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Proposal on Incorporating Content Related to VTS Area Delineation into guideline G1150

# ****SUMMARY****

Considering that "Develop guidance on delineating the VTS area" has been included in the IALA VTS Committee work programme 2023-2027, and relevant recommendations for this work were proposed at the 57th VTS Committee meeting, this proposal aims to discuss the feasibility of incorporating content related to VTS area delineation into guideline G1150 "Guidelines on Establishing, Planning and Implementing a VTS" (hereinafter referred to as guideline G1150), the content that could be considered for inclusion, and specific suggestions for modifying guideline G1150.

## **Purpose of the Document**

The purpose of this proposal is to provide reference and recommendations to the IALA VTS Committee for Task 1.1.4 - Develop Guidance on Delineating the VTS Area.

## **Relevant Documents**

VTS53-12.1.1-VTS Committee Task Plan 2023–2027 (2022-10-07)

IALA, Guideline G1150 Ed3.1 Establishing, Planning and Implementing a VTS

VTS57-8.1.1-Proposal for Developing Guidance on Delineating the VTS Area

VTS57-8.1.1.1-Draft G\*\*\*\*-# Delineating VTS area

VTS57-13.1 Report of the 57th session of the IALA VTS Committee

VTS57-12.5.1.1-WP G1150 Ed3.1 Establishing, Planning and Implementing a VTS TG 1.1.4 March 25

# Background

VTS area delineation plays a significant role in shipping safety and efficiency management. However, specific implementation standards currently vary considerably worldwide. Further standardizing the implementation process can enhance the global consistency and normativity of VTS area delineation, while also promoting cross-regional coordination. This is particularly important for meeting the refined management needs of waters with high traffic density and complex navigation environments.

This task has been included as IALA Task 1.1.4 and related work has commenced. China Maritime Safety Administration (China MSA) has proposed the suggested content and framework for "Guidelines on VTS Area Delineation" and provided the draft texts of these guidelines. The relevant documents have been submitted as input papers (VTS57-8.1.1 Proposal for Developing Guidance on Delineating VTS Area, VTS57-8.1.1.1 Draft Guideline Gxxxx Delineating VTS Area) to the 57th session of VTS Committee meeting.

In consideration of the aforementioned task, the IALA Working Group, after discussion, concluded that the content of the VTS area delineation guidelines align with the guiding principles in the existing guideline G1150. Therefore, further development of separate guidelines on this topic was deemed unnecessary, and the relevant content should be incorporated into guideline G1150. The Working Group also believed that a comprehensive review of and structural adjustment to guideline G1150 were needed to incorporate supplementary content related to VTS area delineation.

China MSA concurs with the IALA Working Group's views on the conduct of this task and the next steps. Building on this, China MSA intends to provide suggestions for integrating and modifying guideline G1150, based on the earlier proposal.

# ****DISCUSSION****

## **Feasibility of Incorporating VTS Area Delineation Content into guideline G1150**

The existing framework and content of guideline G1150 provide a foundation for incorporating content related to VTS area delineation:

1. Guideline G1150 follows a project management framework, providing guidance on establishing, planning, and implementing a VTS across five stages: Initiating, Planning, Implementing, Controlling, and Closing. VTS area and sub-area delineation are crucial considerations throughout the VTS planning, implementation, and control processes. Relevant content can be integrated into the corresponding stages based on the practical work involved in VTS area delineation.
2. Within the current framework of guideline G1150, Section "6. Post-Implementation Evaluation" explicitly states that changes in volume of traffic or degree of risk within the area should prompt consideration of VTS area delineation, thereby outlining scenarios and timings for undertaking this work. In addition, Annex "A.5. VTS Area" serving as an independent section provides a list of key factors to consider when delineating a VTS area that can form a basis for further enrichment of its content and standards.

The above demonstrates that guideline G1150 covers content related to VTS area delineation. However, it does not provide sufficient details or clarity regarding the specific process and standard guidance for carrying out this work. Therefore, it is reasonable to modify guideline G1150 to further clarify the processes and standards for VTS area delineation.

