



IALA

VTS MANUAL



2021 - EDITION 8



IALA

First Edition 1993
Second Edition 1998
Third Edition 2002
Fourth Edition 2008
Fifth Edition 2012
Sixth Edition 2016
Seventh Edition 2021



Belgium - Zeebrugge

FOREWORD

The VTS Manual has been a signature document and information source for Governments, Competent Authorities, VTS Authorities, mariners and allied services since first published in 1993.

The Manual is a product of collaboration by the world's leading experts through the VTS Committee, which has the primary oversight for its compilation and editing.

The membership represents most of the world's leading national maritime authorities whose delegates are widely experienced VTS professionals. The VTS Committee is also supported through participation from relevant international sister organizations. This ensures that the Committee is able to speak with international authority on VTS matters and, importantly, to develop new procedures to meet the emerging needs for modern traffic management and to enhance maritime safety.

The Manual provides a source of reference on the establishment and provision of VTS for all stakeholders. It also provides a pointer to the suite of IALA Standards related to VTS and the associated Recommendations, Guidelines, Model Courses that any VTS professional may seek.

The 2021 edition of the VTS Manual also sees its primary means of distribution being in a digital format which will be available on the website (www.iala-aism.org) along with all the other information sources available to our members and users of Marine Aids to Navigation.

I encourage readers of this Manual to also consult the website for other information that may assist you in your day-to-day work in VTS.

I would like to thank the IALA membership for helping to produce this 2021 edition of the VTS Manual and reflect on the unique nature of IALA that allows professionals from around the world to contribute their expertise to assist the international maritime community in improving and harmonizing VTS.

Francis Zachariae
IALA Secretary-General
June 2020



PURPOSE OF THE MANUAL

The purpose of the VTS Manual is to assist Contracting Governments, Competent Authorities and VTS Authorities harmonizing the delivery of VTS worldwide by providing a comprehensive overview on all aspects relating to the provision of VTS.

In particular, the Manual provides guidance on:

- The regulatory and legal framework for implementing and operating VTS.
- The obligations of Contracting Governments and Flag States.
- IALA Standards relating to the implementation and operation of VTS and their associated Recommendations, Guidelines, and Model Courses.

The Manual is also aimed at a wide readership to encompass all who are in any way involved with the policy for provision, operation and effectiveness of VTS, including those with management responsibility at national level and those who deliver services to the mariner.

The VTS Manual is intended to complement IALA documentation relating to VTS. It is not intended to replicate the information and guidance in these documents or be prescriptive about the practices described within them. Rather, it provides a roadmap to assist authorities meet their obligations for the establishment and operation of VTS in a consistent manner.

Key IALA documentation associated with this Manual may be found on the IALA web site www.iala-aism.org.

Note: Recognising the review of IMO Resolution A.857(20) currently underway by the IMO, IALA will be updating this manual for release subject to the new Resolution coming into effect.

ACKNOWLEDGEMENT

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Thanks are due to the individuals and organizations that contributed photographs to this manual.

Thanks for the task of editing this manual are due to
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Green light from lighthouse Skallen within VTS area Marstrand

1. INTRODUCTION TO VESSEL TRAFFIC SERVICES (VTS)

1.1. What is VTS?

VTS is recognized internationally as a navigational safety measure through the International Convention on the Safety of Life at Sea 74/78 (SOLAS). In particular, the provisions in SOLAS Chapter V (Safety of Navigation) Regulation 12 provides for Vessel Traffic Services and states, amongst other things, that:

- “Vessel Traffic Services (VTS) contribute to safety of life at sea, safety and efficiency of navigation and protection of the marine environment, adjacent shore areas, work sites and offshore installations from possible adverse effects of maritime traffic.”, and
- “Governments may establish VTS when, in their opinion, the volume of traffic or the degree of risk justifies such services.”

SOLAS also states that Contracting Governments planning and implementing VTS shall, wherever possible, follow the guidelines developed by the International Maritime Organization (IMO).

IMO Resolution A.857(20) Guidelines for Vessel Traffic Services describes the principles and general provisions for the operation of a VTS and participating vessels; the roles and responsibilities of Contracting Governments, Competent Authorities and VTS Authorities; and the qualifications and training requirements for VTS personnel. Specifically, the Resolution defines a Vessel Traffic Service as:

“A service designed to improve the safety and efficiency of vessel traffic and to protect the environment. The service should have the capability to interact with the traffic and to respond to traffic situations developing in the VTS area”.

1.2. Purpose of VTS

The purpose of VTS is to contribute to safety of life at sea, safety and efficiency of navigation and the protection of the environment within the VTS area by mitigating the development of unsafe situations through:

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

1.3. Benefits of VTS

The benefits of implementing a VTS are that it allows identification and monitoring of vessels, strategic planning of vessel movements and provision of navigational information and assistance. It can also assist in prevention of pollution and coordination of pollution/emergency response.

Amongst the most important functions that a VTS may carry out are those related to, contributing to and thereby enhancing:

- Safety of life at sea;
- Safety of navigation;
- Efficiency of vessel traffic movement;
- Protection of the marine environment;
- Search and Rescue;
- Supporting maritime security;
- Supporting law enforcement; and
- Protection of adjacent communities and infrastructure.

By being proactive, a VTS can contribute to the prevention of incidents resulting from vessel traffic movements. VTS contributes not only to the improvement of vessel traffic safety but also to the improvement of safety of life at sea and protection of the environment.

Unlike other marine aids to navigation, VTS, being active, has the capability to interact and influence the decision-making process on board the vessel. For example, VTS might detect the development of a vessel running into danger, and can thus alert such vessels accordingly. As the majority of maritime accidents can be attributed to human factors, the involvement of VTS, and interaction with it, can provide a significant additional safeguard.

Where an incident has occurred, VTS can also be used to support other incident mitigation operations. In the context of vessel traffic safety, VTS might support, for example Maritime Assistance Services (IMO Resolution A.950(23)), Places of Refuge (IMO Resolution A.949(23)), Search and Rescue, firefighting, pollution response and salvage operations.

1.4. Development of VTS – A Brief History

The movement of goods by sea has supported world commerce for centuries, giving rise to a need for ships to navigate safely and efficiently. To this end, authorities throughout the world have provided aids to navigation in and around their coastal waters. The earliest aids to navigation were shore-side beacons and lights, followed by the introduction of buoys. Over the years, these aids have been steadily improved upon with greater visibility and range and the addition of audible signals.

In the 1940s it became clear that short range, audio-visual aids to navigation were insufficient to enable the full utilization of port facilities in all conditions of visibility and increasing traffic density. Adverse weather and congestion resulted in delays of vessel traffic movement, which in turn created serious disruption to port operations with consequences for other modes of transport.

A consensus emerged among maritime experts that traffic monitoring using shore-based radar combined with communications could be applied to enhance safety and efficiency in port areas and their approaches. The first radar based Port Control station was established in Douglas, Isle of Man, in 1948.

Later the same year, the port of Liverpool established a radar site and similar trials took place in Rotterdam. In the 1950s, a number of shore-based radar sites were established around the world as well as in European ports, including the approaches to the port of Amsterdam in 1952 and the entire Rotterdam port area in 1956.

Although these early systems were intended to minimise traffic delays and increase the efficiency of traffic flow in general, attention was also given to the number of shipping accidents and the ways in which these might be reduced. Studies were carried out to see what effect that these rudimentary vessel traffic services were having on reducing the number of accidents in port areas using radar surveillance. The studies concluded that, in addition to increasing the operational hours, thereby providing better utilization of a port’s capacity, the number of accidents was also being reduced.

In the 1960s and 1970s major shipping disasters, including Torrey Canyon, Metula and Amoco Cadiz, made the public keenly aware of the environmental damage that a shipping accident could cause. The ensuing public outcry for protection of the marine environment brought substantial pressure on authorities to implement measures to enhance the safety of shipping. The concern that such disasters might happen in port approaches and port areas further expanded the use of radar surveillance and the management of vessel traffic.

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The Shipping World

MARCH 10, 1948



Figure 1 Harbour control by radar – Douglas harbour installation by Cossor Ltd



In these early days of radar-aided traffic management, the view on how to proceed further was hotly debated among the various port authorities, including pilots and shipmasters. The exercise of regulatory management over shipping from ashore was a new phenomenon and it soon became apparent that some form of international harmonization of these emerging vessel traffic services was needed.

In 1968, the Inter-Governmental Maritime Consultative Organization (IMCO) examined the Recommendation A.158 - 'Port Advisory Services', adopted by the Maritime Safety Committee, which recommended to Governments that they consider setting up such services in ports and their approaches, that warrant it by the importance and nature of their traffic, particularly in oil terminals and ports where noxious or hazardous cargoes are loaded and unloaded. This Recommendation also instructed masters that an early indication of the expected time of arrival to the appropriate authorities would also contribute to safety, due regard being given to the actual conditions and the existing local arrangements.

In 1985 the International Maritime Organization (IMO) adopted Resolution A.578(14) - 'Guidelines for Vessel Traffic Services'. In general, these Guidelines described the operational procedures and planning for VTS. The Guidelines did not address liability or responsibility, which needed to be considered by the authority establishing a VTS, nor did they create new rights to enact legislation on the requirements for shipping. With respect to personnel, the Guidelines did not specifically address recruitment, qualifications and training of VTS operators.

The requirements for VTS were considered by International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) and a follow-up study was undertaken jointly with the International Maritime Pilots' Association (IMPA) and the International Association of Ports and Harbours (IAPH). The original IMO Resolution on VTS was revised and updated with the adoption in 1997 of IMO Assembly Resolution A.857(20) - 'Guidelines for Vessel Traffic Services', which is the currently internationally recognized source policy document for VTS.

The development of modern technology was very important for the technical concept of VTS. The concept developed from a simple radar and voice radio system, with the aim of enhancing navigation in poor visibility, to a modern system using multiple sensors with the objectives of enhancing safety of navigation, improving the efficiency of maritime traffic and protecting the marine environment.

