Space project management

Information/documentation management

ECSS Secretariat
ESA-ESTEC
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Foreword

This Standard is one of the series of ECSS Standards intended to be applied together for the management, engineering and product assurance in space projects and applications. ECSS is a cooperative effort of the European Space Agency, National Space Agencies and European industry associations for the purpose of developing and maintaining common standards.

Requirements in this 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.

The formulation of this standard takes into account the existing ISO 9000 family of documents.

Significant changes between this version and the previous version are:

- Definition of information/documentation management process flow with consequent review and updating of existing requirements.
- Document restructuring to align the descriptive section (clause 4) with requirement section (clause 5).
- Introduction of unique requirements identification.
- Statement of new requirements related to:
  - Electronic information/documentation;
  - Electronic approval signature;
  - Electronic exchange of information/documentation.
- Addition of document requirements definitions (DRD) to specify the content of expected documentation.
- Provision of information guidelines for electronic signature implementation.

This Standard has been prepared by the ECSS M-50 Working Group, reviewed by the ECSS Executive Secretariat and approved by the ECSS Technical Authority.

This version B cancels and replaces ECSS-M-50A.

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Introduction

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

The document is structured in two main parts, the first part presenting the information/documentation management processes and the second providing the detailed requirements.

In addition the expected information/documentation management documentation is specified in the annexed document requirements definitions (DRDs).

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1 Scope

The present standard "Information/documentation management" is part of a collection of ECSS Standards belonging to the Management branch.

The scope of this Standard is to describe the processes and to define 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 standard should be tailored to match the genuine 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 Standard.

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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 revisions 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 most recent editions of the normative documents indicated below. For undated references the latest edition of the publication referred to applies.

ECSS-P-001 ECSS - Glossary of terms

ECSS-M-40 Space project management - Configuration management

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3
Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purpose of this Standard, the terms and definitions given in ECSS-P-001 and the following apply.

3.1.1
information/documentation management
process for ensuring timely and effective creation, collection, review, delivery, storage, and archiving of project information

3.1.2
information system
set of resources, procedures and data required in support of project management processes

3.1.3
metadata
metadata are structured, encoded data that describe characteristics of information-bearing entities to aid in the identification, discovery, assessment, and management of the described entities

NOTE: Adapted from Committee on Cataloguing Task Force on metadata Summary Report.

3.1.4
self-signed certificate
certificate auto-generated by the signer

3.1.5
technical data package
ZIP file containing structured collection of files with their related metadata, to be exchanged between information systems

NOTE: Adapted from ISO10303 AP232 TDP definition.

3.2 Abbreviated terms

The following abbreviations are defined and used within this document:

Abbreviation	Meaning
CAD	computer aided design
CD	compact disk
CI	configuration item
CM	configuration management
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
IETF	internet engineering task force
IS	information system
ISO	international standard for organization
ITU	international telecommunication union
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

4 Information/documentation management principles

4.1 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. To achieve this objective, all recorded project information is managed electronically.

Information/documentation management is applied throughout the entire life cycle of the project and allows someone to

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

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

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

4.2 Information/documentation management planning

4.2.1 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 informa-

tion/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.

4.2.2 IDM interfaces

Information/documentation management 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 the following Figure 1.

