IN-PREP

"An INtegrated next generation PREParedness programme for improving effective inter-organisational response capacity in complex environments of disasters and causes of crises"

D2.6 User Requirements

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Executive Summary

Europe has become increasingly vulnerable to transboundary crises and disasters. These crises propagate across the EU's complex systems and tightly integrated infrastructures and create immense challenges to Member State authorities, which are forced to collaborate across regional and national borders, and across policy and system boundaries. Planning and preparedness for these large-scale disasters and complex crises is thus essential. This requires an intelligent, multi-faceted, systematic and coordinated approach, supported by the latest technology.

IN-PREP aims to integrate novel tools to support transboundary training and preparedness activities and to interlink a wide range of stakeholders to strengthen transboundary collaboration.

This deliverable presents the End User Requirements (EUR) for the IN-PREP project, derived from workshops held in the Netherlands and Germany. These requirements will be re-assessed and updated throughout the project. This is therefore a living document. User requirements may change with new insights and an improved understanding of the project's broader potential.

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Glossary of terms and abbreviations used

Abbreviation / Term	Description
TBC	Transboundary Crisis
CPM	Civil Protection Mechanism
EUR	End User Requirement
MRPP	Mixed Reality Preparedness Platform
CM	Crisis Management
COP	Common Operational Picture
IS	Information System
SA	Situational Awareness

1 Introduction

IN-PREP is a software platform that helps emergency managers to prepare, plan and train for transboundary crises (TBCs). This document presents the end-user requirements for the project. The project seeks constant feedback from user groups, varying from national governments to corporate organisations governing critical infrastructures.

To get a clear picture of what the end users want from the IN-PREP platform, we organized two workshops with user groups and project partners. We realize that user insights and understandings of the project may change in the course of the project. We therefore view this as a "living" document. The user requirements in this report will be updated where necessary throughout the project.

1.1 About IN-PREP

The IN-PREP project addresses two objectives. First, it will design and develop a Mixed Reality Preparedness Platform (MRPP). This innovative IT tool will allow practitioners to train and prepare for TBCs, using new and existing scenarios, in a virtual environment. Second, the project will create an accompanying Handbook of Transboundary Preparedness and Response Operations, addressing operational and procedural best practices and technical recommendations for the further development of relevant systems.

Planning for crises has never been an easy task. Who is responsible for what, who do we need, and when do we initiate certain measures? Planning becomes even harder when a crisis stretches over borders and/or policy domains (we refer to a transboundary crisis (TBC)). In TBCs, multiple actors, (national) policies and crisis frameworks have to be connected. What makes TBCs particularly difficult is that there is no 'ground zero' around which to organize. TBCs tend to have multiple ground zeros or none at all (e.g. in the case of a cyber-attack). The IN-PREP project is established to give member states tools to prepare for TBCs.

Recent research in the domain of crisis management studies has identified five managerial tasks that are critical to the effectiveness of any crisis response (see also D2.1: Success and Failure Factors):

1. Situation assessment
2. Decision making
3. Coordination, command and control
4. Capacities and logistics
5. Communication with the public

Having such a framework helps to prepare for crises. Any crisis, including transboundary crises, will be much more manageable when these tasks are well executed. Preparation and training are critical in this regard. The aim of IN-PREP is to offer a platform that can support and facilitate the training and preparedness of the crisis management processes.

The overall goals of the IN-PREP project are to support joint response planning, to facilitate real-time information sharing, and to help coordinate the use of critical resources. The project focuses on planning and training of crisis managers who might be involved in a transboundary response. If the platform proves to be valuable in the training and preparation phase (the "cold" phase), it may also be used during the actual crisis response (the "hot" phase). The interdisciplinary training will be based on realistic scenarios that make use of (real-time) data and visualizations

By training with IN-PREP, end-users can identify weaknesses in their response planning for transboundary events, and they can adapt their response accordingly. IN-PREP can be used to prepare for the five strategic crisis management tasks mentioned above. So if, for instance, an organization concludes that its communication capabilities are not sufficient for transboundary crises, IN-PREP can help to strengthen crisis communication capacities by producing a transboundary scenario in which the existing capacities are challenged, tested and assessed.

In short, IN-PREP should help users to:

- Identify weaknesses in response planning;
- Recognize actors in transboundary networks;
- Become familiar with crisis decision-making in a transboundary context;
- Know what type of information is needed and how to get it;
- Practice communicating with multiple publics and stakeholders.

1.2 Addressing the IN-PREP Description of Action

IN-PREP GA requirements	Section(s) of present deliverable addressing IN-PREP GA	Description
Task 2.4: "[CPLAN] will aim to establish a draft list of requirements"	The initial requirements are presented and elaborated on in chapter 4. A complete list can be found in the Annex.	Results of the first workshop, together with the overall aims and promises of the IN-PREP project are translated into user requirements.
Task 2.4: "The final list of requirements (D2.6) will remain a living document, updated when considered necessary by the partners"	In chapter 1 it is clearly stated that this deliverable is a living document. The user requirements are presented in chapter 4, and as a list in the Annex.	This document will be revised in accordance with findings from the second workshop in Berlin (and then with future findings as they emerge throughout the project)
Task 2.4: "Finally [..] user requirements will also address social cultural, legal and ethical issues"	Ethics and other issues are discussed in chapter 4.3.	Ethics and other issues will be further addressed in Workshop 2.

Table 1 - Deliverable's adherence to IN-PREP objectives and Work Plan

1.3 EURs and Prioritization

The end user requirements (EURs) for the MRPP are categorized according to the six core functionalities of the system agreed upon during the Leiden Workshop. These core functionalities are:

1. Make a plan: the MRPP should assist in planning for transboundary crisis events.
2. Create a scenario: the MRPP should assist in the making of an immersive scenario that allows players to test and assess their plans.

3. Define criteria to test: the MRPP should offer a testing framework to help players assess their capacities in an objective and relevant way.
4. Play (train): the MRPP should make it easy to play the scenario and facilitate the training of the end-users.
5. Score / assess / evaluate: the MRPP should provide a framework that makes the scoring and evaluation near-automatic.
6. Adapt: the MRPP should help end-users adapt their plans in light of the training assessment.

All user requirements are recorded in the following way:

ID	Name	Description	Priority

- **ID** is the unique identification number of the EUR
- **Name** is the name of the requirement
- **Description** gives a summary of what the requirement entails.
- **Priority** signifies the distinction that will be made between the EUR priorities: mandatory, important and interesting requirements.

Mandatory requirements are those which are absolutely needed. They determine the core functionality of the system, and the absolute minimal requirements requested by the end users. If there is no possibility to integrate these in the IN-PREP system, this should be discussed and clearly justified.

Important requirements are those that add the necessary functionalities to ensure that the tool will deliver sufficient business value. They can be postponed to the final version but are still needed before releasing a commercial version of the system.

Interesting requirements bring in added value if present, but do not hamper the value of the IN-PREP system if absent. They nevertheless increase the pertinence of the tool and reinforce its potential success.

1.4 Methodology

The IN-PREP system requirements will be validated by the end users. Validation is an external process of verification whose goal is to ensure the IN-PREP system meets the needs of end users. It was achieved by gathering feedback from end users during two workshops. The first workshop in Leiden, the Netherlands was designed to spark discussion between end users using transboundary crisis scenarios. During these discussions, initial requirements for the IN-PREP project's MRPP were identified. The focus on the MRPP was purposeful so that IN-PREP's technical partners could have a draft list of EURs early in the project, as they will then translate the EURs into system specifications, used to guide technical developments.

