

ICS 13.200

English version

Urban search and rescue - Guideline for the application of a test method for innovative technologies to detect victims in debris

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 members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye 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

Contents	Page
European foreword.....	3
Introduction	4
1 Scope.....	5
2 Normative references.....	5
3 Terms and definitions	5
4 Test procedures for Urban Search and Rescue (USaR) equipment.....	6
4.1 General.....	6
4.2 Select technology to be tested	7
4.3 Roles and tasks in collaborative and field tests.....	7
4.4 Identify and define evaluation criteria	8
4.5 Define test scenario and use case.....	8
4.6 Documentation of the evaluation tests	9
5 Testing evaluation methodology development.....	9
5.1 General.....	9
5.2 Factors for choosing the evaluation methodology.....	10
5.2.1 Verification process	10
5.2.2 Validation process	11
5.2.3 Collaboration lab test or field test	11
5.3 Evaluation methodology.....	11
5.3.1 Collaborative lab test evaluation.....	12
5.3.2 Field test evaluation.....	12
5.3.3 Integration test evaluation	13
5.4 Key Performance Indicators	16
6 Tools and technologies.....	16
6.1 General.....	16
6.2 Levels of USaR team capacities.....	17
6.3 Checklist for selecting technical solutions.....	17
6.4 Categorisation of a typical USaR toolkit at present	19
6.5 Categories of novel tools and technologies candidates eligible for the USaR toolkit.....	20
6.6 Mapping of ASR levels with novel tools and technologies.....	21
Bibliography.....	25

European foreword

This CEN Workshop Agreement (CWA 17947:2022) has been developed in accordance with CEN-CENELEC Guide 29 “CEN/CENELEC Workshop Agreements– A rapid way to standardization” and with the relevant provision of CEN/CENELEC Internal Regulations – Part 2. It was approved by a Workshop of representatives of interested parties on 2022-11-04, the constitution of which was supported by CEN following the public call for participation made on 2021-10-29. However, this CEN Workshop Agreement does not necessarily reflect the views of all stakeholders who may have an interest in its subject matter.

The final text of CWA 17947:2022 was submitted to CEN for publication on 2022-11-10.

Results incorporated in this CEN Workshop Agreement received funding from the European Union’s Horizon 2020 research and innovation program under the grant agreement numbers 832790 (CURSOR).

The following organizations and individuals developed and approved this CEN Workshop Agreement:

- ASTRIAL GmbH/ Evangelos Sdongos (Chairperson)
- Centre for Research and Technology Hellas (CERTH)/ Anastasios Dimou
- Commissariat à L’Energie Atomique et aux Energies Alternatives (CEA)/ Emmanuel Scorsone
- Defence Research and Development Canada (DRDC)/ Gerry Doucette
- Entente pour la Forêt Méditerranéenne (Valabre)/ Nathalie Bozabalian
- German Federal Agency for Technical Relief (THW)/ Tiina Ristmäe (Vice-Chairperson)
- Institute of Communication and Computer Systems (ICCS)/ Dimitra Dionysiou, Panagiotis Michalis
- International Security Competence Centre GmbH (ISCC)/ Friedrich Steinhäuser
- Netherlands Institute for Public Safety (NIPV)/ Theo Uffink
- Public Safety Community Europe (PSCE)/ Anthony Lamaudiere
- SINTEF/ Giacarlo Marafioti
- Tohoku University/ Satoshi Tadokoro
- University of Manchester/ Krishna Persaud
- Vicomtech/ Harbil Arregui

Attention is drawn to the possibility that some elements of this document may be subject to patent rights. CEN and CENELEC policy on patent rights is described in CEN/CENELEC Guide 8 “Guidelines for Implementation of the Common IPR Policy on Patent”. CEN shall not be held responsible for identifying any or all such patent rights.

Although the Workshop parties have made every effort to ensure the reliability and accuracy of technical and non-technical descriptions, the Workshop is not able to guarantee, explicitly or implicitly, the correctness of this document. Anyone who applies this CEN Workshop Agreement shall be aware that neither the Workshop, nor CEN, can be held liable for damages or losses of any kind whatsoever. The use of this CEN Workshop Agreement does not relieve users of their responsibility for their own actions, and they apply this document at their own risk. The CEN Workshop Agreement should not be construed as legal advice authoritatively endorsed by CEN.

Introduction

In the face of natural or man-made disasters, search and rescue teams and other first responders like police, medical units, civil protection or volunteers, race against the clock to locate survivors within the critical 72-hour timeframe (Golden Hours), facing challenges such as instable structures or hazardous environments but also insufficient situational awareness – all resulting in lengthy search and rescue processes. In order to speed up the detection of survivors trapped in collapsed buildings and to improve working conditions for the first responders, the EU-funded research project CURSOR designed an innovative Search and Rescue Kit (CURSOR USaR Kit) based on drones, miniaturized robotic equipment, advanced sensors and incident management applications. The overreaching aim of CURSOR is to develop a USaR kit that will be easy and fast to deploy, leading to a reduced time in detecting and locating trapped victims in disaster areas. To make sure that these solutions meet the needs of the first responders in the field, the system was tested by first responders of the CURSOR consortium as well as by external practitioners (e.g. INSARAG secretariat, Regione Liguria, USaR NL, Bavarian Red Cross, Japan NRIFD) throughout the whole development process. Several lab and small scale field trials were conducted. Against this background the consortium identified the standardisation potential for this CEN Workshop Agreement, which describes a field test and the associated methodology for assessing the use of innovative technologies such as the USaR kit.

In this document, the following verbal forms are used:

- “shall” indicates a requirement,
- “should” indicates a recommendation,
- “may” indicates a permission,
- “can” indicates a possibility or capability.

1 Scope

This document specifies requirements and recommendations on the set-up of a field test and a test methodology for Urban Search and Rescue (USaR) equipment for the detection of victims under debris. A realistic field test is described to gather information to test for example a Soft Miniaturized Underground Robot (SMURF) or drones equipped with specialized sensors, e.g. preparation of debris cones made of different materials. Furthermore, a performance test method for each component and the complete USaR system is described. The purpose of the test method is to specify the apparatuses, procedures and performance metrics necessary to quantitatively measure a search and rescue kit's abilities.

This document is intended to be used by Urban Search and Rescue (USaR) equipment manufacturers and developers. The document is not primary intended to be used by first responders, although the user community is benefitted by the relevant guidelines to be put in place.

The current document discusses and provides guidelines around the following questions:

- How to set up a test field for an innovative USaR kit?
- What should be tested?
- How should be tested?
- Who should conduct the testing?
- What is the minimum set of specifications for the technological tools?

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1

field test

test that is performed in near real-life conditions in collaboration between solution provider and end user

3.2

use case

intended use of a technology within an application

3.3

collaborative lab test

test that is performed in a laboratory-controlled environment in collaboration between solution provider and end user