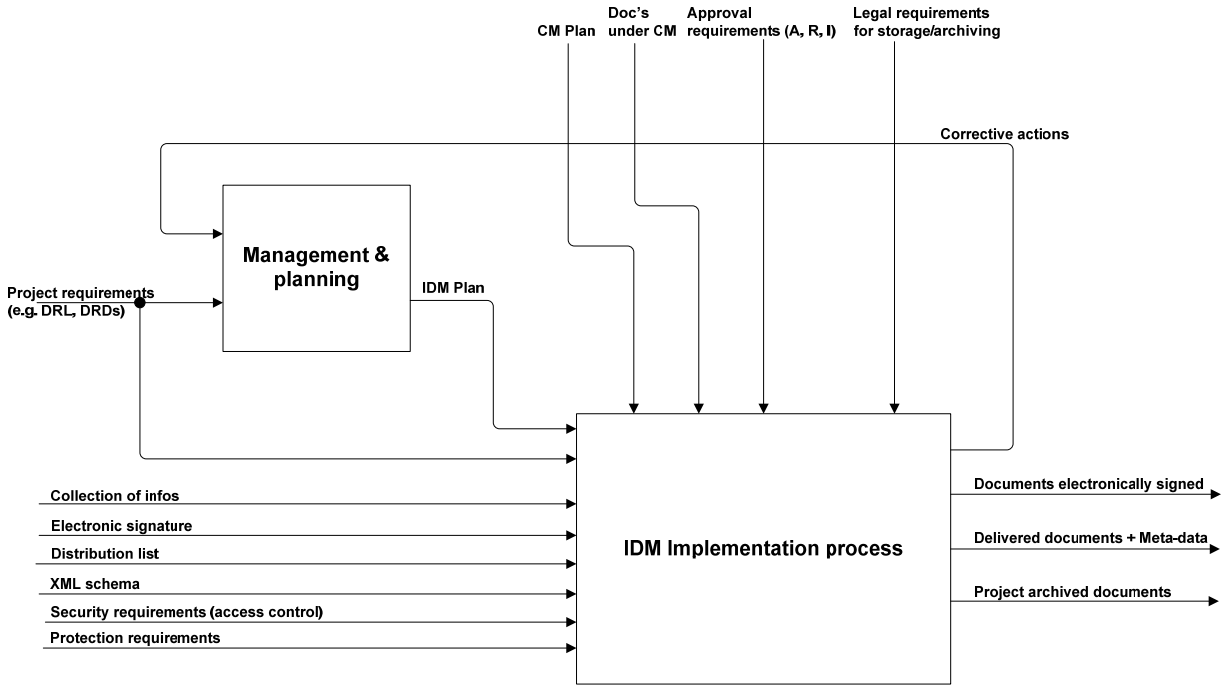

Figure 1: Information/documentation management

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

4.3 Implementation of information/documentation management

4.3.1 General

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

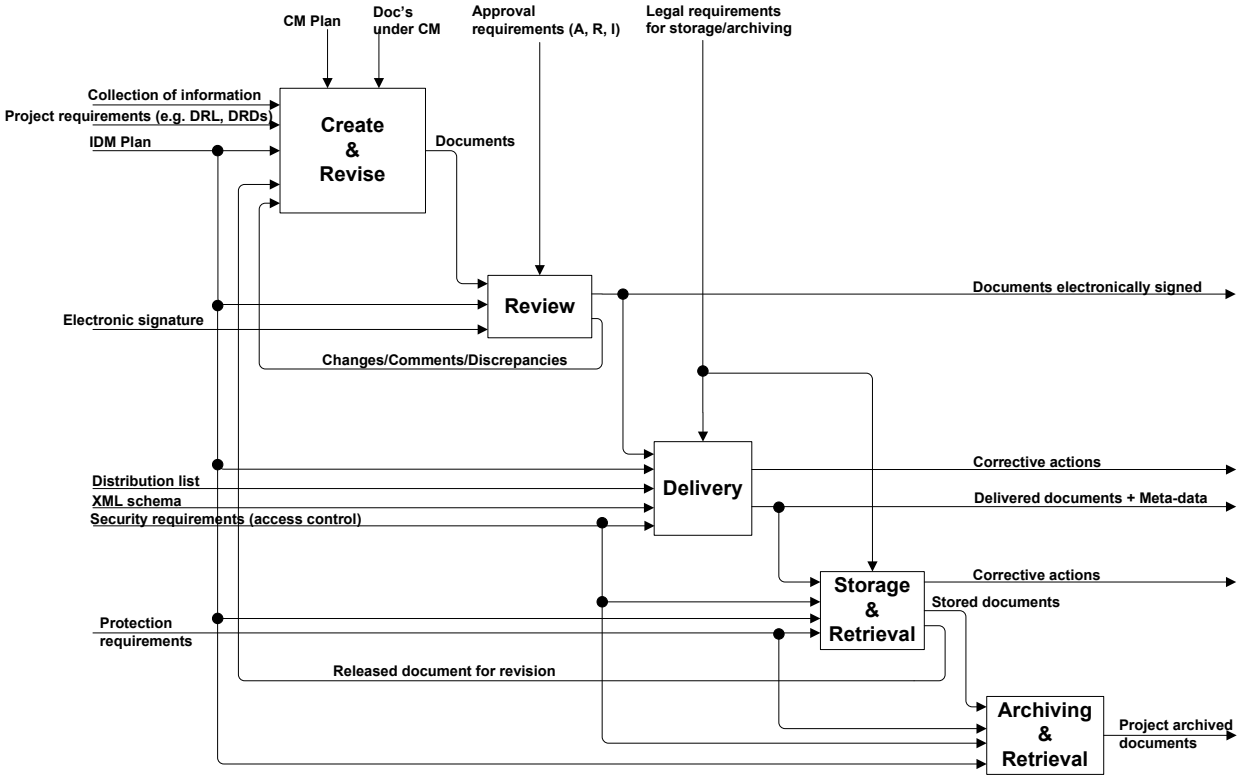

Figure 2: Implementation of information/documentation management

4.3.2 Creation and revision

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 can be included as needed (e.g. DRL/DRD reference, CI Identifier, authorities involved in the review process). For configuration controlled documents, the configuration control process defined in ECSS-M-40 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.

4.3.3 Review

4.3.3.1 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).

4.3.3.2 Approval and release

Approval can be given either by electronic signature or by process as defined in the IDMP.

Electronic signature or approval by process ensures that

1. the document has not been modified after its approval (i.e. integrity), and
2. the author cannot deny his 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 implies a new version.

4.3.4 Delivery

Documents are delivered in line with the procedures defined by the IDMP taking 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 STEP AP232 metadata added by some specific metadata defined in Annex B.

The metadata are stored in the "datapackage.xml" file. See Figure 3:

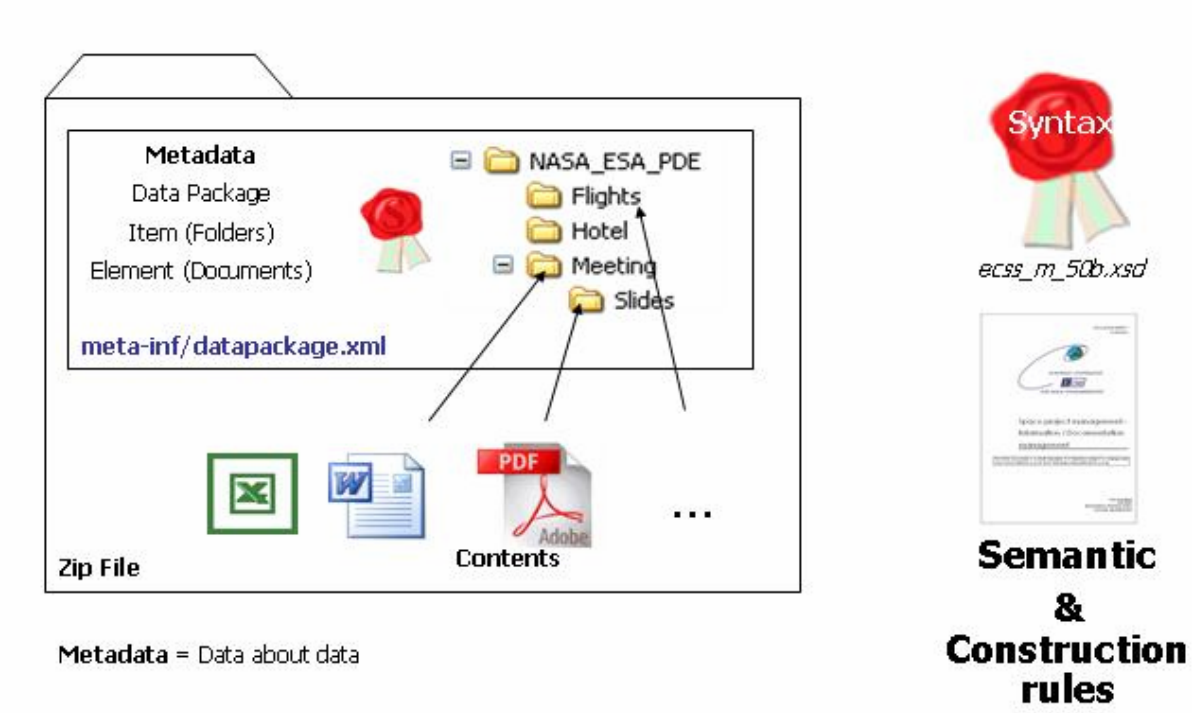

Figure 3: TDP contents

The delivery process is summarized in the following diagram. The main steps are:

1. the originating organization “exports" content files and metadata from its Information System (IS) to TDP;
2. the originating organization provides TDP to recipient organization via e.g. e-mail, ftp, CD-ROM;
3. the recipient organization "opens and controls" the compliance of the TDP;
4. the recipient organization "imports" the TDP into its Information System.

