



IALA

TECHNICAL DOCUMENTS CATALOGUE ED 5.0 • SEPTEMBER 2022

*Successful voyages,
Sustainable planet.*

Homigot lighthouse, IALA Heritage lighthouse of the year 2022



IALA



MESSAGE FROM SECRETARY-GENERAL

Established in 1957, IALA gathers together Marine Aids to Navigation authorities, manufacturers, consultants, and, scientific and training institutes from all parts of the world and offers them the opportunity to exchange and compare their experiences and achievements.

IALA encourages its members to work together in a common effort to harmonise Aids to Navigation worldwide and to ensure that the movements of vessels are safe, expeditious and cost effective while protecting the environment.

This booklet gives you an overall view of the IALA standards, recommendations and guidelines with summary. I hope you enjoy the reading and find useful information for your work, study or research.

Francis Zachariae
Secretary-General

A handwritten signature in black ink, appearing to read "F. Zachariae".

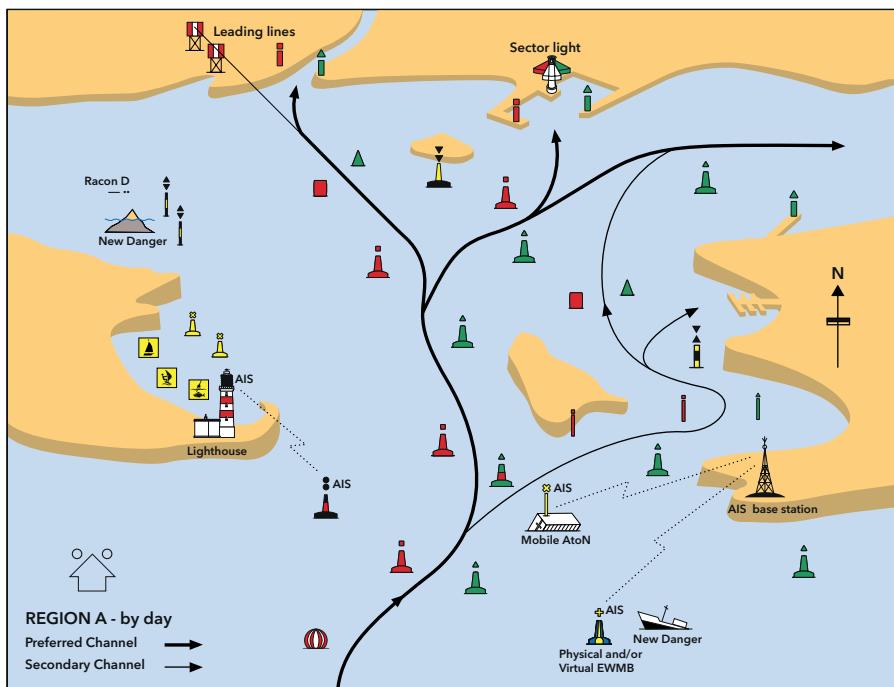
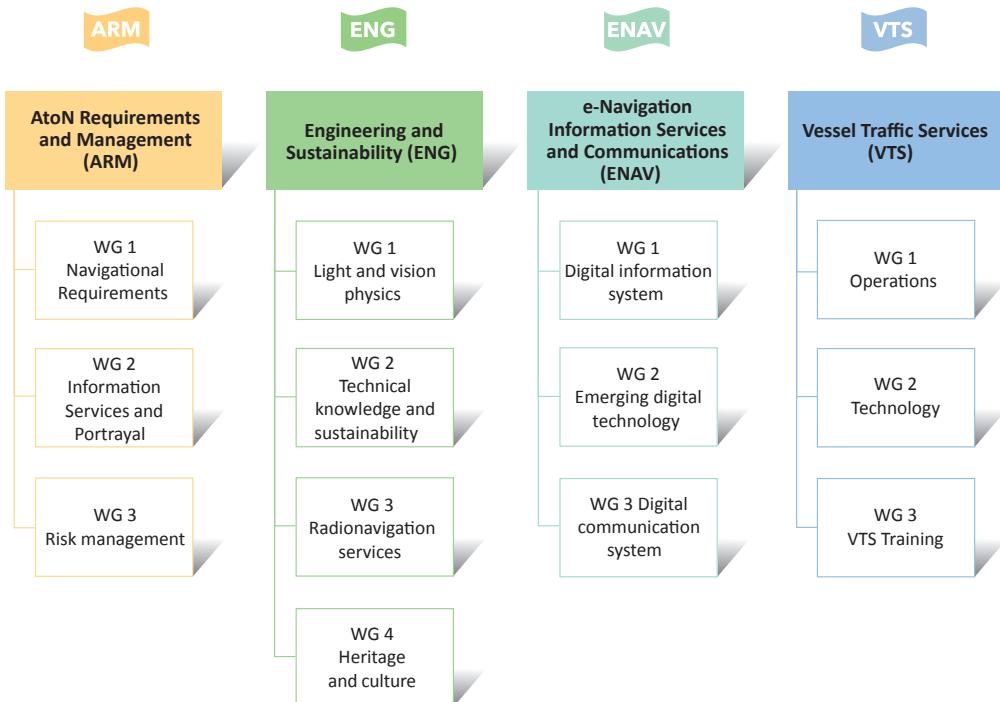


IALA TECHNICAL GUIDANCE

IALA develops wide-ranging technical guidance through the work of its committees. These are the “engine room” of the association. IALA committees bring together Marine Aids to Navigation authorities, subject matter experts, manufacturers and consultants from all parts of the world.

Participation in Committee work offers the opportunity to:

- Contribute expertise and compare experiences with other IALA members;
- Share points of view within the international maritime community;
- Participate in the development of new systems and technologies;
- Enable the worldwide maritime community to speak with one voice in international forums at a time when maritime requirements run the risk of being lost within a fast developing technological context; and
- Meet with suppliers or customers and contribute to the design of “best practice” products.



IALA GUIDANCE DOCUMENTS HIERARCHY

1. Standards

IALA standards are a part of a framework, the implementation of which by all coastal states will harmonise Marine Aids to Navigation worldwide. IALA standards cover technology and services and are non-mandatory.

2. Recommendations

IALA recommendations specify what practices shall be carried out in order to comply with that recommendation, and may be referenced, in full or in part, in an IALA standard.

3. Guidelines

IALA guidelines describe how to implement practices normally specified in a Recommendation.

4. Manuals

Manuals give a detailed overview of a specific topic. Currently this includes: NAVGUIDE; VTS Manual; and Complementary Lighthouse Use Manual.

5. Other appropriate publications (Model courses)

IALA publishes three categories of model course for VTS personnel, Aids to Navigation Managers and Aids to Navigation Technicians.

IALA STANDARDS

IALA standards are suitable for implementation by all Marine Aids to Navigation authorities.

STANDARD 1010

ATON PLANNING AND SERVICE REQUIREMENT



- 1.1 Marine Aids to Navigation planning
- 1.2 Obligations and regulatory compliance
- 1.3 Levels of service
- 1.4 Risk management
- 1.5 Quality management
- 1.6 Virtual marking

STANDARD 1020

ATON DESIGN AND DELIVERY



- 2.1 Visual signalling
- 2.2 Range and performance
- 2.3 Design, implementation, and maintenance
- 2.4 Floating aids to navigation
- 2.5 Environment and sustainability
- 2.6 Heritage and legacy
- 2.7 Power systems

STANDARD 1030

RADIONAVIGATION SERVICES



- 3.1 Satellite positioning and timing
- 3.2 Terrestrial positioning and timing
- 3.3 Racon and radar positioning
- 3.4 Augmentation services



STANDARD 1040

VESSEL TRAFFIC SERVICES



- 4.1 VTS implementation
- 4.2 VTS operations
- 4.3 VTS data and information management
- 4.4 VTS communications
- 4.5 VTS technologies
- 4.6 VTS auditing and assessing
- 4.7 VTS additional services

STANDARD 1050

TRAINING AND CERTIFICATION



- 5.1 Training and assessment
- 5.2 Human factors and ergonomics
- 5.3 Simulation in training
- 5.4 Capacity building
- 5.5 Competency, certification and revalidation

STANDARD 1060

DIGITAL COMMUNICATION TECHNOLOGIES



- 6.1 Wide and medium bandwidth systems
- 6.2 Narrow bandwidth systems
- 6.3 Harmonised maritime connectivity

STANDARD 1070

INFORMATION SERVICES



- 7.1 Data models and data encoding
- 7.2 Data exchange systems
- 7.3 Terminology, symbology and portrayal

Superseded documents and publications are available on request to the secretariat, contact@iala-aism.org



STANDARD 1010

ATON PLANNING AND SERVICE REQUIREMENT

1.1 Aids to Navigation planning

Maritime buoyage system and fairway design

No	N/I	Date	Title	Ed	Summary
R1001	Nor	June 2017	IALA Maritime Buoyage System	1.1	IALA Maritime Buoyage System.
	ARM				
No	Date	Title		Ed	Summary
G1078	Dec. 2021	Use of AtoN in the design of fairways & channels		2.0	Guidance on the use of AtoN in the design of fairways including dredged channels and canals, and review of existing AtoN in the area.
ARM					

Port traffic signals

No	N/I	Date	Title	Ed	Summary
R0111	Nor	Dec 2019	Port traffic signals	1.3	Principle of the system and rules for port traffic signals.
ENG					

Marking bridges and structures

No	N/I	Date	Title	Ed	Summary
R0113	Nor	Dec 2011	Marking of fixed bridges and other structures over navigable waters	2.1	Applies to fixed bridges and other structures including floating bridges, overhead pipelines.
ARM					
No	Date	Title		Ed	Summary
G1163	Dec 2021	Marking of Breakwaters and barriers	1.0	Provides guidance for the marking of exposed (above water) and submerged breakwaters..	
ARM					

Marking man-made offshore structures

No	N/I	Date	Title	Ed	Summary
R0139	Nor	Dec 2021	Marking of Man-made offshore structures	3.0	Recommends the members ensure that the marking of man-made structures conforms to the standards and practices specified in the relevant sections of the guidelines.
G1162	Dec 2021	ARM	Marking of Offshore Man-made Structures	1.0	Information for national authorities, lighthouse authorities and others on marking of Man-made offshore structures.

Marine spatial planning

No	N/I	Date	Title	Ed	Summary
R1010	Inf	June 2017	Involvelement of maritime authorities in Marine Spatial Planning (MSP)	1.1	Includes MSP involvement, risk management toolbox, and mitigating measures.
G1033	Dec 2003	ARM	Provision of AtoN for different classes of vessels including high speed craft	1.0	Provides information on consideration for high-speed craft and assessing requirements for the provision of AtoN for different classes of vessels.
G1079	Dec 2009	ARM	Establishing and conducting user consultancy by AtoN authorities	1.0	General guidance on consultation but does not preclude the development and implementation of strategies for specific programs.
G1121	June 2017	ARM	Navigational safety within marine spatial planning	1.0	Informs AtoN and other maritime authorities of the main elements of the Marine Spatial Planning (MSP) process. It also provides information to other MSP stakeholders and the MSP authority of the underlying navigation factors to be taken into account during the process.

Cost comparison

No	Date	Title	Ed	Summary
G1047 	Dec 2005	Cost comparison methodology of buoy technologies	1.0	Provides information on various materials could be used for buoys, and considerations and financial analysis and the Net Present Value (NPV) method.

