SLOVENSKI STANDARD
SIST EN 9300-003:2014

01-april-2014

Aeronavtika - LOTAR - Trajno arhiviranje in zagotavljanje digitalne tehnične dokumentacije, kot so 3D, CAD in podatki PDM - 003. del: Osnove in pojmi

Aerospace series - LOTAR - Long term archiving and retrieval of digital technical product documentation such as 3D, CAD and PDM data - Part 003: Fundamentals and concepts

Luft- und Raumfahrt - Langzeitarchivierung und Bereitstellung digitaler technischer Produktdokumentationen beispielsweise 3D CAD und PDM Daten - Teil 003: Grundlagen und Konzepte

Série aérospatiale - LOTAR - Archivage long terme et récupération des données techniques produits numériques, telles que CAD D et PMD - Partie 003: Fondamentaux et concepts

Ta slovenski standard je istoveten z: **EN 9300-003:2012**

ICS:

01.110	Tehnična dokumentacija za izdelke	Technical product documentation
35.240.30	Uporabniške rešitve IT v informatiki, dokumentiranju in založništvu	IT applications in information, documentation and publishing
49.020	Letala in vesoljska vozila na splošno	Aircraft and space vehicles in general

SIST EN 9300-003:2014 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 9300-003

September 2012

ICS 01.110; 35.240.30; 49.020

English Version

Aerospace series - LOTAR - Long term archiving and retrieval of digital technical product documentation such as 3D, CAD and PDM data - Part 003: Fundamentals and concepts

Série aérospatiale - LOTAR - Archivage long terme et récupération des données techniques produits numériques, telles que CAD D et PMD - Partie 003: Fondamentaux et concepts

Luft- und Raumfahrt - LOTAR - Langzeit-Archivierung und - Bereitstellung digitaler technischer Produktdokumentationen, wie zum Beispiel von 3D-, CAD- und PDM-Daten - Teil 003: Grundlagen und Konzepte

This European Standard was approved by CEN on 10 March 2011.

CEN 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 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 member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

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

Management Centre: Avenue Marnix 17, B-1000 Brussels

Ref. No. EN 9300-003:2012: E

Contents

Page

Foreword

This document (EN 9300-003:2012) 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 March 2013, and conflicting national standards shall be withdrawn at the latest by March 2013.

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 standard was prepared jointly by ASD-STAN and the PROSTEP iViP Association.

The PROSTEP iViP Association is an international non-profit association in Europe. For establishing leadership in IT-based engineering it offers a moderated platform to its nearly 200 members from leading industries, system vendors and research institutions. Its product and process data standardization activities at European and worldwide levels are well known and accepted. The PROSTEP iViP Association sees this standard and the related parts as a milestone of product data technology.

Users should note that all standards undergo revision from time to time and that any reference made herein to any other standard implies its latest edition, unless otherwise stated.

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, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This European Standard defines basic terms, e.g. *Long Term Archiving* and *Retention* and identifies the context and scope of EN 9300. The section *Fundamentals* describes the basic concepts and approaches of EN 9300 and referenced related standards.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 9103, *Aerospace series — Quality management systems — Variation management of key characteristics*

EN 9300-007*, *Aerospace series — LOTAR — Long Term Archiving and Retrieval of digital technical product documentation such as 3D, CAD and PDM data — Part 007: Terms and references* 1)

ISO 10303-203:1994 and Edition 2 draft, *Industrial automation systems and integration — Product data representation and exchange — Part 203: Application protocol: Configuration controlled 3D designs of mechanical parts and assemblies*

ISO 10303-209:2001, *Industrial automation systems and integration — Product data representation and exchange — Part 209: Application protocol: Composite and metallic structural analysis and related design*

ISO 10303-210:2001, *Industrial automation systems and integration — Product data representation and exchange — Part 210: Application protocol: Electronic assembly, interconnection, and packaging design*

ISO 10303-212:2001, *Industrial automation systems and integration — Product data representation and exchange — Part 212: Application protocol: Electrotechnical design and installation*

ISO 10303-214:2001 and ISO 10303-214:2003, *Industrial automation systems and integration — Product data representation and exchange — Part 214: Application protocol: Core data for automotive mechanical design processes*

ISO/DIS 10303-233, *Industrial automation systems and integration — Product data representation and exchange — Part 233: Systems engineering data representation*1)

ISO 10303-237, Industrial automation systems and integration — Product data representation and exchange — *Part 237, Application protocol: Fluid dynamics*1)

ISO 14721, *Space data and information transfer systems — Open archival information system — Reference model*

ARP9034, *A Process Standard for the Storage, Retrieval and Use of Three-Dimensional Type Design Data*

BP 0008, *Code of Practice for Legal Admissibility and Evidential Weight of Information Stored electronically*

---

* And all parts quoted in this standard.

