International Network of Evaluators & Guideline for a Methodological Approach in Exercise Evaluation

D3.1 User requirements and state-of-the-art matching report

WP3 – Evaluation Tools

Dissemination Level: Public

Deliverable Type: R(eport)

DOCUMENT INFORMATION PAGE	
Grant Agreement No. 101047665	Deliverable Due Date: M6
Project Starting Date: 01 January 2022 (18 months)	Actual Submission: 03.10.2022
Deliverable Number: D3.1 (WP3)	Leading Partner: AIT

KEY WORDS
User requirements, taxonomy, gap, solution

AUTHORS & CONTRIBUTORS		
Author	**Institution**	**Entire Document-Section-Appendix**
Dražen Ignjatović	AIT	Section 3, 5
Bernhard Bürger	AIT	Section 2, 4
Georg Neubauer	AIT	Section 1, 6
Contributors		

REVIEWS		
Reviewer	**Institution**	**Entire Document-Section-Appendix**
Vlatko Jovanovski	DCNA	Entire Document

VERSION HISTORY		
Release	**Status**	**Date**
0.1	Initial Draft	15 July 2022
1.0	Final Version – submitted to EC	03 October 2022

Disclaimer

Table of Contents

List of Figures

List of Tables

Executive Summary

To build a versatile evaluation methodology for exercises it is imperative to know the requirements of experienced exercise evaluators. To achieve this objective two parallel approaches are chosen. Firstly, online workshops are organised with invited experts with experience in evaluating in TTX, CPX, FSX, both on EU/international level as well as on a national level. Secondly, INEGMA E² partners are participating in exercises to get in touch with evaluators in order to interview them on requirements related to exercise evaluation. All so far identified requirements are described in a systematic way and are made available online in the knowledge management tool Gaps Explorer. At the stage of finalisation of this deliverable 41 end user requirements were identified so far. These requirements serve as support for the development of the evaluation methodology of INEGMA E². Because the experience of evaluators is widespread and dynamic on one hand and to be in line with the indicator of requested 45 experts on the other, the process of identification of end user requirements will continue until the end of the project and beyond. The majority of identified requirements is related to exercise planning and execution. Another category that is often addressed encompasses information and data management aspects such as language barriers. The requested qualification of evaluators is also a relevant issue. Another body of information relevant for optimised exercise evaluation methods are existing standard operating procedures (SOPs) and evaluation tools. So far 12 solutions were identified, encompassing both supportive software tools as well as SOPs such as handbooks. All identified solutions are described in the knowledge management system Portfolio of Solutions, identification of additional solutions will also go on during the remaining lifetime of the project and beyond. The analysis of the potential of solutions to fulfil the identified end-user requirements is a central requirement within INEGMA E². The knowledge management systems Gaps Explorer and the Portfolio of Solutions offer the possibility of a matching functionality based on the taxonomy of Crisis Management Functions. Since the available functions turned out not to be suitable for the very specific requirements of exercise evaluation a new taxonomy of exercise evaluation functions was developed. This taxonomy consists of the five main categories Simulation Control, Findings Processing, Organisation, Evaluation Criteria and Context. Like the end user requirements this taxonomy is dynamic and extended in case of need. The taxonomy is the logic link between Gaps Explorer and Portfolio of Solutions (PoS) and allows a semi-automatic validation of which the solutions described in the PoS can be used to meet the end-user requirements described in the Gaps Explorer. This is done by applying a relevance score that is calculated based on the overlap of taxonomy terms used for describing solutions and requirements and is a numerical value for the matching. Matching of 31 requirements with all solutions showed rather modest values of matching. Only 1 solution turned out to have a high score for one end user requirement, in 8 cases a medium ranked matching of solutions and end user requirements was found, in all other cases the matching was low or no matching at all was indicated. One must be aware that this matching is an automated approach and provides only an indicator if a solution may fulfill a specific end user requirement. The outcomes of this deliverable are both applied to support the work in WP2 on the development of the evaluation methodology and consequently further activities in WP3 related to the development of a demonstrator for exercise evaluation. The results presented in this document represent both end user requirements as well as solutions known to the project team at the moment of publication of the Deliverable, but both bodies of knowledge will be further expanded by documentation of both end user requirements as well as solutions in the Gaps Explorer and the Portfolio of Solutions. In average, an end user specified so far about 1.7 end user requirements and the number of 41 identified requirements is a promising basis for the development of an optimised evaluation methodology. The rather low matching score of end user requirements with existing solutions can be seen as good justification for development of optimised evaluation methodologies, bearing in mind that profound evaluation of available solutions and SOPs might lead to better insight on their suitability.

About this Project

In the context of civil protection exercises, well-considered and extensive evaluation plays a crucial role in documenting best practices and shortcomings happening during those exercises. By noting lessons learnt evaluation is essential for a constant improvement in training efforts, thus promoting the capacities of response units in the European Union and its neighbouring countries for dealing with real disaster scenarios. INEGMA E² is building upon an upcoming approach of independent evaluation and aims for a new level of exercise evaluation, which will meet high standards concerning documentation, replicability, and goal orientation.

The three pillars of the project are:
1) The development of an adequate and versatile evaluation methodology, addressing the different types of existing exercises. Each of those has different needs and goals, thus requiring diverse evaluation approaches.
2) Exploring the great number of existing tools, which can facilitate the data collection throughout the exercise process. Software solutions and technical tools like databases and handhelds empower the evaluators to collect a great amount of data even under difficult circumstances often part of the training reality.
3) The creation of an international pool of evaluators, which will be accessible by all institutions managing those kinds of exercises, to ensure the availability of highly skilled experts when needed. Those invited to this pool of evaluators will have to meet a certain skill set developed during the project.

A strong interconnection of all three essential fields - methods, tools and network – is crucial for setting new standards in exercise evaluation. By ensuring the provision of results for future exercises INEGMA E² will significantly contribute to a continuous improvement of exercise outcomes. In addition, it will connect experts in exercise evaluation, will create a mechanism to share knowledge and good practices and will be designed for further grow and scale up.

About this Deliverable

The main goal of this document is to provide a list of user requirements and a catalogue of existing evaluation tools with technical and functional descriptions. The main part of it will focus on mapping and summary of the identified gaps.

Abbreviations and Glossary

A common glossary of terms for all INEGMA E² deliverables, as well as a list of abbreviations, will be made available on the INEGMA E² website.

1   Introduction

Evaluation is imperative for the assessment of best practices and shortcomings occurring during exercises. To have a profound basis for the development of an adequate and versatile evaluation methodology, one of the central pillars of INEGMA E² is on one hand to know the requirements of experienced exercise evaluators as well as existing procedures and tools for evaluation on the other. The user requirements to be identified and evaluated shall focus both on exercise evaluation processes as well as tools dedicated to support such processes. To accomplish the objectives of the project indicators to be reached are to get in touch with at least 45 experts providing user requirements as well as to identify and describe minimum 5 technical support tools.

For the identification of end-user requirements, crisis management practitioners having experience in the evaluation of different of types of exercises such as simulation exercises, table-top exercises or field exercises need to be involved. Qualified end-users need to be identified and invited. Such experts can belong to the initial networks of the project partners or can be qualified members of the project partners. Multiple approaches are possible to identify the end user requirements such as workshops, e.g., held in mixed format, as well as the use of specifically designed questionnaires. It is necessary to document the requirements in a standardized and comprehensive way, therefore the knowledge management solution Gaps Explorer is applied for this purpose. The multitude of end user requirements has to be compared to existing evaluation tools and procedures. Such tools may have different levels of technical maturity and may be provided by different types of stakeholders, such as academia, SMEs or industry. A comprehensive overview on existing solutions will be provided in the Portfolio of Solutions, another knowledge management solution that can be used in combination of the above-mentioned Gaps Explorer.

One of the central elements of the analysis of the identified end user requirements as well as the solutions for exercise evaluation is to identify the potential of the solutions to fulfil partly or completely the identified end-user requirements. Gaps Explorer and the Portfolio of Solutions offer the possibility of such a matching functionality based on a so-called taxonomy of crisis management functions. Both knowledge management solutions as well as the taxonomy were developed in the frame of European project DRIVER+.

First analyses have shown that the available taxonomy does not include the necessary elements for exercise evaluation. It is therefore necessary to develop a sub-group of taxonomy elements specifically designed for this purpose. Similar to the collection of end user requirements and exercise evaluation tools the evolution of the taxonomy is dynamic and can be extended at any time. At this stage it is worthy to mention that removal of elements of the taxonomy may jeopardize existing relations between requirements and solutions and shall be avoided.

The process of identification of evaluators and support tools is an on-going process that will continue until the end of the project, therefore the information provided in this Deliverable can be seen interim status of an ongoing process. All identified and specified end user requirements are continuously updated and shown on the Gaps Explorer, all tools and processes for exercise evaluation on the Portfolio of Solutions.

2 Requirement Collection Process

End-user requirements for exercise evaluation specify what the user (evaluator) expects from the solution applied to evaluate an exercise. They aim to describe the needs of the end users in relation to their work in exercise evaluation. The following section explains how these requirements were collected while discussing the topic of exercise evaluation with subject matter experts in workshops.

Additionally, the exercise Profound held from September 1st-3rd in Dunaújváros, Hungary, was visited by the team of INEGMA E² work package 3 to speak to exercise evaluators there. Based on observations and notes by the project team, discussions were held with evaluation staff and end user requirements were formulated.

2.1 The End User Workshops – The End User Selection Process

To validate the taxonomy, subject matter experts were invited to two workshops. Those events were designed to:

- Present the taxonomy to the experts and provide a possibility for them to give feedback
- Consider potential end user requirements, suggested by the invited experts, and discuss them in detail

The first workshop was conducted on July 13th and five subject matter experts were involved. The second one took place on September 16th, with 11 experts.

To reach relevant persons with the necessary expertise, multiple channels of communication were used. The individual professional networks of the consortia members were utilized for this purpose. Additionally, the search was extended by postings on the social media platforms.

By addressing especially professionals of diverse nationalities from the fields of emergency management, disaster management, exercise planning, exercise evaluation and similar relevant topics, a broad range of views was ensured. This helped to increase the value of the gathered information.

The participants were introduced to the INEGMA E² project, the developed taxonomy, and the Gaps Explorer tool. Afterwards they were asked to take part in a series of interactive sessions, in which Google Jamboards was used as a virtual collaborative space.

The first interactive session aimed to identify a pool of user requirements through brainstorming. From this pool, a selection of requirements was discussed in small groups of 2 to 3 experts to specify the selected requirements in more detail.

To achieve a broad selection of in-detail formulated user requirements, this selection was made by the workshop facilitators. This was done by considering certain criteria:

- How often the same or similar requirements were mentioned in the previous sessions: If user requirements were mentioned several times, this was noted as a sign of importance, but the requirement was only described in detail, once.
- Similarity of identified user requirements: If similar user requirements were identified by experts, a discussion was held on the possibility to merge those requirements into one
- User requirements that have previously been analysed in previous workshops were not discussed a second time.

By considering these criteria a broad spectrum of different relevant aspects was examined more closely, without only paying attention to the ones considered most important/pressing.

