship	Biodiesel and derivative products are new and their commercialization should be viewed as entrepreneurial. Products from special oil traits may create new business opportunities.	The center's activities, including the development of intellectual property, provide opportunities for entrepreneurial activity.	Biomedical device research requires innovation and commercialization will require entrepreneurship.	The center's primary focus is to facilitate the growth of high-value private sector unmanned aircraft systems industry jobs in North Dakota.	The center has demonstrated its capability to provide incentives for entrepreneurial development. Its private sector partners continue to practice entrepreneurship.	The center will allow students and professionals the tools and support needed to develop new applications, products, protocols, and services leading to entrepreneurial endeavors.
Promote the commercialization of new products and services in industry clusters	New products in the form of agricultural technology will be developed by the center. New products will be evaluated and may become commercially available.	The center conducts research and development of new coatings that benefit its partners in a number of industries important to North Dakota.	The center will enhance advanced manufacturing in North Dakota, resulting from the desired outcome of the center of the establishment of a manufacturing plant in Minot.	The center will be involved in the commercialization of a number of products and services in the unmanned aircraft system industry.	The center will be involved in the commercialization of high resolution macroimagery, remote data stream transmission, data processing capacity within data centers, and the manufacture of machine components, product demonstrations, and adult learner modules.	The center will allow for the development of new ideas into products and services that the center will promote. The production data facility will allow new clients to join the partnership and bring new businesses to North Dakota.
Become financially self-sustaining	Successful commercialization will provide royalty income that will be shared by NDSU and Monsanto which should provide a basis for future funding.	The center plans to become self-sustaining by procuring additional funds and support from grant and contract activity involving public and private organizations.	The goal of the center is to demonstrate successful research development and commercialization of biomedical devices to attract biomedical companies to use the center for conducting these activities. The center may also attract federal or other grants.	The request includes funding for a business development position to assist in making the center financially self-sustaining by supporting commercialization of technologies and expansion of private businesses in Grand Forks.	The center is pursuing revenue from: 1. Additional partners, 2. Federal agencies, 3. Licensing fees for access to product designs, and 4. Private sector grants.	The center will become self-sustaining through contracts for services with private sector clients. Additional funds may be generated through grant-sponsored activities.
Establish and meet a deadline for acquiring and expending all public and private funds specified in the application	The center will spend the funds over four years.	The center plans to spend the funds over three years.	The center anticipates spending the funds over three years.	The center plans to spend the funds over two years.	The center plans to spend the funds over three and one-half years.	The center plans to spend the funds over two and one-half years.

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Responses to previous Emergency Commission questions						
The potential new private sector jobs that will be created if your center of excellence proposal is funded, including the nature of the jobs and the number of new jobs	The potential of 160 jobs in two new processing plants, including technicians, professionals, and manufacturing positions; and 1,639 secondary indirect jobs	The center projects creating 20 to 30 new private sector jobs, including high-tech manufacturing jobs, laboratory personnel, and technicians.	The center will initially create six jobs with the potential of creating the following 200 jobs by 2012: 10 or more managers, 10 or more engineers, 5 or more quality and regulatory positions, 30 or more technicians, 20 or more administrators, and 125 or more production positions.	The center's activities are anticipated to create 40 high-paying private sector jobs, including engineers, flight instructors, technicians, managers, and technical support positions.	The center anticipates creating 26 new private sector jobs. The nature of the jobs is not identified.	The center anticipates creating 70 new high-technology knowledge-based jobs by June 30, 2010.
How any new building that is proposed with the use of the funds will be sustained from a financial standpoint, detailing the costs of sustaining the building and the source of revenue	N/A	N/A	N/A	N/A	N/A	N/A
Details concerning the private sector match for each proposal, including description and value of any in-kind match	Private sector cash $80,000 Private sector in-kind match: Monsanto - Germplasm canola $5,000,000 ADM - Quality evaluation 500,000 Total private sector in-kind match $5,500,000	Private sector cash $50,000 Private sector in-kind match: Praxair - Testing, equipment, technical support, and marketing $300,000 Sulzer Metco - Testing, equipment, technical support, and marketing 1,966,950 Marvin Windows and Doors - Research and other projects 180,000 Akzo Nobel - Technical support, equipment, and materials 600,000 Technology Applications Group - Testing and research 75,000	Private sector cash $3,714,000 Private sector in-kind match: Enova Medical Technologies - Administrative expenses $105,000 Consulting fees 60,000 Regulatory expenses 75,000 Patent expenses 60,000 Total private sector in-kind match $300,000	Private sector cash $0 Private sector in-kind match: Lockheed Martin - Training, consulting, testing, and access to equipment $1,000,000 Raytheon - Training, consulting, and access to equipment 150,000 Total private sector in-kind match $1,150,000	Private sector cash $0 Private sector in-kind match: Agri Ima GIS Technologies - Personnel, software, licensing, and use of equipment $150,000 Airborne Data Systems - Personnel, machine components, materials, aircraft usage 260,000 Farmers Edge Precision Consulting - Personnel 21,000 Pocket Digital, LLC - Personnel and sensors and software modules 20,000	Private sector cash $0 Private sector in-kind match: SRT Communications - Data bandwidth, server space, power consumption, other data-related costs $30,000 InfoTech-MTC - Technical expertise 1,500,000 Application R&D contracts 2,500,000 Future contracts 100,000 Total private sector in-kind match 70,000 $4,200,000

