UNIVERSITY of ALASKA
Many Traditions One Alaska

ARCTIC DOMAIN AWARENESS CENTER
A DEPARTMENT OF HOMELAND SECURITY CENTER OF EXCELLENCE

# *ADAC "At a Glance" Project Slides*

As/of 5 Dec 2016

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# ARCTIC DOMAIN AWARENESS CENTER

A DEPARTMENT OF HOMELAND SECURITY CENTER OF EXCELLENCE

***ADAC is hosted by the University of Alaska,*** *with work conducted at UA campuses in Anchorage and Fairbanks…and conducts research across a growing network of academic and industry partners.*

***Vision:*** *The DHS Center of Excellence, providing networked and mission-focused support to the USCG Operator in the High North.* ***The vision includes efforts to transition ADAC into a National Center.***

***Mission:*** *To develop and transition technology solutions, innovative products and educational programs to improve situational awareness and crisis response capabilities related to maritime challenges posed by the dynamic Arctic environment.*

***Strategy:*** *The Center's strategy is to advance knowledge in relevant science and technology through conducting research and development in close collaboration with mission agencies' end users. The Center also develops future leaders for the DHS enterprise through structured and well-led programs.*

***ADAC's principal customer:*** *United States Coast Guard in support of Arctic Search and Rescue, Humanitarian Assistance and Disaster Response*

***ADAC works*** *with an array of federal, state, local, tribal, industry and academic partners to advance domain awareness of the Arctic region.*

**ADAC's Leadership**

- Douglas Causey, PhD, Principal Investigator, University of Alaska, Anchorage (UAA)
- Larry Hinzman, PhD, Research Director, University of Alaska Fairbanks (UAF)
- Randy Kee, Maj Gen (Ret) USAF, Executive Director (UAA)
- Heather Paulsen, MBA, Finance Director (UAA)
- Clarice Conely, MFA, Education Outreach and Workforce Development Director (UAA)
- LuAnn Piccard, MSE PMP, Project Management Director (UAA)

# Project Title: Community-Based Observer Networks for Situational Awareness (CBON-SA)

FOA/NOFO Research Question(s): Topic 1a, Maritime Risk & Threat Analysis; Topic 2c, Information & Intelligence Integration within Maritime Operations. **Specific research question: 2c. 1. question iii.**

**Project Objectives:**

- Utilize distributed human observers as sensors to systematically observe and document Arctic environmental changes relevant to resource security.
- Utilize human observers to detect and place in context a range of critical variables pertinent to maritime security.
- Develop reliable data streams, in real time, that are compatible with other monitoring data streams.

**Potential Impact:**

- Provision of local fine-scale data and situational awareness for maritime security.
- Observations support and observers are supported by AIFC.

**Key Accomplishments:**

- Established operational CBON for Bering Sea comprising 3 communities.
- Developed and tested protocols in villages of Gambell, Unalaska, and Wales.
- Successful preliminary test of Field Information Support Tool (FIST) by local observer with USCG Exercise.
- Program was highlighted at White House Arctic Science Ministerial in DC Sep 2016.

**Funding:**

- Expended to Date by End of Year 2 ……$153,774.80

**Key Milestones/Deliverable Schedule:**

- Project Start……..Jan 15 √
- Developed and documented data intakes ……May 15 √
- Tested cell-to-satellite phone data relay ……Jun 15 √
- Completed observer training and protocols……Jun 15 √
- Replicated protocols in new communities……May16 √
- Expanded network to three communities……Jun16 √
- Operational CBON-SA in place……Jun 16 √
- Test CBON-SA with field operator tool (FIST)……Mar 17
- Project end date……Jun 19

**Performance Metrics:**

- Successful image and data relays, integration of observing data with FIST tool, detection of anomalous events.

**Program Champions:**

- **Mr. H. Blaney, HQ USCG CG-255.**
- CDR S. Hale, HQ USCG CG-5PW.
- CAPT D. Evans, USCG RDC.

