

Space engineering - Simulation modelling platform

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

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Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
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English version

## Space engineering - Simulation modelling platform

Ingénierie spatiale - Plateforme de modélisation pour  
simulationRaumfahrttechnik - Teil 40-07: Modelliersoftware-  
Plattform

This European Standard was approved by CEN on 17 May 2020.

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## Table of contents

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<b>European foreword.....</b>	<b>7</b>
<b>Introduction.....</b>	<b>8</b>
<b>1 Scope.....</b>	<b>9</b>
<b>2 Normative references .....</b>	<b>10</b>
<b>3 Terms, definitions and abbreviated terms.....</b>	<b>11</b>
3.1 Terms from other standards.....	11
3.2 Terms specific to the present standard .....	11
3.3 Abbreviated terms.....	16
3.4 Nomenclature .....	16
<b>4 Principles .....</b>	<b>17</b>
4.1 Objectives.....	17
4.2 Common Concepts and common types .....	17
4.3 Architecture .....	18
4.4 Time handling principle.....	19
4.5 Simulation lifecycle .....	20
4.6 Simulation method .....	21
4.6.1 Discrete-event simulation (DES) .....	21
4.6.2 Parallelization and distribution.....	22
4.6.3 Inter component communication .....	22
4.7 Models, Services and Components .....	23
4.7.1 Objects.....	23
4.7.2 Components.....	25
4.7.3 Factories .....	27
4.7.4 Models and Services.....	27
4.8 Publication and Persistence.....	28
4.9 Dynamic invocation.....	29
4.10 Components meta data .....	31
4.10.1 Catalogue .....	31
4.10.2 Package.....	31

4.10.3	Configuration.....	32
4.11	Model exchanges considerations.....	32
4.11.1	Overview.....	32
4.11.2	SMP Bundle.....	32
<b>5</b>	<b>Interface requirements.....</b>	<b>33</b>
5.1	Common.....	33
5.1.1	Primitive Types specification.....	33
5.1.2	Time Kinds.....	35
5.1.3	Path string.....	36
5.1.4	Universally Unique Identifiers (UUID).....	37
5.1.5	Exception specification.....	37
5.2	Components and Objects interfaces.....	37
5.2.1	Object Specification (IObject).....	37
5.2.2	Collection Specification (ICollection).....	38
5.2.3	Component Specification.....	39
5.2.4	Aggregation.....	42
5.2.5	Composition.....	45
5.2.6	Events.....	47
5.2.7	Entry points.....	50
5.2.8	Dynamic Invocation.....	50
5.2.9	Persistence (IPersist).....	54
5.2.10	Failures.....	55
5.2.11	Field interfaces.....	56
5.2.12	Requirements on utilization of Simulation Environments interfaces by components.....	62
5.3	Simulation Environment interfaces.....	63
5.3.1	Logger (ILogger interface).....	63
5.3.2	Time Keeper (ITimeKeeper).....	65
5.3.3	Scheduler (IScheduler).....	67
5.3.4	Event Manager (IEventManager).....	75
5.3.5	Resolver (IResolver).....	79
5.3.6	Link Registry (ILinkRegistry).....	80
5.3.7	Simulator (ISimulator).....	82
5.3.8	Persistence.....	94
5.3.9	Publication.....	95
5.3.10	Type Registry.....	102
5.3.11	Component Factory (IFactory).....	107

5.4	Meta data .....	108
5.4.1	Catalogue .....	108
5.4.2	Package.....	112
5.4.3	Configuration data.....	112
<b>6</b>	<b>Implementation mapping .....</b>	<b>113</b>
6.1	Catalogue to C++ .....	113
6.1.1	Mapping templates.....	113
6.1.2	Namespaces and files.....	116
6.1.3	Element and Type Visibility Kind .....	116
6.1.4	Mapping of elements.....	117
6.1.5	Basic Value Types .....	126
6.1.6	Compound Value Types.....	128
6.1.7	Reference Types.....	130
6.2	Package to library.....	133
6.2.1	Mapping templates.....	133
6.2.2	Common to Unix and Windows .....	133
6.2.3	Unix (Shared object).....	134
6.2.4	Addendum for Windows Dynamic Link Library (DLL) .....	135
6.2.5	SMP Bundle.....	136
<b>Annex A</b>	<b>(normative) Catalogue file - DRD .....</b>	<b>137</b>
A.1	Catalogue DRD .....	137
A.1.1	Requirement identification and source document.....	137
A.1.2	Purpose and objective.....	137
A.2	Expected response .....	137
A.2.1	Scope and content .....	137
A.2.2	Special remarks .....	137
<b>Annex B</b>	<b>(normative) Package file - DRD .....</b>	<b>138</b>
B.1	Package DRD.....	138
B.1.1	Requirement identification and source document.....	138
B.1.2	Purpose and objective.....	138
B.2	Expected response.....	138
B.2.1	Scope and content .....	138
B.2.2	Special remarks .....	138
<b>Annex C</b>	<b>(normative) Configuration file - DRD .....</b>	<b>139</b>
C.1	Configuration DRD.....	139
C.1.1	Requirement identification and source document.....	139

