SLOVENSKI STANDARD
SIST EN 4660-004:2019

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SIST EN 4660-004:2011

Aeronavtika - Modularne in odprte letalske elektronske arhitekture - 004. del: Pakiranje

Aerospace series - Modular and open avionics architectures - Part 004: Packaging

Luft- und Raumfahrt - Modulare und offene Avionikarchitekturen - Teil 004: Paketierung

Série aérospatiale - Architectures avioniques modulaires et ouvertes - Partie 004 : Packaging

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ICS:

49.090	Oprema in instrumenti v zračnih in vesoljskih plovilih	On-board equipment and instruments

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EUROPEAN STANDARD

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English Version

Aerospace series - Modular and open avionics architectures - Part 004: Packaging

Série aérospatiale - Architectures avioniques modulaires et ouvertes - Partie 004 : Packaging

Luft- und Raumfahrt - Modulare und offene Avionikarchitekturen - Teil 004: Paketierung

This European Standard was approved by CEN on 2 December 2018.

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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 4660-004:2019) 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of an identical text or by endorsement, at the latest by February 2020, and conflicting national standards shall be withdrawn at the latest by February 2020.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 4660-004:2011.

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.

Introduction

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 hereafter: *(in this figure the document is highlighted).*

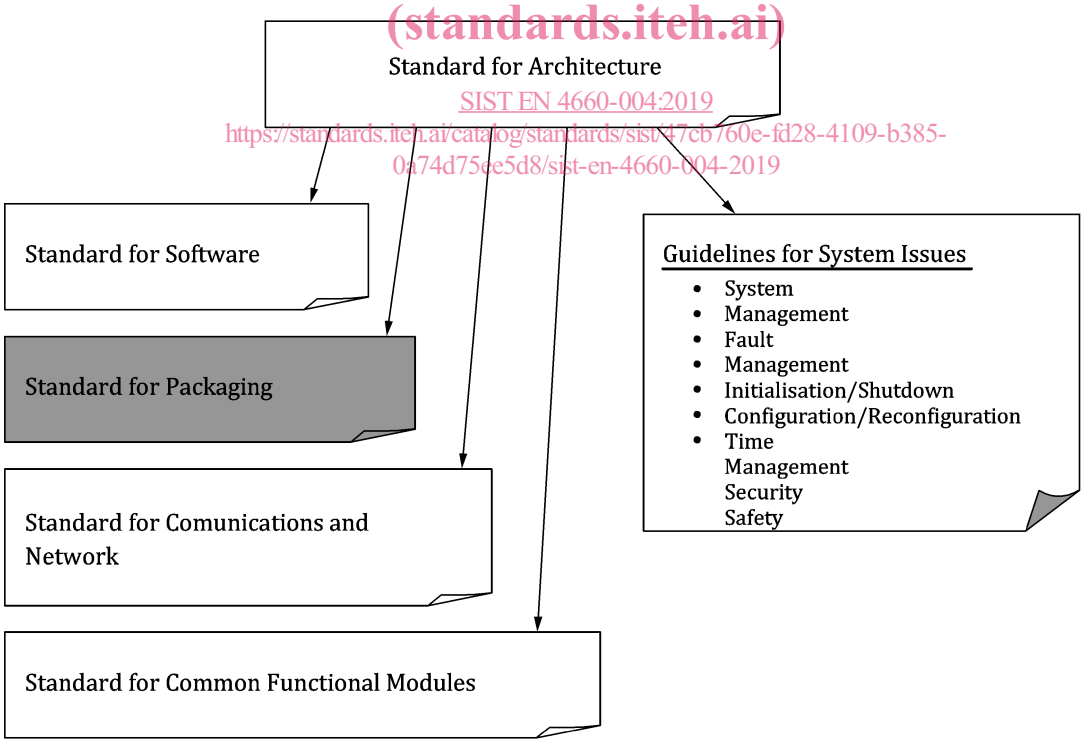

Figure 1 — MOAA Standard Documentation Hierarchy

1 Scope

This European standard establishes uniform requirements for Packaging for the Common Functional Modules (CFM) within an Integrated Modular Avionic (IMA) system. It comprises the module physical properties and the Module Physical Interface (MPI) definitions together with guidelines for IMA rack and the operational environment.

The characteristics addressed by the Packaging Standard are:

Interchangeability:

— For a given cooling method all modules conforming to the packaging standard will function correctly when inserted into any rack slot conforming to the standard for the cooling method.

— All modules conforming to the Module Physical Interface (MPI) definitions for connector, IED and cooling interface will function correctly when inserted into any rack slot conforming to the same MPI definition.