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		New projects with other companies 195,000 Total private sector in-kind match $3,316,950			Verdi Plus - Personnel, data equipment, and devices 80,000 Total private sector in-kind match $531,000	
For the center's executive summary and budget detail see:	Appendix A	Appendix B	Appendix C	Appendix D	Appendix E	Appendix F
Emergency Commission recommendation/vote	Approve 5-1	Approve 5-1	Approve 5-1	Approve 5-1	Approve 4-2	Approve 4-2

APPROVAL PROCESS

In order to receive a funding award and be designated a center of excellence, each application must:

1. Be approved by the Centers of Excellence Commission - The commission may modify the application request (Section 15-69-02(1)).
2. Be approved by the Economic Development Foundation (Section 15-69-02(2)).
3. Be approved by the State Board of Higher Education (Section 15-69-02(2)).
4. Be reviewed by the Emergency Commission. The Emergency Commission makes a recommendation on each application to the Budget Section (Section 15-69-02(2)).
5. Be considered by the Budget Section. The Budget Section, in considering each proposal, has the following options:
   - Approve the proposal.
   - Reject the proposal.
   - Rerefer the proposal to the Centers of Excellence Commission with recommended modifications.

If, upon receiving a rereferred recommendation, the commission modifies the recommendation or retains the recommendation and provides additional information within 30 days, the Emergency Commission may meet and either approve or reject the recommendation. If the Emergency Commission does not meet to consider the rereferred proposal within 30 days, the proposal will be considered at the next Budget Section meeting as modified or retained with additional information. (Section 15-69-02(2)).

ATTACH:6

III. Executive Summary (limited to one page)

Oilseeds is one of the fastest growing agricultural markets. It is driven by 1) the emerging and rapidly growing biodiesel industry, which uses canola and other oilseeds as feedstock; 2) shifts in demand for healthful oil traits in the United States and elsewhere; and 3) by the combined effects of increased demand for oils in foods world-wide. Oilseeds are strategic crops of great importance to North Dakota. We are the largest producer of canola, a crop with a number of important attributes. The oil content per acre of canola is high and exceeds that of soybeans and other competing crops. Its healthy attributes make it desirable for the food industry, and its cold-flow properties and lubricity properties make it a valuable feedstock for biodiesel production. The major factor limiting the growth of these sectors is the supply of canola as a feedstock.

Our partners, (Monsanto, the largest agbiotechnology developer, and Archers Daniels Midland, a major processor of oilseeds and biofuels in the United States), Mr. Shane Goettle, and others in the biofuels industry have urged us to accelerate and expand the COE on Oilseed Development and pursue objectives deleted earlier due to budgetary reasons. In response, this project will expand the current COE by developing drought tolerant and reduced shattering lines of *Brassica napus*, the traditional canola species that are adapted to acres south and west of the traditional canola growing region. *Brassica juncea*, a crop with similar oil properties as canola and adaptability to more arid regions will also be studied. The project will be accomplished by expanding our screening programs while incorporating winter nurseries and marker assisted breeding.

Primary beneficiaries are growers, who benefit from increased yields, reduced risks, and greater profits (by $20-66 million/yr), and processors, who invest in processing plants in rural North Dakota. These are not fleeting opportunities. North Dakota dominates canola production and processing. Those processors employ high-paying technicians, professionals, and skilled laborers in their rural plants. Our targeted gain in oil content could support up to 10-12 new biodiesel plants each of which employ 80 or more people thereby increasing wealth in this sector of our economy.

