



IEC 61162-460

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# INTERNATIONAL STANDARD



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**Maritime navigation and radiocommunication equipment and systems –  
Digital interfaces –  
Part 460: Multiple talkers and multiple listeners – Ethernet interconnection –  
Safety and security**

INTERNATIONAL  
ELECTROTECHNICAL  
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# INTERNATIONAL ELECTROTECHNICAL COMMISSION

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## MARITIME NAVIGATION AND RADIOCOMMUNICATION EQUIPMENT AND SYSTEMS – DIGITAL INTERFACES –

### Part 460: Multiple talkers and multiple listeners – Ethernet interconnection – Safety and security

#### FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 61162-460 has been prepared by IEC technical committee 80: Maritime navigation and radiocommunication equipment and systems.

This second edition of IEC 61162-460 cancels and replaces the first edition published in 2015. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) 460-Switches and 460-Forwarders are required to implement IGMP snooping;
- b) connection between secure and non-secure areas requires a 460-Forwarder as an isolation element;
- c) SFI collision detection added as function of network monitoring;
- d) 460-Gateway and 460-Wireless gateway are no longer required to report to the network monitoring;
- e) all alerts from network monitoring have standardized alert identifiers.

The text of this International Standard is based on the following documents:

| FDIS        | Report on voting |
|-------------|------------------|
| 80/879/FDIS | 80/884/RVD       |

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

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

This International Standard is to be used in conjunction with IEC 61162-450:2018.

A list of all parts in the IEC 61162 series, published under the general title *Maritime navigation and radiocommunication equipment and systems – Digital interfaces*, can be found on the IEC website.

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

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

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# MARITIME NAVIGATION AND RADIOCOMMUNICATION EQUIPMENT AND SYSTEMS – DIGITAL INTERFACES –

## Part 460: Multiple talkers and multiple listeners – Ethernet interconnection – Safety and security

### 1 Scope

This part of IEC 61162 is an add-on to IEC 61162-450 where higher safety and security standards are needed, for example due to higher exposure to external threats or to improve network integrity. This document provides requirements and test methods for equipment to be used in an IEC 61162-460 compliant network as well as requirements for the network itself and requirements for interconnection from the network to other networks. This document also contains requirements for a redundant IEC 61162-460 compliant network.

~~This standard extends the informative guidance given in Annex D of IEC 61162-450:2011.~~  
This document does not introduce new application level protocol requirements to those that are defined in IEC 61162-450.

### 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.

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

IEC 61162-450:~~2011~~ 2018, *Maritime navigation and radiocommunication equipment and systems – Digital interfaces – Part 450: Multiple talkers and multiple listeners – Ethernet interconnection*

IEC 61924-2:2012, *Maritime navigation and radiocommunication equipment and systems – Integrated navigation systems – Part 2: Modular structure for INS – Operational and performance requirements, methods of testing and required test results*

IEC 62288:2014, *Maritime navigation and radiocommunication equipment and systems – Presentation of navigation-related information on shipborne navigational displays – General requirements, methods of testing and required test results*

IEEE 802.1D-2004, *IEEE Standard for Local and metropolitan area networks: Media Access Control (MAC) Bridges*

IEEE 802.1Q:~~2005~~, *IEEE Standard for Local and metropolitan area networks: Virtual Bridged Local Area Networks*

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INTERNET SOCIETY (ISOC). RFC 5424, *The Syslog Protocol* [online]. Edited by R. Gerhards. March 2009 [viewed 2018-01-08]. Available at <https://tools.ietf.org/html/rfc5424>

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE



**Maritime navigation and radiocommunication equipment and systems – Digital interfaces –**

**Part 460: Multiple talkers and multiple listeners – Ethernet interconnection – Safety and security**

**Matériels et systèmes de navigation et de radiocommunication maritimes – Interfaces numériques –**

**Partie 460: Émetteurs multiples et récepteurs multiples – Interconnexion Ethernet – Sûreté et sécurité**

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# INTERNATIONAL ELECTROTECHNICAL COMMISSION

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## MARITIME NAVIGATION AND RADIOCOMMUNICATION EQUIPMENT AND SYSTEMS – DIGITAL INTERFACES –

### Part 460: Multiple talkers and multiple listeners – Ethernet interconnection – Safety and security

#### FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 61162-460 has been prepared by IEC technical committee 80: Maritime navigation and radiocommunication equipment and systems.

