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Aerospace series — LOTAR Long Term Archiving and Retrieval of digital technical product documentation such as 3D, CAD and PDM data

Part 012: Reference process description ''Ingest''

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National foreword

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Foreword

This document (EN 9300-012:2013) 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.

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Introduction

This European 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 European Standard and the related parts as a milestone of product data technology.

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

1 Scope

This European Standard provides a detailed description for the recommended process of transferring data to the archive as overviewed in EN 9300-010. This transfer includes the conversion of the Content Information into the archiving format STEP and the generation of the Archive Information Package. Furthermore, the main focus for the process description is on the validation and verification of the converted Content Information.

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 9300-003, *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*

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)]

EN 9300-010, *Aerospace series — LOTAR — Long Term Archiving and Retrieval of digital technical product documentation such as 3D, CAD and PDM data — Part 010: Overview Data Flow* [1)]

ISO 14721:2003, *Space data and information transfer systems — Open archival information system — Reference model [OAIS]*

3 Terms, definitions and abbreviations

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

4 Applicability

EN 9300-012 is applicable to new 3-D product data records and may be applicable to existing 3D product data records, on current and earlier products, produced using previous regulations, standards and procedures. The current version is focused on product data as defined in the domain specific parts.

1) Published as ASD-STAN Prestandard at the date of publication of this standard (www.asd-stan.org).

5 Ingest

See Figure 1.

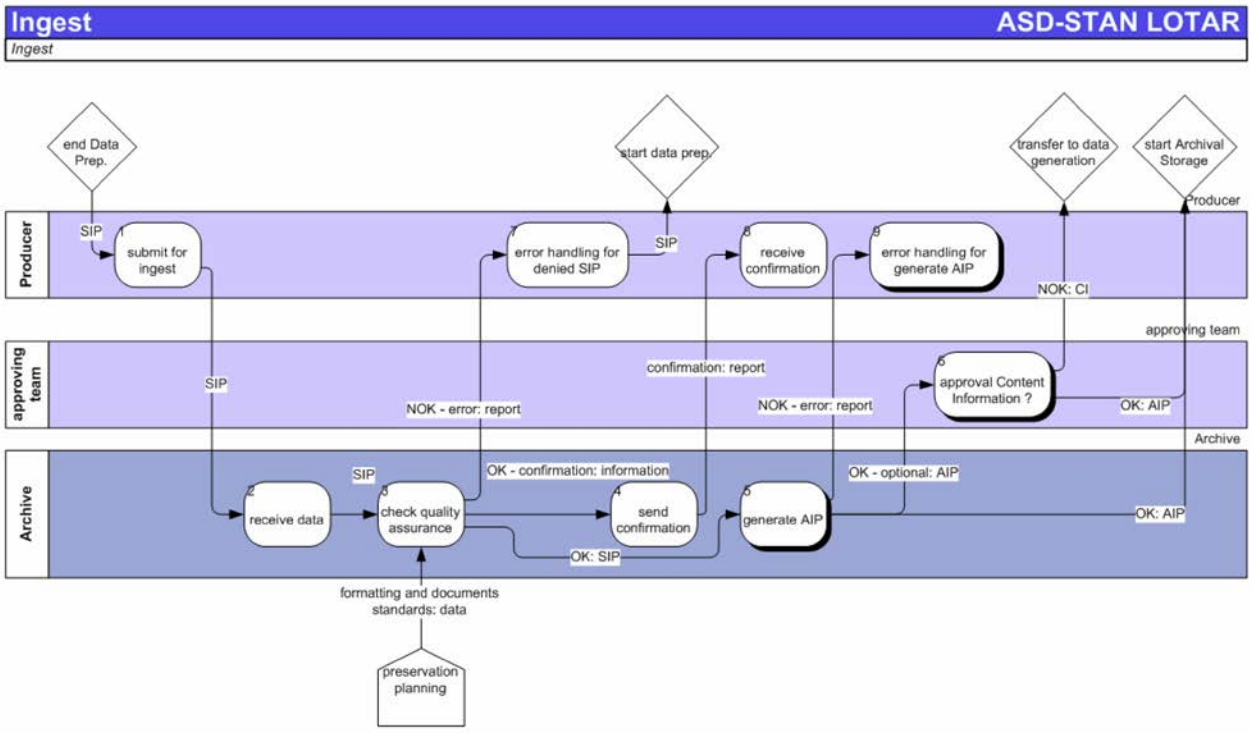

Figure 1 — Overview of Ingest process

During the Ingest process, the data producer submits the Submission Information Package (SIP) from the working environment into the archiving environment. The archive receives the data packages and checks if the SIP contains data of the recommended format and generates the Archiving Information Package (AIP) afterwards. After submitting the SIP to the archive, the source data receives the status read only.