Figure 1 - Brainstorming for user requirements in the 2nd workshop
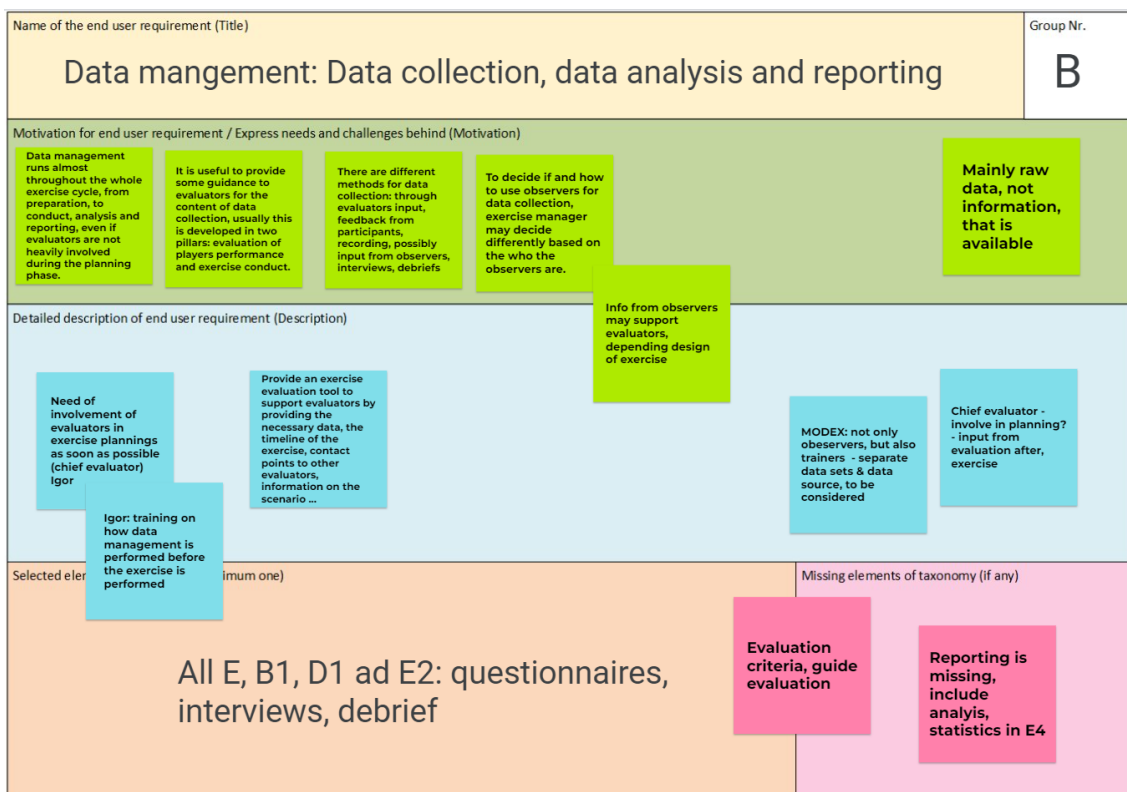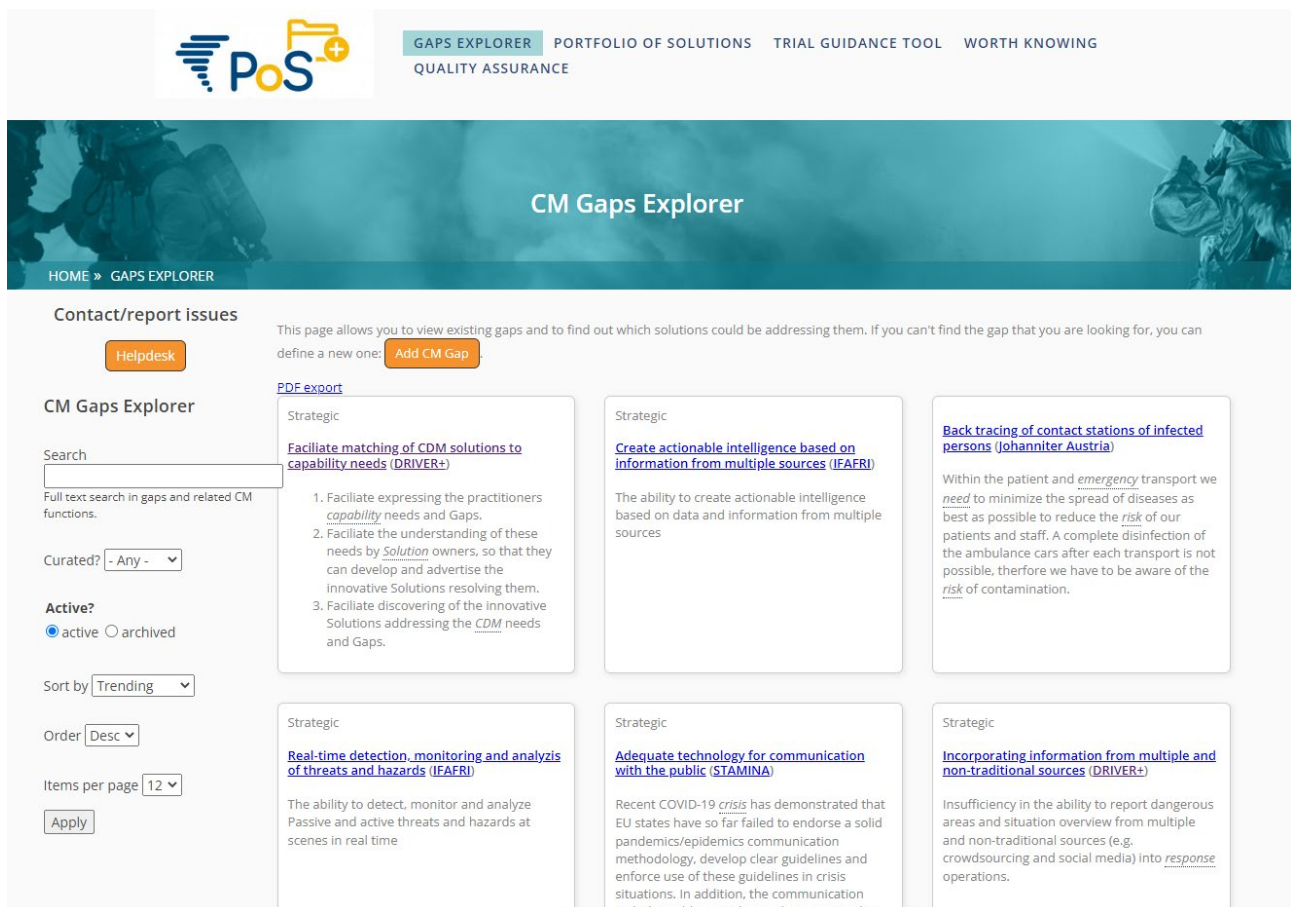
Figure 2 - Selected user requirements were described in detail

The agenda of the workshops can be found in Annex 7.1. All identified user requirements are listed in section 5.1.

2.2 Gaps Explorer

The Gaps Explorer is a software tool developed as part of the DRIVER+[1] project to document gaps existing in the crisis and disaster management domain. The tool is part of the DRIVER+ toolchain consisting of the Trial Guidance Tool, the Portfolio of Solutions (PoS, described in chapter 3.2) and the Gaps Explorer. During the development phase, a common database was used for all three tools, allowing collaboration between the tools and shared access to all available data. The data model of a gap as described in the Gaps Explorer is very similar to the data model for end user requirements applied in INEGMA E² and therefore it was decided to use the Gaps Explorer in this project and extend its functionality to document not only gaps from the crisis and disaster management domain, but also end-user requirements identified in INEGMA E². The aforementioned data model consists of several fields including: Title, Motivation, Endorsing Organization, Description, and associated taxonomy terms. Originally, a taxonomy of crisis management (CM) functions was part of the Gaps Explorer, but in INEGMA E² this taxonomy was extended to specifically include the domain exercise evaluation, as described in chapter 4.2. In addition to documenting and presenting end-user requirements (or gaps), one of the core functions of Gaps Explorer is to perform a semi-automatic comparison with available solutions. Simply put, this functionality is made possible by the aforementioned link to the Portfolio of Solutions, where available information on solutions designed for application in the Crisis and Disaster management domain is stored. The Gaps Explorer compares the information about the solutions and matches them with the end-user requirements (or gaps) stored in it. This function is based on the elements of the taxonomy. Since the same taxonomy is used to describe both solutions and end-user requirements (or gaps), the system automatically checks the overlap of the elements used and based on the results, identifies possible solutions that could be used to satisfy the requirements.

---

[1] https://www.driver-project.eu/

Figure 3: Gaps Explorer user interface

2.2.1   Documentation of Requirements

Since the Gaps Explorer is a web application, the process of documenting end-user requirements in it is quite simple. The tool's user interface provides assistance to the user for filling out the form to describe a requirement specified by him. Figure 3 shows the web application form presented to the user. The form consists of several fields, some of which are mandatory.

Figure 4: Form for adding end user requirements in Gaps Explorer

After all fields are filled in, the second, more important part of the description process follows. In this part, the elements of the taxonomy are mapped, and the Gaps Explorer aims to support the identification of relevant elements by providing a user-friendly search window (see Figure 5). The window combines a free-text search box, where the user can search for terms (or a combination thereof), with a filter to specify a functional group. Since the taxonomy used as a basis is the crisis management taxonomy, it is made up of many different aspects, and narrowing it down to a specific functional group makes it easier to search for specific items. Once identified, the user can simply check them with a checkbox and assign them to the defined end-user requirement.

Figure 5: Taxonomy elements selection window

After all fields are filled in and all elements of the taxonomy are added, the end-user requirements are saved and published in the Gaps Explorer. The user has of course the option to save the progress and not publish the information, but in the final step, if the description is satisfactory, the end-user requirements become visible to all users of the site and can be searched through the Gaps Explorer user interface. Figure 6 shows an example of the INEGMA E² end-user requirements identified during the workshop as they are presented in the tool.

Registering the descriptive information (metadata) illustrating the circumstances of the observed exercise events (e.g. time, place, etc.), for future evaluation (INEGMA-E²)

To collect as much as possible information (metadata) describing the circumstances of the *observation*. This approach is in accordance with commonly used the evidence-based methodology, helping to draw more credible conclusions. The excessive registered information may be omitted during analysis, but unregistered information cannot be easily retrieved.

Clear objectives for the exercise (INEGMA-E²)

Without clearly defined objectives it's impossible to measure if the *exercise* was successful or not. They are necessary to give value to an *exercise*.

TIME TABLE & LOCATION MAP FOR MEL / MIL (INEGMA-E²)

In order to assure that the evaluators are present for all relevant events / injects.

Tools to gather and analyze the gathered information (INEGMA-E²)

The evaluator has to gather a lot of information, later analyse it and produce (first impression) reports, which is a difficult task that could be made easier by using modern tools such as applications on a phone or a tablet.

