



**SLOVENSKI STANDARD**  
**SIST EN ISO 21351:2005**  
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Space systems - Functional and technical specifications (ISO 21351:2005)

Raumfahrtsysteme - Funktionale und technische Spezifikationen (ISO 21351:2005)

Systemes spatiaux - Cahier des charges fonctionnel et spécification technique de besoin (ISO 21351:2005)

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN ISO 21351**

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English version

**Space systems - Functional and technical specifications (ISO  
21351:2005)**

Systèmes spatiaux - Cahier des charges fonctionnel et  
spécification technique de besoin (ISO 21351:2005)

Raumfahrtssysteme - Funktionelle und technische  
Spezifikationen (ISO 21351:2005)

This European Standard was approved by CEN on 28 February 2005.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

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**EN ISO 21351:2005 (E)****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of an identical text or by endorsement, at the latest by November 2005, and conflicting national standards shall be withdrawn at the latest by November 2005.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<sup>1)</sup> 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.

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

This document includes a Bibliography.

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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.

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1) ECSS-E-10 Part 6.

## 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.

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**EN ISO 21351:2005 (E)****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.

**3.1.1****constraint**

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

<https://standards.iteh.ai/catalog/standards/sist/3e1539e8-3666-4244-9634-110506220001/en-13701-2001>

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.



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

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.

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

**EN ISO 21351:2005 (E)****3.2 Abbreviated terms**

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

<b>Abbreviation</b>	<b>Meaning</b>
<b>IEC</b>	International Electrotechnical Commission
<b>FS</b>	functional specification
<b>PA</b>	product assurance
<b>TS</b>	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:

- 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.

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;

- Scope: to define without ambiguity the subject of the FS and TS and aspects covered, thereby indicating limits of applicability;
- References: to list all the normative (applicable) documents and standards, with titles, issue revision, and dates that are referred to in the FS;
- Terms, definitions and abbreviated terms: to list the specific terms and abbreviated terms used in the FS.

It also provides general information related to the context of the project, product or system:

- to provide a clear and rapid understanding of the project and the main needs or mission statements;
- to give indications of the market as additional information, as well as information about the context of the project and the objectives (situation of the project in a larger programme, further developments);
- to provide information on the environment and its constraints;
- to detail the different situations of the product or system life cycle.

## 5 Process for establishing a functional specification and a technical specification

### 5.1 General

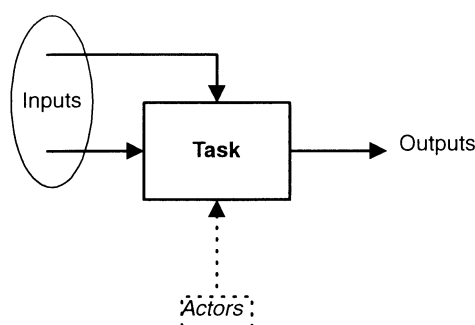
The management of a programme necessitates the establishment of a set of successive states of a product and a network of customer and supplier relationships. At any intermediate level, the supplier of an item acts as customer in specifying components towards its suppliers.

The two first states - the functional state and the specified state - are expressed in a FS and in a TS.

The procurement of products is governed by business agreements constituting the contract between two parties - the customer and the supplier.

A business agreement results from a negotiation process between a customer with a problem to solve, and a supplier with potential solutions. This results in a set of requirements that engages both parties. The list of requirements constitutes an important part of the business agreement and is adapted to the nature of the expected outcome.

Figures through 2 to 5 are provided to help supporting the understanding of a process for establishing a functional specification and a technical specification. The model used for these figures is presented in Figure 1.



**Figure 1 — Model presentations**

Where:

- The box represents the task to be performed;
- The left- and top-side arrows represent the necessary inputs to the task;
- An arrow on the right-side represents the output produced by the task;
- An arrow coming from below represent the actor involved in performing the task.