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FOREWORD

The VTS Manual has been a signature document and information source for Governments, Competent Authorities, VTS Providers, 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 Providers 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.

ULSAN VTSO by Korea Coast Guard

ACKNOWLEDGEMENT

The photographs in this Manual were provided by members of the VTS Committee acting either in their capacity as representatives of a member organization or as private individuals. The photographs were accompanied by permission to publish them in this Manual. IALA wishes to acknowledge these donations as well as the copyright of donors.

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Thanks for the task of editing
this manual are due to
Neil Trainor

LANGUAGE DISCLAIMER

The authentic version of IALA documentation is English unless otherwise stated.

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Kiel Canal3-Germany

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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 are shore-side systems to monitor and manage ship traffic to ensure the safety and efficiency of ship movements.

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.1158(32) Guidelines for Vessel Traffic Services defines VTS as: services implemented by a Government with the capability to interact with vessel traffic and respond to developing situations within a vessel traffic service area to improve the safety and efficiency of navigation, contribute to safety of life at sea and support the protection of the environment.

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

Key benefits of implementing VTS include:

- identification and monitoring of ships;
- strategic planning of ship movements;
- management of ship traffic;
- provision of information that may influence ship movements and assist onboard decision-making;
- support to the navigational safety of ships through the provision of essential navigational information to assist onboard navigational decision-making; and
- support to related activities such as pilotage, search and rescue, maritime security and law enforcement.

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.

Masan VTSO, Korean Coast Guards

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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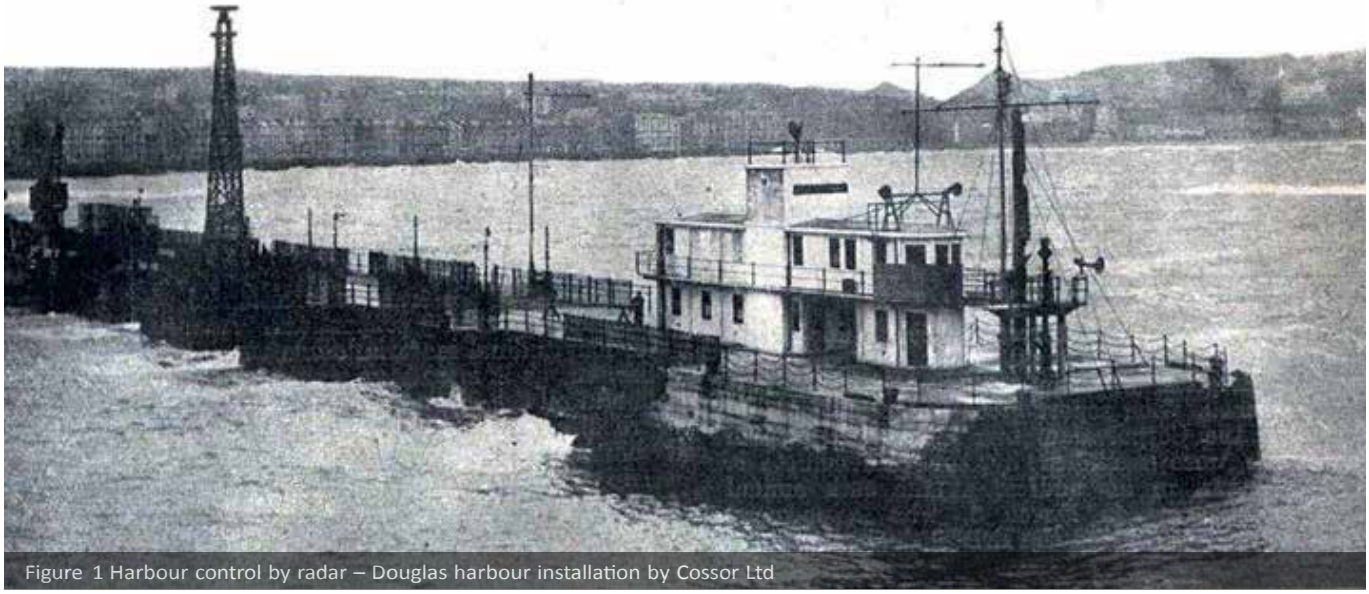


Figure 1 Harbour control by radar – Douglas harbour installation by Cossor Ltd

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.


Car carrier Autorunner

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'.

Recognizing that various organizational, operational and technological developments have taken place globally in a rapidly changing maritime domain since 1997, IALA coordinated a review and update of the Resolution during its 2018-2022 work programme for submission to the IMO. The submission culminated in adoption of IMO Assembly Resolution A.1158(32) in December 2021.


