



Driving Innovation in Crisis Management  
for European Resilience



# D922.41 – TRIAL GUIDANCE METHODOLOGY AND GUIDANCE TOOL SPECIFICATIONS (VERSION 2)

SP92 - TEST-BED

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## Revision Table

| Issue | Date       | Comment                                    | Author  |
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| V0.01 | 23/12/2018 | First version of the Handbook (Annex 3)    | Chiara Fonio, JRC, Adam Widera, Nicola Rupp WWU (main authors with contributions from other partners as well)                     |
| V0.02 | 25/01/2019 | Contribution to Section 2.2                | Dirk Stolk, TNO   |
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| V0.06 | 08/02/2019 | Completion of Section 2.2 and Annex 2      | Dirk Stolk and Lisette de Koning, TNO   |
| V0.07 | 19/02/2019 | Completion of Section 3                    | Drazen Ignjatovic, AIT  |
| V0.08 | 20/02/2019 | First draft of Sections 1, 4 and 5         | Chiara Fonio, JRC   |
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| V0.09 | 22/02/2019 | Review of Sections 2, 1 and 5              | Adam Widera, WWU  |
| V0.10 | 22/02/2019 | Contribution to Section 5                  | Andreas Seipelt, ARTTIC   |
| V0.11 | 23/02/2019 | Second draft                               | Chiara Fonio, JRC   |
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| V0.14 | 25/02/2019 | Third draft                                | Chiara Fonio, JRC   |
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## The DRIVER+ project

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

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

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

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

## Executive summary

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This document presents the second version of the Trial Guidance Methodology (TGM) and the Trial Guidance Tool specifications. The methodological framework has been revised after the first two Trials based on comments received on the evaluation of the TGM carried out in **SP94**. Additionally, lessons learned from supporting activities, internal discussions and input from the members of the Advisory Board, have been taken into account to develop a more user-friendly version of the TGM: the TGM Handbook.

The deliverable consists of three main parts:

1. The Introduction, along with sections 2 and 3, revolve around the journey that paved the way to the TGM Handbook and to the updated list of requirements for the Trial Guidance Tool (TGT). The reasons behind the delivery of the TGM Handbook at an earlier stage in the project than originally planned are provided, along with needs identified and improvements now captured in the Handbook.
2. Sections 4 and 5 deal with the future, namely with the sustainability of the TGM in the context of the pan-European Test-bed and with the way forward (reaching out the “safe boundaries” of the DRIVER+ project).
3. TGM version 2 (the TGM Handbook) the core part of this document, is provided in Annex 3.

Purposefully, the first two parts are relatively short to give priority to the kernel of **D922.41** which is the Handbook.

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## List of Acronyms

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| Acronym          | Definition   |
|------------------|--|
| <b>BPMN</b>      | Business Process Model and Notation  |
| <b>CM</b>        | Crisis Management  |
| <b>CMINE</b>     | Crisis Management Innovation Network Europe                                    |
| <b>CoE</b>       | Centre of Expertise  |
| <b>CoU</b>       | Community of Users   |
| <b>D+</b>        | DRIVER+  |
| <b>DoW</b>       | Description of Work  |
| <b>DR1 / DR2</b> | Dry Run 1 / Dry Run 2  |
| <b>EU</b>        | European Union   |
| <b>FEU</b>       | Federation of the European Union Fire Officer Associations                     |
| <b>FP7</b>       | 7 <sup>th</sup> Framework Programme for Research and Technological Development |
| <b>json</b>      | Java Script Object Notation  |
| <b>PoS</b>       | Portfolio of Solutions   |
| <b>SIA</b>       | Societal Impact Assessment   |
| <b>SMART</b>     | Specific, measurable, assignable, realistic, timely                            |
| <b>SP</b>        | Subproject   |
| <b>TAP</b>       | Trial Action Plan  |
| <b>TC</b>        | Trial Committee  |
| <b>TGM</b>       | Trial Guidance Methodology   |
| <b>TGT</b>       | Trial Guidance Tool  |
| <b>TIM</b>       | Trial Integration Meeting  |
| <b>TM</b>        | Training Module  |
| <b>TRL</b>       | Technology Readiness Level   |
| <b>URL</b>       | Uniform Resource Locator   |
| <b>WP</b>        | Work Package   |
| <b>xml</b>       | Extensible Markup Language   |



## 1. Introduction

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The Trial Guidance Methodology (TGM), whose foundations have been presented in **D922.21** (1), has been applied in two Trials and systematically evaluated. While the delivery of the first version happened to be right before the application of the methodological approach in Trial 1 (May 2018), the second version included in Annex 3 as a Handbook, should guide Trial 3 and Trial 4 as well offer opportunity for reflection while preparing the Final Demonstration.

The time between the first two Trials was intense and entailed an in-depth assessment of the lessons identified and learned. The main guiding question for the TGM developers has been whether the methodological approach was helpful to assess potential innovative solutions for CM development. While it turned out that the TGM is appropriate for this specific purpose, in the Trial Committees specific needs emerged and a significant amount of support was deemed necessary to evaluate the solutions in a systematic way.

The relevant stakeholders involved in Trials were not always familiar with unavoidable processes and steps that lead to Trials. Several internal meetings, informal discussions and working sessions with the Trial owners, shed light on a major need: having much more pragmatic guidelines to understand better who, when and how a task should be performed. While the TGM supporters responded timely and effectively to requests, it became clear that the initial version of the TGM (1) was not user-friendly and the delivery of a manual could not wait until October 2019, as originally planned in the Description of Work (DoW). The decision of providing a Handbook nine months before the actual schedule, stemmed from the knowledge gained in the journey that paved the ground to Trial 1 and Trial 2 as well as from critical internal (**WP922**) reflections.

Identifying one prominent aspect in this process is challenging as it was more a combination of different elements that led to the decision of designing a Handbook early enough to be used in Trials 3 and 4. However, two considerations played a major role. First and foremost, what was missing in the first version of the methodology was a comprehensive reference to the pan-European Test-bed as a whole. The rationale behind the TGM was explained along with the design, but the interrelation with the tools (intended in the broad sense of the term), was not captured in the first version. The reason is that the complexity of the relations and dependencies between DRIVER+ artefacts emerged mainly in the Trials. The necessity to offer the “full picture” through a less fragmented didactical approach was revealed both in the TGM team and when dealing with Trial owners. The second version of the methodology could not focus only on phases and steps; instead it should convey a vision of the conditions and the context in which a Trial can be carried out. The Test-bed, in all its complexity, demanded more attention. While acknowledging that other deliverables are available to dig deep into, for instance, technical features, the TGM is the glue that keeps the pieces of the puzzle together. Hence, it was recognised as important to outline not only, for instance, the six-step approach in the preparation phase, but also to indicate which tools can or should come into play in each step.

Second, having described the foundations of the methodology, the “how to put it into practice” needed to be re-thought. To put something in practice, clear-cut information and answers are needed. With this in mind, it was decided to keep the explanations at a rather general level but to provide straightforward directions on who, what, how and when (also in terms of amount of time needed to carry out a task). Additionally, methods, tools, inputs and outputs should have been visibly indicated. To achieve this goal, a new layout was necessary as well as new ways of presenting content.

The results are captured in Annex 3 that is the core of this deliverable. The Handbook represents a leap forward, if compared to the first version of the methodology. Not only because it is written in a less scientific language and it is easier to understand, but because it aims at illustrating a more holistic vision of the pan-European Test-bed and yet makes explicit the substance of the glue that keeps everything

together. It relies on hands-on experiences in DRIVER+ Trials and does not present fictive examples, to ensure realism.