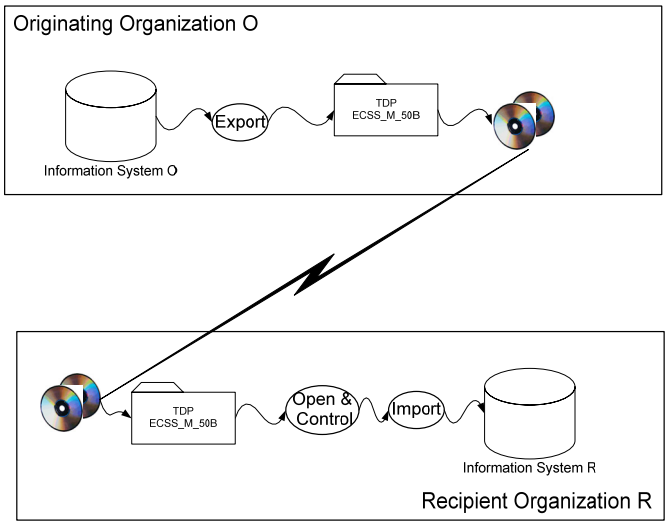

Figure 4: Delivery process for TDP

4.3.5 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.

4.3.6 Archiving and retrieval

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

– preserved from damage or loss,

– accessible and retrievable for use, and

– access controlled to authorized personnel

5
Requirements for information and documentation management

5.1 General

In this ECSS Standard, in order to facilitate reading and traceability, the paragraph numbering in this clause is consistent with the paragraph numbering of clause 4. Each requirement has a unique identification number.

5.2 Information/documentation management planning

5.2.1 Information and documentation management plan

5.2.1.1 General

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.

EXPECTED OUTPUT: Information and documentation management plan.

5.2.1.2 Information security

a. Information shall only be classified when imposed 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 confidentiality classes.

c. The information access and confidentiality classes shall be agreed between customer and supplier.

d. The list of authorized personnel having access to the information system shall be agreed between the customer and supplier.

EXPECTED OUTPUT: Information security and confidentiality classes defined

5.2.1.3 Classification

a. Customer and subcontractors 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 persons having the right authorizations and privileges.

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 recorded.

h. Classified information shall be downgraded or declassified only with the prior written consent of the originating organization.

EXPECTED OUTPUT: Classification system applied.

5.2.2 IDM interfaces

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.

EXPECTED OUTPUT: Inputs for IDMP and Information System.

5.3 Implementation of information/documentation management

5.3.1 General

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 national/European law takes precedence.

EXPECTED OUTPUT: Collaborative environment with access control (validated Information System)

5.3.2 Creation and revision

5.3.2.1 Responsibilities

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. Process for revising information/documents shall involve and apply the same authorities and approval process as for previous issues.

f. During the creation phase the information /documentation shall be considered preliminary and shall not be used for binding agreements.

EXPECTED OUTPUT: Identified information/documentation responsibility.

5.3.2.2 Data collection

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, containing as a minimum the terms required in Annex B

EXPECTED OUTPUT: Information Master (set of data and their metadata).

5.3.2.3 Conversion to electronic format

a. In the case of paper documents, their content shall be converted to electronic format and uploaded into the information system together with its metadata.

b. The process of converting electronic content from its native format to the delivery format shall maintain visual integrity.

EXPECTED OUTPUT: Information Master (set of data and their metadata).

5.3.2.4 Identification

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 an issue to another (e.g. Product Item, Configuration Item, level of approval, issue).

EXPECTED OUTPUT: Unique identification reference.

5.3.2.5 Revision

a. Changes to information/documentation shall be always 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 defined in ECSS-M-40.

d. Once released, the integrity of any information/documentation shall be guaranteed by the information system.

EXPECTED OUTPUT: Traceable evolution of information content.

5.3.3 Review

5.3.3.1 Review activity

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.

EXPECTED OUTPUT: Assessed and dispositioned information/ documentation.

5.3.3.2 Approval methods

5.3.3.2.1 Approval by digital signature

a. Information/documentation shall be signed using 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 on the cover page an indication stating that the document has been digitally signed

NOTE: Information about digital signature is provided in Annex C (Digital signature).

EXPECTED OUTPUT: Digitally signed information/documentation

5.3.3.2.2 Approval by process

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

EXPECTED OUTPUT: Approved information/documentation by process

5.3.4 Delivery

a. Information/documentation shall be delivered using TDP in compliance with Annex B : Information Exchange DRD.
b. Customer and Supplier shall agree upon the optional meta-data to be exchanged in compliance with Annex B : 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 ZIP

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

EXPECTED OUTPUT: Secure information exchange.

5.3.5 Storage and retrieval

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

EXPECTED OUTPUT: Ensured, controlled access to project information.

5.3.6 Archiving and Retrieval

a. The supplier shall define and implement an archiving solution to ensure that project information/documentation is:

– preserved from damage or loss,

– accessible and retrievable for use, and

– access controlled to authorized personnel

b. The supplier shall agree with the customer the duration of the archiving activities.

EXPECTED OUTPUT: Legacy information in viewable format.

Annex A (normative) Information/documentation Management Plan (IDMP) DRD

A.1. DRD identification

A.1.1. Requirement identification and source document

ECSS-M-50B, requirement 5.2.1.

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 ECSS-M-50 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 for the various information categories the data formats to be used for

   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:

- certificate type
- management of signature key
- time stamping
- signing of PDF documents
- 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.

A.2.3. Special remark

The response to this DRD may be combined with the response to the project management plan, as defined in ECSS-M-00B.

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Annex B (informative)
Information exchange DRD

B.1. DRD Identification

B.1.1. Requirement identification and source document

ECSS-M-50B requirement 5.3.4

B.1.2. Purpose and objective

The objective of the TDP is to provide a standard approach for the delivery and exchange of information/documents during the programme or project life cycle in electronic format.