SMA - A container ship arrives at the port of Gothenburg in VTS area Göteborg

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.1158(32) 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.

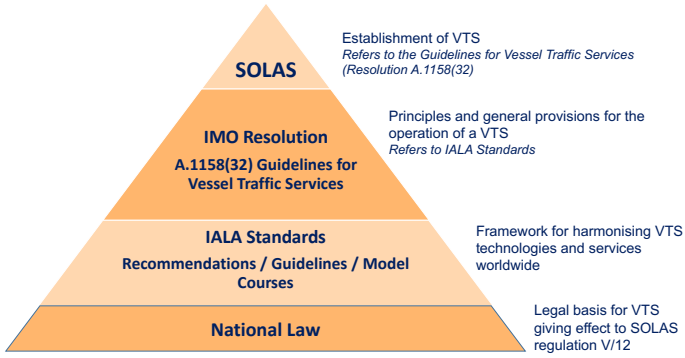
2.2.1. SOLAS Chapter V Regulation 12 – Vessel Traffic Services

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.1158(32) 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.1158(32) Guidelines for Vessel Traffic Services in 2021 recognizing that:

- various organizational, operational and technological developments have taken place globally in a rapidly changing maritime domain since the adoption, in 1997, of resolution A.857(20) on Guidelines for vessel traffic services and that a revision of those Guidelines became necessary; and
- vessel traffic services should be established and operated in a harmonized manner and in accordance with internationally approved guidelines

The Resolution describes the purpose of VTS, the regulatory and legal framework for establishing and operating VTS, the roles and responsibilities of Contracting Governments, competent authorities, VTS providers and participating ships and the qualifications and training requirements for VTS personnel.

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

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

Under the general provisions of treaty law and of IMO conventions, Contracting Governments 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.

The establishment of VTS is dependent on national law and relevant international conventions, recognizing factors such as the volume of traffic, degree of risk, and geographical and environmental conditions. Key responsibilities of Contracting Governments and competent authorities for establishing and operating VTS described in Resolution A.1158(32) include, amongst other things:

- establishing a legal basis for VTS that gives effect to regulation V/12 of the Convention.
- establishing a regulatory framework for establishing and operating VTS in accordance with relevant international conventions and IMO instruments, IALA standards and national law.
- establishing a compliance and enforcement framework with respect to violations of VTS regulatory requirements.

Vessel Swallow Ace passes Hatteberget where seals are resting

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 specifies the practices associated with implementing and establishing VTS in Recommendation 0119 - Establishment of VTS.

3.2. Recommendation 0119 - Establishment of a VTS

Recommendation 0119 specifies the practices associated with the establishment and operation 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 a VTS.
- 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 a 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 practices described in the associated Guidelines should be taken into account.

IALA *Recommendation 0119 - Establishment of VTS* can be found at https://www.iala-aism.org/product/r0119/

3.2.1. Guideline 1150 - Establishing, Planning and Implementing a VTS

Guideline 1150 provides the framework to assist authorities:

- in establishing, planning and implementing VTS.
- routinely evaluate a VTS to ensure the operational objectives are being met, the technical and operational performance is 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.

IALA Guideline 1150 – Establishing, Planning And Implementing a VTS can be found at https://www.iala-aism.org/product/g1150/ .

3.2.2. 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/g1083/ .

3.2.3. 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/ https://www.iala-aism.org/guidance-publications


VTS Centre Travemünde - Baltic Sea-Germany

3.3. Additional Guidance

Additional guidance to assist authorities in establishing, planning and implementing VTS includes:

- Guideline 1160 - Competencies for Planning and Implementing a VTS
- Guideline 1171 - Human Factors and Ergonomics in VTS
- Guideline 1166 - VTS in Inland Waters

3.3.1. Guideline 1160 - Competencies for Planning and Implementing a VTS

Guideline 1160 describes the knowledge, skills, attitudes and personal attributes that would assist those responsible for the planning and implementation of VTS.

The purpose of the guidance is to assist Contracting Governments, competent authorities for VTS and VTS providers in establishing, planning and implementing a VTS effectively in a manner consistent with their international obligations under SOLAS and to conform with IALA Standards.

In particular, the guidance provides a mechanism to ensure those responsible for the planning and implementation are competent in the practices described in Recommendation R0119 (V-119) Establishment of a VTS and associated Guideline G1150 Establishing, Planning and Implementing a VTS.

IALA Guideline 1160 - Competencies for Planning and Implementing VTS can be found at https://www.iala-aism.org/product/g1160/

IALA Guideline 1160 – Competencies for Planning and Implementing VTS is associated with Recommendation R0119 Establishment of a VTS.