Audible signals

No	Date	Title	Ed	Summary
G1090 	Dec 2012	Use of audible signals	1.0	Provides clarification for the use of audible signals to warn mariners of navigational hazards and for use as an augmentation to floating AtoN.

e-Navigation requirements

No	Date	Title	Ed	Summary
G1096 	May 2013	Anticipated user e-Navigation requirements from berth to berth, for AtoN authorities	1.0	Provides guidance for AtoN authorities on user requirements and applications of e-Navigation from berth to berth.

Planning and reporting of e-Navigation

No	Date	Title	Ed	Summary
G1107 	June 2016	Planning and reporting of e-Navigation testbeds	2.0	Offers guidance on the planning and reporting or results from e-Navigation testbeds. This document covers the design of testbeds and reporting of the testbed results.

Emerging technologies template

No	Date	Title	Ed	Summary
G1153 	Dec 2019	Template for the review of emerging technologies for possible use by IALA members	1.0	Provides information to IALA membership on how to evaluate emerging digital technologies in consideration of user requirements and needs.

Use of Mobile AtoN

No	N/I	Date	Title	Ed	Summary
R1016	Nor 	Dec 2020	Mobile marine AtoN (MAtoN)	2.0	Recommends IALA members and authorities to use MAtoN in accordance with the appropriated risk assessment.
G1154	Date 	Dec 2020	Title Use of Mobile AtoN	Ed 1.0	Explains types of MatoN, deployment, monitoring, reporting, discontinuation and responsibilities.

Availability and reliability

No	Date	Title	Ed	Summary
G1035	Dec 2004 	Availability and reliability of AtoN - theory and examples	2.0	Provides a method of calculating availability and reliability calculation with a view to enabling members to provide a cost-effective AtoN service.

1.2 Obligations and regulatory compliance

AtoN awareness for mariners

No	N/I	Date	Title	Ed	Summary
R1021	Nor 	Jan 2022	Marine Aids to Navigation awareness for mariners	1.1	Recommends the national members bring the content of the recommendation to the attention of the relevant maritime administration responsible for the implementation of the STCW, maritime training institute, organisations representing mariners.

IMSAS

No	Date	Title	Ed	Summary
G1054	Dec. 2021 	Preparing for an IMO Audit on AtoN service delivery	2.0	Provides information on the pre-audit questionnaire and checklist for auditing preparation.

1.3 Levels of service

Categorisation and availability

No	N/I	Date	Title	Ed	Summary
R0130	Nor ARM	Dec 2017	Categorisation and availability objectives for short range AtoN	3.1	Recommends the categories and availability objectives.
No	Date	Title	Ed	Summary	
G1004	June 2017 ARM	Level of service	3.0	Description and benefits of establishing the level of service for AtoN provision. How to develop LOS and calculate availability.	



1.4 Risk management

Simulation

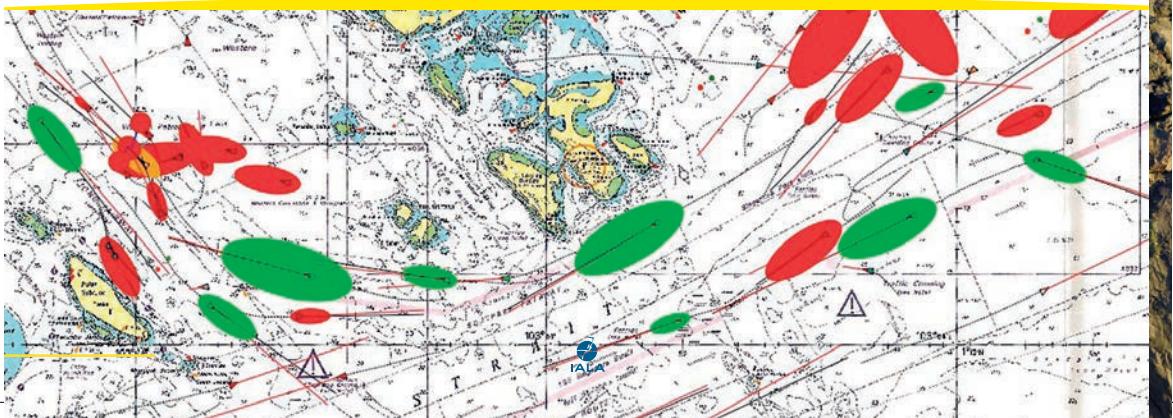
No	N/I	Date	Title	Ed	Summary
R0138	Inf 	Dec 2007	Use of GIS and simulation by AtoN authorities	1.1	Covers rationale, the volume of traffic and degree of risk, geographic information systems and AtoN, and simulation.
No	Date	Title	Ed	Summary	
G1057	Dec 2007 	Use of geographic information systems by AtoN authorities		1.0	Guidance for the implementation and use of GIS to assist authorities in the planning and evaluation of the suitability and effectiveness of the provision of AtoN.
G1058	June 2022 	Use of simulation as a tool for waterway design and AtoN planning		3.0	Covers the range of user requirements, simulation tools, and analysis, reporting and documentation of results.

Maritime data sharing

No	N/I	Date	Title	Ed	Summary
R0142	Inf 	Dec 2009	Maritime data sharing 'IALA-NET'	1.1	Provides guiding principle of the IALA NET.
No	Date	Title	Ed	Summary	
G1086	June 2012 	Global sharing of maritime data & information		1.0	Guidance on relevant aspects related to the exchange of global maritime data and information in the context of promoting the safety of navigation, security, protection of the maritime environment and efficiency of maritime traffic.

Risk management

No	N/I	Date	Title	Ed	Summary
R1002	Nor	June 2017	Risk management for marine AtoN	1.1	Recommends using the risk management and IALA risk management tools.
No	Date	Title	Ed	Summary	
G1018	June 2022	Risk management		4.0	Outlines a general description of risk management methodology for AtoN including VTS through the analysis of all the hazards in a waterway.
G1123	June 2022	Use of IALA Waterway Risk Assessment Programme (IWRAP MK II)	2.0	IWRAP is a risk assessment tool to provide authorities with a standardized quantitative method to evaluate the probability of collisions and groundings in a given waterway.	
G1124	June 2022	Use of Ports And Waterways Safety Assessment (PAWSA MK II) tool	2.0	Provides guidance on PAWSA's systematic approach to the identification of major waterway safety hazards.	
G1138	Dec 2017	Use of the Simplified IALA Risk Assessment method (SIRA)	1.0	Provides guidance on SIRA's structured process which identifies hazards, and undesired incidents or scenarios in a given area.	
G1104	Dec 2013	Application of maritime surface picture for analysis in risk assessment and the provision of AtoN	1.0	Provides guidance on the use of GIS to assess the requirement and impact of AtoN in the area of interest. It covers the incorporation of charting overlays with new dangers and amplification of existing dangers.	



Disaster recovery

No	N/I	Date	Title	Ed	Summary
R1009	Inf	June 2017	Disaster recovery	1.1	Recommends competent authorities to develop a set of appropriate generic responses.
	ARM				
No	Date	Title		Ed	Summary
G1120	June 2017	Disaster recovery		1.0	Promotes awareness of the benefits of building a disaster recovery plan, and recommend a basic field of responsibility and actions.
	ARM				

Marking wrecks

No	N/I	Date	Title	Ed	Summary
R1015	Nor	Dec 2017	Marking of hazardous wrecks	1.1	General recommendation on marking of hazardous wrecks including monitoring and reporting.
	ARM				
No	Date	Title		Ed	Summary
G1046	June 2019	Response plan for the marking of new wrecks		2.0	The basis for developing an Emergency Wreck Marking Plan (EWMP) for marking a wreck including considerations and procedures.
	ARM				



1.5 Quality management

Quality management

No	N/I	Date	Title	Ed	Summary
R0132	Nor ARM	Dec 2013	Quality management for AtoN authorities	2.2	Recommends authorities responsible for AtoN implementing and maintaining a Quality Management System.
No	Date	Title		Ed	Summary
G1052	Dec 2013 ARM	Quality management in AtoN service delivery		3.0	Basic platform for the implementation of a QMS. It is designed to encourage and assist Competent Authorities to consistently achieve the required outcomes in the delivery of service.
G1133	June 2019 ARM	Requirement traceability		1.0	Provides guidance to IALA members to establish requirement traceability as part of their requirement management, and maximize the benefit of it.
G1168	June 2022 ENG	Quality control of third-party AtoN service providers		1.0	Provides contracting authorities with guidance on a framework for ensuring third-party contractors that are providing engineering and maintenance services for AtoN are delivering those services to an acceptable standard.
G1005	Dec 2005 ARM	Contracting out AtoN service		1.0	Procedure for AtoN authorities when considering contracting out AtoN service..

Recording AtoN position

No	N/I	Date	Title	Ed	Summary
R0118	Nor ARM	Dec 2005	Recording of AtoN positions	1.2	Recommendation on the recording of AtoN positions.

1.6 Virtual marking

Virtual AtoN

No	N/I	Date	Title	Ed	Summary
R0143	Inf ARM	June 2021	Provision of virtual AtoN	2.0	Definition, purpose, and application of virtual AtoN including its risks, limitation, and benefit.

No	Date	Title	Ed	Summary
G1081	June 2021 ARM	Provision of virtual AtoN	2.0	Guidance on the use of virtual AtoN risks and benefits, criteria for application, notification process, display, application and delivery methods, and etc.





STANDARD 1020 ATON DESIGN AND DELIVERY

2.1 Visual AtoN

Off station signal

No	N/I	Date	Title	Ed	Summary
R0104	Nor 	June 2012	'Off station' signals for major floating aids	2.1	Technical recommendation on the light and Morse code when major floating aids is off station.

Retroreflecting material

No	N/I	Date	Title	Ed	Summary
R0106	Nor 	June 2017	Retroreflecting Material on Aids to Navigation Marks within the IALA MBS	2.1	Recommends standard code and comprehensive code of retroreflecting material on AtoN.
No	Date	Title	Ed		Summary
G1145	June 2019 	Application of retroreflecting material on AtoN		1.0	Gives more detailed information on what retroreflectivity is and how retroreflective material can be applied on AtoN.

Surface colours

No	N/I	Date	Title	Ed	Summary
R0108	Nor 	Dec 2017	Surface colours used as visual signals on AtoN	4.1	Recommends national members and other appropriate authorities to use the surface colours set out in the annexes.
No	Date	Title	Ed		Summary
G1134	June 2021 	Surface colours used as visual signals on AtoN		2.0	Covers the specification and measurement of the colours, considerations of particular colours, and degradation of pigments and etc.

Rhythmic characters

No	N/I	Date	Title	Ed	Summary
<u>R0110</u>	Nor	June 2021	Rhythmic characters of lights on AtoN.	2.0	Rhythmic characters of lights on AtoN.
					

No	Date	Title	Ed	Summary
<u>G1116</u>	Dec 2016	Selection of rhythmic characters and synchronization of lights for AtoN	1.0	Provides guidance to the technical aspects of selecting the rhythmic characters. It includes temporal consideration, selection of colours, the use of the fixed and flashing character, user considerations, synchronization and sequencing.
				

Leading lights

No	N/I	Date	Title	Ed	Summary
<u>R0112</u>	Nor	Dec 2005	Leading lights	1.2	Recommends the thresholds of illuminance at night and day, and the calculation program is included.
					