**Stakeholders:**

- HQ USCG, UCSG RDC, USCG Pac Area & USCG D-17
- NOAA and NWS.

**Points of Contact:**

- Lil Alessa, Univ. of Idaho, Project Principal Investigator.
- Andy Kliskey, Univ. of Idaho, Project Co-investigator.

**See PowerPoint Notes for Project Abstract*

# Project Title: High resolution Modeling of Arctic Sea Ice and Currents

FOA/NOFO Research Question(s): Topic 1a, Maritime Risk & Threat Analysis; Topic 2b, Coastal and Marine Modeling and Analysis; Topic 2d, Arctic Analysis. **Specific research question: 2d. 3. question iii**.

**Project Objectives:**

- To support USCG Arctic operators and planners, develop a High-resolution Ice-Ocean Modeling and Assimilation System (HIOMAS) to realistically forecast Arctic sea ice thickness, concentration, and motion, and ocean currents.

**Potential Impact:**

- Help the Coast Guard to conduct search and rescue missions more safely and reliably; enhance the Coast Guard's ability to prepare for and respond to oil spills.
- Support Arctic stakeholders in planning; modeling feeds ADAC's Arctic Information Fusion Capability (AIFC).

**Key Accomplishments:**

- Developed HIOMAS based on the well-established Pan-Arctic Ice-Ocean Modeling and Assimilation System (PIOMAS) with high resolution (6 km).
- Conducted model calibration and validation using observations of sea ice thickness, concentration, and motion; carried out HIOMAS hindcast and forecast.
- Configured HIOMAS with even higher resolution (2-4 km); currently testing the 4 km resolution HIOMAS.

**Funding:**

- Expended to Date by End of Year 2 ……$104,148.00

**Key Milestones/Deliverable Schedule:**

- Project Start……..…. Jan 15 √
- Developed and validated 6-km HIOMAS…..Jun 16 √
- Develop and validate 4-km HIOMAS…….Dec 16
- Conduct hindcast/forecast assessments…….. Jun 17
- Project end date…….....Jun 19

**Performance Metrics:**

- Mean model error in ice concentration: < 30%, achieved.
- Mean model error in ice thickness: < 0.4 m, achieved.
- Mean model error in ice drift: < 0.02 m/s, achieved.

**Program Champions:**

- **LCDR M. Kennedy, HQ USCG CG-751.**
- Mr. H. Blaney, HQ USCG, CG-255.

**Stakeholders:**

- HQ USCG, USCG RDC, USCG Pac Area and USCG D-17.
- NOAA and NWS.

**Point of Contact:**

- Jinlun Zhang, Univ of Washington, Principal Investigator.

**See PowerPoint Notes for Project Abstract*

# Project Title: Arctic Oil Spill Modeling

FOA/NOFO Research Question(s): Topic 1a, Maritime Risk & Threat Analysis; Topic 2a Coastal and Marine Critical Infrastructure development; Topic 2b, Coastal and Marine Modeling and Analysis.

**Specific research question: Topic 2b. question 3.**

## Project Objectives:

- In order to support USCG deliberate and crisis planning, assist NOAA Office of Response and Restoration with the development of an Arctic-capable GNOME oil spill model.
- Develop and transfer algorithms for determining the movement and spreading of oil released (a) near the surface, accounting for the presence of sea ice and (b) under ice, accounting for under-ice roughness.

## Potential Impact:

- The research contributes to the development of an Arctic-capable oil spill model referred to as GNOME-2.
- Project also feeds Arctic Information Fusion Capability.

## Key Accomplishments:

- Guidance to NOAA on how to account for ice in oil spreading algorithms. The guidance was incorporated into GNOME-2.
- Demonstrated that HIOMAS Ocean / Sea Ice model output can be used to drive GNOME oil spill model.
- Successful adaptation of TAMU plume model (for well blowouts) to the Arctic Ocean with ice cover.
- Identified an approach for estimating the movement and spreading of oil released under ice, accounting for the roughness of the under side of the sea ice.

