

ANNEX 21

**RESOLUTION MSC.302(87)
(adopted on 17 May 2010)**

**ADOPTION OF PERFORMANCE STANDARDS FOR
BRIDGE ALERT MANAGEMENT**

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING ALSO resolution A.886(21) on Procedure for the adoption of, and amendments to, performance standards and technical specifications, by which the Assembly resolved that the function of adoption of performance standards and technical specifications, as well as amendments thereto, shall be performed by the Maritime Safety Committee,

RECOGNIZING the need to prepare performance standards harmonizing the priority, classification, handling, distribution and presentation of alerts, to enable the bridge team to devote full attention to the safe operation of the ship and to immediately identify any alert situation requiring action to maintain the safe operation of the ship,

RECOGNIZING ALSO that a central alert management human machine interface (CAM-HMI) for presenting alerts as individual alerts or as aggregated alerts supports the bridge team in the immediate identification of any abnormal situation, of the source and reason for the abnormal situation and in its decisions for the necessary actions to be taken,

NOTING that further guidance on the presentation of alerts is provided in the Code on Alerts and Indicators, 2009 (resolution A.1021(26)) which is intended to provide general design guidance and to promote uniformity of type, location and priority for alerts and indicators,

HAVING CONSIDERED, at its eighty-seventh session, the recommendation made by the Sub-Committee on Safety of Navigation at its fifty-fifth session,

1. ADOPTS the Performance standards for bridge alert management, set out in the Annex to the present resolution;
2. RECOMMENDS Governments:
 - .1 to encourage the use of Bridge Alert Management on the ships flying their flags;
 - .2 that central alert management (CAM) and central alert management human machine interface (CAM-HMI), if installed on the bridge on or after 1 July 2014, conform to performance standards not inferior to those set out in Annex to the present resolution; and
 - .3 to encourage that the general requirements of modules A and C of the performance standards set out in Annex to the present resolution are applied to relevant equipment on the bridge presenting alerts on or after 1 July 2014.

ANNEX

PERFORMANCE STANDARDS FOR BRIDGE ALERT MANAGEMENT

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1 Purpose

1.1 The purpose of the bridge alert management (BAM) is to enhance the handling, distribution and presentation of alerts, applying the Guidelines on the application of SOLAS regulation V/15 to INS, IBS and bridge design (SN.1/Circ.265).

1.2 The BAM harmonizes the priority, classification, handling, distribution and presentation of alerts, to enable the bridge team to devote full attention to the safe operation of the ship and to immediately identify any alert situation requiring action to maintain the safe operation of the ship.

1.3 A central alert management human machine interface (CAM-HMI) for presenting alerts as individual alerts or as aggregated alerts supports the bridge team in the immediate identification of any abnormal situation, of the source and reason for the abnormal situation and supports the bridge team in its decisions for the necessary actions to be taken.

1.4 The BAM architecture and the acknowledgement/silencing concept specified avoid unnecessary distraction of the bridge team by redundant and superfluous audible and visual alarm announcements. It reduces the cognitive load on the operator by minimizing the information presented to which is necessary to assess the situation.

1.5 Further guidance on the presentation of alerts is provided in the Code on Alerts and Indicators, 2009 (resolution A.1021(26)) which is intended to provide general design guidance and to promote uniformity of type, location and priority for alerts and indicators.

2 Scope

To enhance the safety of operation, these Performance standards provide requirements for the harmonized presentation and treatment of alerts on the bridge and specify a central alert management (CAM).

3 Application

3.1 Module A describes the general concept of the BAM and the presentation of alerts on the bridge equipment.

3.2 Modules B and D contain requirements for the CAM and the CAM-HMI.

3.3 Module C describes the interface requirements for BAM.

3.4 In addition to the general requirements set out in the General requirements for shipborne radio equipment performing part of the GMDSS and for electronic navigational aids (resolution A.694(17), as amended)* and the presentation requirements set out in the Performance standards for the presentation of navigation-related information on shipborne navigational displays (resolution MSC.191(79)), CAM should meet the requirements of these performance standards and follow the relevant guidelines on ergonomic principles adopted by the Organization.

3.5 If an INS is installed on the bridge it should be assured that the functionality of module C of the INS PS is included in one CAM system.

* Refer to publication IEC 60945.

3.6 In case of conflict with alert requirements of existing performance standards, the present Performance standards will take precedence.

3.7 These Performance standards should apply for all alerts presented on, and transferred to, the bridge.

4 Definitions

For the purpose of these Performance standards, the definitions in appendix 1 apply.

