Driving Innovation in Crisis Management for European Resilience

D911.91- LESSONS LEARNED ON PROJECT LEVEL

SP91 - PROJECT MANAGEMENT

MAY 2020 (M73)

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The DRIVER+ project

Current and future challenges, due to increasingly severe consequences of natural disasters and terrorist threats, require the development and uptake of innovative solutions that are addressing the operational needs of practitioners dealing with Crisis Management. DRIVER+ (Driving Innovation in Crisis Management for European Resilience) is an 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

The objective of this deliverable, as part of **WP911** General Management, is to identify and describe the lessons learned of DRIVER+ on project level, including the achievement towards the objectives, recommendations for future projects and demonstrations, and recommendations for future Framework Work Programmes. DRIVER+ was conducted within the context of FP7. It was a so-called demonstration project, and within H2020 and HEU this kind of projects does not exist anymore as such. Furthermore, DRIVER+ was a project within the area of Disaster Resilient Societies. Nevertheless, it is expected that the specific lessons learned formulated and the recommendations also apply to H2020 and HEU projects as well as projects outside of the Crisis Management and Disaster Risk Management domain.

The lessons learned are structured along the following, partly overlapping, categories: (1) restructuring/ suspension phase, (2) general project management and coordination, (3) quality management, (4) risk and issue management, (5) practitioner centred approach, (6) multiple perspectives and inclusive approach, (7) focus on sustainability, (8) informal management and teamwork, (9) internal communication, and (10) public relations, dissemination and communication. For each category, the main observations and experiences are described, followed by a summary of the strengths and weakness, and finally the identified lessons learned reflecting these.

The following key recommendations are formulated for research projects and demonstration activities:

1) Take a well-informed decision before entering into a suspension phase.
2) Formulate an overarching project vision in the form of a User Story.
3) Assess the scope and added value of the advisory bodies.
4) Establish an internal review board.
5) Actively involve practitioners in the development of main outputs.
6) Include multiple trialling and demonstration activities.
7) Support the uptake and implementation of results.
8) Integrate sustainability in all aspects of the project.
9) Actively and continuously engage with external stakeholders.

For the EC and the future Work Programme, the following key recommendations are formulated:

1) Implement a forward-looking capability planning mechanism in practitioner organisations.
2) Adopt a common trial and validation framework.
3) Align MS and EU capability development strategies.
4) Allow for a sufficient size and duration of Security RD&I projects.
5) Lift the coordination of useful project interactions to DG level.
6) Adopt research results as EC.
7) Advance the dialogue between all stakeholders.
8) Align the EC financial instruments.

Describing and disseminating experiences and lessons learned contributes to enhancing the efficiency and impact of European funded research and innovation projects. Project teams as well as the EC need each other to create successful projects leading to sustainable results, and should therefore learn from each other. Formulating lessons learned based on the experiences of this exciting and challenging project was a grateful task for the DRIVER+ team to do. One final recommendation to the EC would be to request all EC-funded projects to publish a lessons learned document including recommendations for both projects and the EC.

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List of Acronyms

Acronym	Definition
AB	Advisory Board
CfA	Call for Applications
CM	Crisis Management
CMINE	Crisis Management Innovation Network Europe
CoE	Centre of Expertise
CoU	Community of Users
CoW	Collaborative Workspace
CWA	CEN Workshop Agreement
D#	Deliverable <+ ordinal ID>
DoW	Description of Work
DRM	Disaster Risk Management
DRMKC	Disaster Risk Management Knowledge Centre
EC	European Commission
ECM	External Cooperation Manager
ESAB	Ethical and Societal Advisory Board
EUCP	European Union Civil Protection
F2F	Face-to-face
FD	Final Demonstration
FET	Future and Emerging Technologies program
FP7	7th Framework Programme
GA	General Assembly
GAW	Gap Assessment Workshop
GDPR	General Data Protection Regulation of the EU
H2020	Horizon 2020 program
HEU	Horizon Europe program
I4CM	Innovation for Crisis Management
IATE	Interactive Terminology for Europe
ISO	International Organization for Standardisation
KN	Knowledge Network
KoM	Kick-off Meeting
KPI	Key Performance Indicator

M#	Month (+ordinal ID), as per the project schedule
NGO	Non-Governmental Organisation
PCT	Project Coordination Team
PD	Project Director
PM	Person Month
PMB	Project Management Board
PO	Project Officer
PoS	Portfolio of Solutions
PR	Public Relations
PRDR	Policy-Research Dialogue Roundtable
RB	Review Board
RD&I	Research Development and Innovation
REA	Research Executive Agency
SB	Sustainability Board
SME	Small & Medium-sized Enterprise
SP	Subproject
SPCC	Subproject Coordination Committee
SRE	Security Research Event
TC	Technical Coordinator
TGM	Trial Guidance Methodology
TGT	Trial Guidance Tool
TM	Training Module
ToR	Terms of Reference
TRL	Technology Readiness Level
TTI	Test-bed Technical Infrastructure
TWG	Terminology Working Group
UW0	Updated Workshop 0
WP	Work Package
W0	Workshop 0
QM	Quality Manager

1. Introduction

This introduction first describes the rationale of this deliverable and the relation to other DRIVER+ deliverables (Section 1.1). Next, Section 1.2 describes the approach followed to produce this deliverable.

1.1 Rationale

The previous phase of the project started in May 2014 and was put on hold in June 2016; after a suspension period, DRIVER+ started in September 2017 and lasted till June 2020. Many different staff and organisations participated in the consortium, and several key roles and responsibilities have changed. During the course of the project many challenges were faced and lessons were identified and implemented. The objective of this deliverable, as part of **WP911** ***General Management***, is to identify and describe the lessons learned on project level, including the achievement towards the objectives, recommendations for future projects and demonstrations, and recommendations for future Framework Work Programmes. The intended target audience is quite broad and includes the DRIVER+ consortium partners, project managers involved in the development and execution of (European) research projects, partners in European research projects, as well as staff at the European Commission responsible for programming and monitoring research and innovation projects. It is the intention that describing and disseminating the DRIVER+ lessons learned contributes to enhancing the efficiency and impact of European funded research and innovation projects.

Several other DRIVER+ deliverables also contain reflections on achievements and/or descriptions of lessons learned, either for specific Work Packages of Subprojects. Reflections on the involvement of external collaboration are provided in **D912.21** ***Report on the involvement of external stakeholders in DRIVER+ trials*** (1)**.** Final feedback from the Advisory Board is included in **D911.45** ***SP91 Subproject Coordination Committee meetings-5*** (2)*,* while **D913.22** ***Minutes of ESAB meeting 3 and 4*** (3) provides the final feedback of the Ethical and Societal Advisory Board (ESAB). Deliverable **D941.31** ***SP94 Overall evaluation of the trials and final demo*** (4) includes a meta review on the feasibility, use and added value of conducting the Trials, taking into account the EU added value, usefulness and achievements (including potential for future applications and operations), scalability and modularity, reliability, innovation, affordability and cost-effectiveness. Deliverable **D952.14** ***Dissemination and Communication activities – Final report*** (5) reflects on the Dissemination and Communication strategy followed throughout the project. Deliverable **D953.14** ***Enhancing the shared understanding of CM – Final report and way forward*** (6) reflects on how the DRIVER+ project has contributed to achieving a shared understanding of Crisis Management, including the sustainability of the Crisis Management Innovation Network Europe (CMINE). The pan-European network of Centres of Expertise (CoE) is an important element of the sustainability strategy, which is described in **D954.41** ***DRIVER+ Test-bed sustainability plan*** (7) and further updated in **D951.14** ***SP95 Subproject Coordination Committee meeting minutes-5*** (8). The standardisation activities are recapitulated in deliverable **D955.31** ***Summary of conducted standardisation activities*** (9).

This report will briefly summarise the reflections described in these deliverables and extend these to the project level or beyond.

1.2 Approach

A rather comprehensive, yet extensive definition of lessons learned is used by several space agencies: “A lesson learned is a knowledge or understanding gained by experience. The experience may be positive, as in a successful test or mission, or negative, as in a mishap or failure. Successes are also considered sources of lessons learned. A lesson must be significant in that it has a real or assumed impact on operations; valid in that is factually and technically correct; and applicable in that it identifies a specific design, process or decisions that reduces or eliminates the potential for failures and mishaps, or reinforces a positive result” (10) (11).

Following the DRIVER+ deliverable **D530.1** ***Lessons Learned Framework*** (12), this deliverable defines lessons learned as the structured production and application of experience-based knowledge to develop and improve doctrine, organisation, training, materiel, leadership, personnel and facilities to achieve more efficient and effective operations. This implies that the experiences of the people who have worked in or with the project are important sources of information. As part of the project's management and coordination processes, risks, progress and quality of the outputs were continuously monitored and acted upon (as described in the various SP Coordination Reports). The feedback received by REA after the Technical Review Meetings, and the recommendations received from the project's advisory boards were instrumental in this. In addition, feedback collected from organisations participating to the various events (Trials, Final Demonstration, workshops, PRDRs, I4CMs, Final Conference) was reviewed and implemented on a regular basis. This open attitude and continuous learning process allowed the project to accommodate to the dynamic context in which it was operating and to deliver the expected outcomes successfully.

The observations and experiences of the project members were continuously collected from the start of DRIVER+ onwards and are based on the frequent and regular SPCC meetings within each SP, the biweekly PCT and PMB meetings, the regular meetings of the Review Board, and the biweekly meetings between the Technical Coordinator and individual SP leaders. In the process of preparing this deliverable, three virtual meetings were conducted with the PCT and PMB members. The PCT and PMB can be regarded as the appropriate decision-making bodies to acknowledge the lessons identified as lessons learned at project level, as these bodies were to decide on the related strategies and actions during the course of the project. During these sessions, with an open attitude and in a transparent atmosphere, the observations and experiences were shared, structured, and validated. Based on the results, recommendations have been formulated. Some discussions inevitably referred to individual persons and/or organisations; however, no personal and/or sensitive information has been included in this deliverable.

This deliverable is structured as follows: Section 2 contains a reflection on the DRIVER+ achievement toward its objectives. The objectives and all products and results that have been delivered in achieving these objectives are briefly presented putting the lessons learned in a broader perspective. Section 3 is the heart of this deliverable, describing the main lessons learned on project level. Section 4 presents recommendations for future projects and demonstration activities as well as for the programming and monitoring of projects within the European Framework Work Programme. The final section contains the main conclusions (Section 5).

2. Achievement towards the project objectives

DRIVER+ aimed at improving the way capability development and innovation management are tackled, by assessing and validating (in realistic environments) solutions that are addressing the operational needs of Crisis Management practitioners. In order to achieve this, DRIVER+ has worked towards three main objectives:

1. Develop a pan-European Test-bed for Crisis Management capability development.
2. Develop a well-balanced comprehensive portfolio of Crisis Management solutions.
3. Facilitate a shared understanding of Crisis Management across Europe.

These three objectives support each other. The Test-bed is used to trial, adjust and develop CM solutions. These solutions, including the experiences and Trial results, are included in the Portfolio of Solutions (PoS). The PoS can be consulted to find and select already available solutions to be trialled. Conducting Trials to test out solutions addressing the practitioners' gaps requires an intense interaction by all stakeholders: CM practitioners, solution providers, policy-makers, researchers and citizen representatives. This interaction is structured and facilitated by the main components of the Test-bed, namely the Trial Guidance Methodology (TGM) and the Test-bed Technical Infrastructure (TTI). Furthermore, this interaction is supported by the shared overview of solutions in the PoS. Using both the Test-bed and the PoS contributes to the shared understanding in CM. This shared understanding is reinforced by CMINE, the online platform on which all stakeholders can discuss about gaps and needs, Trials and solutions, share experiences and lessons learned, and generate new ideas. By inviting non-DRIVER+ stakeholders to the various events (Trials, I4CM, PRDR, Final Demonstration, Final Conference, workshops, CWA activities), information about the DRIVER+ results is disseminated throughout Europe leading to increased willingness to adopt the outcomes; in addition, by explicitly asking for feedback on the Test-bed and the PoS, the quality of these products has continuously increased, resulting in better addressing the project objectives. Finally, the shared understanding has strengthened the long-term sustainability of the Test-bed, the PoS and CMINE, with high potential for enhancing European CM capabilities.