Appendix 1
NDSU Center of Excellence for Oilseed Development II
Detailed Four-year Budget

COE Item	COE Budget
Germplasm Development and Marker-Assisted Breeding	
Salaries/benefits	$ 415,000
Operating and supplies	450,000
Equipment	75,000
AgBiosystems Eng: Quality Lab, Biofuel Testing (including prospects for collaboration)	
Salaries/benefits	150,000
Operating and supplies	40,000
Equipment	0
Marketing and Economic Analysis	
Salaries/benefits	340,000
Operating and supplies	30,000
Equipment	0
Total	$1,500,000

Matching Item	Match
Cash	
ADM (Selected projects)	80,000
In-kind materials	
Monsanto: Germplasm Canola	$5,000,000
ADM Quality Evaluation (estimated)	580,000
Total	$5,580,000

Details of the four year operating budget, broken down by years and activity.

	Year 1	Year 2	Year 3	Year 4	Total
Germplasm Development and Marker-Assisted Breediing					
Salaries/benefits	55,000	80,000	145,000	135,000	415,000
Operating and supplies	112,500	112,500	112,500	112,500	450,000
Equipment	75,000	0	0	0	75,000
AgBiosystems Engineering: Quality Lab, Biofuel Testing					
Salaries/benefits	37,500	37,500	37,500	37,500	150,000
Operating and supplies	10,000	10,000	10,000	10,000	40,000
Equipment	0	0	0	0	0
Marketing and Economic Analysis					
Salaries/benefits	70,000	80,000	110,000	90,000	340,000
Operating and supplies	7,500	7,500	7,500	7,500	30,000
Equipment	0				0

Budget Justification. The budget includes line items for each of the below. In each case, no new faculty positions are sought but instead the efforts will be conducted through existing faculty and/or professionals hired for the duration of the project. In most cases existing resources will be used and expanded to accomplish the accelerated and expanded initiatives

Germplasm Development, Breeding and Marker Assisted Breeding. One germplasm development leader exists. He is assisted by a new hire to work on the breeding and germplasm development efforts in canola. Funding is provided for two graduate students and faculty summer support. Operating funds are required to evaluate the advanced lines. This will include field rental both locally and for a winter nursery, as well as travel to the in-state and winter nursery sites. Personnel (graduate students) and research support of molecular marker analysis is also included. Some dedicated field and lab equipment will be required.

AgBiosystems Eng: Quality Lab, Biofuel Testing and Bio-Products (including prospects for collaboration) The quality lab and pilot plant have already been expanded so minimal additional expenditures are required. Funding is provided for one technician over the period of the project to assist Dr. Wiesenborn. In addition, funds are reserved to pursue varying forms of collaboration on the polymers initiative pending interests and further collaborative funding by the partners.

Marketing and Economic Analysis. Funds are provided for faculty summer support and one research scientist. This may be supplemented by a graduate student. These professionals will coordinate the project and will conduct specified marketing and commercialization studies. In addition, one will work on new product strategies.

Monsanto's' Contribution These are minor issues and can be resolved prior to submission to the COE commission: 1) Monsanto will provide germplasm valued at $4-6 million, or more as noted in their letter; 2) At the appropriate time, they will provide a detailed listing of the germplasm lines, and valuation in an executive appendix; and 3) these are in addition to the additional lines added to their

contribution as well as use of equipment, winter nurseries in Chile, etc, under the current COE which were not valued, nor required.

Further, Monsanto had earlier provided cash contribution of $250K which was to be credited toward the previous COE. However, with the reduced contribution from the COE Commission, they would expect their required contribution to be less. Hence, a portion of that is carried over and added as cash to the COE II proposal. However, we have not carried that funding into the budget nor request for the COE II. It is mentioned here as it is important there has been a cash contribution from Monsanto and these have and will be used to fund future related activities.

ADM's Contribution ADM's support continues and will be comparable to the previous COE.

In addition to testing, other forms of collaboration, as well as hiring of interns, ADM uses an internal procedure for collaborative projects such as proposed under the COE. This takes the form of identifying targeted research areas, developing proposals, identifying individuals or business units at ADM working in those areas, and then jointly submitting them to a review committee for funding approval. This is the source of anticipated cash contribution from ADM at $80,000. We currently have 3 proposals going through that process. This will be the procedure they propose to use for funding specific projects under this COE, including technical work on biofuels, processing as well as explorative and joint work in polymers and coatings applications of these oils. The latter could be pursued jointly with other Centers or departments at NDSU.

Other Parnters: This COE is built around the dominant players in the industry. We have taken the view that as others enter the industry, the project would be extended to them as well.

SURFACE PROTECTION

III. Executive Summary (limited to one page)

NDSU proposes Phase 2 funding for the Center for Surface Protection (CSP). Since its establishment in 2006, the Center has engaged private sector participants in economically significant materials research and development. The Center for Surface Protection works with private sector partners to address new materials development, industrial product issues, and provides technical services in the form of testing. The Center is anchored by the world-class reputation and technical expertise of both the NDSU Department of Coatings and Polymeric Materials (CPM) and the NDSU Center for Nanoscale Science and Engineering (CNSE).

