



IALA GUIDELINE

G1166 VTS IN INLAND WATERS

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1. INTRODUCTION

Inland waters or inland waterways are rivers, lakes or other stretches of water, whether linked to the sea or landlocked, which by natural or man-made features are suitable for navigation.

The United Nations Convention on the Law of the Sea (UNCLOS) [1] does not use the term “inland waters” but refers to a nation's “internal waters” and states that:

“waters on the landward side of the baseline of the territorial sea form part of the internal waters of the State.”

The International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended [2], states in Chapter V on Safety of Navigation, inter alia, that:

“The Administration may decide to what extent this chapter shall apply to ships operating solely in waters landward of the baselines which are established in accordance with international law.’ (Regulation V/1)”; and

“Contracting Governments undertake to arrange for the establishment of VTS where, in their opinion, the volume of traffic or the degree of risk justifies such services.” (Regulation V/12).

IMO Resolution *A.1158(32) Guidelines for Vessel Traffic Services* [3] is associated with SOLAS Regulation V/12. It provides high-level guidance for planning, implementing and operating a vessel traffic service under national law. This resolution notes that the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) has contributed significantly to the development of internationally harmonized guidance for vessel traffic services and states that:

“Contracting Governments are encouraged to take into account IALA standards and associated recommendations, guidelines and model courses.”

A State has sovereignty over its inland waters and may make laws to regulate inland waters and their use and may utilize any resource. Foreign vessels have no right of passage within inland waters, and the passage of foreign vessels in inland waters may be regulated by national or regional legislation. While the obligations of SOLAS Regulation V/12, IMO Resolution *A.1158(32)* and IALA standards do not apply in inland waters, it is recommended that their provisions are taken into account.

Noting the IMO regulatory framework for VTS does not apply in inland waters, the following definition for an inland vessel traffic service (inland VTS) has been adopted:

“A service in inland waters implemented by an authority 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 and support the protection of the environment.”

2. PURPOSE

The purpose of this Guideline is to assist authorities establish inland VTS in inland 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.

This Guideline is associated with IALA Recommendation *R0119 (V-119) Establishment of a VTS*.

This Guideline is an informative document which describes desirable practices to assist authorities establishing inland VTS to plan, implement and operate them in a harmonized manner that is aligned with IALA Standards as

appropriate to minimize any confusion to masters of sea-going ships and skippers of inland waterway vessels moving from one vessel traffic service area to another.

3. FEATURES OF INLAND VTS

Inland waterway vessels, including barges, operating in inland waters may navigate beyond inland waters into coastal and port/harbour areas. On the other hand, seagoing ships may operate in inland waters. It follows, therefore, that there are considerable benefits in the control and management of vessel traffic in inland waters being harmonized to similar global standards as far as is appropriate and to follow the IALA guidance for operating VTS in coastal waters and port/harbour areas.

Authorities should, therefore, consider legislating for the control and management of vessels operating in inland waters to be aligned as appropriate with the guidance provided for VTS covering coastal waters and port/harbour areas.

There are many features of inland VTS that may require consideration in the development of a national policy and a regulatory framework.

3.1. SHIPS AND CREW

Inland waterway vessels comprise a wide variety of different types, often with different characteristics to sea going ships and may be subject to different regulatory requirements. Particular consideration may need to be given to:

- carriage requirements for VHF radiotelephone, AIS and other communication equipment;
- crewing standards;
- safety measures;
- requirements for vessels intended for the carriage of passengers, and high-speed craft (HSC);
- requirements and monitoring of vessels carrying dangerous goods; and
- pollution prevention requirements (may differ from MARPOL).

Skippers and other persons responsible for the navigation of inland waterway vessels may have limited VTS awareness and a lack of skills and knowledge of procedures when communicating with a VTS and other vessels. Differing local dialects and an inability to communicate other than in their native language may further complicate communications between inland waterway vessels, sea-going ships, port authorities and VTS personnel.

