Driving Innovation in Crisis Management for European Resilience

D942.22 – REPORT ON THE APPLICATION OF THE SOLUTIONS IN TRIAL 2

SP94 - TRIALS

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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:
    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. **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 standardization.

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

This document reports on the application of solutions in Trial 2, the nature and main functions of the solutions which were applied, the way they were allocated to participating organisations, and prepared for this. It also reports on the execution phase of the Trial itself. Its intended audience is non-technical readers interested in Trial 2 and Trials in general. It is focused on the application of solutions, without any consideration regarding Trial design, technical integration into the Test-bed or evaluation. These aspects are addressed by other reports such as (1) and (2) or will be addressed by other reports in the future like (3).

The general purpose of Trial 2 is to improve cooperation and coordination between different organizations and agencies from different countries, using innovative solutions for large scale and complex (multi-event) crisis.

The scenario of Trial 2 is a large forest fire with industrial cascading effects and civil victims. The severity of the crisis, which happens in France near the Italian border, triggers first a request for support from the Italian resources, and secondly a request for additional airplanes through the European Civil Protection Mechanism. This complex scenario requires the cooperation of firefighters from France and Italy, environmental risk agency, and emergency medical services from France and the Italian Red Cross.

The four innovative solutions which were trialled are related to sharing situational awareness, improved coordination between firefighters and medical services and the management of data from social media. These solutions are CrisisSuite, LifeX COP, MDA command and control and SMAP.

Table 1.1: Innovative solutions in Trial 2

Name	Organisation	Utilisation in Trial 2
CrisisSuite	Merlin Software	**Logbook** solution for sharing information both vertically and horizontally in the CM organisations. Generates various **Situation Reports** and other standard **forms**.
LifeX COP	Frequentis	**Common Operational Picture** with geographical focus. Displays Tactical situation, defines danger area and other shared information on Map. Displays movement of moving ambulances.
MDA C2	MDA	Emergency Medical Services management. Supports **call taking**, **dispatching** and **routing** of ambulances (to avoid danger area), reporting on casualties.
SMAP	Thales	Social media analysis. Collects tweets related to topics of interest and helps filtering, enables push of information of interest to Common Operational Picture.

The Trial set-up involves the French Crisis Management chain of command (from field level to local, regional and national levels), the Italian firefighters' chain of command (from field level to local level), the environmental agency, the Italian Red Cross, and an advanced medical post.

Command organisations are equipped with Crisis Suite and LifeX COP, medical organisations with MDA C2, and the local operational centre is equipped with SMAP, MDA C2 and the command tools Crisis Suite and LifeX COP.

Trial 2 is organised as a desktop exercise, following a specified scenario. Scenario injects are performed either via players or via simulators provided by XVR.

The application of solutions which this document reports upon can be divided in four steps:

- The first step of this task was to **define the kind of processing** each solution will do, and the **exchanges of information** that will need to happen between solutions during the scenario.
- The second step was to **adapt solutions** to the kind of processing and exchanges they needed to perform.
- The third step was to **deploy the solutions** with as many servers and workstations as needed by the scenario, and to configure them with the scenario data (map, data-sets, and organisations).
- The fourth step was to **monitor them during the execution** of the Trial to make sure they were running correctly and still connected to the Test-bed, and **provide support** to the players.

One of the main challenges of the Trial was the tight schedule: only six weeks separated the selection of solutions from the Dry Run1 when the technical exchanges should have been tested according to the DRIVER+ Trial Guidance Methodology (TGM). In order to face this challenge, the team adopted a flexible iterative approach: the first test scenarios (describing the needed processing and exchanges between solutions) were defined as early as possible even though the Trial scenario was not fully completed. Additional test scenarios were requested and defined in agreement with the Trial Committee after Dry Run1 when the scenario got more precise and the solutions were better known. These test scenarios could be tested before Dry Run2. An outcome of the Dry Run was that the solutions met the requirements during the Trial.

Regarding the adaptation of solutions, challenges were of various natures:

- CrisisSuite: the main challenge was to apply CrisisSuite in a first responders' context, when this solution usually deployed in single non-CM focused organisation such as a hospital or a factory.
- LifeX COP: the main challenge was to decide the type of information of general interest that should be shared through the Common Operational Picture geographical view and to organise the way other solutions contributed to the COP or uses its information.
- MDA: the main challenge was to open-up a mature solution which runs its "own world" and manages actual resources, to a Trial 2 context where it is managing simulated resources and has to interact with external solutions.
- SMAP: the main challenge represented by the integration of SMAP in Trial 2 was to choose the adaptations in order to serve the practice of a social media manager when this new practice is not fully mature or harmonized in the French civil protection organisations.

These challenges have been completely met for CrisisSuite, LifeX COP and MDA, and partially met for SMAP for which the single player remarked, it would have been more adequately deployed at prefect level (which was not part of scenario) than at the local level where it was deployed.

At execution time of the Trial, all solutions were individually performing their tasks and exchanging information according to the plan. The Trial scenario could be played with only a short 10 minutes interruption and assistance was provided to players when needed.

Some lessons relative to the application of solutions were identified and recommendations for future Trials were formulated: they are regarding the organisation of the integration team, the involvement of future players in the preparation process to secure the adequacy of the deployment and use of solutions, the checking of the actual deployment of solutions in the planned rooms, or the need for the Trial committee to get to better know the solutions for the design of the Trial.

Consequently, Trial 2 can be considered both as an achievement with respect to the application of solutions, and a step forward with respect to the refinement of the way the DRIVER+ Trial Guidance Methodology can be applied.

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List of Acronyms

Acronym	Definition
AMP	Advanced Medical Post
CAP	Common Alerting Protocol
CCIM	Crisis Communications and Information Management
CESIR	European Centre for Risk Simulation
CM	Crisis Management
CNIL	French Data Protection Agency
CODIS	French firefighters Departmental Operational Centre
COGIC	French firefighters National Operational Centre
COP	Common Operational Picture
COZ	French firefighters Zonal Operational Centre
C2	Command and Control
C3	Command, Control and Communications
DIREX	Direction of exercise (in this case, of Trial).
DREAL	*Direction régionale de l'environnement, de l'aménagement et du logement* (French Environment Protection Agency)
DR	Dry Run (1 or 2)
DR1	Dry Run 1
DR2	Dry Run 2
EMS	Emergency Medical Service
EMSI	Emergency Management Shared Information
ERCC	Emergency Response Coordination Centre
EUCPM	European Union Civil Protection Mechanism
F2F	Face-to-face (meeting)
FCP	Field Command Post
FF	Fire Fighter
GDPR	General Data Protection Regulation
GIS	Geographic Information System
GUI	Graphical User Interface
HQ	Head Quarters
HTML5	HyperText Markup Language 5
IC	Incident Commander

Acronym	Definition
KML	Keyhole Markup Language
KPI	Key Performance Indicators
PMA	Poste Médical Avancé (Advanced medical post)
PoS	Portfolio of Solutions
RQ	Research Question
SDIS	Department Fire Fighter Brigade (France)
SiTac	Tactical Situation map
SP	Subproject
TAP	Trial Action Plan
TP	Transit Point
VOST	Virtual Operations Support Team

1. Introduction

This document reports on the work done and the results of the task **T942.2** ***Applying solutions in the trials*** for Trial 2. The main objectives of this task are to ensure that selected solutions are ready to be used in Trials, which includes:

- Adapting and configuring the solution as required by the Trial Committee or practitioners for its usage in the Trial.
- Deploying solutions and supporting their usage during the Trial.

The main output of this task is a set of adapted solutions, offering the planned functions, supporting the Trial specific data, configured and deployed in the target technical set-up (rooms, network) and made available to Trial participants for evaluation during the Trial.

As Trial 2 was organized as a comparison between legacy tools and innovative tools, the two sets of solutions needed to be described and discussed here: the legacy solutions (cf. section 3.1) and the innovative solutions (cf. section 3.2). Yet, as the adaptation was only made on innovative solutions, the adaptation is only discussed in (cf. section 3.2).

The **main objectives of this document** are to describe the solutions used during Trial 2, explain the preparation work and discuss how the prepared solutions did perform at Trial's execution time. It aims at drawing lessons learnt from the experience of Trial 2 for the benefits of future DRIVER+ and other Trials.

The **intended audience** of this document are people interested in the Trial 2 set-up and context. This document will be necessary to understand the Trial evaluation report (3) where this information will not be repeated.

In order to avoid redundancy, some information which are necessary for the understanding of this document, but are already or will be part of other documents, are not included in this document:

- The description of the Trial, its objectives, gaps, research questions, the selection process and results, can be found in detail in (1). The structure of the Trial's sessions, which have been changed between the publication of the Trial Action Plan (TAP) and the execution of the Trial, will be described in this document.
- The description of Test-bed related adaptations made on solutions can be found in (4).
- The trainings of the solutions will be reported in (5) for the selected solution.

The document is structured as follows:

- This introduction discusses the **purpose, scope, intended audience and structure** of this document and provides the links to other DRIVER+ complementary deliverables
- Section 2 presents an **overview of the solutions in Trial 2 as a whole**, where they were deployed (physically and organisationally), what major functions they were covering, and what information they were processing in Trial 2 and what main challenges the preparation of the solutions implied.
- Section 3 presents the **solutions individually**. It is divided in two sub-sections: section 3.1 presents the legacy solutions, focusing on their main functions and purpose, and section 3.2 describes innovative solutions and discusses their roles, functional scope, inputs and outputs, other functions (not used during Trial 2), adaptations made for the Trial (other than Test-bed related adaptations), and the support that provided by the solution team during the Trial.
- Section 4 discusses the application of solutions at Trial's **execution** time, how the technical support was organised, how plans were implemented and what performance could be observed.
- Section 5 discusses the achievements and lessons learnt of the preparation and execution time.
- Section 6 draws a conclusion to the document and draws a perspective for future Trials.

