

7th IHO-HSSC Meeting

Busan, Republic of Korea, 9-13 November 2015

Paper for consideration by HSSC 7

Development of an S-100-Based Product Specification for Under Keel Clearance Management Information

Submitted by:	Australia
Executive Summary:	<p>A proposal by the Australian Maritime Safety Authority (AMSA) and the Australian Hydrographic Service (AHS) that an S-100 based product specification is developed for Under Keel Clearance Management (UKC) information.</p> <p>If agreed, the IHO is requested to assign a product specification number from the S-10x series and for a draft standard to be developed by a Project Team within the S-100 Working Group.</p>
Related Documents:	IMO's e-navigation Strategy Implementation Plan (NCSR 1/28 Annex 7 and MSC 94/21 Paragraph 9.15 refers).
Related Projects:	S-10X and IMO-led development and implementation of e-navigation

Introduction

Under Keel Clearance (UKC) management systems are relatively common in Australian ports. Such systems are also being used in an increasing number of ports and waterways around the world. For example a UKC management system will be implemented in the Straits of Malacca and Singapore.

Shipmasters and marine pilots typically use UKC management system information either with a hard copy printout of a proposed UKC-managed transit plan, electronically on a Portable Pilot Unit (PPU) or within similar 'connected' devices (e.g. laptop computers). In Australia, licensed coastal pilots are required to use AMSA's UKC management system in Torres Strait. Many commercial ports in Australia and in other countries also use real-time UKC management systems to assist manage tight UKC margins and maximise cargo uplift.

UKC management systems are prime examples of user needs being addressed by the application of current and emergent technology. They are also good examples of e-navigation-like solutions, as they meet the International Maritime Organization (IMO) definition of e-navigation (which involves the collection, integration, exchange, presentation and analysis of maritime information onboard and ashore by electronic means, so as to provide navigational safety and efficiency benefits).

Currently, real-time UKC management system information cannot be displayed on a ship's Electronic Chart Display and Information Systems (ECDIS). A first step in remedying this situation is to develop an S-100-based Product Specification for UKC management system information.

DISCUSSION**Is the proposal within the scope of IHO objectives?**

This specification is intended to provide a suitable format for the exchange of digital data pertaining to maritime safety and efficiency of marine traffic. It will also supplement the navigational information included in ENCs for use in ECDIS. Therefore, the specification seeks to create a digital format with the necessary attribution features to enable the exchange of information between Member States and for using electronic UKC management information in an Integrated Navigation System and/or ECDIS.

Is the subject of the paper within the scope of an item in the current IHO work programme?

This paper seeks that the development and adoption of a draft UKC management information specification be included within the current IHO work programme as an S-10X Product Specification. Given that S-100 is relatively new, and the potential benefits it can offer are only just starting to be realised by other organisations, it is reasonable to expect new product specifications will progressively emerge. The IHO continues to be responsive to emerging requirements such as UKC management systems and to this extent the topic lies within the scope of IHO's objectives.

Adequate industry standards

The IHO Geospatial Information (GI) Registry is a fundamental underpinning component of S-100 for categorising and defining hydrographic and related data.

S-100 is aligned with the ISO 19100 series of geographic standards, thereby making the use of hydrographic and other geographic data more interoperable (over and above that of the present IHO S-57 data transfer standard). The former IMO Sub-Committee on Safety of Navigation (NAV), at its 57th session in 2011, agreed on the use of the IHO GI Registry as a baseline for the collection, exchange, and distribution of e-navigation-related data. This was the first step towards a common maritime data structure, vital for e-navigation to succeed globally.

Currently there are no known S-100-based products relating to UKC management system information.

E-NAVIGATION

The need for harmonisation

E-navigation, in part, involves the provision of navigational services, based on user needs.

There is a need to harmonize e-navigation services (and the products that underpin such services) globally and avoid differing regional services and systems. Harmonisation of services will provide a robust basis for compatibility and interoperability between regionally implemented services for international shipping.

A common understanding about product specifications needs to be coordinated internationally and accessible for all stakeholders, either as presented or to be used as a baseline to develop customised products to suit particular needs.