B.2. Expected response

B.2.1. Response identification

The requirements for document identification contained in requirement 5.3.2.4 shall be applied to this TDP.

B.2.2. Scope and content

This annex describes the approach, the relevant steps to create an ECSS_M_50B TDP and the semantics of the metadata model.

The TDP can be created by using stand alone tools which allow creation of TDP by picking up files from hard disk (in this case, metadata shall be re-typed manually), or by IS integrated tools which allow creation of the TDP from files and metadata already stored in the IS.

In both cases, a mapping between ECSS_M_50B terms (see column 1 of Table B-1 to Table B-5) and the company terminology needs to be performed.

When using IS integrated tools, a second mapping between ECSS_M_50B terms and the IS internal data structure (e.g. columns of the relational database of the IS) needs to be performed, and a connector (export or import) that is compliant with the requirements of clause 5.3.4 b. to f. has to be implemented.

B.2.3. Steps to create an ECSS_M_50B TDP

a. Create an XML document (called datapackage.xml) containing tags and

values about documents to exchange, in the order defined by the ecss_m_50b.xsd XML Schema. (See XML Schema on ECSS website http://www.ecss.nl).

b. Include the document content files and the datapackage.xml file inside a zip file.

B.2.4. Detailed ECSS_M_50B TDP ZIP file definition:

1. The TDP ZIP file shall contain:
   - The Content file(s) (in the root directory or in any folder of the zip file)
   - Only one *datapackage.xml* file in the *\META-INF* folder.

as shown in the following Figure B-1:

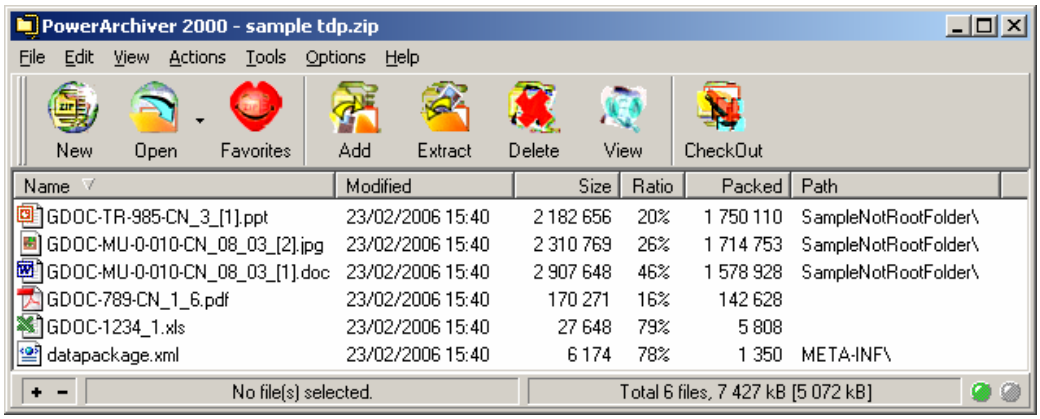

Figure B-1: TDP ZIP file

2. The datapackage.xml file shall be "XML valid" i.e. it is structurally compliant with the grammar defined by the ecss_m_50b.xsd XML Schema. (See XML Schema on ECSS website http://www.ecss.nl).
3. The values contained in the datapackage.xml file shall be semantically compliant with Table B-1 to Table B-6 below.
4. Each content file shall be named as follows: REFERENCE_C{_I}{_[VOL]}.ext
   Where:
   - REFERENCE mandatory (REFERENCE being the identifying number of the document)
   - _C mandatory (C being the change level)
   - _I if relevant (I being the issue level)
   - _[VOL] mandatory if the "number of volume" > 1 (VOL being the volume number in the case of several files attached to the same reference/change_level/issue_level
5. The file path of a content file within the ZIP archive relative to the meta-inf/datapackage.xml file shall be stored inside the “context_file_name” implementation field.

B.2.5.

In the following TDP-ZIP archive file of Figure B-2, the content file "DSI-SP-SC-2006-2524_01_00.doc" is stored in the "\GDOC_DOC" folder of the "DSI-SP-SC-2006-2524.doc.zip" file.

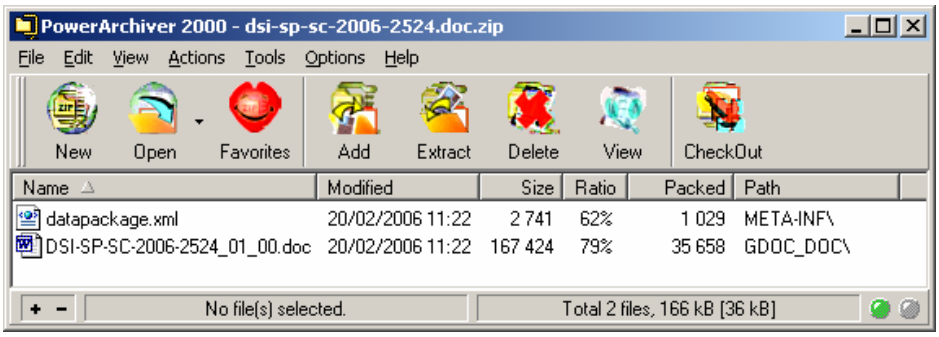

Figure B-2: ZIP archive

In the associated "datapackage.xml" file which is in the "\meta-inf" folder, the "context_file_name" field shall be filled as follow: …<entry_file context_file_name="..\GDOC_DOC\DSI-SP-SC-2006-2524_01_00.doc" native_format_file_name="My Original-DocName.doc"/>

B.2.6. Semantics of the metadata model

The metadata model is defined by an XML schema tree, see Figure B-3.

