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**Maritime navigation and radiocommunication equipment and systems – Bridge
alert management
Part 101: Guideline on implementation**

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IEC Secretariat
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**MARITIME NAVIGATION AND RADIOCOMMUNICATION EQUIPMENT
AND SYSTEMS – BRIDGE ALERT MANAGEMENT**

Part 101: Guideline on implementation

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IEC PAS 62923-101 has been prepared by IEC technical committee 80: Maritime navigation and radiocommunication equipment and systems.

The text of this PAS is based on the following document:

This PAS was approved for publication by the P-members of the committee concerned as indicated in the following document

Draft PAS	Report on voting
80/1041/DPAS	80/1044/RVDPAS

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MARITIME NAVIGATION AND RADIOCOMMUNICATION EQUIPMENT AND SYSTEMS – BRIDGE ALERT MANAGEMENT

Part 101: Guideline on implementation

1 Scope

This document primarily provides support to other workgroups to include alert requirements in standards in line with Bridge Alert Management (BAM), and additionally provides support to designers to implement alert properties so that they conform with the BAM requirements.

This document is applicable, and is intended to provide guidance, when the intention is to implement BAM according to IMO Resolution MSC.302(87).

Based on the IMO decision to adopt the BAM Performance Standard MSC.302(87) as a high level leading umbrella standard for intended implementation of BAM, IMO resolved in MSC.302(87), 3.6, that in case of conflict with alert requirements in existing performance standards, MSC.302(87) takes precedence.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

<https://standards.iteh.ai/catalog/standards/sist/1b55b24-30d3-4b86-b542-9d5dd5de178f/iec-61162-1>, *Maritime navigation and radiocommunication equipment and systems – Digital interfaces – Part 1: Single talker and multiple listeners*

IEC 62923-1:2018, *Maritime navigation and radiocommunication equipment and systems – Bridge alert management – Part 1: Operational and performance requirements, methods of testing and required test results*

IEC 62923-2:2018, *Maritime navigation and radiocommunication equipment and systems – Bridge alert management – Part 2: Alert and cluster identifiers and other additional features*

IMO A.1021(26), *Code on alerts and indicators, 2009*

IMO MSC.302(87), *Performance standards for Bridge Alert Management (BAM)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 62923-1 apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

4 Purpose

4.1 Bridge alert management – Implementation

Resolution MSC 302(87) and the resulting testing standards IEC 62923-1 and IEC 62923-2 are a major step towards the harmonization of the priority, classification, presentation, handling and distribution of alerts generated by bridge equipment to draw the attention of their operator to out-of-the-ordinary situations. IMO stated in Resolution MSC.302(87) the intention for improved operational awareness, reduced unnecessary disturbance of the operator from their task at hand and improved decision support for the operator. Following this, a main purpose is to help the operator to decide what task or alert needs their attention first and which alert(s) can wait given the consequences of the underlying problem being reported by the alert, thereby reducing the chance of operator errors and thus enhancing the safe operation of a ship.

The requirements posed in IEC 62923-1 and IEC 62923-2 brought many changes compared to the previous requirements with respect to generation, propagation and handling of an alert, changes that have consequences for new bridge equipment and for interfacing with pre-BAM equipment on board of existing ships. The now following steps are implementation of Bridge Alert Management in the individual equipment standards and actual application in equipment to reach the intentions IMO laid down.

This guidance document informs the reader in narrative form about the main components of BAM, about the differences between symptomatic alerts (pre-BAM) and functional alerts (conforming to the BAM concept) and about some significant changes with respect to replacing pre-BAM alerts with functional alerts (in particular the handling of power failures and system failures).

It should be regarded as an add-on to IEC 62923-1:2018, Annex E. It provides generic guidance on the concept of Bridge Alert Management (BAM). It is highly recommended to read IEC 62923-1:2018, Annex E, first, before specifying a BAM implementation in a standard as well as before designing/realizing such equipment.

Compared to a standard, this PAS is more limited in nature, as its intention is not to specify what alerts have to be generated in which condition; that is the task of an individual equipment standard and/or the designer of the equipment. Rather, it will provide characteristic examples of how an alert implementation can be designed to reach IMO's BAM goals, such that that author or that designer is able to use those examples as a guideline for their own alert design problem.

4.2 Structure of document

Clause 5 discusses a generic guideline to implement the latest version of BAM to realize an (updated) individual equipment standard.

Clause 6 provides a number of ideas to help understand when and how to specify the properties of alerts. It describes the difference between symptomatic alerts (pre-BAM) and functional (BAM) alerts.

Clause 7 provides a number of examples that help understand how legacy specifications of power failures and system failures should be reported conform BAM.

Clause 8 provides insights on the use of alert identifiers.