In the January 2006 ED-COE proposal, $4,725,985 was requested to work with a number of private sector partners to engage in industries ranging from window/door manufacturing to re-manufacturing of products for equipment. The Center funding was reduced and thus the number of private sector partners had to be trimmed commensurate with the funding. As a result of this action, the CSP is requesting Phase 2 funding to address more industrial groups as well as expand relationships with current partners in new market areas.

The CSP is focused on market-driven commercialization research for the private sector consistent with the intent of the ED-COE program. The CSP performs cutting edge research by leveraging existing capabilities built primarily with federal funding. Such research provides opportunities for companies to grow existing markets as well as enter new markets. The CSP is currently focused on hard coatings (HC) and soft coatings (SC).

Hard Coatings (CSP-HC). New coatings systems being proposed will demonstrate improved corrosion, erosion, and wear properties relative to the current state-of-the-art coatings systems. These technologies will serve applications such as food processing equipment, defense and armaments, and aerospace. The hard coatings program is aimed to partner with two world leaders in the hard coatings field. Access to their resources and experience will significantly accelerate research, product development, and commercialization.

Soft Coatings (CSP-SC). CSP will work with North Dakota companies such as Technology Application Group (TAG) [involving magnesium surfaces and related testing services] and Marvin Windows and Doors [new coatings development and testing services]. CSP will also conduct research for Akzo-Nobel on new coatings. The CSP partners and their proposed applications are discussed in the Section V. Center Description.

Appendix A: Center for Surface Protection – Budget and Justification

REQUESTED OF THE ND ED-COE PROGRAM	Year 1	Year 2	Year 3	Total
Personnel (Staff, Faculty, Student interns)	296,968	454,538	567,001	1,318,507
Materials, Equipment, Rent and Recharge Center Fees	374,693	46,400	45,400	466,493
Travel	15,000	15,000	15,000	45,000
Remodeling and Furnishing Labspace	55,000	5,000	5,000	65,000
COE Business Development	35,000	35,000	35,000	105,000
TOTAL REQUESTED OF THE ND ED-COE PROGRAM	**776,661**	**555,938**	**667,401**	**2,000,000**
MATCHING FUNDS				
Private-sector cash match for projects				
Akzo Nobel Aircraft Coatings	0	0	50,000	50,000
Private-sector in-kind/in-lieu of cash match for projects				
Praxair	100,000	100,000	100,000	300,000
Sulzer-Metco	655,650	655,650	655,650	1,966,950
Marvin Windows and Doors	60,000	60,000	60,000	180,000
Akzo Nobel Aircraft Coatings	100,000	200,000	300,000	600,000
Technology Applications Group (TAG)	25,000	25,000	25,000	75,000
New Research Projects with other Private Sector Companies	65,000	65,000	65,000	195,000
Federal Funds Facilitated w/ Private Sector	265,880	242,319	124,851	633,050
TOTAL MATCHING FUNDING	1,271,530	1,347,969	1,380,501	4,000,000

Budget Justification for Funding Requested from ED-COE Program

Personnel - includes staff, faculty, and students for work on CSP private-sector partnered projects.

Materials Equipment, Rent and Recharge Center Fees - these expenses include the supplies and materials needed for CSP research projects, capital equipment expenditures, and rent for additional space.

Travel - these expenses include business travel for meetings with private sector partners and research symposium for presentation of results.

COE Business Development - these expenses include market analysis, marketing, consultant and legal fees, and business plan development. More detail is given in Appendix C, p.38.

Private-Sector Matching: The matching is based on commitments noted in the letter of commitment and estimates of future interest. The "New research projects with other private sector partners" in-kind match represents opportunities currently in the discussion/exploratory phase with both current and potential CSP partners, but which are not yet ready to be formalized into official CSP projects. Such opportunities speak to the need for a level of flexibility with in the Center and are the basis for future sustainability.

Federal Matching: Funding already secured for the anticipated award period.

III. Executive Summary (limited to one page)

In the recent past there has been commercial interest in bringing biomedical research projects to North Dakota to take advantage of the engineering and medical experience and expertise, as well as the development incentives and opportunities that exist in the state. The UND and NDSU campuses through the two engineering schools and the UND medical school have also been developing expertise in biomedical devices with a view to initiating an inter-institutional biomedical engineering graduate degree program focused on biomedical device research and development. In a recent initiative, Enova Medical Technologies (EMT) of St. Paul, MN has indicated a desire to partner with the Minot Area Development Corporation to establish a manufacturing operation and with ND's research universities to undertake research, development and commercialization (RDC) activities in the field of biomedical devices. Specifically EMT wishes to develop and commercialize its existing intellectual property, and future intellectual property generated by the partnership, to create employment opportunities for Minot area residents through the expansion of EMT to Minot.