2. General overview

This section provides an overview of the solutions in Trial2 as a whole, where they were deployed (physically and organisationally), what major functions they were covering, and what information they were processing in Trial2.

A detailed presentation of Trial 2 can be found in the Trial 2 Trial Action Plan (1). As this document was delivered in September 2018, the sessions´ structure was modified between its delivery and the Trial execution. This change is mentioned in section 2.2. The explanation of this change will be provided in (3) to be delivered in M57 (January 2019).

The legacy solutions applied during the Baseline runs are the following:

- Synergi.
- Asphodèle.
- Sinus.
- Tweetdeck.

They are presented in more details in section 3.1.
The innovative solutions applied during the innovative runs of each session are the following:

- CrisisSuite.
- LifeX-COP.
- MDA.
- SMAP.

Asphodèle being necessary to the production of the Tactical Situation (SITAC) it is also deployed with the innovative solutions.

Table 2.1 displays the name, and main utilisation of the 4 innovative solutions applied in Trial 2.

Table 2.1: Trial 2 innovative solutions

Solution	Organisation	Stage	Short description	Utilization in Trial 2
CrisisSuite	Merlin Software	Market Growth	Logbook	Logbook(s) for sharing of vertical and horizontal information. Generates various Situation Reports and other standard forms.
Life-X COP	FREQUENTIS	Early adoption / distribution	Common Operational Picture	COP tool with geographical focus. Displays SITAC, defines danger area and other shared information on Map. Displays simulated movement of ambulances.
MDA C2	MDA	Wide scale adoption	EMS command and control	Emergency Medical services management. Supports call taking, dispatching and routing of ambulances, reporting on casualties.
SMAP	THALES	Initial piloting	Social media analysis	Collects and helps filtering information from Twitter, pushes information of interest to COP.

It shall be noted that the CrisisSuite solution is from Merlin Software an external solution provider (not a partner of the DRIVER+ consortium). This selection of solutions results from selection process which evaluates the adequacy of candidate solutions to the Trial, taking into account the Trial's gaps and research questions. This process and its results are detailed in (1). The innovative solutions are presented in more details in section 3.1.

2.1 Functional coverage of the solutions

This section presents the functional coverage of the innovative solutions applied in Trial 2. This functional coverage has been established relatively to the DRIVER+ CM functions taxonomy (6). Table 2.2 presents the full picture with the following colour code:

- **Dark green**: key functions which are actually provided and activated during the Trial 2. These functions will structure the evaluation process (3).
- **Light green**: secondary functions provided and activated by the solution in Trial 2.
- **Yellow**: functions which the solution contributes to but does not provide *per se*.
- **Grey**: functions which can be provided by the solutions but are not part of Trial 2.

Table 2.2: Functional coverage of solutions in Trial 2

Ref #	Functional area	Taxonomy category	CrisisSuite	Life-X COP	MDA	SMAP
1.2.1.2	Mitigation	Map the hazards per geographic area.				
4.1	Protection	Conduct systematic monitoring and data collection.				
4.3	Protection	Conduct incident or emergency response.				
4.3.1	Protection	Detect pending emergencies and provide early warning.				
5.1.2	Response	Conduct damage and needs assessment.				
5.2.1	Response	Activate Crisis Management bodies.				
5.2.2	Response	Maintain shared situational awareness.				
5.2.2.1	Response	Collect information from deployed sources.				
5.2.2.2	Response	Develop and sustain COP.				
5.2.2.3	Response	Disseminate COP and assessments.				
5.2.3	Response	Conduct coordinated tasking and resource management.				
5.2.4.3	Response	Deploy first responders.				
5.2.4.4	Response	Manage organized volunteers.				
5.4.2	Response	Provide on-site first aid.				
7.3.1.3	CCIM	Provide for crowd sourcing.				
7.3.4.6	CCIM	Set-up data storage and retrieval.				
7.3.4.7	CCIM	Set-up data analysis.				
7.5.2.1	CCIM	Communicate operational information across chain of command.				
7.5.3	CCIM	Support C3 decision making.				
7.5.6	CCIM	Detect and debunk deception and rumours in social media.				
8.3.3	C3	Determine principles of information exchange.				
8.4.4	C3	Establish trans-border coordination.				

Ref #	Functional area	Taxonomy category	CrisisSuite	Life-X COP	MDA	SMAP
8.5.13	C3	Manage resources to cope with priority tasks.				
8.5.2	C3	Provide situational awareness, share COP.				
8.5.7	C3	C3 volunteers operations.				

This mapping shows that the most covered functional areas is the CCIM domain (7 key functions), second is the response domain (4 functions), and third the C3 and protection domains (1 function each).

The importance of these two main functional areas seem relevant as Trial 2 deals with the coordination of cross border resources to produce a response effort and the CCIM and response functional areas are defined in (6) as follows:

- *"The structuring of the Crisis Communications and Information Management **(CCIM) functional area** is developed within two main assumptions: an integrated communications system is established to provide opportunities for agencies and levels of command and management to communicate; information flows are managed according to a coordinated architecture and procedures"* (7)
- *"Operations are the essence of the response function. They are defined in two basic directions: to limit the scope of the damage and to support the affected people. The taxonomy elaborates operational tasks across the full cycle of orientation, decision-making, mobilisation of responders and resources, command of operations, and preparation for immediate relief and comprehensive recovery."* (8)

The functions which are offered by the solutions but not activated are related to volunteer's management (MDA), damage assessment, early warning and interoperability (LifeX COP) and Rumour debunking (SMAP). CrisisSuite seem to be covering its native functional domain in Trial 2 as not major CM functions is greyed for this solution.

2.2 Sessions and activation of solutions

The Trial is organised as a comparison between legacy solutions and innovative solutions. A set of seven sessions is organized. Each session is divided in two sub-sessions, the first sub-session (X1) is played with the legacy solutions, and the second sub-session (X2) is played with the innovation solutions. Six sessions (A, B, C, D, E, and F) are related to the same fictitious crisis: a forest fire in the Alps area with industrial cascading effects. Session F does not have a legacy sub-session.

An additional session (SM), dedicated to the social media solutions and not related to the fictitious scenario is organized.

Trial 2 sessions and their main topic are summed up in Table 2.3.

Table 2.3: Sessions of Trial 2

Sessions	Main topic of session
Social media	Search for information (not connected to Trial scenario)
A (1,2)	Alert (fire start)
B (1,2)	Fire upscale
C (1,2)	Environmental risk

Sessions	Main topic of session
D (1,2)	Civil victims
E (1,2)	Medical evacuation of victims
F	EUCPM activation

The solutions which were applied during Trial 2 are legacy solutions (applied during the legacy runs of each session) and innovative solutions (applied during the innovative runs of each session). Table 2.4 shows in what sessions legacy and innovative solutions where activated.

Table 2.4: Activation of solutions during Trial 2 sessions

Solutions		Sessions						
Legacy	*Innovative*	SM	A	B	C	D	E	F
Synergi	CrisisSuite (command instance)							
	LifeX COP							
Asphodèle								
(Office Suite)	CrisisSuite (DREAL instance)							
Sinus	MDA							
Tweetdeck	SMAP							

2.3 Scenario injects

As Trial 2 is a Command Post Exercise and most sessions (except SM) are related to the Trial 2 scenario, the scenario is animated by injects. SM in itself can be considered as a Table Top Exercise.

Only two injects have a direct impact on innovative solutions:

- The phone call received by MDA in session D. This inject been played by a person does not required any explanation here.
- The tweets injected in Tweeter for sessions B, D and E. This inject is explained in the following.

In the scenario related sessions where it was deployed (B, D, E), SMAP was fed by fictitious tweets related to the scenario and injected in Twitter via a private account which only the Trial 2 player, Thales development team and XVR Test-bed infrastructure could access. This of course was a security to avoid sending fake information to the public. This was done, using the scenario injector of the Test-bed.

The fictitious tweets, their number, nature and style were inspired from real crisis which had been followed using SMAP. The 40 tweets data set used during these sessions is presented in Annex 3.

The architecture which enabled this injection involved simulators provided by XVR and the Test-bed and the whole set-up is described in Annex 5 (Figure A9). The injection and the possibility for social media application to collect the tweets were tested with SMAP.

2.4 SM Session

This section aims at presenting the specific SM session which was added after the submission of the TAP (1).

This SM session was especially dedicated to social media solutions Tweetdeck and SMAP. The objective of this session was to evaluate the ability of these solutions to find relevant information in the realistic context of Twitter. This evaluation objective will be presented and discussed in (3).

The session was divided in two sub sessions of 20 minutes each, the first one being dedicated to Tweetdeck, and the second one to SMAP. The objective was to collect as many tweets of interest as possible. The overall topic of the session and the choice of which information was to be looked for was left to the decision of the participant (without any *a priori* notice to the solution provider).

The event chosen for this session (by the player) was the visit of Emanuel Macron in the department of Aude after the important and deadly flooding which occurred the week before the Trial.

2.5 Deployment of solutions

This section presents the planned deployment of Trial 2's innovative solutions among the playing organisations.

The four tools have their own domain: CrisisSuite and LifeX Cop are dedicated to data sharing in a command environment. Yet, although both tools have a map view and a logbook, Life-X COP is more map centred, and CrisisSuite more logbook centred. Consequently, it was decided to trial LifeX COP for the geographical view and CrisisSuite for the logbook.

Based on this choice, CrisisSuite (command instance) was deployed at each organisation involved in the command and coordination aspect of the incident (CODIS, COZ, COGIC, FCP, IC, and Transit Point, Poste Médical Avancé (PMA), and Italian Operational centre and reinforcement group).

The DREAL instance of CrisisSuite was deployed locally in DREAL's box. This deployment corresponds to the most frequent use of CrisisSuite, within an organisation not exclusively dedicated to Crisis Management but having to deal with Crisis Management (e.g. hospitals, factories).