For each of the objectives, the DRIVER+ project has delivered the following set of concrete outcomes:

A pan-European Test-bed for Crisis Management capability development

The DRIVER+ Test-bed comprises the following main components, which are described in more detail in the respective deliverables:

- Trial Guidance Methodology (TGM):
  - **D922.42** ***Handbook for systematic designing of trials*** (13)
  - https://tgm.ercis.org/
- Trial Guidance Tool (TGT):
  - **D922.42** ***Handbook for systematic designing of trials*** (13)
  - https://pos.driver-project.eu/en/gt/methodology/tool
- Test-bed Technical Infrastructure (TTI):
  - **D923.23** ***Reference implementation v3*** (14)
  - https://github.com/DRIVER-EU/test-bed
- Societal Impact Assessment Framework:
  - **D913.31** ***Societal Impact Assessment Framework – Version 2*** (15)
  - **D913.41** ***A guide on assessing unintended societal impacts of different CM functions - Version 2*** (16)
- Training Module (TM):
  - **D924.12** ***Materials for the training module II*** (17)
  - https://www.sisekaitse.ee/en/why-trial-guidance-methodology-and-training-module

A well-balanced comprehensive portfolio of Crisis Management solutions

The DRIVER+ Portfolio of Solutions comprises the following main components, which are described in more detail in the respective deliverables:

- Portfolio of Solutions (PoS):
  - **D933.41** ***DRIVER+ PoS database and guidance tools*** (18)
  - **D954.51** ***Portfolio of Solutions sustainability plan*** (19)
  - https://pos.driver-project.eu/en/PoS/solutions
- The CM Gaps Explorer
  - **D933.41** ***DRIVER+ PoS database and guidance tools*** (18)
  - https://pos.driver-project.eu/en/gaps

A shared understanding of Crisis Management across Europe

The shared understanding in Crisis Management across Europe has been enhanced by the development of a variety of outcomes (**D953.14** (6)), which are described in more detail in the respective deliverables:

- Crisis Management Innovation Network Europe (CMINE):
  - **D953.14** ***Enhancing the shared understanding of CM – Final report and way forward*** (6)
  - https://www.cmine.eu/
- DRIVER+ Terminology:
  - https://www.driver-project.eu/driver-project/terminology/
- Lessons Learned Library (L3):
  - **D530.1** ***Lessons Learned Framework*** (12)
  - https://l3crisis.eu/
- CEN Workshop Agreements (CWA):
  - **D955.31** ***Summary of conducted standardisation activities*** (20)
  - **D955.21** ***Report on DRIVER+ standardisation potentials*** (21)
  - CEN/WS 100 - CEN Workshop Trial Guidance Methodology (TGM)[1].
  - CEN/WS 099 - CEN Workshop on the Semantic and Syntactical Interoperability for Crisis and Disaster Management[2].
  - CEN/WS 101 - CEN WS Crisis management - Building a Common Simulation Space[3].
  - CEN/WS TER-CDM - Terminologies in Crisis and Disaster Management[4].
  - In addition, one Preliminary Work Item for ISO (on the Societal Impact Assessment Framework) has been proposed.
- A variety of events has been organized with numerous external stakeholders participating from throughout Europe:
  - **D952.12** ***Dissemination and Communication activities - Progress report- 1*** (22), **D952.13** ***Dissemination and Communication activities - Progress report- 2*** (23), **D952.71** ***DRIVER+ Final Conference*** (24), (5), (6) (4).
  - Gaps Assessment Workshop (GAW).
  - Two Innovation for Crisis Management (I4CM) events.
  - One DRIVER+ User workshop.

[1] https://standards.cen.eu/dyn/www/f?p=204:110:0::::FSP_PROJECT,FSP_ORG_ID:71429,2625694&cs=124BA791820D5FFD98F7B289F00C24EFE

[2] https://standards.cen.eu/dyn/www/f?p=204:110:0::::FSP_PROJECT,FSP_ORG_ID:71430,2625693&cs=1EEED7D019BB56DC8D5A78ADDC4DA441E

[3] https://standards.cen.eu/dyn/www/f?p=204:110:0::::FSP_PROJECT,FSP_ORG_ID:71431,2625696&cs=18FB42E54ED0FEC7174225 20B3A6D9C8E

[4] https://standards.cen.eu/dyn/www/f?p=204:110:0::::FSP_PROJECT,FSP_ORG_ID:67669,2266085&cs=1FC3B90DEC835A9A367F6AD1774CE5FA0

- Three Policy-Research Dialogue Roundtable (PRDR) workshops[5,6,7].
- Four Trials[8,9,10,11] .
- Final Demonstration (including VIP event).
- Final Conference (including VIP event).
- CoE training workshop.

Finally, a pan-European network of Centres of Expertise (CoE) has been established, including the CoE toolkit supporting organisations in becoming a CoE.

- Pan-European Centre of Expertise and CoE toolkit:
  - **D954.41** ***DRIVER+ Test-bed sustainability plan*** (7)
  - **D954.51** ***DRIVER+ Portfolio of Solutions sustainability plan*** (19)
  - https://www.driver-project.eu/centres-of-expertise-coe/

Conclusion

Based on the regular Technical Reviews organised by REA, and the final reports from both the Advisory Board (AB) and the Ethical and Societal Advisory Board (ESAB), it can be concluded that DRIVER+ has successfully met all three objectives. Reflections on how these objectives have been achieved, including the lessons learned, will be described in the next section.

[5] https://www.driver-project.eu/wp-content/uploads/2019/05/DRIVER_PRDR1_position-paper_FINAL.pdf
[6] https://www.driver-project.eu/wp-content/uploads/DRIVER_PRDR2_position-paper_v1.pdf
[7] https://www.driver-project.eu/wp-content/uploads/2020-04-29_DRIVER_PRDR3_position-paper.pdf
[8] https://www.driver-project.eu/wp-content/uploads/2020/03/Summary-Trial-1_final.pdf
[9] https://www.driver-project.eu/wp-content/uploads/2020/03/Summary-Trial-2_final.pdf
[10] https://www.driver-project.eu/wp-content/uploads/2020/03/Summary-Trial-3_final.pdf
[11] https://www.driver-project.eu/wp-content/uploads/2020/03/Summary-Trial-4_final.pdf

3. Lessons learned

This section includes reflections on how the project objectives have been achieved. This is structured along the following, partly overlapping, categories: restructuring/suspension phase (Section 3.1), general project management and coordination (Section 3.2), quality management (Section 3.3), risk and issue management (Section 3.4), project approach (Section 3.5), informal management and teamwork (Section **Error! Reference source not found.**), internal communication (Section 3.7), and Public Relations, dissemination and communication (Section 3.8). For each category, the main observations and experiences are described, followed by a summary of the strengths and weakness, and finally the identified lessons learned reflecting these. The section concludes with an overview of all lessons learned (Section 3.9).

3.1 Restructuring/suspension phase

The previous phase of the project was suspended in June 2016 (M27). Suspension is a drastic measure taken by REA and is the final intervention before deciding to terminate a project. Already during the previous phase of the project, REA requested for a restructuring of the DoW: this restructuring was conducted in parallel with the ongoing work. However, this turned out to be too complicated for the former project team. Therefore, REA decided to pause the project and decreed a suspension.

The suspension lasted from June 2016 till September 2017 (M27-M41) and during this period the project conducted a major restructuring and transformed into DRIVER+. This restructuring phase was an intense and dynamic period for practically all partners. At the time of the suspension still some beneficiaries from the previous phase were involved who eventually decided later on during that period to withdraw from DRIVER+. During the suspension phase, new partners were approached, selected and integrated as beneficiaries in the DRIVER+ consortium. In parallel, the DoW was completely restructured: a limited number of SPs and WPs, better and stricter alignment with the three main project objectives, structured links and relations between the various SPs to avoid stovepipes, clearly defined and described management structures as well as roles and responsibilities, and strict quality management processes.

Although in the beginning a rather small group of partners took the lead in this restructuring phase, relatively soon after, all other partners were actively involved. This required a lot of coordination and harmonisation, but in the end resulted in a strong commitment of all partners to the new DoW. With the negative experiences of the previous phase of the project still in mind, there was initially (and quite understandably) lack of trust between some partners. However, during the long and good working sessions which were well structured and facilitated, mutual trust and understanding increased considerably and each one's roles and positions were accepted. With the new leadership established in the PCT and PMB, everyone was confident the new project team would be able to deliver the expected results.

Immediately after the new PD and TC were selected during a General Assembly (GA), contact was established with the PO. From that moment on, the PO was constantly updated and consulted on new developments regarding the DoW and the consortium. The originally assigned REA reviewers remained involved and two additional reviewers were added to the review team. In this way, REA was well positioned to assess the progress of work and to conduct the evaluation in order to decide to lift the suspension. In addition, selected members of the Advisory Board were also asked for strategic advice on how to best proceed.

In order to make a brand new start and to convey the message to the outside world that after the suspension the project is really different from the previous phase, it was decided to change the name of the project into DRIVER+ and to implement a completely new branding (including visual identity) of the project and the supporting communication products.

Strengths:

- The restructuring phase created a strong sense of urgency and joint ownership.
- This transition phase from the previous phase of the project to the new DRIVER+ reinforced the team-work and mutual respect.
- The withdrawal of some beneficiaries led to the involvement of new partners, also on key positions within the project. New project partners, new staff and new leadership resulted in a stronger project team.
- Close and coordinated alignment between the project leadership and REA.
- Similar experts (PO, REA reviewers and selected AB members) to assess the progress achieved.

Weaknesses:

- The restructuring phase took a long time and required a huge investment in time and effort from the beneficiaries. Several smaller-sized organisations (SMEs) and NGOs had difficulties in mobilizing staff during this period as none of the costs would be reimbursed by the EC. With some financial compensation, their involvement might have increased and thus the quality of the restructured DoW enhanced.
- Due to the long period of the restructuring process including the time needed for REA to assess the new DoW (14 months), the uncertainty increased with several partners on how long the situation would eventually last. This long period may have led to the decision of some former beneficiaries to leave the consortium.

Lessons learned:

- Suspension of a project can be a valuable intervention to reinforce the quality of the project team.
- Beneficiaries need to be highly motivated to restructure a project as this requires a large financial investment from their side.

3.2 General Project Management and Coordination

During the suspension phase, the project has been restructured considerably. The number of Subprojects and Work Packages has been decreased and was more directly aligned with the three main project objectives. The management and coordination were well-defined in the governance structure and procedures of the project. DRIVER+ had a three-level organisational structure (project, SP, WP), each with its own leadership, and several additional bodies: AB/ESAB, SB, Review Board, CMINE Steering Committee, Trial Committees, Terminology Working Group. Having well-described roles of these bodies at the start was important so it was always clear for all consortium partners whom to reach out to (**D911.10 *Updated Project Handbook*** (25)).

Some level of redundancy is unavoidable and also provided for the back-up of key positions that is necessary for contingency reasons. During the project several key positions have changed. Within the respective organisations, this process was carefully organised so the best person was positioned to take over a specific role. Having a clearly defined governance structure and role descriptions supported the smooth inclusion of the new person in the project team.

In addition to the formal bodies, temporary task forces were established, such as the sustainability task force, the Terminology Working Group (TWG) and the TGT-TGM working group. The main reason was that some difficulties were encountered that required more intense alignment or additional coordination between SPs and WPs. These ad-hoc cross-cutting and temporary groups created additional work for the partners involved, and worked out rather well. However, in the end their continuity was a bit diffuse: in some cases the work was taken up and implemented by the regular WP teams and these ad-hoc groups kind of faded away with no formal ending.

A shared understanding of project objectives, aimed results and expected impact within the consortium was key in establishing good internal and external collaboration. The definition of User Stories was very helpful in this respect (see Section 3.7). The establishment of a Terminology Working Group that has defined and published terms throughout the project and the consequent application of these term in each deliverable and project output was instrumental in this.

Following the experiences of the previous phase of the project, a strict and frequent reporting and review process was agreed upon with REA. Detailed KPIs were defined and agreed upon with REA (**D911.71 *Quality and KPI Plan*** (26)) and updated on a regular basis. The project progress was reported every three months via project-wide management reports or SP coordination reports. Technical Review meetings took place every sixth months. Minutes were written of all meetings and delivered to REA in dedicated deliverables per SP every six months. Although time-consuming for all involved (the project consortium and REA), everyone understood the need for this after the suspension phase, and it has been important in monitoring the progress, receiving frequent feedback from REA, and getting the project back on track quickly after the suspension. It forced all partners to continuously monitor progress against plan, and identify and respond to issues timely. Recommendations from REA were received after each Review meeting, and follow-up status was reported upon soon after. Furthermore, all progress reports helped the WP, SP and project leaders to create a better situational awareness and to take measures to align activities or intervene where needed.

In addition to the financial reporting at the end of each reporting period (12-15 months), all partners had to report their spending of efforts (person months) against plan, and forecast their spending for the upcoming six-month period. The data was monitored by SP leaders and by the project leadership. This process was time-consuming, but provided crucial info on progress and deviations from the plan. E.g. an underspending in several areas of the project was identified in a timely manner and budget was re-allocated to optimize the impact and sustainability of the project outcomes.

Every two weeks the PCT and PMB members had a meeting to discuss the progress of work, risks, issues, and upcoming events. In this way, the continuous alignment between SP-related activities was achieved and prevented the SPs to become isolated stovepipes. The involvement of the Technical Coordinator was key to this integrated approach as he participated in most of the project's bodies. In addition, he had individual meetings with the SP leaders every two weeks and frequent bilateral meetings with other key persons in the project. This resulted in an early identification of risks, determining the most adequate mitigation measures and interventions, and preparing for important project decisions.

