



**mass task force**

**publications review scoping report**

**September 2024**

[1 Purpose and scope 5](#_Toc177214567)

[1.1 Purpose 5](#_Toc177214568)

[1.2 Scope 5](#_Toc177214569)

[2 Background 5](#_Toc177214570)

[2.1 Recent MASS review 5](#_Toc177214571)

[2.2 Definition of MASS 5](#_Toc177214572)

[2.3 Other studies 5](#_Toc177214573)

[2.3.1 Future VTS 6](#_Toc177214574)

[2.3.2 Case Studies - MASS Trials and ‘Test Beds’ 6](#_Toc177214575)

[3 Selection criteria and emerging themes 6](#_Toc177214576)

[3.1 Selection criteria 6](#_Toc177214577)

[3.2 Summary of initial exclusions and emerging themes 7](#_Toc177214578)

[3.2.1 Initial theme exclusions 7](#_Toc177214579)

[3.2.2 Emerging themes 7](#_Toc177214580)

[4 ARM Committee 8](#_Toc177214581)

[4.1 Review of ARM related publications 8](#_Toc177214582)

[4.1.1 R0138 Use of GIS and Simulation by Aids to Navigation Authorities (S1010) 8](#_Toc177214583)

[1.1.1.1 G1058 Use of Simulation as a Tool for Waterway Design and Aids to Navigation Planning (R0138) 8](#_Toc177214584)

[4.1.2 R0143 Provision of Virtual Aids to Navigation (S1010) 8](#_Toc177214585)

[1.1.1.2 G1081 Provision of Virtual AtoN (R0143) 8](#_Toc177214586)

[4.1.3 R1002 Risk Management (S1010) 9](#_Toc177214587)

[1.1.1.3 G1018 Risk Management (R1002) 9](#_Toc177214588)

[1.1.1.4 G1138 SIRA (R1002) 9](#_Toc177214589)

[1.1.1.5 G1023 IWRAP (R1002) 9](#_Toc177214590)

[1.1.1.6 G1124 PAWSA (R1002) 9](#_Toc177214591)

[4.1.4 R1010 The Involvement of Maritime Authorities in Marine Spatial Planning (S1010) 9](#_Toc177214592)

[4.1.4.1 G1033 Provision of Aids to Navigation for Different Classes of Vessels, including High Speed Craft (R1010) 9](#_Toc177214593)

[4.1.4.2 G1079 Establishing and Conducting User Consultancy by Aids to Navigation Authorities (R1010) 10](#_Toc177214594)

[4.1.4.3 G1121 Navigational Safety within Marine Spatial Planning (R1010) 10](#_Toc177214595)

[4.1.5 R1024 Cyber Security for the IALA Domain (S1010) 10](#_Toc177214596)

[4.1.6 G1078 The Use of AtoN in the Design of Fairways (R1001) 10](#_Toc177214597)

[4.1.7 G1159 Ship Reporting from a Shore-based Perspective (-) 10](#_Toc177214598)

[4.1.8 G1105 Shore-side Portrayal Ensuring Harmonization with e-Navigation Related Information (R0148) 10](#_Toc177214599)

[4.1.9 R1019 Provision of Maritime Services in the context of e-Navigation in the domain of IALA 10](#_Toc177214600)

[4.1.9.1 G1161 Evaluation of Platforms for the Provision of Maritime Services in the Context of e-Navigation 11](#_Toc177214601)

[4.1.9.2 G1096 Anticipated use e-Navigation Requirements from Berth to Berth for AtoN authorities 11](#_Toc177214602)

[4.1.9.3 G1107 Planning and Reporting of Testbeds in the Maritime Domain 11](#_Toc177214603)

[4.2 Proposed ARM work tasks 11](#_Toc177214604)

[5 DTEC Committee 12](#_Toc177214605)

[5.1 Review of DTEC related publications 12](#_Toc177214606)

[5.1.1 R0140 The Architecture for Shore-based Infrastructure 'fit for e-Navigation' (S1060) 12](#_Toc177214607)

[5.1.1.1 G1113 Design and Implementation Principles for Harmonized System Architectures of Shore-based Infrastructure (R0140) 12](#_Toc177214608)

[5.1.1.2 G1114 A Technical Specification for the Common Shore-based System Architecture (CSSA)(R0140) 12](#_Toc177214609)

[5.1.2 R0144 Harmonized implementation of Application Specific Messages (ASM) (S1070) 12](#_Toc177214610)

[5.1.2.1 G1095 Harmonised implementation of Application-Specific Messages (ASMs)(R0144) 12](#_Toc177214611)

[5.1.3 G1178 An introduction to the artificial intelligence (AI) from an IALA perspective (R1024) 12](#_Toc177214612)

[5.1.4 G1179 An introduction to the internet of things (IoT) from an IALA perspective (R1024) 12](#_Toc177214613)

[5.2 Proposed DTEC work tasks 13](#_Toc177214614)

[6 ENG Committee 13](#_Toc177214615)

[6.1 Review of ENG related publications 13](#_Toc177214616)

[6.1.1 R1017 Resilient Position Navigation and Timing (PNT)(S1030) 13](#_Toc177214617)

[6.1.1.1 G1180 Resilient Position Navigation and Timing (PNT)(R1017) 13](#_Toc177214618)

[7 VTS Committee 13](#_Toc177214619)

[7.1 Review of VTS related publications 14](#_Toc177214620)

[7.1.1 R0119 Establishment of a VTS (S1040) 14](#_Toc177214621)

[7.1.1.1 G1150 Establishing, Planning and Implementing a VTS (R0119) 14](#_Toc177214622)

[7.1.2 R0127 VTS Operations (S1040) 14](#_Toc177214623)

[7.1.2.1 G1045 Staffing levels at VTS Centres (R0127) 15](#_Toc177214624)

[7.1.2.2 G1089 Provision of VTS (R0127) 15](#_Toc177214625)

[7.1.2.3 G1110 Use of Decision Support Tools for VTS Personnel (R0127) 15](#_Toc177214626)

[7.1.2.4 G1131 Setting and Measuring VTS Objectives 15](#_Toc177214627)

[7.1.2.5 G1141 Operational Procedures for Delivering VTS (R0127) 15](#_Toc177214628)

[7.1.2.6 G1144 Promulgating the requirements of a VTS to Mariners – A VTS user guide template (R0127) 16](#_Toc177214629)

[7.1.3 R1012 VTS Communications (S1040) 16](#_Toc177214630)

