IALA GUIDELINE

G1131
SETTING AND MEASURING VTS OBJECTIVES

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1. INTRODUCTION

A vessel traffic service (VTS) is recognized internationally as a navigational safety measure through the *International Convention on the Safety of Life at Sea 74/78* (SOLAS) [1]. However, the establishment and on-going operation of a VTS is a considerable investment.

To achieve the purposes for which a VTS was implemented, the service needs to be effective and routinely evaluated. This is important to ensure that the operational objectives are being met and the technical and operational performance is acceptable. The issues identified in determining the need for a VTS have been either alleviated or at least reduced to an acceptable level.

2. AIMS AND OBJECTIVES

The aim of this document is to provide guidance for competent authorities and VTS providers for setting operational objectives for a VTS and achieving them. In particular, the guidance focuses on providing assistance to:

a. Meet their obligations in accordance with *Regulation 12 of Chapter V of SOLAS (Vessel traffic services)* and IMO Resolution *A.1158(32) Guidelines for Vessel Traffic Services* [2].

b. Respond to the IMO Resolution *A.1067(28) Framework and Procedures for the IMO Member State Audit Scheme* [3] with regards to how they implement and enforce *SOLAS Chapter V (Safety of Navigation) Regulation 12*. In particular, to ensure measures are in place to evaluate the effectiveness in implementing *SOLAS regulations V/12* and the effectiveness of a VTS.

2.1. INTERNATIONAL FRAMEWORK

There are several resolutions and guidelines related to the requirements for the competent authorities and VTS providers to use to establish a VTS and the subsequent auditing and assessment of the service.

2.1.1. INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA (SOLAS)

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

> "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."

SOLAS also states that contracting Governments planning and implementing a VTS shall, wherever possible, follow the guidelines developed by the International Maritime Organization.

2.1.2. IMO RESOLUTION A.1158(32) GUIDELINES FOR VESSEL TRAFFIC SERVICES

IMO Resolution *A.1158(32)* states that:

> "The VTS provider should …. set operational objectives for VTS that are consistent with improving the safety and efficiency of ship traffic and protection of the environment. The objectives set should be routinely evaluated to demonstrate they are being achieved".

2.1.3. IMO Member State Audit Scheme (IMSAS)

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.

Key IMO documents regarding IMSAS include those in sections 2.1.4 to 2.1.6.

2.1.4. Resolution A.1067(28) on the Framework and Procedures for the IMO Member State Audit Scheme

The purpose of this framework is to describe the objective, principles, scope, responsibilities and capacity-building aspect of the IMO Member State audit, which together constitute the strategy for the audit scheme.

This framework is supported by the procedures for the IMO Member State audit and the IMO *Instruments Implementation Code (III Code)*.

2.1.5. Resolution A.1070(28) on IMO Instruments Implementation Code (III Code) [4]

The objective of this Code is to enhance global maritime safety and protection of the marine environment and assist States in the implementation of instruments of the Organization. The Code seeks to address those aspects necessary for a Contracting Government or Party to give full and complete effect to the provisions of the applicable international instruments to which it is a Contracting Government or Party, including *SOLAS Chapter V (Safety of Navigation) Regulation 12*. This manual has been developed as guidance to assist in the planning, conducting and reporting by auditors in the execution of their duties as defined in the Framework and Procedures for the IMO Member State Audit Scheme, which was adopted by the Assembly through resolution *A.1067(28).*

2.1.6. IMO Circular Letter No. 3425 - Auditor's Manual for the IMO Member State Audit Scheme (IMSAS) [5]

This manual has been developed as guidance to assist in the planning, conducting and reporting by auditors in the execution of their duties as defined in the framework and procedures for the IMO Member State Audit Scheme, which was adopted by the Assembly through resolution *A.1067 (28)*. Specifically, the manual refers to demonstrating measures are in place to evaluate the effectiveness of a VTS.