In addition to the six-monthly review meetings, conference call meetings were held between the project leadership (TNO and ATOS) and the PO every month to update the PO on the progress and discuss issues in a timely manner. In between meetings, contact was frequently established by mail or phone with the PO to update him on major issues, risks and activities, to ask for advice or approval for changes to the DoW. Recommendations from REA following up on every six-month review were all implemented and the progress of this implementation was reported upon, which resulted in re-establishing the trust of the reviewers in the project team which was damaged during the previous phase of the project.

The PO and the REA reviewers were highly committed in supporting the project and provided many and constructive recommendations and feedback: not only during formal technical reviews, but also after important project events, like a Trial, PRDR and I4CM. There was an open and transparent relation between the project leadership and the PO and a high level of mutual trust and respect.

Once every approximately eight months the project organised meetings with the AB/ESAB and SB. These boards consisted of high-level experts whose advice and recommendations were implemented and used to improve the quality of the work. During the course of the project, some AB members appeared to be less available than expected and together with the AB chair it was decided to have them replaced by new members. The negative effect was that it took some time to bring these new members up to speed regarding the objectives and outcomes of the project. On the other hand, these fresh eyes and high-level experts really provided added value to the project team. It was positive that several members of the

AB/ESAB, including the chairs were the same as during the previous phase of the project and remained in position till the end of the project.

During the restructuring of the DoW during the suspension phase, it was decided to put the Trials at the heart of the project. The Trials forced the project to be very practical and have products of added value to the practitioners already in an early stage. In the Trials all project results and objectives were combined in an integrated way. The scheduling of the Trials throughout the project and the detailed planning and preparation required for each Trial strongly enhanced a cross-SP planning and collaboration and achieving synergies. Moreover, systematically collecting and sharing the lessons learned after each Trial not only lead to mutual learning between Trials, but also improved development of the main DRIVER+ products (see also **D941.31** (4)).

Societal impact and research ethics have been strategically embedded in **SP91** ***Project Management***, to make sure this was addressed systematically within all project activities. A specialised partner coordinated these activities and for all consortium partners it was crystal clear whom to reach out to. A dedicated Ethical and Societal Advisory Board (ESAB) has been established for expert support. During meetings with the ESAB, research ethics issues and questions were discussed that are relevant to the project and have been mentioned by partners in the regular ethical monitoring reports. In addition to research ethics, the board was also consulted on societal impact issues when relevant. The implementation of GDPR amid the project represented some challenges. These are described at length in several previous deliverables such as **D913.12** ***Ethical Approval*** (27) and **D913.13** ***Ethical Monitoring Report*** (28). In the end no critical issues relating to research ethics or societal impact have been discovered in the project, that were not quickly resolved (**D913.22** ***Minutes of Ethical and Societal Advisory Board 3 and 4*** (3).

On the one hand the planning of the project activities was highly structured, yet on the other hand the team was able to adapt and evolve to external conditions and feedback. This flexibility was achieved by delivering prototype versions of the outputs early on and on a regular basis, collecting feedback (from the PO, REA reviewers, AB/ESAB and other external stakeholders), and adjusting the development of the outputs accordingly. If this resulted in adjustments of the planning, it could be easily justified and communicated with the PO.

It can be concluded that the project worked as a well-oiled machine. The project has been coordinated in an effective and efficient way. This was not only mentioned by consortium partners, but also reported by REA and the project's Advisory Board.

Strengths:

- The management and coordination were well-defined in the governance structure and procedures of the project. The layered approach with strong coordination team (Contractor, PD, TC, QM, ECM) and the PMB with the SP leaders, worked well. The Updated Project handbook was very clear and easily accessible via the CoW as a report and interactive webpage.
- Strong and inspirational leadership of TC, PD and SP leaders.
- Replacement of key personnel was smoothly accommodated.
- The establishment of temporary bodies, in addition to the formal bodies, was useful to resolve cross-SP issues.
- The high frequency of (bilateral and group) meetings at all levels within the project, resulting in a shared understanding of vision, objectives, outcomes, activities and planning.
- The intense monitoring of the efforts, planned activities, KPIs and progress, and receiving frequent feedback from REA supported the project team in steering the project adequately, and still remain flexible.
- The high involvement and constructive feedback of the PO and the REA reviewers.
- The open and transparent relation between the project leadership and the PO and the high level of mutual trust and respect.
- Having a committed AB, ESAB and SB with expert members.

- Joint meetings between the AB and ESAB, leading to fruitful discussions about ethics, science and science communication in the context of Crisis Management.
- The requirement, guidance and support to do research ethics were well-integrated within the project as a whole; the responsible partner handled communication on the content and the 'need' for ethics (including terminology and procedures) very well which greatly contributed to partners' opening up and embracing ethics.

Weaknesses:

- The administrative burden of progress reports, coordination reports, technical reviews, effort reporting, even at task level, was a time-consuming process for all involved (the project consortium and REA).
- It still took some time to achieve a shared deep understanding of the project outputs and expected impact, as this goes, to some extent, beyond the description in the DoW.
- The continuity of some ad-hoc cross-cutting and temporary groups was a bit diffuse.
- Both the AB and SB had a strong interest in the sustainability of the project outcomes; for the project partners involved in the consultations by these two bodies, parts of these meetings were perceived of as redundant.

Lessons learned:

- Having well-defined project management structures and roles and responsibilities is essential, especially for a project with many beneficiaries and a large staff; this facilitates the accommodation of new staff and the replacement of key staff in particular.
- The establishment of temporary bodies, in addition to the formal bodies, was useful to resolve cross-SP issues; nevertheless, the duration of their existence should be clearly determined.
- It is key for the team to formulate and stick to an overarching vision (including project objectives, outcomes and expected impact), and to communicate this vision frequently, to avoid getting lost in the details. A well-agreed vision facilitates the communication to, and collaboration with, external stakeholders.
- The efforts (PMs, budget) were monitored on Task level. Perhaps this high level of detail was appropriate in the first phase after the restructuring, yet when the project was on track the time-consuming process sometimes felt as an overkill.
- Flexibility of planning is essential; defining key milestones are helpful in remaining focused on the main outcomes to be achieved.
- Determine the scope of the project's advisory bodies as distinct as possible, or otherwise decide to merge these bodies.
- Basic advice and support with research ethics is still vital to (applied) research projects, even though it is not a new challenge.

3.3 Quality Management

At the start of DRIVER+, as part of the quality management framework, many different management and content-related KPIs were defined. These KPIs were, together with the PO, continuously updated and adapted in line with the developments and progress of the work. It took quite a lot of time to establish these KPIs and initially created some confusion monitoring them. Based on the assessment of the KPIs, a traffic-light system was used to easily track the progress and quality of the work at WP level. Its purpose is to show progress and make it clear/transparent when specific intervention/re-orientation is needed. The system works as described in Figure 3.1. By applying the traffic-light system on a three-monthly basis, progress on objectives is monitored over time, and potential corrective actions can be taken in a timely and due manner.

Instrumental to the high and consistent quality of the deliverables and other project outputs were the well-structured document templates. For different types of documents (technical deliverable, management and coordination reports, minutes of meeting, agenda, deliverable review sheets, etc.) templates have been defined and updated. It was fairly easy for SP leaders and deliverable leaders to include all relevant information in a consistent and harmonised manner. In addition, a template for power point presentations has been developed.

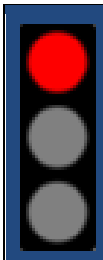
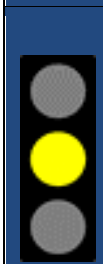
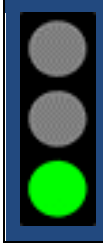
	**Description** Red light in the document significates that there are important issues with the work package. The work package requires corrective action to meet its objectives and the issue cannot be handled solely by the work package leader. One or more aspects of work package viability – time, cost, scope – exceed tolerances set by the DoW. **Action** The matter should be escalated to the PD and PMB immediately.
	**Description** Orange light in the document significates a problem that has a negative effect on the WP performance, but that the problem can be dealt with by the work package Leader or work package partners. Action is taken to resolve the problem or a decision made to watch the situation. One or more aspect of project viability – time, cost, scope – is at risk. However, the deviation from plan is within tolerances assigned by the DoW. **Action** The PD and the PMB should be notified.
	**Description** Green light in the document significates that the WP is performing according to plan. All aspects of WP viability are within tolerance. **Action** No specific action needed.

Figure 3.1: Traffic-light system

There was no formal review and quality management process in place for outputs other than deliverables, namely presentations, position papers, Trial summaries, websites, online tools and external publications. For external publications this was a deliberate decision as in most cases these documents are peer-reviewed by the respective organising committee. For the position papers following the PRDRs, the Trial summaries, as well as the CMINE Task Group roadmaps/reports, an internal review process was established ad-hoc. For the communication materials (newsletters, press releases, videos, hand-outs material), reviews were mainly conducted by the **SP95** leadership and the TC and this worked well. For some online tools, an additional check on the quality would have been useful. As translations of the main project outcomes were initially not foreseen, no quality assurance process was installed; nevertheless, when these translations were decided for, the **SP95** leadership established this swiftly.

Many different terms are used with varying definitions: not only in the CM domain as such, but also within the DRIVER+ consortium. In order to agree upon the terms, definitions and abbreviations to be used within DRIVER+, the Terminology Working Group (TWG) was established. The TWG followed a structured process in identifying, selecting and deciding on the adoption and definition of specific terms[12]. The list with terms,

[12] https://www.driver-project.eu/driver-project/terminology/

definitions and abbreviations was published and regularly updated on the project internal SharePoint and the public project website. It was mandatory to use this list to include relevant terms, definitions and abbreviations in each deliverable; the QM checked every deliverable on this aspect leading to a harmonised language across all DRIVER+ deliverables. Besides, the Interactive Terminology for Europe (IATE), being the EU's terminology database, has agreed to implement several Crisis Management terms and definitions as established by DRIVER+.

Strengths:

- The KPIs were useful in assessing the performance, and the traffic lights set for each WP provided a useful project wide overview.
- Well-structured document templates.
- Clearly defined deliverable production timeline and internal review process.
- Strong leadership and dedication to perfection of the QM.
- Teamwork within the Review Board, and between the RB members and the deliverable authors.
- Ad-hoc established internal review processes for other outputs worked well.
- Structured and high-quality process of establishing the DRIVER+ terminology.

Weaknesses:

- The quite high total number of KPIs.
- Establishing ad-hoc internal reviews for position papers and online tools required additional flexibility of involved staff, with the risk of burdening the QM staff.

Lessons learned:

- Define templates for the deliverables and other important outputs like papers, reports, handouts and presentations.
- Specific content-related KPIs are helpful for the consortium while generic management-related KPIs are regarded more useful for REA.
- QM is quite an administrative workload, but allocating sufficient time for producing, reviewing and submitting deliverables is worth the effort.
- Establish a good process for reviewing other types of outputs as well (especially dissemination material, position papers and online tools).
- Establish an internal review board supporting the authors in addition to a layered review and approval process.

3.4 Risk and Issue Management

At project and SP level, risks and issues were identified, monitored and mitigated. These were divided in more generic managerial and content-specific ones. In the management and coordination reports these were all reported upon. At the SP level, the main risks and issues were dealt with by the Subproject Coordination Committee (SPCC). In dedicated cross-SP governance bodies, like the Trial Committees, the TGT-TGM working group and the Review Board, risks were discussed upon intensively. During the PCT and PMB meetings high-impact SP risks and issues as well as risks on project level were discussed. When needed, non-PMB members were invited to give updates on specific risks (e.g. Trial Owners and hosts, Final Demo organiser). In addition, the TC had frequent bilateral contact with SP leaders and other key personnel, and was involved in many of the cross-SP governance bodies; this enabled him, together with the key members involved, to quickly react and anticipate on (emerging) risks. Furthermore, the escalation of issues and risks towards higher management layers worked well.

During the course of the project not too many, but still some high impact risks emerged. These are briefly described next:

- The first originated from an opportunity, namely to combine one of the Trials with a European Civil Protection Exercise. This resulted in the need to change the timing of the particular Trial and to swap it with another Trial. This decision had a big impact on many partners and external stakeholders. In the end it was managed in a satisfactory way for all involved organisations.
- The second risk was related to the location of the Final Demonstration (FD). Originally it was the intention to host the FD in two countries, with one hosting the back-up facility of the ERCC (who was the main actor and stakeholder of the FD). Unfortunately, due to heavy autumn storms, this facility was severely damaged and not available anymore. Together with the involved partners and former Trial Hosts, it was managed to arrange for both an alternative location for the ERCC and to still have a two-country setting implemented.
- With the onset of the COVID-19 crisis, a comprehensive risk assessment was performed regarding the activities to be conducted till the original end date (30/04/2020) of the project. These risks were related to the submission of remaining deliverables, translations of key outcomes, sustainability of the outcomes, and the establishment of the CoE network. This resulted in an extension of the project duration by two months, till 30/06/2020.