## Funding:

- Expended to Date by End of Year 2 ……$96,130.65

## Key Milestones/Deliverable Schedule:

- Project Start……..….Jan 15√
- Review of 23 Arctic oil spill studies ……..……..Jun 15√
- Completed “Diagnostic Save Files”……..……..Jun 16√
- Successful runs of GNOME model using high resolution & conventional Diagnostic Save Files……..Jun 16√
- Algorithms for oil spreading in icy seas…….....Jun 17
- Project end date……..……...Jun 19

## Performance Metrics:

- Number of studies reviewed (target of 10 to 30) – 23 reviewed. √
- Resolution of GNOME model (target 2 km) – 6 km resolution GNOME model achieved (note, project tied to High Resolution Sea Ice and Currents project). √

## Program Champions:

- **LT R. Brooks, HQ USCG CG-MER.**
- Mr. J. Popiel, USCG D-9.
- Mr. H. Blaney, HQ USCG CG-255.

## Stakeholders:

- HQ USCG, USCG RDC, USCG Pac Area and USCG D-17.
- NOAA Office of Response and Restoration (ORR).

## Points of Contact:

- Tom Ravens, UAA, Project Principal Investigator.
- Scott Socolofsky, TAMU, Project Principal Investigator.

**See PowerPoint Notes for Project Abstract*

# Project Title: Real-Time Storm Surge, Coastal Flooding, & Coastal Erosion Forecasting for Arctic Alaska

FOA/NOFO Research Question(s): Topic 1a, Maritime Risk & Threat Analysis; Topic 2b, Coastal and Marine Modeling and Analysis. **Specific research question: Topic 2b. questions 1 & 3.**

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## Project Objectives:

- Work in collaboration with the US Coast Guard and NOAA to provide high resolution surge, wave, and erosion forecasts for vulnerable coastal communities.
- Calibrate and validate the models with available data, including observations of ice and geomorphic change.

## Potential Impact:

- The research has the potential to transform the Arctic coastal zone from an area with little or no real-time or forecasted coastal data to one with data that is comparable in quality to Continental U.S.
- An added benefit of the high resolution coastal data is that it will potentially improve oil spill modeling and search and rescue operations by providing high resolution velocity data.

## Key Accomplishments:

- Successful development of a high resolution coastal surge/flooding and wave forecasting model for the Yukon Kuskokwim (YK) Delta and for Norton Sound.
- Successful validation of the surge forecasting model based on near-shore water level data in the YK Delta.
- Validation of surge/flooding calculations with satellite observations of inundation extent.
- Expansion of original scope to include links with UAF's Ice Radar observations and Univ. of Texas El Paso (UTEP) observations of geomorphic change in Barrow Alaska.

## Funding:

- Expended to Date by End of Year 2 ……$202,814.06

## Key Milestones/Deliverable Schedule:

- Project Start……..…...Jan 15√
- Code for real-time surge forecasting..……..…...Jun 15√
- Forecasting of surge in YK Delta……..…..Jun 15√
- Forecasting of surge in Norton Sound…..……..…Jun 16√
- Validation of YK Delta surge model……..….Jun 16√
- Coding for real-time surge and wave forecasts……...Jun 16√
- Develop forecasts of storm surge, coastal flooding, nearshore waves, and coastal erosion……..Jun 17
- Project end date……...……Jun 19

## Performance Metrics:

- Accuracy of surge/flooding forecasts (target error 0.25 to 0.5 m), target achieved. √
- Number of months the surge model was "operational" (target: 0 to 12 months). Model operational: 12 months. √

## Program Champions:

- **Awaiting Project Champion designation.**

## Stakeholders:

- HQ USCG, USCG RDC, USCG Pac Area & USCG D-17.
- NOAA and NWS.

