INTERNATIONAL STANDARD

**ISO 21351**

First edition
2005-05-15

# Space systems — Functional and technical specifications

*Systèmes spatiaux — Cahier des charges fonctionnel et spécification technique de besoin*

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO 21351:2005
https://standards.iteh.ai/catalog/standards/sist/a0fa6f0c-ab37-4883-9141-852d615f5137/iso-21351-2005

Reference number
ISO 21351:2005(E)

© ISO 2005

**PDF disclaimer**

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO 21351:2005
https://standards.iteh.ai/catalog/standards/sist/a0fa6f0c-ab37-4883-9141-852d615f5137/iso-21351-2005

© ISO 2005

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

 © ISO 2005 – All rights reserved

# 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 21351 was prepared by the European Committee for Standardization (CEN) in collaboration with Technical Committee ISO/TC 20, *Aircraft and space vehicles*, Subcommittee SC 14, *Space systems and operations*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Throughout the text of this document, read "...this European Standard..." to mean "...this International Standard...".

ISO 21351:2005
https://standards.iteh.ai/catalog/standards/sist/a0fa6f0c-ab37-4883-9141-852d615f5137/iso-21351-2005

© ISO 2005 – All rights reserved

# Contents



iTeh STANDARD PREVIEW
(standards.iteh.ai)
ISO 21351:2005
https://standards.iteh.ai/catalog/standards/sist/a0fa6f0c-ab37-4883-9141-852d6155f137/iso-21351-2005


© ISO 2005 – All rights reserved

iTeh STANDARD PREVIEW
(standards.iteh.ai)

**Figures**



ISO 21351:2005
https://standards.iteh.ai/catalog/standards/sist/a0fa6f0c-ab37-4883-9141-852d615f5137/iso-21351-2005

© ISO 2005 – All rights reserved

# Foreword

This document (EN ISO 21351:2005) has been prepared by European Cooperation for Space Standardization (ECSS), the secretariat of which is held by CMC, in collaboration with Technical Committee ISO/TC 20 “Aircraft and space vehicles”.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by November 2005, and conflicting national standards shall be withdrawn at the latest by November 2005.

It is based on a previous version[1)] originally prepared by the ECSS Functional and Technical Specification Working Group, reviewed by the ECSS Engineering Panel and approved by the ECSS Steering Board. The 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.

This European Standard is one of the series of space standards intended to be applied together for the management, engineering and product assurance in space projects and applications.

Requirements in this document 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.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

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

This document includes a Bibliography.

ISO 21351:2005
https://standards.iteh.ai/catalog/standards/sist/a0fa6f0c-ab37-4883-9141-852d615f5137/iso-21351-2005

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

1) ECSS-E-10 Part 6.


© ISO 2005 – All rights reserved

## Introduction

This document introduces the strategy of establishing and positioning the Functional Specification (FS) and the Technical Specification (TS) in a project process to improve the effectiveness of its management in terms of performance, cost, schedule and risk.

These two specifications are recommended in ISO 14300-1 in order to focus to customer (or user) needs and to allocate proper time and resources for investigating and comparing a sensible range of candidate concepts, and selecting a preferred solution to be developed or to be purchased.

The FS is the baseline for investigating and comparing candidate concepts, while the TS is the baseline of the business agreement to develop or purchase the selected solution.

NOTE Functional Specification is also referred as “Functional Performance Specification (FPS)” in EN 1325-1.

iTeh STANDARD PREVIEW
(standards.iteh.ai)
ISO 21351:2005
https://standards.iteh.ai/catalog/standards/sist/a0fa6f0c-ab37-4883-9141-852d615f5137/iso-21351-2005

© ISO 2005 – All rights reserved

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO 21351:2005
https://standards.iteh.ai/catalog/standards/sist/a0fa6f0c-ab37-4883-9141-852d615f5137/iso-21351-2005

# 1 Scope

This document provides an overview of the respective purposes and positions of functional and technical specifications, their required contents, and the process for developing these documents.

This document is applicable to all types of space systems, all product elements, and projects.

# 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.

EN 13701:2001, *Space systems — Glossary of terms.*

EN ISO 17666:2003, *Space systems — Risk management (ISO 17666:2003).*

# 3 Terms, definitions and abbreviations

## 3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 13701:2001 and the following apply.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

**3.1.1**
**constraint**
characteristic, result or design feature which is made compulsory or has been prohibited for any reason

ISO 21351:2005
https://standards.iteh.ai/catalog/standards/sist/e0fc6f0c-ab37-4883-9141-852d615f5137/iso-21351-2005

NOTE 1 Constraints are generally restrictions on the choice of solutions in a system.

NOTE 2 Two kinds of constraints are considered, those which concern solutions, and those which concern the use of the system.