The second workshop in Berlin, Germany, is designed to validate and, if necessary, adapt the user requirements derived from the first workshop. This process of re-validation makes sure the end user's needs are clear and concise. Furthermore, additional requirements were sought in Berlin through small group discussions about topics relevant to the IN-PREP system. An ethics and privacy assessment workshop

1.5 Overview of this report

This deliverable presents the End User Requirements, derived from the IN-PREP End User Workshop#1 in Leiden (M3), the Netherlands, and End User Workshop#2 in Berlin, Germany (M6). Details of the workshop organisation and structure can be found in D2.5 Workshop Proceedings. Furthermore, results of the ethics and privacy assessment workshop are discussed. The complete list of EURs can be found in Annex 1.

2 User Group

The end user organizations present at the workshops are outlined below. A total of 57 individual end users from thirteen countries were represented in the workshops.

Workshop #1 summary:

- Number in attendance: **48**
- IN-PREP project partners: **26**, out of which **18** were end users
- Invited end user guests in attendance: **22**
- Total number of end users from inside and outside of the project: **40**

Workshop #2 summary:

- Number in attendance: **57**
- IN-PREP project partners: **41**, out of which **19** were end users
- Invited end user guests in attendance: **16**
- Total number of end users from inside and outside of the project: **31**

Table 2 lists the end users in the IN-PREP consortium, while Table 3 lists the organisations of invited end user guests. In many cases, multiple people joined from a single organisation.

IN-PREP consortium organisations

Country	Organisation	Domain / Expertise
The Netherlands	Safety Region IJsselland	Civil Protection
Germany	DHPol (German Police University)	Police
Ireland	Health Services Executive	Medical
France	SAMU (Medical services Paris)	Medical
Italy	Ministry of Internal Affairs (CNVVF)	Government
Greece	Municipality of Rhodes	Civil Protection
Northern Ireland	Police Services of Northern Ireland	Police

Table 2 – Overview of IN-PREP end users

Participation of outside organisations

Country	Organisation	Domain / Expertise	WS#1	WS#2
Denmark	EU and Emergency Management Expert	Civil protection	x	
Italy	European Air Crane	Fire brigade	x	
The Netherlands	DCC Economic affairs & Climate	Government	x	
The Netherlands	Gasunie Transport Services	Corporate/institutes	x	
The Netherlands	GHOR (Dutch ambulance services)	Medical	x	
The Netherlands	Leiden, NL Police	Police	x	
The Netherlands	Ministry of Defence	Government	x	
The Netherlands	Ministry of Education, Culture & Science	Government	x	

The Netherlands	Ministry of Infrastructure & Water Management	Government	x	
The Netherlands	Ministry of Justice & Security	Government	x	
The Netherlands	National Cyber Security Centre	Government	x	
The Netherlands	National Coordinator for Security and Counterterrorism	Government	x	
The Netherlands	Police Academy	Police	x	
The Netherlands	Police East Netherlands	Police	x	
The Netherlands	Safety Region Utrecht	Civil protection	x	
The Netherlands	Schiphol Fire Brigade & Safety Training	Fire brigade	x	
The Netherlands	Security expert	Civil protection	x	
The Netherlands	USAR.NL (Urban Search and Rescue team)	Civil protection	x	
The Netherlands	Water Board Drents Overijsselse Delta	Civil protection	x	
United Kingdom	National Police Chiefs' Council	Police		x
France	Safe Cluster	Civil Protection		x
Sweden	Mid Sweden University, Härnösand	Police		x
Spain	Asociacion Profesional de Tecnicos de Bomberos (APTB)	Fire & Rescue		x
Sweden	Södertörns brandförsvarsförbund	Fire & Rescue		x
Germany	Technisches Hilfswerk (THW)	Civil Protection		x
United Kingdom	Cambridgeshire Fire & Rescue Service	Fire & Rescue		x
United Kingdom	International Association of Emergency Managers	Civil Protection		x
France	Office National des Forets (ONF)	Forest Fire		x
Ireland	Mayo County Council's Fire, Rescue and Emergency Planning department - Ireland	Civil Protection		x
Hungary	Capital Disaster Management Directorate	Civil Protection		x
Switzerland	University of Geneva	Crisis and Disaster Risk Management		x
Germany	Berliner Feuerwehr	Fire & Rescue		x
The Netherlands	Institute for Safety	Disaster Relief; Public Crisis Management		x
Germany	ARTTIC	DRIVER+ project		x

Table 3 – Overview of organizations represented by guests who contributed to the IN-PREP project

3 Workshop 1: User Feedback

The first user workshop, organized by Crisisplan, was held in M3, in Leiden, the Netherlands. A total of 40 end users were in attendance, all experts in their fields, which included: police, fire services, medical response, civil protection, industry, and national government. The workshop lasted two days. On the first day, project partners and invited end user guests discussed IN-PREP. The second day, project discussed the findings of the first day and further defined the wishes of IN-PREP's Mixed Reality Preparedness Platform.

A short re-cap of the Workshop 1 follows below. More details about the workshop organization and approach can be found in D2.5 Workshop Proceedings.

3.1 Day 1

Day 1 of the workshop started with a presentation about the IN-PREP project and its goals: to work towards a shared and improved response planning, by developing a training and preparedness platform, and offering an accompanying handbook of operations. After the plenary presentations, participants were split up into three groups. The workshop was designed to be very interactive, to spark a lively discussion between and among all participants. Each group was led by a moderator from the project. Crisisplan prepared four short scenarios to trigger the discussions:

- Wildfire on Rhodes Island, Greece
- Flooding in the Netherlands
- Terrorist attack in Northern Ireland
- Smallpox outbreak in the Netherlands

Based on these scenarios and in an informal setting, the groups were asked specific questions:

- What would be the best response (ideally)?
- Which actors should be involved in the response?
- What resources would be needed?
- What type of (organizational) skills are needed?
- What would this mean for preparation?
- What would this mean for training?

During the afternoon on day 1, the groups presented their findings. This session was moderated by Crisisplan. The plenary discussion helped to condense, clarify and sharpen the groups' findings.

The groups produced different findings, but in the plenary discussion a number of general themes emerged:

- A transboundary crisis is likely an event that has never happened before. This means that highly detailed plans to prepare for such events are impossible. There is a need for broader, more generic plans. In order to create such plans, common denominators in planning and preparation need to be found.
- Asset registration is critically important: what is available, what are the capabilities of available assets? This point was made in two groups. Asset registry across civil protection services is helpful during crisis response, and therefore the system should allow users to have a clear overview of all available assets at any time. It was suggested this registry system should also be aware of the capabilities of assets, so it can immediately answer the problem with the needed assets.
- While creating generic plans and clear asset registering, the differences between countries and the role of politics should not be forgotten. Templates for transboundary cooperation should not be too specific. A user from Denmark recognized that some countries, including his, will likely first seek collaboration with its neighbours, as they already have agreements in place and good relationships. Also, EU support isn't free and the voluntary pool takes three to four days to arrive. The diplomatic side of EU support might slow the allocation of support down.

- One subject that was discussed among all groups was that of information and data sharing. When combining and sharing different streams of information through the system, a shared common operational picture (COP) should be made available to all users. Also, local information, such as current weather and forecasts, integrated in the platform, could be useful to them. One point was made clear throughout the discussions: the system is to support the process of planning and preparation. In other words, the process is more important than the system.
- The number of actors during TBCs can be overwhelming. It was therefore suggested that the MRPP should include a system for actor tracking and identification. The platform should give an overview of network partners and experts on different terrains. One participant suggested that during training, the platform should force users to think about what partners they need and who is involved.
- It was suggested, furthermore, that scenarios should be visualized, in order to make the training convincing. The system can help to identify preparedness and training gaps and to focus various efforts.
- Finally, it was remarked that the platform should be able to assess training results. The system should show or highlight how a response could be more effective. That would require evaluation criteria to be integrated in the system.