MODULE A – PRESENTATION AND HANDLING OF ALERTS ON THE BRIDGE

5 General

5.1 The BAM should provide:

- .1 the means used to draw the attention of the bridge team to the existence of alert situations;
- .2 the means to enable the bridge team to identify and address that condition;
- .3 the means for the bridge team and pilot to assess the urgency of different alert situations in cases where more than one alert situation has to be handled;

.4 the means to enable the bridge team to handle alert announcements; and

- .5 the means to manage all alert-related states in a distributed system structure in a consistent manner.

5.2 If practicable, there should be not more than one alert for one situation that requires attention.

5.3 As alerts can be displayed at several locations, the presentation of the alert on the bridge equipment should be consistent as far as practicable with respect to how alerts are displayed, silenced and acknowledged. The states of alerts should be consistent on the bridge.

5.4 It should be possible to provide the CAM-HMI at least on the workstation for navigating and manoeuvring, and if provided at the workstation for monitoring.

5.5 If an INS is installed on the bridge the functionality of the INS alert management HMI and the CAM-HMI should be integrated.

6 Priorities – Classification

6.1 Priorities of alerts

6.1.1 The BAM should distinguish between the four priorities listed:

- .1 emergency alarms;
- .2 alarms;

- .3 warnings; and
- .4 cautions.

6.1.2 Alerts additional to the alerts required by the Organization should be assigned to a priority level using the criteria for classification.

6.2 Criteria for classification of alerts

6.2.1 Criteria for emergency alarms:

- .1 alarms which indicate that immediate danger to human life or to the ship and its machinery exists and that immediate action must be taken; and
- .2 emergency alarms are specified in the Code on Alerts and Indicators, 2009 (resolution A.1021(26)).

6.2.2 Criteria for classification of alarms:

- .1 conditions requiring immediate attention and action by the bridge team to avoid any kind of hazardous situation and to maintain the safe operation of the ship; and
- .2 escalation required as alarm from not acknowledged warning.

6.2.3 Criteria for classification of warnings: conditions or situations which require immediate attention for precautionary reasons, to make the bridge team aware of conditions which are not immediately hazardous, but may become so.

6.2.4 Criteria for classification of cautions: awareness of a condition which still requires attention out of the ordinary consideration of the situation or of given information.

6.3 Categories of alerts

Alerts should be separated for the alert handling into three categories of alerts:

6.3.1 Category A alerts

6.3.1.1 Category A alerts are specified as alerts where information at a task station directly assigned to the function generating the alert is necessary, as decision support for the evaluation of the alert-related condition, e.g.:

- .1 danger of collision; and
- .2 danger of grounding.

Where category A alerts cannot be acknowledged at a HMI, this fact should be clearly indicated to the user.

6.3.2 Category B alerts

6.3.2.1 Category B alerts are specified as alerts where no additional information for decision support is necessary besides the information which can be presented at the CAM-HMI.

6.3.3 *Category C alerts*

Category C alerts are specified as alerts that cannot be acknowledged on the bridge but for which information is required about the status and treatment of the alerts, e.g., certain alerts from the engine.

7 State of alerts

7.1 General

7.1.1 The presentation of alarms and warnings is defined in the Performance standards for presentation of navigation-related information on shipborne navigational displays (resolution MSC.191(79)).

7.1.2 The state of an alert should be consistently distributed and presented for the BAM and all associated displays.

7.2 Emergency alarms

The handling of emergency alarms is specified in the Code on Alerts and Indicators, 2009 (resolution A.1021(26)).

7.3 Alarms

7.3.1 The BAM should distinguish between different alarm states:

- .1 unacknowledged alarm; and
- .2 acknowledged alarm.

7.3.2 When an alarm condition is detected, it should be indicated as unacknowledged alarm:

- .1 initiate an audible signal, accompanied by the visual alarm announcement;
- .2 provide a message of sufficient detail to enable the bridge team to identify and address the alarm condition; and
- .3 may be accompanied by speech output presented at least in English, using harmonized alert voice messages according to the regulations of the Organization.

7.3.3 An unacknowledged alarm should be clearly distinguishable from those existing and already acknowledged. Unacknowledged alarms should be indicated flashing and by an audible signal.

7.3.4 The characteristics of the audible alarm signal, whether used singly or in combination with speech, should be such that there is no possibility of mistaking it for the audible signal used for a warning.

