driver+

Driving Innovation in Crisis Management for European Resilience

# SUMMARY OF TRIAL 2, VALABRE, FRANCE

23-25 OCTOBER 2018

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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 a FP7 Crisis Management demonstration project aiming at improving the way capability development and innovation management is tackled. DRIVER+ has three main objectives:

1. Develop a pan-European Test-bed for Crisis Management capability development:
    a. Develop a common guidance methodology and tool, supporting Trials and the gathering of lessons learnt.
    b. Develop an infrastructure to create relevant environments, for enabling the trialling of new solutions and to explore and share Crisis Management capabilities.
    c. Run Trials in order to assess the value of solutions addressing specific needs using guidance and infrastructure.
    d. Ensure the sustainability of the pan-European Test-bed.
2. Develop a well-balanced comprehensive Portfolio of Crisis Management Solutions:
    e. Facilitate the usage of the Portfolio of Solutions.
    f. 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.

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# 1. Background

A Trial is an organised and systematic process of searching for innovation in Crisis Management. A Trial should be tailored for finding innovations that show potential to limit or cover identified Crisis Management Gaps related to Crisis Management Functions. However, to achieve this ambitious goal in a manner which enables relevant and representative results, it is important to organise a Trial in conditions as realistic as possible in order to minimise research biases.

The Trial Guidance Methodology (TGM), as a systematic and research-based method, assists Trial Owners in this challenge. Further, the Test-bed Technical Infrastructure (TTI) facilitates creating a realistic set-up for that purpose. A Trial Owner is also actively supported by a Trial Committee which consists of experts supporting the TGM and Test-bed infrastructure implementation, coordination of solution providers and practitioners. The Trial Committee is permanently working with the Trial Owner through the entire process of the Trial organisation.

Therefore, a Trial aims to actively involve Crisis Management practitioners in the search for innovation which meets their expectations. Gaps are revealed and defined by them on the basis of their experiences and problems they face in the realisation of their missions. These expectations and gaps are to be met and covered (partially or completely) by solution providers who address them with their solutions.

By the inclusive approach of the DRIVER+ Trial organization it is possible to reach out to external organisations (solution providers and CM practitioners) to enhance external cooperation and shared understanding. Broad involvement of these two groups at a relatively early stage of a Trial organization facilitates building a common platform. Furthermore, it enhances the understanding between those groups, which provides positive prospects for fulfilling their expectations, as well as achieving the main aim, to find and adopt innovation in Crisis Management.

It is important to underline that the briefly described process of the Trial implementation during the project period is being done in order to test, verify and improve the project outputs, i.e. the Trial Guidance Methodology (TGM), the Test-bed Technical Infrastructure (TTI) and the Trial Guidance Tool (TGT). This will assist to make these outcomes ready for an effective and sustainable utilization after the project's end.

From **22 to 25 October 2018**, the second Trial organized as part of the DRIVER+ project (Trial 2) took place in Aix-en-Provence, France, at the Entente Pour La Foret Méditerranée (Valabre), a public Civil Protection organisation. This event involved more than 70 persons from 14 countries, among which 16 practitioners from France and Italy, with the purpose of demonstrating how to best support the cooperation and coordination between different organisations and agencies from different countries in a large-scale crisis situation. The **general purpose** of Trial 2 was to improve cooperation and coordination between different organisations and agencies from different countries, using innovative solutions for large scale and complex (multi-event) crises.


**Figure 1.1: Valabre simulation centre in which Trial 2 was hosted**

# 2. Context

This section presents the practitioners' needs (gaps) which the selected solutions aimed to address, the research questions guiding the Trial overall process, as well as the scenario on which the Trial realisation is based.

## 2.1 Crisis Management capability gaps

In DRIVER+, a capability gap is understood to be "the difference between a current capability and the capability considered necessary for the adequate performance of one or more disaster management tasks."[1] The list of Crisis Management capability gaps proposed by Trial 2 practitioners is presented below.