It is worth considering that the iteration included here is only the third of a series<sup>1</sup>. As explained in section 5, seven iterations will be delivered until the final version (in month M66/October 2019). Improvements are needed to refine how the concepts are presented as well as to come up with a Handbook which “talks” to a broader (not necessarily DRIVER+) audience. The way to go is still long and, at this stage in the project, it is decisive to implement quickly either recommendations coming from the evaluation of the TGM in Trials or suggestions from practitioners, external experts and projects, and other initiatives that might provide valuable feedback. This is the reason why small iteration cycles were preferred over one single delivery almost at the end of the project.

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<sup>1</sup> The first one was delivered internally in December 2018.

## 2. Lessons learned

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As specified in **D922.21** (1), updated versions of the TGM will be based on both the structural feedback from **SP94** and on internal (**SP92**, in particular **WP922** and **WP924**) lessons learned. The latter result from the participatory method used with the stakeholders involved in Trials and mainly refer to the wide range of support activities, which have been logged in a diary. In doing so, emerging needs were noted and reflections on further developments of the TGM built upon the support diary, as described in section 2.1.

Feedback was also collected during meetings with the Trial Committees and from other sources such as deliverables related to Trial 1 (TAP, (2) and evaluation (3)), external reviews (from the members of the Advisory Board) and discussions that took place at several meetings (e.g. **WP922** meeting in Warsaw, September 2018).

The rich mutual-learning approach was key in collecting needs for improvement of the TGM. Based on the analysis of support diary as well as on lessons learned from the evaluation of the methodology, an initial version of the TGM Handbook was developed (annex 3)<sup>2</sup>. While the official DRIVER+ TGM Handbook is due in October 2019 (**D922.42**), this version offers the opportunity to already check the usability and helpfulness in the upcoming Trials.

As mentioned both in section 1 and 5, further improvements will be included and shared on a monthly basis. In the pages below, explanations on how lessons learned from supporting activities and from the evaluation of the TGM are outlined.

### 2.1 Lessons learned from the supporting activities

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Every new development needs people to adapt to it and to learn how to use it. This holds also true for the TGM. To ease this process, the DRIVER+ project has developed both a Training Module (task **T924.1 Apply the guidance tool in Trials**) and a service-oriented support to Trials. This methodological support is provided to every Trial Committee by an organisation involved in the TGM development.

There are two different sources of needs: one emerging from the Trial Committee (TC) itself asking for support, and one provided by the methodological support team observing the need for support. Both are knowledge-based, but the knowledge available differs as the Trial Committees (TCs) are very heterogeneous groups. The sources of their knowledge differ as well. When asking for support, Trial Committees are already familiar with one or more of these sources. For instance, the explanations provided in **D922.21** (1) or in the Training Module. If this turns out to be the case, they seek more information on specific aspects. However, support can also be pro-active, meaning that it comes from the support team after identifying a lack of awareness about e.g. the right implementation of methods.

This is the context in which mutual learning emerges, since support was requested and was also proactively offered. Both the TGM team and the Trial Committees gain new knowledge in this process and a systematic approach to document the support activities is crucial to capitalise on lessons learned. To ensure that all needs were captured, analysed and addressed, a support diary was used.

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<sup>2</sup> The version included in this deliverable is the third iteration of the Handbook. The first one was provided in December 2018.

The support diary is a simple Excel file that was filled in by the methodological support team every time support was requested or given. As shown in Table 2.1, several fields have been included in the file.

**Table 2.1 Support diary**

| Fields                          | Short explanation   |
|---------------------------------|---|
| Number.                         | Consecutive number.   |
| Date.                           | When the support was given.   |
| Trial #.                        | The number of the Trial.  |
| Support category.               | Phases or specific aspects of the TGM, for instance “evaluation KPIs” or Trial in general.          |
| Main results.                   | What was done in the immediate aftermath to meet the expressed need(s).                             |
| Related document (if relevant). | A document with additional information (e.g. <b>D922.21</b> ; or “ <i>TAP Trial 2</i> ”).           |
| Actions.                        | What are next steps to address the expressed need(s).   |
| Supported by.                   | Shortcut of the TGM supports name (so it is clear, whom to ask, if another team member takes over). |
| Resources.                      | Number of persons and tools needed for the support action.  |
| Duration.                       | In days (if it was a dedicated meeting) or minutes.   |
| Initiated by.                   | As the need(s) can be seen from different perspective.  |

The support categories can be grouped along five main aspects:

1. Creating the base and innovation lines.
2. Data collection.
3. Utilization of the technical Test-bed infrastructure.
4. Evaluation and results analysis.
5. Solutions (selection, use in Trials, integration into the scenario).

This shows that the main needs concern mainly support for preparatory tasks (including the Trial Integration Meeting/TIM and Dry Runs) and the evaluation phase, including their inter-relations. As this part of the TGM is crucial, it is understandable that issues emerge here most. Additionally, sporadic support requests were received which can be explained by the heterogeneous backgrounds of the members of the Trial Committees.

The need for support with regards to the baseline and also the innovation line can be explained by the fact that this method was not explicitly described in the first version of the TGM. It was introduced at a later stage and turned out to be useful to reflect the socio-technical context the practitioner organisation is involved in. The baseline is a depiction of the CM process the practitioner’s gaps are embedded in. This was done using various modelling techniques and especially a light version of the Business Process Model and Notation (BPMN) specification. The aim of this depiction is manifold:

- a) It enhances the understanding of all involved actors, technical tools and information flows.
- b) It supports the localization of the gap (e.g. technical or process related gap).

- c) It is a mean of communication between the CM practitioners, the solution providers, and the technical staff. It enables a quick understanding of the existing socio-technical context and therefore supports the discussion on where and how a specific innovation could be implemented (innovation line).

Although the benefit of having a baseline and innovation line was quickly acknowledged, the use of BPMN was new to the Trial Committees and needed support. The level of detail and the process of creating the model itself was mostly the topic of the support.

**Uptake:** In the TGM Handbook as well as the training material the baseline and innovation line have dedicated sections now. Those mainly cover the goal of “depicting the CM process the gap is embedded in” as well as involved actors, roles and responsibilities, “communication lines” etc. Furthermore, different collaborative modelling techniques are presented.

During the support activities, it became obvious that the whole concept of data collection and evaluation plans is not part of the practitioners’ daily work and hence some insecurity emerged. A great variety of questions was raised: from the difference between quantitative and qualitative methods to “dos and don’ts” with regards to specific data collection plan and analysis. The support activities covered mainly the “how” – as in giving very practical advice on transferring the concepts of the TGM to the specific Trial context. Next to this, the need of a step for a proper quality check was identified.

**Uptake:** In the TGM Handbook as well as in the training material there are now dedicated examples focused on data collection and evaluation. The generic explanations are further illustrated with concrete examples from Trial 1 as well as by referencing the examples from the systematic literature review stored in the DRIVER+ knowledge base in the TGT.

Last but not least, the utilization of the technical Test-bed infrastructure from a methodological perspective turned out to be another main support category. It can be stated that this aspect is also highly related to other methodological aspects, like the scenario design or the data collection plan. Since technical limitations seem to be observed as hard restrictions compared to methodological decisions, the need of a flexible methodology has been identified in the past. In correspondence to this, the TCs received further explanations regarding the need of a tailored use of the technical Test-bed infrastructure. By doing so, the TCs were empowered to explicit their adjustment of the technical Test-bed infrastructure.

**Uptake:** A user-friendly description of the technical Test-bed artefacts is now provided in the Handbook. The tools available within the DRIVER+ Test-bed are described with a specific emphasis on the implications on the scenario (simulation etc.) and the data collection (After Action Review and Observer Support Tool). Furthermore, an introduction to the technical Test-bed infrastructure was added to the Training Modules. Besides, a stronger dialogue between technical development and TGM team has been taken up in order to tailor the tools to the needs.

## 2.2 Lessons learned from the evaluation of the TGM

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In addition to the lessons that are described in the previous section, feedback has also been collected with respect to **D922.21** (1).<sup>3</sup> For this purpose the following sources have been used:

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<sup>3</sup> It should be noted that the comments that were provided by the various sources reflect comments on the draft version of (1). The final version of (1) has been published in December 2018.

