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Entwurf

**Navigations- und Funkkommunikationsgeräte und -systeme für die Seeschifffahrt –
Bridge Alert Management –
Teil 1: Betriebs- und Leistungsanforderungen, Prüfverfahren und geforderte Prüfergebnisse
(IEC 80/856/CDV:2017);
Englische Fassung prEN 62923-1:2017**

Maritime navigation and radiocommunication equipment and systems –
Bridge alert management –
Part 1: Operational and performance requirements, methods of testing and required test results
(IEC 80/856/CDV:2017);
English version prEN 62923-1:2017

Anwendungswarnvermerk

Dieser Norm-Entwurf mit Erscheinungsdatum 2018-02-23 wird der Öffentlichkeit zur Prüfung und Stellungnahme vorgelegt.

Weil die beabsichtigte Norm von der vorliegenden Fassung abweichen kann, ist die Anwendung dieses Entwurfs besonders zu vereinbaren.

Stellungnahmen werden erbeten

- vorzugsweise online im Norm-Entwurfs-Portal von DIN unter www.din.de/go/entwuerfe bzw. für Norm-Entwürfe der DKE auch im Norm-Entwurfs-Portal der DKE unter www.entwuerfe.normenbibliothek.de, sofern dort wiedergegeben;
- oder als Datei per E-Mail an dke@vde.com möglichst in Form einer Tabelle. Die Vorlage dieser Tabelle kann im Internet unter www.din.de/go/stellungnahmen-norm-entwuerfe oder für Stellungnahmen zu Norm-Entwürfen der DKE unter www.dke.de/stellungnahme abgerufen werden;
- oder in Papierform an die DKE Deutsche Kommission Elektrotechnik Elektronik Informationstechnik in DIN und VDE, Stresemannallee 15, 60596 Frankfurt am Main.

Die Empfänger dieses Norm-Entwurfs werden gebeten, mit ihren Kommentaren jegliche relevanten Patentrechte, die sie kennen, mitzuteilen und unterstützende Dokumentationen zur Verfügung zu stellen.

Gesamtumfang 117 Seiten

DKE Deutsche Kommission Elektrotechnik Elektronik Informationstechnik in DIN und VDE
DIN-Normenstelle Schiffs- und Meerestechnik (NSMT)

Nationales Vorwort

Die Deutsche Fassung des europäischen Dokuments prEN 62923-1:2017 „Navigations- und Funkkommunikationsgeräte und -systeme für die Seeschifffahrt – Bridge Alert Management – Teil 1: Betriebs- und Leistungsanforderungen, Prüfverfahren und geforderte Prüfergebnisse“ (Entwurf in der Umfrage) ist unverändert in diesen Norm-Entwurf übernommen worden.

Die Internationale Elektrotechnische Kommission (IEC) und das Europäische Komitee für Elektrotechnische Normung (CENELEC) haben vereinbart, dass ein auf IEC-Ebene erarbeiteter Entwurf für eine Internationale Norm zeitgleich (parallel) bei IEC und CENELEC zur Umfrage (CDV-Stadium) und Abstimmung als FDIS (en: Final Draft International Standard) bzw. Schluss-Entwurf für eine Europäische Norm gestellt wird, um eine Beschleunigung und Straffung der Normungsarbeit zu erreichen. Dem entsprechend ist das internationale Dokument IEC 80/856/CDV:2017 „Maritime navigation and radiocommunication equipment and systems – Bridge alert management – Part 1: Operational and performance requirements, methods of testing and required test results“ unverändert in den Entwurf prEN 62923-1:2017 übernommen worden.

Das internationale Dokument wurde vom TC 80 „Maritime navigation and radiocommunication equipment and systems“ der Internationalen Elektrotechnischen Kommission (IEC) erarbeitet.

Bei der Abstimmung zu dem Europäischen Schluss-Entwurf bei CENELEC und dem Internationalen Schluss-Entwurf bei IEC [Final Draft International Standard (FDIS)] sind jeweils nur „JA/NEIN“-Entscheidungen möglich, wobei „NEIN“-Entscheidungen fundiert begründet werden müssen. Dokumente, die bei CENELEC als Europäische Norm angenommen und ratifiziert werden, sind unverändert als Deutsche Normen zu übernehmen.

Für dieses Dokument ist das nationale Arbeitsgremium K 738 „Elektronische Navigationsinstrumente“ der DKE Deutsche Kommission Elektrotechnik Elektronik Informationstechnik in DIN und VDE (www.dke.de) zuständig.

Für den Fall einer undatierten Verweisung im normativen Text (Verweisung auf ein Dokument ohne Angabe des Ausgabedatums und ohne Hinweis auf eine Abschnittsnummer, eine Tabelle, ein Bild usw.) bezieht sich die Verweisung auf die jeweils aktuellste Ausgabe des in Bezug genommenen Dokuments.

Für den Fall einer datierten Verweisung im normativen Text bezieht sich die Verweisung immer auf die in Bezug genommene Ausgabe des Dokuments.

Der Zusammenhang der zitierten Dokumente mit den entsprechenden deutschen Dokumenten ergibt sich, soweit ein Zusammenhang besteht, grundsätzlich über die Nummer der entsprechenden IEC-Publikation. Beispiel: IEC 60068 ist als EN 60068 als Europäische Norm durch CENELEC übernommen und als DIN EN 60068 ins Deutsche Normenwerk aufgenommen.

Das Präsidium des DIN hat mit Präsidialbeschluss 1/2004 festgelegt, dass DIN-Normen, deren Inhalt sich auf internationale Arbeitsergebnisse der Informationsverarbeitung gründet, unter bestimmten Bedingungen allein in englischer Sprache veröffentlicht werden dürfen. Diese Bedingungen sind für die vorliegende Norm erfüllt.

Da sich die Benutzer des vorliegenden Normentwurfs der englischen Sprache als Fachsprache bedienen, wird die englische Fassung der prEN 62923-1 veröffentlicht. Zu deren Abschnitt 1, der den Anwendungsbereich festlegt, und deren Abschnitt 3, der die Begriffe festlegt, wurde eine Übersetzung angefertigt und als informativer Nationaler Anhang NA des vorliegenden Normentwurfs hinzugefügt. Für viele der verwendeten Begriffe existieren keine gebräuchlichen deutschen Benennungen, da sich die deutschen Anwender in der Regel ebenfalls der englischen Benennungen bedienen. Dieser Normentwurf steht nicht in unmittelbarem Zusammenhang mit Rechtsvorschriften und ist nicht als Sicherheitsnorm anzusehen.

Es ist vorgesehen, auch bei der entsprechenden zukünftigen Deutschen Norm auf die deutsche Sprachfassung zu verzichten und diese in der englischsprachigen Fassung zu veröffentlichen.

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Nationaler Anhang NA (informativ)

Auszugsweise Übersetzung^{N1)}

1 Anwendungsbereich

In Unterstützung des IMO-Beschlusses MSC.302(87) legt die vorliegende Internationale Norm die Betriebs- und Leistungsanforderungen, Prüfverfahren und geforderten Prüfergebnisse für das Brücken-Alert-Management (BAM) fest. Sie ist für alle auf der Brücke angezeigten Alerts und an die Brücke übertragenen Alerts anwendbar.

ANMERKUNG Text mit dem gleichen Wortlaut wie im IMO-Beschluss MSC.302(87) ist in dieser Norm kursiv dargestellt, und der Beschluss sowie die entsprechenden Absatznummern der Leistungsanforderungen sind in Klammern angegeben.

(MSC 302/2) *Um die Betriebssicherheit zu erhöhen, stellen die im Beschluss MSC.302(87) enthaltenen Leistungsanforderungen Anforderungen zur harmonisierten Anzeige und den Umgang mit Alerts auf der Brücke bereit und legen ein zentrales Alert Management-System (CAM-System) fest.*

Annex E enthält Hinweise zu Konstruktionsprinzipien, durch deren Beachtung die gewünschte Erhöhung der Sicherheit erreicht wird.

(MSC 302/3) *Modul A (Abschnitt 6) dieser Norm beschreibt das allgemeine Konzept des BAM und die Wiedergabe von Alerts auf den Geräten der Brücke. Module B (Abschnitt 7) und D (Abschnitt 9) enthalten Anforderungen an CAM und CAM-HMI. Modul C (Abschnitt 8) beschreibt die Schnittstellenanforderungen an das BAM.*

BAM ist ein Anforderungskonzept für Geräte, die Alerts auf der Brücke verarbeiten und darstellen, einschließlich Geräten, die die Funktionalitäten eines zentralen Alert Managements (CAM) bieten.

