Charting New Leads in the Arctic at ADAC

By Douglas Causey, ADAC PI & Seth Campbell, ADAC CRA

One of the major barriers that faced early marine explorers of the Arctic was navigating through the extensive sea ice of the coastal environments. Before the advent of icebreakers, progress was possible only through finding and navigating through ice leads, the narrow cracks through the ice formed by ice floes shifting by ocean currents or wind. By analogy, the ADAC team of staff, students, and researchers are working hard to find new knowledge about the Arctic operational environment to assist in navigation, SAR, emergency response, and ultimately, safety in the Arctic. If ADAC is our ice vessel in this analogy, the good news from the command deck is that our crew and expertise has grown significantly in depth and numbers.

Since the last newsletter, we have been very fortunate to welcome ADAC’s new Administrative and Education Manager Ellee Matthews who joined us in early February. Communications and Research Associate Seth Campbell moved from his earlier position as an ADAC Graduate Fellow in early March. In April, Senior Research Professional Jason Roe began his transition from full time USCG to full-time ADAC, somehow managing to do positions simultaneously in May and June. Our contingent of ADAC student Fellows continues to increase with two more coming on in Spring, now with 18 undergraduate and graduate Fellows!

The ADAC team has accomplished a lot in this second quarter of 2019. The Center held its Annual Meeting this May at USCG HQ, after being delayed twice due to the November 30, 2018 earthquake and the government shutdown in February, 2019. ADAC hosted two venues in Nome and Anchorage for the Spring 2019 Incidents of National Significance (IoNS) workshops, and immediately following, a Crisis Weather workshop in partnership with the US National Weather Service. Currently, ED Kee and 10 ADAC student fellows are participating in the ASIP program in Utqiagvik and Pt Barrow, partnering with Dr. Craig Tweedie and students from UTEP. While there, under the leadership of Ellee Matthews, they all will participate in a MALTE workshop on the Blue Economy.

Busy days for us all, and we are looking forward to continuing our progress ahead at Flank Speed.
Jason Roe Joins the ADAC Team!

ADAC welcomes Senior Research Professional
Jason Roe

By: Communications Team

ADAC welcomed Jason Roe aboard in May, to serve as the Senior Research Professional. Roe comes to ADAC from the United States Coast Guard (USCG) where he primarily worked in Command Centers specializing in Command and Control systems and Search and Rescue planning.

Roe is currently completing 20 years of service in the USCG. Roe’s first duty station involved 2 years in Atlantic City, New Jersey conducting Search and Rescue and Law Enforcement small boat operations. He then transferred to Juneau, Alaska for 4 years, where he performed Search and Rescue Communications duties in remote areas. After his initial time in Alaska, Roe and his family moved to Miami, Florida where he worked for 3 years at sea aboard the Cutter VALIANT patrolling the Caribbean, conducting Law Enforcement and Search and Rescue missions. Next, Roe served for 5 years in Wilmington, North Carolina where he worked in the Sector North Carolina Command Center planning Search and Rescue operations. He has finally settled in Anchorage, Alaska after working another 6 years in the Sector Anchorage Command Center, planning Search and Rescue missions and managing Command and Control systems.

During his 10 years of service in Alaska, Roe has developed a respect and admiration for the resilience and innovativeness of Arctic and rural Alaska communities and will continue to serve their needs through ADAC community coordination.

Roe and his wife Gretchen live in Anchorage where she works at College Gate Elementary School. He enjoys fishing, photography, playing guitar, and exploring Alaska with his family. ADAC looks forward to working with Jason, and is excited to see all the changes he will bring to the Center.

IoNS Nome 2019

Arctic Incidents of National Significance
Alaska Native and Rural Arctic “Insights” Community Workshop

By: Seth Campbell, ADAC CRA

In April, ADAC partnered with Sandia National Laboratories to launch part one in a two-part series of Arctic Incidents of National Significance (IoNS) Workshops. The first of the series was the Alaska Native and Rural Arctic “Insights” Community workshop, held on April 18-19 at the University of Alaska Fairbanks Northwest Campus in Nome, Alaska. The “Insights” workshop was oriented towards gathering Native Alaskan and rural Alaskan concerns, input, and perspectives to more accurately steer part two of the Arctic IoNS workshops in Anchorage, Alaska.