- Comments and recommendations from Trial 1 as described in (3) (**Report on Trial evaluation – Trial 1**) and in an internal document “Evaluation of the TGM for **D941.31**” and comments that are provided during an evaluation meeting of the consortium (Warsaw, September 2018).
- Comments and recommendations from Trial 2 that are gathered from discussions right after the Trial (Valabre, October 2018) and from an initial draft version of (4) (**Report on Trial evaluation – Trial 2**).
- External comments from the review by the European Commission and from a meeting with the Advisory Board (both in 2018).
- Other reflections and discussions during meetings of the consortium, such as the training session during the Updated Workshop “0” in preparation of Trials 3 and 4 (The Hague, November 2018), a consortium meeting on the TGM (Ispra, January 2019), and a review of the draft TGM Handbook by one of the core members who organise Trial 4 (early February 2019).

Of course, comments of these sources overlap. Therefore, they have been grouped and analysed, which resulted into a number of thematic clusters of main improvement needs summarised below. All comments on the TGM version 1 that have been used are listed in Annex 2.

### 1. More practical description of the TGM

Many comments concern the complexity of the TGM as presented in **D922.21** (1). From an end-user perspective, this deliverable was too scientific and the way in which the document has been structured was too complex. Therefore, it was difficult for end-users and other stakeholders, who were involved in organising Trials 1 and 2, to grasp the key messages of the methodology and to decipher what practically had to be done. In addition, definitions of some terms were lacking, while some other terms were not used in a consistent way. Furthermore, a clear need for more practical examples and graphs has been expressed.

When designing and writing the TGM Handbook emphasis has been put on completeness, consistency and user-friendliness (“end-user oriented”). To describe the TGM in a practical way scientific language has been avoided, while texts have been shortened and graphs and examples have been added. In addition, lay-out has been improved and harmonised for each type of topic; e.g. a similar lay-out for each step has been applied. While the nature of the methodology did not change (to put it simply, methodology is not less “complex”), the presentation of the overall methodological approach has been revised. In doing so, a more practical and easy to understand guide is provided.

The TGM Handbook is a kind of user-manual or user-guide and is divided into four sections:

- Introduction of the method (bird’s view of the TGM), roles and tools, and a reader’s guide.
- Explication of all roles and functionalities.
- Description of the various phases and steps to organise a Trial with examples drawn from Trial 1. Description of the SIA.
- Description of the various DRIVER+ Trial supporting tools and methods.

Not only is the description of the TGM more practical (e.g. checklist per step are provided), but also who, when and how a task should be performed is clearly outlined. Moreover, a real-case example is now included.

### 2. Further elaboration of TGM components and steps

In TGM version 1 not all steps of the methodology had been elaborated to the same extent. In particular, the steps related to the execution and evaluation phase were described to a limited extent and therefore were considered as being too generic. While the nature of the Handbook remains generic (if in-depth explanations are provided, key messages will get lost), the evaluation and the execution phase are described in more detail.

In addition, the importance of the pre-preparation phase has been emphasized (step 0) with the purpose to determine the rationale and the context of the Trial. For instance, the gaps to be considered but also issues like the physical, ethical or legal boundaries of conducting a Trial. In the Handbook all phases and steps are explicated in a similar way and to the same extent. In addition, all Test-bed tools and methods are described, including their hyperlinks. Each of them is provided with indicators showing the corresponding steps in which they can or should be applied.

### **3. Adjustment of the TGM**

During Trials 1 and 2 some imperfections of TGM version 1 came to light. It became clear that the Trial scenario should be defined before defining how solutions will be used in the Trial. Earlier cooperation among each component of the Trial (technical, methodological, information content, observation) was strongly required. Furthermore, the TGM needs more focus on how to formulate appropriate questions to collect high quality answers. Finally, as the evaluation is crucial for a Trial, the data collection plan needed to be emphasized. The risk of collecting improper or insufficient data should be minimized, e.g. by testing the data collection plan in practice during Dry Run 2 with practical participation of practitioners and observers to ensure that they know and understand the data collection and evaluation process as well as the tools (e.g. questionnaires) which have to be used.

The TGM has already been adjusted with respect to these comments by addressing them in the concerned steps. An important aspect in this is the addition of the Trial Integration Meeting (TIM) in which various stakeholders align their cooperation and exchange information about their progress in organising the Trial. The TGM Handbook describes also at each step which output (finished products) is required from previous steps.

### **4. Better explication of the role of the Test-bed infrastructure and the various tools**

It became clear, both during Trials 1 and 2 and at the TGM training session of Trials 3 and 4, that the specific role of the technical Test-bed should be described more precisely. Also, there was a need for more explanation about the various technical Test-bed components such as the Observer Support Tool, and how they could or should be applied.

In the Handbook, the principles (potential effectiveness) of a Trial and the DRIVER+ Test-bed have been explicated in an end-user oriented way. In addition, all Test-bed tools are described in the section that is dedicated to tools and methods. Furthermore, in each step it is indicated which tools can (as minimum requirement) or might (as add-on support) be applied to carry out step-related activities. Whether these descriptions are satisfying should be verified during Trials 3 and 4.

### **5. Elaborate the role of solution providers**

Trials 1 and 2 showed that the role of solution providers needs more attention in the TGM description. In Trial 1 it turned out that an approach in which solution providers work together with practitioners in preparation of the Trial, can be useful and enables integration of valuable feedback. However, one should be aware of potential conflicts of interest that may arise, given that solutions are assessed in Trials. Also in Trial 2 it was concluded that the practical dimension of activities, examples of real use, and use in specific activities of the crisis management processes, etc. requires collaboration with solution providers from early stages of the Trial preparation.

In the TGM a participatory management model that combines the three main groups of stakeholders has been further elaborated: practitioners/end-users (demand), solution providers (supply) and methodological support. At each step in the TGM Handbook it is indicated who of these stakeholder groups should participate.

## **6. Harmonisation of the TGM with the TGT and Training Module**

There are different products that support the user with applying the TGM. These are the TGM Handbook, the Trial Guidance Tool and the Training Module. Feedback received is that these three products should be harmonised concerning the terminology that is used and the steps that are described. Also, the topics should be linked in such a way that the user can easily find these topics in the different products, for example with a clear description or a URL link. Another suggestion made was that the TGM can refer to different parts of the training and provides suggestions what part of the Training Module can be followed.

The TGT has been aligned with the TGM, as show in section 3. While, in the course of the project, no additional TGM training sessions will be provided, the training on the TGT will continue.

## **7. Organisational aspects and collaboration**

Conducting a Trial needs involvement of participants of different organisations. The Trial-team is composed of participants of different backgrounds and expertise. Each participant has therefore different goals and different expectations. Collaboration is therefore challenging and miscommunication is at risk because of this. It is important to pay attention to the collaboration within the team. This is also reflected by the feedback of the TCs. Comments they provided were that the TGM should also support collaboration, communication and information exchange, for example by providing tips. Practical guidelines or recommendations with respect to organising Trials are now included. Preparing and conducting a Trial takes a lot of time. In the Handbook, the estimated time needed to perform a task is provided.

## **8. Ethics and legal issues**

Trials should of course meet ethical and legal conditions. In TGM version 1, a section on this topic has paid attention to these aspects. However, a more practical elaboration that can be used while Trial steps are taken was needed. In the current TGM Handbook a two-pager is dedicated to this topic, while at the various steps reminders are added to draw attention on ethical and legal aspects of interest.



