

Arctic Domain Awareness Center (ADAC)
A U.S. Department of Homeland Security
Center of Excellence

Request for Proposal (RFP)

Seeking solutions to support U.S. Coast Guard in addressing an Arctic Maritime Oil Spill

A. Introduction and summary

The Arctic Domain Awareness Center is a U.S. Department of Homeland Security (DHS), Center for Maritime Research (CMR), led by the University of Alaska Anchorage. ADAC seeks to develop and transition technology solutions, innovative products and educational programs to improve situational awareness and crisis response capabilities related to emerging maritime challenges posed by the dynamic Arctic environment. The ADAC research network comprises of academic and industry teams focused in delivering solutions to problems faced by the United States Coast Guard (USCG) and other DHS mission operators across the Arctic maritime region.

ADAC announces a competitive search to address research challenges associated with addressing an Arctic maritime oil spill that addresses shortfalls in science and technology discerned from a workshop conducted via “*Coping with the Unthinkable, an Arctic Maritime Oil Spill*” Arctic-related Incidents of National Significance workshop, (Arctic-related IoNS). This workshop was hosted by the University of Alaska Anchorage and jointly conducted by the Arctic Domain Awareness Center and the University of New Hampshire Coastal Response Research Center (CRRC) from 23-25 October 2017.

The workshop considered a comprehensive array of challenges facing the U.S. Coast Guard and the associated responders serving in U.S. Coast Guard led “Unified Command” in addressing under-researched needs to support crisis action for a ship borne oil spill in the Beaufort Sea.

The purpose of the workshop was to present current research and determine technology shortfalls associated with United States Coast Guard discerned areas of concern, in responding to an Arctic maritime oil spill. The end user of the research associated with this RFP is principally oriented to the United States Coast Guard and other Arctic maritime operators vested with the responsibility of conducting a response to an Arctic maritime oil spill.

The “Coping with the Unthinkable, an Arctic Maritime Oil Spill” Arctic IoNS Workshop Rapporteurs Report accompanies this RFP. The Arctic IoNS Rapporteurs report is posted at

<http://adac.uaa.alaska.edu/>. Applicants are encouraged to closely review this report prior to submitting an application.

ADAC notes, that USCG does not seek responses to all the research tasks developed at the workshop. Accordingly, the below “Research Areas of Interest” specifically reflects where USCG seeks research proposals addressing the Coast Guard mission needs in leading unified command for Arctic maritime oil spill response.

ADAC principally seeks proposals that can transition from research to provide solutions and needed capability for USCG and other DHS Arctic maritime operators. Applicants should plan project duration at approximately 15-months, with a start date no earlier than 1 August 2018.

B. Research Areas of Interest

Teams responding to this RFP need to develop research projects in order to develop proposals to address one or more of the below research areas of interest. These research areas of interest correspond to the 23-25 October 2017 Arctic IoNS workshop, “**Coping with the Unthinkable, an Arctic Maritime Oil Spill**” Rapporteurs Report.

The October 2017 Arctic IoNS workshop Rapporteurs Report described associated tasks to address the range of shortfalls or gaps in research knowledge and/or existing capabilities in responding to an Arctic maritime oil spill, as identified by the select participants from the workshop. The Arctic IoNS Rapporteurs Report organizes research tasks associated with these shortfalls or gaps into six distinct categories:

- Logistical Support of the Oil Spill Response;
- Logistical Support for the Spill Responders;
- Response Techniques for oil spill using dispersants;
- Response Techniques for the oil spill using “in-situ” burning;
- Detection, Tracking and Modeling of an Arctic maritime oil spill;
- Degradation and Fate of an Arctic maritime oil spill.

The following are the specific research questions developed from the 35 Arctic IoNS Rapporteurs Report research tasks. These questions attempt to synthesize the large number of research tasks identified at the workshop into scientific research questions in order to facilitate responses that advance both scientific merit of research as well as relevancy to the spill response community.

Accordingly, ADAC is seeking proposals responding to these research questions or knowledge gaps, to improve the science of an Arctic maritime oil spill response, through creating knowledge products, advancing decision support or developing needed technology, ultimately resulting in improved capability of unified command to an Arctic maritime oil spill.