3.2. VESSEL TRAFFIC FLOW

In the inland waters connected to the sea area and in coastal areas, vessel traffic and vessel traffic flow is often affected by the tide, meteorological conditions (the wind, icing, fog etc.) and seasonal variations in fluvial flow. There may, therefore, be a peak vessel traffic flow during the period of rapid rise and fall of the tide as well as during a rapid change of weather conditions.

An inland VTS concerns the operational management of traffic and the forward planning of vessel movements to prevent congestion and dangerous situations. An inland VTS is particularly relevant in times of high traffic density or when the movement of special transports may affect the flow of other traffic.

Due to the limited dimensions of many fairways in inland waters and permanent inland waterway structures such as locks, dams, weirs and bridges, the distribution of docks, berths and anchorages may be concentrated and, in some sections, vessel traffic may be dense. Therefore, it may be difficult for an inland VTS to predict the position of vessels through Time to Closest Point of Approach (TCPA) and Closest Point of Approach (CPA) and some

information may be limited. As a result, it may be necessary to rely on broader traffic organization measures to implement VTS traffic management.

In relatively large water systems, lakes and busy inland waterways, there may be a succession of inland VTS centres with adjacent VTS Areas; in such circumstances, coordination among VTS centres and other contributing centres will be important.

3.3. EQUIPMENT AND SYSTEMS

When a VTS system is established in inland waters, it is maybe prone to radar clutter and low resolution. Due to the large number of vessels being tracked, the AIS signal may become less reliable or even lost, especially when AIS class B is being used. The VTS alarm function may also be difficult to use effectively. In some circumstances, CCTV may have increased importance as an inland VTS sensor.

Inland VTS may be enhanced by linking it to bespoke systems for tracking, such as the European Vessel Tracking and Tracing (VTT) system.

When the inland VTS covers a long and narrow section of an inland waterway, the VHF working channels of nearby inland VTS centres may cause interference.

Inland waters may naturally be close to shore and in areas covered by Wi-Fi or other mobile networks. Thus, some ship-to-shore communication can be carried out in a more timely and effective manner through these networks. However, consideration should be given to the potential reduction in situational awareness if public networks are used as an alternative to simplex VHF channels.

Inland AIS equipment carried by inland waterway vessels should be compatible with the maritime AIS; it enables direct data exchange in areas where both sea-going ships and inland waterway vessels may be navigating.

3.4. GENERAL NAVIGATION ENVIRONMENT

In inland waters, the dimensions of the fairway, the presence of bridges, dams, weirs, ship locks, revetments and other permanent structures, together with the arrangement of aids to navigation and varying water levels, may cause restrictions on the navigation and operation of vessels. An inland VTS centre may need to process a large amount of information in real time. For some sections of inland waterways, the arrangement of a passage plan, a system of traffic clearances or other appropriate measures may be required.

4. IALA GUIDANCE OF RELEVANCE TO INLAND VTS

The *IALA VTS Manual* [4] provides a source of reference on the establishment and provision of a VTS for all stakeholders. It also provides a pointer to the suite of IALA standards related to VTS and the associated recommendations, guidelines and model courses.

IALA standards apply to VTS in international, territorial and coastal areas and in ports/harbours. Many of the associated recommendations and guidelines may also have a relevance to inland VTS. However, the applicability of this Guideline to inland waters may vary considerably dependent on such high-level aspects as the density of traffic, the type of vessels navigating the inland waterway, the nature of the inland waterway and the applicable local, regional and national provisions.

If it is decided that an inland VTS should be established, IALA guidance should be considered with due regard to inland waters. This includes, but is not limited to, the considerations in the sections below.

This Guideline should be read in conjunction with the *IALA VTS Manual*. Each of the subheadings that follow are aligned with those of the VTS Manual. Each subheading is followed with:

- an “IALA Guidance” subsection identifying IALA guidance of potential relevance to inland waters. The *IALA VTS Manual* should be referred to for a short description and up-to-date referencing for any of the documents quoted; and
- an “Inland Waters Considerations” subsection setting out considerations and best practices that may apply in inland waters.

