GUIDELINE

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SETTING AND MEASURING VTS OBJECTIVES

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1.   INTRODUCTION

Vessel Traffic Services (VTS) are recognised internationally as a navigational safety measure through the International Convention on the Safety of Life at Sea 74/78 (SOLAS). However, the establishment and on-going operation of a VTS is a considerable investment.

To achieve the purposes for which 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 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 Authorities for setting 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.857(20) Guidelines for Vessel Traffic Services with regards to:

- Ensuring that objectives for the VTS are set (Refer 2.2.2.2)

- Determining the type and level of services to be provided, having regard to the objectives of the VTS (Refer 2.2.2.5)

- Ensuring that the VTS authority is provided with the equipment and facilities necessary to effectively accomplish the objectives of the VTS (Refer 2.2.2.7), and

- Ensuring that the objectives of the VTS are met (Refer 2.2.3.1)

b.   Respond to the IMO Resolution A.1067(28) Framework and Procedures for the IMO Member State Audit Scheme 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 VTS.

2.1   INTERNATIONAL FRAMEWORK

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

International Convention on the Safety of Life at Sea 74/78 (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."
- "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 VTS shall, wherever possible, follow the guidelines developed by the International Maritime Organization.

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

Recognising that the safety and efficiency of maritime traffic and the protection of the marine environment would be improved if vessel traffic services were established and operated in accordance with internationally approved guidelines the IMO Assembly adopted IMO Resolution A.857(20) Guidelines for Vessel Traffic Services. The

Resolution describes the principles and general provisions for the operation of a VTS and participating vessels and the roles and responsibilities of contracting governments, competent authorities and VTS Authorities.

Further IMO Resolution A.857(20) states that the Guidelines should be used in conjunction with the IALA VTS Manual.

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:

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).

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

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).

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

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 VTS, for example:

a) Measures to evaluate effectiveness in implementing IMO mandatory instruments
Please describe the measures, if any, taken to evaluate the effectiveness in implementing SOLAS regulations V/12).

b) Evaluation and review
Please describe the measures taken to evaluate effectiveness of AtoN and VTS (e.g. vessel tracking analysis, incident analysis, service availability, AtoN planning and inspection).

IALA Recommendation V-119 on the Implementation of Vessel Traffic Services

This Recommendation states that:

a) operational objectives should be established with the ultimate aim of alleviating the defined problems (Refer 2.1.1);

b) It is important for the Competent/VTS Authority to carry out an evaluation after introduction of the new or re-assessed VTS, to ensure that the VTS operational objectives have been met, and the problems identified and defined in the Preliminary Assessment phase have been either alleviated or at least reduced to an acceptable level (Refer 4); and

c) The evaluation should ensure that the VTS operational objectives are met (Refer 4).

IALA Guideline 1101 on Auditing and Assessing VTS

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" (Refer 2).

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

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 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 on 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 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 recognised organisation, for the purposes of implementing and delivering 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:

a)   Be a clear statement of a specific, measurable outcome to be achieved; and,

b)   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:

a)   The principles of VTS

b)   The purpose / reason for VTS

c)   Operational considerations to deliver the requisite service/s

d)   The compelling need for implementing the VTS

3.2 PRINCIPLES OF VTS

The key principles of VTS include:

a)   Overview of Traffic and Maintaining a Traffic Image

IMO Resolution A.857(20) states that:

- A VTS should at all times be capable of generating a comprehensive overview of the traffic in its service area combined with all traffic influencing factors (Refer 2.5.2.1).

- The VTS should be able to compile a traffic image, which is the basis for its capability to respond to traffic situations developing in its service area (Refer 2.5.2.1).

- The traffic image allows the VTS operator to evaluate situations and make decisions accordingly (Refer 2.5.2.1).

b) Interacting with the traffic

A.857(20) states that the service should have the capability to interact with the traffic (Refer 1.1.1).

c) Responding to traffic situations developing

A.857(20) states that the service should have the capability to respond to traffic situations developing in the VTS area (Refer 1.1.1).

3.3 THE PURPOSE / REASON FOR VTS

As defined by the International Convention on the Safety of Life at Sea (SOLAS) Chapter V (Safety of Navigation) Regulation 12, VTS contributes to provide:

a) Safety of life at sea

b) Safety and efficiency of navigation

c) Protection of the marine environment, adjacent shore areas, work sites and offshore installations from possible adverse effects of maritime traffic (SOLAS).

Examples of objectives that contribute to the purpose / reason for VTS are provided at Annex A.

3.4 OPERATIONAL CONSIDERATIONS

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

a) Equipment

A.857(20) states that a VTS should at all times be capable of generating a comprehensive overview of the traffic in its service area combined with all traffic influencing factors. The VTS should be able to compile a traffic image, which is the basis for its capability to respond to traffic situations developing in its service area. The traffic image allows the VTS operator to evaluate situations and make decisions accordingly. Data should be collected to compile the traffic image (Refer 2.5.2.1).