## **Content Related to Area Delineation for Consideration in guideline G1150**

Based on the discussions of the IALA Working Group and VTS operational practices, we propose to adjust factors to consider during VTS area delineation. Modifications to some factors listed in Annex A.5. "Delineating the VTS Area" of guideline G1150 were proposed in document VTS57-12.5.1.1-WP G1150 Ed3.1 Establishing, Planning and Implementing a VTS TG 1.1.4 March 25. We believe that the relevant influencing factors can be further expanded and adjusted. Specific adjustments are detailed in "A.5.1 Considerations for Delineating a VTS Area" in Annex A.

we also propose that the following content related to VTS area delineation could be added to guideline G1150:

1. Definitions for "VTS Area Delineation" and "VTS Sub-area Delineation". Currently, IALA documents and the IALA Dictionary lack relevant definitions or explanations for the terms of "VTS Area Delineation" and "VTS Sub-area Delineation". This may lead to divergent interpretations of the concept of VTS Sub-area. Defining these terms is essential.
2. Factors to consider during VTS sub-area delineation. Current guideline G1150 and document VTS57-12.5.1.1 WP guideline G1150 Ed3.1 mention some factors related to VTS sub-area delineation, but the content is in the same module as VTS area delineation. In VTS practice, there are certain differences and distinctions between the considerations for delineating the overall VTS area and VTS sub-area. It is recommended to list the additional factors specific to sub-area delineation separately. See "A.5.2 Factors to Consider for VTS sub-area delineation" in Annex A.
3. Considerations for VTS area assessment. While Section 6 "Post-Implementation Evaluation" in guideline G1150 mentions that VTS area delineation should be considered in light of changes in volume of traffic or degree of risk within the area, the specific considerations for conducting such an assessment are not listed. It is recommended that these be clarified and supplemented. Specific content is detailed in "A.5.3 Considerations for Conducting VTS Area Assessment" within Annex A.
4. Implementation steps for VTS area and sub-area delineation. Better guidance could be provided for adjusting VTS areas and delineating sub-areas by clarify the specific steps and methods, and adding concrete steps. Specific content can be found in "A.5.4 Steps for Conducting VTS Area Delineation and sub-area delineation" in Annex A.

## **Proposed Modifications to guideline G1150**

Considering the above content, it is recommended that guideline G1150 be modified in the following two aspects:

1. Add content related to VTS area delineation and VTS sub-area delineation to Chapter "5. Planning and Implementation" in the main body of the guideline;
2. Revise the existing Annex A.5. to incorporate specific details such as factors to consider during implementation, assessment procedures, etc.

Specific suggestions for incorporating VTS area delineation and sub-area delineation content:

### Recommendations on VTS Area and Sub-area Delineation：

* Amendment to Chapter 5.1 ("Phase 1: Initiating"), adding provisions on VTS area delineation: under "Feasibility study – The purpose of a feasibility study is to establish whether a VTS is a viable solution to address the issue or problem. The following areas may be considered:……", enhance the operational feasibility factor as follows: “Operational feasibility - Does implementing a VTS meet the needs of the entity by solving problems and/or taking advantage of identified opportunities? How is the scope of VTS implementation determined? Specifically, how should the VTS service area be delineated, and is sub-area delineation necessary?” This ensures that VTS area delineation and sub-area delineation are considered at the initial stage of VTS establishment.
* Amendment to Chapter 5.1 ("Phase 1: Initiating"), adding information collection and analysis: under "Possible issues and problems relating to ship traffic include: Interaction of maritime traffic; Volume and composition of traffic; Protection of the marine environment and surrounding areas; The local conditions such as geography, hydrological/meteorological, and tides", add: “Port and anchorage facility capacity, emergency rescue and search-and-rescue (SAR) capabilities, dangerous cargo hazards, and inter-regional traffic coordination mechanisms.”
* Amendment to Chapter 5.2 ("Phase 2: Planning"), adding Solutions content. Add the following after “Functional requirements”: “Solutions – Proposals to meet functional requirements and address issues/problems identified in Phase 1.”
* Amendment to Chapter 6 ("Post Implementation Evaluation"), adding Clarification on VTS area delineation: Under "The evaluation may indicate changes to the volume of traffic or the degree of risk have culminated in the need to consider changes such as: The delineated VTS area", add: “Whether the delineated area requires adjustment, and whether sub-area delineation within the existing VTS area is necessary.”
* Consolidation of capacity assessment statements in Chapter 6, merge the two existing points: "Enhanced capabilities for monitoring and managing ship traffic (e.g. staffing, decision support capabilities) to ensure the safety and efficiency of ship movements through, for example, the forward planning of ship movements or organizing space allocation." and" Reduced capabilities to monitor and manage ship traffic (e.g. staffing, technological capabilities) may adequately address the risks." Revised to: “Monitoring and management of ship traffic capabilities (e.g., staffing, decision support, technical capacity) shall be dynamically evaluated, with proactive planning implemented to ensure maritime safety and efficiency in risk mitigation.”