One important risk was that key personnel could leave the project hindering a smooth progress of the work. In all cases, the respective beneficiary carefully selected new staff for the respective position regarding the required skills and competence. In addition, ample time was reserved for a proper handover to the new staff. In the case PCT and PMB members were about to leave the project, the TC and PD were informed about this at an early stage so that potential risks could be communicated with the PO. During the project, and actually already directly after lifting the suspension phase, several key staff has changed: PD, QM, ECM and the leaders of two SPs. In all cases, the new key members were well introduced in the consortium with no negative impacts. Moreover, deputy staff was in place for all key roles.

The project followed a very dynamic and high intense process. After the suspension phase, every single project member was aware of the high attention received by REA, resulting in an intensified management and quality control. In addition, many milestone events (e.g. Trials, I4CM) were scheduled during which intermediate version of the products had to be applied and/or demonstrated. In addition, a high number of deliverables (both management and technical) had to be prepared and submitted meeting the high quality standards. This all resulted in quite a high workload with the risk of dropping out. During the meetings in the various governance bodies, it was checked on a regular basis whether not only deadlines could still be achieved but also if the workload within the teams was still manageable.

During the course of the project, some partners were performing at a lower level as expected. In most cases this did not negatively impact the overall work conducted within the project and was related to contributing to specific tasks or deliverables. Nevertheless, it was acted upon by the respective SP leader after consultation with the TC. These partners acknowledged their low performance and were willing to improve their contributions. In other cases more formal interventions were implemented by the TC on behalf of the PCT/PMB: one time by sending a formal letter to the management of the beneficiary after several discussions, and in another case a bilateral meeting with the senior management of the respective organisation. In both these cases this resulted in an improvement by adding additional staff to the project team or to shift roles and responsibility within the team. In a third case the discussions did not result in a structural improvement, so the total number of PMs effort of the respective partner was decreased.

In only one case the low performance of a partner with a crucial role in the dissemination and communication was a serious risk to achieving the respective KPIs. Initially this was compensated for by the SP lead, but this additional effort could not be maintained. After several discussions and attempts to support them in improving their performance, the PMB decided to reallocate specific roles and the associated PMs to another beneficiary.

A formal escalation and declaration of underperformance has never been decided for. Main reasons were that the respective beneficiaries were still highly motivated to improve, and were performing well in the

other tasks they were involved in. In only one case there would have been a good ground for such a declaration; however, as this was a beneficiary with only minimal involvement in a non-critical task, it was decided not to follow this path for efficiency reasons: it would have taken a lot of effort and bureaucratic overhead without contributing to the identified solution.

Strengths:

- Frequent bilateral and group discussions at project, SP and WP level, resulted in early identification of (emerging) risks and issues.
- Most risks, as well as the most important issues, have all been mitigated.
- Conflicts with lower performing partners were established in a respectful manner, keeping everyone on board.

Weaknesses:

- Compensating for a less performing partner camouflaged the risk; if a firmer intervention would have been taken sooner, this might have led to a faster and in the end more effective solution.

Lessons learned:

- Frequent discussions at all levels leads to an early identification of (emerging) risks, and to an early mitigation strategy.
- With an open and transparent project culture, it is easier to discuss lower performance in a constructive way and implement acceptable interventions.

3.5 Project approach

The overall project approach of DRIVER+ is built on three main pillars: (1) practitioner centred approach, (2) multiple perspectives and inclusive approach, and (3) focus on sustainability. These will be discussed next in the following sections.

3.5.1 Practitioner centred approach

The main target group of DRIVER+ were the European Crisis Management practitioners. In order to come up with tools and methods that could be used to improve their way of capability development and innovation management, it was decided to address relevant and validated gaps that are of immediate concern to the practitioners. This would increase the willingness and relevance of practitioners to actually engage in the project activities. For that reason, a Gap Assessment Workshop (GAW) was organized during which practitioner gaps were validated as a basis for the project activities (**D922.11** ***List of CM gaps*** (29)) also involving CM experts external to the DRIVER+ consortium.

The Trials and the Final Demo took a central place in the project. These were the main milestones during which prototypes of the main outcomes could be co-created and tested together with practitioners (see **D941.31** (4) for a more detailed overall analysis of the Trials and FD). During Workshop 0 and the updated W0, the specific gaps and research questions for each of the Trials were elaborated on with the Trial hosts and Trial owners strongly in the lead. Based on this, the Call for Applications (CfA) and solution selections were implemented, involving additional practitioners both from within and external to the consortium (**D942.11** ***Report on review and selection process*** (30), **D942.12** ***Report on review and selection process (trial 3-4-demo)*** (31). During the further preparations of the Trials, the practitioners strongly remained in the driver seat, supported by the other project members, creating realistic Trials addressing their identified gaps. During this co-creation process, the main DRIVER+ products like the TGM and the TTI were developed taking as much as possible into account the practitioners' language and way of working and thinking: these practitioner experiences were used to further update the next prototype versions of these products. Additional feedback from practitioners who participated in the Trials as observers and evaluators further

enhanced this process. Inviting practitioners external to the consortium to participate or observe during a Trial is a good way to experience what the project is doing and delivering, and how these may benefit their organisation.

It was experienced during the Trials that it was difficult to really adapt the work processes and operational procedures when introducing the innovative solutions. To a large extent this was caused by a lack of sufficient training time to learn about all relevant functionalities of the solutions and to familiarize with these. This was further hampered by the fact that during the DR1, DR2 and the actual Trial it was practically impossible to have the same group of practitioners involved. Trying to use the innovative solutions is already challenging, and in addition changing standard procedures only complicates this. Besides, in some cases the legacy solutions were still available on the Trial scene. In some cases, this resulted in practitioners falling back to these legacy systems or in a limited use of the innovative solutions. A good solution for this problem is to have the practitioners supported by staff of the solution providers: they did not really take over, but gave assistance and guidance to the practitioners in applying the solutions. Finally, during the Trials some practitioners had a strong tendency to be more focused on solving the crisis, rather than on trying out the innovative solutions. Several practitioners still regarded the Trial as some kind of exercise or training, despite the briefings before and during the Trial. Shifting their mind-set in this respect turned out to be more complicated than expected.

Trial Austria was organised and conducted in relation to the EU Civil Protection Exercise IRONORE. The idea behind this was to make efficient use of each other's resources and manpower, and to demonstrate how a Trial could be embedded in an exercise context. In the end, mainly due to organisational and logistical reasons, the link between these two activities was weaker than originally anticipated (**D945.12 *Report on Trial Evaluation – Trial 3***, (32)). On the one hand this weaker link ensured a smooth execution of the DRIVER+ Trial and ensured that the Trial was not hampered by the challenges the IRONORE exercise faced. On the other hand, making more use of the opportunity to link up a major exercise with a Trial, would have demonstrated a strength of the DRIVER+ approach that could have been broadly recognized as a game-changer in the field of Crisis Management and Civil Protection. The potential is still there, and this surely needs to be taken up and tried again by other project teams and/or practitioner organisations.

In the end, the project did not succeed in demonstrating that the Trials enabled practitioner organizations to actually close the identified gap and to support them to advance their capability development. Obviously, the project had a clearly defined scope and mandate, and the Trials mainly served as a way to test and improve the various components of the DRIVER+ Test-bed. In addition, many solutions improved considerably during the whole Trial process, because the feedback of practitioners was used to improve the solutions. Nevertheless, it would have been worthwhile to organise closer follow-up and support activities in the post-Trial phases, for example by proactively facilitating the continuous engagement processes between practitioner organisations and solution providers towards a potential procurement. In the end, a Trial is just one (yet new and important) element in the process of capability development and innovation management, but explicitly embedding it within this larger context, also within the frame of the project, could have generated valuable input for improving the Trial process and/or the link with the broader follow-up process.

Strengths:

- The development of the DRIVER+ products within the context of Trials, was based on validated practitioner needs, gaps and research questions.
- All main products developed within DRIVER+ are co-created with many different practitioners, stimulating the uptake of these products.
- Co-creation encompasses listening to, cooperating and interacting with, and learning from the practitioners; DRIVER+ did not impose any of the methods or tools.
- Implementing feedback from practitioners showed them that their opinion truly mattered.
- Having staff from the solution providers offering support and guidance to the practitioners in applying the innovative solutions compensating for a lack of training.

- Combining a Trial with the European Civil Protection Exercise IRONORE.

Weaknesses:

- Although the number, diversity and geographical distribution of practitioners involved is quite high, the number of practitioners from the Balkan region was still rather limited.
- The work processes and procedures were hardly adapted during a Trial following the application of the innovative solutions.
- The time for training and familiarisation with the innovative solutions, was in general too limited.
- Too weak link between the Trial and the EU Civil Protection Exercise IRONORE.
- The project did not succeed in demonstrating that the Trials enabled practitioner organizations to actually close the identified gap and to support them to advance their capability development.

Lessons learned:

- Co-creating products with practitioners takes time, but is in the end highly beneficial to the quality, acceptance and sustainability of these products.
- Knowledge-transfer is bi-directional: it not only goes from researchers and developers to the practitioners, but also the other way around.
- Having staff from solution providers assisting practitioners in applying innovative solutions, can compensate for a lack of familiarisation.
- Organising closer follow-up and support activities after conducting a Trial, increases the likelihood that practitioner organisations really close the identified gap, and use the project results to actually structure their capability development process and innovation management.

3.5.2 Multiple perspectives and inclusive approach

Achieving the project's objectives required the expertise and perspective of many different stakeholders. Within the consortium itself, partners represented practitioners, research and technology organisations, universities, industry, small and medium sized enterprises (SME), non-governmental organisations (NGO), coming from a wide variety of Member States.

During Trials and other events, many external stakeholders were invited to participate and reflect on the activities and (intermediate) outcomes. As described in more detail in **D912.21** (1), at the launch of DRIVER+ the key target of an open and inclusive approach was introduced, together with plans for significant efforts to be dedicated to the involvement of external stakeholders in the project activities. External Cooperation was considered a cornerstone for the success of DRIVER+, and the role of an External Cooperation Manager (ECM) was established as part of the Project Coordination Team (PCT).

The focus of the External Cooperation activities was originally the involvement of external stakeholders, practitioner and solution providers, specifically in the DRIVER+ Trials. Along the implementation of the project however the External Cooperation activities have developed, expanded and considerably increased compared to the original plan. The value of involvement of stakeholders external to the DRIVER+ consortium in a much wider range of activities than the project Trials has been recognised, and the project has acted upon these indications and adapted the External Cooperation activities to maximise the input and value of such collaborations to further the impact and sustainability of the project outcomes.

The involvement of external solution providers and external observers in the Trials, assured that the project based its work on the latest developments in industry and the wider community of experts. Opening the Trials up for external solution providers prevented the consortium for implementing only solutions coming from project partners, which resulted in having solutions better fitting the practitioners' gaps and research questions.

Within each Trial only a subset of all practitioners, solution providers, researchers, developers and policy makers the project was connected to, could be involved. Therefore, each Trial was followed by a dedicated

lessons learned meeting requiring the participation of all involved stakeholders (see **D941.13** (4)). During these lessons learned meetings, all aspects of conducting a Trial were critically reflected upon, and the report shared with the other Trial Committees. In this way, the perspectives and experiences of one Trial were transferred to the other Trials.

The Portfolio of Solutions was explicitly opened up for external solution providers, and was intentionally not restricted to solutions coming from only consortium partners. Initially, convincing external solution providers to implement information about their solutions in the PoS was rather difficult: it took quite some time to include all required information and it was not always obvious which information was needed. In addition, some providers who developed their solutions within the context of other research projects, regarded the PoS as a database from a competing project, and even establishing only links with sites of other projects did not always succeed. A manual describing how to implement information, as well as a tutorial demonstrating this, enhanced the population of the PoS. In the final stage of the project, a 'solution support team' established by the respective SP leader, initiated the implementation of solutions into the PoS, and contacted the solution providers afterwards for their approval. This proved to be a far more effective and efficient approach for increasing the number of solutions in the PoS.

Opening up for multiple (external) perspectives provided for a continuous critical reflection on the steps taken in the design of the DRIVER+ products and the approaches followed in events like Trials. DRIVER+ has organized a series of events to actively reach out to external experts, supporters and potential adopters: two I4CMs, three PRDRs, a User Workshop and the Final Conference. Furthermore, several presentations and exhibitions have been attended to demonstrate and present the (prototype) results, amongst others the Security Research Event (SRE), the DRMKC annual event and CoU events. In addition, all members of the Advisory Board (AB) and Ethical and Societal Advisory Board (ESAB) were external experts representing relevant stakeholders who gave their independent feedback and recommendations on all aspects of the project; in addition the external members of the Sustainability Board reflected on the sustainability approach of the project.

All in all, intentionally looking for and including multiple perspectives eventually resulted in products that are useful for a wide community. In order to stimulate the inclusion of External Cooperation Management in future projects, a WP template has been developed that can be used by other projects (see Annex 2).