This second edition of IEC 61162-460 cancels and replaces the first edition published in 2015. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) 460-Switches and 460-Forwarders are required to implement IGMP snooping;
- b) connection between secure and non-secure areas requires a 460-Forwarder as an isolation element;

- c) SFI collision detection added as function of network monitoring;
- d) 460-Gateway and 460-Wireless gateway are no longer required to report to the network monitoring;
- e) all alerts from network monitoring have standardized alert identifiers.

The text of this International Standard is based on the following documents:

| FDIS        | Report on voting |
|-------------|------------------|
| 80/879/FDIS | 80/884/RVD       |

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

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

This International Standard is to be used in conjunction with IEC 61162-450:2018.

A list of all parts in the IEC 61162 series, published under the general title *Maritime navigation and radiocommunication equipment and systems – Digital interfaces*, can be found on the IEC website.

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

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

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# MARITIME NAVIGATION AND RADIOCOMMUNICATION EQUIPMENT AND SYSTEMS – DIGITAL INTERFACES –

## Part 460: Multiple talkers and multiple listeners – Ethernet interconnection – Safety and security

### 1 Scope

This part of IEC 61162 is an add-on to IEC 61162-450 where higher safety and security standards are needed, for example due to higher exposure to external threats or to improve network integrity. This document provides requirements and test methods for equipment to be used in an IEC 61162-460 compliant network as well as requirements for the network itself and requirements for interconnection from the network to other networks. This document also contains requirements for a redundant IEC 61162-460 compliant network.

This document does not introduce new application level protocol requirements to those that are defined in IEC 61162-450.

### 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.

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

IEC 61162-450:2018, *Maritime navigation and radiocommunication equipment and systems – Digital interfaces – Part 450: Multiple talkers and multiple listeners – Ethernet interconnection*

IEC 61924-2:2012, *Maritime navigation and radiocommunication equipment and systems – Integrated navigation systems – Part 2: Modular structure for INS – Operational and performance requirements, methods of testing and required test results*

IEC 62288:2014, *Maritime navigation and radiocommunication equipment and systems – Presentation of navigation-related information on shipborne navigational displays – General requirements, methods of testing and required test results*

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INTERNET SOCIETY (ISOC). RFC 5424, *The Syslog Protocol* [online]. Edited by R. Gerhards. March 2009 [viewed 2018-01-08]. Available at <https://tools.ietf.org/html/rfc5424>

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## COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

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### **MATÉRIELS ET SYSTÈMES DE NAVIGATION ET DE RADIOCOMMUNICATION MARITIMES – INTERFACES NUMÉRIQUES –**

#### **Partie 460: Émetteurs multiples et récepteurs multiples – Interconnexion Ethernet – Sécurité et sécurité**

##### AVANT-PROPOS

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La Norme internationale IEC 61162-460 a été établie par le comité d'études 80 de l'IEC: Matériels et systèmes de navigation et de radiocommunication maritimes.

Cette deuxième édition de l'IEC 61162-460 annule et remplace la première édition parue en 2015. Cette édition constitue une révision technique.

Cette édition inclut les modifications techniques majeures suivantes par rapport à l'édition précédente:

- a) les commutateurs-460 et les redirecteurs-460 sont exigés pour la mise en œuvre de la surveillance du trafic des protocoles Internet de gestion de groupe (IGMP – *Internet group management protocol*);
- b) le raccordement entre des zones protégées et des zones non protégées exige un redirecteur-460 en tant qu'élément isolant;
- c) ajout de la détection de collision par ID de fonction du système (SFI – *system function ID*) comme fonction de surveillance du réseau;
- d) la consignation de la passerelle-460 et de la passerelle sans fil-460 à la surveillance du réseau n'est plus exigée;
- e) toutes les alertes issues de la surveillance du réseau ont des identificateurs d'alerte normalisés.

Le texte de cette Norme internationale est issu des documents suivants:

| FDIS        | Rapport de vote |
|-------------|-----------------|
| 80/879/FDIS | 80/884/RVD      |

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à l'approbation de cette norme.

Ce document a été rédigé selon les Directives ISO/IEC, Partie 2.

Cette Norme internationale doit être utilisée conjointement avec l'IEC 61162-450:2018.

Une liste de toutes les parties de la série IEC 61162, publiées sous le titre général *Matériels et systèmes de navigation et de radiocommunication maritimes – Interfaces numériques*, peut être consultée sur le site web de l'IEC.

Le comité a décidé que le contenu de ce document ne sera pas modifié avant la date de stabilité indiquée sur le site web de l'IEC sous "<http://webstore.iec.ch>" dans les données relatives au document recherché. A cette date, le document sera

- reconduit,
- supprimé,
- remplacé par une édition révisée, ou
- amendé.

