SLOVENSKI STANDARD
SIST EN 16603-10-09:2014

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Vesoljska tehnika - Referenčni koordinatni sistem

Space engineering - Reference coordinate system

Raumfahrttechnik - Bezugskoordinatensystem

Ingéniérie spatiale - Système de coordonnées de référence

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Space engineering - Reference coordinate system

Ingéniérie spatiale - Système de coordonnées de référence

Raumfahrttechnik - Bezugskoordinatensystem

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Foreword

This document (EN 16603-10-09:2014) has been prepared by Technical Committee CEN/CLC/TC 5 “Space”, the secretariat of which is held by DIN.

This standard (EN 16603-10-09:2014) originates from ECSS-E-ST-10-09C.

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of an identical text or by endorsement, at the latest by January 2015, and conflicting national standards shall be withdrawn at the latest by January 2015.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document has been developed to cover specifically space systems and has therefore precedence over any EN covering the same scope but with a wider domain of applicability (e.g. : aerospace).

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

Introduction

Clear definition of reference directions, coordinate systems and their inter-relationships is part of the System Engineering process. Problems caused by inadequate early definition, often pass unnoticed during the exchange of technical information.

This Standard addresses this by separating the technical aspects from the issues connected with process, maintenance and transfer of such information. Clause 4 provides some explanation and justification, applicable to all types of space systems, missions and phases. Clause 5 contains the requirements and recommendations. Helpful and informative material is provided in the Annexes.

1
Scope

The objective of the Coordinate Systems Standard is to define the requirements related to the various coordinate systems, as well as their related mutual inter-relationships and transformations, which are used for mission definition, engineering, verification, operations and output data processing of a space system and its elements.

This Standard aims at providing a practical, space-focused implementation of Coordinate Systems, developing a set of definitions and requirements. These constitute a common reference or "checklist" of maximum utility for organising and conducting the system engineering activities of a space system project or for participating as customer or supplier at any level of system decomposition.

This standard may be tailored for the specific characteristics and constraints of a space project in conformance with ECSS-S-ST-00.

2
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.

EN reference	Reference in text	Title
EN 16601-00-01	ECSS-S-ST-00-01	ECSS system – Glossary of terms
EN 16601-10	ECSS-M-ST-10	Space project management – Project planning and implementation

3
Terms, definitions and abbreviated terms

3.1 Terms from other standards

For the purpose of this Standard, the terms and definitions from ECSS-S-ST-00-01 apply.

NOTE 1 Some terms are taken from other documents, referenced in square brackets in the References.

NOTE 2 There is no agreed convention for usage of combinations of the words “reference, coordinate, frame and system”. These terms are often used interchangeably in practice. In 1989, Wilkins’ [1] made a proposal. This Standard adopts a simpler terminology, which is more in line with everyday practice.

3.2 Terms specific to the present standard

3.2.1 coordinate system

method of specifying the position of a point or a direction with respect to a specified frame

NOTE E.g. Cartesian or rectangular coordinates, spherical coordinates and geodetic coordinates.

3.2.2 frame

triad of axes, together with an origin

3.2.3 inertial frame

non-rotating frame

NOTE 1 Inertial reference directions are fixed at an epoch.

NOTE 2 The centre of the Earth can be considered as non-accelerating for selecting the origin, in some applications.

3.2.4 J2000.0

astronomical standard epoch 2000 January 1.5 (TT)

NOTE equivalent to JD2451545.0 (TT).

3.3 Abbreviated terms

For the purpose of this Standard, the abbreviated terms from ECSS-S-ST-00-01 and the following apply:

Abbreviation	Meaning
AIT	assembly integration and test
AIV	assembly integration and verification
BCRS	barycentric celestial reference system
BIPM	Bureau International des Poids et Mesures – international bureau of weights and measures
CAD	computer aided design
CCSDS	Consultative Committee for Space Data Systems
CoM	centre of mass
CSD	coordinate systems document
DoF	degree of freedom
DRD	document requirements definition
GCRS	geocentric celestial reference system
IAG	International Association of Geodesy
IAU	International Astronomical Union
ICD	interface control document
ICRF	international celestial reference frame
ICRS	international celestial reference system
IERS	international Earth rotation and reference service
IMCCE	Institut de Mécanique Céleste et de Calcul des Ephémérides
ISO	International Organization for Standardization
ITRF	international terrestrial reference frame
ITRS	international terrestrial reference system
IUGG	International Union of Geodesy and Geophysics
J2000.0	epoch 2000 January 1.5 (TT)
JPL DExxx	Jet Propulsion Laboratory development ephemeris, number xxx
L/V	launch vehicle
MICD	mechanical interface control document
RCS	reaction control system
SEP	system engineering plan
SI	système international
STR	star tracker
TAI	temps atomique international – international atomic time
ToD	true of date