### Proposed Modifications to Existing Annex "A.5. VTS Area" in guideline G1150

It is recommended that the above content described in Section "3.2 Content Related to Area Delineation for Consideration in guideline G1150" of this proposal be comprehensively revised and used to replace the existing content of Annex "A.5. VTS Area". The sub-heading of this section could be further changed to "A.5. Implementation Considerations for VTS Area Delineation". The detailed modifications for this section are outlined in Annex A.

To facilitate the review of the Working Group , we provide a revised version of guideline G1150 with the modifications described in sections 3.3.1 and 3.3.2 marked. Please refer to Annex B "G1150 Establishing, Planning and Implementing a VTS (Track Changes Version - China MSA)".

# Recommendation

It is recommended that the Committee consider the above content when revising guideline G1150.

# References

G1045 Staffing Levels at VTS Centres

G1171 Human Factors and Ergonomics in VTS

VTS Communication Regulation Port of Rotterdams. Rotterdam 2010

# Action Requested of the Committee

The Committee is requested to consider the proposals in this document and take appropriate action.

# Annexes

Annex A: A.5. Implementation Considerations for VTS Area Delineation

Annex B: G1150-Establishing Planning, and Implementing a VTS (Track Changes Version - China MSA)Annex A：A.5. Implementation Considerations for VTS Area Delineation

### A.5.1. Factors to Consider for VTS Area Delineation

* Delineating the VTS area and, if appropriate, VTS sub-areas or sectors;
* Ship traffic rules, such as one-way traffic zones and regulations concerning vessels carrying hazardous cargoes;
* Allocation of waterway space or management of infrastructure such as locks and bridges;
* Types and sizes of vessels which are required or expected to participate in the VTS;
* Adjacent VTSs and/or Ship Reporting Systems and co-ordination of operations/procedures;
* Distribution of port areas and terminals: Study the distribution of port areas and terminals to analyze traffic flow patterns for different areas/terminals. Consideration must be given to including all or specific port areas within the VTS area during delineation.
* Hydrographic and topographic features: Primarily implement precise control based on natural geographic boundaries and risk points (e.g., narrow channels, shoals). Ensure VTS monitoring effectively covers critical waters during area delineation.
* Hydrometeorological conditions: Hydrometeorological conditions within the area must be considered. For example, during the coincidence of daily high tide and spring tides, the instantaneous flow velocity in certain waters may significantly impact vessel manoeuvring. Ensure the VTS area coverage includes waters significantly affected by hydrometeorological changes impacting navigation.
* Traffic flow and habitual shipping routes: Analyze information including vessel tracks and speeds to determine the distribution of habitual shipping routes. Ensure the VTS area coverage incorporates these routes, which aids the VTS in better traffic organization.
* Effective surveillance coverage of VTS system equipment: The operational range radius of equipment such as radar, AIS, and VHF directly influences the management area boundaries. Ensure surveillance coverage is comprehensive (no blind spots).
* Communication and data transmission capacity: Consider the communication bandwidth between vessels within the management area and the VTS Centre to avoid data congestion impacting monitoring efficiency.
* Alignment with aids to navigation: The division of the management area must correspond with the positions of physical aids to navigation such as lighthouses, buoys, and other navigation marks.
* International, national, and regional regulatory requirements for VTS safety supervision and services: Different countries and regions have varying domestic regulatory requirements for safety supervision services. These requirements must be fully considered during VTS area delineation.
* Particularly Sensitive Sea Areas (PSSA): When delineating the VTS area, special consideration must be given to whether a PSSA should be included within it to minimize potential adverse impacts from maritime traffic.
* Location of traditional fishing grounds: Confirm the location of traditional fishing grounds with fisheries authorities to avoid conflicts between the VTS area and fishing zones.
* Needs of shipping companies and crew: Consider vessel navigation practices to avoid VTS area (or sub-area) delineation adversely affecting vessel navigation and increasing crew workload.
* Coordination with adjacent service areas: Beyond adjacent VTSs, also consider boundary coordination with areas such as Search and Rescue (SAR) Regions of Responsibility, pilotage districts, and maritime radio reporting areas.
* Future development plans: Account for foreseeable future developments within the area, such as new port terminals, cross-sea bridges, and offshore wind farms.

