driver+

Driving Innovation in Crisis Management for European Resilience

D955.21 – REPORT ON DRIVER+ STANDARDISATION POTENTIALS

SP95 - IMPACT, ENGAGEMENT AND SUSTAINABILITY

JUNE 2019 (M62)

This project has received funding from the European Union's 7th Framework Programme for Research, Technological Development and Demonstration under Grant Agreement (GA) N° #607798

Project information

Project Acronym:	DRIVER+
Project Full Title:	Driving Innovation in Crisis Management for European Resilience
Grant Agreement:	607798
Project Duration:	72 months (May 2014 - April 2020)
Project Technical Coordinator:	TNO
Contact:	coordination@projectdriver.eu

Deliverable information

Deliverable Status:	Final
Deliverable Title:	D955.21 - Report on DRIVER+ standardisation potentials
Deliverable Nature:	Report (R)
Dissemination Level:	Public (PU)
Due Date:	June 2019 (M62)
Submission Date:	28/06/2019
Subproject (SP):	SP95 - Impact, Engagement and Sustainability
Work Package (WP):	WP955 – Standardisation Activities
Deliverable Leader:	DIN
Reviewers:	Chiara Fonio, JRC Marcel van Berlo, TNO Hector Naranjo, GMV Tim Stelkens-Kobsch, DLR
File Name:	DRIVER+_D955.21_Report on DRIVER+ standardisation potentials.docx
Version of template used:	V2.2 – February 2019

Revision Table

Issue	Date	Comment	Author
V0.01	10/04/2019	Initial draft	Esther Kähler, DIN
V0.02	15/04/2019	Contribution to Section 2.1.2 and 2.2.5	Alice CLEMENCEAU, VALABRE Laure Dodin, ARTTIC Rob Munro, ARTTIC
V0.03	15/04/2019	Contribution to Section 2.1.2 and 2.2.5	Laurent Dubost, Thales Steven van Campen, XVR
V0.04	16/04/2019	Contribution to Sections 2.1.1 & 3	Georg Neubauer, AIT
V0.05	17/04/2019	Contribution to Sections 2.1.3	Nicola Rupp, WWU
V0.10	23/05/2019	Second draft	Anja Seeliger, DIN Esther Kähler, DIN René Lindner, DIN
V0.11	29/05/2019	Peer review	Chiara Fonio, JRC
V0.12	02/06/2019	Peer review	Marcel van Berlo, TNO
V0.20	07/06/2019	Third draft	Anja Seeliger, DIN Esther Kähler, DIN René Lindner, DIN
V0.21	10/06/2019	Contribution to Sections 2 and 4	Marie-Christine Bonnamour, PSCE David Lund, PSCE
V0.22	24/06/2019	Peer review	Marcel van Berlo, TNO
V0.23	25/06/2019	Review of section 2.2.7	Laure Dodin, ARTTIC
V0.24	26/06/2019	Review of section 2.2.7	Nicola Rupp, WWU
V0.30	26/06/2019	Final version	Esther Kähler, DIN
V0.31	28/06/2019	Final check and approval for submission	Tim Stelkens-Kobsch, DLR, Quality Manager
V0.32	28/06/2019	Final check and approval for submission	Marijn Rijken, TNO, Project Director
V1.00	28/06/2019	Final check and submission to the EC	Francisco Gala, ATOS

The DRIVER+ project

Current and future challenges, due to increasingly severe consequences of natural disasters and terrorist threats, require the development and uptake of innovative solutions that are addressing the operational needs of practitioners dealing with Crisis Management. DRIVER+ (Driving Innovation in Crisis Management for European Resilience) is a FP7 Crisis Management demonstration project aiming at improving the way capability development and innovation management is tackled. DRIVER+ has three main objectives:

1. Develop a pan-European Test-bed for Crisis Management capability development:
    a. Develop a common guidance methodology and tool, supporting Trials and the gathering of lessons learnt.
    b. Develop an infrastructure to create relevant environments, for enabling the trialling of new solutions and to explore and share Crisis Management capabilities.
    c. Run Trials in order to assess the value of solutions addressing specific needs using guidance and infrastructure.
    d. Ensure the sustainability of the pan-European Test-bed.
2. Develop a well-balanced comprehensive Portfolio of Crisis Management Solutions:
    a. Facilitate the usage of the Portfolio of Solutions.
    b. Ensure the sustainability of the Portfolio of Solutions.
3. Facilitate a shared understanding of Crisis Management across Europe:
    a. Establish a common background.
    b. Cooperate with external partners in joint Trials.
    c. Disseminate project results.

In order to achieve these objectives, five Subprojects (SPs) have been established. **SP91** ***Project Management*** is devoted to consortium level project management, and it is also in charge of the alignment of DRIVER+ with external initiatives on Crisis Management for the benefit of DRIVER+ and its stakeholders. In DRIVER+, all activities related to Societal Impact Assessment are part of **SP91** as well. **SP92** ***Test-bed*** will deliver a guidance methodology and guidance tool supporting the design, conduct and analysis of Trials and will develop a reference implementation of the Test-bed. It will also create the scenario simulation capability to support execution of the Trials. **SP93** ***Solutions*** will deliver the Portfolio of Solutions which is a database driven web site that documents all the available DRIVER+ solutions, as well as solutions from external organisations. Adapting solutions to fit the needs addressed in Trials will be done in **SP93**. **SP94** ***Trials*** will organize four series of Trials as well as the Final Demo (FD). **SP95** ***Impact, Engagement and Sustainability***, is in charge of communication and dissemination, and also addresses issues related to improving sustainability, market aspects of solutions, and standardisation.

The DRIVER+ Trials and the Final Demonstration will benefit from the DRIVER+ Test-bed, providing the technological infrastructure, the necessary supporting methodology and adequate support tools to prepare, conduct and evaluate the Trials. All results from the Trials will be stored and made available in the Portfolio of Solutions, being a central platform to present innovative solutions from consortium partners and third parties, and to share experiences and best practices with respect to their application. In order to enhance the current European cooperation framework within the Crisis Management domain and to facilitate a shared understanding of Crisis Management across Europe, DRIVER+ will carry out a wide range of activities. Most important will be to build and structure a dedicated Community of Practice in Crisis Management, thereby connecting and fostering the exchange of lessons learnt and best practices between Crisis Management practitioners as well as technological solution providers.

Executive summary

This deliverable presents standardisation activities related and initiated by DRIVER+. It focuses on three main topics: standardisation potentials, the contribution of the DRIVER+ terminology to standardisation and liaising with third parties in the context of standardisation.

The identification, specification, and assessment of DRIVER+ results, which have the potential to become a standard for crisis and disaster management is presented in section 2. The DRIVER+ partners identified standardisation-relevant results of DRIVER+ during a standardisation potential workshop in Warsaw in September 2018, which is presented in section 2.1. These ideas were further elaborated upon and specified. To select the most relevant potentials, the ResiStand Assessment Framework (RAF) as developed by the European funded research project ResiStand, was used. These most promising and relevant potentials are presented in section 2.2. The decision-making process is presented in section 2.3. This decision has led to the initiation of two CEN Workshop agreements (CWA) in April 2019 and a third one will be kicked-off on 09/07/2019. The CWAs are on: CEN Workshop on the semantic and syntactical interoperability for crisis and disaster management, CEN Workshop on the Trial Guidance Methodology and CEN Workshop on building a common simulation environment. The initiation process is presented in section 2.5.

DRIVER+ does not only transform its results into standards via CWAs, but also contributes to existing standards: newly developed terms of the DRIVER+ terminology were submitted to and discussed with the national standardisation committees in Germany and the Netherlands. As a consequence, the terms in the EN 17173 *European CBRNE glossary* will be considered by the responsible European standardisation organisations (NEN and DIN). This action is presented in section 3.

This document also gives an overview of interactions with project externals – with the standardisation community and at third party events where the DRIVER+ standardisation activities were promoted.

TABLE OF CONTENT

List of Figures

List of Tables

List of Acronyms

Acronym	Definition
CBRNE	Chemical, Biological, Radiological, Nuclear, and Explosive
CCMC	CEN-CENELEC Management Centre
CDM	Complex Decision-Making
CEN	Comité Européen de Normalisation; English: European Committee for Standardisation
CEN/TC	European Committee for Standardisation/Technical Committee
CIS	Common Information Space
CM	Crisis Management
CMINE	Crisis Management Innovation Network Europe
CoE	Centre of Expertise
COP	Common Operational Picture
CSS	Common Simulation Space
CWA	CEN Workshop Agreement
EN	European Standard
ETSI	European Telecommunications Standards Institute
EU	European Union
GDPR	General Data Protection Regulation
GIS	Geographical Information System(s)
HLA	High Level Architecture
ISG	Industry Specification Group
ISO	International Organisation for Standardisation
ITU	International Telecommunication Union
MC-PTT	Mission Critical Push to Talk services
MC-Video	3GPP Standards – Mission Critical Video Services
PoS	Portfolio of Solutions
prEN	Draft European Standard
RAF	ResiStand Assessment Framework
SIA	Societal Impact Assessment
SMAP	Social Media Analysis Platform
TGM	Trial Guidance Methodology
TRL	Technology Readiness Level
TWG	Terminology Working Group
UCPM	Union Civil Protection Mechanism
WG	Working Group
WP	Work Package

1. Introduction

A standard is a document that specifies requirements for products, services and/or processes, laying down their required characteristics. This helps ensure the free movement of goods and encourages exports. Standardisation promotes efficiency and quality assurance in industry, technology, science and the public sector. It serves to safeguard people and goods and to improve quality in all areas of life. Standards are developed in a consensus-based process organized by a recognized standards body.

Standards reflect the state-of-the-art in their related fields. Also, in crisis management standards support the everyday work. They are consensus-based documents which are approved by a recognized body and provide rules, guidelines or characteristics for activities or their results. They are based on consolidated results of science, technology and experience and therefore promote knowledge and technology transfer. Particularly in the field of security (i.e. crisis management and disaster risk reduction), a high demand for standards has been identified within the framework of the execution of mandate M/487 to CEN, CENELEC and ETSI to establish security standards. One possibility to initiate new standardisation activities for security lies in the exploitation and dissemination of outcomes in research and innovation projects.

Standardisation is an important mechanism to enhance the sustainability of the DRIVER+ results, by supporting the transfer of the project results to the market and thereby directly to the practitioners. During the standardisation process, results of the project will be discussed with external partners representing different perspectives, including organisations who are interested in adopting and implementing project results and in potentially becoming a DRIVER+ Centre of Expertise (CoE). Therefore, these CoEs use not only results of DRIVER+ but also a standardised outcome, e.g. a standardised Trial Guidance Methodology, or a standardised simulation environment. This might lead to more confidence in the results of the project and a willingness to adopt these.

To identify the capability of DRIVER+ results of becoming a standard, a standardisation potential workshop was conducted. It aimed to identify topics within the DRIVER+ project that can potentially become standards. Within DRIVER+, it has been decided to initiate three CEN Workshop Agreements (CWA). This process is described in section 2. DRIVER+ aspires to use these CWAs to initiate a new formal standard, led by a standardisation committee, i.e. by proposing a New Work Item Proposal to the relevant Technical Committee (TC) (1). DRIVER+ has already a liaison with CEN/TC 391 – Societal and Citizen Security.

Additionally, project results can be used as input for ongoing standardisation activities, which are led by a standardisation committee, e.g. by giving input to existing draft or revised standards. That is how the DRIVER+ terminology was proposed to be incorporated into EN 17173 *European CBRNE glossary*, and is described in section 3.

An overview of interactions with project external initiatives: – from the national and European standardisation organisations and third-party events – is then given in section 4.

Finally, in section 5, the way forward of **WP955** ***Standardisation activities*** is described and presents the next steps of the CWA development process.

2. Standardisation potentials of DRIVER+

Standardisation of DRIVER+ results aims to support their sustainability as it might lead to more confidence in the results of the project and generate a willingness among external people to adopt them. Therefore, topics were identified within DRIVER+ which possesses potential to become a standard. This was done during a DRIVER+ internal standardisation potential workshop. The workshop and its outcomes are briefly presented in section 2.1. Further details are given in the milestone report MS41 (2).

It was discussed which topic might become a standard itself and which topic might contribute to an existing standard. The terminology was identified as a topic to contribute to an existing standard. This is explained in more detail in section 3.1, as section 2 focuses on the standardisation potentials that are able to become a CWA. Following the standardisation potential workshop seven potential standardisation topics were analysed in detail. The specified content of these seven potential topics is shown in section 2.2. An assessment for each idea was made to decide which topic can be further developed to become a CWA. This process is shown in section 2.3. How the final decision was made, based on the assessment, is presented in section 2.4. Finally, in section 2.5 the initiation of the three CWAs which were agreed upon and the current status of their development are presented.

A CWA is a pre-standard and aims to be used as input for formal standards. Therefore, it cannot be in conflict with European standards. A CWA developed in a project funded by the EU can be publicly available and free of charge. A CWA is a valuable tool for dissemination and exploitation in research and innovation projects.

2.1 Identification of standardisation potentials

Standardisation topics were identified by the DRIVER+ partners during a standardisation potential workshop. The workshop aimed to analyse the project results from the perspective of transferring their potential into a standard. It occurred at a DRIVER+ internal workshop during the General Assembly on 05-06/09/2018 in Warsaw, Poland with 40 participants. At least one person was requested to represent each partner (2).

As preparation for the workshop, an internal inventory/questionnaire was conducted (see Annex 2). It built a bridge from the first task in **WP955**; the identification and assessment of relevant standards for the project (**T955.1**), to the second task; the identification of standardisation potentials (**T955.2**). Therefore, it asked on the one hand for feedback and additions of the list of relevant standards and on the other hand, for familiarity of each of the DRIVER+ partners regarding standardisation and ideas on standardisation potential. In total, 23 DRIVER+ partners from all subprojects answered the questionnaire[1].

The workshop was divided into three main parts: providing information about standardisation possibilities to the DRIVER+ partners, identifying standardisation potentials and specifying relevant standardisation potentials.

The first part aimed to inform the participants of the value and possibilities of standards to make research project results sustainable. DIN gave a presentation to reach this goal, as only three partners indicated their

[1] The questionnaire was conducted via google forms and sent to all partners via mail

familiarity with standardisation as high in the questionnaire (Figure A1 in Annex 2) and only seven partners expressed knowledge of CWAs.

The second part of the workshop aimed to collect various standardisation potentials. Therefore, the participants were divided into small groups and were asked to discuss project results with respective standardisation potential, with the following question in mind: Is there a methodology, process or result within your DRIVER+ task, work package or subproject that you would recommend to someone outside the project to work with? A similar question was already asked during the preparation questionnaire and its results were presented as inspiration in the form of a tag cloud (see Figure A3 in Annex 2).

The groups consisting of five to six people had 15 minutes to agree on at least three ideas. Those ideas were presented to all participants afterwards. In every group, at least one member of the **WP955** partners were involved, in order to have a future contact point and also to have a person involved that is already experienced in standardisation.

The identified standardisation potentials of DRIVER+ were collected on cards and in the form of keywords. They are presented in Table A2 in Annex 2. These twenty ideas are summarized in the table regarding their possible type of standard: classification-standard, process-standard, measurement-standard, interface-standard or product-standard.

The third part of the workshop intended to clarify some of the identified standardisation potentials in more detail. Therefore, each group focused on one standardisation potential and reflected on it as if it might become a standard. In this context each group answered the following questions, which were provided on an information sheet:

- Background of the proposal for a standard:
  Which activity (work package, deliverable, and solution) forms the basis for this proposal? What is the problem that should be solved by developing a standard?
- Scope:
  What is the standard about? (e.g. "The standard lists requirements of ... (topic)" or "The standard describes a framework for … (topic)"), Who is the target group of this standard?
- Instigators of the standard:
  Who could be the initiator and the main contributors from the project? Who else should be involved (whether internal or external to the project) and who has already agreed to take part in the standards development?
- Possible elements of the standard:
  How could the standard look like (e.g. table of contents)? Which elements need to be included and which may be excluded?

These points/questions were derived from the Project Plan[2] for a CEN Workshop, which needs to be published on the CEN Website before starting a CWA aiming to collect this relevant information. More information on the project plan is presented in section 2.5.1.

The seven ideas which were specified regarding their background, scope, proposer of the standard and possible elements of the documents are:

- Requirements on Information Exchange across borders and organisations.

[2] More information about the Project Plan for a CEN Workshop is given on the CEN website:
https://boss.cen.eu/developingdeliverables/CWA/Pages/default.aspx

- Building a Common Simulation Environment.
- Trial Guidance Methodology.
- Societal Impact Assessment Framework.
- Scenario Description.
- Situational Awareness via Social Media.
- Common Operational Picture – Symbols.

For more detailed results of the standardisation potential workshop, refer to the milestone report MS41. Those seven clarified standardisation potentials were further specified during various telephone conferences with the respective DRIVER+ partners. Additionally, the seven standardisation potentials were presented on the DRIVER+ website. A specified description of every standardisation idea is presented in section 2.2.

The results of the workshop and specifically the standardisation potentials identified were further developed afterwards. To support the relation to all DRIVER+ outcomes/results, an overview of all the solutions, tools and processes that have been addressed within the project was completed. This background information is listed in Annex 3.

All tools, processes and solutions used or developed in DRIVER+ were compared to existing standards as well as to the standardisation activities that will be conducted in the project, with the aim of checking whether they have a standardisation potential (see section 2.4). Table A3 to Table A6 in Annex 3 give an overview of each tool, solution or process related to **SP92**, **SP93**, **SP94** and **SP95** and its related standard(s). The **SP92** offers two items to consider, both of which will feed into the CEN Workshop on Trial Guidance Methodology. **SP93**, with its variety of solutions included has 23 items; the most items of all SPs. Due to its nature, there are several standards and ongoing CEN Workshops that relate to each of the items. In **SP94**, eleven items have been identified, three of which relate to the CEN Workshop on the Trial Guidance Methodology, which also confirms the Trial focus of **SP94**. Finally, **SP95** has three items, none of which has a direct relation to an identified standard. Overall, this information will be used when developing each standard and, when not directly related to the current CEN Workshops, for further potential consideration in future standardisation activities outside of DRIVER+.

2.2 Overview of standardisation potentials

The seven standardisation potentials, which were identified during the workshop, are presented in detail in this section.

2.2.1 Requirements on Information Exchange across Borders and Organisations

It has been identified that the communication between different organisations, regions and countries – with their specific processes and tools – is a major challenge in crisis and disaster management (1). Efficient communication and access to critical information is a key requirement for the operations of public safety and security services in disasters. Several examples demonstrate the relevance of adequate information exchange. (3) (4) (5).

DRIVER+ provides a platform named Test-bed that makes interoperability between multiple crisis and disaster management solutions possible. This platform was specifically designed to support the execution of Trials (see **D923.11**). The Test-bed consists of several software components, including the CIS (Common Information Space). The CIS is a central messaging bus providing standardised CIS Connectors to integrate solutions to the Test-bed. The central functionality of the CIS is the distribution of messages in a secured way during Trials. The CIS of the Test-bed technical infrastructure ensures syntactical interoperability.

In order to realise the connection of solutions to the Test-bed technical infrastructure, procedures on how to integrate and test single and multiple solutions to the CIS are described in **D934.21**. Central steps of the integration of any solution are the integration of the Test-bed connectors followed by subsequent connection and integration tests.

The provision of a shared framework for information exchange in crisis and disaster management is a clear need of the stakeholders. The request for such a platform is not limited to the needs of DRIVER+, but relevant in any case information needs to be exchanged across multiple types of borders (e.g. state borders or organisational borders) between different stakeholders. The purpose of this CEN Workshop Agreement is therefore to define basic requirements that need to be fulfilled while setting up such a platform/framework.

