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| IALA Guideline |

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Guideline on QUALITY MANAGEMENT SYSTEM FOR Vessel Traffic Service

Edition x.x

Date (of approval by Council)

urn:mrn:iala:pub:gnnnn

Revisions to this document are to be noted in the table prior to the issue of a revised document.

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# Introduction

The quality management system is an effective tool for VTS providers to efficiently manage, operate and drive continuous improvement.

As part of navigational Aids to Navigation, VTS providers and other navigational authorities have independent characteristics in the management of procedures, especially based on different legal frameworks and international obligations

This guideline is designed to guide and assist VTS organizations to establish VTS quality management system, and to link with VTS related IALA documents, facilitate the relevant organizations to carry out audit and evaluation work, and promote the sustainable development of VTS providers.

# scope

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.

To better achieve its objectives, VTS providers can establish and operate a quality management system (QMS) based on documents such as ISO 9001 (2015), IMO A.1158(32), IALA Recommendation O-132 and Guideline G1052. VTS providers should specify the scope of application of the QMS, such as the following aspects:

* VTS operation and management；
* Equipment operation and maintenance；
* Personnel management；
* Vessel traffic services delivery .

QMS shall also define its document structure or composition and form documented information. There is no specific limitation on the type of documented information, which can be management procedures, operation manual, records, etc., so as to facilitate relevant parties to ensure the suitability, adequacy and effectiveness of the QMS through regular review/audit. Documented information management includes：

* creating and updating documented information;
* Control of documented information.

# Normative references

Documents such as international conventions, rules, domestic regulations and technical specifications that need to be complied with should be listed in the QMS.

# Terms and definitions

The terms and definitions used in QMS should be specified or explained, e.g.

* Vessel traffic services (VTS) means services implemented by a Government with the capability to interact with vessel traffic and respond to developing situations within a VTS area to improve safety and efficiency of navigation, contribute to the safety of life at sea and support the protection of the environment.
* VTS provider means the organization or entity authorized by the Government or competent authority to provide vessel traffic services.
* Process approach means it involves the systematic definition and management of processes, and their interactions, so as to achieve the intended results in accordance with the quality policy and strategic direction of the organization.
* Risk is the effect of uncertainty and any such uncertainty can have positive or negative effects. A positive deviation arising from a risk can provide an opportunity, but not all positive effects of risk result in opportunities.
* Opportunity means a situation that is conducive to achieving a desired outcome, reducing waste or improving service efficiency. For example, the emergence of new theories, technological innovation and so on.

# CONTEXT OF THE ORGANIZATION

ISO 9001:2015 Quality Management Systems — Requirements states:

The organization shall determine external and internal issues that are relevant to its purpose and its strategic direction and that affect its ability to achieve the intended result(s) of its quality management system.

IMO Resolutions A.1158(32) Guidelines For Vessel Traffic Services states:

VTS operate within a comprehensive environment in which ships, ports, allied services and other organizations fulfil their respective roles, as appropriate.

QMS shall clarify the environment in which VTS operates.

## INTERNAL ISSUES

The VTS provider's internal issues includes but is not limited to

* Working environment, including workstation, lighting, air conditioning and office equipment;
* VTS system and related information equipment;
* Human resources, including age, education, qualifications and skills;
* Organizational structure, including VTS responsibilities, post responsibilities and periods of duty.

## EXTERNAL ISSUES

The external issues of the VTS provider includes but are not limited to

* Regulatory requirements;
* Volume and composition of marine traffic;
* VTS users’ needs and expectations, including ship, crew, shipping enterprise, port agent, pilots, etc.;
* Meteorological and sea conditions and other natural environmental factors;
* Navigation environment factors，such as fairway, anchorage, depth of water, Aids to navigation and obstructions.

