ICS 49.140 SLOVENSKÁ TECHNICKÁ NORMA Máj 2022

STN	Kozmická technika Časovo spínaný Ethernet	STN EN 16603-50-16 31 0543

Space engineering - Time triggered Ethernet

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. 04/22

Obsahuje: EN 16603-50-16:2021

obsahuje farebné strany

134624

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 16603-50-16

December 2021

ICS 49.140

English version

Space engineering - Time triggered Ethernet

Ingénierie spatiale - Ethernet à déclenchement temporel (TTE)

Raumfahrttechnik - Zeitgesteuertes Ethernet

This European Standard was approved by CEN on 5 December 2021.

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Ref. No. EN 16603-50-16:2021 E

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European Foreword

This document (EN 16603-50-16:2021) has been prepared by Technical Committee CEN-CENELEC/TC 5 “Space”, the secretariat of which is held by DIN.

This standard (EN 16603-50-16:2021) originates from ECSS-E-ST-50-16C.

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of an identical text or by endorsement, at the latest by June 2022, and conflicting national standards shall be withdrawn at the latest by June 2022.

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.

1 Scope

Using standard communication protocols for spacecraft communication links can provide interface compatibility between communication devices and components. Thus, it can improve the design and development process as well as integration and test activities at all levels and provide the potential of reusability across projects.

The aim of this space engineering standard is to define the interface services and to specify their corresponding network protocol elements for spacecraft using the Time-Triggered Ethernet data network. It also aims at defining requirements for the harmonisation of the physical interfaces and usage of the [IEEE 802.3] and [SAE AS6802] layer features.

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

Approach

The approach of the ECSS working group for defining this standard aims at identification of layers, services and functions of the typical Time-Triggered Ethernet communication network to ensure the use of the technology for various space projects. The standard aims at:

- Identifying Reference Architectures (Layers, Services, Functions and Elements of protocol) of typical Time-Triggered Ethernet communication network;
- Characterizing Services, Functions and Elements of Protocol of each Layer within identified Reference Architectures, using concrete project specifications;
- Define normative requirements rather than recommendations.

As far as possible, the defined communication requirements are extracted from the experience on existing spacecraft specifications.

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
	ARINC 664 part 7, 23 September 2009	Aircraft Data Network Part 2: Avionic Full-Duplex Switched Ethernet Network
	IEEE 802.3, 28 December 2012	Ethernet Standard
	SAE AS6802, November 2011	Time-Triggered Ethernet
	RFC 768, 28 August 1980	User Datagram Protocol (UDP)
	RFC 791, September 1981	Internet Protocol (IP)
	RFC 792, September 1981	Internet Control Message Protocol (ICMP)
	RFC 1157, May 1990	A simple network management protocol (for SNMPv1)
	RFC 1350, July 1992	The TFTP Protocol (Revision 2)