



PASSAGES

The Canadian-German Research Project

Protection and Advanced Surveillance System for the Arctic: Green, Efficient, Secure

Project Overview

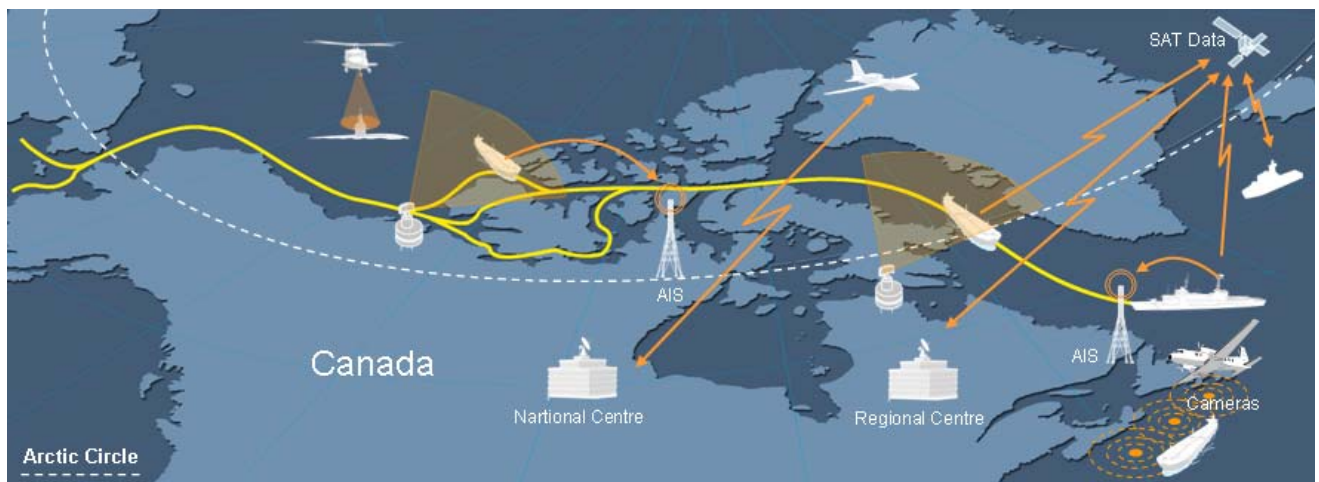
This initiative is an applied research project that aims to specify the requirements and the modular architecture of an innovative and persistent maritime surveillance system that is adapted to arctic conditions. Although the basic system elements should be universally deployable in different arctic and subarctic regions, the focus of this particular project is on the effective surveillance of the Northwest Passage (NWP) leading through the Canadian Arctic Archipelago.

The motivation for a surveillance system of the Northwest Passage clearly is the projected growth of maritime traffic along Arctic sea routes and the need for securing Canada's sovereignty by controlling its arctic waters as well as for protecting the safety of international shipping and the intactness of the arctic marine environment.

The goal of a surveillance system for the NWP is to reliably provide maritime situational awareness to the degree of detail needed by different customers and stakeholders such as government agencies, international organizations, industries, and Northern residents and communities. This includes a risk-based decision support system to enhance the capability of selecting and positioning responses to risks in a timely and efficient manner.

To date, there is no such comprehensive system in place in the Canadian Arctic. The extent and remoteness of the surveillance area together with the harsh arctic conditions require a new surveillance concept that fuses i) heterogeneous sensor data (AIS, radar, imagery, sonar), ii) contextual information (meteorological and ice data, shipping routes, ship library data, simulated and modeled data, etc.) and iii) available pre-processed surveillance data, and links all components to efficiently extract and provide the maximum available amount of information.

The picture shows an example of a surveillance system with distributed hierarchical control centers and different interconnected surveillance and communication components.



Example of information-centric surveillance of the Northwest Passage

The tasks to be performed within the scope of this project include:

- a comprehensive analysis of stakeholders and their needs and expectations
- the preparation of a concept of operations
- the derivation of operational requirements for a surveillance system of the NWP
- the analysis of appropriate sensors (already available and potentially available sensors and sensor platforms)
- new concepts of sensor data and information fusion
- new concepts of automated traffic anomaly detection
- improved models of maritime traffic risk assessments in the NWP
- the conceptual design of a customer- and role-based situation picture
- the interpretation of the situation picture to support decision making processes in critical situations (e.g. Search and Rescue operations, actions against illegal activities, prevention of oil spills)

The project is scheduled for a period of three years starting on July 1, 2013 and running until June 30, 2016.

It is a joint project involving the following three research groups:

- Airbus Defence and Space, Ulm, Germany (<http://www.airbusdefenceandspace.com>)
- Fraunhofer Institute for Communication, Information Processing and Ergonomics FKIE, Wachtberg, Germany (<http://www.fkie.fraunhofer.de/en.html>)
- Dalhousie University, Halifax, Nova Scotia (<http://www.dal.ca>)

and one Canadian industrial partner:

- exactEarth Ltd. / Cambridge, Ontario (<http://www.exactearth.com>)

Together the partners have approved expertise in the areas of sensors & sensor data acquisition, information fusion, large-scale surveillance systems, maritime traffic modelling and maritime risk assessment.

The project is co-funded by the German Ministry of Economy and Technology (Bundesministerium für Wirtschaft und Technologie, BMWi) under the heading "Maritime Technologies of the Next Generation". The work of the research group at Dalhousie University is co-funded by the Natural Sciences and Engineering Research Council (NSERC) of Canada. Project milestones will be reviewed and project deliverables will be validated on a regular basis by the customers (BMW, NSERC) as well as by a council of selected stakeholders that will advise and guide the project team concerning requirements and design questions.

Project Sponsors



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für Wirtschaft
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aufgrund eines Beschlusses
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