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

3 Terms, definitions and abbreviations

For the purposes of this document, the terms, definitions and abbreviations given in EN 9300-007 apply.

4 Major differences of terms

4.1 Introduction

4.1.1 General

Different user communities have different definitions for *long term archiving* and *retention*. This clause explains the major differences of both terms and their relation to the scope of EN 9300.

Companies within the aerospace industry need to keep data to fulfil business, certification and legal requirements. For modern definitions this data is usually digital. These requirements lead to four main areas of consideration regarding the retention of digital data.

— Invariance: how important is it to ensure that digital data is not altered

— Objectives: why keeping of digital data is required

— Length of time: the required length of time for retaining digital data

— Stored Form: the stored format of the digital data

The following subchapters consider these questions for long term archiving and retention and are the basis for the scope definition of EN 9300. The scope of EN 9300 is a combination of aspects from long term archiving and retention.

4.1.2 Invariance

Invariance covers the need to ensure that the information has not changed and so provide evidential weight that the design intent has not changed, see Figure 13. Three categories can be distinguished:

— *Auditable* – where validation methods and test suites ensure that information cannot be changed without the change being detected.

— *Implicit* – where the system is designed to prevent changes. The system must supervise activities which would result in changes of the digital data. The supervision, for example, could be realized within a separate write-protected vault. The proof of "no change" is shown by an absence of change having been recorded AND that by showing that the system itself is reliable.

— *Not required* – where changes to data are not explicitly controlled.

Of the three, auditable invariance is the strongest, and is likely to be the most suitable where the information is used in legal proceedings.

4.1.3 Objectives for keeping digital data

For digital data, the challenge is that the data are often stored in a proprietary, native format and will most likely become not interpretable after a time. The use of a neutral archiving data format safeguards the interpretability of the stored data for a much longer time, perhaps for the entire retention period. EN 9300 recommends the use of standard formats for long term archiving rather than native formats, accompanied by regular and frequent migrations of storage media and, if necessary, of data format. Because a data migration may lead to data loss, usually time stamps and digital signatures (which are used ensuring the integrity and immutability of archived data/ data packages) have to be renewed. The use of auditable archiving and retrieval processes ensures the data readability and integrity within current and future systems.

The objectives for keeping the data are distinguished into two major subcategories:

— Legal requirements/certification requirements, such as for proof of technical documentation for actions in law.

— Business requirements, such as keeping knowledge.

Within the two subcategories EN 9300-003 offers four characteristics which describe the objectives in more detail:

— To *preserve* the *original* data (generated by a source system) so that it can be used as evidence of what data was at a particular date. This characteristic fits with the subcategory 'legal requirement'

— To *keep data available* to new users over the period for which it is kept. This characteristic fits with the subcategories 'legal requirement' and 'business requirement'.

— To be able to *preserve* the *source* of the kept data. This characteristic fits with the subcategory 'business requirement'.

— To be able to *reuse* the data, for example, by modifying design data to meet new requirements. This characteristic fits with the subcategory 'business requirement'.

4.1.4 Length of time of keeping data

The life cycle of software and hardware is relatively short compared to the life cycle of aircraft. The life cycle of digital data can be described in terms of software versions and generations. The release of a new software version within a generation general alters only a small part of the functionalities of the software without affecting the data format. A generation change occurs when the software used changes substantially, for example, to a new architecture. The change of a generation may result in new data formats.

Currently, for CAD software, the period between versions is of the order of 6 months to 12 months, while between generations is of the order of 3 years to10 years. This should be compared to an aircraft life cycle which may be 30 years to 50 years or longer. This gives rise to the following definitions within EN 9300:

— *Short term* - within one or two versions

— *Medium term* - within one generation

— *Long term* - over multiple generations

Additionally to the technical aspects, legal requirements have to be considered when defining archiving terms. For further information see EN 9300-001 (Structure) and EN 9300-002 (Requirements).