LifeX COP was deployed in French and Italian chains of command.

MDA, being a medical services application was deployed at organisations managing Medical services (CODIS which usually does the call taking and dispatching of Firefighters ambulances) and the Italian Red Cross which reinforced the firefighters' ambulances. The deployment of MDA at PMA was effective, but it was later discovered that this did not make operational sense as PMA does not dispatch the ambulances (cf. section 4).

SMAP being dedicated to social media analysis was deployed at CODIS where the social media manager is operating.

The deployment of the solutions within these organisations is displayed in Table 2.5.

Table 2.5: Deployment of innovative solutions within playing organisations

Organisations (French side)	Role	CrisisSuite (French Command)	LifeX COP	Crisis suite (DREAL)	MDA	SMAP	CrisisSuite (Italian command)	Organisation (Italian side)
COGIC	National OC	■	■					
COZ	Zonal OC	■	■					
CODIS FR	Departmental OC	■	■		■	■		
FCP	Field OC	■	■					
IC	Incident Commander	■						
TP Officer	Transit Point	■						
DREAL Crisis Cell	Environment agency		■	■				
PMA Officer	Advanced Medical Post	■			■			
	Italian Operational Centre		■				■	ITA Operational Centre
	Italian reinforcement group						■	ITA reinf.
	Italian Red Cross		■		■			ITA EMS HQ RED CROSS

2.6 Interaction between solutions

The various solutions were exchanging information. The nature of the information exchanged between the various solutions in depicted in Table 2.6.

Table 2.6: Inputs and outputs of solutions

	Inputs	Processing	Outputs
CrisisSuite (French Command instance)	User inputs	Update of logbooks generation of SITREPS messages (following forms)	Display of area map Display of three logbooks: Strategic, Tactical and Operational) SITREP Messages: Deployment information form IC report to CODIS Preliminary operational form Request for assistance form (to ERCC) Casualty report (alternative to MDA one)
CrisisSuite (Dreal instance)	User inputs	Update of logbooks Generation SITREPS	Event form (SITREP)
CrisisSuite (Italian Command instance)	User inputs	Update of logbooks Generation SITREPS	

	Inputs	Processing	Outputs
LifeX COP	SITAC (and updates) Danger area (defined by user) SITREP messages	Extract of geolocation of incident Generation of SITREPS	Display of SITAC Display of moving ambulances Display of area map Display of Transit Point, PMA, FCP positions Display of danger area Generation of danger area Message
MDA	Call Picture of patient Incident location. Location of hospitals. Location of ambulances Danger area message	Call taking Dispatching of ambulances Calculate route avoiding danger area	Dispatching of ambulances (French and Italian) Routes of ambulances to hospitals Generation of Casualty reports
SMAP	Public Twitter injected tweets from scenario (private account)	Collect and filter tweets, push tweets of interest to COP	Tweets of interest pushed to COP
(Asphodèle)	User inputs		Tactical Situation (SITAC)

2.7 Support of standards

The interaction between solutions in Trial 2 is implemented using two Crisis Management related standards:

- Common Alerting Protocol (CAP) (9).
- EMSI (10).

These standards are related to the representation of information. They support the exchange of structured information between various solutions. Their implementation was made possible by the fact that the Test-bed reference implementation (11) implements these standards as well and is thus able to receive them, send them and verify their structure.

Table 2.7 shows which standards are supported for the exchange of information within Trial 2 by the various solutions. The table mentions if this standard is used for input, output or both.

Table 2.7: Supported CM standards

	Input	Output
CrisisSuite	CAP	CAP
LifeX COP	CAP, EMSI	
MDA	CAP	EMSI
SMAP		CAP

EMSI is used for the exchange of Casualty reports (between MDA LifeX COP). And CAP is used for the all other exchanges: SITREP messages sent by CrisisSuite, Danger area sent by LifeX Cop, and tweets of interest sent by SMAP.

For CrisisSuite, MDA and SMAP, the support of these standards required an adaptation made for Trial 2. In the case of LifeX COP, the standard had been already implemented for EXPE41 (12) but on different types of exchanges.

Being a legacy solution, Asphodèle (which participated in the innovative runs) could not be adapted to support one of these standards. The adaptation made during EXPE41 ((12) to enable Asphodèle to export the SITAC in KML (13) was re-used.

The more detailed view on the types and structures of CAP and EMSI messages which were exchanged can be found in (4).

2.8 Main challenges

This section comments the main challenges of this task. Overall main challenges were related to the schedule and the organisation, the external cooperation, and specific challenges are related to each solution.

2.8.1 Overall schedule

This section describes the aspects related to overall schedule of the Trial and the impact it had on the preparation. This schedule was very tight for Trial 2, especially between selection and DR1 where only separated by six weeks.

Table 2.8 presents the main milestones of Trial 2's preparation.

Table 2.8: Trial 2 main milestones

Meeting / Milestone	Date
Solution demonstration and Trial Committee meeting #4	15-16/05/2018
Dry Run 1	26-28/06/2018
Dry Run 2	01-05/10/2018
Trial Execution	29/10-02/11/2018

This schedule challenge was faced by adopting an agile attitude, defining a first set of test scenarios as soon as possible after the selection, even though the corresponding Trial scenario and data capture strategy was not finalized. It was clear at that time that this set would not be complete, but this enabled the solution and integration teams to start working and take a first step.

These first test scenarios were passed during DR1, and a second set of test scenarios was defined during DR1 as a consequence of the refinement of the Trial scenario in the meantime.

Similarly, the solution and integration team prepared these test scenarios which were passed during DR2 meeting.

Finally, this flexible attitude of the solution, integration and Trial team led to the fact that all necessary test scenarios had been defined and tested at Trial's time.

2.8.2 Organisation

The application of solution practically involves many actors: the solution coordinator, the solution providers, the integration coordinator and the Test-bed infrastructure coordinator.

The coordination of all these actors was at first a challenge which was faced by organising weekly integration telephone conferences gathering all these partners.

At the time of execution, the technical coordinator was held by the Test-bed infrastructure coordinator who was coordinating the final testing of the whole set-up, and monitoring the set-up during the execution (cf. section 4).

2.8.3 External cooperation

The involvement of an external partner, whose partial reimbursement for its adaptation and integration efforts was not assured at the time the selection was made, was a challenge. This challenge was made more important by the central place that was envisaged for CrisisSuite.

The preparation phase actually proved that the commitment of Merlin Software was very strong and sufficient to provide the adaptation of CrisisSuite to Trial 2 and support the solution during the Trial.

The decision to reimburse the efforts may have played a part in the ability of this external partner to commit to the success of Trial 2.

2.8.4 Challenge relative to each solution

At selection time, some general challenges were perceived by the Trial committee relatively to each selected solution.

Only the challenges related to the usage of the solutions are mentioned here. The ones related to their evaluation will be discussed in (3).

- CrisisSuite: The main challenge represented by the integration of CrisisSuite in Trial 2 was to see if and how this solution which was usually and successfully used in a different context (e.g. single organisation other than first responders) could be beneficial in the chain of command of a first responders organisation. Its main strengths were its apparent simplicity of its flexibility (ability to adapt to the context of diverse organisations.
- LifeX COP: LifeX Cop had already been part of EXPE41 (12) so its benefit as a potential COP was already secured. The main challenges were first to feed the COP geographical view with common shared information (and consequently to define which information was going to be shared), second to organise the way other solutions were contributing to the COP.
- MDA: The main challenge represented by the integration of MDA in Trial 2 was to open-up a mature solution that is current running in its “own world” and managing actual resources, to a Trial 2 context where it is managing simulated resources and interacting with external solutions.
- SMAP: The main challenge represented by the integration of SMAP in Trial 2 was to choose the adaptations in order to serve the practice of a social media manager when this new practice is not fully mature or harmonized in the French civil protection organisations.

3. Applying solutions

This section describes the solutions applied during Trial 2. Section 3.1 presents the legacy solutions and section 3.2 the innovative ones.

3.1 Application of legacy solutions

This section describes the legacy solutions used during the legacy runs of Trial 2:

- Asphodèle: the tactical C2.
- Synergi: the legacy COP of higher levels.
- Sinus: the emergency medical services application for the management of victims.
- Tweetdeck: the native dashboard application provided by Twitter.

3.1.1 Asphodèle

This section describes the Asphodèle system which is the legacy tactical command and control in Valabre (and other departments) and briefly explains how and when it was used during Trial 2.

Asphodèle was deployed at the Field Command Post, and activated during all scenario related sessions (all but the specific social media session).

Asphodèle was used to manage the fire resources and generate the Tactical situation (SITAC). Figure 3.1 shows a tactical situation generated by Asphodèle.