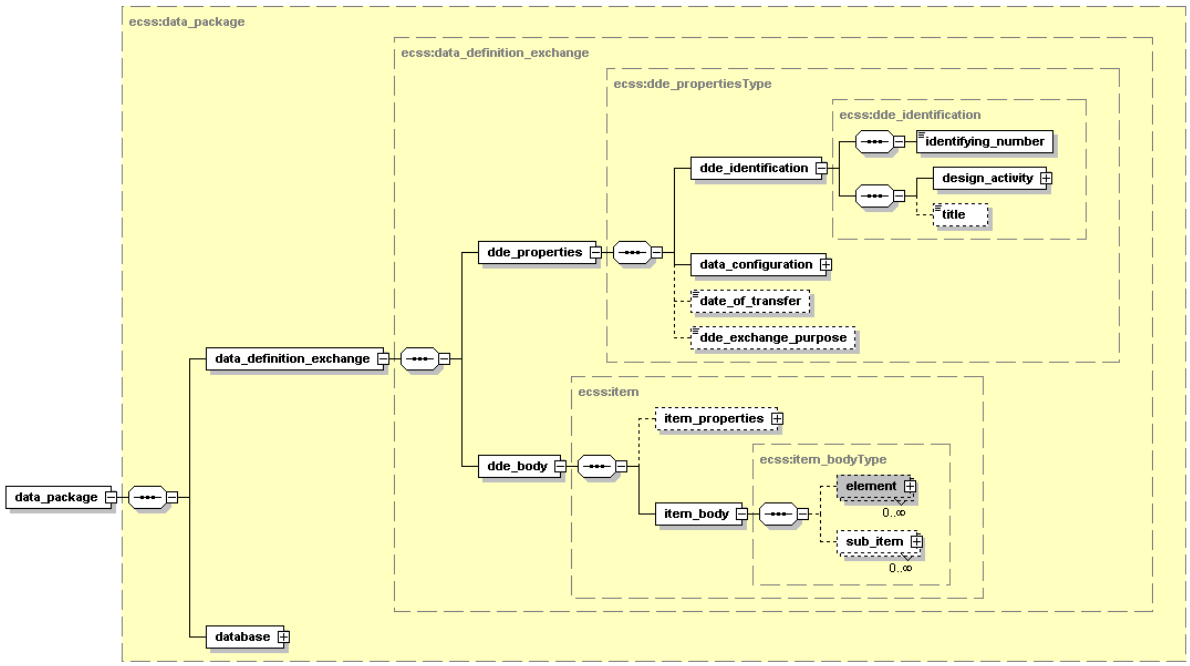

Figure B-3: XML schema tree

The top level branches shown are as follows:

1. data_package: root of the metadata model (See Table B-1)
    a. dde_definition_exchange:
        i. dde_properties: metadata related to the whole TDP (See Table B-2)
        ii. item_properties: metadata to build virtual folders. Each item can have many elements (See Table B-3).
        iii. elements_properties: metadata to describe a file (See Table B-4)
    b. database: persons and companies that are linked to elements (See Table B-5)

B.2.7. Data Tables description

- Table B-1 to Table B-5 below, describe the final blocks of the previous tree (defined by the ecss_m_50b.xsd XML Schema)
- They also provide the semantics of each term with the corresponding ISO definition if any.

REMARK:	These tables are given to ease human understanding of the metadata model. However, only the ecss_m_50b.xsd XML Schema is applicable (see clause 5.3.4 c.)

- The column "ISO 10303 AP-232 Definition" contains the ISO definition. If ECSS_M_50B specific comments alter the ISO definition, they are written inside a grey box.
- In order to locate precisely the blocks in the XML Schema tree, the full XML path is given above each group of terms using XPATH syntax (See http://www.w3.org/TR/xpath).
- The mandatory terms are enclosed inside asterisks and written bold.
- Multiple terms relating to the same parent term are separated by dashed lines.
- Table B-6 provides additional information necessary to the comparison of terms used in Table B-1 to Table B-5.

Table B-1: data_package

This table describes the root of the data model

ECSS_M_50B term	Designation	ISO 10303 AP-232 Definition	Your mapping	Example
/data_package				
* schemaVersion *	Version of the XML Schema	Specific ECSS_M_50B (New) Version of the XML Schema, the XML file respects	2.3	2.3

Table B-2: data_definition_exchange

This table describes metadata related to the whole TDP

ECSS_M_50B term	Designation	ISO 10303 AP-232 Definition	Your mapping	Example
/data_package/data_definition_exchange/dde_properties/dde_identification/				
* identifying_number *	Data package reference	The identifying_number specifies an identification number for the specific group of product information of interest as issued by the Design_activity. NOTE The identifying_number may be an alphanumeric.		A5-TDP-11000-0001-A-DLA-FRE
date_of_transfer (date, specific_time)	Data Package creation date	The date_of_transfer specifies the date and time when the responsible activity initiated the transfer of the Data_definition_exchange. The date_of_transfer need not be specified for a particular Data definition_-exchange_header.		date=2004-11-15 speci-fic_time=23:59:59.99999+02:00

ECSS_M_50B term	Designation	ISO 10303 AP-232 Definition	Your mapping	Example
title	Data package title	The title specifies the formal designation of the specific group of product information of interest. The title need not be specified for a particular Element_identification. NOTE The document title may be an abbreviated form of the title or may have abbreviations of selected words within the title.		Saturn Express Critical Design Review Data Package
dde_exchange_purpose	Purpose of the exchange	The exchange_purpose specifies textual information where the reason for the exchange can be specified. The exchange_purpose need not be specified for a particular Reason.		Critical Design Review
*** design_activity ***	Issuing company reference	Reference to the company responsible for the design content.		
*** configuration_Id ***	Project code	The configuration_id specifies the unique identification of a variation of the Product_model.		A5
*** product_name ***	Project name	The product_name specifies the name of the Product_model that is under configuration management.		Ariane 5
preparing_contracts (list)	Specifies the contracts	The preparing_contracts specifies the contracts authorizing the developing of the Configuration of interest. The preparing_contracts need not be specified for a particular Configuration. There may be more than one preparing_contracts for a configuration.		
contract_number		The contract_number specifies the contract number used to reference the Contract. NOTE The contract number may be an alphanumeric identification.		
contract_data_requirements_list		The contract_data_requirements_list specifies the contract data requirement list clause or contract work listing number that authorizes, specifies, and regulates the formal agreement between two or more parties. The contract data requirements list is part of the Contract. The contract_data_requirements_list need not be specified for a particular Contract.		
data_item_description_identification		The data_item_description_identification specifies a specific set of data or system products that are referenced within a contract. The data_item_description_identification need not be specified for a particular Contract.		