Guideline 1160 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.

Kiel Canal Brunsbüttel Locks-Germany

3.3.2. Guideline 1171 - Human Factors and Ergonomics in VTS

Guideline 1171 provides awareness regarding the role of the human factor in the performance of a VTS. It is intended to present a source of information to assist the VTS provider in the preparation and implementation of systems to support operational performance. It is not intended to provide specific information on the safety culture or portrayal of data.

Furthermore, this Guideline provides guidance in implementing human factors during the training cycle (e.g., initial On-the-Job, recurrent, updating and adaptation training).

IALA Guideline 1171 - Human Factors and Ergonomics in VTS is associated with Recommendation R0119 - Establishment of a VTS.

Guideline 1171 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.

IALA Guideline 1171 - Human Factors and Ergonomics in VTS can be found at https://www.iala-aism.org/product/g1171/

3.3.3. Guideline 1166 – VTS in Inland Waters

The purpose of this Guideline is to assist authorities establish inland VTS in waters effectively and in a manner that reflects the international regulatory regime for VTS. It identifies IALA recommendations and guidelines that may have relevance to inland VTS and offers considerations for applying or adapting IALA guidance to inland waters, which national administrations may wish to take into account when applying this to national legislation or policy.

IALA Guideline 1166 – VTS in Inland Waters is associated with Recommendation R0119 - Establishment of a VTS.

Guideline 1166 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.

IALA Guideline 1166 - VTS in Inland Waters can be found at https://www.iala-aism.org/product/g1166/

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 a VTS.
- Guideline 1141 - Operational Procedures for Delivering VTS.
- 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 practices described in the associated Guidelines should be taken into account.

IALA Recommendation 0127 - VTS Operations can be found at https://www.iala-aism.org/product/r0127/ .

River Elbe-Germany


Kaapduin

4.2.1. Guideline 1089 - Provision of a VTS

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 a VTS can be found at https://www.iala-aism.org/product/g1089/ .

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/g1141/ .

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

Decision Support Tools are used to help enhance situational awareness and the decision-making process of VTS personnel by providing analysis and insight to developing or emergency situations, in real time, near real time and for long-term planning.

Guideline 1110 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.

IALA Guideline 1110 – Use of Decision Support Tools for VTS Personnel can be found at https://www.iala-aism.org/product/g1110/ .

4.2.4. Guideline 1131 - Setting and Measuring VTS Objectives

IMO Resolution A.1158(32) Guidelines for Vessel Traffic Services states that the VTS provider should:
"set operational objectives for VTS that are consistent with improving the safety and efficiency of ship traffic and the protection of the environment. The objectives set should be routinely evaluated to demonstrate that they are being achieved".
Guideline 1131 provides guidance for Competent Authorities and VTS providers for setting objectives for a VTS and achieving the obligations associated with SOLAS regulation V/12 (Vessel Traffic Services) and IMO Resolution A.1158(32).

IALA Guideline 1131 - Setting and Measuring VTS Objectives can be found at https://www.iala-aism.org/product/g1131/ .

4.2.5. Guideline 1045 - Staffing Levels at VTS Centres

IMO Resolution A.1158(32) Guidelines for Vessel Traffic Services states that the VTS provider should:
"ensure that VTS are adequately staffed and that VTS personnel are appropriately trained and qualified"
Guideline 1045 provides guidance to assist authorities in determining appropriate staffing levels for a VTS Centre.

IALA Guideline 1045 – Staffing Levels at VTS Centres can be found at https://www.iala-aism.org/product/g1045/ .

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/g1118/ .

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.

Pilot boat during the storm Egon

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/ .

4.3. Additional Guidance

Additional guidance to assist authorities in VTS operations includes:

- Guideline 1167 - VTS Management
- Guideline 1149 - VTS Training for Deck Officers
- Guideline 1176 - How to Promote Safety Culture in VTS

4.3.1. Guideline 1167 - VTS Management

Good management practices are important to achieving the obligations of a VTS provider described in IMO resolution A.1158(32) Guidelines for Vessel Traffic Services.

Guideline 1167 provides information to assist VTS providers implement management activities to facilitate the effective and efficient delivery of VTS and achieve its purpose and operational objectives. It describes the general principles of management processes, activities related to VTS management and presents associated competencies and training subjects.

IALA Guideline 1167 is not associated with an IALA Recommendation and is an informative provision of IALA Standard 1040 Vessel Traffic Services.

