The world´s leading international professional body for qualified mariners

e-Navigation

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DigitalShip
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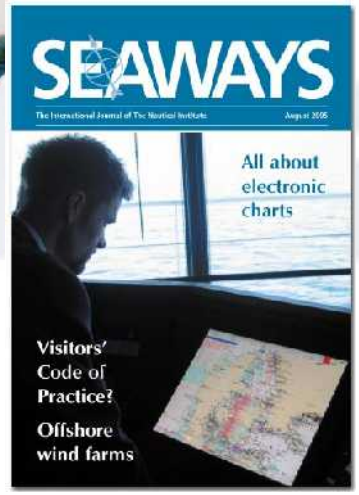
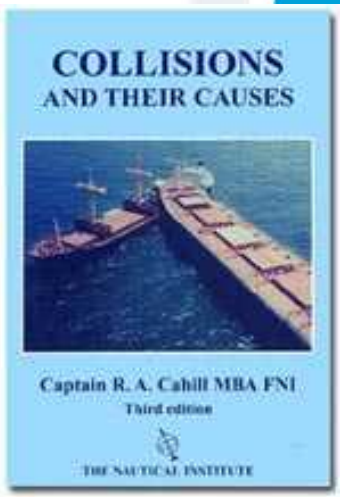
- Leading International Professional Body for Qualified Mariners
- 7,000 members, 40+ branches worldwide
- Not for Profit – Member funded
- “Supporting those in Control of Seagoing Craft”
- Major Maritime Publisher





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Definition

"e-Navigation is the harmonised collection, integration, exchange, presentation and analysis of marine information onboard and ashore by electronic means to enhance berth to berth navigation and related services for safety and security at sea and protection of the marine environment

IMO working definition

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e-Navigation

e-Navigation is an International Maritime Organization (IMO) led concept based on the harmonisation of marine navigation systems and supporting shore services **driven by user needs**.

It is generally accepted that the IMO concept of “e-Navigation” can be thought of as a brand, such as “iPod”, without the need for “e” to be specifically defined.

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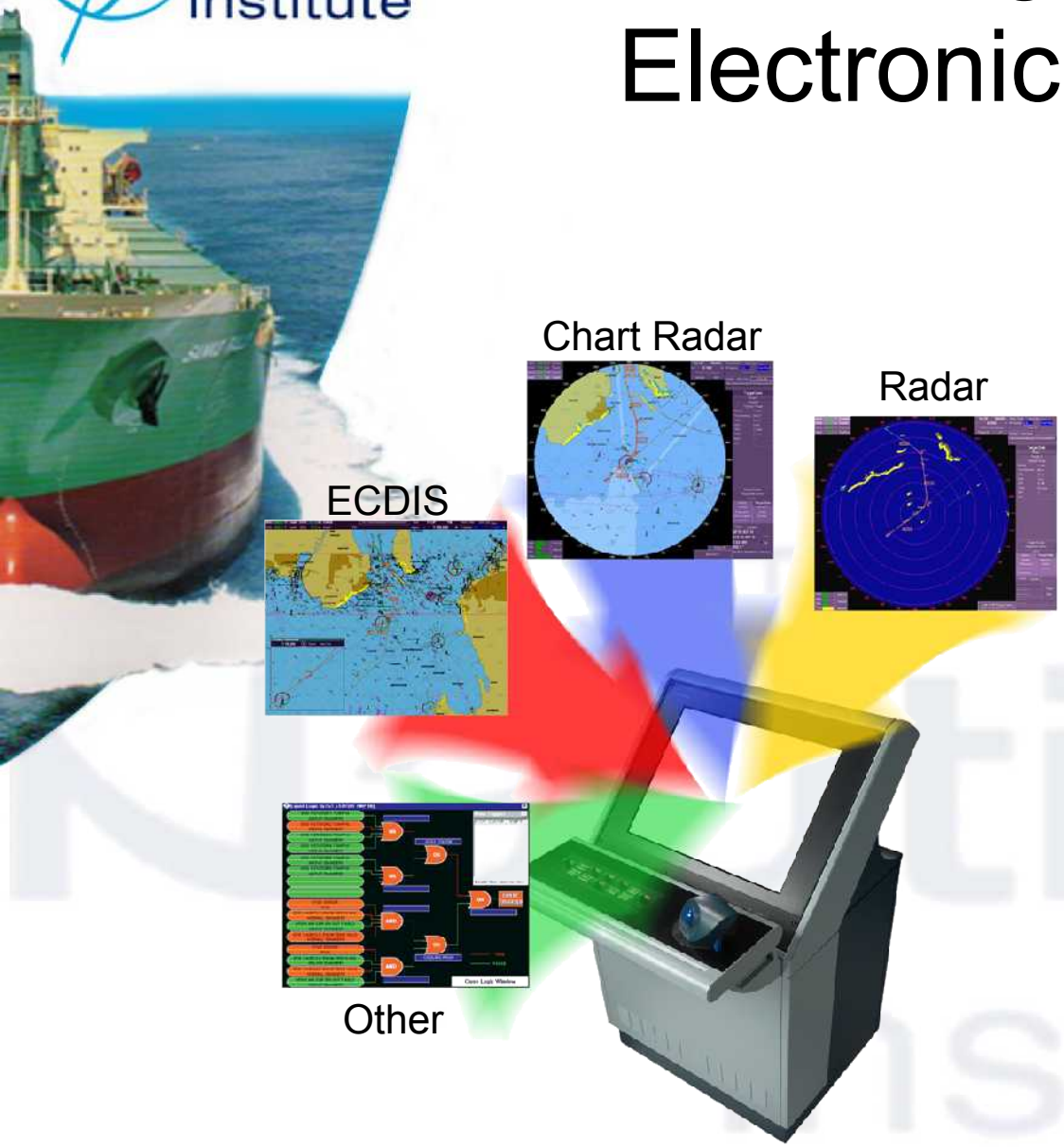
e-Navigation vs. Electronic navigation