### A.5.2. Factors to Consider for VTS Sub-area Delineation

* Waterway and Route Characteristics: Includes channel width, curvature, depth variations, and distribution of navigational hazards (e.g., shoals, reefs). For instance, areas like narrow channels, sharp bends, or zones where vessels frequently alter course, manoeuvre, or approach convergence zones, route junctions, or traffic crossing points should be assessed to determine if they warrant designation as separate sub-areas for priority monitoring and management, guiding vessels safely through.
* Direction and Volume of Traffic Flow: If vessel movement directions differ across areas (e.g., unidirectional, bidirectional, or multidirectional flows), sectors should be delineated based on flow patterns to facilitate targeted traffic organization and command. Concurrently, areas with high vessel quantity or traffic density also require rational sub-area delineation to prevent management confusion.
* VHF Channel Management: Consider the availability of VHF channels and vessel communication needs. When channels are congested, prone to interference, or overloaded, establishing sectors enables sector-based frequency management. Assigning dedicated VHF channels to each sub-area ensures smooth communication between the VTS and vessels.
* VTS Operator Workload: The size and complexity of an area directly impact an operator's monitoring capability and stress level. Ensure VTS operators monitor and manage their assigned area effectively, preventing management oversights due to excessive workload. Also, strive for a roughly balanced monitoring load across operator consoles.
* Functional Differences within the Area: VTS areas encompass diverse vessel operation zones (e.g., container terminals, bulk cargo terminals, passenger terminals) and areas with concentrated large vessel movements. Different zones have distinct vessel operation characteristics and safety requirements. Sectors can be delineated functionally, allowing for tailored management measures.
* Geographical Boundaries and Markers: Utilize natural geographical features (e.g., islands, headlands, estuary) or artificial markers (e.g., lighthouses, buoys) as sector boundaries. This aids identification, management, and helps vessels accurately determine their location.
* Timings for delineating sub-area-Sub-area delineation should be considered when the following situations occur:
* High and Complex Traffic Volume: When the VTS area experiences numerous vessels, high traffic density, and frequent occurrences of different types of vessels and routes intersection, sub-area delineation allows for precision monitoring and management, preventing traffic congestion and collisions.
* Complex Geographic Environment: If the VTS area encompasses diverse geographical regions (e.g., narrow channels, winding rivers, multi-island waters, shoal areas) with different navigational risks and requirements, sub-area delineation facilitates the development of specific management measures and contingency plans suited to each sub-area.
* High Vessel Communication Demand: When vessel communication demand is high, causing channel congestion and impacting information exchange and traffic organization efficiency, sub-area delineation combined with assigning dedicated communication channels per sub-area reduces interference and improves communication quality.
* High-incident zones: Dynamic risk assessment may be conducted with reference to the IALA Risk Tool by integrating real-time traffic data, hydrometeorological information, and historical accident data to determine whether it constitutes a high-risk area. Upon confirmation, sub-area delination may be considered to implement differentiated control measures. This enables VTS operators to focus on critical areas, thereby reducing time spent on ineffective monitoring.

### A.5.3. Factors to Consider for VTS Area Assessment

* Traffic Pattern Changes: Changes such as the addition/reduction of routes, seasonal traffic fluctuations, and shifts in vessel type proportions. Quantitative data analysis should be considered.
* Environmental Vulnerability Changes: Addition/reduction of ecological protection zones or sensitive infrastructure (e.g., cross-sea bridges, submarine pipelines).
* Risk Distribution Changes: Accident hotspots migration and hydrogeological evolution (e.g., channel deviation caused by sedimentation/erosion).
* Coordination Requirement Changes: Boundary overlaps or functional conflicts with adjacent VTS/port service areas.

### A.5.4. Steps for VTS Area Delineation and Sub-area Delineation

* Demand analysis;
* Stakeholder consultation (Conduct in-depth consultations with all affected parties, such as shipping companies, ship masters, pilots, port authorities, fisheries representatives);
* Solution design;
* Delineation of new boundaries;
* Definition of area functions;
* Impact assessment;
* Apply the IALA Risk Assessment Tool to quantify post-adjustment risk variations;
* Assess impacts on vessel compliance costs and cross-jurisdictional coordination;
* Regulatory compliance review: To ensure conformity with SOLAS Chapter V/Regulation 12 and national legislation;
* Phased implementation:

Pilot operation;

Revise the VTS operations manual;

* Official announcement and entry into force: Publish changes through Notices to Mariners.

1. Input document number, to be assigned by the Committee Secretary [↑](#footnote-ref-1)
2. Leave open if uncertain [↑](#footnote-ref-2)