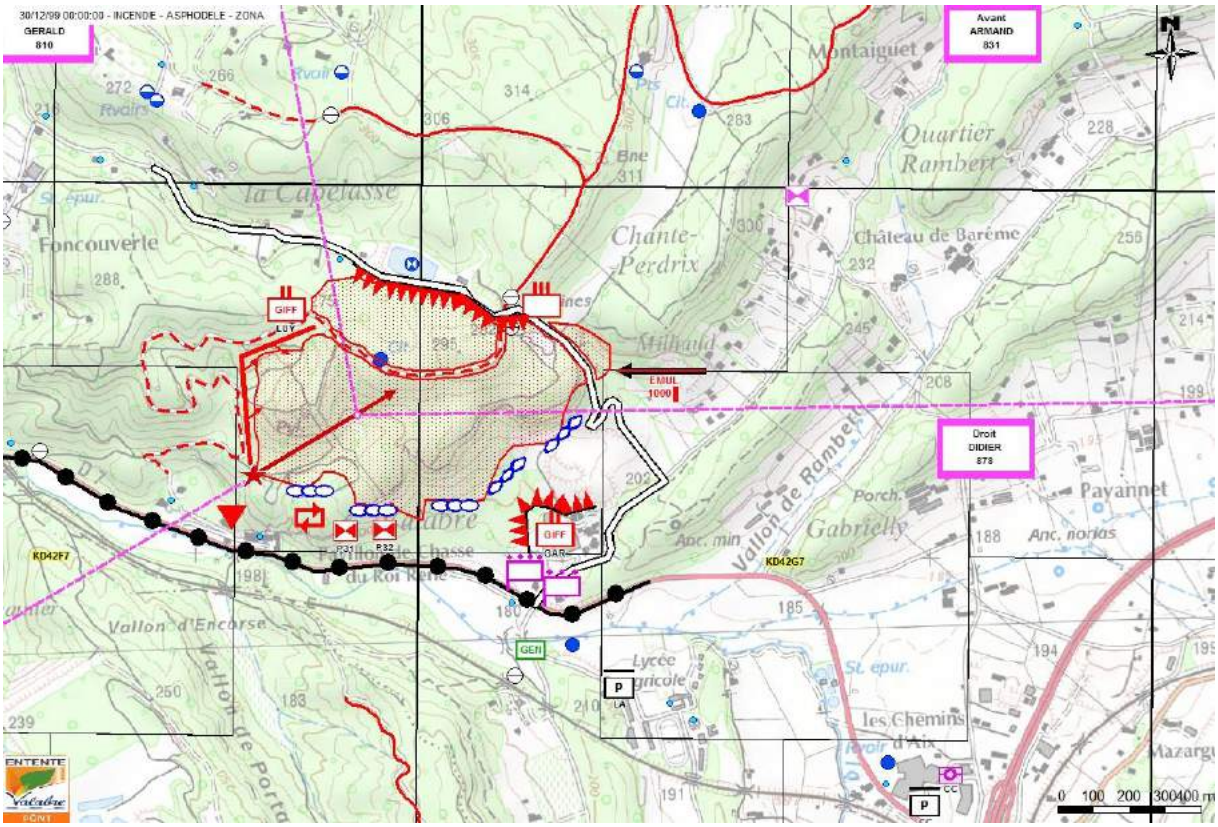

Figure 3.1: Asphodèle's map view

The Asphodèle software was developed by the *Université de Savoie* and Valabre for the SDIS of *Alpes Maritimes* Asphodèle is a C2 system for dedicated situation assessment and resource management. It is

adapted to all kinds of events. It is used by the firefighters' officer managing the intervention on site. The tactical situation corresponds to a specific intervention scheme on an identified geographical area.

About thirty symbols, describing the engaged means or actions are available. Asphodèle complies with the principles of the French national operational mapping. Its main functionalities are the following: draw a tactical situation, link it with the resource management table, export/import data (e.g. fire contour), send the tactical situation by email, create locations, measure distances.

Asphodèle functionalities can be assimilated to a graphic editor based on a GIS. Its user interface is simple: the tool bar allows the selection of the various involved means and actions undertaken or planned. This tool is used in the field command post and is operated by a dedicated officer, called intelligence officer. The tactical situation is then used by the incident commander to manage the crisis. This software was completed in 2003 with the implementation of SYNERGI.

Asphodèle's interoperability is limited. Its daily operational use is to interoperate by sending screen shots of its tactical situation (SITAC) by e-mail to other systems (SYNERGI). The adaptation made in DRIVER+ for EXPE41 enabled Asphodèle to send the SITAC as a KML file, KML being a technical standard allows to display drawings on a map, without any semantic. The same KML export was re-used in Trial 2.

3.1.2 Synergi

This section describes the Synergi system which was the legacy solution for the sharing of information at the strategic levels of the chain of command (from local Command Post - CODIS, to national COGIC) and briefly explains how and when it was used during Trial 2.

Synergi was deployed at local, regional and national levels (CODIS, COZ and COGIC), during legacy scenario related sessions (cf. section 2.2).

SYNERGI is part of the ORSEC portal, the Crisis Management portal of the French ministry of interior. The purpose of SYNERGI is to facilitate the transmission of information between civil protection players and authorities via an event manager and reporting forms.

SYNERGI implements some COP functions such as a logbook (Figure 3.2), a repository of reference documents, and a directory of all the concerned services. The access to SYNERGI is secured: only authorized persons from authorized organisations can access it.

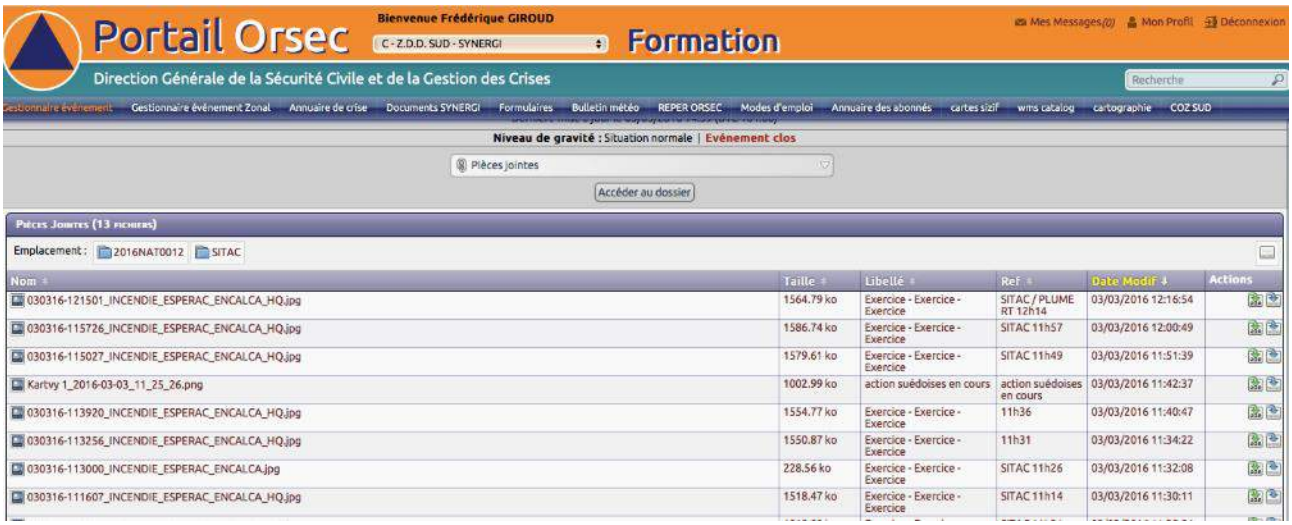

Figure 3.2: SYNERGI logbook

SYNERGI is used from the local level (both by the prefect services and the operational coordination at CODIS) up to the zonal and national levels.

3.1.3 Sinus

This section describes the SINUS (Système d'information numérique standardise – Standardized digital Information system) system which was the legacy solution for the management of victims and briefly explains how and when it was used during Trial 2.

SINUS was deployed at the Advanced Medical Post (PMA), and activated during Session D1 and E1 (the legacy runs of the session with a medical focus) (cf. section 2.2).

As Trial 2 was a table top exercise, the victims were not played, but simulated. Consequently, the field module (with the bracelets) was not played in Trial 2, but only the casualty report which gave the number, severity and type of victims.

This description contains public information on SINUS which can also be found in (14).

The SINUS system enables to manage the victims in a crisis situation. It is compatible with the ORSEC emergency plan. It was developed by the Préfecture de Police de Paris where it is operational since 2009. Since then, SINUS has been adopted by several other departments in France.

SINUS supports the identification, counting and tracking of victims. It secures the flow of information regarding the victims and produces a report on the victims, which includes information on the age, gender, nationality, address, hospital where the victim was transported…

As soon as the victim is found, a SINUS identification number is attached to the victim (bracelet with a bar-code), and stickers with the same identification number are put on the victim's clothes and other personal belongings.

After the victim reaches the advanced medical post (PMA: Poste Médical Avancé) a medical report (FMA: fiche médicale de l'avant (Figure 3.3) is attached to the victim's identification number before the victim is sent to the hospital.

A simple scanning of the SINUS bracelet, by any stakeholder equipped with the SINUS system provides the information on the victim.

Although SINUS was first designed for the management of many victims, it is now used in day to day operations in order to facilitate its appropriation by its users (first responders, and prefectural services). During the first year of its launching SINUS was activated more than 40 times and managed more than 600 victims.