Evaluation of Project Management During the Project Cycle of the Exercise (INEGMA-E²)

The *evaluation* of an EU-funded civil protection *exercise* is not limited to the *evaluation* of the *exercise* itself but regularly also to the entire project cycle. This includes the formative evaluation of the phases of exercise planning and exercise preparation in order to be able to identify fields of improvement already in an early phase of the project.

Making and registering the observations as soon as possible (in time and place) (INEGMA-E²)

Registering as many as possible facts in real time, possibly in field (FSX,TTX), improves the impartiality of collected observations due to avoiding opportunity for interpretation from the observers' sides. Moreover, it helps to distribute *observation* collection activities in both phases: during and after the *exercise*, providing logistical advantage. Lastly, the observations are available in the *evaluation* database earlier, giving the opportunity to be used for introducing the corrections after each stage of the *exercise*, so the information use also for exercise conducting purposes.

Attendance of participants at post event review (INEGMA-E²)

Participants tend to lose interest in the *exercise*, after having completed it. Depending on the expectations about the post-event outcomes (it is about findings, explaining to the people, is it about particular/specific processes/findings).

Opinion of the participants about the *exercise* is an important part of the picture. It should be a composition of partial perspectives.

Procedures that participants follow (INEGMA-E²)

An evaluator needs to know why participants do certain things and whether they follow their own procedures, which are different from those of the evaluator's country, or whether they have no procedures but improvise.

Achievement of the participants' goals during the exercise (INEGMA-E²)

As an evaluator one has to have a good understanding of what the participants want to achieve to be able to know, whether the scenarios of the *exercise* supported these learning opportunities or not.

Figure 6: Example of identified requirements in Gaps Explorer

3 The Solution Collection Process

A solution is a means that contributes to a crisis management function. A solution is either one or more processes or one or more tools with related procedures.

Source: DRIVER+, https://www.driver-project.eu/driver-project/terminology/

3.1 Initial Requirements and Criteria

One of the goals of the INEGMA E² project is to identify solutions that can be used/implemented to satisfy end-user requirements for exercise evaluation. To start this process, initial requirements were gathered and based on this, research was conducted to identify potential solutions that already exist in the market or were made available in the frame of research initiatives. The main method used was literature search. Information available online was researched and potentially interesting solutions were selected. One of the constraints that was defined was to focus on existing solutions that are at least level 6 of the technical readiness level - Technology demonstrated in relevant environment. This was decided mainly because the project does not foresee a real evaluation of the solutions, but only an investigation of the solutions already existing on the market. A potential way to evaluate the possibility of the solutions to satisfy the end-user requirements defined in INEGMA E² would be to apply the Trial Guidance Methodology2, but as mentioned above, this is not foreseen in the project. As in the definition of what a solution is, the focus was not only on software technical solutions, but also methods defined for exercise evaluation. Figure 7 shows the results of the research. As these are initial results based on the initially identified end-user requirements, the presented list of solutions is not final and complete, as it may happen that other types of solutions become relevant after additional requirements have been identified. All identified solutions will also be documented in the Portfolio of Solutions, as described in section 3.2.

---

[2] https://tgm.ercis.org/

Name	Organisation/Project	Description	Link	Type of exercise	Type
Observer Support Tool	ITTI/DRIVER+	The observer support tool records all observations from the observers digitally, so they can be analysed during and after the trial. To collect feedback, the OST also provides the ability for participants and trial staff to fill in questionnaires, directly after (a part/episode of) the trial is executed.	/	any	Software
Technical Testbed infrastructure	DRIVER+	Technical testbed combines tools and data to quickly setup an environment for testing new solutions in the crisis domain, either standalone or in collaborative trials and experiments.	https://tgm.ercis.org/methods-tools/tti-overview	Trial; other	Software
IN-PREP Scenario Builder	EXUS/H2020 IN-PREP	The goal of the IN-PREP Scenario Building Tool is to help managers practice strategic decion making in transboundary crises. The tool focuses in the the transboundary crisis preparedness. Users are allowed to make a plan, create a scenario with various critical incidents, define testing criteria, execute, asses their level and adapt.	https://www.youtube.com/watch?v=QHYWMRzJQFs&ab_channel=IN-PREPH2020	TTX; FSX; Demo	Software
Surveda	InSTEDD	Surveda allows for the collection of survey data from populations via mobile phone by text message, voice call, mobile web and more. Surveda can reach people across different mobile usage styles, languages, demographics and makes it possible to get country representative info at a scale of millions. Additionally, target your survey to collect data among specific age or gender groupings. Surveda allows for the same survey to go out in multiple different ways with all results being aggregated on one data dashboard.	https://instedd.org/technologies/surveda-mobile-surveys/	any	Software
PhysUSP	GEDAE-LaB Study	A web-based software to estimate the energy expenditure and energy system contributions during the exercise using the measurement of oxygen uptake and the blood lactate accumulation.	https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0145733	FSX; Trial; Demo	Software
Google Forms	Google	Google Forms is a survey administration software included as part of the free, web-based Google Docs Editors suite offered by Google. The service also includes Google Docs, Google Sheets, Google Slides, Google Drawings, Google Sites, and Google Keep. Google Forms is only available as a web application. The app allows users to create and edit surveys online while collaborating with other users in real-time. The collected information can be automatically entered into a spreadsheet.	https://docs.google.com/forms/u/0/	any	Software
SurveyMonkey	Momentive Inc.	SurveyMonkey is an online survey development cloud-based software as a service company providing an online survey tool for organizations. It offers data analysis, sample selection, bias elimination, and data representation tools.	https://www.surveymonkey.de/	any	Software
H-EPREP	Harvard School of Public Health	This toolkit is an online resource to help you develop exercise evaluation forms for your disaster exercise. Public health and healthcare agencies will find this database helpful in developing exercise evaluation forms for the optimal evaluation of their preparedness exercises.	http://phasevtechnologies.com/studies/lamps/index.php	TTX; FSX; Demo	Software
CDEM Capability Assessment Tool	National Emergency Management Agency	The tool consists of a set of key performance indicators and performance measures ('capability criteria') against which organisations can assess themselves or be externally assessed. Indicators span the 4Rs and are organised in a framework based on the National CDEM Strategy. There are six main sections - four based on the four goals of the National CDEM Strategy, and two 'enabler' sections	https://www.civildefence.govt.nz/assets/Uploads/CDEM-Capability-Assessment-Tool-2014-v7.0-August-2014.xls	TTX	Software
HANDBOOK Evaluation of Exercises	Swedish civil contingencies agency	This handbook is produced as a tool for the evaluation of the Barents Rescue exercise in Sweden in September 2011	https://www.msb.se/siteassets/dokument/publikationer/english-publications/evaluation-of-exercises.pdf	TTX;FSX;Demo	Handbook
KoBoToolbox	KoBo, Inc.	KoBoToolbox was founded in 2005 by Phuong Pham and Patrick Vinck. In 2013, with funding from USAID, UNOCHA and IRC partnered with KoBoToolbox to take the existing tool and transform it into a comprehensive platform for humanitarian data collection. The resulting platform was launched in 2014 as a free tool with unlimited data collection and storage for humanitarian actors	https://www.kobotoolbox.org/	any	Software
WHO simulation exercise manual	WHO	WHO simulation exercise manual: a practical guide and tool for planning, conducting and evaluating simulation exercises for outbreaks and public health emergency preparedness and response	https://apps.who.int/iris/handle/10665/254741	any	Handbook

Figure 7: List of identified solutions that could support exercise evaluation

3.2 The Portfolio of Solutions

The Portfolio of Solutions (PoS) is an online knowledge management system that stores information on crisis management (CM) gaps, solutions, and experiences in using these solutions and makes this information available to the end-users through a web interface. This assures that all information about the innovative solutions in the crisis and disaster management is easily available to anyone that has access to the Internet, which bridges the gap of having interested communities geographically dispersed across Europe. For solution owners, the Portfolio of Solution provides a platform for advertising their offers in an efficient way, for the practitioners an efficient way to discover the relevant solutions. Thanks to the use of an online platform, the information about solutions can be easily updated. Furthermore, the platform also facilitates the communication between interested parties by mean of the contact forms, thus allowing faster information flow without exposing the e-mail addresses of participants to potential spammers (Ignjatovic et al. 2019)[3].

Since PoS provides a way to systematically document information about available solutions by implementing standardized templates and taxonomies, it also allows for easy comparison of information as well as providing information to the Gaps Explorer (described in Chapter 2.2) about what solutions could be used to meet identified end-user needs. These functionalities are used within INEGMA E² to achieve the objectives of Task T3.2 – Matching of available solutions with end user requirements. Initial results are described in chapter 5.3.
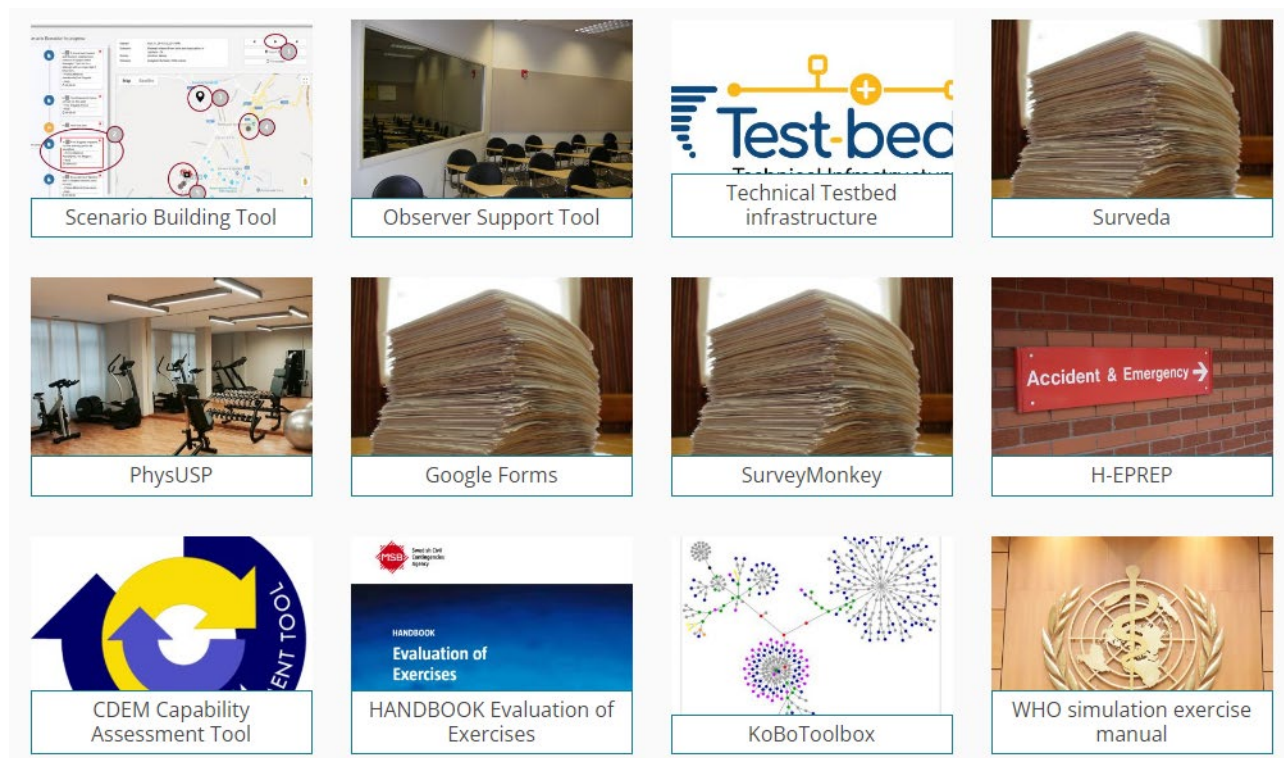
Figure 8: Identified solution in the Portfolio of Solutions

[3] Ignjatović, D., Havlik, D., Neubauer, G., Turptil, S., Gonzales, F., Regeczi, D.: The Portfolio of Solutions. In:Proceedings of the 27th Interdisciplinary Information Management Talks, Kutná Hora, Czech Republic, 4 – 6September 2019, pp199-206

4 The Mapping Process

Disasters create complex situations, which require various actors such as fire and rescue services, public authorities, critical infrastructure providers and many more to act. This broad range of agencies fulfill diverse tasks to overcome the effects and to re-establish stability.