No	Date	Title	Ed	Summary	
<u>G1023</u>	Dec 2005	Design of leading lines	1.1	Basics of leading line design including design program in excel.	
					

Method and ambient light levels

No	Date	Title	Ed	Summary
<u>G1038</u>	Dec 2016	Method and ambient light levels for the activation of AtoN lights	3.0	Guidance on ambient light levels, local environmental factors, sensors, testing, and alternative switching methods and power considerations.
				

Light sources

No	Date	Title	Ed	Summary
<u>G1043</u>	Dec 2011	Light sources used in visual AtoN	1.2	Provides information on existing and developing light sources used in AtoN systems, and associated operational considerations such as AtoN light source lifetime, reliability, operating cost and power consumption.
				

No	Date	Title	Ed	Summary
G1048 ENG	Dec 2005	LED technologies and their use in signal lights	1.0	Understanding of the unique optical, thermal and electrical properties of LEDs and LED lights.

Light application

No	Date	Title	Ed	Summary
G1061 ENG	Dec 2008	Light application- illumination of structures	1.0	Focuses on the illumination of light for the navigational aspect. Technical consideration, application and design considerations are included.

Daymark

No	Date	Title	Ed	Summary
G1094 ENG	June 2016	Daymarks for AtoN	2.0	A general informative overview of the main factors that need to be considered when providing and designing a daymark. It points out the aspects of visual perception and how to optimize the identification of a daymark.

Pictogram

No	Date	Title	Ed	Summary
G1122 ARM	June 2017	Use of pictograms on AtoN	1.0	Provides guidance to competent authorities on the application of pictograms on special marks.



2.2 Range and performance

Light colours

No	N/I	Date	Title	Ed	Summary
R0201 ENG	Nor	Dec 2017	Marine signal lights - colours	3.1	Recommendation on the colour regions and chromaticity chart.

Light calculation, definition and notation

No	N/I	Date	Title	Ed	Summary
R0202 ENG	Nor	Dec 2018	Marine signal lights - calculation, definition and notation of luminous range	3.1	Recommendation on the luminous range nomographs and tables.
No	Date	Title	Ed		Summary
G1148 ENG	Dec 2019	Determination of required luminous intensity for marine signal lights	1.0		Provides information to determine the light intensity to provide a good service to the user in a given area, whilst maintaining a balance between performance and cost.

Light measurement

No	N/I	Date	Title	Ed	Summary
R0203 ENG	Nor	Dec 2008	Marine signal lights - measurement	1.1	Recommendation on the measurement.
No	Date	Title	Ed		Summary
G1065 ENG	Dec 2021	AtoN signal light beam vertical divergence	4.1		Provides users practical guide on the lantern divergence for any given AtoN.



Effective intensity

No	N/I	Date	Title	Ed	Summary
R0204 ENG	Nor	June 2022	Marine signal lights - determination and calculation of effective intensity	3.0	Recommendation on the determination and calculation of effective intensity with modified Allard method.
No	Date	Title	Ed	Summary	
G1135 ENG	June 2022	Determination and calculation of effective intensity	3.0	Describes how to calculate the effective intensity of a given flash of light when viewed at the IALA defined illumination threshold of visual signalling.	

Estimation of optic performance

No	N/I	Date	Title	Ed	Summary
R0205 ENG	Inf	Dec 2008	Marine signal lights - estimation of the performance of optical apparatus	1.1	Methods of approximate calculation of the peak luminous intensity of the beam, and estimation of beam intensity.

Data collection

No	Date	Title	Ed	Summary
G1037 ENG	Dec 2009	Data collection for AtoN performance calculation	2.0	Provides details of methods that can be used to collect information on the availability and reliability of AtoN equipment.

Sector light

No	Date	Title	Ed	Summary
G1041 ENG	June 2016	Sector lights	3.0	General guidance on planning sector lights including technical considerations.

Conspicuity

No	Date	Title	Ed	Summary
G1073 ENG	Dec 2017	Conspicuity of AtoN lights at night	2.0	Overview of the factors affecting the usefulness of a marine AtoN light and ways to improve its effectiveness by increasing conspicuity.

Range of sound signal

No	N/I	Date	Title	Ed	Summary
R0109 ENG	Inf	June 1998	Calculation of the range of a sound signal	1.1	Recommends using the method described in the annex of the document.



2.3 Design, implementation, and maintenance

Use of AIS

No	N/I	Date	Title	Ed	Summary
R0126 	Inf (A-126)	Dec. 2021	Use of the AIS in Marine AtoN services	2.0	Information on the technical standard for AIS AtoN stations, and supplementary messages, and implementation.
No	Date	Title	Ed	Summary	
G1082 	June 2016	Overview of AIS	1.0	Introduction to AIS at an overview level for shore authorities and references relevant documentation where further information can be found.	
G1062 	Dec 2008	Establishment of AIS as an AtoN	1.0	Identifies general criteria to assist AtoN authorities in determining whether AIS AtoN functionality should be provided.	
G1084 	June 2011	Authorization of AIS AtoN	1.0	Provides information on the suggested procedure for the authorization of AIS AtoN.	
G1098 	May 2013	On the application of AIS AtoN on buoys	1.0	Provides information on the application of employing AIS-AtoN on buoys, and specification, installation, and maintenance.	

Responsible design

No	N/I	Date	Title	Ed	Summary
R1018 	Inf	Dec 2019	Responsible design, operation and maintenance in the provision of marine AtoN	1.1	Recommends national members to implement systematic procedures for the design, maintenance, and safe and sustainable operation.
No	Date	Title	Ed	Summary	
G1165 	Dec 2021	Sustainable Structural Design of Marine Aids to Navigation	1.0	Provides guidance to AtoN manager to understand the principles and application of structural design codes, thus facilitating good technical communication and the global implementation of harmonized AtoN solutions.	

No	Date	Title	Ed	Summary
G1077 ENG	Dec 2009	Maintenance of AtoN	1.0	Information to help develop a maintenance strategy. Several annexes are attached to provide detailed information on the activities involved in the maintenance.

Remote control

No	Date	Title	Ed	Summary
G1008 ENG	May 2009	Remote control and monitoring of AtoN	2.0	Objectives of remote control and monitoring, and technical aspects such as communication links, display, maintenance and integration with other systems.

Lighting protection

No	Date	Title	Ed	Summary
G1012 ENG	May 2013	Protection of lighthouses and other AtoN against damage from lighting	3.0	Guidance on lighthouse design, protection system, earthing, periodic inspection and maintenance against lighting damage including risk analysis and calculation sheet.

Built up area

No	Date	Title	Ed	Summary
G1051 ARM	Dec 2005	Provision and identification of AtoN in built up areas	1.0	Guidance when assessing the level of AtoN effectiveness in built-up areas and potential methods for improving the conspicuity of the AtoN.

Bird deterrents

No	Date	Title	Ed	Summary
G1091 ENG	June 2019	Bird deterrents and bird fouling solutions	2.0	Provides information on the problem of bird fouling on AtoN by focusing on identification of the detrimental effects of bird fouling and the possible use of effective bird deterrents or alternative solutions.

Safety management

No	Date	Title	Ed	Summary
G1092 ENG	Dec 2017	Safety management for AtoN activities	2.0	Overview and practical guide to managing safety in the AtoN workplace. It provides a general guide on the development, standards and codes of practice.

Extreme weather

No	Date	Title	Ed	Summary
G1108 ENG	Dec 2013	Challenges of providing AtoN services in polar regions	1.0	Provides guidance to IALA members on aspects related to the definition, installation, operation and maintenance of AtoN in Polar Region.
G1136 ENG	Dec 2017	Providing AtoN services in extremely hot and humid climates	1.0	Practical guideline on the requirements for AtoN in extremely hot and humid regions. It covers characteristics of extremely hot and humid environments, and AtoN management, and maintenance, and design and engineering considerations.

Theft and vandalism

No	Date	Title	Ed	Summary
G1109 ENG	Dec 2013	Theft and vandalism deterrents	1.0	Provides a definition and examples of theft and vandalism, and details of the detrimental effects, and information on previous experiences faced by authorities or organizations.

Commissioning of AtoN

No	Date	Title	Ed	Summary
G1140 ENG	Dec 2017	Commissioning of AtoN equipment and systems	1.0	Covers the concept of commissioning, identification of critical factors, responsibilities, measurements and records of parameters and etc.

AtoN Maintenance

No	Date	Title	Ed	Summary
G1151 ENG	Dec 2019	Maintenance of AtoN structure	1.0	Provides general guidance and advice on the types of structures, component materials, maintenance, refurbishment and repair techniques. Much of the information provided is in the context of civil engineering and building construction technology.



2.4 Floating AtoN

Moorings

No	N/I	Date	Title	Ed	Summary
R0107 ENG	Inf	May 2009	Moorings for floating AtoN	2.1	Technical recommendation on moorings.

No	Date	Title	Ed	Summary
G1066 ENG	June 2010	Design of floating AtoN moorings	1.1	General consideration on mooring materials, and comparison of mooring loads and design.

Plastic buoy

No	Date	Title	Ed	Summary
G1006 ENG	Dec 2013	Plastic buoys	4.0	Points to be considered when evaluating plastic buoys. Characteristics of materials and execution methods are explained.



Buoy painting

No	Date	Title	Ed	Summary
G1015 ENG	Dec 2013	Painting AtoN buoys	2.0	Practical guidance on how to paint steel, glass-reinforced plastic, and moulded polyethylene buoys.

Buoy design

No	Date	Title	Ed	Summary
G1099 ENG	May 2013	Hydrostatic design of buoys	1.0	Provides information on the calculation of buoy stability for new buoy designs and for establishing the impact of the installation of new equipment on existing buoys. Methods of measuring these parameters on existing buoys are also explained.

2.5 Environment and sustainability

Environmental management

No	N/I	Date	Title	Ed	Summary
R1004 ENG	Inf	Dec 2019	Sustainability in the provision of Marine AtoN	2.1	National members and other authorities to implement a formal system to protect the marine environment, and minimise the impact.
No	Date	Title	Ed	Summary	
G1036 ENG	June 2017	Environmental management in AtoN		3.0	Environmental challenges, references and legislative compliance, and technical considerations.
G1137 ARM	Dec 2017	AtoN management in protected areas		1.0	Provides information as a tool for competent authorities in identifying steps to follow when it is time to consider the installation of an AtoN in Protected Area (PA), and Marine Protected Areas (MPA).

2.6 Heritage and culture

Lighthouse conservation and maintenance

No	N/I	Date	Title	Ed	Summary
R1005	Inf ENG	June 2017	Conserving the built heritage of lighthouses and other AtoN	1.1	Recommends members and other authorities to promote conservation and maintenance of heritage lighthouses.
No	Date	Title	Ed	Summary	
G1049	Dec 2007 ENG	Use of modern light sources in traditional lighthouse optics	2.0	Guidance on methods of using modern light sources in traditional optic systems with advantages and disadvantages.	
G1063	Dec 2008 ENG	Agreement for complementary use of lighthouse property	1.0	What should the agreement contain and safety aspect of the agreement including examples of few countries.	
G1080	Dec 2011 ENG	Selection and display of heritage artefacts	1.0	General guidance on the selection and display historic artefacts and offers some examples from lighthouse authorities around the world.	
G1093	Dec 2012 ENG	Management of surplus lighthouse property	1.0	General guidance to the most appropriate methods for the management or disposal of surplus lighthouse properties in order to preserve the lighthouse heritage to the best level possible.	