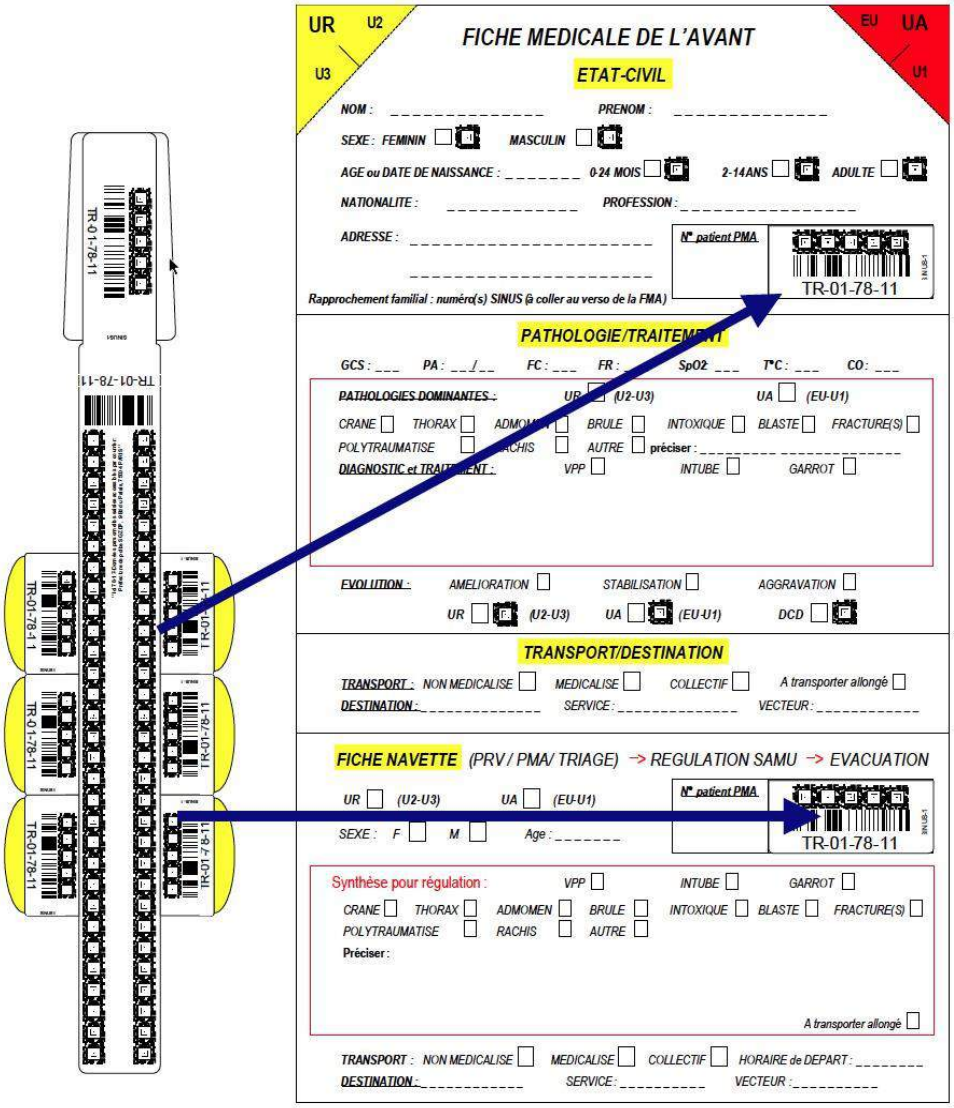

Figure 3.3: Example of SINUS medical report

The SINUS System includes the following modules:

- **A field module:** this module deployed on a laptop, and a bar-code reader, enables the creation of the victims' files. The transmission of data to and from the server is ensured either via a 3G connection, or through a USB key.
- **A data base:** victims' reports are stored in a secured data base based in the ministry of interior. Only authorized personnel and can be accessed on by authorized personnel.
- **A prefecture application:** dedicated to the CIP (Centre d'Information du Public – Public information centre) cell in charge of informing the relatives of the victims. According to the law, Information on the victims is made available to the CIP only after they have been validated by a judicial police officer.

3.1.4 Tweetdeck

This section describes the Tweetdeck solution which was the legacy solution for the management of social media and briefly explains how and when it was used during Trial 2.

Tweetdeck in a Twitter application which enables to, manage a dashboard with notification, search and sending capabilities.

Tweetdeck was deployed at the CODIS and activated during special session SM and session B1. It was planned to be activation during session D1 and E1 but some adaptations were made to take into account some feedback from the player (cf. section 5.2.5).

This description derives from public information available at (15).

The interface of Tweetdeck is a dashboard which can be configured by the user. The user can add as many columns as they want, and each column serves a different function. The main following types of columns are available:

Tweetdeck's main feature in Crisis Management is its search function.

The follow search features are available:

- Content: Tweets matching keywords, media type, dates and time, language, or including or excluding retweets. Wild card character can be used.
- Location: Tweets geotagged in a specified location.
- Date: Users can now also filter tweets by date (location search only).
- Users: Tweets from a specific account, members of a list, or verified accounts.
- Engagement: Tweets with a minimum number of Retweets, likes, or replies.

Figure 3.4: Tweetdeck dashboard

Other types of columns which can be defined in Tweetdeck are the following:

- Home: This shows the Twitter stream for a particular account.
- User: Shows all the tweets from a particular account.
- Trending: This shows hashtags, words, and phrases that are trending at any given time.
- Notifications: A notifications column shows all mentions, replies, retweets, and favourites and new followers for a Twitter account.
- Followers: This column lists the followers of a Twitter account.
- Favourites: shows the tweets user has favourited.
- Scheduled: See all the tweets the user has scheduled for future dates.

The activation of Tweetdeck was planned for sessions SM, B1, D1 and E1 (Table 2.4). After sessions SM and B1, its activation for D1 and E1 was reconsidered following feedback from the player.

3.2 Application of innovative solutions

This section describes the innovative solutions used during the innovative runs of Trial 2:

- CrisisSuite: the information sharing system (focused on its logbook).
- LifeX COP: the Common Operational Picture (focused on its mapview).
- MDA: the call taking, ambulance dispatching, routing and reporting solution.
- SMAP: the social media analysis platform, dedicated to crowdsourcing.

3.2.1 CrisisSuite

This section describes the CrisisSuite solution provided by Merlin Software and its application during Trial 2.

The main objective of CrisisSuite (online Crisis Management software) is to enable organisations to successfully manage information during a crisis. CrisisSuite is a tool that supports the net centric working methods of crisis teams by creating a universal picture of the crisis and sharing it horizontally and vertically with all the other teams in the crisis organisation. CrisisSuite also assists in maintaining an effective crisis meeting structure and it decreases the administrative workload for the people managing the crisis.

A corporate Video describing the solution can be found on internet (16).

3.2.1.1 Role in Trial

Crisis Suite was applied in Trial 2 in order to:

- Provide ability to log command related decision (information, decision, actions) in a logbook.
- Generate reports: Updated Situation Reports (SitReps) give the latest overview of the state of affairs regarding a specific topic.

An example of a CrisisSuite logbook is shown by Figure 3.5.

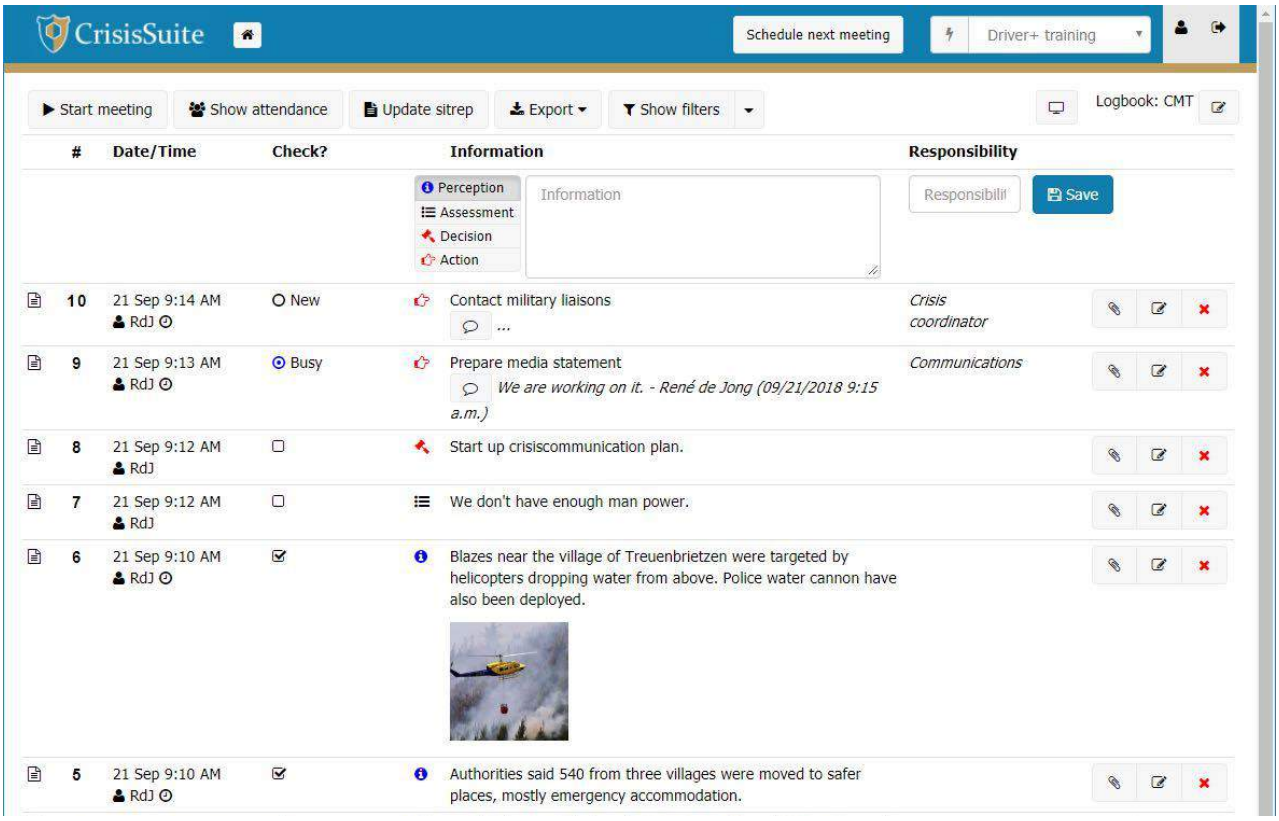

Figure 3.5: Example of CrisisSuite logbook

Three instances of CrisisSuite were deployed during Trial2:

- One instance was deployed in the incident chain of command. This instance covered the French vertical chain of command (from Field to National levels). This instance was configured with three Logbooks:
  - The strategic logbook gathered the upper part of the Chain of Command (CODIS, COZ, COGIC).
  - The tactical logbook was gathering the operational part of the Chain of Command (FCP, IC, CODIS)
  - The operational logbook was gathering the transverse sectors interacting with the Field Command Post, PMA and TP
- One instance was deployed at the environmental agency (DREAL). Participants in DREAL were sharing the same Logbook.
- One instance was deployed in the chain of command of the Italian fire fighters.

The interfaces of CrisisSuite with other innovative solutions during Trial 2 are displayed in Table 2.6.

Table 3.1 shows the deployment of Crisis Suite and the structure of logbooks.