[7.1.3.1 G1132 VTS Voice Communications and Phraseology (R1012) 16](#_Toc177214631)

[7.1.4 R0125 VTS Portrayal (S1040) 16](#_Toc177214633)

[7.1.4.1 G1177 Portrayal of VTS Information (R0125) 16](#_Toc177214634)

[7.1.5 R0128 VTS Systems and Equipment (S1040) 17](#_Toc177214637)

[7.1.5.1 G1111 Establishing Functional and Performance Requirements for VTS Systems and Equipment (R0128) (including G1111-1 – 9) 17](#_Toc177214638)

[7.1.6 R0103 Training and Certification of VTS Personnel (S1050) 17](#_Toc177214639)

[7.1.6.1 G1027 Simulation in VTS Training (R0103) 17](#_Toc177214640)

[7.1.6.2 C103-1 VTS Operator Training (R0103) 17](#_Toc177214641)

[7.1.6.3 C103-2 VTS Supervisor Training (R0103) 17](#_Toc177214642)

[7.1.6.4 C103-3 VTS On-the-Job Training (R0103) 18](#_Toc177214643)

[7.1.6.5 C103-4 VTS On-the-Job Training Instructor (R0103) 18](#_Toc177214644)

[7.1.6.6 C103-5 The Revalidation Process for VTS qualification and certification (R0103) 18](#_Toc177214645)

[7.1.7 R0149 Accreditation of Training Organisations (S1050) 18](#_Toc177214646)

[7.1.7.1 G1014 Accreditation of VTS Training Organizations and Approval to Deliver IALA VTS Model Courses (R0149) 18](#_Toc177214647)

[7.1.8 R1002 Risk Management for Marine Aids to Navigation (S1010) 18](#_Toc177214653)

[7.1.8.1 G1018 Risk Management (R1002) 18](#_Toc177214654)

[7.1.8.2 G1123 The Use of IALA Waterway Risk Assessment (R1002) 19](#_Toc177214655)

[7.1.8.3 G1124 The Use of Ports and Waterways Safety Assessment (PAWSA MkII) Tool (R1002) 19](#_Toc177214656)

[7.1.8.4 G1138 The Use of the Simplified IALA Risk Assessment Method (SIRA) (R1002) 19](#_Toc177214657)

[7.1.8.5 G1104 The Application of Maritime Surface Picture for Analysis in Risk Assessment and the Provision of [Marine] Aids to Navigation Service Delivery (R1002) 19](#_Toc177214658)

[7.1.9 Other Guidance documents (not associated with a recommendation) 19](#_Toc177214659)

[7.1.9.1 G1070 VTS Role in Managing Restricted or Limited Access Areas (S1040) 19](#_Toc177214660)

[7.1.9.2 G1102 VTS Interaction with Allied or Other Services (S1040) 19](#_Toc177214661)

[7.1.9.3 G1130 Technical Aspects of Information Exchange Between VTS and Allied or Other Services (S1040) 19](#_Toc177214662)

[7.2 New VTS Related Publications (2023/2027 Work Programme) 19](#_Toc177214663)

[7.2.1 Guideline on VTS Interaction with a Mix of Conventional, Automated and Autonomous Ships (R0127) 19](#_Toc177214664)

[7.2.2 Guidance on VTS digital communications (operational aspects) (R0127 +R1012) 20](#_Toc177214665)

[7.2.3 Guidance for digital route exchange within VTS operations (S1040) 20](#_Toc177214666)

[7.2.4 Technical Service Specifications for VTS (S1040) 20](#_Toc177214667)

[7.2.5 Product Specification S-212 on VTS Digital Information (S1070) 20](#_Toc177214668)

[7.3 VTS work tasks 21](#_Toc177214681)

[8 Next steps 23](#_Toc177214682)

[8.1 Committee work 23](#_Toc177214683)

[9 References 23](#_Toc177214684)

[appendi x A – record of initial scoping review relevant documents 24](#_Toc177214685)

# Purpose and scope

## Purpose

The purpose of this document is to:

* Identify IALA recommendations, guidelines, and model courses that require revision to accommodate the advent of MASS.
* Identify new IALA recommendations, guidelines, and model courses that may be required to address the advent of MASS insofar as they are not adequately or fully addressed in other IALA recommendations and guidelines.
* Assist IALA and its Committees to adopt work programme tasks to facilitate IALA documentation related to Marine Aids to Navigation, including VTS to reflect the advent of MASS.

## Scope

This report is an initial scoping exercise of IALA recommendations and guidelines to determine where those documents may require update or modification to incorporate the requirements and challenges of AtoN and VTS provision for MASS.

It is anticipated that, as the work plan items are initiated by the committees, it may become evident that other IALA publications are relevant to the review, or that certain publications are not relevant, using the initial scoping criteria. The Secretariat will liaise with the committees to agree changes to the work proposed by this initial scoping report.

Both the VTS Manual and NAVGUIDE are likely to require update, following any updates to the recommendations and guidelines resulting from this work.

# Background

## Recent MASS review

This report is a resulting action from the publication of the IALA report *The Future of Maritime Autonomous Surface Ships (MASS) - Future Scenarios Regarding the Development and Evolution of Mass* [1]. The MASS report aims to guide IALA members in consideration of MASS related AtoN challenges and this report sets out a plan of action to help the committees review the existing IALA guidance in the light of the information contained within the MASS report.

## Definition of MASS

The term MASS in the context of this documents refers to a range of vessel types from partly automated to fully autonomous. The MASS report states that the realization of autonomous large ships undertaking international voyages is likely to be 20 years away. In the meantime, the challenges for AtoN provision will derive from a developing vessel traffic mix with various degrees of automation and autonomy (see the “Mass Degree/ Time Frame” matrix in [1]).

This review therefore considers the challenges of the timeframe where numbers of MASS and the levels of automation are increasing, rather than there being wholly autonomous vessel traffic.

## Other studies

### Future VTS

As part of its 2023-2027 work programme the VTS Committee is regularly reviewing/updating the document entitled ‘*Future* VTS’ (Task 1.9.4).

The purpose of this document is to provide a basis for discussion on emerging trends, technologies and practices that have implications for VTS and to strategically plan and coordinate embracing the change associated with these to improve the safety and efficiency of navigation, contribute to the safety of life at sea and support protection of the marine environment. Specifically, the document provides a mechanism for a planned and coordinated transition as:

* Requisite technologies develop (e.g., digital communications and automated data exchange),
* Emerging practices such as MASS, Sea Traffic Management and Just-in-time arrival mature, and
* Changes are adopted to key IMO instruments such as SOLAS, COLREG and STCW to accommodate emerging developments.