The information exchange paradigm should be based on automated sharing of information between participating actors in an exploitable way, not only for them but also for the IT infrastructure supporting their tasks. It is a central pre-requirement that each participating organisation can continue to use its own solution and is not requested to replace it. For this purpose, IT connectors to make communication between the different tools possible need to be developed. The subsequent list includes main needs to be fulfilled by a connection service that will be tackled in the frame of this CEN Workshop Agreement:

- Communication interface between solutions and CIS, translation of proprietary data formats of connected legacy systems to standards used in Emergency Management IT standards (e.g. CAP, EMSI, EDXL ...).
- Message validation.
- Implementation of security features such as authentication, wrapping and encryption.
- Distribution services managing connection and data exchange with other solutions.

While the connection service ensures syntactical interoperability, other concepts need to be applied in order to ensure semantic interoperability. One approach is to use a central vocabulary and to match the terminologies of participating organisations to this central vocabulary. Concepts and requirements for semantic interoperability will be specified in the frame of the CEN Workshop Agreement.

2.2.2 Building a Common Simulation Environment

How to prepare for a crisis situation? This is one of the questions crisis managers are facing every day. For this preparation, they train and test different response procedures, decision making and (creative) problem solving methods, together with using operational systems and innovative crisis management solutions. Many of those solutions can be trained with and tested in a virtual reality, by using a simulated crisis situation instead of a physically staged or even real incident. The Common Simulation Space_provides a data exchange interface for multiple systems to connect (i.e. operational crisis management systems and simulators providing a virtual crisis) via standardised connections.

To produce a suitable virtual crisis, one could use different simulations, benefitting from the advantages of multiple simulators. Such a technical infrastructure for example might consist of one simulator calculating and showing the flow of water during a flood, another simulator that provides critical information (e.g. capacity, reachability of hospitals, police stations, power stations, etc.), and a third simulator imitating relevant resources moving to and from incident sites. These three simulators need to work together using one shared time and coordination system and exchange information, as for example the water levels may influence the traffic flow, to present the crisis managers consistent information about this simulated incident.

A standardised Common Simulation Space would ease the cooperation between different simulators developed by different providers and therefore facilitate the quick creation of a common virtual training/test environment, which comes closer to its real-world equivalent. These standardised connectors

are designed to be easily implemented, taking into account budget availability of civil emergency services and that some simulators are not designed to be interoperable by design (although some military simulators are interoperable by design, yet often still requiring high efforts to interconnect them). The ability to connect different simulators without major integration efforts, improves the capability development process, positively contributes to the trialling of new and innovative solutions and improves the preparatory work especially for large-scale exercises.

The core of the development of the technical DRIVER+ Test-bed in **WP923** (i.e. the technical infrastructure supporting the execution of the Trials) is based on creating two data exchange interfaces:

1. The Common Information Space, on which solutions can be connected to send and receive data (i.e. to/from other solutions and to/from the Common Simulation Space)
2. The Common Simulation Space, on which simulators can be connected to send and receive data (i.e. to/from other simulators and to/from the Common information Space), thereby creating a virtual world with a realistic, yet fictive (i.e. simulated) crisis, to feed the CM solutions (e.g. with GPS-coordinates of fictive resources) and provide direct information flows regarding this simulated crisis to the CM practitioners (e.g. a three-dimensional eye-level view on the simulated wildfire).

How information is exchanged from solutions/simulators to the CIS/CSS is based on a shared technical design. For connecting to the CIS, already standardised message exchange formats are used as much as possible (e.g. Common Alerting Protocol). Due to the need for quick and high-throughput information exchange between simulators, these standards available for connecting solutions are often not seen as efficient for connecting simulators. Military standards for connecting simulators are available (e.g. HLA), but often require high investments to implement them (i.e. higher than available in most CM sectors) and are still resulting in case-by-case integrations. Therefore, a more simplified technical design for the CSS is drafted and implemented in the DRIVER+ project, in which good aspects of the military standards are taken over. Because of the positive reception by multiple simulator providers of the CSS design, the DRIVER+ project would like to file a Certification Workshop Agreement about this CSS design, so that in future simulation connection projects/programs one can refer to this already established design for simulator data exchange.

2.2.3 Trial Guidance Methodology

Crisis Management is obviously directly concerned with any kind of change in society. Still the uptake of innovative solutions in this area is quite low nowadays. One reason of this is that solutions cannot be assessed in every day crisis management, due to various ethical concerns. Hence an objective assessment of innovative solutions (even at lower TRL) needs to be done in a special event – in a realistic and relevant scenario but outside of emergencies. It is this assessment that leads to better development of innovative solutions and better decisions on purchasing the best fitting solution.

The Trial Guidance Methodology (TGM) will address this gap in enabling an easier uptake and also more dedicated development of innovative solutions. The TGM offers a rigorous yet pragmatic step-by-step approach that leads the end-user (Crisis Management professionals) but also the other involved parties (like solution providers) to creating a “Trial”. Within a Trial a solution will be assessed to bridge a specific gap the end-user experiences in a realistic as possible scenario.

As a standardisation idea within DRIVER+, the Trial Guidance Methodology is a quite natural choice, as this is one of the major outputs of the project. The base for the standard is the very latest version of the methodology as it was developed and is used in the DRIVER+ project. It consists of 3 phases:

1.) Preparation phase: Identifying the gap & its context, creating a Trial by following the six step approach (objective, research question, data collection, evaluation approach, scenario, solution selection).

2.) Execution phase: four events that ensure the possibility to collect the needed data using various means (software, observers etc.)
3.) Evaluation phase: analysing and synthesising high quality data and disseminating the results.

The benefit of standardising the Trial Guidance Methodology is not only that Crisis Management practitioners will be enabled to create a Trial in order to put their purchase decisions on more objective categories but also that they can influence the development of innovative solutions in order to address their gaps directly. Although the main target audience are Crisis Management practitioners, it became apparent during the DRIVER+ project that also the industry will benefit from a dedicated methodology. The benefit lies in the fact, that solution providers will know beforehand in which way they will be assessed and can prepare in a more dedicated way. Furthermore a Trial is a co-creative process that enhances the collaboration between Crisis Management practitioners and solution providers and hence also enhances the shared understanding in the domain.

2.2.4 Societal Impact Assessment Framework

A Societal Impact Assessment (SIA) is a process of research, planning and the management of social change or consequences (positive and negative, intended and unintended) arising from policies, plans, developments and projects (UNEP, 2007).

A SIA can be carried out in many different contexts, and for many different purposes, which makes it difficult to give a definite definition of what it entails. Whatever the definition though, “societal” always implies that there are people involved, so an assessment of what a certain solution does for a society, means thinking about how it impacts the people in it.

The objective of doing a SIA is to ensure that the implementation of CM solutions maximises its benefits and minimises its burdens, especially those burdens borne by people. Burdens and benefits may not be measurable or quantifiable and are often hard to consider exactly for this reason. Nonetheless, they are important, and by identifying societal impacts in advance, in particular two advantages are evident:

1) Better decisions can be made about which solutions should be employed, and how they should be employed;
2) Mitigating actions can be implemented to minimise the harm and maximise the benefits from a specific planned solution or related activity.

In the larger societal context, by achieving these advantages, other benefits include positive impacts such as accountability and acceptability.

- *Accountability* means that CM participants are in various ways responsible for what they do and should be able to give a satisfactory reason for it.
- *Acceptability* of solutions, since crisis managers depend on the society accepting the CM solutions, especially if the solutions are participatory in the sense that they require that the public actively engages in them.

This CWA will provide a common guidance on how to carry out the Societal Impact Assessment on potential CM solutions

Selecting a CM solution in a societal responsible way requires a systematic assessment approach that will allow an evaluation of the way the solution may impact the society. The SIA framework was developed within the DRIVER+ project to that purpose. The framework contains a structured methodology for assessing societal impact of CM solutions in order to avoid negative societal side effects.

The framework consists of two main elements: functions and criteria. These two elements are portrayed in a user-friendly table that allows a quick identification of a societal responsible solution. The assessment is

designed to enable its application to any particular solution. The potential standard will raise awareness on the importance of societal impact assessment in CM.

2.2.5 Scenario Description

If a Crisis Management professional plans to test a particular solution, a crisis scenario providing the context in which the solution is intended to operate, is needed as basis for this test. Moreover, a CM capability gap that a practitioner intends to close might be related to a specific type of crisis scenario. In addition to training purposes, scenarios are developed both in many European funded research projects and by public safety organisations to test (innovative) solutions. However, this development process is not carried out in a standardised, consistent way, and therefore the assessment of the solution, as well as the results of this assessment, are not directly comparable.

One of the identified standard potentials, mainly related to **SP94** ***Trials***, relates to the development of scenarios, understood here as the storyline of the crisis event. This standard potential is directly related to the four DRIVER+ Trials (**WP943**, **WP944**, **WP945**, **WP946**), as well as the Final Demo (**WP947**). Each of these events is based on a type of disaster: Trial 1 was about a chemical accident polluting a river, while Trial 2 was based on a forest fire scenario with cascading effects on various human activities (which will probably be the scenario retained for the Final Demo as well). Trial 3 and 4 are respectively about an earthquake with search and rescue issues and a major flood in a densely populated area. This standard potential is also indirectly related to the Trial Guidance Methodology (**WP922**) that it would complement.

This standard idea shall focus on the methodology of the scenario building, and therefore plans to provide criteria on a scenario description and steps to be followed in a systematic way. The specificity of a Trial context should be taken into account, as guidelines for developing scenarios for training exercises already exist. Moreover, for trialling purposes, scenarios might accommodate reality biases, and this should be controlled by specific rules to ensure that the scenarios remain realistic and fit for purpose. The idea is to propose a series of steps either starting from a list of CM capability gaps that the practitioner has identified as key issues for his/her organisation, or from one or several solutions that the end-user is willing to trial. Not only should it provide a methodology for developing the scenario, but it also aims at making available a checklist to verify, step after step that the draft scenario focuses on the CM processes at stake, provides the right triggering event enabling to unfold the CM processes at stake, is realistic enough and, in the end, allows to meet the set objectives.

The goal is to use this potential standard to improve comparability of solutions, because they would be all tested in the same way with the same criteria and features of a scenario if they follow this standard. This would enhance the shared understanding of different solutions in European CM area. Additionally, it is planned to simplify the preparation of a Trial from a practitioner perspective, by providing the criteria in the form of a check-list.

2.2.6 Situational Awareness via Social Media

This standardisation idea is related to **WP934**, where solutions are adapted for Trials, to **WP942,** where solutions are applied in Trials and to **WP944,** in which the SMAP social media solution was deployed and the need for anonymization of data to ensure the compliance with the GDPR was faced.

Social media is becoming more and more important in Crisis Management, not just as a tool to communicate with the public during a crisis, but also for tasking volunteers and for improving the situational awareness of the responders. In crisis situations they are used to pushing information (advice, alerts, information) but also for collecting information (crowd sourcing) from the public. A role is dedicated to this task: the social media managers. When they are scanning social media, posts of relevance need to

be identified and cross-checked with other information to become reliable so that they can support the management of the crisis

Social media data is most often considered as personal data as they can reveal either in their content or in their metadata the identity of their author. In order to be able to use this information for Crisis Management purpose and use it in a way that is in line with the GDPR, it is therefore necessary to perform some kind of anonymization of the data. The level of anonymization which must be performed depends on many factors such as the purpose of the processing and the retention period. The DRIVER+ partners propose to standardise some levels of anonymization at a scale, which would help both the prescription for anonymization and its implementation by solution providers.

The expected impact of this standardisation idea is to simplify the usage of social media-based solutions in Crisis Management, while ensuring at reduced costs their compliance to GDPR. By defining use cases and their associated needs for anonymization, it would contribute to reducing the costs associated to the legal compliance of these solutions and reduce the potential disparity which might be at term observed in the anonymization measures to be implemented for each use case.

2.2.7 Common Operational Picture – Symbols

The need for a standard for the representation in crisis situations of resources and assets adopting a commonly understood and used set of symbols to provide consistency in delivering a common operational picture to incident commanders has been identified by the DRIVER+ partners in relation to **SP94**. Whether these Trials deal with flooding and chemical hazard (Trial 1), a forest fire (Trial 2), an earthquake (Trial Austria) or a flood situation (Trial – The Netherlands), there has been a recognition that a commonly understood terminology between the different emergency responder organisations and the different partner countries was lacking and should be addressed. The design and adoption of a common set of Geographical Information System (GIS) map symbols for resources and assets has been further considered as a way to fulfil the DRIVER+ objective of ensuring the sustainability of the emergency responses defined in the project.

Common Operational Picture (COP) symbols are command and control symbols underpinned by commonly shared definitions which typically provide information on a map of an area where a crisis has occurred. They differ in shapes and sometimes in colours, depending on the items they depict, i.e. resources, assets, hazards and threats. They can be particularly useful in the management of a crisis as they facilitate information exchanges and provide an “at a glance” situational awareness, understood by all participants. They are also of direct operational interest, enabling users to make more accurate and informed decisions based on current or planned activities. However, not only are those symbols not necessarily consistent between CM agencies from one country to another, but they may also differ between COP tool suppliers, resulting in potential discrepancies and variations in the interpretation of a given situation by crisis managers and local responders. There would therefore be value in the development and adoption of a standardised set of COP symbols in the European Union to address any potential issues arising from the lack of symbols’ consistency, especially but not only in case of cross-borders crisis situations.

The standardisation of COP symbols is expected to have an important impact in the management of crises in Europe. From a general perspective, it should lead to an improvement in the crisis response capacity of the European Union, allowing for an enhanced shared understanding of crisis situations, and accelerated decision making and tasking in those situations. It is especially important in the situations were language barriers may limit mutual understanding. It will also significantly increase the interoperability and decision-making processes’ abilities of emergency responder organisations from different European Member States, especially those cooperating in the framework of the UCPM (Union Civil Protection Mechanism).

2.3 Analysis of standardisation potentials

This section presents the analysis of the standardisation potentials. It aims to lead to a decision on which of the standardisation potentials will be implemented into a CEN Workshop Agreement. The decision process is described in section 2.4.

The analysis of standardisation potentials was carried out using the ResiStand Assessment Framework (RAF). It is the only tool existing to assess standardisation potentials. This assessment tool analyses the urgency, impact and feasibility of a standardisation potential. It is described in more detail in Annex 4. The framework was developed by the European funded research project ResiStand - *Increasing disaster Resilience by establishing a sustainable process to support Standardisation of technologies and services*. ResiStand was a two-year project (May 2016 - April 2018) that aimed to identify new ways to improve the crisis management and disaster resilience capabilities of the European Union and individual Member States through standardisation (6).

The RAF is a tool for assessing the potential of a standardisation idea in the domain of disaster resilience and crisis management to be implemented as a new standardisation document. It is designed to capture those factors needed in order to inform a systematic mapping of benefits, impact and feasibility of a standardisation potential. The tool examines the extent to which the proposed standard has considered the essential ethical, legal and social issues, and to select the organisational conditions, under which the standard would be developed and implemented.

For each standardisation potential, one RAF needed to be filled in. To limit the subjectivity of the results – as the RAF is filled in by a person – a public questionnaire for each standardisation potential was conducted. It aimed to collect the most relevant information for the RAF. Additionally, it asked for the relation of the standardisation potential to the DRIVER+ objectives. The questionnaire is presented in Annex 5.

Additionally, the RAF was filled in by the **WP955** experts who have experience in the related fields. Therefore, three types of input were collected for each standardisation potential aiming to make the decision on which standardisation potential will become a CWA:

- RAF based on the questionnaire results.
- Relation of the standardisation potential to the objectives of DRIVER+.
- RAF based on experts' opinion.

The analyses of all seven standardisation potentials were done following the same process. As an example, the data of the standardisation potential *Building a Common Simulation Environment* is in detail presented in Annex 5 and Annex 6 .

To collect input for the five input tabs of the RAF a questionnaire was developed and published on the dedicated DRIVER+ webpage for each of the seven standardisation potentials.[3] In total, 42 answers were collected – five from external people and 37 from DRIVER+ partners. The questionnaire did not ask for all information needed in the five input tabs but was limited to some main questions. Based on this input the RAF was filled in partly and came to an assessment. The *assessment tab* is presented exemplary for the

[3] The questionnaires were conducted via google forms and external people as well as the DRIVER+ partners were asked to answer the questions for the ideas they are interested in. The questionnaire was open from 19th November 2018 until 31st December 2018. The DRIVER+ partners were invited via e-mail; the questionnaire was advertised in the DRIVER+ newsletter and promoted via social media in several posts. DIN additionally sent it to their national standardisation experts to receive feedback.

standardisation potential *Building a Common Simulation Environment* in Annex 5. For each potential a separated questionnaire needed to be answered to get the related data to be filled in the RAF. The results of these assessments are summarised in Table 2.1. It shows the number of answers and the assessed urgency to develop the document, the impact these standards might have and the feasibility to develop it.

In parallel, the RAF was filled in by experts in **WP955** for each standardisation potential. Detailed data is presented for the example of the standardisation potential *Building a simulation environment* in Annex 6 . Table 2.1 shows the assessment results of the RAF based on both inputs – the one given via the questionnaire and the one provided by the experts. It shows the assessed urgency to develop the CWA, the impact these standards might have and the feasibility to develop it.

Table 2.1 Comparison of the RAF assessments

Standardisation potential	RAF assessment based on the input from questionnaire				RAF assessment based on the input from experts		
	Number of answers in the questionnaire	Urgency	Impact	Feasibility	Urgency	Impact	Feasibility
Requirements on Information Exchange across Borders and Organisations	5	< 1 year	limited	low	< 2 years	considerable	medium
Building a Common Simulation Environment	9	< 2 years	limited	low	< 3 years	great	low
Trial Guidance Methodology	5	< 1 year	limited	low	As soon as possible	moderate	high
Societal Impact Assessment Framework (SIA)	3	< 1 year	limited	low	< 1 year	considerable	medium
Scenario Description	8	< 1 year	limited	low	< 2 years	considerable	high
Common Operational Picture – Symbols	7	< 1 year	limited	low	< 2 years	considerable	medium
Situational Awareness via Social Media	5	< 1 year	limited	low	< 2 years	limited	low

2.4 Prioritisation of the standardisation potentials

The seven standardisation potentials identified by the DRIVER+ partners needed to be prioritized in order to decide which ideas will further be followed. Therefore, the information gained from all aspects of the analysis of the standardisation potentials (section 2.3) was used. The final ranking was done by the members of **WP955** who were all invited to a face-to-face workshop in Berlin on 17-18/01/2019. At the

workshop the seven standardisation potentials were shortly presented and discussed. During the presentation of standardisation potential number 7 on *Situational Awareness via Social Media* the workshop participants agreed on not following the idea within DRIVER+ because the standardisation potential is not based on a DRIVER+ result and therefore it does not seem feasible to follow the topic within the given timeframe limited to the DRIVER+ project duration.

To prepare the ranking of the remaining six ideas and get all information needed for the decision making, the RAF for each of the standardisation potentials was filled in by the experts during the workshop. The RAF assessment based on the input from experts indicated the standardisation potentials on the *Trial Guidance Methodology* and *Scenario Description* as the most urgent potentials. The standardisation potential idea on *Building a Common Simulation Environment* was considered as the idea with the highest impact. Furthermore the RAF assessment implied that the feasibility of the potentials on Trial Guidance Methodology and Scenario Description is high. Due to the limited number of answers in the questionnaire, the RAF assessment based on the input from questionnaire was discussed by the experts but had limited impact on the ranking. Thus the number of answers could provide input on the interest in the potentials. The results of the RAF and the collected information on each potential was presented on the walls and therefore visible and comparable before the ranking.

The participants had time to wander around and get the required information. Everyone was asked to rank the standardisation potentials with dots in different colours regarding *Urgency*, *Impact*, and *Feasibility*. The dots were marked with numbers 1 to 4, indicating 4 the highest and 1 the lowest "vote". The numbers were counted for each aspect and also the overall numbers per standardisation potential. Results can be seen in Table 2.2.

Table 2.2 Ranking of the standardisation potentials

Position	Standardisation potential	Urgency	Impact	Feasibility	Total
1	Requirements on Information Exchange across Borders and Organisations.	12	13	12	37
2	Trial Guidance Methodology.	9	12	14	35
3	Scenario Description.	12	14	6	32
4	Building a Common Simulation Environment.	14	7	9	30
5	Societal Impact Assessment Framework (SIA).	7	7	9	23
6	Common Operational Picture – Symbols.	6	7	6	19

It was discussed to combine some of the ideas. The participants agreed that **SP92** had to decide if *Trial Guidance Methodology*, *Scenario Description* or a merged standard should be developed.

