

IALA Guideline No. #####

On

**Use of Decision Support Tools
for VTS personnel**

Edition 1

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10, rue des Gaudines
78100 Saint Germain en Laye, France
Telephone: +33 1 34 51 70 01 Fax: +33 1 34 51 82 05
e-mail: contact@iala-aism.org Internet: www.iala-aism.org

Document Revisions

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

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Use of Decision Support Tools for VTS Personnel

1 INTRODUCTION

According to IMO Resolution A.857(20), Vessel Traffic Services are implemented to improve the safety and efficiency of vessel traffic and to protect the marine environment. The service should have the capability to interact with the traffic and to respond to traffic situations developing in the VTS area.

Decision support is a way to help VTS personnel make decisions in routine or non-routine situations. It is especially useful for VTS personnel facing decisions about developing situations or emergency situations.

Decision Support Tools (DST) are used in VTS centres to enhance situation awareness by assisting VTS personnel. These tools can assist VTS personnel decision making activities at operational, tactical and strategic levels.

1.1 Objective

The aim of this document is to give guidance on the use of decision support tools for VTS personnel when considering decisions on evolving or emergency situations in a harmonised way.

2 ACRONYMS AND DEFINITIONS

To assist in the use of this guideline, the following acronyms and definitions, mainly based on IMO Resolutions, have been used:

Table 1 Acronyms

| | |
|-------------|---|
| <i>IALA</i> | International Association of Marine Aids to Navigation and Lighthouse Authorities |
| <i>IMO</i> | International Maritime Organization |
| <i>VTS</i> | Vessel Traffic Services |
| <i>VTSO</i> | VTS Operator is an appropriately qualified person performing one or more tasks contributing to the services of the VTS. |
| <i>INS</i> | An information service is a service to ensure that essential information becomes available in time for on-board navigational decision-making. |
| <i>TOS</i> | A traffic organization service is a service to prevent the development of dangerous maritime traffic situations and to provide for the safe and efficient movement of vessel traffic within the VTS area. |
| <i>NAS</i> | A navigational assistance service is a service to assist on-board navigational decision-making and to monitor its effects. |

Table 2 General Definitions

| | |
|-------|--|
| Alarm | A high priority alert requiring immediate attention and action (IMO Res. A.1021(26)) |
| Alert | An announcement of abnormal situations and conditions requiring attentions (IMO Res. A.1021(26)) |

| | |
|-----------------------------------|---|
| Caution | Lowest priority of an alert. Awareness of a condition which does not warrant an alarm or warning condition, but still requires attention out of the ordinary consideration of the situation or of given information. (IMO Res. A.1021(26)) |
| Warning | Condition requiring immediate attention, but not immediate action. (IMO Res. A.1021(26)) |
| Emergency alarm | Highest priority of an alert. Alarms which indicate immediate danger to human life or to the ship and its machinery exits and require immediate action. (IMO Res. A.1021(26)) |
| Decision-maker | A person or group authorized to make decisions. |
| Decision support tool (DST) | A tool to assist the decision-maker at an operational, tactical and strategic level. This may be in real-time or at a tactical or strategic level. |
| Passive decision support tool | A tool that aids the process of decision making, but that cannot bring out explicit decision suggestions or solutions. |
| Active decision support tool | A tool that brings out decision suggestions or solutions to support decision making. |
| Cooperative decision support tool | A tool that helps the decision-maker to modify, complete, or refine the decision suggestions provided by the tool, and feed back to the tool. The tool again improves, completes, and refines the suggestions of the decision-maker and feedback for validation. The whole process may start again, until a consolidated solution is generated. |

3 UTILIZATION OF DECISION SUPPORT TOOLS

3.1 General principles

The use of DST may differ depending on the needs and services of the VTS. In order to assist VTS personnel fulfilling their tasks (INS, TOS and NAS) in a specific context, some DST may require user input such as the vessel(s) concerned or the area supervised. In other cases, some tools are working permanently in a self-contained way and should inform the VTS personnel automatically.