## the needs and expectations of interested parties

VTS providers shall identify their stakeholders and their needs and expectations in order to improve the efficiency of VTS operations. Relevant parties of the VTS provider include internal relevant parties such as VTS personnel and external relevant parties such as ships, ports, pilots, etc. VTS can obtain the needs and expectations of relevant parties through questionnaires, visits, meetings, interviews and other forms.

# leadership

The top management of the VTS provider shall demonstrate leadership and commitment with respect to the quality management system by:

* taking accountability for the effectiveness of the quality management system;
* ensuring that the quality policy and quality objectives are established for the quality management system and are compatible with the context and strategic direction of the VTS provider;
* ensuring the integration of the quality management system requirements into vessel traffic services processes;
* promoting the use of the process approach and risk-based thinking;
* ensuring that the resources needed for the quality management system are available;
* communicating the importance of effective quality management and of conforming to the quality management system requirements;
* ensuring that the quality management system achieves its intended results;
* engaging, directing and supporting persons to contribute to the effectiveness of the quality management system;
* promoting improvement;
* supporting other relevant management roles to demonstrate their leadership as it applies to their areas of responsibility.
* VTS user and applicable statutory and regulatory requirements are determined, understood and consistently met;
* the risks and opportunities that can affect conformity of services and the ability to enhance VTS user satisfaction are determined and addressed;
* the focus on enhancing VTS user satisfaction is maintained.

# Risks and opportunities

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.

Opportunities can arise as a result of a situation favourable to achieving an intended result. Actions to address opportunities can also include consideration of associated risks.

In the QMS, VTS shall clarify the identification methods and approaches of risks and opportunities, the methods to evaluate these risks and opportunities, the actions to address these risks and opportunities, and how to evaluate the effectiveness of these actions, in response to the contents of 5.1, 5.2, and 5.3 above.

Top management should organize person(s) to monitor and review the internal and external environment of VTS, maintain interaction with relevant parties, regularly carry out risks and opportunities identification and assessment, determine risk control measures, make decisions and take actions.

Risks and opportunities for VTS shall include but not be limited to:

* Personnel factors, including the number of personnel for watchkeeping and equipment maintenance, personnel ability, periods of duty, etc;
* Vessel factors, including crew ability, crew watch, vessel communication facilities, vessel defects, etc.;
* Natural factors, including navigational environmental factors such as wrecks, shallow spots, mariculture areas, accident-prone areas, busiest sailing areas, as well as weather, sea conditions in the VTS area;
* Equipment factors, including VTS system or equipment failure, equipment performance, communication system failure, etc.;
* Guarantee factors, including working environment, implementation of quality management system, etc.

For more information about risk management please refer to IALA G1018 Risk Management.

# QUALITY POLICY AND OBJECTIVE

In order to meet the needs and expectations of relevant parties, VTS shall clarify its quality policy and quality objectives in the QMS. The quality objectives should fully reflect the spirit of the quality policy, and take into account the important environmental factors, the needs of relevant parties and the requirements of laws and regulations.

Top management is responsible for ensuring that the quality policy and objectives are properly understood and implemented by VTS personnel.

Top management is required to regularly review the quality policy and objectives for their continued suitability and effectiveness, and make necessary adjustments based on the review results.

For more information about quality objectives please refer to IALA G1131 Setting and Measurement VTS Objectives.

# RESOURCE MANAGEMENT

Top management shall identify and provide the resources required to establish, implement, maintain and continuously improve the quality management system, and shall take into account the capabilities and limitations of existing internal resources and the resources required to be obtained from external suppliers.

The VTS should effectively manage various resources, save resources as much as possible while ensuring normal operation, and maximize the utilization of resources.