The realities of modern shipping, with larger and less manoeuvrable ships, traffic congestion in ports and waterways, hazardous cargoes and the potential for environmental damage, demanded that sophisticated measures be taken to reduce risks. Establishing Vessel Traffic Services was and still is a significant response to that demand. When established, implemented and operated within the context of international laws, conventions and maritime practices and, with the cooperation of vessel operators, a VTS can contribute substantially to the safety and efficiency of maritime traffic, protection of the environment as well as security within the port area.

As a result of the improvements in efficiency, safety and the reduction of potential environmental pollution experienced by authorities using a VTS, together with the rapid developments in computer technology, the number of VTS type operations has increased considerably and there are now well over 500

of these services operating worldwide. In some countries VTS centres have also been established for vessels operating in inland waters with similar overall objectives that apply to the coastal and offshore systems.

As Vessel Traffic Services increased in number throughout the world, the operating concepts have led to VTS being established to cover coastal waters, ports or harbours, rivers and inland waterways.



Car carrier Autorunner

2. REGULATORY AND LEGAL FRAMEWORK

2.1. Introduction

This chapter provides an overview of the international regulatory and legal framework for establishing VTS.

The key components of the international framework include:

- International Convention for the Safety of Life at Sea (SOLAS) 1974;
- IMO Resolution A.857(20) Guidelines for Vessel Traffic Services;
- IALA Standards; and
- National Law.

In addition to the VTS specific components listed above, the United Nations Convention on the Law of the Sea (UNCLOS) lays down a comprehensive regime of law and order in the world's oceans and seas.

2.2. International Convention for the Safety of Life at Sea (SOLAS)

The SOLAS Convention is generally regarded as the most important of all international treaties concerning the safety of merchant ships. The first version of the Convention was adopted in 1914 following the Titanic disaster and the version in force today was adopted in 1974. SOLAS Chapter V (Safety of Navigation) identifies certain navigation safety services which should be provided by Contracting Governments.

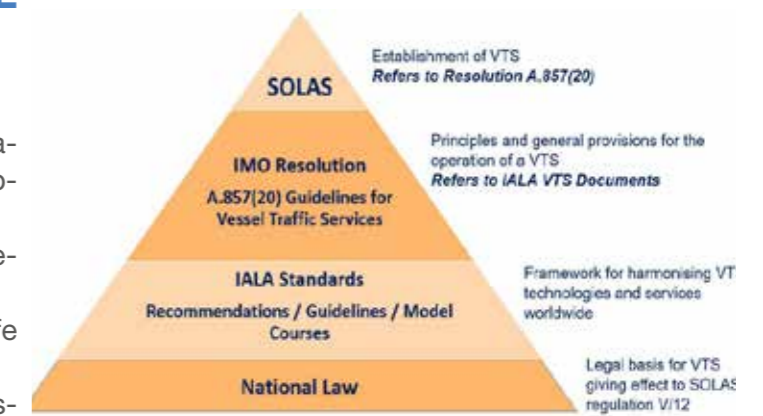
2.2.1. SOLAS Chapter V Regulation 12 – Vessel Traffic Services

SOLAS regulation V/12 (Vessel Traffic Services) recognizes VTS internationally as a navigational safety measure. In particular, it provides for VTS and states that:

"Vessel Traffic Services (VTS) contribute to safety of life at sea, safety and efficiency of navigation and protection of the marine environment, adjacent shore areas, work sites and offshore installations from possible adverse effects of maritime traffic."

SOLAS also states that:

- Governments may establish VTS when, in their opinion, the volume of traffic or the degree of risk justifies such services;
- VTS may only be made mandatory in the sea areas within the territorial seas of a coastal State; and
- Governments planning and implementing VTS shall, wherever possible, follow the guidelines developed by the IMO.



Under the general provisions of treaty law and of IMO Conventions, States are responsible for promulgating laws and regulations and for taking all other steps which may be necessary to give those instruments full and complete effect so as to ensure safety of life at sea and protection of the marine environment.

2.3. IMO Resolution A.857(20) Guidelines for Vessel Traffic Services

Resolutions are documents that IMO or its main bodies have accepted and which IMO Member States are encouraged to accept and implement into their national legislation.

The IMO Assembly adopted Resolution A.857(20) Guidelines for Vessel Traffic Services in 1997 recognizing that:

- The safety and efficiency of maritime traffic and the protection of the marine environment would be improved if vessel traffic services were established and operated in accordance with internationally approved guidelines; and
- The use of differing vessel traffic service procedures may cause confusion to masters of vessels moving from one vessel traffic service area to another.

The Resolution describes:

- The principles and general operational provisions for VTS and participating vessels; and
- The requirements for the VTS Authority to be provided with sufficient staff, appropriately qualified, suitably trained and capable of performing the tasks required.

Key responsibilities of Contracting Governments, Competent Authorities and VTS Authorities described in the Resolution include:

- Ensuring a legal basis for the operation of a VTS is provided for and that the VTS is operated in accordance with national and international law;
- Establishing appropriate standards for shore and offshore based equipment;



- Ensuring the VTS Authority is provided with sufficient staff, appropriately qualified, suitably trained and capable of performing the tasks required;
- Establishing appropriate qualifications and training requirements for VTS operators; and
- Instructing the VTS Authority to operate the VTS in accordance with relevant IMO Resolutions.

2.3.1. IMO Maritime Safety Committee Circular (MSC.1/Circ.1065, as amended)

This circular refers to IALA VTS Model Courses and invites Member States to bring the provisions for the training and certification of VTS personnel contained in IALA Recommendation 0103 to the attention of their Competent Authority, VTS Authorities, VTS training organizations and any other party concerned with VTS and VTS training.

2.4. IALA Standards

To achieve world-wide harmonization and improvement of VTS, IALA has developed a document structure to be used in order to develop and publish documents specifically related to the development, implementation and operation of VTS. The principal components to the IALA document structure include:

- Standards;
- Recommendations;
- Guidelines; and
- Model Courses.

IALA Standards are not mandatory. However, if an organization wishes to claim compliance with an IALA Standard then it should implement the normative Recommendations referenced in the Standard.

IALA Standards relating to VTS are:

- 1040 - Vessel Traffic Services;
- 1010 - AtoN Planning and Service Requirements;
- 1050 - Training and Certification; and
- 1070 - Information Services.

2.4.1. Recommendations



Vessel Swallow Ace passes Hattberget where seals are resting

IALA Recommendations specify what practices shall be carried out in order to comply with a Recommendation, and may be referenced, in full or in part, in an IALA Standard.

Recommendations may be referenced as Normative or Informative, where:

- Normative provisions are those with which it is necessary to conform in order to claim compliance to the Standard.
- Informative provisions are those which specify additional desirable practices but with which it is not necessary to conform in order to claim compliance to the Standard.

2.4.2. Guidelines

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

2.4.3. Model Courses

IALA Model Courses are training documents which define the level of training and knowledge needed to reach levels of competence defined by IALA.

Model Courses for VTS include training programmes on the specific knowledge and skill requirements necessary for qualification as a VTS Operator and other relevant VTS positions.

2.4.4. Documentation Relating to VTS

A reference list of the Standards, Recommendations, Guidelines and Model Courses specifically related to VTS is available at Annex 3.

2.5. National Law

Key responsibilities of Contracting Governments and Competent Authorities in implementing and operating VTS described in IMO Resolution A.857(20) include:

- Ensuring that a legal basis for the operation of a VTS is provided for and that the VTS is operated in accordance with national and international law;
- Ensuring that VTS Authorities are appointed and legally empowered;
- Instructing the VTS Authority to operate the VTS in accordance with relevant IMO Resolutions; and
- Establishing a policy with respect to violations of VTS regulatory requirements, and ensuring that this policy is consistent with national law.

3. VTS IMPLEMENTATION

3.1. Introduction

The implementation of a VTS to improve the safety and efficiency of navigation, safety of life at sea and the protection of the marine environment for a particular waterway, and its ongoing operation, is a significant investment.

IALA Standard 1040 Vessel Traffic Services references IALA Recommendations that specify the practices associated with implementing and establishing VTS. These include:

- Recommendation 0119 - Establishment of VTS
- Recommendation 0120 - Vessel Traffic Services in Inland Waters.
- Recommendation 0102 - The Application of the User Pays Principle to Vessel Traffic Services.

3.2. Recommendation 0119 Establishment of VTS

Recommendation 0119 specifies the practices associated with the implementation of VTS as prescribed in SOLAS regulation V/12 (Vessel Traffic Services).

Guidelines describing how to implement the practices specified in Recommendation 0119 include:

- Guideline 1050 - Establishing, Planning and Implementing VTS.
- Guideline 1071 - Establishment of a Vessel Traffic Service beyond territorial seas.
- Guideline 1083 - Standard nomenclature to identify and refer to Vessel Traffic Service centres.
- Guideline 1142 - The provision of Local Port Services other than VTS.

IALA Recommendation 0119

Establishment of VTS is a normative provision of IALA Standard 1040 Vessel Traffic Services and shall be observed if compliance with this Standard is claimed. To demonstrate compliance with the Recommendation the provisions of the associated Guidelines need to be implemented.

IALA Recommendation 0119 - – Establishment of VTS can be found at <https://www.iala-aism.org/product/r0119-establishment-of-vts/>

3.2.1. Guideline 1150 - Establishing, planning and implementing VTS

In deciding whether or not to implement a VTS there are two fundamental questions to be addressed:

- What are the safety, environmental and economic consequences of having or not having a VTS?
- What is the level of investment that can be justified to improve the safety and efficiency of navigation, safety of life at sea and the protection of the marine environment for a particular waterway? This includes both the costs associated with implementation and the on-going costs associated with operating the VTS.

Guideline 1150 provides guidance on the decision making process for implementing a VTS, or for reviewing an existing VTS, by providing a framework to assist authorities to:

- Assess the risks associated with a waterway;
- Assess the contribution that VTS can provide in mitigating risk and improving the safety and efficiency of navigation, safety of life and the protection of the environment; and
- Determine whether or not a VTS is the most appropriate mechanism to improve the safety and efficiency of navigation, safety of life at sea and the protection of the marine environment for a particular waterway.