Research area 1: Logistical Support of the Response:

1. What new technologies, including technologies combined with new non-technological methods and tools, can be developed to effectively improve the U.S. Department of Homeland Security's ability to conduct voice and data communications in remote Arctic regions?
2. What new technologies including technologies combined with new non-technological methods and tools, can be developed to improve the ability to contain and recover oil encapsulated in Arctic sea ice?
3. What decision support products, new technologies, potentially combined with new non-technological methods and tools, can be developed that result in an optimized U.S. Coast Guard led logistical response to an Arctic maritime oil spill?
4. What methods exist or are being developed, across national and international government agencies, to accurately predict and monitor Arctic sea ice conditions as an aid to navigation in all Arctic maritime regions, on weekly and monthly time scales? How do these products compare in terms of maturity, accuracy, and utility related to mission needs?
5. What new knowledge and decision support products can be developed to effect a comprehensive Arctic emergency program that includes international collaborations in prevention, response, and recovery?

Research area 2: Logistical Support for the Responders:

1. How can emergency response agencies best utilize pre-positioned and locally available resources and personnel to most effectively respond to human catastrophes and environmental and disasters in remote Arctic regions?
2. What are the optimum techniques and applications (including the use of commander decision support algorithms or command center decision support instrumentation) to enable rapid response to emergencies in isolated Arctic coastal communities?
3. What new technologies, including new remote or autonomous control response robotics, may greatly reduce human capital needed for intervention to an Arctic maritime oil spill?
4. What new small and micro marine technologies, including technologies combined with new non-technological methods and tools, would be suitable for quick-response oil-spill containment and deployed on USCG and participating Arctic merchant transport ships?

Research area 3: Response Techniques: Dispersant Use:

1. How effective are oil spill dispersants in Arctic marine conditions? Do these dispersants create greater impact than oil on key animal and plant species and important higher trophic level subsistence species?
2. What are the most effective response methods that impose the lowest overall environmental impact for responding to oil maritime spill disasters in Arctic conditions?
3. What new technologies, including technologies combined with new non-technological methods and tools will create an effective oil recovery system that separates oil and water in ice-dominated Arctic marine environments?

Research area 4: Response Techniques: In-situ Burning:

1. What are the local, moderate, long-scale effects on weather and natural environment of in-situ burning in Arctic maritime environments? How do seasonal differences effect their impact? What is the impact of in-situ burning on key animal and plant species and important higher trophic level subsistence species?
2. What are the optimum ignitors for in-situ burning of a maritime oil spill under Arctic conditions?
3. How do extreme Arctic maritime conditions (such as Arctic winter temperatures, sea ice dynamics and extreme Arctic marine weather) affect the properties of typically used ignitors for in-situ burning?
4. What new technologies, including technologies combined with new non-technological methods and tools, can be developed to improve the efficacy of oil recovery methods in ice-covered ocean waters in Arctic regions?
5. What new technologies, including technologies combined with new non-technological methods and tools can be developed for unmanned air monitoring and quantification analysis for in-situ burning?

Research area 5: Detection, Tracking and Modeling:

Detection/Tracking:

1. What are the most effective technologies for short-, medium-, and long-range detection and tracking of petroleum products in an Arctic maritime environment?
Correspondingly, what are the most effective detection and tracking methods of oil in an Arctic maritime region (such as isotopic, chemical adjuncts, or spectral signatures)?
2. What new technologies, (including remote or autonomous control response robotics and sensors) can be developed to provide effective sampling, detection, tracking and communication of an Arctic maritime oil spill to FOSC?
3. What spatial and temporal resolutions and instrumentation, and under what conditions, are optimum for the detection of oil in an Arctic maritime environment?
4. How do extreme Arctic conditions (such as Arctic winter temperatures, sea ice dynamics and extreme Arctic marine weather) effect the detection capability of an Arctic maritime oil spill?