ECSS_M_50B term	Designation	ISO 10303 AP-232 Definition	Your mapping	Example
distribution_authorizations (list)	Specifies the distribution notice (allowed persons distribution)	The distribution_authorizations specifies the allowable circulation of information that is applicable to the Configuration. The distribution_authorizations need not be specified for a particular Configuration. There may be more than one distribution_authorizations for a Configuration.		
security_identifications	Specifies the security levels of the data package	The security_identifications specifies the security or sensitivity of the Configuration and its contents. The security_identification need not be specified for a particular Configuration. There may be more than one security_identifications for a Configuration.		
item_classification		The item_classification specifies the security level or sensitivity level of the Tdp_element. The security classification is assigned by the originator based on predetermined criteria.		
title_security_classification		The title_security_classification specifies the security level or sensitivity of the title of the Tdp_element. The security classification is assigned by the originator based on predetermined Government or commercial criteria restricting the title or nomenclature used within the title. The title_security_classification need not be specified for a particular Security_classification.		
classification_date		The classification_date specifies the date the item was given the item_classification. The classification_date need not be specified for a particular Security_classification.		EXAMPLE A radar absorbing material specification is classified on the date the specification is created.
declassification_date		The declassification_date specifies the date the item was given the item_classification. The declassification_date need not be specified for a particular security_classification.		EXAMPLE The secret performance specifications to a retired fighter jet is declassified on this date.
release_authorizations (list)	Identifies the company and person that has authenticated data package contents	The release_authorizations specifies the originating system sources that have authenticated the Configuration contents for the purposes of release. The release_authorizations need not be specified for a particular Configuration. There may be more than one release_authorizations for a Configuration.		

ECSS_M_50B term	Designation	ISO 10303 AP-232 Definition	Your mapping	Example
release_date (date, specific_time)		The release_date specifies the date and time that the design release activity released the Tdp_element.		
release_authority		The release_authority specifies the name of the Company responsible for the release of the Tdp_element.		
authentication		The authentication specifies the originating system identification of the authentication. NOTE The authentication constitutes an electronic signature that assures the integrity of the Tdp_element's contents. This may be conducted by reviewing the Tdp_element's contents or by validating the automated data processing system procedures that constructed or manages the Tdp_element Specific ECSS_M_50B (Clarification) This term specifies the originating system identification of the authentication.		

Table B-3: item_properties

This table describes metadata to build virtual folders within a TDP. Each item (=folder) can have many elements (=documents)

ECSS_M_50B term	Designation	ISO 10303 AP-232 Definition	Your mapping	Example
/data_package/dde_definition_exchange/dde_body/item_properties/				
* identifying_number *	folder name	~~The identifying_number specifies an Identifier or a Drawing_suffix_number_combination that is an identifier that defines the identification number for the Item as issued by the design_activity of the component.~~ Specific ECSS_M_50B (Replace ISO Definition) The identifying_number specifies an Identifier that defines the identification number for the Item as issued by the design_activity of the component.		

ECSS_M_50B term	Designation	ISO 10303 AP-232 Definition	Your mapping	Example
nomenclature_or_name	folder label	The nomenclature_or_name specifies the name, noun phrase, or abbreviated name of the Item. The nomenclature_or_name need not be specified for a particular Item_identification.		

Table B-4: element

This table describes metadata of a file

ECSS_M_50B term	Designation	ISO 10303 AP-232 Definition	Your mapping	Example
/data_package/dde_definition_exchange/dde_body/item_body/element/element_properties/				
* identifying_number *	Document reference	The identifying_number specifies an identification number for the specific group of product information of interest as issued by the Design_activity. NOTE The identifying_number may be an alphanumeric		ATV-ST-10-029-CN
* design_activity *	Issuing company reference	The design_activities specifies the organization, company, business, or industry responsible for the Element_identification.		CNES
language_code	Specifies the language use in the document.	The languages specifies the type of vocabulary nomenclatures used in the document or Tdp_element text. The langauges need not be specified for a particular Header. There may be more than one languages for a Header. Specific ECSS_M_50B (Supplementary info) ISO 639 2 letter code http://www.w3.org/WAI/ER/IG/ert/iso639.htm		FR EN DE …
/data_package/dde_definition_exchange/dde_body/item_body/element/element_properties/identification/document_element/				
* title *	Document title	The title specifies the formal designation of the specific group of product information of interest. The title need not be specified for a particular Element_identification. .		Technical specification of solar array

ECSS_M_50B term	Designation	ISO 10303 AP-232 Definition	Your mapping	Example
* status_code *	Life cycle or working process stage	The status_code specifies the process stage of the information. NOTE Product Data Management (PDM) systems use this status to aid in identifying where in the life cycle an information element resides.		Unknown In Preparation In Review Released Withdrawn
* change_level *	1st level version level (issue)	~~The change_level specifies the latest alteration made to a File, Item, or Tdp_ element as part of a revision. The change_level need not be specified for a particular Change_identification.~~ ~~NOTE For format standards, a change level may be the same as an addendum or amendment.~~ Specific ECSS_M_50B (Replace ISO Definition) The change_level specifies the first level of version identification.		if version is 2.3 then the change_level is 2 and the issue_level is 3
* date * specific_time	1st level version date (issue)	~~The change_date specifies either the date and time that the change_level was advanced or the date and time of the change. The change_date need not be specified for a particular Change_identification.~~ Specific ECSS_M_50B (Replace ISO Definition) The change_date specifies either the date and time of the change.		date=2004-11-15 specific_time=23:59:59.99999+02:00

ECSS_M_50B term	Designation	ISO 10303 AP-232 Definition	Your mapping	Example
issue_level	2nd level version level (revision)	~~The issue_level specifies the issue number of the File, Item , or Tdp_element. The issue_level need not be specified for a particular Change_identification.~~ ~~NOTE 1 Changes to documents are normally tracked by revisions and engineering change notices. However, in cases where changes to the document do not affect technical content, a new issue of the document may be provided for which no revision or engineering change notice level is advanced.~~ Specific ECSS_M_50B (Replace ISO Definition) The issue_level specifies the second level of version identification.		if version is 2.3 then the change_level is 2 and the issue_level is 3
date specific_time	2nd level version date (revision)	~~The issue_date specifies the date and time that the activity issued the File, Item, or Tdp_element. The issue_date need not be specified for a particular Change_identification.~~ Specific ECSS_M_50B (Replace ISO Definition) The issue_date specifies either the date and time of the issue.		date=2004-12-20 specific_time=14:30:27
document_abstract	list of abstracts (in several languages if needed)	The document_abstract specifies a brief overview of the document or Tdp_element. The document_abstract need not be specified for a particular Header.		
authors (list)	Specifies the list of authors for the document.	A Person is an individual with legal rights and duties. A person shall be uniquely identified for purposes of a data exchange. Specific ECSS_M_50B (Supplementary info) Note: Person and Person_and_organization ISO terms are replaced by person_and_company A person shall exist in the <database> section of the XML Schema		