Further it was discussed that symbols could become an important chapter in "information exchange" but no content regarding symbols out of DRIVER+ is yet available. Harmonisation of symbols would therefore be a huge challenge. It was decided that symbols would not be turned into a CWA within DRIVER+. Nevertheless, the harmonisation of symbols is of high importance and interest and a recommendation is made that it should be taken into account in future standardisation activities.

Not only the available content within the DRIVER+ results was an important point for the prioritisation but also the initiators of the idea needed to be clear. Therefore, the initiators and partners of each of the ideas were discussed. The results are presented in Table 2.3.

Table 2.3 Proposed initiators and partners per standardisation potential

Standardisation potential	proposed initiator	proposed partners
Trial Guidance Methodology	JRC	PCSE, WWU, TCS
Scenario Description	JRC	PSCE, WWU, TCS
Requirements on Information Exchange across Borders and Organisations	AIT	TCS, PSCE
Building a Common Simulation Environment	XVR	TNO, TCS
Societal Impact Assessment Framework	PRIO	WWU, EOS, PSCE

The results showed that enough partners were identified for each of the listed ideas. A proposal of the investigator and partners was made by the **WP955** members with the reservation that it might not be feasible for all of the suggested investigators and/or partners regarding their interest and resources (manpower and/or person months) to chair a CWA.

Based on the information and discussions, the standardisation potentials were ranked. The ranking can be seen in Table 2.2. In combination with the *Scenario Description* the *TGM* was ranked first. Second ranked were the *Requirements on Information Exchange across Borders and Organisations*, the standardisation potential *Building a Common Simulation Environment* was ranked third and the *SIA* potential ranked fourth. The ideas on *Situational Awareness via Social Media* and *Common Operational Picture – Symbols* were not ranked because, as mentioned before, both ideas were already excluded during the preparation of the prioritizing.

Table 2.4 Final Ranking

Position	Standardisation potential	Total
1	Trial Guidance Methodology / Scenario Description.	35 + 32
2	Requirements on Information Exchange across Borders and Organisations.	37
3	Building a Common Simulation Environment.	30
4	Societal Impact Assessment Framework (SIA).	23

The ranking was confirmed by the DRIVER+ management team and it was decided to follow the standardisation potentials that have been ranked first, second and third.

SP92 members agreed to follow the *Trial Guidance Methodology* as one of the core elements within DRIVER+. Thus the standardisation potentials on the *Trial Guidance Methodology*, *Requirements on Information Exchange across Borders and Organisations* and on *Building a Common Simulation Environment* were followed within DRIVER+ and the initiation of the CWAs was started.

2.5 Status of standards development

This section focuses on the standards development within **WP955** by introducing the CEN Workshop Agreement. In Section 2.5.1 the proposal phase of the development process is explained in detail. Section 2.5.2 provides information on the timeline of the CEN Workshop Agreements, focusing on the initiation and on the next steps.

A CEN Workshop Agreement (CWA) is described in the CEN-CENELEC Guide 29. The guide details the CWA as a document agreed by participants of a Workshop. The participants do not have to be a member of a technical committee; therefore, a CWA is developed outside the normal CEN/CENELEC technical committee structure. The workshop is open to everyone interested in participating in the development of the document. The CWA is published by CEN valid for three years with a maximum lifetime of six years. After the validation of three years the workshop participants are asked to reconfirm, revise, upgrade into a standard/technical specification or withdraw the document.

The development of a CWA follows a specific process which can in general be divided into five phases. This will be described next.

2.5.1 Process of CWA Initiation

This section focuses on the initiation of the CWAs and thereby on the proposal phase (Figure 2.1).

Figure 2.1: CWA proposal phase

The proposal phase starts with the "Administrative Initiation". During this phase the initiator of a proposed idea and national standardisation bodies work together on the formal initiation of the standardisation project. The initiator provides information on the idea allowing the standardisation body to check if there are existing standards or standardisation activities within the topic that would permit the development of a CWA. A CWA is not allowed to be in conflict with a standard. If there is a standardisation gap which can be filled with the proposed idea, the next step can be initiated.

A project plan needs to be set up by the proposers with the help of a standardisation body. The aim of the project plan is to inform the public on the idea, thus the project plan is published for 30 days. The project plan includes the background to the proposed workshop, the motivation for the creation of the workshop, information on the market and legal environment, including a list of existing standards and standard related activities and documents. Information is also included regarding the workshop proposers and workshop participants with a short description of their background. The scope shall be included and should be very clear by also providing an overview what is within the scope of the document and what is excluded. Furthermore the target group of the CWA should be mentioned. The working plan and schedule should be presented including also the work that has already been delivered. Other chapters refer, amongst others, to the workshop structure, resource requirements and related activities, and liaisons, usually filled in by the proposed secretary of the workshop. The project plan ends with the contact details of the proposed chair and vice-chair of the CWA, the CCMC programme manager and the secretary of the proposed CEN

workshop. Furthermore it is important to set up a date and city where the Kick-off meeting is about to take place to ensure possibility of direct participation of anyone with an interest.

For the publication of the project plan, it is sent to CCMC together with the agenda of the Kick-off meeting and a self-assessment (7). If the proposed topic touches a scope of a European standardisation committee, the technical body shall be consulted on the CWA proposal. The project plan is published by CEN. With the publication the first commenting phase starts. While the project plan is available, the public is asked to give their comments. Each of the received comments should be addressed during the Kick-off meeting.

The Kick-off meeting shall take place after the end of the first comment phase and shall be held in the country of the CEN/CENELEC national member responsible for the secretary of the proposed CWA. During the Kick-off meeting the workshop chair (and vice-chair) is appointed and the project plan is approved by the workshop participants. With the approval of the project plan, each participant of the Kick-off meeting becomes a member of the workshop. After the Kick-off meeting, the drafting phase starts.

In Table 2.5 the DRIVER+ partners participating in the CWAs are listed. External partners are not mentioned due to the fact that the workshop is a closed event.

Table 2.5 participants of the CEN workshops

Standardisation potential	Chair	Vice-chair	contributing DRIVER+ partners
Trial Guidance Methodology.	WWU	PSCE	JRC, TCS, TNO, ARTTIC, Valabre.
Requirements on Information Exchange across Borders and Organisations.	AIT	PSCE	TCS, DLR, ARC, VALABRE, TNO, ARTTIC, FRQ.

2.5.2 Timeline of the initiated CWAs

The timeline of the proposal phase of the initiated CWAs can be seen in Figure 2.2.

Requirements on Information Exchange across Borders and Organisations	Feb	Mar – Apr	29th April 2019
Trial Guidance Methodology	Feb	Mar – Apr	29th April 2019
Building a Common Simulation Environment	Feb-Mar	July	9th July 2019

Figure 2.2: Timeline proposal phase initiated CWAs

For both workshops on the Trial Guidance Methodology and on information exchange, the project plans were created by the initiators with the support of DIN in February 2019. The fist comment phase ended by 28/04/2019. The Kick off meeting was combined for both workshops and was held in Berlin on 29/04/2019. The proposal phase for both workshops is completed.

The project plan for the CEN workshop on simulation was drafted by February and March 2019. The commenting phase started on 06/06/2019. A kick off meeting will take place in Delft on 09/07/2019.All CWAs will end in February 2020.

3. Terminology

The DRIVER+ terminology aims to establish an English project terminology of key terms and associated definitions in order to enhance a common understanding within the project team and to contribute to a shared understanding within Crisis Management in Europe. The rationale behind this terminology was already presented in **D955.11**. The terminology currently consists of 82 published terms, which are mainly based on already given references such as standards or UNISDR 2015. The DRIVER+ terminology will be enhanced continuously throughout the project´s lifetime. If there is no reference which suits to the term, the Terminology Working Group (TWG) develops an appropriate definition for the term in the context of DRIVER+. Eight of these newly developed terms were submitted to and discussed with the national standardisation committees in Germany and the Netherlands to be involved in the EN 17173 *European CBRNE glossary* by the responsible European standardisation organisation (section 3.1). To enhance a common understanding within the project team also a list of acronyms and abbreviations used in the project was published on the DRIVER+ website. Additionally, cooperation with other European research projects was established aiming to merge existing project terminologies in the area of crisis and disaster management: this is presented in section 3.2.

3.1 Contribution to EN 17173 – *European CBRNE glossary*

A formal standard – developed by a national, European or international standardisation body – needs to be reviewed every five years to ensure a state-of-the-art document. In case of EN 17173 *European CBRNE glossary* the European standardisation committee responsible for the document, CEN/TC 391, recently decided to update the last version. Therefore, a draft of the new EN 17173 – prEN 17173 – was published to be commented by every national standardisation body in Europe. The commenting phase was lasting from Mid-March until Mid-April 2019. During this time the partners of the Terminology Working Group provided the new developed terms as comments to the standard in Germany and the Netherlands.

The national standardisation committees have to take these comments into account and the German DRIVER+ partners were invited to discuss the suggestions with the related standardisation committee (Firefighting and Fire Protection Standards Committee). This discussion led to the agreement to take three of the eight suggested terms into the European discussion, within CEN/TC 391. CEN/TC 391 consist of experts from every national standardisation committee - maximum three national delegates. The German delegated experts agreed to take three DRIVER+ terms into the discussion and share the opinion that the terms will enhance the EN 17173. Five terms were not agreed to be taken into consideration. However, the committee acknowledged them as good definitions but not fitting into the context of CBRNE.

Table 3.1 Suggested terms of DRIVER+ terminology as input for EN 17173

Suggested term	DRIVER+ definition	Decision by German standardisation committee
Best Practice	This encompasses the preferred actions in a specific type of situation to efficiently and effectively achieve a certain objective. Best Practice may be formalised in internal policy documents such as handbooks and standard operation procedures and could be based on one or several Lesson Identified/Lessons Learned approved by decision-makers.	Accepted. But renamed into "good practice".
Civil Society	Part of the population that is linked by common interests, but not part of the professional response and not professionally trained in crisis management.	Rejected

Communication between first responders	The process of communication, information sharing and diffusion between professional responders.	Rejected
Community building	Practices directed toward the creation or enhancement of community among individuals within a regional area (such as a neighbourhood) or with a common interest.	Rejected
Societal impact	Dimension of crisis management that refers to its unintended positive or negative impacts on different societal groups or society as a whole, as well as on its core values and societal principles as captured for example in fundamental rights, constitutional laws, but also in public debate.	Rejected
Societal impact assessment	The process of identifying, analysing and managing intended and unintended (positive or negative) societal consequences.	Accepted
Societal resilience	Social entities and their abilities to tolerate, absorb, cope with and adjust to environmental and social threats of various kinds.	Accepted
Strategic decision maker	The individual who has the power and is tasked to take a strategic decision. These are elected officials, and high ranking personnel in response organisations / relevant authorities / agencies tasked with the response to the crisis.	Rejected

On European level, CEN/TC 391 rejected all terms for the reason of not being mentioned in a standard yet. Following this decision, DRIVER+ will add their new developed terms into the three CWAs developed in the context of the project and hand in the terms again.

As there is no suitable standard on European level for disaster management terminology, DRIVER+ will hand in the terms during the upcoming revision of ISO 22300 on an international level. Unfortunately, no expert of the Dutch standardisation committee is mirroring the work of CEN/TC 391. Therefore, the comments handed in to the NEN will not be taken to CEN/TC 391 discussion as there is no delegated expert joining the meeting on behalf of the Netherlands.

3.2 Cooperation with other research projects

In order to facilitate and foster a community-wide mutual understanding about terms used in CM it is evident that a cross-project and cross-initiative agreement is required. The Terminology Working Group initiated communication with several EU-funded projects (e.g. SAYSO, HEIMDALL, FIRE-IN). These projects were approached and asked if parts of their terminology can be included in the DRIVER+ overview.

Another decision by the TWG was to include those terminologies in its structured approach to find definitions (see **D955.11**). Furthermore DRIVER+ will provide a thesaurus service within the PoS to provide the DRIVER+ terms and definitions and to hold alternative definitions previously discussed.

Finally the TWG will set up a thesaurus (Excel and/or electronically) to provide an integrated list of definitions including other project terminologies.

4. Liaising with standardisation bodies and third-party events

It is important that already during the project lifetime of DRIVER+, outreaching activities related to the standardisation activities will take place. Therefore DRIVER+ has set up a liaison with the European standardisation committee CEN/TC 391 *Societal and Citizen Security*, of which the Working Group (WG) 3 is dedicated to Crisis Management and Civil Protection. Another possibility to interact with project externals and to inform/promote on the DRIVER+ standardisation activities is the active participation at third party events.

4.1 Liaison activities with CEN/TC 391

It is possible to link a research project with an existing standardisation committee and to proactively exchange and interact with each other. The standardisation committee on European level that is mostly related to the DRIVER+ project is the CEN/TC 391 *Societal and Citizen Security* and in particular WG3 Crisis Management/Civil Protection. The main goal of this liaison is that it allows partners of DRIVER+ to participate (without voting rights) in the meetings of the TC and relevant WG meetings as an observer. More information on the liaison is described in the CEN-CENELEC Guide 25 *The concept of Partnership with European Organisations and other stakeholders* (8).

The benefits of a liaison are to:

- Participate in the TC directly and thus ensuring the synergies between the research and related standardisation work, resulting in avoiding duplication of standardisation work.
- Demonstrate a formal collaboration with the European Standardisation System.
- Propose a new work item (standard).
- Have a relationship to the standardisation system throughout the whole research project.

The opportunities for DRIVER+ are to:

- Promote the DRIVER+ standardisation (ideas and) activities among the experts of the TC.
- Gain experts from the TC to support the (development of the) standardisation ideas (i.e. CEN Workshop Agreements).
- Know the ongoing standardisation activities and contributing to them.
- Presenting the CWAs to the TC and thus foster the uptake of the CEN Workshop Agreements into a European EN or an international ISO standard.
- Enhance the visibility of DRIVER+ standardisation activities throughout common activities (e.g. events, articles).

The liaison with the CEN/TC 391 is established since 2015. Since then DRIVER+ has already fruitfully integrated some project results into existing standardisation work. For example, and as described in section 3.1, definitions of the project have been forwarded and incorporated in the EN 17173 *European CBRNE glossary*. A similar contribution was done in 2016, as the DRIVER+ project has successfully commented to the draft standard of ISO 22319:2017 *Security and resilience -- Community resilience -- Guidelines for planning the involvement of spontaneous volunteers*. Apart from the current ongoing CWAs (see section 3), the standardisation ideas that are not addressed in these CWAs will be also forwarded to the CEN/TC 391 for further consideration.

With the CEN/TC 391 already several activities were conducted in the framework of the liaison. One main activity was the joint event during the third I4CM event in Warsaw in September 2018, an event especially dedicated to standardisation. In preparation for this event, the DRIVER+ project partner DIN had several web conferences with the chairs of the CEN/TC 391 and the WG3. As a result, the I4CM included a panel session on "The importance of standards development in case of multi-agency disaster response: How can

standardisation improve the capabilities of the European Union and Members States?" was conducted, including contributions from DIN, French Home office, DG HOME, BSI, European Forensic Initiatives Centre, UNECE and Paderborn University. The panel discussion informed the audience not only about existing standards in crisis management but also about the importance of participation in the development of new standards. In this regard it was mentioned that local and end users should contribute more to the development of standards to ensure its future uptake.

Besides the panel, a networking workshop was organised to bring ongoing research and innovation projects on the topics of crisis and disaster management together with the standardisation community. The aim of this workshop was to explain the basics in standardisation on national and European level, present new standards in crisis and disaster management and to explain how standards can be developed within the framework of a European research project. As sharing experiences on standardisation was another focus, several research and innovation projects in the field of crisis management were invited to this round table. The following projects participated with a presentation: I-LEAD, NO-FEAR, PEN-CP, ARCSAR, DARENET, E-NOTICE, FIRE-IN, and ILEANET. The workshop concluded that part of the Research and Innovation Community still has too little knowledge and experience about the possibilities of standardisation and standardisation in research and innovation projects. The participating researchers agreed that with the help of standardisation, both the implementation of research projects as well as their results can be significantly upgraded.

Apart from this joint work in the third I4CM, the CEN/TC 391 members were informed and asked to actively participate in the development of the CEN Workshop Agreements as described in section 2. These CWAs as well as the current status of the DRIVER+ project have also been presented at the CEN/TC 391 meeting on 19 June 2019 in Vienna. A high interest was shown and the German speaking experts of the CWAs are invited to join the next German mirroring committee meeting in Berlin on 11/10/2019 to present the current status of the CWAs.

4.2 Liaison activity with ETSI CEN CDM

In parallel to the formation of the CEN Workshop on the semantic and syntactical interoperability for crisis and disaster management, a similar activity has been initiated within European Telecommunication Standards Institute (ETSI).

ETSI have initiated a new Industry Specification Group (ISG) to begin considering standards for a Common Information Sharing Environment Service and Data Model (CDM)[4]. This new ISG held a Kick of meeting on 29/05/2019 at ETSI headquarters in Sophia Antipolis, France. It is clear from the title alone that similar goals are held to that of the CWA initiated by DRIVER+. Project partner PSCE attended the Kick Off meeting to learn more and understand both potential overlap and commonality, and the differences and complementarity of the two activities.

The CWA and ISG CDM have the following commonalities:

- Both hold the common theme – to standardise common information sharing capabilities and processes.
- Both are founded on the basis of a previous and existing EU H2020 project.
- Both activities will produce guiding technical reports. No activity is currently planned to produce normative standards, although is a common goal after the initial preparatory work.

[4] https://www.etsi.org/committee/1584-cdm

The following differences and complementarities are identified:

- ISG CDM:
  - Focused primarily on using the outcomes of the EUCISE project[5]. EUCISE focuses solely on the sharing of information for maritime surveillance information.
  - Has an initial working duration of two years.
  - Will spend the 1st year transferring the outcomes of EUCISE into ETSI Technical Reports and Specifications describing service and data models in the context of maritime. The work has a primarily technical specification nature fitting the technical nature of ETSI.
  - Would like to expand the specifications to include other domains than just maritime.
- DRIVER+ CWA:
  - Focuses on the "Requirements" of the Common Information Sharing from a syntactic and Semantic perspective, with a primary focus on Crisis Management.
  - Is focused primarily on using the outcomes of the DRIVER+ project and previous projects like EPISECC.
  - Has a working duration of one year.

During the ISG CDM Kick Off meeting, the domination of EUCISE partners as members of the ISG makes a clear agenda to retain the focus on maritime domain within the first year of the work. However, the presence of PSCE at the Kick Off meeting, and knowledge of the DRIVER+ CWA, was found to be interesting in order to consider the broader scope of any future ISG CDM standards to become wider and more generic, to cover information sharing during crisis management and other domains.

4.3 Liaison activity with 3GPP Mission Critical Standards

3GPP[6] is a global partnership of Standardisation bodies with the primary goal to produce standards to specify mobile communication technologies. Their current work plan seeks to standardise 5G mobile technology. 3GPP has been focusing on the needs of public safety and crisis management since 2014, with the formation of a dedicated working group: SA6 Mission Critical Applications[7]. Since then, a number of key standards have been produced that will allow public safety and crisis management practitioners to be able to use commercial mobile technology with features that they are used to using with their old push-to-talk radios. Existing technology used today is typically of a 2G nature. New, mission critical enabled broadband mobile technology will enhance the mobile technology that we all rely on daily, to provide the features that crisis managers and responders will need, and with a key focus on security and resilience.

3GPP Mission Critical standards enable new group calling and data exchange features such as, at least:

- Mission Critical Push to Talk services (MC-PTT).
- Mission Critical Video Services (MC-Video).
- Mission Critical Data Services (MC-Data).