Emerging trends, technologies and practices considered in this document that will shape the role and capabilities for ‘future VTS’ specifically related to MASS include:

* Maritime Autonomous Surface Ships (MASS)
* Digital technologies and communications
* Advanced Decision Support Tools
* Automated Data and Information Exchange
* Sea Traffic Management
* Marine Spatial Planning
* Interacting Objects
* Enhanced Situational Awareness Through a Shared Operational Picture
* Slot Management

This document has been circulated to the other IALA Committees and Council for their information and consideration. A copy of the document is at <link>.

### Case Studies - MASS Trials and ‘Test Beds’

Noting the increasing number of trials and ‘test beds’ being conducted globally, the VTS Committee has identified a number of “case studies” that may assist gaining a greater understanding of MASS and its implications by monitoring their development/outcomes and identifying opportunities for involvement/engagement.

The ‘Case Studies’ are maintained through participants providing information and lessons learned to the Committee. A copy is available at ***<https://www.iala-aism.org/technical/mass/>.***

# Selection criteria and emerging themes

## Selection criteria

The initial review of recommendations and guidelines was undertaken with the following considerations:

* *Round 1* – Whether:
  + generally, is it anticipated that MASS technology could affect the functionality or level of performance of the existing AtoN technology, service or system described in the recommendation or guideline (in other words, could there be a difference in the interaction of MASS with AtoN compared to that of human operated vessels?)?; or
  + could the MASS technology could potentially influence a change to the existing AtoN technology, service or system to ensure an acceptable level of service, demanded by MASS.

For example, *G1066 The Design of Floating Aid to Navigation Moorings (*on initial inspection) is unlikely to have content that will change due to the impact of MASS but *G1081 Provision of Virtual Marine Aids to Navigation* may have relevant content due partly, for example, to the change from human interaction with an ECDIS on board an autonomous vessel, to data exchange and interpretation by the vessel system.

* *Round 2* – The recommendations and guidelines were examined for immediate evidence of potential relevance to the two categories described in Round 1. Where it was judged that the publication was unlikely to have relevance it was marked as not relevant.

For those publications that were identified as relevant, the documents are sorted into the relevant committee and a summary paragraph written in this report in sections 4 to 7.

## Summary of initial exclusions and emerging themes

### Initial theme exclusions

As referred to in section 3.1 publications covering certain topics were not examined further than Round 1 in the initial scoping exercise, since they will not alter in their nature or content due to the development of MASS. These include:

* Structural/mechanical/physical characteristics of fixed and floating AtoN
* Light parameters and technology (including publications covering luminous intensity, rhythmic characters and sector lights)
* DGNSS/Loran/eLoran
* Radio navigation services, AIS (apart from in relation to Application Specific Messages) and Racon
* Heritage aspects

It should be recognised that there may be an indirect influence of MASS development on the topics raised above that is not immediately apparent at this stage.

For example, if visual object detection and classification techniques becomes more prevalent within MASS, it is possible that physical aids may need some adaption to make them more conspicuous to machine vision systems. However, it is not clear what adaptions, if any at all, are needed.

MASS development will be continuously monitored, and the topics above may become relevant for MASS in the future. IALA will review the relevant documents at an appropriate time when the direction of the technology is clearer.

### Emerging themes

Following the initial scoping review, some emerging themes that were deemed relevant for committee review include:

* Virtual AtoN
* Cyber security
* VTS
* Marine Spatial Planning
* Risk Management
* Simulation

Sections 4 to 7 describe the recommendation and guideline review in detail and summarise the documents recommended for further committee appraisal, in a table at the end of each section. For the recommendations the relevant IALA Standard is marked within brackets in the headings and for the guidelines it is the connected recommendation (if any). A copy of the initial scoping review of all the documents deemed relevant to MASS using the criteria in section 3.1 are included in Appendix A.

# ARM Committee

## Review of ARM related publications

### R0138 Use of GIS and Simulation by Aids to Navigation Authorities (S1010)

This publication may require review because it refers to the use of simulation and the ongoing development of simulation techniques. It may be appropriate to mention consideration of MASS as part of the 3D simulation build, if relevant in the waterway, including the behaviour of MASS vessels in a waterway and the “view from the bridge” for MASS vessels.

Specific sections for particular consideration include section 5.1.

* + - 1. G1058 Use of Simulation as a Tool for Waterway Design and Aids to Navigation Planning (R0138)

G1058 discusses simulation techniques in detail and there may be a need to review the discussion for input data to include MASS data rather than solely human operated vessels. Vessel type is mentioned throughout the document, and it may be appropriate to extend this detail to MASS.

Most sections require review, but Appendix B requires particular scrutiny and includes *B8.4 eNavigation Services* that may require update.

### R0143 Provision of Virtual Aids to Navigation (S1010)

This publication may require review because it contains an Annex that summarises the application of Virtual AtoN, which may be influenced by the use of MASS.

Most sections require review.

The applicability of the technology could be affected by MASS because the advantages and disadvantages of Virtual AtoN that apply to conventional vessels may not apply to MASS, and vice versa. The references include many IMO, ITU and IALA documents that may in themselves be revised in the context of MASS or complemented by other titles.

* + - 1. G1081 Provision of Virtual AtoN (R0143)

For the same reasons highlighted in section 4.1.2, *G1081* requires thorough review. In particular, any changes to ITU and IMO publications. There is a section in *8.1 Technical Aspects* that refers to eNavigation as does section *12 Development Considerations*. The section *10.1 Risk Mitigation* also justifies specific scrutiny for new hazards or hazards that may not be applicable to MASS.

### R1002 Risk Management (S1010)

The wording of the Recommendation is quite generic so no specific suggestion for review or alteration of this related to MASS, however it may be worth a check. Risk related MASS topics are more likely to be relevant in the related guidelines (see section 1.1.1.3 and 1.1.1.4)

* + - 1. G1018 Risk Management (R1002)

This publication may require review because of the specific hazards and undesired scenarios that could arise due to MASS being a part of the vessel traffic mix.

Specific sections for consideration include section 3.5 in general on simulation and specifically section 3.5.1 where there is an existing reference to MASS.

* + - 1. G1138 SIRA (R1002)

The document refers to specific hazards and undesired scenarios throughout; it may be useful to identify hazards specific to MASS.