- Ein Gerät ist BAM-konform, wenn es die in Module A – Presentation and handling of alerts on the bridge und Module C – Interfacing dieser Norm beschriebenen Anforderungen erfüllt.
- Ein Gerät ist CAM-konform, wenn es BAM-konform ist und außerdem die in Module B – Central alert management system functionality und Module D dieser Norm beschriebenen Anforderungen erfüllt.

Um die Nachrüstung eines Schiffs mit BAM-konformen Geräten zur Verarbeitung der Alert-bezogenen Kommunikation mit verbleibenden nicht-BAM-konformen Geräten („veraltete Alert-Quellen“) zu unterstützen, enthält diese Norm Anleitungen zur Verknüpfung von BAM-konformen Geräten mit verbleibenden nicht-BAM-konformen Geräten (siehe 4.4 und Annex H).

Teil 2 dieser Norm legt genormte Alert- und Gruppenkennzeichen und weitere Zusatzfunktionen fest (siehe IEC 62923-2).

3 Begriffe und Abkürzungen

Für die Anwendung dieses Dokuments gelten die folgenden Begriffe und Abkürzungen.

^{N1)} Nationale Fußnote: Die Nummerierung des IEC-Schriftstücks 80/856/CDV:2017-09 wurde beibehalten.

3.1 Begriffe

3.1.1

aktiver Alert

(en: active alert)

Alert, der nicht den Zustand ‚normal‘ hat

3.1.2

Sammelüberschriften-Alert

(en: aggregated header alert)

(MSC 302/A) *Alert, der das Vorliegen mehrerer Einzel-Alerts derselben Art kennzeichnet und von der Aggregations-Quelle mit einem von den zugehörigen Aggregations-Mitglieder-Alerts festgelegten Alert-Zustand und Alert-Bezeichner gesendet wird, mit Alert-Instanz ‚0‘ und einer aussagekräftigen Aggregationsüberschrift im Alert-Titel und/oder in der Alert-Beschreibung*

3.1.3

Aggregation

(en: aggregation)

(MSC 302/A) *Zusammenstellung von einem Sammelüberschriften-Alert und den zugehörigen Einzel-Aggregations-Mitglieder-Alerts, die alle den gleichen Alert-Bezeichner und die gleiche Aggregations-Quelle haben, um davon einen einzelnen Alert abzuleiten (d.h. ein Sammelüberschriften-Alert fasst eine Reihe von Einzel-Aggregations-Mitglieder-Alerts zusammen)*

3.1.4

Aggregations-Überschrift

(en: aggregation header)

Titel einer Aggregation, nach dem die Alerts der zugehörigen Aggregations-Mitglieder gruppiert werden, der den generischen Teil der Aggregations-Mitglieder-Alerts angibt und durch die Aggregations-Quelle festgelegt ist

Anmerkung 1 zum Begriff: Die Überschrift darf die aktuelle Anzahl der Aggregations-Mitglieder-Alerts in dieser Aggregation enthalten (siehe 8.1.5.1).

3.1.5

Aggregations-Quelle

(en: aggregation source)

BAM-konformes Gerät, das eine Aggregation (einiger) seiner Alerts festlegt

3.1.6

Aggregations-Mitglieder-Alert

(en: aggregation-member alert)

Einzel-Alert, der durch seine Quelle als Teil einer Aggregation festgelegt ist

3.1.7

Alarmmeldung

(en: alarm)

(MSC 302/A) *Alert hoher Priorität. Zustand, der sofortige Aufmerksamkeit und Maßnahmen der Brückenmannschaft erfordert, um die sichere Schiffsführung den sicheren Schiffsbetrieb zu gewährleisten*

3.1.8

Alert

(en: alert)

(MSC 302/A) *Ankündigung von außergewöhnlichen Situationen und Zuständen, die Aufmerksamkeit erfordern. Alerts werden in vier Prioritäten eingeteilt: Notfallalarmmeldungen, Alarmmeldungen, Warnmeldungen und Vorsichtsmeldungen. Ein Alert stellt Informationen über eine definierte Zustandsänderung zusammen mit Informationen darüber bereit, wie dieses Ereignis in bestimmter Art und Weise dem System und dem Anwender anzukündigen ist*

3.1.9

Ankündigung des Alerts

(en: alert announcements)

(MSC 302/A) *optische und akustische Anzeige von Alerts*

3.1.10

Alerts-Historien Liste

(en: alert history list)

(MSC 302/A) zugreifbare Liste bisheriger Alerts

3.1.11

Alert-Management

(en: alert management)

(MSC 302/A) Konzept für die einheitliche Regulierung von Überwachung, Handhabung, Weitergabe und Darstellung von Alerts auf der Brücke

3.1.12

Alert-Quelle

(en: alert source)

Geräte, die Alertzustände hervorbringen und verwalten

3.1.13

hörbares Signal

(en: audible indication)

Geräusch aus dem EUT, das nicht mit einer Alarmmeldung hoher Priorität oder einer Warnung in der Liste der aktiven Alerts des EUT in Zusammenhang steht

BEISPIEL 1 Ein Ton, der einen Wechsel des Steuerstands anzeigt.

BEISPIEL 2 Tabelle 7.1.1 des IMO-Beschlusses A.1021(26) „Code on Alerts and Indicators“

3.1.14

Brücken-Alert-Management

(en: bridge alert management)

BAM

(MSC 302/A) Gesamtkonzept für Verwaltung, Behandlung und einheitliche Darstellung von Alerts auf der Brücke

3.1.15

BAM-konformes Gerät

(en: BAM compliant equipment)

Geräte, die den Modulen A und C von MSC.302(87) entsprechen

3.1.16

zentrales Alert-Management

(en: central alert management)

CAM

(MSC 302/A) Funktionalität für die Verwaltung der Darstellung von Alerts im CAM-HMI, zur Kommunikation von Alertzuständen zwischen CAM-HMI und Navigationssystemen und -sensoren. Funktionen dürfen zentralisiert oder in Teilsystemen teilweise zentralisiert und durch eine genormte Alert-bezogene Kommunikation verbunden sein

3.1.17

zentrales Alert-Management-HMI

(en: central alert management HMI)

CAM-HMI

Mensch-Maschine-Schnittstelle zur Anzeige und Behandlung von Alerts auf der Brücke

3.1.18

zentrales Alert-Management-System

(en: central alert management system)

CAM-System

kombiniert die Funktionalitäten von CAM und CAM-HMI

3.1.19**Alerts der Kategorie A**

(en: category A alerts)

(MSC 302/A) *Alerts, bei denen an der unmittelbar der Alert-auslösenden Funktion zugeordneten Task-Station graphische Informationen als Entscheidungshilfe erforderlich sind, um den Alert-Zustand bewerten zu können***3.1.20****Alerts der Kategorie B**

(en: category B alerts)

(MSC 302/A) *Alerts, bei denen außer den an der zentralen Mensch-Maschine-Schnittstelle des Alert-Managements (HMI) darstellbaren Informationen keine weiteren Informationen als Entscheidungshilfe nötig sind***3.1.21****Alerts der Kategorie C**

(en: category C alerts)

(MSC 302/A) *Alerts, die auf der Brücke nicht bestätigt werden können, für die jedoch Information zum Zustand und zur Behandlung des Alerts erforderlich ist*

Anmerkung 1 zum Begriff: Wird das Brücken-Alert-Management nicht für die Brücke, sondern in einer anderen Anhäufung angewendet (siehe Anhang E), gilt diese Festlegung in entsprechender Anwendung.

3.1.22**Vorsichtsmeldung**

(en: caution)

(MSC 302/A) *niedrigste Priorität eines Alerts. Kenntnis eines Zustands, der weder eine Alarmmeldung noch eine Warnmeldung rechtfertigt, aber dennoch Beachtung der außergewöhnlichen Situation oder der vorliegenden Informationen erfordert***3.1.23****Anhäufung**

(en: cluster)

(MSC 302/A) *Anhäufung von Funktionen auf einer hohen Ebene, z.B. Navigation, Automatisierung*

Anmerkung 1 zum Begriff: Hinweise zur Verwendung von Anhäufungen sind in Anhang E zu finden.