The integration of the RDC goals of EMT with a joint UND/NDSU graduate program in biomedical devices, and the creation of employment opportunities in Minot, results in a Center of Excellence proposal with outstanding synergy and potential. The development and manufacture of biomedical devices represents a high value, low volume industry that is well suited to North Dakota, and its economic development goals. The requested funding will be used over a three-year period in which the Center will be initiated, laboratories and offices equipped, staff hired, and graduate students enrolled. RDC activities will be undertaken in the engineering schools and in the medical school, and marketing and business plan support for the later stages of the project will be provided through UND's College of Business and Public Administration. The initial RDC activities will focus on EMT's existing exclusive license on an issued patent relating to clot removal in blood vessels. If successful, this will have the potential to create a new manufacturing operation with 200+ employees in Minot by 2012.

The mission of the proposed Center will be to serve the state by providing a RDC resource for a range of biomedical devices. Over time the Center will conduct multiple, concurrent projects for various biomedical companies and cities, thus providing the potential for economic development throughout the state and region.

1. REVISED BUDGET REQUEST

PERSONNEL	Site	YEAR 1	YEAR 2	YEAR 3	TOTAL
Director	UND	$100,000	$105,000	$110,250	$315,250
Program Manager (0.5 FTE)	EMT/Minot	$40,000	$42,000	$44,100	$126,100
Research Engineer (4)	UND(2)/NDSU(2)	$300,000	$157,500	$165,375	$622,875
Research Fellow (1)	UND			$50,000	$50,000
Graduate Students (4/8/8)	UND(2/4/4)/NDSU(2/4/4)	$80,000	$168,000	$176,400	$424,400
Clerical (0.5 FTE)	UND	$12,000	$12,600	$13,230	$37,830
Adjunct Faculty (5)	UND(2/3/3)/NDSU(2/2/2)	$35,000	$45,150	$47,408	$127,558
Fringe Benefits		$141,908	$136,044	$155,346	$433,298
Total		**$708,908**	**$666,294**	**$762,109**	**$2,137,311**
EQUIPMENT					
Item A	Fluoroscopy / UND				
Total	**(moved to match)**				
OPERATING					
Travel	Conference, Workshops, Equipment ,Suppliers, Agencies	$5,000	$5,000	$5,000	$15,000
Supplies	Minor Equipment, Office Supplies, Materials	$10,000	$45,000	$90,000	$145,000
Services	Animals, Testing	$10,000	$99,706	$50,391	$160,097
Communications	Phone, computing, mail	$5,000	$5,000	$5,000	$15,000
Miscellaneous	Recruitment, furniture, publications	$16,092	$9,000	$2,500	$27,592
Total		**$46,092**	**$163,706**	**$152,891**	**$362,689**
TOTAL COSTS		**$755,000**	**$830,000**	**$915,000**	**$2,500,000**

2. BUDGET MATCH (minimum)

EMT	Cash	$1,239,000	$1,340,000	$1,135,000	$3,714,000
	In-kind	$100,000	$100,000	$100,000	$300,000
	In-lieu				
Minot City	Cash	$150,000	$220,000	$375,000	$745,000
	In-kind				
	In-lieu				
Minot EDC	Cash			$220,000	$220,000
	In-kind	$21,000			$21,000
	In-lieu				
Total		**$1,510,000**	**$1,660,000**	**$1,830,000**	**$5,000,000**

Due to limitations within the university accounting system, the system does not provide for accumulating and reporting of expenses at the detail outlined above. The costs will be accounted for and reported at the category level. The detail above is presented for proposal evaluation purposes only.

III. Executive Summary (limited to one page)

Leading aircraft manufacturers such as Lockheed Martin, Raytheon, Northrop Grumman, and Boeing are developing next-generation aircraft – Unmanned Aircraft Systems (UASs), commonly referred to as Unmanned Aerial Vehicles (UAVs). Although UASs have been a mainstay in military operations for a number of years, they are now capturing the attention of civilian industries. The UAS industry is expected to rapidly expand to a $23 billion industry within the next few years. Examples of civilian use include homeland security, law enforcement, agricultural operations, forestry, and weather forecasting. However, the commercialization of UAS technologies and applications is still in its infancy. Thus, this proposal requests $1.5 million in funding from the state of North Dakota for continued support of the University of North Dakota (UND) Unmanned Aircraft Systems Center of Excellence (COE) for Economic Development to create an additional 50 high-value UAS industry jobs (40 private and 10 public sector).