IALA Guideline 1167 – VTS Management can be found at https://www.iala-aism.org/product/g1167/

4.3.2 Guideline 1149 - VTS Training for Deck Officers

An efficient VTS relies upon the co-operation between the bridge team and the VTS operator (VTSO). The effectiveness of information exchange depends upon each party's understanding of their respective functions and responsibilities. Increased knowledge and understanding of a VTS by the bridge team will enhance teamwork between VTS and ships and improve safe navigation.

This Guideline presents guidance and information to be used by maritime training organizations in the development of training on VTS as an integral part of the training of deck officers. This document also provides examples of activities that could be used to facilitate effective communications and the exchange of information between the bridge team and the VTSO.

IALA Guideline 1149 is not associated with an IALA Recommendation and is an informative provision of IALA Standard 1040 Vessel Traffic Services.

IALA Guideline 1149 - VTS Training for Deck Officers can be found at https://www.iala-aism.org/product/g1149/

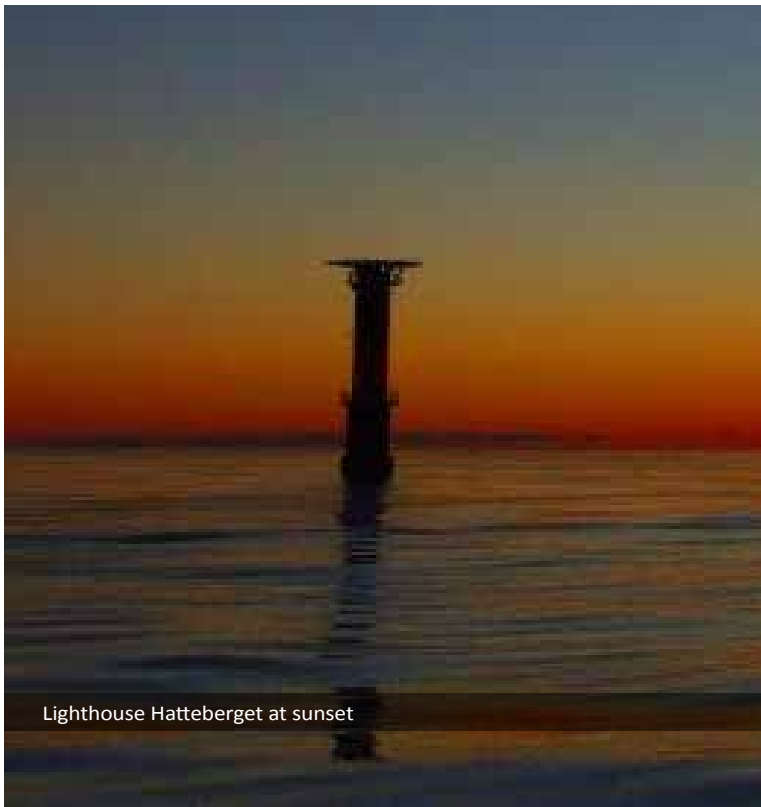
4.3.3 Guideline 1176 - How to Promote Safety Culture in VTS

The promotion of safety culture in VTS operations is essential to ensure the safety and efficiency of vessel traffic in VTS areas.

Guideline 1176 provides information to assist competent authorities and VTS providers in the promotion of safety culture.

IALA Guideline 1176 is not associated with an IALA Recommendation and is an informative provision of IALA Standard 1040 Vessel Traffic Services.

IALA Guideline 1176 - How to Promote Safety Culture in VTS can be found at https://www.iala-aism.org/product/g1176/



Lighthouse Hatteberget at sunset

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 practices described in the associated Guidelines should be taken into account.

IALA Recommendation 1012 - VTS Communications can be found at https://www.iala-aism.org/product/r1012/ .

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/ .

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 practices described in the associated Guidelines should be taken into account.

IALA Recommendation 1013 - Auditing and Assessing Vessel Traffic Services can be found at https://www.iala-aism.org/product/r1013/ .

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/g1101/ .

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/g1115/ .

Storm at Skallen within VTS area Marstrand

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 in nature and are to encourage best practice.

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/g1070/ .

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/g1102/ .

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/ .

8. VTS DATA AND INFORMATION MANAGEMENT

8.1.Introduction

The compilation of an accurate traffic image in the VTS Centre, thus allowing the evaluation of situations more accurately and decisions to be made more readily, is substantially dependent on the manner in which the data is presented.

IALA Standard 1040 Vessel Traffic Services specifies the practices associated with the presentation of data and information at a VTS centre is in Recommendation 0125 - VTS Portrayal.

