



GIS-Based Infrastructure Management System for Optimized Response  
to Extreme Events of Terrestrial Transport Networks



## **Report on (future) standardisation activities of the IMS V1 (D10.2)**

February 2020 (V1.0)

**PUBLIC**



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# **SAFEWAY**

## **GIS-BASED INFRASTRUCTURE MANAGEMENT SYSTEM FOR OPTIMIZED RESPONSE TO EXTREME EVENTS OF TERRESTRIAL TRANSPORT NETWORKS**

**Grant Agreement No. 769255**

### **Report on (future) standardisation activities of the IMS V1**

**WP 10**

**Exploitation, Dissemination and  
Communication**

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## SAFEWAY Project Synopsis



According to European TEN-T guidelines, due consideration must be given to the risk assessments and adaptation measures during infrastructure planning, in order to improve resilience to disasters. SAFEWAY's aim is to design, validate and implement holistic methods, strategies, tools and technical interventions to significantly increase the resilience of inland transport infrastructure. SAFEWAY leads to significantly improved resilience of transport infrastructures, developing a holistic toolset with transversal application to anticipate and mitigate the effects extreme events at all modes of disaster cycle:

1. **"Preparation"**: substantial improvement of risk prediction, monitoring and decision tools contributing to anticipate, prevent and prepare critical assets for the damage impacts;
2. **"Response and Recovery"**: the incorporation of SAFEWAY IT solutions into emergency plans, and real-time optimal communication with operators and end users (via crowdsourcing and social media);
3. **"Mitigation"**: improving precision in the adoption of mitigation actions (by impact analysis of different scenarios) together with new construction systems and materials, contributing to the resistance & absorption of the damage impact.

SAFEWAY consortium has 15 partners that cover multidisciplinary and multi-sectorial business fields associated with resilience of transport infrastructure in Europe: national transport infrastructure managers & operators, a main global infrastructure operator, partners able to provide various data sources with large coverage in real time, comprehensive ITC solutions, and leading experts in resilience, risk databases, remote sensing-based inspection, and decision systems based on predictive modelling.

SAFEWAY will carry-out 4 real case studies distributed through 4 countries, linked to 5 corridors of the TEN-T Core Network. SAFEWAY has as main expected impacts:

1. at least 20% improvement in mobility; and
2. at least 20% lower cost of infrastructure maintenance.

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## **Executive Summary**

This document, deliverable 10.2 "Report on (future) standardisation activities of the IMS V1" is a deliverable of SAFEWAY project. It presents the plan and schedule of the standardisation activities strategy that will be followed along and beyond the project in order to meet the standardisation objectives. The planned activities will be focused on the definition of standards in force, ongoing standardisation activities in the context of the SAFEWAY solution, identification of key standardisation bodies and interaction with them, as well as dissemination of SAFEWAY research results to the market as well as to relevant standardisation committees. This report describes the overall strategy and includes planned activities, interoperability standards adopted, methods as well as planned events and workshop. This deliverable presents the first version of the Standardisation activities. There will be two more versions of the plan in order to keep the plan updated in accordance with the identified standardisation needs.

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## Glossary of Terms

AB	Advisory Board
ASTM	American Society for Testing and Materials
CEN	European Committee for Standardisation
CENELEC	European Committee for Electrotechnical Standardisation
CWA	CEN Workshop Agreement
DCP	Dissemination and Communication Plan
DoA	Division of Activities
ETS	European Telecommunications Standards Institute
HES	Higher Education Establishments
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IFC	Industry Foundation Classes
IIM	Information Infrastructure Model
IND	Industry
ISO	International Organization for Standardisation
ITU	International Telecommunication Union
KS	Key Stakeholders
NSBs	National Standards Bodies
OGC	Open Geospatial Consortium
PMB	Project Management Board
PTC	Project Technical Committee
PUB	Public Bodies
REC	Research Organisations
SMS	Small and Medium Enterprises
SNF	Standardisation Needs Form
SO	Standardisation Organisations
TG	Target Group



## 1. Introduction

European Commission (2008) defined standardisation as a voluntary cooperation among industry, consumers, public authorities and other interested parties for the development of technical specifications based on consensus. In the light of European Commission Communication 'Towards an increased contribution from standardisation to innovation in Europe' (COM (2008) 133 final, 11 March 2008) [1] and the Council Conclusions on standardisation and innovation (Brussels, 25 September 2008), Europe is aiming at boosting a close collaboration between standardisation and research. It is important to synchronize standardisation with innovation and research and include standardisation activities within the research projects. Standardisation plays a pivotal role in research projects since it facilitates:

- the transfer of knowledge and technology into marketable products and services;
- the dissemination and exploitation of research results;
- the enhancement of recognition of the project and its results;
- networking with other researchers, industries and stakeholders for future research and innovation;
- the inclusion of all interested parties in framing the rules relevant for future research;
- the use of licensing revenues of own patents by referencing them into standards.