3.2 Day 2

The focus of the second day of the workshop was on clarifying the exact purpose of the MRPP. The original proposal for the MRPP described an IT-based platform, a mixture of novel disaster management tools and processes that can harness the capacities of individual countries and specialized agencies. The MRPP holistically integrates Information Systems (IS) and Situational Awareness (SA) modules to be used in training practitioners for the unexpected. Once validated, the platform may also be used in operations. The information generated from such tools and processes are fused and synthesised resulting in a decision support mechanism and the visualisation of assets and personnel to address the transboundary crisis management challenge. The platform will enable joint preparation through the creation of realistic scenarios (transforming "what-if" to "what is" to boost realism), it will enable shared planning of critical resources (upgrading response planning and optimizing response deployments), and it will make it possible for actors that have never worked together before to share information and coordinate their activities, effectively and rapidly (boosting cross-organisational collaborative response).

The discussions during workshop 1 concentrated on clarifying the main purpose for the MRPP: enhancing preparedness through the creation of realistic scenarios, explicitly excluding response activities. Especially the latter is important to keep the project's development focus onto the preparedness phase. Training and scenario-building is therefore the main focus of the project.

The project partners identified, with the goals of the MRPP and the discussions of the first day in mind, that the MRPP should be able to support the following processes:

1. Make a plan
2. Create a scenario
3. Define criteria to test
4. Play (train)
5. Score / assess / evaluate
6. Adapt

Users can **make a plan**, or enter an existing plan, and in this step, inventorize their assets. End users agreed it was essential to track capacities in order to know what human and material resources are available to them.

To **create a scenario**, the Mixed Reality Preparedness Platform will be used. Users can determine the scale and complexity, use simulated or real data, and make use of IN-PREP models and/ or their own legacy software. Scenarios should be adaptable and scalable. Several workshop participants shared that in this step, the IN-PREP

system will serve as a tool to help them think about a critical task: to recognize which actors should be involved in the response (and therefore training) to various transboundary crises.

Defining assessment criteria is a challenge, and a critical factor in determining the success of training/preparedness. These criteria can be generically defined for strategic level actions related to transboundary crises, or specifically made relevant individual end user organizations. Users suggested that IN-PREP can make use of checklists within this step, and incorporate success and failure factors from previous trainings as well as actual responses.

Playing a scenario offers an opportunity to bring many actors together and test the validity of a plan. The opportunity to train will allow end users to create awareness within their own organizations and among collaborating agencies about the complexities of transboundary crises. It will allow users, in a safe environment, to identify obstacles to an effective response, which lead to lessons learned and can then be incorporated in future trainings.

Scoring a training session allows users to assess whether they have achieved their goals, and based on the outcomes, how they can improve their preparation and planning.

Users want to be able to save and re-use scenarios, which also means they will be able to **adapt** them to include lessons learned from previous training sessions or actual responses.

End users emphasized that training and preparedness is an ongoing job, never to be considered finished. These EUR categories allow for a circular, continuous training and preparedness process. In practice, the order of steps followed may change. Some will wish to first define criteria, for example, and then create a scenario. Others may have a scenario in mind, based on an identified threat, and then create the plan criteria as a way to train for that scenario. In short, these processes are considered essential, although the order is adaptable.

4 Workshop 1 – User Requirements

This section outlines the user requirements of IN-PREP Mixed Reality Preparedness Platform (MRPP). The MRPP system and the IN-PREP goals were discussed in Workshop 1, and in this chapter the insights of this discussion are combined with the objectives stipulated in the IN-PREP-proposal.

The chapter begins with an overview of the goals and technical capabilities of the MRPP, and end users' feedback followings, including the formulation of their needs and wishes for the system into EURs. These EURs will guide the technical development of the project.

The MRPP

IN-PREP will offer a novel platform enabling interdisciplinary actors to collaborate across boundaries to prepare and train for transboundary crises.

More specifically, the MRPP is an innovative holistic suite of tools that will:

a) Allow for the incorporation of existing crisis management plans or the creation of new ones, which can be assessed, tested, analysed and improved through the planning process and through training sessions;

b) Offer a training and preparedness platform that works with legacy systems;

c) Enable trainers to create multiple scenarios, using a building block approach for the translation of learning goals into sequential or simultaneous training steps;

d) Allow trainees to be immersed into an environment that combines real world information with dynamic and contextual simulated information;

e) Enable trainers to monitor in real time, control, keep track of and have a direct link with trainees, thus being able to guide them and consequently adapt the training;

f) Improve cost-effectiveness of large-scale exercises by reducing the proportion of trainers/actors to trainees.

The technical capabilities required for the MRPP are categorized as follows:

1. **Command, Control and Communications System (C2/C3)**
    a. Information System (IS) (databases, reports, logistics, sensor info, etc.)
    b. Situational Awareness (SA) (real information on status of operations via reports dynamically changing or real-time sensor input coupled with assessment software that interprets data)
    c. Common Operational Picture (referring to the process and means for conveying the same information across users, and allow for the same visualization and assessment of the situation)
    d. Communications
2. **Modelling System**
    a. Catastrophe modelling (earthquake, flood, terrorist attack)
    b. Air/fire dispersion
    c. Evacuation modelling
    d. Flood modelling
3. **Decision support and Scenario building**
    a. Decision support based on assessments from modelling and SA
    b. Scenario building/editing based on modelling, IS, SA manipulation

Below are the MRPP requirements gathered in Workshop 1. All these requirements will be translated into technical specifications that will define the system design (WP3).

First are the General Requirements that apply to the MRPP. Following, requirements are structured according to the six steps of the crisis preparation process discussed in section 3 (make a plan, create a scenario, define criteria to

test, train, score and adapt). This process is cyclic and supports the overall goal of the IN-PREP project to develop collaborative response planning, which is trained and continuously adapted.

4.1 MRPP General Requirements

The MRPP should be user-friendly or it will not be accepted by end users. The user should be able to easily understand and operate the system, through an interface that is self-evident, intuitive and well designed.

ID	Name	Description	Priority
IDs will be assigned by CPLAN after EURs are final	User-friendly interface	The MRPP should have a user-friendly interface that can be easily understood and operated.	End users: PLEASE ASSIGN PRIORITIES to all EURs. These will be discussed in a conference call in the week of 22-25 May. (The complete list of EURs is in the Annex)

Secondly, the MRPP should allow for interdisciplinary training. Planning for transboundary crises is particularly difficult as it involves many actors from different jurisdictions and policy domains. The MRPP should offer a collaborative work space that enables crisis management actors from various domains (e.g. fire services, police services, medical response teams) and at different levels of government (e.g. national or regional) to train together. This requires a homogenous information structure entailing universal symbols, an international language (English), and easily accessible explanations or definitions of the key concepts.

ID	Name	Description	Priority
	Collaborative platform	The MRPP should allow for multiple actors to use it at the same time.	
	Transboundary playing field	The MRPP should support the interactions of a large network of actors spread over an extensive geographical area.	
	Universal symbols	The MRPP should employ universally accepted symbols.	
	Definitions of key concepts	Definitions of key concepts in the system should be easily accessible to the user.	

Thirdly, the MRPP should not (unnecessarily) replace the tools end-users currently have in place (legacy systems) for responding to crises. The aim of the MRPP in this respect is to accommodate for their continuous use.

ID	Name	Description	Priority
	Interoperability	The MRPP should accommodate for the legacy systems end-users employ to respond to crises.	

The MRPP is a tool which can be used to for preparedness and training for transboundary responses. Before elaborating on the substantive requirements, an important condition must be highlighted: the system needs to protect sensitive information. Some information is sensitive, and some information can be confusing or not suitable for all actors. Users noted they may wish to share select information, but not all information. In particular because their legacy systems will be incorporated, they want to be sure that appropriate security is in place, and that not all users have access to all information. The system needs to allow for the classification of sensitive information. All information saved within the system should be secured and/or encrypted.

ID	Name	Description	Priority
	Encryption	All information stored in the MRPP should be encrypted.	
	Security	The MRRP should allow users to determine which information should be shared or seen by other actors.	