The equipment requirement should be as per IALA Recommendation V-128 on Operational and Technical Performance Requirements for VTS Equipment (to IALA Guideline 1111).

b) Staff

Recommendation R0103 (V-103) and Guideline 1045 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

Recommendation V-127 provides assistance to develop operational procedures needed for VTS operation.

d) Quality Management

IALA Recommendation R0132 (O-132) Quality Management for Aids to Navigation Authority 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 1101 on Auditing and Assessing VTS;

- IALA Guideline 1115 on Preparing for the IMO Audit Scheme VTS;

- IMO A.857(20); and

- IALA VTS Manual.

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

3.5   THE NEED FOR ESTABLISHING VTS

VTS objectives should be established with the aim of alleviating the issues identified when determining the need to establish the VTS as described in IALA Recommendation V-119 on the Implementation of Vessel Traffic Services.

Examples of objectives that contribute to addressing the need for establishing the VTS 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 organisation?

- 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 organisation

4.3   REVIEW

It is important for the Competent / VTS Authority to regularly assess the VTS to ensure that the VTS operational objectives have been met and the problems identified and defined in the Preliminary Assessment phase have been either alleviated or at least reduced to an acceptable level. Refer to IALA Recommendation V-119 on the Implementation of VTS and IALA Guideline 1018 on Risk Management.

5.   ACRONYMS

AtoN	Marine Aids to Navigation
CPA	Closest Point of Approach
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities – AISM
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 Services
VTSO	Vessel Traffic Services Operator

6.   REFERENCES

[1]   IMO Resolution A.857(20) Guidelines for Vessel Traffic Services

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

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

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

[5]   IALA Recommendation V-119 on The Implementation of Vessel Traffic Services

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

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

[8]   IALA Recommendation V-128 Operational and Technical Performance of VTS systems

[9]   IALA Guideline 1045 on Staffing Levels at VTS Centres

[10]   IALA Guideline 1101 on Auditing and Assessing VTS

[11]   IALA Guideline 1110 on the Use of Decision Support Tools for VTS Personnel

[12]   IALA Guideline 1111 on Preparation of Operational and Technical Performance for VTS Equipment

[13]   IALA VTS Manual

Principle of VTS	Possible Objectives	Examples of Possible Measurements
Overview of Traffic and Maintaining a Traffic Image		
A VTS should at all times be capable of generating a comprehensive overview of the traffic in its service area combined with all traffic influencing factors (Refer A.857(20) 2.5.2.1).	The system is capable of compiling a traffic image throughout the VTS area and in a manner consistent with the types of service delivered. The sensor coverage is reliable and consistent throughout the VTS area.	The availability of the traffic image is greater than or equal to 99.8% for a set period.
Interacting with traffic		
The service should have the capability to respond to traffic situations developing in the VTS area (Refer A.857(20) 1.1.1). Refer to IALA Guideline 1110 on the Use of Decision Support Tools for VTS Personnel.	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 the VTSO 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 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.

Principle of VTS	Possible Objectives	Examples of Possible Measurements
Training and Certifications of VTSOs		
Related responsibilities under (A.857(20)) include the need to establish appropriate qualifications and training requirements for VTS operators, taking into consideration the type and level of services to be provided (Refer 2.2.2.9). IALA Recommendation R0103(V-103) Standards for Training and Certification of VTS Personnel IALA Guideline 1045 - Staffing Levels at VTS Centres	Establish VTSO training policy and procedures (e.g. number of days, quality of course, etc.) to meet Recommendation V-103.	100% VTSOs trained to the minimum of V-103/1 and V-103/3 Recurrent training of VTSOs completed every 3 years. Annual regular assessments of VTSOs.
Safety of life at sea		
Safety and efficiency of navigation and protection of the environment (Refer A.857(20)).	Zero accidents and reduced number of incidents. Eliminate delays or reduce the waiting times for traffic. Measurement of user satisfaction surveys. Relationships are enhanced with allied services, stakeholders and other interested parties.	Zero collision and grounding in the VTS area. Reduce the yearly incidents by at least 60%. Minimise delays by 90%. More than 90% positive feedback on stakeholder engagement regarding efficient traffic management i.e. meetings, questionnaires, customer surveys etc.
Compliance and Enforcement		
Related responsibilities under A.857(20): Establish a policy with respect to violations of VTS regulatory requirements, and ensure that this policy is consistent with national law. This policy should consider the consequences of technical failures, and due consideration should be given to extraordinary circumstances that result. (2.2.2.12)	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.

Principle of VTS	Possible Objectives	Examples of Possible Measurements
Quality Management		
All staff are subject to Quality Management System (QMS) (IALA Recommendation O-132 Quality Management for Aids to Navigation Authority)	To establish and maintain a formal QMS.	100% VTS staff are familiar with the QMS sections relevant to their VTS.