4.1. REGULATORY AND LEGAL FRAMEWORK

4.1.1. IALA GUIDANCE

The *IALA VTS Manual* identifies SOLAS Regulation V/12 and IMO Resolution *A.1158(32)* as the primary basis of the regulatory and legal framework for a VTS. It also notes that IMO Resolution *A.1158(32)* encourages Contracting Governments to take into account IALA standards and associated recommendations, guidelines and model courses.

The VTS manual describes the types of documents relating to VTS and their purposes. It also highlights the key responsibilities of Contracting Governments and competent authorities set out in IMO Resolution *A.1158(32)* for implementing and operating a VTS.

4.1.2. INLAND WATERS CONSIDERATIONS

It is recommended as best practice that an inland VTS:

- is aligned to international standards set out by IMO and expanded upon by IALA as far as is reasonably practicable;
- is formally established in national law;
- has appointed inland VTS providers that are legally empowered; and
- is coordinated between nations at borders or where responsibilities are shared.

The national structure may differ from that recommended in IMO Resolution *A.1158(32)* [3]; however, it is recommended that provision is made to ensure that:

- a legal basis for an inland VTS is established;
- a regulatory framework for establishing and operating an inland VTS is put in place;
- inland VTS providers are authorized to operate an inland VTS within a delineated VTS area; and
- a compliance and enforcement framework with respect to violations of inland VTS regulatory requirements is established.

Local, regional or national regulations may be required to reflect the navigable environment as well as custom and practice relating to such issues as pilotage, prohibited zones and traffic control which will usually take precedence.

It should be noted that *the International Regulations for Preventing Collisions at Sea* only apply to vessels on the high seas and all waters connected to the high seas and navigable by seagoing ships. Special regional and/or national rules may apply in inland waters.

Special consideration may be needed for areas where inland waters are connected to the high seas and coastal areas and to the transition between different regulatory regimes.

4.2. INLAND VTS IMPLEMENTATION

4.2.1. IALA GUIDANCE

IALA provides guidance on planning and implementing a VTS. References relevant to implementation include:

- Recommendation *R0119 Establishment of VTS*
- Guideline *G1150 Establishing, planning and implementing a VTS*
- Guideline *G1160 Competencies for planning and implementing VTS*

In waterways where a national authority is of the opinion that the navigational complexity, volume of traffic or the degree of risk does not justify the establishment of a VTS, a Local Port Service (LPS) may be implemented. In such circumstances, IALA provides guidance in Guideline *G1142, The Provision of Local Port Services other than VTS*.

Further guidance is also provided in Guideline *G1083 Standard Nomenclature to Identify and Refer to a VTS*.

4.2.2. INLAND WATERS CONSIDERATIONS

IMO Resolution *A.1158(32)* states the responsibilities of a VTS provider and those of participating ships which may also be relevant to an inland VTS. In particular, an inland VTS should be provided with appropriate equipment, systems and facilities for the delivery of the inland VTS and should be adequately staffed with inland VTS personnel who are appropriately trained and qualified. This is further expanded in IALA guidance.

If it is assessed that the navigational complexity, volume of traffic or the degree of risk does not justify the establishment of an inland VTS but that some form of co-ordination of local services is required, then note should be taken of the provisions of Guideline *G1142 for the establishment of a local port service* or equivalent noting the provisions of Guideline *G1083* that any service that is not authorized as a VTS should not use the term “VTS” in its name identifier.

