
**Space systems — Programme
management — Information and
documentation management**

*Systèmes spatiaux — Management de programme — Management de
l'information et de la documentation*





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Contents

Page

Foreword	v
Introduction	vi
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Abbreviated terms	2
5 Information/documentation management principles	3
5.1 Information/documentation management process and objectives	3
5.2 Information/documentation management planning	3
5.3 Implementation of information/documentation management	4
6 Requirements for information and documentation management	7
6.1 General	7
6.2 Information/documentation management planning	8
6.3 Implementation of information/documentation management	9
Annex A (normative) Information/Documentation Management Plan (IDMP) DRD	13
Bibliography	16

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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

ISO 10789 was prepared by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, Subcommittee SC 14, *Space systems and operations*.

ISO 10789 supports ISO 14300-1, *Space systems — Programme management — Part 1: Structuring of a project*.

Introduction

This International Standard defines the information/documentation management requirements for space programmes or projects.

The International Standard is structured in two main parts. The first part presents the information/documentation management processes and the second part provides the detailed requirements.

Requirements in this International Standard are defined in terms of what shall be accomplished, rather than in terms of how to organize and perform the necessary work. This allows existing organizational structures and methods to be applied where they are effective, and for the structures and methods to evolve as necessary without rewriting the standards.

Space systems — Programme management — Information and documentation management

1 Scope

This International Standard describes the processes and the requirements for the management of information/documentation within space programmes and projects.

The requirements specified herein apply to and affect the customer and supplier at all levels.

When viewed from the perspective of a specific project context, the requirements defined in this International Standard need to be tailored to match the specific requirements of the particular profile and circumstances of a project.

NOTE Tailoring is a process by which individual requirements of specifications, standards and related documents are evaluated and made applicable to a specific programme or project by selection and, in some exceptional cases, modification of existing or addition of new requirements.

Defence information and documentation are not part of the scope of this International Standard.

2 Normative references

The following referenced documents are indispensable for the application 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.

ISO 10007:2003, *Quality management systems — Guidelines for configuration management*

ISO 10303-232, *Industrial automation systems and integration — Product data representation and exchange — Part 232: Application protocol: Technical data packaging core information and exchange*

3 Terms and definitions

For the purpose of this document, the following terms and definitions apply.

3.1 information/documentation management

process for ensuring timely and effective creation, collection, review, delivery, storage, and archiving of project information

3.2 information system

set of resources, procedures and data required in support of project management processes

3.3 metadata

structured, encoded data that describe characteristics of information-bearing entities to aid in the identification, discovery, assessment, and management of the described entities

3.4 self-signed certificate

certificate auto-generated by the signee

3.5
technical data package
TDP

ZIP file containing structured collection of files with their related metadata, to be exchanged between information systems

NOTE Adapted from ISO 10303-232.

4 Abbreviated terms

The following abbreviated terms are defined and used within this International Standard.

CAD	Computer Aided Design
CD	Compact Disk
CI	Configuration Item
CM	Configuration Management
CSAR	Configuration Status Accounting Reports
DRD	Document Requirements Definition
DRL	Document Requirements List
DXF	Drawing Exchange Format
FTP	File Transfer Protocol
IDM	Information/Documentation Management
IDMP	Information and Documentation Management Plan
IEC	International Electrotechnical Commission
IS	Information System
ISMS	Information Security Management System
ISO	International Organization for Standardization
JPEG	Joint Photographic Experts Group
LZW	Lempel-Ziv-Welch
MS	Microsoft
PA	Product Assurance
PDF	Portable Document Format
RID	Review Item Discrepancy
ROM	Read Only Memory
SMTP	Simple Mail Transfer Protocol
STEP	Standard for The Exchange of Product
TDP	Technical Data Package

TIFF	Tagged Image File Format
XML	Extensible Mark-up Language

5 Information/documentation management principles

5.1 Information/documentation management process and objectives

Information/documentation management is the process for ensuring timely and effective creation, collection, review, delivery, storage, and archiving of project information.

Information/documentation management is applied throughout the entire life cycle of the project and ensures:

- the correctness, accessibility, rapid availability, reliability and security of information provided to all the actors both internal and external to the project;
- the coherence of the overall project information, thus facilitating effective and efficient use of the information;
- that all the actors who need access to information are aware of its availability, the means of access, and related methods and procedures;
- support to the programme/project reporting.