## Points of Contact:

- Tom Ravens, UAA, Project Principal Investigator.
- Craig Tweedie, UTEP, Project Principal Investigator. (Starting in Year 3)

**See PowerPoint Notes for Project Abstract*

# Project Title: Identifying, Tracking and Communicated Sea-Ice Hazards in an Integrated Framework

FOA/NOFO Research Question(s): Topic 1a, Maritime Risk & Threat Analysis; Topic 2d, Arctic Analysis; Topic 5c, Arctic E2E. **Specific research question: Topic 2d. question 1.**

## Project Objectives:

- Develop framework for identifying, tracking and communicating sea ice-related hazards utilizing existing Arctic observing assets
- Enhance the capability of surface-based radar for monitoring sea ice hazards, particularly in coastal settings.
- Communicate imagery, velocity data and sea-ice related hazards to USCG and other operator centers and provide acquired information to ADAC's AIFC.

## Potential Impact:

- Improved ability to leverage Arctic observing assets for sea ice hazard mitigation
- Development of transferable technology to enhance Arctic MDA capabilities of surface-based radar assets.

## Key Milestones/Deliverable Schedule:

- Project Start……..Jan 15√
- Development of near-real time ice velocity data product from Barrow coastal radar…… May 15√
- Conceptual framework for Arctic MDA testbed……..Dec 15√
- Application of ice tracking technique to other radar platforms and assessment of MDA value…….....…..Mar 17
- Planning document for TTX within Arctic MDA testbed…Jun 17
- Project end……..……Jun 19

## Performance Metrics:

- Radar ice velocity product: TRL 6: achieved √
- Radar ice divergence product: TRL 5 achieved (Target 6)
- Framework document for Arctic MDA testbed: TRL 2:achieved √
- Overlap with AIFC model grid: in progress.

## Key Accomplishments:

- Implementation of software to provide near-real time data on sea ice velocity and convergence from Barrow coastal ice radar (June 2016).
- Dissemination of radar imagery and velocity data to Barrow search and rescue team during landfast ice detachment event (29 April 2014).
- Demonstration of ship-based application of radar ice tracking methods on board *USGC Healy* (July 2015)
- Publication of whitepaper outlining Barrow Arctic MDA testbed concept and relevant observing system resources (March 2016).

## Funding:

- Expended to Date by End of Year 2…….$127,922.78

## Program Champions:

- **LCDR M. Kennedy, HQ USCG CG-751.**
- CAPT D. Evans, USCG RDC.

## Stakeholders:

- HQ USCG, USCG RDC, USCG Pac Area & USCG D-17.
- NOAA and NWS.
- Alaska North Slope Borough.

## Points of Contact:

- Andrew Mahoney, UAF, Principal Investigator.
- Hajo Eiken, UAF, Co-Investigator.

**See PowerPoint Notes for Project Abstract*

# Project Title: Arctic Information Fusion Capability (AIFC)

FOA/NOFO Research Question(s): Topic 1a, Maritime Risk & Threat Analysis; Topic 2b, Coastal and Marine Modeling and Analysis; Topic 2c, Information and Intelligence Integration within Maritime Operations, Topic 2d, Arctic Analysis; Topic 3f, Maritime IoNS; Topic 5c, Arctic E2E. **Specific research questions: 2d. 3. i & iii.**

**Project Objectives:**

- Integrate and fuse information from an array of authoritative data sources in support of USCG operators in the Arctic.
- Enhance domain awareness by communicating both from and to community-based observers in the field achieving "Fusion Central and Fusion Forward."
- Provide decision support through data visualization, connecting to and from the field despite austere comms; and in later stage, apply artificial/machine intelligence.
- Through NOAA partnering, utilize and advance Arctic ERMA, as the base platform, a tool already used by USCG.

**Potential Impact:** Next generation agile decision support.

**Key Accomplishments:**

- Use case scenarios developed with USCG D17 with agreement on initial focus on marine environmental response.
- Catalog of over 1800 data feeds in support of use cases established.
- Coordination with NOAA on delivery of fusion products through ERMA.
- Field Information Support Tool portal established as conduit between CBONS and AIFC.
- Data fusion testbed / prototype established with oil spill simulation and high-resolution storm surge model.

