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**Space systems — Configuration  
management**

*Systèmes spatiaux — Management de la configuration*

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# Contents

|  | Page      |
|--|-----------|
| Foreword.....  | v         |
| Introduction.....  | vi        |
| <b>1 Scope.....</b>  | <b>1</b>  |
| <b>2 Normative references.....</b>                                       | <b>1</b>  |
| <b>3 Terms and definitions.....</b>                                      | <b>1</b>  |
| <b>4 General.....</b>  | <b>2</b>  |
| <b>5 Configuration management planning.....</b>                          | <b>3</b>  |
| 5.1 General.....   | 3         |
| 5.2 Configuration management plan.....                                   | 3         |
| 5.3 Configuration management interfaces.....                             | 4         |
| <b>6 Configuration identification.....</b>                               | <b>4</b>  |
| 6.1 General.....   | 4         |
| 6.2 Main activities of configuration identification.....                 | 4         |
| 6.3 Product tree.....  | 4         |
| 6.4 Configuration item.....  | 5         |
| 6.5 Selection of configuration items.....                                | 5         |
| 6.6 Configuration documents list.....                                    | 5         |
| 6.7 Identification marking.....  | 6         |
| 6.8 Configuration document.....  | 7         |
| 6.9 Configuration baseline.....  | 9         |
| 6.10 Configuration change documentation.....                             | 9         |
| 6.11 Publication and maintenance of the configuration documentation..... | 9         |
| <b>7 Configuration control.....</b>                                      | <b>10</b> |
| 7.1 General.....   | 10        |
| 7.2 Configuration control requirements.....                              | 10        |
| 7.3 Change.....  | 10        |
| 7.3.1 Change classification.....   | 10        |
| 7.3.2 Change procedure.....  | 11        |
| 7.4 Deviation/waiver.....  | 12        |
| 7.4.1 Deviation/waiver requirements.....                                 | 12        |
| 7.4.2 Deviation/waiver classification.....                               | 13        |
| 7.4.3 Deviation/waiver application.....                                  | 13        |
| 7.4.4 Deviation and waiver control procedure.....                        | 14        |
| 7.5 Interface control.....   | 15        |
| <b>8 Configuration status accounting.....</b>                            | <b>16</b> |
| 8.1 General.....   | 16        |
| 8.2 Configuration status accounting requirements.....                    | 16        |
| 8.3 Configuration status accounting process.....                         | 16        |
| <b>9 Configuration verification.....</b>                                 | <b>18</b> |
| 9.1 General.....   | 18        |
| 9.2 Verification of the product configuration definition.....            | 18        |
| 9.3 Verification of the product configuration.....                       | 18        |
| <b>10 Configuration audit.....</b>                                       | <b>18</b> |
| 10.1 General.....  | 18        |
| 10.2 Configuration audit requirements.....                               | 19        |
| 10.3 Configuration audit team.....                                       | 19        |
| 10.4 Responsibilities of the supplier and the customer.....              | 19        |
| 10.5 Meeting minutes.....  | 20        |
| 10.6 Functional configuration audit.....                                 | 20        |
| 10.7 Physical configuration audit.....                                   | 21        |

|  |           |
|--|-----------|
| 10.8 Others.....   | 21        |
| <b>11 Configuration control board.....</b>   | <b>21</b> |
| <b>Annex A (informative) Structure and content of a configuration management plan.....</b> | <b>23</b> |
| <b>Annex B (informative) Configuration management.....</b>                                 | <b>25</b> |
| <b>Annex C (informative) Configuration status accounting reports.....</b>                  | <b>26</b> |
| <b>Bibliography.....</b>   | <b>29</b> |

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## 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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

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

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

## Introduction

The space system is a complex system and needs configuration management to ensure its success. Configuration management establishes and maintains a consistent record of a product's functional and physical characteristics compared to its design and operational requirements in order to allow personnel that are involved to know, at any time, the technical description of a product using approved documentation, and the operational possibilities and limitations of each product time.

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# Space systems — Configuration management

## 1 Scope

This document defines the contents, methods and requirements of configuration management for space projects, and the responsibilities and authorities of related parties. It can be used together with ISO 14300-1:2011, Clause 10.

This document is applicable to the configuration management of space projects from the mission analysis phase to the disposal phase.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 14300-1, *Space systems — Programme management — Part 1: Structuring of a project*

ISO 10795, *Space systems — Programme management and quality — Vocabulary*

ISO 10007, *Quality management — Guidelines for configuration management*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 14300-1, ISO 10007 and ISO 10795 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

### 3.1 configuration

interrelated functional and physical characteristics of a product or service defined in configuration information

#### 3.1.1 functional characteristic

performance parameter and design constraint to be realized or required, including operational and logistic parameters and their respective tolerances

Note 1 to entry: Functional characteristics include all performance parameters such as range, speed, lethality, reliability, maintainability and safety.