The operational procedures of the VTS should clarify the use of DST according to the local environment of the VTS area.

The DST can be implemented during or after the establishment of VTS, and if necessary should be based on the outcome of a formal risk assessment.

3.2 Situation awareness

The use of different levels of alerts could increase the situation awareness with the DST. In accordance with IALA Recommendation V-125, it is recommended that the terminology used for alerts (alarm, warning and caution) reflects the maritime standards contained in IMO Resolution A.1021(26)) “Code on alerts and indicators”, unless particular local circumstances require otherwise.

The increasing levels of alerts provided by the DST starts with caution then warning, alarm and emergency alarm (*Figure 1*).

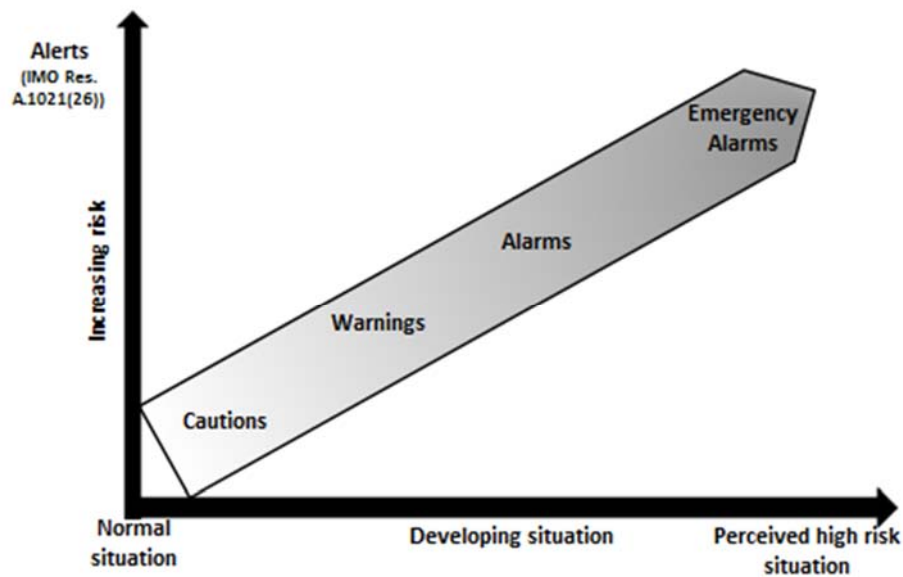


Fig 1 – DST increasing alerts

3.2.1 Cautions

In a routine condition, the DST provides a caution alert. A caution alert is a condition of awareness which does not warrant an alarm or warning condition, but still requires attention out of the ordinary consideration of the situation or of given information.

Example of caution

Speed vector gives basic information which can be set by the VTS personnel.

3.2.2 Warnings

For conditions requiring immediate attention, but not immediate action the DST provides a warning. Warnings are presented for precautionary reasons to make the VTS personnel aware of changed conditions which are not immediately hazardous, but may become hazardous if no action is taken.

Example of warning

Vessel approaching shallow water with sufficient manoeuvring space to avoid shallow water.

3.2.3 Alarms

For conditions requiring immediate attention and action the DST provides an alarm.

Example of alarm

Vessel approaching shallow water with minimum manoeuvring space to avoid shallow water.

3.2.4 Emergency alarms

For conditions which indicate immediate danger to human life, vessels or the environment that require the immediate initiation of emergency procedures.

Example of Emergency alarm

Vessel is not able to avoid shallow water.

3.3 Types of decision support tools

Depending on the relationship between the DST and the decision-maker, a DST can be classified as passive, active, or cooperative.

Whatever type of DST is used, the final decision is always at the discretion of the decision-maker according to the relevant VTS operational procedures.

3.3.1 Passive decision support tool

A passive DST is the most common type available in VTS centres. Such a tool is generally used for generating alerts.