IALA Guideline 1150 – Establishing, Planning And Implementing VTS can be found at <https://www.iala-aism.org/product/g1150-establishing-planning-and-implementing-vts/>.

3.2.2. Guideline 1071 - Establishment of a Vessel Traffic Service Beyond Territorial Seas

SOLAS regulation V/12 (Vessel Traffic Services) paragraph 3, specifically states that 'The use of VTS may only be made mandatory in sea areas within the territorial seas of a coastal State.' However, instances have arisen where the need to extend or establish a VTS beyond territorial seas has been identified.

Guideline 1071 provides guidance for establishing VTS beyond territorial seas of a coastal State to contribute to the safety of vessel traffic and the protection of the environment in a manner consistent SOLAS regulation V/12 (Vessel Traffic Services), which is:

- In association with an IMO adopted ships' routing system or mandatory ship reporting system, in accordance with Regulations V/10 and V/11 of the Convention, respectively; and
- On the basis of voluntary participation.

IALA Guideline 1071 – Establishment of a Vessel Traffic Service beyond Territorial Sea can be found at <https://www.iala-aism.org/product/establishment-of-a-vessel-traffic-service-beyond-territorial-seas-1071/>.

3.2.3. Guideline 1083 - Standard Nomenclature to Identify and Refer to VTS Centres

It is important that VTS's identify themselves as a VTS in a consistent manner to minimise any possible confusion to mariners and other stakeholders that may arise through the use of a variety of identifiers.

Guideline 1083 provides guidance for ensuring there is a consistent nomenclature for describing VTS around the world.

IALA Guideline 1083 – Standard Nomenclature to identify and refer to VTS centres can be found at <https://www.iala-aism.org/product/standard-nomenclature-to-identify-and-refer-to-vts-centres-1083/> .

3.2.4. Guideline 1142 - The Provision of Local Services Other Than VTS

There are many waterways where the Contracting Government(s) are of the opinion that the navigational complexity, volume of traffic or the degree of risk does not justify exercising their rights under SOLAS to establish VTS.

In such situations, other measures are invariably adopted to attain the expected level of safety and efficiency of the maritime traffic in the area.

Guideline 1142 provides guidance to:

- Assist Governments/Competent Authorities ensure the difference between VTS and local port services is clearly communicated to mariners, allied services and other stakeholders; and
- Assist entities operating local port services to enhance efficiency and safety in a globally harmonized manner.

IALA Guideline 1142 - The Provision of Local Services other than VTS can be found at <https://www.iala-aism.org/product/g1142-the-provision-of-local-port-services-other-than-vts/> .<https://www.iala-aism.org/guidance-publications>

3.3. Recommendation 0120 - Vessel Traffic Services in Inland Waters

The safety and efficiency of vessel traffic and the protection of the environment would be improved if the establishment and operation of VTS in inland waters was harmonized through international guidelines that are, as far as practicable, consistent with the IMO guidelines.

Recommendation 0120 provides guidance for establishing VTS in inland waters.

IALA Recommendation 0120 - Vessel Traffic Services in Inland Waters is an informative provision of IALA Standard 1040 Vessel Traffic Services. It specifies additional desirable practices but with which it is not necessary to conform in order to claim compliance to the Standard.

IALA Recommendation 0120 - Vessel Traffic Services in Inland Waters can be found at <https://www.iala-aism.org/product/vessel-traffic-services-in-inland-waters-v-120/> .



Kiel Canal Brunsbüttel Locks-Germany

IALA Recommendation 0102 - The Application of the User Pays principle to Vessel Traffic Services is an informative provision of IALA Standard 1040 Vessel Traffic Services. It specifies additional desirable practices but with which it is not necessary to conform in order to claim compliance to the Standard.

3.4. Recommendation 0102 – The Application of the ‘User Pays’ Principle to Vessel Traffic Services

The principle of ‘User Pays’ is well accepted throughout the world for recovering costs associated with services.

Recommendation 0102 provides guidance for authorities considering adoption of a ‘User Pays’ model to apportion the costs associated with the provision of VTS to identified beneficiaries of the service.

IALA Recommendation 0102 - The Application of the User Pays principle to Vessel Traffic Services can be found at <https://www.iala-aism.org/product/application-of-the-user-pays-principle-to-vts-v-102/> .

3.5. Additional Guidance

To assist authorities in establishing, planning and implementing VTS effectively IALA has prepared Guideline XXXX Competencies for planning and implementing VTS. The Guideline provides a mechanism to ensure those responsible for the planning and implementation are competent in the practices described in Recommendation R0119 - Establishment of VTS and associated Guideline G1150 - Establishing, Planning and Implementing VTS.

3.5.1. Guideline XXXX - Competencies for planning and implementing VTS

Guideline XXXX describes the knowledge, skills, attitudes and personal attributes that would assist those responsible for the planning and implementation of VTS.

IALA Guideline XXXX – Competencies for Planning and Implementing VTS describes knowledge, skills, attitudes and personal attributes to assist in implementing the practices described in Recommendation R0119 - Establishment of VTS and associated Guideline G1150 - Establishing, Planning and Implementing VTS.

Guideline XXXX is informative in nature and is to encourage best practice. It is not necessary to conform to in order to claim compliance to Recommendation R0119.



4. VTS OPERATIONS

4.1. Introduction

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 those operating the VTS and participating ships and the delivery of precise and unambiguous VTS operations in accordance with internationally approved guidelines.

IALA Standard 1040 Vessel Traffic Services specifies the practices associated with the delivery of VTS operations in *Recommendation 0127 – VTS Operations*.

4.2. Recommendation 0127 - VTS Operations

Recommendation 0127 specifies the practices associated with the delivery of VTS operations. Guidelines describing how to implement the practices specified in Recommendation 0127 include:

- Guideline 1089 - Provision of VTS (INS, TOS & NAS).
- Guideline 1141 - Operational Procedures for Vessel Traffic Services.
- Guideline 1110 - Use of Decision Support Tools for VTS Personnel.
- Guideline 1131 - Setting and Measuring VTS Objectives.
- Guideline 1045 - Staffing Levels at VTS Centres.
- Guideline 1118 - Marine casualty / incident reporting and recording, including near-miss situations as it relates to VTS.
- Guideline 1144 - Promulgating the Requirements of a VTS to Mariners – A VTS Users Guide Template

IALA Recommendation 0127 - VTS Operations is a normative provision of IALA Standard 1040 Vessel Traffic Services and shall be observed if compliance with this Standard is claimed. To demonstrate compliance with the Recommendation the provisions of the associated Guidelines need to be implemented.

IALA Recommendation 0127 - VTS Operations can be found at <https://www.iala-aism.org/product/operating-procedures-for-vessel-traffic-services-127/>.



Kaapduin

4.2.1. Guideline 1089 - Provision of VTS (INS, TOS & NAS)

Guideline 1089 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 mitigating the development of unsafe situations through:

- Provision of timely and relevant information on factors that may influence the ship's movements and assist onboard 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.

IALA Guideline 1089 - Provision of VTS (INS, TOS & NAS) can be found at <https://www.iala-aism.org/product/provision-of-vts-types-of-service-1089/>.

4.2.2. Guideline 1141 - Operational Procedures for Vessel Traffic Services

Clearly defined operational procedures are an integral part of VTS operations to ensure standards are consistently maintained and that the service is delivered accurately, efficiently and effectively. Operational procedures should also be an integral part of a verifiable quality management system for the VTS (Refer to Section 14).

Guideline 1141 provides the framework for harmonizing VTS procedures globally. In particular, it describes processes and procedures associated with:

- Day-to-day operations to;
 - Provide timely and relevant information on factors that may influence the ship's movements and assist on board decision-making;

Monitor and manage ship traffic to ensure the safety and efficiency of ship movements; and

Respond to developing unsafe situations.

- Management and administration to;

Ensure the VTS operates in accordance with relevant international conventions and IMO instruments, IALA standards and national law; and

Set operational objectives for the VTS that are consistent with improving safety and efficiency of ship traffic and protection of the environment and routinely evaluating that they are being achieved.

IALA Guideline 1141 - Operational Procedures for Vessel Traffic Services can be found at <https://www.iala-aism.org/product/operational-procedure-for-delivering-vts/>

4.2.3. Guideline 1110 - Use of Decision Support Tools for VTS Personnel

Decision Support Tools are computer-based tools (simulation models, and/or techniques and methods) to enhance situational awareness and assist VTS personnel interact with the traffic and respond to traffic situations developing in the VTS area.

Guideline 1110 provides guidance on the use of decision support tools to enhance situational awareness and support VTS personnel provide timely and relevant information, monitor and manage ship traffic and respond to developing unsafe situations

IALA Guideline 1110 – Use of Decision Support Tools for VTS Personnel can be found at <https://www.iala-aism.org/product/use-of-decision-support-tools-for-vts-personnel-1110/>.



River Elbe-Germany



4.2.4. Guideline 1131 - Setting and Measuring VTS Objectives

IMO Resolution A.857(20) Guidelines for Vessel Traffic Services states in operating a VTS the VTS Authority should “ensure that the objectives of the VTS are met”.

Guideline 1131 provides guidance for Competent Authorities and VTS Authorities for setting objectives for a VTS and achieving the obligations associated with SOLAS regulation V/12 (Vessel Traffic Services) and IMO Resolution A.857(20).

IALA Guideline 1131 - Setting and Measuring VTS Objectives can be found at <https://www.iala-aism.org/product/g1131-setting-measuring-vts-objectives/>.

4.2.5. Guideline 1045 - Staffing Levels at VTS Centres

IMO Resolution A.857(20) Guidelines for Vessel Traffic Services states that in planning and establishing a VTS, the Contracting Government(s) or the Competent Authority should ensure that the VTS Authority is provided with sufficient staff, appropriately qualified, suitably trained and capable of performing the tasks required.

Guideline 1045 provides guidance to assist authorities in determining appropriate staffing levels for a VTS Centre to ensure that the VTS operations can be carried out efficiently and safely under all conditions.

IALA Guideline 1045 – Staffing Levels at VTS Centres can be found at https://www.iala-aism.org/product-category/publications/?s=1045&post_type=product&search=SEARCH.