### 3. Trial Guidance Tool: updated list of requirements

In **D922.21** (1) an initial list of functional requirements for the TGT was provided. As indicated, the requirements should also be revised based on structural feedback from **SP94**. However, given that the tool was not ready before Trial 1 and Trial 2, most of the efforts were focused on alignment between the TGM and the TGT, and implementing feedback from representatives of the Trial Committees 3 and 4 during a dedicated workshop in Vienna (29-30 January 2019). In doing so, design changes as well as new features have been thoroughly discussed and implemented in the TGT using an electronic ticketing system.

Decisions that led to this updated list of requirements for the TGT were mainly taken during the following meetings:

- Trial Guidance Tool strategy meeting that took place in Ispra, Italy 30-31/10/2018.
- Trial Guidance Tool strategy meeting, that took place in Vienna, Austria 21/11/2018 and a Tool telco, that followed immediately after strategy meeting.
- Trial Guidance Tool telco on 10/01/2019.
- Trial Guidance Tool workshop, that took place in Vienna, Austria 29-30/01/2019.

The interaction between the designers, developers and future users (representatives of the Trial Committees) led to additional insights in the Trial Guidance Methodology and the Tool. These new insights were processed together with the previously identified change requests into changed and additional functional requirements for the TGT. The current status of the TGT requirements is shown in Table 3.1.

The table is divided into nine sections and requirements are numbered in each section, to give a better insight to the reader. The *requirement status* column states if the requirement has been updated, if it was newly added or if it was found to be obsolete with respect to TGT requirements described in **D922.21** (1).

**Table 3.1. Current status of the TGT requirements**

| No.                            | Requirement  | Is implemented | Requirement status |
|--------------------------------|--|----------------|--------------------|
| <b>1. General Requirements</b> |  |                |                    |
| 1                              | The TGT is used by Trial Committees in general and is not restricted to the DRIVER+ project.   | ✓              | updated            |
| 1a                             | The TGT has a procedure for assigning accounts.<br>Only legitimate users are allowed to use the TGT, so the procedure should assure legitimacy.  | ✓              | new                |
| 2                              | The TGT is web-based.  | ✓              |                    |
| 3                              | The TGT mainly supports the preparation phase of the Trials.   | ✓              |                    |
| 4                              | The TGT provides help functionality (explanations, checklists, references).<br><i>The starting point is the list of tips &amp; tricks described in section 5 of (1) under the headings "Actions and Required participation".</i> | ✓              | updated            |
| 4a                             | The TGT provides checklists for each step and has validation criteria to ensure correctness.   | ✓              | new                |
| 4b                             | The TGT provides links to the TGM Handbook   | ✓              | new                |
| 5                              | The TGT contains a repository of examples.<br><i>Input from the DRIVER+ Trials will provide additional examples.</i>   | ✓              | updated            |

| No.                                 | Requirement   | Is implemented | Requirement status |
|-------------------------------------|---|----------------|--------------------|
| 5a                                  | The TGT implements search and filter function for examples.   | X              | new                |
| 6                                   | The TGT validates the Trial definition.<br><i>The validation comprises simple checks at first (i.e. all fields filled in; each gap/objective addressed). Experiences in using the Trial will provide additional checks.</i> | ✓              | updated            |
| 7                                   | The TGT supports different types of users.  | ✓              |                    |
| 8                                   | The TGT implements a three-layer quality assurance.   | ✓              | new                |
| 9                                   | The TGT provides e-mail notifications for Trial members to inform them of changes.  | ✓              | new                |
| 10                                  | The TGT provides support in describing other types of Trial-like experiments.<br>The TGT extends types of references that solutions can advertise.  | X              | new                |
| 11                                  | The TGT allows Test-case descriptions.  | ✓              | new                |
| 12                                  | The TGT provides a live chat functionality.   | X              | new                |
| 13                                  | The TGT provides a link to contact the TGM experts.   | X              | new                |
| <b>2. Trial Management</b>          |   |                |                    |
| 1                                   | Access to the TGT for authorized users only.  | ✓              |                    |
| 2                                   | Authorized users can add or modify Trials in the TGT.   | ✓              |                    |
| 3                                   | Trials can be exported (xml/json format).   | ✓              |                    |
| <b>3. Trial Preparation</b>         |   |                |                    |
| 1                                   | The TGT supports the iterative six-step approach.   | ✓              | updated            |
| 1a                                  | The TGT implements a relation between six step components (in both directions).   | ✓              | new                |
| 2                                   | The output of the TGT may be directly imported into section 2 of the Trial Action Plan (TAP).   | ✓              |                    |
| 3                                   | The TGT extracts information from the Portfolio of Solutions (PoS).   | ✓              |                    |
| 4                                   | The validated DRIVER+ CM gaps are input to the TGT.   | ✓              | updated            |
| 4a                                  | The TGT provides a possibility to define new Trial gaps.  | ✓              | new                |
| 5                                   | For each Trial, at least one gap must be selected.  | ✓              |                    |
| 6                                   | Allow interaction between different users with the Trial Committee.<br><i>Users who are involved in preparation, execution or evaluation of the Trial, such as scientists or a scenario writer.</i>                         | ✓              |                    |
| <b>4. Defining Trial objectives</b> |   |                |                    |
| 1                                   | Trial objectives are linked to at least one CM gap and each CM gap is related to a CM function.   | ✓              |                    |
| 2                                   | The TGT provides a template to facilitate the formulation of the Trial objectives in a manner that is SMART (specific, measurable,  | ✓              |                    |

| No.  | Requirement   | Is implemented | Requirement status |
|--|---|----------------|--------------------|
|  | assignable, realistic and timely).  |                |                    |
| 3  | Each objective is categorized as either “Crisis Management objective”, “solution objective” or “Trial objective”.   | ✓              |                    |
| 4  | The TGT provides a list of identified Trial objectives in the Trial.<br><i>Users can add/remove/modify Trial objectives in the list.</i>  | ✓              |                    |
| 5  | Examples of Trial objectives used in other Trials are provided, supported by a search filter.<br><i>Users can copy such examples into his/her Trial definition and modify the Trial objective.</i>                            | X              |                    |
| 6  | Include metrics with Trial objectives.<br><i>User can select from a list or enter additional metric.</i>  | ✓              |                    |
| <b>5. Trial Preparation (research questions)</b> |   |                |                    |
| 1  | A research question relates to a Trial objective.   | ✓              |                    |
| 2  | The TGT provides a template for the research question dealing with crisis management task, process, content, crisis management roles and the solution required.   | X              |                    |
| 3  | Examples of research methods are provided from the DRIVER+ knowledge base, including lessons learnt.  | X              |                    |
| <b>6. Data collection plan</b>                   |   |                |                    |
| 1  | The TGT offers a list of possible methods for data collection.  | ✓              | updated            |
| 1a   | The TGT offers Excel-file templates for users to download.  | ✓              | new                |
| 2  | Every metric is linked to at least one assessment method.   | ✓              | obsolete           |
| 3  | Examples of research methods with associated data collection plans are provided from the DRIVER+ knowledge base.  | X              | obsolete           |
| 4  | Provide a description of different data collection and analysis techniques.   | ✓              |                    |
| 5  | Provide a checklist (for the data collection plan).   | ✓              |                    |
| 6  | Relate metrics to the Observer Support Tool which is a component of the reference implementation of the Test-bed.<br><i>The TGT supports an export function with measurements/observations for the Observer Support Tool.</i> | X              |                    |
| <b>7. Evaluation approaches and metrics</b>      |   |                |                    |
| 1  | Examples of data analysis techniques and metrics from previous Trials are derived from the DRIVER+ knowledge base.  | X              |                    |
| 2  | Examples of evaluation approaches applied in previous Trials.   | X              |                    |
| 3  | Provide explanation on evaluation approaches, distinguishing between literature and practice (past Trials).   | X              |                    |
| 4  | Examples for data techniques to measure/observe metrics in a Trial.   | X              |                    |
| <b>8. Trial preparation (scenario)</b>           |   |                |                    |

| No.   | Requirement  | Is implemented | Requirement status |
|---|--|----------------|--------------------|
| 1   | Scenario text can be entered by uploading a text file.   | ✓              |                    |
| 2   | Scenario text can be edited.   | ✓              |                    |
| <b>9. Trial Preparation (select solution)</b> |  |                |                    |
| 1   | Solutions are related to one or more CM functions.   | ✓              |                    |
| 2   | The TGT supports the DRIVER+ CM function taxonomy.   | ✓              |                    |
| 3   | The TGT supports searching the PoS for possible solutions for the objectives formulated, using filter options.<br><i>The users can refine/broaden the search by changing the filter options or keywords.</i>                     | ✓              | updated            |
| 3a  | The TGT offers a list of possible Solutions based on Trial gaps.   | ✓              | new                |
| 4   | Selected solutions are presented in the TGT for review, including all information relevant.<br><i>For example (if available) the description of the solution, previous Trial results, experiences from end-users, TRL level.</i> | ✓              |                    |
| 5   | Solutions can be included / excluded into the Trial by the user.   | ✓              |                    |

In the remainder of this section, these status changes for individual requirements are explained. Each heading represents a same-named part from the Table 3.1.