As with all Arctic IoNS workshops, the “Insights” workshop was intended to identify knowledge gaps in effective crisis response capabilities by having workshop participants assess a hypothetical disaster response scenario. This workshop’s proposed scenario involved a low-pressure “bomb cyclone” that formed in the Bering Sea, damaging the navigation and communication systems of a container ship, whilst also causing the vessel to list and lose a great deal of its potentially hazardous material cargo. In addition, the storm damaged petroleum product tanks in Western Alaska, causing petroleum distillates to leak into the environment.

Both of these scenarios were presented to workshop participants, who hailed from throughout Western Alaska. Participants separated into three distinct breakout groups and were tasked with answering a series of 11 questions. These questions pertained to the possible first response by on-site local community members, how the logistics of these efforts would be carried out, what negative impacts might be suffered as a result of the disaster, and how to best preserve Alaska Native culture (including subsistence-related issues and preserving culturally-relevant sites and processes).

However, the workshop was not solely focused on gathering responses to specific questions. Roughly two hours were set aside for listening to storm-related stories proffered by workshop participants. Although the breakout groups focused on assessing a hypothetical scenario, the storm-related stories provided a sobering glimpse into actual disaster-related impacts suffered by workshop participants. Many of the workshop participants recounted severe personal and familial hardships as a result of storms, climate change, sea ice declination, and habitat loss.

Workshop participants gave ADAC and Sandia National Laboratories a very thorough and, at times, intensely personal view of hardships endured and challenges overcome as a result of real-world experiences, in addition to what challenges might occur as a result of the workshop’s hypothetical scenario. ADAC is extremely grateful to all the Nome workshop participants for extending their hand and providing their experiences, wisdom, and knowledge in order to contribute to research that provides a better and brighter future for Arctic maritime crisis response. ADAC would also like to thank Sandia National
IoNS Anchorage 2019

Arctic Incidents of National Significance “Stressing the System: Managing a Complex Arctic Crisis” Workshop

By: Seth Campbell, ADAC CRA

The second component of the two-part 2019 Arctic Incidents of National Significance (Arctic IoNS) workshops was held on May 20-22 at the University of Alaska Anchorage. This workshop, similar to the Nome “Insights” workshop, was hosted by ADAC in concert with Sandia National Laboratories. The goal of this workshop was to identify knowledge gaps, informed by the Nome Arctic IoNS workshop, to form research questions which will be used to craft Requests For Proposals (RFPs). Anchorage Arctic IoNS brought together participants from academia, industry, and all levels of government.

The hypothetical workshop scenario involved two separate “Moves.”

• Move #1 was largely the same as the “bomb cyclone” employed during the Nome “Insights” workshop.
• Move #2 introduced a compounding problem in the form of a concurrent magnitude 7.5 earthquake centered in Anchorage.

The earthquake was assumed to damage (but not completely disable) the Port of Alaska, airport runways, and road systems. As a result, emergency crisis response teams faced not only geographic and logistical challenges due to western Alaska’s far-flung distances, but also logistical challenges associated with working around damaged infrastructure in Alaska’s main hub.

The first day was devoted to various panelist sessions, intended to provide workshop participants with the same baseline knowledge for addressing Move #1 (Bomb Cyclone Scenario) and Move #2 (Earthquake Scenario). However, during the first day workshop participants were also asked to discuss Move #1 amongst themselves and then, in a “hot wash,” identify associated shortfalls, solutions, and recommendations.

The second day began with Move #2, which was conducted similarly to Move #1, including the “hot wash” session. After Move #2, USCG District 17 LCDR Jereme Altendorf provided a review of the Alaska Area Contingency Plan, which was then followed by the division of workshop participants into six breakout groups. Each breakout group was asked to form research questions for specific disaster response technologies; for example, one group was assigned latent detection technology challenges, associated with locating nigh-undetectable “dark target” containers adrift at sea. Once breakout groups created research questions, each workshop participant was given five votes to distribute across research questions via the Delphi prioritization method.

ADAC recently released a draft report of the Anchorage IoNS Delphi voting results, and a final draft is expected to follow shortly. ADAC is extremely grateful to all workshop participants, and would like to thank them for contributing their expertise, knowledge, and concerns towards pursuing the most well-informed and rigorous Arctic-related research possible!

ADAC Brings Aboard Seth Campbell

Transitioning from ADAC Fellow to ADAC Employee

By: Communications Team

Seth Campbell was brought on as ADAC’s Communications and Research Associate (CRA) in early March. In May, he graduated from the University of Alaska Anchorage (UAA) with his Master of Science in Civil Engineering (MSCE), specializing in water resources. Campbell began his tenure at ADAC as an ADAC Fellow working on the Great Lakes ICECON project with Dr. Thomas Ravens, Dr. Andy Mahoney, and Dr. Shawn Butler. His MSCE thesis was entitled “Development of ICECON: A ship-specific forecasting tool for the Great Lakes.”

