

Arctic Observatory Feasibility Study ^[1]

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In early 2011 ONC signed a collaboration agreement with Aboriginal Affairs and Northern Development Canada (AANDC) to complete a feasibility study on installing an Ocean Observatory in Canada's Arctic. Led by the Ocean Networks Canada Innovation Centre with partners from ASL Environmental Sciences, Golder Associates and Coastal and Ocean Resources, a team of industry experts completed a detailed study on using technologies developed on VENUS and NEPTUNE Canada to establish a permanent, 24/7 monitoring capability in Canada's High Arctic. These technologies are based on infrastructure using electro-optic cables, supplemented by mobile assets (autonomous underwater vehicles), moored buoys, and satellites.

The study, now completed, focused on Cambridge Bay, the site of the Canadian High Arctic Research Station as an example location, but three types of possible locations were considered. Identification of the most appropriate location for Canada's contribution to Arctic ocean observing requires further study because observatories, and their selected location, must be based on high priority scientific goals as well as other national needs, for example sea ice forecasting. And of equal importance is the need to involve Northerners in facility planning, construction and operation, and the imperative of using observatory capabilities to enhance the lives of local residents through training, employment, and provision of relevant local information.

The need for Arctic observatories is clear because our understanding of physical and biogeochemical processes in the Arctic, especially related to marine ecosystems, is rudimentary yet it is precisely here where we are witnessing the most rapid and profound impacts of global environmental change. Many national and international organizations have stressed the need for long-term monitoring of Arctic ecosystems to understand better how they function, how they will respond to global change, and to inform public policy.

This study sought input from a wide range of stakeholders, including scientists, federal and territorial government representatives and Northerners, on the use of cabled ocean observatories in complementing existing marine research activities and contributing to a better understanding of the oceanic environment by making measurements throughout the entire year. Dramatic changes in sea ice characteristics, duration and distribution are also leading to more frequent use of Canadian arctic waters for both destination and transit shipping, also brings the possibility of environmental disasters, such as oil spills, and potential routes for

illegal immigrants or terrorists to enter Canada and North America. These changes in the arctic system will require increased surveillance, from the standpoints of the environment, security and sovereignty. With global commodity and energy demand increasing at an ever more rapid pace, the Arctic will see the exploitation of base metal and petroleum resources, which are becoming increasingly more competitive, further increasing shipping and infrastructure development in the North. All of these activities will have significant effects on the lives of Northerners and their traditional activities on the land and ice.

The wide range of stakeholders consulted in the study identified a range of candidate sites and programs for ocean monitoring systems. Observatories in environments such as the Arctic offer the possibility of monitoring environmental processes throughout the year, even when areas are inaccessible due to the presence of ice, harsh weather or darkness. Such observations complement the brief sampling and measurement opportunities provided by research vessels during the open water season or measurements obtained by logistically challenging field programs from the ice. For surveillance activities, the continuous presence is essential for monitoring vessel activities, both surface and submerged, and being able to react quickly if necessary, and for assessing environmental impacts related to arctic shipping.

Canadian Arctic Cabled Observatory Study ONC-DN-2011-02

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