

Proposal for the Creation of the  
**Alaska Center for Unmanned Aircraft Systems Integration - Research,  
Development, Test and Evaluation (ACUASI - RDT&E)**

26 November 2012

**Background:**

The State of Alaska has an abundance of natural resources, but its vast size — over twice that of Texas — has provided significant challenges for the management and exploitation of those resources. Alaska has few roads, making aviation the only year-round way to access the farthest reaches of the state, including almost 200 rural villages. Alaska has become an aviation-centric state with six times more pilots per capita than the rest of the nation. For the past two decades the Department of Defense has driven the extremely rapid expansion and deployment of unmanned aircraft systems (UAS) for military applications. The race to transition these systems for civil commercial and scientific applications provides an enormous opportunity for Alaska to develop and exploit the benefits of this new technology; and Alaska is the best place in the country to work out the issues of separating and integrating the emerging UAS airspace from the existing National Airspace System (NAS).

Anticipating the importance of these unmanned systems for Alaska, the Geophysical Institute of the University of Alaska Fairbanks (UAF-GI) began aggressively experimenting with these technologies several years ago and is rapidly becoming a world leader in UASs. Most of the UAS development work has been carried out at the UAF-GI's Poker Flat Research Range (PFRR), the nation's largest land-based rocket range and the only one in the country owned by a university. The UAF-GI has flown a variety of in-situ and remote sensing instruments on several types and sizes of unmanned aircraft at multiple locations in Alaska (and around the globe) for applications including: resource mapping; monitoring marine mammals; fighting forest fires; mapping glaciers and sea ice; and many more. The use of UAS eliminates the need for pilots in the cockpit and UAS are especially well suited to applications that are dirty, dull or dangerous.

The 2012 Federal Aviation Administration Modernization and Reform Act addresses the issue of creating a UAS airspace and integrating it into the NAS and provides for the establishment of six separate UAS Test Ranges around the country aimed at safe implementation of these new technologies for commercial and scientific applications.

Recognizing the important future benefits of UASs for Alaska, in 2012, the State of Alaska appropriated \$5M in the Capital Budget for the UAF-GI for "Research and Development of Unmanned Aerial Systems" and to help position to the UAF-GI to compete for one of the new UAS Test Ranges. This appropriation supplements the significant external funding received by UAF-GI from a variety of federal and non-federal sources that currently supports the core efforts and personnel of the proposed center.

**Discussion:**

The UAF-GI has aggressively expanded its UAS hardware and software procurements, flight operations, educational outreach activities and is actively seeking industry partners and opportunities to create new economic opportunities for UAS in Alaska. Previous funding for this activity had been solely customer based, primarily government agencies, the fishing industry, and the oil industry. With the new State

capital funding, economic and social growth leading to a sustainable high-tech industry in Alaska is becoming a major element of the program. In response, Atkinson Aeronautics has established an office in Alaska and is partnering with the UAF-GI. A second company, Concurrent Technologies Corporation, is recruiting an employee to reside in Alaska and help them establish an office in Alaska to capitalize on the growth opportunities for unmanned aviation in Alaska led by the UAF/GI UAF-GI program. Additionally, three former graduates from the UAF's Electrical and Computer Engineering have launched a company, Northern Embedded Solutions LLC, supporting some of the programs hardware needs.

The GI is working with the College of Engineering and Mines (CEM) and the Community and Technical College (CTC) to integrate UAS engineering, science and technology into UAF's teaching, research and service activities. The State legislature funded two additional, full-time tenure track engineering faculty positions at UAF beginning in FY13, and the UAF-GI is working with CEM to fill one of these positions with an individual focused on UAS engineering, science, and technology. The new faculty position will be a joint professorship with the Department of Electrical and Computer Engineering (ECE) and GI and will serve to develop new capabilities and opportunities for UAS studies and integrate them into the existing engineering curricula and research programs. The UAF-GI is also working with CTC to incorporate UAS technology into its existing aviation curricula to help train a new generation of Alaskan UAS developers, technicians and pilots. The UAF-GI is working to expand its educational outreach opportunities into the Alaskan villages to introduce this new technology which may have enormous advantages to remote communities.

Universities in other states (e.g. University of Hawaii, Oregon State University, University of Washington) are reaching out to the UAF-GI to develop a memorandum of understanding (MOU) for a potential western state UAS range collaboration.