- With or without and agreed infrastructure or interface, electronic navigation will happen!
- Manufactures already make use of integration and multifunction displays, and many systems are ‘broadband’ ready.

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Compelling Need

"There is a clear and compelling need to equip the master of a vessel and those ashore responsible for the safety of shipping with modern, proven tools to make maritime navigation and communications more reliable and user friendly and thereby reducing errors. However, if current technological advances continue without proper coordination there is a risk that the future development of marine navigation systems will be hampered through a lack of standardisation onboard and ashore, incompatibility between vessels and an increased and unnecessary level of complexity."

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Time Line…

- First announced RIN Conf - Nov 05
- Submitted to MSC 81 – May 06
- Nav 52 convened CG – July 06
- IALA e-Nav meetings twice a year.
- First major review Nav 53 – July 07
- Next Major review Nav 54 – July 08
- Target for Strategy – Nav 54/MSC 85
- Implementation …

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Significant Outcome 1

Onboard navigation systems will be developed that benefit from the integration of own ship sensors, supporting information, a standard user interface, and a comprehensive system for managing guard zones and alerts. Core elements of such a system will include high integrity electronic positioning, Electronic Navigational Charts (ENC) and an analysis capability to reduce human error, actively engaging the mariner in the process of navigation while preventing distraction and overburdening.

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Significant Outcome 2

The management of vessel traffic and related services from ashore will be enhanced through better provision, coordination, and exchange of comprehensive data in formats that will be more easily understood and utilised by shore-based operators in support of vessel safety and efficiency.

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Significant Outcome 3

An infrastructure designed to enable authorised seamless information transfer onboard ship, between ships, between ship and shore and between shore authorities and other parties with many attendant benefits, including a reduction of single person error.

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Capturing User Needs

- Identify Users
- Use international networks (IMO, IALA, Nautical Institute, etc...)
- Identify the user needs for the harmonisation of: Collection, Integration, Exchange, Presentation, and Analysis, taking into account HE issues.
- Assess and report the needs

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Shipborne users
Generic SOLAS vessels
Commercial tourism craft
High speed craft
Mobile VTS assets
Pilot vessels
Coastguard vessels
SAR vessels
Law enforcement vessels (police, customs, border control, immigration, fisheries inspection)
Nautical assistance vessels (tugs, salvage vessels, tenders, fire fighting, etc)
Counter pollution vessels
Military vessels
Fishing vessels
Leisure craft
Ferries
Dredgers
AtoN service vessels
Ice patrol/breakers
Offshore energy vessels (rigs, supply vessels, lay barges, survey vessels, construction vessels, cable layers, guard ships, production storage vessels)
Hydrographic survey vessels
Oceanographic research vessels

Shore-based users
Ship owners & operators, safety managers
VTM organisations
VTS centres
Pilot organisations
Coastguard organisations
Law enforcement organisations
National administrations
Coastal administrations
Port authorities
Security organisations
Port state control authorities
Incident managers
Counter pollution organisations
Military organisations
Fairway maintenance organisations
AtoN organisations

Excerpt from CG Draft Report to Nav 54 – Annex C

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Actual User Needs:

- “Safer navigation, improved collision avoidance”
- “All information to be readily available, accurate and in a useful format”
- “Centralised systems for passage planning and execution.
- “Common reports to be sent only once!”
- “Positive means of communication”