## MONITORING AND MEASUREMENT

To ensure the effectiveness and compliance of VTS services, the following resources can be monitored and measured:

* Personnel, mainly to evaluate the training, performance, work quality, etc.;
* Equipment, mainly to monitor the performance, status and reliability of the equipment;
* Users, mainly to collect and evaluate the opinions, suggestions and complaints of VTS users;
* Management, mainly to evaluate VTS operation mode, management effectiveness, service quality, etc.；
* Allied service - allied services are services actively involved in the safe and efficient passage of the vessel through the VTS area；
* Other services refer to services other than the allied services, which may use VTS data to more effectively undertake their work (e.g., ensuring local security or preventing illegal imports).

VTS shall regularly check and verify the monitoring and measurement standards of the above resources to ensure the reliability of the measurement results and services.

* The method and content of personnel assessment should be adjusted according to the development of information technology, the progress of VTS work, and the relevant regulations of superiors.
* Equipment maintenance should be maintained and calibrated according to the equipment maintenance schedule and the occurrence of equipment failures.
* The method and content of the user survey shall be adjusted according to the opinions, suggestions, complaints of VTS users and the analysis results of the satisfaction survey.
* The content and method of management evaluation shall be adjusted according to the relevant regulations and the key tasks of the VTS.
* VTS providers should evaluate the effectiveness of allied services and other services in accordance with IALA G1102 VTS Interaction With Allied or Other Services.

## knowledge management

When addressing the changing needs and trends, VTS shall consider its current knowledge and determine how to acquire or access any necessary additional knowledge and required updates.

VTS should keep the channels for acquiring knowledge unobstructed, effective and diverse, so that VTS-related personnel such as VTS personnel and equipment maintenance personnel can consult, download and learn in a timely and convenient manner.

VTS can establish a knowledge base, and maintain the review, update and maintenance of the knowledge base to ensure the completeness and effectiveness of the knowledge required. The knowledge base includes but is not limited to the following:

* conventions, laws and regulations, other normative documents;
* VTS equipment operation manual and maintenance manual;
* knowledge gained from experience;
* casualty/incident/near-miss in VTS area;
* academia; conferences, papers, books and other documents;
* gathering knowledge from VTS users or external providers.

# SERVICE PROVISION

VTS shall provide corresponding external services according to the requirements of laws and regulations and the provisions of its own system, and strengthen the control of service process and service quality.

VTS shall identify and control service-related processes to ensure that VTS personnel are clear about the service requirements, including:

* legal and regulatory requirements related to the service;
* VTS internal management regulations;

Before providing services to VTS users, VTS shall review the following:

* requirements of VTS users and their legality;
* requirements of laws and regulations related to VTS service;
* the accuracy of the information obtained by VTS;
* the ability to meet the requirements of VTS users.

VTS can realize the unique identification and storage of the service process and results through watchkeeping records, VTS system videos, records manual, etc., so as to achieve traceability.

VTS shall track the service effect and VTS user feedback after the service is delivered to ensure that the service meets the requirements of laws and regulations and the needs of VTS users. When there are nonconforming outputs, the VTS can take the following actions:

* Correction;
* Suspend wrong actions;
* Informing the VTS user;
* Retain relevant records as the internal training cases.

Conformity to the requirements shall be verified when nonconforming outputs are corrected.

For internal and external procedures related to VTS services, see IALA G1141 Operational Procedures For Vessel Traffic Services.

VTS对外提供服务时，可参考G1089指南。

VTS can refer to IALA G1089 Provision of A VTS when providing services .

# Performance Evaluation

The VTS shall monitor the QMS operation process, and analyze and evaluate the data, equipment status, personnel capabilities, and VTS user satisfaction generated during the QMS operation process.

The analysis and evaluation of the duty performance ability and service compliance of the on-duty personnel can be carried out through personnel assessment and other methods.

The analysis and evaluation of the effectiveness of the QMS can be carried out through internal audit, management review, and external audit, etc.

The analysis and evaluation of VTS user satisfaction can be conducted through visits, interviews, and VHF inquiries, etc.