As ADAC’s CRA, Campbell performs a variety of tasks, ranging from acquiring materials and creating content to writing workshop reports. Campbell has also supported ADAC (prior to his Fellowship) at ADAC’s Arctic Incidences of National Significance 2016 workshop in Anchorage, Alaska, and as an ADAC Fellow at the Arctic 2030+ conference in Fairbanks, Alaska in 2017. Campbell also presented the Great Lakes ICECON project at the Arctic Maritime Science Symposium in 2017. Finally, Campbell wrote a white paper for ADAC regarding the need for new icebreaker construction in the United States, as well as heavily contributed to ADAC’s literature review for the North American Arctic Maritime & Environmental Security workshop as a summer intern in 2018.

Born in Ketchikan, Campbell has remained a lifelong resident of Alaska. He graduated from UAA with a Bachelor of Science in Mechanical Engineering in 2014. With his passion for cultural and social heritage of the Arctic, Campbell looks forward to supporting ADAC’s mission to facilitate Arctic-related research in Alaska that is conducted with the Arctic operator in mind.
HIOMAS Transitioning to Axiom Data Science

A state-of-the-art pan-Arctic sea ice and ocean current modeling tool

By: Seth Campbell, ADAC CRA & Dr. Jinlun Zhang

ADAC is currently in the process of transitioning several projects—chief amongst them is HIOMAS (High-resolution Ice-Ocean Modeling and Assimilation System). HIOMAS is currently being transitioned to an operational capacity by Axiom Data Science, an Anchorage, Alaska-based informatics and software development firm. Dr. Jinlun Zhang is the PI of this ADAC project and developed HIOMAS, which is based on PIOMAS (Pan-Arctic Ice-Ocean Modeling and Assimilation System).

HIOMAS differs from PIOMAS in that it offers higher resolution modeling capabilities; HIOMAS can model the whole Arctic at 6 km, 4 km, or 2 km resolutions. The 2 km resolution HIOMAS is being transitioned to Axiom Data Science. In the future, HIOMAS may also model the United States Exclusive Economic Zone (EEZ) at a 1 km resolution. HIOMAS is able to model Arctic sea ice areal concentration, thickness, and velocity and also boasts capabilities to determine the fraction of ridged and multi-year ice, ice edge locations, snow depth, and ocean velocity.

Each of the environmental conditions that HIOMAS can model is important for determining the state of Arctic sea ice. This is extremely useful for operational needs because the United States Coast Guard (USCG) can more accurately account for sea ice when considering mission logistics (especially for time-sensitive crisis response such as search and rescue). HIOMAS is also useful for determining sea ice declination due to climate change, which can provide a more accurate baseline for future studies focusing on Arctic sea ice.

Upcoming Program Year 5 and 6 Events

July 2019

- July 1: start of ADAC Program Year 6. The Center is thrilled to continue its efforts in S&T R&D, education programs, and convening of experts to create important research and knowledge products for the U.S. Coast Guard and other Arctic operators.
- July 17 -18: July 8th Symposium on the Impacts of an Ice-Diminishing Arctic on Naval and Maritime Operations (IDA-8), Washington D.C.
- July 22 - 26: Air Force Chief Scientist Group visits Alaska, including Poker Flat Research Range visit.
- July 30 - August 1: DHS COE S&T UP Summit, Arlington, VA

August 2019

- August 2: Completion of ADAC Summer Intern Project
- August 19: Fall Semester 2019 begins
- August 31: Submission of final ADAC Program Year 5 Report

September 2019

- September 4 - 6: Arctic 2050 Conference, Wilson Center, Washington D.C.
- September 10 - 12: ADAC’s Arctic Maritime Horizons workshop
- September 19: ADAC Quarterly Review
- September 26: ADAC Customers and Partners Roundtable

ADAC’s Mission

The Arctic Domain Awareness Center, led by the University of Alaska, develops and transitions 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.

Contact Information

Center News is presented quarterly by the Arctic Domain Awareness Center. Please provide feedback or questions via any of the following contact points:

Website: adac.uaa.alaska.edu
Email: uaa.adac@uaa.alaska.edu
3211 Providence Dr.
BOC3 Suite 120
Anchorage, AK, 99508

@ADACAlaska
@ADACAlaska
Arctic Domain Awareness Center