2.1.7. IALA Guideline G1150 on Establishing, Planning and Implementing a VTS [6]

This Guideline states that:

- careful planning should be undertaken to ensure a VTS is implemented effectively, achieves its objectives and is sufficiently resourced and funded on an ongoing basis; and
- when planning and implementing a VTS a project management approach is recommended to ensure the major deliverables, assumptions and constraints are clearly documented. This will assist in defining the scope of the VTS, its goals and objectives that need to be met. Project management is considered as a discipline with the purpose to achieve specific goals and objectives by planning, organizing, motivating and controlling resources.

2.1.8. IALA Guideline G1101 on Auditing and Assessing a VTS [7]

This Guideline states that to achieve the purposes for which it was implemented, a VTS:

> "needs to be effective and routinely evaluated to ensure that 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".

2.1.9. IALA GUIDELINE G1115 ON PREPARING FOR AN IMO MEMBER STATE AUDIT SCHEME (IMSAS) ON A VTS [8]

This Guideline provides guidance for Contracting Governments and competent authorities to meet the objectives of an IMO Member State Audit Scheme (IMSAS) with respect to the implementation and delivery of a VTS, that is, to demonstrate they are fulfilling their responsibilities under the general provisions of treaty law and IMO conventions for promulgating laws and regulations. They are also responsible for taking all other steps which may be necessary to give full and complete effect to the *International Convention for the Safety of Life at Sea (SOLAS) Chapter V (Safety of Navigation) Regulation 12*.

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

- Compliance with the audit standard.
- The enactment of legislation, as appropriate, for delivery of a VTS under SOLAS.
- The administration and enforcement of the applicable laws and regulations of the Member State.
- 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 a VTS, is effected.

3. SETTING OBJECTIVES FOR A VTS

3.1. WHAT ARE VTS OBJECTIVES?

A VTS Objective is a statement with direct and practical interpretation for management purposes and against which performance can be evaluated quantitatively (i.e., targets/thresholds) and measured practically. In particular, it should:

- be a clear statement of a specific, measurable outcome to be achieved; and,
- not be a listing of strategies or actions that will be performed during the fiscal year.

In setting the objectives for a VTS consideration should be given to defining statements that contribute to one or more of the following:

- the purpose of the VTS; and
- operational considerations to deliver the requisite service(s).

3.2. THE PURPOSE OF VTS

The *International Convention on the Safety of Life at Sea (SOLAS) Chapter V (Safety of Navigation) Regulation 12* states that:

> "Vessel traffic services 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."

IMO Resolution *A.1158(32)* states that:

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

.1 providing timely and relevant information on factors that may influence ship movements and assist on-board decision making.

.2 monitoring and managing of ship traffic to ensure the safety and efficiency of ship movements.

.3 responding to developing unsafe situations."

Examples of objectives that contribute to the purpose of a VTS are provided at annex A.

3.3. OPERATIONAL CONSIDERATIONS

In determining objectives, consideration should be given to, but not limited to:

a) Equipment

A.1158(32) states that "The VTS provider should …. ensure that appropriate equipment, systems and facilities for the delivery of VTS are provided".

The equipment requirement should be as per IALA Recommendation *R0128 (V-128) on Operational and Technical Performance Requirements for VTS Equipment* [9] and IALA Guideline *G1111 on Preparation of Operational and Technical Performance Requirements for VTS Systems* [10].

b) Staff

Recommendation *R0103 (V-103)* [11] and Guideline *G1045* [12] are the main documents for providing the standard for training and certification of VTS personnel and staffing level for VTS personnel respectively. In addition, Guideline 1017 provides guidelines on the assessment for various training requirements.

c) Procedures

Guideline *G1141* [13] provides assistance to develop operational procedures needed for VTS operation.

d) Quality Management

IALA Recommendation *R0132 Quality Management for Aids to Navigation Authority (O-132)* [14] is the main reference document to be utilized for establishing a quality management system (QMS) process at VTS Centres. Additionally, the following documents are also relevant for operational consideration with regards to quality management:

- IALA Guideline *G1101 Auditing and Assessing a VTS*
- IALA Guideline *G1115 Preparing for the IMO Audit Scheme (IMSAS) on a VTS*; and
- IALA *VTS Manual* [15].