It is recognised that 3GPP standards are entirely of a technical nature and do not focus on any specification application. The applications for data exchange between a mobile device (handset, wearable or any other

[5] European test bed for the maritime Common Information Sharing Environment in the 2020 perspective; http://www.eucise2020.eu

[6] https://www.3gpp.org/about-3gpp/partners

[7] https://www.3gpp.org/specifications-groups/sa-plenary/sa6-mission-critical-applications

device), with other mobile devices, and with control centres is outside of the scope of 3GPP. However, there is a strong dependency on those applications and the mobile network over which the data is exchanged.

DRIVER+ maintains a visibility of the activities and a presence within 3GPP through the PSCE partner, who are a Market Representation Partner of 3GPP[6]. The primary interface considers the DRIVER+ CWA and the 3GPP Mission Critical Data Services and their ability to transfer Crisis Management data. The DRIVER+ CWA on the semantic and syntactical interoperability for crisis and disaster management will describe requirements that should both:

- Be aware of, and align with existing MC-Data specifications.
- Prepare to propose changes to MC-Data, should it be found that it cannot fulfil necessary requirements found during our CWA.

PSCE attended the last two Project Coordination Group (PCG) meetings, an ad-hoc, ITU submission workshop, where the work of DRIVER+ has been either presented or discussed with delegates:

- 18/10/2018 – PCG-41, Makuhari, (online attendance and presentation).
- 24/10/2018 – PCG-ah-34069, Brussels.
- 28/03/2019 – PCG-42, Versoix.

4.4 Participation at third-party events

DIN participates at third party events to promote the DRIVER+ standardisation activities to project externals and to get project externals interested in joining the CWA developments. So far, the standardisation activities of DRIVER+ have been promoted via participation at the two below listed conferences.

DIN conducted a presentation at the post conflict and disaster resilience session within the 11th International Forum on Urbanism (IFOU) Congress 2018 on *Reframing urban resilience implementation: Aligning sustainability and resilience* on 10th - 12th December 2018 at Barcelona, Spain. In this presentation the following aspects were explained and presented:

- The link between standardisation and research and innovation.
- Impact and typical activities of standardisation for research and innovation projects.
- Methodology for integrating standardisation in the DRIVER+ project.
- Standardisation ideas that derived from the standardisation potential workshop from September 2018.

The attendance to this conference with the presentation supported the dissemination of the project results and the standardisation approach as well as gave a possibility to receive feedback on the proposed standardisation ideas.

In May 2019, DIN participated with a poster presentation at the 16th International Conference on Information Systems for Crisis Response and Management (ISCRAM) in Valencia (Spain). The poster with the title "Standardisation for an enhanced crisis management" presented the methodology of standardisation within the DRIVER+ project, the three CEN Workshops that were initiated throughout the DRIVER+ project as well as a reference to the CMINE. Several conference participants showed their interest in the ongoing DRIVER+ standardisation activities and wanted to join the activities through the CMINE platform.

5. Way Forward

WP955 will focus on the development of the three CEN Workshop Agreements. An overview of the next steps is given in Figure 5.1. The development of the manuscripts will last until the end of November for all three workshops. A second comment phase is not foreseen. Final versions of the three manuscripts are expected latest by January 2020 and will published by February 2020.

INFORMATION EXCHANGE	May – Nov	–	Dec – Jan	Feb 2020
TGM	May – Nov	–	Dec – Jan	Feb 2020
SIMULATION	Jul – Nov	–	Dec – Jan	Feb 2020

Figure 5.1: Timeline for the next steps in the CWA development process

These CEN Workshop Agreements will lead to a standardised Test-bed simulation exchange tool, standardised requirements on information exchange between different solutions, and a standardised methodology to conduct Trials. These results will strengthen the way Trials are to be conducted in the Centres of Expertise. These three CWAs are based on results of DRIVER+, but are also discussed and adapted together with external participants who are member of the CEN Workshops. Therefore the CWAs influence the definition of the results which are to be implemented by the CoEs and other end-users.

References

1. **DRIVER+ project.** *D922.11 - List of Crisis Management Gaps.* 2018.

2. —. *D951.18 - SP95 Coordination Report-4.* 2019.

3. **Altay, N. and Labonte, M.** *Challenges in humanitarian information management and exchange: evidence from Haiti.* 2014. doi:10.1111/disa.12052.

4. **Tso, Y. E. and McEntire, D.** *Emergency management in Taiwan: Learning from past and current experiences. .* 2011.

5. **Studies, Army Command and General Staff Coll Fort Leavenworth KS School of Advanced Military.** *Comprehensive Common Operating Picture (COP) for Disaster Response.*

6. **ResiStand.** *D6.1 The ResiStand pre-standardisation process.*

7. **CEN-CENELEC.** *CEN-CENELEC GUIDE 29 - CEN/CENELEC Workshop Agreements.* 2014.

8. —. *CEN-CENELEC GUIDE 25 - The concept of Partnership with.* 2017.

9. **DRIVER+ project.** *Portfolio of Solutions: http://pos.driver-project.eu/PoS/solutions.*

10. —. *D923.11 - Functional specification of the Test-bed infrastructure.* 2018.

11. —. *D934.21 – Solution testing procedure.* 2018.

Annexes

Annex 1 – DRIVER+ Terminology

In order to have a common understanding within the DRIVER+ project and beyond and to ensure the use of a common language in all project deliverables and communications, a terminology is developed by making reference to main sources, such as ISO standards and UNISDR. This terminology is presented online as part of the Portfolio of Solutions and it will be continuously reviewed and updated[8]. The terminology is applied throughout the documents produced by DRIVER+. Each deliverable includes an annex as provided hereunder, which holds an extract from the comprehensive terminology containing the relevant DRIVER+ terms for this respective document.

Table A1: DRIVER+ Terminology

Terminology	Definition	Source
Interoperability	The ability of diverse systems and organisations to work together, i.e. to interoperate.	ISO 22397:2014(en) Societal security — Guidelines for establishing partnering arrangements.
Organisation	Person or group of people that has its own functions with responsibilities, authorities and relationships to achieve its objectives.	ISO 22300:2018(en) Security and resilience — Vocabulary
Crisis management professionals	Person with knowledge, experience or ability needed to effectively and timely respond to crisis in order to minimize damage to society.	Initial DRIVER+ definition
Crisis management taxonomy	A taxonomy of Crisis Management Functions describing strategically-directed activities to prevent, prepare, respond to and mitigate the effects of and recover from a crisis. Note 1 to entry: Taxonomy is a scheme of categories and subcategories that can be used to sort and otherwise organize itemized knowledge or information that are processed, organized and correlated to produce meaning.	ISO 5127:2017(en) Information and documentation — Foundation and vocabulary.
Scenario	Pre-planned storyline that drives an exercise, as well as the stimuli used to achieve exercise project performance objectives.	ISO 22300:2018(en) Security and resilience — Vocabulary.

[8] The Portfolio of Solutions and the terminology of the DRIVER+ project are accessible on the DRIVER+ public website (https://www.driver-project.eu/). Further information can be received by contacting coordination@projectdriver.eu.

Societal impact	Dimension of crisis management that refers to its unintended positive or negative impacts on different societal groups or society as a whole, as *well as on its core values and societal principles as captured for example in fundamental rights, constitutional laws, but also in public debate.*	Initial DRIVER+ definition
Societal impact assessment	The process of identifying, analysing and managing intended and unintended (positive or negative) societal consequences.	Initial DRIVER+ definition
Terminology	Set of terms representing a system of concepts within a specified domain.	ISO/TS 17117:2002(en), 3.1
Test-bed technical infrastructure	The software tools and middleware to systematically create an appropriate (life and/or virtual) environment in which the trialling of solutions is carried out. The Test-bed infrastructure can enable existing facilities to connect and exchange data.	Initial DRIVER+ definition
Trial guidance methodology	A structured approach from designing a Trial to evaluating the outcomes and identifying lessons learnt.	Initial DRIVER+ definition

Annex 2 – Questionnaire as preparation for the standardisation potential workshop

The survey was addressed to the DRIVER+ project members with the aim to raise the awareness of standardisation within the project and collected standardisation ideas. Therefore, it was used as preparation for the workshop on standardisation potential.

The first question was to identify how familiar the DRIVER+ partners are with standardisation to get an impression of how detailed the introduction in the field of standardisation needed to be. Possible answers were numbers from one to four indicating the knowledge from number one "not familiar" to number 4 "familiar". A schematic representation of the frequency of the given answers can be found in Figure A1.

Several questions (e.g. "Is there a methodology or parts of a methodology (for example the guidance methodology) within DRIVER+ task, work package or subproject you would like to recommend to someone outside the project to work with?") indicate that the methodology, terminology, definitions, processes, tools or exchange formats should be consistent. An exemplary schematic representation of the frequency of the given answers regarding methodologies can be found in Figure A2. Whereas about 71 % agreed that there is a methodology or parts of a methodology, a result, or a process they would recommend to someone external.

Most frequently the Trial Guidance Methodology (TGM) was mentioned in that context. Other answers were the Trial action plan or the social impact assessment (SIA). Also the answers regarding the question about which process would be the one that could be used somewhere else, mostly addressed to the TGM.

Key words of the answers are presented in Figure A3. It shows a tag cloud. The size of the word corresponds with the number of times it has been suggested for becoming a standard. It was shown during the interactive session where first standardisation potentials were collected. The outcomes are presented in Figure A4 .

Figure A1 Indication of familiarity with standardisation

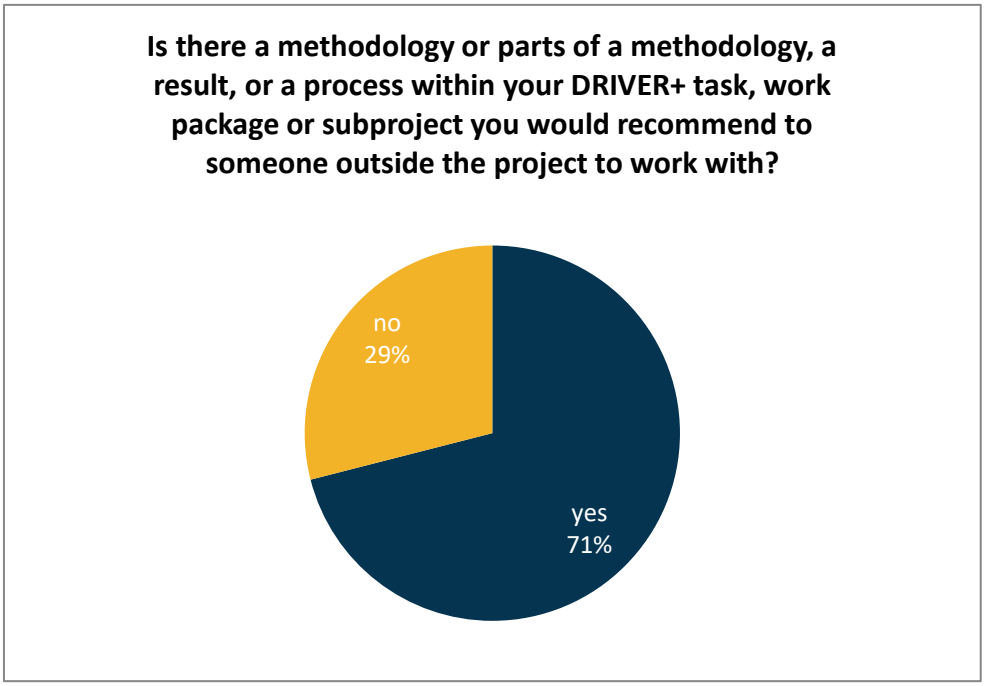


Figure A2 standardisation potential

Figure A3 Tag Cloud consisting of answers from the survey.

Table A2 Suggested ideas of standardisation potentials

Classification	Process	Measurement	Interface	Product
Terminology • Operational • Hazard • POS • Questionnaires • Scenario definitions	Solution testing procedure as a part of the TGM.	Societal impact assessment framework.	Test-bed reference implementation.	Social media post representation.
Taxonomy of crisis management functions	Trial guidance methodology • Process • Documentation	Trial - Measurement of KPIs	Test-bed software / interfaces	(Trial-)Scenario (Reference) – especially cross border
Portfolio of solution (standard taxonomy of solution)	Solution integration procedure	Trustworthiness of social media • Source of information • verify accounts	Crisis Management information exchange massage formats (technical perspective) / simulation data exchange.	Training modules (match educational standards already available)
Management of data / sharing data	How to build a community management tool (of CMINE)			
Type of resources and COP symbols	Dissemination and communication action plan			
Syntactical (maybe semantic) interoperability (icon mapping)				

Annex 3 – Overview of tools, processes and solutions developed or used in DRIVER+ and its related standards

The DRIVER+ project has a wide range of solutions, tools and processes that are incorporated into the project. In order to support the identification of standardisation potential, the **WP955** partners consider all solutions, processes and tools developed and used within the project when initiating new standards. Therefore, these project results are listed in the following tables (Table A3 to Table A6) and their relation to existing standards and the standardisation ideas of the previous sections is presented.

Note: The **SP93** table is filled with the solutions which are (or going to be) trialled within DRIVER+. The standards mentioned in the corresponding standard column are the ones reported by the solution providers in the DRIVER+ Portfolio of Solution (PoS). (9)

Table A3 Tools, processes and solutions within SP92 and its related standards

SP92: Tool/ processes/ solution	Related standard (if applicable)
Trial Guidance Methodology	CWA Trial Guidance Methodology.
The Trial Guidance Tool helps crisis management practitioners to design, conduct and assess Trials. A Trial is an event for systematically assessing solutions for practitioners needs.	• BS 11200: Crisis management and good practice. • ISO/IEC 19501: Information technology – open distributed processing – unified modelling language (UML) Version 1.4.2.

Table A4 Tools, processes and solutions within SP93 and its related standards

SP93: Tool/ processes/ solution	Related standard (if applicable)
Socrates OC: a Command and Control system for situation assessment, resource management and tasking.	• EMSI: ISO/TR 22351:2015. • OGC Web Map Service. • OpenGIS Web Feature Service Interface Standard (WFS). • CAP Common Alerting Protocol Version 1.2 (OASIS Standard, 01 July 2010). • CEN Workshop on semantic and syntactical interoperability for crisis and disaster management.
GDACSmobile: a support platform for collecting and sharing situational awareness information.	• CAP Common Alerting Protocol Version 1.2 (OASIS Standard, 01 July 2010). • CEN Workshop on semantic and syntactical interoperability for crisis and disaster management.
CrisisSuite: An online crisis management software to enable organisations to successfully manage information during a crisis.	• CAP Common Alerting Protocol Version 1.2 (OASIS Standard, 01 July 2010). • CEN Workshop on semantic and syntactical interoperability for crisis and disaster management.
HumLogSuite: a performance assessment platform that	• CEN Workshop on semantic and

serves logistic processes in crisis management.	syntactical interoperability for crisis and disaster management.
Protect: a web-based alert and notification system for emergency (and early warnings) situations concerning civil protection.	• CAP Common Alerting Protocol Version 1.2 (OASIS Standard, 01 July 2010). • CEN Workshop on semantic and syntactical interoperability for crisis and disaster management.
SMAP: a Social Media Analysis platform, which helps social media managers collecting, analyse and report on social media during a crisis.	CAP Common Alerting Protocol Version 1.2 (OASIS Standard, 01 July 2010). • Geographic information - Spatial referencing by coordinates. • CEN Workshop on semantic and syntactical interoperability for crisis and disaster management.
SE-STAR: A Crowd simulation engine which can simulate crowds of individuals based on their behaviours, motivations, and stimuli, to support the training of crisis managers and the design of safer infrastructure.	• CEN Workshop on Building a Common Simulation Environment.
Crowd Tasker: enables crisis managers to instruct large numbers of non-institutional (either spontaneous or pre-registered) volunteers with customizable tasks, contextual information, warnings and alerts, as well as to crowdsource information from them.	• CAP Common Alerting Protocol Version 1.2 (OASIS Standard, 01 July 2010). • CEN Workshop on semantic and syntactical interoperability for crisis and disaster management.
IO-DA is research software which is able to automatically build a plan of the actions to be taken by described actors in order to manage a described crisis.	• CAP Common Alerting Protocol Version 1.2 (OASIS Standard, 01 July 2010). • CEN Workshop on semantic and syntactical interoperability for crisis and disaster management. • CEN Workshop on Building a Common Simulation Environment.
EMT (Emergency Mapping Tool) is crisis management oriented simple COP tool, which enable various users to work with their own language, and map symbology.	• CAP Common Alerting Protocol Version 1.2 (OASIS Standard, 01 July 2010). • CEN Workshop on semantic and syntactical interoperability for crisis and disaster management.
Rumour Debunker offers a solution for internet news analytics, which prevents it from being part of online mis- or disinformation campaigns.	N/A
PROCeed Laboratory is a serious gaming solution which can support crisis managers in choosing the best solutions by simulating the consequences of decisions and events.	• CAP Common Alerting Protocol Version 1.2 (OASIS Standard, 01 July 2010). • CEN Workshop on semantic and syntactical interoperability for crisis and disaster management.

LifeX COP is a web-centric multi-user Common Operational Picture for Crisis Management which is to display data coming from various sources in a map-centric user interface.	• EMSI: ISO/TR 22351:2015. • OGC Web Map Service. • OpenGIS Web Feature Service Interface Standard (WFS). • CAP Common Alerting Protocol Version 1.2 (OASIS Standard, 01 July 2010). • CEN Workshop on semantic and syntactical interoperability for crisis and disaster management.
The Debris Tool is a software based solution designed to amalgamate various defined inputs from the field, historic survey data and other sources, for the prediction and modelling of waste and debris removal options in a post-crisis environment.	N/A
PFA is a scenario enabled psychological first aid (PFA) training which comprises knowledge on what PFA is, guidelines on how to perform PFA and an experiential training package to build the capacity to deliver quality PFA.	N/A
XVR Crisis Media is a software which supports the training of crisis managers on how to manage and monitor communication from news media, social media and internal communication sources in a crisis situation.	N/A
PROTECT is a map-based system for the pooling of resources and the monitoring and controlling of emergencies in a crisis situation.	• EMSI: ISO/TR 22351: 2015. • CAP Common Alerting Protocol Version 1.2 (OASIS Standard, 01 July 2010). • CEN Workshop on semantic and syntactical interoperability for crisis and disaster management.
MDA C4I is Emergency Medical Service system which allows for efficient, real time response to tasks on the field (e.g. people in need for medical assistance), by allocating the site, allocating the resources needed and available, tasking the resources and following up the accomplishment.	• ESMI (ANSI/ATIS 0500002). • CEN Workshop on semantic and syntactical interoperability for crisis and disaster management.
The solution “Airborne and Terrestrial Situational Awareness” is composed of several individual components and tools, which are integrated into a complete system, ready to be deployed in different crisis management scenarios, enabling remotely piloted vehicles (RPV) supported reconnaissance, processing of resulting images, and crisis management specific traffic management.	• OpenGIS Web Feature Service Interface Standard (WFS). • OGC Web Map Service. • CEN Workshop on semantic and syntactical interoperability for crisis and disaster management.
CrisisSuite is a tool that supports the netcentric working methods of crisis teams by creating a universal picture of the crisis and share it horizontally and vertically with all the other teams in the crisis organisation.	• CAP Common Alerting Protocol Version 1.2 (OASIS Standard, 01 July 2010). • CEN Workshop on semantic and syntactical interoperability for crisis and disaster management.

VieWTerra Is a "GIS & Simulation" suite of products allowing Civil responders to rapidly build a virtual 4D representation (3D synthetic environment+ Time dimension), which provides a Common Operational Picture to both the Crisis Center and the rescue units out in the field.	• OGC Web Map Service • CEN Workshop on semantic and syntactical interoperability for crisis and disaster management.
DroneRapidMapping enables rapid mapping of incident/crisis area based on imagery acquired by any drone (RPAS) and make it available to rescue or crisis management actors.	• CEN Workshop on semantic and syntactical interoperability for crisis and disaster management.
The Portfolio of Solutions is a database-driven online catalogue that presents details of crisis and disaster management solutions based on the DRIVER+ taxonomy. This approach allows matching of requirement of practitioners and features of solutions.	• BS 11200: Crisis management and good practice. • ISO/IEC 19501: Information technology – open distributed processing – unified modelling language (UML) Version 1.4.2.