Disaster exercises act as simulated emergencies, which help to test the current state of readiness and responder's capabilities to deal with such harmful events. Exercises create output, which manifests in actions or decisions, taken by participants. To learn from exercises, this output must be analyzed and interpreted. When designing the taxonomy, this form of output therefore was given a prominent role. All taxonomy categories (see section 4.1) were chosen due to their specific purpose in relation to exercise output and provide different perspectives on the subject.

By examining exercise output from different angles, an understanding of exercise evaluation requirements can be achieved. This can be utilized to develop future evaluation methods and tools, to improve organizational learning.

4.1 The INEGMA E² Taxonomy and its Purpose

The taxonomy is a classification system, based on aspects of an exercise that will influence its output in a positive or negative way, while facilitating, generating, measuring, understanding, and processing it. It presents a list of functionalities that are relevant when evaluating emergency exercises.

Together with Gaps Explorer and Portfolio of Solutions the taxonomy is an ongoing concept, that is designed to overtime improve the knowledge of emergency management professionals. It will be further developed throughout and after the INEGMA E² project. The current version of the taxonomy is shown in figure Figure 9 and described in section 4.2. A larger and better readable version can be found as annex in section 7.2.
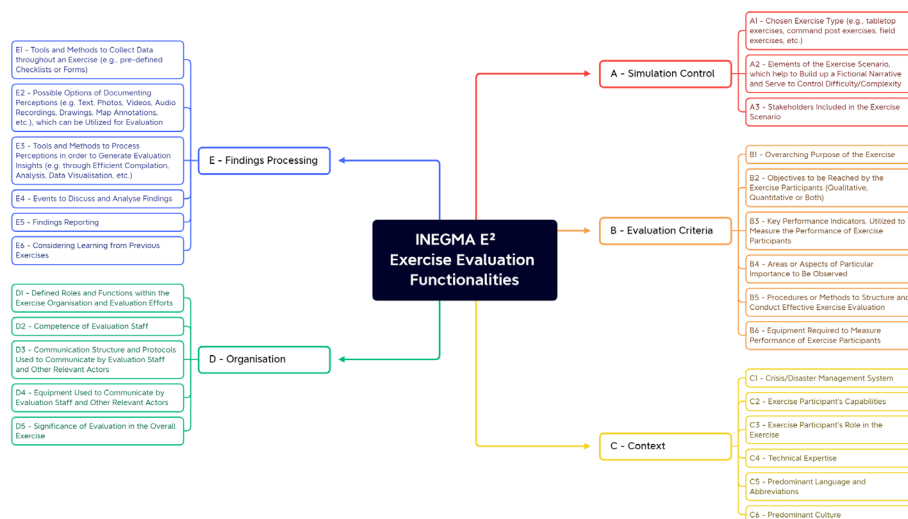
Figure 9: INEGMA E² Taxonomy

A hierarchical taxonomy style was chosen to be implemented in Gaps Explorer and the Portfolio of Solutions. It consists of five taxonomy categories (A, B, C, …), which contain several exercise evaluation functions (A1, A2, A3, …). Detailed user requirements can be assigned to one or more exercise evaluation functions. Minimum one function must be assigned, to be included in the list of user requirements.

With the help of the taxonomy users of Gaps Explorer can mark their user requirements (gaps) and solutions with relevant exercise evaluation functionalities. This enables the software to match gaps and solutions and present potential answers to the challenges faced by exercise planners.

4.2   Elements of the Taxonomy

This section explains in detail which categories and elements the taxonomy consists of and why they were selected in the taxonomy.

Elements depict functionalities, which are relevant in exercise evaluation from a holistic point of view. No value, priorization or (chronological) order was defined throughout the elements. Each element was given a unique code (e.g., A1, B4, E2, etc.) to help with identification. This code, again, does not depict chronological order or priorization.

4.2.1   Simulation Control (A)

Elements in the Simulation Control category concentrate on generating exercise output. Participants of an exercise have no opportunity to affect those elements, but the way how the simulation is presented to them does have an effect on their behavior and performance. Therefore, although exercise evaluation mainly concentrates on observing and interpreting the participants performance, the style and quality of the simulation must be taken into account when conducting the evaluation efforts.

User requirements concerning simulation and its controlling factors may be assigned to the functions listed below.

4.2.1.1   Chosen Exercise Type (e.g., tabletop exercises, command post exercises, field exercises, etc.) (A1)

The choice of the exercise format affects its design and the style of the challenge that the participants are confronted with. While for example tabletop exercises are primarily discussion-based, without deployment of actual forces in the field, field exercises use physical (more "realistic") simulation of hazards and emergency operations.

Requirements that are relevant for the choice of exercise types can be assigned to this function.

4.2.1.2   Elements of the Exercise Scenario, which Help to Build up a Fictional Narrative and Serve to

Control Difficulty/Complexity (A2)

Nature, quality, quantity or pace of injects have an effect on the exercise output, as they will control how challenging or extensive an exercise scenario will present itself to participants.

Relevant requirements for the design of the exercise scenario and its sub-elements can be assigned to this function.

4.2.1.3   Stakeholders Included in the Exercise Scenario (A3)

The selection of organisations and services, which respond within an exercise scenario, will provide different expertise, capabilities, or competencies to meet the given challenges. The level of realism and therefore credibility of the exercise output is defined by the participating actors.

Requirements regarding the selection of involved actors can be assigned to this function.

4.2.2 Evaluation Criteria (B)

Evaluation Criteria includes all elements of an exercise, which aim to measure the output created in an exercise. Those elements essentially define an objective expectation of how the participants should perform and consider minimum and desired quality standards.

Requirements concerning Evaluation Criteria may be assigned to the functions listed below.

4.2.2.1 Overarching Purpose of the Exercise (B1)

By deciding on the purpose, a strategic meaning is given to an exercise. This must be reflected in the exercise-design and the subsequent objectives and goals, which shall be achieved by the exercise participants. To ensure a valid oversight of how well those targets were met, the evaluation method must be fitted to take relevant aspects into account. For this reason, the exercise purpose indirectly affects the requirements for exercise evaluation in the very early stage of exercise planning.

Requirements regarding an exercise's purpose may be assigned to this function.

4.2.2.2 Objectives to be Reached by the Exercise Participants (Qualitative, Quantitative or Both) (B2)

Exercise planner's expectations on the performance of exercise participants are formulated in specific objectives, before an exercise is conducted. The quality of objectives is a key factor for the quality of the overall evaluation, as it is required to examine how well the participants performed and if, e.g., minimum expectations were met. Ideally quantifiable benchmarks are used, to meet requirements like an objective and fair evaluation, or easily comparable results. Objectives are a key element to measure exercise output.

Requirements regarding an exercise's objectives can be assigned to this function.

4.2.2.3 Key Performance Indicators, Utilized to Measure the Performance of Exercise Participants (B3)

Key Performance Indicators (KPI) may be used to measure the performance of participants, and the exercise output overall. They provide additional details on why objectives were met and can be described as quantifiable success factors (number of staff, response time, accuracy of decisions, etc.). KPI may vary from exercise to exercise and depend on various factors, such as e.g., the nature of the scenario, the participants tasks, design of the exercise objectives, etc.

Requirements regarding key performance indicators can be assigned to this function.

4.2.2.4 Areas or Aspects of Particular Importance to be Observed (B4)

Some areas or aspects may be identified before the exercise, which should be closely observed by evaluators. The choice of such aspects may influence the evaluation and can be relevant when measuring the output of an exercise.

Requirements regarding such aspects can be assigned to this function.

4.2.2.5 Procedures or Methods to Structure and Conduct Effective Exercise Evaluation (B5)

The evaluation approach might differ from exercise to exercise, dependent on various factors like e.g., scenario, participating organisations, involved level of command, etc. The chosen approach for exercise evaluation must therefore be considered, when concluding findings about the output.

Requirements regarding the evaluation approach may be assigned to this function.

4.2.2.6   Equipment Required to Measure Performance of Exercise Participants (B6)

Specific equipment might be needed to measure the exercise output. Equipment may depend on defined key performance indicators or other performance benchmarks and can include e.g., timers, positioning instruments or other sensors.

Requirements regarding such equipment may be linked to this function.

4.2.3   Context (C)

This category includes functions that provide context information about the organizational environment the exercise participants operate in. It explains how the situation would be approached in theory, without considering the actual performance of participants in the exercise.

Functions in this category help to understand the exercise output and can be utilized to explain why an exercise has run its course.

4.2.3.1   Crisis/Disaster Management System (C1)

Crisis and disaster management systems describe theoretical frameworks designed to respond to emergencies. Responsibilities, tasks, competencies, or legal conditions may vary from system to system and can differ between nations or even between individual organizations. This must be considered when evaluating exercise output.

Requirements regarding crisis/disaster management systems may be assigned to this function.

4.2.3.2   Exercise Participant's Capabilities (C2)

Participant's capabilities differ and depend on their training and experience, but also on team composition or available equipment. Knowledge about participant capabilities helps to understand exercise output and should be considered in the evaluation efforts.

Requirements relevant for participant capabilities, can be linked to this function.

4.2.3.3   Exercise Participant's Role in the Exercise (C3)

How exercise participants understand their role (incl. mandate, purpose, tasks, etc.) in an exercise, will determine the course of their actions and the course of an exercise overall. To understand the output of an exercise, this factor must be considered.

Requirements relevant for participant's roles in exercises, can be assigned to this function.

4.2.3.4   Technical Expertise (C4)

Standard operating procedures, textbook tactics, rules for the usage of equipment: The way on how to approach given tasks during exercises might be pre-defined within an organization or pre-suggested as best practice within the subject community the participants belong to. Also, the use of equipment may be determined by its producers. Expertise on these factors is required to understand exercise output, e.g., how a situation should have been approached correctly or why participants decided to resolve a task in a specific way.

Requirements regarding the technical expertise of participants may be assigned to this function.

4.2.3.5 Predominant Language and Abbreviations (C5)

Examining the way participants communicate (language, terminology, abbreviations, etc.) during an exercise, within an organisation but also with external actors, can be utilized to understand exercise output.