The main activities of the information/documentation management process, depicted in Figure 1, are:

- a) management and planning;
- b) implementation, i.e. creation, collection, review, delivery, storage and retrieval, and archiving.

5.2 Information/documentation management planning

5.2.1 Information/documentation plan

The customer defines the information/documentation management requirements for a programme or project. These requirements are applicable to all the actors of the programme or project as defined by each level customer towards his supplier(s). Each supplier produces an information/documentation management plan (IDMP) responding to his customer's information/documentation management requirements. The IDMP is submitted to the customer for approval. Upon customer approval, the supplier executes his own IDMP and ensures that his lower tier suppliers execute their IDMP.

The purpose of the IDMP is to provide all elements necessary to ensure that the implementation of the information/documentation management meets all customer requirements, and that it is in line with the programme or project organization and management structure.

The customer defines the programme or project phase during which the IDMP is prepared and approved.

Each actor assigns a person responsible for implementing information/documentation management activities within his programme or project team. His role, responsibilities and authorities are described in the IDMP.

5.2.2 IDM interfaces

IDM is an integral part of project management and directly interfaces with configuration management and its processes and, through them, with engineering, product assurance, manufacturing and production.

IDM contributes to programme or project activities by provision of all the necessary information through the information system. The information system is a repository of information where the project disciplines implement data and activate processes.

Relationships are described in Figure 1.

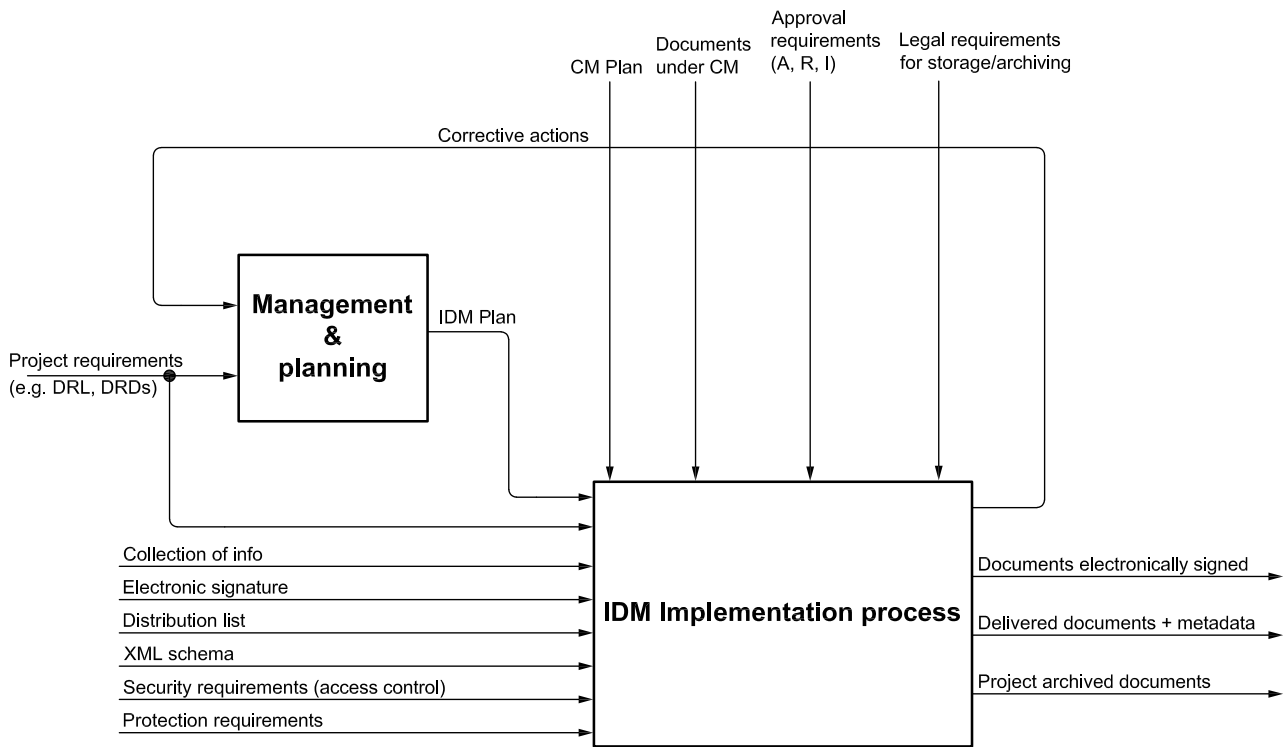


Figure 1 — Information/documentation management

Corrective actions are improvements on the process itself as a consequence of lessons learned and any feedback provided on the project.