UND researchers teaming in this Center of Excellence represent the John D. Odegard School of Aerospace Sciences, the School of Engineering and Mines, the Northern Plains Center for Behavioral Research (i.e., Nursing and Psychology), and the Center for Innovation. The UAS Center of Excellence focus areas are 1) education and training development for the integration of UASs into the civilian aviation industry; 2) human factors flight performance research for UAS pilots and UAS ground station cockpit environments; and 3) research and development on UAS payload sensors for civilian and environmental scientific applications. The work of this COE will further promote the commercialization of new products (e.g., UAS sensor payloads), the test and evaluation of new civil UAS systems and services (e.g., UAS flight education), as well as promote private sector job growth within Grand Forks and throughout the state of North Dakota. A combination of new government grants, business and industry partnerships, facilities use, and revenue from training fees and product sales will ensure sustainability. Additionally, the University of North Dakota is working hand in hand with the FAA to create one of three centers for UAS test and evaluation within the United States.

UAS Center of Excellence Budget Summary

Category	Year 1	Year 2	Totals
Personnel Expenses			
Human Factors	84,269	88,135	172,404
UAS Education Development (Aviation)	163,783	171,451	335,234
Payload (Engineering)	64,455	65,677	130,132
Center for Innovation	31,129	43,211	74,340
Subtotal Personnel	343,636	368,474	712,110
Total Fringe Benefits	89,539	97,091	186,630
Total Personnel	433,175	465,565	898,740

Category	Year 1	Year 2	Totals
Operating Expenses			
Travel	57,500	41,000	98,500
Data Processing	7,000	4,000	11,000
Communications	2,992	2,991	5,983
Rents & Leases	500	0	500
Office	2,500	2,500	5,000
Supplies	42,887	35,804	78,691
Fees	58,500	53,086	111,586
Insurance	33,750	45,000	78,750
Graduate Tuition Expense	20,000	20,000	40,000
Subtotal Operating	225,629	204,381	430,010
Facilities & Equipment	171,250	0	171,250
Total Direct Costs	830,054	669,946	1,500,000

Matching Funds

Lockheed Martin (In-Kind)	1,000,000
Center for Behavioral Sciences Infrastructure Funds	300,000
DoD Money	1,550,000
Raytheon	150,000
Total	3,000,000

UAS Center for Excellence Budget Justification

Payroll Criteria: Fringe benefits have been calculated at 38% for faculty and staff in the Human Factors area, 28% for faculty and staff in the other areas, and 8% for students. Annual salary increases for Year 2 is included. Each area of the COE will employ Student Research Assistants (Graduate and/or Undergraduate) to assist in research activities.

Human Factors: A Cognitive Psychologist will be hired from the psychology field. A Data Coordinator will be hired to coordinate data collection and entry activities. The Program Coordinator will help coordinate the activities of the Human Factors area of the Center of Excellence. Two UAS ground-based control stations will be purchased for behavioral research purposes.

UAS Development: The Center Director will oversee the entire UAS COE operations of each of the 4 COE entities - - Aviation, School of Engineering and Mines, Center for Behavioral Research and the Center for Innovation. The Director of UAS operations and UAS Flight Operations will oversee research, development and testing aspects of the Aviation area of the Center of Excellence. The Flight Operations Curriculum Specialist will help write the curriculum for the Aviation area and help with the implementation of that curriculum. The Director of UAS regulations will oversee the coordination efforts with the FAA and other agencies to allow UASs into the national airspace system. Flight Instructors will be employed to teach civilian sector UAS pilots. Technical Support will provide expertise for the technological aspects of UASs.

Payload (Engineering):
Two faculty or professional staff in electrical and mechanical engineering will receive support for one and one-half (1.5) months per year for a total of two (2) years. These individuals will be responsible for directing the Unmanned Aircraft Systems Engineering team, selecting research and design projects, and seeking industrial collaborations

Undergraduate students are involved in the actual hardware development, testing, and flight of the payloads, while the graduate students are involved in more theoretical concepts such as mathematical modeling and statistical data analysis.

Center for Innovation: The Innovations Center portion of the budget will provide private sector business development and consulting services to the COE. $91,951 is provided for year one and $108,049 for year two of the COE.