* + - 1. G1023 IWRAP (R1002)

The IWRAP causation factor parameters may require review and update with the advent of MASS, although this is part of the program algorithm rather than the publication. There may be an appropriate point at which to make reference to MASS and their particular characteristics for consideration in an IWRAP assessment, if such characteristics are identified.

* + - 1. G1124 PAWSA (R1002)

The PAWSA waterway risk factors may require review and update on how to develop a risk profile for waterways that include MASS.

### R1010 The Involvement of Maritime Authorities in Marine Spatial Planning (S1010)

This publication may require review because MASS may be a specific consideration for a waterway, and it is an appropriate document to prompt competent authorities to consider MASS as a future technology. The Recommendation is however sufficiently generic such that not mentioning MASS (as a vessel type) doesn’t alter the potential application to MASS, it may just be timely to mention MASS in this document.

Sections 2.2 and 2.6 may benefit from insertion of MASS references.

* + - 1. G1033 Provision of Aids to Navigation for Different Classes of Vessels, including High Speed Craft (R1010)

This publication may require review to define the implications of automated/autonomous vessels, in the context of HSC.

Specific sections for consideration include section 4.2 that defines HSC specific AtoN requirements and 4.3 new developments.

The functionality requirements of the AtoN for HSC could be affected by MASS because the current considerations in the Guideline assume on-site human operator interaction, which is influenced by speed and reaction time.

* + - 1. G1079 Establishing and Conducting User Consultancy by Aids to Navigation Authorities (R1010)

The Guideline is sufficiently generic such that not mentioning MASS (as a vessel type) doesn’t alter the potential application to MASS. It may be timely to mention MASS in this document for example in Annex A where examples of consultation scenarios are provided.

* + - 1. G1121 Navigational Safety within Marine Spatial Planning (R1010)

This publication may require review because consideration of MASS and their routes is a fundamental part of Marine Spatial Planning (MSP). There are numerous points throughout the document where it may be appropriate to modify and include reference to MASS, including the Annexes.

### R1024 Cyber Security for the IALA Domain (S1010)

This publication may require review because it contains Annex A, a list of appropriate standards and best practices, that in turn may require updating with MASS relevant cyber security related publications. Such publications may describe MASS specific mitigation and response procedures specific to MASS vessels.

Cyber security Guideline.

### G1078 The Use of AtoN in the Design of Fairways (R1001)

This publication may require review because the provision of AtoN for MASS may require additional or different considerations. The document would benefit from a review of section 4 *Performance Parameter of AtoN Systems* in particular, in the context of MASS, for example, on the variation in relevance of visual AtoN perception vs digital data rendering and reception for a variation in human interpretation/automated systems on a vessel. If available, an example of a MASS test bed waterway design could be a good inclusion.

### G1159 Ship Reporting from a Shore-based Perspective (-)

This publication may require review:

* to determine if the principles of ship to shore communication, as described in the Guideline are altered by the concept of MASS. These principles are described in words and graphically, so the diagrams justify review as well as the paragraphs; and
* because the requirements of shore-based reporting may be influenced by the numerous IMO, documents referenced in the document and these may have been updated, which in turn may lead to the Guideline content requiring modification.

Specific sections for consideration include all of sections 2 to 5

### G1105 Shore-side Portrayal Ensuring Harmonization with e-Navigation Related Information (R0148)

Review of this Guideline is required because the references within the documents may have been updated and the document is an appropriate place to mention the development of MASS and its influence on dynamic information interpretation. Sections 2 to 4 inclusive may justify particular scrutiny.

### R1019 Provision of Maritime Services in the context of e-Navigation in the domain of IALA

This publication may require rewording to include considerations of the technologies providing different degrees of autonomy on board and ashore.

* + - 1. G1161 Evaluation of Platforms for the Provision of Maritime Services in the Context of e-Navigation

The Background section may require rewording in this document

* + - 1. G1096 Anticipated use e-Navigation Requirements from Berth to Berth for AtoN authorities

The majority of the Guideline content can be reviewed for applicability of MASS requirements.

* + - 1. G1107 Planning and Reporting of Testbeds in the Maritime Domain

Although this document can be used for planning and reporting MASS test beds, it is sufficiently generic such that not mentioning MASS explicitly doesn’t affect its potential future use of the document’s principles to MASS.

## Proposed ARM work tasks

It is proposed that the ARM committee review the following documents for the reasons described in section 4.1:

*Table 1 Summary of proposed ARM Committee work tasks*

| **Relevant publication** | **Additional comments** |
| --- | --- |
| R0138 Use of GIS and Simulation by AtoN Authorities |  |
| G1058 Use of Simulation as a Tool for Waterway Design and Aids to Navigation Planning |  |
| R0143 Provision of Virtual AtoN |  |
| R1002 Risk Management | Generically worded so covers MASS without review |
| G1138 SIRA |  |
| G1023 IWRAP |  |
| G1024 PAWSA |  |
| G1104 The Application of Maritime Surface Pictures for Analysis in Risk Assessment and the Provision of AtoN |  |
| R1010 The involvement of Maritime Authorities in Marine Spatial Planning | Generically worded so covers MASS without review |
| G1033 Provision of AtoN for Different Classes of Vessels, including High Speed Craft |  |
| G1079 Establishing and Conducting User Consultant by AtoN Authorities | Generically worded so covers MASS without review |
| G1124 Navigational Safety within Marine Spatial Planning |  |
| R1024 Cyber Security for the IALA Domain |  |
| G1078 The Use of AtoN in the Design of Fairway |  |
| G1159 Ship Reporting from a Shire-Based perspective |  |
| G1105 Shore-side portrayal Ensuring Harmonization with e-Navigation Related Information |  |
| R1019 Provision of Maritime Services in the Context of eNavigation in the Domain of IALA |  |

# DTEC Committee

## Review of DTEC related publications

### R0140 The Architecture for Shore-based Infrastructure 'fit for e-Navigation' (S1060)

This publication may require review because the specific recommendations may require addition of specific considerations for MASS including automated processes. The Recommendation is sufficiently generic, however such that not mentioning MASS explicitly doesn’t alter the potential application of the document principles to MASS.

* + - 1. G1113 Design and Implementation Principles for Harmonized System Architectures of Shore-based Infrastructure (R0140)

There is currently no mention of MASS or autonomy within the document and the document may require review to identify the potential for user need requirements on autonomous vessels. Many of the principles and processes referred to in the documents apply to MASS and conventional vessels. It is worth explicit consideration of MASS, however, to provide a future look to examine if MASS will modify the HSA principles included in the Guideline.