### **Recommendation:**

The accomplishments and growing stature of the UAF-GI UAS program have made apparent the need for a more formal structure in order to support the next levels of program expansion and accomplishment. An Alaska Center for Unmanned Aircraft Systems Integration - Research, Development, Test and Evaluation (ACUASI-RDT&E), organized within the Geophysical Institute at UAF, will provide the needed structure, visibility, focus, and support for the program's much greater leadership role in the University, in the State of Alaska, and beyond, both nationally and internationally. ACUASI-RDT&E will become a natural hub of educational work and outreach, linking research to course development, curriculum and research to outreach, drawing Alaska's youth into science and engineering while advancing understanding in a host of other scientific endeavors. The Center will become a draw for technology firms both to provide needed talent and as an incubator for entrepreneurial spinoffs. Workforce development coupled with significant expansion of technical job opportunities in Alaska, ranging from skilled, certified maintainers and operators to top notch researchers and engineers, will likely start in Fairbanks and expand quickly to the rest of the state.

ACUASI-RDT&E's access to uncrowded airspace, both above military ranges through its partnership with JPARC and via its own approved airspace, will draw Federal agencies, other universities, and commercial partners for test and evaluation work as well as direct research. The Center would facilitate coordination in small UAS activity at the UAF-GI and larger UAS deployment by the Alaska Aerospace Corporation (AAC). The Center will collaborate with Eielson Air Force Base to house UAS at the base

and utilize military airspace throughout Alaska, including Eielson's, for UAS testing and evaluation. This collaboration will make Eielson AFB a hub of arctic and sub-arctic UAS activities and support the USAF's ongoing operations at Eielson AFB. The UAF-GI is poised to lead the nation in safely developing UAS for a variety of commercial applications and to integrate them into the national airspace to meet growing economic demand. The collaboration with Eielson AFB is an excellent opportunity for UAF in the foreseeable future. Opportunities in the UAS field are very broad, however, and extend well beyond this specific collaboration. Small UAS can operate almost anywhere, and larger ones can operate from a variety of other aeronautical facilities around Alaska.

We respectfully request that the University of Alaska President and Board of Regents approve the establishment of the Alaska Center for Unmanned Aircraft Systems Integration - Research, Development, Test and Evaluation (ACUASI-RDT&E ) within the Geophysical Institute of the University of Alaska Fairbanks.

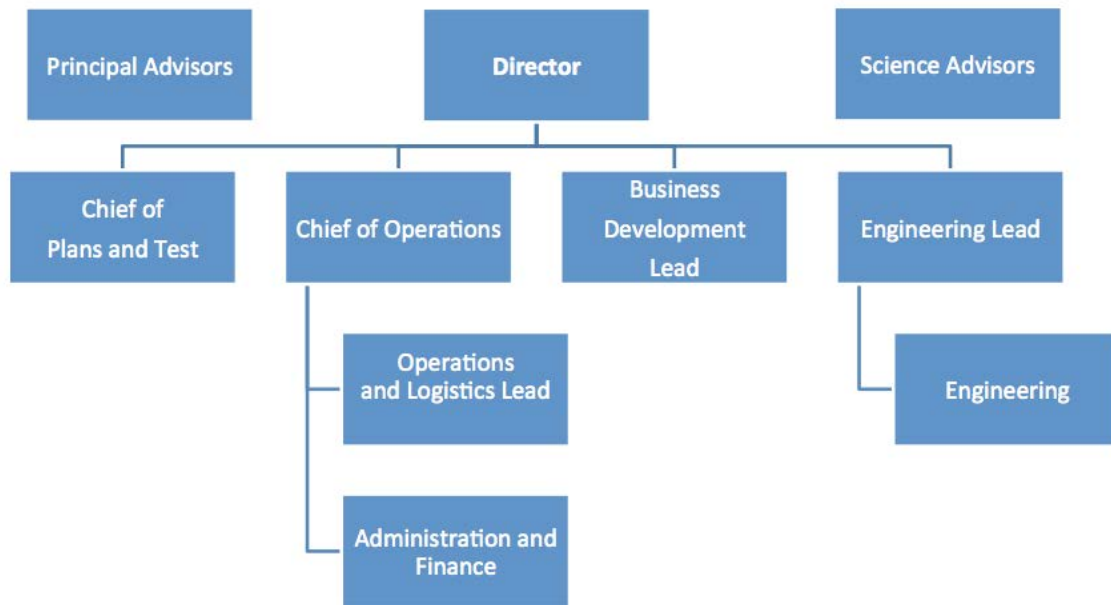
## **Alaska Center for Unmanned Aircraft Systems Integration - Research, Development, Test and Evaluation (ACUASI-RDT&E): Organizational Structure and Budget**

### **Overall Structure:**

The Center's organization will be flat, reflecting the amount of interaction between the different positions, and the desire to be able to rapidly respond to client and organizational needs. This organizational structure allows the Center to be responsive both in management and operational execution to short-notice client demands, and emergency situations in which UAS assets are requested.