Table 3.1: Deployment of CrisisSuite

CrisisSuite instances	French chain of Command			Environmental agency (DREAL) Instance	Italian chain of command
	Strategic logbook	Tactical logbook	Operational logbook	DREAL logbook	Italian logbook
COGIC					
COZ					

CrisisSuite instances	French chain of Command			Environmental agency (DREAL) Instance	Italian chain of command
	Strategic logbook	Tactical logbook	Operational logbook	DREAL logbook	Italian logbook
CODIS					
FCP					
IC					
TP Officer					
PMA Officer					
DREAL Crisis Cell					
ITA Operational Centre					
ITA reinf.					
EMS HQ RED CROSS					
SMM (at CODIS)					

3.2.1.2 Other functions not used in Trial

Apart from the function used in Trial 2, CrisisSuite offers the following other functions:

- Tasking module (keeping track of action items logged in the logbook).
- Alerting module: alerting a group of an individual.
- Plans module: provides the ability to upload some emergency plans, and make them available on-line to the community they are relevant to. In Trial 2 this was used – in a minor way – to store and retrieve the DREAL plan.
- Maps module: provides a geographic view.
- Attachments – Share images and documents with all people involved in a particular crisis.
- Organisation – Make it as easy as possible for people to reach out to another.

3.2.1.3 Adaptations made for Trial

This section reports about the adaptations which were made during the preparation on CrisisSuite to meet Trial 2 requirements.

The technical adaptations required for the connection to the Test-bed are described in (4).

Apart from these the following adaptations were made:

- Configuration of the three instances (French command chain, DRAL, Italian command chain).
- Configuration of the three logbooks (in the French command chain instance).
- New functionality offered in the filling of a SITREP (by drawing an area on the map).
- Development of all SITREP forms, and their workflow:
  - Deployment information form.
  - IC report to CODIS.

- Preliminary operational form.
- Request for assistance form (to ERCC).
- Casualty report (alternative to MDA one).
- Event form (DREAL).

3.2.1.4 Support during Dry Runs and Trials

Support for CrisisSuite was provided to players by Merlin during the Trial execution whenever problems on the user side were obvious. In the Field Command Post, the situation reported by several observers made more constant kind of support necessary, and a member of the Merlin team joined the FCP with the role of operator (see also section 4.4).

3.2.2 LifeX COP

This section describes the LifeX COP solution.

LifeX COP is a web-centric multi-user solution developed by Frequentis to address the lack of a Common Operational Picture in the field of Crisis Management. The COP GUI presents in a map all information related to an event: incidents, alerts, resources, observations and sensor data; added manually and/or automatically. Information is organized in layers that can be changed individually (show/hide, sort and set transparency). Figure 3.6 shows the user interface of the LifeX COP.

Based on client-server architecture all information becomes immediately available for all users: info layers are automatically refreshed. The COP allows multiple clients to access to the Web GUI (just requiring a standard HTML5 internet browser) for tactical and operational users.

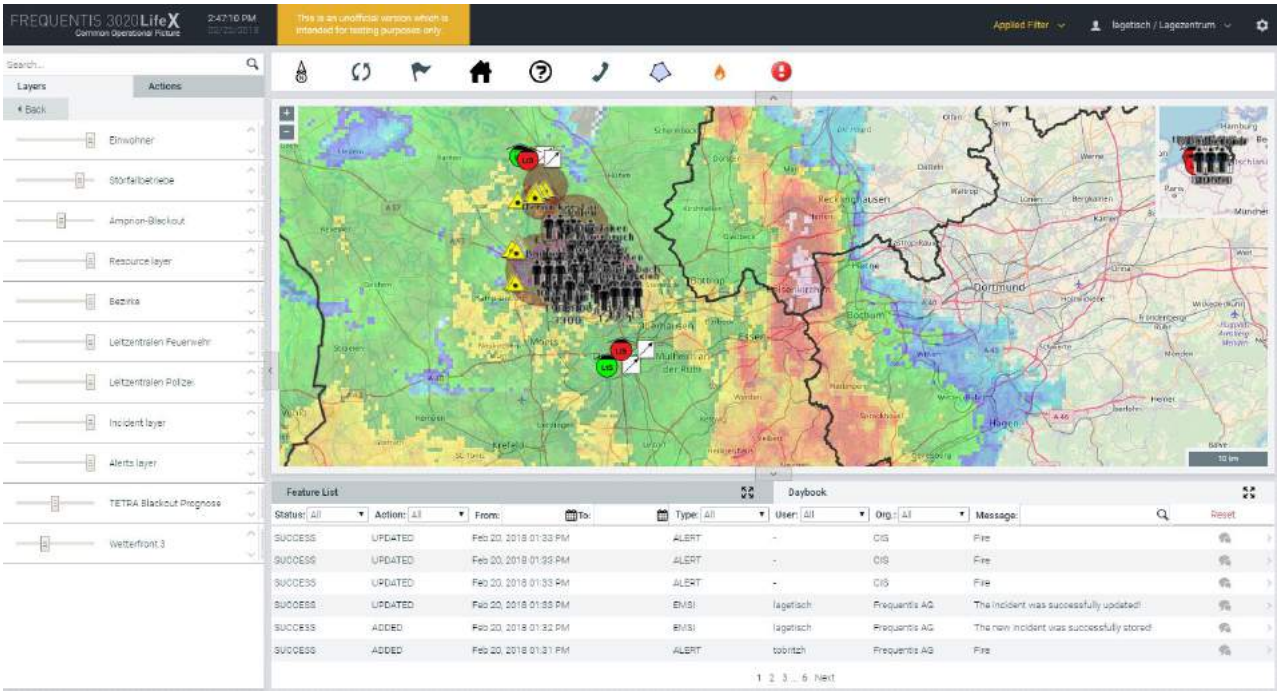

Figure 3.6: LifeX COP map centric user interface

This information can be grouped in layers which can be arranged to improve the visibility of the data. Additionally, information can be filtered so non-interesting data can be hidden from the user view.

LifeX COP also enables each user to add comments in a logbook that can be reviewed at any time. Information is presented both in a map view and list view. In terms of visual design, the graphic user

interface is dynamic allowing the user to decouple windows (map, logbook and list) to be arranged in a multi-monitor operation centre.

3.2.2.1 Role in Trial

LifeX COP was the innovative solution for the Common Operational Picture. It provided the users with a common geographical representation of the situation where the following information was shared:

- Map of Alpilles area.
- Chemical plant (actually a plant from Marseille costal industrial area incrusted in Alpilles map).
- Tactical situation (SITAC): fire contour, fire units (generated by Asphodèle).
- Danger area (defined by the firefighters, access reserved for firefighters only).
- Moving ambulances (dispatched by MDA application, movement calculated by XVR, display done in Life-X COP).
- Location of Transit Point (TP), Advanced Medical Post (PMA), and Field Command Post (FCP), location of hospitals.
- Tweets of interest pushed on the COP by a social media manager.

LifeX COP was used in all sessions by both the French and the Italian practitioners' organisations. The deployment of LifeX COP is described in Table 2.5. In total 10 workstations of LifeX COP were installed.

Figure 3.7 shows the SITAC provided by Asphodèle using its symbology. Figure 3.8 shows the stations and moving units. A role concept was utilized, making it possible to provide different roles with different content. To be precise, DREAL and First Responder were distinguished. The details of moving units were visible only to first responders.