4.2.6. Guideline 1118 - Marine Casualty / Incident Reporting and Recording, Including Near Miss Situations

The reporting and analysis of incidents and near-misses is recognized in environments where risk management is essential as a fundamental aspect of safety management.

Casualty, incident and near-miss reports also provide opportunities to assess how a VTS may further improve the delivery of its service.

Guideline 1118 provides guidance on developing and establishing processes for the reporting, recording and analysis of marine casualties, incidents and near-miss situations.

IALA Guideline 1118 – Marine casualty / incident reporting and recording, including near-miss situations as it relates to VTS can be found at <https://www.iala-aism.org/product/marine-casualty-incident-reporting-recording-including-near-miss-situations-relates-vts-1118/>.

4.2.7. Guideline 1144 - Promulgating the Requirements of a VTS to Mariners – A VTS Users Guide Template

It is important that mariners have timely access to the range of information and procedures that may be required when entering or passing through a VTS area.

Guideline 1144 provides guidance for VTS authorities to promulgate the information related to a VTS in a concise and globally harmonized manner to:

- Reduce the burden on masters in obtaining the requirements of a VTS, and
- Minimise confusion to the masters of vessels moving from one vessel traffic service area to another.

IALA Guideline 1144 - Promulgating the Requirements of a VTS to Mariners – A VTS Users Guide Template can be found at <https://www.iala-aism.org/product/g1144-promulgating-the-requirements-of-a-vts-to-mariners-a-vts-users-guide/>.

5. VTS COMMUNICATIONS

5.1. Introduction

A major factor in the effective delivery of VTS is the provision of precise and unambiguous voice communications to the bridge team and allied services. The use of common communication phrases by VTS personnel helps to reduce the opportunities for misunderstanding and the time required to communicate messages.

IALA Standard 1040 Vessel Traffic Services specifies the practices associated with the provision of VTS communications in *Recommendation 1012 – VTS Communications*.

5.2. Recommendation 1012 - VTS Communications

Recommendation 1012 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.

IALA Guideline 1132 VTS Voice Communications and Phraseology describes how to implement the practices specified in Recommendation 1012.

IALA Recommendation 1012 - VTS Communications is a normative provision of IALA Standard 1040 Vessel Traffic Services and shall be observed if compliance with this Standard is claimed. To demonstrate compliance with the Recommendation the provisions of the associated Guidelines need to be implemented.

IALA Recommendation 1012 - VTS Communications can be found at <https://www.iala-aism.org/>.

5.2.1. Guideline 1132 - VTS VHF Voice Communication

Guideline 1132 provides the framework for authorities to develop standardized operating procedures for voice communication to ensure VTS communications are harmonised through the use of standard message structure and phrases to:

- Facilitate clear, concise, and unambiguous communications that are timely and effective.
- Minimise misunderstanding of the intent of messages and reduce the time required for effective communication.
- Mitigate complacency amongst VTS personnel.

The guideline will also assist:

- *VTS authorities prepare standardised operating procedures for communication and should be read in conjunction with IALA Guideline G1141 - Operational Procedures for Vessel Traffic Services.*
- *VTS Training organizations incorporate the use of standard VTS phraseology into their course curriculums.*

IALA Guideline 1132 - VTS Voice Communications and Phraseology can be found at <https://www.iala-aism.org/product/g1132-vts-vhf-voice-communication/>.



Pilot boat during the storm Egon



Lighthouse Hatterberget at sunset

6. VTS AUDITING AND ASSESSING

6.1. Introduction

To achieve the purposes for which it was implemented a VTS should be routinely evaluated to ensure that the operational objectives are being met, the technical and operational performance is acceptable and the risks identified and defined in determining the need for the VTS have been mitigated to an acceptable level.

IALA Standard 1040 Vessel Traffic Services specifies the practices associated with VTS auditing and assessing in *Recommendation 1013 - Auditing and Assessing Vessel Traffic Services*.

6.2. Recommendation 1013 - Auditing and Assessing Vessel Traffic Services

Recommendation 1013 specifies the practices associated with implementing a formal system for auditing and assessing VTS as a means to ensure the harmonized delivery of VTS worldwide.

Guidelines describing how to implement the practices specified in Recommendation 1013 include:

- *Guideline 1101 – Auditing and Assessing VTS.*
- *Guideline 1115 – Preparing for an IMO Member State Audit Scheme (IMSAS) on Vessel Traffic Services.*

IALA Recommendation 1013 - Auditing and Assessing Vessel Traffic Services is a normative provision of IALA Standard 1040 Vessel Traffic Services and shall be observed if compliance with this Standard is claimed. To demonstrate compliance with the Recommendation the provisions of the associated Guidelines need to be implemented.

IALA Recommendation 1013 - Auditing and Assessing Vessel Traffic Services can be found at <https://www.iala-aism.org/product/r1013-auditing-assessing-vessel-traffic-services/>.

6.2.1. Guideline 1101 - Auditing and Assessing VTS

Guideline 1101 provides guidance for authorities to meet their obligations under SOLAS for the establishment and operation of VTS. In particular, it provides the framework for auditing and assessing an entity establishing a VTS and the subsequent on-going assessment and evaluation to ensure:

- Conformity with international obligations;
- The technical performance of the VTS equipment is consistent with the objectives of the VTS and the types of service/s provided;
- The operational objectives are being met; and
- The degree of risk identified in determining the need for the VTS have been either alleviated or at least reduced to an acceptable level.

IALA Guideline 1101 – Auditing and Assessing VTS can be found at <https://www.iala-aism.org/product/auditing-and-assessing-vts-1101/>.

6.2.2. Guideline 1115 - Preparing for an IMO Member State Audit Scheme (IMSAS) on Vessel Traffic Services

Guideline 1115 provides guidance for authorities to meet the objectives of an IMO Member State Audit Scheme (IMSAS) with respect to the implementation and delivery of VTS. In particular, to demonstrate that they are fulfilling their responsibilities under the general provisions of treaty law and IMO Conventions for promulgating laws and regulations and taking all other steps which may be necessary to give full and complete effect to SOLAS regulation V/12 (Vessel Traffic Services).

The guidance focuses on providing assistance with the planning and preparation for an IMSAS audit, including:

- Compliance with the audit standard;
- The enactment of legislation, as appropriate, for delivery of VTS under SOLAS;
- The administration and enforcement of the applicable laws and regulations of the Member State; and
- The mechanism and controls in place, by which the delegation of authority by a Member State to a recognized organization, for the purposes of implementing and delivering VTS, is effected.

IALA 1115 - Preparing for an IMO Member State Audit Scheme (IMSAS) on Vessel Traffic Services can be found at <https://www.iala-aism.org/product/preparing-for-imo-audit-scheme-vts-1115-2/>.

7. VTS ADDITIONAL SERVICES

7.1. Introduction

VTS is often involved in providing information and supporting other services due to its capacity to maintain a traffic image and interact with ships and other services in the VTS area.

To assist VTS Authorities in providing additional services IALA has prepared the following Guidelines:

- Guideline 1070 - VTS Role in Managing Restricted or Limited Access Areas.
- Guideline 1102 - VTS Interaction with Allied or Other Services.
- Guideline 1130 - Technical Aspects of Information Exchange between VTS and Allied or Other Services.

These Guidelines are not associated with an IALA Recommendation and are informative provisions of IALA Standard 1040 Vessel Traffic Services. They specify additional desirable practices but with which it is not necessary to conform in order to claim compliance to the Standard.

7.1.1. Guideline 1070 - VTS Role in Managing Restricted or Limited Access Areas

Guideline 1070 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.

IALA Guideline 1070 - VTS Role in Managing Restricted or Limited Access Areas can be found at <https://www.iala-aism.org/product/vts-role-in-managing-restricted-or-limited-access-areas-1071/>.

7.1.2. Guideline 1102 - VTS Interaction with Allied or Other Services

Guideline 1102 describes the issues and criteria that should be considered and the principles to be respected for successful interaction between VTS and allied or other services.

IALA Guideline 1102 - VTS Interaction with Allied or Other Services can be found at <https://www.iala-aism.org/product/vts-interaction-with-allied-services-1102/>.

7.1.3. Guideline 1130 - Technical Aspects of Information Exchange between VTS and Allied or Other Services

Guideline 1130 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.

IALA Guideline 1130 - Technical aspects of information exchange between VTS and allied or other services can be found at <https://www.iala-aism.org/product/g1130-technical-aspects-information-exchange-vts-allied-services/>.



Storm at Skallen within VTS area Marstrand



8. VTS DATA AND INFORMATION MANAGEMENT

8.1. Introduction

The compilation of an accurate traffic image is essential for VTS personnel to monitor traffic, evaluate situations and make decisions accordingly. The traffic image is dependent on the integration and portrayal of data from different sensors (e.g. radar, AIS, CCTV), information from reports such as VHF voice, and is supported by an effective data and information management framework. IALA Standard 1040 Vessel Traffic Services references IALA Recommendations that specify the practices associated with VTS data and information management. These include:

- Recommendation 0125 - The Use and Presentation of Symbology at a VTS Centre.
- Recommendation 1014 - Portrayal of VTS Information Data.

8.2. Recommendation 0125 - The Use and Presentation of Symbology at a VTS Centre

Recommendation 0125 specifies the practices associated with the use and presentation of symbology at a VTS centre.

Key principles associated with the presentation of symbology include:

- The portrayal of VTS information should reflect as far as possible the equivalent portrayal on board ships;
- The international on-board symbology and chart standards should be used as far as possible;
- Symbology already identified for existing on-board use should not normally be assigned a different meaning for VTS purposes, however these symbols may be adapted to suit VTS requirements;
- Any adaptations to symbology must not modify the agreed standard for data transfer; and
- The clarity of the presentation and operator workload should be carefully considered.

IALA Recommendation 0125 - The use and presentation of symbology at a VTS Centre is a normative provision of IALA Standard 1040 Vessel Traffic Services and shall be observed if compliance with this Standard is claimed.