5.3 Implementation of information/documentation management

5.3.1 General

Implementation of information/documentation management comprises the activities depicted in Figure 2 and described in the following subclauses.

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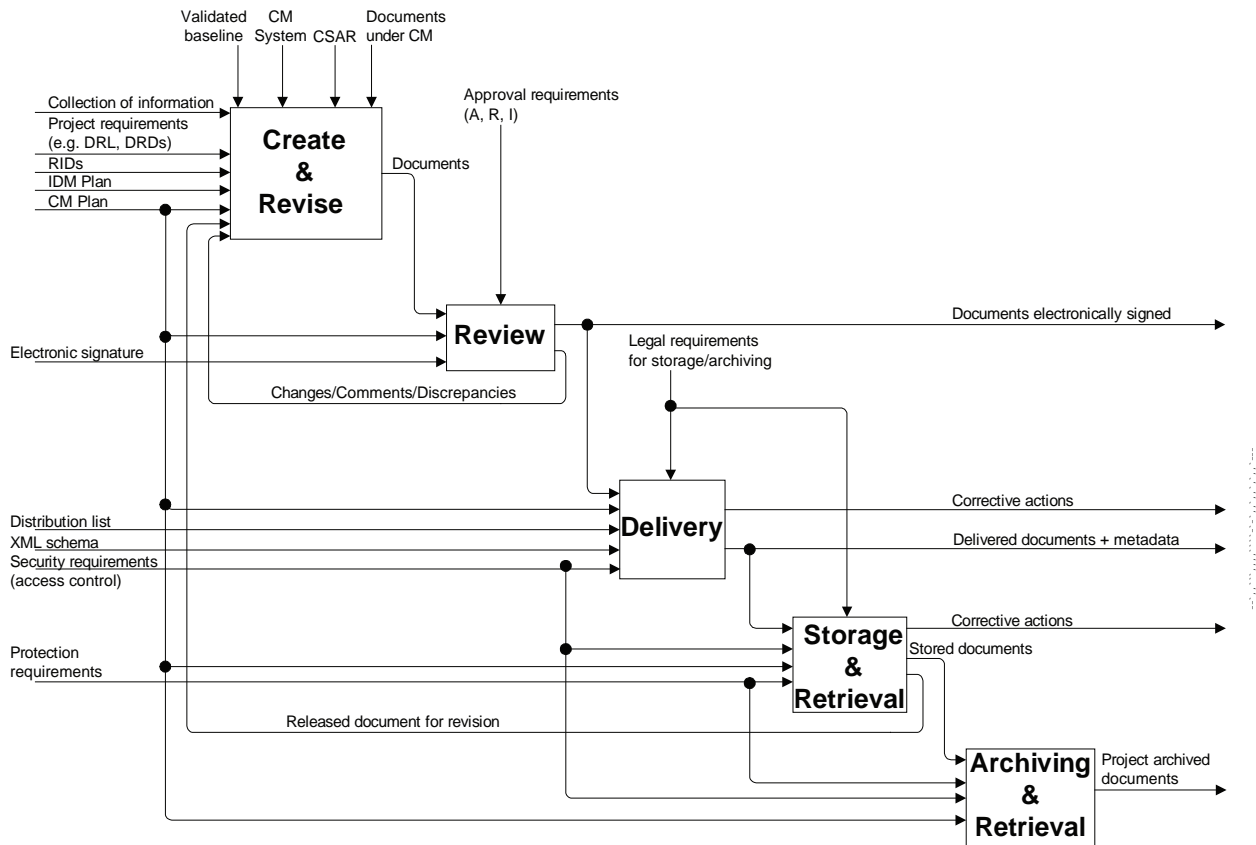


Figure 2 — Implementation of information/documentation management

5.3.2 Creation and vision

During this phase the content of a document is established and the documentation reference is assigned. This activity is performed under the responsibility of the organization assigned in the DRL. Attributes in addition to the documentation reference may be included as needed (e.g. DRL/DRD reference, CI Identifier, authorities involved in the review process). For configuration controlled documents, the configuration management process specified in ISO 10007 is applied.