* + - 1. G1114 A Technical Specification for the Common Shore-based System Architecture (CSSA)(R0140)

The comments made in section 5.1.1.1 similarly apply to this Guideline.

### R0144 Harmonized implementation of Application Specific Messages (ASM) (S1070)

This Recommendation may require review to consider any future modifications or additions to ASM for use in the case of MASS. The Recommendation is sufficiently generic, however, such that not mentioning MASS explicitly doesn’t alter the potential application of the document principles to MASS.

* + - 1. G1095 Harmonised implementation of Application-Specific Messages (ASMs)(R0144)

As for R0144, this Guideline may require review to consider ASM requirements or technical functionality in the context of MASS.

### G1178 An introduction to the artificial intelligence (AI) from an IALA perspective (R1024)

Given the potential uses of AI in MASS, it may be worth including in this Guideline where the interaction of AI systems with AtoN may be of interest to competent authorities. This may be of particular interest and have overlap with the use of simulation in VTS and VTS interaction with autonomous ships or automated processes.

### G1179 An introduction to the internet of things (IoT) from an IALA perspective (R1024)

There may be value in reviewing the text related to the “Application Layer” to include interaction of MASS.

## Proposed DTEC work tasks

*Table 2 Summary of proposed DTEC Committee work tasks*

| **Relevant publication** | **Additional comments** |
| --- | --- |
| R0140 The Architecture for Shore-based Infrastructure 'fit for e-Navigation' | Generically worded so covers MASS without review |
| G1113 Design and Implementation Principles for Harmonized System Architectures of Shore-based Infrastructure |  |
| G1114 A Technical Specification for the Common Shore-based System Architecture (CSSA) |  |
| R0144 Harmonized implementation of Application Specific Messages (ASM) | Generically worded so covers MASS without review |
| G1095 Harmonised implementation of Application-Specific Messages (ASMs) |  |
| G1178 An introduction to the artificial intelligence (AI) from an IALA perspective |  |
| G1179 An introduction to the internet of things (IoT) from an IALA perspective |  |

# ENG Committee

## Review of ENG related publications

### R1017 Resilient Position Navigation and Timing (PNT)(S1030)

This Recommendation requires review as it may be an appropriate place to mention the advent and challenges of MASS as a specific consideration when seeking to achieve PNT, within the Recommendation text. The Recommendation is sufficiently generic, however, such that not mentioning MASS explicitly doesn’t alter the potential application of the document principles to MASS.

* + - 1. G1180 Resilient Position Navigation and Timing (PNT)(R1017)

The Guideline currently makes a passing reference to the growth of autonomy and how this highlights the importance of resilient PNT. The whole document could be reviewed with the requirements of MASS in mind together with the applicability of the statements within the document to MASS. It may be useful to have an explicit section discussing MASS implications for PNT and referencing the existing statements in the text, where the statements do not fully apply to autonomous vessels. Note that this Recommendation is informative.

*Table 3 Summary of proposed ENG Committee work tasks*

| **Relevant publication** | **Additional comments** |
| --- | --- |
| R1017 Resilient Position Navigation and Timing | Generically worded so covers MASS without review |
| G1180 Resilient Position Navigation and Timing |  |

# VTS Committee

Noting that IMO aims to have a non-mandatory MASS Code adopted in the 1st half of 2025, with a mandatory Code entering into force on 1 January 2032, the Committee intends to:

1. Prepare new recommendations, guidelines required to address the advent of MASS insofar as they are not adequately or fully addressed in existing documents.
2. Review and update existing VTS related publications that may require revision to accommodate the advent of MASS.

## Review of VTS related publications

The VTS Committee has a present Task (1.1.3 b) of the current Work Programme to assess the implications associated with the advent of MASS on IALA Standards specifically related to the establishment and operation of VTS (scoping exercise). The task intends to identify Recommendations, Guidelines, Model Courses and other appropriate documents specifically related to VTS and which may need to be revised / updated in order to reflect the progress and changes to associated IMO instruments on MASS.

For this scoping exercise see documents listed below.

### R0119 Establishment of a VTS (S1040)

R0119 specifies the practices associated with the establishment and operation of VTS as prescribed in SOLAS regulation V/12 (Vessel Traffic Services).

The Recommendation may be reviewed to ensure that considerations are being made to the existence of MASS in the area.

* + - 1. G1150 Establishing, Planning and Implementing a VTS (R0119)

This Guideline provides the framework to assist relevant authorities in establishing, planning and implementing a VTS. It also describes how to routinely evaluate a VTS to ensure the operational objectives are being met; the technical and operational performances are acceptable; and the issues identified and defined in determining the need for the VTS have been either alleviated or at least reduced to an acceptable level.

When planning to implement a new VTS area or changing an existing area, considerations should also be made on whether there is a need to monitor a specific area where a mix of conventional, automated and autonomous ships may exist or whether certain ships, e.g. fully automated or unmanned ships, may not be supported or even allowed in the VTS area. G1150 should therefore be reviewed.

### R0127 VTS Operations (S1040)

To achieve its purpose a VTS must have the capability to maintain a comprehensive overview of the traffic in its service area, interact with traffic and respond to traffic situations developing in its area to mitigate the development of unsafe situations. The level of safety and efficiency in the movement of maritime traffic within an area covered by a VTS is dependent upon close cooperation between any ship operating the VTS and participating ships and the delivery of precise and unambiguous VTS operations.

R0127 specifies the practices associated with the delivery of VTS operations. It is a normative provision of IALA Standard 1040 Vessel Traffic Services and shall be observed if compliance with this Standard is claimed.

R0127 may be reviewed in order to ensure that considerations are also being made to the presence and operation of MASS in the area.

* + - 1. G1045 Staffing levels at VTS Centres (R0127)

G1045 provides guidance to assist in determining appropriate staffing levels for a VTS Centre.

The guideline should be reviewed to ensure that VTS are adequately staffed and that VTS personnel are appropriately trained and qualified also for existence with any MASS.

* + - 1. G1089 Provision of VTS (R0127)

G1089 provides guidance on how VTS contributes to safety of life at sea, safety and efficiency of navigation and the protection of the environment within the VTS area by through:

* Provision of timely and relevant information on factors that may influence the ship’s movements and assist on board decision-making;
* Monitoring and management of ship traffic to ensure the safety and efficiency of ship movements; and
* Responding to developing unsafe situations.

The Guideline also provides the framework to achieve harmonization in the provision of the services worldwide in order to avoid confusion about the delivery of VTS services for the mariner trading between various jurisdictions.