Recommendation 0125 - The use and presentation of symbology at a VTS Centre can be found at <https://www.iala-aism.org/product/use-and-presentation-of-symbology-at-a-vts-centre-including-ais-125/>.

8.3. Recommendation 1014 - Portrayal of VTS Information and Data

Recommendation 1014 specifies the practices associated with the portrayal of VTS information and data to assist a VTS operator to manage the system and input data to efficiently take action through a human-centered design and an ergonomic approach.

The portrayal should facilitate achieving an appropriate situational awareness and support effective decision-making. In particular:

- The portrayal should be designed for efficiency of operation and avoidance of information overload; and
- The portrayal should present information to the user intuitively.

IALA Recommendation 1014 - Portrayal of VTS Information Data is a normative provision of IALA Standard 1040 Vessel Traffic Services and shall be observed if compliance with this Standard is claimed.

Recommendation 1014 - Portrayal of VTS information data can be found at <https://www.iala-aism.org/product/r1014-portrayal-vts-information-data/>.



9. VTS TECHNOLOGIES

9.1. Introduction

A significant proportion of the investment associated with the implementation and on-going operation of a VTS is the equipment and systems to:

- Maintain a comprehensive traffic image;
- Ensure the capability to interact with the traffic; and
- Respond to traffic situations developing in the VTS area.

IALA Standard 1040 Vessel Traffic Services specifies the practices associated with VTS technologies in Recommendation 0128 - Operational and Technical Performance of VTS Systems.

9.2. Recommendation 0128 - Operational and Technical Performance of VTS Systems

Recommendation 0128 specifies the practices associated with the operational and technical performance of VTS systems to ensure:

- Conformity with international obligations;
- The technical performance of the VTS systems is consistent with the objectives of the VTS and the types of service provided;
- The operational objectives are being met; and
- The degree of risk identified in determining the need for the VTS have been either alleviated or, at least, reduced to an acceptable level.

IALA Guideline 1111 - Preparation of Operational and Technical Performance Requirements for VTS Systems describes how to implement the practices specified in Recommendation 0128.

IALA Recommendation 0128 - Operational and Technical Performance of VTS Systems is a normative provision of IALA Standard 1040 Vessel Traffic Services and shall be observed if compliance with this Standard is claimed. To demonstrate compliance with the Recommendation the provisions of the associated Guideline need to be implemented.

IALA Recommendation 0128 (V-128) - Operational and Technical Performance of VTS Systems can be found at <https://www.iala-aism.org/product/operational-and-technical-performance-of-vts-systems-v-128/>.

9.2.1. Guideline 1111 - Preparation of Operational and Technical Performance Requirements for VTS Systems

Guideline 1111 provides the framework to assist authorities in preparing the definition, specification, establishment, operation and upgrades of a VTS system. In particular, the Guideline addresses the relationship between the operational requirements and system performance (technical) requirements and how these reflect into system design and sub-system requirements.

IALA Guideline 1111 - Preparation of Operational and Technical Performance Requirements for VTS Systems can be found at <https://www.iala-aism.org/product/preparation-of-operational-and-technical-performance-for-vts-equipment/>.



SMA-Bridge opening in Trollhatten kanal



10. DATA MODELS AND DATA ENCODING

10.1. Introduction

It is widely recognised that the development of the e-Navigation architecture will contribute to the emergence of enhanced means for the interactions between ship and shore and shore to shore, in the following fields:

- Shore-based technical e-Navigation services;
- Technical means for communication;
- Data modelling and referential data; and
- Human-Machine Interface presentations.

IALA Standard 1070 Information Services specifies the practices associated with data models and data encoding in *Recommendation 0145 - The Inter-VTS Exchange Format (IVEF) Service*.

10.2. Recommendation 0145 - The Inter-VTS Exchange Format (IVEF) Service

IALA Recommendation 0145 provides a framework with formats and protocols for data exchange between VTS systems, stakeholders and relevant external parties to assist in the efficient deployment of services to the mariner and to the maritime community by facilitating the harmonization, connectivity and the integration of components.

IALA Recommendation 0145 - The Inter-VTS Exchange Format (IVEF) Service is a normative provision of IALA Standard 1070 Information Services and shall be observed to demonstrate compliance with the Standard.

IALA Recommendation 0145 - The Inter-VTS Exchange Format (IVEF) Service can be found at <https://www.iala-aism.org/product/inter-vts-exchange-format-service-145/>.



Belgium - Zeebrugge



Co-existing wildlife at Sillesund, VTS area Marstrand

11. TRAINING AND ASSESSMENT

11.1. Introduction

A major factor in the delivery of VTS is the competence of its personnel.

VTS personnel should only be considered competent when appropriately trained and qualified for their VTS duties. This includes:

- Satisfactorily completing generic VTS training approved by a competent authority (refer chapter 12);
- Satisfactorily completing on-the-job training at the VTS where the person is employed;
- Undergoing periodic assessments and revalidation training to ensure competence is maintained; and
- Being in possession of appropriate certification.

IALA Standard 1050 Training and Certification specifies the practices associated with the training and assessment of VTS personnel in *Recommendation 0103 - Training and Certification of VTS Personnel*.

11.2. Recommendation 0103 (V-1033) - Training and Certification of VTS Personnel

Recommendation 0103 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.

IALA Guidelines and Model Courses describing how to implement the practices specified in Recommendation 0103 include:

- Guideline 1156 – Recruitment, Training and Assessment of VTS Personnel.
- Guideline 1017 - Assessment for Recognition of Prior Learning in VTS Trainin.
- Guideline 1027 - Simulation in VTS Training.
- Guideline 1103 - Train the Trainer.

- Model Courses:
- V-103/1 VTS Operator Training.
- V-103/2 VTS Supervisor Training.
- V-103/3 VTS On-the-Job Training.
- V-103/4 VTS On-the-Job Training Instructor.
- V-103/5 The Revalidation Process for VTS Qualification and Certification.

IALA Recommendation 0103 - Training and Certification of VTS Personnel can be found at <https://www.iala-aism.org/product/r0103-v-103-training-and-certification-of-vts-personnel/>.

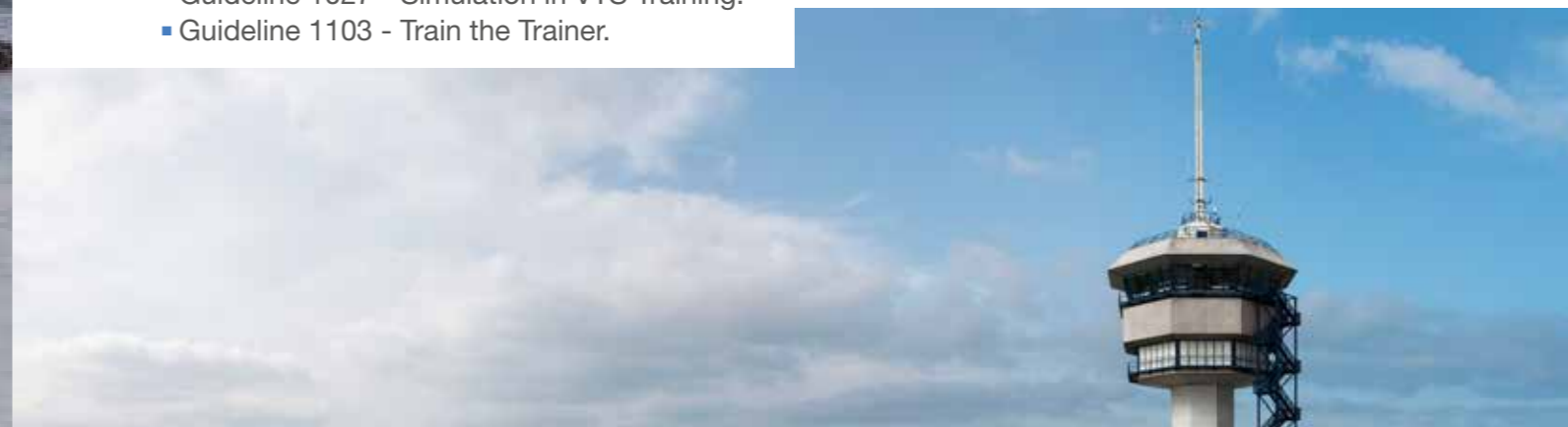
IALA Recommendation R0103 – Training and Certification of VTS Personnel is a normative provision of IALA Standard 1050 Training and Certification and shall be observed if compliance with this Standard is claimed. To demonstrate compliance with the Recommendation the provisions of the associated Guideline need to be implemented.

11.2.1. Guideline 1156 – Recruitment, training and assessment of VTS personnel

Guideline 1156 provides guidance on the training and assessment of VTS personnel to ensure it is developed and harmonised in accordance with the IMO Guidelines for Vessel Traffic Services, IALA standards, recommendations, guidelines and model courses.

Competent authorities are encouraged to implement this guidance, together with the associated model courses as a basis for mandatory training in a manner consistent with their domestic legal framework. This may include establishing appropriate qualifications and training requirements to ensure that VTS personnel are certified.

IALA Guideline 1156 Recruitment, Training and Assessment Of VTS Personnel can be found at <https://www.iala-aism.org/product/g1156-recruitment-training-and-certification-of-vts-personnel/>.



VC Zeebrugge panorama



11.2.2. Guideline 1017 - Assessment for Recognition of Prior Learning in VTS Training

Guideline 1017 provides guidance to training organizations when developing a framework to assess and recognise the prior learning of students. The objective of the assessment is to grant exemptions from subject areas or modules within an IALA model course.

IALA Guideline 1017 Assessment for Recognition of Prior Learning in VTS Training can be found at <https://www.iala-aism.org/product/assessment-of-training-requirements-for-existing-vts-personnel-candidate-vts-operators-revalidation-of-vts-operator-certificates-1017/>.

11.2.3. Guideline 1027 - Simulation in VTS Training

Guideline 1027 provides guidance on the use of simulators in VTS training. This includes information on:

- Principles of simulation training;
- Planning of simulation exercises;
- Design of simulation exercises;
- Development and validation of simulation exercises;
- Documentation for simulation exercises; and
- Conduct of simulation exercises.

