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Space engineering — Control engineering handbook

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National foreword

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**CEN-CENELEC Management Centre:
Rue de la Science 23, B-1040 Brussels**

Table of contents

European Foreword	4
Introduction	5
1 Scope	6
2 References	7
3 Terms, definitions and abbreviated terms	8
3.1 Terms from other documents.....	8
3.2 Terms specific to the present handbook	8
3.3 Abbreviated terms.....	12
4 Space system control engineering process	14
4.1 General.....	14
4.1.1 The general control structure	14
4.1.2 Control engineering activities	17
4.1.3 Organization of this handbook	17
4.2 Definition of the control engineering process	17
4.3 Control engineering tasks per project phase.....	18
5 Control engineering process recommendations	24
5.1 Integration and control.....	24
5.1.1 General.....	24
5.1.2 Organization and planning of CE activities	24
5.1.3 Contribution to system engineering data base and documentation.....	24
5.1.4 Management of interfaces with other disciplines	24
5.1.5 Contribution to human factors engineering	25
5.1.6 Budget and margin philosophy for control	25
5.1.7 Assessment of control technology and cost effectiveness	25
5.1.8 Risk management.....	25
5.1.9 Support to control components procurement.....	25
5.1.10 Support to change management involving control.....	26

5.1.11	Control engineering capability assessment and resource management.....	26
5.2	Requirements engineering.....	26
5.2.1	General.....	26
5.2.2	Generation of control requirements.....	26
5.2.3	Allocation of control requirements to control components.....	27
5.2.4	Control verification requirements.....	30
5.2.5	Control operations requirements.....	30
5.3	Analysis.....	30
5.3.1	General.....	30
5.3.2	Analysis tasks, methods and tools.....	31
5.3.3	Requirements analysis.....	32
5.3.4	Disturbance analysis.....	33
5.3.5	Performance analysis.....	33
5.4	Design and configuration.....	35
5.4.1	General.....	35
5.4.2	Functional design.....	36
5.4.3	Operational design.....	36
5.4.4	Control implementation architecture.....	36
5.4.5	Controller design.....	37
5.5	Verification and validation.....	38
5.5.1	Definition of control verification strategy.....	38
5.5.2	Preliminary verification of performance.....	39
5.5.3	Final functional and performance verification.....	39
5.5.4	In-flight validation.....	39

Figures

Figure 4-1:	General control structure.....	14
Figure 4-2:	Example of controller structure.....	16
Figure 4-3:	Interaction between CE activities.....	18

Tables

Table 4-1:	Summary of control engineering tasks.....	19
Table 4-2:	Control engineering inputs, tasks and outputs, Phase 0/A.....	20
Table 4-3:	Control engineering inputs, tasks and outputs, Phase B.....	21
Table 4-4:	Control engineering inputs, tasks and outputs, Phase C/D.....	22
Table 4-5:	Control engineering inputs, tasks and outputs, Phase E/F.....	23
Table 5-1:	Contributions of analysis to the CE process.....	31

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European Foreword

This document (CEN/TR 17603-60:2022) has been prepared by Technical Committee CEN/CLC/ITC 5 “Space”, the secretariat of which is held by DIN.

It is highlighted that this technical report does not contain any requirement but only collection of data or descriptions and guidelines about how to organize and perform the work in support of EN 17603-60.

This Technical report (CEN/TR 17603-60:2022) originates from ECSS-E-HB-60A.

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This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

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

Introduction

Control engineering, particularly as applied to space systems, is a multi-disciplinary field. The analysis, design and implementation of complex (end to end) control systems include aspects of system engineering, electrical and electronic engineering, mechanical engineering, software engineering, communications, ground systems and operations – all of which have dedicated ECSS engineering standards and handbooks. This Handbook is not intended to duplicate them.

This Handbook focuses on the specific issues involved in control engineering and is intended to be used as a structured set of systematic engineering provisions, referring to the specific standards and handbooks of the discipline where appropriate. For this, and reasons such as the very rapid progress of control component technologies and associated “de facto” standards, this Handbook does not go to the level of describing equipment or interfaces.

This Handbook is not intended to replace textbook material on control systems theory or technology, and such material is intentionally avoided. The readers and users of this Handbook are assumed to possess general knowledge of control systems engineering and its applications to space missions.

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1 Scope

This Handbook deals with control systems developed as part of a space project. It is applicable to all the elements of a space system, including the space segment, the ground segment and the launch service segment.

The handbook covers all aspects of space control engineering including requirements definition, analysis, design, production, verification and validation, transfer, operations and maintenance.

It describes the scope of the space control engineering process and its interface with management and product assurance, and explains how they apply to the control engineering process.