G1089 should be reviewed to include guidance on how to provide VTS to a mix of conventional, automated and autonomous ships, or in some cases, Remote Control Centres.

* + - 1. G1110 Use of Decision Support Tools for VTS Personnel (R0127)

G1110 provides guidance to assist authorities on the use of decision support tools to manage identified risks, enhance situational awareness and support VTS personnel providing timely and relevant information, monitoring and managing ship traffic and responding to developing unsafe situations.

G1110 should be reviewed to ensure that considerations are being made for adequate tools to be used for monitoring the presence and operation of MASS in the area.

* + - 1. G1131 Setting and Measuring VTS Objectives

G1131 provides guidance for Competent Authorities for VTS and VTS providers for setting objectives for a VTS. In determining the objectives, the Guideline should be reviewed to contain considerations whether or not MASS is included to be supported in the VTS area.

* + - 1. G1141 Operational Procedures for Delivering VTS (R0127)

G1141 provides the framework for VTS processes and procedures. The Guideline describes the operational procedures of VTS operations on e.g.:

* providing timely and relevant information on factors that may influence the ships’ movements and assisting on board decision-making;
* monitoring and managing ship traffic to ensure the safety and efficiency of ship movements; and
* responding to developing unsafe situations

G1141 should be reviewed to ensure that the operational procedures contain considerations to deliver VTS to a mix of conventional, automated and autonomous ships, or in some cases, Remote Control Centres.

* + - 1. G1144 Promulgating the requirements of a VTS to Mariners – A VTS user guide template (R0127)

This guideline provides guidance for VTS providers to promulgate the information related to the service that is provided in a concise and globally harmonized manner. G1144 should be reviewed to consider if the VTS user guide also should include specific guidance on MASS information.

### R1012 VTS Communications (S1040)

R1012 specifies the practices to ensure VTS communications are harmonized through common phraseology, procedures and technology for the delivery of precise, simple and unambiguous communications to the bridge team and allied services.

The Recommendation may be reviewed to ensure that considerations are being made to the existence of MASS in the area.

* + - 1. G1132 VTS Voice Communications and Phraseology (R1012)

This Guideline provides the framework for authorities to develop standardized operating procedures for voice communication to ensure VTS communications are harmonized through the use of standard message structure and phrases.

G1132 should be reviewed to ensure consistency with new guidance being prepared for VTS digital communications particularly in relation to MASS (Refer to 7.2.2 Guidance on VTS digital communications) considering if the VTS user guide also should include specific guidance on MASS information.

### R0125 VTS Portrayal (S1040)

R0125 specifies the practices associated with the portrayal of VTS data and information at a VTS centre.

The Recommendation may be reviewed to ensure that considerations are being made to the existence of MASS in the area.

* + - 1. G1177 Portrayal of VTS Information (R0125)

G1177 describes aspects to be considered and the general principles to be applied in presenting data and information at a VTS centre to facilitate accurate evaluation of situations and assist decisions to be made more readily.

G1177 should be reviewed to consider guidance for considerations on how to present MASS in the VTS systems.

### R0128 VTS Systems and Equipment (S1040)

R0128 provides the framework to assist competent authorities for VTS and VTS providers when arranging for the establishment of the functional and performance requirements for VTS systems and equipment.

The Recommendation may be reviewed to ensure that considerations are being made to the existence of MASS in the area.

* + - 1. G1111 Establishing Functional and Performance Requirements for VTS Systems and Equipment (R0128)  
         (including G1111-1 – 9)

This Guideline provides the framework to assist competent authorities and VTS providers in the preparation and establishment of functional and performance requirements for VTS systems.

The G1111 Guideline series provide generic guidance for all potential equipment and sensors that may be used in designing a VTS system.

G1177 should be reviewed to consider the implications of MASS on the functional and performance requirements for VTS systems and equipment.

### R0103 Training and Certification of VTS Personnel (S1050)

R0103 specifies the practices associated with the training and certification of VTS personnel to assist authorities when recruiting, training and assessing VTS personnel to ensure the harmonized delivery of vessel traffic services world-wide.

The Recommendation may be reviewed to ensure that generic VTS training takes into account the existence of MASS.

* + - 1. G1027 Simulation in VTS Training (R0103)

This Guideline provides guidance on the use of simulations in VTS training.

G1177 should be reviewed to consider the implications of MASS on Simulation in VTS training.

* + - 1. C103-1 VTS Operator Training (R0103)

The purpose of this model course is to assist training organizations and their teaching staff in the preparation and provision of new training courses for VTS Operators, or in enhancing, updating, or supplementing existing training material.

C0103-1 should be reviewed to consider the implications of MASS when training VTS Operators.

* + - 1. C103-2 VTS Supervisor Training (R0103)

This Model Course describes the knowledge, skills and competences required to be certified as a VTS Supervisor.C0103-2 should be reviewed to consider the implications of MASS when training VTS Supervisors.

* + - 1. C103-3 VTS On-the-Job Training (R0103)

The purpose of the model course is to assist VTS providers and their teaching staff to establish and conduct On-the-Job training that ensures personnel are competent to undertake duties at the VTS where they are employed.C0103-3 should be reviewed to consider the implications of MASS for training organizations when establishing On-the-Job training for VTS personnel.

* + - 1. C103-4 VTS On-the-Job Training Instructor (R0103)

The purpose of this model course is to assist training organizations and their teaching staff in the preparation and provision of new training courses for VTS On-the-Job Training Instructors, or in enhancing, updating, or supplementing existing training material.

C0103-4 should be reviewed to consider the implications of MASS for training organizations when establishing On-the-Job training courses for their instructors.

* + - 1. C103-5 The Revalidation Process for VTS qualification and certification (R0103)

The purpose of this Model Course is to provide guidance on how to maintain and improve the performance of VTS personnel, through training and other activities, to ensure continuous professional development.

C0103-5 should be reviewed to consider any changes and implications of MASS for VTS personnel when revalidating their certificates.

### R1002 Risk Management for Marine Aids to Navigation (S1010)

In cooperation with ARM to cover VTS aspects on MASS.

* + - 1. G1018 Risk Management (R1002)

In cooperation with ARM to cover VTS aspects on MASS.

* + - 1. G1123 The Use of IALA Waterway Risk Assessment (R1002)

In cooperation with ARM to cover VTS aspects on MASS.

* + - 1. G1124 The Use of Ports and Waterways Safety Assessment (PAWSA MkII) Tool (R1002)

In cooperation with ARM to cover VTS aspects on MASS.