3.1.24**umgewandelter Alert**

(en: converted alert)

Alert, der das Ergebnis der Umwandlung eines veralteten Alerts in einen BAM-konformen Alert ist

3.1.25**Notfallalarmmeldung**

(en: emergency alarm)

(MSC 302/A) *höchste Priorität eines Alerts. Alert, der anzeigt, dass unmittelbare Gefahr für menschliches Leben oder das Schiff und dessen Ausrüstung existiert, und sofortiges Handeln erfordert***3.1.26****EUT-Funktionen vom Typ P**

(en: EUT function type P)

Funktionen im EUT, die dieses zu einem BAM-konformen Gerät machen

EUT-Funktionen vom Typ Q

(en: EUT function type Q)

Funktionen, über die das EUT zusätzlich zu den Funktionen vom Typ P verfügen muss, um es zu einem BAM-konformen CAM-System zu machen

EUT-Funktionen vom Typ R

(en: EUT function type R)

optionale Funktionen, über die das EUT zusätzlich zu den Funktionen vom Typ P verfügen muss, um Alerts von Alert-Quellen neu zu bewerten (Übertragung der Verantwortlichkeit)

EUT-Funktionen vom Typ S

(en: EUT function type S)

optionale Funktionen, über die das EUT zusätzlich zu den Funktionen vom Typ P verfügen muss, um veraltete Alert-Kommunikation aus veralteten Alert-Quellen in BAM-konforme Alert-Kommunikation umzuwandeln

EUT-Funktionen vom Typ T

(en: EUT function type T)

Funktionen, über die ein INS zusätzlich zu den Funktionen vom Typ Q verfügen muss, um es zu einem BAM-konformen INS zu machen

3.1.27

Fehleranalyse

(en: failure analysis)

(MSC 302/A) *logische, systematische Prüfung eines Geräts einschließlich seiner Diagramme oder Formeln mit dem Ziel, Wahrscheinlichkeit, Ursachen und Folgen möglicher und tatsächlich vorhandener Fehler zu identifizieren und zu analysieren*

3.1.28

funktionale Alert-Gruppe

(en: functional alert group)

Zusammenstellung von einem funktionalen Alert-Gruppen-Überschriften-Alert und den zugehörigen Einzel-Gruppenmitglieder-Alerts, die von einer funktionalen Alert-Gruppen-Quelle festgelegt werden, um davon einen einzelnen Alert abzuleiten (d. h. ein funktionaler Alert-Gruppen-Überschriften-Alert fasst eine Reihe von Einzel-Gruppenmitglieder-Alerts zusammen)

3.1.29

funktionale Alert-Gruppen-Quelle

(en: functional alert group source)

BAM-konformes Gerät, das eine funktionale Alert-Gruppe festlegt, die aus von ihm empfangenen und/oder erstellten Alerts besteht

Anmerkung 1 zum Begriff: Hierbei kann es sich um eine Alert-Quelle, ein BAM-konformes Gerät, das Alerts von der Alert-Quelle erhält, oder ein CAM-System handeln.

3.1.30

funktionale Alert-Gruppen-Überschrift

(en: functional alert group header)

Titel einer funktionalen Alert-Gruppe, nach dem die Alerts der zugehörigen Gruppenmitglieder gruppiert werden, der die Gemeinsamkeit der Gruppen-Mitglieder-Alerts angibt und durch die funktionale Alert-Gruppen-Quelle festgelegt ist

Anmerkung 1 zum Begriff: Die Überschrift darf die aktuelle Anzahl der Gruppenmitglieder-Alerts in dieser funktionalen Alert-Gruppe enthalten (siehe 8.1.5.2).

3.1.31

funktionaler Alert-Gruppen-Überschriften-Alert

(en: functional alert group header alert)

Alert, der die Existenz mehrerer Einzel-Alerts mit Gemeinsamkeiten in Bezug auf ihre Funktion und/oder Priorität angibt und der von der funktionalen Alert-Gruppen-Quelle mit einem durch die zugehörigen Gruppenmitglieder-Alerts festgelegten Alertzustand, einem eindeutigen Alert-Bezeichner mit Alert-Instanz „0“ und mit „einer für die funktionale Alert-Gruppe repräsentativen funktionalen Alert-Gruppen-Überschrift“ übertragen wird

3.1.32

funktionale Alert-Gruppierung

(en: functional alert grouping)

(MSC 302/A) *Anordnung von Alerts in Bezug auf ihre Funktion und/oder ihre Priorität*

3.1.33**Gruppenmitglieder-Alert**

(en: group-member alert)

Einzel-Alert, der durch eine funktionale Alert-Gruppen-Quelle als Teil einer funktionalen Alert-Gruppe festgelegt ist

3.1.34**Mensch-Maschine-Schnittstelle**

(en: human machine interface)

HMI

(MSC 302/A) *der Teil eines Systems, über den der Bediener mit dem System interagiert. Die Schnittstelle setzt sich aus den technischen Mitteln zusammen, die dem Anwender die Interaktion mit einer Maschine, einem Gerät oder System (dem System) ermöglichen. Die Schnittstelle stellt Mittel, die dem Nutzer die Steuerung des Systems erlauben, zur Eingabe, und Mittel, die dem System ermöglichen, Informationen für den Nutzer anzuzeigen, für die Ausgabe bereit*

3.1.35**Einzel-Alerts**

(en: individual alerts)

(MSC 302/A) *Alerts, die eine einzelne außergewöhnliche Situation und Zustand ankündigen, die Aufmerksamkeit erfordern*

3.1.36**veraltete Alert-Quelle**

(en: legacy alert source)

Gerät, das Alerts erzeugt und verwaltet, die nicht konform sind zur Schnittstelle nach Anhang C

Anmerkung 1 zum Begriff: Veraltete Alert-Quellen können in Geräten angetroffen werden, die auf ein Schiff gebracht werden, wenn das Schiff mit einem CAM-System nachgerüstet wird, oder wenn kein geeignetes BAM-konformes Gerät existiert.

3.1.37**Multifunktionsanzeige**

(en: multifunction display)

MFD

(MSC 302/A) *einzelne optische Anzeigeeinheit für Information von mehr als einer Quelle, zur gleichzeitigen oder sequentiellen Anzeige einer Reihe von auswählbaren Seiten*

3.1.38**Bordzeit**

(en: ship's time)

an Bord eines Schiffes geltende Uhrzeit

3.1.39**einfacher Bedienschnitt**

(en: simple operator action)

(MSC 302/A) *Vorgang, der durch höchstens zwei Tasten- oder Softkey-Betätigungen ohne Berücksichtigung von Cursor-Bewegungen oder einen vorgegebenen Stimmbefehl eingeleitet wird*

3.1.40**einzelner Bedienschnitt**

(en: single operator action)

(MSC 302/A) *Vorgang, der durch höchstens eine Tasten- oder Softkey-Betätigung ohne Berücksichtigung von Cursor-Bewegungen oder einen vorgegebenen Stimmbefehl eingeleitet wird*

3.1.41

Task-Station

(en: task station)

(MSC 302/A) Multifunktionsanzeige mit fest zugeordneten Steuerungseinrichtungen, die die Darstellung und Durchführung aller Aufgaben ermöglicht. Eine Task-Station ist Teil einer Arbeitsstation

3.1.42

Warnmeldung

(en: warning)

(MSC 302/A) Alert für einen Zustand, der sofortige Aufmerksamkeit aber keine unmittelbare Aktivität der Brückenbesatzung erfordert. Warnmeldungen werden vorsorglich angezeigt, um die Brückenbesatzung auf geänderte Situationen hinzuweisen, die noch nicht unmittelbar gefährlich sind, dies aber werden können, wenn nichts unternommen wird

3.1.43

Arbeitsstation

(en: workstation)

Kombination aller aufgabenbezogenen Gegenstände einschließlich der Konsole mit allen Geräten und allem Mobiliar.

Anmerkung 1 zum Begriff: Brückenarbeitsstationen sind in MSC/Circ.982 beschrieben.

3.2 Abkürzungen

CPA	Ort der dichtesten Annäherung (en: closest point of approach)
FMEA	Fehlermöglichkeits- und -einflussanalyse (en: Failure Mode and Effect Analysis)
IMO	Internationale Seeschiffahrtsorganisation (en: International Maritime Organization)
EUT	Gerät im Test (en: equipment under test)
HMI	Mensch-Maschine-Schnittstelle (en: human machine interface)
IBS	integriertes Brückensystem (en: integrated bridge system)
IEC	Internationale Elektrotechnische Kommission (en: International Electrotechnical Committee)
INS	integriertes Navigationssystem (en: integrated navigation system)
MSC	Schiffssicherheitsausschuss (en: Maritime Safety Committee)
OOW	Wachoffizier (en: officer of the watch)
SOLAS	Schutz des menschlichen Lebens auf See [en: Safety Of Life At Sea]
TAG	Transport Annotate and Group
TCPA	Zeitdauer bis zur dichtesten Annäherung (en: time to closest point of approach)

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**MARITIME NAVIGATION AND
RADIOCOMMUNICATION EQUIPMENT AND SYSTEMS –
Bridge alert management –
Part 1: Operational and performance requirements,
methods of testing and required test results**

FOREWORD

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International Standard IEC 62923 has been prepared by IEC technical committee 80: Maritime navigation and radiocommunication equipment and systems.

