SLOVENSKI STANDARD
SIST EN 4660-003:2019

01-oktober-2019

Nadomešča:
SIST EN 4660-003:2011

Aeronavtika - Modularne in odprte letalske elektronske arhitekture - 003. del: Komunikacije/omrežje

Aerospace series - Modular and Open Avionics Architectures - Part 003: Communications/Network

Luft- und Raumfahrt - Und offene Avionikarchitekturen Modulare - Teil 003: Kommunikation/Netzwerk

Série aérospatiale - Architectures Avioniques Modulaires et Ouvertes - Partie 003 : Communication/Réseau

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ICS:

35.100.01	Medsebojno povezovanje odprtih sistemov na splošno	Open systems interconnection in general
49.090	Oprema in instrumenti v zračnih in vesoljskih plovilih	On-board equipment and instruments

SIST EN 4660-003:2019 **en,fr,de**

EUROPEAN STANDARD

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English Version

Aerospace series - Modular and Open Avionics Architectures - Part 003: Communications/Network

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Luft- und Raumfahrt - Modulare und offene Avionikarchitekturen - Teil 003: Kommunikation/Netzwerk

This European Standard was approved by CEN on 5 November 2018.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (EN 4660-003:2019) has been prepared by the Aerospace and Defence Industries Association of Europe - Standardization (ASD-STAN).

After enquiries and votes carried out in accordance with the rules of this Association, this Standard has received the approval of the National Associations and the Official Services of the member countries of ASD, prior to its presentation to CEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by February 2020, and conflicting national standards shall be withdrawn at the latest by February 2020.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 4660-003:2011.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

The purpose of this MOAA standard is to define a set of open architecture standards, concepts & guidelines for Advanced Avionics Architectures (A3).

The three main goals for the MOAA Standards are:

— Reduced life cycle costs,

— Improved mission performance,

— Improved operational performance.

The MOAA standards are organised as a set of documents including:

— A set of agreed standards that describe, using a top down approach, the Architecture overview to all interfaces required to implement the core within avionics system,

— The guidelines for system implementation through application of the standards.

The document hierarchy is given in Figure 1: *(in this figure the document is highlighted)*

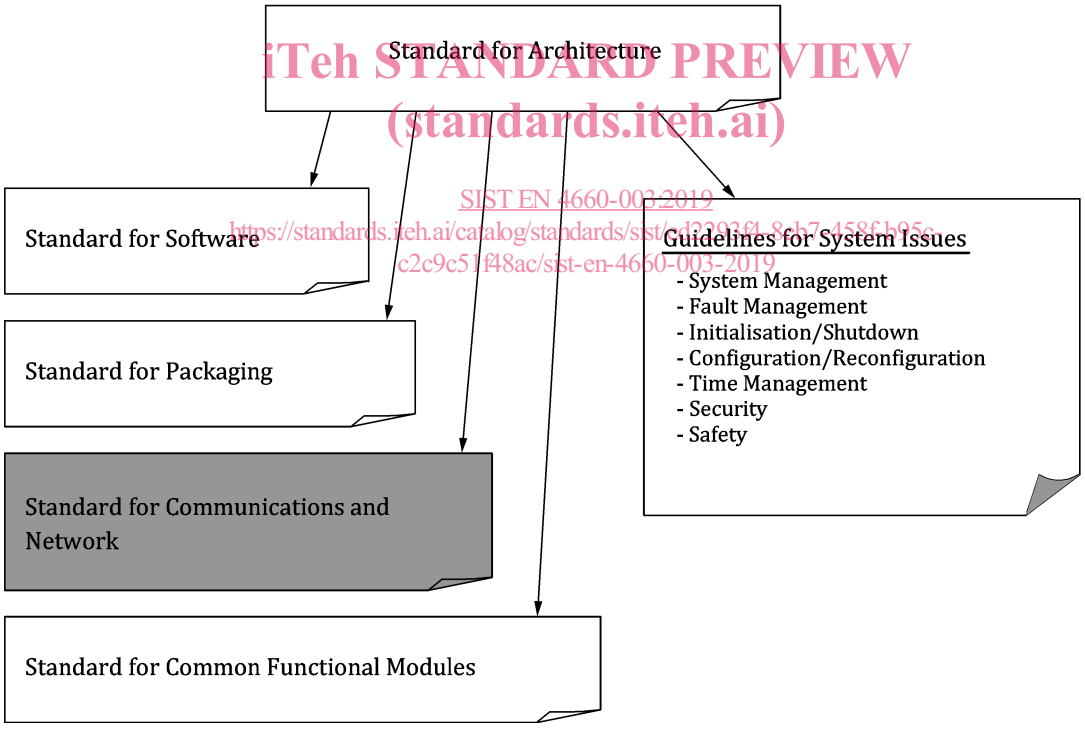

Figure 1 — MOAA Standard Documentation Hierarchy

This standard details the functionality and principle interfaces of an EN 4660 compliant network to ensure the interoperability of Common Functional Modules and design guidelines to assist in implementation of such a network.