* + - 1. G1138 The Use of the Simplified IALA Risk Assessment Method (SIRA) (R1002)

In cooperation with ARM to cover VTS aspects on MASS.

* + - 1. G1104 The Application of Maritime Surface Picture for Analysis in Risk Assessment and the Provision of [Marine] Aids to Navigation Service Delivery (R1002)

In cooperation with ARM to cover VTS aspects on MASS.

### Other Guidance documents (not associated with a recommendation)

* + - 1. G1070 VTS Role in Managing Restricted or Limited Access Areas (S1040)

G1070 provides a framework for authorities for defining appropriate procedures to manage traffic around and inside areas, where limitations to normal navigation may need to be, or have been, established. This could also concern MASS test areas or MASS in general.

This guideline should be reviewed to consider the implications of MASS in such areas.

* + - 1. G1102 VTS Interaction with Allied or Other Services (S1040)

G1102 describes the issues and criteria that should be considered as well as the principles to be respected for successful interaction between VTS and allied or other services, where MASS and possible Remote Control Centres for MASS may be involved.

This guideline should be reviewed to consider any interaction with a MASS and its Remote Control Centre as part of an allied or other service.

* + - 1. G1130 Technical Aspects of Information Exchange Between VTS and Allied or Other Services (S1040)

G1130 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.This guideline should be reviewed to consider any technical aspect on information exchange between a VTS and a MASS and its eventual Remote Control Centre as part of an allied or other service.

## New VTS Related Publications (2023/2027 Work Programme)

New VTS related publications specifically related to MASS include:

### Guideline on VTS Interaction with a Mix of Conventional, Automated and Autonomous Ships (R0127)

The Committee is finalizing a new guideline on *VTS Interaction with a Mix of Conventional, Automated and Autonomous Ships* as part of the 2023-2027 Work Programme (Task 1.1.3 a) to assist VTS providers prepare for interacting with ship traffic comprising a dynamic mix of conventional, automated and autonomous ships.

The guideline is being prepared in a manner that addresses practices to be considered when managing ship traffic and responding the developing unsafe situations in a VTS area with increasing automated, remote control, or autonomous operation of on-board functions that, as of now, are not adequately or fully addressed in other IALA recommendations and guidelines specifically related to the operation of VTS.

The Committee intends to review and update the guideline at each Committee meeting, noting the existing MASS Code is still in draft and the IMO aims to have a non-mandatory MASS Code adopted in the 1st half of 2025, with a mandatory Code entering into force on 1 January 2032.

### Guidance on VTS digital communications (operational aspects) (R0127 +R1012)

The VTS Committee is developing new guidance on VTS digital communications from an operational aspect as part of the 2023-2027 Work Programme (Task 1.3.1). The purpose is to specify interaction between VTS and ships by digital means. In particular, it should describe harmonized digital communications between VTS, ships (also MASS) as well as Remote Control Centres through standard message structure, format and elements. It should also provide the framework for:

* How ships can meet their reporting requirements by digital means.
* How VTS interacts with and manages ship traffic to ensure the safety and efficiency of ship movements by providing information or issuing advice, warnings and instructions as deemed necessary by digital means or supported by digital means.

### Guidance for digital route exchange within VTS operations (S1040)

The VTS Committee has a task (1.2.1) on developing guidance for digital route exchange within VTS operations (including application of S-421) which is planned to be commenced at VTS58.digital route

This guidance should cover possibilities to exchange a digital route between all ships, including any MASS.

### Technical Service Specifications for VTS (S1040)

The VTS Committee is working on developing technical service specifications for digital data exchange between VTS and other entities - primarily ships as part of the 2023-2027 Work Programme (Task 2.5.2).

The technical service specifications will enable VTS providers and related stakeholders such as ship equipment manufacturers to implement technical services and thus enable them to exchange digital information securely and reliably. This will bring VTS into the digital era with all the associated benefits including support from the future of MASS.

This work requires extensive resources and time as every service needs to be developed separately. For the moment it includes VTS Traffic Clearance (test version available on IALA web site) and Route Exchange, but more will follow.

### Product Specification S-212 on VTS Digital Information (S1070)

The VTS Committee is working on developing a Product Specification S-212 on VTS Digital Information as part of the 2023-2027 Work Programme (Task 2.8.1). Relevant data to be exchanged needs to be standardized and harmonized with the VTS data model. Only features and data elements relevant for VTS will be taken into account.

This work requires extensive resources and considering the limited time, the task is split into 3 phases:

* Phase 1 - Information exchange between ship to shore and shore to ship.
* Phase 2 - Inter VTS information exchange.
* Phase 3 - Information exchange with VTS and allied services.

## Proposed VTS work tasks

*Table 4 Summary of proposed VTS Committee work tasks*

| **Relevant publication** | **Additional comments** |
| --- | --- |
| R0119 Establishment of a VTS | See text above. |
| G1150 Establishing, planning and implementing a VTS |  |
| R0127 VTS operations |  |
| G1045 Staffing levels at VTS Centres |  |
| G1089 Provision of a VTS |  |
| G1110 Use of decision support tools for VTS Personnel |  |
| G1131 Setting and measuring VTS objectives |  |
| G1141 Operational procedures for delivering VTS |  |
| G1144 Promulgating the requirements of a VTS to Mariners – A VTS user guide template |  |
| R1012 VTS Communications |  |
| G1132 VTS Voice Communications and Phraseology |  |
| R0125 VTS Portrayal |  |
| G1177 Portrayal of VTS Information |  |
| R0128 VTS Systems and Equipment |  |
| G1111 Establishing Functional and Performance Requirements for VTS Systems and Equipment (R0128) (including G1111-1 – 9) |  |
| R0103 Training and Certification of VTS Personnel |  |
| G1027 Simulation in VTS Training |  |
| C103-1 VTS Operator Training |  |
| C103-2 VTS Supervisor Training |  |
| C103-3 VTS On-the-Job Training |  |
| C103-4 VTS On-the-Job Training Instructor |  |
| C103-5 The Revalidation Process for VTS qualification and certification |  |
| R1002 Risk Management for Marine Aids to Navigation |  |
| G1018 Risk Management |  |
| G1123 The Use of IALA Waterway Risk Assessment |  |
| G1124 The Use of Ports and Waterways Safety Assessment (PAWSA MkII) Tool |  |
| G1138 The Use of the Simplified IALA Risk Assessment Method (SIRA) |  |
| G1104 The Application of Maritime Surface Picture for Analysis in Risk Assessment and the Provision of [Marine] Aids to Navigation Service Delivery |  |
| G1070 VTS Role in Managing Restricted or Limited Access Areas |  |
| G1102 VTS Interaction with Allied or Other Services |  |
| G1130 Technical Aspects of Information Exchange Between VTS and Allied or Other Services |  |

# Next steps

## Committee work

The IALA committees should incorporate review of the relevant publications in their work programme ensuring that the reviews include at least the following:

* Check of references throughout the document for updates and implications of any changes.
* Identification of cross committee references and liaison requirements.
* Proposal of additional content and/or modification of existing content.