The text of this standard is based on the following documents:

FDIS	Report on voting
XX/XX/FDIS	XX/XX/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or

58 • amended.

59

60 The National Committees are requested to note that for this publication the stability date
61 is 2021.

62 THIS TEXT IS INCLUDED FOR THE INFORMATION OF THE NATIONAL COMMITTEES AND WILL BE
63 DELETED AT THE PUBLICATION STAGE.

64

65

66 INTRODUCTION

67 This International Standard has been written in pursuit of IMO resolution MSC.302(87), to
68 further detail the technical requirements of bridge alert management and to enable testing of
69 any equipment against the requirements of bridge alert management.

70 Bridge Alert Management (BAM) is the IMO defined overall concept for the management,
71 handling and harmonized presentation of alerts on the bridge.

72 This standard has been written in such a way that this form of alert management can be
73 applied ship wide, next to, and in cooperation with, cluster(s) on the bridge.

74 Individual equipment that applies the BAM principles:

- 75 • uses harmonized states for its alerts;
- 76 • uses harmonized presentation for presentation of its alerts;
- 77 • uses harmonized alert communications for;
 - 78 ○ communication with other equipment (VDR and equipment with more
 - 79 knowledge, as applicable);
 - 80 ○ communication with a CAM system, if provided on board;

81 A Central Alert Management CAM system including its HMI(s):

- 82 • uses harmonized states for its alerts;
- 83 • uses harmonized presentation for presentation of all alerts generated on the bridge;
- 84 • uses harmonized alert communications for communication with other equipment (VDR,
85 alert source equipment);
- 86 • provides the function to silence all audible alerts on the bridge;
- 87 • provides the function to individually acknowledge all alerts generated on the bridge for
88 which additional decision support information is not required;

89 A CAM system may be standalone or combined with other equipment e.g. in the case of an
90 INS.

91 All equipment that applies the BAM principles may provide intelligence to deal with the
92 processing of non-BAM 'legacy' alarm communications for harmonized presentation at its
93 HMI.

94 This standard provides the harmonization requirements.

95

MARITIME NAVIGATION AND RADIOCOMMUNICATION EQUIPMENT AND SYSTEMS -

Bridge alert management – Part 1: Operational and performance requirements, methods of testing and required test results

1. Scope

This International Standard specifies the operational and performance requirements, methods of testing, and required test results, for the bridge alert management (BAM) in support of IMO resolution MSC.302(87). It is applicable to all alerts presented on and transferred to the bridge.

NOTE All text of this standard, whose wording is identical to that of IMO resolution MSC.302(87), is printed in italics, and the resolution and associated performance standard paragraph numbers are indicated in brackets.

(MSC 302/2) *To enhance the safety of operation, the Performance standards given in resolution MSC.302(87) provide requirements for the harmonized presentation and treatment of alerts on the bridge and specify a central alert management (CAM) system.*

Annex E provides guidance on design principles that, when applied, will achieve the desired enhancement of safety.

(MSC 302/3) *Module A (Clause 6) of this standard describes the general concept of the BAM and the presentation of alerts on the bridge equipment. Modules B (Clause 7) and D (Clause 9) contain requirements for the CAM and the CAM-HMI. Module C (Clause 8) describes the interface requirements for BAM.*

BAM is a concept that imposes requirements on equipment that handles and presents alerts on the bridge including equipment that provides central alert management (CAM) system functionalities.

- Equipment is BAM compliant if it meets Module A - Presentation and handling of alerts on the bridge and Module C – Interfacing of this standard.
- Equipment is CAM system compliant if it is BAM compliant equipment and, in addition, meets Module B – Central alert management system functionality and Module D – System and equipment documentation for CAM system of this standard.

To support retrofitting a ship with BAM compliant equipment handling alert related communication with remaining non-BAM compliant equipment (referred to as 'legacy alert sources'), this standard includes guidance on how to interface BAM compliant equipment with remaining devices that are not BAM compliant (see 4.4 and Annex H).

Part 2 of this standard provides standardized alert and cluster identifiers and other additional features (see IEC 62923-2).

2. Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60945:2008, *Maritime navigation and radiocommunication equipment and systems – General requirements – Methods of testing and required test results*

IEC 61162-1, *Maritime navigation and radiocommunication equipment and systems – Digital interfaces – Part 1: Single talker and multiple listeners*

143 IEC 61162-2, *Maritime navigation and radiocommunication equipment and systems – Digital*
144 *interfaces – Part 2: Single talker and multiple listeners, high-speed transmission*

145 IEC 61162-450, *Maritime navigation and radiocommunication equipment and systems –*
146 *Digital interfaces – Multiple talkers and multiple listeners – Ethernet interconnection*

147 IEC 61924-2, *Maritime navigation and radiocommunication equipment and systems –*
148 *integrated navigation systems – Part 2: Modular structure for INS – Operational and*
149 *performance requirements, methods of testing and required test results*

150 IEC 62288, *Maritime navigation and radiocommunication equipment and systems –*
151 *Presentation of navigation-related information on shipborne navigational displays – General*
152 *requirements, methods of testing and required test results*

153 IEC 62923-2, *Maritime navigation and radiocommunication equipment and systems – Bridge*
154 *Alert Management – Part 2: Alert and cluster identifiers and other additional features*

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

156 3. Terms, definitions and abbreviations

157 For the purposes of this document, the following terms, definitions and abbreviations apply.

158 3.1 Terms and definitions

159 3.1.1

160 active alert

161 alert that is not in state 'normal'

162 3.1.2

163 aggregated header alert

164 (MSC 302/A) *alert indicating the existence of multiple individual alerts* of the same kind,
165 transmitted by the aggregation source with alert state and alert ID determined by the
166 associated aggregation-member alerts, with alert instance 0 and with, in the alert title and/or
167 alert description text, an aggregation header representative for the aggregation

168 3.1.3

169 aggregation

170 (MSC 302/A) *single combination of an aggregated header alert and associated individual*
171 *aggregation-member alerts* that all have the same alert identifier and the same aggregation
172 source, *to provide one alert (one aggregated header alert represents plenty of individual*
173 *aggregation-member alerts)*

174 3.1.4

175 aggregation header

176 title of an aggregation, under which the associated aggregation-member alerts are sorted,
177 indicating the generic part of the aggregation-member alerts, and defined by the aggregation
178 source

179 Note 1 to entry: The header may contain the current number of aggregation-member alerts in that aggregation
180 (see 8.1.5.1).

181 3.1.5

182 aggregation source

183 BAM compliant equipment that defines an aggregation of (some of) its alerts

184 3.1.6

185 aggregation-member alert

186 An individual alert that is defined by its source as part of an aggregation

- 187 **3.1.7**
188 **alarm**
189 (MSC 302/A) *high-priority alert. Condition requiring immediate attention and action by the*
190 *bridge team, to maintain the safe navigation and safe operation of the ship*
- 191 **3.1.8**
192 **alert**
193 (MSC 302/A) *announcement of abnormal situations and conditions requiring attention. Alerts*
194 *are divided in four priorities: emergency alarms, alarms, warnings and cautions. An alert*
195 *provides information about a defined state change in connection with information about how*
196 *to announce this event in a defined way to the system and the operator*
- 197 **3.1.9**
198 **alert announcements**
199 (MSC 302/A) *visual and acoustical presentation of alerts*
- 200 **3.1.10**
201 **alert history list**
202 (MSC 302/A) *accessible list of past alerts*
- 203 **3.1.11**
204 **alert management**
205 (MSC 302/A) *concept for the harmonized regulation of the monitoring, handling, distribution*
206 *and presentation of alerts on the bridge*
- 207 **3.1.12**
208 **alert source**
209 *equipment generating and managing alerts*
- 210 **3.1.13**
211 **audible indication**
212 *sound from the EUT that is not associated with raising an alert of priorities alarm or warning in*
213 *the list of active alerts of the EUT*
- 214 EXAMPLE 1 A sound indicating a change of control position.
- 215 EXAMPLE 2 Table 7.1.1 of IMO Resolution A.1021(26) "Code on Alerts and Indicators"
- 216 **3.1.14**
217 **bridge alert management**
218 **BAM**
219 (MSC 302/A) *overall concept for management, handling and harmonized presentation of alerts*
220 *on the bridge*
- 221 **3.1.15**
222 **BAM compliant equipment**
223 *equipment compliant with Modules A and C of MSC.302(87)*
- 224 **3.1.16**
225 **central alert management**
226 **CAM**
227 (MSC 302/A) *functionality for the management of the presentation of alerts on the CAM-HMI,*
228 *the communication of alert states between CAM-HMI and navigational systems and sensors.*
229 *The functions may be centralized or partly centralized in subsystems and interconnected via*
230 *a standardized alert-related communication.*
- 231 **3.1.17**
232 **central alert management HMI**
233 **CAM-HMI**
234 *human machine interface for centralized presentation and handling of alerts on the bridge*
- 235