Requirements concerning the predominant language or abbreviations can be assigned to this function.

4.2.3.6 Predominant Culture (C6)

When examining exercise output, the culture of exercise participants must be considered to fully understand why situations were approached/resolved in the chosen way. This applies to cultures and cultural differences from a geo-social perspective (different cultures in different countries) as well as an organisational perspective (e.g., civil vs. military stakeholders).

4.2.4 Organisation (D)

The organisation category and its elements aim to summarise potential requirements to facilitate exercise output, by organising the general exercise event and its evaluation. In this category, actions and decisions of exercise participants are not relevant. Instead, it focusses on the event management and logistics, based on the assumption that a well-facilitated exercise leads to different output, than a less well-facilitated one would do.

User requirements concerning the facilitation of exercise output may be assigned to the functions listed below.

4.2.4.1 Defined Roles and Functions within the Exercise Organisation and Evaluation Efforts (D1)

The selection of roles and functions for exercise organisation and evaluation staff, as well as defined tasks and competencies, may influence the exercise output.

Requirements regarding roles and functions of organisation and evaluation staff may be assigned to this function.

4.2.4.2 Competence of Evaluation Staff (D2)

The level of competence, through training and experience, will be reflected in the evaluation results. The quality of facilitation of the exercise will be determined by how competent evaluation staff is. The required competence might differ between exercises, due to aspects like exercise type, type of participants or evaluation objectives.

Requirements regarding competence of evaluation staff may be assigned to this function.

4.2.4.3 Communication Structure and Protocols Used to Communicate by Evaluation Staff and Other

Relevant Actors (D3)

Conducting an exercise often requires constant communication between members of the exercise organisation team, as well as evaluation staff. How the communication and reporting lines are set up will have an effect on how fast and effective information is passed on, and therefore how smoothly the evaluation will run its course.

Requirements regarding communication structure/protocols may be assigned to this function.

4.2.4.4   Equipment Used to Communicate by Evaluation Staff and Other Relevant Actors (D4)

Conducting an exercise often requires constant communication between members of the exercise organisation team, as well as evaluation staff. The type, usability, accessibility of the communication equipment used will have an effect on how fast and effective information is exchanged, and therefore how smoothly the evaluation will run its course.

Requirements regarding communication equipment may be assigned to this function.

4.2.4.5   Significance of Evaluation in the Overall Exercise (D5)

How important the evaluation of the exercise is conceived by the organisers, affects the quality of the learnings. Possible factors for these effects are the level of inclusion of evaluation staff in the exercise preparation or the anticipation and facilitation of needs for successful evaluation.

Additionally, some exercises may contain elements/scenarios which aim to meet non-evaluation objectives (e.g., demonstrations for public relation purposes). In such cases those elements must be separated from those parts of an exercise, which shall be evaluated. This is to ensure validity of findings.

Requirements regarding the significance of evaluation may be assigned to this function.

4.2.5   Findings Processing (E)

When exercise output is created, it needs to be processed to identify evaluation insights and learnings. This taxonomy category concentrates on aspects, which aim to process exercise output to enable valuable evaluation.

4.2.5.1   Tools and Methods to Collect Data throughout an Exercise (e.g., pre-defined Checklists or Forms)

(E1)

To assist evaluation staff in conducting their work, certain tools and methods may be used. Such solutions (analogue or digital) help to gather data in-line with the intended evaluation topics and ensure that a structured processing can be conducted.

Requirements regarding tools and methods for data gathering purposes may be assigned to this function.

4.2.5.2   Possible Options of Documenting Perceptions (e.g. Text, Photos, Videos, Audio Recordings,

Drawings, Map Annotations, etc.), which can be Utilized for Evaluation (E2)

Observations during exercises may be documented in various ways. They can be e.g., written down, but also described graphically by utilizing drawing, photos, videos or other. Another option would be to record speech or other sounds. These options are differently prone to interpretation (distortion of truth through e.g., bias, vigility, etc.) and hold differing information value for processing the exercise output.

Requirements regarding possible options for perception documentation may be assigned to this function.

4.2.5.3   Tools and Methods to Process Perceptions in order to Generate Evaluation Insights (e.g. through

Efficient Compilation, Analysis, Data Visualisation, etc.) (E3)

Perceptions which have been documented throughout an exercise need to be processed to reveal findings and to boost organisational learning. This can be achieved by utilizing various data analysis methods and tools.

Requirements regarding tools and methods for perception processing may be assigned to this function.

D3.1 User requirements and state-of-the art matching report	Copyright © INEGMA E² Project Consortium	Page 23 of 24

4.2.5.4   Events to Discuss and Analyse Findings (E4)

Workshops, discussion panels, focus groups, or other suitable formats may be used to examine the exercise output and extract valuable learnings.

Requirements regarding such events may be assigned to this function.

4.2.5.5   Findings Reporting (E5)

Identified learnings shall be compiled in a report, to distribute knowledge and enhance learning. The quality of exercise evaluation reports is a factor for the sustainability of findings and the learning success.

Requirements regarding findings reporting may be assigned to this function.

4.2.5.6   Considering Learning from Previous Exercises (E6)

Findings (learning) shall be contrasted with the findings of previous exercises, to identify if improvement was achieved. If this is not the case, the evaluation approach might be inadequate and needs to be adapted.

Requirements regarding the reflection of learning from previous exercises may be assigned to this function.

4.3   Example of Assigning Taxonomy Elements to User Requirements

This section provides an example on how to choose relevant elements of the taxonomy for user requirements in the field of emergency exercise evaluation. The example user requirement used is:

 "Evaluation of Patient Decontamination in CBRN Events": When hazards posed by chemical, biological, radiological, or nuclear (CBRN) substances are simulated and casualties need to be decontaminated by exercise participants, the success of the decontamination must be validated. Due to invisible substances (e.g., gases) and the high threat potential of insufficient decontamination, this poses a challenge to evaluation. Altogether this formulates a need, and therefore user requirement, of exercise evaluation staff.

To enable accurate matching with suitable solutions, relevant taxonomy elements shall be assigned to this requirement. A possible selection of elements could be:

Nr.	Title	Explanation for Selecting this Element
A1	Chosen Exercise Type (e.g., tabletop exercises, command post exercises, field exercises, etc.)	Decontamination consists of manual actions, which only can be evaluated sufficiently in life events. Discussion-based exercise formats like Tabletop Exercises or Command Post Exercises may not provide sufficient opportunities to evaluate these actions. The right exercise format therefore is relevant.
B2	Objectives to be Reached by the Exercise Participants (Qualitative, Quantitative or Both)	Suitable solutions may include formulated objectives.
B3	Key Performance Indicators, Utilized to Measure the Performance of Exercise Participants	Suitable solutions may include defined Key Performance Indicators.
B6	Equipment Required to Measure Performance of	To examine the success of decontamination efforts specialized equipment may be required (e.g., analysis tools to measure

	Exercise Participants	rest-contamination or timers to control maximum decon time per casualty).
C2	Exercise Participant's Capabilities	Success of decontamination may be influenced by participant's capabilities to conduct the task.
C4	Technical Expertise	State-of-the-art methods need to be considered when evaluating decontamination efforts.
E1	Tools and Methods to Collect Data throughout an Exercise (e.g., pre-defined Checklists or Forms)	Suitable solutions may include checklists and forms for evaluation staff.

Table 1 - Example on how to assign exercise evaluation functions to end user requirements

Registered solutions in the Gaps Explorer tool (refer to section 2.3), which are assigned to similar taxonomy elements, will be matched with user requirements, and may provide answers on how to approach given challenges in exercise evaluation.

5 Overview and Analysis

This chapter provides an overview of the end-user requirements and solutions for exercise evaluation identified so far. In addition, this chapter describes the potential of existing solutions to meet end-user requirements and the implications of the identified requirements for the demonstrator system to be developed in INEGMA E².

5.1 Overview of End-User Requirements

As described in Chapter 2.1, several workshops are organized during the project to reach many exercise evaluation experts, and the identification of their exercise evaluation requirements is done in a few steps. First, the requirements are formulated in a sentence, then the sentence is elaborated in more detail and corresponding taxonomy terms are assigned, and finally they are documented in the Gaps Explorer. Since the second part requires the most expert knowledge, not all identified gaps are elaborated in detail in one workshop but are collected by the INEGMA-E² team and elaborated in detail in follow-up workshops. In this phase of the project, 41 such requirements have been identified, of which 31 have already been elaborated in detail, documented, and published in Gaps Explorer. The table below lists the identified end-user requirements and indicates their status, i.e. whether they have only been identified or whether they have been fully elaborated and published. Identified requirements were brought up during the brainstorming session in the workshops. The ones elaborated in detail were discussed in the breakout-sessions between experts. (see section 2.1) Since the goal of the project is to document as many requirements as possible by reaching out to many exercise evaluation experts, this list is not the final list and will be expanded to include any additional requirements identified as the project progresses. They will all be published in Gaps Explorer and made available to the public.

End-user requirement	Current status	Link in Gaps Explorer
Having valid data	Identified	/
Tools to gather and analyze the gathered information	Elaborated in detail; included in the Gaps Explorer	https://pos.driver-project.eu/en/gaps/2418
Attendance of participants at post event review	elaborated in detail; included in the Gaps Explorer	https://pos.driver-project.eu/en/gaps/2420
Evaluation team member participation during pre-meetings	Identified	/
Possibility of working offline; immediate capturing of findings	Identified	/
Socialisation possibilities between participants	Identified	/
Access to needed plans and documents in time prior to the exercise in order to have awareness of expected function or behavior of evaluated organisation	Identified	/
Adequate capabilities and expertise of	Elaborated in detail; included in the	https://pos.driver-

	International Network of Evaluators & Guideline for a Methodological Approach in Exercise Evaluation	Funded by the European Union