7.3.5 Means may be provided at an HMI to temporarily silence audible alarm signals, if the alert identification is provided at the HMI. If an alarm, which can be acknowledged on the bridge (categories A and B), is not acknowledged within 30 s the audible signal should start again or as specified in the equipment performance standards.

7.3.6 It should be possible to temporarily silence category C alarms. The alarm should be retriggered after a specified period of time consistent with the Code on alerts and indicators when the alarm is not acknowledged at the specified workplace (e.g., engine-room).

7.3.7 The visual indication for an unacknowledged alarm should continue until the alarm is acknowledged, unless specified otherwise in the equipment performance standards, e.g., for CPA/TCPA alerts where the visual signal can be ceased when the alarm condition is rectified.

7.3.8 The audible indication, if not temporarily silenced, for an unacknowledged alarm should continue until the alarm is acknowledged or the alarm condition is rectified. The audible signal of an unacknowledged alarm should be ceased when the alarm condition is rectified.

7.3.9 An acknowledged alarm should be indicated by a steady visual indication.

7.3.10 The visual signal for an acknowledged alarm should continue until the alarm condition is rectified.

7.4 Warnings

7.4.1 The BAM should distinguish between different warning states:

- .1 unacknowledged warning; and
- .2 acknowledged warning.

7.4.2 When a warning condition is detected, it should be indicated as unacknowledged warning:

- .1 initiate a momentarily audible signal, accompanied by the visual warning announcement;
- .2 provide a message of sufficient detail to enable the bridge team to identify and address the warning condition; and
- .3 may be accompanied by speech output presented at least in English, using harmonized alert voice messages according to the regulations of the Organization.

7.4.3 An unacknowledged warning should be clearly distinguishable from those existing and already acknowledged. Unacknowledged warnings should be indicated flashing and by an audible signal.

7.4.4 The characteristics of the momentarily audible warning signal, whether used singly or in combination with speech, should be such that there is no possibility of mistaking it for the audible signal used for an alarm.

7.4.5 The visualization for an unacknowledged warning should continue until the warning is acknowledged, unless specified otherwise in the equipment performance standards where the visual indication can be ceased when the alarm condition is rectified.

7.4.6 An acknowledged warning should be indicated by a steady visual indication.

7.4.7 The visual indication for an acknowledged warning should continue until the warning condition is rectified.

7.5 Cautions

7.5.1 A caution should be indicated by a steady visual indication. No acknowledgement should be necessary for a caution.

7.5.2 A caution should be automatically removed after the condition is rectified.

7.5.3 A message should be provided of sufficient detail to enable the bridge team to identify and address the caution condition.

7.6 Alert escalation

7.6.1 The alert escalation should be compliant with the alert escalation requirements of the individual performance standards.

7.6.2 An unacknowledged warning should be:

- .1 repeated as a warning after a limited time period not exceeding 5 min; or
- .2 changed to alarm priority after a limited time period not exceeding 5 min; or
- .3 changed to alarm priority after a user selectable time not more than 5 min, if provided; or
- .4 changed to alarm priority, as required by specific requirements for the individual equipment and system.

8 Presentation of alerts on the bridge

8.1 The alert messages should be completed with aids for decision-making, as far as practicable.

8.2 Audible annunciation of category A should only occur at the task station, system or sensor directly assigned to the function generating the alert.

8.3 The audible annunciation of category B and C alerts should be duplicated at the CAM-HMI.

MODULE B – CENTRAL ALERT MANAGEMENT FUNCTIONALITY

9 Central alert management human machine interface (CAM-HMI)

9.1 All alerts should be displayed on the CAM-HMI either as individual alerts or as aggregated alerts.

- 9.2 The CAM-HMI should offer the possibility to display aggregated alerts.
- 9.3 The CAM-HMI should provide the means to announce and indicate alerts to draw the attention of the bridge team.
- 9.4 The CAM-HMI should have the capability to duplicate the audible alert annunciation of the individual equipment and displays installed on the bridge for category B and C alerts.
- 9.5 The CAM-HMI should allow for easy identification of alerts, and the enabling of immediate identification of the alert releasing function or sensor/source.
- 9.6 The CAM-HMI should be designed that alert messages of the different priorities are clearly distinguishable from each other.
- 9.7 The alert messages should be completed with aids for decision-making, as far as practicable. An explanation or justification of an alert should be available on request.
- 9.8 The CAM-HMI should enable an immediate acknowledgement of individual alarms and warnings by a single operator action for category B alerts.
- 9.9 It should only be possible to acknowledge alarms and warnings individually.
- 9.10 It should be possible to temporarily silence all audible alert signals with a single operator action at the CAM-HMI.
- 9.11 The CAM-HMI should be able to display at least 20 recent alerts at the same time.
- 9.12 If the CAM-HMI is such that it can not display all alerts simultaneously requiring the bridge team's attention, then there should be a clear and unambiguous indication that there are additional alerts requiring attention.
- 9.13 It should be possible to display the additional alerts by a single operator action.
- 9.14 It should be possible to return to the display containing the highest priority alerts by a single operator action.
- 9.15 When information other than the list of active alerts (e.g., the alert history list, configurations) is presented, then it should still be possible to see the appearance of new alerts.
- 9.16 As default, the alerts should be presented grouped in order of priority. Within the priorities the alerts should be displayed in the order in which they occur (sequence). Additionally, alerts may be presented in functional groups.