IALA Guideline 1027 Simulation in VTS Training can be found at <https://www.iala-aism.org/product/simulation-in-vts-training-1027/>.

11.2.4. Guideline 1103 - Train the Trainer

Guideline 1103 provides guidance to assist training organizations in the preparation and implementation of training courses, including enhancing, updating or supplementing existing training material.

IALA Guideline 1103 Train the Trainer can be found at <https://www.iala-aism.org/product/train-the-trainer-1103/>

11.2.5. Model Courses

IALA model courses define the training, knowledge, understanding and skills needed to undertake the duties associated with VTS.

11.2.5.1. Model Course V-103/1 - VTS Operator Training

Model Course V-103/1 provides details of the subject areas, knowledge and practical competence required to undertake the duties associated with VTS operations.

IALA Model Course V-103/1 VTS Operator Train-

ing can be found at <https://www.iala-aism.org/product/vessel-traffic-service-operators-training-v-1031/>.

11.2.5.2. Model Course V-103/2 - VTS Supervisor Training

Model Course V-103/2 provides details of the subject areas, knowledge and practical competence required for a VTS Operator to gain an endorsement as a VTS Supervisor.

IALA Model Course V-103/2 - VTS Supervisor Training can be found at <https://www.iala-aism.org/product/vessel-traffic-services-supervisor-training-v-1032/>.

11.2.5.3. Model Course V-103/3 - VTS On-The-Job Training

Model Course V-103/3 identifies the practical experience, knowledge and competencies required to become a VTS Operator or VTS Supervisor at a specific VTS Centre. The Model Course complements the training delivered in model courses V-103/1 and V-103/2 and provides VTS personnel with the specific knowledge of local VTS operational, geographical and equipment related procedures.

IALA Model Course V-103/3 VTS On-The-Job Training can be found at <https://www.iala-aism.org/product/vessel-traffic-service-on-the-job-training-v-1033/>.

11.2.5.4. Model Course V-103/4 - VTS On-The-Job Training Instructor

Model Course V-103/4 provides details of the subject areas of the knowledge and practical competence required for VTS personnel to assist in the preparation and implementation of On-the-Job Training at a specific VTS Centre.

IALA Model Course V-103/4 VTS On-The-Job Training Instructor can be found at <https://www.iala-aism.org/product/vessel-traffic-services-on-the-job-training-instructor-v-1034/>.

11.2.5.5. Model Course V-103/5 - The Revalidation Process for VTS Qualification and Certification

Model Course V-103/5 provides guidance on how to maintain and improve the performance of VTS personnel, through training and other activities, to ensure continuous professional development.

IALA Model Course V-103/5 The Revalidation Process for VTS Qualification and Certification can be found at <https://www.iala-aism.org/product/vessel-traffic-service-revalidation-process-v-1035/>.

12. ACCREDITATION, COMPETENCY, CERTIFICATION AND REVALIDATION

12.1. Introduction

To ensure international consistency in the qualification and training of VTS personnel, organizations providing training should be accredited by the relevant national authority and individual IALA model courses (Refer to Section 11) provided approved.

IALA Standard 1050 Training and Certification specifies the practices associated with accreditation, competency, certification and revalidation in *Recommendation O-149 - Accreditation of Training Organisations*.

12.2. Recommendation O-149 - Accreditation of Training Organisations

Recommendation O-149 specifies the practices associated with the accreditation of VTS Training Organizations and approval of the model courses provided.

IALA Guideline 1014 Accreditation and Approval Process for VTS Training Courses describes how to implement the practices specified in Recommendation O-149.

IALA Recommendation O-149 - Accreditation of Training Organizations is a normative provision of IALA Standard 1050 - Training and Certification and shall be observed to demonstrate compliance with the Standard. To demonstrate compliance with the Recommendation the provisions of the associated guideline need to be implemented.

IALA Recommendation O-149 - Accreditation of Training Organizations can be found at <https://www.iala-aism.org/product/accreditation-training-organisations-o-149/>.

12.2.1. Guideline 1014 - Accreditation and Approval Process for VTS Training Courses

Guideline 1014 provides guidance for accrediting VTS training organizations and approving the model courses provided.

IALA Guideline 1014 Accreditation and Approval Process of VTS Training can be found at <https://www.iala-aism.org/product/guideline-on-the-accreditation-and-approval-process-for-vts-training/>.



BUSAN VTS CENTER by Korea Coast Guard

13. RISK MANAGEMENT

13.1. Introduction

Risk management is a term applied to a logical and systematic process to identify hazards, assess risk, specify risk control options, make decisions and take action. Risk management is an ongoing process to keep track on changed or new risks and adopt adequate measures.

IALA Standard 1010 AtoN Planning and Service Requirements specifies the practices associated with risk management in *Recommendation 1002 - Risk Management for Marine Aids to Navigation*.

13.2. Recommendation 1002 - Risk Management for Marine Aids to Navigation

Recommendation 1002 recommends the use of risk management and IALA risk management tools when assessing the risks in waterways.

IALA Guidelines describing how to implement the practices specified in Recommendation 1002 include:

- Guideline 1018 - Risk Management.
- Guideline 1123 - The Use of IALA Waterway Risk Assessment Programme (IWRAP MkII).
- Guideline 1124 - The Use of Ports and Waterways Safety Assessment (PAWSA) MkII Tool.
- Guideline 1138 - The Use of the Simplified IALA Risk Assessment Method (SIRA).

IALA Recommendation 1002 Risk Management for Marine Aids to Navigation and its associated Guidelines is a normative provision of IALA Standard 1010 AtoN Planning and Service Requirements and shall be observed if compliance with this Standard is claimed. To demonstrate compliance with the Recommendation the provisions of the associated Guidelines need to be implemented.

IALA Recommendation 1002 Risk Management for Marine Aids to Navigation can be found at <https://www.iala-aism.org/product/r1002-risk-management-marine-aids-navigation/>

13.2.1. Guideline 1018 - Risk Management

Guideline 1018 provides guidance on the use of risk management methodology to ensure all the hazards in a waterway are identified, analysed and managed by authorities.

IALA Guideline 1018 - Risk Management can be found at <https://www.iala-aism.org/product/risk-management-1018/>.

13.2.2. Guideline 1123 - The Use of IALA Waterway Risk Assessment Programme (IWRAP MK II)

The IALA Waterway Risk Assessment Program (IWRAP) risk assessment process provides a standardized, quantitative method to evaluate the probability of collisions and groundings in a given waterway. Using AIS data IWRAP is a Windows-based software program, allowing for different scenarios to be developed, so that changes such as those in traffic volume or composition, route geometry, aids to navigation or the introduction of other mitigating measures, can be modelled.

IALA Guideline 1123 - The Use of IALA Waterway Risk Assessment Programme (IWRAP MK II) can be found at <https://www.iala-aism.org/product/g1123-use-iala-waterway-risk-assessment-programme-iwrap-mkii/>.

13.2.3. Guideline 1124 - The Use of Ports and Waterways Safety Assessment (PAWSA) MK II Tool

The Ports and Waterways Risk Assessment (PAWSA) provides a structured and systematic approach to:

- Identify major waterway safety hazards;
- Estimate risk levels, evaluate potential mitigation measures; and
- Set the stage for implementation of selected measures to reduce risk.

As a qualitative tool, PAWSA is exploratory and the analysis seeks to get a deeper understanding of why a certain phenomenon occurs, its associated consequences and the potential effectiveness of additional mitigation measures.

IALA Guideline 1124 - The Use of Ports and Waterways Safety Assessment (PAWSA) Mk II tool can be found at <https://www.iala-aism.org/product/g1124-use-ports-waterways-safety-assessment-pawsa-mkii-tool/>.

13.2.4. Guideline 1138 - The Use of the Simplified IALA Risk Assessment Method (SIRA)

The Simplified IALA Risk Assessment (SIRA) is a simplified qualitative method to assess the volume of traffic and degree of risk and identify potential risk mitigation options to reduce the risks to acceptable levels.

SIRA is particularly applicable where good quality AIS data, on which IWRAP depends, is not available or where access to individuals with the necessary level of experience in the risk categories used by PAWSA is limited.

IALA Guideline 1138 - The Use of the Simplified IALA Risk Assessment Method (SIRA) can be found at <https://www.iala-aism.org/product/g1124-use-ports-waterways-safety-assessment-pawsa-mkii-tool/>.



INCHEON VTSO by Korea Coast Guard



BUSAN VTSO by Korea Coast Guard





Cormorants within VTS area Marstrand

14. QUALITY MANAGEMENT

14.1. Introduction

A Quality Management System is a formalized system that documents processes, procedures, and responsibilities for achieving quality policies, objectives and practices. It is not a simple set of documents but a dynamic process that brings resources, activities and behaviours together and focuses on the achievement of objectives.

IALA Standard 1010 AtoN Planning and Service Requirements specifies the practices associated with quality management in *Recommendation O-132 - Quality Management for Aids to Navigation Authorities*.

14.2. Recommendation O-132 - Quality Management for Aids to Navigation Authorities

Recommendation O-132 specifies the practices for implementing and maintaining a Quality Management System as a means of ensuring a high standard of availability, reliability and delivery of service.

IALA Guideline 1052 - Quality Management Systems for Aids to Navigation Service Delivery describes how to implement the practices specified in Recommendation O-132.

IALA Recommendation O-132 - Quality Management for Aids to Navigation Authorities is a normative provision of IALA Standard 1010 AtoN Planning and Service Requirements and shall be observed if compliance with this Standard is claimed. To demonstrate compliance with the Recommendation the provisions of the associated Guidelines need to be implemented.

IALA Recommendation O-132 - Quality Management for Aids to Navigation Authorities can be found at <https://www.iala-aism.org/product/quality-management-for-aids-to-navigation-authorities-o-132/>.

14.2.1 Guideline 1052 - Quality Management Systems for Aids to Navigation Service Delivery

Guideline 1052 describes how to implement a Quality Management System to ensure ongoing integrity through periodic:

- Certification by an accredited third party; and/or
- Assessment by a third party; and/or
- Self-assessment.