Modeling:

1. What new petroleum and ice dynamics models can be developed, validated, and verified for FOSC decision making in response to Arctic maritime oil spills? New petroleum and ice dynamic models should address petroleum interaction with critical environmental parameters in fine scale (example given: petroleum/petroleum product interaction with Arctic Ocean currents, sea ice extent, thickness and movement) and address the unique factors associated with petroleum and ice dynamics within the Marginal Ice Zone (MIZ).
2. What new model can be developed, validated, and verified for a Captain of the Port to evaluate proposed alternative planning criteria for vessel response plans (VRPs) as

allowed by 33 CFR 155.1065 and 33 CFR 155.5067? The Model should incorporate vessel operations and oil types/volumes to determine the National Planning Criteria (NPC) in 33 CFR Part 155 and compare proposed alternative response resources, response methodologies, and prevention measures to evaluate the equivalency of the proposed alternatives to the NPC. The 14 NPC response resource requirements of a VRP are: Qualified individual, Spill Management Team, Aerial Tracking, Logistical Support and Sustainment, On-water Recovery (Average Most Probable Discharge); On-water Recovery (Max Most Probable Discharge), Shoreline Protection, Shoreline Cleanup, Dispersants; Salvage Assessment and Survey, Salvage Stabilization, Salvage Special Operations; and Marine Firefighting. An alternative may propose an equivalent measure for any response resource requirements of NPC that are determined to be inappropriate for a vessel's operations.

Research area 6: Degradation and Fate:

1. What are the biochemical and/or biological processes (such as enzymes, microbes) that can reduce the impact of petroleum spills in an Arctic maritime environment? Do these processes create any unintended set of consequences (such as degrading or disrupting the biological food web) in an Arctic maritime environment?
2. What is the degradation and fate of various classes of petroleum encapsulated within Arctic sea ice? What are the associated properties of oil-ice amalgamates, to include weathering characteristics, in an Arctic marine environment?
3. What is the rate and fate of various classes of petroleum dispersion, diffusion and degradation in partially ice-covered Arctic maritime regions?

C. Award Information

1. Funding Availability

ADAC anticipates approximately three to five projects in varying funding amounts may be awarded under this solicitation. In order to facilitate suitable alignment to the research questions and associated project length as described in this RFP, ADAC recommends proposals scoped between approximately \$200,000 to \$350,000 U.S. dollars. After evaluation, ADAC reserves the right to determine the number of projects funded. The exact amount of awarded funds to projects will be determined during the negotiations between the proposal applicants, ADAC and/or DHS at time of award. Publication of this notice does not obligate ADAC to award any specific project or to obligate funds. Following award selection under this RFP, ADAC has no obligation to provide additional funding in connection with the award.

Notwithstanding written assurances from the University of Alaska Anchorage (UAA), there is no obligation on the part of DHS or ADAC to cover pre-award costs unless

approved by UAA, Office of Sponsored Programs (OSP) as part of the terms when executing a proposal award.

Final determination on project selection will depend on proposal merit in addressing research questions and customer relevancy. ADAC encourages applicants to carefully observe and diligently comply with each requirement of this RFP in submitting a response.

2. Project/Award Period

Awards made under this RFP may have a maximum period of 15 months; awards may be shorter in duration. ADAC will not accept proposals requesting funding for a longer performance period than 15 months.

3. Type of Funding Instrument

Under this RFP, ADAC will fund projects via a Federal Demonstration Partnership (FDP) subaward agreement. ADAC is required to flow down all DHS - UAA Cooperative Agreement Terms and Conditions with all subawardees.

4. Allowable Costs

Funds awarded may not necessarily pay for all costs that the recipient might incur in the course of carrying out the project. ADAC determines allowable costs by reference to the Uniform Administrative Requirements, Cost Principles, and Audit Requirements at 2CFR200 and the DHS Standard Terms and Conditions for Centers of Excellence. Generally, allowable costs include salaries and supplies as long as these are “necessary and reasonable.” ADAC funds travel only when considered essential to project completion; travel to present findings at conferences for professional development will not be allowed.

5. Student involvement

An important goal of the ADAC is to foster the next generation of scientist and engineers devoted to the discovery, development and improvement of technologies and applications for Arctic MDA, response, and resilience. ADAC supports both undergraduate and graduate students’ direct involvement in ADAC led research projects through the ADAC Fellows program and encourages projects that include student participation. Project budgets may include support for undergraduate/graduate student research, including students seeking advanced graduate degrees. Postdoctoral research support (as student fellows) will not be available at this time. Any student involvement in an awarded project is subject to the agreement of the individual student to commit to the DHS terms and conditions of the student support.