Business Development through the leveraging of capabilities, past performance, and relationships is the job of every member of ACUASI-RDT&E even though there is a specified Director of Business Development. Successful execution of a project is a form of business development, as is face-to-face contact with a potential client. Basic fundamentals of business development will be part of the "core curriculum" taught to all ACUASI-RDT&E team members. ACUASI-RDT&E will use the "Relationship Manager" model in which clients are assigned a single POC within ACUASI-RDT&E. This model also applies to teaming and partnership relationships. While this model does have limitations, it ensures more consistent communications and the ability to more closely manage the business development process.

The leadership team consists of the following positions: Director, Chief of Operations, Business Development Lead, Engineering Lead, and Chief of Plans and Test with participation by the Finance Manager. An external Board of Advisors will be established to provide guidance to the leadership team.



**ACUASI-RDT&E Structural Organization Chart**

The number of personnel within this structure can expand as the center grows or missions dictate. However, the vision is that over the next 36-months this organizational structure will remain fixed.

**Board of Advisors:**

The Board of Advisors provides guidance to this organization. This board will be selected from within the University and outside sources familiar with aviation, best business practices and entrepreneurial growth.

**Director:**

The Director is responsible for organizing and managing the execution of the mission and vision of ACUASI-RDT&E. The Director establishes mutually agreed on, realistic and attainable goals for his direct reports, and works to support their successful attainment of those goals. The Director provides direction to the ACUASI-RDT&E senior staff, monitors their progress against established objectives, and ensures successful attainment of the overall ACUASI-RDT&E mission. The Director manages strategically important ACUASI-RDT&E relationships, identifies economic or business opportunities, and, as part of the Business Development team, ensures the organization of the public/private relationships necessary to successfully meet the opportunity.

**Principal Advisors:**

The Principal Advisors support ACUASI-RDT&E by providing non-traditional and alternative views and perspectives, which will allow the ACUASI-RDT&E leadership team to rapidly attain mission success while ensuring the broader-scoped University of Alaska mission is taken into account. The Principal Advisors serve as the leadership mentors to the ACUASI-RDT&E team, and, in combination with the

Director, support ACUASI-RDT&E team members' professional growth. The Principal Advisors are responsible for training and education initiatives, and will actively support successful contact and relationship management of high-priority, high visibility programs and/or clients. The Principal Advisors may act as the Program Managers for selected programs.

#### **Chief of Operations:**

The Chief of Operations is responsible to the Director for day-to-day ACUASI-RDT&E operations. The Chief of Operations ensures operational missions are scheduled, resourced, and successfully executed. The Chief of Operations is responsible for the overall scheduling and de-confliction of operational activities, and works with fellow leadership team members to prioritize and resource all activities, including flight operations, training, business capture, engineering, and logistics.

#### **Chief of Plans and Test:**

The Chief of Plans and Test is responsible for the planning, oversight, and management of operations including those related to the proposed FAA Test Range. The Chief of Plans and Test is responsible for developing range structural plans and policies, reviewing and approving test plans and procedures, conducting range operations in support of tests, and reporting the analysis, evaluation and results of test efforts.

#### **Business Development Lead:**

The Business Development Lead is responsible for the development and successful execution of the ACUASI-RDT&E business development plan. The Business Development Lead coordinates all business development activities, ensuring follow-up with potential clients, and management of existing clients. The Business Development Lead is responsible for the development and management of a portfolio of teaming partners who bring value to the ACUASI-RDT&E mission. The Business Development Lead may act as the Program Manager for selected programs.

#### **Engineering Lead:**

The Engineering Lead is responsible for the overall technical execution of the engineering development and integration within the ACUASI-RDT&E mission. The Engineering Lead executes and manages all engineering efforts, including payload integration, payload development, power and energy, materials applications, software development and integration, and other applicable engineering disciplines within a system engineering environment. The Engineering Lead manages the ACUASI-RDT&E engineering team and works to ensure client satisfaction.

#### **Logistics Lead:**

The Logistics Lead is responsible for all pre-planning and pre-deployment logistics support, pack-up and re-supply during an operation, and re-constitution efforts on return to home base, including any UAS refurbishment efforts required. The Logistics Lead is responsible for all logistics related activity for any operation that falls within the purview of ACUASI-RDT&E.