Strengths:

- Key to the success of the high level of involvement of external stakeholders was the role of a dedicated External Cooperation Manager and supporting team, along with the procedures, instruments and budget that were established to this end.
- The great variety of stakeholders, both within and outside the consortium brought together a variety of visions, knowledge, skills and networks that made the project outputs useful for a wide community. Involvement and feedback of external stakeholders resulted in a higher quality and better acceptance of the products, and contributed to the credibility of the project in the CM and DRM community.
- Mutual learning between the Trials.
- Having External Cooperation coordinated by the same beneficiary leading the Dissemination & Communication activities, has led to a harmonized external profile and reach out of the project.
- Opening up the PoS for external solution providers.
- Establishing a solution support team, taking the initiative to search for and implement solutions in the PoS.

Weaknesses:

- ECM is quite an administrative workload.
- With many different stakeholders involved, it takes more time to speak the same language, to align the different approaches and to clarify the mutual expectations.
- Initial instructions on how to implement solutions in the PoS could be improved.

Lessons learned:

- Understanding and alignment of the diverse expectations of the many different stakeholders is a valuable, yet time-consuming and continuous effort.
- Deliberate and pro-active effort (via meetings, workshops, Trials, questionnaires) should be undertaken to include multiple perspectives.

3.5.3 Focus on sustainability

Sustainability was a dedicated WP within the project. As described in **D954.41** (7), sustainability has been at the heart of DRIVER+ since the very beginning. The project has followed an open source policy, meaning that all outcomes should in principle be freely available for all interested stakeholders. All of the key project outcomes have been developed, used, tested and evaluated iteratively during various cycles, mainly following the four Trials and the Final Demonstration that have been conducted. Especially the experiences of the practitioner organisations, also external to the project, were taken into account to enhance the future uptake of these products. Also, other organisations were not only supported in applying the main DRIVER+ outcomes and sharing their experiences, but also stimulated to use the outcomes (for more details, see **D912.21** (1)).

A core team dedicated to sustainability has been established, comprising selected DRIVER+ consortium partners, giving guidelines and recommendations to the teams working on the key outcomes, to ensure the sustainability of these project outcomes. However, halfway the project the complete team of the main responsible partner has changed. This hindered their understanding of the products and their potential usage, and it took quite some time for the new staff to get fully up to speed regarding the ongoing development of all DRIVER+ outcomes, and how to best stimulate their sustainability. This may have had a negative impact on their perceived effectiveness by the development teams of the DRIVER+ products.

By allocating a dedicated WP to the issue of sustainability, it was the intention to give it a key position within the project. It was positioned as a WP within the SP on 'Impact, Engagement and Sustainability'. Looking in hindsight, having a dedicated WP on sustainability was a good choice. However, embedding it in the respective SP may have been a less well decision. Given the importance of sustainability, it may have been a better choice to have it embedded within the SP on 'General Management', like was done with ECM and SIA. In this way, it could have had a more strategic relation with the overall management as well as ECM.

In addition, a Sustainability Board has been established with both DRIVER+ consortium members (practitioner organisations and SP leaders) and selected external experts coming from practitioner organisations and business (see **D953.11** (33) and **D953.12** (34)). This Sustainability Board has reviewed and steered the work done by DRIVER+ with regards to sustainability.

One of the key principles that has characterised the approach to sustainability was the continuous collaboration between **WP954** and the respective Subprojects within DRIVER+ (especially those in charge of the Test-bed and the Portfolio of Solutions) in the definition of next steps as well as in shaping adoption strategies (including the concept and profile of CoEs). To some extent, this approach had to be flexible in order to adapt to potential new developments and insights resulting from the research and work that has been carried out within the project, but also in order to take fully on board external developments (like the rescEU legislation[13]). Developing the DRIVER+ products and finding ways to enhance and promote the sustainability, was a continuous balancing between scientific rigour on the one hand and applicability on

[13] Decision (EU) 2019/420 of the European Parliament and of the Council of 13 March 2019 amending Decision No 1313/2013/EU on a Union Civil Protection Mechanism

the other. Obviously, the development of the products had to follow a scientifically robust approach, yet should not hinder the engagement of the practitioners during the co-creation process.

During the project, only a limited number of disaster risks and practitioner gaps could be addressed during the Trials, yet the results should be applicable to a wide variety of crisis situations. The intention was to have all products coming out of the project to be used as easily as possible. Therefore, various animations, videos, webinars, tutorials and training modules have been developed, and an international User Workshop organised. To promote and strengthen the outreach to potential adopters, sustainability was a core objective for the communication team (see **D952.14** ***Dissemination and Communication activities – Final report*** (35)).

In order to facilitate the uptake and implementation of the DRIVER+ outcomes, Centres of Expertise have been created. A CoE is a practitioner-centred organisation having a central (national) role in the capability development and innovation management of practitioners. A Centre of Expertise will act, whenever relevant and possible, as an intermediary between practitioner organisations and (applied) research organisations, solution providers, public administration and policy-makers in the Crisis Management and security domain. In order to work together within this innovation ecosystem, an exchange of information, results and experiences between all stakeholders, projects and knowledge networks should be facilitated. With this purpose in mind, the DRIVER+ pan-European network of Centres of Expertise has been established. As the implementations and experiences will vary from organisation to organisation as well as between Member States, this CoE network will gather and share lessons learned, and, if necessary, adapt the respective DRIVER+ outcomes to organisational and/or national contexts. Sharing these experiences and lessons learned within the pan-European network of CoEs is crucial. Only then a shared understanding in Crisis Management and a shared approach in practitioners' capability development can be achieved and further improved.

The identification of the individual CoEs has started in the final year of the project. It was quite natural that some of the practitioner organisations who were members of the DRIVER+ consortium were the first ones to raise their interest. This was followed by discussions with additional practitioner organisations outside of the consortium who were already involved in project activities (e.g. Trials, PRDR, I4CM). The question is whether this process could have been accelerated. Experience so far has been that the products to be adopted by CoEs need to be in a pretty final status of development in order for them to make the decision to become a CoE. Furthermore, establishing the network of CoEs required some formal arrangements to be described in Terms of Reference (ToR). At the time of submitting this deliverable (May 2020), the draft ToR is being decided upon by the CoEs, based on the various functions the CoE network should be fulfilling, namely: (1) Exchange of information and experiences, (2) Network management, (3) PR, dissemination and communication, (4) Stakeholder management, (5) Funding the network, and (6) Collaboration. Although the ToR were formulated as light and lean as possible, it still required some formal processing (and thus time) within the involved organisations. Besides, as a result of the COVID-19 situation, many CoEs are actively involved in responding to this crisis, with limited time available for joint meetings on the CoE network.

Furthermore, sustainability of the DRIVER+ results can also be supported by standards (**D955.21** (21), **D955.31** (9). The work accomplished by DRIVER+ has resulted in four CEN Workshop Agreements and one Preliminary Work Item for ISO. The main lessons learned and recommendations regarding standardisation are described in more detail in **D955.31** (9), so this section briefly summarizes the main elements:

- A comprehensive overview of standards in Crisis Management, but also on thematic focal points such as volunteer management, floods or wild fires has emerged. However, it is unclear whether the standards research has actually increased the attention of project partners for existing standards in Crisis Management. Therefore, it is recommended to explicitly reach out to specific consortium partners for whom the standards research could be most relevant and interact in a more focused way with these partners.
- Ideas for new standards were quickly found, but specifying them, i.e. clarifying what should be standardised in a method or technique and what should not, required further agreements.

- A precise formulation of the goals of standardisation activities of any research project is very important to include in the DoW to avoid misleading expectations. The approach followed in DRIVER+, by identifying standardisation requirements during the project, was well perceived by the partners.
- CWAs should be written by the user of the standards to make those pre-standards de facto standards and therefore show a strong need to become formal standards. The more users, the better it is in order to strengthen the value of the CWA. These users should not be restricted to the project consortium, but include additional participants as well. Besides, it is recommended to involve members of standardisation committees in the development of CWAs: they can bring the topic on the agenda of the standardisation committees and adopt and promote the CWA results in a way that they are accepted by the committee members.

Close to the end of the project duration, it appeared that originally planned costs did not occur, leading to the availability of budget for additional activities. In order to increase access to the main DRIVER+ products, enhancing the uptake and sustainability, it was decided to have these products translated in several languages. The TGM, the TGT, the PoS interface, the CoE toolkit and the project flipbook were translated in eight languages (German, Dutch, Swedish, French, Italian, Spanish, Polish and Estonian) and the product leaflets even in all MS languages. Two translation offices were subcontracted, and several native speaking consortium partners assigned to proof-read the translations. The quality of the translations however, varied considerably, and the proof-reading took far more time and effort than expected. Not all translators were familiar with the CM and DRM domain. More important, however, is that the translators do not have the in-depth knowledge and insight of the project and the products.

For simple leaflets this is not an issue, but for more comprehensive and extensive products, the exact meaning of the text and the relevance for the target groups, sometimes got lost in the translation. In some cases, proof-reading turned into rewriting large parts of the texts by the native speaking consortium partners themselves, notably for the TGM Handbook. In addition, when multiple native speakers from the consortium were tasked to reduce the individual workload, the coordination of all work within the consortium and with the translation offices required a lot of time. A complicating factor was the visual layout and design of the products: text should perfectly fit (with a maximum number of character and font size) this layout, either in a document or in the online interfaces. Guaranteeing the quality of the translations was regarded as highly important: only if the translations have a high quality, the products would be published, otherwise not.

When the COVID-19 crisis evolved, two DRIVER+ products were adapted and made available as a supporting tool to respond to this crisis. This was done to support the European practitioners, to demonstrate the broader applicability of the DRIVER+ products (as pandemics were not explicitly covered), and to raise an interest in the project's products in general. Firstly, a questionnaire has been widely distributed amongst practitioners to identify the most urgent gaps that were encountered and to inventory specific solutions. Several weeks later, this questionnaire has been updated and translated in eight languages. At the date of submitting this deliverable (May 2020), 99 responses from 33 countries (of which 20 MS) were received; about 60% of the respondents were located in Europe. Regarding the profession of the respondents the two largest groups were working in the health and the research area.

Based on the results, the taxonomy of functions and Gaps Explorer within the PoS have been updated, and additional solutions added to the PoS, supporting practitioners in getting a more comprehensive overview of available solutions. This activity will be continued by STAMINA, a new H2020 project in the area of pandemics, starting in September 2020. Secondly, the Lessons Learned Library (L3) has been tailor-made to specifically implement and share lessons learned related to the COVID-19 crisis[14]. When submitting this

[14] https://l3covid.eu/

deliverable (May 2020) this COVID-19 version of the L3 has only just been published. For both initiatives, social media activities have been initiated, and for the first one this has also been reinforced by the EC. Following the COVID-19 crisis, a myriad of solutions, tools and publications have been published: in order to achieve some level of visibility and response, a lot of (social media) attention had be raised to these two DRIVER+ initiatives, especially because pandemics were not in the core of the project and its network.

Strengths:

- A strategic approach towards sustainability has been developed and implemented, and it has received a lot of attention throughout the project.
- The open source policy stimulated the uptake and further development of the DRIVER+ products.
- The establishment of CoEs and the CoE network to sustain the products.
- The development of several CWAs and a Preliminary Work Item.
- Translations strongly enhance the access to the products and stimulate the uptake of project results.
- Offering DRIVER+ products for immediate use during an ongoing crisis situation may positively affect the uptake of the respective products (as well as the other project products).
- The continuation of the COVID-19 PoS initiative by a new H2020 project in the area of pandemics.

Weaknesses:

- The replacement of the entire team at the side of the main partner responsible for sustainability, leading to less perceived added value.
- Not having the WP on sustainability strategically embedded in the SP on Project Management may have resulted in sometimes being perceived as less valuable as expected by the development teams.
- It is unclear whether the standards research has actually increased the attention of all project partners for existing standards in Crisis Management.
- When translating the products, in some cases the essence of the meaning and relevance for the target group got lost.
- Proof-reading the translations and assessing the quality took far more time and efforts than expected and even resulted in rewriting large parts of the texts by the native speaking consortium members.

Lessons learned:

- Sustainability activities should be strategically embedded within the project management structure.
- Sustainability aspects should be as much as possible an integral part of the development of the project's products.
- The establishment of CoEs and the CoE network is an attractive manner of sustaining the results of the project.
- It is more effective and efficient to explicitly reach out to specific consortium partners for whom the standards research could be most relevant and interact in a more focused way with these partners.
- Preparing a CWA and PWI (in the process of pre-standards to de facto standards leading to formal standards) requires the involvement of the users of the standard, external experts as well as members of the respective standardisation committee.
- Translating project outcomes involves more than simply subcontracting a translation office. Proof-reading the translated products by native speaking project partners is essential to guarantee that the essence and relevance of these products is captured.
- Managing the translation process (subcontracting, coordinating within the consortium and with the translators) is a critical and labour intense process, leading to a high workload of the project members. Consequently, it should be planned well in advance (not at the very end of the project), with a well-defined process and responsibilities, and with sufficient resources allocated to it.
- Initiating new initiatives directly related to an imminent crisis needs to be accompanied by a strong publicity campaign and to be supported by a specialized project/network to increase the credibility.