4.2 MRPP Processes

4.2.1 Make a Plan

Planning for transboundary crises involves considering who does what, where, when and how. Often, end users already have response plans, which should be exploitable (no need to reinvent the wheel). It is therefore desirable that existing plans can be imported into the MRPP.

Workshop discussions revealed that many organizations still have detailed plans, however, there was a general agreement that overly-detailed plans are not useful. Some participants commented that their organizations have thrown away detailed plans and created / are creating one generic plan instead. Others mentioned creating one generic plan per threat, typically focused on the top prioritized threats to a region based on risk assessments.

The logic behind using generic plans is that within their individual roles, and for routine responses, teams are generally well-trained. Too many specifics on response details make the plans overly operational and cumbersome. As one user said, reactions in response situations become instinctive over time, and with through training and actual responses, teams learn to work well together. Details related to tasks that become instinctive or are regularly trained do not need to be included in plans. In short, a generic plan assumes that the operational processes work well.

Furthermore, overly detailed plans will most likely not be relevant for transboundary crises, in which the specifics – or even the type – of crisis tend to be very difficult to predict.

What end users believed improved crisis management response were not the actual plans, but the planning *process*. A detailed written plan, they explained, will sit on a shelf, and no one goes to the shelf to pull out the plan during a crisis. They highlighted the benefits that all relevant stakeholders should be involved, and that continuous training, again with all relevant stakeholders, is the best way to improve crisis management preparedness.

Some end users still make use of detailed plans, however, and wish to be able to incorporate these into the IN-PREP platform, with the ability to revise and update them, as well as share them with others.

ID	Name	Description	Priority
	Import existing plans	The MRPP should allow the user to import and edit existing plans.	
	Create generic,	The MRPP should be able to make generic plans, at different	

	strategic plans	territorial levels (regional, national, transboundary).	
	Create detailed plans	The MRPP should also allow for the creation of detailed plans.	
	Plan library	The MRPP should allow users to save plans into a library.	
	View and edit plans	The MRPP should allow users to visualize, edit or delete plans.	
	Share plans	The MRPP should allow users to share plans with other users/organizations.	

Checklists

Given that IN-PREP aims to improve the process of preparedness rather than encourage highly detailed plans, the MRPP should have the possibility to make checklists. Standard tasks have been identified in crisis management, as described in Section 1.1. With these in mind, users can identify probable high-level actions or decisions to be made. These can be documented and categorized in a checklist. If users create a plan for cross-border flooding, for example, they can assume that one decision to be made will be whether/when to evacuate. This can be included in a checklist, and having identified this possibility, users will also be triggered to think about which actors will be involved in the decision making process related to evacuation (i.e. regional/municipality leadership), but also in carrying out the evacuation itself (roadway and public transportation organisations).

With a checklist created during preparedness phase, users can benefit from the structured, detailed thinking that is achieved during planning but that becomes very difficult during the response phase, known for high uncertainty, time pressure and incomplete information.

ID	Name	Description	Priority
	Checklists for plans	The MRPP should allow the user to create and follow a checklist related to response plans.	

Asset Registry

End users would like to have information about their own capacities as well as capacities available to them. They would like to be able to visualize these assets on a map. Ideally, this list should be dynamic, so that if particular capacities are temporarily unavailable or in use, this is immediately clear.

They agreed that the description of the capacities is highly important. Processes developed in the U.S. are a good benchmark for resource sharing among agencies. For example, the Emergency Management Assistance Compact (EMAC) is a mutual aid agreement between states made in normal times (pre-crisis) to facilitate sharing personnel and equipment across borders. Legal and financial aspects of equipment sharing are also established during this time, so states can quickly ask and receive assistance. The available capacities and capabilities are described in a uniform way to avoid confusion. Thanks to EMAC agreements, the process of capacity sharing is efficient, easy to understand, and financial burdens and obligations are clear. Certainly, this process is easier to streamline in the US, under a federal government, than in Europe. The EMAC is triggered when a state governor declares an emergency, something that is not easy to emulate among the different EU member states. However, best practices can be derived from such agreements.

IN-PREP should allow for storing capacity information in an organized way.

ID	Name	Description	Priority
	Asset registry: available capacities	The MRPP should allow users to access an asset registry showing available capacities (e.g. personnel or equipment).	
	Asset registry: interoperability	The MRPP should allow users to visualise the available capacities of other organisations.	
	Asset registry: easy to understand	The asset registry should allow users to enter details about the available capacities (location, descriptions, number of persons needed to operate particular equipment, certifications needed, etc.).	
	Asset registry: constraints	The asset registry should specify the constraints (e.g. legal or financial) of sharing available capacities.	
	Asset registry: localization	The location of registered assets should be able to be shown on a map.	

In some cases, end user organizations will already have an asset registry they would like to continue using, and in this case, IN-PREP should allow for integration of this registry.

ID	Name	Description	Priority
	Asset registry: compatibility	The MRPP should allow users to integrate an existing asset registry.	

4.2.2 Create a scenario

Scenario Builder

Since the goal of the MRPP is to get users to practice strategic decision making in transboundary crises, both simulated and real data must be used for designing scenario conditions in order to make a training session as realistic as possible. The MRPP should allow for the creation of multi-hazard, dynamic scenarios. Users want to be able to apply one or more hazards to a geographical area of their choosing, which is not necessarily within a one contained area. For example, cyberterrorism scenarios may have multiple locations that are not geographically connected. The same is true of pandemics, or terrorist attacks.

Depending on what methods/goals and in which way they wish to train, some trainers may wish to script out a scenario and have trainers follow it closely. In other cases, trainers may adapt the scenario during the session based on the user reactions, decisions, progress, etc. Users want the possibility of creating dynamic scenarios, where the type of hazard, the severity, the location, scale, consequences, etc. can be altered during a training session.

If a plan exists for a particular risk, the scenarios can serve as a means to test the plan. If no plan yet exists for a particular scenario, the process of training on a scenario will help users to identify the information they wish to include in a plan.

The IN-PREP platform should allow for building a convincing scenario. To be convincing, a scenario builder should allow for variation. This variation makes sure that end users are trained in different settings (e.g. locations or threats), with different actors and different tasks and responsibility structures.

ID	Name	Description	Priority
	Scenario Builder: mixed reality	The Scenario Builder should allow the user to employ both real and simulated information when creating a scenario.	
	Scenario Builder: 3D map	The Scenario Builder should offer a 3D map (with indoor and outdoor areas) as the basis on which scenarios are configured.	
	Scenario Builder: transboundary scenarios	The Scenario Builder should allow for the creation of scenarios in geographical regions of any size, including disconnected geographic regions.	
	Scenario Builder: various simulated incidents	The Scenario Builder should allow the user to add various types of simulated incidents to different locations on the map.	
	Scenario Builder: various simulated actions	The Scenario Builder should allow the user to add various types of simulated actions/behaviours (e.g. deploying resources to a certain location or evacuation) to the scenario.	
	Scenario Builder: timeline	The Scenario Builder should allow the user to establish the exact timing when specific incidents or actions come into play.	
	Scenario Builder: simulation triggers	The Scenario Builder should allow the user to set triggers for the different simulations added.	

Actors and Roles

One vital element that should be available and adjustable relates to identifying relevant actors (i.e. organisations), and the importance of clear (individual) roles. End users at the workshop saw a lot of potential in IN-PREP helping them to identify relevant actors (organisations) for the various types of crises they prepare for, highlighting that this is critical to an effective crisis response. Failing to identify a relevant actor (in time) can have very negative consequences in crisis management. Furthermore, identifying actors in the preparedness phase instead of during an actual crisis allows users the opportunity to train and prepare together with those actors.