Table A5 Tools, processes and solutions within SP94 and its related standards

SP 94: Tool/ processes/ solution	Related standard (if applicable)
Solution selection for Trials: a process to launch a call for application and select a few solutions to be trialled, based on the identified CM capability gaps and the set objectives.	• CEN Workshop on Trial Guidance Methodology.
Application of solutions in Trials: involvement of the solution provider in the Trial preparation phase and technical integration of the solutions in the Test-bed and between each other.	• CEN Workshop on Trial Guidance Methodology.
Scenario definition / scenario framework: definition of the storyline of the Trial so that the users of the solutions feel immersed in the situation.	N/A
Trial Action Plan: The main Trial planning document, facilitating collaborative planning and supporting execution of the Trial. It covers all areas related to the Trial organisation and is used to record efforts, circulate decisions and assess progress.	N/A
Application of TGM: applying the Trial Guidance Methodology to a specific Trial (**D922.21**)	N/A
Validation of TGM and Test-bed: Checking the relevance and usability of the TGM and Test-bed in light of a specific Trial, and providing critics and recommendations in a process of continuous improvement.	• CEN Workshop on Trial Guidance Methodology.
Workshop "0": KoM of a Trial (concept).	N/A
Trial Committee: organisation of work and division of responsibilities between the different stakeholders of a Trial.	N/A

Platform adaptation: adapting and developing a platform to host a specific Trial.	N/A
Lessons learnt: process of distributing the problem information to the subsequent Trials, warning if similar failure modes or mechanism issues exist and taking preventive actions.	N/A
Policy recommendations: provide recommendations at policy level based on the results of a Trial.	N/A

Table A6 Tools, processes and solutions within SP95 and its related standards

SP 95: Tool/ processes/ solution	Related standard (if applicable)
Dissemination & Communication Audit Questionnaire.	N/A
Catalogue of solutions for each Trial.	N/A
Video of each Trial, including interviews with key participants.	N/A

Annex 4 – Background of the RAF

The ResiStand Assessment Framework (RAF) is a tool for assessing the potential of a standardisation idea in the domain of disaster resilience and crisis management to be implemented as a new standardisation document. It is designed to capture those factors needed in order to inform a systematic mapping of benefits, impact and feasibility of a standardisation potential. The tool examines the extent to which the proposed standard has considered the essential ethical, legal and social issues, and to select the organisational conditions, under which the standard would be developed and implemented.

It aims to provide insight into a standardisation initiative at an early stage, when individuals or organisations consider developing a CWA or submitting a New Work Item Proposal to a standardisation committee. Apart from the insights into urgency, expected impact and feasibility, it also pinpoints the issues that still need attention before the proposal is mature for actual standardisation. [D6.1 The ResiStand pre-standardisation process]

The RAF is an Excel based tool consisting of five input tabs:

i. In the **Intake tab** the proposed standardisation initiative (the initiators, the objectives of the standard, its scope and its target groups), an overview of the types of organisations that should be involved in the development of the proposed standard, the urgency of having the standard available and a first description of its potential impact need to be filled in.
ii. **The Impact – End-users tab** asks for potential benefits for end-users or practitioners; such as improved crisis management capabilities, reduction in loss of life and damage to properties, improved responder safety and cost savings.
iii. **The Impact – Industry & Research tab** need to be filled in with information regarding to economic benefits (business opportunities) and technological progress to the industry and/or research organisations.
iv. In the **Ethical, Societal and Legal issues tab** potential effects of the standard on issues including (but not limited to) avoidance of harm, privacy, non-discrimination and solidarity need to be filled in.
v. The **Feasibility tab** asks for information on investigation of the conditions for developing and implementing the standard: foundation, development perspectives, implementation perspectives and considerations of drawbacks.

In a sixth tab – an output tab – the results of the assessment are shown. Based on the information on the standardisation initiative filled in by the user into the five input tabs, the RAF automatically creates the results onto the output tab. It is not necessary to fill in every tab and provide all information the RAF askes for to get an assessment result in the end. Naturally, the more information is included in the RAF the more realistic the result is. (6)

Annex 5 – Input for the ResiStand Assessment Framework via a Questionnaire

For each of the seven standardisation potentials a survey was conducted. It is presented in this section. The questions and answers of the questionnaire is shown representatively via the example of the standardisation potential *Building a Common Simulation Environment*. Nine people answered the questionnaire for this standardisation potential – eight DRIVER+ partners and one external.

The questionnaire started with a short introductory text, which was followed by a brief summary of the content of the standardisation potential. The first three question were slightly different in each questionnaire as they were related to the specific topic of the standardisation potential and asked for the background of the participant and his/her experience in the field of the standardisation potential.

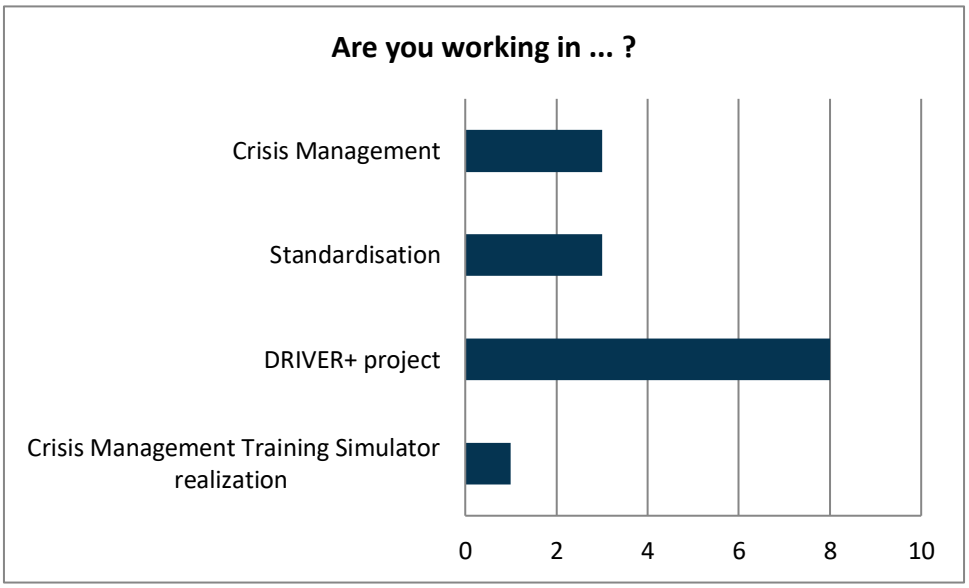


Figure A4 Professional background of participants

Figure A4 shows that eight of the nine participants in the survey worked for DRIVER+, three of them in the area of Crisis Management, three of the in the standardisation and one works in the context of realisation of crisis management training simulators. Figure A5 shows that three participants do not develop a virtual test-bed and six have experience in this field. Regarding the experience in the usage of a simulation environment or a virtual test-bed, Figure A6 shows that 44 % pf the participants do not have experience and 56 % have.

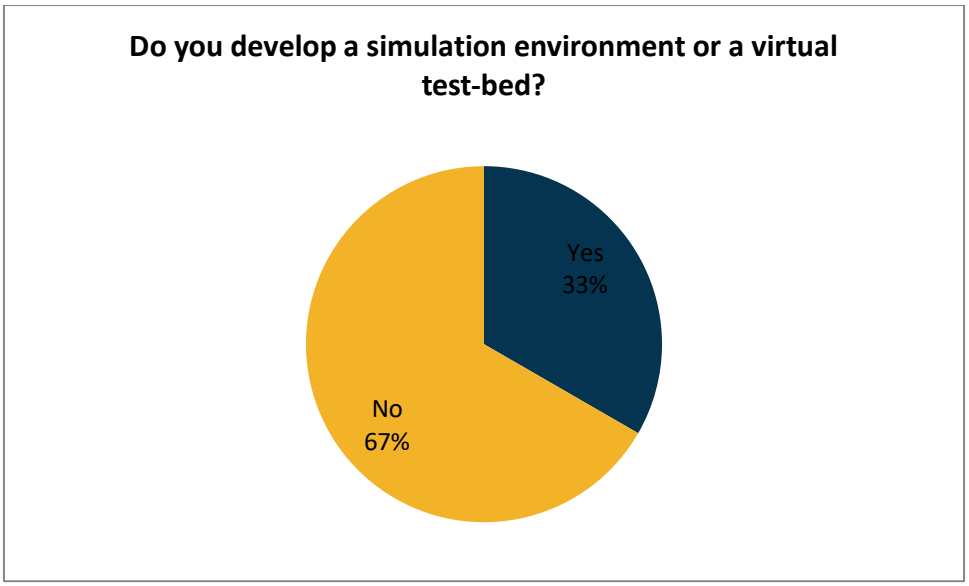


Figure A5 Experience in the development of a virtual test-bed

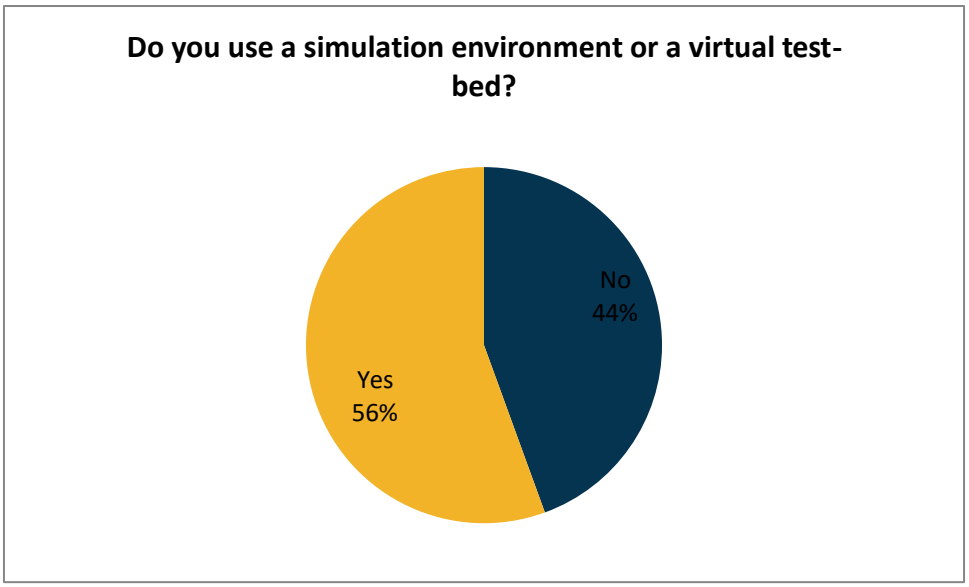


Figure A6 Experience with usage of simulation environment or virtual test-beds

In case the answer regarding the usage of a simulation environment or a virtual test-bed was "yes", more details were asked to be provided. The answers are as follows:

- We have connected our simulators to the DRIVER+ Test-bed and provided multiple individual connections with other simulators throughout multiple projects,
- In DRIVER+ Trials,
- Using for simulated crisis situation under Trial 1.

Following this part of the questionnaire, the focus was on questions aimed at getting more input for the ResiStand Assessment Framework. The following questions were asked to get input for the *Intake tab*.

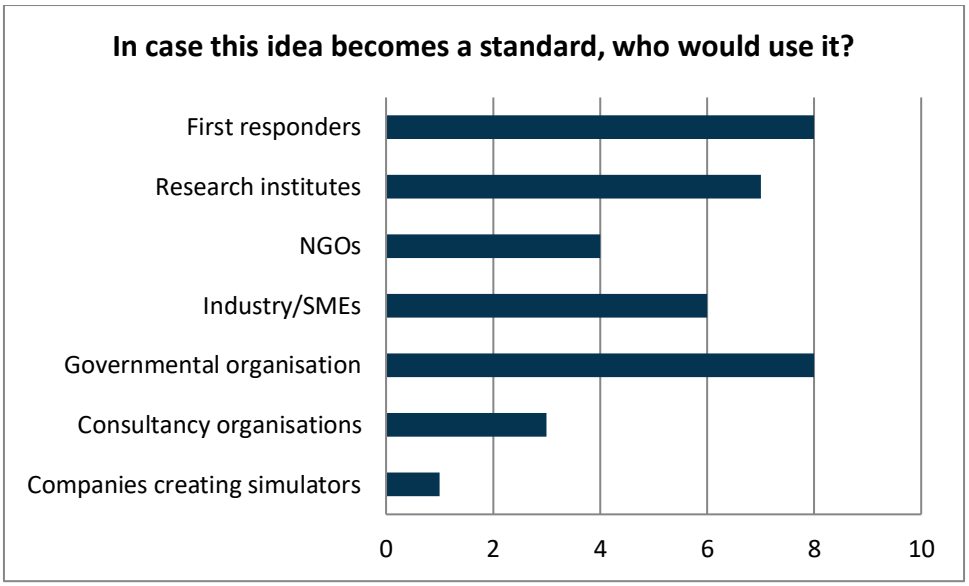


Figure A7 Target groups for applying the standard

For the question "**What would be the expected benefit of the standard from your point of view?",** it was possible to give an answer as a text. The following answers were received:

- Easy connection of multiple simulators.
- As demonstrated in the recent international exercise at the Valabre Center on 23rd, 24th and 25th October 2018 – in which I participated as a player representing the ITALIAN INTERIOR MINISTRY - international cooperation procedures need standardisation, as far as possible. This, in order to allow the operational subjects (firefighters, civil protection, police, etc.) to intervene in the rescue of the populations in the international environment maintaining their standard (mobile colonies for example), but with procedures, means and equipment - as more compatible as possible.
- One unified understanding of a virtual training/test environment; easy and fast connectivity with multiple simulators; additional services that are available from the start of connection.
- Harmonized technological infrastructure facilitating sharing of results and lessons learned, stimulating the networking of technological infrastructures (and thus the collaboration between stakeholders).
- Education and training of emergency services.
- Increasing the realism of Table top Trials and exercises. Minimize costs of exercises. Open business opportunities for industry (developing simulators).
- Ease the cooperation between different simulators.

Regarding the potential urgency of developing the proposed standard it was asked when and why the standard needs to be ready. The answers are shown in Figure A8 and the text below.

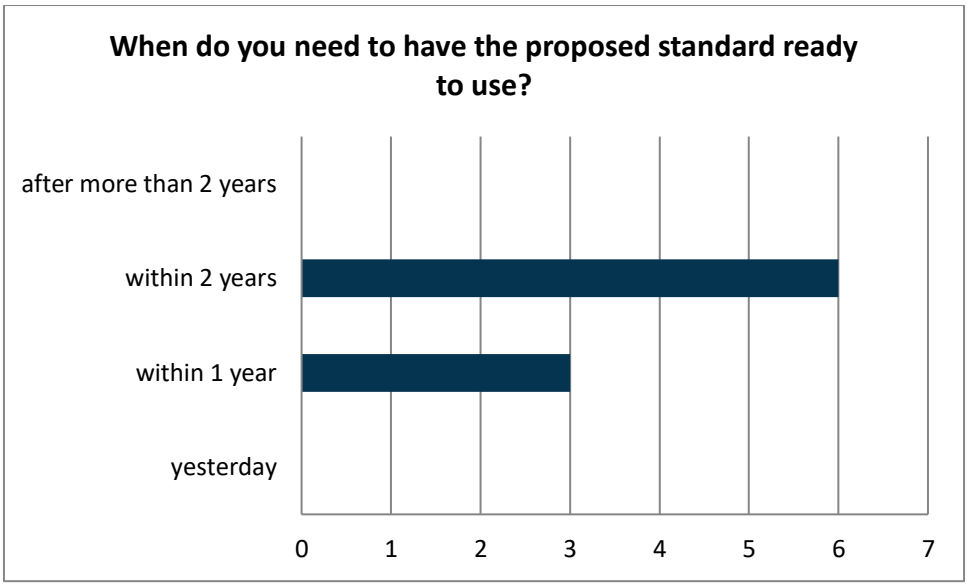


Figure A8 Urgency of the standards development

Please explain why?

- Takes time to create agreement on the design.
- For the reasons stated above.
- We keep getting requests for interconnectivity from large projects, but we can work with our own implemented specific connections.
- Miracles need a bit longer.
- This would be nice to make the best of all existing simulators. But is not an operational emergency though.
- Time to get to the market and explore opportunities.

The last question for the *Intake tab* asked for the required type of stakeholders for the development of the CEN Workshop Agreement. The answers are shown in Figure A9.

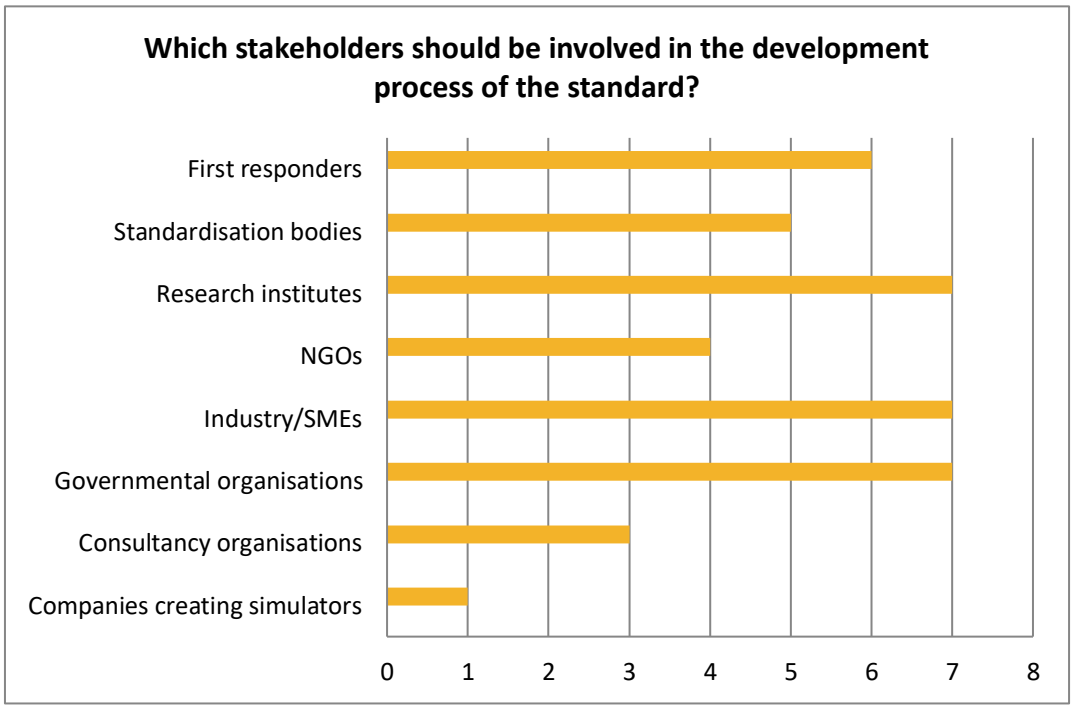


Figure A9 Required types of stakeholder

Following this, two questions were asked aiming to get input for the *Impact End-Users tab*. The first one asked for the potential improvement of Crisis Management capabilities and the second one for the improvement of the responder safety. The answers are shown in Figure A10 and Figure A11.