Maintainability:

— All modules are easily removable at first line.

— No special tools required at first line.

— No manual adjustment is necessary when installing modules. No tool is required for installation or removal of the modules.

— Mechanical keying is provided that prevents insertion of a module into a rack slot that may cause an unsafe condition.

The Module Physical Interface definition, contained within this standard, does not include the properties of the signalling used in the optical interface (e. g. wavelength). These are covered in EN 4660-003.

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 2101, *Aerospace series — Chromic acid anodizing of aluminium and wrought aluminium alloys*

EN 2284, *Aerospace series — Sulphuric acid anodizing of aluminium and wrought aluminium alloys*

EN 2437, *Aerospace series — Chromate conversion coatings (yellow) for aluminium and aluminium alloys*

EN 4165 (all parts), *Aerospace Series — Connectors, electrical, rectangular, modular — Operating temperature 175 °C continuous*

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 4660-003, *Aerospace series — Modular and Open Avionics Architectures — Part 003: Communications/Network*

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

ASAAC2-GUI-32450-001-CPG Issue 01, *Final Draft of Guidelines for System Issues*[1]

— *Volume 1 — System Management.*

— *Volume 2 — Fault Management.*

— *Volume 3 — Initialisation and Shutdown.*

— *Volume 4 — Configuration / Reconfiguration.*

— *Volume 5 — Time Management.*

— *Volume 6 — Security.*

— *Volume 7 — Safety.*

ARINC 600, *Air transport avionics — Equipment interfaces*[2]

ARINC 650, *Integrated Modular Avionics Packaging and Interfaces*[2]

ARINC 836, *Cabin Standard Enclosures — Modular Rack Principle (MRP)*[2]

VITA 46, *VPX: Baseline*[3]

Def Stan 03-18, *Chromate Conversion Coatings (Chromate Filming Treatments) Grades: Standard and Brushing for Aluminium and Aluminium Alloys*[4]

Def Stan 03-24, *Chromic Acid Anodizing of Aluminium and Aluminium Alloys*[4]

Def Stan 03-25, *Sulphuric Acid Anodizing of Aluminium and Aluminium Alloy*[4]

BS 5599, *Specification for hard anodic oxidation coatings on aluminium and its alloys for engineering purposes* [5]

MIL-C-26074E, *Coatings, Electroless Nickel Requirements*[6]

MIL-A-8625E, *Anodic Coatings for Aluminium and Aluminium Alloys*[6]

MIL-C-81706, *Chemical Conversion Materials for Coating Aluminium and Aluminium Alloys*[6]

MIL-C-5541, *Chemical Conversion Coatings on Aluminium and Aluminium Alloys*[6]

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1 In preparation at the date of publication of this European standard.

2 Published by: ARINC, www.aviation-ia.com/product-categories.

3 Published by: VMEbus International Trade Association (VITA), www.vita.com/Standards.

4 Published by: UK Ministry of Defence, www.dstan.mod.uk.

5 Published by: British Standards Institution (BSI), www.bsigroup.com.

6 Published by: DoD National (US) Mil. Department of Defense http://www.defenselink.mil/.

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 General

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

— The word SHALL in the text express 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

AFA	Air Flow Around
AFT	Air Flow Through
ARINC	Aeronautical Radio Inc
ASAAC	Allied Standard Avionics Architecture Council
CC	Conduction Cooled
CFM	Common Functional Module
DAF	Direct Air Flow
EMC	ElectroMagnetic Compatibility
IED	Insertion Extraction Device
IMA	Integrated Modular Avionics
MBU	Multiple Bit Upset
MPI	Module Physical Interface
MT	Mechanical Transfer
NBC	Nuclear, Biological and Chemical
PSD	Power Spectral Density
SEU	Single Event Upset

3.3 Precedence

Figures in this document have precedence over text.

3.4 Terms and definitions

3.4.1 General terms

3.4.1.1
backplane
structure containing optical and electrical communication paths and electrical power supply wiring between modules which shall be a removable structure or integrated into the rack

3.4.1.2
cassette
mechanical frame enclosing the electrical components of the module

3.4.1.3
connector
device to provide all of the electrical and optical connections between the cassette and the backplane

Note 1 to entry: The connector fixed to the module cassette plugs into the corresponding connector of the backplane.

Note 2 to entry: It comprises a shell, inserts contacts and ferrules.

3.4.1.4
contact
single signal connection, either an electrical pin/socket or a single fibre

Note 1 to entry: In the case of fibre optic contacts this does not necessarily imply the mating parts are in mechanical contact.

