Application Score Sheet

Proposed Project: Florida Institute for Human and Machine Cognition, National Center for Collaborative Autonomy (#342)
Proposed Project/Program County: Escambia
Board of County Commission Support:
Rural County:
Opportunity Zone:

Total Projected Project Cost: $29,688,238
Match Provided: $22,967,433
Triumph Funds Requested: $6,720,805 (23%)
Triumph Funds Recommended by Staff: $6,720,805

Score: A
ROI: $12.8 dollars of increased personal income (in constant dollars) per dollar of Triumph expenditure

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Economic Analysis, Impact and Score

The Florida Institute for Human and Machine Cognition (IHMC) proposal describes the National Center for Collaborative Autonomy (NCCA), which is intended to seed rapid growth of advanced collaboration between autonomous platforms and systems, and to develop methods for human operators to guide the systems and ensure their safe and effective operation. The Triumph funding request of $6,720,805 represents 23 percent of the total project cost of $29,688,238. Other funding sources in support of the NCCA include grant and contract-funded expenditures over a ten-year performance period of $20,000,000, and IHMC internally-funded support of
$2,967,433 over the performance period.

IHMC is internationally recognized in three (3) distinct fields of research prominence: Robotics, Artificial Intelligence, and Healthspan, Resilience, and Performance. The envisioned NCCA will combine two of IHMC's research focus areas: Robotics and Artificial Intelligence. Scaling IHMC's robotics research to large, multi-domain collaborating autonomous teams will strengthen IHMC's position as a leader in robotics and AI research. NCCA will leverage advances in both research areas to spearhead the next generation of advancement provided by collaborative autonomy.

The proposal proposes several outcomes that result in the following suggested metrics:

- Performance Metric 1: The addition of twelve (12) newly created FTE positions within the first four (4) years (year 4) of receipt of the Triumph funds. For an overall project total of twelve (12) new FTE positions by end of year three (3).
- Performance Metric #2: Expenditure of $20,000,000 in competitively awarded research grants within ten years of the first disbursement of TGC grant funds.

- Performance Metric #3: Provide substantive collaborative assistance and mentoring via local entrepreneurial outreach and mentorship. NCCA researchers will conduct a minimum of four per year (40 total) research outreach activities delivered to groups of all ages.

The NCCA will serve as a catalyst for economic growth in Northwest Florida by leveraging IHMC's proven track record in securing substantial federal research funding and generating high-impact research programs. The center's focus on collaborative autonomous systems will attract new federal grants, contracts, and private investments that would otherwise not be directed to the region. This influx of external funding will create a robust pipeline of resources, stimulating local business growth, and increasing overall economic activity. The combination of direct and indirect job creation increased federal spending, and entrepreneurial activity will drive significant long-term economic benefits for the region.

The view of Triumph staff is that this project will be transformational for the region. We calculate that the non-Triumph funding contribution to this project will result in over $18 million of direct personal income impact itself over the life of the project. Following literature regarding differences in seed and early-stage financing among metro areas with business accelerator programs versus those without, these direct impacts are likely to galvanize additional local activity so as to roughly triple investment in this business sector within the Triumph region. Taking these metrics together, the total impact on the region measured is expected to be $12.8 dollars of increased personal income (in constant dollars) per dollar of Triumph expenditure. For these reasons, Triumph staff rate the project as an "A."

Project Summary (based on information provided by the applicant)

The Florida Institute for Human and Machine Cognition (IHMC) is requesting a $6,720,805 Triumph grant to support the creation of the National Center for Collaborative Autonomy (NCCA.) The grant funds will seed rapid growth of advanced collaboration between autonomous platforms and systems, and to develop methods for human operators to guide the systems and ensure their safe and effective operation. The grants funds will be used for equipment, supplies, personnel and grant compliance will be matched by $22,967,433 in IHMC funds and external grants and contracts expended over ten years.

The NCCA will serve as a catalyst for economic growth in Northwest Florida by leveraging IHMC's proven track record in securing substantial federal research funding and generating high-impact research programs. The center's focus on collaborative autonomous systems will attract new federal grants, contracts, and private investments that would otherwise not be directed to the region.

The future of autonomous systems incudes moving away from the current model of a single operator controlling a single vehicle. In the context of this proposal, Collaborative Autonomy refers to autonomous platforms operating in multiple domains such as maritime (surface, underwater), ground, air, and space with limited human input that still provides valuable oversight.

NCCA will establish and support multiple areas of research, including multi-domain collaborative autonomous systems, robust communication and networking techniques, collaborative manipulation, coordinated behavior, distributed artificial intelligence, machine learning techniques for multiple distributed autonomous systems, and human-machine teaming strategies for heterogeneous autonomous systems.

IHMC is uniquely positioned to take the research lead in the area of developing methods for human operators to guide the systems and ensure their safe and effective operation due to its experience with a broad range of systems, such as its expertise in the field of AI and autonomy, and its focus on the human and machine teamwork.

Commercial interest in developing and deploying autonomous platforms and systems is at an all-time high. The estimated market value for aerial drones in 2023 was $15,364,000 and it is expected to grow to $91,304,000 by the end of 2033 with a compound annual growth rate of 19.3%. Autonomous underwater systems are a $3,420,000 market with a growth rate of 15.6%, and autonomous surface vehicles are a $2,160,000 market with a growth rate of 4.7%.