### General requirements – cf. part 1 of Table 3.1

Requirement No. 1 from the *General Requirements* of the TGT was updated during the TGT strategy meeting in Vienna. It was decided that this requirement needs to be extended to the requirement 1a, and that a procedure for assigning accounts must be defined in order to restrict the usage of the TGT only to legit users to avoid abuse and to assure the quality of the content that will be stored in the tool's database. The TGM team requested that requirement No. 4 from the *General Requirements* is extended with requirements 4a and 4b due to the development of the TGM Handbook in order to assure better understanding and implementation of the methodology with the help of the tool and also to improve the alignment of the TGT with the TGM. Requirement No. 5 from the *General Requirements* was extended with requirement No. 5a based on the feedback collected from Trial 3 and 4 Committees during the TGT Workshop. It was decided to extend the repository of examples with a search and filter function in order to improve the user experience. During the TGT strategy meeting in Vienna, *General Requirements* of the TGT were extended with 4 new requirements No. 8, 9, 10 and 11. It was decided that TGT will implement a three-layer quality assurance process, in which the user will be able to state which items are ready to be published (individually or as a complete package) and the final decision is left to the TGT's quality assurance team which decides if the provided content meets the content quality standards of the web tool. It was also decided that the TGT should provide an e-mail notification to the Trial members that are using it, in order to inform them of any changes while they are working, to improve the usability of the TGT itself.

During this meeting, the decision was also made that the TGT will allow description of other Trial-like tests or experiments; for example smaller-scale events for assessing a single solution to assure the TGT's usage after the DRIVER+ project. During this meeting, it was decided that test cases are also to be added to the TGT, to support users with integrating solutions in the Test-bed. A new data model was defined that supports the user in the description of such test cases.

Requirements No. 12 and 13 from the *General Requirements* of the TGT were added during the TGT Workshop in January where the Trial 3 and 4 Committee members expressed a wish that the TGT provides a live chat functionality in order to make collaboration between Trial Committee members easier; it also addresses a wish to allow some way of directly contacting TGM-experts (at an envisioned Centre of Expertise) while working on particular parts of the Trial.

#### **Trial preparation – cf. part 3 of Table 3.1**

Requirement No. 1 from the *Trial Preparation* requirements of the TGT was updated during the strategy meeting in Ispra, where it was decided to extend it with the requirement No. 1a to indicate references in both directions between the steps in order to assure the correct implementation of the 6-step approach defined by the TGM. During this meeting it was also decided that the requirement No. 4 of the *Trial preparation* requirements of the TGT is updated with the requirement No. 4a, where the TGT needs to allow users to define a new Gap, and not only to choose from the currently implemented Gaps. This decision was made in order to assure the sustainability of the TGT after the project, since maintaining a list of defined Gaps proves to be challenging and resource demanding.

#### **Data Collection Plan – cf. part 6 of Table 3.1**

Requirement No. 1 from the *Data Collection Plan* requirements of the TGT was updated during a teleconference meeting following the TGT strategy meeting in Vienna, with the requirement No. 1a, where it was decided that data collection plan step in the TGT provides downloadable Excel templates provided by TGM to the user in order to assure collection of relevant data. Given the new design of the step, requirements No. 2 and 3 from the *Data Collection Plan* requirements of the TGT became obsolete.

#### **Trial preparation (select solution) – cf. part 9 of Table 3.1**

Requirement No. 3 from the *Trial Preparation (select solution)* requirements of the TGT was updated during the TGT Workshop in January where the Trial 3 and 4 Committee members expressed a wish that TGT supports the user in the Solution selection step in a way that only the solutions that address the same CM functions that are mentioned in Trial Gaps are given as a possibility in order to assure that correct Solutions are selected for the Trial. The way forward of the TGT is briefly described in section 5.

## 4. Sustainability of the TGM in the context of the pan-European Test-bed

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The sustainability of the TGM heavily depends on the future configuration of a pan-European Test-bed. At the moment of writing (February 2019), an overall sustainability framework is being developed in **WP954** and initial discussions have been carried out with relevant partners to ensure alignment and share ideas on concrete sustainability paths. This section describes the sustainability objectives and requirements of the TGM as well as potential challenges<sup>4</sup>. This plan will be refined and further developed in the course of the project in alignment with **WP954**. While the overall sustainability of the Test-bed goes beyond the scope of this deliverable, it is worth mentioning that the effective application of the TGM can be sustained and maintained only in the broader context of the pan-European Test-bed which is envisioned as a constellation of Centres of Expertise (CoEs). These CoEs are organisations that are envisioned to offer DRIVER+ services after the duration of the project. These services aim at the application, maintenance and further development of the TGM, the TGT, the Test-bed infrastructure and the Training Module, as well as the PoS. How these services may best be provided, which organisations are part of this pan-European network and how this network can be established, is still work in progress. Being nodes within the pan-European Test-bed, the CoEs act not only as service providers but also as ambassadors of the overall DRIVER+ approach towards capability development and innovation management in Crisis Management.

The methodological approach developed in DRIVER+ is designed for CM practitioners who are interested in assessing potential innovative solutions for CM capability development. The TGM provides an evidence-based approach to explore innovation in the CM domain; hence its sustainability is strictly related to the **application** of the method itself. In other words, it is crucial to guarantee that the TGM can be applied in the future by CM practitioner organisations. A TGM applied only in the context of a research project is likely to be validated a limited number of times and within certain conditions. A broader field of application, facilitated by the CoEs helps fostering this approach as useful in the CM practitioner community. European networks like the CoU and CMINE will play a significant role in promoting the use of the TGM (and other DRIVER+ products) to assess innovative solutions.

The CoEs ensure the TGM is **accessible** and **applied properly**. If CoEs are organizations with previous experience of DRIVER+ Trials (e.g. as Trial hosts), a proper application is highly facilitated thanks to this hands-on experience. To further support these CoEs, as well as CoEs originating from non-project partners, it is recommended to establish a methodological and technological **support-service**. This central European support service would be responsible for maintaining, updating and further developing the TGM and related DRIVER+ products, and facilitating training courses and lessons-learned workshops for the various CoEs. In addition, the availability of a Training Module package as described in **D924.12** (5) will further support the uptake of the TGM by the COEs and other stakeholders.