Clause 9 provides clarification on presentation of the list of active alerts.

Clause 10 discusses the potential assistance of IEC TC 80 Working Group 16 in the implementation of BAM in standards.

5 Implementing BAM in an equipment standard

5.1 Implementing a concept

As specified in IEC 62923-1 and IEC 62923-2, Bridge Alert Management (BAM) is a concept that has to be implemented in (bridge) equipment to enhance the capability of that equipment to fulfil the needs of mariners to process, understand and act upon information (alerts) provided by the equipment on out-of-the-ordinary situations such as errors, failures, dangers, etc. with potential negative consequences for the safe operation of the vessel. BAM is not a system, not a 'box' that does something if a signal is sent to it (see Figure 1). As such BAM does not replace any parts of equipment, rather it imposes additional requirements to all alert functions of (bridge) equipment. Therefore, BAM is a concept applied to any bridge equipment that may need to inform its operator on out of the ordinary situations.

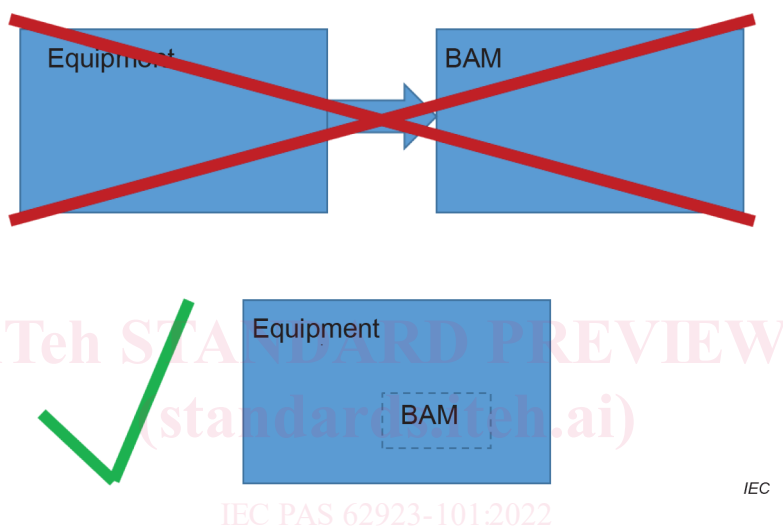


Figure 1 – BAM is a concept applied to equipment rather than a piece of equipment

BAM has a number of properties (as elaborated in Clause 6) that differ from the pre-BAM era. In particular, these are:

- an operator focused definition of alerts and prioritization (disturbance level, based on the level of hazard of a situation for the operation of the ship) of alerts;
- alert Category and audible signal as means to indicate where the operator can handle the alert;
- harmonization of alert sound; and
- facilities for the optional addition of a means for central presentation of alerts (Central Alert Management (CAM) system).

5.2 Implementation process

The following steps can be regarded as a rough guideline on how to implement BAM in an existing standard (it should be noted that many of these steps may not be relevant for the regarded standard).

- Remove (potentially conflicting) requirements regarding alerts and alert management that have an equivalent requirement in IEC 62923-1 and IEC 62923-2 and remove any alert-related references to IEC 61924-2, IEC 61162-1 and IEC 62288.

Where necessary, replace them by a reference to IEC 62923-1 and IEC 62923-2.

- Add a generic requirement for the equipment to comply with IEC 62923-1 and IEC 62923-2. "The equipment shall comply with IEC 62923-1 and IEC 62923-2." is sufficient.
- Avoid adding explanation of IEC 62923 – if necessary engage in liaison with IEC TC 80 WG 16.

- Add a generic test to confirm compliance with IEC 62923.
“Confirm by inspection of documented evidence that the EUT complies with IEC 62923-1 and IEC 62923-2.”
- Avoid adding any test already covered by IEC 62923 (ISO/IEC Directives discourage duplicated work).
- For the purpose of alert management, avoid adding duplicate requirements for the application of IEC 61162 series interfacing. This is already addressed in IEC 62923 and gives an undue focus on the technical side. Of course any overview of logical interfaces of the equipment can be expanded with the applicable BAM-related interfaces conforming to IEC 62923-1:2018, Annex C.
- Evaluate if the alerting defined in the standard is necessary and useful to the operator:
 - which detected abnormal situations have negative consequences for the operation, and thus need to be brought under the attention of the operator? These may be candidates for raising an alert;
 - which pre-BAM alerts report technical problems that have to be analysed first by the operator before they know the relevance of the problem and the way to deal with the situation or to resolve the problem. The alert needs to be replaced by a functional alert that informs the operator about the consequences for their operation and, where practicable, advice on how to act to deal with the consequences;
 - which pre-BAM alerts have the same consequences and require the same advice on how to act on the underlying problems: these can be taken together in a functional alert.
- Define the situations in which the equipment should provide alerts. As BAM introduces a change to operator-centred functional alerts taking into account the consequences of a situation for the operation, the type of newly defined alerts may be quite different from the alerts in the pre-BAM era.