9.17 Aggregated alerts

- 9.17.1 Aggregated alerts may be provided.
- 9.17.2 As the handling of aggregated alerts requires more user operations and time to obtain the necessary information alerts required by the Organization for presentation on the bridge should only be aggregated to combine multiple individual alerts of the same kind to provide one alert at the CAM-HMI for which individual presentation is anyway necessary at alert releasing task station or system.

9.17.3 Alerts presented on the bridge which are not required by the Organization may be aggregated for presentation on the CAM-HMI, according to the requirements in these performance standards.

9.17.4 Only alerts of the same priority should be combined in one aggregated alert.

9.17.5 It should not be possible to acknowledge aggregated alerts unless otherwise specified by the Organization.

9.17.6 It should be possible to temporarily silence aggregated alerts.

9.17.7 Individual alerts should not trigger more than one aggregated alert.

9.17.8 Each additional new individual alert has to retrigger the aggregated alert.

9.17.9 If required by the Organization to be displayed as individual alert, alerts should not be aggregated.

9.18 Alert history list

9.18.1 An operator accessible alert history list should be provided by the CAM-HMI.

9.18.2 When an alert is no longer active the message should be kept with its entire content in an alert history list, with the date and time the alert was raised, acknowledged and rectified.

9.18.3 The messages of the alert history list should be displayed in chronological order.

9.18.4 Access to the alert history list and return to the active alert display should be possible by a simple operator action.

9.18.5 The system should provide a clear and unambiguous indication when the alert history list is being accessed and displayed.

9.18.6 The CAM-HMI should support the search and identification of alerts in the alert history list.

9.18.7 For the purpose of onboard "trouble shooting" it should be possible to keep the content of the alert history list at least for 24 h.

9.18.8 If an INS is installed, the functionality of INS may be extended to include the alert history functionality.

10 Functional aspects of CAM

10.1 The CAM should handle alert information for presentation on the CAM-HMI, including priority, state.

10.2 Alert information, including priority, state should be distributed to appropriate functions and equipment carrying out further processing or presentation (e.g., CAM-HMI).

10.3 The presentation of the alert on the bridge equipment should be consistent as far as practicable with respect to how alerts are displayed. Before presentation of an alert on any HMI it should be checked wherever possible, whether the functions and equipment may have

the ability to evaluate and process the alert with additional knowledge, regarding its presentation, priority, and state. If this functionality is provided the CAM should support this further processing. The presentation of an alert should take place after the result of the processing could have been taken into consideration. For INS, the requirements are specified in paragraph 21 of the Performance standards for integrated navigation systems (INS) (resolution MSC.252(83)).

10.4 Only one CAM should be active on the bridge at any one time, but it is allowed to display and operate the information on multiple CAM-HMIs. The CAM functions may be centralized or partly centralized in subsystems and interconnected via a standardized alert-related communication.

11 Back-up and redundancies

11.1 The system configuration should allow one of the two possibilities for the layout of the back-up and redundancy functionality for the CAM, CAM-HMI:

- .1 in case of a failure of the CAM-HMI, it should be ensured that the connected systems present their alerts individually (a system failure of the CAM-HMI functionality should not lead to the loss of the alert announcement functionality); and
- .2 or, if functionality from systems and equipment is transferred to the CAM and CAM-HMI, a back-up should be provided. The back-up arrangement should enable a safe takeover of CAM functionality and ensure that a CAM failure does not result in a critical situation. The power supply of the back-up arrangement solution should be resistant against single failures.

11.2 In case of a breakdown of one task station, at least one other task station should be able to take over the CAM-HMI task.