8.2. Recommendation 0125 - VTS Portrayal

Portrayal covers the interaction of users with the (technical) system in a VTS Centre. This includes presentation on screen and any other visible and/or acoustical output from the system. It also includes the tactile (type, click) and acoustical input (voice) to the system.

Recommendation 0125 specifies the practices associated with the portrayal of VTS data and information at a VTS centre.

IALA Recommendation 0125 - VTS Portrayal 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 practices described in the associated Guidelines should be taken into account.

Recommendation 0125 - VTS Portrayal can be found at https://www.iala-aism.org/product/r0125/ .

8.2.1. Guideline 1177 - Portrayal of VTS Information

Guideline 1177 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.

Guideline 1177 can be found at https://www.iala-aism.org/product/g1177/

Winter at Pater Noster within VTS area Marstrand

9. VTS TECHNOLOGIES

9.1. Introduction

The establishment and on-going operation of a VTS requires the implementation and on-going maintenance of VTS systems and equipment to ensure the capability to interact with the traffic and to respond to the developing situations in the VTS area. The functional and performance requirements for VTS systems need to be carefully considered in the establishment and ongoing operation of VTS to ensure the purposes of the VTS can be achieved.

IALA Standard 1040 Vessel Traffic Services specifies the practices associated with VTS technologies in *Recommendation 0128 - VTS Systems and Equipment.*

9.2.Recommendation 0128 - VTS Systems and Equipment

Recommendation 0128 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.

IALA guidelines related to the establishment of the functional and performance requirements for VTS systems and equipment include:

- G1111 - Establishing Functional and Performance Requirements for VTS Systems and Equipment
- G1111-1 Producing Requirements for the Core VTS System
- G1111-2 Producing Requirements for Voice Communications
- G1111-3 Producing Requirements for RADAR Systems
- G1111-4 Producing Requirements for AIS
- G1111-5 Producing Requirements for Environment Monitoring Systems
- G1111-6 Producing Requirements for Electro Optical Systems
- G1111-7 Producing Requirements for Radio Direction Finder Systems
- G1111-8 Producing Requirements for Long Range Sensor Systems
- G1111-9 Producing Framework for Acceptance of VTS Systemspractices specified in Recommendation 0128.

IALA Recommendation 0128 - VTS Systems and Equipment 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 practices described in the associated Guidelines should be taken into account.

IALA Recommendation 0128 - VTS Systems and Equipment can be found at https://www.iala-aism.org/product/r0128/ .

9.2.1. Guideline 1111 - Establishing Functional and Performance Requirements for VTS Systems and Equipment

Guideline 1111 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. The guidance is not prescriptive, and the capabilities required may vary between VTS, VTS area and VTS sectors or even specific parts of a VTS area or sector. VTS capability should be linked to a risk assessment which will identify the degree of mitigation expected of a VTS, together with other mitigation measures, in addressing a specific hazard or hazards. The extent of risk mitigation will be determined by a number of factors that include the equipment fit, equipment capability, local geography and operator authorization/training. This Guideline focuses on an overview of the key areas for consideration related to the establishment of a VTS system.

IALA sub-guidelines G1111-1 to G1111-8 provide specific guidance on initiating and planning functional and performance requirements and implementing VTS systems and equipment, based on operational requirements.

Acceptance steps are typically conducted on the proposed or implemented VTS to ensure compliance with the requirements. These acceptance steps are discussed in G1111-9 Framework for Acceptance of VTS Systems and Equipment.

IALA Guideline 1111 - Establishing Functional and Performance Requirements for VTS Systems and Equipment can be found at https://www.iala-aism.org/product/g1111/ .

IALA Guideline 1111-1 Producing Requirements for the Core VTS System can be found at https://www.iala-aism.org/product/g1111-1/

IALA Guideline 1111-2 Producing Requirements for Voice Communications can be found at https://www.iala-aism.org/product/g1111-2/

IALA Guideline 1111-3 Requirements for RADAR can be found at https://www.iala-aism.org/product/g1111-3/

IALA Guideline 1111-4 Producing Requirements for AIS can be found at https://www.iala-aism.org/product/g1111-4/

IALA Guideline 1111-5 Producing Requirements for Environment Monitoring Systems can be found at https://www.iala-aism.org/product/g1111-5/

IALA Guideline 1111-6 Producing Requirements for Electro Optical Systems can be found at https://www.iala-aism.org/product/g1111-6/

IALA Guideline 1111-7 Producing Requirements for Radio Direction Finders can be found at https://www.iala-aism.org/product/g1111-7/

IALA Guideline 1111-8 Producing Requirements for Long Range Sensors can be found at https://www.iala-aism.org/product/g1111-8/

IALA Guideline 1111-9 Framework for Acceptance of VTS Systems and Equipment can be found at https://www.iala-aism.org/product/g1111-9/

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 if compliance with this Standard is claimed. To demonstrate compliance with the Recommendation the practices described in the associated Guidelines should be taken into account

IALA Recommendation 0145 - The Inter-VTS Exchange Format (IVEF) Service can be found at https://www.iala-aism.org/product/r0145/ .

