MODULE 1

Use of AIS transceivers on small vessels

Call Partner: exactEarth Ltd.
Funding level: $125,000
Anticipated Number of projects: 1-2
Timeline: 2 years
Website: http://www.exactearth.com/

MEOPAR and exactEarth Ltd. are seeking projects to study the utility of installing new (under development) light AIS (Automatic Identification System) transceivers on small vessels, and the benefit of using the output data to track small vessels for maritime traffic analysis, as well as for collecting data in the marine environment. Small here refers to recreational vessels including, but not limited to, artisanal fishing boats, fishing fleets, whale watching vessels, and water taxis.

This module is relevant to at least two key aspects of MEOPAR's strategic plan. The fundamental purpose of the global AIS system is for vessel safety, as improved information on vessel positions help to avoid ship collisions. New technologies allow for the extension of the system to small vessels and potentially contribute to addressing MEOPAR's Theme 2: "…risks and opportunities arising from pressures that are a direct consequence of human activity within the marine environment". Extending AIS usage to transmit additional data on the operating environment (a recent development in the technology), can contribute to MEOPAR's "Ocean Observing" challenge area, which can lead to improved modelling in various domains. Proposals under this module must clearly identify how the application of this new technology will lead to research impact that will advance MEOPAR's strategic plan.
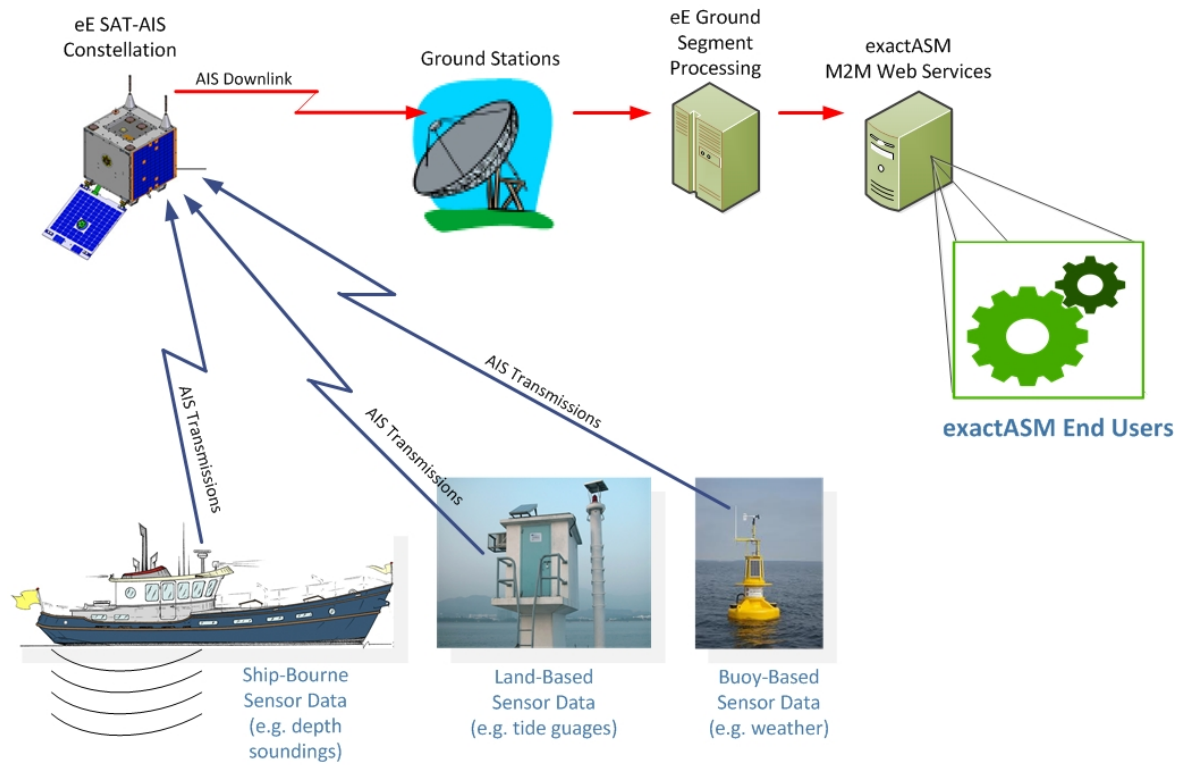
Applicants will be expected to partner with organization(s) with access to a fleet of small vessels and who will allow AIS transceivers on board. Ideally, experiments will be conducted on both the East and West coasts. These AIS transceivers provide a vessel tracking capability (position reports with time stamps) as well as the ability to transmit additional sensor data. The research team must also collaborate with exactEarth Ltd. to integrate additional sensors to collect observational data which can be incorporated into the transceivers (exactEarth Ltd. will provide an Interface Control Document explaining the options). The additional sensor(s) and accompanying data must be tied

to the outcomes of the research project (e.g. meteorological data or other user input data - whale sightings, weather observations, fish catch reports, water conditions, etc.).

exactEarth Ltd. will provide the AIS transceivers as an in-kind contribution to the project (approximately $25K total value) along with technical support and training on the devices as required by the research team. Projects will likely begin in April of 2018 subject to the availability of AIS transceivers and approval from Industry Canada for an experimental license. exactEarth Ltd. will work with the PI to submit the government license application after funding has been approved.

Relevant factors:

1. Numbers of AIS transceivers – estimate 25 – see data sheets for 2 different units
2. Other linked sensors must be provided by Project
3. Data transfer limits per attached (see below)

Ship-Bourne Sensor Data (e.g. depth soundings)
Land-Based Sensor Data (e.g. tide guages)
Buoy-Based Sensor Data (e.g. weather)

- AIS' data exchange utility:
  - Every ship/maritime asset is potentially a 'floating observatory', e.g.:
    - Ship operating data, e.g. engine performance, emissions, fuel usage, scrubbers, ballast water, etc.
    - Below the water environment – temperature, current, salinity, bathymetry, etc.
    - Above the water environment – weather, sea-state, etc.
- AIS' data exchange capability:
  - Technical specifications
    - Message 6 AIS Addressed Binary (Multiple Slots)
    - Message 8 AIS Binary Broadcast (Multiple Slots)
    - Message 25 Single Slot Binary Message
    - Message 26 Multiple Slot Binary Message With Communications State
  - Referred to now as 'Application Specific Messages' (ASM), nominally incurs no service costs
  - Two-way in the terrestrial AIS context, but uni-directional wrt current Satellite AIS systems
  - Data payload anything from 8 bytes to 119 bytes, depending on number of transmission slots used (1 to 5) and whether 'addressed' or 'broadcast'