4.1.5 Stored Form

4.1.5.1 General

A key distinction is between a *representation* and a *presentation.* In a representation, the computer holds the information about the concept, whereas in a presentation the computer holds a form which is its appearance to a human. For example, a musical score is a representation of a piece of music, whereas a recording of the piece is a presentation.

The stored form has been divided into three main subcategories:

— Detail Level: the description level of model;

— Representation: describing the different logical forms of data representation;

— Format: describing the different physical formats of the data.

4.1.5.2 Detail level

— An *accurate* representation is where data elements are described in the original level of detail, independent of whether they are represented in a native or other format;

— An *approximate representation* is where data elements are described in a lower level of detail than the accurate representation, e.g. where a curved surface is approximated by a set of small, flat faces.

4.1.5.3 Representation

— A *native representation* is that created by and private to the source system;

— A *derived representation* is a transformation of the native data, which may be based on a *native format* or on a *standardized format,* e.g. a html version may be derived from a text document as an alternative representation;

— A *presentation* is a visualization of data to a user, e.g. a drawing or a print out of product structure information as a snapshot of the current data representation.

4.1.5.4 Format

— A *native format* is a specific format of data in a syntax which is proprietary and dependent on a specific system or interface. A native format depends directly on the life cycle (versions, generations) of the related system or interface;

— A *standardized open format* is a format of data in a syntax, which is defined by a broad community, such as by ISO, and which is independent of specific system or interface. “Open” means completely and precisely documented in syntax and semantics and is applicable for free. In addition, standardisation processes regulates the change processes for the standard.

Note that the motivation for including the accurate and approximate representation is that both may be archived in parallel in a standard representation such as STEP, which is openly documented and which may be stable for a much longer period than native formats.

4.2 Terminology

4.2.1 General

From descriptions in 4.1, the following definitions of terms are derived: *Product information model*, *Product model*, *Business Application*, *Retention* and *Long Term Archiving*. These definitions are used within EN 9300.

4.2.2 Product information model

The Product information model represents an information model which provides an abstract description of facts, concepts and instructions about a product, e.g. STEP [2)] Application reference model or STEP Application interpreted model.

2) ISO 10303-1:1994

4.2.3 Product model

The Product model represents an occurrence of a product information model for a particular product, e.g. the geometric model of part a123. Companies will create product models of different types, depending on the life cycle stages or disciplines, e.g. there are product models of type "space allocation mock up". Product models are independent from their presentation.

As a further determination EN 9300 distinguishes:

— A dynamic or temporary Product Model (in internal memory of the computer),

— The static Product Model (e.g. represented as a file or as a data base on permanent storage media, such as disks or tapes);

Product Models can be consulted and queried via applications only via the loading of the static form of the Product Model into the dynamic form in memory of the same Product Model.

Additionally there are different usages of a Product Model, optimized for different functions/users intents.

EN 9300 distinguishes:

— the Working Form Product Model, used for creation & modification by the native application; it corresponds generally to the design stage of the Product Model; this Working Form is often in the native format of the **COTS** (Component off the shelf) application.

— the Original Product Model, used specially to keep the design intent for Long Term Archiving in the context of certification & legal requirements for proof. It can be stored in a native or standardized format.

Based on these definitions, EN 9300 recommends the archiving for long term of the **original & accurate Product Models in a static standardized open format like STEP**. These Product Models, after retrieval, will be loaded in applications as temporary dynamic form, enabling the check of validation properties and specified operations (consultation, …).

In the scope of EN 9300, an application is a piece of software, which allows processing the Product Model according to a dedicated purpose. This purpose can be:

— the visualisation with possible 3D measurement,

— a type of simulation (FEA, aerodynamics, …),

— NC programming for Manufacturing,

— …

4.2.4 Business Application

Typically, a Business Application is the software X generating native Product Models for creation and modifications that will have to be converted in a standardized Product Model for Long Term Archiving. Examples of Business Applications relevant for CAD Product Models are: Unigraphics, Catia V5, CADDS5, Pro/Engineer, … Other examples of Business Applications relevant for PDM Product Models are: VPM, Metaphase, Enovia, Windchill, …

The starting point of the Long Term Archiving activity for a special type of Product Model is the description of Use Cases that the Retrieved Product Model will have to support. Some Use Cases for Long Term Archiving of 3D Definition models will result in visualisation of information. Other Use Cases for Long Term Archiving of Finite Element Analysis models may result in replaying the simulation, in order to demonstrate that the sub assembly support the associated load cases.