In this phase the document bears the status “In Preparation”. It is considered preliminary and is therefore not used for binding agreements. The same logic applies for a new version of a document under preparation.

5.3.3 Review

5.3.3.1 Review activity

When the document is complete, it is submitted for review and approval as required. The review process is then initiated as specified within the IDMP.

In this phase the document bears the status “In Review”.

The same restriction regarding its use applies as for the creation/revision phase, and is therefore not to be used for binding agreements. The review authority either confirms that the content complies with the applicable requirements, or states the identified discrepancies together with the proposed resolution. In the latter case, the document is returned to the creation/revision phase for incorporation of comments and resolution of the identified discrepancies.

During the review process a document can be “withdrawn” (if it did not pass the review cycle and is maintained or traced for historical purposes only) or get the status “obsolete” or “superseded” (when it has been released but superseded by a new document).

5.3.3.2 Approval release

Approval shall be given by the process defined in the IDMP.

Approval by process ensures that:

- a) the document has not been modified after its approval (i.e. integrity), and
- b) the author acknowledges responsibility for the content of the document (i.e. non-repudiation).

At the end of the review phase, once all required approvals are given, the document reaches the status “Released”.

Once released, the document is valid for use and therefore ready for distribution. After the document is released, any modification to the document requires a new version (i.e. version update).

5.3.4 Delivery

Documents are delivered in line with the procedures defined by the IDMP which takes into account the level of confidentiality applicable to each document. The status of the document is not changed during delivery.

Documents are delivered using Technical Data Package (TDP) format which defines the way to exchange content files and their related metadata and to structure them within folders.

The TDP is a ZIP file containing document file(s) and metadata describing these documents. Metadata used in the TDP are a subset of the ISO 10303-232 metadata.

The metadata are stored in the “datapackage.xml” file. See Figure 3.