Generally, standardisation follows a three-level structure, which includes the national standards bodies (NSBs), the three European Standards Organizations (ESOs) such as CEN, CENELEC, and ETS and the international organizations (ISO, IEC and ITU). The ESOs have been formally recognized by the EU in Directive 98/34/EC7. There are also many informal standardisation organizations, to which industry also engages. Some examples of informal standards are ASTM International and IEEE.

In the context of the standardisation, the SAFEWAY project consortium plans to perform the following activities:

- to provide an overview of existing technical standards and ongoing standardisation activities in safety and construction;
- to implement open data interoperability standards at the Infrastructure Information Model (IIM) of the SAFEWAY Platform, which will be done in collaboration with SAFEWAY's Advisory Board (AB) and clustering with other organisations – e.g., Open Geospatial Consortium (OGC), buildingSMART International (bSI);
- to reach policy makers and public bodies through SAFEWAY's AB to influence existing and future regulatory processes by advising new policies and directives; and
- to define consortium standardisation needs to support the identification of standardisation potential.

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This deliverable focuses on defining the framework for the above mentioned activities that will be carried out during the project. This report will comprise objectives, planned activities as well as identify target audience and the key message that the consortium intends to deliver to meet the defined objectives.

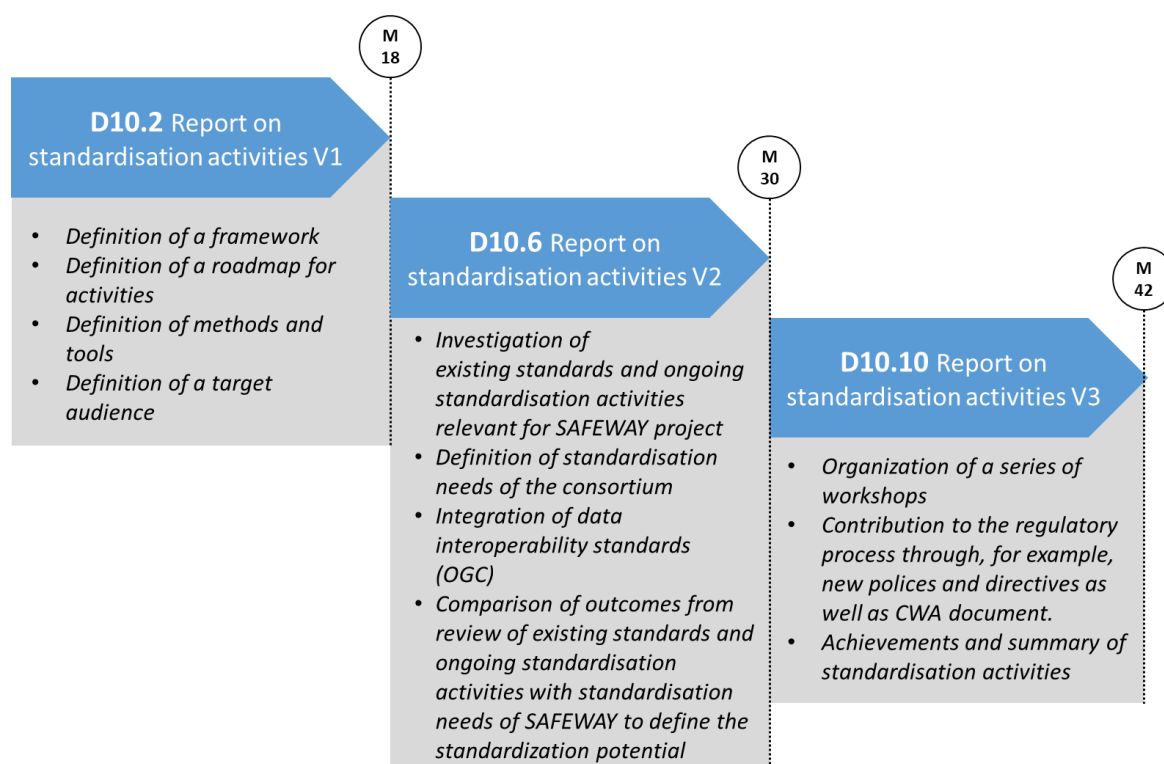
## 2. Overall standardisation strategy

The goal of this document is to provide a general strategy for the standardisation activities and working process of T10.2 (Task 10.2) to collect consortium standardisation needs and to formulate contributions for new policy, standards or directives.

This document is a first deliverable of Task 10.2 – Standardisation activities. The task has a total duration of 25 months, from month 18 to month 42. According to DoA, the following three deliverables are planned and are expected to be submitted in month 18, 30 and 42, respectively (Table 1). To deliver these reports, the involved partners in T10.2 will follow the schema in Figure 1 along the project.

**Table 1:** Planned calendar for submission of the Training Plan and its updates

Deliverable Number	Deliverable Title	Due date
D10.2	Report on (future) standardisation activities of the IMS V1	M18
