SLOVENSKI STANDARD
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Vesoljska tehnika – Zemeljski sistemi in delovanje – 2. del: Dokumenti z definicijami zahtev

Space engineering - Ground systems and operations - Part 2: Documents requirements definitions (DRDs)

Raumfahrttechnik - Bodensysteme und Bodenbetrieb - Teil 2: Dokumente mit Definitionen von Anforderungen

Ingénierie spatiale - Systemes sol et exploitation - Partie 2 : Définition des exigences documentaires (DRD)

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Space engineering - Ground systems and operations - Part 2: Documents requirements definitions (DRDs)

Ingénierie spatiale - Systèmes sol et exploitation - Partie 2 : Définition des exigences documentaires (DRD)

Raumfahrttechnik - Bodensysteme und Bodenbetrieb - Teil 2: Dokumente mit Definitionen von Anforderungen

This European Standard was approved by CEN on 2 February 2004.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

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.

CEN members are the national standards bodies of 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.

EUROPEAN COMMITTEE FOR STANDARDIZATION
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Foreword

This document (EN 14737-2:2004) has been prepared by CMC.

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of an identical text or by endorsement, at the latest by September 2004, and conflicting national standards shall be withdrawn at the latest by September 2004.

It is based on a previous version[1)] originally prepared by the ECSS Space Engineering Working Group, reviewed by the ECSS Technical Panel and approved by the ECSS Steering Board. The European Cooperation for Space Standardization (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.

EN 14737 "*Space engineering – Ground systems and operations*" is published in 2 Parts:

Part 1: Principles and requirements

Part 2: Document requirements definitions (DRDs)

Requirements in this European 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 European Standard takes into account the existing EN ISO 9000 family of documents.

The annexes A, B, C, D, E, F, G, H and I are normative.

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-70-2A.

Introduction

Ground systems and operations are key elements of a space system and as such play an essential role in achieving mission success. Mission success is defined here as the achievement of the target mission objectives as expressed in terms of the quantity, quality and availability of delivered mission products and services within a given cost envelope.

Mission success requires successful completion of a long and complex process covering the definition, design, implementation, validation, in flight operations and post operational activities, involving both the ground segment and also space segment elements. It involves technical activities, as well as human and financial resources, and encompasses the full range of space engineering disciplines. Moreover it necessitates a close link with the design of the space segment in order to ensure proper compatibility between both elements of the complete space system.

1 Scope

Part 2 of ECSS-E-70 "Space engineering — Ground systems and operations" specifies the content of the document requirements definitions (DRDs) which are called up by other European Space Standards and specifically referenced in EN 14737-1: "Principles and requirements".

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

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

EN 14737-1, *Space engineering — Ground systems and operations — Part 1: Principles and requirements.*

ECSS-E-70-41A, *Space engineering — Ground systems and operations — Telemetry and telecommand packet utilization.*

3 Terms, definitions and abbreviated terms

For the purposes of this European Standard, the terms, definitions and abbreviated terms given in EN 13701 and EN 14737-1 apply.

4 Document requirements definitions (DRD) list

European Space Standards specify the production and use of project documents. Document requirements definitions are defined to control the content of the project documents.

Document requirements definitions serve to ensure:

a) completeness and consistency of information within documents;

b) that the information contained in a document conforms to its defined scope, and correctly implements its interfaces with other documents; and

c) that portions of a document can be generated or maintained by separate organizational groups and seamlessly integrated into a coherent whole.

Table 1 lists and gives a summary of the DRDs that are defined in the annexes of this European Standard and called up in EN 14737-1.

Table 1 — EN 14737-2 DRD list

DRD ID	DRD title	DRD summary content	Applicable to (phase)	Delivered (phase)	Remarks
EN 14737-2:2004, annex A	Customer requirements document (CRD)	Formally defines the requirements from the Customer on the ground segment. Covers design, implementation and operations as well as cost and programmatic issues.	B	B	
EN 14737-2:2004, annex B	Ground segment baseline Definition (GSBD)	Formal response to CRD. Constitutes the ground segment technical baseline for the its design, implementation of the ground segment and for the operations of the mission. It includes conformance to CRD requirements, identifies derived requirements and major constraints and assumptions.	C to F	B	
EN 14737-2:2004, annex C	Mission operations concept document (MOCD)	Defines the overall mission operations concept at the level of major ground segment entities.	A, B	A[a] /B	
EN 14737-2:2004, annex D	Space segment user manual (SSUM)	Provides all information required to implement the ground segment and to operate the space segment, i.e.: — space segment design characteristics of operational relevance (e.g. operational modes, constraints); — telemetry and telecommand lists (i.e. all information items required for ground processing of TM and TC); — nominal and contingency recovery procedures (only covering space segment aspect).	C to F	C[a] /D	Used in phases C/D for design of G/S and maintenance in phase F
EN 14737-2:2004, annex E	Operational validation plan (OVP)	Provides all information required to execute the operational validation of the ground segment, i.e.: — definition of simulations and rehearsal activities; — timeline of above activities; — related organizational aspects and required resources and participation.	D	D	