12 System failures and fallback arrangements

12.1 System failures should be alerted according to these performance standards.

12.2 Loss of system communication between the CAM and connected systems should be indicated as a warning at the CAM-HMI. The alerts from the systems where the communication is lost should be removed from the list of active alerts on the CAM-HMI. After reactivation of the communication all active alerts should be displayed again.

12.3 A system failure of the CAM or the loss of system communication between the CAM and the connected systems should not lead to the loss of the alert announcement functionality of the individual functions.

MODULE C – INTERFACING

13 Interfacing

13.1 *Interfacing requirements for alert-related communication*

13.1.1 The communication protocol should allow the implementation of the functions described in these standards.

13.1.2 The alert-related communication should follow a standardized concept to provide the following functions and operations:

- .1 unique identification of an alert divided into cluster, function, alert code, time;
- .2 distribution of alerts with its priority, state and text information;
- .3 distribution of acknowledgement, silencing and other commands for alerts from different locations, including operator input and results of system processing;
- .4 transmission of aggregated alerts with relevant information (e.g., number of alerts aggregated);
- .5 proper reconnection after disconnection or power down at any time and in any alert condition with a result of a consistent alert presentation within recovery time; and
- .6 standardized communication should be used. Individual subsystems may use an alternative internal concept.

13.2 Connection to the ship's power supply

13.2.1 The CAM should be supplied from both the main and the emergency source of electrical power with automated changeover through a local distribution board with provision to preclude inadvertent shutdown.

13.2.2 After an electrical power failure the system should restart automatically when the power is restored.

MODULE D – SYSTEM AND EQUIPMENT DOCUMENTATION

14 Manuals

14.1 Operating manuals should include:

- .1 an overall description of the CAM functionality;
- .2 a description of the redundancy concept; and
- .3 a description of possible failures and their effects on the system (e.g., by using part of the failure analysis).

14.2 The installation manuals should include adequate information to allow the installation of an alert management so that it can meet all requirements adopted by the Organization.

14.3 The installation manuals should include the following:

- .1 interconnection diagrams and interfacing details for connected systems and sensors;

- .2 instructions for the installation and connection of facilities including the BNWAS; and
- .3 the details of the power supply arrangements.

15 Information regarding system configuration for surveyor

Manufacturer or system integrator of CAM should declare the following information relating to the system configuration, if applicable:

- .1 basic system configuration;
- .2 data flow schematic diagram and its interpretation; and
- .3 back-up and redundancy arrangement.

16 Failure analysis

A failure analysis, at functional level, should be performed and documented for the CAM. The failure analysis should verify that a failure of the CAM should not affect the functionality of the connected systems and sensors including their alert announcement functionality.

17 Guidance to equipment manufactures for the provision of onboard familiarization material

Material enabling onboard familiarization training should be provided for the CAM. The onboard familiarization material should explain configurations, functions, limitations, controls, displays, alerts and indications. Furthermore, the onboard familiarization material should explain the results of operational actions as acknowledgement, silencing for the CAM-HMI and the connected systems. Guidance and recommendations to the equipment manufacturers for the provision of onboard familiarization material are given in appendix 2.

Appendix 1

Definitions

Aggregated alert	Alert indicating the existence of multiple individual alerts.
Aggregation	Combination of individual alerts to provide one alert (one alert represents plenty of individual alerts).
Alarm	An alarm is a high-priority alert. Condition requiring immediate attention and action by the bridge team, to maintain the safe navigation of the ship.
Alert	Alerts are announcing abnormal situations and conditions requiring attention. Alerts are divided in four priorities: emergency alarms, alarms, warnings and cautions. An alert provides information about a defined state change in connection with information about how to announce this event in a defined way to the system and the operator.
Alert announcements	Visual and acoustical presentation of alerts.
Alert history list	Accessible list of past alerts.
Alert management	Concept for the harmonized regulation of the monitoring, handling, distribution and presentation of alerts on the bridge.
Bridge Alert Management (BAM)	Overall concept for management, handling and harmonized presentation of alerts on the bridge.
Central Alert Management (CAM)	Functionality for the management of the presentation of alerts on the CAM-HMI, the communication of alert states between CAM-HMI and navigational systems and sensors. The functions may be centralized or partly centralized in subsystems and interconnected via a standardized alert-related communication.
Category A alerts	Alerts for which graphical information at the task station directly assigned to the function generating the alert is necessary, as decision support for the evaluation of the alert-related condition.

