

STN	Kozmická technika Inžinierstvo ASIC, FPGA a IP Core	STN EN 16603-20-40 31 0543
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Space engineering - ASIC, FPGA and IP Core engineering

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 03/24

Obsahuje: EN 16603-20-40:2023

138351



EUROPEAN STANDARD

EN 16603-20-40

NORME EUROPÉENNE

EUROPÄISCHE NORM

December 2023

ICS 49.140

English version

Space engineering - ASIC, FPGA and IP Core engineeringIngénierie spatiale - Ingénierie des ASIC, FPGA et
noyaux de PIRaumfahrttechnik - Entwicklung von ASICs, FPGAs und
IP-Kernen

This European Standard was approved by CEN on 3 December 2023.

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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 and CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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

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European Foreword

This document (EN 16603-20-40:2023) has been prepared by Technical Committee CEN-CENELEC/TC 5 “Space”, the secretariat of which is held by DIN.

This standard (EN 16603-20-40:2023) originates from ECSS-E-ST-20-40C.

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of an identical text or by endorsement, at the latest by June 2024, and conflicting national standards shall be withdrawn at the latest by June 2024.

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

Developing custom designed monolithic integrated circuits such as ASICs or FPGAs, and developing IP Cores, as off-the-shelf Building Blocks for these complex ICs, make certain engineering and technical management activities crucial to the success of these developments.

ECSS-E-ST-20-40 was written in parallel and in co-ordination with the writing ECSS-Q-ST-60-03, by the same ECSS Working Group. These two new and complementary standards cover respectively the engineering and the product assurance requirements to be applied when developing ASICs, FPGAs and IP Cores, and these two new standards together supersede ECSS-Q-ST-60-02C.

The DEVICE qualification status is assessed based on the requirements from both ECSS-E-ST-20-40 and ECSS-Q-ST-60-03. In order for a DEVICE to be qualified and accepted according to ECSS standards, the DEVICE development reviews specified in ECSS-E-ST-20-40 have to be declared successful by the customer engineering and PA responsible persons and project management who monitored the DEVICE development.

1

Scope

This standard specifies a comprehensive set of engineering requirements for the successful development of digital, analogue and mixed analogue-digital signal custom designed integrated circuits, such as application specific integrated circuits (ASICs), field programmable gate arrays (FPGAs) and Intellectual Property Cores (IP Cores), from now on referred to with the single and generic term DEVICES.

Microelectronics systems created by more than one DEVICE die but that are interconnected and packaged together as a single DEVICE are not considered single monolithic DEVICES. However ECSS-ST-20-40 is to be applied to (a) the development of each individual monolithic die, (b) also for their integration onto a multi-die single DEVICE considering those dice as IP Cores.

This standard may be tailored for the specific characteristic and constraints of a space project in conformance with ECSS-S-ST-00. A pre-tailoring based on the actual DEVICE type and criticality category of the DEVICE is addressed in clause 5.1.2.

This standard does not cover requirements for the selection, control, procurement or usage of DEVICES for space projects nor DEVICE ESCC qualification requirements, as those requirements are covered by ECSS-Q-ST-60C EEE components standard and the ESCC generic specification No. 9000 respectively. Nevertheless, this standard contemplates the possibility for the DEVICE to undergo ESCC qualification after the DEVICE customer acceptance as an ECSS qualified DEVICE, and thus a DEVICE ESCC Detail Specification and DEVICE Radiation Test Plan and Report are optional expected outputs.

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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	<i>ECSS system – Glossary of terms</i>
EN 16602-30	ECSS-Q-ST-30	<i>Space product assurance – Dependability</i>
EN 16602-40	ECSS-Q-ST-40	<i>Space product assurance – Safety</i>
-	ECSS-Q-ST-60-03	<i>Space product assurance – ASIC, FPGA and IP Core product assurance</i>

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