236 **3.1.18**
 237 **central alert management system**
 238 **CAM system**
 239 combined functionality of CAM and CAM-HMI

240 **3.1.19**
 241 **category A alerts**
 242 (MSC 302/A) *alerts for which graphical information at the task station directly assigned to the*
 243 *function generating the alert is necessary, as decision support for the evaluation of the alert*
 244 *related condition*

245 **3.1.20**
 246 **category B alerts**
 247 (MSC 302/A) *alerts where no additional information for decision support is necessary besides*
 248 *the information which can be presented at the central alert management HMI*

249 **3.1.21**
 250 **category C alerts**
 251 (MSC 302/A) *alerts that cannot be acknowledged on the bridge but for which information is*
 252 *required about the status and treatment of the alert*

253 Note 1 to entry: If the bridge alert management is applied in another cluster than the bridge (see Annex E),
 254 this definition applies mutatis mutandis.

255 **3.1.22**
 256 **caution**
 257 (MSC 302/A) *lowest priority of an alert. Awareness of a condition which does not warrant an*
 258 *alarm or warning condition, but still requires attention out of the ordinary consideration of the*
 259 *situation or of given information*

260 **3.1.23**
 261 **cluster**
 262 (MSC 302/A) *group of functions on a high level, e.g., navigation, automation*

263 Note 1 to entry: For guidance on the use of clusters, see Annex E.

264 **3.1.24**
 265 **converted alert**
 266 alert resulting from translation of a legacy alert into BAM compliant alert

267 **3.1.25**
 268 **emergency alarm**
 269 (MSC 302/A) *highest priority of an alert. Alarms which indicate immediate danger to human*
 270 *life or to the ship and its machinery exists and require immediate action*

271 **3.1.26**
 272 **EUT function type P**
 273 functions required in EUT to make it BAM compliant equipment

274 **EUT function type Q**
 275 functions additional to functions of type P required in EUT to make it a BAM compliant
 276 CAM system

277 **EUT function type R**
 278 optional functions additional to functions of type P required in EUT performing revaluation of
 279 alerts from alert sources (responsibility transfer)

280 **EUT function type S**
 281 optional functions additional to functions of type P necessary in EUT performing conversion of
 282 legacy alert communication from legacy alert sources to BAM compliant alert communication

283 **EUT function type T**
 284 functions additional to functions of type Q required in an INS to make it a BAM compliant INS

285 **3.1.27**
286 **failure analysis**
287 (MSC 302/A) *logical, systematic examination of an item, including its diagrams or formulas, to*
288 *identify and analyse the probability, causes and consequences of potential and real failures*

289 **3.1.28**
290 **functional alert group**
291 single combination of a functional alert group header alert and associated individual group-
292 member alerts, defined by a functional alert group source, to provide one alert (one functional
293 alert group header alert represents plenty of individual group-member alerts)

294 **3.1.29**
295 **functional alert group source**
296 BAM compliant equipment that defines a functional alert group, consisting of alerts it has
297 received and/or generated

298 Note 1 to entry: This may be an alert source, BAM compliant equipment receiving alerts from the alert source,
299 or a CAM system.

300 **3.1.30**
301 **functional alert group header**
302 title of a functional alert group, under which the associated group-member alerts are sorted,
303 indicating the commonality of the group-member alerts, defined by the functional alert group
304 source

305 Note 1 to entry: The header may contain the current number of group-member alerts in that functional alert
306 group (see 8.1.5.2).

307 **3.1.31**
308 **functional alert group header alert**
309 alert indicating the existence of multiple individual alerts with commonality in terms of their
310 function and/or priority, transmitted by the functional alert group source with alert state
311 determined by the associated group-member alerts, with a unique alert ID, with alert instance
312 0 and with, in the alert title and/or alert description text, “a functional alert group header
313 representative for the functional alert group”

314 **3.1.32**
315 **functional alert grouping**
316 (MSC 302/A) *arrangement of alerts in terms of their function and/or priority*

317 **3.1.33**
318 **group-member alert**
319 an individual alert that is defined by a functional alert group source as part of a functional
320 alert group

321 **3.1.34**
322 **human machine interface**
323 **HMI**
324 (MSC 302/A) *the part of a system an operator interacts with. The interface is the aggregate of*
325 *means by which the users interact with a machine, device, and system (the system). The*
326 *interface provides means for input, allowing the users to control the system and output,*
327 *allowing the system to inform the users*

328 **3.1.35**
329 **individual alerts**
330 (MSC 302/A) *alerts announcing one abnormal situation and condition requiring attention*

331 **3.1.36**
332 **legacy alert source**
333 equipment generating and managing alerts not in conformity with the interfaces specified in
334 Annex C

335 Note 1 to entry: Legacy alert sources may be encountered in equipment carried on a ship when the ship is
336 retrofitted with a CAM system or when suitable BAM compliant equipment does not exist.

337 **3.1.37**
338 **multifunction display**
339 **MFD**
340 (MSC 302/A) *a single visual display unit that can present, either simultaneously or through a*
341 *series of selectable pages, information from more than a single function*

342 **3.1.38**
343 **ship's time**
344 time reference used on board

345 **3.1.39**
346 **simple operator action**
347 (MSC 302/A) *a procedure achieved by no more than two hard-key or soft-key actions,*
348 *excluding any necessary cursor movements, or voice actuation using programmed codes*

349 **3.1.40**
350 **single operator action**
351 (MSC 302/A) *a procedure achieved by no more than one hard-key or soft-key action,*
352 *excluding any necessary cursor movements, or voice actuation using programmed codes*

353 **3.1.41**
354 **task station**
355 (MSC 302/A) *multifunction display with dedicated controls providing the possibility to display*
356 *and operate any tasks. A task station is part of a workstation*

357 **3.1.42**
358 **warning**
359 (MSC 302/A) *condition requiring immediate attention, but no immediate action by the bridge*
360 *team. Warnings are presented for precautionary reasons to make the bridge team aware of*
361 *changed conditions which are not immediately hazardous, but may become so if no action is*
362 *taken*

363 **3.1.43**
364 **workstation**
365 the combination of all job-related items, including the console with all devices, equipment and
366 the furniture, to fulfil certain tasks.

367 Note 1 to entry: Workstations for the bridge are specified in MSC/Circ.982.

368 **3.2 Abbreviations**

369	CPA	Closest point of approach
370	FMEA	Failure Mode and Effect Analysis
371	IMO	International Maritime Organization
372	EUT	Equipment under test
373	HMI	Human Machine Interface
374	IBS	Integrated Bridge System
375	IEC	International Electrotechnical Committee
376	INS	Integrated Navigation System
377	MSC	Maritime Safety Committee
378	OOW	Officer of the Watch
379	SOLAS	Safety Of Life At Sea
380	TAG	Transport annotate and group
381	TCPA	Time to closest point of approach

4. Description

4.1 Purpose

(MSC 302/1.1) *The purpose of the bridge alert management (BAM) concept 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).*

(MSC 302/1.2) *The BAM concept 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.*

(MSC 302/1.3) *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.*

Annex E provides guidance on the application of alert management.

(MSC 302/1.4) *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.*

(MSC 302/1.5) *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.*

4.2 EUT function types

Because of the variety of BAM-related functionality possible in EUT and because of the complexity of this standard and its application, various EUT function types are identified.