3.6 Leadership and team work

As indicated in Section 3.1, the suspension was a very intense and dynamic period for many of the consortium partners. The collaborative effort of partners in the restructuring phase was a key moment and created new dynamics. The atmosphere in the team was excellent leading to strong personal relationships which was instrumental to create trust and respect, while at the same time remaining critical in sharing feedback to achieve a high performance. Similarly, the interaction and collaboration between the new project leadership and the PO was revitalised, and characterised by mutual trust, and respect.

The culture in the project can be characterised as open, transparent and committed. The leadership of the project heavily influenced this culture: key staff was always friendly, positive, productive and leading by example. Project members were willing to take up responsibilities. The leadership of the TC worked out very well in this regard; he was well respected for his authority in the field and his clear leadership style.

Having many meetings especially during the start of the project, both face-to-face and virtual, was essential to get to know the people, to develop social bonds, and to create the shared understanding of the project. It was a valid decision to invest much time in getting to understand each other, with so many organisations coming from different backgrounds as well as having different research and development approaches. The Kick-off meeting and Workshop "0", both early in the project, were two crucial events in this sense: all project partners were meeting for a full week discussing and working on, amongst others, the shared vision, SP and WP-internal organisation of the work, alignment between SPs, and the establishment and functioning of the Trial Committees.

Having f2f meetings on a regular basis facilitates the organisation of virtual meetings. Getting to know each other during an f2f meeting makes it easier to follow up on this via virtual meetings. During the course of the project, however, for several partners extensive traveling was still needed and demanding but very useful.

There was a very strong personal commitment of several key players at every level in the consortium. Without this, DRIVER+ would have never produced that many high quality outcomes in reaching its project objectives. Although dedication to the project was obviously highly appreciated (some members considered themselves married to the project), this has the risk that the project is too demanding and expecting too much from persons, which may lead to health issues and drop out (see also Section 3.4). Within the various bodies and teams, but also at personal levels, the well-being of the project members was paid attention to and support offered where needed. Besides, some new staff just entering the project acknowledged being a bit scared about the extreme high expectations and workload within the team.

Strengths:

- The culture in the team was open, transparent and committed; there was an excellent atmosphere in the team, characterised by support, mutual trust and respect.
- Many (f2f and virtual) meetings were organised lowering the thresholds to contact each other when needed.
- A very strong personal commitment of several key players at every level in the consortium.

Weaknesses:

- Strong commitment and high expectations may be perceived as stressful for new staff members.

Lessons learned:

- Investing time and effort in establishing a positive, yet critical and constructive atmosphere is an important success factor.
- The project leadership should lead by example in establishing a committed and transparent culture.
- Strong personal relationships benefit the team work, as long as everyone remains open for critique and feedback, and the project culture remains inclusive.

3.7 Internal communications

It was key to have an overarching vision describing the project's mission, the objectives, the main outcomes, the approach to follow in delivering these outcomes, the target groups, and the sustainability strategy. These key messages where repeatedly communicated during f2f project meetings by the PCT and PMB members to all consortium members, and via mail messages. The shared awareness and understanding of the vision and expected results makes it clearer how the particular output of a specific WP relates to outputs of other WPs: everyone should be aware of the broader picture and ambition.

Having frequent meetings, discussions and communications, both internally as well as with the AB and other external experts, helped in rephrasing and improving the vision. Especially events including all consortium members (like the KoM, W0 and UW0), were crucial in this respect. An approach that appeared to work fine was creating user stories (or customer journeys). A user story explains which outcomes the DRIVER+ project would deliver, and how a particular user (e.g. regional crisis manager, policy support officer, EC crisis manager) could use these products. It helped in creating a joint understanding of what the project would deliver, how these results could be used by whom, and which benefits this would bring. It turned out that these user stories worked well, both internally and externally.

Internal communication is further improved by speaking a common language. Many different terms are used with varying definitions, which hinders a shared understanding. Not only in the CM domain as such, but also within the DRIVER+ consortium. In order to agree upon the terms, definitions and abbreviations to be used both within DRIVER+ and in the external world, the Terminology Working Group (TWG) was established (see also Section 3.3). This TWG facilitated the consortium internal understanding and usage of terms and definitions.

Within the project a Collaborative Workspace (CoW) has been created. The overall functioning of the CoW (a Microsoft Office 365 license with SharePoint) was good. The collaborative editing of documents allowed for an efficient way of working. The latest versions of documents were always available to all relevant persons. In addition, several mailing lists were used for SPs, WPs and the different bodies. For joint virtual meetings, both Microsoft TEAMS and GoToMeetings were used; occasionally, other communication platforms were used as well (e.g. Skype for Business, Cisco Webex, Adobe Connect).

Communication about upcoming events was mainly done via mail, including links to the documents on the CoW. For project members that were not directly involved in the respective task and thus the organisation of a specific event (e.g. a Trial), it turned out to be not always that easy to find the proper information.

Via the PCT and PMB meetings, relevant information was distributed via the SPCC meetings to the WP leaders, who in turn updated the WP partners. In addition to this flow of information, the PD and TC sent internal mail updates to all consortium members on a regular basis and typically before and after important meetings (e.g. a technical review meeting) or events (e.g. a Trial). This was perceived as very informative by the consortium members: there was so much happening within the project that is was hardly possible to collect that information by oneself.

Strengths:

- The customer journeys/user stories worked well in creating the joint understanding, both internally and externally.
- Considering the amount of partners and the complexity and number of issues that were dealt with, the quality and frequency of internal communication was perceived as pretty well.
- The Terminology Working Group facilitated the common understanding of terms and definitions and thus the internal communication.
- The CoW, TEAMS and GoToMeetings were very well functioning platforms.
- Internal mail updates from the project leadership to all consortium staff were perceived positively.

Weaknesses:

- Communication within the consortium about upcoming events could have been better: where to find which information on the CoW was not always that clear, nor who was expected/able to attend a particular event (e.g. Trial).
- The frequency of the internal mail updates might be increased.

Lessons learned:

- A clear and shared vision that can be understood and explained by all project members is an important condition for the project success.
- A realistic User Story (or Customer Journey) is a very useful way of explaining what a project will be delivering, how these results can be used by whom, and which benefits this brings.
- Internal communication is as important as external communication.

3.8 Public Relations, Dissemination & Communication

After the restructuring phase, DRIVER+ started with a completely new branding and supporting communication products (see Section 3.1); the branding was further improved halfway the running time of the project. As described in **D952.14** (5), the dissemination and communication activities were organised in three phases: Start-up, Demonstration and Sustainability. Overall, it can be concluded that the results of communication and dissemination efforts have been satisfactory. The different activities (Trials, workshops, I4CM and PRDR events) have systematically benefitted from robust dissemination and communication support before, during and after the events to promote stakeholder attendance and awareness; generate media engagement; ensure adequate coverage through social media; document the activity; and publish results and findings. High-quality documentation and promotional material has been created, including a comprehensive public website, a set of videos and animations introducing project outputs or covering Trials and events, product leaflets and flipbooks.

The dissemination and communication products and processes were key to the wide and recurring involvement of external stakeholders, and the early adoption of the products. An overall assessment of how the products and the dissemination and communication activities of DRIVER+ contributed to a shared understanding in CM is described in **D953.14** (6). In summary, this was achieved by (1) creating a diverse set of sustainable results, ranging from the Test-bed to networking opportunities and a dynamic repository of innovative solutions, to the Trials and by (2) facilitating complex knowledge generation processes that resulted in comprehensive policy recommendations for the European CM domain (PRDR, I4CM). Since its launch on the new Hivebrite platform in June 2019, the Crisis Management Innovation Network Europe (CMINE) has evolved substantially in terms of members, activity, content and functionalities (see **D953.14** (6) for more details):

- Registration of 768 individuals (Status: 15/05/2020) from all relevant stakeholder domains.
- Registration of 26 organisations/projects/networks.
- Proactive community building activities by the designated community managers and partners (e.g. posting news items, embedded tweets, RSS feeds, promoting events).
- Interfacing of CMINE with the Portfolio of Solutions (PoS).
- Launch of the CMINE app.

Given that the platform in this form only exists for only nearly a year at the time of publishing this deliverable (May 2020), this is quite a positive achievement. If the decision to abandon the previous community platform would have been taken sooner, this could have potentially resulted in a larger and more active community.

Many deliverables that were produced within DRIVER+ were public. Still, some deliverables were restricted to the consortium. Amongst these deliverables were the Trial evaluation reports. Main reason for labelling these as restricted was the risk of negative publicity for the involved participants, for instance: the Trial

Hosts and Owners in case of disturbed scenarios, the solution providers in case of negative assessments, and the Crisis Management practitioners in case of unsolved crisis situations. The disadvantage was that the actual outcomes of the Trials, and the answers to the Research Questions, remained unpublished for a too long time. Halfway the project summaries of the performed Trials were published, but these were rather brief and descriptive. Only in Q4 of 2019, more extensive and public summaries of the Trials, including the actual outcomes, were published. If this had been done shortly after the evaluation of each Trial had been conducted, and communicating the outputs as attractive as the other dissemination material, it might have helped in convincing practitioners to adopt the assessed solutions.

Several EC bodies (DG HOME, DG ECHO, REA, DRMKC) highly supported the project in disseminating and communicating the results. They provided opportunities to attend EC organised events (e.g. CoU meetings, seminars, IFAFRI meetings), established links with other DGs and with related projects (notably the Practitioner Networks), and used their social media channels. They provided active support and contributions in various project events (e.g. PRDR, FD and FC). Furthermore, REA is actively endorsing the uptake of the DRIVER+ products by other related EC-funded research projects by distributing a so-called DRIVER+ Adopters Package, explicitly requesting these projects to make use of the DIRVER+ outcomes.

Strengths:

- High-quality and very attractive promotional material in different formats.
- Well-organised and well-attended events.
- A sufficient and flexible budget and a partner with professional skills in communications centrally organising this work together with subcontractors is key.
- Changing the community platform to a state-of-the-art platform, rather than developing it by the consortium itself.
- Strong endorsement of project results by DG ECHO, DG HOME, REA and DRMKC.

Weaknesses:

- Delayed abandoning of the previous community platform.
- Late publication of public summaries of the Trials.

Lessons learned:

- A wide variety of high-quality and attractive promotional material in different formats (like videos, animations, handouts, website, newsletters) using a consistent visual identity, is a key success factor.
- A sufficiently large budget for external communication together with a partner experienced and flexible in handling subcontracts pays off.
- Building a community around the project, and convincing the members to use a technology-supported community platform, takes time.
- Selection of a community platform should be “state-of-the-art” and meeting the expectations of the users in terms of e.g. functionalities; otherwise it will limit the acceptance of such a technology-supported community platform.
- Active endorsement of project results by EC stakeholders is crucial for the credibility and acceptance of the project.

3.9 Summary of lessons learned

Table 3.1 summarises all lessons learned at project level as described in the previous sections.