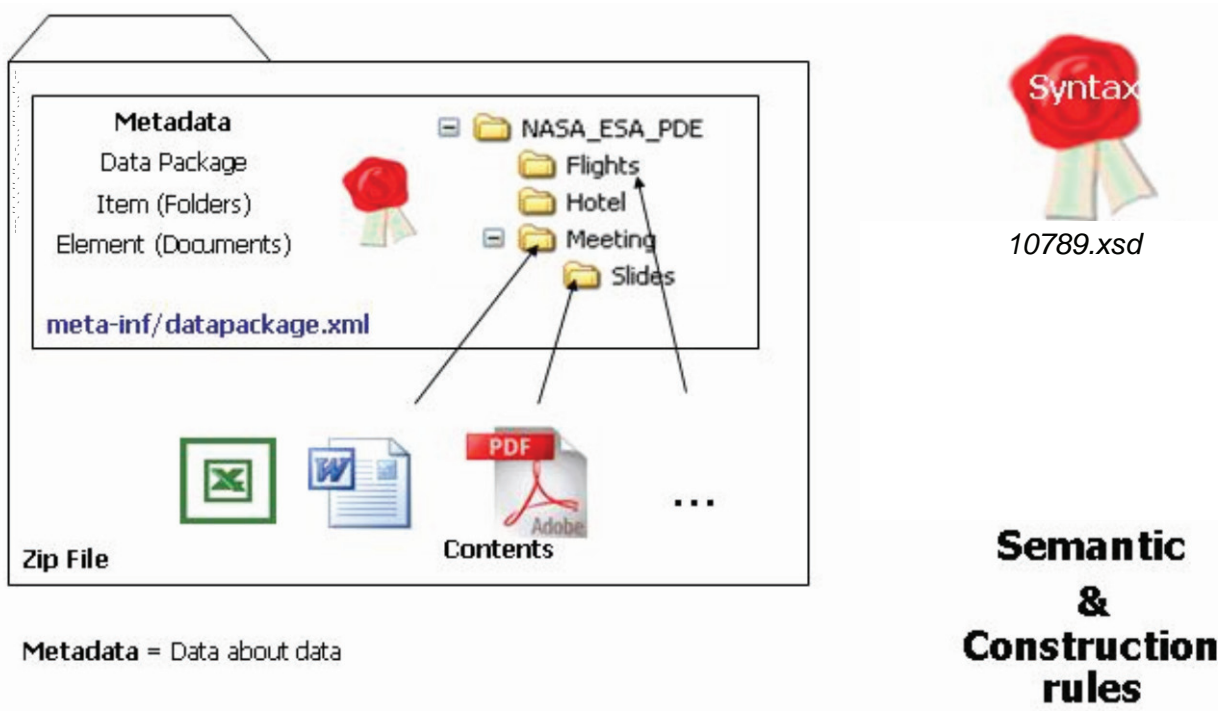


Figure 3 — TDP contents

The delivery process is summarized in Figure 4. The main steps are:

- a) the originating organization “exports” content files and metadata from its Information System (IS) to TDP;
- b) the originating organization provides TDP to recipient organization via, for example, e-mail, ftp, CD-ROM;

- c) the recipient organization “opens and controls” the compliance of the TDP;
- d) the recipient organization “imports” the TDP into its Information System.

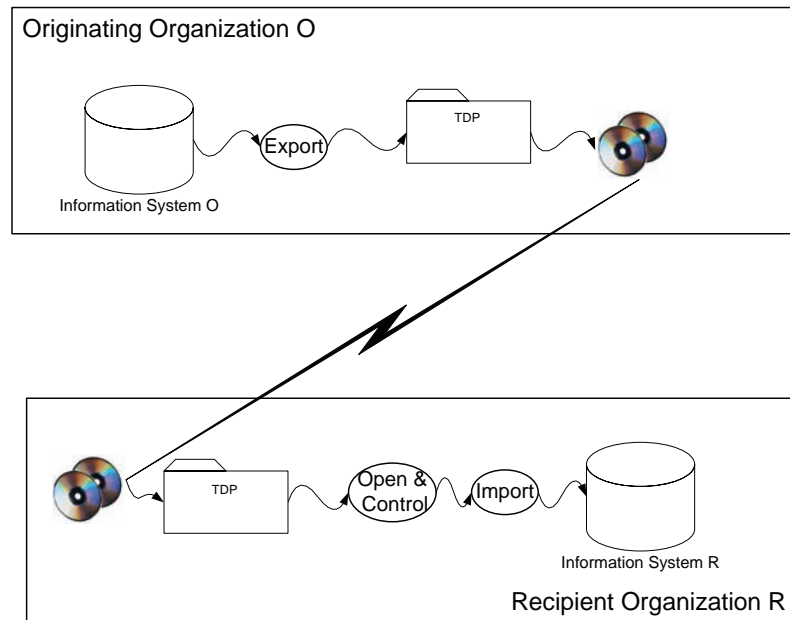


Figure 4 — Delivery process for TDP

5.3.5 Storage and retrieval

Storage and retrieval overlaps with the other phases defined above. The status of the document is not changed during storage and retrieval.

The information system is deployed in order to handle metadata and static and dynamic content. The reproducibility and integrity of the stored information is ensured for the programme/project life cycle.

5.3.6 Archiving and retrieval

Archiving is the last phase of the information process. It ensures that project information/documentation is:

- a) preserved from damage or loss,
- b) accessible and retrievable for use, and
- c) controlled and access only allowed to authorized personnel.

6 Requirements for information and documentation management

6.1 General

In this International Standard, in order to facilitate reading and traceability, the paragraph numbering in this clause is consistent with the paragraph numbering of Clause 5. Each requirement has a unique identification number.

6.2 Information/documentation management planning

6.2.1 Information/documentation management planning

NOTE An Information Security Management System (ISMS) can be implemented using ISO/IEC 27001.

6.2.1.1 General

The general requirements for an information/documentation management plan are the following.