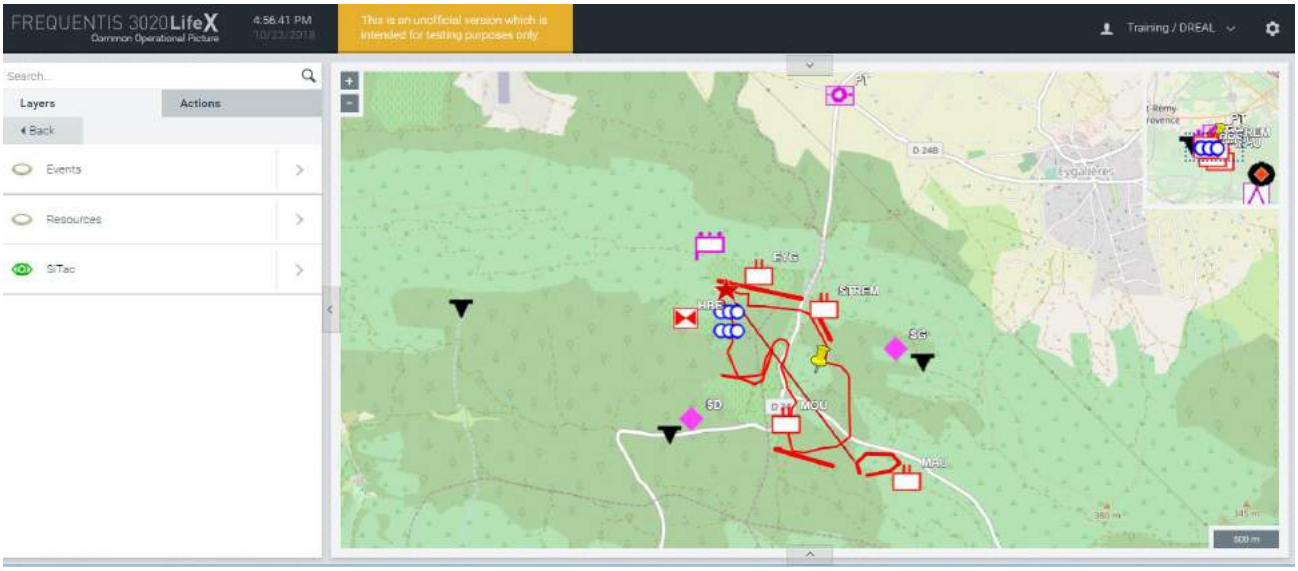

Figure 3.7: The SITAC shown on the LifeX COP

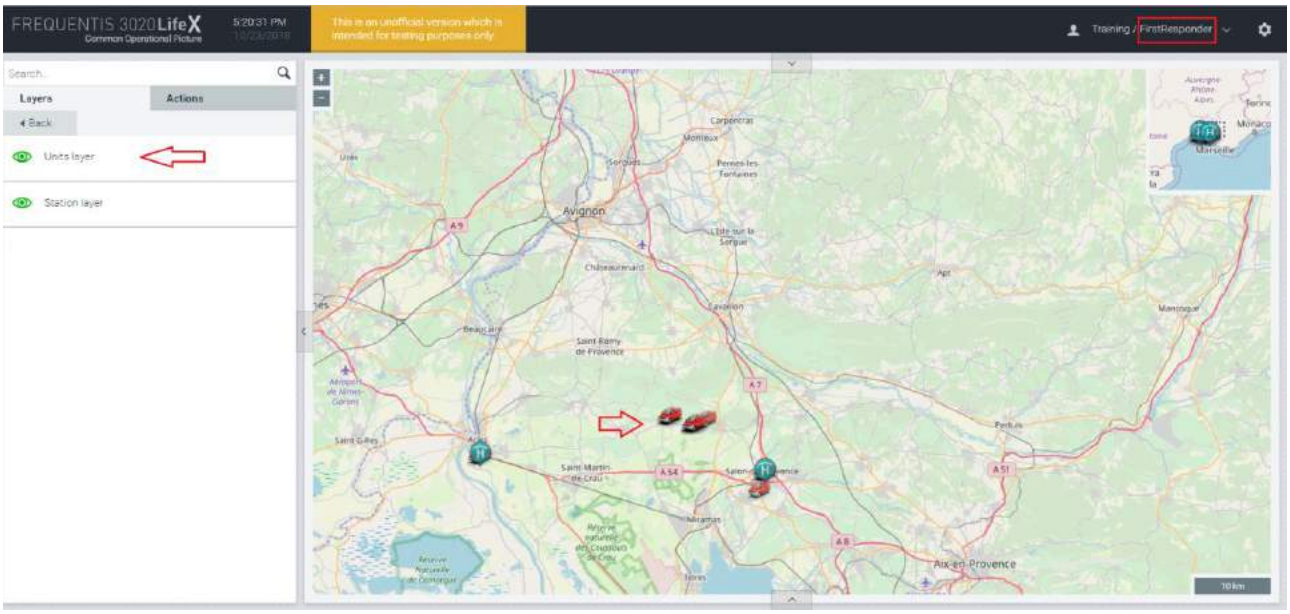

Figure 3.8: Hospitals and moving ambulances

The inputs and outputs of LifeX Cop are detailed in Table 2.6.

3.2.2.2 Other functions not used in the Trial

In addition to the functionality described above, the LifeX COP prototype offers the following functionality which was not used in the Trial, either because the scenario did not request such functionality, or another solution provided the functionality instead:

- Logbook function.
- Statistics.
- Display of sensor data: Ability to receive CAP messages from external systems (e.g. C2, Sensors) via feeds.
- Semantic mapping: Ability to display various symbologies on the map for the same entities. The symbology is then displayed according to the user's context (French users get French symbols, and Italian ones, get Italian symbols).

3.2.2.3 Adaptations made for the Trial

This section describes the adaptation made on LifeX COP for Trial 2. These adaptations regard the frontend (client side) and the backend (server side) part of the solution.

On the frontend side, during Trial 2, additional information was received from other solutions, namely CrisisSuite, MDA and SMAP. In order to provide a visualization of this information on the LifeX COP the frontend was adapted. Adaptations included

- The possibility to open a resource (i.e. an image) in a pop-up by clicking on a link.
- An additional form showing the casualties.
- The possibility to show moving units (e.g. ambulances) on the map.

Figure 3.9 shows the resource pop-up marked with a red rectangle. Also, the link of this resource is marked in red.

Figure 3.10 shows the casualties form again marked with a red rectangle.

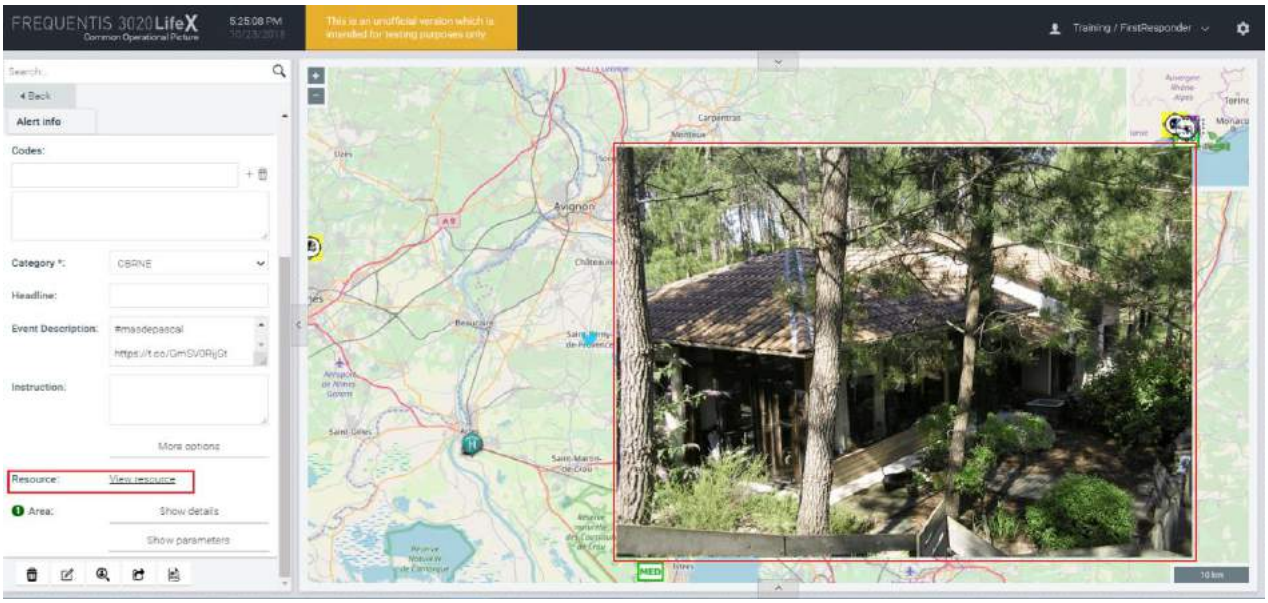

Figure 3.9: Tweet of interest received from SMAP shown on the COP

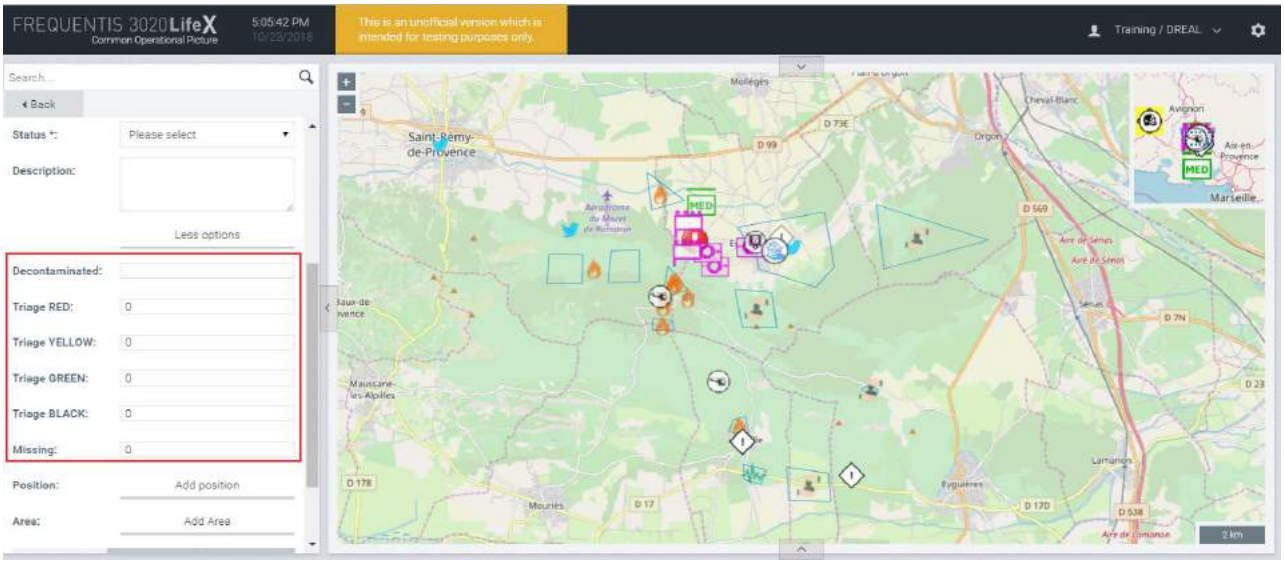

Figure 3.10: Casualties received from MDA shown in a form

As users of the LifeX COP can switch on and off each information layer separately it can happen that new information is overlooked when the respective layer is not switched on. In order to notify a user that new information became available, a pop-up notification was created in LifeX COP, see Figure 3.9.

On the Back-end side, also a few modifications were needed to apply the solution in Trial 2:

- During Trial 2, SITACs generated by the legacy tool Asphodèle were shown on the LifeX COP. In order to enable this functionality, the handling of this information in form of KML layers was implemented. The KML file was provided to the client using a drag&drop upload and clients were notified that a new layer was available.
- Another need in Trial 2 was to show the overlay of an actual power plant on the map.

- Finally, to show stations, e.g. hospitals and moving units, e.g. ambulances on the map, the objects were retrieved from the Test-bed[1] format and stored in the LifeX COP database.

Other adaptations which are more related to the integration into the Test-bed than to Trial 2 are described in (4).