About Maritime Service Portfolios

In order to have a common understanding of the services available in a given region, the concept of a Maritime Service Portfolio (MSP) was developed by IMO. The MSPs for a given region consist of a collection of standardized operational and technical services. A technical service is an exchange of data described by data products. A technical service can consist of more than one data product.

The proposal for UKC management products within S-10X can be considered as being part of an IMO MSP technical service.

ANALYSIS

The product

S-10X UKC management products proposed to the HSSC may include:

- Areas (polygons) where UKC management may be implemented (see Figure 1). This will assist in transit planning and real-time monitoring by ship's crews;
- Real-time 3 dimensional (3D) and 4 dimensional (4D) chart overlay information, over and above simple safety contour display, showing horizontal distribution of UKC information. This will include locations where, given certain nominated parameters, a potential UKC breach condition (or grounding) may occur (see Figure 2). This will improve situational awareness for pilots and masters within a single integrated display; and
- Sub-metre, high resolution and high accuracy gridded bathymetry in support of chart overlay products (bENC). This may support the generation of safety contours and integration of chart overlay data.

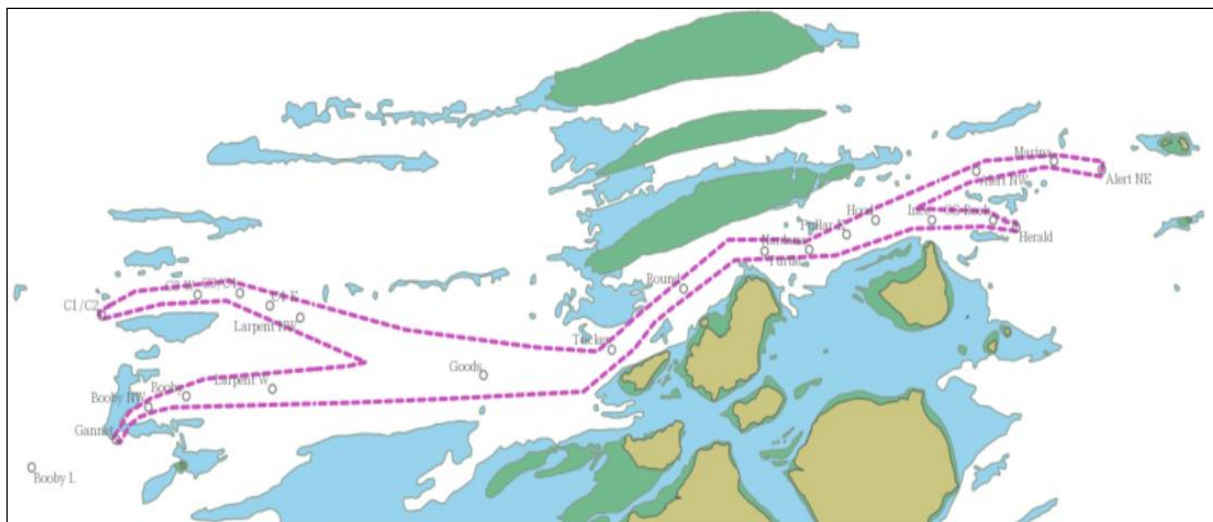


Figure 1: ENC data showing defined UKC management areas (in magenta).