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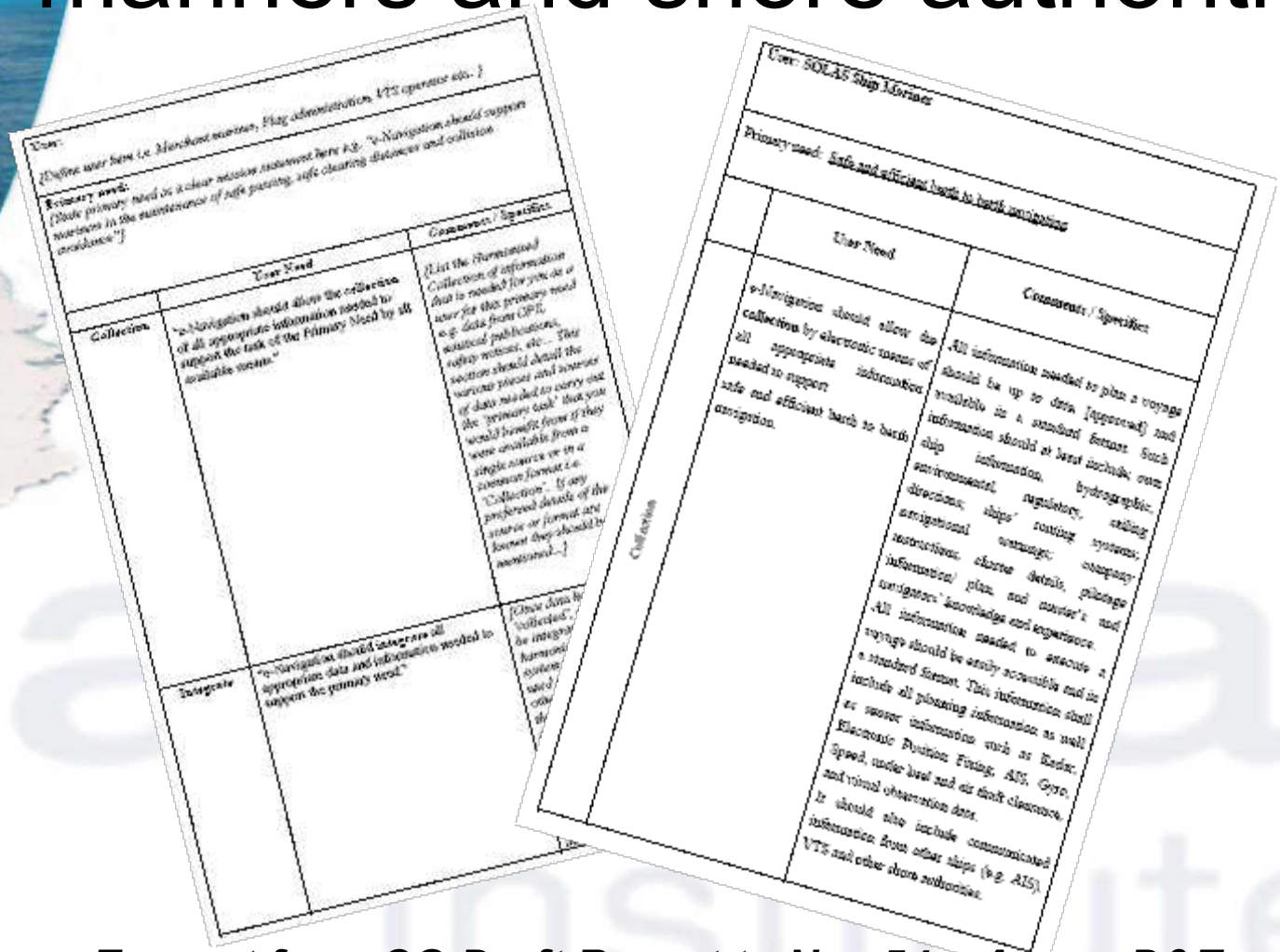
Generic Needs for Solas mariners and shore authorities



User:	
[Define user here i.e. Merchant marine, Flag administration, VTS operator etc.]	
Primary need: [State primary need in a clear mission statement here e.g. "e-Navigation should support mariners in the maintenance of safe passing, safe 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."	[List the harmonised Collection of information that is needed for you as a user for this primary need e.g. data from GPS, nautical publications, safety notices, etc... This section should detail the various places 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 i.e. "Collection". If any preferred details of the source or format are known they should be mentioned...]
Integrate: "e-Navigation should integrate all appropriate data and information needed to support the primary need."	[How data is collected, be integrated, harmonised, system, used, other, the

User: SOLAS Ship Masters	
Primary need: Safe and efficient berth to berth navigation	
User Need	Comments / Specifics
Collection: e-Navigation should allow the collection by electronic means of all appropriate information needed to support safe and efficient berth to berth navigation.	All information needed to plan a voyage should be up to date, [approved] and available in a standard format. Such information should at least include; own ship information, hydrographic, environmental, regulatory, sailing directions, ships' routing systems, navigational warnings, consumer restrictions, charter details, pilotage information, plan and master's and navigators' knowledge and experience. All information needed to execute a voyage should be easily accessible and in a standard format. This information shall include all planning information as well as sensor information such as Radar, Electronic Position Fixing, AIS, Gyro, Speed, under keel and air draft clearance, and visual observation data. It should also include communicated information from other ships (e.g. AIS), VTS and other shore authorities.