IALA Guideline 1052 - Quality Management Systems for Aids to Navigation Service Delivery can be found at <https://www.iala-aism.org/product/quality-management-systems-for-aton-service-delivery-1052/>.

15. ADDITIONAL GUIDANCE RELATED TO THE PROVISION OF VTS

15.1. Introduction

IALA provides guidance for shore based infrastructure and systems that, although not specifically related to VTS, should be considered in establishing and operating VTS. These include:

- Recommendation A-123 - The Provision of Shore Based Automatic Identification System (AIS).
- Recommendation A-126 - The use of the Automatic Identification System (AIS) in Marine Aids to Navigation Services.
- Guideline 1082 - An overview of AIS.

15.2. Recommendation A-123 - The Provision of Shore Based Automatic Identification System (AIS)

Recommendation A-123 specifies the practices associated with the provision of shore based AIS services in accordance with IMO, the International Telecommunication Union (ITU), and the International Electrotechnical Commission (IEC) and provides references to key publications that should be taken into account.

IALA Recommendation A-123 - The Provision of Shore Based Automatic Identification System (AIS) is a normative provision of IALA Standard 1060 Digital Communication Technologies and shall be observed if compliance with this Standard is claimed.

IALA Recommendation A-123 - The Provision of Shore Based Automatic Identification System (AIS) can be found at <https://www.iala-aism.org/product/provision-of-shore-based-ais-a-123/>.

15.3. Recommendation A-126 on the use of the Automatic Identification System (AIS) in Marine Aids to Navigation Services

Recommendation A-126 specifies the practices associated with the use of the Automatic Identification System (AIS) in Marine Aids to Navigation Services and recommends that National Members and other appropriate authorities providing marine aids to navigation services use appropriate AIS units as part of their marine aid to navigation services for:

- The provision of information and data to shipping; and
- Monitoring and control purposes.

IALA Guideline 1082 - An overview of AIS provides further guidance for shore authorities on AIS and how it can be used.

IALA Recommendation A-126 on the use of the Automatic Identification System (AIS) in Marine Aids to Navigation Services is an informative provision of IALA Standard 1020 AtoN Design and Delivery. It specifies additional desirable practices but it is not necessary to conform in order to claim compliance to the Standard.

IALA Recommendation A-126 on the use of the Automatic Identification System (AIS) in Marine Aids to Navigation Services can be found at <https://www.iala-aism.org/product/use-of-the-ais-in-marine-aids-to-navigation-service-126/>.

15.3.1. Guideline 1082 - An Overview of AIS

Guideline 1082 provides an overview and introduction to AIS for shore authorities and references relevant documentation where further information can be found.

IALA Guideline 1082 - An overview of AIS can be found at <https://www.iala-aism.org/product/an-overview-of-ais-1082/>.

15.4. Guideline 1105 - Shore-Side Portrayal Ensuring Harmonization with E-Navigation Related Information

IALA Guideline 1105 provides guidance on how to achieve a 'harmonized presentation' of information ashore with the presentation on board in the e-Navigation context. The goal is to achieve improved common understanding of situations by shore side users and ship navigators by having similar portrayal of common information.

This Guideline is not associated with an IALA Recommendation and is an informative provision of IALA Standard 1060 Digital Communication Technologies. It simply additional desirable practices but with which it is not necessary to conform in order to claim compliance to the Standard.

IALA Guideline 1105 - Shore-side portrayal ensuring harmonization with e-Navigation related information can be found at <https://www.iala-aism.org/product/shore-side-portrayal-1105/>.



16. IALA

16.1. Introduction

IALA is a non-profit, international technical association. Established in 1957, IALA brings 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 harmonize marine aids to navigation worldwide and to ensure that the movements of vessels are safe, expeditious and cost effective while protecting the environment.

The term 'Marine Aid to Navigation' referred to in the IALA Constitution should be understood to be a device, system or service, external to a vessel, designed and operated to enhance safe and efficient navigation of individual vessels and vessel traffic. For the purposes of IALA this definition includes Vessel Traffic Services.

16.2. Aim

The aim of IALA is to foster the safe, economic and efficient movement of vessels, through improvement and harmonization of aids to navigation worldwide and, and by other appropriate means, for the benefit of the maritime community and the protection of the environment.

To achieve world-wide improvement and harmonization of Vessel Traffic Services IALA publishes Standards, Recommendations, Guidelines, and

Model Courses specifically related to the development, implementation and operation of Marine Aids to Navigation.

IALA achieves its aim by, among other things:

- Developing international cooperation by promoting close working relationships and assistance between members;
- Collecting and circulating information about the activities of its members as well as encouraging, supporting and communicating recent developments;
- Facilitating mutual exchange of information with organizations representing the users of marine aids to navigation;
- Formulating and publishing appropriate Standards, Recommendations, Guidelines, Manuals and other appropriate papers;
- Encouraging members to take into account the development of multi-purpose systems which may also be used, for instance, to monitor the marine environment;
- Establishing committees, working groups or other such bodies as may be appropriate to study special issues;
- Facilitating assistance to services or organizations requesting help within the marine aids to navigation and allied fields, whether technical, organizational or training;
- Organising conferences, symposia, seminars, workshops and other events relevant to its work.

16.3. Vision

The Strategic Vision for IALA for the period 2018-2026 defines two goals:

Goal 1 - Marine Aids to Navigation are developed and harmonized through international cooperation and the provision of standards.

Goal 2 - All coastal States have contributed to a sustainable and efficient global network of Marine Aids to Navigation through capacity building and the sharing of expertise.

To achieve these Goals, eight strategies are defined in the Strategic Vision. These include:

S1 - Develop standards suitable for direct citation by States, in areas deemed important by the General Assembly, and the related Recommendations and Guidelines.

S2 - Position IALA as the source of standards, knowledge, and expertise that will enable States to provide Marine Aids to Navigation, in accordance with relevant international obligations and recommendations.

S3 - Coordinate the further development of Marine Aids to Navigation, taking into account evolving operational and functional requirements, new techniques, new technologies and sustainability.

S4 - Continue to develop capacity building activities to improve the global provision of Marine Aids to Navigation.

S5 - Harmonise the information structure and communications for future navigation by creating standards, and by cooperation with other international organizations, to achieve worldwide interoperability of shore and ship systems.

S6 - Improve and harmonise the delivery of VTS globally and in a manner consistent with international conventions, national legislation and public expectations, to ensure the safety and efficiency of vessel traffic and to protect the environment.

S7 - Work towards the transformation of IALA into an IGO, to enable the organization to achieve its aim and objectives.

S8 - Ensure that the resources and capabilities of the Secretariat are sufficient to enable IALA and its committees and organs to reach its goals.

16.4. Standards

IALA Standards are a vital component of the Strategic Vision, providing the overarching framework to harmonise Marine Aids to Navigation worldwide, including VTS, through implementation by all coastal States. The framework provides a hierarchy of five documents, including:

▪ **Standard:** IALA Standards form a framework, implementation of which by all coastal States will harmonize Marine Aids to Navigation worldwide. IALA standards cover technology and services and are non-mandatory.

▪ **Recommendation:** IALA Recommendations specify what practices shall be carried out in order to comply with a Recommendation, and may be referenced, in full or in part, in an IALA Standard.

▪ **Guideline:** IALA Guidelines describe how to implement practices normally specified in a Recommendation.

▪ **Model Course:** IALA Model Courses are training documents which define the level of training and knowledge needed to reach levels of competence defined by IALA.

▪ **Manual:** IALA Manuals provide an overall view of a wide subject area. The IALA Dictionary is considered a Manual.

IALA Standards are suitable for direct citation by States in the interest of an efficient and harmonised global delivery of VTS.

Implementation of a Standard by a Marine Aids to Navigation provider is at the choice of the organization. IALA Standards are not mandatory. However if an organization wishes to claim compliance with an IALA Standard then it should implement the normative Recommendations referenced in the Standard.

The IALA Standards and associated documentation specifically related to VTS are provided in [Chapter 2.4 – IALA Standards](#).



VTS Centre Brunshötel Elbe Traffic



Belgium - Zeebrugge

16.5. Membership

IALA has four types of members:

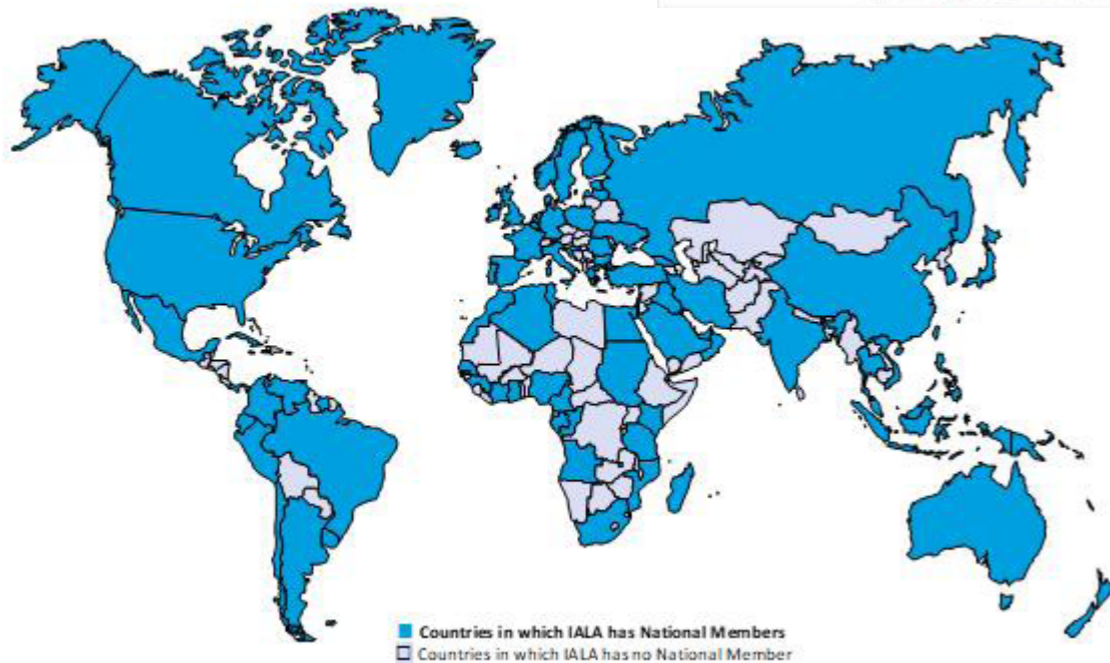
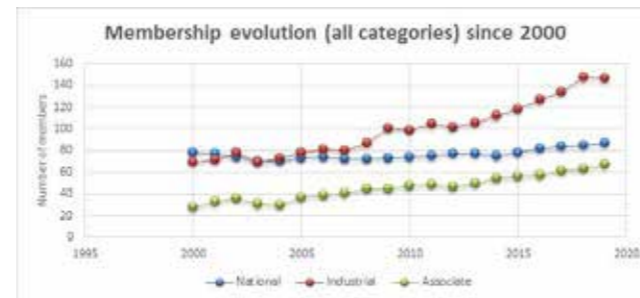
National membership: Applicable to the national authority of any country that is legally responsible for the provision, management, maintenance or operation of Marine Aids to Navigation.