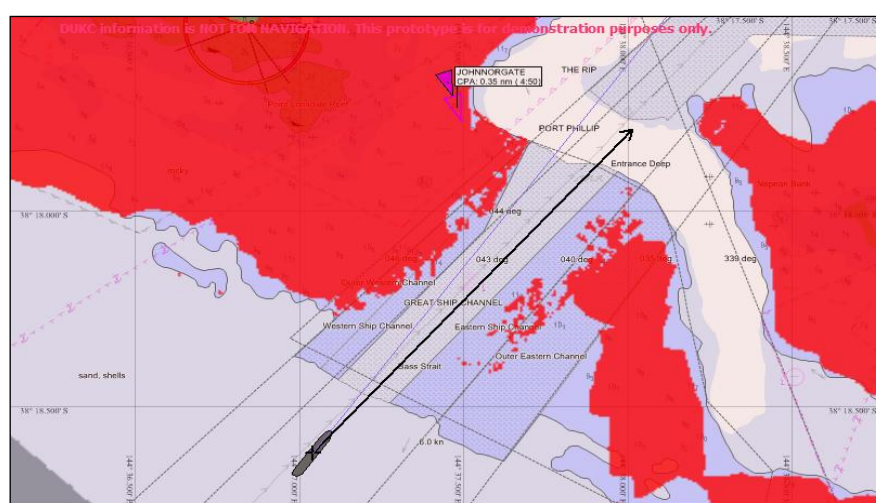


Figure 2: Real-time chart overlay information showing areas (in red) of insufficient UKC for a vessel transiting a channel.

Do the benefits justify the proposed action?

The following benefits have been identified:

- Addition of a new Product Specification within the S-100 series for UKC management information is in line with and supports the IMO's decision to use S-100 as the baseline for e-navigation Common Maritime Data Structures (CMDS);
- Ships' officers have an obligation in SOLAS (regulation V/34) to plan their passage from berth to berth. Integrated UKC management information in ECDIS will assist in this process;
- When ships are under pilotage in areas where real-time UKC management is implemented, ship's officers have an obligation to monitor and assist marine pilots. In such areas, officers are currently limited in the extent to which they can work with marine pilots as ship's fitted navigation systems do not have the ability to integrate nor display UKC management information; and
- Situational awareness can be greatly improved by the inclusion of planning and real-time UKC management products.

Are there any potential cost impacts on the maritime industry, Member States or other involved parties?

There is expected to be an overall cost benefit to the maritime industry and Member States. By using a digital format, the cost of implementing the specification (compared with existing paper charts and maps) will decrease the overhead of exchanging UKC management information.

Use of the specification by a Member State will not be mandatory.

Member States implementing UKC management systems to create S-10X UKC management products is the responsibility of each Member State.

CONCLUSION

The inclusion of UKC management information is an appropriate application for an S-100 Product Specification. Such a Product Specification would be considered to be additional overlay information in ship's navigation systems (i.e. an "S-10X Product Specification").

Gridded bathymetry to support UKC management information is already catered for in S-100 with the S-102 Bathymetric Surface Product Specification. This could be used in a real-time UKC Product Specification.

Additional consideration could be given to the use of predicted and observed tidal information and temporal information about a vessel's dynamic handling characteristics.

RECOMMENDATIONS

It is recommended that a UKC Project Team be established within the S-100 Working Group to coordinate development of a draft Product Specification for UKC management products.

The proposed UKC Project Team will also need to address associated IHO Geospatial Information Registry considerations, as outlined in S-99, regarding:

- the requirement to (possibly) establish a dedicated domain within the Feature Concept Dictionary Register,
- participation of Subject Matter Experts (SME) on the Registry/Register Control Board, and
- identification of appropriate resources for development and maintenance of the Product Specification.

Justification and impacts

Identifying any resource implications resulting from the recommendations, such as the number of working group sessions, expertise, need for expert consultants, funding, etc.

- AMSA will lead the development work with assistance from the AHS. Interested IHO Member States would be invited to participate.

Identifying which HSSC working group(s) are essential to completing any proposed new work items;

- S-100 Working Group.

The date when any proposed new work item is expected to be completed;

- Until the scope of work is fully identified a completion date is not able to be nominated.

The proposed priority (high, medium, low);

- This is considered a medium priority work item.

Any related activities that may impact on a proposed work item or decision.

- None are identified.

Action requested of HSSC 7

HSSC-7 is invited to:

- a. **consider** the appropriateness of UKC management information as a S-10X product specification;
- b. **agree** that UKC management information requires an IHO S-100 based Product Specification;
- c. **agree** to the formation of a UKC management information Project Team with the S-100 Working Group to coordinate development of a draft Product Specification; and
- d. **assign** an S-100 Product Specification number.