- a) Each supplier shall provide for customer's approval an information and documentation management plan in conformance with Annex A.
- b) Internal procedures called up in the information and documentation management plan shall be made available for customer review upon request.

6.2.1.2 Information security

Information security requirements for an information/documentation management plan are the following.

- a) Information shall be classified as required by national or international laws, or by programme/project requirements, or to protect company/organizational interests.
- b) Information shall be protected against unauthorized access and according to the security classification.
- c) The information access and security classification shall be agreed between customer and supplier.
- d) The list of authorized personnel having access to the information system shall be defined by the supplier.

6.2.1.3 Classification

Classification requirements for an information/documentation management plan are the following.

- a) Suppliers shall indicate within the IDMP the classification classes to be applied and the documentation set that will be affected.
- b) Classification classes shall be clearly indicated on the documents.
- c) Classified information shall be accessible only to suitable persons having the right authorizations.
- d) Classified information shall be used only in a secure environment or location (e.g. area limited in access).
- e) The assigned classification shall be maintained only as long as the information requires protection.
- f) The responsibility for classifying information shall rest solely with the originating organization.
- g) Destruction of classified information and the method used for destruction shall be defined and recorded.
- h) The classification organization should consent to the change.

6.2.1.4 IDM interfaces

IDM interface requirements for an information/documentation management plan are the following.

- a) IDM shall interface with project management and planning, taking into account the contractual provisions, requirements, schedule and organization for the definition and phasing of IDM activities.
- b) IDM shall interface with configuration management for defining rules for documentation identification and processing, control and distribution.

- c) IDM shall support Engineering, Product Assurance (PA), manufacturing and production by providing the information/documentation in time and in adequate format for their activities.

6.3 Implementation of information/documentation management

6.3.1 General

The general requirements for the implementation of an information/documentation management are the following.

- a) Each actor shall ensure that the information management processes and information system are in accordance with the project needs.
- b) The information system shall support the creation, collection, review, delivery, storage, retrieval and archiving of information/documentation and related data.
- c) The relevant project information/documentation shall be accessible to all authorized project members.
- d) The information system shall support the agreed reporting requirements (e.g. generating of document status lists, schedule reports).
- e) All information/documentation released for a programme or project shall be managed electronically.
- f) In case of discrepancies between electronic and paper-based information, the electronically stored version shall take precedence.

NOTE In case of conflict, the particular laws governing the parties and their contracts (i.e. business agreements) involved in the programme/project take precedence.

6.3.2 Creation and revision

6.3.2.1 Responsibilities

Responsibilities for creation and revision for the implementation of an information/documentation management are the following.

- a) Responsibility for the information/documentation content shall lie with the organization closest to the data source.
- b) Author(s) for creating the information/documentation shall be assigned responsibility by the relevant organization.
- c) The information/documentation content shall be established in accordance with the DRD which describes the document.
- d) Author(s) shall always identify the reason(s) for generating a new document issue.
- e) Processes for revising information/documents shall involve and apply the same authorities and approval process as for previous issues, as well as any mutually agreed to updates.
- f) During the creation phase, the information/documentation shall be considered preliminary and shall not be used for binding agreements.

6.3.2.2 Data collection

Data collection requirements for the implementation of an information/documentation management are the following.

- a) All project-related information shall be maintained within the information system.
- b) Data applicable to a programme or project shall be ordered in such a way that they can be extracted from the information system and ordered according to the predefined values.
- c) Metadata shall be identified and entered into the information system.

6.3.2.3 Conversion to electronic format

Requirements for the conversion to electronic format for the implementation of an information/documentation management are the following.

- a) In the case of paper documents, their content shall be converted to electronic format and uploaded into the information system together with their metadata.
- b) The process of converting electronic content from its native format to the delivery format shall maintain visual integrity.

6.3.2.4 Identification

Identification requirements for the implementation of an information/documentation management are the following.

- a) Each document and each document issue shall be uniquely identified.
- b) Configuration management requirements shall be taken into account for documents that are part of a configuration baseline.
- c) Document identification shall not contain any elements that are liable to change from one issue to another (e.g. product item, configuration item, level of approval, issue).

6.3.2.5 Revision

Revision requirements for the implementation of an information/documentation management are the following.