Business plan

G1074 ENG	Dec 2009	Branding and marketing of historical lighthouses	1.0	General guidance on the branding and marketing of heritage lighthouses. Strategy and possible visitor services are included.
G1075 ENG	Dec 2009	Business plan for the complementary use of a historic lighthouse	1.0	Process in developing a business plan for an individual lighthouse estate or as part of the development of an organizational estate management plan.

2.7 Power systems

Solar power system

No	Date	Title	Ed	Summary
G1170 	June 2022	Solar modules for a marine environment	1.0	<p>Provides assistance to AtoN manufacturers and authorities when selecting and applying solar modules to a power system in a marine environment. It is intended to inform the reader about factors influencing performance and reliability, as well as considering the aspect of selection, application and purchasing. In addition, a sample specification is presented in Annex A, capturing some of the key factors to consider when engaging with the market.</p>
G1039 	Dec 2017	Designing solar power systems for AtoN (solar sizing tool)	2.0	<p>Information on the design of PV solar power systems and describe how to use the IALA calculation tool. The tool is G1039-1, and handbook G1039-2.</p>

Integrated lanterns

No	Date	Title	Ed	Summary
G1064 	Dec 2008	Integrated power system lanterns (Solar LED lanterns)	1.0	<p>Overview and guidance for use of integrated power system lanterns and consideration on application criteria, limitations of applications, specification, construction, design, intensity, range, and power consumption, etc.</p>

Power system selection

No	Date	Title	Ed	Summary
G1067 	Dec 2017	Selection of power systems for AtoN and associated equipment	3.0	<p>Contains a summary of power generation and energy storage options that are available for use with AtoN. G1067-1 is on total electrical loads of AtoN, G1067-2 on power sources, G1067-3 on electrical energy storage for AtoN.</p>



STANDARD 1030 RADIONAVIGATION SERVICES

3.1 Satellite positioning and timing

PNT

No	N/I	Date	Title	Ed	Summary
R1017	Inf <small>ENG</small>	Dec 2018	Resilient position navigation and timing (PNT)	1.1	Recommends national members conducting a risk assessment into the impact of PNT service degradation or total loss, and how PNT information can be made more resilient.

GNSS

No	N/I	Date	Title	Ed	Summary
R0129	Inf <small>ENG</small>	Dec 2012	GNSS vulnerability and mitigation measures	3.1	Information on all types of GNSS vulnerability within the maritime field, and the mitigation measures that may be used to overcome them.
No	N/I	Date	Title	Ed	Summary
R1022	Nor <small>ENG</small>	June 2021	Provision of GNSS Augmentation Service for maritime applications	1.0	National members and other appropriate Authorities/ Organisations providing GNSS augmentation services for maritime use to submit a formal declaration of their service as being adequate for maritime navigation for collation.

High accuracy positioning

No	Date	Title	Ed	Summary
G1127	June 2022 <small>ENG</small>	Systems and services for high accuracy positioning and ranging	2.0	Provides an overview of systems and services enabling high-accuracy positioning or ranging in specific areas such as waterways, traffic separation schemes, traffic zones with limited manoeuvring space and etc.

3.2 Terrestrial positioning and timing

Terrestrial radionavigation systems

No	N/I	Date	Title	Ed	Summary
R1020 ENG	Inf	Dec 2020	Terrestrial radio-navigation systems	1.0	Recommends the members and authorities to consider the provision of terrestrial radionavigation systems which may include regional systems.

eLoran

No	N/I	Date	Title	Ed	Summary
R1011 ENG	Nor	June 2017	Performance and monitoring of eLORAN services in the frequency band 90-110 kHz	1.1	Recommends principles on the performance and monitoring of eLORAN.
No	Date	Title	Ed		Summary
G1125 ENG	June 2017	Technical approach to establishing a maritime eLoran service	1.0		Enables service providers to deliver, monitor and assess the performance of eLoran services in a common manner.



3.3 RACON and Radar positioning

RACON

No	N/I	Date	Title	Ed	Summary
R0101 ENG	Nor	Dec 2004	Marine radar beacons (RACONS)	2.1	Technical parameters and operating range on use of RACON.

No	N/I	Date	Title	Ed	Summary
R0146 ENG	Nor	Dec 2011	Strategy for maintaining RACON service capability	1.0	The role of RACONs, and options for RACON services.

No	Date	Title	Ed	Summary
G1010 ENG	June 2005	RACON range performance	2.0	Factors under the control of the radar operator and estimation of RACON range with examples.

ERPS

G1147 ENG	June 2022	The use of enhanced radar positioning systems	1.0	Provides guidance on the use of ERPS which the eRacon provides absolute position information encoded in its response signal to the eRadar.
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3.4 Augmentation service

Maritime radionavigation service

No	N/I	Date	Title	Ed	Summary
R0115	Nor ENG	Dec 2005	Provision of maritime radionavigation services in the frequency band 283.5-315 kHz in region 1 and 283-325 kHz in regions 2 and 3	1.2	Provides information on the regulation of the maritime radionavigation services.

No	Date	Title	Ed	Summary
G1016 ENG	Dec 2005	Bilateral agreements inter-agency memorandums of understanding on the provision of DGNSS services in the frequency band 283.5-325 kHz	1.1	Examples of bilateral agreements and MoU that set out the responsibilities of the countries and agencies concerned.

Performance and monitoring DGNSS

No	N/I	Date	Title	Ed	Summary
R0121 	Nor	May 2015	Performance and monitoring of DGNSS services in the frequency band 283.5-325 kHz	2.1	Recommends the principles should be adopted.
No	Date	Title	Ed	Summary	
G1112 	May 2015	Performance and monitoring of DGNSS services in the frequency band 283.5-325 kHz	1.0	Provides the design and implementation principles on performance and monitoring of DGNSS services in the frequency band 283.5-325 kHz.	
G1119 	Dec 2016	Marine beacon coverage prediction	1.0	Practical guideline on calculating marine beacon coverage considering various effects.	
G1126 	June 2017	Calculation of DGNSS antenna efficiency	1.0	Assists providers of DGNSS with establishing correct output signal levels from their LF/MF transmitter stations, and measuring the antenna efficiency.	



Future of DGNSS

No	N/I	Date	Title	Ed	Summary
R0135 	Inf	Dec 2008	Future of DGNSS	2.1	Outlines an update strategy for the recapitalization of DGNSS, setting out the requirements and options and identifying area still needing further study.
G1060 	June 2011		Recapitalization of DGNSS	2.0	Provides replacement options, progress to date and guidance on the recapitalization of DGNSS.

DGNSS service provision

No	N/I	Date	Title	Ed	Summary
R0150 	Inf	Dec 2016	DGNSS service provision, upgrades and future uses	1.1	General recommendation on the provision of DGNSS services in the frequency band 283.5-315 kHz in Region 1 and 285-325 kHz in Region 2 and 3.
G1053 	Nov 2006		Template for the submission of a DGNSS service for recognition as a component of the IMO WWRNS	1.0	Template for the submission of DGNSS service including discussions, and future and implications.



SBAS

No	Date	Title	Ed	Summary
G1129 ENG	June 2022	Retransmission of SBAS corrections using MF radiobeacon and AIS	2.0	Sets out guidance for AtoN service providers wishing to understand where SBAS could be used to support the mariners and then how to employ such data.
G1152 ENG	Dec 2019	SBAS maritime service	1.0	Provides the description of all the elements of SBAS relevant to the maritime administrations (direct reception of SBAS Signal in Space (SiS) onboard the vessels).

VDES R-Mode

No	Date	Title	Ed	Summary
G1158 ENG	Dec 2020	VDES R-Mode	1.0	Sets out guidance for authorities to setup VDES R-Mode and developers to design a VDES R-Mode receiver or transmitter.





STANDARD 1040 VTS

4.1 VTS implementation

VTS planning

No	N/I	Date	Title	Ed	Summary
R0119 	Nor (V-119)	June 2022	Establishment of a VTS	4.2	Recommends that competent authorities and VTS providers take into account IALA standards and associated recommendations and guidelines specifically related to the establishment and operation of VTS to contribute to achieving worldwide harmonization of VTS when arranging for the establishment of a VTS.

No	Date	Title	Ed	Summary
G1071 	Dec 2009	Establishment of a Vessel Traffic Service beyond territorial seas	1.0	Provides guidance on options and types of services available beyond territorial seas.
G1083 	Jan 2022	Standard nomenclature to identify and refer to VTS	1.1	Provides guidance to promote consistent nomenclature amongst VTS around the world.
G1150 	June 2022	Establishing, planning and implementing a VTS	3.0	Provides a framework to assist authorities in implementing practices specified in IALA Recommendation R0119 on the establishment of VTS.
G1160 	Jan 2022	Competencies for planning and implementing a VTS	1.1	Assists Contracting Governments, competent authorities for VTS and VTS authorities in establishing, planning and implementing a VTS effectively in a manner consistent with their international obligations under SOLAS and to conform with IALA Standards.

Human Factor

No	Date	Title	Ed	Summary
G1171 	June 2022	Human factors and ergonomics in VTS	1.0	Provides awareness regarding the role of the human factor in the performance of a VTS to competent authorities and VTSOs. Furthermore, to provide guidance in implementing human factors in the training cycle of initial training, sector training, recurrent training, updating training and adaptation training.

VTS inland waters

No	N/I	Date	Title	Ed	Summary
R0120 	Inf (V-120)	Dec 2013	Vessel Traffic Services in inland waters	2.1	Covers general considerations, responsibility and operation of VTS in inland waters.
G1166 	Jan 2022	Vessel Traffic Services in inland waters	1.1	Assists authorities establish inland VTS in inland waters effectively and in a manner that reflects the international regulatory regime for VTS.	

VTS Management

No	Date	Title	Ed	Summary
G1167 	Jan 2022	VTS Management	1.1	Assist VTS providers in implementing management activities to facilitate the effective and efficient delivery of VTS and achieve its purpose and operational objectives

4.2 VTS operations

VTS operation

No	N/I	Date	Title	Ed	Summary
R0127 	Nor (V-127)	Jan 2022	VTS Operations	3.2	Recommends that competent authorities and VTS authorities contribute to precise and unambiguous delivery of VTS operations with the traffic by implementing harmonised and standardised VTS operations.
No	Date	Title	Ed	Summary	
G1089 	Jan 2022	Provision of VTS services	2.0	Gives guidance on the delivery of the VTS services.	
G1110 	Jan 2022	Use of decision support tools for VTS personnel	2.1	Gives guidance on the use of decision support tools for VTS personnel when considering decisions on evolving or emergency situations in a harmonized way.	

G1131 	Jan 2022	Setting and measuring VTS objectives	1.1	Provides guidance for competent authorities and VTS authorities for setting objectives for a VTS and achieving them.
G1141 	Jan 2022	Operational procedures for delivering VTS	2.1	Assists VTS authorities in identifying key aspects that should be considered when developing operational procedures for a VTS centre.
G1144 	Jan 2022	Promulgating the requirements of a VTS to mariners - a VTS users guide template	1.1	Provides guidance for VTS authorities to promulgate the information related to a VTS in a concise and globally harmonized manner.

Staffing levels

No	Date	Title	Ed	Summary
G1045 	Jan 2022	Staffing levels at VTS centres	1.2	Assists authorities in determining an appropriate staffing level for a VTS centre.