Category B alerts	Alerts where no additional information for decision support is necessary besides the information which can be presented at the CAM-HMI.
Category C alerts	Alerts that cannot be acknowledged on the bridge but for which information is required about the status and treatment of the alert.
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.
Central alert management HMI (CAM-HMI)	Human machine interface for presentation and handling of alerts on the bridge.
Cluster	Group of functions on a high level, e.g., navigation, automation.
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.
Failure analysis	The logical, systematic examination of an item, including its diagrams or formulas, to identify and analyse the probability, causes and consequences of potential and real failures.
Grouping	Arrangement of alerts in terms of their function or priority.
Human machine interface (HMI)	The part of a system an operator interacts with. The interface is the aggregate of means by which the users interact with a machine, device, and system (the system). The interface provides means for input, allowing the users to control the system and output, allowing the system to inform the users.
Individual alerts	Alerts announcing one abnormal situation and condition requiring attention.
Multifunction display	A single visual display unit that can present, either simultaneously or through a series of selectable pages, information from more than a single function.

Simple operator action

A procedure achieved by no more than two hard-key or soft-key actions, excluding any necessary cursor movements, or voice actuation using programmed codes.

Single operator action

A procedure achieved by no more than one hard-key or soft-key action, excluding any necessary cursor movements, or voice actuation using programmed codes.

Task station

Multifunction display with dedicated controls providing the possibility to display and operate any tasks. A task station is part of a workstation.

Warning

Condition requiring immediate attention, but no immediate action by the bridge team. Warnings are presented for precautionary reasons to make the bridge team aware of changed conditions which are not immediately hazardous, but may become so if no action is taken.

Appendix 2

Guidance to equipment manufacturers for the provision of onboard familiarization material

1 General

1.1 It is a requirement of the International Safety Management Code (ISM) that personnel working on assignments related to safety and the protection of the environment need to be given proper familiarization with their duties.

1.2 To assist with this process it is required that the equipment manufacturer or system integrator provides suitable training material that may be used by the ship operator as a basis for onboard familiarization of users.

1.3 The intention of the familiarization material is that it should give a rapid means of understanding the configuration of the bridge alert management, the presentation of alerts on the CAM-HMI and its method of operation.

1.4 The material should be organized such that it represents the actual equipment and configuration that is fitted to the ship.

2 Onboard familiarization

2.1 The aim of familiarization training is to explain the functionality of the CAM and the CAM-HMI.

2.2 It should allow an OOW to become rapidly acquainted with the installed system.

2.3 Emphasis should be given on producing effective familiarization training that can be completed in the shortest possible time.

2.4 For a typical system it may be expected that it will take no longer than 30 minutes for an OOW to undertake familiarization. This time does not include the time taken to become familiar with major interconnected functionality, such as radar and ECDIS.

2.5 Familiarization can take a number of forms. The following are illustrative examples but other effective methods of training are acceptable:

- .1 computer-based training on the vessel. Such training may also be appropriate to be used remotely (e.g., on a notebook computer of a new user, prior to joining the ship);
- .2 a training mode on the fitted systems;
- .3 a training video (on tape, disk or solid state memory), supported by a self-training manual; and
- .4 a stand-alone self-training manual.

2.6 The topics that need to be covered are listed in section 3 below.

2.7 The familiarization material does not replace the User Instruction Manual. Appropriate references can be made to it from within the material. This may be beneficial when describing more detailed operations or to reference large diagrams.

2.8 For lesser used, non-critical functions it is only necessary to reference the relevant section in the User Instruction Manual, rather than them having to be included in their entirety in the familiarization material. Ideally, material is provided for such functions but with instructions to enable the user to skip these sections, as appropriate, until a more convenient opportunity.

3 Familiarization training framework

3.1 General description

3.1.1 This should start with a system overview and a top-level functionality description.

3.1.2 A description should be given of a BAM configuration, including CAM-HMI and possible connected equipment. This description should be supported by a block diagram.

3.1.3 The general philosophy of presentation of alerts and user actions (e.g., acknowledgement, silencing) for the BAM should be explained, including a description of the CAM-HMI.

3.1.6 The back-up and redundancy concept for CAM, CAM-HMI should be explained.

3.2 Detailed operation

3.2.1 The functionality of the CAM-HMI should be described.

3.2.2 Where appropriate, the following should be included:

- .1 description of functions;
- .2 description of menu structure and displayed information;
- .3 description of operator controls; and
- .4 description how to configure the user-modifiable presentation preferences.
The method to rapidly revert to defaults configurations.

3.2.3 Instructions on setting basic display controls such as brightness, contrast, colour and day/night colour schemes should be given.