**IMPORTANT – Le logo "*colour inside*" qui se trouve sur la page de couverture de cette publication indique qu'elle contient des couleurs qui sont considérées comme utiles à une bonne compréhension de son contenu. Les utilisateurs devraient, par conséquent, imprimer cette publication en utilisant une imprimante couleur.**



# MATÉRIELS ET SYSTÈMES DE NAVIGATION ET DE RADIOCOMMUNICATION MARITIMES – INTERFACES NUMÉRIQUES –

## Partie 460: Émetteurs multiples et récepteurs multiples – Interconnexion Ethernet – Sûreté et sécurité

### 1 Domaine d'application

La présente partie de l'IEC 61162 vient s'ajouter à la norme IEC 61162-450 lorsque des normes plus rigoureuses en matière de sûreté et de sécurité sont nécessaires, par exemple en raison d'une exposition plus importante aux menaces externes ou afin de renforcer l'intégrité du réseau. Le présent document spécifie des exigences et des méthodes d'essai pour les matériels à utiliser dans un réseau conforme à l'IEC 61162-460 ainsi que des exigences relatives au réseau proprement dit et des exigences relatives à l'interconnexion du réseau avec d'autres réseaux. Le présent document comprend également des exigences s'appliquant aux réseaux redondants conformes à l'IEC 61162-460.

Le présent document n'introduit pas de nouvelles exigences relatives aux protocoles des niveaux d'application par rapport à celles définies dans l'IEC 61162-450.

### 2 Références normatives

Les documents suivants cités dans le texte constituent, pour tout ou partie de leur contenu, des exigences du présent document. Pour les références datées, seule l'édition citée s'applique. Pour les références non datées, la dernière édition du document de référence s'applique (y compris les éventuels amendements).

IEC 60945, *Matériels et systèmes de navigation et de radiocommunication maritimes – Spécifications générales – Méthodes d'essai et résultats exigibles*

IEC 61162-450:2018, *Matériels et systèmes de navigation et de radiocommunication maritimes – Interfaces numériques – Partie 450: Émetteurs multiples et récepteurs multiples – Interconnexion Ethernet*

IEC 61924-2:2012, *Maritime navigation and radiocommunication equipment and systems – Integrated navigation systems – Part 2: Modular structure for INS – Operational and performance requirements, methods of testing and required test results* (disponible en anglais seulement)

IEC 62288:2014, *Matériels et systèmes de navigation et de radiocommunication maritimes – Présentation des informations relatives à la navigation sur des affichages de navigation de bord – Exigences générales, méthodes d'essai et résultats d'essai exigés*

IEEE 802.1D-2004, *IEEE Standards for Local Area Networks: Media Access Control (MAC) Bridges*

IEEE 802.1Q, *Virtual Bridged Local Area Networks*

INTERNET SOCIETY (ISOC). RFC 792, *Internet Control Message Protocol (ICMP), Standard STD0005 (and updates)* [en ligne]. Édité par J. Postel. Septembre 1981 [consulté 2018-01-08].  
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INTERNET SOCIETY (ISOC). RFC 2819, *Remote Network Monitoring Management Information Base* [en ligne]. Édité par S. Waldbusser. Mai 2000 [consulté 2018-01-08]. Adresse <https://tools.ietf.org/html/rfc2819>

INTERNET SOCIETY (ISOC). RFC 3411, *An Architecture for Describing Simple Network Management Protocol (SNMP) Management Frameworks* [en ligne]. Édité par D. Harrington. Décembre 2002 [consulté 2018-01-08]. Adresse <https://www.ietf.org/rfc/rfc3411.txt>

INTERNET SOCIETY (ISOC). RFC 3577, *Introduction to the RMON family of MIB modules* [en ligne]. Édité par S. Waldbusser. Août 2003 [consulté 2018-01-08]. Adresse <https://tools.ietf.org/html/rfc3577>

INTERNET SOCIETY (ISOC). RFC 4604, *Using Internet Group Management Protocol Version 3 (IGMPv3) and Multicast Listener Discovery Protocol Version 2 (MLDv2) for Source-Specific Multicast* [en ligne]. Édité par H. Holbrook et al. Août 2006 [consulté 2018-01-08]. Adresse <https://tools.ietf.org/html/rfc4604>

INTERNET SOCIETY (ISOC). RFC 5424, *The Syslog Protocol* [en ligne]. Édité par R. Gerhards. Mars 2009 [consulté 2018-01-08]. Adresse <https://tools.ietf.org/html/rfc5424>