#### 3.1.2 physical characteristic

quantitative and qualitative expression of a product and its tolerance

EXAMPLE Mechanical, electrical, chemical or biological characteristic.

**3.2 configuration management**

activity for establishing and maintaining consistent records of the status of and changes to the performance parameters of a product and its functional and physical attributes compared to the product design and operational requirements

Note 1 to entry: Configuration management is applied throughout the entire life of the product (i.e. development, production, deployment, operation and disposal).

**3.3 configuration item**

aggregation of hardware, software, processed materials, services or any of its discrete portions, that is designated for configuration management and treated as a single entity in the *configuration management* (3.2) process

Note 1 to entry: A configuration item can contain other configuration item(s).

**3.4 configuration document**

document that defines the requirements for the function, design, build, production and verification for a *configuration item* (3.3)

Note 1 to entry: For space systems, configuration documents can include documents relating to the operation and disposal of the configuration item.

**3.5 configuration baseline**

approved status of requirements and design of a product at a project key milestone that serves as the reference for activities throughout the life cycle of the product

**3.6 change control**

activity for controlling the changes or deviation/waiver to the product after the formal approval of its *configuration baseline* (3.5)

**3.7 change**

official numerically issued alterations to a document or any portion thereof, usually brought about by changed conditions or more complete information

Note 1 to entry: "Class 1" (Major) are changes that impact the contractual/technical agreement reached between the project and its customer. It is necessary that such changes be submitted to the customer for review and approval before implementation.

Note 2 to entry: "Class 2" (Minor) are changes that do not impact the customer contract and that are necessary for the project and its supply chain to meet the technical/contractual requirements and provisions. Such changes can be implemented after configuration control board (CCB) approval.

**4 General**

**4.1** Configuration management establishes and maintains a consistent record of product functional and physical characteristics compared to its design and operational requirements. Configuration management shall be applied throughout the entire life cycle of the product and improved as the project develops.

**4.2** Establish the CCB consisting of representatives of related fields on the basis of the complexity of the configuration item and its position in the project breakdown structure. The CCB consists of permanent representatives of all programme or project disciplines necessary for the review and evaluation of changes. The members of the CCB are with the decision-making authority.



**4.3** Each supplier produces a configuration management plan (CM plan) responding to the customer's configuration management requirements. The CM plan shall specify the objectives, missions, responsibilities and requirements of each phase during the entire life cycle and make necessary revisions according to the specific circumstances as the project develops.

**4.4** Configuration management interfaces with engineering, product assurance, manufacturing and production and contributes to the programme or project organization and their schedule for execution by identifying all constraints related to the business agreement provisions.

## 5 Configuration management planning

### 5.1 General

Configuration management planning is aimed at specific configuration items. Effective configuration management planning coordinates configuration management activities in a specific context over the product life cycle and shall be performed at the initial phase of the project.

Configuration management planning shall:

- a) ensure the configuration management process can comprehensively and accurately record and control the evolution of product configuration;
- b) ensure the participating personnel know the correct configuration documents of a product at any time;
- c) ensure the configuration documents used are complete, correct, controlled and approved;
- d) ensure the traceability of the configuration evolution;
- e) ensure the consistency of internal and external interfaces of a product;
- f) ensure the consistency of the configuration of the inspected product and requirements of the technical documents.

### 5.2 Configuration management plan

**5.2.1** Configuration management plan is a document specifying the organization and its responsibilities, the procedure, resources and means to implement configuration management. The output of configuration management planning is a configuration management plan. The configuration management plan prepared by the supplier shall be submitted to the customer for approval in response to a requirement from customer.

**5.2.2** For a configuration item, the configuration management plan shall:

- a) meet the requirements of the contract;
- b) establish the overall objective and phase objectives for the implementation of configuration management;
- c) specify the responsibilities and authorities for the implementation of configuration management;
- d) establish the procedure and means to implement configuration management;
- e) comply with the configuration requirements defined by the customer;
- f) clarify the interface control requirements;
- g) ensure that the process of the configuration management is under control.

5.2.3 [Annex A](#) provides the structure and basic contents of the configuration management plan.

### 5.3 Configuration management interfaces

Configuration management is an integral part of project management. Configuration management processes shall interface with engineering management, product assurance, product manufacturing and information/documentation management. For the definition and phasing of configuration management activities, configuration management should also take into account the contractual provision and schedule.

## 6 Configuration identification

### 6.1 General

Configuration identification incrementally establishes and releases controlled documentation for the purpose of identifying configuration characteristics of a product until it is fully defined with respect to its intended functional and physical characteristics. Configuration identification establishes and maintains a documentation basis for configuration control, status accounting, verification and audit, and is the basis for the implementation of configuration management. The management of the configuration documents should be incorporated into the information/document management process, and the relationship is detailed in [Annex B](#).