**Funding:**

- Expended to Date by End of Year 2 ……..$229,312.72

**Key Milestones/Deliverable Schedule:**

- Project restart…… Mar 16 √
- Identify elements of domain awareness…… Oct 16 √
- Integrate community based observer through Field Information Support Tool (FIST) demonstration.....Aug 16 √
- 2D map of geospatial data, feeds……..……..…Mar 17
- Completion of demonstration scenario……..…May 17
- Near-real-time and intelligent support……May 17
- Project End……..……...…..……Jun 19

**Performance Metrics:**

- AIFC products in Arctic ERMA. Some products ingested
- Model data available via Arctic ERMA. Status: completed √ for some products, others in testbed stage.
- AIFC fusion demo. Status: in development.

**Program Champions:**

- **Mr. H. Blaney, HQ USCG CG-255.**
- CAPT D. Evans, USCG RDC.

**Stakeholders:**

- DHS S&T.
- HQ USCG, USCG RDC, USCG Pac Area & USCG D-17.
- NOAA / NWS.
- NASA-ACE.

**Points of Contact:**

- Federal Agency POC: Amy Merten, NOAA/ORR.
- Kenrick Mock, UAA, Principal Investigator.
- John DeLaurentis, ASRC Federal Mission Solutions, Project Manager.

**See PowerPoint Notes for Project Abstract*

# Project Title: Low Cost Wireless Remote Sensors for Arctic Monitoring and Lifecycle Assessment

FOA/NOFO Research Question(s): Topic 2d, Arctic Analysis; Topic 3c Environmental Technologies; Topic 3d, Law Enforcement; Topic 3e, Low Cost. **Specific research question: Topic 2d. question 2.**

**Project Objectives:**

- Develop low-cost wireless sensors network architecture for use in remote monitoring, asset management, surveillance, and security.
- Use asynchronous, self-organizing, decentralized network design for robust in-place event verification and peer-to-peer communication of detected events to periphery nodes
- Make sensor info available to decision-makers via ADAC's AIFC project.

**Potential Impact:**

- Rapid network deployment to remote regions inaccessible to humans or existing technologies, that includes a data-fusion sub-system with Modular & reconfigurable design.
- USCG; U.S.Customs & Border Patrol potential users.

**Key Accomplishments:**

- Successful Demonstration of the proof-of-concept of 7x7 device array hardware testbed.
- Design communication protocols and COTS integration to the sensor network construction.
- Successful event validation and geo-location without common clock or GPS or engineered network layout.
- Demonstrated event sensing by decentralized, distributed sensor-networks that are resilient to failing components.
- Developed dynamic gridded display of sensor locations.

**Funding:**

- Expended to Date by End of Year 2 ……$112,683.43

**Key Milestones/Deliverable Schedule:**

- Project Start……..….Jun 15√
- Software Simulator…….....Dec 15√
- Device Operating System ….....Jan16√
- 7x7 Hardware Testbed ….....Jul 16√
- Neuromorphic event verification…….....Oct 17√
- Database Reporting……..……...……...In progress
- Test Harness…….....Jan 17
- Project End…….....…..Jun 19

**Performance Metrics:**

- Ability to differentiate a random noise from the network nodes activated by a desired event.
- Resiliency of data in the event of device failure.

**Program Champions:**

- **LCDR M. Kennedy, HQ USCG CG-751.**
- Mr. H. Blaney, HQ USCG CG-255**.**

**Stakeholders:**

- HQ USCG, USCG RDC, USCG Pac Area & USCG D-17.
- U.S. Customs and Border Protection.

**Points of Contact:**

- Martin Cenek, UAA, Project Principal Investigator.
- Aaron Dotson, UAA, Co Principal Investigator.