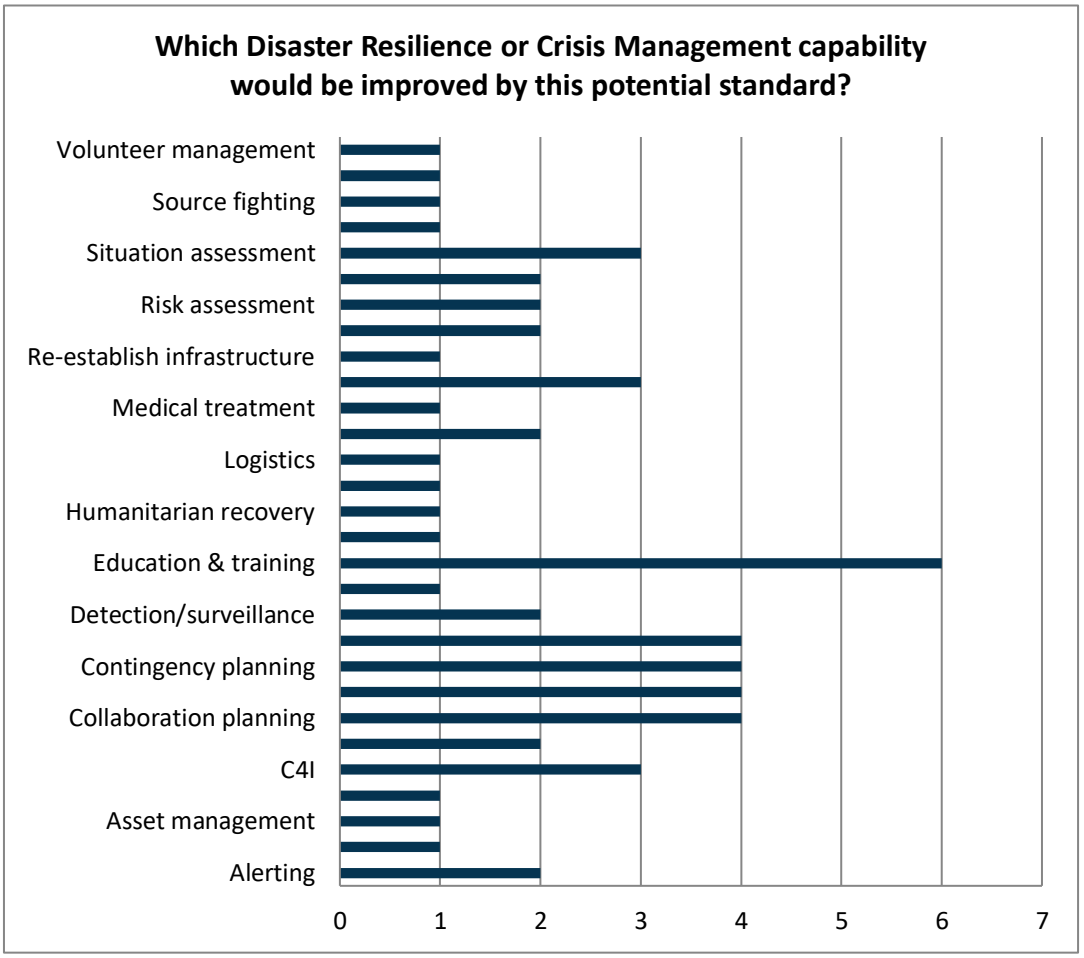


Figure A10 Improvement of DR and CM capabilities

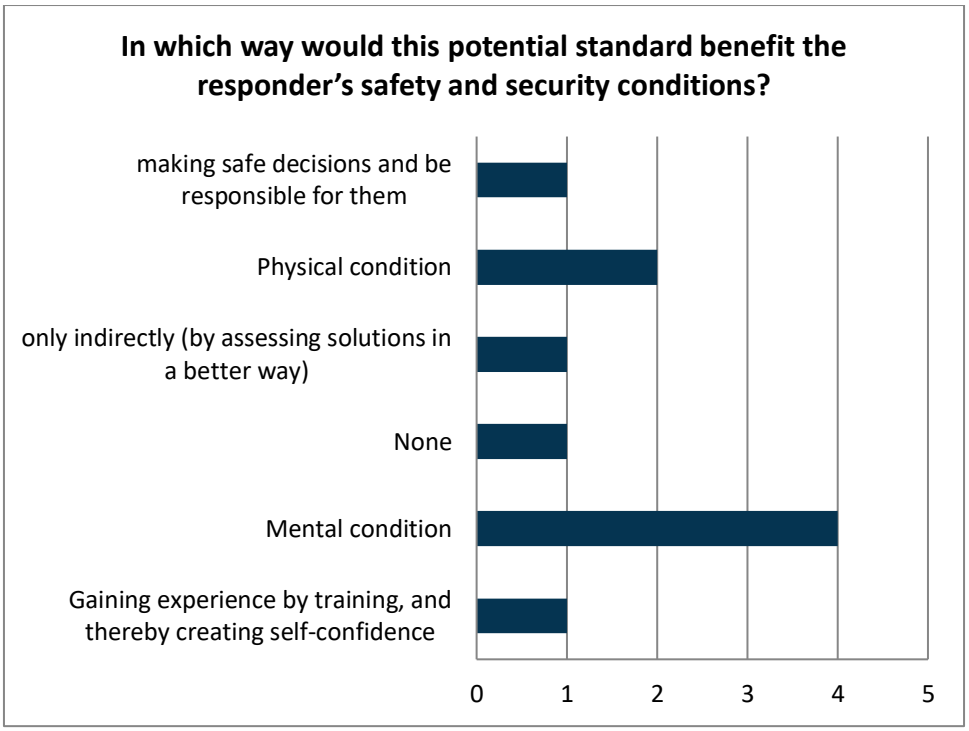


Figure A11 Improvement of responder safety

For the *Impact Industry and Research tab* as well as for the *Ethical, Societal and Legal issues tab,* no questions were asked as the participants should not take too much time to fill in the questionnaires.

As input for the *Feasability tab* the following statements were made and the participants were asked to indicate how likely they think they are:

Statement 1: This standard will be supported by standardisation bodies
Statement 2: The consensus among all stakeholders will be achieved
Statement 3: There will be a governmental/top level commitment to this potential standard
Statement 4: This potential standard responds to a clearly expressed need in crisis management
Statement 5: This potential standard will lead to awareness among all stakeholders of its content benefits

The answers are shown in Figure A12.

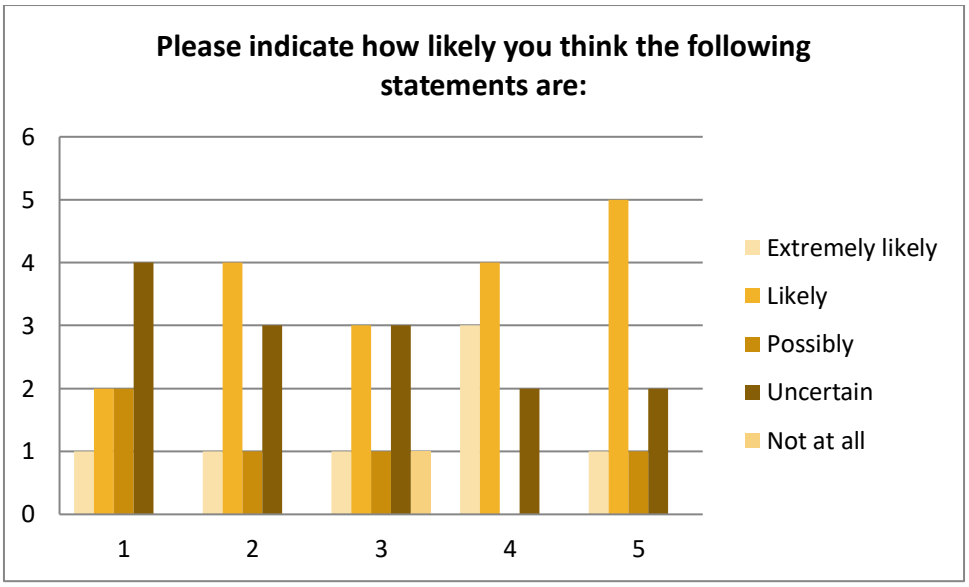


Figure A12 Feasibility of the potential to become a standard

Additionally it was asked whether the standardisation potential supports the DRIVER+ objectives. The answers are shown in Figure A13.

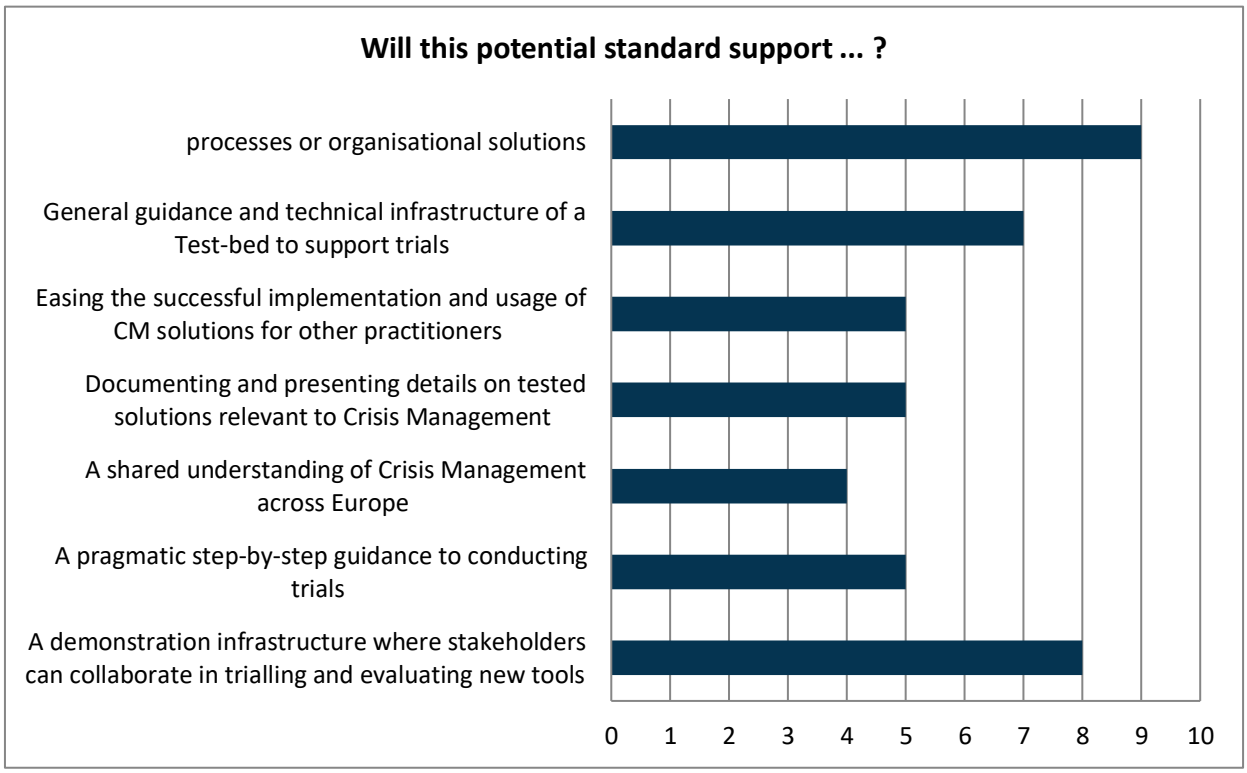


Figure A13 DRIVER+ objectives

Based on this input the RAF was filled in partly and came to an assessment. The *assessment tab* is presented as Figure A14.

In the upper part of the figure, the title and scope are given as specified during the telephone conferences following the standardisation potential workshop. After this a diagram is shown displaying on the x-coordinate the Feasibility and on the y-coordinate the Impact of the potential. The size of the point in the diagram presents the urgency of the standardisation potential to become a standard.

The result of the RAF based on the input from the questionnaire for the standardisation potential *Bulding a simulation environment* shows a moderate urgency (within the next 2 years), a limited overall impact and a low feasibility.

Figure A14 RAF based on the questionnaire results for the standardisation potential *Bulding a simulation environment*

Annex 6 - Results of the ResiStand Assessment Framework filled in by experts

This section presents the results of the ResiStand Assessment Framework filled in by experts in **WP955**. As an example, the result of the RAF for the standardisation potential *Bulding a simulation environment* is presented in detail. It shows a limited urgency (within the next 3 years), a great overall impact and a low feasibility.

The input for the RAF was provided from the DRIVER+ partner XVR. The different tabs of the ResiStand Assessment Framework with all information included are shown in the following pictures. The *Intake tab* is presented in Figure A16, the *Impact – End-users tab* can be seen in Figure A17, followed by the *Impact – Industry & Research tab* in Figure A18, the *Ethical, Societal and Legal issues tab* in Figure A19, and finally the *feasibility tab* in Figure A20.

The assessment sheets of the all standardisation potentials are presented in the following figures:

Standardisation potential	Figure
Requirements on Information Exchange across Borders and Organisations	Figure A21 Assessment of the standardisation potential "Requirements on Information Exchange across Borders and Organisations" regarding its urgency, impact and feasibility to become a CWA
Building a Common Simulation Environment	Figure A15 Assessment of the standardisation potential "Building a Common Simulation Environment" regarding its urgency, impact and feasibility to become a CWA
Trial Guidance Methodology	Figure A22 Assessment of the standardisation potential "Trial Guidance Methodology" regarding its urgency, impact and feasibility to become a CWA
Societal Impact Assessment Framework (SIA)	Figure A23 Assessment of the standardisation potential "Societal Impact Assessment Framework" regarding its urgency, impact and feasibility to become a CWA
Scenario Description	Figure A24 Assessment of the standardisation potential "Scenario Description" regarding its urgency, impact and feasibility to become a CWA
Common Operational Picture – Symbols	Figure A26 Assessment of the standardisation potential "Common Operational Picture – Symbols" regarding its urgency, impact and feasibility to become a CWA
Situational Awareness via Social Media	Figure A25 Assessment of the standardisation potential "Situational Awareness via Social Media" regarding its urgency, impact and feasibility to become a CWA

Assessment

ResiStand

Title of the proposed standard: Building a Common Simulation Environment
Identification number:

Proposed standardisation activity and its perspectives

	Organisation or project consortium	Stakeholder category
Proposing organisations or projects:	XVR Simulation	Industry
	TNO	Research
		-
		-
		-

Scope of the standard: The DRIVER+ Test-bed Infrastructure provides a data exchange interface for multiple systems to connect to (i.e. operational crisis management systems and simulators providing a virtual crisis) via standardised connections.

To produce a suitable virtual crisis, one could use different simulations, benefitting from the advantages of multiple simulators. A Test-bed Infrastructure for example might consist of one simulator calculating and showing the flow of

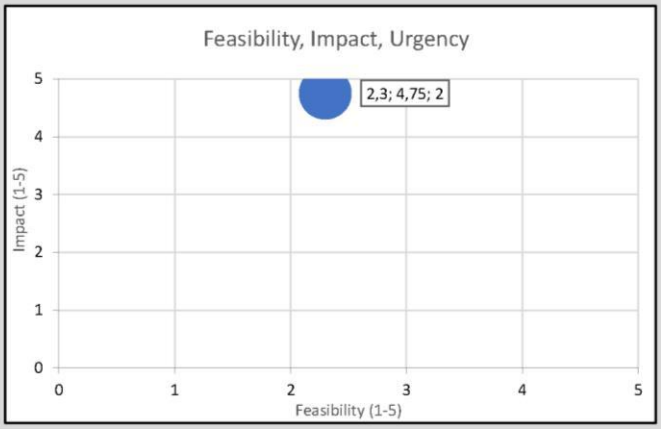
Type of standard: Workshop Agreement

Urgency (when needed?): Limited (< 3 yrs)

Overall impact: Great

Feasibility: Low

Legend (scores presented in the rectangle)
1st Feasibility: 1=Very low; 2=Low; 3=Medium; 4=High; 5=Very high
2nd Impact: 1=None; 2=Limited; 3=Moderate; 4=Considerable; 5=Great
3rd Urgency: 1=Very limited;2=Limited;3=Moderate;4=High;5=Very high



Impact

End-users

Improvement of DR and CM capabilities (functions/tasks):	Great
Improvement of the safety of society:	Great
Improvement of responder safety:	Great
Cost savings for end-user organisations:	Great

Industry & Research

Increase of business opportunities:	Great
Improvement of business quality management:	Considerable
Innovation progress:	Great
Improvement of business functions:	Considerable

Feasibility

Foundation:	Insufficient
Development perspectives:	Moderate
Implementation and follow-up perspectives:	Insufficient
Anticipated drawbacks and constraints:	Insufficient

Other issues

Potential ethical, social and/or legal effects of the proposed standard:	Considerably
Benefit of the standard to types of incident:	Incidents in general
Specifically for the following incidents:	Accident on water Air crash -

Relevant trends

Trends in society, in incidents, and/or in disaster resilience and crisis management that are typically anticipated by the standard:	Simulators focussing on specific simulation models (e.g. flood model, a wetaher model, driving simulators, etc)
Technical and non-technical trends of interest for industry and research that potentially are addressed by the standard:	Open source software development

ResiStand Assessment Framework 2.0 TNO

Figure A15 Assessment of the standardisation potential "Building a Common Simulation Environment" regarding its urgency, impact and feasibility to become a CWA

Intake

ResiStand

Title of the proposed standard:	Building a Common Simulation Environment
Identification number:	

Proposed standardisation activity

Proposing organisations or projects (at least 1 and up to 5):	**Organisation or project consortium**	**Stakeholder category**
	XVR Simulation	Industry
	TNO	Research
		-
		-
		-

Type of standard:	Workshop Agreement
Scope of the standard:	The DRIVER+ Test-bed Infrastructure provides a data exchange interface for multiple systems to connect to (i.e. operational crisis management systems and simulators providing a virtual crisis) via standardised connections. To produce a suitable virtual crisis, one could use different simulations, benefitting from the advantages of multiple
Example or illustration 1:	
Example or illustration 2:	

Compliance with legislation	**Compliant (Y/N)?**	**Explanation**
with European legislation:	Unknown	Most probably there is no regulation about this yet (and will also not be created)
with national and regional legislation:	Unknown	Most probably there is no regulation about this yet (and will also not be created)

Target groups for applying the standard	**Target group (Y/N)?**	**Free space for additional comments**
First Responders:	Yes	Espically for the larger regional/national rescue service academies, having full-time staff
Governmental organisations:	Yes	Espically for the larger regional/national rescue service academies, having full-time staff
NGOs:	Unknown	
Industry/SMEs:	Yes	Especially companies providing simulators
Consultancy organisations:	Yes	Especially organisations implementing simulators and creating simulation-supported
Research institutes:	Yes	Especially organisations implementing simulators and creating simulation-supported
Standardisation bodies:	Unknown	
Others:	Unknown	

Potential impact and urgency

Benefits for stakeholder categories	**Description of who will benefit and in what way**
End-users:	Being able to combine the best features/functionalities of multiple systems together, for training, testing and experimenting.
Industry:	Being able to focus on core-feature developments of the own tools and relying on other companies to develop other tools/functions (note that this also gives way for all companies to focus on their core and leave room for other in
Research:	Being able to combine the best features/functionalities of multiple systems together
Policy makers:	Being able to combine the best features/functionalities of multiple systems together, for testing and experimenting (and potentially training)
Citizens:	Cost effectiveness of governmental investments in simulation tools (i.e. directly by first responders/national bodies or indirectly via publicly funded research institutes)

Urgency of the standard: (when is it needed for implementation?)	Limited (< 3 yrs)	It is already possible to link simulators on a case-by-case basis, without standardized connections. However, this means that effort (and thus money) is wasted in every project re-creating a similar connection.

