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Space engineering - Verification

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 04/19

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Supersedes EN 14725:2003

English version

Space engineering - Verification

Ingénierie spatiale - Vérification

Raumfahrttechnik - Verifikation

This European Standard was approved by CEN on 28 September 2018.

CEN and CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN and CENELEC member.

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 and CENELEC 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 Foreword

This document (EN 16603-10-02:2018) has been prepared by Technical Committee CEN/CLC/TC 5 “Space”, the secretariat of which is held by DIN (Germany).

This document (EN 16603-10-02:2018) originates from ECSS-E-ST-10-02C Rev.1.

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of an identical text or by endorsement, at the latest by May 2019, and conflicting national standards shall be withdrawn at the latest by May 2019.

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

This document supersedes EN 14725:2003.

The main differences between EN 14725:2003 (that was based on ECSS-E-10-02A) and this standard are:

- Restructuring of the document following, in particular: moving of the guidelines in the associated Handbook, inclusion of an introductive clause on the Verification principles, structuring of the requirement clauses in line with the verification process flow as summarized in the principles.
- Clarification on standard applicability to different types of products (e.g. launcher, transportation system, ground segment, GSE).
- Clarification of the verification vs. validation coverage.
- Moving of detailed test requirements to EN 16603-1003 (based on ECSS-E-ST-10-03C) “Testing” including AIT Plan, Test Specification and Test Procedure DRDs.
- Introduction of risk assessment and mitigation plan concerning those requirements not verified by test.
- Clarification on the applicability of verification by similarity as analysis method in relationship to different types of products (requirement 5.2.2.3c)
- Clarification on product categories vs. heritage and relevant qualification requirements (clause 5.2.4.2)
- Clarification on in-orbit stage verification activities, in particular the relationship with the commissioning (clause 5.2.4.5)
- Inclusion of a requirement concerning the verification database delivery in electronic form (requirement 5.4.1c)
- Introduction of “status of compliance” in the VCD data (VCD DRD)

- Simplification of DRD's number and content

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).

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

1 Scope

This Standard establishes the requirements for the verification of a space system product.

It defines the fundamental concepts of the verification process, the criteria for defining the verification strategy and specifies the requirements for the implementation of the verification programme. It includes also the list of the expected documentation (i.e. Document requirements definitions, DRDs).

This Standard is intended to apply to different products at different levels from a single equipment to the overall system.

Discipline related verification aspects are complemented in Standards specific to those disciplines.

For verification process for SW the following standards are considered fully sufficient for development of these items:

- ECSS-E-ST-40 Space engineering – Software
- ECSS-Q-ST-80 Space product assurance - Software product assurance

Detailed requirements for Testing are covered in the ECSS E-ST-10-03.

This standard does not specifically address Validation of space products as a separate process, since product Verification is performed against requirements that also address the suitability of the product to fulfil the needs of its intended use. As such, Validation is achieved through the Verification process provided adequate requirements are placed on the product.

It is recognised that testing and analysis also occur during the product development process, but they are not addressed by this standard as they are not formal requirement verification activities in the sense of the customer-supplier relationship.

The guidelines on verification are provided in the associated handbook ECSS-E-HB-10-02A.

The requirements on the systems engineering process are gathered in ECSS-E-ST-10 “System Engineering”; specific aspects of the SE process are further elaborated in dedicated standards, in particular: ECSS-E-ST-10-06 “Technical Specification”, ECSS-E-ST-10-02 “Verification” (the present standard), and ECSS-E-ST-10-03 “Testing”. These standards are based on the same principles, process and documentation model.

The applicability of each these standards can therefore not be considered in isolation from the others

This standard may be tailored for the specific characteristic and constraints of a space project in conformance with ECSS-S-ST-00.

2
Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this ECSS Standard. For dated references, subsequent amendments to, or revision of any of these publications do not apply. However, parties to agreements based on this ECSS Standard are encouraged to investigate the possibility of applying the more recent editions of the normative documents indicated below. For undated references, the latest edition of the publication referred to applies.

EN reference	Reference in text	Title
EN 16601-00-01	ECSS-S-ST-00-01	ECSS system — Glossary of terms.
EN 16603-10	ECSS-E-ST-10	Space engineering – System engineering general requirements
EN 16603-10-03	ECSS-E-ST-10-03	Space engineering — Testing
EN 16601-10	ECSS-M-ST-10	Space project management — Project planning and implementation
EN 16602-10-09	ECSS-Q-ST-10-09	Space product assurance — Nonconformance control system
EN 16602-20	ECSS-Q-ST-20	Space product assurance — Quality assurance.