- Limits in the ability to merge and synthetize disparate data sources and models in real time (historic events, spreading models, tactical situation, critical assets map, etc.) to support incident commander decision making.
- Shortcomings in the ability to exchange crisis-related information among agencies and organisations (also related to as interoperability).
- Limits in the ability to ensure a common understanding of the information exchanged (terminology, symbology) by all crisis managers involved in the response operations.
- Lack of common doctrines and procedures supporting international cooperation in aerial firefighting.
- Insufficiency in the ability to incorporate accurate and verified information from multiple and non-traditional sources (e.g. crowdsourcing and social media) into response operations.
- Lack of efficient coordination mechanism to overcome the limited capacity to deal with large numbers of severely burned casualties at Member State level.
- Limited ability to identify the location of injured/trapped/deceased casualties in large forest fires.
- Barriers in the capability to provide medical assistance to casualties by either transporting them to a safe place or bringing Emergency Medical Service to the scene (when medical care is not provided by fire-fighters).

All these gaps have been discussed and validated during the DRIVER+ gaps assessment workshop[2] in January 2018 and subsequently prioritized by the Trial 2 Committee.

## 2.2 Main Research Questions

The main research questions driving the Trial 2 process are the following:

I. How to improve and maintain, in real time, a shared situational awareness by supporting the exchange of crisis-related information among agencies and organisations?
II. How to improve the coordination of fire-fighters' response operations and Emergency Medical Service rescue operations during a large forest fire with casualties?
III. How to transform raw data from social networks into actionable information directly useful to the incident commander?

[1] ECORYS and TNO for European Commission DG HOME. First Responders - Identifying capability gaps and corresponding technology requirements in the EU. January 2016.

[2] DRIVER+ Project. D922.11 List of CM gaps. March 2018 (https://www.driver-project.eu/wp-content/uploads/2018/08/DRIVERPLUS_D922.11_List-of-CM-gaps.pdf)

## 2.3 Scenario outline

The Trial 2 overall scenario is a large forest fire in the South East of France with cascading effects on:

- a chemical infrastructure: the industrial process of a plant is impacted because of power outage related to the forest fire crossing the electric lines supplying the plant, and on
- human settlements: a campsite with tourists is threatened by the fire and people disrespect security advices and escape the campsite on foot.

The later element was introduced to consider the CM capability gap on cooperation between fire-fighter and Emergency Medical Services as well as the recent forest fire with casualties in Portugal (2017) and Greece (2018).


**Figure 2.1: Trial staff injecting simulated inputs to bring the scenario to life**

In Trial 2, the various sessions comprising the Trial shared the same scenario and set up. The difference between the sessions are the time in the storyline where each session occurs, the roles that are active at this specific point in time, and the solutions that are available to the practitioners.