See the next Figure 1 illustrating the types of functions of Business applications for Product Model processing.

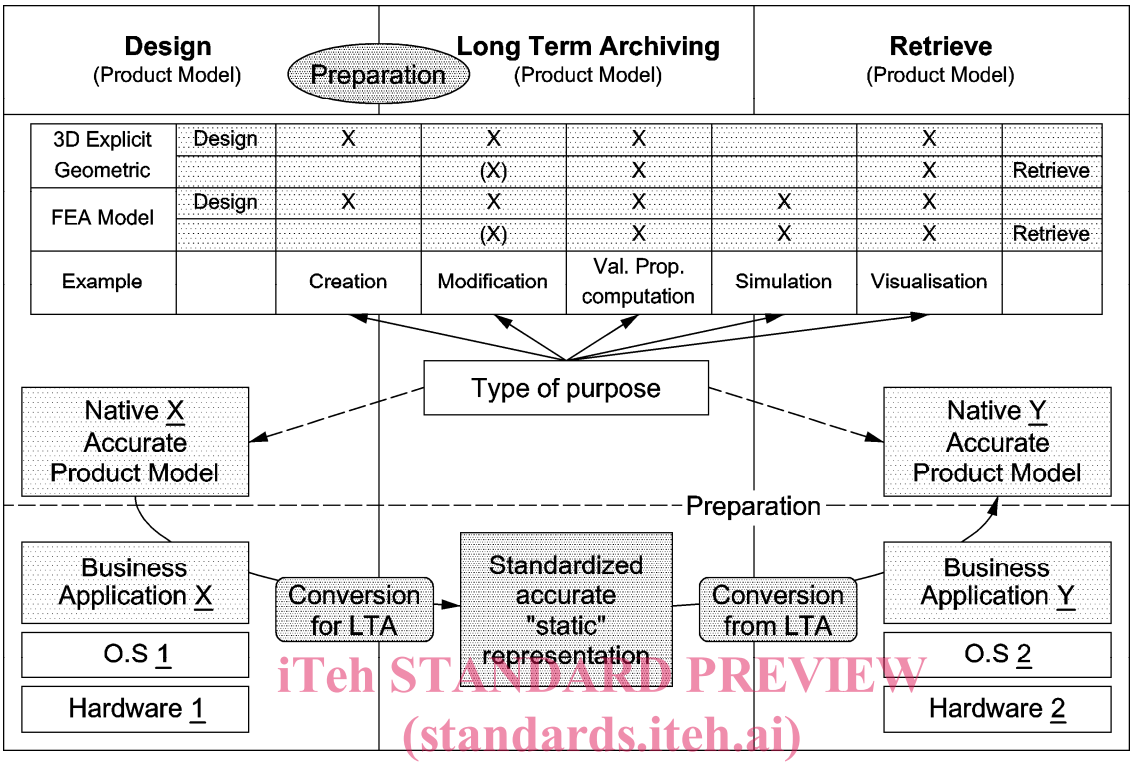

Figure 1 — Example for retrieve use case for specification of long term retention

4.2.5 Retention

“Retention”: Storage of data for reuse of a later date:

— aiming for data re-use and to keep data available;

— retaining any of the representations needed, but not the presentations;

— working over medium and short term;

— expecting invariance, though this is not mandatory;

— migration of the data format is allowed to guaranty data quality and interpretability.

4.2.6 Long Term Archiving

“Long Term Archiving”: Storage of a copy of data in an appropriate way for record, certification and legal purposes.

— The data will be preserved and kept available for a use within the archive and possibly for further re-use.

— With certified conversion processes, the native data representation generated by the source system can be converted into a representation which is appropriate for long term archiving. To fulfil legal and certification requirements, the stored form can be an accurate or approximate representation of the source.