- EUT function type P – functions required in EUT to make it BAM compliant equipment
- EUT function type Q – functions additional to functions of type P required in EUT to make it a BAM compliant CAM system
- EUT function type R – optional functions additional to functions of type P required in EUT performing revaluation of alerts from alert sources (responsibility transfer)
- EUT function type S – optional functions additional to functions of type P necessary in EUT performing conversion of legacy alert communication from legacy alert sources to BAM compliant alert communication
- EUT function type T – functions additional to functions of type Q required in an INS to make it a BAM compliant INS

For each EUT the manufacturer should declare which function types are embedded in the EUT. The scope of the declared function types determines the applicable requirements and tests from this standard.

Indications have been added for Clauses 6 to 9 and the Annexes for which function type the various sections are applicable.

An EUT may, or may be required according to MSC. 302(87) (see 1 and 6.1.4) to, embed multiple function types at the same time:

- EUT with functions of type P may also have additional functions of types Q, R and/or S;
- EUT with functions of types P and Q may also have functions of types R, S and/or T;
- EUT with functions of types P and R may also have functions of types Q and/or S;
- EUT with functions of types S and P may also have functions of types Q and/or R;
- EUT with functions of types P, Q and T may also have functions of types R and/or S.

4.3 Application

(MSC 302/3.4) *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) and the related standard IEC 60945) 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) and the related standard IEC 62288), CAM system should meet the requirements of these performance standards (MSC.302(87), and the related standard (IEC 62923)) and follow the relevant guidelines on ergonomic principles adopted by the IMO in MSC/Circ.982.*

(MSC 302/3.5) *If an INS is installed on the bridge it should be assured that the functionality of module C of the INS Performance standards (resolution MSC.252(83) and the related standard IEC 61924-2) is included in one CAM system. See 6.1.4.2.2.*

(MSC 302/3.6) *In case of conflict with alert requirements of existing performance and test standards, the Performance standards given in resolution MSC.302(87), and requirements and tests in this standard, will take precedence.*

(MSC 302/3.7) *The Performance standards of resolution MSC.302(87) should apply for all alerts presented on, and transferred to, the bridge.*

NOTE This does not include audible indications (see 3.1.13).

4.4 Implementation of a BAM interfaces

This standard includes a communication protocol based on an interface using a series of sentences, ALF, ALC, ACN, ARC and HBT as described in Annex C, which provides harmonized alert communications.

It is recognized that for some time not all equipment installed on a bridge that may generate alerts will have this interface or that bridges with non-BAM compliant equipment may be retrofitted with a CAM system. Some equipment may have a legacy interface based on ALR/ACK sentences, some equipment may only be able to interface using relay contact signals, and other equipment may have other types of interfaces. In order to achieve BAM, there needs to be BAM compliant equipment (a CAM system, a dedicated BAM compliant legacy alert handler, or other BAM compliant equipment) having the capability to transform the alert handling of such legacy alert sources to emulate as well as possible BAM compliant presentation and handling of alerts which is as consistent as feasible with that of BAM compliant alert sources, while taking into account the limitations of the legacy alert source (see Annex H).

Figure 1 shows examples of alert sources with different interface arrangements and how they might be connected to the CAM system, either directly in case the CAM system provides the transformation capability, or via a dedicated BAM compliant legacy alert handler or via other BAM compliant equipment.

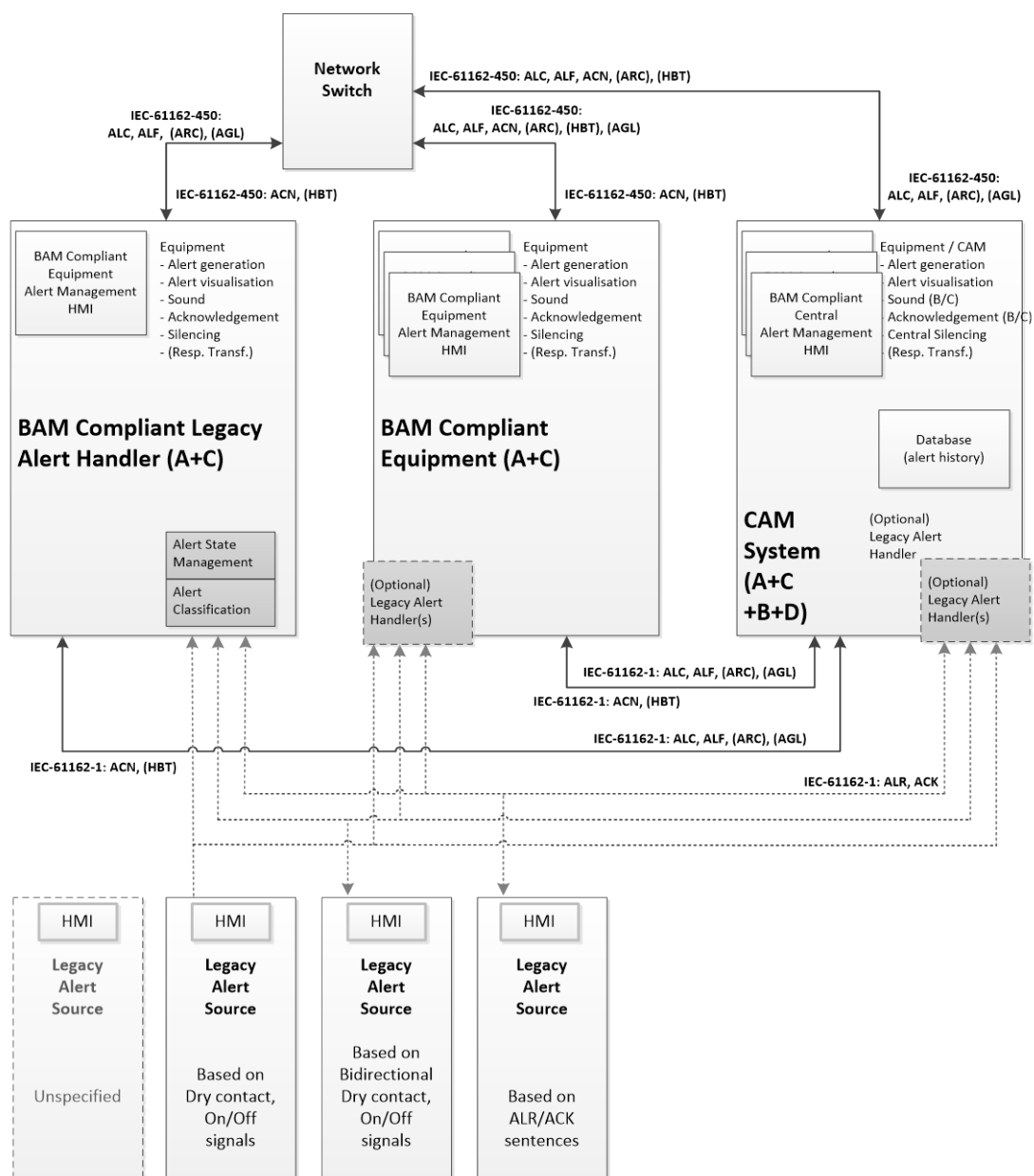


Figure 1 – Interfacing legacy alert sources with BAM compliant equipment

4.5 Clusters

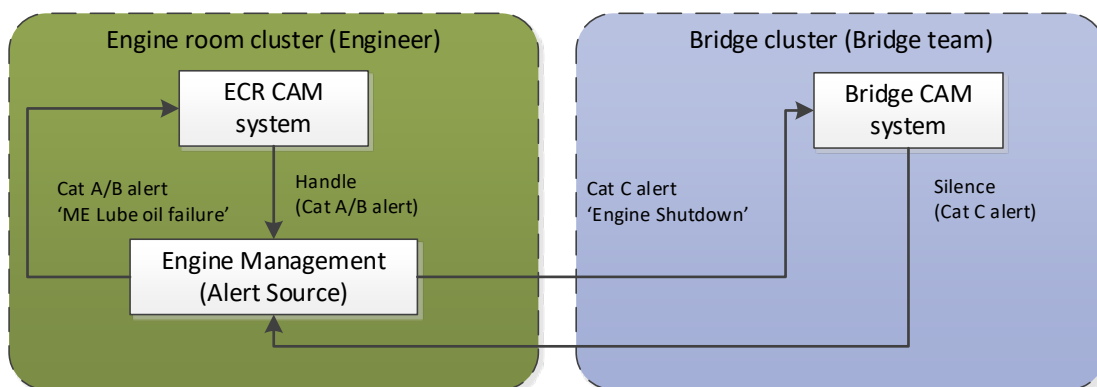
Although this standard focusses on bridge alert management, aimed at the navigator, the alert management as described in this standard can also be applied in all other clusters on the ship. See 8.1.1.1 and, for guidance on the use of clusters, Annex E.4.4.