- a) Changes to information/documentation shall always be justified.
- b) Changes to information/documentation and their justification shall be traceable within the information/documentation.
- c) The updating of any configuration-controlled document shall be processed according to the configuration process specified in ISO 10007.
- d) Once released, the integrity of any information/documentation shall be guaranteed by the information system.

6.3.3 Review

6.3.3.1 Review activity

Requirements for the review activity are the following.

- a) Each actor shall implement a review cycle for each information/documentation item he is required to release.
- b) The review cycle for classified information/documentation shall be established according to the level of classification defined for the information/documentation itself.
- c) The supplier shall implement a control process to ensure that all information requiring customer or lower tier supplier signatures are submitted on time to the customer or lower tier supplier.
- d) The customer shall confirm his approval or non-approval with rationale to the relevant supplier in accordance with their business agreement.
- e) The lower tier supplier shall confirm his approval or non-approval with rationale to the relevant customer within the contractually agreed timeframe.
- f) Any discrepancy raised against a document shall be provided to the originating organization in writing.
- g) Information/documents shall be delivered when the review cycle has been completed and all the required approvals are obtained.

6.3.3.2 Approval methods

6.3.3.2.1 Approval by digital signature

Approval by digital signature requirements are the following.

- a) Information/documentation shall be signed using a digital signature.
- b) The digital signature shall be in compliance with internationally recognized standards.
- c) Self-signed certificates shall not be used.
- d) The digital signature shall be implemented to sign information/documentation in any electronic format.
- e) The digital signature shall support multiple signing.
- f) Digitally signed information shall provide indication that the information has been digitally signed.
- g) A digitally signed document shall provide an indication on the cover page stating that the document has been digitally signed.

6.3.3.2.2 Approval by process

Approval by process requirements are the following.

- a) Information/documentation approved by an informatics process shall clearly indicate approval in a visible manner:
 - 1) on the cover page of the electronic document file (source file or .pdf-file),
 - 2) as part of the information file header.
- b) Actors involved in the approval loop shall be identified on approved information/documentation.
- c) The information system managing the process shall record the processing steps of approval.
- d) A Log-File of the processing steps of approval shall be generated automatically by the information system.
- e) The Log-File shall be stored together with the released information/documentation within the information system.

6.3.4 Delivery

Delivery requirements are the following.

- a) Information/documentation shall be delivered using TDP in compliance with the Information Exchange DRD.
- b) Customer and supplier shall agree upon the optional metadata to be exchanged in compliance with the Information Exchange DRD.
- c) Based on customer input, the supplier shall provide for customer approval the method, format and schedule for the delivery of the required information.
- d) The following formats shall be used for delivery:

Read-only documents	Acrobat PDF compatible format
Editable documents	MS Office compatible format
Photographic images	JPEG compatible format
Technical images	TIFF with LZW or other lossless compression

Technical/CAD drawings	DXF, 3-D CAD file, ISO Step format
Technical Data Package (TDP)	TDP ZIP

- e) Additional formats may be implemented and agreed with the customer.
- f) The delivery mechanism shall ensure that the information:
 - 1) comes from a given, identified sender (guarantee of authenticity);
 - 2) cannot be disclaimed by the sender (guarantee of non-repudiation);
 - 3) cannot be read by third parties during transmission (guarantee of confidentiality);
 - 4) cannot be modified by third parties during transmission (guarantee of data integrity).

NOTE Electronic mail via SMTP and file transfer via FTP cannot be used with unencrypted files because these delivery methods do not meet the above requirements.

- g) Where a concurrent environment is available, accessibility to it shall be possible by using established privileges and rules for authorized programme/project members.

6.3.5 Storage and retrieval

Storage and retrieval requirements are the following.

- a) Each actor shall ensure that the information/documentation is available to the programme/project members throughout the entire programme/project life cycle.
- b) Each actor shall store all released document issues in the information system.
- c) Each actor shall store information/documentation in its native format for future update, together with metadata, throughout the programme/project life cycle.
- d) Information/documentation shall be protected against environmental and accidental risks and against unauthorized access.
- e) Access to classified information/documentation shall be restricted to authorized personnel.