# References

1. IALA. (2023) The Future of Maritime Autonomous Surface Ships (MASS) - Future Scenarios Regarding the Development and Evolution of MASS
2. IALA. (2024) Developments with Autonomous ships (Working draft) <https://www.iala-aism.org/content/uploads/2022/02/Possible-case-studies-Operations-and-Trials-of-Autonomous-Ships-24-Jan-22.pdf> Accessed 25/03/2024

appendix A – record of initial scoping review relevant documents

| **Type** | **Compliance** | **Number** | **Ed.** | **Name** | **Parent.** | **Committee** |
| --- | --- | --- | --- | --- | --- | --- |
| Recommendation | Informative | R0138 | 1.1 | Use of GIS and Simulation by Aids to Navigation Authorities | S1010 | ARM |
| Recommendation | Informative | R0143 | 2.0 | Provision of Virtual Aids to Navigation | S1010 | ARM |
| Recommendation | Normative | R1002 | 1.1 | Risk Management for Marine Aids to Navigation | S1010 | ARM |
| Recommendation | Normative | R1002:fr | 1.1 | Gestion des risques pour les aides à la navigation maritimes | S1010 | ARM |
| Recommendation | Informative | R1010 | 1.1 | The Involvement of Maritime Authorities in Marine Spatial Planning | S1010 | ARM |
| Recommendation | Informative | R1019 | 1.1 | Provision of Maritime Services in the context of e-Navigation in the domain of IALA | S1070 | ARM |
| Recommendation | Normative | R1024 | 1.0 | Cyber security for the IALA domain | S1010 | ARM |
| Guideline | N/A | G1018 | 4.0 | Risk Management | R1002 | ARM |
| Guideline | N/A | G1033 | 1.0 | Provision of aids to navigation for different classes of vessels, including high speed craft | R1010 | ARM |
| Guideline | N/A | G1054 | 2.0 | Preparing for a Voluntary IMO Audit on Aids to Navigation Service Delivery | R1021 | ARM |
| Guideline | N/A | G1058 | 3.0 | Use of Simulation as a Tool for Waterway Design and Aids to Navigation Planning | R0138 | ARM |
| Guideline | N/A | G1078 | 2.0 | The Use of AtoN in the Design of Fairways | R1001 | ARM |
| Guideline | N/A | G1079 | 1.0 | Establishing and Conducting User Consultancy by Aids to Navigation Authorities | R1010 | ARM |
| Guideline | N/A | G1081 | 2.0 | Provision of Virtual AtoN | R1043 | ARM |
| Guideline | N/A | G1104 | 1.0 | The application of maritime surface picture for analysis in risk assessment and the provision of Aids to Navigation | R1002 | ARM |
| Guideline | N/A | G1105 | 2.0 | Shore-side Portrayal Ensuring Harmonization with e-Navigation Related Information | R0148 | ARM |
| Guideline | N/A | G1121 | 1.0 | Navigational Safety within Marine Spatial Planning | R1010 | ARM |
| Guideline | N/A | G1159 | 2.0 | Ship Reporting from a shore-based perspective | R1023 | ARM |
| Recommendation | Informative | R0140 | 2.1 | The Architecture for Shore-based Infrastructure 'fit for e-Navigation' | S1060 | DTEC |
| Recommendation | Normative | R0144 | 1.1 | Harmonized implementation of Application Specific Messages (ASM) | S1070 | DTEC |
| Guideline | N/A | G1095 | 1.0 | Harmonised implementation of Application-Specific Messages (ASMs) | R0144 | DTEC |
| Guideline | N/A | G1113 | 1.0 | Design and Implementation Principles for Harmonized System Architectures of Shore-based Infrastructure | R0140 | DTEC |
| Guideline | N/A | G1114 | 1.0 | A Technical Specification for the Common Shore-based System Architecture (CSSA) | R0140 | DTEC |
| Recommendation | Informative | R1017 | 1.1 | Resilient Position Navigation and Timing (PNT) | S1030 | ENG |
| Guideline | N/A | G1178 | 1.0 | An introduction to the artificial intelligence (AI) from an IALA perspective | R1024 | ENG |
| Guideline | N/A | G1179 | 1.0 | An introduction to the internet of things (IoT) from an IALA perspective | R1024 | ENG |
| Guideline | N/A | G1180 | 1.0 | Resilient Position, navigation and timing (PNT) | R1017 | ENG |
| Recommendation | Normative | R0127 | 3.2 | VTS operations | S1040 | VTS |
| Recommendation | Normative | R0128 | 5.0 | Operational and Technical Performance Requirement for VTS Equipment | S1040 | VTS |
| Recommendation | Normative | R0145 | 1.1 | Inter-VTS Exchange Format Service | S1070 | VTS |
| Guideline | N/A | G1027 | 1.2 | Simulation in VTS Training | R0103 | VTS |
| Guideline | N/A | G1070 | 1.1 | VTS role in managing Restricted or Limited Access Areas | R0128 | VTS |
| Guideline | N/A | G1089 | 2.1 | Provision of VTS services (INS, TOS & NAS) | R0127 | VTS |
| Guideline | N/A | G1102 | 1.1 | VTS Interaction with Allied or Other Services | R0128 | VTS |
| Guideline | N/A | G1110 | 2.0 | Use of Decision Support Tools for VTS Personnel | R0127 | VTS |
| Guideline | N/A | G1115 | 1.1 | Preparing for an IMO Member State Audit Scheme (IMSAS) on VTS | R1013 | VTS |
| Guideline | N/A | G1130 | 2.0 | Technical aspects of information exchange between VTS and allied or other services | R0128 | VTS |
| Guideline | N/A | G1141 | 2.1 | Operational procedures for delivering VTS | R0127 | VTS |
| Guideline | N/A | G1150 | 3.0 | Establishing, planning, and implementing a VTS | R0119 | VTS |
| Guideline | N/A | G1160 | 1.1 | Competencies for planning and implementing a VTS | R0119 | VTS |