4.3. INLAND VTS OPERATIONS

4.3.1. IALA GUIDANCE

IALA provides a number of documents relating to key operational considerations. These include:

- Recommendation *R0127 VTS Operations* and an associated Guideline *G1141 Operational Procedures for a VTS*;
- Guideline *G1089 Provision of a VTS* that sets out advice on providing a VTS including the responsibilities and purpose;
- Guideline *G1110 Use of Decision Support Tools for VTS Personnel*;
- Guideline *G1131 Setting and measuring VTS objectives*;
- Guideline *G1045 Staffing Levels at VTS Centres*;
- Guideline *G1118 Marine Casualty/Incident Reporting and Recording, Including Near Miss Situations*; and
- Guideline *G1144 Promulgating the Requirements of a VTS to Mariners A VTS Users Guide Template*

4.3.2. INLAND WATERS CONSIDERATIONS

Many of the detailed considerations for operational procedures listed in the IALA guidance may not be relevant to inland waters. However, the need for operational guidance is of equal importance to inland VTS personnel, and the principle of setting out operational procedures should be followed and the basic principles of the IALA guidelines adapted as appropriate and suitable objectives set.

The Guideline *G1089* expands further on how to provide a VTS. Particular note should be made of the further explanation given on the purpose of a VTS in the provision of timely and relevant information, the monitoring and managing of vessel traffic and responding to developing situations. The close confines of many inland waterways and the ability to maintain a comprehensive traffic image may result in a more limited ability to respond to

developing situations. Nevertheless, as long as the possibility exists that such interaction might be necessary, then it is important that inland VTS personnel are appropriately trained and certified for such interventions.

While decision support tools may differ, the use of decision support tools is likely to be of similar value to an inland VTS as it is to a VTS in coastal waters and port/harbour areas and the IALA guidance of equal relevance.

Where an inland waterway is managed by multiple inland VTS centres, coordination between adjacent inland VTS centres or sub-centres is essential.

Information promulgating the requirements of an inland VTS should be publicized in a concise and harmonized format to reduce the burden on masters, skippers and other persons responsible for the navigation of seagoing ships or inland waterway vessels and to minimize misunderstandings when moving from one inland VTS area to another. The IALA guidance with a standardized format should, therefore, be used.

4.4. INLAND VTS COMMUNICATIONS

4.4.1. IALA GUIDANCE

A major factor in the effective delivery of VTS is the provision of precise and unambiguous voice communication. IALA provides:

- Recommendation *R1012 VTS Communications*; and
- an associated Guideline *G1132* providing greater detail on “*VTS Voice Communications and Phraseology*”.

4.4.2. INLAND WATERS CONSIDERATIONS

IALA documentation seeks to ensure the harmonization of procedures and communications worldwide. Both inland waterway vessels and seagoing ships may operate in inland waters and may transit both inland and port/harbour VTS areas. National administrations should ensure that inland VTS providers follow the IALA guidance as far as is reasonably practicable.

It is recognized that local language may be the primary language for an inland VTS, but the principles of phraseology and standardized phrases recommended by IALA should still be used when translated into the local language and the principles for VTS nomenclature should be followed.

Local, regional and national agreements and recommendations of river commissions on the use of the language in radio communications on inland waterways may apply.

Inland waterway administrations may consider the application of the provisions of the IALA recommendations and guideline relating to the voice communication in full or partially, taking into account special regional and/or national rules.

Inland VTS providers should take measures to eliminate or minimize interference to VHF communications, while also considering alternative means of communication as a backup.

4.5. INLAND VTS AUDITING AND ASSESSING

4.5.1. IALA GUIDANCE

A VTS should be routinely evaluated to ensure that the operational objectives are being met, the technical and operational performance is acceptable and that the risks identified and defined in determining the need for the VTS have been mitigated to an acceptable level. IALA provides:

- Recommendation *R1013 Auditing and Assessing Vessel Traffic Services*; and
- an associated Guideline *G1101 Auditing and Assessing a VTS*.

4.5.2. INLAND WATERS CONSIDERATIONS

The IALA guidance on auditing and assessing a VTS provides a basis for development of assessment procedures and control measures which is largely applicable to an inland VTS.

The responsibilities may differ from those set out in the Guideline on auditing and assessing a VTS. The annexed checklists to the Guideline may also require further modification to suit the individual circumstances of a particular inland VTS, but the subject headings are most relevant and provide a good starting point to identify checks that should be considered.