3.4.1.5
cooling Interface
surface which contributes to the removal of heat from the module

3.4.1.6
ferrule
housing and alignment device for one or more optical fibres

3.4.1.7
insert
section of a connector containing a number of ferrules or contacts

3.4.1.8
Insertion Extraction Device (IED)
device to aid the insertion and extraction of the module from the rack and give mechanical advantage over the mating forces associated with the connector

Note 1 to entry: It also provides the retention system for the module within the rack such that the module connector remains mated under all conditions specified.

3.4.1.9
module
grouping of electronic devices, assembled together to perform a specific function, into a flight-line protected hardware assembly

Note 1 to entry: This is the Common Functional Module.

Note 2 to entry: The CFM is replaceable at first line.

3.4.1.10
rack
mechanical arrangement for housing avionics equipment

Note 1 to entry: This provides physical support, environmental protection and cooling for the modules.

3.4.1.11
shell
outer mating parts of the connector that provide the structure of the connector, fixings to the module and backplane parts and the support for the Inserts

3.4.2 Module mechanical items

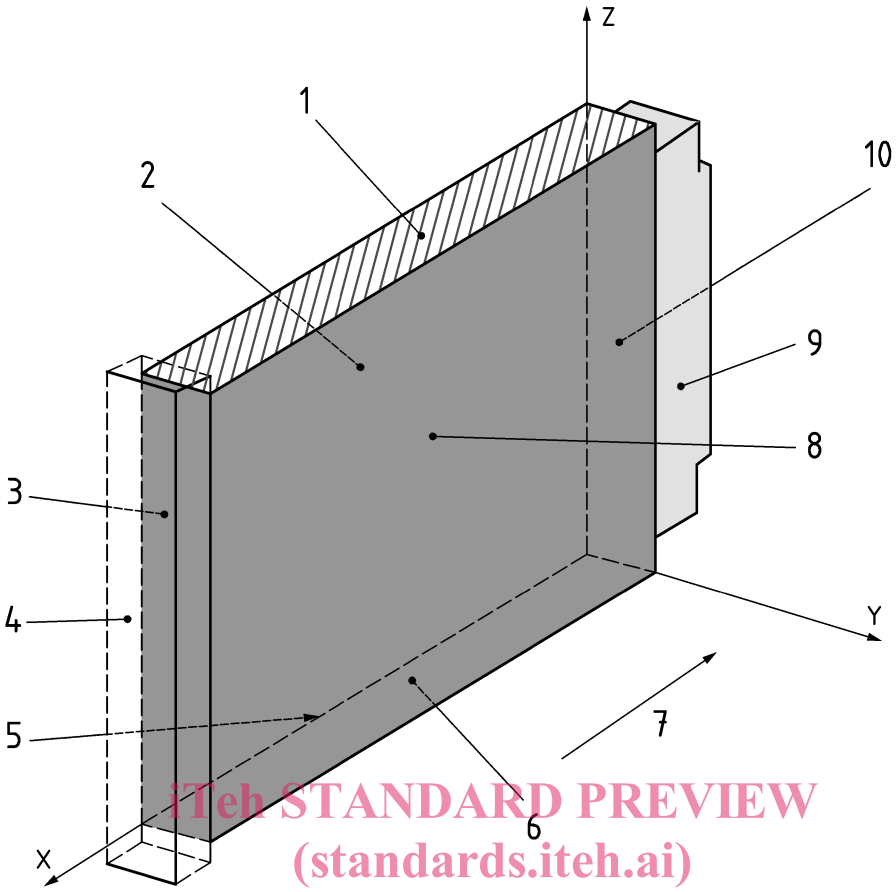
A Common Functional Module comprises:

— a cassette;

— a connector;

— an insertion extraction device.

The volume of the cassette is delimited by a cuboid. The module is referenced against a Cartesian Reference System as represented on Figure 2.



Key

1	Side C	6	Side D
2	Side A	7	Insertion Direction
3	Module Header	8	Side B
4	Volume for Insertion/Extraction Device	9	Connector
5	Guide Edge	10	Reference Plane

Figure 2 — Module definitions

Guide Edge Edge of the CFM running along the X axis. It defines the location of the module within the rack.

Height The cassette dimension in the Z-axis. It is measured from cassette Side C to cassette Side D.

Length The cassette dimension in the X-axis measured from the Reference Plane to the module header (this excludes the Insertion Extraction Device and the connector).

Module header The surface of the cassette parallel to the Reference Plane, and opposite to the cassette surface contained within the Reference Plane The IED shall be mounted on this surface.