NOTE 3 For example constraints can come from environmental and operational conditions, law, standards, market demand, investments and means availability, or the organization's policy.

NOTE 4 Adapted from EN 1325-1.

**3.1.2**
**environment, noun**
<product> natural conditions (such as weather, climate, ocean conditions, terrain, vegetation, dust, light and radiation) and induced conditions (such as electromagnetic interference, heat, vibration, pollution and contamination) that constrain the design definitions for end products and their enabling products

**3.1.3**
**environment, noun**
<project> external factors affecting an enterprise or project

**3.1.4**
**environment, noun**
<development> external factors affecting development tools, methods, or processes

**3.1.5**
**function**
intended effect of a system, subsystem, product or part

NOTE 1 Adapted from EN 1325-1.

© ISO 2005 – All rights reserved

NOTE 2 Functions should have a single definite purpose. Function names should have a declarative structure (e.g. “Validate Telecommands”), and say “what” is to be done rather than “how”. Good naming allows design components with strong cohesion to be easily derived.

**3.1.6**
**functional analysis**
technique of identifying and describing all functions of a system

NOTE Adapted from EN 1325-1.

**3.1.7**
**functional specification**
document by which the customer establishes the intended purpose of a product, its associated constraints and environment, the operational and performances features, and the permissible flexibility

NOTE 1 This document contains a complete set of provisional technical requirements for a product.

NOTE 2 This term is equivalent to "functional performance specification” as defined in EN 1325-1.

**3.1.8**
**life cycle**
time interval between the conceptual exploration of the product introduction to its withdrawal from service

**3.1.9**
**need**
what is necessary for, or desired by, the user

iTeh STANDARD PREVIEW
(standards.iteh.ai)

NOTE 1 A need can be declared or undeclared; it can be an existing or a potential one.

NOTE 2 The user is a person or an organization for which the product is designed and which exploits at least one of its functions at any time during its life cycle.

ISO 21351:2005
https://standards.iteh.ai/catalog/standards/sist/a0fa6f0c-ab37-4883-9141-852d615f5137/iso-21351-2005

NOTE 3 For the space community, the needs are often called mission statement.

NOTE 4 Adapted from EN 1325-1.

**3.1.10**
**specification**
document stating requirements

NOTE 1 A specification can be related to activities (e.g. procedure document, process specification and test specification), or products (e.g. functional specification, technical specification)

NOTE 2 Adapted from ISO 9000:2000.

**3.1.11**
**technical specification**
specification expressing technical requirements for designing and developing the solution to be implemented

NOTE The technical specification evolves from the functional specification and defines the technical requirements for the selected solution as part of a business agreement.

**3.1.12**
**verification matrix**
matrix that defines the verification strategy for each product technical requirement in terms of methods, level and stages


© ISO 2005 – All rights reserved

### 3.2 Abbreviated terms

The following abbreviated terms are defined and used within this document:

| Abbreviation | Meaning |
|---|---|
| **IEC** | International Electrotechnical Commission |
| **FS** | functional specification |
| **PA** | product assurance |
| **TS** | technical specification |

## 4 Functional specification and technical specification purpose and description

### 4.1 Functional specification purpose and description

A functional specification is a document through which a customer expresses his needs (or those that he is responsible for expressing) and the related environment and constraints in terms of technical requirements.

The FS is used for searching for possible concepts, evaluating them and selecting a preferred solution.

The technical requirements contained in the FS provide flexibility to:

iTeh STANDARD PREVIEW
(standards.iteh.ai)

- allow potential suppliers to propose the best technical and programmatic solutions;
- facilitate the adjustment among the need or mission statement, the context (e.g. programmatic elements and environmental constraints) and possible solutions.

ISO 21351:2005
https://standards.iteh.ai/catalog/standards/sist/a0fa6f0c-ab37-4883-9141-852da0151517/iso-21351-2005

NOTE The intention of the functional specification is not to assume or refer to specific solutions.

### 4.2 Technical specification purpose and description

The technical specification evolves from the functional specification and defines the technical performances for the proposed solution as part of a business agreement.

The TS is the technical reference for the acceptance of the definition and for the acceptance of the end product.

In that scope, the technical requirements contained in the TS have no flexibility. They are attainable and verifiable, and for each technical requirement, the method of verification (e.g. by test, by analysis) is specified.

### 4.3 FS and TS content

A specification (FS or TS) is typically composed of three major sets of information:

- General information related to the context of the document (e.g. administrative information, normative documents and informative documents);
- General information related to the context of the project, the product or system;
- Technical requirements (described in Clauses 6 and 8).

The specification provides the general information related to its context:

- Administrative information: to provide all the information regarding, for example, the owner, status, identification, distribution list, and management rule;

© ISO 2005 – All rights reserved