With the definition of situations in which an alert is to be provided, it is possible to specify an alert title and even an alert descriptive text. However, in that case it should be assessed for each alert if the situation for which an alert is to be provided has sufficiently standard consequences when taking into account the variety in scope, design and environment of equipment to allow a standardized alert title and/or alert description text in order to provide the user in all variations with correct and useful information for situational awareness and guidance for decision making (see 6.4).

Results of such assessment can be:

- a standard alert title is justified (e.g. when a distress message is received);
 - a standard alert title can be of value, but with good reason alternatives can be allowed when sufficient justification for the alternative is available, given the scope, design and environment of equipment;
 - a standard alert title is not appropriate. In such situation only the situation in which an alert is to be provided is to be defined, and guidance for an appropriate alert title and descriptive text can be provided.
- Evaluate requirements for audible indication (see 6.1.1) in order to avoid conflicts with the purpose of audible alert signals.
 - Liaise with IEC TC 80 WG 16 regarding:
 - the alerts – to validate if the identified alert purposes are consistent with BAM principles; and
 - the alert identifiers – to assure that there are no identifiers assigned that already are designed to other types of alerts in other standards and that the mapping on standard alert identifiers is done consistent with their meaning. New alerts can be assigned a new alert identifier by WG16 only.

It is important to note that only alert identifiers issued by WG 16 and confirmed after liaison with WG 16 will be taken on board in future editions of IEC 62923-2.

It may be necessary to show that original IMO requirements were removed on purpose or even to retain original IMO requirements that have been identified for removal in a note, to show to the reader what happened.

EXAMPLE 1 “With regard to alert management, MSC.302(87) supersedes <identification of the requirement>.”

EXAMPLE 2 “Note: Resolution MSC. 302(87) and derived IEC 62923-1 have superseded the requirement: <identification of the requirement and optionally the full requirement>”

5.3 Subjects for consideration when developing/modifying an individual equipment standard

5.3.1 General

The concept defined in MSC.302(87) and IEC 62923 requires that, when developing a new or modifying an existing individual equipment standard, the subjects described in 5.3.2 should be addressed in that standard.

It is important to note that most of the current IMO standards, and at the time of writing still also a lot of IEC Standards, are still based on alarm concepts from before the BAM-era. Where conflicts arise, the alert concept in these pre-BAM standards is superseded by BAM, and the updated standard needs to be adjusted to conform to IEC 62923, while preventing duplication of requirements.

Implementation of BAM therefore includes a thorough review to replace similar and conflicting provisions to BAM by a reference to IEC 62923-1 and IEC 62923-2. Examples of such an operation can be found in IEC 62288 from Ed.2 to Ed.3 and IEC 61924-2 from Ed.1 to Ed.2.

Finally, there have been standards that refer to preliminary, now superseded, versions of Bridge Alert Management, like IEC 61924-2 (Ed.2), IEC 62288 (Ed.2) and IEC 61162-1 (Ed.5). Such standards should be adjusted to have correct references. In this respect, one should remember the ISO/IEC policy (see Directives) that duplication of requirements in different standards is to be avoided to prevent inconsistencies and to enhance maintainability.

5.3.2 Description of subjects

The subjects for consideration are:

- correct terminology. It is especially important to realize that the related alert terminology, such as “alarm”, in the old situation had a different meaning (sometimes even between standards) than under the BAM concept, and needs alignment with the BAM concept. Sometimes the meaning of such terms does not even pertain to ‘alerts’ in BAM context at all. For example in GMDSS-related standards the term ‘alarm’/‘alert’ could relate to the message transmitted over the radio instead of relating to the ‘alert’ to the operator that such a message is available. Compliance with BAM implies that the use of such terms are brought in line with the harmonized definitions defined in IEC 62923. Implementation should also clearly distinguish between similar terms for different matters (e.g. ‘BAM-alert’ and ‘GMDSS-alert’, which have a different meaning);
- a proper definition of useful (functional) alerts providing a clear message to the operator
 - to reflect on the operational consequences of a situation (see 6.4),
 - to make alerts sensitive to the context (see 6.5), and
 - to provide advice on what the operator should do to deal with the consequences of the situation;
- a clear separation of operational information from diagnostic information (see also 6.4). Diagnostic information, e.g. for fault finding, is not part of bridge alert management and should, as part of the ‘maintainer task’, be addressed through a different (part of the) user interface. Whereas this is an important user interface for someone responsible for repair and maintenance of systems, it is not important for the navigator and therefore not to be addressed by Bridge Alert Management;