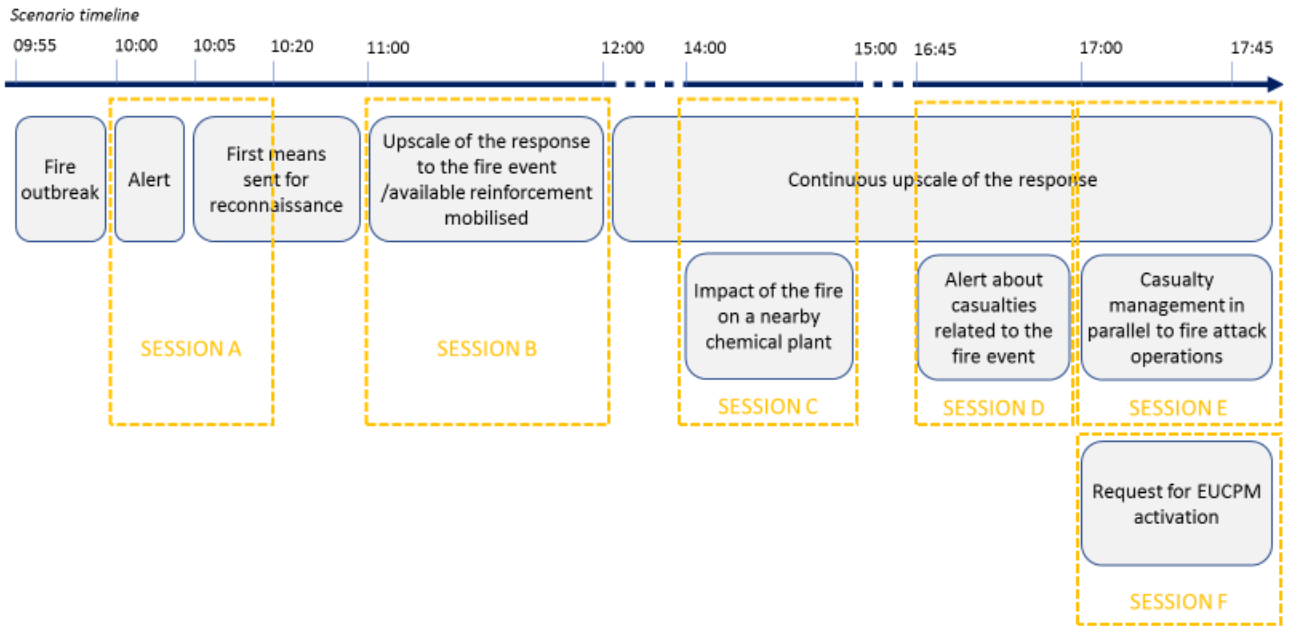


**Figure 2.2: Breakdown of the scenario storyline into sessions**

# 3. Solutions

After passing the Call for Application and the selection process, the Dry Run 1 and Dry Run 2, the following four solutions were implemented in Trial 2. One of them (CrisisSuite), was provided by a non-DRIVER+ partner company while the other three (MDA C2, SMAP, LifeX COP) were from DRIVER+ partners.

**CrisisSuite** (provided by Merlin, the Netherlands), performing the following main functions:

- Provide a centralized platform for the exchange of formal and informal information.
- Manage the overall tasking of all organisations involved (task definition, progress management).
- Manage the overall crisis day log of all organisations involved.
- Manage SITREP generation based on tasking and day log.

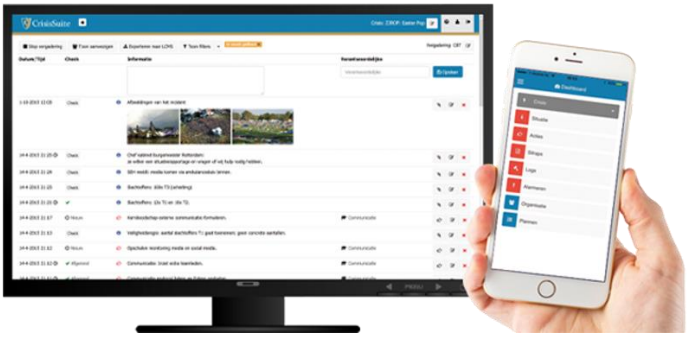

**Figure 2.3: CrisisSuite**

**MDA C2** (provided by MDA, Israel), performing the following main functions:

- Call taking.
- Dispatching EMS vehicles to take the victims in charge and send them to hospital.
- Route EMS vehicle avoiding danger area(s).
- Report on victims status and victims being sent to hospital.

**Figure 2.4: MDA C2 mobile terminal**

**SMAP** (provided by Thales Communication Services, France), performing the following main functions:

- Collect Twitter data relative to a crisis of interest.
- Filter down collected information to identify tweets of interest.
- Export tweets of interest to a Common Operational Picture (COP).

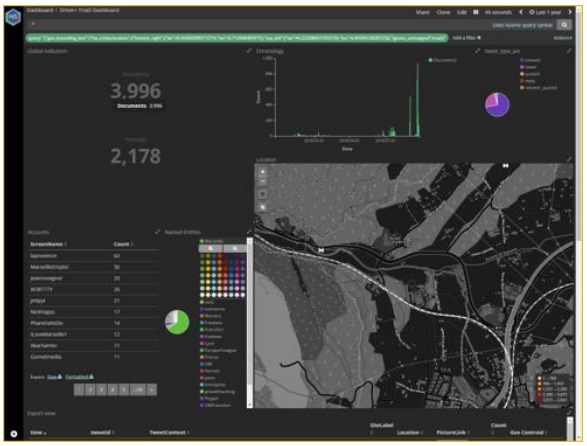


**Figure 2.5: SMAP dashboard**

**LifeX COP** (provided by Frequentis, Austria), performing the following main functions:

- Manage a geographical Common Operational Picture based on reporting of other solutions.
- Define danger zone(s).
- Manage day log.