In addition to incorporating various actors into a scenario, users would also like to be able to assign specific roles to individuals/teams/groups. Often actors and roles will be identified in the planning phase before users create a scenario. Therefore, actors and roles lists should be accessible between the response plans and scenario builder.

ID	Name	Description	Priority
	Scenario Builder: actors	The Scenario Builder should allow the user to add various actors to the scenario.	

	Scenario Builder: actor roles	The Scenario Builder should allow the user to define clear roles for actors.	
	Actors: link with Scenario Builder	The MRRP should allow the user to access and use actor and role lists when creating or updating plans.	

Saving, Revising, Editing and Sharing Scenarios

End users should be able to create scalable and adaptable scenarios, save the scenarios they created, and be able to re-use them. This will enable training also separately on the five managerial tasks of crisis response (situation assessment; decision making; coordination, command and control; capacities and logistics; communication with the public). Furthermore, some end users noted that it would be useful if the scenarios could be shared. This encourages diversity in terms of what practitioners prepare for, and saves resources since multiple end users can employ an existing scenario.

ID	Name	Description	Priority
	Scenario Builder: scenario library	The Scenario Builder should allow users to save scenarios into a library.	
	Scenario Builder: variations on a theme	The Scenario Builder should allow users to create scenarios with alternative evolutions.	
	Scenario Builder: share scenarios	The Scenario Builder should allow users to share scenarios with other users/organizations.	

4.2.3 Define criteria to test

When the scenario is created, end users should be encouraged to define assessment criteria. It would be helpful if the system offered ways to record assessment observations.

ID	Name	Description	Priority
	Criteria for scoring	The MRPP will allow users to define criteria for scoring users during training.	

4.2.4 Play/train

IN-PREP aims to create realistic training sessions, inasmuch as realism is possible in a simulated environment. Users want to be able to build dynamic, convincing scenarios combining real and simulated data to enhance effective collaborative response planning.

The MRPP Scenario Builder will offer the possibility to create multi-hazard scenarios, incorporating various modelling tools. End users were interested to learn of the types of hazards and events that the planned modelling tools will be able to simulate (including forest fires, earthquake, terrorism, refugee crises, floods, and industrial accidents). They welcomed the possibility to provide an impact assessment for some of these hazards. Users also discussed the changing nature of transboundary crises and unforeseen causes of crises. This could include previously unheard of hazards or events, more extreme or new combinations of cascading hazards (floods causing landslides), or even 'invisible' threats, such as cyber terrorism.

The visualization of the scenario should be a shared experience, allowing users a common operational picture of the situation. When training, this aids in sense-making, improving response, as the actors have a uniform understanding of the unfolding crisis.

ID	Name	Description	Priority
	Common Operational Picture (COP)	The MRPP should allow the user to visualize the scenario elements (including updates) in a Common Operational Picture.	
	COP: mixed reality	The COP should allow the user to employ both real and simulated information in training with a scenario.	
	COP: disaster effects	The COP should allow the user to visualize the effects of different incidents (e.g. forest fires, earthquake, terrorism, refugee crises, floods, or industrial accidents).	
	COP: impact assessment	The COP should provide the user with an impact assessment of the simulated incidents (wildfires, earthquakes, terrorist attacks).	

Effective crisis management is brought about by a well-orchestrated network of actors. These actors have their own security arrangements and data or asset sharing restrictions, which tend to delay the response. Becoming familiar with these restrictions and the limits of collaboration is an important aspect in crisis preparedness, especially in a transboundary context. Adding to its credibility, the system should therefore allow multiple actors to train concomitantly, and it should be aware of their location and actions, and adapt or allow the trainer to adapt the course of the scenario accordingly.

ID	Name	Description	Priority
	COP: actor status and location	The COP should allow the user to see the status and location of all participating actors (including simulated ones).	
	COP: asset registry	The COP should allow the user to have access to an updated asset registry.	
	COP: logistics	The COP should allow the user to visualize the current state of deployed resources.	
	COP: ad-hoc modifications	The COP should allow the user to change parameters of a scenario, as it is being played.	

Finally, the training experience should be immersive and accommodate participants in different locations. For this purpose, a mobile system will be developed to allow users to interact with each other and with the scenario elements.

ID	Name	Description	Priority
	COP: mobile device support	The COP should allow actors in the field to use their mobile devices to send and receive real-time information (to and	

		from the COP) during a training session.	

4.2.5 Score/assess/evaluate

Each training should be assessed and evaluated. Obstacles to an effective response can be identified, which result in lessons learned and the adaptation of response planning. The system should be able to generate feedback using pre-determined criteria.

This can be very helpful, for example, when users wish to train on one or more of the managerial tasks. Practice makes perfect, as the saying goes, and you can only manage what you measure. By identifying goals and measuring outcomes, users can track progress and identify their strengths and weaknesses. The criteria will be determined by end users, but the system should allow for the input and tracking of this criteria.

During the training, it should be possible to log the steps taken and decisions that are made. This enables assessing response action in the evaluation.

ID	Name	Description	Priority
	Logging function	The MRPP should log actions made while a scenario is played (including the notifications generated by the COP).	
	Feedback	The system should offer a template for generating feedback (using pre-determined criteria) from a scenario.	

4.2.6 Adapt

After a training exercise, and taking into account the evaluation, end users should be able to adapt the response planning, taking into account the lessons learned.

ID	Name	Description	Priority
	Recommendations	The system should allow the user to include recommendations for the existing plans after evaluating a played scenario.	
	Lessons Learned	The system should allow for creating and saving after action reports and lessons learned.	

5 Workshop 2: User feedback

The second end user workshop, organized by FhG, was held in M6 in Berlin, Germany. A total of **31** end users attended, 16 from inside the IN-PREP consortium, and 15 invited guests from 9 EU countries in various domains, including: police, fire and forest fire rescue services, civil protection, a disaster relief organisation, and a university. End users represented 12 different European countries.

The workshop lasted two days, and the goal was to refine and validate end user requirements from the first workshop, as well as to generate fruitful discussions in order to identify any additional EURs. In addition, the workshop included ethics and privacy impact assessments.

Validation of Initial EURs

Following Workshop #1, CPLAN created a first version of the EURs and shared them internally with project partners for feedback (MS2). Partners agreed with the initial list and the categorisation of the EURs:

- Make a plan
- Create a scenario
- Define test criteria
- Play / train
- Score / evaluate
- Adapt

At the start of Workshop #2, following a project introduction, the EURs were encouraged to speak openly about their ideas for how best to achieve the project goals and design the system. They were invited to be critical of the results of the first workshop. Then, the initial EURs were discussed one-by-one. In this way, all EURs were validated. None were rejected.

This set the basis for the rest of the workshop discussion. Participants now understood IN-PREP's goals to improve on transboundary training and preparedness, and, through the EURs, had specific information on how the IN-PREP system would achieve them.

Small group discussions

During both days of the workshop, small group discussions were held to gather feedback. The 'World Café Method' allowed for participants to sit around a table in small groups for casual discussions on a particular subject, moderated by a table host. In total, there were four rounds of discussion over the two days, with users moving to new tables (and thus topics) each time. Each table addressed one of the following topics shown in Figure 1.