INEGMA E²

observers	Gaps Explorer	project.eu/en/gaps/2416
Understanding of procedures in order to understand if participants are following them or improvising	Elaborated in detail; included in the Gaps Explorer	https://pos.driver-project.eu/en/gaps/2422
Sufficient evaluator experience in order to understand the participants	Elaborated in detail; included in the Gaps Explorer	https://pos.driver-project.eu/en/gaps/2421
Sufficient number of evaluators during the exercise	Identified	/
Possibility of having handover between evaluator teams	Identified	/
Possibility of access to all communication channels	Elaborated in detail; included in the Gaps Explorer	https://pos.driver-project.eu/en/gaps/2429
Clear objectives for the exercise	Elaborated in detail; included in the Gaps Explorer	https://pos.driver-project.eu/en/gaps/2419
Meeting expectations of national training programmes	Identified	/
Having insights in change of participant's understanding of a topic during/due to the exercise	Identified	/
Making sure that the objectives are understood by all (participants, organisers, etc.)	Identified	/
Making sure that the participants have achieved own goals during the exercise	Elaborated in detail; included in the Gaps Explorer	https://pos.driver-project.eu/en/gaps/2423
Collection of feedback from exercise organization and control staff	Elaborated in detail; included in the Gaps Explorer	https://pos.driver-project.eu/en/gaps/2425
Evaluation of achievement of strategic goals	Elaborated in detail; included in the Gaps Explorer	https://pos.driver-project.eu/en/gaps/2432
Involvement of evaluators in exercise development	Elaborated in detail; included in the Gaps Explorer	https://pos.driver-project.eu/en/gaps/2426
Translator presence in case of language barriers	Elaborated in detail; included in the Gaps Explorer	https://pos.driver-project.eu/en/gaps/2427
Timetable & location map for Main Events List (MEL) / Main Incidents List (MIL)	Elaborated in detail; included in the Gaps Explorer	https://pos.driver-project.eu/en/gaps/2428
Registering the descriptive information (metadata) illustrating the circumstances of the observed exercise events (e.g. time, place, etc.),	Elaborated in detail; included in the Gaps Explorer	https://pos.driver-project.eu/en/gaps/2430

for future evaluation		
Collection of participant feedback	Elaborated in detail; included in the Gaps Explorer	https://pos.driver-project.eu/en/gaps/2424
Evaluation of Project Management During the Project Cycle of the Exercise	Elaborated in detail; included in the Gaps Explorer	https://pos.driver-project.eu/en/gaps/2431
Making and registering the observations as soon as possible (in time and place)	Elaborated in detail; included in the Gaps Explorer	https://pos.driver-project.eu/en/gaps/2433
Possibility of access to the entire information exchange	Elaborated in detail; included in the Gaps Explorer	https://pos.driver-project.eu/en/gaps/2417
Evaluation of safety and security	Elaborated in detail; included in the Gaps Explorer	https://pos.driver-project.eu/en/gaps/2448
Overcoming language barriers in exercise evaluation	Elaborated in detail; included in the Gaps Explorer	https://pos.driver-project.eu/en/gaps/2449
Anticipation of actions and decisions of participants	Elaborated in detail; included in the Gaps Explorer	https://pos.driver-project.eu/en/gaps/2453
Overview of an exercise for evaluators	Elaborated in detail; included in the Gaps Explorer	https://pos.driver-project.eu/en/gaps/2447
Information for exercise preparation	Elaborated in detail; included in the Gaps Explorer	https://pos.driver-project.eu/en/gaps/2450
Considering evaluators in logistic preparation	Elaborated in detail; included in the Gaps Explorer	https://pos.driver-project.eu/en/gaps/2451
Assistance in border crossing for international participants	Elaborated in detail; included in the Gaps Explorer	https://pos.driver-project.eu/en/gaps/2452
Evaluators Assessment	Elaborated in detail; included in the Gaps Explorer	https://pos.driver-project.eu/en/gaps/2454
Need of certification of evaluators	Elaborated in detail; included in the Gaps Explorer	https://pos.driver-project.eu/en/gaps/2455
Framework information - "framing the exercise"	Elaborated in detail; included in the Gaps Explorer	https://pos.driver-project.eu/en/gaps/2457
Data management: Data collection, data analysis and reporting	Elaborated in detail; included in the Gaps Explorer	https://pos.driver-project.eu/en/gaps/2458
SOP for the evaluator	Elaborated in detail; included in the Gaps Explorer	https://pos.driver-project.eu/en/gaps/2459
Discussing the evaluation before the exercise	Elaborated in detail; included in the Gaps Explorer	https://pos.driver-project.eu/en/gaps/2456

Table 2: Overview of identified end user requirements

5.2 Overview of Available Solutions

As described in chapter 3.1, an initial search was conducted for available solutions that could be used to support exercise evaluation. 12 such solutions were identified and documented in the PoS. The following table provides an overview of these solutions, indicating the terms from the exercise evaluation taxonomy (chapter 4.2) that they are linked to and the link to published solution descriptions.

Name	Taxonomy elements	Link in PoS
Observer Support Tool	- Sufficient technical expertise (e.g. about tactics, correct use of equipment, best practice, etc.) - Overarching purpose for the exercise - Tools and Methods to Collect Data throughout an Exercise (e.g., pre-defined Checklists or Forms) - Possible options of documenting perceptions (e.g. text, photos, videos, audio recordings, drawings, map annotations, etc.), which can be utilized for evaluation	https://pos.driver-project.eu/en/PoS/solutions/280
Technical Testbed infrastructure	- Elements of the exercise scenario, which help to build up a fictional narrative and serve to control difficulty/complexity - Overarching purpose for the exercise - Areas/Aspects of particular importance to be observed - Tools and Methods to Collect Data throughout an Exercise (e.g., pre-defined Checklists or Forms) - Possible options of documenting perceptions (e.g. text, photos, videos, audio recordings, drawings, map annotations, etc.), which can be utilized for evaluation	https://pos.driver-project.eu/en/PoS/solutions/281
IN-PREP Scenario Builder	- Elements of the exercise scenario, which help to build up a fictional narrative and serve to control difficulty/complexity - Sufficient understanding of the exercise participants capabilities - Defined Roles and Functions within the exercise organisation and evaluation efforts	https://pos.driver-project.eu/en/PoS/solutions/121
Surveda	- Overarching purpose for the exercise - Areas/Aspects of particular importance to be observed - Procedures or methods to structure and conduct effective exercise evaluation - Possible options of documenting perceptions (e.g. text, photos, videos, audio	https://pos.driver-project.eu/en/PoS/solutions/282

	recordings, drawings, map annotations, etc.), which can be utilized for evaluation • Tools and methods to process perceptions in order to generate evaluation insights (e.g. through efficient compilation, analysis, data visualization, etc.)	
PhysUSP	• Key Performance Indicators, utilized to measure the performance of exercise participants • Areas/Aspects of particular importance to be observed • Equipment required to measure performance of exercise participants	https://pos.driver-project.eu/en/PoS/solutions/283
Google Forms	• Sufficient understanding of the crisis/disaster management system evaluated • Areas/Aspects of particular importance to be observed • Procedures or methods to structure and conduct effective exercise evaluation • Possible options of documenting perceptions (e.g. text, photos, videos, audio recordings, drawings, map annotations, etc.), which can be utilized for evaluation • Tools and methods to process perceptions in order to generate evaluation insights (e.g. through efficient compilation, analysis, data visualization, etc.)	https://pos.driver-project.eu/en/PoS/solutions/284
SurveyMonkey	• Sufficient understanding of the crisis/disaster management system evaluated • Areas/Aspects of particular importance to be observed • Procedures or methods to structure and conduct effective exercise evaluation • Possible options of documenting perceptions (e.g. text, photos, videos, audio recordings, drawings, map annotations, etc.), which can be utilized for evaluation • Tools and methods to process perceptions in order to generate evaluation insights (e.g. through efficient compilation, analysis, data visualization, etc.)	https://pos.driver-project.eu/en/PoS/solutions/285
H-EPREP	• Sufficient technical expertise (e.g. about tactics, correct use of equipment, best practice, etc.)	https://pos.driver-project.eu/en/PoS/solutions/286

	• Areas/Aspects of particular importance to be observed • Equipment required to measure performance of exercise participants • Tools and Methods to Collect Data throughout an Exercise (e.g., pre-defined Checklists or Forms) • Tools and methods to process perceptions in order to generate evaluation insights (e.g. through efficient compilation, analysis, data visualization, etc.)	
CDEM Capability Assessment Tool	• Sufficient understanding of the crisis/disaster management system evaluated • Key Performance Indicators, utilized to measure the performance of exercise participants • Equipment required to measure performance of exercise participants • Possible options of documenting perceptions (e.g. text, photos, videos, audio recordings, drawings, map annotations, etc.), which can be utilized for evaluation • Tools and methods to process perceptions in order to generate evaluation insights (e.g. through efficient compilation, analysis, data visualization, etc.)	https://pos.driver-project.eu/en/PoS/solutions/287
HANDBOOK Evaluation of Exercises	• Sufficient understanding of the crisis/disaster management system evaluated • Sufficient understanding of the exercise participants capabilities • Procedures or methods to structure and conduct effective exercise evaluation • Possible options of documenting perceptions (e.g. text, photos, videos, audio recordings, drawings, map annotations, etc.), which can be utilized for evaluation • Tools and methods to process perceptions in order to generate evaluation insights (e.g. through efficient compilation, analysis, data visualization, etc.)	https://pos.driver-project.eu/en/PoS/solutions/288
KoBoToolbox	• Sufficient technical expertise (e.g. about tactics, correct use of equipment, best practice, etc.) • Sufficient understanding of the	https://pos.driver-project.eu/en/PoS/solutions/289

D3.1 User requirements and state-of-the art matching report	Copyright © INEGMA E² Project Consortium	Page 31 of 32

	crisis/disaster management system evaluated • Areas/Aspects of particular importance to be observed • Tools and methods to process perceptions in order to generate evaluation insights (e.g. through efficient compilation, analysis, data visualization, etc.)	
WHO simulation exercise manual	• Chosen Exercise Type (e.g., tabletop exercises, command post exercises, field exercises, etc.) • Sufficient understanding of the crisis/disaster management system evaluated • Procedures or methods to structure and conduct effective exercise evaluation • Tools and methods to process perceptions in order to generate evaluation insights (e.g. through efficient compilation, analysis, data visualization, etc.) • Sufficient understanding of the exercise participants capabilities	https://pos.driver-project.eu/en/PoS/solutions/290

Table 3: Overview of identified solutions

From this table it can be seen that some elements of the taxonomy were not assigned to any of the solutions and that some elements are used more frequently. Since the taxonomy was defined primarily to classify end-user requirements in terms of exercise evaluation, this result was to be expected, since no 1:1 relationship was expected from the outset.

5.3 Potential of Existing Solutions to Close Gaps

As mentioned earlier, the Gaps Explorer and PoS software tools provide a semi-automatic check of which of the solutions described in PoS can be used to meet the end-user requirements described in Gaps Explorer. The following table summarizes this information by indicating which solutions were automatically matched to which requirements and how high is the relevance score. The relevance score is calculated based on the overlap of taxonomy terms used in describing solutions and requirements and is a numerical value for that overlap. In the table there are three levels of relevance:

1. Low: 1-3 – solutions that show low potential to meet the end-user requirements

2. Medium: 4-5 – solutions that show potential to meet the end-user requirements generally

3. High: 6+ - solutions that show high potential to meet the end-user requirements

Since this is an automated approach, the system only provides indications that the solution may fulfil a specific end user requirement. The reliability of the matching depends on the quality of the solution/gap descriptions and the assigned exercise evaluation functions. A validation can currently only be done from the user side - either by manually checking whether the suggestions make sense or by performing actions aimed at evaluating the correctness of the suggestion (e.g., testing a solution in a test environment).