Operating Expenses: Funds for operating expenses are included in the budget. A travel budget is included for trips to conferences and meetings, travel to hardware and flight testing facilities, as well as moving expenses for recruitment of personnel in the first year. Data processing funds are provided to cover the expenses of data analysis for the human factors research and flight data. Communications funds are provided to cover telephone service (local, long distance, line charges), faxes and postal and express mail expenses. An office budget is included to pay for office supplies, toner, recruitment advertising and accessories. Funds for supplies for computer

equipment and hardware, software and test equipment to support a mechanical/electrical payload design and other research supplies to support the project are included. Hull and liability insurance is included on the unmanned aircraft systems. Fees for a business development consultant for the Center for Innovation, research data and other specialized industry reports and analysis and trade publication and marketing media are requested. The cost of graduate student tuition is included.

Facilities and Equipment: Equipment to support the payload development activities, the purchase or capital lease of a ground control station, an unmanned aircraft and facilities renovation.

Matching Funds: A total of $3 million in matching funds is pledged for the Center of Excellence. The expected contributors include Lockheed Martin, Raytheon, the Department of Defense (DoD) and NIH. (See documentation in appendices).

III. Executive Summary (limited to one page)

Public concern has emerged over potential expansion of North Dakota's confined livestock industry, in-spite of development of a strategic plan for North Dakota agriculture which calls for expansion of animal enterprises. However, both dairy and swine expansion can occur on the northern high plains consistent with sound agronomic principles and environmental health practice. To do so will require use of precision application technologies which augment capable management of these farms. This proposed 3-year initiative expands the program of the Dakota Center for Technology-Optimized Agriculture, consistent with its original design, by addressing the need to harness emerging data-based site-specific control technologies to agronomic knowledge of soil profiles, crop need, and use of manure nutrients. Since towed-hose manure slurry application tools are used by dairy and swine producers in North Dakota, this initiative proposes to couple site-specific data and controllers to these knifing technologies, thereby precisely placing manure in soil zones with the most productive capacity, and retarding application where soil is unfit for normal production or within areas which constitute buffers, watersheds, set-asides, or other fragile acreages. Additionally, this initiative proposes to develop a prototypical manure injection tool, additional site-specific control technology, new data capture capability, educational modules which dairy, swine, and other livestock producers could access at any time when engaged in year-to-year strategic planning of their enterprises, and incentives for job growth and development through licensing, franchising, and allied entity creation. En-route, scientifically valid experimental data will be analyzed, required reports will be provided, the DCTOA's Steering Committee will convene, educational modules will be placed on an e-college backbone, licensing/franchising options with DCTOA partners and other entities shall be explored and deployed, and legislatively-mandated accountability measures will be compiled.

Attachment #1 – Proposed Budget – Matching Funds

DCTOA partners have committed $843,400 in matching funds of various types. Briefly summarized, these partners are committed in the following manner (detail in Attachment # 7):

Public Sector:	
Lake Region State College	
Cash match	$ 50,000
In-kind use of LRSC farm, answer farms, etc.	14,400
Federal Resources	248,000
Private Sector:	
Agri ImaGIS Technologies, Inc	
In-Lieu of Cash	60,000
In-Kind	90,000
AGVISE Laboratories (Destroyed by tornado on 08/26/07) (Staff will monitor project!)	
Airborne Data Systems, Inc.	
In-Lieu of Cash	50,000
In-Kind	210,000
Farmers Edge Precision Consulting, Inc.	
In-Lieu of Cash	21,000
Packet Digital, LLC.	
In-Lieu of Cash	10,000
In-Kind	10,000
Verdi-Plus	
In-Lieu of Cash	30,000
In-Kind	50,000
TOTAL	$843,400

Attachment # 1 – Proposed Budget – Projected Expenditures

Objective 1: Injection tool fabrication in year 01:	
Staff Salaries, Fringe, etc.	$ 31,000
Equipment Components	39,000
Objective 2: High-resolution aerial stereographic imagery camera development, image acquisition, archiving, and data manipulation software development in year 01:	
Staff Salaries, Fringe, etc.	100,000
Equipment Components	50,000
Objective 3: Design and development of remotely transmitting nutrient sensors and on-board machine controllers in year 02:	
Staff Salaries, Fringe, etc.	30,000
Equipment Components	11,000
Objective 4: Answer farm 2-year trial in years 02-03:	
Staff Salaries, Fringe, etc.	45,000
Answer Farm Cost to Modify Manure Application	24,000
Objective 5: Design and field test of educational modules in year 03-04:	
Staff Salaries, Fringe, etc.	43,000
Beta Tests of Modules on the e-College Frame	9,000
Assessment of Content Reliability, Validity, & Livestock Producer Ease of Use	12,000
Objective 6: Data Management, progress reports, and scientific journal entries in years 01-04:	
Staff Salaries, Fringe, etc.	6,000
TOTAL	$400,000