**See PowerPoint Notes for Project Abstract*

# Project Title : Development of Propeller Driven Long Range Autonomous Underwater Vehicle (LRAUV)

FOA/NOFO Research Question(s): Topic 2d, Arctic Analysis; Topic 3b, Maritime Robotics; Topic 3c Environmental Technologies. **Specific research question: Topic 3b. questions 4 and 7.**

**Project Objectives:**

- Build a prototype AUV with long-range based capability to characterize oil & environmental hazards under ice.
- Develop software simulation for operators to plan mission scenarios with available environmental data models.
- Identify and implement an oil detection sensor package.

**Potential Impact:**

- Provide 'last seat on the helicopter' LRAUV with off-the-shelf capability for baseline surveys and oil detection.
- Give first responders data quickly in order to limit damages.

**Key Accomplishments:**

- Sensor package identified and integrated into a REMUS AUV for open water testing and Nov 2016 Demo.
- Software simulation for mission planning and operator training.
- LRAUV Tethys fabrication underway.

**Funding:**

- Expended to Date by End of Year 2 ……$183,441.94

**Key Milestones/Deliverable Schedule:**

- Project Start……Jan 15 √
- Sensor identified……Jun 15 √
- Software Simulation……Jun16 √
- Sensors integrated on REMUS for Demo……Oct 16 √
- Complete prototype LRAUV ……Jun 18
- Arctic water tests……late 18/early 19
- Project end……Jun 19

**Performance Metrics:**

- Simulator fidelity: built and tested, enhancements ongoing with modeling data √
- Oil limit of detection< 80 ppb crude oil and oil sensitivity 3 ppb crude oil (verified by WET Labs SeaOWL) COTS, easy to use. √

**Program Champions:**

- **LT R. Brooks, HQ USCG CG-MER.**
- Mr. J. Popiel, USCG D-9.
- Mr. H. Blaney, HQ USCG CG-255.

**Stakeholders:**

- HQ USCG CG-MER, USCG District 9 and 17.
- NOAA, BSEE, & US Department of the Interior.

**Points of Contact:**

- Amy Kukulya, WHOI, PI
- Jim Bellingham, WHOI, PI

**See PowerPoint Notes for Project Abstract*

# Project Title - Arctic Education: Implementing the Arctic Strategy in Training

FOA/NOFO Research Question: 6a, New curricula, courses, and certificate programs.

**Project Objectives:**

- Develop Basic and Advanced Ice Navigation classes.
- Obtain certification for both courses from USCG as meeting requirements for ice navigation under the new International Maritime Organization (IMO) Polar Code.
- Teach basic ice navigation class in a classroom setting.

**Potential Impact:**

- Provides required ice navigation training under the new Polar Code to USCG and other Arctic oriented U.S. mariners.

**Key Accomplishments:**

- Basic Ice Navigation Course completed and submitted to USCG for approval for certification.
- Basic Ice Navigation class approved for certification.
- A total of 22 students completed the classroom version of the Basic Ice Navigation course in Spring 2016.
- Participation and presentations at various events and conferences promoting ice navigation and Polar Code compliance.

**Funding:**

- Expended to Date by End of Year 2 ……$177,372.67

**Key Milestones/Deliverable Schedule:**

- Project Start…… ……Jan 15√
- Finished Basic Ice Navigation class…… ……Dec 15√
- First Ice Navigation class taught……...….Jan 16√
- Basic Ice Navigation class certified by USCG……...Jul 16√
- Advanced Ice Navigation class completed……..…..….Jun 17
- Project End……..……..…….Jun 17

**Performance Metrics:**

- Basic Ice Navigation class completed & certified – complete. √
- Advanced class completed and certified – pending funding
- Basic ice navigation class taught is a classroom setting and completed by 22 students – complete. √

**Program Champions:**

- **LCDR. M. Kennedy, HQ USCG CG-751.**
- CAPT D. Evans, USCG RDC.

