

Original article

## Improving Canada's Marine Navigation System through e-Navigation\*

*Daniel BRETON<sup>1</sup>, Jennifer BARRY<sup>2</sup>, Lisa VANDEHEI<sup>3</sup>*

<sup>1</sup> Canadian Coast Guard, Ottawa, Ontario, Canada, [Daniel.Breton@dfo-mpo.gc.ca](mailto:Daniel.Breton@dfo-mpo.gc.ca), Author

<sup>2</sup> Canadian Coast Guard, Ottawa, Ontario, Canada, [Jennifer.Barry@dfo-mpo.gc.ca](mailto:Jennifer.Barry@dfo-mpo.gc.ca), Corresponding Author

<sup>3</sup> Canadian Coast Guard, Ottawa, Ontario, Canada, [Lisa.Vandehai@dfo-mpo.gc.ca](mailto:Lisa.Vandehai@dfo-mpo.gc.ca)

### Abstract

The full application and benefits of e-Navigation, as a whole, cannot yet fully be known. Technological developments will continuously change the course of national and international initiatives in the field, and lead the pace of the evolution. However, how countries govern and support the development of e-Navigation is very much within the realm of control. National-level e-navigation governance structures that are capable of harnessing innovation and supporting the needs of mariners will help ensure that the only limits to the evolution of e-navigation are technological.

The aim of this paper is to describe a model for National-level e-Navigation structures, and to offer the Canadian model as an example for potential replication in other countries. The scope of the paper is limited, providing an account of the steps to implement the e-Navigation model in the Canadian context. The methodology is similarly humble, outlining the framework of the Canadian e-Navigation Concept of Operations, and current e-Navigation priorities. It is the basis for this model that is the keystone to the paper. The Canadian model was developed in a way that ideas, innovation and needs in Canada are not wholly determined by the government, but rather, the government aims to act as a facilitator and guide in bringing together disparate needs and ideas under a harmonized approach.

The conclusion proposed is that on-going work with key partners and stakeholders can be used as the primary mechanism to identify e-Navigation related innovation and needs, and to prioritize next steps. Moving forward in Canada, implementation of new e-navigation services will continue to be stakeholder driven, and used to drive improvements to Canada's marine navigation system.

**Keywords:** e-Navigation, Canada, marine navigation, SOLAS, Non-SOLAS ships

## **I. Introduction**

The full application and benefits of e-Navigation, as a whole, cannot yet fully be known. Technological developments will continuously change the course of national and international initiatives in the field, and lead the pace of the evolution. However, how countries govern and support the development of e-Navigation is very much within the realm of control. National-level e-navigation governance structures capable of harnessing innovation and supporting the needs of mariners, will help ensure that the only limits to the evolution of e-navigation are technological.

Many e-Navigation initiatives have already been conducted to improve marine safety, security, and efficiency in Canada. Success to date has been due to collaboration and communication with key partners and stakeholders, where on-going consultation is used as the primary mechanism to identify e-Navigation related needs and to prioritize next steps.

As such, the aim of this paper is to describe a model for National-level e-Navigation structures, and to offer the Canadian model as an example for potential replication in other countries. The scope of the paper is limited, providing an account of the steps to implement the e-Navigation model in the Canadian context. The methodology is similarly humble, outlining the framework of the Canadian e-Navigation Concept of Operations, and current e-Navigation priorities. It is the basis for this model that is the keystone to the paper. The Canadian model was developed in a way that ideas, innovation and needs in Canada are not wholly determined by the government, but rather, the government aims to act as a facilitator and guide in bringing together disparate needs and ideas under a harmonized approach.

## **II. Navigation and Communication System of non-SOLAS Ships**

In 2008, Canada focused on the development of a vision and strategy for e-Navigation. As stated in the Canadian Coast Guard e-navigation strategy (2008, p.3), Canada's vision is the widespread use of e-navigation in Canada by mariners and shore authorities for greater marine safety, security, efficiency and environmental protection.

Building on this initial vision, subsequent efforts focused on identification of user-needs through stakeholder consultation, which led to the development of Canada's Required Services Matrix (2011, p.1 - 3). The matrix identified and prioritized various e-Navigation related services for specific waterways and regions across Canada and has become a very important tool for implementation purposes. The matrix clearly identifies the highest priority information and data requested for a given area. Given Canada's diverse geography, coastline and waterway characteristics, high priority required services can vary largely by area. The main categories of information and data that have been prioritized by users include: meteorological and hydrographic services, ice information, navigational charts and bathymetric data, aids to navigation information, restrictions to navigation, vessel traffic services and pilotage related information.

In 2012, further work on Canada's e-Navigation vision and strategy continued between federal partners, including Transport Canada, Environment Canada, the Canadian Hydrographic Service

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