Belgium - Zeebrugge

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 - 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:
  - C0103-1 VTS Operator Training.
  - C0103-2 VTS Supervisor Training.
  - C0103-3 VTS On-the-Job Training.
  - C0103-4 VTS On-the-Job Training Instructor.
  - C0103-5 The Revalidation Process for VTS Qualification and Certification.

IALA Recommendation 0103 - 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 practices described in the associated Guidelines should be taken into account.

IALA Recommendation 0103 - Training and Certification of VTS Personnel can be found at https://www.iala-aism.org/product/r0103/

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/ .

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/g1017/ .

11.2.3. Guideline 1027 - Simulation in VTS Training

Guideline 1027 provides guidance on the use of simulations 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/g1027/ .

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/g1103/

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 C0103-1 - VTS Operator Training

The purpose of the 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. It provides guidance on the level of training and knowledge needed to reach levels of competence defined by IALA to obtaining a C0103-1 certificate.

IALA Model Course C0103-1 VTS Operator Training can be found at https://www.iala-aism.org/product/c0103-1/ .

11.2.5.2. Model Course C0103-2 - VTS Supervisor Training

Model Course C0103-2 describes the knowledge, skills and competences required to be certified as a VTS Supervisor. It also provides a framework for:

- training organizations to ensure their C0103-2 curriculum meets IALA standards; and
- competent authorities to approve C0103-2 courses provided by a training organization.

IALA Model Course C0103-2 – VTS Supervisor Training can be found at https://www.iala-aism.org/product/c0103-2/ .

11.2.5.3. Model Course C0103-3 - VTS On-The-Job Training

The purpose of model course C0103-3 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. It provides guidance on the level of training and knowledge needed to reach levels of competence defined by IALA to obtain a C0103-3 endorsement.

This model course is designed to provide a consistent approach to the training of VTS Personnel in a specific operational VTS environment, and complements the training delivered in model courses C0103-1 and C0103-2.

IALA Model Course C0103-3 VTS On-The-Job Training can be found at https://www.iala-aism.org/product/c0103-3/ .

11.2.5.4. Model Course C0103-4 - VTS On-The-Job Training Instructor

The purpose of model course C0103-4 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. It provides guidance on the level of training and knowledge needed to reach levels of competence defined by IALA to be certified as a VTS On-the-Job Training Instructor.

IALA Model Course C0103-4 VTS On-The-Job Training Instructor can be found at https://www.iala-aism.org/product/c0103-4/ .

11.2.5.5. Model Course C0103-5 - The Revalidation Process for VTS Qualification and Certification

Model Course C0103-5 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 C0103-5 The Revalidation Process for VTS Qualification and Certification can be found at https://www.iala-aism.org/product/c0103-5/ .

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 practices described in the associated Guidelines should be taken into account.

IALA Recommendation O-149 - Accreditation of Training Organizations can be found at https://www.iala-aism.org/product/r0149/ .

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/g1014/ .

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 practices described in the associated Guidelines should be taken into account.

IALA Recommendation 1002 Risk Management for Marine Aids to Navigation can be found at https://www.iala-aism.org/product/r1002/

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/g1018/ .

INCHEON VTSO by Korea Coast Guard

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/ .

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/ .

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/g1138/ .

BUSAN VTSO by Korea Coast Guard

Cormorants wihtin 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 practices described in the associated Guidelines should be taken into account.

IALA Recommendation O-132 - Quality Management for Aids to Navigation Authorities can be found at https://www.iala-aism.org/product/r0132/ .

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/g1052/ .

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 0123 - The Provision of Shore Based Automatic Identification System (AIS).
- Recommendation 0126 - The use of the Automatic Identification System (AIS) in Marine Aids to Navigation Services.
- Guideline 1082 - An overview of AIS.
- Guideline 1105 - Shore-Side Portrayal Ensuring Harmonization with E-Navigation Related Information.

15.2. Recommendation 0123 - The Provision of Shore Based Automatic Identification System (AIS)

Recommendation 0123 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 0123 - 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 0123 - The Provision of Shore Based Automatic Identification System (AIS) can be found at https://www.iala-aism.org/product/r0123/ .