C.1.2	Purpose and objective.....	139
C.2	Expected response .....	139
C.2.1	Scope and content .....	139
C.2.2	Special remarks .....	139
<b>Annex D (normative) Manifest file - DRD .....</b>		<b>140</b>
D.1	Configuration DRD.....	140
D.1.1	Requirement identification and source document.....	140
D.1.2	Purpose and objective.....	140
D.2	Expected response .....	140
D.2.1	Scope and content .....	140
D.2.2	Special remarks .....	142
<b>Bibliography.....</b>		<b>143</b>

## Figures

Figure 4-1: Common Concepts and Type System .....	18
Figure 4-2: SMP Architecture .....	18
Figure 4-3: SMP State machine.....	20
Figure 4-4: Object mechanisms.....	24
Figure 4-5: Overview of components hierarchy .....	25
Figure 4-6: Component Mechanisms .....	26
Figure 4-7: Component State machine .....	26
Figure 4-8: Sequence of calls for dynamic invocation .....	30

## Tables

Table 4-1: Overview of simulation states .....	21
Table 4-2: ViewKind values .....	28
Table 5-1: Primitive Types.....	33
Table 5-2: Component states .....	39
Table 5-3: Semantically equivalent types for connections.....	61
Table 5-4: Default Log Message Kinds.....	64
Table 5-5: Condition for emitting predefined global events .....	78
Table 6-1: C++ declaration templates.....	114
Table 6-2: C++ definition templates .....	116
Table 6-3: C++ mapping for the Visibility kind attribute .....	116
Table 6-4: C++ mapping of Association depending on ByPointer attribute.....	119
Table 6-5: C++ mapping for the Direction kind attribute.....	120

Table 6-6: C++ mapping for Property depending on ByPointer attribute .....	121
Table 6-7: C++ mapping for the Operator attribute kinds .....	124
Table 6-8: C++ declaration templates for packages.....	133
Table D-1 : SMP Manifest Key .....	141



## European foreword

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This document (EN 16603-40-07:2020) has been prepared by Technical Committee CEN-CENELEC/TC 5 "Space", the secretariat of which is held by DIN.

This standard (EN 16603-40-07:2020) originates from ECSS-E-ST-40-07C.

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 December 2020, and conflicting national standards shall be withdrawn at the latest by December 2020.

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 prepared under a standardization request 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 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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

## Introduction

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Space programmes have developed simulation software for a number of years, which are used for a variety of applications including analysis, engineering operations preparation and training. Typically, different departments perform developments of these simulators, running on several different platforms and using different computer languages. A variety of subcontractors are involved in these projects and as a result a wide range of simulation software are often developed. This standard addresses the issues related to portability and reuse of simulation models. It is based on the work performed by ESA in the development of the Simulator Model Portability Standards SMP1 and SMP2 starting from the mid-end of the nineties.

This standard integrates the ECSS-E-ST-40 with additional requirements which are specific to the development of simulation software. The formulation of this standard takes into account:

- The existing ISO 9000 family of documents, and
- The Simulation Model Portability specification version 1.2.

The intended readership of this standard is the simulator software customer and supplier.

# 1

## Scope

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ECSS-E-ST-40-07 is a standard based on ECSS-E-ST-40 for the engineering of simulation software.

ECSS-E-ST-40-07 complements ECSS-E-ST-40 in being more specific to simulation software. Simulation software include both Simulation environments and simulation models. The standard enables the effective reuse of simulation models within and between space projects and their stakeholders. In particular, the standard supports model reuse across different simulation environments and exchange between different organizations and missions.

This standard can be used as an additional standard to ECSS-E-ST-40 providing the additional requirements which are specific to simulation software.

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

### Applicability

This standard lays down requirements for simulation software including both Simulation environments and simulation models. The requirements cover simulation models' interfaces and simulation environment interfaces for the purpose of model re-use and exchange to allow simulation models to be run in any conformant simulation environment.

A consequence of being compliant to this standard for a model is the *possibility* of being reused in several simulation facilities or even in several projects. However, adherence to this standard does not imply or guarantees model reusability, it is only a precondition. Other characteristics of the model, to be defined outside this standard, such as its functional interfaces and behaviour, its configuration data as well as quality, suitability and performance, etc. are also heavily affecting the potential for a model to be reused. In addition, agreements need to be reached on simulation environments compatibility, model validation status as well as legal issues and export control restrictions.

Therefore, this standard *enables* but does not mandate, impose nor guarantee successful model re-use and exchange.

Model reuse in this standard is meant both at source-code and binary level, with the latter restricted to a fixed platform.

## 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 revision 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 more 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 16603-40	ECSS-E-ST-40	Space engineering - Software general requirements
	[SMP_FILES]	ECSS_SMP_Issue1(2March2020).zip – SMP C++ Header files, SMP XML schemas and SMP Catalogue. (Available from ECSS website)
	<a href="https://www.w3.org/TR/xmlschema11-2/">https://www.w3.org/TR/xmlschema11-2/</a>	XML schema specification
	<a href="http://www.opengroup.org">http://www.opengroup.org</a>	The UUID specification from Open Group.
	<a href="https://www.osgi.org/developer/specifications/">https://www.osgi.org/developer/specifications/</a>	OSGi Specifications