e-Navigation users

Methodology for capturing user needs

The IMO has clearly mandated that the development of an e-Navigation concept and strategy should be led by 'user needs'. IALA has developed a methodology for capturing these.

It now invites all NI members, branches and readers of *Seaways* to use this methodology to identify their user needs and submit them to David Patraiko djp@nautinst.org before the end of 2007. Copies of template examples and more information are available from him.

Such needs will be used when developing a proposed e-Navigation strategy for the IMO.

SHIPSIDE
Merchant vessels (including all types of cargo and passenger vessels)
High speed craft including displacement and non-displacement vessels
Assets for mobile VTS
Pilot vessels
Coastguard vessels
SAR vessels and aircraft
Law Enforcement vessels
- police
- customs

SHORESIDE (1)
Ship owners & operators, safety managers
VTM organisations (competent authorities within the concept)
VTS – organisations (centres)
- VTS operators (tactical/operational)
- Management (strategic)
Pilot organisations
Coastguard organisations (or equivalents)

SHORESIDE (2)
Shipowners and operators, logistic stakeholders
Media (news organisations)
Integrated coastal management authorities
Marine accident investigation organisations
Health and medical organisations
Insurance and financial institutions
Governmental and other national/regional organisations (competent authorities)
Port authorities (strategic)

It is clearly of great importance that all users are identified and their needs assessed. The development of a list of user groups came out of discussions at IALA, from the intersessional meeting of the Operations and Strategic Working Group in July 2007, the 26th meeting of the VTS Committee and the third meeting of the e-nav Committee.

In order to categorise potential users, consideration was given to the likely methods that would be used for sharing information between users. These are:

- Ship to shore / Shore to ship (ship with VTS/VTM or coastguard-centre and vice versa)
- Shore (VTS/VTM) to shore 1 (maritime/nautical information towards maritime organisations and stakeholders)
- Shore (VTS/VTM) to shore 2 (public and transport/cargo information supporting the logistic chain).

The user groups will comprise various individual users; administrations may need to identify appropriate user group organisations to solicit information about particular e-Navigation user needs.

The table (see extract right) provides three separate lists. The general distinction between Shoreside (1) and Shoreside (2) is that organisations listed under Shoreside (1) have a responsibility for safety, while those in Shoreside (2) generally do not.

The following methodology is proposed for the capture of all users of e-Navigation on a global basis. In order to systematically capture the specific 'user needs' of all users, it is requested that all users first break down their operation into navigational 'primary needs' and then assess these primary needs using a template that will be provided.

As an example, the IALA e-Navigation committee has broken the user needs of a generic Solas class merchant mariner into the following primary navigational needs: voyage planning, safe navigation, collision avoidance, manoeuvring and conning, communication, and recording/record keeping. See Table 1, opposite page, for a collision avoidance example.

Once a primary navigational need has been identified, the needs for the harmonised provision and presentation of the 'maritime information' must be identified as referenced in the definition of e-Navigation that is, *collection, integration, exchange, presentation* and *analysis*. For ease of understanding it may be useful to rephrase each question in isolation, such as 'What is the user need for the harmonised collection, or harmonised integration of maritime information for the primary task of collision avoidance?'.

The following advice for addressing the headings of collection, integration, exchange, presentation and analysis is suggested:

What to look for

■ **Collection.** List the harmonised collection of information that is needed for you as a user for this primary need, eg data from GPS, nautical publications, safety notices etc. This section should detail the various pieces and sources of data needed to carry out the 'primary task' that you would benefit from if they were available from a single source or in a common format, 'Collection'. If any preferred details of the source or format are known they should be mentioned.

■ **Integration.** Once data has been 'collected', it will need to be integrated in a harmonised way into a system in order for it to be used in conjunction with other data for the benefit of the end user. If there are any specific system requirements or limitations for such integration, such as software, hardware, protocols or system integrity needs, these should be mentioned here in either detailed or general terms.

■ **Exchange.** Harmonised data exchange should be considered between any two parties such as ship/ship or ship/shore or broadcast needs such as from one party to many. If specific exchange issues such as radio frequency, bandwidth or protocols are known, they should be stated.

■ **Presentation.** List any special requirements from your specific user need for the presentation of information that will improve your decision making ability. This may include the grouping of information, presentation options such as video and/or audio, or a preferred layout of equipment and controls.

■ **Analysis.** Analysis needs may refer to any additional functionality for decision support tools, or the rapid and systematic processing of routine tasks.

■ You should use **additional comments** to identify any restrictions or limitations assumed when defining the primary need. For instance, when defining 'safe navigation' you might state that the task of 'collision avoidance' has been dealt with separately for simplification. You may also highlight any other suggested 'user needs' that you feel have not been addressed elsewhere in the exercise.

Following an extensive consultation of user needs from stakeholders, the resultant collection of user needs will be collated into an amalgamated user needs document that will be delivered to the IMO. The next steps will involve the creation of an IMO e-Navigation strategy and development plan.

User: Generic Solas merchant mariner		
Primary need: e-Navigation should support mariners in the maintenance of **safe passing and clearing distances** and **collision avoidance**.		
	User need	**Comments/specifics**
Collection	'e-Navigation should allow the **collection** of all appropriate information needed to support the task of the primary need by all available means.'	This may include but would not be limited to information from radar, ARPA, AIS, any shore VTS, audio, gyro compass and visual identification.
Integration	e-Navigation should **integrate** all appropriate data and information needed to support the primary need.	e-Navigation should **integrate** all appropriate data and information needed by a mariner to identify and monitor targets and to make appropriate decisions to maintain safe distance and to monitor the safe passage of all targets including throughout any manoeuvres. This may include but would not be limited to information from radar, ARPA, AIS, gyro compass, official navigational charts and visual identification. Thought should be given to the assimilation of targets from all sensors, and the process of integration should support the role of the mariner and not lead to distraction and overburden.
Exchange	e-Navigation should allow for the **exchange** of any data or information needed to support the primary need.	e-Navigation should allow for the **exchange** of any data or information (pertaining to the identification of targets or the prevention of collision) between ships and between ships and shore, to facilitate the maintenance of safe passing and clearing distances at all times. Thought should be given to the sharing of such information in a standard format, and in automatic or user selectable modes.
Presentation	e-Navigation should facilitate the clear **presentation** of all information pertaining to the primary need in a manner that supports the decision making process, engages the user and minimises any risk of distraction or over burden. It should also provide easy to use facilities for a user to interact with the system and input data.	e-Navigation should facilitate the clear **presentation** of all information pertaining to the maintenance of safe distances in a manner that minimises any risk of distraction or overburden, engages the mariner and supports the decision making process. The presentation of target data should be developed in compliance with SOLAS Ch V Reg 15 and make best use of association and standardised symbology. The presentation needs to provide the best possible level of situational awareness to support the mariner's decision making process. This should include the ready availability of hydrographic information, positional data, met-ocean data, shore provided information and own ship sensor information such as echo sounder depth. The presentation should support the role of the mariner and not lead to distraction and overburden.
Analysis	e-Navigation should support the user through the appropriate **analysis** of data and information to support the primary need.	Consideration should be given to decision support systems to aid in the assessment of risk and avoidance of single person or single point of failure errors.

▲ Table 1: Example of methodology template