Table 3.1: Overview of lessons learned at project level

Overview of lessons learned at project level
Restructuring/suspension phase
Suspension of a project can be a valuable intervention to reinforce the quality of the project team.
Beneficiaries need to be highly motivated to restructure a project as this requires a large financial investment from their side.
General Project Management and Coordination
Having well-defined project management structures and roles and responsibilities is essential, especially for a project with many beneficiaries and a large staff; this facilitates the accommodation of new staff and the replacement of key staff in particular.
The establishment of temporary bodies, in addition to the formal bodies, was useful to resolve cross-SP issues; nevertheless, the duration of their existence should be clearly determined.
It is key for the team to formulate and stick to an overarching vision (including project objectives, outcomes and expected impact), and to communicate this vision frequently, to avoid getting lost in the details. A well-agreed vision facilitates the communication to, and collaboration with, external stake-holders.
The efforts (PMs, budget) were monitored on Task level. Perhaps this high level of detail was appropriate in the first phase after the restructuring, yet when the project was on track the time-consuming process sometimes felt as an overkill.
Flexibility of planning is essential; defining key milestones are helpful in remaining focused on the main outcomes to be achieved.
Determine the scope of the project's advisory bodies as distinct as possible, or otherwise decide to merge these bodies.
Basic advice and support with research ethics is still vital to (applied) research projects, even though it is not a new challenge.
Quality Management
Define templates for the deliverables and other important outputs like papers, reports, handouts and presentations.
Specific content-related KPIs are helpful for the consortium while generic management-related KPIs are regarded more useful for REA.
QM is quite an administrative workload, but allocating sufficient time for producing, reviewing and submitting deliverables is worth the effort.
Establish a good process for reviewing other types of outputs as well (especially dissemination material, position papers and online tools).
Establish an internal review board supporting the authors in addition to a layered review and approval process.
Risk and Issue Management
Frequent discussions at all levels leads to an early identification of (emerging) risks, and to an early

mitigation strategy.
With an open and transparent project culture, it is easier to discuss lower performance in a constructive way and implement acceptable interventions.
Practitioner centred approach
Co-creating products with practitioners takes time, but is in the end highly beneficial to the quality, acceptance and sustainability of these products.
Knowledge-transfer is bi-directional: it not only goes from researchers and developers to the practitioners, but also the other way around.
Having staff from solution providers assisting practitioners in applying innovative solutions can compensate for a lack of familiarisation.
Organising closer follow-up and support activities after conducting a Trial, increases the likelihood that practitioner organisations really close the identified gap, and use the project results to actually structure their capability development process and innovation management.
Multiple perspectives and inclusive approach
Understanding and alignment of the diverse expectations of the many different stakeholders is a valuable, yet time-consuming and continuous effort.
Deliberate and pro-active effort (via meetings, workshops, Trials, questionnaires) should be undertaken to include multiple perspectives.
Focus on sustainability
Sustainability activities should be strategically embedded within the project management structure.
Sustainability aspects should be as much as possible an integral part of the development of the project's products.
The establishment of CoEs and the CoE network is an attractive manner of sustaining the results of the project.
It is more effective and efficient to explicitly reach out to specific consortium partners for whom the standards research could be most relevant and interact in a more focused way with these partners.
Preparing a CWA and PWI (in the process of pre-standards to de facto standards leading to formal standards) requires the involvement of the users of the standard, external experts as well as members of the respective standardisation committee.
Translating project outcomes involves more than simply subcontracting a translation office. Proof-reading the translated products by native speaking project partners is essential to guarantee that the essence and relevance of these products is captured.
Managing the translation process (subcontracting, coordinating within the consortium and with the translators) is a critical and labour intense process, leading to a high workload of the project members. Consequently, it should be planned well in advance (not at the very end of the project), with a well-defined process and responsibilities, and with sufficient resources allocated to it.
Initiating new initiatives directly related to an imminent crisis needs to be accompanied by a strong publicity campaign and to be supported by a specialized project/network to increase the credibility.
Leadership and team work
Investing time and effort in establishing a positive, yet critical and constructive atmosphere is an important success factor.

The project leadership should lead by example in establishing a committed and transparent culture.
Strong personal relationships benefit the team work, as long as everyone remains open for critique and feedback, and the project culture remains inclusive.
Internal communications
A clear and shared vision that can be understood and explained by all project members, is an important condition for the project success.
A realistic User Story (or Customer Journey) is a very useful way of explaining what a project will be delivering, how these results can be used by whom, and which benefits this brings.
Internal communication is as important as external communication.
Public Relations, Dissemination & Communication
A wide variety of high-quality and attractive promotional material in different formats (like videos, animations, handouts, website, newsletters) using a consistent visual identity, is a key success factor.
A sufficiently large budget for external communication together with a partner experienced and flexible in handling subcontracts pays off.
Building a community around the project, and convincing the members to use a technology-supported community platform, takes time.
Selection of a community platform should be “state-of-the-art” and meeting the expectations of the users in terms of e.g. functionalities; otherwise it will limit the acceptance of such a technology-supported community platform.
Active endorsement of project results by EC stakeholders is crucial for the credibility and acceptance of the project.

4. Recommendations

This section contains recommendations for research projects and demonstration activities (Section 4.1) as well as recommendations for the EC and the future Work Programme (Section 4.2). More detailed and specific recommendations following the Trial and Final Demo activities are described in **D941.31** (4).

4.1 Recommendations for future projects

In addition to the specific lessons learned described in the previous section, this section contains nine key recommendations for future projects (see Figure 4.1).

Figure 4.1: DRIVER+ recommendations for projects

1) Take a well-informed decision before entering into a suspension phase

Putting a project on hold is not an easy decision taken by REA: in that case the project is seriously under-performing for a longer period of time. The suspension phase can offer a way out of this situation, but the time, effort and money needed to restructure and restart the project is substantial. It is important to be aware of this, and to gather a small group of dedicated partners with the capacity to lead the restructuring. Intense contact with REA should be actively pursued to harmonise the mutual expectations. It is a shared interest of both the consortium and REA to have a project successfully restarted after a suspension period.

2) Formulate an overarching project vision in the form of a User Story

Formulate an overarching project vision as soon as possible, and share this vision both within and outside the project. A well-agreed vision facilitates the communication to, and collaboration with, external stakeholders and helps in getting a good and common understanding of the project objectives. A realistic User Story is a very useful way of explaining what a project will deliver, how these results can be used by whom, and which benefits this brings. Multiple User Stories may be defined, depending on the target groups.

3) Assess the scope and added value of the advisory bodies

Establishing one or multiple advisory bodies with external experts and stakeholders can bring value to the project. Conditional is that these experts are informed in a transparent way, enabling them to give valuable and strategic advice to the project. Engaging with these external advisors is not just a tick in the box, but can really bring the project further. However, therefore it is necessary that these advisors attend the meetings frequently and participate actively. If this is not the case, these members should be replaced. Likewise, if advisory bodies are not that distinct anymore, consider merging them or to abolish one.

4) Establish an internal review board

Reviewing deliverables goes beyond the internal approval of documents. Establishing an internal review board that is actively supporting the lead authors in structuring and editing the document greatly contributes to high quality outputs. The members come from throughout the project team and are not directly involved in the activities leading to an output, so they have an independent view on the quality. The review board members support each other in their assessment of the quality of deliverables and the suggested interventions. Having such a pool of internal reviewers available distributes the workload, and provides the flexibility to assign the best suited staff to review an output.

5) Actively involve practitioners in the development of main outputs

After FP7, the involvement of practitioners in H2020 projects has improved considerably: for several topics in the Work Programme the consortium is required to include a minimum numbers of practitioners from a minimum number of countries. However, practitioners should not only be included in the projects as the subjects testing the outputs. They should be actively involved in actually co-developing the main outputs of the project, which will improve the quality and applicability of the outputs and create a sense of ownership. This requires effort from both the practitioners and the researchers, but in the end it is highly beneficial to the quality, acceptance and sustainability of these products. Practitioners learning more about research and innovation, and researchers learning more about missions and operations, will result in the generation of so-called *pracademics*[15].

6) Include multiple trialling and demonstration activities

With the transition from FP7 to H2020, even more emphasis has been given to designing multiple trialling and demonstration activities centred around the testing of prototype products in a realistic environment strongly involving the practitioners as the prospective users. The purpose of this kind of activities, being trials, field labs, operational tests, user workshops, trainings and exercises, both small and large, is to gather user feedback and further improve the development of the products. In addition, these events can be used as a mechanism for knowledge transfer between researchers and practitioners, and as an awareness raising and dissemination instrument towards the stakeholders external to the consortium. Rather than organising these events only as demonstration-like activities, they should stimulate these external stakeholders to actively participate, enabling them to experience what it is to actually use and benefit from the project results. This engagement does not stop once the trialling and demonstration activities have been organised: these events are part of the whole process of actively involving all categories of stakeholders and should be carefully followed up to create opportunities for a successful uptake of the project results.

[15] Addiers, C (2020), Emergency response and civil protection: Bridging a strategic gap. Keynote presentation during the VIP event of the DRIVER+ Advanced Crisis Management Conference. Brussels, 18/02/2020

7) Support the uptake and implementation of results

Usually research projects deliver products that have a TRL between 5 and 8: these are not yet ready for implementation. However, it is difficult for practitioner organisations to follow up on these research projects and make the final steps towards uptake and implementation. The engagement with practitioners should therefore not stop after the development and testing of these outcomes. Taking the steps as much as possible already during the project duration, or providing explicit guidance on how to follow this process, increases the likelihood that practitioner organisations really use the project results to actually structure their capability development process and innovation management.

8) Integrate sustainability in all aspects of the project

Sustainability of project results should not be of interest only towards the end of a project, but from its beginning. Sustainability aspects should be as much as possible an integral part of the development of the project's products. Therefore, sustainability should not just be a dedicated work-package, but strategically and centrally embedded within the project management structure. Potential adopters of the results should be identified and involved as soon as possible. Establishing a dedicated network of practitioner-centred organisations (like the DRIVER+ CoE network), committed to adopt, use, maintain and improve the results after the project closure, is an attractive manner of sustaining the results. This network should have mass and status. A sufficient number of respected organisations need to be member of this network (which will attract new members). In addition, concrete arrangements need to be put in place to organise the functioning of such a network and to increase the chance it will sustain.

9) Actively and continuously engage with external stakeholders

Communicating about the project and the results needs to start at the beginning of the project to raise the awareness of the envisioned adopters. Telling and showing a realistic User Story is an effective and attractive way of doing this. A wide variety of high-quality and attractive promotional material in different formats (e.g. videos, animations, handouts, website, newsletters) using a consistent visual identity, is a key success factor. However, engaging implies interacting with these stakeholders as well. Understanding and alignment of the diverse expectations of the many different stakeholders is a valuable, yet time-consuming and continuous effort. Building a community around the project, or a cluster of projects, ensures constant access to feedback of relevant users and experts. This can be done by organising trials, tests, and experiments, involving external stakeholders as well, either as participants or observers.

Organising workshops, training sessions, conferences and seminars are obviously relevant in this respect as well. A flexible budget should be allocated to facilitate the involvement of these external stakeholders and it is recommended to assign a dedicated External Cooperation Manager. In addition to this variety of meetings, this community needs to be able to share information and experiences on more frequent basis as well, in order to keep the community engaged. This can be done with a technology-supported community platform. However, establishing a community simply takes time. Therefore, such a tool/platform should be up and running shortly after the start of the project, and should not need to be developed during the course of the project. This community platform should be "state-of-the-art" and meeting the expectations of the users in terms of e.g. functionalities; otherwise it will limit the acceptance of such a platform and negatively impact the sustainability of the community.

4.2 Recommendations for EC and future Work Programmes

This section describes eight key recommendations for the EC and future Work Programmes (see Figure 4.2).

Figure 4.2: DRIVER+ recommendations for EC

1) Implement a forward-looking capability planning mechanism in practitioner organisations

Many practitioner organisations do what they have to do: prepare for and respond to urgent and actual crisis situations. Planning is usually covering a period up to five years ahead. The initiation of research and innovation activities is often triggered by specific events. This limited timeframe and reactive approach leads to a situation in which fast-changing security situations are not adequately dealt with. The risk is that research and innovation programmes are focusing on solving yesterday's crises. A pre-condition to a capability deployment programme would be the establishment of a forward-looking capability planning process in Disaster Risk Management and Security. Such a process would identify medium to long-term needs and gaps and would contribute to the definition of EU RD&I agendas matching the end-user requirements.

To achieve this goal, besides the practitioners, experts from various technological and social sciences, both from the Crisis Management and other domains, need to closely collaborate with each other. These experts conduct technology watches, inventory socio-cultural, climate and demographic developments, and determine potential impacts on the practitioners. Based on these potential future scenarios, capabilities can be described and associated topics for future research programs identified.

This structured capability development approach needs to be implemented at Member States level feeding into the research programming at EC level to address validated and broadly accepted practitioners' needs. And ideally, these expert groups collaborate across the EU and Associated Countries, in order to avoid unnecessary duplication of efforts, to learn from each other and to allow an exploitation of synergies between the efforts already undertaken at MS level and the ones expected to be complementary on the EU level. The established H2020 Practitioner Networks as well as the DRIVER+ CoE network can play an important facilitating role in this respect. Obviously, these networks must be sustained after the respective projects for which support of national governments may be needed.

It must be understood, however, that the future is volatile, thus research and innovation projects cannot and should not in all cases directly be linked to clearly defined capabilities. Low 'Technology Readiness Level' (TRL) research actions in the work programmes should be included and be as open as possible to allow the inclusion of potential disruptive technologies. A close link between the Future and Emerging Technologies (FET) program[16] and the domain of DRM needs to be established. Because there is much uncertainty about the future usability of these technologies, the initial duration of such projects should be limited with options for continuation if the results are promising and the future need is still acknowledged. This requires a more flexible and agile research and innovation programming.

2) Adopt a common trial and validation framework

Following the steps in the capability development cycle, from an analysis of gaps and needs, via an assessment of what is available, to research and innovation, and eventually to acquisition, strongly supports the successful implementation of innovative technologies into the field of operations at MS level. Validation of whether these needs have been properly addressed should be the responsibility of the MS. In order to support this validation already during the research and innovation projects, it is beneficial to introduce a pan-European trial and validation framework (like the DRIVER+ Test-bed) into the European research programme. A standardised methodology for trialling and validation should be adopted, or at least it should be a requirement to clearly explain the trial and validation methods to be used. This is not always the case, leading to the potential risk of having an imprecise or inaccurate understanding of the outcomes of a trial, of the reliability and validity of its results and its potential benefits for practitioner organisations.