15.3. Recommendation 0126 - The use of the Automatic Identification System (AIS) in Marine Aids to Navigation Services

Recommendation 0126 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 Recommendation 0126 - 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 0126 - The use of the Automatic Identification System (AIS) in Marine Aids to Navigation Services can be found at https://www.iala-aism.org/product/r0126/ .

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 is not associated with an IALA Recommendation and is an informative in nature.

IALA Guideline 1082 - An overview of AIS can be found at https://www.iala-aism.org/product/g1082/ .

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.

IALA Guideline 1105 - Is not associated with an IALA Recommendation and is an informative provision of IALA Standard 1060 Digital Communication Technologies. It specifies additional desirable practices but 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/g1105/ .

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.

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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.

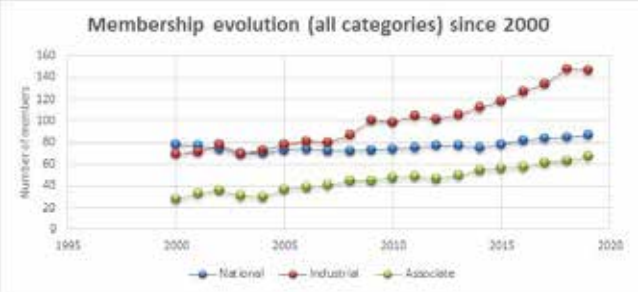
IALA Standards are suitable for direct citation by States in the interest of an efficient and harmonised global delivery of VTS.
Implementation of a Standard by a Marine Aids to Navigation provider is at the choice of the organization. IALA Standards are not mandatory. However if an organization wishes 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.

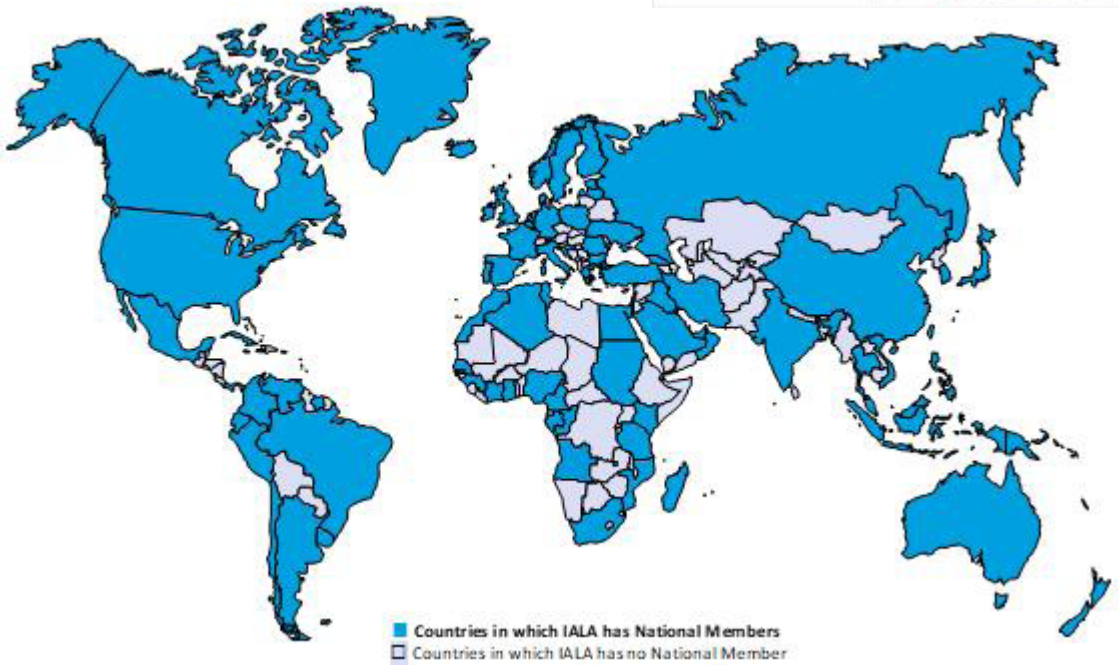

Belgium - Zeebrugge

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.





