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ILNAS-EN 16602-60-13:2023

Space product assurance - Commercial electrical, electronic and electromechanical (EEE) components

Assurance produit des projets spatiaux - Composants électriques, électroniques et électromécaniques (EEE) commerciaux

Raumfahrtproduktsicherung - Kommerzielle, elektrische, elektronische und elektromechanische (EEE) Bauteile

06/2023

National Foreword

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Space product assurance - Commercial electrical, electronic and electromechanical (EEE) components

Assurance produit des projets spatiaux - Composants électriques, électroniques et électromécaniques (EEE) commerciaux

Raumfahrtproduktsicherung - Kommerzielle Elektrische, elektronische und elektromechanische (EEE) Bauteile

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European Foreword

This document (EN 16602-60-13:2023) has been prepared by Technical Committee CEN-CENELEC/TC 5 "Space", the secretariat of which is held by DIN.

This standard (EN 16602-60-13:2023) originates from ECSS-Q-ST-60-13C Rev.1.

This document will supersede EN 16602-60-13:2015.

The main changes with respect to EN 16602-60-13:2015 are listed below:

- Implementation of Change Requests
- Definition of "traceability information (trace code)" updated"
- Alignment with updated version of ECSS-Q-ST-60

This document has been prepared under a standardization request given to CEN by the European Commission and the European Free Trade Association.

This document has been developed to cover specifically space systems and has therefore precedence over any EN covering the same scope but with a wider domain of applicability (e.g. : aerospace).

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Introduction

This standard is based on and complementary to ECSS-Q-ST-60C. It defines the applicability and tailoring of the requirements of ECSS-Q-ST-60C for COTS EEE. This standard can only be used in conjunction with ECSS-Q-ST-60C in its current revision. This standard applies only to commercial components - as defined in its scope - which meet defined technical parameters that are on the system application level demonstrated to be unachievable with existing space components or only achievable with qualitative and quantitative penalties. The standard requires that qualitative and quantitative penalties are specified, as applicable, as a minimum in terms of quantifiable parameters such as: functional capability, parts count, power dissipation, frequency of operation, data/signal processing efficiency, interconnect complexity, mass, volume, …

For traceability to ECSS-Q-ST-60, the modifications or additions are marked in blue. Text in black colour is unmodified text.

For easy tailoring and implementation of the requirements into a Requirement Management Tool, and for direct traceability to ECSS-Q-ST-60, requirements in this standards have been written in the way of a ECSS Applicability Requirement Matrix (EARM), as defined in Annex A of ECSS-S-ST-00 "ECSS system – Description, implementation and general requirements".

In line with ECSS-Q-ST-60, this standard differentiates between three classes of components through three different sets of standardization requirements (clauses) to be met.

The three classes provide for three levels of trade-off between assurance and risk. The highest assurance and lowest risk is provided by class 1 and the lowest assurance and highest risk by class 3. Procurement costs are typically highest for class 1 and lowest for class 3. Mitigation and other engineering measures can decrease the total cost of ownership differences between the three classes. The project objectives, definition and constraints determine which class or classes of components are appropriate to be utilised within the system and subsystems.

a. Class 1 components are described in Clause 4

b. Class 2 components are described in Clause 5

c. Class 3 components are described in Clause 6

The objective of the EEE component selection, control, procurement and use requirements is to ensure that EEE components used in a space project enables the project to meet its mission requirements.

Important elements of EEE component requirements include:

a. component programme management,

b. component selection, evaluation and approval,

c. procurement,

d. handling and storage,

e. component quality assurance,

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f. specific components, and

g. documentation.

The main tools which can be used to reach the objective are:

a. concurrent engineering,

b. standardization of component types,

c. characterization of components,

d. assessment of component manufacturers including declared competencies and processes,

e. testing, screening, lot acceptance and periodic testing,

f. procurement specifications,

g. control and inspection,

h. control of nonconforming materials,

i. assessment and use of existing component data,

j. application of specific control to mitigate risk for components with limited data or confidence, and

k. information management.

The basic approach is as follows:

- The customer of a given space project defines the EEE component requirements within the boundaries of this standard. They appear in the appropriate clauses of the project requirements as defined in ECSS-M-ST-10.
- The supplier defines a component control plan to implement those requirements into a system which enables, for instance, to control the selection, approval, procurement, handling in a schedule compatible with his requirements, and in a cost-efficient way.
- The supplier ensures that the applicable parts requirements are passed down to lower level suppliers and ensure that they are compliant to these parts requirements.

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