Equipment that belongs to one cluster may present alerts on its own HMI and on the CAM in that cluster (category A/B alerts) to inform the operator of that cluster of a situation that warrants his attention and/or action. These alerts can only be handled from either that HMI or that CAM and not from a CAM in another cluster.

Simultaneously, that same equipment may raise an additional alert to inform the operator of another cluster if the situation warrants also his attention (e.g. 'Engine shutdown' in Figure 2, originating in the engine room cluster, but also important for the bridge team as they may need to be aware of that situation and/or to act on that situation). At the CAM of that other cluster, this category C alert can only be temporarily silenced.

NOTE All other clusters on a ship (see also Annex E and IEC 62923-2 Annex B) also could have each own CAM installed, according to the CAM requirements of this standard, but dedicated to the alerts in that cluster. See Figure 2.

484 The category C alert will be acknowledged/rectified only at the source cluster, typically
485 connected to the acknowledgement/rectification of the related category A/B alert.



486
487 **Figure 2 – Example of cluster-dependent alert management limitations**

488 5. Test methods

489 5.1 Subject of tests

490 The tests in this standard shall be used to demonstrate BAM compliancy for individual alert
491 source(s). These tests may be supplemented with tests in applicable individual equipment
492 standards. This standard contains all tests mandatory for CAM systems.

493 If the EUT supports operation of multiple CAM-HMIs simultaneously, the tests of clauses 6
494 and 7 shall be performed on at least 2 CAM-HMIs simultaneously.

495 If the EUT is not a CAM system, and supports operation of multiple HMIs simultaneously, the
496 tests of clause 6 shall be performed on at least 2 HMIs simultaneously.

497 The tests in clauses 6 and/or 7 that refer to multiple HMIs shall at least be performed on the
498 HMIs selected under this clause.

499 5.2 Test set-ups

500 Examples of test set-ups which may be used for testing BAM-related functionality and
501 interfaces are described in Annex A.

502 5.3 General requirements

503 The equipment used for BAM shall comply with the general requirements contained in
504 IEC 60945, as applicable to the equipment category, for example “protected”.

505 If the performance requirements are not given elsewhere in IEC standards the following
506 definitions shall be used for the purpose of testing to IEC 60945.

- 507 • Performance test

508 perform any operator action in the EUT and confirm by non-quantitative observation that the
509 system is still operative.

- 510 • Performance check

511 Identical to the “performance test”.

512 5.4 Configuration for testing

513 The manufacturer shall specify the type(s) and maximum number of each type of interface
514 available in the EUT.

515 The test setup shall include all types of interfaces available in the EUT.

516 The tests involving interfacing shall be conducted on each type of interface available.

517 6. Module A - Presentation and handling of alerts on the bridge

518 6.1 General

519 6.1.1 Provisions

520 6.1.1.1 Applicability

521 EUT with functions of type P 'all BAM compliant equipment functions'.

522 6.1.1.2 Requirement

523 (MSC 302/5.1) *The BAM compliant equipment shall provide:*

- 524 1. *the means used to draw the attention of the bridge team to the existence of alert*
- 525 *situations;*
- 526 2. *the means to enable the bridge team to identify and address that condition;*
- 527 3. *the means for the bridge team and pilot to assess the urgency of different alert situations*
- 528 *in cases where more than one alert situation has to be handled;*
- 529 4. *the means to enable the bridge team to handle alert announcements; and*
- 530 5. *the means to manage all alert-related states in a distributed system structure in*
- 531 *a consistent manner.*

532 6.1.1.3 Methods of test and required results

533 Verified by tests in subclauses 6.1.2 and 6.1.3, and the applicable sections of 6.2, 6.3 and

534 6.4.

535 6.1.2 Number of alerts for one situation

536 6.1.2.1 Applicability

537 EUT with functions of type P 'all BAM compliant equipment functions'.

538 6.1.2.2 Requirement

539 (MSC 302/5.2) *If practicable, there shall be not more than one audible alert for one situation*

540 *that requires attention.*

541 Unless required by IMO, if there is a situation that requires attention, a functional alert (see

542 Annex E) shall be raised, while the underlying causes (e.g. technical situations or symptoms)

543 shall not provide (additional) audible alert(s). See also 6.4.6.1.

544 NOTE 1 Additional diagnostic interfaces could be provided by the EUT, which could provide information on

545 technical situations (e.g. loss of input signal) and symptoms (e.g. temperature outside normal operating range).

546 The 'Responsibility Transfer'-mechanism may be used to control the number of audible alerts

547 for one situation. See 6.9 for requirements for the 'Responsibility Transfer'-mechanism.

548 NOTE 2 "if practicable" Is facilitated by the optional 'responsibility transfer'-mechanism as described in this

549 standard. An INS contains elements that have the knowledge and capability to decide on the matter described here

550 to make use of this mechanism to prevent superfluous audible alerts. Also individual BAM compliant equipment

551 containing this mechanism may be configured to interact with other equipment using this mechanism for the

552 purpose of supporting this requirement (for guidance see Annex E).

553 NOTE 3 The same alert may be presented on more than one task station, see 6.1.3.

554 NOTE 4 One failure may result in additional different alerts from subsequent functions which have

555 dependency on the failed function. If practicable, all available methods could be used to avoid multiple audible

556 alerts (for example use of caution and use of responsibility transfer). See Annex E.

557 NOTE 5 Aggregation of alerts is a means to reduce the number of visually presented alerts of the same kind

558 and with the same priority. Typical candidates for aggregation are collision alerts, see 6.8.

559 NOTE 6 Audible alerts include ('active – unacknowledged') alarms and ('active – unacknowledged') warnings.

560 6.1.2.3 Methods of test and required results

561 Refer to manufacturer's documentation. Confirm by analytic evaluation that, if there is a

562 situation the requires attention, the EUT raises a functional alert (see Annex E), while the

563 underlying causes (e.g. technical situations or symptoms) do not provide (additional) audible

564 alerts(s).

565 See 6.9 for tests for the 'Responsibility Transfer'-mechanism.

6.1.3 Alert presentation at several locations**6.1.3.1 Applicability**

EUT with functions of type P ‘all BAM compliant equipment functions’.

6.1.3.2 Requirement

(MSC 302/5.3) *As alerts can be displayed or presented at several locations, the presentation of the alert on the bridge equipment shall be consistent as far as practicable with respect to how alerts are displayed or presented, silenced and acknowledged. The states of alerts shall be consistent on the bridge as far as practicable.*

In case the EUT is not a CAM system, the list of active alerts of the EUT shall only include alerts raised by the EUT.

6.1.3.3 Methods of test and required results

Methods of test and required test results are described in 6.3.2.3.

In case the EUT contains an alert HMI that is not a CAM-HMI, confirm by analytical evaluation that it is not possible to display alerts of other equipment in its list of active alerts.

6.1.4 Central alert management HMI**6.1.4.1 Provisions for CAM system****6.1.4.1.1 Applicability**

EUT with functions of type Q ‘CAM functions’.

6.1.4.1.2 Requirement

(MSC 302/5.4) *It shall be possible to provide the CAM-HMI at least on the workstation for navigating and manoeuvring, and if provided at the workstation for monitoring.*

The installation manual shall contain guidance to install at least one CAM-HMI at the navigating and manoeuvring workstation.

NOTE IMO MSC/Circ.982 defines navigating and manoeuvring workstation.

6.1.4.1.3 Methods of test and required results

Confirm by inspection of the installation manual that guidance is given to install at least one CAM-HMI at the navigating and manoeuvring workstation.

If the EUT is not an INS confirm by inspection of the manufacturer's documentation that the installation manual states that for the case that an INS is installed a separate CAM system is not permitted to be installed on board.

6.1.4.2 Provisions for INS**6.1.4.2.1 Applicability**

EUT with functions of type T ‘INS functions’.

6.1.4.2.2 Requirement

(MSC 302/5.5) *If an INS is installed on the bridge the functionality of the INS alert management HMI and the CAM-HMI shall be integrated.*

6.1.4.2.3 Methods of tests and required results

If the EUT is an INS confirm by analytical evaluation that the INS alert management HMI and the CAM-HMI are integrated.