#### **Science Advisors:**

The Science Advisors support ACUASI-RDT&E in collaboration with the Director and act as principal investigators on specific projects they secure that leverage the ACUASI-RDT&E infrastructure. These individuals are the discipline lead scientists for ACUASI-RDT&E. The Science Advisors support keeping ACUASI-RDT&E in a leading position as it relates to the use of UAS in university research and educational programs.

### **Financial Manager:**

The Financial Manager is responsible for the financial planning and execution for the organization. This includes analysis of existing contracts for fiscal compliance and projecting program costs for ACUASI-RDT&E activity. The Financial Manager will work with the Leadership Team to establish budgets for their respective areas of responsibility, and supports the financial review and accountability efforts of ACUASI-RDT&E.

### **Administration:**

This individual is responsible for working with the Leadership Team in the development of documents for the organization. The Administration office provides guidance for interfacing within the University and is responsible for tracking documents within the University and the organization.

### **Budget:**

The following budget reflects the recent history of the unmanned aircraft program and projects the consequences of the growth provided by the recent legislative appropriation. Any further State appropriation directed at the ACUASI-RDT&E will likewise be converted into further economic potential for the State. The intent for the legislative appropriation was not to grow the University but rather use the University's increased capacity to catalyze and grow the economy of Alaska. The legislative appropriation provided the funding that grants and contracts cannot provide to plan and build the infrastructure and formalize the connections needed for a successful expansion of the UAS efforts to businesses and agencies across the State. As a consequence, the growth created by the legislative appropriation is sustainable because the University program is growing as a consequence of increased capacity and capability, along with an increased recognized need and value within the State.

The years 2010 through 2012 were selected to document the unmanned aircraft program's funding history as the Federal earmark that initialized the unmanned aircraft effort (2007 - \$590K, 2008 - \$715K, and 2009 - \$1,052K after pass through fees were removed) had expired. These budgets show that the program migrated from this initial seed funding to a sustainable program and demonstrates that the ACUASI-RDT&E leadership can grow a self-sustaining program out of directed marks.

The nature of the unmanned aircraft business, and current ACUASI-RDT&E operations, is that many projects tend to be identified and executed within the same year. This makes it challenging to predict funding levels beyond a year or two. For example, many of the 2013 opportunities listed as *Quantified Opportunities* are still being arranged with customers. To qualify as a *Quantified Opportunity* a project must have an on-going discussion and at least a rough level of funding identified and discussed. Because of this requirement, opportunities that may appear as a result of being recognized as an FAA test range have not been included in this budget as they are not yet quantified and the discussions are still immature.

Of the many Science Advisors that are affiliated and work with ACUASI-RDT&E the only one whose funding is included in this budget is the new Electrical and Computer Engineering (ECE) faculty. This position was explicitly budgeted in the legislative appropriation and ACUASI-RDT&E has covered 100% of the position's research load for the first three years to allow the new faculty member time to establish their own funding opportunities.

The spike in the 2012 *Total Program Revenue/FTE* is a consequence of the lag between receiving the legislative appropriation and increasing the staffing level to deliver an increased capacity. The ACUASI-RDT&E staffing level has and will remain roughly tied to the program's total revenue as more funded projects requires more staffing to implement.

Category \ Year	2010	2011	2012	2013	2014	2015	2016	Totals
<b>Grants and Contracts</b>								
Existing Awards	\$1,248,000	\$1,338,000	\$1,425,000	\$943,000	\$126,400			<b>\$5,080,400</b>
Quantified Opportunities				\$1,880,000	\$4,175,000	TBD	TBD	<b>\$6,055,000</b>
<b>2012 Legislative Appropriation</b>								
Education			\$173,558	\$199,697	\$203,337	\$209,639	\$213,769	<b>\$1,000,000</b>
Technology			\$461,420	\$311,023	\$296,387	\$297,219	\$133,951	<b>\$1,500,000</b>
Range			\$789,954	\$686,516	\$707,668	\$203,400	\$112,462	<b>\$2,500,000</b>
<b>Annual Program Totals</b>	<b>\$1,248,000</b>	<b>\$1,338,000</b>	<b>\$2,849,932</b>	<b>\$4,020,236</b>	<b>\$5,508,792</b>	<b>TBD</b>	<b>TBD</b>	
FTE's working on the projects or in the center	4.25	4.75	6.75	12.75	17.00	TBD	TBD	