### 6.2 Main activities of configuration identification

Main activities of configuration identification are:

- a) select configuration items on the basis of the project breakdown structure and product tree; processes and requirements of project breakdown structures are performed according to ISO 27026;
- b) determine configuration documents produced at different phases (including internal and external interface documents) and form the preliminary configuration documents list;
- c) specify identifiers for configuration items and configuration documents;
- d) produce configuration documents based on the approved configuration documents list;
- e) establish the configuration baseline;
- f) document the configuration change information and provide its identifier.

### 6.3 Product tree

**6.3.1** The supplier shall break down the task of the project, starting from the functional requirements and according to certain logic and requirements defined by Level 1 customer. On the basis of the project breakdown structure, the supplier shall determine the project structure levels and the corresponding work, and complete the respective product trees in accordance with functional requirements for each product.

**6.3.2** The product tree, based on the approved final function, breaks down the system into successive levels and defines the top-down architecture framework of a product, such as system level, subsystem level, unit level etc.

**6.3.3** The supplier shall ensure that the product tree can comprehensively describe the product's successive breakdown, the product's compositions and their positions and the necessary configuration items for the delivering of the product function.

**6.3.4** The product tree is established on the basis of historical information or knowledge gained through the project. The product tree shall be updated under configuration control.

## 6.4 Configuration item

**6.4.1** The selection of configuration items is conducted on the basis of the project breakdown structure and product tree. Configuration items correspond with the structure of product tree and are identified at various levels of the product tree.

**6.4.2** Configuration items fall into two categories, developed configuration item and non-developed configuration item. A developed configuration item is subject to development and fully or partially designed for the programme or project, while a non-developed configuration item is a standardized or “off-the-shelf” product that is not developed specifically for the programme or project. Both of the two categories shall be managed by the requirements of configuration management.

## 6.5 Selection of configuration items

**6.5.1** Select configuration items as early as possible. Configuration items of upper levels (system and subsystem level) shall be selected at the early definition phase; configuration items of lower levels (unit level) shall be selected at the initial stage of its life cycle.

**6.5.2** The number of configuration items selected shall take into account the management effect, cost, risks, including safety and security, and development time etc, in order to maximize the project control capacity of the organization.

**6.5.3** The organization shall determine configuration items according to certain selection criteria. The selected configuration items usually are: [ISO 21886:2019](https://standards.iteh.ai/catalog/standards/sist/c77de9be-36ef-4a7a-8b6e-4e26865a7652/iso-21886-2019)

- a) items whose functional and physical characteristics can be separately managed;
- b) items of system level, sub-system level or developed cross-unit and cross-sector;
- c) items that have critical characteristics from a safety, risk and mission success point of view;
- d) items that incorporate new design, technology or methods;
- e) items interfacing with other items;
- f) items designated for separate procurement;
- g) items that are critical for use and security.

**6.5.4** For configuration items controlled by the customer and their related baseline review, the customer and supplier shall make mutual consultation to determine the principles to be defined in the configuration management plan.

**6.5.5** A list of confirmed configuration items shall be submitted to the customer for approval. The list shall indicate the structure (system, subsystem and unit), names and identifiers of the configuration items.

**6.5.6** Review and update configuration items as the project develops.

## 6.6 Configuration documents list

**6.6.1** Each supplier shall determine the configuration documents related to design, manufacturing, testing, operation, maintenance, storage, etc. (including internal and external interface documents) to be

prepared during the entire life cycle of the product. The configuration documents list shall be improved and updated with the progress of configuration identification activities.

**6.6.2** The configuration documents list shall include:

- a) document title and identifier;
- b) type of document;
- c) phases during the life cycle;
- d) expected release time (determined by the phases and supplier's schedule);
- e) preparation company and document status;
- f) classification (open, classified), etc.

**6.6.3** The configuration documents list prepared by the supplier shall be submitted to the customer for approval.

## **6.7 Identification marking**

### **6.7.1 General**

For confirmed configuration items, their identification marking mainly includes configuration item identifiers and configuration document identifiers.

### **6.7.2 Configuration item identifier**

**6.7.2.1** Configuration item identifier is a code to indicate the item (product) designation and type, and shall be produced by the customer, supplier or related parties according to its sources and breakdown structure (such as system, subsystem, unit, etc.).

**6.7.2.2** A configuration item identifier shall be unique. A configuration item identifier shall include:

- a) model identifier;
- b) serial number;
- c) configuration item identifier;
- d) manufacturer identifier;
- e) product name, etc.

**6.7.2.3** Identifiers for standard products and off-the-shelf products shall comply with relevant standards and requirements.

### **6.7.3 Configuration document identifier**

**6.7.3.1** Configuration document identifier is a code to indicate the entity described and the document type and is usually produced by the supplier according to internal regulations.

**6.7.3.2** A configuration document identifier shall be unique.

**NOTE** To avoid the possible existence of the same identifier for different products (items), a common practice is to prefix the identifier with an enterprise identifier.