Casualty and incident reporting and recording

No	Date	Title	Ed	Summary
G1118 	Dec 2016	Marine casualty/ incident reporting and recording, including near-miss situations as it relates to VTS	1.1	Provides guidance and information to VTS authorities and competent authorities on the development and establishment of harmonized casualty/incident/near-miss reporting, recording and analysis processes.



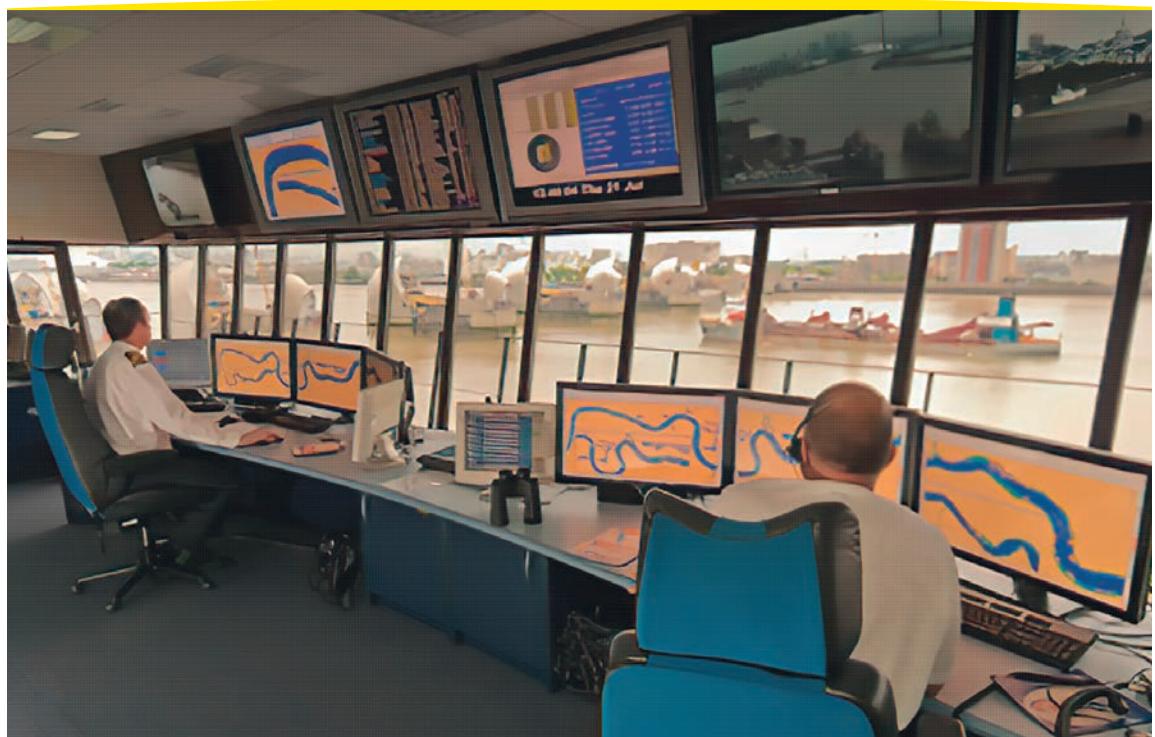
4.3 VTS data and information management

Symbology

No	N/I	Date	Title	Ed	Summary
R0125 (V-125) 	Nor	June 2012	Use and presentation of symbology at a VTS centre	3.1	General principles, symbology elements, and detailed symbology considerations.

Portrayal

No	N/I	Date	Title	Ed	Summary
R1014 	Nor	Dec 2017	Portrayal of VTS information and data	1.1	National members and other appropriate authorities to provide human-centred design and an ergonomic approach on VTS.



4.4 VTS communications

VTS Communications

No	N/I	Date	Title	Ed	Summary
R1012 	Nor	Dec 2017	VTS communications	1.1	Competent authorities and VTS authorities contribute to precise and unambiguous communications with the traffic.
No	Date	Title	Ed	Summary	
G1132 	Jan 2022	VTS Voice Communications and Phraseology	2.1	Intends to engage and support all VTSOs, new and experienced, in promoting best practice in effective VTS radio voice procedures.	

4.5 VTS technologies

VTS Systems

No	N/I	Date	Title	Ed	Summary
R0128 (V-128) 	Nor	May 2015	Operational and technical performance of VTS systems	4.1	General information on the operational and technical performance of VTS systems.
No	Date	Title	Ed	Summary	
G1111 	May 2015	Preparation of operational and technical performance requirements for VTS systems	1.0	Assists VTS authorities in preparing the definition, specification, establishment, operation and upgrades of a VTS system.	

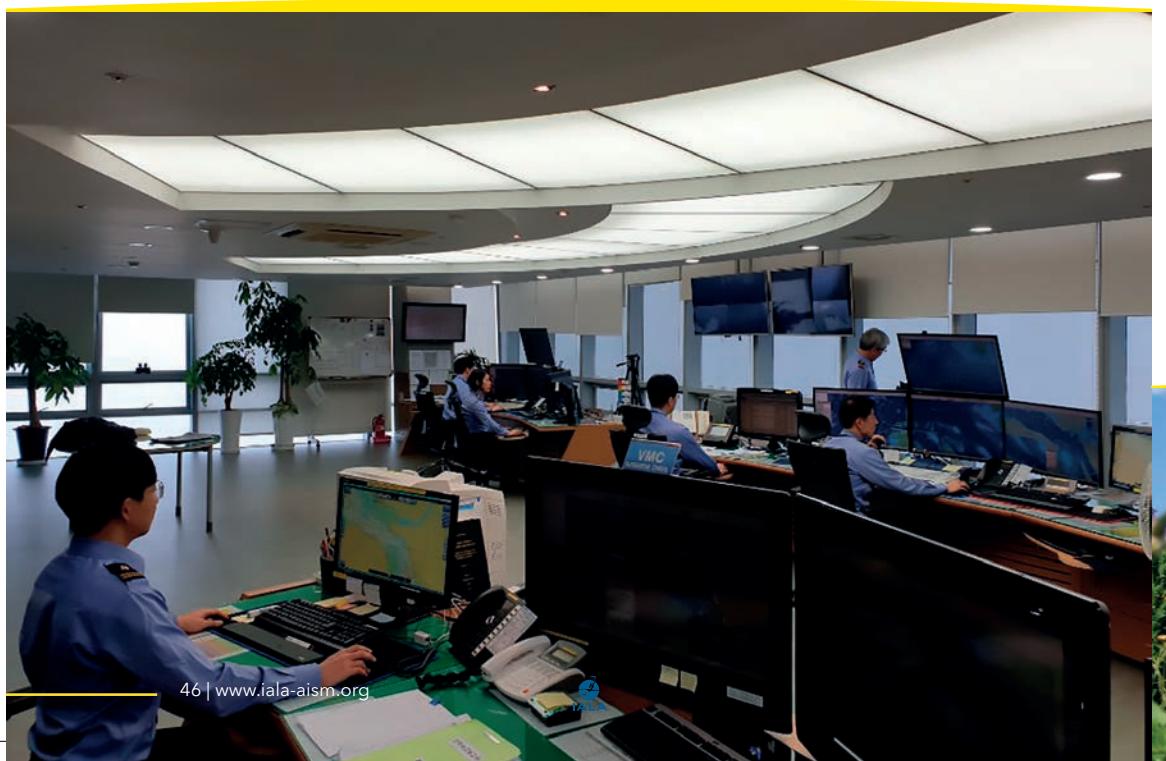
Information exchange

No	Date	Title	Ed	Summary
G1130 	Dec 2017	Technical aspects of information exchange between VTS and allied or other services	1.0	Describes from a technical point of view, the issues to be considered and the principles to be applied for interaction between VTS and allied or other services.

4.6 VTS auditing and assessing

Auditing and assessing VTS

No	N/I	Date	Title	Ed	Summary
R1013 VTS	Nor	Dec 2017	Auditing and assessing Vessel Traffic Services	1.1	Recommends to implement a formal system for auditing and assessing VTS as a means to ensure the harmonized delivery of VTS worldwide.
No	Date	Title	Ed	Summary	
G1101 VTS	Jan 2022	Auditing and assessing a VTS	1.1	Provides guidance for competent authorities and VTS authorities to meet their obligations under SOLAS for the establishment and operation of VTS.	
G1115 VTS	Jan 2022	Preparing for an IMO Member State Audit Scheme (IMSAS) on VTS	1.1	Provides guidance for contracting governments and competent authorities to meet the objectives of an IMO IMSAS with respect to the implementation and delivery of VTS.	



4.7 VTS additional services

Restricted or limited access areas

No	Date	Title	Ed	Summary
G1070 VTS	Dec 2009	VTS role in managing restricted or limited access areas	1.0	Assists VTS authorities in defining appropriate procedures to manage traffic around and inside areas with particular restrictions to navigate.

Interaction with allied or other services

No	Date	Title	Ed	Summary
G1102 VTS	Jan 2022	VTS interaction with allied or other services	1.1	Describes the issues to be considered and the principles to be respected for successful interaction between VTS and allied or other services.

Local port services

No	Date	Title	Ed	Summary
G1142 VTS	Jan 2022	Provision of Local Port services other than a VTS	1.1	Assists governments and competent authorities to ensure the difference between VTS and Local Port Services (LPS), and assist entities operating LPS to enhance efficiency and safety.

Deck officers

No	Date	Title	Ed	Summary
G1149 VTS	Dec 2019	VTS training for deck officers	1.0	Presents guidance and information to be used by maritime training organisations in the development of training on VTS as an integral part of the training of deck officers.



STANDARD 1050 TRAINING AND CERTIFICATION

5.1 Training and assessment

VTS Training and certification

No	N/I	Date	Title	Ed	Summary
R0103 	Nor (V-103)	Jan 2022	Training and certification of VTS personnel	3.1	Sets out the training requirements and certification standards for VTS personnel.
<hr/>					
No	Date	Title	Ed	Summary	
G1017 	June 2021	Assessment of prior learning exemption for VTS model courses	2.0	Provides principles, evidence of prior learning, the assessment process for VTS.	
G1027 	Jan 2022	Simulation in VTS training	1.2	General description on VTS training simulation including principle, planning, design, development, validation, documentation and conduct of simulation exercises.	
G1103 	Dec 2013	Train the trainer	1.0	Assists maritime training organizations and their teaching staff in the preparation and introduction of new training courses for trainers, teachers and/or instructors.	
G1156 	Jan 2022	Recruitment, training and certification of VTS personnel	1.1	Provides guidance on implementing practices associated with the recruitment, training and assessment of VTS personnel.	



AtoN Training and certification

No	N/I	Date	Title	Ed	Summary
R0141	Nor ENG	June 2022	Training and certification of Marine AtoN personnel	5.0	Provides general recommendations on training for AtoN managers, technicians and instructors for selection, recruitment, qualification, certification, and training part.
No	Date	Title	Ed	Summary	
G1020	Dec 2005 ARM	Training related to AtoN	1.1	Assists Lighthouse Authorities in the delivery of their life cycle management requirement including training.	
G1169	June 2022 ENG	Training and certification of marine Aids to Navigation personnel	1.0	Provides guidance on implementing practices associated with the recruitment, training, and assessment of AtoN personnel to ensure that it provides the greatest possible uniformity in AtoN in accordance with SOLAS Chapter V Regulation 13 and is developed and harmonized in accordance with the IALA standards, recommendations, guidelines and model courses.	