D3.1 User requirements and state-of-the art matching report	Copyright © INEGMA E² Project Consortium	Page 32 of 33

End-user requirement	Potential solution(s)	Relevance
Tools to gather and analyse the gathered information	SurveyMonkey; H-EPREP; Observer Support Tool; CDEM Capability Assessment Tool; Technical Testbed infrastructure; HANDBOOK Evaluation of Exercises; Surveda; Google Forms; WHO simulation exercise manual; KoBoToolbox	Highest: 2 Lowest: 2 Comment: all solutions show low relevance score, meaning that they address the requirement in a general way and there is no solution that is specifically well suited
Attendance of participants at post event review	Technical Testbed infrastructure; Surveda; Observer Support Tool;	Highest: 1 Lowest: 1 Comment: all solutions show low relevance score, meaning that they address the requirement in a general way and there is no solution that is specifically well suited
Adequate capabilities and expertise of observers	**H-EPREP**; SurveyMonkey; Observer Support Tool; CDEM Capability Assessment Tool; Technical Testbed infrastructure; HANDBOOK Evaluation of Exercises; Surveda; Google Forms; WHO simulation exercise manual; KoBoToolbox; HANDBOOK Evaluation of Exercises; PhysUSP; Scenario Building Tool	Highest: 5 Lowest: 3 Comment: all solutions show medium relevance score, meaning that they address the requirement in a general way, but show good potential
Understanding of procedures in order to understand if participants are following them or improvising	SurveyMonkey; H-EPREP; Observer Support Tool; CDEM Capability Assessment Tool; Technical Testbed infrastructure; HANDBOOK Evaluation of Exercises; WHO simulation exercise manual; KoBoToolbox; HANDBOOK Evaluation of Exercises; PhysUSP; Scenario Building Tool	Highest: 4 Lowest: 1 Comment: all solutions but one show low relevance score, meaning that they address the requirement in a general way and one solution shows good potential
Sufficient evaluator experience in order to understand the participants	SurveyMonkey; H-EPREP; Observer Support Tool; CDEM Capability Assessment Tool; KoBoToolbox; HANDBOOK Evaluation of Exercises; PhysUSP; Scenario Building Tool; Surveda;	Highest: 4 Lowest: 1 Comment: all solutions but one show low relevance score, meaning that they

		address the requirement in a general way and one solution shows good potential
Possibility of access to all communication channels	WHO simulation exercise manual	Highest: 1 Lowest: 1 Comment: Only one solution that shows low relevance score, meaning that this requirement is not adequately covered by existing solutions
Clear objectives for the exercise	SurveyMonkey; H-EPREP; Observer Support Tool; CDEM Capability Assessment Tool; Technical Testbed infrastructure; HANDBOOK Evaluation of Exercises; Surveda; Google Forms; WHO simulation exercise manual; KoBoToolbox; HANDBOOK Evaluation of Exercises; PhysUSP; Scenario Building Tool	Highest: 4 Lowest: 2 Comment: all solutions show medium to low relevance score, meaning that they address the requirement in a general way, but show good potential
Making sure that the participants have achieved own goals during the exercise	SurveyMonkey; H-EPREP; Observer Support Tool; CDEM Capability Assessment Tool; Technical Testbed infrastructure; HANDBOOK Evaluation of Exercises; WHO simulation exercise manual; KoBoToolbox; HANDBOOK Evaluation of Exercises; PhysUSP; Scenario Building Tool	Highest: 4 Lowest: 1 Comment: all solutions but one show low relevance score, meaning that they address the requirement in a general way and one solution shows good potential
Collection of feedback from exercise organization and control staff	SurveyMonkey; H-EPREP; Observer Support Tool; CDEM Capability Assessment Tool; Technical Testbed infrastructure; HANDBOOK Evaluation of Exercises; Surveda; Google Forms; WHO simulation exercise manual; KoBoToolbox; HANDBOOK Evaluation of Exercises; PhysUSP; Scenario Building Tool	Highest: 2 Lowest: 1 Comment: all solutions show low relevance score, meaning that they address the requirement in a general way and there is no solution that is specifically well suited
Evaluation of achievement of strategic goals	**Scenario Building Tool;** SurveyMonkey; H-EPREP; Observer Support Tool; CDEM Capability Assessment Tool; Technical Testbed infrastructure; HANDBOOK Evaluation	Highest: 6 Lowest: 2 Comment: all solutions show medium to low relevance score, and one

	of Exercises; Surveda; Google Forms; WHO simulation exercise manual; KoBoToolbox; HANDBOOK Evaluation of Exercises; PhysUSP;	a high relevance score, meaning that it has good potential
Involvement of evaluators in exercise development	SurveyMonkey; H-EPREP; Observer Support Tool; CDEM Capability Assessment Tool; Technical Testbed infrastructure; HANDBOOK Evaluation of Exercises; Surveda; Google Forms; WHO simulation exercise manual; KoBoToolbox; HANDBOOK Evaluation of Exercises; PhysUSP; Scenario Building Tool	Highest: 4 Lowest: 1 Comment: all solutions but one show low relevance score, meaning that they address the requirement in a general way and one solution shows good potential
Translator presence in case of language barriers	/	Comment: no solutions are suitable for this requirement
Timetable & location map for mel / mil	SurveyMonkey; H-EPREP; Observer Support Tool; CDEM Capability Assessment Tool; Technical Testbed infrastructure; HANDBOOK Evaluation of Exercises; Surveda; Google Forms; WHO simulation exercise manual; KoBoToolbox; HANDBOOK Evaluation of Exercises; PhysUSP; Scenario Building Tool	Highest: 2 Lowest: 1 Comment: all solutions show low relevance score, meaning that they address the requirement in a general way and there is no solution that is specifically well suited
Registering the descriptive information (metadata) illustrating the circumstances of the observed exercise events (e.g., time, place, etc.), for future evaluation	SurveyMonkey; H-EPREP; Observer Support Tool; CDEM Capability Assessment Tool; Technical Testbed infrastructure; HANDBOOK Evaluation of Exercises; Surveda; Google Forms; WHO simulation exercise manual; KoBoToolbox; HANDBOOK Evaluation of Exercises; PhysUSP; Scenario Building Tool	Highest: 4 Lowest: 1 Comment: all solutions but one show low relevance score, meaning that they address the requirement in a general way and one solution shows good potential
Collection of participant feedback	Scenario Building Tool; SurveyMonkey; H-EPREP; Observer Support Tool; CDEM Capability Assessment Tool; Technical Testbed infrastructure; HANDBOOK Evaluation of Exercises; Surveda; Google Forms; WHO simulation exercise manual; KoBoToolbox; HANDBOOK Evaluation of Exercises; PhysUSP;	Highest: 2 Lowest: 1 Comment: all solutions show low relevance score, meaning that they address the requirement in a general way and there is no solution that is specifically well suited
Evaluation of Project Management	H-EPREP; SurveyMonkey; Observer	Highest: 5

During the Project Cycle of the Exercise	Support Tool; CDEM Capability Assessment Tool; Technical Testbed infrastructure; HANDBOOK Evaluation of Exercises; Surveda; Google Forms; WHO simulation exercise manual; KoBoToolbox; HANDBOOK Evaluation of Exercises; PhysUSP; Scenario Building Tool; Google Forms; Technical Testbed infrastructure;	Lowest: 3 Comment: all solutions show medium to low relevance score, meaning that they address the requirement in a general way, but some show good potential
Making and registering the observations as soon as possible (in time and place)	Scenario Building Tool; SurveyMonkey; H-EPREP; Observer Support Tool; CDEM Capability Assessment Tool; Technical Testbed infrastructure; HANDBOOK Evaluation of Exercises; Surveda; Google Forms; WHO simulation exercise manual; KoBoToolbox; HANDBOOK Evaluation of Exercises; PhysUSP;	Highest: 4 Lowest: 2 Comment: all solutions show medium to low relevance score, meaning that they address the requirement in a general way, but show good potential
Possibility of access to the entire information exchange	H-EPREP; SurveyMonkey; Observer Support Tool; CDEM Capability Assessment Tool; HANDBOOK Evaluation of Exercises; Surveda; Google Forms; WHO simulation exercise manual; KoBoToolbox; HANDBOOK Evaluation of Exercises; PhysUSP; Scenario Building Tool; Google Forms; Technical Testbed infrastructure;	Highest: 3 Lowest: 1 Comment: all solutions show low relevance score, meaning that they address the requirement in a general way and there is no solution that is specifically well suited
Evaluation of safety and security	Google Forms; SurveyMonkey; Surveda; WHO simulation exercise manual; HANDBOOK Evaluation of Exercises;	Highest: 1 Lowest: 1 Comment: All solutions show very low relevance score, meaning that this requirement is not adequately covered by existing solutions
Overcoming language barriers in exercise evaluation	/	Comment: no solutions are suitable for this requirement
Anticipation of actions and decisions of participants	Google Forms; SurveyMonkey; Surveda; WHO simulation exercise manual; HANDBOOK Evaluation of Exercises;	Highest: 1 Lowest: 1 Comment: All solutions show very low relevance score, meaning that this requirement is not adequately covered by

D3.1 User requirements and state-of-the art matching report	Copyright © INEGMA E² Project Consortium	Page 36 of 37

		existing solutions
Overview of an exercise for evaluators	H-EPREP; SurveyMonkey; Observer Support Tool; CDEM Capability Assessment Tool; HANDBOOK Evaluation of Exercises; Surveda; Google Forms; WHO simulation exercise manual; KoBoToolbox; HANDBOOK Evaluation of Exercises; PhysUSP; Scenario Building Tool; Google Forms; Technical Testbed infrastructure;	Highest: 2 Lowest: 1 Comment: all solutions show low relevance score, meaning that they address the requirement in a general way and there is no solution that is specifically well suited
Information for exercise preparation	Google Forms; SurveyMonkey; Surveda; WHO simulation exercise manual; HANDBOOK Evaluation of Exercises; KoBoToolbox; CDEM Capability Assessment Tool;	Highest: 2 Lowest: 1 Comment: all solutions show low relevance score, meaning that they address the requirement in a general way and there is no solution that is specifically well suited
Considering evaluators in logistic preparation	Google Forms; SurveyMonkey; Surveda; WHO simulation exercise manual; HANDBOOK Evaluation of Exercises; CDEM Capability Assessment Tool; Scenario Building Tool;	Highest: 2 Lowest: 1 Comment: all solutions show low relevance score, meaning that they address the requirement in a general way and there is no solution that is specifically well suited
Assistance in border crossing for international participants	Google Forms; SurveyMonkey; Surveda; WHO simulation exercise manual; HANDBOOK Evaluation of Exercises; CDEM Capability Assessment Tool; Scenario Building Tool;	Highest: 2 Lowest: 1 Comment: all solutions show low relevance score, meaning that they address the requirement in a general way and there is no solution that is specifically well suited
Evaluators Assessment	H-EPREP; SurveyMonkey; Observer Support Tool; CDEM Capability Assessment Tool; HANDBOOK Evaluation of Exercises; Surveda; Google Forms; WHO simulation exercise manual; KoBoToolbox; HANDBOOK Evaluation of Exercises; PhysUSP; Scenario Building Tool;	Highest: 2 Lowest: 1 Comment: all solutions show low relevance score, meaning that they address the requirement in a general way and there is no solution that