## Internal audit

The audit plan shall be formulated before the internal audit. The audit plan shall specify the purpose, scope, frequency and method of the audit based on the status and importance of the audited activities and the results of previous audits. The following should be considered in the audit:

* Results of previous audits,
* Audit frequency and method;
* Audit criteria and scope;
* Selection of auditors to ensure objectivity and impartiality of the audit process.

The audit may be conducted by asking questions, reviewing records and observing on-site activities to collect objective evidence of the operation of the QMS and to verify the operation of the QMS. Audit findings should be reported in an audit report. The audit report should be submitted to the top management.

## Management review

Management review is organised and carried out by the top management, mainly to evaluate the suitability, adequacy and effectiveness of the system, to identify opportunities for system improvement and the need for change. An audit plan should be developed before the audit, including the purpose, scope and content of the review; the specific timing and arrangements for the review; and the audit team personnel.

During the management review, the following should be considered:

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* the status of actions from previous management reviews;
* changes in external and internal issues that are relevant to the quality management system;
* information on the performance and effectiveness of the quality management system, including trends in:
* customer satisfaction and feedback from relevant interested parties;
* the extent to which quality objectives have been met;
* process performance and conformity of services;
* Non-conformity and corrective actions;
* monitoring and measurement results;
* audit results;
* the performance of external providers.
* the adequacy of resources;
* the effectiveness of actions taken to address risks and opportunities;
* opportunities for improvement.

The audit team conducts audits according to the plan, records the audit findings, and the team leader makes an overall evaluation of the compliance and effectiveness of the management system. The basic situation, findings and overall evaluation of the audit should be included in the management review report. The audit report shall be submitted to top management.

## External audit

An external audit is an audit conducted by an accredited third-party agency. The external audit is carried out according to the requirements of the audit implementation unit.

# improvement

VTS shall improve the quality management system continuously by addressing the service, management system and management activities.

VTS may use activities such as quality policy, quality objectives, audit results, data analysis, corrective and preventive actions and management reviews to select improvement opportunities to continuously improve the effectiveness of the quality management system.

For the output that does not meet the expected requirements in audit, daily management and service, VTS shall take necessary measures to meet service requirements and enhance VTS user satisfaction. This includes:

* Determine the reasons for non-conformity through review and analysis;
* Take action to control and correct non-conformity;
* Correct, prevent or reduce adverse effects;
* Improve the performance and effectiveness of the quality management system;
* Improve operation management and service to meet requirements and respond to future needs and expectations;
* Review the effectiveness of corrective actions taken;
* Update the risk and opportunity measures if necessary;
* Change the quality management system when necessary.

# documented information

Documentation and records are basic elements in any QMS. Without the documents and records, it is difficult to consider any kind of improvement action.

Documented information should be traceable and continuous.

A requirement to “maintain” documented information does not exclude the possibility that the organization might also need to “retain” that same documented information for a particular purpose, e.g. to retain previous versions of it.

It is worth noting that many records of VTS are stored in the relevant system in the form of electronic data. For the storage of electronic data records, please refer to IALA G1111 Preparation Of Operational And Technical Performance Requirements For VTS Systems.

# References

1. IMO Resolutions A.1158(32) Guidelines For Vessel Traffic Services
2. ISO 9001：2015 Quality Management Systems-Requirements
3. IALA S1040 VESSEL TRAFFIC SERVICES
4. IALA Recommendation O-132 on Quality Management for Aids to Navigation Authorities
5. IALA Guideline G1141 Operational Procedures for Delivering VTS
6. IALA Guideline G1052 Quality Management Systems for Aids to Navigation Service Delivery
7. IALA Guideline G1101 Auditing and Assessing VTS
8. IALA Guideline G1018 Risk Management
9. IALA G1111 Preparation Of Operational And Technical Performance Requirements For VTS Systems
10. IALA G1131 Setting and Measurement VTS Objectives
11. IALA G1102 VTS Interaction With Allied or Other Services
12. IALA G1089 Provision of A VTS