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).