D10.6	Report on (future) standardisation activities of the IMS V2	M30
D10.10	Report on (future) standardisation activities of the IMS V3	M42



**Figure 1:** T10.2 framework and its deliverables

This first version of the report is focussed on the definition of a framework for the whole T10.2 that should be followed by the consortium. Moreover, a roadmap of activities and methods as well as the target audience is defined here.

The second version of the report will focus on the identification of standardisation needs of the consortium and existing standards as well as ongoing standardisation activities that are relevant for the SAFEWAY project. The summary of this review will be included in V2 of the report. The integration of the standards developed by buildingSMART International will be foreseen in the Information Infrastructure Model (IIM) as a result of T3.3 – Automation capability of monitoring data analysis. Finally, the comparison between outcomes from standardisation needs and review of standards will be carried out to define the standardisation potential.

The third version of the report will summarise the outcomes from the workshops, organized within SAFEWAY project. The consortium plans to carry out a series of workshops and parallel events with project partners and interested parties (e.g., standardisation bodies and key stakeholders) to elaborate together the contribution for new policies, directives and standards based on SAFEWAY outcomes. The workshops could be organized following the procedure of CEN Workshop in order to produce a CEN Workshop Agreement (CWA). Table 2 summarises the planned events.

**Table 2:** Planned events for standardisation activities

<b>Project meeting</b>	<b>M24</b>	<b>M36</b>	<b>M42</b>
<b>Planned Location</b>	The Netherlands	Portugal	Madrid
<b>Estimated Date</b>	September 2020	September 2021	February 2022
<b>Type of meeting</b>	PMB + AB	PMB + AB	Final project event
<b>Partners attending</b>	ALL + AB	ALL + AB	PTC/ALL
<b>Type of event</b>	• 1st Parallel Event	• 2nd Parallel Event	• SAFEWAY Workshop (SW)
<b>Activities related to D10.2</b>	<ul style="list-style-type: none"> <li>• Present AB + KS results from standards review (WP3 and WP8)</li> <li>• Get feedback from AB + KS on SO needs</li> </ul>	<ul style="list-style-type: none"> <li>• Present AB + KS preliminary results on proposed Standardisation actions as result from SAFEWAY work</li> <li>• Get feedback from AB and KS to produce the final recommendations</li> </ul>	<ul style="list-style-type: none"> <li>• Present final recommendations for SO and PM</li> </ul>