Another key sustainability aspect is the **scalability** of the TGM. The amount of resources (technical, human, economic) needed to have the overall Test-bed up and running is significant. Simply duplicating the same conditions at CoEs does not seem to be realistic, although at a CoE it would be easier to mobilize the required resources. If the assessment of innovative solutions cannot be facilitated through the CoEs mechanism, CM organisations might not have sufficient time and resources to apply the TGM the way in which it has been applied in the project. For instance, the co-creative iterative approach requires non-linear

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<sup>4</sup> This chapter does not deal with the sustainability of the TGT since sustainability goes hand-in-hand with the development of the tool as such which is carried out in **SP93**.

iteration cycles of the six-step approach (preparation phase) as well as the involvement of functions represented in the Trial Committees. The execution phase might also be considered quite challenging as it entails meetings and rehearsals of the Trial as such that are unlikely to happen without a high level of commitment and resources. To apply the TGM in smaller contexts with less resources, a scalable version should be provided; for instance, including less iteration cycles of the six-step approach during the preparation phase, having less members assigned in a Trial Committee, or less rehearsals of a Trial.

While the TGM is scalable already as it can be applied by selecting, for instance, only two gaps and two solutions, as opposed to four or five solutions assessed in DRIVER+ Trials, a sustainability requirement is to indicate in the final version “mays and musts”. In indicating whether activities have to be carried out (and to what extent) or are optional, the scalability will be ensured.

The transferability of the TGM implies also a less “DRIVER+” oriented approach in terms of language. To transfer an output like the Handbook so that it is understandable outside the project, specific DRIVER+ references must be left out. The requirement to make the TGM sustainable is to make it applicable by organizations which are not familiar with artefacts developed in the project. Each artefact comes with a jargon that is challenging to grasp. The final version of the Handbook must provide explanations, which are fully understandable to the outside world.

As opposed to other Test-bed components (e.g. the technical infrastructure), the TGM does not require frequent updates. A methodological framework like the TGM can and should be enriched by lessons learned but the design and the overall rationale behind it will remain. In the TGM there will always be three phases (preparation, execution and evaluation) and e.g. data quality check will always be part of the evaluation phase. However, potential improvements and additions to the actual framework might be needed.

The sustainability requirement related to aspect mentioned above is to secure that a **mutual learning process** is maintained. Most likely, it cannot be the same learning process, which is currently in place in the project as it entails an evaluation of the methodology after each Trial and frequent adjustments through small iteration cycles. Collecting feedback from the users of the TGM (practitioners) is key but potential changes must be structured along the lines of the helpfulness of the guidelines, rather than on the content (phases and steps) as such. To put it simply, major adjustments will be requested only if the TGM will be deemed unsuitable (by the users) to assess innovative CM solutions. The central node should also be responsible for collecting feedback on the helpfulness of the TGM and should streamline the overall process with regards to improvements.

The “learning” dimension is an important element of the pan-European Test-bed. This dimension is captured, for instance, in the knowledge base, a relational database in the Trial Guidance Tool that enables access to a wide range of useful methodological knowledge. Feeding this knowledge base through experiences and examples from future Trials is key and must be ensured.

As mentioned, the technical Test-bed components are more likely to receive frequent updates. Given that close interrelation between the TGM and the technical infrastructure, reliance on up-to-date technology and tools enhances the quality that can be delivered through the application of the TGM.

The way forward, with regards to the sustainability of the TGM, is to identify end-users and necessary competences and skills to take up this output as well as outline potential bottlenecks for replicability.

## 5. Way forward

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As mentioned in the Introduction, there is still a long way to go before the delivery of the final Handbook and the process to deliver a comprehensive final version of the Handbook has been agreed upon already within **WP922**. Small iteration cycles enable to provide, on a monthly basis, for a better version of the Handbook to serve the needs of the Trial owners. Before the delivery of the final Handbook in October 2019, a total amount of 10 iterations are expected (from December 2018 to September 2019). Additionally, in October a more interactive version of the Handbook will be released to facilitate future users.

The TGM developers use a ticketing system in a collaboration tool (Trello<sup>5</sup>) to keep track of revisions suggestions, needs for improvements and responsibilities (who is in charge to revise a specific part of the Handbook and by when). This allows for real-time identification, analysis and prioritization of revision items. Suggestions for revisions come from different sources: both from internal partners and from people not necessarily involved the project, like the members of the Advisory Board (AB). So far, we have received already feedback on the second iteration of the Handbook from two members of the AB. While we are still in the process of analysing their input, some recommendations have already been taken up in the Handbook included in Annex 3. With regards to internal partners, not only structural feedback from **SP94** is collected and processed, but also lessons learned from the supporting activities are taken into account. Additionally, Sub-project meetings (such as the last **SP92** meeting held in Ispra in January 2019), fostered structured discussions on what is expected to be included in the next iterations, what is missing and what should be adjusted.

Collaboration with other Subprojects is also key in this context. Two important cross-SPs collaboration activities are on-going: one with **SP91** (on External Collaboration) and the other with **SP95**. The current discussions and activities constitute already the “way forward” for the TGM and the TGT.

Given that a mature version of the TGM is available, seeking for feedback outside the boundaries of DRIVER+ can increase significantly both the quality of the methodological framework and the transferability of the output (and hence the sustainability). With this objective in mind, and with support from the external cooperation manager, several external projects have been identified. The main purpose is to select projects in which practitioners are involved due to the main target audience of the TGM. The initial outline provided in Table 5.1 below is an extract from the external cooperation action list related to a specific action type: “Application of the Test-bed to gather external feedback”.

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<sup>5</sup> <https://trello.com>



**Table 5.1 Proposed cooperation actions (TGM) with external projects**

| Cooperation Partner                                   | Project/Country                     | Proposed cooperation action   |
|---|-------------------------------------|---|
| IN-PREP project                                       | H2020                               | Use of the Test-bed in their exercises in various MS.   |
| beAWARE Project                                       | H2020                               | Offer the Test-bed for the planned pilots (Flood, Fire, Heatwave) in beAWARE ( <a href="https://beaware-project.eu/the-project/pilots/">https://beaware-project.eu/the-project/pilots/</a> ).   |
| US DEPARTMENT OF HOMELAND SECURITY                    | US                                  | The DHS wants to assess new technology solutions for first responders. Information about the TGM will be shared in order to identify and exploit potential synergies.   |
| BROADWAY Project                                      | H2020                               | The TGM was already presented to the Practitioner Evaluation Team meeting (23.01.19). PSCE will compile an overview of the key issues identified in order to define the way forward in identifying and exploiting synergies.  |
| BART! Project   | National Project<br>The Netherlands | BART! Expressed an interest in using the TGM for their Trials. BART! is a national innovation project (Dutch police, municipality of the Hague, TNO, Delft University of Technology) focused on developing socio-technical innovations that enable the police to connect better to citizens-driven initiatives. |
| FEU (Federation of European Fire Officer Association) |                                     | FEU expressed interest in the TGM which will be presented in at the FEU meeting in Porto from 16-18 of May 2019.  |

The feedback from external projects and organisations adds to the users' experiences to assess whether the TGM is an effective guidance. A structured plan will be agreed upon with **SP91** to define how the TGM can be applied by external projects in the context of the pan-European Test-bed.

With regards to **SP95**, collaboration is ongoing with respect to the design and to sustainability. A designer is working with the TGM developers to improve the layout of the Handbook and develop the interactive version. In addition, as mentioned in section 4, the collaboration with **WP954** on sustainability, is on-going. While sustainability objectives and requirements have been touched upon already in this deliverable, the necessary competencies and skills of the TGM users will be flesh-out in the following months.

The TGT with all until now defined requirements does not yet represent the final version. It is foreseen, that additional improvements will make their way into the final version of the tool. The most valuable input is expected from the Trial 3 and 4 committees, since they will have the opportunity to use the tool in practise, and therefore provide valuable information, identify possible problems and also suggest ways for further improvement of the TGT.

After they have used the tool, they will be interviewed by the TGT-development team and their input will be analysed and presented to the TGT management team, which will result in additional requirements for the TGT.

Additional workshop(s) will be organized and the tool will be opened for external try-outs before the end of the project, where the gathered results could also lead to additional requirements to be implemented. This process is key to assure that, after the end of the project, TGT is a complete and functional tool helping practitioners in the systematical assessment of new and innovative Solutions for crisis management gaps.