The research to be conducted by NCCA will also be of keen interest to the federal government and particularly to the US military. As observed in recent conflicts, unmanned systems in general and drones in particular, are transforming modern warfare. The ability for inexpensive drones to disable and/or destroy expensive equipment is creating a stark asymmetry, one that will be amplified by collaborative autonomy.

Scaling an operator's span of control from 1 to many, if not hundreds, of autonomous platforms simultaneously to fight an adversary will vastly improve US effectiveness in combat. Collaborative autonomy reduces dependance on operators, exponentially increasing both utility and application for unmanned systems making it one of the most important and needed research areas across the Federal Government. IHMC expects that establishing NCCA will result in many funding opportunities with the Federal Government (and with the commercial sector) that currently are not tapped into by the northwest Florida region. Given the demonstrated importance of autonomous platforms in modern and future warfare, NCCA will position IHMC to serve the defense and industrial priorities of not just Northwest Florida, but the United States as a whole.

In addition to military applications, capabilities developed at NCCA could help mitigate the effects of natural disasters that threaten to disrupt the economy of Northwest Florida. For example, teams of autonomous systems could quickly survey damage after a natural disaster, direct relief efforts and help locate missing people and assets. Autonomous teams could rapidly inspect damage to infrastructure such as roads, bridges, and the electrical grid. Investing in the development of autonomous systems at NCCA can help protect Northwest Florida's economy against the impact of future natural disasters.

Northwest Florida is uniquely positioned to conduct research in Collaborative Autonomy given its proximity to the Gulf of Mexico and various other bodies water (bay, sound, bayou). Our history in naval aviation, and robust military presence with the Air Force Research Laboratory at Eglin, Special Operations Command at Hurlburt Field, and the Navy Surface Warfare Center in Panama City make this a unique and arguably best suited location to conduct research in

collaborative autonomy. There are very few regions of the country that offer access to Air, Space, Sea, and Land resources.

IHMC will leverage the geographic features of Northwest Florida to perform one-of-a-kind research on multi-domain collaborative autonomous systems. The artificial reef at Park East, the USS Oriskany, the Joe Patti Barge, and other underwater sites provide rich features for testing navigation and perception algorithms on water-surface and underwater autonomous systems. Littoral environments around Pensacola allow for testing autonomous teams of all domains: ground, underwater, water surface, and aerial all working in conjunction. The bayous provide calm water for water-surface robots and their low visibility can allow stress testing of perception and navigation of underwater robots. These unique geographic assets will allow NCCA's work on collaborative autonomy to have significant national impact.

NCCA will catalyze the development of a robust ecosystem of industrial innovation in collaborative maritime and land-based autonomy in Northwest Florida through collaborations with local entrepreneurial entities, including CO: LAB and TechFarm Capital. NCCA will facilitate access to additional funding opportunities targeted to small businesses, which often requires significant existing equipment to be in place. Prior collaborations with the Pensacola Police Department and Santa Rosa SWAT, providing novel custom drones, show that regional entities can be strengthened by integrating autonomous systems developed through NCCA.

IHMC's NCCA will provide outreach and assistance to local entrepreneurial and educational entities focused on autonomous systems by conducting extensive outreach to local entities focused on autonomous systems. These outreach efforts will seek to inspire the next generation of scientists and engineers to pursue careers that will drive long term, significant economic growth to Northwest Florida. Outreach to entrepreneurial entities will provide mentorship and support to de-risk job growth in the autonomous systems sector.

IHMC's partnership with UWF offering the Intelligent Systems and Robotics program will produce a seamless talent recruitment and development pipeline, helping to develop the next generation of innovators. Unique outreach activities will connect the research to the broader public and drive recruitment efforts.

Through collaborations with prestigious universities and research institutions across Europe and other nations, including NATO member countries, the NCCA will position Northwest Florida as a key player in global research and development. These partnerships will not only enhance the region's visibility but also attract further investment and talent.

The NCCA infrastructure will support the economy by adding high earning jobs in Northwest Florida through new federal funding for this increasingly important area of research. NCCA research and associated technologies involve the incorporation of export-controlled technologies and federally designated "Controlled Unclassified Information (CUI)." The CUI designation is an unclassified handling control aimed at preventing the loss of information that does not meet the requirement to be classified (Confidential, Secret or Top Secret) but is nevertheless valuable to the security goals of the United States Government.

Recent Federal laws and regulations have strengthened the logical controls placed on CUI and export-controlled information within IT systems. These controls have developed into a Cyber Maturity Model Certification (CMMC) requirement. Obtaining this certification requires significant re-tooling and acquisition of services not currently in place at IHMC. As a critical component of this project, IHMC proposes to develop a CMMC qualified IT solution to directly support the sensitive NCCA research throughout its development.

The establishment of the National Center for Collaborative Autonomy (NCCA) by IHMC will be a transformative force for Northwest Florida, positioning the region as a hub of innovation and research in Collaborative Autonomous Systems. IHMC's renowned expertise and leadership in the field will amplify the center's impact, setting a global standard for excellence in autonomous systems research and development.

Budget and Funding

See attached