## 2.1 Standardisation objectives

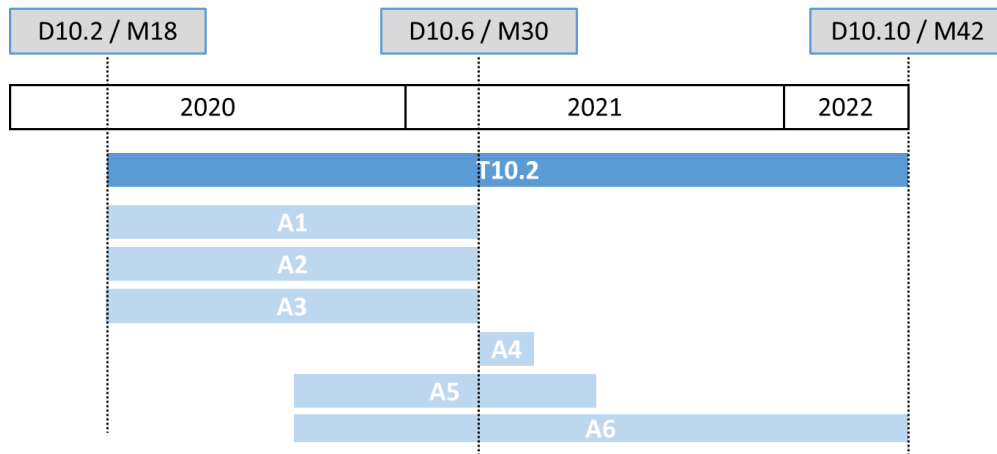
The main objectives related to the standardisation process are defined in Table 3.

**Table 3:** SAFEWAY Standardisation Objectives

Standardisation Objectives	
<b>1</b>	To define standards in force and ongoing standardisation activities in identified areas of interest of the consortium and in the context of the SAFEWAY solution.
<b>2</b>	To identify key standardisation bodies (formal and/or informal) in the relevant domain(s).
<b>3</b>	To interact with the identified standardisation bodies.
<b>4</b>	To disseminate SAFEWAY research results to the market as well as to relevant standardisation committees

In order to achieve these objectives, the following standardisation activities have been defined and scheduled (Figure 2):

- **A1:** Identification of standardisation needs in the consortium.
- **A2:** Identification of existing technical standards and ongoing standardisation activities relevant for SAFEWAY project.
- **A3:** Identification of relevant standardisation bodies.
- **A4:** Comparison of outcomes from reviewing existing standards and ongoing standardisation activities with standardisation needs of SAFEWAY to define the standardisation potential.
- **A5:** Contribution to data interoperability standards, based on the implementation of open standards in IIM (T3.3).
- **A6:** Organization of two parallel events and one Standardisation Workshop.



**Figure 2:** T10.2 Activities schedule

## 2.2 Target audience

SAFEWAY project lasts from September 2018 until February 2022. Standardisation activities will occur throughout the project, more concentrated towards the end of the project, so that the results can be shared.

As shown in Table 2, there will be:

- 2 parallel events organized by IP around M24 and M36 potentially in the Netherlands and Portugal, respectively;
- one SAFEWAY Workshop in M42.

In Safeway's Dissemination and Communication Plan [2] the target groups for dissemination activities are defined and some of them will also be involved in standardisation activities. The target groups for standardisation activities are:

- SAFEWAY partners;
- Industry;
- Standardisation organisations; and
- Stakeholders.

The consortium plans to contact and invite to the workshops, parallel events and other related events where standardisation activities will take place the following TGs: Policy Makers, European Commission Policy Officers and other Public Authorities in regard to Knowledge Share in Regulations, Standards, Policy and European Directives.

The project key messages and specific activities planned for each of the target groups above mentioned are summarised below in Table 4.