5.2 Human factors and ergonomics

No documents yet

5.3 Simulation in training

No documents yet

5.4 Capacity building

No documents yet

5.5 Competency, certification and revalidation

Accreditation

No	N/I	Date	Title	Ed	Summary
R0149 	Nor (O-149)	Dec 2016	Accreditation of training organizations	1.1	Recommends authorities consider accrediting and approving VTS and AtoN training organizations.
No	Date	Title	Ed	Summary	
G1014 	Dec 2021	Accreditation of VTS Training Organizations and Approval to Deliver IALA VTS Model Courses	4.0	General considerations for the approval of VTS training courses, and procedures for the accreditation and approval process.	
G1100 	Dec 2017	Accreditation and approval process for AtoN personnel training	2.0	Ensures conformance with the standards and requirements of AtoN training. Competent Authorities are encouraged to adopt this guideline on the accreditation and approval process for AtoN personnel training.	





STANDARD 1060

DIGITAL COMMUNICATION TECHNOLOGIES

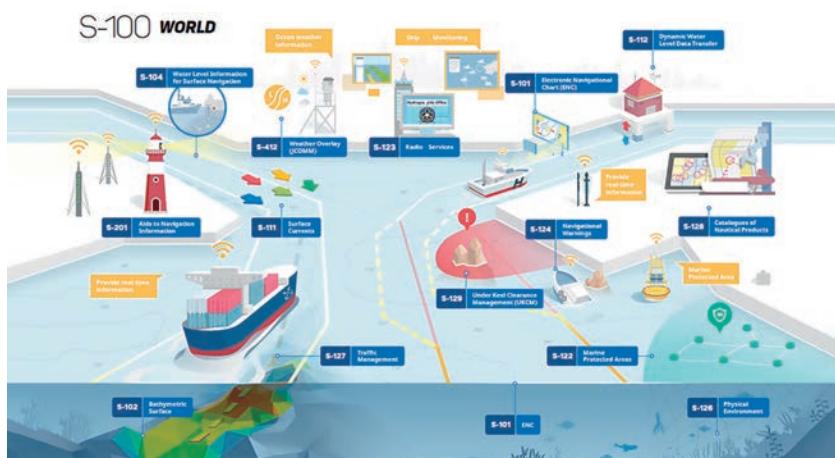
6.1 Narrow bandwidth systems

No documents yet

6.2 Harmonised maritime connectivity

Shore based infrastructure architecture

No	N/I	Date	Title	Ed	Summary
R0140	Inf ENAV	May 2015	Architecture for shore-based infrastructure "fit for e-Navigation"	2.1	Recommends national members and other appropriate authorities establish shore-based infrastructure for e-Navigation.
No	Date	Title	Ed	Summary	
G1113 ENAV	May 2015	Design and implementation principles for harmonized system architectures of shore-based infrastructure	1.0	Identifies consequences stemming from the international context for the design and implementation of any harmonized shore-based technical system architecture.	



G1114	May 2015	A technical specification for the common shore-based system architecture (CSSA)	1.0	Provides information on common shore-based system architecture general layout, CSSA detail layout, consequences and options, and migration and life-cycle management issues.
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Regional e-Navigation implementation

No	N/I	Date	Title	Ed	Summary
R0148	Inf	Dec 2015	Need to implement regional e-Navigation solutions based on international standards	1.1	Recommends members and authorities to take into account the standards exist and liaise with other regional authorities.

Portrayal

No	Date	Title	Ed	Summary
G1105	Dec 2013	Shore side portrayal ensuring harmonization with e-Navigation related information	1.0	Provides guidance on how to achieve a harmonized presentation of information ashore with the presentation on board in the e-Navigation context.

6.3 Wide and medium bandwidth systems

Provision shore based AIS

No	N/I	Date	Title	Ed	Summary
R0123 (A-123)	Nor	June 2007	Provision of shore-based AIS	2.1	Benefits of AIS as a maritime, safety-related information service and the relationship between other international organizations.

No	Date	Title	Ed	Summary
G1050 ARM	Dec 2005	Management and monitoring of AIS information	1.0	Guidance on information provided by AIS and use of historical AIS data for planning and evaluation process. Design and implementation of AIS data storage, handling and processing systems are also provided.

AIS service

No	N/I	Date	Title	Ed	Summary
R0124 (A-124) 	Nor	Dec 2012	AIS service	2.2	A suit of shore-based AIS service descriptions; A-124 appendices 0 - 19 are included.
R0124 (A-124 App.0)	Nor	Dec 2012	AIS Service	2.2	References, Glossary of terms and Abbreviations
R0124-1 (A-124 App.1)	Nor	Dec 2011	AIS Service	1.1	Basic AIS Services, AIS Data Model and AIS Service specific MDEF sentences
R0124-3 (A-124 App.3)	Nor	Dec 2012	AIS Service	2.2	Distribution model of the AIS Service (Including relevant coverage planning aspects)
R0124-4 (A-124 App.4)	Nor	Dec 2011	AIS Service	1.1	Interaction and Data Flow Model of the AIS service
R0124-5 (A-124 App.5)	Nor	Dec 2011	AIS Service	1.0	Interfacing model of the AIS Service
R0124-9-10-11 (A-124 App.9-11)	Nor	Dec 2012	AIS Service	2.2	Functional Description of the AIS Service components
R0124-12 (A-124 App.12)	Nor	Dec 2012	AIS Service	2.2	Co-location issues at AIS Physical Shore Stations (AIS-PSS) and on-site infrastructure considerations
R0124-14 (A-124 App.14)	Nor	Dec 2011	AIS Service	2.1	FATDMA Planning and Operation of an AIS Service
R0124-16 (A-124 App.16)	Nor	Dec 2011	AIS Service	2.1	DGNSS Broadcasts from an AIS Service
R0124-17 (A-124 App.17)	Nor	Dec 2011	AIS Service	1.1	Channel Management by an AIS Service
R0124-18 (A-124 App.18)	Nor	Dec 2011	AIS Service	1.1	VDL load Management
R0124-19 (A-124 App.19)	Nor	Dec 2011	AIS Service	1.1	Satellite AIS considerations

VDES

No	N/I	Date	Title	Ed	Summary
R1007 	Nor	June 2017	VHF Data Exchange System (VDES) for shore infrastructure	1.1	For those authorities without existing AIS shore infrastructure should consider implementing VDES shore infrastructure.
No	Date	Title		Ed	Summary
G1117 	Dec 2017	VHF Data Exchange System (VDES) overview	2.0		Provides an introduction to the VHF Data Exchange System (VDES) at an overview level. This document is intended to assist in the understanding, development and promotion of VDES.
G1139 	June 2019	Technical specification of VDES	3.0		Provides technical information required in the development of VDES equipment which integrates the functions of VHF Data Exchange (VDE), Application Specific Messages (ASM) and the Automatic Identification System (AIS).





STANDARD 1070 INFORMATION SERVICES

7.1 Data models and data encoding

Harmonized implementation of ASM

No	N/I	Date	Title	Ed	Summary
R0144	Nor ENAV	June 2011	Harmonized implementation of Application Specific Messages (ASM)	1.1	National as well as industrial members recognize the need for harmonization of content, encoding, application and portrayal of ASM.
G1095	May 2013 ENAV		Harmonized implementation of Application Specific Messages (ASM)	1.0	Describes how ASM should be implemented in a harmonized manner. Operational aspects and technical aspects are included.

Product Specification

No	N/I	Date	Title	Ed	Summary
R0147	Nor ARM	June 2017	Product specification development and management	2.1	General recommendation on developing product specification.
G1085	June 2012 ARM		Standard format for electronic exchange of AtoN product information	1.0	Describes an electronic data format intended for the preparation of a standardized data file containing comprehensive AtoN product information.
G1087	June 2017 ARM		Procedures for the management of the IALA domain under the IHO GI registry	3.0	Describes the roles, responsibilities and procedures for IALA as a submitting organization under the IHO registry.

G1088 	Dec 2012	Introduction to preparing S-100 product specification	1.0	Introduces the process of developing S-100 Product specification.
G1106 	June 2017	Producing an IALA S-200 product specification	2.0	<p>Provides an overview of the development process and be a step-by-step guideline from the data modelling to the actual production of a product specification;</p> <p>G1106-1 IALA PS number template</p> <p>G1106-2 proposal for additional S-100 feature concept dictionary (FCD) item - the name of proposed FCM item</p> <p>G1106-3 PS under development- template</p>

Maritime Service

No	N/I	Date	Title	Ed	Summary
R1019 	Inf	Dec 2019	Provision of Maritime Services in the context of e-Navigation in the domain of IALA	1.1	Recommends IALA members to provide Maritime Services in digital formats, using international standards and ensure that a communications infrastructure to provide such digital maritime services is available in their area of responsibility.
No	Date	Title		Ed	Summary
G1155 	Dec 2020	Development of a description of a maritime service in the context of e-Navigation		1.0	Assist members and other international organisations in the development and implementation of a MS in the context of e-Navigation.
G1161 	June 2021	Evaluation of Platforms for the Provision of Maritime Services in the Context of e-Navigation		1.0	Provides information for the evaluation of harmonized and suitable platforms for the provision of Marine Aids to Navigation (AtoN) services including VTS in the context of e-Navigation.

IVEF

No	N/I	Date	Title	Ed	Summary
R0145 	Nor	June 2011	Inter-VTS exchange format (IVEF) service	1.1	Covers the service model of the IVEF service including data, interaction, security, interfacing models.

MRN

No	Date	Title	Ed	Summary
R0123 	June 2022	Maritime Resource Names (MRN)	1.0	Recommends the members and authorities on the provision and application of MRN.
G1143 	June 2021	Unique identifiers for Maritime Resources	3.0	Provides information on the requirements for MRN which is a unique identifier for maritime use, and its syntax, areas of application and other information required.
No	Date	Title	Ed	Summary
G1164 	Dec 2021	Management Of Maritime Resource Name Organisation Identifiers	1.0	Provides guidance on the procedures for IALA to process requests for Organizational Identifiers (OID) and related namespaces within the MRN construct."

7.2 Data exchange systems

Web service based S-100 data exchange

No	Date	Title	Ed	Summary
G1157 	Dec 2020	Web service based S-100 data exchange	1.0	Provides guidance to service providers, system architects and developers who are designing S-100 based technical service and implementing MS in the context of e-Navigation.

Technical Service

No	Date	Title	Ed	Summary
G1128 	Dec 2021	Specification of e-Navigation technical services	1.3	Provides information on how to make specifications of e-Navigation technical services. This guideline is intended for service architects, system engineers and developers in charge of designing and developing a technical service or designing and developing a device to use it.

Ship reporting

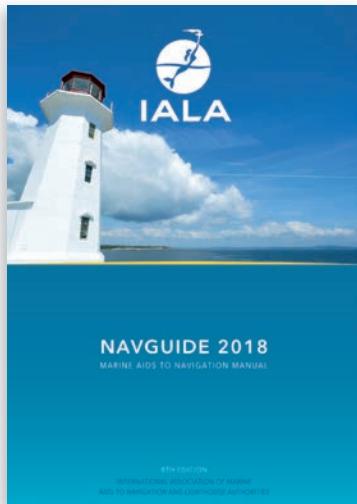
No	Date	Title	Ed	Summary
G1159 	June 2021	Ship reporting from a shore-based perspective	1.0	Assists shore-based stakeholders with automating processes and procedures associated with VTS Reporting and ship reporting in general, while complying with national and regional reporting requirements.