D. Eligibility Applicants

Awards can be made to accredited academic institutions of higher education, non-profit (U.S. non-profit, non-governmental organization must provide a copy of their Section 501(c)(3) or status determination letter received from the Internal Revenue Service), and industry institutions. Partnered proposals between academic, non-profit, and industry are acceptable. ADAC advises international applicants to consider joint proposals with a U.S.-based entity, conforming to this paragraph.

E. Proposal Format and Evaluation Criteria

While the intent of this RFP is to resource awards through terms and conditions associated with a cooperative, it may be determined that an award could be issued through a task-order contract.

Given the complexity of challenges posed by the research questions above, ADAC encourages prefers proposals that incorporate multi-disciplinary expertise in methodological approaches.

ADAC invites applicants to submit a proposal organized to address the following:

Title Page (one-page limit) must contain the following:

1. Project Title;
2. Project Duration (with a start date no earlier than 1 August 2018);
3. Applicant name;
4. Applicant address and phone number of the Principal Investigator or Contact for Institution/organization;
5. The theme(s) for which this proposals addresses.

Technical Narrative (11 point Calibri font, 10-page limit, including figures):

1. Introduction;
2. Research Question(s) being addressed;
3. Goal and Objectives;
4. Research Methodology;
5. Tasks;
6. Milestones;
7. Deliverables (Outputs);

8. Performance Metrics;
9. Stakeholder Engagement;
10. Transition Approach;
11. Impact/Benefit (Outcomes);
12. Programmatic Risks and Mitigation Plans;
13. References (References do not count towards the page limit).

Compliance Assurances (2-page limit):

1. Data Needs– if the applicant is not generating their own data, please outline the data you will acquire in this project and how you will obtain it (e.g., publicly available, available for purchase, federal data). If you are relying on federal data sources, please explain in detail how you plan to gain access to these, as their release is not a condition of the award.
2. Human Subjects Research (IRB) or Animal Welfare Research (IACUC)—if applicable.
3. ITAR/Export Controls– if applicable.

Cost Information (no page limit):

1. Detailed Budget showing itemized direct costs as well as indirect costs;
2. Budget Narrative/Justification.

Biographical Sketch for the PI (2-page limit)

F. Submission Instructions

1. Proposals must be submitted in a single PDF (electronic format) to ADAC at the following email address: uaa.adac@alaska.edu;
2. If application via electronic submission to email is not feasible, delivery via postal mail or commercial mail to:
Arctic Domain Awareness Center
University of Alaska Anchorage
3211 Providence Drive
BOC Suite 120
Anchorage, AK 99508

3. Deadline for receipt of the application (and validated by email response) is 5 PM Alaska Daylight Time, **7 May 2018**. ADAC will respectfully reject applications received after the deadline without further consideration.
4. **Please note that ADAC may request additional reference information or supporting documentation (in any format) following submission.**
5. **Please review the “Coping with the Unthinkable...an Arctic Maritime Oil Spill” Arctic IoNS Rapporteur’s Report dated 1 March 2018, as previously described.**

G. Review/ Selection Process

An initial ADAC leadership review will screen the application for compliance to the details as described within this RFP. This screening will include a review for any conflicts of interest, which would disqualify an application. Following the initial screening, reviewers from the academic and/or research community and DHS will evaluate the proposals.

Proposals receive Merit-based evaluation criteria to determine the award(s) based on scientific quality and relevance to DHS and USCG mission.

Scientific Quality Review

ADAC will coordinate a Proposal Review Panel (PRP) of subject matter experts, similar to the format used by National Science Foundation to review the scientific merit of submitted proposals. This PRP will be coordinated and aligned as to preclude any potential conflicts of interest in addressing proposals submitted by ADAC or ADAC researchers. The panel will meet via convened teleconference/electronic conferencing with an assigned date and timeframe approximately 4 weeks following the close of solicitation period. Reviewers will be asked to rate how the proposal addresses the following criteria, posed as questions. Reviewers will rate applications using numerical ratings of 1 to 5 (poor to excellent) and apply the percentage-weighting factor as indicated for an overall rating.