**Table 4:** Target groups, key messages and standardisation activities

Target group	Key Messages	Standardisation activities
<b>SAFEWAY partners</b>	<ul style="list-style-type: none"> <li>✓ Project objectives, partners, activities, public documents and videos.</li> <li>✓ Project standardisation needs.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Definition of the Standardisation Needs Form.</li> <li>✓ Identification of standardisation needs.</li> <li>✓ Identification of standardisation activities and existing standards.</li> <li>✓ <b>Parallel events</b> in M24 and M36.</li> <li>✓ <b>SAFEWAY workshop.</b></li> </ul>
<b>Industry</b>	<ul style="list-style-type: none"> <li>✓ Project objectives, partners, activities, public documents and videos.</li> <li>✓ Project contents, developments and results.</li> <li>✓ Project results applicability, taking into consideration regulations and standards.</li> </ul>	<ul style="list-style-type: none"> <li>✓ <b>SAFEWAY workshop.</b></li> <li>✓ <b>Organisation of parallel project events.</b></li> <li>✓ Identification of standardisation activities and needs.</li> </ul>
<b>Standardisation organisations</b>	<ul style="list-style-type: none"> <li>✓ Project objectives, partners, activities, public documents and videos.</li> <li>✓ Project results and main features of the manufacturing process and novel products.</li> <li>✓ Standards relevant data from the project.</li> <li>✓ Project results applicability, taking into consideration regulations and standards.</li> </ul>	<ul style="list-style-type: none"> <li>✓ <b>SAFEWAY workshop.</b></li> <li>✓ <b>Organisation of parallel project events.</b></li> <li>✓ Identification of standardisation activities and existing standards.</li> </ul>
<b>Stakeholders</b>	<ul style="list-style-type: none"> <li>✓ Project results and main features of the manufacturing process and novel products.</li> <li>✓ Project contents, developments and results.</li> <li>✓ Project results applicability, taking into consideration regulations and standards.</li> </ul>	<ul style="list-style-type: none"> <li>✓ <b>SAFEWAY workshop.</b></li> <li>✓ <b>Organisation of parallel project events.</b></li> <li>✓ Identification of standardisation activities and needs.</li> </ul>

### 2.3 Partners involvement

The level of involvement in standardisation activities will be defined for each partner, indicating their duties. The partners will spread the awareness of standardisation activities of the project, information about standards via presentations at conferences, workshops and scientific publications (e.g. journals).

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## 2.4 Relation to other activities in the project

Standardisation activities are mainly connected to the outcomes, described in the following deliverables from the following tasks:

- T3.3, which will provide input to formulate the contribution of the SAFEWAY project to data interoperability standards, policies and/or directives.
  - D3.2 IIMs report (M24)
- T8.1, which will provide information on Emergency Management Plan to identify limitations of the current application procedures and requirements for product approval in conformity with standards and regulations.
  - D8.1 Emergency Management Plan (M16).
- T8.3, which will be the input for the identification of existing standards and ongoing standardisation activities, and definition of standardisation needs in the field of construction sector in general and transport infrastructures in particular.
  - D8.3 Report on Legal and Normative framework (M42).
- T9.3, in which the Industrial partners and the technology-related industrial partners will identify limitations of the current application procedures after undertaking the demonstration activities.
- The outcomes from the dissemination and communication and the standardisation tasks, that is, T10.1 and T10.2.
  - D10.1 DCP V1 and future versions (M6, M30 and M42)
  - D10.3 TP V1 and future versions (M18, M30 and M42)



### 3. Standardisation at 3 levels

Standardisation activities in T10.2 will be carried out at three levels, involving all partners of the consortium:

- 1<sup>st</sup> level: Existing technical standards.
- 2<sup>nd</sup> level: Data interoperability standards.
- 3<sup>rd</sup> level: Policy making.

A short description of the activities at each level is provided below.

#### 3.1 Existing technical standards

The first part is focused on defining the standardisation needs of the SAFEWAY consortium and analysing existing technical standards and ongoing standardisation activities, which are relevant to SAFEWAY project. This is indicated as activities A1 and A2 in Figure 2. Activity A1 is related to the definition of Standardisation Needs in the consortium. A Standardisation Needs Form (SNF) will be developed for the members of the consortium to identify their needs. Activity A2 includes research of standards in force, standards under development and other standardisation activities on European (e.g., CEN) and international level (e.g., ISO). In particular, the research will focus on the materials, products and technologies, developed in SAFEWAY and relevant to some of the standardisation committees identified at European level. This activity is connected mainly to outputs of task 8.3. In parallel with A1 and A2, the activity A3 - Identification of relevant standardisation bodies will be performed in the context of SAFEWAY. Results of these activities will be included in D10.6. Figure 1

#### 3.2 Data interoperability standards

In this project, the input of data to the platform will be structured using Open Standards. After the state of the art and taking into account the current overview of the infrastructure industry, the IFC Schema developed by buildingSMART is meant to be taken as basis in SAFEWAY. In this way, SAFEWAY will help the European standards already developed and approved to get more relevance. The expected result from this part of SAFEWAY's project is the integration of data into a unique interoperable cloud-based platform using and extending existing IFC Standards. This will be validated through different components (infrastructure design, condition monitoring and rating, real-time traffic flow monitoring, etc.).