Development

Required types of stakeholders	**Required (Y/N)?**	**Free space to explain why their participation in the development is required**
First Responders:	No	As this is a highly technical standardisation agreement, no direct input in the decisions
Governmental organisations:	No	As this is a highly technical standardisation agreement, no direct input in the decisions
NGOs:	No	As this is a highly technical standardisation agreement, no direct input in the decisions
Industry/SMEs:	Yes	Needed as they mainly provide the simulators to connect.
Consultancy organisations:	Unknown	Maybe they can add to the decision making process and can provide advice/support in
Research institutes:	Yes	Needed to provide insight in feasible use of the standard by technicians and simulator end-
Others:	No	

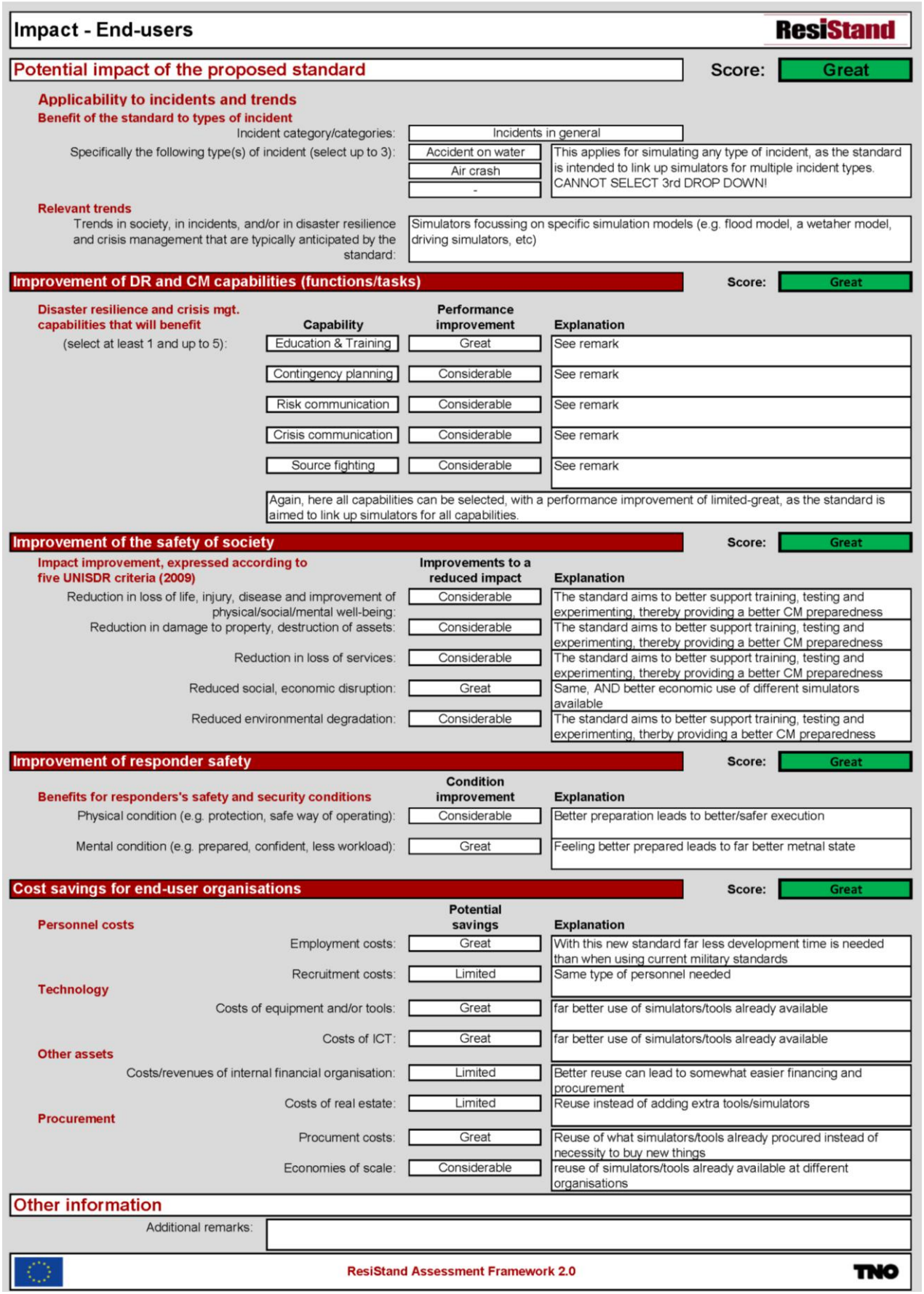
Preferred leading type of stakeholder:	Industry/SME	As they mainly develop the simulators.
Expected barriers and constraints:	Maybe very large simulation providers rather have only their simulators connected to each other (via their propriatory connection technique). Maybe large system instegrators (mostly industry funded institutes) rather use man-power intensive military	

Other information

Additional remarks:	

ResiStand Assessment Framework 2.0 TNO

Figure A16 Intake tab of the standardisation potential "Building a Common Simulation Environment"



Impact - End-users

ResiStand

Potential impact of the proposed standard

Score: Great

Applicability to incidents and trends

Benefit of the standard to types of incident

Incident category/categories:	Incidents in general	
Specifically the following type(s) of incident (select up to 3):	Accident on water	This applies for simulating any type of incident, as the standard is intended to link up simulators for multiple incident types. CANNOT SELECT 3rd DROP DOWN!
	Air crash	
	-	

Relevant trends

Trends in society, in incidents, and/or in disaster resilience and crisis management that are typically anticipated by the standard:	Simulators focussing on specific simulation models (e.g. flood model, a wetaher model, driving simulators, etc)

Improvement of DR and CM capabilities (functions/tasks)

Score: Great

Disaster resilience and crisis mgt. capabilities that will benefit (select at least 1 and up to 5):	Capability	Performance improvement	Explanation
	Education & Training	Great	See remark
	Contingency planning	Considerable	See remark
	Risk communication	Considerable	See remark
	Crisis communication	Considerable	See remark
	Source fighting	Considerable	See remark

Again, here all capabilities can be selected, with a performance improvement of limited-great, as the standard is aimed to link up simulators for all capabilities.

Improvement of the safety of society

Score: Great

Impact improvement, expressed according to five UNISDR criteria (2009)	Improvements to a reduced impact	Explanation
Reduction in loss of life, injury, disease and improvement of physical/social/mental well-being:	Considerable	The standard aims to better support training, testing and experimenting, thereby providing a better CM preparedness
Reduction in damage to property, destruction of assets:	Considerable	The standard aims to better support training, testing and experimenting, thereby providing a better CM preparedness
Reduction in loss of services:	Considerable	The standard aims to better support training, testing and experimenting, thereby providing a better CM preparedness
Reduced social, economic disruption:	Great	Same, AND better economic use of different simulators available
Reduced environmental degradation:	Considerable	The standard aims to better support training, testing and experimenting, therby providing a better CM preparedness

Improvement of responder safety

Score: Great

Benefits for responders's safety and security conditions	Condition improvement	Explanation
Physical condition (e.g. protection, safe way of operating):	Considerable	Better preparation leads to better/safer execution
Mental condition (e.g. prepared, confident, less workload):	Great	Feeling better prepared leads to far better metnal state

Cost savings for end-user organisations

Score: Great

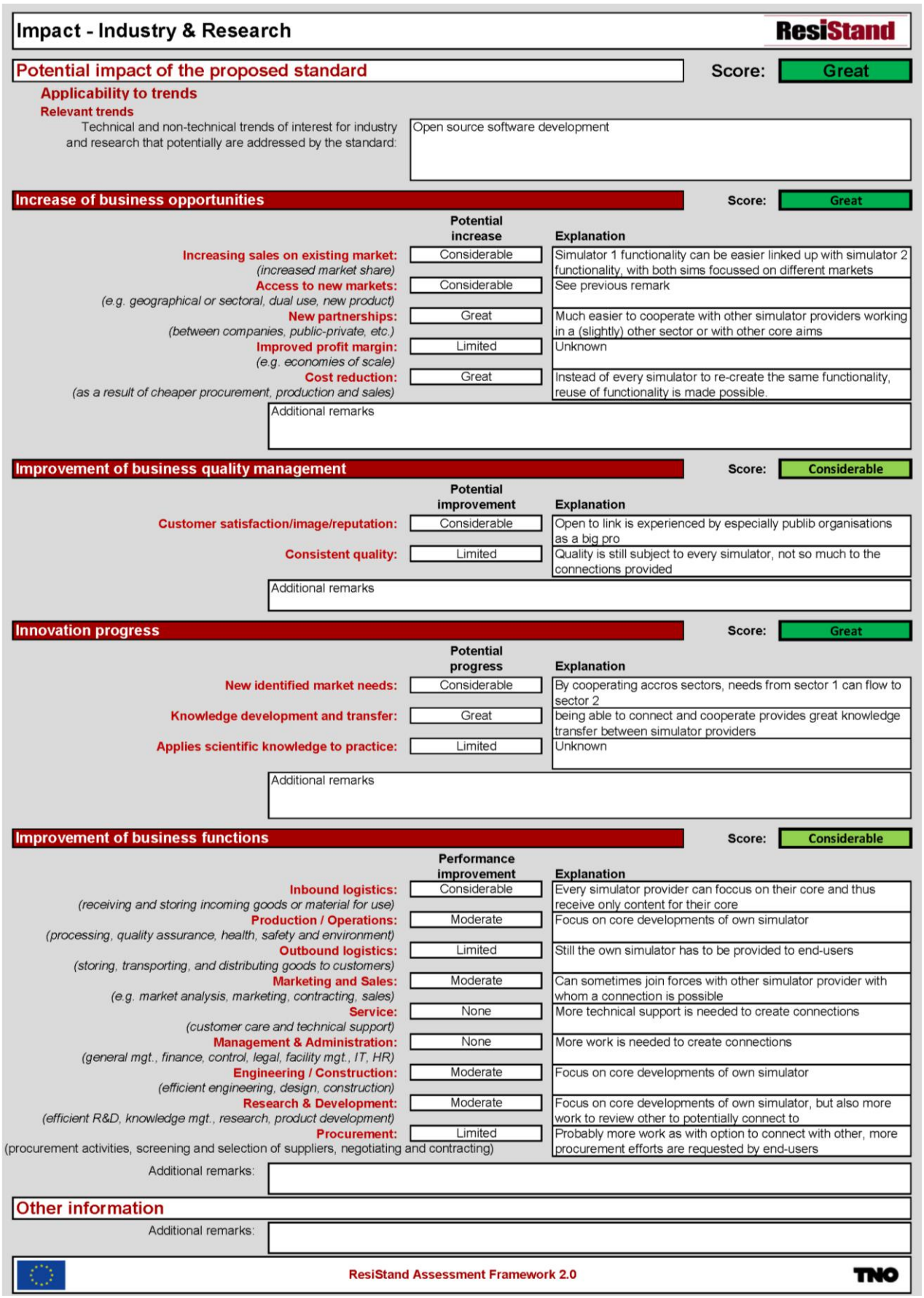
	Potential savings	Explanation
Personnel costs		
Employment costs:	Great	With this new standard far less development time is needed than when using current military standards
Recruitment costs:	Limited	Same type of personnel needed
Technology		
Costs of equipment and/or tools:	Great	far better use of simulators/tools already available
Costs of ICT:	Great	far better use of simulators/tools already available
Other assets		
Costs/revenues of internal financial organisation:	Limited	Better reuse can lead to somewhat easier financing and procurement
Costs of real estate:	Limited	Reuse instead of adding extra tools/simulators
Procurement		
Procument costs:	Great	Reuse of what simulators/tools already procured instead of necessity to buy new things
Economies of scale:	Considerable	reuse of simulators/tools already available at different organisations

Other information

Additional remarks:

ResiStand Assessment Framework 2.0 TNO

Figure A17 Impact - End-User tab of the standardisation potential "Building a Common Simulation Environment"



Impact - Industry & Research

ResiStand

Potential impact of the proposed standard

Score: Great

Applicability to trends

Relevant trends

Technical and non-technical trends of interest for industry and research that potentially are addressed by the standard: Open source software development

Increase of business opportunities

Score: Great

	Potential increase	Explanation
Increasing sales on existing market: *(increased market share)*	Considerable	Simulator 1 functionality can be easier linked up with simulator 2 functionality, with both sims focussed on different markets
Access to new markets: *(e.g. geographical or sectoral, dual use, new product)*	Considerable	See previous remark
New partnerships: *(between companies, public-private, etc.)*	Great	Much easier to cooperate with other simulator providers working in a (slightly) other sector or with other core aims
Improved profit margin: *(e.g. economies of scale)*	Limited	Unknown
Cost reduction: *(as a result of cheaper procurement, production and sales)*	Great	Instead of every simulator to re-create the same functionality, reuse of functionality is made possible.

Additional remarks

Improvement of business quality management

Score: Considerable

	Potential improvement	Explanation
Customer satisfaction/image/reputation:	Considerable	Open to link is experienced by especially publib organisations as a big pro
Consistent quality:	Limited	Quality is still subject to every simulator, not so much to the connections provided

Additional remarks

Innovation progress

Score: Great

	Potential progress	Explanation
New identified market needs:	Considerable	By cooperating accros sectors, needs from sector 1 can flow to sector 2
Knowledge development and transfer:	Great	being able to connect and cooperate provides great knowledge transfer between simulator providers
Applies scientific knowledge to practice:	Limited	Unknown

Additional remarks

Improvement of business functions

Score: Considerable

	Performance improvement	Explanation
Inbound logistics: *(receiving and storing incoming goods or material for use)*	Considerable	Every simulator provider can foccus on their core and thus receive only content for their core
Production / Operations: *(processing, quality assurance, health, safety and environment)*	Moderate	Focus on core developments of own simulator
Outbound logistics: *(storing, transporting, and distributing goods to customers)*	Limited	Still the own simulator has to be provided to end-users
Marketing and Sales: *(e.g. market analysis, marketing, contracting, sales)*	Moderate	Can sometimes join forces with other simulator provider with whom a connection is possible
Service: *(customer care and technical support)*	None	More technical support is needed to create connections
Management & Administration: *(general mgt., finance, control, legal, facility mgt., IT, HR)*	None	More work is needed to create connections
Engineering / Construction: *(efficient engineering, design, construction)*	Moderate	Focus on core developments of own simulator
Research & Development: *(efficient R&D, knowledge mgt., research, product development)*	Moderate	Focus on core developments of own simulator, but also more work to review other to potentially connect to
Procurement: (procurement activities, screening and selection of suppliers, negotiating and contracting)	Limited	Probably more work as with option to connect with other, more procurement efforts are requested by end-users

Additional remarks:

Other information

Additional remarks:

ResiStand Assessment Framework 2.0 TNO

Figure A18 Impact – Industry & Research tab of the standardisation potential "Building a Common Simulation Environment"

Ethical, Societal and Legal issues

ResiStand

Consideration of potential effects of the proposed standard

Score: Considerably

Theme (a-h)

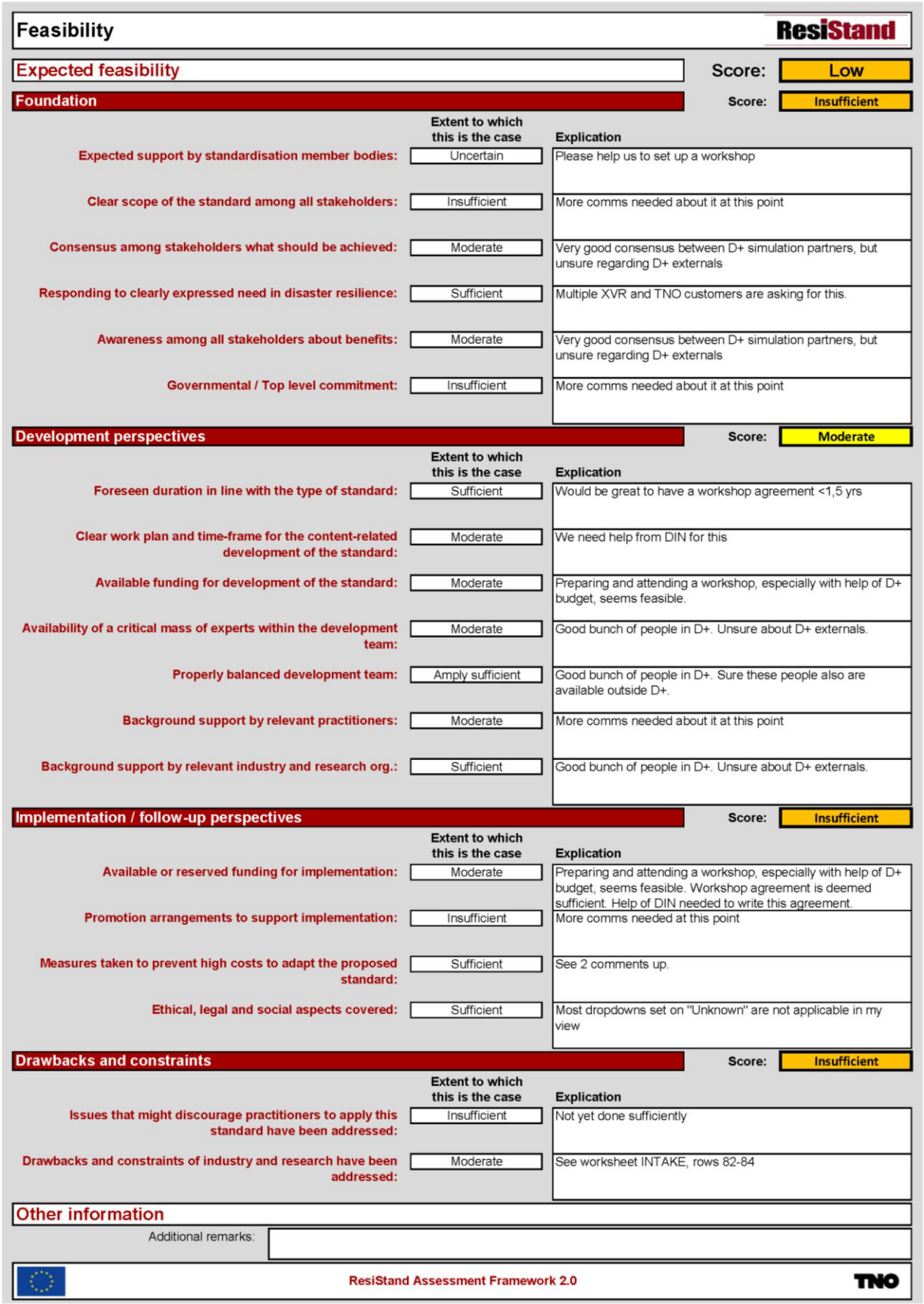
	Measure of consideration	Explication of the potential effects
a) Dignity		
Human and/or community dignity	Unknown	not applicable
Awareness among practitioners of fairness practice in risk management	Unknown	not applicable
b) Avoidance of harm		
The public's perception of the issues addressed by the standard	Unknown	not applicable
c) Non-discrimination		
Encouraging inclusion and avoiding exclusion of any groups	Completely	It encourages to connect multiple types of simulators, not restricting use of only a few.
Easy accessibility for all relevant stakeholders to necessary training to develop or implement the standard	Moderate	Technical software education is required.
d) Privacy		
Addressing privacy of the parties affected by the standard	Unknown	not applicable
e) Duty to provide care		
Increasing ability to communicate risks/harms to those with the power to address them	Considerably	Applies to every individual simulator, not so much to the connections made. As such not really applicable.
f) Accountability		
Supporting progress overall in society with a vision towards future generations	Completely	Standard is aimed at easy inclusion of simulators now available and innovations to come
Conducting ethical, privacy, and data protection impact assessments	Unknown	Applies to every individual simulator, not so much to the connections made. As such not really applicable
Plans and/or policies for reporting and managing the possibility of mis-use, malfunction, or unintended consequences	Moderate	Applies to every individual simulator, and combinations that can be amde with it.
Clear and verifiable, and publically accessible statements about the measures taken to mitigate risk during the development of the standard	Unknown	Not sure how this is applicable
g) Autonomy		
Supporting a person's or institution's ability to make informed decisions	Considerably	Applies to every individual simulator, and information provided about how connections can be made.
Enabling a practioner's or agency's freedom of movement, association, or behaviour	Completely	Better reuse, more simulators to choose from
h) Solidarity		
Respect of human rights and civil liberties of individuals and groups	Considerably	Better reuse, more simulators to choose from
Supporting work towards equal opportunity for all citizens in daily life	Moderate	Better reuse, more simulators to choose from. Yet aimed at technically educated simulator users.
Promoting well-being of individuals or groups	Considerably	Aimed at better reuse of simulators already available and to support better training, tests and experiments in the field of CM
Increasing trust between different practitioners, and between practioners and the public	Considerably	Better reuse, more simulators to choose from

Other information

Additional remarks: ...