Excerpt from CG Draft Report to Nav 54 – Annex D&E

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Consolidated User Needs

- Common Maritime Information/Data Structure
- Automated and Standardised Reporting Functions
- Effective and Robust communications
- Human Centred Presentation
- Human Machine Interface
- Data and System Integrity
- Analysis
- Implementation Issues

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Proposed

Common Maritime Information/Data Structure

Mariners require information pertaining to the planning and execution of voyages, the assessment of navigation risk and compliance with regulation. This information should be accessible from a single integrated system. Shore users require information pertaining to their maritime domain, including static and dynamic information on vessels and their voyages. This information should be provided in an internationally agreed common data structure. Such a data structure is essential for the sharing of information amongst shore authorities on a regional and international basis.

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Automated and Standardised Reporting Functions:

Proposed

e-Navigation should provide automated and standardised reporting functions for optimal communication of ship and voyage information. This includes safety related information that is transmitted ashore, sent from shore to shipborne users and information pertaining to security and environmental protection to be communicated amongst all users. Reporting requirements should be automated or pre-prepared to the extent possible both in terms of content and communications technology. Information exchange should be harmonized and simplified to reduce reporting requirements. It is recognised that security, legal and commercial issues will have to be considered in addressing communications needs.

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Effective and Robust communications

Shore-based users require an effective means of communicating with vessels to facilitate safety, security and environmental protection and to provide operational information. To be effective, communication with and between vessels should make best use of audio/visual aids and standard phrases to minimise linguistic challenges and distractions to operators.

Proposed

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Human Centred Presentation

Navigation displays should be designed to clearly indicate risk and to optimise support for decision making. There is a need for an integrated 'alert management system' as contained in the present IMO Integrated Navigation System (INS) performance standards. Consideration should be given to the use of decision support systems that offer suggested responses to certain alerts, and the integration of navigation alerts onboard ships within a whole ship alert management system. Users require uniform and consistent presentations and operation functionality to enhance the effectiveness of internationally standardised training, certification and familiarisation. The concept of S-Mode has been widely supported as an application onboard ship during the work of the Correspondence Group. Shore users require displays that are fully flexible supporting both a Common Operating Picture (COP) and a User Defined Operating Picture (UDOP) with layered and/or tabulated displays. All displays should be designed to limit the possibility of confusion and misinterpretation when sharing safety related information.

Proposed

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Human Machine Interface

Proposed

e-Navigation systems must be designed to engage and motivate the user while managing workload. As electronic systems take on a greater role, facilities need to be developed for the capture and presentation of information from visual observations, as well as user knowledge and experience. The presentation of information for all users should be designed to reduce ‘single person errors’ and enhance team operations. There is a clear need for the application of ergonomic principles both in the physical layout of equipment and in the use of light, colours, symbology and language.

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Data and System Integrity

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e-Navigation systems should be resilient and take into account issues of data validity, plausibility and integrity for the systems to be robust, reliable and dependable. Requirements for redundancy, particularly in relation to position fixing systems, should be considered.

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Analysis

Proposed

e-Navigation systems should support decision making, improve performance and prevent single person error. To do so, shipboard systems should include analysis functions that support the user in complying with regulations, identifying risks, and avoiding collisions and groundings including the calculation of Under Keel Clearance (UKC) and air draughts. Shore based systems should support environmental impact analysis, forward planning of vessel movements, hazard/risk assessment, reporting indicators and incident prevention. Consideration should also be given to the use of analysis for incident response and recovery, risk assessment and response planning, incident detection and prevention, risk mitigation, preparedness, resource (e.g. asset) management and communication.

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Implementation Issues

Proposed

Training, good practices and familiarisation relating to aspects of e-Navigation for all users must be effective and established in advance of technical implementation. The use of simulation to establish training needs and assess its effectiveness is endorsed. e-Navigation should as far as practical be compatible forwards and backwards and support integration with equipment and systems under existing IMO carriage requirements. The highest level of interoperability between e-Navigation and external systems should be sought where practicable.

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S-Mode

- S-Mode is a Nautical Institute proposal for all shipboard navigation displays to have the ability to revert, by a single operator action, to a standardised navigation display, with standardised functionality and interface. S-Mode would supplement additional manufacturer-supplied modes.
- Funding needed…

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Participate

- IALA FAQ's www.iala-aism.org
- Flag administration
- At IMO, IALA, CIRM or NGOs
- Industry events
- The Nautical Institute

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Support of The Nautical Institute through membership and participation is very much appreciated!

Thank You

Join Now!

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