1. Originality and/or Innovativeness (25%)

- Is it original, e.g., does the proposed effort challenge and seek to shift current research or paradigms by utilizing novel theoretical concepts, inter-disciplinary approaches or methodologies?
- Is it innovative, e.g., is the proposal a novel refinement, improvement, or new application of theoretical concepts, inter-disciplinary approaches or methodologies proposed?
- Does this research have the potential to generate influential publications in the

scientific community or lead to new discoveries or areas of investigation?

2. Proposed Approach/Methodology (25%)

- Does the proposal establish research goals that are clear and based on sound theory?
- Does the proposal establish research methods clearly and appropriate for testing the hypotheses?
- Are the data generation or collection approaches appropriate for the research methods?
- Is the approach or methodology technically sound, incorporating interdisciplinary expertise when appropriate, including a demonstrated understanding of the critical technology or engineering challenges required for achieving the project goals?

3. Influence and Cooperative Linkages (25%)

- Does the application show partnerships or cooperative initiatives with other institutions or organizations?
- Does the application demonstrate a viable plan for developing substantial and continuing linkages with the Homeland Security Enterprise?

4. Qualifications of Personnel and Suitability of Facilities (15%)

- Does the investigative team have the breadth of qualifications - credentials and experience - to conduct and complete the proposed research?
- Does the investigative team have prior experience in similar efforts?
- Does the investigative team clearly demonstrate an ability to deliver products that meet the proposed technical performance within their proposed budget and schedule?
- Are the facilities suitable for the proposed research?

5. Costs (10%)

- Is the proposed research (and/or education) costs appropriate and reasonable?

Relevancy Review

In parallel to the Scientific Quality Review, Headquarters U.S. Coast Guard will conduct a Relevancy Review of proposals conforming to the criteria as outlined in this funded solicitation. Reviewers will be asked to rate how the proposal addresses the following criteria, posed as questions. Reviewers will rate applications using numerical ratings of 1 to 5 (poor to excellent) and apply the percentage-weighting factor as indicated for an overall rating.

1. Mission Relevance (75%)

- Does the proposed project address one or more of the research questions as described within the RFP (as described in Section B).
- Does the proposed project reflect understanding and application of USCG's "Surveillance, Detection, Classification, Identification ("SDCI") methodology as the key aspect of Maritime Domain Awareness and the enabler to actual mission prosecution?
- Does the proposed project complement (and not duplicate) – existing research and development programs sponsored by DHS, USCG or others?
- Does the proposal sufficiently describe the potential research deliverables and users of the research?
- Does the proposal have a clear pathway to transition from research to acquisition according to DHS and/or USCG mission needs?

2. Communicating/Transitioning Results (25%)

- Does the applicant have a record of accomplishment of effectively communicating or successfully transitioning research results to appropriate stakeholders, specifically?
- Will the research team be able to deploy a technology and/or solution(s) transition the project effectively to the user community through either acquisition to USCG or other DHS maritime mission users, commercialization of the technology, open source distribution, or through other means?
- Does the proposal demonstrate the implementation of an appropriate knowledge transfer process (i.e., models from case studies to other areas, patents, etc.) from academic to government end-users and other DHS customers?

H. Award Process

1. ADAC will notify Awardees.
2. Subject to the availability of funds, review of proposals will occur during the months following the proposal due date given in this announcement and is expected to be completed no later than 30 June 2018. Awardees should expect project funding following work plan approval. Awarded researchers should not be expect to begin prior work plan approval (approximately 1 August 2018). Please note that selection by ADAC to submit a work plan to DHS does not obligate ADAC or DHS to funding. The proposal packet under this RFP is merely phase 1 of the process for awarding funds.

3. In no event will ADAC or DHS be responsible for proposal preparation costs. Publication of this announcement does not obligate ADAC or DHS to award any specific project or to obligate any available funds. Recipients are subject to all U.S. federal laws, agency policies, regulations and procedures.

I. Points of Contact

Should any applicant have questions or concerns regarding this request for proposal, please email ADAC team at uaa.adac@alaska.edu. ADAC will not respond to RFP questions after the close of the RFP period of solicitation.