**Stakeholders:**

- HQ USCG, USCG RDC, USCG D-17.
- U.S. Maritime Academies.
- Professional Arctic Mariners.

**Points of Contact:**

- Sue Hazlett, MMA, Project PI.
- Captain Ralph Pundt, MMA Technical Investigator.

**See PowerPoint Notes for Project Abstract*

# Project Title: MSI & Integrated Arctic Education (& Workforce Development)

FOA/NOFO Research Question(s). Topic 6c, Arrangements for programs and linkages with Minority Serving Institutions; Topic 6g, Programs to identify COE students for DHS internship opportunities.

**Project Objectives:**

- Objective 1: Attract the highest caliber undergraduate and graduate students to ADAC projects within the ADAC Research Network (ARN).
- Objective 2: Nurture and train these students for careers in DHS—related applied fields of science and technology.
- Objective 3: Provide students opportunities for direct involvement in DHS operations and embedded research among our DHS collaborators and stakeholders.
- Objective 4: Provide education, mentorship and internships to students that leads to timely completion of degrees and fulfilling careers in DHS Enterprise.

**Potential Impact:**

- Impact 1: Contribute to growth of highly skilled workforce for Homeland Security agencies.
- Impact 2: Contribute to the capability of US Coast Guard operator to provide disaster relief, search& rescue, & humanitarian aid in the Arctic.

**Key Accomplishments:**

- Master's in Arctic Engineering degree program at UAA and online course available to the public.
- Hosted MSI summer intern from FL institute in UAA ADAC project.
- In year 2, ADAC built a plan to recruit disadvantaged students into summer internships that commence summer 2017.
- Creation of ADAC Fellows Program, including CDG, MSI and project research interns
  - MSI and Workforce Development funding for Year 3 approved beginning Nov, 2016.
  - Scope of originally proposed education plan not sufficiently funded or implemented prior to new Center management in Year. 2

**Funding:**

- Expended to Date by End of Year 2……..…$33,454.52

**Key Milestones/Deliverable Schedule:**

- Project Start……Sep 14 √
- Key Milestone 1(student recruitment and selection)……Nov 16
- Key Milestone 2 (place minority summer interns)……May 17
- Key Milestone 3 (execute Fellows mentoring).....….Nov 16
- Project End……..……Jun 19

**Performance Metrics:**

- Recruit, assign mentors and student research work in individual ADAC projects for MSI and WFD (year 3 plan)
- Provide bi-monthly ADAC Fellows coaching and mentoring sessions
- Assess performance of minority students in summer research programs
- MSI students who compete and earn CDG scholarships following internship

**Program Champions:**

- **N/A.**

**Stakeholders:**

- DHS, and DHS components.
- State of Alaska; University of Alaska Anchorage, Fairbanks and ADAC Research Network.

**Points of Contact:**

- **Federal Agency Customer: Ms S. Willett** and R. Flowers, DHS S&T OUP.
- Clarice Conley, UAA, Principal Investigator.

**See PowerPoint Notes for Project Abstract*

# Project Title: Career Development Grant (DHS S&T COE Supplemental)

FOA/NOFO Research Question(s): Topic 6g, Programs to identify COE students for DHS internship opportunities.

**Project Objectives:**

- Objective 1: Attract the highest caliber undergraduate and graduate students to our science and engineering programs at UAA.
- Objective 2: Nurture and train these students for careers in DHS—related applied fields of science and technology.
- Objective 3: Provide students opportunities for direct involvement in DHS operations and embedded research among our DHS collaborators and stakeholders.
- Objective 4: Provide education and mentorship to students that leads to timely completion of degrees and fulfilling careers in DHS Enterprise.

**Potential Impact:**

- Impact 1: Contribute to growth of highly skilled workforce for Homeland Security agencies
- Impact 2: Contribute to the capability of US Coast Guard operator and in support of USCG missions in the Arctic.