## References

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1. **DRIVER+ project.** *D922.21 - Trial Guidance Methodology and Guidance Tool Specifications (Version 1)*. 2018.
2. —. *D943.11 - Report on Trial Action Plan - Trial 1*. 2018.
3. —. *D943.12 - Report on Trial Evaluation - Trial 1*. 2018.
4. —. *D944.12 - Report on Trial Evaluation - Trial 2*. 2019.
5. —. *D924.12 - Materials for the Training Module II*. 2019.

## Annexes

### Annex 1 – DRIVER+ Terminology

In order to have a common understanding within the DRIVER+ project and beyond and to ensure the use of a common language in all project deliverables and communications, a terminology is developed by making reference to main sources, such as ISO standards and UNISDR. This terminology is presented online as part of the Portfolio of Solutions and it will be continuously reviewed and updated<sup>6</sup>. The terminology is applied throughout the documents produced by DRIVER+. Each deliverable includes an annex as provided hereunder, which holds an extract from the comprehensive terminology containing the relevant DRIVER+ terms for this respective document.

**Table A1: DRIVER+ Terminology**

| Terminology     | Definition   | Source   |
|-----------------|--|--|
| Dry run 1       | First rehearsal of a Trial, focusing on the technical integration of solutions, reference implementation of the Test-bed, and scenario validation; it also serves as a readiness review to approve the maturity of technical solutions.  | Initial DRIVER+ definition.  |
| Dry run         | Full scale rehearsal of a Trial without external end-users participation, aimed at detection of technical issues and last second fine-tuning; Dry Run 2 is organised as a complete mirror of the Trial.  | Initial DRIVER+ definition.  |
| Innovation      | Implementation of a new or significantly improved product (good or service), or process, new marketing method, or new organizational method in business practices, workplace organization or external relations.<br><br>DRIVER+ note 1: Alternative definition: new or changed object realizing or redistributing value (ISO 37500:2014(en) Guidance on outsourcing, section 3.6). | ISO 9000:2015(en) Quality management systems — Fundamentals and vocabulary, 3.6.15 |
| Lessons learned | Lessons learning: process of distributing the problem information to the whole project and organization as well as other related projects and organizations, warning if similar failure modes or mechanism issues exist and taking preventive actions.   | ISO 18238:2015(en) Space systems — Closed loop problem solving management, 3.3.    |

<sup>6</sup> The Portfolio of Solutions and the terminology of the DRIVER+ project are accessible on the DRIVER+ public website (<https://www.driver-project.eu/>). Further information can be received by contacting [coordination@projectdriver.eu](mailto:coordination@projectdriver.eu).

| Terminology                      | Definition   | Source                      |
|----------------------------------|--|-----------------------------|
| Solution                         | 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.   | Initial DRIVER+ definition. |
| Test-bed                         | The software tools, middleware and methodology to systematically conduct Trials and evaluate solutions within an appropriate environment. An “appropriate environment” is a testing environment (life and/or virtual) where the trialling of solutions is carried out using a structured, all-encompassing and mutual learning approach. The Test-bed can enable existing facilities to connect and exchange data, providing a pan-European arena of virtually connected facilities and crisis labs where users, providers, researchers, policy makers and citizens jointly and iteratively can progress on new approaches or solutions to emerging needs. | Initial DRIVER+ definition. |
| Test-bed infrastructure          | The software tools and middleware to systematically create an appropriate (life and/or virtual) environment in which the trialling of solutions is carried out. The Test-bed infrastructure can enable existing facilities to connect and exchange data.   | Initial DRIVER+ definition. |
| Trial                            | An event for systematically assessing solutions for current and emerging needs in such a way that practitioners can do this following a pragmatic and systematic approach.   | Initial DRIVER+ definition. |
| Trial Guidance Methodology (TGM) | A structured approach from designing a Trial to evaluating the outcomes and identifying lessons learnt.  | Initial DRIVER+ definition. |
| Trial Guidance Tool (TGT)        | A software tool that guides Trial design, execution and evaluation in a step-by-step way (according to the Trial Guidance Methodology) including as much of the necessary information as possible in form of data or references to the Portfolio of Solutions.   | Initial DRIVER+ definition. |

## Annex 2 – Comments on TGM version 1

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This annex provides an overview of all comments and recommendations that have been provided with respect to the draft version of the TGM version 1. This concerns the version that has been used during Trials 1 and 2, and that has been reviewed both outside and inside the DRIVER+ consortium.

### Trial 1

The following outcomes, recommendations and reflections have been provided in (3) (pages 69-78):

- The outcome of the Trial is strongly dependent on the level of involvement of practitioners – their involvement needs a good quality instructions and preparation which leads to conclusion that practitioners need more time on the training of solutions (more training, better instructions for practitioners, more scenario-oriented training, and more focused training). Training should be provided not only about the solution but also about the Trial scenario and how the solution is going to be used in the session.
- The scenario and set up of the Trial should be almost fully defined before Dry Run 1 so that the technical integration during Dry Run 1 and operational integration during Dry Run 2 are realistic enough. Only minor changes should be possible after that stage. The Trial scenario should be defined before defining how the solutions will be used in the Trial.
- Earlier cooperation among each component of the Trial (technical, methodological, information content, observation) is strongly required.
- Approach to let solution provider work together with practitioners is very useful and allows having a valuable feedback – this kind of cooperation could be taken into account in the TGM, although an eventual conflict of interest may rise.
- Many participants experienced an information overload during training day and the briefing sessions. As a result, not all information may have come across, which probably have influenced the effectiveness of CM operations.
- Role of the Test-bed infrastructure has to be decided in real advance before the Trial – this role needs to be more precisely described in the TGM.
- The Trial itself is very tiring for everyone: participants, solution providers and Trial team. The TGM could focus a little on this problem to lower the influence of it on the Trial's results. Additionally, a problem for practitioners to find a time to be present on so many meetings before the Trial was announced. The TGM should try to find a solution which helps to have a balance between the quality of the results of the Trial and the time required from practitioners.
- The TGM needs more focus on how to formulate appropriate questions to collect high quality answers. Quality of the questions in the questionnaire on Trial 1 was good and generic enough. However, several too similar questions and meaning of some questions were not entirely clear. It was mentioned that more precise sessions oriented questions regarding Trial aspects are needed. Additionally, Participants cannot give a feedback if someone has no experience with the solution (some group trained without the solution). To fulfil Participants expectations, each of them needs to have an opportunity to work with solutions at least once.
- Separation of each group for observation purposes for different parts of each session is required. However, it also depends on the type of the session and the solution trialed. Having more than one group into one room could influence the observation process (interfere). Observers should be experienced practitioners to understand what is going on during a Trial to make observation without interfere.
- Recurring group of observers should be valuable, in order to ensure continuity and enable comparison.
- In order to better support its application, a more practical description of the TGM is needed as well as training for using all Test-bed components.