Table 1 — EN 14737-2 DRD list

DRD ID	DRD title	DRD summary content	Applicable to (phase)	Delivered (phase)	Remarks
EN 14737-2:2004, annex F	Flight operations plan (FOP)	Defines information required to operate the space segment during all applicable in-orbit phases of the mission, i.e.: — general operation organization and decision making process and major mission rules; — detailed schedule of flight operations; — Flight control procedures (FCP see below) for both nominal operations and major contingencies.	D	E, F	To contain also space segment disposal procedures
EN 14737-2:2004, annex G	Ground operations plan (GOP)	Defines all information required to operate the corresponding ground facility and its constituent elements in order to support the mission, i.e.: — operations management and organizational aspects; — detailed schedule of activities for the entity in relation to mission events; — elementary entity operation procedures.	D	E, F	To contain also ground segment disposal procedures
EN 14737-2:2004, annex H	Operations anomaly report (OAR)	Documents a departure from the expected performance of an item during its operation. Includes: — date and time of anomaly occurrence and unique identifier for the anomaly; — summary description of the symptoms and impacts; — corrective actions and recommendations.	E	E	
EN 14737-2:2004, annex I	Flight control procedure (FCP)	Elementary constituent of the FOP. — Defines all actions to be performed to ensure adequate configuration of the space segment to achieve a given mission goal. — Addresses operational responsibilities, system prerequisites and post execution verification conditions. Two types of FCPs can be distinguished, for nominal and routine operations, and contingency operations respectively.	D	E, F	To contain also space segment disposal procedures

[a] Delivery phase marked with an asterisk indicates a preliminary (draft) delivery.

Annex A
(normative)

Customer requirements document (CRD) DRD

A.1 Introduction

The customer requirements document (CRD) defines the requirements from the space segment customer on the supplier of the ground segment and operations.

A.2 Scope and applicability

A.2.1 Scope

This document requirements definition (DRD) establishes the data content requirements for the customer requirements document. This DRD does not define format, presentation or delivery requirements for the customer requirements document.

A.2.2 Applicability

This DRD is applicable to all projects using the European Space Standards.

A.3 References

A.3.1 Glossary and dictionary

This DRD uses terminology and definitions controlled by:

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

EN 14737-1, *Space engineering — Ground systems and operations — Part 1: Principles and requirements.*

A.3.2 Source documents

This DRD defines the content and data requirements of a Customer Requirements Document as controlled by the following source document: EN 14737-1, *Space engineering — Ground systems and operations — Part 1: Principles and requirements.*

A.4 Definitions and abbreviations

For the purposes of this DRD the definitions and abbreviations given in EN 13701 and in EN 14737-1 shall apply.

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

Abbreviation	Meaning
AOCS	attitude and orbit control system
CRD	customer requirements document
DRD	document requirements definition
GSBD	ground segment baseline definition
HCI	human-computer interaction
LEOP	launch and early orbit phase

A.5 Description and purpose

The CRD contains all the essential top-level assumptions, constraints and operational requirements for the [insert project name] mission to allow the supplier of the ground segment and operations to perform a design of the ground segment and to develop an operations concept.

A.6 Application and interrelationship

The CRD shall be written by the space project customer and is the highest-level requirements document defining the requirements on the ground segment and operations. The supplier of the ground segment and operations shall formally respond to the CRD with the ground segment baseline definition document (GSBD) where all requirements in the CRD can be traced to a proposed implementation.

A.7 Customer requirements document preliminary elements

A.7.1 Title

The document to be created based on this DRD shall be titled "[insert project name] customer requirements document".

A.7.2 Title page

The title page shall identify the project document identification number, title of the document, date of release and release authority.

A.7.3 Contents list

The contents list shall identify the title and location of every clause and major sub-clause, figure, table and annex contained in the document.