**Key Accomplishments:**

- Awarded five full-time fellowships.
- ADAC students completed comprehensive Arctic IONS Literature Review.
- Two scholars participated in MSC Summer Intern Seminar and one completed summer internship with industry at engineering firm.
- 100% student retention rate.
  - Funding arrived in Sep 15, too late to award fellowships for Fall semester 15. Fellowships were awarded in Spring semester 16.

**Funding:**

- Expended to Date by End of Year 2 ……$77,693.92

**Key Milestones/Deliverable Schedule:**

- Project Start……..…Feb 16 √
- Key Milestone 1 (student recruitment/selection) ……... Feb 16 √
- Key Milestone 2 (sponsor summer internships)…….....Jun 16 √
- Key Milestone 3 (student degree completion) ……Jun 17
- Project End…….……..….Jun 18

**Performance Metrics:**

- Type of Major: 5 STEM—2 Masters, 3 Undergraduate.
- 13 DHS focus areas; 17 faculty involved.
- 100% student retention rate.

**Program Champions:**

- **N/A.**

**Stakeholders:**

- DHS, and DHS components.
- State of Alaska; University of Alaska Anchorage, Fairbanks and ADAC Research Network.

**Points of Contact:**

- **Federal Agency Customer: Ms. S. Willett,** and Ms. R. Flowers, DHS S&T OUP.
- Clarice Conley, UAA, Principal Investigator.

**See PowerPoint Notes for Project Abstract*

# Project Title: Arctic-Related Incidents of National Significance Workshops (DHS S&T COE Supplemental)

FOA/NOFO Research Question(s): Topic 3f, Maritime Incidents of National Significance (IoNS) Response and Recovery. **Specific research question: Theme Area 3 Question 7.**

## Project Objectives:

- Objective 1: Working in partnership with USCG and other Arctic operators to construct a workshop with select researchers in order to identify research and technology gaps and define research questions.
- Objective 2: Following the conclusion of the workshop and completion of the associated Rapporteurs report, work with DHS to accomplish merit competitions conducted by issuing requests for proposals (RFPs).
- Objective 3: In support of USCG Arctic Strategy, seek inclusion of Canadian government and academic participation.

## Potential Impact:

- Impact 1: Contribute additional S&T R&D in response to workshop conclusions of research concerns derived by USCG and associated Arctic operators. Onward research intended to provide capability to support USCG operator to provide disaster relief, search and rescue, and humanitarian aid in the Arctic.

## Key Accomplishments:

- Convening a bi-national planning team
- Conducted comprehensive literature review of USCG and other Arctic operator derived research concerns.
- Assembled bi-national research team to present current state of associated research.
- Conducted a successful Arctic IoNS workshop, hosted in Anchorage Alaska on 21-22 Jun 16.
- Completed post workshop report and associated research proposal.

## Funding:

- Expended to Date by End of Year 2……$94,359.00

## Key Milestones/Deliverable Schedule:

- Project Start……Mar 16 √
- Work closely with DHS, USCG and Canadian counterparts to develop workshop scenario.....Mar-May16 √
- Conduct research to identify SMEs, determine prior research to address the likely challenges posed by the scenario and challenges most relevant to USCG……Mar-Jun 16 √
- Accomplish workshop……1-22 Jun 16 √
- Develop and issue post event report and RFP……Sep 16 √
- Review and award proposals and develop Workplans……Mar 17
- Project End……Jun 19

## Performance Metrics:

- Successful completion of workshop, report, RFP and establishing research.

## Program Champions:

- **CDR S. Hale, HQ USCG CG-5PW.**
- CAPT D. Deptula, HQ USCG CG-CPE.
- Mr. J. Robinson, USCG D-17.

## Stakeholders:

- HQ USCG (CG-9), USCG RDC and USCG D-17.

## Points of Contact:

- **Federal Agency Customer. Mr. T. Gemelas** and Ms. J. Antler, DHS S&T OUP.
- Randy Kee, UAA, Principal Investigator.

**See PowerPoint Notes for Project Abstract*