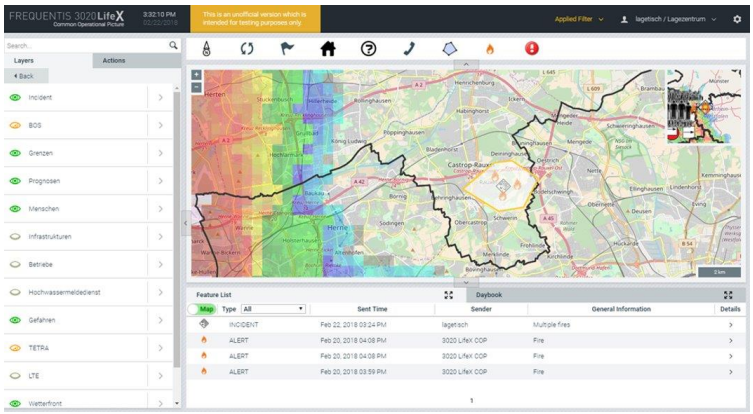

**Figure 2.6: LIFEXCOP dashboard**

# 4. Results

The results are structured along three dimensions: the Trial dimension, the solution dimension and the Crisis Management dimension. The **Trial dimension** relates to the Trial organisation: everything that has to do with the Trial run in very "hands-on" manner is part of this dimension. The **solution dimension** tackles all functionalities as well as the usability of each solution that is trialled. The most important dimension is the **Crisis Management dimension**, because this is looking at the potential impact a solution has on the selected CM gaps.

## 4.1 Trial Dimension

The participants' number, background and commitment supported the Trial adequately. The scenario and the simulated environment were deemed realistic for the practitioners' immersion.

The training of solutions turned out to be a major issue and was considered insufficient by the practitioners and the observers to allow an efficient use of the innovative solutions.

Several time-delays had almost no impact on the execution of the Trial runs but did have a major consequence on the post-Trial data collection. Technical failures also caused the loss of important data,

which negatively impacted the quality of the data analysis. It is important to keep in mind though that at the time of Trial 2, the components of the Test-bed Technical Infrastructure that are dedicated to data collection and evaluation, were not yet available.

All participants valued the high quality organisation of the Trial.

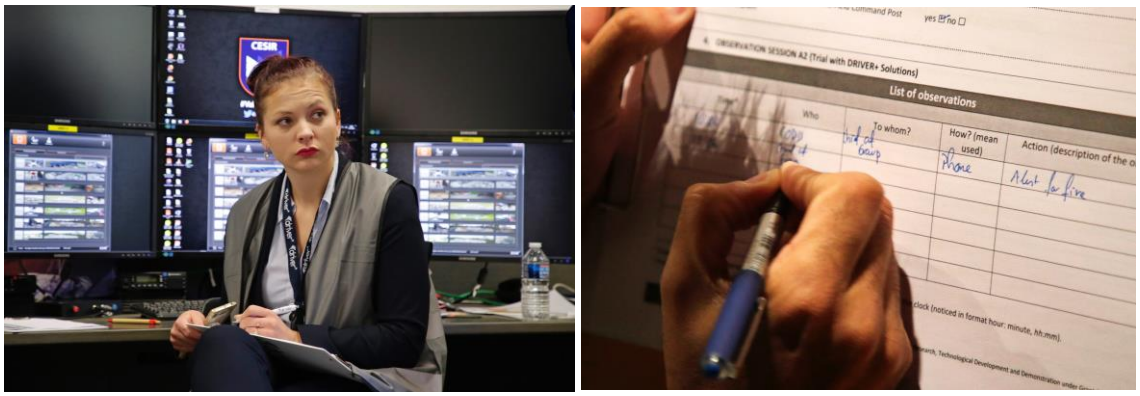


**Figure 4.1: Observer taking notes during the Trial execution**

## 4.2 Solutions Dimension

The objective of this evaluation in the solution dimension is, for each innovative solution, to provide a detailed answer to the question "Does the selected solution fulfil the expected functions during the Trial?"