Input data:

— SIP.

Output data:

— AIP;

— Content Information (CI);

— SIP.

6 Detailed process steps description

6.1 General

Input and output data described in this standard represent the minimal requirements for the fulfilment of the process steps. Additional data may be added, but shall match at a minimum the requirements for the information package (see EN 9300-003, Section 5.3.2.1 “Definition of the core model”).

6.2 Submit for Ingest

The producer initiates the submission of the SIP from his personal working environment to the archive. With the initiation of the submission the producer applies the approval for that SIP. A further change of the content data should not be possible otherwise the changed data shall be archived by a new approval and data preparation process.

Input data:

— SIP.

Output data:

— SIP.

6.3 Receive data

The archive receives the SIP for archiving from the producing system through data transfer. The SIP shall be kept within the archives working environment for further processing during the ingest process.

Input data:

— SIP.

Output data:

— SIP.

6.4 Check quality assurance

A function within the Archive environment checks the quality of the ingested data. This includes the successful transfer of the SIP to the staging area. For digital submissions, these mechanisms may include Cyclic Redundancy Checks (CRCs), or checksums associated with each data file, or the use of system log files to record and identify any file transfer, or checking for media read/write errors. In addition to OAIS recommendations, the function checks the types of data formats used and the existence of PDI within the received SIP. The exchanged data and its representations shall be stipulated in the ingest agreement between the archive and the producer. Stipulations may cover aspects such as CAD data formats and Model files or PDM data formats such as STEP. The agreement shall include, at a minimum, the specification of:

— the key characteristics of the product information to preserve;

— the Descriptive Information of the SIP;

— the acceptance criteria used for the verification;

— the validation properties of the source information to archive;

— the related KPI’s.

Each agreement will be archived itself, as part of the context information of the new category of product information to archive.

Input data:

— SIP;

— Data formatting and document standards.

Output data:

— If the quality assurance check is successful:
  — SIP;
  — Confirmation Information.
— Otherwise:
  — Error report.

6.5 Send confirmation

The archive creates a report of the successful receiving of the SIP into the archives working environment.

Input data:

— Confirmation Information.

Output data:

— Confirmation report.

6.6 Generate AIP

The archive performs the generation of an Archival Information Package (AIP) automatically. This includes the conversion of the Content Information (with validation) from the submitted native format into the archiving format, the validation of the converted data, and the generation of any additional Preservation Descriptive information (PDI) and Descriptive Information (the meta data for the Content Information).

“Generate AIP” shall ensure that the design intent of the source file of the producer is preserved conforming to the domain specific parts. It is based on the verification and on the validation of the key characteristics of the product data.

Input data:

— SIP.

Output data:

— If generation is successful:
  — AIP.
— If generation fails:
  — Error report. The failure of the generation of the AIP is related to the conversion of the representation of the Content Information to its final format and its validation.

6.7 Approval Content Information

This process step is recommended, but not mandatory, and is applicable only to new data. This step synchronises with the producer's engineering approval process (not shown), such that the final engineering approval is only given if the information passes the archiving criteria, and conversely, the archive only proceeds if the engineering approval is given.

NOTE In effect, this step means that, if the data is not fit to archive, it is not fit to be approved for use. Since many of the archive checks should be performed automatically, putting archivability as a quality gate before engineering approval means that the cost of an additional (expensive) engineering approval is avoided if the data needs rework in order to be archived.

Input data:

— AIP.

Output data:

— AIP;

— CI.

6.8 Error handling for denied SIP

The producer should perform an error check in the case that the data is rejected by the archive. Furthermore, the Producer should restart the Data Preparation, which includes the changing of the data, in order to make it fit to archive.

Input data:

— Error report.

Output data:

— SIP (identifying the data).

6.9 Receive Confirmation

The producer receives the archive's confirmation report.

Input data:

— Confirmation report.

6.10 Error handling for generate AIP

Within this process the Producer and/or the Administrator has to perform an error handling procedure. This includes the decision whether data is still usable or has to be generated again. The administrator will be informed.

Input data:

— Error report.

7 Support Process Steps: Preservation Planning

The process provides services and functions for monitoring the environment of the archive and recommendations to ensure that the information stored in the archive remains accessible to the consumer over the long term, even if the original computing environment becomes obsolete. Preservation Planning functions include developing recommendations for archive standards and policies and monitoring changes in the technology environment, archiving format and the addressed consumer.