4.6. INLAND VTS ADDITIONAL SERVICES

4.6.1. IALA GUIDANCE

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. IALA provides the following guidelines:

- *G1070 VTS Role in Managing Restricted or Limited Access Areas;*
- *G1102 VTS Interaction with Allied or Other Services; and*
- *G1130 Technical Aspects of Information Exchange between VTS and Allied or Other Services.*

4.6.2. INLAND WATERS CONSIDERATIONS

Interactions between allied/other services and an inland VTS may differ, and restricted or limited access areas may still be encountered in some inland waters. Reference to the relevant IALA guidance may be of value in such cases.

Standards for vessel tracking and tracing, electronic ship reporting in inland navigation and notices to skippers may also be relevant.

There may be a greater number of additional services associated with an inland VTS compared with VTS in coastal and port/harbour areas and may have an enhanced significance. Administrations should define the additional services and identify where they apply.

If the additional services include allied or other services, inland VTS providers should develop the issues, criteria, and principles to be applied.

4.7. INLAND VTS DATA AND INFORMATION MANAGEMENT

4.7.1. IALA GUIDANCE

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 and CCTV), information from reports such as VHF voice or data, and is supported by an effective data and information management framework. IALA provides:

- *Recommendation R1014 Portrayal of VTS Information and Data; and*
- *Recommendation R0125 Use and Presentation of Symbology at a VTS Centre.*

4.7.2. INLAND WATERS CONSIDERATIONS

While an inland VTS may have a restricted set of functions, many of the principles set out in the guidance on the portrayal of information to VTS personnel will be relevant in establishing a suitable environment for inland VTS operations.

The use of symbology to identify vessels of particular interest such as passenger vessels, vessels carrying dangerous goods and vessels restricted in their ability to manoeuvre can be of particular use in improving situational awareness in an inland VTS.

Regional and competent authorities responsible for inland waters may wish to consider the development and application of harmonized exchange of information to support traffic and transport management and the transfer of information between operators, vessels and allied or other services. Inland VTS may be enhanced by linking it to bespoke systems for tracking ships such as the European VTT.

Note: The Guideline *G1105 Shore-Side Portrayal Ensuring Harmonization with E-Navigation Related Information* may also be of relevance to data and information management and the portrayal of information to inland VTS personnel.

4.8. INLAND VTS TECHNOLOGIES

4.8.1. IALA GUIDANCE

A significant proportion of the investment associated with the implementation and on-going operation of a VTS is the equipment and relevant systems. Once the need for a VTS has been established, it will be necessary to set out the requirements for procurement, especially as regards the technical requirements.

IALA documents relating to setting the technical requirements include:

- Recommendation *R0128 Operational and Technical Performance Standards of VTS systems*; and
- Guideline *G1111 Establishing Functional & Performance Requirements for VTS Systems*.

4.8.2. INLAND WATERS CONSIDERATIONS

IALA guidance on the procurement, technical specifications and performance standards for a VTS assume the need for continuous and uninterrupted surveillance of the entire area for which it is responsible with a high degree of reliability and redundancy. The technical specifications, particularly for radar, relate to relatively open waters. Not all of these may relate to inland waters; equally, there may be additional requirements unique to inland waters, such the management of locks and bridges that require additional consideration. Furthermore, gapless coverage may not be feasible or necessary. The guidance does, however, provide a useful baseline on which to draw in developing the specifications for an inland VTS.

Equipment and facilities should be equipped in accordance with regional/local requirements. The technical performance of the inland VTS equipment should meet the objectives of the inland VTS. Authorities and providers should consider the following items when implementing an inland VTS:

- The technical requirements for inland VTS may vary in different countries or in different waters. Inland VTS providers should evaluate the detailed technical requirements.
- There may be a requirement for the output power of AIS, VHF and other equipment of all vessels in certain inland water areas to be lower than the default value, although the navigable environment of inland waters is often complex. These factors should be taken into account by competent authorities and inland VTS providers during the design and operation of shore-based facilities such as VHF base stations, AIS base stations and radar stations.