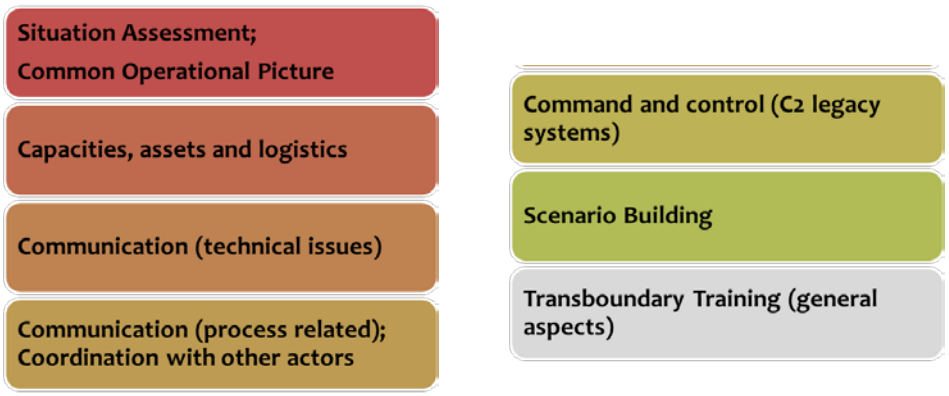

Figure 1 Workshop #2 small group discussion topics

Each discussion started with the experience of the end users, then sought feedback on what users' needs would be for the IN-PREP Mixed Reality Preparedness Platform related to that topic.

The first day of the workshop, participants were asked, with regard to transboundary response training, about their current situation, including:

- Tools or processes
- Urgent / important challenges
- Recognized shortcomings (improvements needed)

The second day of the workshop, the discussions focused on the value that IN-PREP could add to transboundary training and preparedness. Users were asked what they would expect from the MRPP platform, with regard to functionalities and features. They were prompted to consider possible collaboration challenges that would be introduced by using the IN-PREP training tool to foster transboundary collaboration, and asked to consider solutions.

More details about the workshop organization and approach, as well as the small group discussion minutes can be found in *D2.5 Workshop Proceedings*.

6 Workshop 2 - User requirements

6.1 MRPP General Requirements

When analysing the discussions from Workshop #2 in light of how they impact the IN-PREP user requirements for the system in general, a significant finding is that the requirements developed after Workshop #1 were validated by the end-users. More specifically, a different group of end-users confirmed the need for a platform that enables joint preparation through the creation of realistic scenarios; such scenarios will allow trainees to improve on shared planning of critical resources and on mobilizing or activating in a complex response network required in transboundary crises.

End-users noted the necessity to focus on the transboundary domain. At the national level, there are various software tools, platforms, simulators, etc. for training both specific skills (especially tactical and operational) and crisis management in general. This is why end-users do not expect IN-PREP to improve preparation for dealing with disasters at a national level (or at least not directly). A key assumption of the IN-PREP platform should be that crisis management processes and arrangements at country-level work well.

In transboundary crises, even the simplest of tasks (e.g. knowing whom to contact when a joint logistical decision needs to be made) becomes challenging. Including all the relevant stakeholders in responding to transboundary crises, the familiarity with counterparts of the chain of command in different jurisdictions, a shared terminology, the compatibility of legal aspects, etc. are very difficult to achieve, let alone improve on, in the absence of join preparedness. The IN-PREP platform should facilitate training with other jurisdictions. This includes the tools and capacities of the European Union.

ID	Name	Description	Priority
	Compatibility	The MRPP should be compatible with EU systems or tools for crisis management.	

At a more abstract level, the goal of IN-PREP should be to enable or further the understanding of the core crisis management principles and processes of other jurisdictions. Although this idea is too broad to be encapsulated into a general requirement for the MRPP, it does have specific implications for the different modules of the system. This aspect will be thus reiterated in the following relevant sections, with the emerging new requirements and updates.

Finally, end-users validated the 6-step process identified at Workshop #1: make a plan; create a scenario; define criteria to test; play (train); score / assess / evaluate; adapt. Even though the discussions at Workshop #2 revolved around slightly different topics, the outcomes thereof are presented below, in relation to the individual steps.

6.2 MRPP Processes

6.2.1 Make a Plan

End-users' feedback on the existing requirements for how the MRPP should assist in making a plan was very positive. They expressed support for the plan library and were enthusiastic about the prospect of the ability to display existing assets on a map, the ability to enrich disposable assets with information such as characteristics, status, type, or financial or legal limitations related to their deployment or usability. End-users also encouraged efforts to enable checklists that would aid users in building a response plan.

In addition to the existing requirements, end-users explained that resources (or assets) need to be categorized depending on their usability by the different levels of command (strategic, tactical, and operational). Irrespective of how this categorization will be recorded (through a colour code or tags), it should allow actors to browse resources relevant to the service they provide. Finally, end-users mentioned that only select data in the asset registry should be shared with other organizations.

ID	Name	Description	Priority
	Asset registry: categorization	The asset registry should allow the user to link an asset to the appropriate level of command (strategic, tactical, and operational).	
	Asset registry: filtering	The asset registry should allow the user to filter the existing assets depending on their different (standard) characteristics.	
	Asset registry: sharing	The asset registry should allow the user to select whether the introduced asset is to be shared with other organizations or not. Only shareable assets should therefore become visible to other actors.	

The discussion with end-users also helped in refining the ideas behind the plan library. Countries have their own ways of doing things, and their plans vary in complexity – something IN-PREP is certainly not trying to change. The overarching challenge IN-PREP addresses is: knowing that countries do things differently and do not frequently work together, how can we best facilitate a joint response in the event of a transboundary crisis?

In thinking about planning for a transboundary response, it is critical that participating actors in the response network have a basic understanding of each other's capacities, organization, and starting principles. IN-PREP can help to share this information among actors. According to the workshop #1 requirements, it should be possible to upload existing plans and make them searchable. End-users recognized the importance of this functionality especially for local preparedness efforts. Yet in a transboundary context (which is the focus of IN-PREP), this is not enough. Without underestimating their importance, plans differ in their underlying rationale, and thus in length and level of detail. Grasping them requires an immense effort. For training, preparedness and scenario building for transboundary events, actors need to have a quick and basic understanding of how *others* work: what they do, what they can bring to the response.

With this in mind, we consider the system should allow the user to create a synopsis for their plan library. This will be a standard document comprised of a set of key questions, whose answers can be uploaded into IN-PREP and used by planners and trainers to facilitate collaboration.

ID	Name	Description	Priority
	Plan synopsis	The MRPP should allow the user to upload, into a standard format, information on the core crisis management principles, processes, arrangements, etc., essential to the understanding of existing response plans and/or approaches.	
	Link with actors	The MRPP should link the synopsis to its author.	

6.2.2 Create a scenario

The existing requirements for the Scenario Builder were validated by the new end-user group present at Workshop #2. They highlighted the need for flexibility in this module, meaning that the scenarios created should allow for the use of both real and simulated data. This is especially relevant for exploring alternative evolutions of events, affected, for example, by the availability of additional resources or the involvement of unforeseen actors (such as volunteers). In this light, although it is implied in the requirement "Scenario Builder: various simulated actions", the possibility of adding virtual actors and assets should be formulated separately, as new requirements.

ID	Name	Description	Priority
	Scenario Builder: various simulated actors	The Scenario Builder should allow the user to add virtual actors to the scenario.	
	Scenario Builder: various simulated assets	The Scenario Builder should allow the user to add virtual assets to the scenario.	

A note of caution from the end-users is that we should not aim to create a transboundary crisis simulator. Instead, the Scenario Builder should offer a set of core functionalities, along the lines of the existing user requirements, without putting too much effort into aesthetics or complicating the mechanics unnecessarily. The advice to take here is that the focus is the exercise, i.e. running the scenario, rather than building the scenario or the scenario itself.

6.2.3 Define criteria to test

The discussion with end-users also touched upon how the system should support the process of defining criteria to test. The two most important outcomes are that it is essential to establish beforehand what the goal of an exercise is and what exactly will be assessed. This can differ per actor or per scenario phase. Secondly, an assessment is generally done both quantitatively and qualitatively. Although it is interesting to explore the possibility of identifying a number of essential indicators that would help evaluate the performance of a network in responding to transboundary crises, for now it was generally agreed that the system should accommodate for both possibilities.