6.2 Priorities classification and categories**6.2.1 Applicability**

EUT with functions of type P ‘all BAM compliant equipment functions’.

See Annex E for guidance about assigning priorities and categories.

609 6.2.2 Requirement**610 6.2.2.1 Priorities**

611 (MSC 302/6.1.1) *The BAM shall distinguish between the four priorities listed:*

612 1. *emergency alarms;*

613 2. *alarms;*

614 3. *warnings; and*

615 4. *cautions.*

616 (MSC 302/6.2.1) *Criteria for classification of emergency alarms:*

617 1. *alarms which indicate that immediate danger to human life or to the ship and its machinery*
618 *exists and that immediate action must be taken; and*

619 2. *emergency alarms are specified in the Code on Alerts and Indicators, 2009 (resolution*
620 *A.1021(26)).*

621 (MSC 302/6.2.2) *Criteria for classification of alarms:*

622 1. *conditions requiring immediate attention and action by the bridge team to avoid any kind*
623 *of hazardous situation and to maintain the safe operation of the ship; and*

624 2. *escalation required as alarm from not acknowledged warning.*

625 (MSC 302/6.2.3) *Criteria for classification of warnings: conditions or situations which require*
626 *immediate attention for precautionary reasons, to make the bridge team aware of conditions*
627 *which are not immediately hazardous, but may become so.*

628 (MSC 302/6.2.4) *Criteria for classification of cautions: awareness of a condition which still*
629 *requires attention out of the ordinary consideration of the situation or of given information.*

630 6.2.2.2 Categories

631 (MSC 302/6.3) *Alerts shall be separated for the alert handling into three categories of alerts:*

632 (MSC 302/6.3.1) *Category A alerts which are specified as alerts where information at a task*
633 *station directly assigned to the function generating the alert is necessary, as decision support*
634 *for the evaluation of the alert-related condition, e.g.:*

635 1. *danger of collision; and*

636 2. *danger of grounding.*

637 *Where category A alerts cannot be acknowledged at a HMI, this fact shall be clearly indicated*
638 *to the user. If an icon is used, it shall comply with Annex F.*

639 NOTE 1 This condition is called 'acknowledge not allowed'.

640 When the EUT is an INS its alerts and their technical sources are part of the INS. In such
641 case, depending on the selected operative mode, all multi-function displays of the INS may be
642 capable of fulfilling the requirement to present the alerts together with the required graphical
643 presentation for the evaluation of the alert related condition at the task station directly
644 assigned to the function generating the alert. It is possible to acknowledge a category A alert
645 if the selected operative mode provides the necessary graphical information, for example:

- 646 • the necessary graphical information for danger of collision is presentation of targets (i.e.
647 tracked targets and active AIS targets) and presentation of background information (i.e.
648 radar echoes and sleeping AIS targets) in Radar or ECDIS mode;
- 649 • the necessary graphical information for danger of grounding (i.e. safety contour) is
650 presentation of chart information in ECDIS or Radar mode;
- 651 • the necessary graphical information for depth below keel alarm is presentation of
652 histogram of the depth information.

653 The same principles apply for multi-function displays (MFD). For example, when the EUT
654 comprises the combination of Radar and ECDIS functionality in one MFD, when the technical
655 source of alerts is this MFD, and when above listed conditions given for INS are fulfilled.

656 it is possible to acknowledge ECDIS related alerts in Radar mode and Radar related alerts in
657 ECDIS mode of this MFD.

658 Every MFD which is capable of accepting acknowledge of a category A alert shall perform
659 visual presentation and audible annunciation of the alert as an indication that the MFD can
660 accept acknowledge of the alert.

661 (MSC 302/6.3.2) *Category B alerts which are specified as alerts where no additional*
662 *information for decision support is necessary besides the information which can be presented*
663 *at the CAM-HMI.*

664 NOTE 2 Because category C alerts can be silenced, and because category A alerts need an audible signal to
665 distinguish which HMI has additional information for decision support and thus can be used to handle the alert,
666 categories C and A alerts have situations in which they cause an audible signal. As cautions never cause an
667 audible signal, they always belong to category B.

668 (MSC 302/6.3.3) *Category C alerts which are specified as alerts that cannot be acknowledged*
669 *on the bridge but for which information is required about the status and treatment of the*
670 *alerts, e.g., certain alerts from the engine.*

671 **6.2.2.3 Additional alerts**

672 (MSC 302/6.1.2) *Alerts additional to the alerts required by the IMO shall be assigned to a*
673 *priority level using the criteria for classification.*

674 The manufacturer shall provide a list of the alerts of the EUT indicating at least the priority
675 and category and the application of the criteria used for classification. See Annex E for
676 guidance about assigning priorities and categories.

677 **6.2.3 Methods of test and required results**

678 Confirm by inspection that the manufacturer's documentation lists the alerts of the EUT
679 indicating at least the priority, category and the criteria used for classification (see 6.3.2.3 for
680 further tests).

681 Identify if category A alerts can be displayed on an HMI while these alerts cannot be
682 acknowledged on that HMI. If such alerts can be displayed, simulate an alert of category A
683 and confirm by observation that:

- 684 • the alert cannot be acknowledged on the HMI;
- 685 • there is an indication on the HMI that acknowledgement will not be accepted; and
- 686 • if an icon is used, it complies with Annex F.

687 For INS or MFD (see 6.2.2.2), confirm by analytic evaluation that all locations in which it is
688 possible to acknowledge a category A alert are displaying necessary graphical information
689 and perform audible annunciation according to Table 2, Table 3, Table 4 and Table 5 when
690 they allow acknowledgement of the category A alert.

691 **6.3 Presentation and state of alerts**

692 **6.3.1 Applicability**

693 EUT with functions of type P 'all BAM compliant equipment functions'.

694 **6.3.2 General**

695 **6.3.2.1 Statement**

696 (MSC 302/7.1.1) *The presentation of alarms and warnings is defined in the Performance*
697 *standards for presentation of navigation-related information on shipborne navigational*
698 *displays (resolution MSC.191(79) and the related standard IEC 62288).*

699 **6.3.2.2 Requirement**

700 (MSC 302/7.1.2) *The state of an alert shall be consistently distributed and presented for the*
701 *BAM compliant equipment and all associated displays.*

702 Alert states and related conditions are described in Table 1.

703

Table 1 – Alert states and related conditions

Alert state	Condition
'active – unacknowledged'	Alert condition still present, alert not acknowledged
'active – silenced'	Alert condition still present, alert not acknowledged but audible signals have been silenced by the operator
'active – acknowledged'	Alert condition still present, alert acknowledged by the operator
'active – responsibility transferred'	Alert condition still present, a function of the BAM compliant equipment with additional system knowledge has taken over
'rectified – unacknowledged'	Alert condition rectified, alert still unacknowledged
'active'	Alert condition present
'normal'	No alert condition present
NOTE 1 'Responsibility transferred' is the process used to inform functions, sensors and/or sources that after revaluation, BAM compliant equipment, with its system knowledge, has taken the responsibility in order to reduce number of high-priority alerts. NOTE 2 For each alert priority a separate state diagram has been defined, see Annex G. The state diagrams each apply a selection of states listed in this table, as detailed in Table 2 till Table 5.	

704

705 Alert states and their presentation are described in Table 2, Table 3, Table 4 and Table 5.

706 Visual presentation of alert title and/or alert description text, if provided, is mandatory.

707 Optionally icons can be presented together with the alert title and/or alert description text,

708 according to 6.4.5.

709

Table 2 – Alert state and presentation for emergency alarms

Alert state	Visual presentation ^a	Audible annunciation
'active'	Red flashing	CAM-HMI: silent Source: according to A.1021(26)
'normal'	None	CAM-HMI: silent Source: according to A.1021(26)
^a Optional icons for alert management are given in Annex F, the requirements and tests for display of icons are given in 6.4.5. NOTE 1 Audible signals are not required from the CAM-HMI as the audible signals given in IMO resolution A.1021(26) are presented on the bridge by other equipment. NOTE 2 If the user is required to read alarm text a marker symbol shall flash rather than the text (IEC 60945:2008, 6.1.5). e.g. an icon could be used.		

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Table 3 – Alert state and presentation for alarms

Alert state	Visual presentation ^a	Audible annunciation ^b
'active – unacknowledged'	Red flashing	3 short audible signals that shall be repeated every 7 s to 10 s ^c Speech output optional ^c
'active – silenced'	Red flashing	No audible signal and no speech output
'active – acknowledged'	Red steady, but distinguishable from	No audible signal and no speech output