ResiStand Assessment Framework 2.0 TNO

Figure A19 Ethical, Societal and Legal issues tab of the standardisation potential "Building a Common Simulation Environment"



Feasibility — ResiStand

Expected feasibility — Score: Low

Foundation — Score: Insufficient

	Extent to which this is the case	Explication
Expected support by standardisation member bodies:	Uncertain	Please help us to set up a workshop
Clear scope of the standard among all stakeholders:	Insufficient	More comms needed about it at this point
Consensus among stakeholders what should be achieved:	Moderate	Very good consensus between D+ simulation partners, but unsure regarding D+ externals
Responding to clearly expressed need in disaster resilience:	Sufficient	Multiple XVR and TNO customers are asking for this.
Awareness among all stakeholders about benefits:	Moderate	Very good consensus between D+ simulation partners, but unsure regarding D+ externals
Governmental / Top level commitment:	Insufficient	More comms needed about it at this point

Development perspectives — Score: Moderate

	Extent to which this is the case	Explication
Foreseen duration in line with the type of standard:	Sufficient	Would be great to have a workshop agreement <1,5 yrs
Clear work plan and time-frame for the content-related development of the standard:	Moderate	We need help from DIN for this
Available funding for development of the standard:	Moderate	Preparing and attending a workshop, especially with help of D+ budget, seems feasible.
Availability of a critical mass of experts within the development team:	Moderate	Good bunch of people in D+. Unsure about D+ externals.
Properly balanced development team:	Amply sufficient	Good bunch of people in D+. Sure these people also are available outside D+.
Background support by relevant practitioners:	Moderate	More comms needed about it at this point
Background support by relevant industry and research org.:	Sufficient	Good bunch of people in D+. Unsure about D+ externals.

Implementation / follow-up perspectives — Score: Insufficient

	Extent to which this is the case	Explication
Available or reserved funding for implementation:	Moderate	Preparing and attending a workshop, especially with help of D+ budget, seems feasible. Workshop agreement is deemed sufficient. Help of DIN needed to write this agreement.
Promotion arrangements to support implementation:	Insufficient	More comms needed at this point
Measures taken to prevent high costs to adapt the proposed standard:	Sufficient	See 2 comments up.
Ethical, legal and social aspects covered:	Sufficient	Most dropdowns set on "Unknown" are not applicable in my view

Drawbacks and constraints — Score: Insufficient

	Extent to which this is the case	Explication
Issues that might discourage practitioners to apply this standard have been addressed:	Insufficient	Not yet done sufficiently
Drawbacks and constraints of industry and research have been addressed:	Moderate	See worksheet INTAKE, rows 82-84

Other information

Additional remarks:

ResiStand Assessment Framework 2.0 — TNO

Figure A20 Feasibility tab of the standardisation potential "Building a Common Simulation Environment"

Here is the assessment sheet of the RAFs for each standardisation potential presented. All RAF were filled in by experts of **WP955**. As presented above, five input tabs lead to the assessment of each RAF.

Assessment ResiStand

Title of the proposed standard: interoperability in crisis and disaster management
Identification number:

Proposed standardisation activity and its perspectives

	Organisation or project consortium	Stakeholder category
Proposing organisations or projects:	AIT	Research - - - -

Scope of the standard: To specify minimum technical requirements to ensure interoperability on syntactical and semantic level. The focus is set on interfacing technical solutions operated in crisis and disaster management encompassing cross border as well as cross organisational information exchange

Type of standard: Workshop Agreement

Urgency (when needed?): Moderate (< 2 yrs)

Overall impact: Considerable

Feasibility: Medium

Legend (scores presented in the rectangle)
1st Feasibility: 1=Very low; 2=Low; 3=Medium; 4=High; 5=Very high
2nd Impact: 1=None; 2=Limited; 3=Moderate; 4=Considerable; 5=Great
3rd Urgency: 1=Very limited;2=Limited;3=Moderate;4=High;5=Very high

Impact

End-users

Improvement of DR and CM capabilities (functions/tasks):	Great
Improvement of the safety of society:	Considerable
Improvement of responder safety:	Moderate
Cost savings for end-user organisations:	Considerable

Industry & Research

Increase of business opportunities:	Considerable
Improvement of business quality management:	Considerable
Innovation progress:	Considerable
Improvement of business functions:	Considerable

Feasibility

Foundation:	Moderate
Development perspectives:	Moderate
Implementation and follow-up perspectives:	Moderate
Anticipated drawbacks and constraints:	Moderate

Other issues

Potential ethical, social and/or legal effects of the proposed standard:	Moderate
Benefit of the standard to types of incident:	Natural and Technological incidents
Specifically for the following incidents:	Earthquake Fire -

Relevant trends

Trends in society, in incidents, and/or in disaster resilience and crisis management that are typically anticipated by the standard:	increasing number of cascading events as well as complex interrelations between different incidents
Technical and non-technical trends of interest for industry and research that potentially are addressed by the standard:	Development for command and control technologies, changes in crisis and disaster management procedures

ResiStand Assessment Framework 2.0 TNO

Figure A21 Assessment of the standardisation potential "Requirements on Information Exchange across Borders and Organisations" regarding its urgency, impact and feasibility to become a CWA

Assessment

ResiStand

Title of the proposed standard: Trial Guidance Methodology (TGM)
Identification number:

Proposed standardisation activity and its perspectives

Proposing organisations or projects:	Organisation or project consortium	Stakeholder category
	PSCE	Hybrid
	JRC	Research
	WWU	Research
	Thales	Industry
	TNO	Research

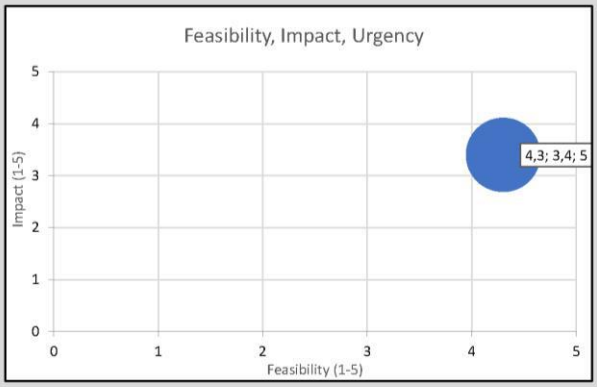
Scope of the standard: Methodology for the design of a test (called Trial within DRIVER+) aiming at the objective assesment of one or several innovative solutions in the area of Crisis Management.

Type of standard: Workshop Agreement

Urgency (when needed?): Very high (ASAP)

Overall impact: Moderate

Feasibility: High



Legend (scores presented in the rectangle)
1st Feasibility: 1=Very low; 2=Low; 3=Medium; 4=High; 5=Very high
2nd Impact: 1=None; 2=Limited; 3=Moderate; 4=Considerable; 5=Great
3rd Urgency: 1=Very limited;2=Limited;3=Moderate;4=High;5=Very high

Impact

End-users

Improvement of DR and CM capabilities (functions/tasks):	None
Improvement of the safety of society:	None
Improvement of responder safety:	None
Cost savings for end-user organisations:	Great

Industry & Research

Increase of business opportunities:	Considerable
Improvement of business quality management:	Great
Innovation progress:	Great
Improvement of business functions:	Great

Feasibility

Foundation:	Insufficient
Development perspectives:	Amply sufficient
Implementation and follow-up perspectives:	Amply sufficient
Anticipated drawbacks and constraints:	Amply sufficient

Other issues

Potential ethical, social and/or legal effects of the proposed standard:	Moderate
Benefit of the standard to types of incident:	Incidents in general
Specifically for the following incidents:	-
	-
	-

Relevant trends

Trends in society, in incidents, and/or in disaster resilience and crisis management that are typically anticipated by the standard:

Technical and non-technical trends of interest for industry and research that potentially are addressed by the standard:

ResiStand Assessment Framework 2.0 TNO

Figure A22 Assessment of the standardisation potential "Trial Guidance Methodology" regarding its urgency, impact and feasibility to become a CWA

Assessment

ResiStand

Title of the proposed standard: Societal Impact Assessment Framework for the crisis management context
Identification number:

Proposed standardisation activity and its perspectives

	Organisation or project consortium	Stakeholder category
Proposing organisations or projects:	Peace Research Institute Oslo (PRIO)	Research - - - -

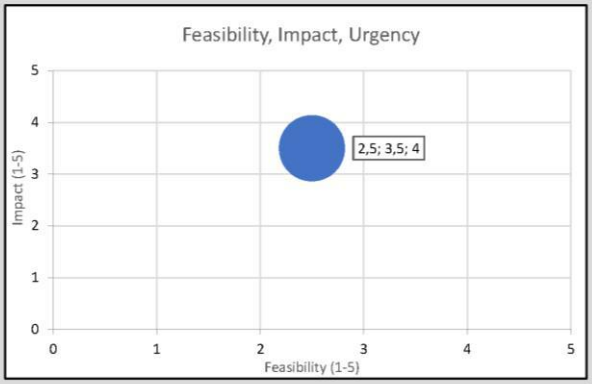
Scope of the standard: The standard describes a framework for assessing the societal impact of the various functions that crisis management solutions have. The SIA framework consists of two basic elements: a set of assessment criteria, and a taxonomy of crisis management functions, which the criteria are used to assess. Since the framework is not linked to specific solutions, but rather their functions, it can be applied to a wide array of current and future solutions.

Type of standard: Standard

Urgency (when needed?): High (within 1 year)

Overall impact: Considerable

Feasibility: Medium



Legend (scores presented in the rectangle)
1st Feasibility: 1=Very low; 2=Low; 3=Medium; 4=High; 5=Very high
2nd Impact: 1=None; 2=Limited; 3=Moderate; 4=Considerable; 5=Great
3rd Urgency: 1=Very limited;2=Limited;3=Moderate;4=High;5=Very high

Impact

End-users

Improvement of DR and CM capabilities (functions/tasks):	Great
Improvement of the safety of society:	Great
Improvement of responder safety:	Moderate
Cost savings for end-user organisations:	None

Industry & Research

Increase of business opportunities:	None
Improvement of business quality management:	Considerable
Innovation progress:	Great
Improvement of business functions:	Considerable

Feasibility

Foundation:	Sufficient
Development perspectives:	Insufficient
Implementation and follow-up perspectives:	Insufficient
Anticipated drawbacks and constraints:	Insufficient

Other issues

Potential ethical, social and/or legal effects of the proposed standard:	Considerably
Benefit of the standard to types of incident:	Incidents in general
Specifically for the following incidents:	- - -

Relevant trends

Trends in society, in incidents, and/or in disaster resilience and crisis management that are typically anticipated by the standard:

Technical and non-technical trends of interest for industry and research that potentially are addressed by the standard: The development of CM technologies moves forward rapidly, yet their long-term consequences are unknown. As only few systematic approaches to assessing the societal impact of crisis management activities are known, this framework has particular relevance

ResiStand Assessment Framework 2.0 TNO

Figure A23 Assessment of the standardisation potential "Societal Impact Assessment Framework" regarding its urgency, impact and feasibility to become a CWA

Assessment

ResiStand

Title of the proposed standard: Scenario description in crisis management
Identification number: 5

Proposed standardisation activity and its perspectives

	Organisation or project consortium	Stakeholder category
Proposing organisations or projects:	PSCE	Hybrid
	VALABRE, SGSP, DEN HAAG	End-users
	AUSTRIAN RED CROSS	End-users
	XVR	Industry
	from DRIVER+ such as AIT, TNO, WWU	Research

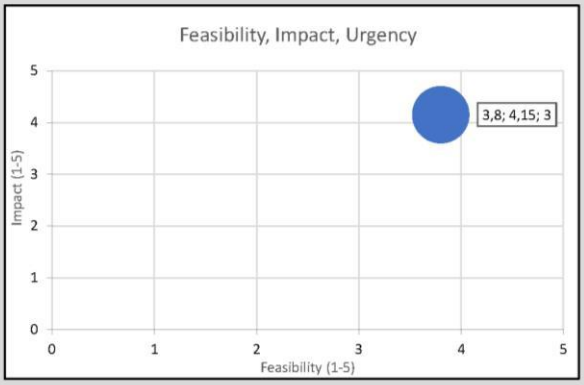
Scope of the standard: This standard aims at providing a methodology for the development of crisis scenarios for the preparation of experiments to test solutions in the field of Crisis Management. to be adapted.... (Training and Testing (called Trialing in DRIVER+))

Type of standard: Workshop Agreement

Urgency (when needed?): Moderate (< 2 yrs)

Overall impact: Considerable

Feasibility: High



Legend (scores presented in the rectangle)
1st Feasibility: 1=Very low; 2=Low; 3=Medium; 4=High; 5=Very high
2nd Impact: 1=None; 2=Limited; 3=Moderate; 4=Considerable; 5=Great
3rd Urgency: 1=Very limited;2=Limited;3=Moderate;4=High;5=Very high

Impact

End-users

Improvement of DR and CM capabilities (functions/tasks):	Great
Improvement of the safety of society:	Great
Improvement of responder safety:	Great
Cost savings for end-user organisations:	Considerable

Industry & Research

Increase of business opportunities:	Considerable
Improvement of business quality management:	Great
Innovation progress:	Considerable
Improvement of business functions:	None

Feasibility

Foundation:	Sufficient
Development perspectives:	Amply sufficient
Implementation and follow-up perspectives:	Moderate
Anticipated drawbacks and constraints:	Moderate

Other issues

Potential ethical, social and/or legal effects of the proposed standard:	Moderate
Benefit of the standard to types of incident:	Incidents in general
Specifically for the following incidents:	-
	-
	-

Relevant trends

Trends in society, in incidents, and/or in disaster resilience and crisis management that are typically anticipated by the standard:	
Technical and non-technical trends of interest for industry and research that potentially are addressed by the standard:	fair assessment of solutions, traceability

ResiStand Assessment Framework 2.0 TNO

Figure A24 Assessment of the standardisation potential "Scenario Description" regarding its urgency, impact and feasibility to become a CWA

Assessment

ResiStand

Title of the proposed standard: Requirements on Anonymisation for Social Media Data
Identification number:

Proposed standardisation activity and its perspectives

Proposing organisations or projects:	Organisation or project consortium	Stakeholder category
	Thales	Industry
	PSCE	Hybrid
	AIT	Research
	Austrian Red Cross	End-users
		-

Scope of the standard: The aim of this standard is to provide guidelines to stakeholders involved in crisis management regarding the level of anonimisation they need to implement on the social media data they are using of processing for to comply with the GDPR requirements.

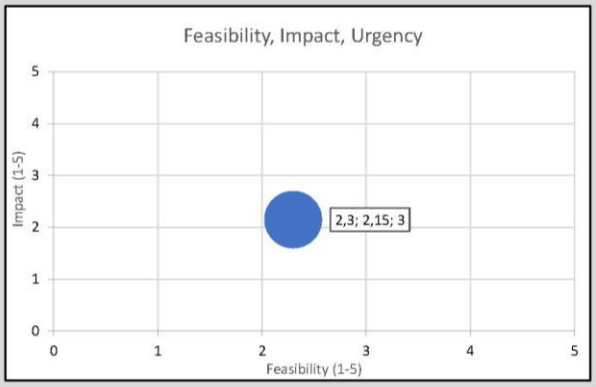
Type of standard: Workshop Agreement

Urgency (when needed?): Moderate (< 2 yrs)

Overall impact: Limited

Feasibility: Low

Legend (scores presented in the rectangle)
1st Feasibility: 1=Very low; 2=Low; 3=Medium; 4=High; 5=Very high
2nd Impact: 1=None; 2=Limited; 3=Moderate; 4=Considerable; 5=Great
3rd Urgency: 1=Very limited;2=Limited;3=Moderate;4=High;5=Very high



Impact

End-users

Improvement of DR and CM capabilities (functions/tasks):	Great
Improvement of the safety of society:	Moderate
Improvement of responder safety:	Limited
Cost savings for end-user organisations:	Moderate

Industry & Research

Increase of business opportunities:	None
Improvement of business quality management:	None
Innovation progress:	None
Improvement of business functions:	None

Feasibility

Foundation:	Insufficient
Development perspectives:	Insufficient
Implementation and follow-up perspectives:	Insufficient
Anticipated drawbacks and constraints:	Moderate

Other issues

Potential ethical, social and/or legal effects of the proposed standard:	Moderate
Benefit of the standard to types of incident:	Incidents in general
Specifically for the following incidents:	-
	-
	-

Relevant trends

Trends in society, in incidents, and/or in disaster resilience and crisis management that are typically anticipated by the standard:

Technical and non-technical trends of interest for industry and research that potentially are addressed by the standard:

ResiStand Assessment Framework 2.0 TNO

Figure A25 Assessment of the standardisation potential "Situational Awareness via Social Media" regarding its urgency, impact and feasibility to become a CWA

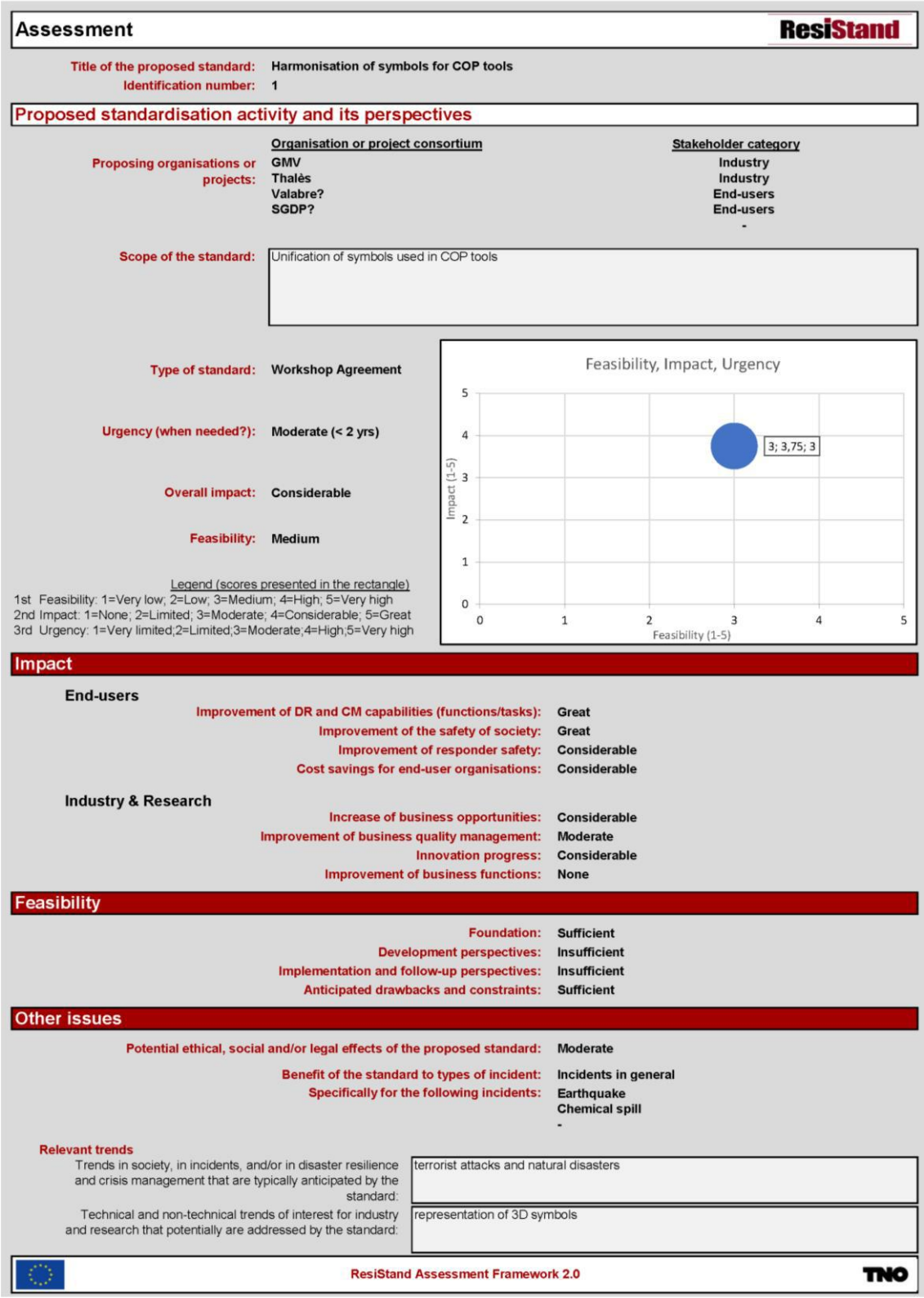


Figure A26 Assessment of the standardisation potential "Common Operational Picture – Symbols" regarding its urgency, impact and feasibility to become a CWA