3) Align MS and EU capability development strategies

In many Member States, national institutions are often fragmented and spread across different line ministries leading to poor communication and lack of cooperation: national harmonisation is required. In addition, policy-makers should take ownership of the results. If they call for specific topics/research, they should feel responsible for implementing the results, or at least facilitating their implementation.

The establishment of the pan-European network of CoEs contributes to a partnership-based DRM innovation ecosystem supporting the alignment of capability development strategies of practitioner organisations, Member States' authorities, European institutions, the research community and the private sector (industry, incubators). This innovation eco-system should be practitioner-driven to ensure practical outputs, systematic tests and trials, and a service-oriented approach. Achieving this would require the adoption of a co-creation process and the constant involvement of practitioners. This multiple-stakeholder engagement is crucial, as the perspectives of practitioners, researchers, policy-makers, industry and citizens on what a "good" result is can be very different.

The rationale for a partnership-based approach lies in the need to implement an efficient capability process that would allow the common missions, needs and operational requirements to be defined and, at the same time, identify possible solutions matching these requirements in a mid to long-term time frame. In the process, the demand side (responsible for the assessment of needs), the research community (better placed to identify technology and capability gaps) and the private sector (well positioned to develop solutions and provide services) complement each other. Such a "requirement pull" approach would make security research investments at MS and EU level more efficient by linking

[16] https://ec.europa.eu/programmes/horizon2020/en/h2020-section/future-and-emerging-technologies

RD&I activities to capability deployment, completing the mission-oriented approach proposed in the Horizon Europe Regulation.

4) Allow for a sufficient size and duration of Security RD&I projects

Simply reducing the duration of projects does not lead to shorter times to market. On the contrary: rushing the development and testing of new solutions may lead to suboptimal results, no implementation, and even negative effects on operational performance. In the end, such duration reduction strategy results in a disinvestment and loss of time.

Likewise, minimizing the size of projects does not automatically increase the efficiency, and large projects do not automatically lead to inefficiency. Projects at the scale of DRIVER+ can definitely provide an added value. A larger scale project creates mass, can deliver rather mature, consistent and integrated products and can mobilise and bring together a broad community of different stakeholders.

5) Lift the coordination of useful project interactions to DG level

It is important to note that RD&I projects are no stand-alone projects, but rather a shackle in a chain. In order to have an as strong chain as possible, leading to a successful implementation of new solutions, key actors of the next step in the innovation process should already be actively engaged. Research is only part of the journey, only piece of the bigger security puzzle. One potential way of articulating the connections among the pieces, is to lift the coordination of useful project interactions to DG level; this would allow further policymaking to draw from the learnings in the Security RD&I projects performed. This could be organised via a dedicated CSA organising a platform to facilitate synergies and to avoid duplication in efforts managed by the DG directly. As reflected in the Security Union, the high interdisciplinarity of research topics in Secure Societies also asks for recognition of several other activities, e.g. under DG ECHO, DG SANCO, DG DEFIS, EDA, and ESA, which is difficult to achieve from the view of a single project. This higher level coordination will avoid fragmentation of the RD&I landscape and support the integration of the various results.

6) Adopt research results as EC

An active endorsement of project results by the EC is crucial for the credibility and acceptance of these results by stakeholders. However, the EC itself is also an important stakeholder and potential user of project outcomes, and should not just coordinating/monitoring and financing the projects. Specifically related to DRIVER+, the TGM and the TTI could be used as a common trial and validation framework (DG HOME, DG ECHO, REA, JRC), as well as instruments to further enhance the design and evaluation of exercises (DG ECHO); the PoS and the L3 could contribute to building a proper understanding of the current state-of-the-art solutions and lessons learned (REA, DG HOME); CMINE can support the engagement with the relevant communities and stakeholders within the CoU and the Practitioner Networks (DG HOME), the EUCP Knowledge Network (DG ECHO) and the dissemination of project results (REA, DG RTD); the CoE network can boost the collaboration and exchange of information, results and experiences between all stakeholders within the innovation ecosystem and stimulates the access to research results (DG HOME, JRC, DG ECHO).

Also for future projects the EC should seriously consider adopting and using results of projects that are financed with EC funds. Participation as a potential user during the project would be the first and minimum step: not only at the very end of a project, but preferably at the beginning so as to include their user input and feedback, and to align with current (and emerging) EC policy frameworks.

7) Advance the dialogue between all stakeholders

Preconditional to establishing structured partnerships and aligning capability development strategies is the facilitation of a well-structured dialogue between all stakeholders. For this purpose, DG HOME has established the Community of Users for Secure, Safe and Resilient Societies. It has the ambition to develop synergies among research and capacity-building projects and to contribute to Strategic Civil

Security Research Agendas in support of the Horizon Europe programming. As part of the rescEU policy framework, the Union Civil Protection Knowledge Network is being established. Currently under development, the Knowledge Network will support experts, practitioners, policy-makers, researchers, trainers and volunteers at every stage of the disaster management cycle through networking, partnerships, collaborative opportunities, and access to expertise and good practices.

All EC-funded projects are currently required to build and maintain their own stakeholder communities and to create their own community platform. In general, the individual projects seem to compete amongst each other in this respect and are hesitant towards sharing their networks with other projects and initiatives. After the projects end, there is a high risk that these networks become inactive, potentially leading to less enthusiasm with the stakeholders to join yet another community for future projects.

It is recommended that the EC (REA, DG HOME) not only endorses but actually requires the usage of one common technology-supported community platform by all projects (at least within Secure Societies). This not only enhances the exchange of information and creates synergies, but also saves time and tax payer's money. DRIVER+ has developed CMINE which is a suitable candidate community platform.

8) Align the EC financial instruments

A more efficient approach to the research programming and the consecutive procurement of solutions should be based on a medium to long-term approach following a systematic process of the definition of needs, identification of capability gaps and definition of common operational requirements that would allow the successful implementation of the solutions, enhancing interoperability and minimising, at the same time, the risk of security breaches.

Going from idea to market asks for a coherent development trajectory, reflecting all stages of technology readiness and maturity to be achieved to come up with a final innovative solution. This cannot be covered by one single RD&I project: this trajectory comprises multiple, often sequential projects, partly involving different partners. It calls for a better alignment of H2020/Horizon Europe programs with other financial instruments and funding mechanisms (e.g. capacity building projects, DG ECHO funded exercises, INTERREG, national innovation programs) to develop projects from early stage concept up to advanced prototype solutions leading to a successful implementation and market uptake.

5. Conclusion

DRIVER+ was conducted within the context of FP7. It was a so-called demonstration project, and within H2020 and HEU this kind of projects does not exist anymore as such. Furthermore, DRIVER+ was a project within the area of Disaster Resilient Societies. Nevertheless, it is expected that the specific lessons learned formulated and the recommendations also apply to H2020 and HEU projects as well as projects outside of the CM and DRM domain.

DRIVER+ aimed at improving the way capability development and innovation management are tackled, by assessing and validating (in realistic environments) solutions that are addressing the operational needs of Crisis Management practitioners. In order to achieve this, DRIVER+ has worked towards three main objectives: (1) Develop a pan-European Test-bed for Crisis Management capability development, (2) Develop a well-balanced comprehensive portfolio of Crisis Management solutions, and (3) Facilitate a shared understanding of Crisis Management across Europe. It can be concluded that DRIVER+ has successfully met all three objectives.

Describing and disseminating experiences and lessons learned contributes to enhancing the efficiency and impact of European funded research and innovation projects. Project teams as well as the EC need each other to create successful projects leading to sustainable results, and should therefore learn from each other. Formulating lessons learned based on the experiences of this exciting and challenging project was a grateful task for the DRIVER+ team to do. One final recommendation to the EC would be to request all EC-funded projects to publish a lessons learned document including recommendations for both projects and the EC.

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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[17]. 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
Crisis Management	Holistic management process that identifies potential impacts that threaten an organization and provides a framework for building resilience, with the capability for an effective response that safeguards the interests of the organization's key interested parties, reputation, brand and value-creating activities, as well as effectively restoring operational capabilities. Note 1 to entry: Crisis Management also involves the management of preparedness, mitigation response, and continuity or recovery in the event of an incident, as well as management of the overall programme through training, rehearsals and reviews to ensure the preparedness, response and continuity plans stay current and up-to-date.	ISO 22300:2018(en) Security and resilience — Vocabulary.
Innovation ecosystem	Complex system of interdependent components from the public and private sectors that work together to enable innovation within a city or community. DRIVER+ Note: The components may also be entrepreneurs, investors, researchers, university faculty, venture capitalists as well as business development and other technical service providers such as accountants, designers, contract manufacturers and providers of skills training and professional development.	ISO 37106:2018(en)
Lessons learned	Lessons learning: process of distributing the problem	ISO 18238:2015(en)

[17] 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.

	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.	Space systems
Portfolio of Solutions	A database driven web site that documents the available Crisis Management solutions. The PoS includes information on the experiences with a solution (i.e. results and outcomes of Trials), the needs it addresses, the type of practitioner organisations that have used it, the regulatory conditions that apply, societal impact consideration, a glossary, and the design of the Trials.	
Sustainability	Sustainability encompasses that outcomes of projects or other initiatives are applied and maintained beyond their duration. In the context of DRIVER+, this means that the Test-bed, the Portfolio of Solutions and the Crisis Management Innovation Network Europe – CMINE are adopted, maintained and updated.	
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.	
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.	
Trial Guidance Methodology	A structured approach from designing a Trial to evaluating the outcomes and identifying lessons learnt.	
Trial Guidance Tool	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.	
User story	A simple narrative illustrating a user requirement from the perspective of a persona (persona: model of a user with defined characteristics, based on	ISO/IEC/IEEE 26515:2018

	research). DRIVER+ Note: A user story explains which outcomes the DRIVER+ project would deliver, and how a particular user (e.g. regional crisis manager, policy support officer, EC crisis manager) could be using these products.	

Annex 2 – External Cooperation WP template

WP	External Cooperation
Objectives	• Ensure that the project activities will be conducted while taking into account state-of-the-art knowledge available outside of the project consortium (open and inclusive approach). • Identify relevant external stakeholders and enable their participation and contribution to project activities in order to ensure high quality, relevance and appropriateness beyond the scope of the project. • Ensure transparency and consistency for the engagement of externals in the project activities by defining and implementing procedures and terms of reference. • Support the project implementation as well as the sustainability and impact ambitions by structuring, coordinating and executing External Cooperation activities in close alignment with the relevant project management levels (e.g. Project coordinator or WP leaders). • Act as the communication focal point towards external stakeholders and as an internal project communication facilitator.
Task 1	**Roles, responsibilities, procedures and terms of reference**
Objectives	• Define roles and responsibilities for the External Cooperation management team (incl. methodologies and tools). • Define adequate rules of the foreseen engagement through Terms of Reference (ToR), to manage expectations and agree on requirements (e.g. informed consent). • Define clear and transparent procedures how to identify, select, invite, reimburse (if applicable) and collect feedback from external stakeholders participating in project related activities.
Activities	• Develop procedures and terms of reference. • Establish the External Cooperation management team and produce tools to be applied – guidelines, templates, communication rules, etc.
Expected results	• Clear and transparent procedures and terms of reference for the engagement of external stakeholders in project activities. • Well-functioning External Cooperation management structure fully integrated into the respective project coordination setup and project work plan.
Task 2	**Involvement of project external stakeholders**
Objectives	• Ensure the involvement of a suitable range of relevant stakeholders to ensure continuous and flexible access to reliable experts' knowledge and experience useful for the project when needed. • Ensure that interested project external stakeholders will be directly and actively involved in the project activities (e.g. as observers or evaluators).
Activities	• Continuous and well-aligned communication activities between the project and external stakeholders. • Enable participation of external stakeholders according to the procedures and ToR defined. • Compile, update and maintain an External Cooperation action and contact list to keep track of the contacts and progress made.

	• Act as an internal facilitator to identify, initiate and facilitate communication between project partners and external stakeholders. • Gather evaluation feedback regularly and ensure its integration into the process in case improvements/adaptions are needed. • Manage the External Cooperation budget to ensure efficient and effective use of available resources.
Expected results	• Involvement of external stakeholders in project related activities based on the project's needs. • External Cooperation action list to keep track, follow-up and generate statistics of actions. • External Cooperation contact list as a well-structured central repository for the communication purposes of the project.
Task 3	**External Cooperation in support of impact and sustainability activities**
Objectives	• Support a coordinated approach towards impact and sustainability activities across the whole project by building upon the activities and results of Task 2.
Activities	• Facilitate the structured identification of external stakeholders through a comprehensive stakeholder mapping. • Analyse, combine and prioritise existing and new enquiries for collaboration with external stakeholders. • Facilitate the implementation of External Cooperation actions needed for the activities in other WPs (initiate contacts, organize meetings and ensure that explicit agreements are in place).
Expected results	• Continuous improvements based on feedback obtained from external stakeholders. • Structured identification and exploration of sustainability opportunities for the project.