

CEN

CWA 17357

WORKSHOP

February 2019

AGREEMENT

ICS 13.200; 25.040.30

English version

Urban search and rescue (USaR) robotic platform technical and procedural interoperability - Guide

This CEN Workshop Agreement has been drafted and approved by a Workshop of representatives of interested parties, the constitution of which is indicated in the foreword of this Workshop Agreement.

The formal process followed by the Workshop in the development of this Workshop Agreement has been endorsed by the National Members of CEN but neither the National Members of CEN nor the CEN-CENELEC Management Centre can be held accountable for the technical content of this CEN Workshop Agreement or possible conflicts with standards or legislation.

This CEN Workshop Agreement can in no way be held as being an official standard developed by CEN and its Members.

This CEN Workshop Agreement is publicly available as a reference document from the CEN Members National Standard Bodies.

CEN and CENELEC members are the national standards bodies and national electrotechnical committees of 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 United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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

© 2019 All rights of exploitation in any form and by any means reserved worldwide for CEN national Members and for CEN/CENELEC Members.

C

Ref. No.:CWA 17357:2019 E

Contents

European foreword	3
Introduction	5
1 Scope	6
2 Normative references	6
3 Terms, definitions, abbreviations and acronyms	7
3.1 Terms and definitions	7
3.2 Abbreviations and acronyms	8
4 Operational needs	9
4.1 General.....	9
4.2 Victim detection.....	9
4.3 Performance.....	9
4.4 Modularity.....	9
4.5 Fault tolerance.....	9
4.6 Security and safety.....	9
4.7 Human-robotic platform interaction	10
4.8 Provision of external interfaces	10
5 Architectural principles	10
5.1 General.....	10
5.2 High-level architecture	11
5.3 Intra-robot components and their organization.....	12
6 Operational and procedural interoperability	12
6.1 Operational constraints.....	12
6.2 Procedural interoperability	12
7 Technical interoperability	13
7.1 General.....	13
7.2 Data and semantic interoperability.....	14
7.3 Intra-USaR robotic platform interaction	15
7.4 Inter-USaR robotic platform interaction	16
8 Visualization	16
Annex A (informative) Standardization activities related to USaR robotic platforms interoperability	18
A.1 Standards related to USaR robotic platforms interoperability	18
A.2 International technical committees	22
Bibliography	23

European foreword

This CEN-CENELEC Workshop Agreement has been drafted and approved by a workshop of representatives of interested parties on 2018-11-13, the constitution of which was supported by CEN-CENELEC following the public call for participation made on 2018-05-09.

The CEN-CENELEC Workshop offers a platform whereby stakeholders can discuss and resolve standardization issues by consensus and validation in an open process.

The main activity of a CEN-CENELEC Workshop is the development and publication of a CEN-CENELEC Workshop Agreement (CWA). The CWA is a voluntary standard applicable internationally and does not have the force of regulation. A CWA can be an initial step in the development of a European standard.

The development of CWA 17357, *Urban search and rescue (USaR) robotic platform technical and procedural interoperability – Guide*, has received funding from the European Union's Seventh Framework Programme (FP7/2007-2013) under grant agreement no.607522INACHUS.

The secretariat was held by the British National Standards Body, BSI. A list of the individuals and organizations which supported the technical consensus represented by the CEN Workshop Agreement is available to purchasers from the CEN-CENELEC Management Centre. These are listed below:

- Airbus
- BYTE
- CLAWAR Association Ltd
- Crisisplan
- DIGINEXT
- EXODUS SA
- FUNDACION TEKNIKER
- Kangwon University
- SINTEF
- TELINT RTD Consultancy Services Ltd
- The Institute of Communication and Computer Systems (ICCS)

Along with the following individuals:

- Dr Angelos Amditis, Chair
- Dr Vasilis Sourlas, Vice-Chair

Those CEN-CENELEC Technical committees supporting technical consensus are as follows:

- CLC/TC 79 Alarm systems

The formal process followed by the Workshop in the development of the CEN-CENELEC Workshop Agreement has been endorsed by the National Members of CEN but neither the National Members of CEN nor the CEN-CENELEC Management Centre can be held accountable for the technical content of the CEN-CENELEC Workshop Agreement or possible conflict with standards or legislation. This CEN-CENELEC Workshop Agreement can in no way be held as being an official standard developed by CEN-CENELEC and its members.

The final review/endorsement round for this CWA was started in October 2018 and was successfully closed in November 2018. The final text of this CWA was submitted to CEN for publication in November 2018.

This CEN-CENELEC Workshop Agreement is publically available as a reference document from the National Members of the following countries: 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.

Comments or suggestions from the users of the CEN-CENELEC Workshop Agreement are welcome and should be addressed to the CEN-CENELEC Management Centre.

Introduction

This CWA provides specific information on technical content where this is deemed to be necessary for the application of the CWA. It contains background to the project, guidance on the approach taken and an explanation of any new concepts that the CWA is based on.

This document constitutes a CEN Workshop Agreement (CWA) that represents a consensus among the participants of the Workshop and gives guidance on the technical and procedural interoperability of urban search and rescue (USaR) robotic platforms.

This document is a preview generated by EVS

1 Scope

This CWA provides recommendations to enable technical interoperability (hardware, software) between urban search and rescue (USaR) robotic platforms and the equipment, sensors and tools that are attached to them. This CWA also provides guidance on the principles for enabling USaR robotic platforms (various types of them such as drones, snake-like, robots with wheels, legs, etc.) to operate in all ground search environments. In this way a generic platform can be adapted, designed and built for any possible search and rescue (SaR) scenario on the ground.

The CWA is for use by organizations responsible for designing, manufacturing, configuring, customizing and maintaining USaR robotic platforms, tools, equipment and sensors (e.g. drones, snake-like robots, mobile robots with wheels, cameras, lasers, environmental analysis sensors, etc.).

The CWA is also for use by integrators and providers of SaR support systems in general.

The CWA is of interest to first responder organizations, operators of the USaR systems, public authorities and end-users in the field dealing with USaR mission organization and execution.

The CWA is also of interest in the procurement of USaR platforms.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

ISO 10218-1, *Robots and robotic devices – Safety requirements for industrial robots*

ISO 10218-2, *Robots and robotic devices – Safety requirements for industrial robots – Part 2: Robot systems and integration*

ISO 13482, *Robots and robotic devices – Safety requirements for personal care robots*

ISO 12100, *Safety of machinery – General principles for design – Risk assessment and risk reduction*

International Search And Rescue Advisory Group (INSARAG), *Guidelines and Methodology, Volume II: Preparedness and Response, Manual B: Operations*