7.3 Terminology, symbology and portrayal

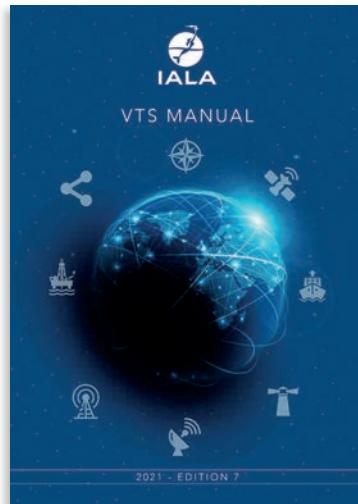
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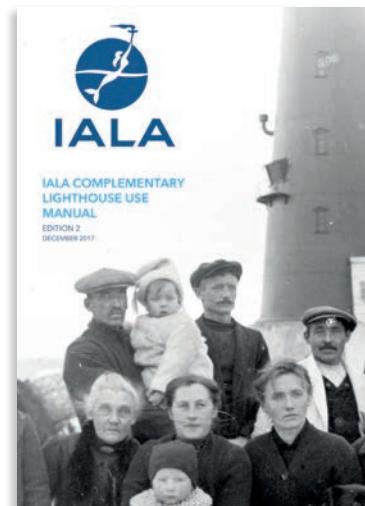
IALA MANUALS



[IALA NAVGUIDE Ed.8.0 2018](#)



[VTS Manual Ed.7.0 2021](#)



[IALA complementary lighthouse use manual, Ed. 2.0 2017](#)

IALA MODEL COURSES

Aids to Navigation Management

Ref.	Edition	Title
C1001	Ed3.1	Marine Aids to Navigation - Manager Training
C1002	Ed1.0	Master of Marine Aids to Navigation Management
C1003	Ed2.0	Aids to Navigation manager training Level 1- Use of the IALA Risk Management Tools
C1004	Ed2.0	Aids to Navigation Management Training Level 1 - Global Navigation Satellite Systems and e-Navigation
C1005	Ed2.0	Historic Lighthouse Projects

Aids to Navigation Technician

Ref.	Edition	Title
C2000	Ed3.0	Level 2 - Model Course Overview
C2001-1	Ed1.0	Introduction to Aids to Navigation
C2001-2	Ed1.0	Introduction to Aids to Navigation Buoyage
C2001-3	Ed2.0	Buoy Handling and Safe Working Practices
C2001-4	Ed3.0	Buoy Moorings
C2001-5	Ed2.0	Buoy Cleaning
C2001-6	Ed2.0	Introduction to Buoy Positions
C2001-7	Ed2.0	Maintenance of Plastic Buoys
C2001-8	Ed3.0	Maintenance of Steel Buoys
C2001-9	Ed3.0	Power to Sources on Buoys
C2001-10	Ed2.0	An introduction to shore marks
C2002-1	Ed1.0	DC Power Systems
C2002-2	Ed1.0	Primary and Secondary Battery Maintenance

C2002-3	Ed3.0	Photovoltaic (Solar panel) systems and maintenance
C2002-4	Ed2.0	Wind Generators
C2002-5	Ed2.0	Mains AC Utility Power Systems; Diesel and Petrol Generators
C2002-6	Ed2.0	Lightning Protection
C2003-1	Ed2.0	Lights and Marine Lanterns
C2003-2	Ed2.0	Light Flashers Lamp changers and IPS lanterns
C2003-3	Ed2.0	Rotating Beacons and Classic lenses
C2003-4	Ed2.0	Maintenance of Mercury Rotating Optics
C2003-5	Ed2.0	Range, sector and precision direction lights
C2004-1	Ed2.0	Sound Signals
C2005-1	Ed2.0	Introduction to coatings and specifications; surface preparation
C2006-1	Ed2.0	Aids to Navigation Service Craft and Buoy Tenders
C2007-1	Ed3.0	Racons Beacon Maintenance
C2008-1	Ed2.0	AIS Aids to Navigation Operations
C2009-1	Ed2.0	Introduction to Radionavigation and DGNSS
C2010-1	Ed2.0	Introduction to remote monitoring of Aids to Navigation
C2011-1	Ed2.0	Marine Aids to Navigation structures: materials, corrosion and protection
C2011-2	Ed2.0	Preservation of Structures
C2011-3	Ed2.0	Maintenance Planning & Records

VTS

Ref.	Edition	Title
C0103-1 <u>(V-103/1)</u>	Ed2.0	Vessel Traffic Services Operators Training
C0103-2 <u>(V-103/2)</u>	Ed2.0	Vessel Traffic Services Supervisor - Training
C0103-3 <u>(V-103/3)</u>	Ed2.0	Vessel Traffic Services On-the-Job Training
C0103-4 <u>(V-103/4)</u>	Ed2.0	Vessel Traffic Services - On-the-Job Training Instructor
C0103-5 <u>(V-103/5)</u>	Ed1.0	The revalidation process for VTS Qualification and Certification

DOCUMENTS LIST

Standards

Ref.	Title
Standard 1010	AtoN planning and service requirement
Standard 1020	AtoN design and delivery
Standard 1030	Radionavigation services
Standard 1040	Vessel Traffic Services
Standard 1050	Training and certification
Standard 1060	Digital communication technologies
Standard 1070	Information services

Recommendations

Ref.	Edition	Title
R0101	Ed2.1	Maritime Radar Beacons (RACONS)
R0103(V-103)	Ed3.1	Standards for training and certification of VTS Personnel
R0104	Ed2.1	'Off Station' signals for major floating aids
R0106	Ed2.1	Use of retro-reflecting material on aids to navigation marks within the IALA Maritime Buoyage System
R0107	Ed2.1	Moorings for floating aids to navigation
R0108	Ed4.1	Surface colours used as visual signals on marine aids to navigation (specifications for ordinary and fluorescent colours)
R0109	Ed1.1	Calculation of the range of a sound signal
R0110	Ed5.0	Rhythmic characters on Aids to Navigation
R0111	Ed1.3	Port Traffic Signals
R0112	Ed1.2	Leading lights (includes Excel program)
R0112-1	Ed2.02	Annex programe
R0113	Ed2.1	The marking of fixed bridges and other structures over navigable waters

R0115	Ed1.2	Provision of maritime radionavigation services in the frequency band 283.5-315 kHz in Region 1 and 285-325 kHz in Region 2 and 3
R0118	Ed1.2	Recording of aids to navigation positions
R0119(V119)	Ed4.2	Establishment of a VTS
R0120(V-120)	Ed2.1	Vessel Traffic Services in Inland Waters
R0121	Ed2.1	Performance and monitoring of a DGNSS Service in the band 283.5 - 325 kHz
R0123	Ed2.1	Provision of Shore Based AIS
R0124	Ed2.2	The AIS Service
A-124 App.0	Ed1.1	References, Glossary of terms and Abbreviations
A-124 App.1	Ed1.1	Basic AIS Services, AIS data models and AIS service specific MDEF sentences
A-124 App.3	Ed1.1	Distribution Model of the AIS Service (including relevant coverage planning aspects)
A-124 App.4	Ed1.1	Interaction and Data Flow Model of the AIS Service
A-124 App.5	Ed1.1	Interfacing Model of the AIS Service
A-124 App.9/10/11	Ed1.1	Functional description of AIS components (AIS-PCU, AIS-LSS & AIS-SM)
A-124 App.12	Ed1.1	Co-location issues at AIS physical shore stations (AIS-PSS) and on-site infrastructure considerations
A-124 App.14	Ed2.1	FATDMA planning and operation
A-124 App.16	Ed2.1	DGNSS
A-124 App.17	Ed1.1	Channel Management
A-124 App.18	Ed1.1	VDL load management
A-124 App.19	Ed1.1	Satellite AIS considerations
R0125(V-125)	Ed3.1	On the Use and Presentation of Symbology at a VTS Centre (including AIS)
R0126	Ed2.0	Use of the AIS in Marine Aids to Navigation Service
R0127(V-127)	Ed3.2	Operating Procedures for Vessel Traffic Services
R0128(V-128)	Ed4.1	Operational and Technical Performance Requirement for VTS Equipment
R0129	Ed3.1	GNSS Vulnerability and Mitigation Measures
R0130	Ed3.1	Categorisation and Availability Objectives for Short Range Aids to Navigation
R0132	Ed2.2	Quality Management for Aids to Navigation Authorities
R0135	Ed2.1	Future of DGNSS
R0138	Ed1.1	Use of GIS and Simulation by Aids to Navigation Authorities
R0139	Ed3.0	Marking of Man-Made Offshore Structures

R0140	Ed2.1	The Architecture for Shore-based Infrastructure 'fit for e-Navigation'
R0141	Ed5.0	Standards for Training and Certification of AtoN Personnel
R0142	Ed1.1	Maritime Data Sharing 'IALA-NET'
R0143	Ed2.0	Provision of Virtual Aids to Navigation
R0144	Ed1.1	Harmonized implementation of Application Specific Messages (ASM)
R0145(V-145)	Ed1.1	Inter-VTS Exchange Format Service
R0146	Ed1.1	Strategy for Maintaining Racon Service Capability
R0147	Ed2.1	Product Specification Development and Management
R0148	Ed1.1	The need to implement regional e-navigation solutions based on international standards
R0149	Ed1.1	Accreditation of Training Organisations
R0150	Ed1.1	DGNSS service provision upgrade and future use
R0201	Ed3.1	Marine Signal Lights - Colours
R0202	Ed2.1	Marine Signal Lights - Calculation, Definition and Notation of Luminous Range
R0203	Ed1.1	Marine Signal Lights - Part 3 - Measurement
R0204	Ed3.0	Marine Signal Lights - Determination and Calculation of Effective Intensity
R0205	Ed1.1	Marine Signal Lights - Part 5 - Estimation of the Performance of Optical Apparatus
R1001	Ed1.1	Maritime Buoyage System
R1002	Ed1.1	Risk Management for Marine Aids to Navigation
R1004	Ed2.1	Sustainability in the Provision of Marine Aids to Navigation
R1005	Ed1.1	Conserving the Built Heritage of Lighthouses and other Aids to Navigation
R1007	Ed1.1	The VHF Data Exchange System (VDES) for Shore Infrastructure
R1009	Ed1.1	Disaster Recovery
R1010	Ed1.1	The Involvement of Maritime Authorities in Marine Spatial Planning
R1011	Ed1.1	The performance and monitoring of eLoran services in the frequency band 90-110 kHz
R1012	Ed1.1	VTS Communications
R1013	Ed1.1	Auditing and Assessing Vessel Traffic Services (VTS)
R1014	Ed1.1	Portrayal of VTS Information and Data
R1015	Ed1.1	Marking of Hazardous wrecks
R1016	Ed2.0	Mobile Aids to Navigation (MAtoN)
R1017	Ed1.1	Resilient Position Navigation and Timing (PNT)