In order to focus strictly on the gaps selected for Trial 2, not all of the solutions' functionalities were evaluated. The general feedback from the practitioners was that the solutions provided the trialled functionalities, however they did not consider them highly innovative.

**CrisisSuite** was easy to use but is, according to the practitioners, more suitable for control rooms (strategic or non-first responders´ organizations) than in field environments.

**LifeX COP** would require the creation of an information manager role to be effectively used; in addition, the existing information management function should be better explained during the training.

**MDA C2** is regarded as a rather complex solution which requires longer training. It is particularly useful at Operational Centre level, especially in the management of even larger events with bigger noria (i.e. chain of ambulances) of Emergency Medical Services vehicles to be dispatched and routed.

**SMAP** was evaluated by the practitioner as quite easy to learn and use, and its crowd sourcing function was recognized as quite relevant and mature. Nevertheless, SMAP was not considered as bringing much novelty in an operational fire department. The practitioner's opinion is that a solution like SMAP would be more suitable for authorities at the prefect level (i.e. strategic CM level in France).

In addition to each solution individually, the value of the system of systems aspect (i.e. the integration of the solutions) was investigated in the participant's questionnaire. This was deemed particularly important in the Trial as the solutions were all integrated, in the sense of automatic exchange of data to each other. For instance, all the situation reports created in CrisisSuite were displayed on LIFEX COP, all the ambulances managed through MDA were tracked on LIFEX COP, and it was possible to send selected tweets from SMAP to LifeX COP. The scores were all positive or neutral for the five statements:

- Less time needed for practitioners in their search for relevant information.
- Less time needed for practitioners to read data from one solution and entering data manually into another solution.
- Lower probability of wrong information caused by human errors while reading/entering data from/into a solution.
- More time to define, communicate, execute and supervise response actions.
- Higher quality of the Crisis Management outcome due to the time savings, better data quality and improvement of communication.

## 4.3 Crisis Management Dimension

Overall results indicate that the innovative solutions make the data gathering faster and hence shortening the time to dispatch, even though the actions carried out through the innovative solutions are always doubled by radio. **Time saving** is expected to be further improved with more training and with more people available in the advanced medical post as it would be the case in real crises.

Furthermore the **accuracy of the information** seems to be improving due to the new solutions. In particular an unusual event (injured fire-fighter) was better dealt with in the innovative run.

Especially for one of the French organisations involved (DREAL) the innovative solutions were considered really helpful to **organize the information** and share them internally (via CrisisSuite), as well as to have a visualization through the COP. The results show a better structuring of the information shared and an improved **visualisation** of supporting resources.

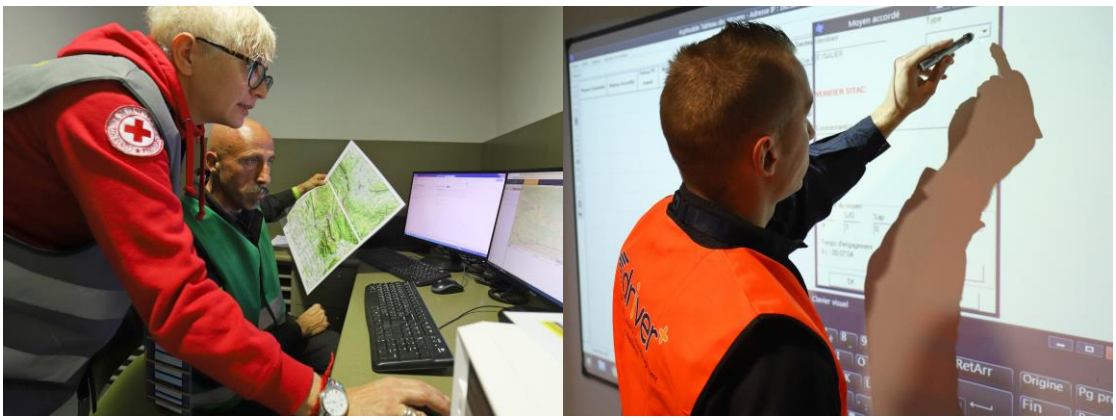

**Figure 4.2: Practitioners using solutions during the Trial execution**

## 4.4 Answers to the research questions

**I. How to improve and maintain, in real time, a shared situational awareness by supporting the exchange of crisis-related information among agencies and organizations?**

It was demonstrated in Trial 2 that time-delays, sharing and quality (accuracy) of the information could be effectively improved by some of the trialled solutions.