- This training should not only be via e-learning but also include cycles of face-to-face meetings in order to further support the practical application of both the TGM and the Test-bed infrastructure.
- To facilitate the discussion about the innovation and usability of the TGM, the language used to describe the TGM should be better adapted to the end-users. The current language is too scientific, and the proposed examples of practical solutions, testing and implementation are too generic. The various phases, steps and tasks need to be written in simple and accessible language. It is recommended that this same principle will be followed for the Trial Guidance Tool. During the process of updating the TGM and developing the TGT, it is advised to include the input and feedback of CM practitioners, in order to have a Test-bed that not only stimulates innovation, but also is usable, affordable and efficient.
- As the evaluation is crucial for a Trial, the data collection plan should be emphasized. In addition, if during a Trial session data are not (properly) collected, it is highly recommended to stop a session and restart it in a way which enables the collection of the required data. This risk could be minimized by testing the data collection plan in practice during DR2 with practical participation of practitioners and observers to ensure that they know and understand the data collection and evaluation process as well as the tools (e.g. questionnaires) which have to be used. This implies having the Test-bed infrastructure technically set up and fully tested during DR1.
- Observers should be experienced practitioners in Crisis Management since it ensures that the processes they observe and data they record are collected in a reliable and objective way. Moreover, experienced observers are able to observe aspects which could have an influence on the Crisis Management dimension and were not previously defined in the data collection plan. Such factors could be then consciously recorded and decided upon after the Trial execution whether or not to be taken into account for the Evaluation Phase.
- The Trial Committee and the solution providers have to work together to define a data collection plan that describes not only the “needed” data, but also takes the functionalities of the solution into account. This implies on the one hand that the solution providers are aware of the requirements of a sound data collection plan, and on the other hand that the Trial Committee has a good understanding of the functionalities of the solution so it can best be implemented in the Trial.
- The more training on solutions is conducted, the better. The more the practitioners are familiarized with a solution the more comfortable they feel operating it. This approach will limit the bias related to the novelty of the solutions and that the baseline is the preferred way of working.

At the consortium meeting dedicated on the evaluation of Trial 1 (Warsaw, September 2018) the following decisions have been taken related to the practical use and the extension of the TGM:

- Adjust the TGM in such a way that it becomes more end-user friendly.
- The TGM should contain a chapter that briefly describes the DRIVER+ Testbed and a Trial.
- The TGM should contain a chapter that describes the pre-preparation phase.
- The TGM should contain a chapter that describes all roles of persons in the preparation, execution and evaluation phases.
- The TGM should provide an overview of roles that are needed at each step in each phase (minimum requirements) and which roles are optional in these phases/steps.
- Elaborate the execution and the evaluation phase.
- Insert the DRIVER+ Lessons Learned Framework into the TGM.
- Use Trial 1 for examples in the TGM.
- Ensure a consistent use of terminology throughout the TGM.

## Trial 2

From Trial 2 only some initial conclusions were available at the moment this report had to be delivered.

From experiences of Trial 2 the main challenge of the TGM is to create a guide representing the methodological approach, but taking into account the practical dimension of activities, examples of real use, use in specific activities of the CM process. Implementation of a participatory management model combining three process actors (namely, practitioners), solution providers and the Trial/TGM support team. From organisational aspect the following issues were recommended:

- Good practice would be having regular meetings of domain experts (including technical ones) with final recipients, especially in the preparation phase.
- More end-user meetings with solution providers to increase usability.

Other recommendations:

- TGM creates the opportunity to open up to a new approach for crisis management. This process can be more structured. Moreover, actions in accordance with TGM guidelines create opportunities to optimize activities at every stage. Therefore, the TGM should be written in a less academic and more practical language. Practitioners expect more examples of practical use of TGM elements. So, it is required that a detailed explanation of each step of the process is given.
- Provide guidelines which end-users should be involved in the Trial and which role they could play (developer, participant, observer ...). Criteria with respect to this would be helpful.
- The phase description of TGM is not fully understood yet and requires supplementation about elements related to data collection and evaluation process. A more detailed description of each phase of TGM will allow for a more detailed analysis and evaluation of the collected data in order to find answers to research questions.

During a focussed-feedback session right after Trial 2 (Valabre, October 2018) the following interesting items with respect to the TGM were proposed:

- Brief players during the training session the day before the Trial to really use the solution(s) during the Trial.
- Ensure that new solutions are used in a proper way during the Trial: (a) Take enough time for training each solution; not only on the technical issues but also on what changes w.r.t. procedures, organisational and human/end-user aspects. (b) Consider of having an open-book-session during the training (e.g. as you do when teaching somebody a new game [open cards]). (c) Consider of using 1 novel solution at a time (at least in the first parts of the Trial each solution should get individual attention / later on solutions can be combined if really needed).
- Decide – given the objectives of the Trial – on the use of languages during the Trial (English and/or mother tongue(s)), given the Trial set-up. Think of players/practitioners but also the observers because this decision influences the requirements to the participants.
- W.r.t. observation: consider to discriminate between fixed and walking observers.
- Adjust the TGM with possibility that one starts from a set of solutions (instead of starting by a set of gaps).
- Consider of organising a kind of table-top-session at the very beginning (during [Pre-]Preparation phase) to discuss with experienced/senior end-users by using some kind of scenario on the gap(s) and what is expected of potential solutions. In this way it becomes clearer to practitioners – and other stakeholders – at an early stage what the Trial will be all about: description of the gaps and what will be changed / improved by the solutions (technical, organisational, procedural, human aspects) to bridge the gaps.
- A structured elaboration of the gap in categories of characteristics might be helpful for the steps to be taken in the Preparation phase (e.g. by using the DRIVER+ Lessons Learned Framework approach).



## External feedback

Remarks from EU review (EC/REA letter of 13 November 2018 and accompanying Consolidated review report of 8<sup>th</sup> November 2018):

- A more interactive user-friendly, dynamic format for the TGM for post-project updates and sustainability purposes should be developed.
- The description of how to conduct Trials is acceptable but long. Consequently, key messages of the methodology are lost and it is difficult to decipher what is practically to be done. Shorten the text and add more graphics.
- Harmonise the TGM and the TGT (e.g. on the terminology and the 6-step approach).
- Execution and Evaluation phase have to be elaborated.

Advice by the Advisory Board (24 June 2018) is to extend the scope and objectives of Trials. It could include e.g.: (a) identifying and improving CM gaps and answering related questions; (b) validate crisis and disaster management support tools; and (c) preparing for flexibility to cover future challenges (therefore, trialling hypothetical scenarios should as well be covered).

## Internal feedback

During the training session (begin November 2018) in preparation of Trials 3 and 4 (to be conducted in 2019) the following issues raised:

- Relation between the training and the TGM: is it needed to follow the whole training (e-learning and contact phase) before you can call yourself TGM-professional? Or is it sufficient to get some TGM-support on difficult parts of preparing, executing and evaluating the Trial? Define training needs dependent on role in the Trial (in fact, training could be modular).
- Sustainability: who will take care of the TGM (updates) and training (contact with teachers) after DRIVER+ end?
- Direct links between the different topics in the TGM and the available tools is needed (when do you need/use the testbed, PoS, etc.). Therefore, both the TGM Handbook and the training will start to use the same user story line and personas, to explain from the participants' point of view the different ways to proceed through the TGM and what to expect in the end.
- Attractiveness of TGM: we should be able to convince the readers from the start that it is worth the time and money to be spent on a Trial like this. Start to explain the effectiveness of using this method immediately in the beginning (keep talking about the "heart beat"). This requires a professional introduction (e.g. a video).

Decisions that were taken by the consortium with respect to the TGM after the training session:

- Add more information on ethical issues.
- Introduce/explain issues like the DRIVER+ Knowledge Base.
- Describe when the iteration of the six-step approach can finish (when is it good enough?).
- Describe the TIM (Trial Implementation Meeting).
- Explain why step 0 has been added.
- Provide hints for evaluation purposes.

Remarks that were made during a consortium meeting about experiences with the initial version of the TGM Handbook (Ispra, January 2019):

- Describe how much time (and resources) in total one needs at each step, and add an overall timeline also in terms of parallel tasks.
- Add a smart glossary.
- Think of providing translations of the TGM for the future.
- Avoid abbreviations and avoid typical DRIVER+ jargon.
- Double-check the time estimated time per task.

- Use a more appealing name of the TGM Handbook. E.g. think of a sub-title that clarifies what the handbook is about (triallying new, innovative or alternative crisis management solutions)

## Annex 3 – TGM Handbook

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This annex is a pre-release of deliverable **D922.42 *Handbook for systematic designing of Trials*** which will be used in Trials 3 and 4 that are organised in 2019.