R1018	Ed1.1	Responsible design, operation and maintenance in the provision of marine aids to navigation
R1019	Ed1.1	Provision of Maritime Services in the context of e-Navigation in the domain of IALA
R1020	Ed1.0	Terrestrial radionavigation systems
R1021	Ed1.1	Marine aids to navigation awareness for mariners
R1022	Ed1.0	Provision of GNSS Augmentation Service for maritime applications
R1023	Ed1.0	Maritime Resource Names (MRN)

Guidelines

Ref.	Edition	Title
G1004	Ed3.0	Level of service
G1005	Ed2.0	Contracting out Aids to Navigation Services
G1006	Ed4.0	Plastic buoys
G1008	Ed2.0	Remote monitoring and control of aids to navigation
G1010	Ed2.0	Racon Range Performance
G1012	Ed3.0	Protection of lighthouses and aids to navigation against damage from lightning
G1014	Ed3.0	Accreditation and Approval Process for VTS training courses
G1015	Ed2.1	Painting aids to navigation buoys
G1016	Ed1.1	Bilateral agreements and inter-agency memorandums of understanding on the provision of DGNSS services in the frequency band 283.5 – 325 kHz
G1017	Ed2.0	Assessment of prior learning exemption for VTS model courses
G1018	Ed4.0	Risk Management
G1020	Ed1.1	Training related to aids to navigation
G1023	Ed1.1	Design of leading lines (note - for Excel program see Recommendation E-112)
G1027	Ed1.1	Simulation in VTS Training
G1033	Ed1.0	Provision of aids to navigation for different classes of vessels, including high speed craft
G1035	Ed2.0	Availability and Reliability of Aids to Navigation - theory and examples
G1036	Ed3.0	Environmental Management in Aids to Navigation
G1037	Ed2.0	Data Collection for Aids to Navigation Performance Calculation

G1038	Ed2.0	Methods and Ambient Light Levels for the Activation of AtoN Lights
G1039	Ed2.0	Designing Solar Power Systems for AtoN
G1039-1	Ed2.0	Solar Power System Calculation Tool (Excel file)
G1039-2	Ed1.0	Handbook for Meteorological Data for IALA Solar Power System Calculation Tool
G1041	Ed3.0	Sector Lights
G1043	Ed1.2	Light Sources used in Visual Aids to Navigation
G1045	Ed1.1	Staffing levels at VTS Centres
G1046	Ed2.0	Response Plan for the Marking of New Wrecks
G1047	Ed1.0	Cost Comparison Methodology of Buoy Technologies
G1048	Ed1.0	LED Technologies and their use in Signal Lights
G1049	Ed2.0	Use of Modern Light Sources in Traditional Lighthouse Optics
G1050	Ed1.0	Management and Monitoring of AIS Information
G1051	Ed1.0	Provision and identification of Aids to Navigation in built up areas
G1052	Ed3.0	Quality Management in Aids to Navigation Service Delivery
G1053	Ed1.0	Template for the submission of a DGNSS Service for Recognition as a component of the IMO WWRNS
G1054	Ed2.0	Preparing for a Voluntary IMO Audit on Aids to Navigation Service Delivery
G1057	Ed1.0	Use of Geographical Information Systems by Aids to Navigation Authorities
G1058	Ed3.0	Use of Simulation as a Tool for Waterway Design and Aids to Navigation Planning
G1060	Ed2.0	Recapitalisation of DGNSS
G1061	Ed1.0	Light Applications - Illumination of Structures
G1062	Ed1.0	Establishment of AIS as an Aid to Navigation
G1063	Ed1.0	Agreements for Complementary use of Lighthouses
G1064	Ed1.0	Integrated Power Systems Lanterns
G1065	Ed4.0	AtoN Signal Light Beam Vertical Divergence
G1066	Ed1.1	Design of Floating Aid to Navigation Moorings
G1067-0	Ed2.0	Selection of Power Systems for AtoN and Associated Equipment
G1067-1	Ed2.0	Total Electrical Loads of AtoN
G1067-2	Ed2.0	Power Sources
G1067-3	Ed2.0	Electrical Energy Storage for AtoN
G1070	Ed1.0	VTS role in managing Restricted or Limited Access Areas

G1071	Ed1.0	Establishment of a Vessel Traffic Service beyond territorial seas
G1073	Ed2.0	Conspicuity of AtoN Lights at Night
G1074	Ed1.0	Branding and Marketing of Historic Lighthouses
G1075	Ed1.0	Business Plan for the complementary use of a Historic Lighthouse
G1077	Ed1.0	Maintenance of Aids to Navigation
G1078	Ed2.0	The Use of AtoN in the Design of Fairways
G1079	Ed1.0	Establishing and Conducting User Consultancy by Aids to Navigation Authorities
G1080	Ed1.0	Selection and display of heritage artefacts
G1081	Ed2.0	Virtual Aids to Navigation
G1082	Ed2.0	An overview of AIS
G1083	Ed1.0	Standard Nomenclature to identify and refer to VTS centres
G1084	Ed1.0	Procedure for the Authorisation of AIS AtoN
G1085	Ed1.0	Standard Format for Electronic Exchange of AtoN Product Information
G1086	Ed1.0	Global Sharing of Maritime Data
G1087	Ed3.0	Procedures for the Management of the IALA Domains under the IHO GI Registry
G1088	Ed1.0	Introduction to Preparing S-100 Product Specifications
G1089	Ed2.0	Provision of VTS services
G1090	Ed1.0	The Use of Audible Signals
G1091	Ed2.0	Bird Deterrents and Bird Fouling Solutions
G1092	Ed2.0	Safety Management for AtoN Activities
G1093	Ed1.0	Management of Surplus Lighthouse Property
G1094	Ed2.0	Daymarks for Aids to Navigation
G1095	Ed1.0	Harmonised implementation of Application-Specific Messages (ASMs)
G1096	Ed1.0	Anticipated User e-Navigation Requirements from Berth to Berth, for AtoN Authorities
G1098	Ed1.0	On the Application of AIS - AtoN on Buoys
G1099	Ed1.0	The Hydrostatic Design of Buoys
G1100	Ed2.0	The accreditation and approval process for AtoN personnel training
G1101	Ed1.0	Auditing and Assessing VTS
G1102	Ed1.0	VTS Interaction with Allied or Other Services
G1103	Ed1.0	Train the Trainer
G1104	Ed1.0	The application of maritime surface picture for analysis in risk assessment and the provision of Aids to Navigation

G1105	Ed1.0	Shore-side portrayal ensuring harmonisation with e-Navigation related information
G1106	Ed1.0	Producing an IALA S-200 Product Specification
G1106-1	Ed1.0	IALA Product Specification Number Template
G1106-2	Ed1.0	Proposal for Additional S-100 Feature Concept Dictionary (FCD) Item - Name of Proposed FCD Item
G1106-3	Ed1.0	Product Specification under Development - Template
G1107	Ed2.0	Planning and Reporting of e-Navigation Testbeds
G1108	Ed1.0	The Challenges of Providing AtoN Services in Polar Regions
G1109	Ed1.0	Theft and Vandalism Deterrents
G1110	Ed1.0	Use of Decision Support Tools for VTS Personnel
G1111	Ed1.0	Preparation of Operational and Technical Performance Requirements for VTS Systems
G1112	Ed1.0	Performance and Monitoring of DGNSS Services in the Frequency Band 283,5 - 325 kHz
G1113	Ed1.0	Design and Implementation Principles for Harmonized System Architectures of Shore-based Infrastructure
G1114	Ed1.0	A Technical Specification for the Common Shore-based System Architecture (CSSA)
G1115	Ed1.0	Preparing for an IMO Member State Audit Scheme (IMSAS) on Vessel Traffic Services
G1116	Ed1.0	Selection of rhythmic characters and synchronisation of lights for [marine] aids to navigation
G1117	Ed2.0	VHF Data Exchange System (VDES) Overview
G1118	Ed1.0	Marine casualty / incident reporting and recording, including near-miss situations as it relates to VTS
G1119	Ed1.0	Marine beacon coverage prediction
G1120	Ed1.0	Disaster Recovery
G1121	Ed1.0	Navigational Safety within Marine Spatial Planning
G1122	Ed1.0	The Use of Pictograms on Aids to Navigation
G1123	Ed2.0	The Use of IALA Waterway Risk Assessment Programme (IWRAP MKII)
G1124	Ed2.0	The Use of Ports and Waterways Safety Assessment (PAWSA MKII) Tool
G1125	Ed1.0	The Technical Approach to Establishing a Maritime eLoran Service
G1127	Ed2.0	Systems and Services for High Accuracy Positioning and Ranging
G1128	Ed3.0	The Specification of e-Navigation Technical Services
G1129	Ed2.0	The retransmission of SBAS Corrections Using MF-radio beacon and AIS

G1130	Ed1.0	Technical aspects of information exchange between VTS and allied or other services
G1131	Ed1.0	Setting and measuring VTS objectives
G1132	Ed2.0	VTS Voice Communications and Phraseology
G1133	Ed1.0	Requirement Traceability
G1134	Ed2.0	Surface Colours Used as Visual Signals on AtoN
G1135	Ed3.0	Determination and calculation of Effective Intensity
G1136	Ed1.0	Providing AtoN Services in Extremely Hot and Humid Climates
G1137	Ed1.0	AtoN Management in protected areas
G1138	Ed1.0	The use of the Simplified IALA Risk Assessment Method (SIRA)
G1139	Ed1.0	Technical Specification of VDES
G1140	Ed1.0	Commissioning of AtoN Equipment and Systems
G1141	Ed2.0	Operational procedures for delivering VTS
G1142	Ed1.0	Provision of Local Port Services
G1143	Ed3.0	Unique Identifiers for Maritime Resource Names
G1144	Ed1.0	Promulgating the Requirements of a VTS to Mariners - A VTS Users Guide Template
G1145	Ed1.0	Application of Retroreflecting Material on AtoN
G1147	Ed1.0	The Use of Enhanced Racons
G1148	Ed1.0	Determination of required luminous intensity for marine signal lights
G1149	Ed1.0	VTS Training for deck officers
G1150	Ed3.0	Establishment of Vessel Traffic Services
G1151	Ed1.0	Maintenance of AtoN structure
G1152	Ed1.0	SBAS Maritime Service
G1153	Ed1.0	Template for the review of emerging technologies for possible use by IALA members
G1154	Ed1.0	Use of mobile aids to navigation
G1155	Ed1.0	On the development of a description of a maritime service in the context of e-navigation
G1156	Ed1.0	Recruitment, training and assessment of VTS personnel
G1157	Ed1.0	Web service based S-100 data exchange
G1158	Ed1.0	VDES R-Mode
G1159	Ed1.0	Ship Reporting from a shore-based perspective
G1160	Ed1.0	Competencies for planning and implementing a VTS
G1161	Ed1.0	Evaluation of Platforms for the Provision of Maritime Services in the Context of e-Navigation

G1162	Ed1.0	Marking of Offshore Man-made Structures
G1163	Ed1.0	Marking of Breakwaters andbarriers
G1164	Ed1.0	Management Of Maritime Resource Name Organisation Identifiers
G1165	Ed1.0	Sustainable Structural Design of Marine Aids to Navigation
G1166	Ed1.0	VTS in Inland Waters
G1167	Ed1.0	VTS Management
G1168	Ed1.0	Quality control of third-party AtoN service providers
G1169	Ed1.0	Training and certification of marine Aids to Navigation personnel
G1170	Ed1.0	Solar modules for a marine environment
G1171	Ed1.0	Human factors and ergonomics in VTS