ID	Name	Description	Priority
	Criteria for scoring	The MRPP should allow users to define criteria to evaluate a training session.	
	Criteria for scoring: transparency	The MRPP should allow the user (i.e. participant to an exercise) access to the criteria for evaluation.	
	Criteria for scoring: quantitative	The MRPP should allow the user to automatically track the performance on selected indicators.	
	Criteria for scoring: qualitative	The MRPP should allow the user to define qualitative criteria for evaluation.	
	Criteria for scoring: database	The MRPP should allow the user to save the criteria set for a specific training, for future reference.	

6.2.4 Play/train

When it comes to running a scenario, end-users validated the requirements drafted for the Common Operational Picture (COP). They highlighted the need for the system to keep track of and regularly update all items involved (be they actors, their location, decisions, asset distribution, etc.), and to display this information in a comprehensive way. With regard to the evolution of the scenario, end-users noted again the importance of flexibility, this time translated into the system allowing the trainer to modify the pre-planned sequence of events as it unfolds.

The feedback from Workshop #2 also helps shaping new requirements for IN-PREP. End-users insisted that the system should show only information relevant to the user's level of command (strategic, tactical, or operational) so as to avoid information overload. This implies a link between the type of user and the information available to it, or simply a filtering function.

ID	Name	Description	Priority
	COP: appropriate information for each level of command	The COP should allow the user to visualize only information relevant for his/her level of command (strategic, tactical, or operational).	

End-users suggested it would be helpful if the system allowed users to create a situational awareness template and have it available at all times.

ID	Name	Description	Priority
	COP: situation report template	The COP should allow the user to access and populate a pre-saved situation report template at any given moment.	

Finally, end-users assessed the role of the decision support system indirectly. They underline that the system should not make any automatic decisions – all decisions must be left to the user to insert into the system. However, the system can support the users in making decisions. In the preparation phase, a user should be able to create checklists with issues to consider in a transboundary crisis; in the play/train phase, the user should have easy access to such checklists. Furthermore, the system should be intelligent, in the sense that it should analyse the user's action (understood as an order in COP) in relation to the situation in which it is engaged, and notify the user in case the desired action is not feasible. For example, if a certain number of resources are ordered to be deployed to an area but the availability is below the proposed number, the system should alert the user of such incompatibility.

ID	Name	Description	Priority
	COP: decision checklist	The COP should allow the user to access and use decision checklists prepared before an exercise.	
	COP: decision support	The COP should allow the user to receive notifications in case incompatible actions/orders are initiated (without overriding those actions).	

6.2.5 Score/assess/evaluate

End-users validated the need for the system to keep a log of the actions taken in the previous phase, for evaluation purposes. In addition, with regard to the quantitative criteria of assessment, end-users expressed interest in the system generating results (e.g. in the form of graphs) that can be used in evaluation.

ID	Name	Description	Priority
	Performance indicators	The MRPP should allow the user to solicit the results of the indicators followed in the "Play/Train" phase and established in "Define criteria to test".	

End-users also considered the trainer's perspective. In this light, they recommended that the system be able to display the scenario both in a timeline and in a dashboard (or a storyboard). In order to facilitate the trainer task of evaluating the performance of participants, the system should allow the trainer to use a checklist. It should allow the trainer to attach notes to the current status of the COP at any time and to create short clips of the past 10 to 20 seconds of the COP's evolution. A checklist is again considered to facilitate the trainer's task. Finally, the trainer should also have access to and be able to replay an entire training session.

ID	Name	Description	Priority
	Scenario timeline and dashboard	The MRPP should allow the user to visualize the scenario (even after being played) in a timeline and in a dashboard.	
	Trainer's checklist	The MRPP should allow the user to have access to a checklist at all times.	
	COP snapshots	The MRPP should allow the user to create a snapshot of the COP at any given time and attach notes to it.	
	COP video clips	The MRPP should allow the user to create short video clips of the past 10-20 seconds in COP's evolution.	
	Replaying training session	The MRPP should allow the user to replay an entire training session.	

6.2.6 Adapt

End-users attributed great value to this phase. In addition to adapting own plans for dealing with transboundary crises, end-users were enthusiastic about the potential of such lessons to inspire improvement in other organizations. They encourage developers to include in the MRPP a section in which different organisations can make their knowledge gained through the MRPP public. This hints at enabling a network of IN-PREP users focused on sharing the lessons learned in preparing for transboundary crises.

ID	Name	Description	Priority
	Sharing lessons	The MRPP should allow users the possibility to make lessons learned on transboundary preparedness public to other users.	

6.3 Ethics and Privacy Impact Assessment

The external end user experts and IN-PREP's technology partners engaged in a qualitative Ethical and Privacy Impact Assessment (EPIA) workshop in Berlin in order to identify key ethical and privacy risks and, working together, begin to identify mitigation measures and solutions that would be relevant to system design and organisational practice.

The idea is not to think of it as validating the system itself as innately ethical, but to understand how the system enables ethical actions and considerations. The EPIA workshop is a middle step in a larger EPIA methodology to identify and analyse the impact of the project output on privacy, ethical, and societal issues.

The EPIA workshop began with a short introduction for the external end users and tech partners about the multiple meanings of privacy. The presentation also covered key ethical and societal issues and human rights that have already been identified to potentially impact the IN-PREP outcomes, such as autonomy, impartiality, dignity, exclusion, responsibility, proportionality, stewardship, and mission creep. It was made clear that many of these terms carry multiple assumed meanings. For example, security could mean privacy, security to share, or personal safety. It could imply surveillance, consent, pre-emptive risk assessment, and/or infringing upon human dignity. These nuances can fundamentally change how a risk is understood and acted upon. The presentation provided a foundation for workshop participants to understand the level of detail necessary for their discussions and interactions to produce meaningful results.

Below is a sampling of what emerged from the workshop:

- The system relies on legacy systems deployed in agencies for the processing of personal data and access control, potentially bringing into conflict disparate organisational and confidentiality schemes. As a result, it must be conscientious of how these systems are able to converse through IN-PREP's platform in order to avoid mission creep and unintentionally exclusion due to different levels of accessibility.
- IN-PREP also needs to consider carefully how the data it does track are linked to this legacy data for training records. There was great concern across many tables as to how a) the traces within the IN-PREP platform could be used to offer insight into methods and decision-making processes that users do not want to be revealed outside of their agency or team, and b) these traces could be used as a way to retroactively evaluate training, conflating the trace with an individual's actions during the training. Suggested Mitigation measures ranged from only documenting completion of a training simulation but not actions taken, pseudonymising trainee data, to contractual agreements that such data cannot be used as part of individual job evaluation.
- Participants also identified risks in the use of outdated data in how the scenarios are built. This could lead to poor operational decisions that increase personal and property risk. As a result, IN-PREP has an obligation to ensure data providers maintain up-to-date records and that the scenarios building tools need to encourage users to combine current with historical data.
- Participants also raised the high priority risks around trust between agencies from different countries, risking miscommunication no matter how many collaborative tools are in place. It became clear based on end users experience that IN-PREP's tools can augment but not replace prolonged, face to face encounters.
- Of high priority was the ethical concern that the machine learning could contain accidental bias and profiling. There needs to be transparency built into the system and the handbook as to how these analytics should work in order to ensure appropriate human interventions.

Detailed results of the EPIA workshop, including full impact assessment and recommendations, will be presented in D2.2 "*Legal, ethical and privacy impact assessment report*".

EURs FORTHCOMING - TRI

7 Conclusion

Annex 1: List of User Requirements

All of the requirements in the text above will be compiled in one list and included here.

IDs will be assigned when the list is complete.