III. Executive Summary (limited to one page)

The Great Plains Knowledge and Data Center will promote the development and advancement of knowledge-based business in the region. The Center will include two key areas, a production data facility and a research and development facility (R&D), which will support current and new knowledge-based business ventures through three central functions: technology operations, business development, and data center R&D. Approximately 70 new, high-tech knowledge-based jobs paying regionally competitive salaries will be created by June 30, 2010. These jobs will expand the employment base in Minot and strategically diversify the regional economy. Participating partners will be Minot State University (MSU), InfoTech-Minot Technology Center (InfoTech-MTC), and SRT.

The Center will enhance the economic capabilities of the greater Minot area by acting as a catalyst to attract new business, leveraging economic development activities, acting as a focal point for new technology growth opportunities, and attracting capital through new business investments and grants. Center activities will promote high paying jobs, increase area tax base, and reduce out migration due to high skill employment opportunities to diversify Minot's regional economy.

InfoTech-MTC will provide the Center with client projects, technological expertise, internship and employment opportunities, and data center activities. InfoTech-MTC clients will be provided access to data and services through the production data facility. SRT will provide physical infrastructure, broadband access, and professional expertise. The production data facility will host InfoTech-MTC applications and provide a site for MSU student internships and future employment.

MSU will host and operate the R&D facility, which will house a replicated production data facilty for students and faculty to engage in testing and development of client projects and provide marketing, managerial, and data technology consulting services to partners. The Center will assist private and public enterprises in software development and testing. Center staff will pursue additional work in collaboration with Minot Area Development Corporation and other regional partners in economic development for long-term sustainability.

Minot State University
Great Plains Knowledge and Data Center
REVISED Grant Annual Total Costs - 1 October 2007

	FY 2007-08			FY 2008-09		FY 2009-10	
	Start-Up Costs	FTE	1/08-6/08	FTE	7/08-6/09	FTE	7/09-6/10
Funding Periods	1		1		2		3
Personnel							
Director		0.5	$20,000	1.0	$83,200	1.0	$86,528
Benefits			$6,282		$25,966		$27,006
Systems Administrator		0.5	$12,500	0.5	$26,000	0.5	$27,040
Benefits			$3,901		$8,114		$8,439
Project Contract work			$200,000		$200,000		$100,000
Cooperative Learning			$30,000		$50,000		$50,000
Total Personnel			$272,683		$393,280		$299,013
Equipment							
Production Data Facility	$800,000						
R&D Facility	$250,000						
Total Equipment	$1,050,000		$0		$0		$0
Utilities	$50,000						
Marketing, Travel, Training			$15,000		$10,000		$10,000
Total (Column)	$1,100,000		$287,683		$403,280		$309,013
Cumulative			$1,387,683		$1,790,963		$2,099,976

Great Plains Knowledge and Data Center
Budget Narrative

Personnel Costs

Director: Base salary of $80,000, benefits at 31.21%; 50% FTE for Funding Period 1; 100% FTE for Funding Periods 2 and 3. Annual fiscal year increase of 4%.

Systems Administrator: Base salary of $52,000, benefits at 31.21%; 50% FTE for Funding Periods 1, 2, and 3.

Project Contract Work: Technical expertise will be hired on contracts for service to assist in infrastructure setup as well as R&D facility project and service mentoring to student interns, faculty, and businesses. Consultants hired will have technical expertise specific to project needs.

Cooperative Learning: Students will receive stipends for work performed within the R&D facility as well as on-site with partners.

Equipment

R&D Facility Equipment will include secure cages, servers, racks, firewalls, routers, gateways, storage array, switches, etc. Facility, along with Center administrative offices, will be located in one or more MSU buildings. MSU will support costs for renovation of area and relocation of current occupants.

Production Data Facility Equipment will include servers, switches, storage array, etc, and will be located at SRT Communications North Center. Grant funds will purchase the equipment. InfoTech-MTC will have exclusive rights to the use of this equipment.

Utilities include those necessary for updating the space where the R&D Center will be located.

Marketing, Travel, Training, costs are for Center staff for client contacts and meetings, project management discussions, and ongoing training.

Funding Disbursement Request

The budget has been divided into three funding periods (see budget, line 1). We request that the funding be disbursed as follows:

Funding Period 1 (Start up costs and FY 2007-08)	
January 1, 2008	$1,387,683
Funding Period 2 (FY 2008-09)	
July 1, 2008	$ 403,280
Funding Period 3 (FY 2009-10)	
July 1, 2009	$ 309,013