The performance of radar, target tracking and associated decision support warnings may be seriously diminished in the inland environment. The use of short range, high-definition radar may, therefore, also be considered. Greater emphasis may also be needed on the use of other monitoring equipment such as CCTV and Virtual Reality video.

The technical specifications for VHF radiotelephone installations, radar installations and AIS in inland waters can be found in the relevant international, national or regional provisions.

4.9. DATA MODELS AND DATA ENCODING

4.9.1 IALA GUIDANCE

An IALA Recommendation *R0145 The Inter-VTS Exchange Format (IVEF) Service* 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 different components.

4.9.2 INLAND WATERS CONSIDERATIONS

With the increasing globalization and digitalization of maritime operations, the increasing emphasis on data management is likely to be of high importance in inland waters and the IALA guidance on IVEF is of significant relevance.

Network information systems in inland waters are widely used, and the compatibility of data exchange should be considered when building network information systems.

Inland VTS may also consider collecting or updating such data from vessels passing through or navigating on fixed routes in order to establish a database and facilitate traffic management.

4.10. TRAINING AND ASSESSMENT

4.10.1. IALA GUIDANCE

IALA has established international standards for VTS training set out in:

- Recommendation *R0103 Training and Certification of VTS personnel*;
- Guideline *G1156 Recruitment Training and Certification of VTS personnel*;
- Guideline *G1017 Assessment for Recognition of Prior Learning in VTS Training*; and
- Guideline *G1027 Simulation in VTS Training*.

VTS Model Courses have been designed and are set out in model courses for:

- *C0103-1 VTS operator Training (V-103/1)*;
- *C0103- 2 VTS supervisor Training (V-103/2)*;
- *C0103-3 VTS On-the-Job-Training (V-103/3)*;
- *C0103-4 VTS On-the-Job Training Instructor (V-103-4)*; and
- *C0103-5 The Revalidation Process for VTS Qualification and Certification (V-103-5)*.

4.10.2. INLAND WATERS CONSIDERATIONS

While it is for the national administration to mandate the training and certification requirements for inland VTS personnel in inland waters, there is a clear benefit in drawing on the international standards set by IALA for training and certification, which includes guidance on the management and accreditation of training establishments.

The use of IALA modules within the model courses may serve as the basis for training and certification of inland VTS personnel in inland waters and enable them to transition more easily to other VTS centres as part of their career progression.

The closer an inland VTS is aligned to the international standard, the greater the potential for all training to be conducted to the same model course standard, thus achieving equivalent levels of safety, economies of scale and international/worldwide recognition of certification.

Where it is assessed that the establishment of an inland VTS is not justified but that some form of co-ordination of local services is required, the principles for qualification and training set out in the Guideline *G1142 Local Port Services other than VTS* should be considered.

Inland VTS personnel may need additional skills, which should be taken into account when developing training courses. These include:

- the characteristics of inland waters;
- tracking and tracing of vessels;
- vessel reporting;
- routeing schemes;
- local rules and regulations;
- special requirements and procedures for pilotage, including cooperation skills with pilots;
- the competencies of the crews of inland waterway vessels; and
- specific network equipment and systems identified in other parts of this guideline such as CCTV, VTT and short range, high-definition radar.

Simulation training is an equally effective measure in the training of inland VTS personnel, and the IALA guidance is similarly applicable.

Consideration should be given to the promotion of communications skills to skippers and other persons responsible for the navigation of inland waterway vessels.

4.11. ACCREDITATION, COMPETENCY, CERTIFICATION AND REVALIDATION

4.11.1. IALA GUIDANCE

IALA specifies the practices associated with the generic accreditation of training organizations in Recommendation *R0149 Accreditation of Training Organizations*.

For VTS training, detailed guidance is provided in Guideline *G1014 Accreditation and Approval Process for VTS Training*.