Examples of objectives that contribute to achieving the operational considerations are provided at annex A.

4. SETTING GUIDELINES TO MEASURE OBJECTIVES

Once the objectives for the VTS have been set a process should be implemented to ensure they are being met.

4.1. MEASURING THE OBJECTIVES

To monitor and assess that the objectives set for the VTS are met, measures need to be determined. This is to identify that the VTS is effectively contributing to alleviate, or at least reducing to an acceptable level and the issues /problems the VTS was introduced to mitigate (e.g., risk of collisions/groundings, navigational hazards, complexity of waterway).

Both positive (leading) and negative (lag) performance measures should be considered. This ensures that operational outcomes are measured in terms of the success of good practice and the preventative measures that need to be implemented.

4.2. DEFINING PERFORMANCE MEASURES

When testing the suitability of key performance measures the following issues should be considered:

- Are they relevant?
- Are they clearly defined?
- Are they readily measurable?
- Are they acceptable to people across the organization?
- Are they comparable from one measurement to the next?
- Are they unambiguous?
- Are they statistically valid?
- Can it be collected in a timely and cost-effective manner?

This should lead to a set of measures which:

- Accurately and consistently measure the parameter to monitor.
- Are easily understood by users.
- Are relatively simple to collect.
- Are timely in that they support Authorities to identify and implement a response that can influence the outcome.
- Readily relate to the objectives of the organization.

4.3. REVIEW

It is important for the competent authority/VTS provider to regularly assess the VTS to ensure that the VTS operational objectives have been met and the problems identified and defined in the Planning and Implementing phase have been either alleviated or at least reduced to an acceptable level. Refer to IALA Guideline *G1150 Establishing, Planning and Implementing a VTS* and IALA Guideline *G1018 Risk Management* [16].

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.

6. ABBREVIATIONS

AtoN	Marine Aids to Navigation
CPA	Closest Point of Approach
III Code	IMO Instrument Implementation Code
IMO	International Maritime Organization
IMSAS	IMO Member State Audit Scheme
QMS	Quality management system

SOLAS	IMO convention on Safety of Life at Sea (as amended)
VTS	Vessel traffic service or vessel traffic services (dependent on context)

7. REFERENCES

[1] IMO. International Convention for the Safety of Life At Sea

[2] IMO. Resolution A.1158(32) Guidelines for Vessel Traffic Services

[3] IMO. Resolution A.1067(28) Framework and Procedures for the IMO Member State Audit Scheme

[4] IMO. Resolution A.1070(28) on IMO Instruments Implementation Code (III Code)

[5] IMO. Circular Letter No. 3425 - Auditor's Manual for the IMO Member State Audit Scheme (IMSAS)

[6] IALA. Guideline G1150 Establishing, Planning and Implementing a VTS

[7] IALA. Guideline G1101 Auditing and Assessing a VTS

[8] IALA. Guideline G1115 Preparing for an IMO Member State Audit Scheme (IMSAS) on Vessel Traffic Services

[9] IALA. Recommendation R0128 (V-128) Operational and Technical Performance of VTS systems

[10] IALA. Guideline 1111 Preparation of Operational and Technical Performance for VTS Equipment

[11] IALA. Recommendation R0103 (V-103) Standards for Training and Certification of VTS Personnel

[12] IALA. Guideline G1045 Staffing Levels at VTS Centres

[13] IALA. Guideline G1141 Operational Procedures for Vessel Traffic Services

[14] IALA. Recommendation R0132 Quality Management for Aids to Navigation Authority (O-132)