6.3.6 Archiving and retrieval

- a) The supplier shall define and implement an archiving solution to ensure that project information/documentation is:
 - 1) preserved from damage or loss,
 - 2) accessible and retrievable for use, and
 - 3) access controlled to authorized personnel.
- b) The supplier shall agree with the customer the duration of the archiving activities (i.e. the supplier shall retain the information/documentation for the period specified in the business agreement).

Annex A (normative)

Information/Documentation Management Plan (IDMP) DRD

A.1 DRD identification

A.1.1 Requirement identification and source document

(WD 10789), requirement 6.2.1.

A.1.2 Purpose and objective

The aim of the IDMP is to provide in a single document all elements necessary to ensure that the implementation of the information management meets all customer requirements, and that it is in line with the programme or project organization, and management structure.

A.2 Expected response

A.2.1 Response identification

The requirements for document identification contained in this International Standard shall be applied to the IDMP.

A.2.2 Scope and contents

The IDMP shall provide the information presented in the following sections:

<1> Introduction

The IDMP shall contain a description of the purpose, objective and the reason prompting its preparation (e.g. programme or project reference and phase).

<2> Applicable and reference documents

The IDMP shall list the applicable and reference documents supporting the generation of the document.

<3> Management

<3.1> Organization

The IDMP shall describe the organizational context, both technical and managerial, within which the prescribed information management activities shall be implemented.

<3.2> Responsibilities

The IDMP shall describe the allocation of responsibilities and authorities for information management activities to the various parties within the programme or project structure.

<3.3> Policies, directives and procedures

Any external constraints or requirements placed on the information management discipline by other policies, directives, or procedures shall be identified in this section, together with the consequences of applying these to the programme or project.

<3.4> Security

Customer and subcontractors shall indicate within the IDMP the classification classes to be applied and the relevant documentation set.

<4> Implementation

<4.1> Information identification

- a) The IDMP shall describe the main information/documentation categories, such as management information, contractual documentation or engineering data, to be established and used throughout the programme/project life cycle.
- b) The IDMP shall describe methods for information/document identification including versioning.
- c) The IDMP should list the codes for companies, information types, models, subsystems, etc., which are applied specifically in the identification method or are in general use during project execution.
- d) The IDMP shall identify the metadata structures of the main information categories.

<4.2> Data formats

- a) The IDMP shall define the data formats to be used for the various information categories
 - 1) content creation and update
 - 2) distribution
 - 3) archiving
- b) The IDMP shall specify which format takes precedence in case a format conversion is applied.

<4.3> Processes

- a) The IDMP shall describe the actors involved in, as well as the method and processes for, creating, collecting, reviewing, approving, storing, delivering and archiving information items.
- b) The IDMP shall describe the handling of legacy documentation and “off-the-shelf” documentation.
- c) The IDMP shall define the information retention period.

<4.4> Information systems

The IDMP shall list the project information systems to be used for creating, reviewing, storing, delivering and archiving the main information categories (e.g. ABC for schedule, and XYZ for engineering DB).

<4.5> Delivery methods

The IDMP shall describe the methods used to deliver TDPs.

<4.6> Digital signature

The IDMP shall define the procedures, methods and rules applicable to digital signatures. This comprises information about the following aspects:

- a) certificate type;
- b) management of signature key;
- c) time stamping;
- d) signing of PDF documents;
- e) multiple signatures per document.

<4.7> Information status reporting

- a) The IDMP shall describe the process and content for reporting the status of information items.
- b) For documentation, the following attributes shall be reported as a minimum: document identification, version, title, issue date, status, document category.

<5> Schedule and resources**<5.1> Schedule**

The IDMP shall provide the schedule and key milestones for the implementation of any new system or major upgrade of existing systems listed under <4.4>.

<5.2> Resources

- a) The IDMP shall identify the facilities and skills required to implement and operate the information systems and to perform the related information management activities.
- b) The IDMP shall list the training activities to ensure that both users and service providers acquire and maintain an appropriate skill level for the use/support of the information systems.

Bibliography

- [1] ISO 10795, *Space systems — Programme management — Vocabulary*
- [2] ISO/IEC 27001:2005, *Information technology — Security techniques — Information security management systems — Requirements*

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