Associate membership: Applicable to any other service, organization or scientific agency concerned with Marine Aids to Navigation or related matters.

Industrial membership: Applicable to manufacturers and distributors of Marine Aids to Navigation equipment for sale, or organizations providing aids to marine navigation services or technical advice under contract.

Honorary membership: May be conferred for life by the Council to any individual who is considered to have made an important contribution to the work of IALA.

At the end of 2019, IALA comprised a membership of 87 national members, 147 industrial members, 67 associate members and 42 personal honorary members.



16.6. Council

IALA is administered by a Council, headed by a President who is elected by the Council.

The Council comprises of twenty-one elected and three non-elected members. The elected positions are determined by a ballot of all national members attending a General Assembly.

The IALA Council approves the annual budgets, financial statements and IALA Recommendations and Guidelines, as well as other publications as appropriate. The Council also sets the rates for contributions each year and authorizes any major purchases or bank loans.

The three non-elected members are a National member of the Host Nation (France), the National member which hosted the previous Conference and the National member which will host the next Conference.

16.7. Committees

Committees are at the heart of the Association and are established by Council to support the endeavours of IALA. In summary, the Committees:

- Study matters relevant to the aims of IALA, with the objective of preparing Standards, Recommendations, Guidelines, Model Courses and Manuals, and submissions to other organizations in accordance with the work programme approved by IALA Council; and
- Address other objectives as established by IALA Council.

All members are eligible to participate in the Committees resulting in an international community of experts in a particular field, who prepare and review relevant IALA publications. They also continuously monitor specific developments; these can influence the guidance offered to the IALA membership and affect decisions made in the provision of Marine Aids to Navigation.

Committee meetings also enable all members to share expertise and experiences and keep abreast of developments in their field. They normally meet twice a year at the IALA Headquarters, in Saint Germain-en-Laye, France. Frequently, the work of different committees can overlap.

Draft Recommendations and Guidelines, and other documents created by the Committees may address topics relating to management, operations, engineering, emerging technologies and training, and are forwarded to the Council for approval before being published on the website.

16.7.1. VTS Committee

IALA has been associated with the development of VTS for over 50 years, having first discussed the use of shore-based radar installations and VHF radiotelephone communications as a means of providing improved navigational facilities for shipping. IALA followed the developments of VTS and, recognizing that these were uncoordinated and differed from country to country, considered that there needed to be a forum at which similar



problems could be discussed and experiences could be shared.

Consequently, in 1980 or 81, IALA established a VTS Committee to undertake these tasks. Since then the VTS Committee has grown steadily and has developed into the foremost forum on Vessel Traffic Services in the world.

A primary objective of the VTS Committee is the provision of sound and timely guidance and advice to those involved in VTS matters. Given the complexity of modern, multi-discipline systems and management, it rarely does this in isolation, consulting frequently with other committees, allied organizations and the IMO.

The formal posts on the VTS Committee include a Chair, Vice Chair and a Secretary.

The Committee's work programme is decided on a 4-yearly basis by the IALA Council, but new items may be added to meet changes in the maritime industry and the demands of members.

Work items are normally allocated, where this is appropriate, to working groups (WG) within the VTS Committee that have the following broad remits:

- VTS Operations
- VTS Technology
- VTS Training

16.8. World-Wide Academy (WWA)

In January 2012 IALA established the World-Wide Academy, the vehicle by which IALA delivers training and capacity building. The Academy is an integral part of IALA, independently funded.

The Academy works closely with IMO and other key Organizations, such as IHO, to develop capacity building in a coordinated manner as part of the United Nations "Delivering as One" initiative. The Academy establishes and manages systematic aids to navigation capacity building to enable national authorities of developing States in target regions to meet their obligations under the UNCLOS and SOLAS Conventions.

The Academy is there to promote the work of the IALA Committees and assist in the development of IALA standards related to marine aids to navigation training.



VTS Committee at 47th session in September 2019

17. DEFINITIONS

17.1. DEFINITIONS

The definitions of terms used in this Manual can be found in the International Dictionary of Marine Aids to Navigation (IALA Dictionary) at https://www.iala-aism.org/wiki/dictionary/index.php/Main_Page.

The definitions were checked as correct at the time of going to print. Where conflict arises, the IALA Dictionary should be considered as the authoritative source of definitions used in IALA documents.



ANNEX 3



ANNEX 3

STANDARD	SCOPE	RECOMMENDATION			GUIDELINE	
		REF.	TITLE	NORMATIVE/ INFORMATIVE	REF.	TITLE
IALA1010 AtoN Planning and Service Requirements	Risk Management	R1002	Risk Management for Marine Aids to Navigation	Normative	G1018	Risk Management (May 2013)
					G1123	The Use of IALA Waterway Risk Assessment Programme (IWRAP MkII) (June 2017)
					G1124	The Use of Ports and Waterways Safety Assessment (PAWSA MkII) Tool (June 2017)
					G1138	The Use of the Simplified IALA Risk Assessment Method (SIRA) (Dec 2017)
					[G]1104	The Application of Maritime Surface Picture for Analysis in Risk Assessment and the Provision of [Marine] Aids to Navigation Service Delivery (Dec 2013)
	Quality management	O-132	Quality Management for Aids to Navigation Authorities	Normative	G1052	Quality Management Systems for Marine Aids to Navigation Service Delivery (Dec 2013)
IALA1040 Vessel Traffic Services	VTS implementation	R0102 V-102	The application of the 'User Pays' principle to Vessel Traffic Services	Informative		
		R0119	Establishment of VTS	Normative	G1071	Establishment of a Vessel Traffic Service Beyond Territorial Seas (Dec 2009)
	G 1083				Standard Nomenclature to Identify and Refer to VTS Centres (June 2011)	
	G1142				The provision of Local Port Services other than VTS (June 2019)	
	G1150				Establishing, planning and implementing VTS (Dec 2020)	
	R0120 V-120	Vessel Traffic Services in Inland Waters	Informative			
	VTS operations	R0127 (V-127)	VTS Operations	Normative	G1089	Provision of VTS (INS, TOS & NAS) (Dec 2012)
					G1110	Use of Decision Support Tools for VTS Personnel (Dec 2014)
					G1131	Setting and Measuring VTS Objectives (Dec 2017)
					G1045	Staffing Levels at VTS Centres (Dec 2018)
G1118					Marine Casualty / Incident Reporting and Recording, Including Near-Miss Situations as it Relates to VTS (Dec 2016)	
G1141					Operational Procedures for Vessel Traffic Services (Dec 2018)	
G1144					Promulgating the Requirements of a VTS to Mariners - A VTS Users Guide Template (June 2019)	
G1149					VTS Training for Deck Officers (Dec 2019)	

STANDARD	SCOPE	RECOMMENDATION			GUIDELINE	
		REF.	TITLE	NORMATIVE/ INFORMATIVE	REF.	TITLE
IALA1040 Vessel Traffic Services	VTS data and information management	R0125 V-125	The use and presentation of symbology at a VTS centre	Normative		
		R1014	Portrayal of VTS information and data	Normative	1105	Shore side Portrayal ensuring harmonization with e-Navigation related information
	VTS communications	R1012	VTS Communications	Normative	G1132	VTS VHF Voice Communication (Dec 2017)
	VTS technologies	R0128 V-128	Operational and Technical Performance of VTS Systems	Normative	G1111	Preparation of Operational and Technical Performance Requirements for VTS
	VTS Auditing and assessing	R1013	Auditing and Assessing Vessel Traffic Services	Normative	G1101	Auditing and Assessing VTS (Dec 2013)
					G1115	Preparing for an IMO Member State Audit Scheme (IMSAS) on Vessel Traffic Services (Dec 2015)
	VTS additional services				G1070	VTS Role in Managing Restricted or Limited Access Areas (Dec 2009)
					G1102	VTS Interaction with Allied or Other Services (Dec 2013)
					G1130	Technical Aspects of Information Exchange Between VTS and Allied or Other Services (Dec 2017)
	IALA1050 Training and Certification	Training and assessment	R0103 (V-103)	Training and Certification of VTS Personnel	Normative	[G]1017
[G]1027						Simulation in VTS Training (Dec 2005)
[G]1103						Train the Trainer (Dec 2013)
Accreditation, competency, certification and revalidation		R0149 (O-149)	Accreditation of Training Organisations	Normative	[G]1014	Accreditation and Approval Process for VTS Training Courses (Dec 2011)
Model Courses					V-103/1	Vessel Traffic Services Operator Training (Dec 2009)
					V-103/2	Vessel Traffic Services Supervisor Training (Dec 2009)
					V-103/3	Vessel Traffic Services On the Job Training (Dec 2009)
				V-103/4	Vessel Traffic Services On the Job Training Instructor (Dec 2009)	
IALA1050 Training and Certification	Data models and data encoding (IVEF, S-100, S- 200, ASM)	R0145 V-145	The Inter-VTS Exchange Format (IVEF) Service	Normative		



VESSEL TRAFFIC SERVICES MANUAL

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EDITION 8