The purpose of this standard is to establish by means of well defined interfaces and functionality, a network design that is technology transparent and that is open to a multi-vendor market. Therefore, specific data communication network topology, protocols and technologies are not identified in this document.

Although the physical organisation and implementation of the network shall remain the System Designers choice, in accordance with the best use of the current technology, it is necessary to define interfaces and parameter sets in order to achieve a logical definition of the network with a defined functionality. This definition includes:

— The generic functionality applicable to all networks.

— The logical interfaces to the Operating System and Module Support Layers.

— Optionally the physical interfaces to the Common Functional Modules (CFM).

This document identifies the principle interfaces for the Network, in Clause 4, and where appropriate, provides requirements on network parameters to be defined.

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.

EN 4660-001, *Aerospace series — Modular and Open Avionics Architectures — Part 001: Architecture*

EN 4660-002, *Aerospace series — Modular and Open Avionics Architectures — Part 002: Common Functional Modules*

EN 4660-004, *Aerospace series — Modular and Open Avionics Architectures — Part 004: Packaging*

EN 4660-005, *Aerospace series — Modular and Open Avionics Architectures — Part 005: Software*

ISO/IEC 7498-1, *Open System Interconnect Basic Reference Model*

3 Terms and definitions and Abbreviations

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

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

— ISO Online browsing platform: available at http://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1 Terms and definitions

Use of “shall”, “should” and “may” within the standards observe the following rules:

— The word SHALL in the text expresses a mandatory requirement of the standard.

— The word SHOULD in the text expresses a recommendation or advice on implementing such a requirement of the standard. It is expected that such recommendations or advice will be followed unless good reasons are stated for not doing so.

— The word MAY in the text expresses a permissible practice or action. It does not express a requirement of the standard.

3.2 Abbreviations

APOS	Application to Operating System [interface]
ASAAC	Allied Standard Avionics Architecture Council
BER	Bit Error Rate
CFM	Common Functional Module
COTS	Commercial Off The Shelf
DMA	Direct Memory Access
Gbps	Giga bits per second
GLI	GSM Logical Interface
GSM	International Electrotechnical Commission
IEC	Generic System Manager
IMA	Integrated Modular Avionics
ISO	International Standards Organisation
ISR	Interrupt Service Routine
LCC	Life Cycle Cost
Mbps	Mega bits per second
MLI	Module Logical Interface
MOS	Module Support Layer to Operating System [interface]
MPI	Module Physical Interface
MMU	Memory Management Unit
MRM	Module Resource Manager
MSL	Module Support Layer
MSU	Module Support Unit
NIU	Network Interface Unit
NSM	Network Support Module
OLI	OS Logical Interface
OS	Operating System

OSI Open Systems Interconnect

OSL Operating System Layer

QoS Quality of Service

RTBP Run Time Blueprint

SMBP System Management to Blueprint [interface]

SMLI System Management Logical Interface

SMOS System Management to Operating System [interface]

TC Transfer Connection

TLS Three-Layer Stack

VC Virtual Channel

4 Network Definition

4.1 Overview

The communications over an EN 4460 compatible network are defined and managed by a set of ARINC or EN 4660-005 interfaces. It shall be noted that this EN 4660 network standard is independent of specific technologies and therefore the data communication network topology, protocols and technologies are not defined by this document. This specification defines parameters which are need to be specified for EN 4660 network design.

4.2 Specific Network Requirements

There are a number of specific network requirements having an impact on the network design. These are shown as architectural requirements in Table 1 and system requirements in Table 2.

Table 1 — Architecture Requirements

Title	Description
Certification	The EN 4660 network shall be certifiable in military and civil avionics environments
Open standards	No proprietary standards, processes or components shall be specified
Scalability	The network shall be scaleable for all system sizes
Network connections	The network should support a high level of inter-connectivity
Network connections	The network should support minimum interconnections between racks & sensors/effectors e.g. to minimise wing root wiring
Station separation	Inter-node distances up to 200 metres shall be supported
Time distribution	The network shall distribute time as specified as per IEEE 1588 or optinally as described in Volume 5 of ASAAC2-GUI-32450-001-CPG Issue 01.
Initialisation	The network shall initialise to a predefined state