Applying all this for infrastructure management projects will save time and money while innovation is increasing. Moreover, more efficient, transparent and collaborative ways of work will be unlocked during the whole life cycle of the infrastructure. Finally, the correct performance of the final software will allow the improvement in resilience defined in the general objectives of SAFEWAY. At this level, the activity A5 will be performed, as indicated in Figure 2. Results of this activity will be included in D10.6 and D10.10.

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### **3.3 Policy making**

After undertaking task 8.1 and demonstration activities to stakeholders in task 9.3, both, the industrial partners and the technology-related industrial partners will identify limitations of the current application procedures and requirements for product approval in relation to the specifications and the conformity with standards and any other regulatory aspect. The outcomes of the review of standards in force and ongoing standardisation activities will be compared with the needs for standardisation to support the identification of standardisation potential within the project. This is indicated as the activity A4 in Figure 2. Results of this activity will be included in D10.6 and D10.10.

At this level, the integration of standardisation bodies will be done, particularly for the organization of standardisation workshops. The workshops could be organized following procedures of a specific standardisation body, e.g., CEN. This activity is indicated as A6 in Figure 2.

## 4. Standardisation roadmap

To perform the standardisation activities mentioned in the previous chapters, the following methods are planned to be adopted:

- A **Standardisation Needs Form** to collect real needs of the partners towards SAFEWAY solution.
- **State-of-the-art Review** of existing standards, ongoing standardisation activities and key standardisation bodies relevant to SAFEWAY.
- **Two parallel events** with target audience
- **SAFEWAY Workshop** to involve whole consortium, standardisation bodies and interested external partners.

### 4.1 Standardisation needs form

SAFEWAY consortium covers different types of organization like HES, RES, PUB and IND with the different field of expertise and business models. This diversity will result in different standardisation needs. In order to collect these needs a Standardisation Needs Form (SNF) can be adopted and distributed among the partners of the consortium. The data collected through this document will be useful, besides specific needs of the consortium, to define key standardisation bodies and their experts in order to involve them during the standardisation process of SAFEWAY solution. The structure of the SNF will be defined in A3. The outcome from SNF will be also compared with the outcomes of the state-of-the-art review in order to identify a standardisation potential of the SAFEWAY solution.

### 4.2 State-of-the-art Review

The state-of-the-art review will be considered to map the most current standards in force and ongoing standardisation activities in the field of interest, indicated by partners in SNF. Results of this review will enable the consortium to define a standardisation potential and identify key standardisation bodies to be involved on further steps of T10.2.

### 4.3 Parallel events

The consortium plans to organise two parallel events in different EU countries. The first parallel event is planned to be held in the Netherlands in September 2020 (M24). The main goals of this event are:

- to understand how SAFEWAY can contribute to Standardisation Organisations (mostly providing feedback on how they envision SAFEWAY contributions to support their future standardisation activities)
- to present to the Advisory Board (AB) and Key Stakeholders (KS) preliminary findings from the standards review (WP3 and WP8);
- to get feedback on standardisation needs and ongoing standardisation activities.

The second parallel event is planned for September 2021 in Portugal (M36). The main goals of this event are:

- 
- To present preliminary results on proposed Standardisation actions as result from the standardisation activities.
  - To get feedback to produce the final standardisation recommendations.

#### **4.4 SAFEWAY Workshop**

The final international SAFEWAY Workshop will present all project results, not only among project partners but also among stakeholders and other target groups. The conference will be targeted to technology innovators on infrastructure management, including end-users, materials and technology suppliers, the research community, regulatory agencies, standardization bodies and all the potential players interested in fields associated to innovative resilience of transport infrastructures with special focus on their application in railway and roads, as stated in [2]. In the context of standardization activities, the workshop aims to refine the standardisation concept of the interoperability specification. The workshop is planned for February 2022 (M42). The workshop will be used as the main dissemination forum to present the project results, including the final recommendations to Standardisation Organizations and other Key stakeholders.

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## Acknowledgements

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- [1] European Commission. Towards an increased contribution from standardisation to innovation in Europe, 2008, Brussels. Available from: <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM%3A2008%3A0133%3AFIN%3Aen%3APDF>
- [2] C. Perez-Collazo. Dissemination and Communication Plan (DCP) V1 (D10.1). Available from: <https://www.safeway-project.eu/en/results/d10-1> [Accessed 1<sup>st</sup> February 2020].