4.11.2. INLAND WATERS CONSIDERATIONS

The previous section on “Training and Assessment” identifies the benefits of drawing on the international standards set by IALA for training and certification as the basis for training and certification of inland VTS personnel in inland waters to enable them to transition more easily to other VTS centres as part of their career progression. It also recognizes that the closer an inland VTS is aligned to the international standard, the greater the potential for all training to be conducted to the same model course standard, achieving equivalent levels of safety, economies of scale and international/worldwide recognition of certification.

It follows, therefore, that similar processes of accreditation, competency, certification and revalidation should be adopted if these benefits are to be realized.

4.12. RISK MANAGEMENT

4.12.1. IALA GUIDANCE

IALA provides guidance on risk assessment processes that assist in assessing the need for a VTS through risk management in:

- The generic Recommendation *R1002 Risk Management for Marine Aids to Navigation*; and
- Guideline *G1018 Risk Management*.

Three risk management tools are offered in guidelines:

- *G1123 The Use of IALA Waterway Risk Assessment Programme (IWRAP Mk II)*;
- *G1124 The Use of Ports and Waterways Safety Assessment (PAWSA) Mk II Tool*; and
- *G1138 The Use of the Simplified IALA Risk Assessment Method (SIRA)*.

4.12.2. INLAND WATERS CONSIDERATIONS

The guidance on the assessment of risk is based on international, territorial and coastal areas and in ports/harbours. The tools set out in the IWRAP and PAWSA models may prove to be too sophisticated for an inland waterway. However, SIRA provides a simpler process that may be more relevant. Nevertheless, all draw on the capture of AIS information as important source data and this may still be very relevant to risk assessment of inland waters where such data can be gathered.

While the IALA recommendation *R0119* on the establishment of a VTS and the associated Guideline *G1150* on establishing, planning and implementing a VTS are based on the requirements for SOLAS vessels and IMO provisions, these documents set out basic principles, many of which will also be of significant relevance to an inland VTS.

The traffic characteristics of inland waters and the requirements of local, regional and national rules, regulations and conventions relating to inland waters should be taken into consideration when conducting risk assessment.

4.13. QUALITY MANAGEMENT

4.13.1. IALA GUIDANCE

Where a formally appointed VTS is established, a quality management structure is considered necessary. IALA provides guidance on quality management in the form of:

- Recommendation *R0132 Quality Management for Aids to Navigation Authorities*; and
- an associated Guideline *G1052 Quality Management Systems for Aids to Navigation Service Delivery*.

4.13.2. INLAND WATERS CONSIDERATIONS

An inland VTS should have a quality management system in place where auditing should form part of such a process. The IALA guidance may be adapted as appropriate, taking into account relevant national, regional and local requirements.

4.14. ADDITIONAL GUIDANCE RELATED TO THE PROVISION OF INLAND VTS

4.14.1. IALA GUIDANCE

IALA provides guidance for AIS shore-based infrastructure and systems with applicability beyond just VTS that should be considered in establishing and operating VTS through:

- Recommendation *R0123 The Provision of Shore Based Automatic Identification System (AIS)*;
- Recommendation *R0126 The Use of the Automatic Identification System (AIS) in Marine Aids to Navigation Services*; and
- Guideline *G1082 Overview of AIS*.

IALA also provides Guideline G1105 *Shore-Side Portrayal Ensuring Harmonization with E-Navigation Related Information*.

4.14.2. INLAND WATERS CONSIDERATIONS

Many inland waterways draw heavily on AIS as a primary tool for vessel tracking, and it is important that the capabilities and limitations of AIS are fully understood. Much of IALA's Guideline G1082 *Overview of AIS* has equal relevance to inland VTS.

The specifications for AIS equipment on inland waterway vessels may differ from those for AIS on seagoing ships. For example, in Europe, the specification for AIS on inland waterway vessels (Inland AIS) is based on AIS Class A but requires additional functionality to meet the needs of inland navigation.

There may be a higher proportion of vessels equipped with AIS Class B in inland waters.

An inland VTS may need to consider how AIS data from both inland waterway vessels and seagoing ships are presented on a VTS traffic image display system and how the AIS information can be checked for accuracy.