ECSS_M_50B term	Designation	ISO 10303 AP-232 Definition	Your mapping	Example
distribution_authorizations (list)	Specifies the distribution notice (allowed persons distribution)	~~The distribution_authorizations specifies the allowable circulation of information that is applicable to the Configuration. The distribution_authorizations need not be specified for a particular Configuration. There may be more than one distribution_authorizations for a Configuration.~~ Specific ECSS_M_50B (Replace ISO Definition) The distribution_authorizations specifies the allowable circulation of information that is applicable to the Element. The distribution_authorizations need not be specified for a particular Element. There may be more than one distribution_authorizations for an Element.		
element_code (list)	Type of document	The element_code specifies the classification code for a Tdp_element.		NT CR PR …
keyword (list)	Specifies the list of keywords in the document	The document_keywords specifies words that describe the main thought or topic of a document or Tdp_- element. The document_keywords need not be specified for a particular Header. There may be more than one keywords for a Header. Specific ECSS_M_50B (Clarification) The ISO term "document_keywords" is renamed "keywords" in ECSS_M_50B which is a list of "keyword"		
changes_managed_by_sender	Specifies whether the element is configuration managed by the company issuying the TDP	Specific ECSS_M_50B (New)		true or false

ECSS_M_50B term	Designation	ISO 10303 AP-232 Definition	Your mapping	Example
proprietary_extensions	Proprietary extensions to document metadata	Specific ECSS_M_50B (New) If two firms want to exchange some additional metadata, they can use this field to add some (key, value) metadata or to extend the XML Schema in order to exchange new metadata. Note : These metadata are not exchangeable with companies that do not use the same proprietary_extensions.		
/data_package/dde_definition_exchange/dde_body/item_body/element/element_properties/identification/				
*** proprietary_element ***	full proprietary metadata (instead of document_element metadata)	Specific ECSS_M_50B (New) If two firms want to exchange metadata that are not linked to documents, the proprietary_element allows to extend the XML Schema in order to exchange these metadata. Note : These metadata are not exchangeable with companies that do not use the same.proprietary_element.		
/data_package/dde_definition_exchange/dde_body/item_body/element/element_properties/entry_note (list)				
note	Note	The note specifies the explanatory remarks or notations that may be useful or informative to a human.		
type_of_notation	Type of notation	The type_of_notation specifies the type of notation. The type of notation is a characteristic of a note that identifies how, what, or where a notation is used. There may be more than one type_of_notation for a Notation. The type_of_notation need not be specified for a particular Notation.		

ECSS_M_50B term	Designation	ISO 10303 AP-232 Definition	Your mapping	Example
/data_package/dde_definition_exchange/dde_body/item_body/element/element_body/entry_file (list)				
* context_file_name *	Element local file path within the Zip archive, relatively to the meta-inf/datapackage.xml file	The context_file_name specifies the computer system file identification for the File. NOTE When a file is being exchanged, the context_file_name is the file's identification. Specific ECSS_M_50B (Supplementary info) . In addition, the path is defined with characters \ . and .. This field is an "Implementation field" that may be filled automatically by tools		../revue10/ ATV-ST-10-029-CN_02_05_[2].pdf
* native_format_file_name *	Native format file name (not the path)	The native_format_file_name specifies the originating computer system application file identification for the File. The native_format_file_name need not be specified for a particular File. NOTE The originating computer system file identification is generally referred to as the native file name or the native application file name. Specific ECSS_M_50B (Supplementary info) This field is an "Implementation field" that may be filled automatically by tools		specification.doc
byte_size	File size (in bytes)	The size specifies statistics related to the computer system representation of the File. The size need not be specified for a particular File Specific ECSS_M_50B (Supplementary info) This field is an "Implementation field" that may be filled automatically by tools		12563254

ECSS_M_50B term	Designation	ISO 10303 AP-232 Definition	Your mapping	Example
/data_package/dde_definition_exchange/dde_body/item_body/element/element_body/entry_url (list)				
* url *	url of a content	Specific ECSS_M_50B (New) In this case, the content file is not stored inside the datapackage, only the metadata are. This field is an "Implementation field" that may be filled automatically by tools		http://www.ecss.nl/index.html
byte_size	File size (in bytes)	The size specifies statistics related to the computer system representation of the File. The size need not be specified for a particular File Specific ECSS_M_50B (Supplementary info) This field is an "Implementation field" that may be filled automatically by tools		12563254

Table B-5: database

This table describes persons and companies that are linked to elements

ECSS_M_50B term	Designation	ISO 10303 AP-232 Definition	Your mapping	Example
/data_package/database/companies/company				
* design_activity_code *	Issuing company code	The design_activity_code specifies a company identifier code for the Design_authority responsible for the design content. The design_activity_code need not be specified for a particular Design_authority. NOTE Many industry associations and governments assign unique design_activity_codes to each company.		ASTR
* name *	Company name	The name specifies the textual label the company is known by		ASTRIUM
address	Company's address	The address specifies the electronic or physical location where the company can be interfaced with. The address need not be specified for a particular Company.		

ECSS_M_50B term	Designation	ISO 10303 AP-232 Definition	Your mapping	Example
/data_package/database/persons/person				
* last_name *				
first_name				
middle_name				
title				
Email_address				

Additional information on Tables B-1 to B-5

This Table provides additional information to tables 1 to 5, by identifying all the ISO terms mentioned in column "ISO 10303 AP-232 Definition" that are not defined in column "ECSS_M_50B term" (note that these ISO terms correspond to intermediate nodes in the metadata model tree whose unique role is to gather sub terms without any other semantics).

