IALA RECOMMENDATION

R0140 (e-NAV-140)

THE ARCHITECTURE FOR SHORE-BASED INFRASTRUCTURE 'FIT FOR e-NAVIGATION'

Edition 2.1

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DOCUMENT REVISION

Revisions to this IALA Document are to be noted in the table prior to the issue of a revised document.

Date	Page / Section Revised	Requirement for Revision
December 2009	1st issue	Initial release as Edition 1 under the title 'The e-Navigation Architecture - the initial Shore-based Perspective'
April 2015	All sections	Revised in accordance with new IALA documentation policy and substantial relevant international developments from 2009 to 2015; previous Annex, as amended, relocated to a new IALA Guideline 1113.
September 2020	Ed. 2.1 Editorial Corrections	

THE COUNCIL

RECALLING the function of IALA with respect to Safety of Navigation, the efficiency of maritime transport and the protection of the environment,

RECOGNISING that harmonised system architectures of shore-based infrastructure will:

1 assist in the development and maintenance of applications for ship to ship, ship to shore, shore to ship, and shore to shore in the context of e-Navigation;

2 assist in the provision of user information, as stated and portrayed in a defined way, in the required quality, including accuracy, integrity, reliability, continuity, and latency;

3 assist administrations in the efficient deployment of their operational and technical services and to maintain them with the service levels published in their maritime service portfolios;

NOTING:

1 that a strategy for the implementation of e-Navigation has been established by the International Maritime Organisation (IMO) as well as an implementation plan for that strategy and that both are relevant to IALA and IALA membership;

2 that IMO has established user needs for both shipboard and shore-based users, including specifically Search and Rescue (SAR) user needs, and has stipulated that the implementation of e-Navigation should satisfy those user needs;

3 that IMO has initially defined the overarching architecture for e-Navigation which includes, amongst other things, the notion of a 'common shore-based technical system harmonised for e-Navigation' as well as the concept of operational and technical services embedded in the overarching concept of the Maritime Service Portfolios (MSPs);

4 that IMO has expressed an interest in the contribution of IALA to the work on e-Navigation and has recognized Coastal states' Vessel Traffic Services (VTS) provisions and their shore-based infrastructures in their enabling role for e-Navigation as well as IALA's role in this regard;

5 that the IMO e-Navigation strategy has a core objective to support maritime transport processes, including the maritime logistics chain, and that the IMO Secretary General has published a concept of a Sustainable Maritime Transportation System (SMTS) which references IALA's work regarding the 'maritime traffic support and advisory systems';

NOTING ALSO:

1 that the **International Hydrographic Organisation** (IHO) has established a Geo-spatial Information Registry (GI Registry), as defined by their publications S-100 and S-99 and has introduced the notion of 'products' as an internationally unified rule base for the combination of different parts of the GI Registry,

2 that IMO has decided that the IHO standard S-100 should be the baseline for the IMO envisaged Common Maritime Data Structure (CMDS),

3 that IALA has acquired the status of a 'Submitting Organisation' and of a 'Domain Owner' at the IHO's GI Registry,

RECOMMENDS that National Members, and other appropriate Authorities providing marine aids to navigation services, establishing shore-based infrastructure for e-Navigation:

1 Use the principles of a Service-Oriented Architecture (SOA) when designing and implementing their shore-based system(s): a SOA is a design pattern in which application components provide services to other components via a communications protocol typically over a network. The principles of service orientation are independent of any vendor, product or technology.

2 Use user-requirements driven system design, including statements on human-centred design and/or quality levels of service, and a system engineering process: only clearly and consistently stated user requirements result in the technical service provided.

3 Use information-orientation design for system layout: all technical solutions based on data modelling as a rule.

4 Employ the principles of modularity and encapsulation, while preserving a holistic view of the system's intended functionality.

5 Apply a harmonized and ideally uniform model for all technical services provided by the system, regardless of technology, thus exploiting commonality.

6 Use specifications from international standards to the largest extent possible and procure technical solutions based on functional specifications as a rule.

7 Adhere to open system architecture and focus on open and standardised interfaces between components and services: avoid proprietary interfaces as a rule.

8 Employ remote access techniques where feasible to allow for minimum number of technical operation and maintenance centres: components without remote access capabilities should be avoided as a rule.

9 Implement life-cycle management: full life-cycle coverage of technical proposals should be considered before accepting them. Life-cycle management also prevents 'quick-fix-solutions' with their associated long-term costs.

10 Document each functional aspect, ideally in a uniform overall documentation system: this is a pre-requisite for any quality management system.

11 Provide role-based access to the components of the system: particularly, roles and personnel for technical operation and maintenance tasks on one hand and roles and personnel for system development and optimisation tasks on the other hand should be differentiated.

12 Consider regulatory constraints when designing the system architecture, and consider possible consequential amendments to existing regulations based on the development of that system architecture.

13 Consider supporting concepts such as certification in general, quality management system in accordance with ISO 9001 series, environmental management in accordance with ISO 14000 series, IT security certification in accordance with ISO 27000 series, and the IMO Member State Audit Scheme (IMSAS).

14 Introduce policy, change control, and operational governance structures to consistently adapt to ongoing developments, as appropriate and supportive of the above individual items;

RECOMMENDS ALSO

15 That Industrial Members take the above recommendations into account when developing and implementing products and services for their customers.