Output data:

— Data formatting and document standards.

8 Data descriptions

8.1 General

The descriptions here are informative; the definitions are found in EN 9300-007.

8.2 Involved roles

8.2.1 Archive

The Archive is the archiving environment, which usually supports at least the key functions of an archiving architecture according to ISO 14721:2003 (OAIS). Key functions are administration, data management, archival storage, access control and preservation planning.

8.2.2 Producer

The producer is an organisation, person, or client system, which provides the information to be preserved. This can include other archives or internal archive personnel or system components. Typical roles of type "producer" may be. System Designers, Design Engineers, Subcontractors, Manufactures or Test Engineers.

8.2.3 Approving team

Represents the approving organisations of a company. The approving team approves the AIP before the AIP is stored within the Archive.

8.3 Involved data

8.3.1 Archival Information Package (AIP)

The AIP consists of the following elements:

— Content Information (CI) (archiving formatted and optionally native formatted);

— Packaging Information (PI);

— Preservation Description Information (PDI) (Validation Properties, context information for the Content Information);

— Digital Signature Information.

The Content Information is the set of information that the producer is required to retain and has all the qualities needed for permanent storage. Packaging information is the information that is used to bind and identify the components of an Information Package. Preservation Description Information is the information which is necessary for adequate preservation of the Content Information and which can be categorised as Provenance, Reference, Fixity, and Context information. Digital Signature Information is the information about authenticity (identify the signature-key-owner), data integrity and time stamp.

8.3.2 Submission Information Package (SIP)

The SIP consists of following main information objects:

— CI (native formatted data);

— PDI (Validation Properties, context information regarding the CI);

— PI.

8.3.3 Content Information (CI)

The Content Information includes the set of information that is the original target of preservation.

8.3.4 Confirmation Information

Contains the information that the relevant process was performed.

8.3.5 Confirmation report

Gives the information that the relevant process was performed successfully.

8.3.6 Data formatting and document standards

Supporting data from preservation planning.

8.3.7 Error report

Represents error information showing the kind of error occurring during relevant process steps.

9 Definition ‘Transfer to Data Generation’ (Milestone)

Every process step is started by a milestone. The use of milestones allows the integration of required references to and from other processes. The definition of milestones is out of scope for EN 9300 generally. However, the description of the milestone ‘Transfer to Data Generation’ is necessary. The data generation process is not under the direct influence of EN 9300 and will be defined within each company separately.

Definition ‘Transfer to Data Generation’: The source data provided by the producer (the Content Information, or the meta data used for the Preservation Descriptive Information and the Descriptive Information) have to be modified at some point within the data generation process, since they failed in the preparation stage. The data generation process is out of scope for ASD-STAN LOTAR.

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[3] VDA Recommendation 4956, *Product Data Exchange — Part 1: Assembly Data Exchange* (November 2002)

[4] *Reference Model for an Open Archival Information System* (OAIS): *Foreword,* CCSDS 650.0-B-1, BLUE BOOK, January 2002

[5] *STEP — Towards open systems,* STEP Fundamentals & Business Benefits, Dr. Kais Al- Timini, John Mac Krell, 1999, CIMdata

[6] [BooRumJac99] — Booch, G. Rumbaugh, J. Jacobson, I. *The Unified Modeling Language, User Guide*, Addison-Wesley, 1999

[7] **BGB:** Bürgerliches Gesetz Buch — German civil code

[8] **European Union Directive 99/93/EC:** The directive is a common and comparable pan-European standard for offering and using electronic signature proceedings shall be established

[9] **European Union Directive 98/37/EC:** The directive is a common and comparable pan-European standard which means that no machine can be placed on the EU single market or installed if it does not bear the CE Marking

[10] **IDEF0:** is a method designed to model the decisions, actions, and activities of an organisation or system. IDEF0 was derived from a well-established graphical language, the Structured Analysis and Design Technique (SADT), introduced by Douglas T. Ross in the early 1970s. — (David A. Marca and Clement L. McGowan, SADT: *Structured Analysis and Design Techniques*. McGraw-Hill, New York, NY, 1988.)

[11] JAR 21, *Certification procedures for aircraft and related products and parts*

[12] **Unified Modelling Language, v1.4:** UML (Unified Modeling Language) represents an OMG (Object Management Group) standard for visual object oriented modeling. Introduced 1997 it became the standard modeling language for software development. UML consists of different diagram types (Class-, Object-, Statechart-, Activity-, Sequence-, Collaboration-, Use-Case-, and Component Diagram), and each diagram shows a specific static or dynamic aspect of a system [BooRumJac99]

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