7.1 General requirements

ID	Name	Description	Priority
CPLAN to assign after WS2	User-friendly interface	The MRPP should have a user-friendly interface that can be easily understood and operated.	End users: PLEASE ASSIGN PRIORITIES to all EURs. These will be discussed in a conference call in the week of 22-25 May.
	Collaborative platform	The MRPP should allow for multiple actors to use it at the same time.	
	Transboundary playing field	The MRPP should support the interactions of a large network of actors spread over an extensive geographical area.	
	Universal symbols	The MRPP should employ universally accepted symbols.	
	Definitions of key concepts	Definitions of key concepts in the system should be easily accessible to the user.	
	Interoperability	The MRPP should accommodate for the legacy systems end-users employ to respond to crises.	
	Compatibility	The MRPP should be compatible with EU systems or tools for crisis management.	
	Encryption	All information stored in the MRPP should be encrypted.	
	Security	The MRRP should allow users to determine which information should be shared or seen by other actors.	

7.2 Make a Plan

ID	Name	Description	Priority
	Import existing plans	The MRPP should allow the user to import and edit existing plans.	

	Create generic, strategic plans	The MRPP should be able to make generic plans, at different territorial levels (regional, national, transboundary).	
	Create detailed plans	The MRPP should also allow for the creation of detailed plans.	
	Plan library	The MRPP should allow users to save plans into a library.	
	View and edit plans	The MRPP should allow users to visualize, edit or delete plans.	
	Share plans	The MRPP should allow users to share plans with other users/organizations.	
	Checklists for plans	The MRPP should allow the user to create and follow a checklist related to response plans.	
	Plan synopsis	The MRPP should allow the user to upload, into a standard format, information on the core crisis management principles, processes, arrangements, etc., essential to the understanding of existing response plans and/or approaches.	
	Link with actors	The MRPP should link the synopsis to its author.	
	Asset registry: available capacities	The MRPP should allow users to access an asset registry showing available capacities (e.g. personnel or equipment).	
	Asset registry: interoperability	The MRPP should allow users to visualise the available capacities of other organisations.	
	Asset registry: easy to understand	The asset registry should allow users to enter details about the available capacities (location, descriptions, number of persons needed to operate particular equipment, certifications needed, etc.).	
	Asset registry: categorization	The asset registry should allow the user to link an asset to the appropriate level of command (strategic, tactical, and operational).	
	Asset registry: filtering	The asset registry should allow the user to filter the existing assets depending on their different (standard) characteristics.	

	Asset registry: sharing	The asset registry should allow the user to select whether the introduced asset is to be shared with other organizations or not. Only shareable assets should therefore become visible to other actors.	
	Asset registry: constraints	The asset registry should specify the constraints (e.g. legal or financial) of sharing available capacities.	
	Asset registry: localization	The location of registered assets should be able to be shown on a map.	
	Asset registry: compatibility	The MRPP should allow users to integrate an existing asset registry.	

7.3 Create a scenario

ID	Name	Description	Priority
	Scenario Builder: mixed reality	The Scenario Builder should allow the user to employ both real and simulated information when creating a scenario.	
	Scenario Builder: 3D map	The Scenario Builder should offer a 3D map (with indoor and outdoor areas) as the basis on which scenarios are configured.	
	Scenario Builder: transboundary scenarios	The Scenario Builder should allow for the creation of scenarios in geographical regions of any size, including disconnected geographic regions.	
	Scenario Builder: various simulated incidents	The Scenario Builder should allow the user to add various types of simulated incidents to different locations on the map.	
	Scenario Builder: various simulated actions	The Scenario Builder should allow the user to add various types of simulated actions/behaviours (e.g. deploying resources to a certain location or evacuation) to the scenario.	
	Scenario Builder: various simulated assets	The Scenario Builder should allow the user to add virtual assets to the scenario.	
	Scenario Builder: timeline	The Scenario Builder should allow the user to establish the exact timing when specific incidents or actions come into	

		play.	
	Scenario Builder: simulation triggers	The Scenario Builder should allow the user to set triggers for the different simulations added.	
	Scenario Builder: actors	The Scenario Builder should allow the user to add various actors to the scenario.	
	Scenario Builder: various simulated actors	The Scenario Builder should allow the user to add virtual actors to the scenario.	
	Scenario Builder: actor roles	The Scenario Builder should allow the user to define clear roles for actors.	
	Actors: link with Scenario Builder	The MRRP should allow the user to access and use actor and role lists when creating or updating plans.	
	Scenario Builder: scenario library	The Scenario Builder should allow users to save scenarios into a library.	
	Scenario Builder: variations on a theme	The Scenario Builder should allow users to create scenarios with alternative evolutions.	
	Scenario Builder: share scenarios	The Scenario Builder should allow users to share scenarios with other users/organizations.	

7.4 Define criteria to test

ID	Name	Description	Priority
	Criteria for scoring	The MRPP will allow users to define criteria for scoring users during training.	
	Criteria for scoring	The MRPP should allow users to define criteria to evaluate a training session.	
	Criteria for scoring: transparency	The MRPP should allow the user (i.e. participant to an exercise) access to the criteria for evaluation.	
	Criteria for scoring: quantitative	The MRPP should allow the user to automatically track the performance on selected indicators.	
	Criteria for scoring: qualitative	The MRPP should allow the user to define qualitative criteria for evaluation.	
	Criteria for scoring: database	The MRPP should allow the user to save the criteria set for a specific training, for future reference.	

7.5 Play/train

ID	Name	Description	Priority
	Common Operational Picture (COP)	The MRPP should allow the user to visualize the scenario elements (including updates) in a Common Operational Picture.	
	COP: mixed reality	The COP should allow the user to employ both real and simulated information in training with a scenario.	
	COP: disaster effects	The COP should allow the user to visualize the effects of different incidents (e.g. forest fires, earthquake, terrorism, refugee crises, floods, or industrial accidents).	
	COP: impact assessment	The COP should provide the user with an impact assessment of the simulated incidents (wildfires, earthquakes, terrorist attacks).	
	COP: actor status and location	The COP should allow the user to see the status and location of all participating actors (including simulated ones).	
	COP: asset registry	The COP should allow the user to have access to an updated asset registry.	
	COP: logistics	The COP should allow the user to visualize the current state of deployed resources.	
	COP: ad-hoc modifications	The COP should allow the user to change parameters of a scenario, as it is being played.	
	COP: appropriate information for each level of command	The COP should allow the user to visualize only information relevant for his/her level of command (strategic, tactical, or operational).	
	COP: situation report template	The COP should allow the user to access and populate a pre-saved situation report template at any given moment.	
	COP: decision checklist	The COP should allow the user to access and use decision checklists prepared before an exercise.	
	COP: decision support	The COP should allow the user to receive notifications in case incompatible actions/orders are initiated (without overriding those actions).	
	COP: mobile device support	The COP should allow actors in the field to use their mobile devices to send and receive real-time information (to and from the COP) during a training session.	

7.6 Score/assess/evaluate

ID	Name	Description	Priority
	Logging function	The MRPP should log actions made while a scenario is played (including the notifications generated by the COP).	
	Feedback	The system should offer a template for generating feedback (using pre-determined criteria) from a scenario.	
	Performance indicators	The MRPP should allow the user to solicit the results of the indicators followed in the "Play/Train" phase and established in "Define criteria to test".	
	Scenario timeline and dashboard	The MRPP should allow the user to visualize the scenario (even after being played) in a timeline and in a dashboard.	
	Trainer's checklist	The MRPP should allow the user to have access to a checklist at all times.	
	COP snapshots	The MRPP should allow the user to create a snapshot of the COP at any given time and attach notes to it.	
	COP video clips	The MRPP should allow the user to create short video clips of the past 10-20 seconds in COP's evolution.	
	Replaying training session	The MRPP should allow the user to replay an entire training session.	

7.7 Adapt

ID	Name	Description	Priority
	Recommendations	The system should allow the user to include recommendations for the existing plans after evaluating a played scenario.	
	Lessons Learned	The system should allow for creating and saving after action reports and lessons learned.	
	Sharing lessons	The MRPP should allow users the possibility to make lessons learned on transboundary preparedness public to other users.	