The sharing of relevant information can be improved by the access to a common logbook and the exchange of SITREPS (CrisisSuite), while visualization of information (in particular other's organizations means) is improved by the use of a COP. However, it is expected that the solutions could be more efficient in this regard by a better structuring and categorization of information in the logbook (and the automatic generation of SITREPS from the logbooks) and if the static and dynamic layers of the COP were not mixed. The trialled solutions nonetheless contribute in enhancing the quality (in terms of accuracy) of the information, especially with regards to the exact localization of means or events.

Time-saving effects have been observed in most of the CM processes of Trial 2. This was particularly clear at the alert step, when it comes to localization of victims. The knowledge of the solution, and practice by the user, plays a key role in time-saving. Therefore, complete training is a prerequisite before evaluating time-saving effects. Also, it is expected that with more hands-on experience on the solutions, users will have more trust in these, and consequently will stop double checking information with traditional means (like radio) which will result in additional time saving.

**II. How to improve the coordination of fire-fighters' response operations and EMS rescue operations during a large forest fire with casualties?**

A specific focus was made on the cooperation between EMS and fire-fighters organizations. The sharing of a COP between the fire-fighters and the EMS supported a better situation assessment both concerning the

crisis dynamics (fire contour visible for the EMS) and the dispatch of means (ambulances visible for the fire-fighters chain of command). However, it is believed that for such a socio-technical solution to completely pay off, a better understanding of the procedures and the organizational culture appears as a prerequisite. Some limitations are also due to the fact that some practitioners had to take several roles within the Trial, making their participation more complex. The observed improved victims' management (session E) likely came from the fact that a fire-fighter at the Advanced Medical Post and the EMS manager were sitting together and explaining to each other their respective way of working, rather than because the COP was shared. This has been indicated by the practitioners themselves and noted by the observers. This shows how much the role of a liaison officer remains fundamental, even with the integration of innovative solutions.

**III. How to transform raw data from social networks into actionable information directly useful to the incident commander?**

SMAP facilitates the retrieval of information from Twitter for response operations. This might be different for other social media that could not be included in this Trial. While the solution proved its capability to share the selected information by displaying it in a COP (therefore providing visualization of the messages that are geo-referenced), such information was not considered useful by the incident commander and, in consequence, the gap between the retrieval of information and its actual use in the operations was not closed. Here, a cultural resistance might also come at play, as the involved practitioner did not share the interest of having such information during the operations and suggested that such a solution would be more suitable for authorities at the prefect level, meaning at a distance from the operations. Therefore, before integrating that type of solutions into operational procedures, preparatory work is deemed necessary to discuss with the practitioners the added value that this type of information could bring into operations management. The solution looks promising, but it has to be trialled more extensively before drawing firm conclusions.

## 5. Conclusions and EU policy recommendations

The work carried out in Trial 2 has highlighted some shortages that were not identified at the beginning of this activity which are deemed important and could therefore be developed in terms of policy recommendation. This Trial has demonstrated the difficulty to evaluate crises in the forest-fire domain, because there is no pre-existing set of criteria or evaluation method. Furthermore, there is no diagnosis of the current situation against which to assess progress or at least evolution.

In Europe, a tool to evaluate interoperability and inter-organisation cooperation is lacking. In the US, the Department of Homeland Security, following the 9/11 attacks, has developed the Interoperability Continuum tool to assess the performance of cross-agencies interoperability. This tool focuses on communication aspects and provides an interesting approach to assess the overall dynamics of interoperability (governance, SOPs, technologies, training and exercises, usage) among different agencies, like law enforcement, fire-fighters, and Emergency Medical Services). It is believed that a similar assessment tool to evaluate inter-operability at the European level would be highly beneficial. It would enable the diagnosis of the current situation and thus the evaluation of the benefit of the development of the European civil protection policy. This relates in particular to RescEU, which considers assets for fighting forest fires (especially Aerial forest fire-fighting Modules) as the key resources of the RescEU pool managed by the Emergency Response Coordination Centre (ERCC).