The buoyage system applied in inland waters may also be different from the IALA buoyage system. This should be taken into account to avoid, as far as possible, any risk of conflict or confusion between the two systems of buoyage and particularly where there is a transition between the different buoyage systems.

The PIANC guidance "*Guidelines and Recommendations for River Information Services (2019)*" [5] and the PIANC report "*E-Navigation for Inland Waterways (2017)*" [6] may also be of relevance in considering VTS in Inland Waters.

5. DEFINITIONS

The definitions of terms used in this Guideline can be found in the International Dictionary of Marine Aids to Navigation (IALA Dictionary) at <http://www.iala-aism.org/wiki/dictionary> and 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.

In addition, for this document, the following definitions are specifically related to inland waters:

Convoy	<p>"Convoy" means a towed convoy, a pushed convoy or a side-by-side formation;</p> <p>a. "towed convoy" means an assembly of one or more vessels, floating establishments or assemblies of floating material towed by one or more motorized vessels, the later forming part of the convoy and being known as tugs;</p> <p>b. "pushed convoy" means a rigid assembly of vessels, of which at least one is placed in front of the motorized vessel propelling the convoy and is known as a pusher. A convoy composed of a pusher and a pushed craft so as to permit guided articulation is also considered as rigid;</p> <p>c. "side-by-side formation" means an assembly of vessels coupled side-by-side, none of which is placed in front of the motorized vessel propelling the assembly.</p> <p><i>(UNECE resolution No. 24, European Code for Inland Waterways, revision 6)</i></p>
Inland AIS	<p>Inland AIS means AIS for the use in inland navigation and interoperable with (maritime) AIS – technically enabled by amendments and extensions to the (maritime) AIS.</p> <p><i>(UNECE resolution No. 63, International Standard for Tracking and Tracing on Inland Waterways (VTT), revision 2)</i></p>

Inland VTS	Inland vessel traffic service (inland VTS) – a service in inland waters implemented by an authority 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 and support the protection of the environment. <i>(Adapted from the definition in the new IMO Resolution to apply to inland waters)</i>
Inland waters/Inland waterways	Inland waters or inland waterways are rivers, lakes or other stretches of water, whether linked to the sea or landlocked, which by natural or man-made features are suitable for navigation. <i>(UNECE resolution No. 58, Guidelines and Criteria for Vessel Traffic Services on Inland Waterways)</i>
Inland waterway vessel	Inland waterway vessel is a vessel intended solely or mainly for navigation on inland waterways. <i>(UNECE resolution No. 61, Recommendations on Harmonized Europe-Wide Technical Requirements for Inland Navigation Vessels, revision 2)</i>
Vessel Tracking and Tracing (VTT)	Vessel Tracking and Tracing (VTT) combines the functions of tracking and tracing as follows: <ul style="list-style-type: none"> • Vessel Tracking means the function of maintaining status information of the vessel, such as the current position and characteristics and – if needed – combined with information on cargo and consignments. • Vessel Tracing means the retrieving of information concerning the whereabouts of the vessel and, if needed, information on cargo, consignments and equipment. <p><i>(UNECE resolutions Nos. 57, Guidelines and Recommendations for River Information Services, revised, and 63)</i></p>

6. ABBREVIATIONS

UNECE	United Nations Economic Commission for Europe
VTS	Vessel traffic service or vessel traffic services (dependent on context)
VTT	Vessel Tracking and Tracing

7. REFERENCES

- [1] UN. United Nations Convention on the Law of the Sea of 10 December 1982
- [2] IMO. International Convention for the Safety of Life at Sea (SOLAS)
- [3] IMO. Resolution A.1158(32) Guidelines for Vessel Traffic Services
- [4] IALA. VTS Manual
- [5] PIANC. InCom WG 125/I: Guidelines and Recommendations for River Information Services (2019)
- [6] PIANC. InCom WG 156: E-Navigation for Inland Waterways (2017)