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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

Kiel Canal - Germany

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

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Standards, Recommendations, Guidelines and Model Courses specifically related to the establishment and operation of VTS

STANDARD	SCOPE	RECOMMENDATION			GUIDELINE	
		REF.	TITLE	NORMATIVE/ INFORMATIVE	REF.	TITLE
S1040 Vessel Traffic Services	VTS implementation	R0119	Establishment of a VTS (Jun 2022)	Normative	G1150	Establishing, Planning and Implementing a VTS (Jun 2022)
					G1083	Standard Nomenclature to Identify and Refer to VTS Centres (Jan 2022)
					G1142	The provision of Local Port Services other than VTS (Jan 2022)
				Informative	G1160	Competencies for Planning and Implementing a VTS (Jan 2022)
					G1166	VTS in Inland Waters (Jan 2022)
					G1171	Human Factors and Ergonomics in VTS (Jun 2022)
	VTS operations	R0127	VTS Operations (Jan 2022)	Normative	G1089	Provision of VTS (Jan 2022)
					G1141	Operational Procedures for Delivering VTS (Jun 2024)
					G1110	Use of Decision Support Tools for VTS Personnel (Jan 2022)
					G1131	Setting and Measuring VTS Objectives (Jan 2022)
					G1045	Staffing Levels at VTS Centres (Jan 2022)
					G1118	Marine Casualty / Incident Reporting and Recording, Including Near-Miss Situations as it Relates to VTS (Jan 2022)
					G1144	Promulgating the Requirements of a VTS to Mariners - A VTS Users Guide Template (Jan 2022)
				Informative	G1167	VTS Management (Jan 2022)
					G1176	How to Promote Safety Culture in VTS (Dec 2022)
					G1149	VTS Training for Deck Officers (Jan 2022)
	VTS data and information management	R0125	VTS Portrayal (Dec 2022)	Normative	G1177	Portrayal of VTS Information (Jun 2024)
	VTS communications	R1012	VTS Communications (Jan 2022)	Normative	G1132	VTS Voice Communications and Phraseology (Jan 2022)
	VTS technologies	R0128	VTS Systems and Equipment (Dec 2022)	Normative	G1111	Establishing Functional and Performance Requirements for VTS Systems and Equipment (Dec 2022)
	VTS Auditing and assessing	R1013	Auditing and Assessing Vessel Traffic Services (Jan 2022)	Normative	G1101	Auditing and Assessing a VTS (Jan 2022)
					G1115	Preparing for an IMO Member State Audit Scheme (IMSAS) on VTS (Jan 2022)
	VTS additional services				G1070	VTS Role in Managing Restricted or Limited Access Areas (Jan 2022)
					G1102	VTS Interaction with Allied or Other Services (Jan 2022)
					G1130	Technical Aspects of Information Exchange Between VTS and Allied or Other Services (Dec 2022)

STANDARD	SCOPE	RECOMMENDATION			GUIDELINE	
		REF.	TITLE	NORMATIVE/ INFORMATIVE	REF.	TITLE
S1050 Training and Certification	Training and assessment	R0103	Training and Certification of VTS Personnel (Jan 2022)	Normative	G1017	Assessment for Recognition of Prior Learning in VTS Training (Jun 2021)
					G1027	Simulation in VTS Training (Jan 2022)
					G1103	Train the Trainer (Dec 2013)
					G1156	Recruitment, Training and Certification of VTS Personnel (Jan 2022)
	Accreditation, competency, certification and revalidation	R0149	Accreditation of Training Organisations (Dec 2016)	Normative	G1014	Accreditation of VTS Training Organizations and Approval to Deliver IALA VTS Model Courses (Jan 2022)
	Model Courses				C-103-1	Vessel Traffic Services Operator Training (Dec 2022)
					C-103-2	Vessel Traffic Services Supervisor Training (Dec 2023)
					C-103-3	Vessel Traffic Services On the Job Training (Dec 2022)
					C-103-4	Vessel Traffic Services On the Job Training Instructor (Jun 2024)
					C-103-5	Vessel Traffic Service Revalidation Process (Jun 2016)
S1010 Aton Planning and Service Requirements	Risk management	R1002	Risk Management for Marine Aids to Navigation (Jun 2017)	Normative	G1018	Risk Management (Jun 2022)
					G1123	The Use of IALA Waterway Risk Assessment Program (IWRAP MkII) (Jun 2022)
					G1124	The Use of Ports and Waterways Safety Assessment (PAWSA MkII) Tool (Jun 2022)
					G1138	The Use of the Simplified IALA Risk Assessment Method (SIRA) (Dec 2022)
					G1104	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	R0132	Quality Management for Aids to Navigation Authorities (Dec 2013)	Normative	G1052	Quality Management Systems for Marine Aids to Navigation Service Delivery (Dec 2013)
S1070 Information Services	Data models and data	R0145	The Inter-VTS Exchange Format (IVEF) Service (Jun 2011)	Normative		

VESSEL TRAFFIC SERVICES MANUAL

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EDITION 8.4