[15] IALA. VTS Manual

[16] IALA. Guideline G1018 Risk Management

ANNEX A EXAMPLES FOR SETTING OBJECTIVES AND MEASURING THEM

Contribute to improving the safety and efficiency of ship traffic and protection of the environment?	Examples of possible Objectives consistent with improving the safety and efficiency of ship traffic and protection of the environment	Examples of **possible Measurements to demonstrate the objective is being achieved**
Purpose of the VTS		
The purpose of a 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: 1. The provision of timely and relevant information on factors that may influence the ship's movements and assist on-board decision making. 2. The management of ship traffic to ensure the safety and efficiency of ship movements. 3. Responding to developing unsafe situations. (Refer A.1158(32) 3	*Overview of Traffic and Maintaining a Traffic Image* The system is capable of compiling a traffic image throughout the VTS area. The sensor coverage is reliable and consistent throughout the VTS area. *Interacting with traffic* The VTS communications system provides the capability to interact with traffic throughout the VTS area. The decision support tools provide the capability to detect and escalate abnormal behaviour to the attention of VTS personnel in a manner that enables a timely intervention in developing traffic situations. Capability to interact with a vessel to influence the decision-making process on board the vessel.	• The availability of the traffic image is greater than or equal to 99.8% for a <set period>. • The availability of VHF voice communication systems (or other interaction instruments) throughout the VTS area is greater than or equal to, for example, 99.8% for a set period. • The decision support tools escalate 100% of occurrences where vessels deviate from a recommended track. • The decision support tools escalate 100% of occurrences where vessels encroach upon the defined CPA. • Percentage of interventions which successfully influenced the decision-making process on board the vessel i.e., the interventions successfully avoided an incident or accident. • The VTS Operations room is manned 24/7.

Contribute to improving the safety and efficiency of ship traffic and protection of the environment?	Examples of possible Objectives consistent with improving the safety and efficiency of ship traffic and protection of the environment	Examples of possible Measurements to demonstrate the objective is being achieved
Operational considerations		
Compliance and Enforcement The competent authority for VTS should establish a compliance and enforcement framework with respect to violations of VTS regulatory requirements (Refer A.1158(32) 5.2.4) The VTS provider should "[Ensure] compliance with and enforcement of regulatory provisions for which they are empowered" (Refer G1089 4.2)	Ensuring that vessels which are not complying with VTS regulatory requirements are notified that they are breaking national law by means of formal process.	• 100% violation actions taken and notifications issued to the contravening party.
IALA Standards Contracting Governments are encouraged to take into account IALA standards and associated recommendations, guidelines and model courses (Refer A.XXX(XX) Section 9)	Demonstrate ongoing compliance with IALA Standards related to VTS, including: • 1040 - Vessel Traffic Services; • 1010 - AtoN Planning and Service Requirements; • 1050 - Training and Certification; and • 1070 – Information Services.	• Regular internal and external audits confirm compliance.

Qualifications and Training VTS personnel should only be considered competent when appropriately trained and qualified for their VTS duties. This includes: .1 satisfactorily completing generic VTS training approved by a competent authority; .2 satisfactorily completing on-the-job training at the VTS where the personnel are employed; .3 undergoing periodic assessments and revalidation training to ensure competence is maintained; and .4 being in possession of appropriate certification. (Refer A.XXX(XX) Section 8)	Establish training policy and procedures for VTS personnel (e.g., number of days, quality of course, etc.) to meet Recommendation R0103.	• 100% VTSOs trained to the minimum of V-103/1 and V-103/3 • Recurrent training of VTS personnel completed every 3 years. • Annual regular assessments of VTS personnel. • 100% VTS Supervisors trained to the minimum of V-103/1, V-103/2 and V-103/3
Quality Management All staff are subject to Quality Management System (QMS) (Refer IALA Recommendation R0132 Quality Management for Aids to Navigation Authority)	To establish and maintain a formal QMS.	• 100% VTS personnel are familiar with the QMS sections relevant to their VTS.