	Google Forms; Technical Testbed infrastructure;	is specifically well suited
Need of certification of evaluators		
Framework information - "framing the exercise"	WHO simulation exercise manual	Highest: 1 Lowest: 1 Comment: Only one solution that shows low relevance score, meaning that this requirement is not adequately covered by existing solutions
Data management: Data collection, data analysis and reporting	H-EPREP; SurveyMonkey; Observer Support Tool; CDEM Capability Assessment Tool; HANDBOOK Evaluation of Exercises; Surveda; Google Forms; WHO simulation exercise manual; KoBoToolbox; HANDBOOK Evaluation of Exercises; PhysUSP; Scenario Building Tool; Google Forms; Technical Testbed infrastructure;	Highest: 2 Lowest: 1 Comment: all solutions show low relevance score, meaning that they address the requirement in a general way and there is no solution that is specifically well suited
SOP for the evaluator	H-EPREP; SurveyMonkey; Observer Support Tool; CDEM Capability Assessment Tool; HANDBOOK Evaluation of Exercises; Surveda; Google Forms; WHO simulation exercise manual; KoBoToolbox; HANDBOOK Evaluation of Exercises; PhysUSP; Scenario Building Tool; Google Forms; Technical Testbed infrastructure;	Highest: 2 Lowest: 1 Comment: all solutions show low relevance score, meaning that they address the requirement in a general way and there is no solution that is specifically well suited
Discussing the evaluation before the exercise	WHO simulation exercise manual	Highest: 1 Lowest: 1 Comment: Only one solution that shows low relevance score, meaning that this requirement is not adequately covered by existing solutions

Table 4: Overview of potential solutions for identified requirements

6   Summary and Outlook

To reach one of the two central targets of INEGMA E² namely, to build an adequate and versatile evaluation methodology for exercises it is imperative to know the requirements of experienced exercise evaluators. This is reflected by an indicator specifying to get in touch with at least 45 experts providing user requirements. To achieve this objective two parallel approaches are chosen. Firstly, online workshops are organised with invited experts with experience in evaluating in TTX, CPX, FSX, both on EU/international level as well as on a national level. Secondly, INEGMA E² partners are participating in exercises such as the full-scale field exercise Profound to get in touch with evaluators in order to interview them on requirements related to exercise evaluation. All so far identified requirements are described in a systematic way and are made available in the knowledge management tool Gaps Explorer. At the stage of finalisation of this deliverable 41 end user requirements were identified in the frame of two online workshops and one participation in an FSX. In the frame of these events 23 evaluators were approached in total. These requirements serve as support for the development of the evaluation methodology of INEGMA E². Because the experience of evaluators is widespread and dynamic on one hand and to be in line with the indicator of requested 45 experts on the other, the process of identification of end user requirements will continue until the end of the project and beyond. For that purpose, at least two additional online workshops will be organised and participation at other exercises is targeted for.

Looking at the content of the end user requirements a final analysis cannot be performed at this stage due to the ongoing, dynamic assessment process. However, it becomes evident that the majority of requirements is related to exercise planning and execution encompassing multiple aspects such as safety and security measures, involvement of evaluators or the need of adequate debriefing procedures. Another category that is often addressed encompasses information and data management aspects. An example of this category is the management of language barriers. The requested qualification of evaluators is also a relevant issue. Other categories are post exercise actions or support of participants and evaluators.

Another body of information relevant for optimised exercise evaluation methods are existing standard operating procedures (SOPs) and evaluation tools. So far 12 solutions were identified, encompassing both supportive software tools as well as SOPs such as handbooks. The so far identified solutions have different levels of technical maturity, some of them like the SurveyMonkey are not specifically designed for exercise evaluation but offer nevertheless features that are quite helpful for the envisaged purpose. All solutions are described in the knowledge management system Portfolio of Solutions, identification of additional solutions will also go on during the remaining lifetime of the project and beyond.

The analysis of the potential of solutions to fulfil partly or completely the identified end-user requirements is a central requirement within INEGMA E². The knowledge management systems Gaps Explorer and the Portfolio of Solutions offer the possibility of a matching functionality based on the taxonomy of crisis management functions. Both knowledge management solutions as well as the taxonomy were developed in the frame of European project DRIVER+. Because the available functions turned out not to be suitable for the very specific requirements of exercise evaluation a new taxonomy of exercise evaluation functions was developed by the project team. So far, this taxonomy consists of the five main categories Simulation Control, Findings Processing, Organisation, Evaluation Criteria and Context. Moreover, 26 elements of the taxonomy were specified. Like the end user requirements this taxonomy is dynamic and extended in case of need. This is done based on the outcomes of the online workshops in case it turns out that new end user requirements cannot be sufficiently described based on the existing taxonomy elements.

The taxonomy is the logic link between Gaps Explorer and Portfolio of Solutions (PoS) and allows a semi-automatic validation of which of the solutions described in the PoS can be used to meet the end-user requirements described in the Gaps Explorer. This is done by applying a relevance score that is calculated based on the overlap of taxonomy terms used for describing solutions and requirements and is a numerical value for the matching. Matching of 31 requirements with all solutions showed rather modest values of matching. Only 1 solution turned out to have a high score for one end user requirement, in 8 cases a medium ranked matching of solutions and end user requirements was found, in all other cases the matching was low or no matching at all was indicated. One must be aware that this matching is an automated approach and provides only an indicator if a solution may fulfill a specific end user requirement. The reliability of the matching depends on the quality of the solution/gap descriptions and the assigned exercise evaluation functions. Validation of these indicators might be done by trialing of the solutions aligned with the specific end user requirements or by applying other methodologies.

The outcomes of this deliverable are both applied to support the work in WP2 on the development of the evaluation methodology and consequently further activities in WP3 related to the development of a demonstrator for exercise evaluation. The results presented in this document represent both end user requirements as well as solutions known to the project team at the moment of publication of the Deliverable, but both bodies of knowledge will be further expanded by documentation of both end user requirements as well as solutions in the Gaps Explorer and the Porfolio of Solutions. In average, an end user specified so far about 1.7 end user requirements and the number of 41 identified requirements is a promising basis for the development of an optimised evaluation methodology. However, the experts addressed so far reflect mainly the evaluation expertise in international exercises, national exercises might have partially different requirements. The rather low matching score of end user requirements with existing solutions can be seen as good justification for development of optimised evaluation methodologies, bearing in mind that profound evaluation of available solutions and SOPs might lead to better insight on their suitability.

7 Annex

7.1 Agenda – INEGMA-E² End User Workshop

Concept note for INEGMA-E² End User Workshop

Objective: To improve common understanding of end-user requirements for exercise evaluation

Background: In the context of national and international civil protection exercises such as EU MODEX and other formats, structured, well-designed, and comprehensive evaluation plays a critical role in documenting best practices and mistakes that occur during these exercises. By recording lessons learned, evaluation is essential for continuous improvement of training efforts and thus for advancing the capacity of responders in the European Union and its neighbouring countries to deal with real-world disaster scenarios in a world challenged by an ever-increasing number of climate change-related hazards.

INEGMA-E² builds on the independent evaluation approach and aims at a new level of exercise evaluation that meets high standards in terms of documentation, replicability and goal orientation. A goal is the development of an adequate and versatile evaluation methodology that addresses the different types of existing exercises - from tabletop and discussion-based exercises to command posts and full-scale exercises. Each of these exercises has different needs and objectives and therefore requires different evaluation approaches.

The main target audience is experts with experience in participating in TTX, CPX, FSX, both on EU/international level as well as on a national level.

Concrete goals to be achieved during the workshop:

1. To familiarize participants with the INEGMA E² project's base taxonomy (and requirements) for exercise evaluation.
2. To validate and, if requested extend the taxonomy for describing end user requirements.
3. To introduce the Gaps Explorer & Portfolio of Solutions software, which automatically match user requirements with available solutions.
4. To identify and describe the end user requirements specified by the workshop participants in a standardized way making it possible to transfer them to the Gaps Explorer.
5. To have a group discussion on initial entries and experiences

Outputs

A report with the main conclusions of the workshop will be written and a concept for the user requirements gathering regarding the evaluation of the exercise will be elaborated. A plan for additional workshops will be developed.

PROGRAMME

Time	Item	Lead
10:00 – 10:15	Workshop Introduction, overview basis end user requirements	Georg Neubauer (AIT)
10:15 – 10:30	Introduction to the taxonomy for end user requirements	Bernhard Bürger (AIT)
10:30 – 11:00	Demonstration on how to describe an end user requirement	Dražen Ignjatović (AIT)
11:00 – 11:15	Coffee break	
11:15 – 12:15	**Workshop Part I** – Collaborative space. Identification of end user requirements based on own experiences	Bernhard Bürger (AIT)
12:15 – 13:15	Lunch break	
13:15 – 14:00	**Workshop Part II** –Working groups. Specifying end user requirements in detail – assigning taxonomy elements	Dražen Ignjatović (AIT)
14:00 – 14:30	Discussion and reflections	Georg Neubauer (AIT)
14:30 – 15:45	**Workshop Part III** (optional based on request) – Working groups. Specifying end user requirements in detail – second stage	Bernhard Bürger (AIT)
15:45 – 16:00	Final reflections and closing	Georg Neubauer (AIT)

7.2   Set of Exercise Evaluation Functionalities (Taxonomy)

INEGMA E²
Exercise Evaluation Functionalities

A – Simulation Control
- A1 – Chosen Exercise Type (e.g. tabletop exercises, command post exercises, field exercises, etc.)
- A2 – Elements of the Exercise Scenario, which help to Build up a Fictional Narrative and Serve to Control Difficulty/Complexity
- A3 – Stakeholders Included in the Exercise Scenario

B – Evaluation Criteria
- B1 – Overarching Purpose of the Exercise
- B2 – Objectives to be Reached by the Exercise Participants (Qualitative, Quantitative or Both)
- B3 – Key Performance Indicators, Utilized to Measure the Performance of Exercise Participants
- B4 – Areas or Aspects of Particular Importance to Be Observed
- B5 – Procedures or Methods to Structure and Conduct Effective Exercise Evaluation
- B6 – Equipment Required to Measure Performance of Exercise Participants

C – Context
- C1 – Crisis/Disaster Management System
- C2 – Exercise Participant's Capabilities
- C3 – Exercise Participant's Role in the Exercise
- C4 – Technical Expertise
- C5 – Predominant Language and Abbreviations
- C6 – Predominant Culture

E – Findings Processing
- E1 – Tools and Methods to Collect Data throughout an Exercise (e.g. pre-defined Checklists or Forms)
- E2 – Possible Options of Documenting Perceptions (e.g. Text, Photos, Videos, Audio Recordings, Drawings, Map Annotations, etc.), which can be Utilized for Evaluation
- E3 – Tools and Methods to Process Perceptions in order to Generate Evaluation Insights (e.g. through Efficient Compilation, Analysis, Data Visualisation, etc.)
- E4 – Events to Discuss and Analyse Findings
- E5 – Findings Reporting
- E6 – Considering Learning from Previous Exercises

D – Organisation
- D1 – Defined Roles and Functions within the Exercise Organisation and Evaluation Efforts
- D2 – Competence of Evaluation Staff
- D3 – Communication Structure and Protocols Used to Communicate by Evaluation Staff and Other Relevant Actors
- D4 – Equipment Used to Communicate by Evaluation Staff and Other Relevant Actors
- D5 – Significance of Evaluation in the Overall Exercise