Example, shallow water alert

A passive DST shall raise a visible and/or audible indication whenever a vessel is heading to shallow water and action is required.

3.3.2 Active DST

In addition to the functions of a passive DST, an active DST is able to provide potential solutions to the decision-maker. These potential solutions may be derived from a list of pre-defined solutions that should comply with the relevant VTS operational procedures.

Example, shallow water alert

An active DST shall raise a visible and/or audible indication and provide potential options/suggestions such as course and speed alterations, etc.

3.3.3 Cooperative DST

In addition to the functions of an active DST, a cooperative DST may induce more exchanges between human and machine in order to identify a solution that best suits the needs of the decision-maker. Those tools are used in more complex and/or infrequent situations where decision making is difficult.

Example, shallow water alert

A cooperative DST, such as shallow water decision support tool provides options/suggestions to the decision-maker who could request new answers to options suggested by the tool.

Reduce speed could be a solution selected and the cooperative DST could calculate the appropriate speed reduction based on the time of available depth of water in order for the vessel to arrive on the position with sufficient depth.

3.4 Management requirements of decision support tools

Management functionalities should be provided to authorised users to enable the adjustment of alert thresholds and the possibility of de-activation. The appropriate alert thresholds should be part of the agreed VTS operational procedures to ensure that the deployed system is fit for purpose. Alerts should not be excessive.

Management reports may be generated from alert statistics and/or VTSO actions for analysis.

3.5 Operational requirements of decision support tools

DSTs may be based upon a real-time assessment of risks associated with the traffic situation. The DST should:

- provide alerts (audible and / or visible)
- reduce the workload;

- be accurate and in real time;
- be configurable with local VTS operational procedures;
- facilitate the result oriented decision making by VTS personnel in accordance with the type of service declared ;
- comply with IALA Recommendation V-125 (Use and presentation of symbology at VTS centres);
- have recording capacity.

When the risk level exceeds a pre-defined threshold, the VTSO may be advised of the recommended risk mitigation options.

3.6 Training

The VTS Authority should ensure that VTS personnel are adequately trained in the use of DSTs.

General training on the general principles of, types and common uses of DSTs should be provided in IALA Model Course V-103/1 within the Traffic Management module. Additionally, advanced training in the general use of DSTs should be provided in Model Course V-103/2 within the Advanced Traffic Management module recognizing the degree of management and supervisory oversight necessary to ensure the effective use of DSTs.

Specific training on the use and application of DSTs within specific VTS Centres should be provided as a component of Model Course V-103/3 in an On-the-Job Training environment. Additionally, further training should be provided when new DSTs are introduced or modifications are made to existing DSTs.

Emphasis should be given on the inputs and limitations of the DSTs.

4 EXAMPLES OF WHEN DECISION SUPPORT TOOLS MAY BE USED

The following list provides examples of where DSTs may assist in ensuring the safety and efficiency of navigation:

- Collision avoidance;
- Anchor watch;
- Under Keel clearance
- Grounding avoidance;
- Air draught clearance;
- Critical waypoint
- Area related (limited access areas, area to be avoided, etc.);
- Speed limitation;
- Sailing plan compliance;
- Incident or accident management.

5 REFERENCES

The following primary references have been used in the production of this Guideline:

- IMO Resolution A.1021(26) Code on alerts and indicators ;
- IALA VTS Manual;

- IALA Dictionary;
- IALA Recommendation V-125 on the use and presentation of symbology at a VTS Centre (including AIS);
- IALA Recommendation V-127 on Operational Procedures for Vessel Traffic Services;
- IALA Recommendation V-128 on Operational and Technical Performance Requirements for VTS Equipment;
- IALA Guideline 1018 on Risk Management;
- IALA Guideline 1070 on VTS role in managing Restricted or Limited Access Areas.
- IALA Guideline 1089 on provision of Vessel Traffic Services (INS, TOS, NAS)