In the following table, in front of each ISO term previously identified, an ECSS_M_50B term or a pointer to the Table B-1 to Table B-5 is given. For further details, see ecss_m_50b.xsd

Table B-6: Additional information on Tables B-1 to B-5

ISO 10303 AP 232	ECSS_M_50B
Change	change
change_date	date attribute of Change element
Change_identification	change_identification
Configuration	configuration
Contract	contract
data_definition_exchange	data_definition_exchange
data_definition_exchange_header	*Table 2*
Design_authority	company
document_keywords	keyword (list)
Element_identification	element_identification
exchange_purpose	dde_exchange_purpose
File	file
Header	replaced by document_elementType
Issue	issue
issue_date	date attribute of Issue element
Item	*Table 3*
item_classification	item_classification
item_identification	item_identification
Notation	notation
Person	person
Person_and_organization	person_and_company
Product_model	replaced by product_name
Security_classification	security_classification
Tdp_element	*Table 4*

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Annex C (informative)
Digital signature

C.1. Introduction

This annex provides information about the main principles and the implementation of the digital signature as approval method for information/documents.

C.2. Digital signature main principles

The digital signature mechanism relies on an asymmetric cryptography.

Main digital signature components are:

- a public and private key
- an X.509 certificate
- a certificate authority
- a signature tool implementing “hash and cipher algorithm”

Digital signature relies on the following principles:

- Each signer has private and public keys (as for a credit card).
- The signer public key is linked to the signer through a certificate (X.509).
- The certificate is delivered by a certification authority which authenticates the signer and warrants the process for certificate delivery.
- The signer signs the document with his/her own and protected private key using a signature tool.
- The signed document contains signature(s) and information enabling the recipient to verify the signature(s).
- If needed, the recipient, trusting the certification authority of the signer, may verify signatures with the public key figuring in the signer certificate.

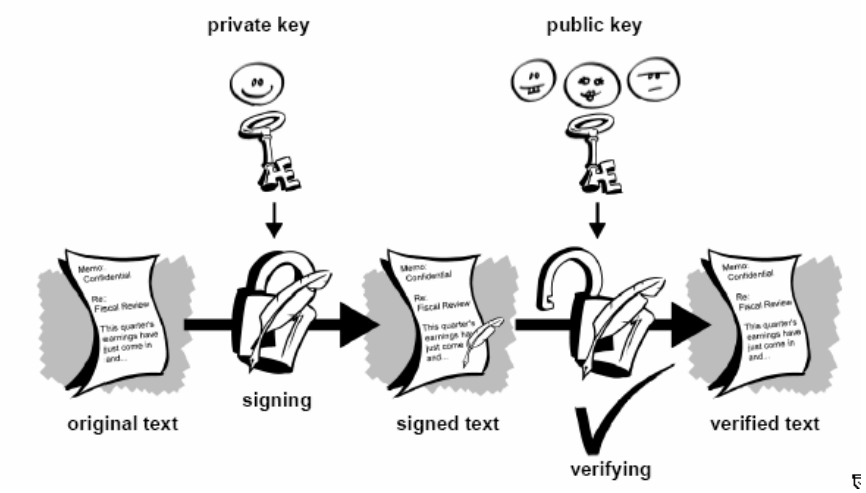

Figure C-1 Digital signature

C.3. Certificates

C.3.1. X.509 certificate

X.509 certificates comply with the ISO/IEC/ITU-T X.509 and IETF international standard.

An X.509 certificate is a collection of a standard set of fields containing information about a user or device and their corresponding public key. The X.509 standard defines what information goes into the certificate.

Additional detailed information can be taken from the following web site: http://www.ietf.org/rfc/rfc3280.txt

C.3.2. Self-signed certificate

A self-signed certificate is a certificate auto-generated by the signer. Some tools allow creation of such certificates. A self-signed certificate is NOT delivered by a recognized certification authority that guarantees the signer identity. The trust level of a self-signed certificate is extremely low.

C.4. Digital signature implementation

There are several means and tools for digitally signing a document; hereafter is described a very simple implementation for signing PDF documents.

NOTE Using PDF format allows the digital signature and document to be embodied in a unique PDF document.

C.4.1. Signature apposition

Signature can be apposed after completion of the following steps;
1 – Implement and retrieve an X509 signature certificate:
Certificate may be acquired closely certification authorities as for example:

- VERISIGN (http://www.verisign.com),
- THAWTE (http://www.thawte.com/),
- Cacert (http://www.cacert.org/)

A certificate retrieval search can be performed using MICROSOFT Internet Explorer.

2 – Find and install a signature tool like « Adobe Acrobat Standard, or UTIMACO»
These products enable to sign PDF with any X.509 certificates.

NOTE Adobe Acrobat Standard is different from "Adobe Acrobat Reader". For more detailed information, go to http://www.adobe.com , or http://www.utimaco.com

3 – Import the certificate into "Signature Tool"
4 – Sign the PDF document using Signature Tool functions.

C.4.2. Signature verification

A user who needs to verify the digital signature verifier has to install:
1 – Adobe Acrobat Reader or equivalent depending on the signature tool
2 – Certificates of certification authorities (in standard with VERISIGN and THAWTE)

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Bibliography

ECSS-M-00B Space project management – Policy and principles

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ECSS Change Request / Document Improvement Proposal

A Change Request / Document Improvement Proposal for an ECSS Standard may be submitted to the ECSS Secretariat at any time after the standard's publication using the form presented below.

This form can be downloaded in MS Word format from the ECSS Website (www.ecss.nl, in the menus: Standards - ECSS forms).

ECSS Change Request / Document Improvement Proposal

1. Originator's name: Organization: e-mail:				2. ECSS Document number: 3. Date:	
4. Number.	5. Location of deficiency clause page (e.g. 3.1 14)		6. Changes	7. Justification	8. Disposition

Filling instructions:

1. **Originator's name -** Insert the originator's name and address
2. **ECSS document number -** Insert the complete ECSS reference number (e.g. ECSS-M-00B)
3. **Date -** Insert current date
4. **Number -** Insert originator's numbering of CR/DIP (*optional*)
5. **Location -** Insert clause, table or figure number and page number where deficiency has been identified
6. **Changes -** Identify any improvement proposed, giving as much detail as possible
7. **Justification -** Describe the purpose, reasons and benefits of the proposed change
8. **Disposition -** not to be filled in (*entered by relevant ECSS Panel*)

Once completed, please send the CR/DIP by e-mail to: ecss-secretariat@esa.int

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