3.2.2.4 Support during DR and Trials

Support for LifeX COP was provided by Frequentis during the DRs and the Trial execution for practitioners using the solution. The solution support was provided whenever problems on the user side were obvious. Support was needed mainly in the following areas:

- Password handling: practitioners did not remember their login and password which were given to them in the solution trainings.
- Pop-up handling for new layers: practitioners were sometimes not paying attention to the pop-ups (e.g. in stressful situations) and sometimes clicked on them unintentionally (which makes them disappear).
- Switching between map view and list view: some practitioners did not remember from the training how the list view can be switched on.
- Drawing an area in the COP: some practitioners did not remember from the training how an area (e.g. a danger area) can be drawn in LifeX COP.

3.2.3 MDA

This section describes the MDA solution developed by MDA.

MDA solution is a fully functional system, supporting MDA operations. The system provides the capacity to manage the full cycle of operations from the reception of the call to the dispatching and deployment of available resources to the scene and the follow--up of the emergency response.

MDA's command and control system for emergency response organization allows presentation of the missions and based on localization, suggests the unit that will be the first to arrive. On a map, the operator can follow the units. For each mission, documentation and comments can be added. The system integrates all the information received for different sources – mobile apps, cameras and other sources.

The command and control system is made of different modules, and allows the dispatcher to receive a layout of all the critical information needed, for example, the patient's vital medical information, current traffic and more, in order to make life or death decisions in a matter of seconds. Although the system is consisting of many layers and contains vast amounts of knowledge - it is able to perform many actions automatically, thus avoiding malfunctions and saving precious time, allowing the dispatcher to focus on guiding the patients and assisting them.

The system is connected to a switchboard, and once an emergency call comes in, the details of the caller appear immediately on the dispatcher's screen, allowing him to begin questioning the caller and dispatching teams. At the same time, the system is able to locate the caller using GIS technology and send the precise location to the teams already in the ambulance. The dispatcher can flag the location on the map and use it in order to direct the teams to the correct address.

[1] The technical format was geoJson.

Dashboard cameras have been installed on all of MDA's rescue vehicles in order to allow the dispatcher to watch a live video feed from the field. Many times, this ability is a make or break factor in managing an incident, allowing the dispatcher to understand the true nature of it and to call additional MDA teams or other security forces.

The system is also able to automatically locate the patient, even in cases of remote areas, such as forests, beaches or the desert. When the caller is only able to provide an estimated location, the dispatcher sends them an SMS with a possibility to share their location. After clicking the link, the precise location of the caller appears on the GIS screen in MDA's command and control system and forces are immediately dispatched to the incident.

Figure 3.11 shows the "new incident" screen, where the user inserts the information about the incident, allocate units (on the right side of the screen) and dispatch them.

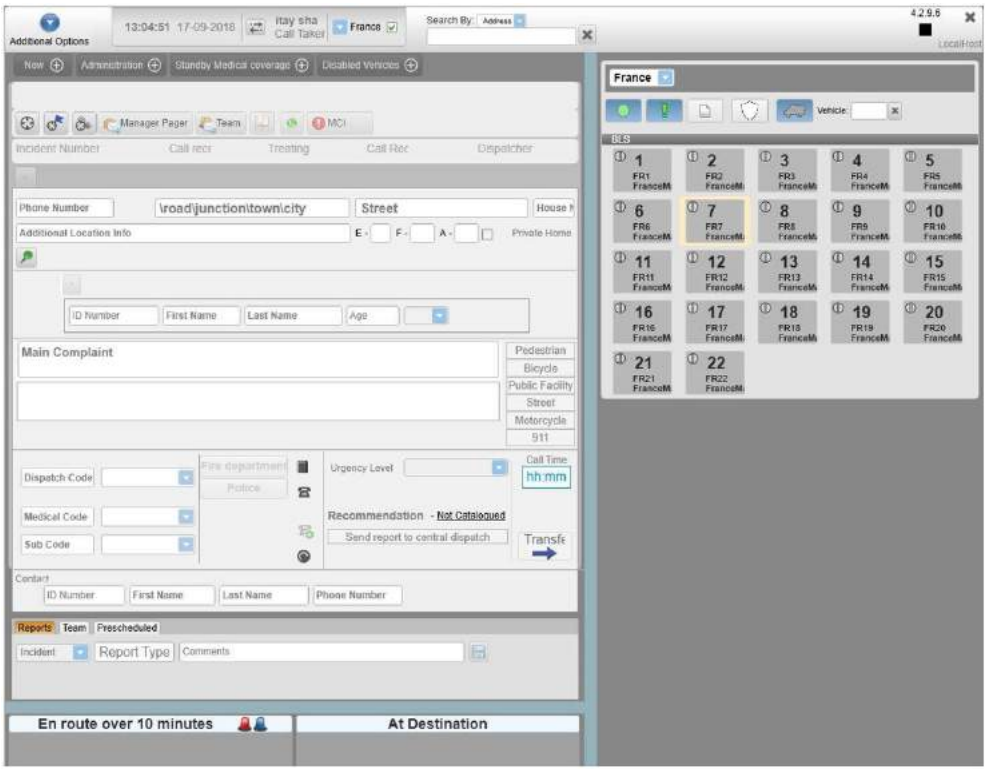

Figure 3.11: MDA dispatching of resource to a new incident

3.2.3.1 Role in Trial

MDA command and control system was used for the management of the medical response to the incidents in the Trial. It was in use in sessions D and E (cf. Table 2.4), that included tasks oriented on victim management. The solution instances were located in the French CODIS and in the French PMA (cf. Table 2.5).

In both locations the practitioners managed the units and the incidents, while being able to see the actions done by the other users. The information appeared on the screens as written information and on a map as new flags and new movements of units.

The units and their movements were simulated by XVR simulator. The command and control system received geo-location of the danger area from LifeX COP.

Figure 3.12 shows the map screen where the incident is marked with a flag: The colour of the flag indicates the level of emergency of the incident.

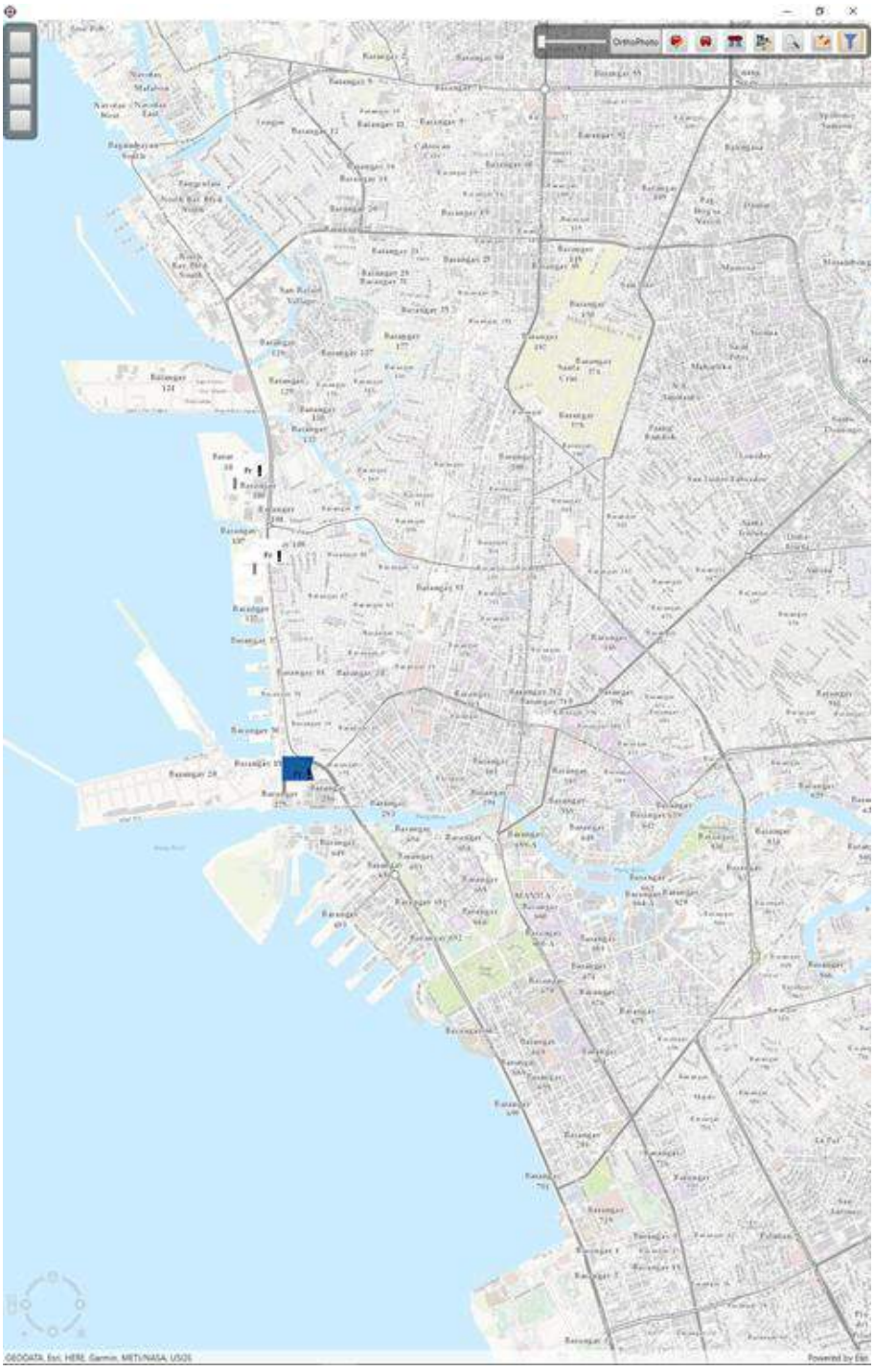

Figure 3.12: MDA's map screen

In the first session where it was used, practitioners used the MDA solution to create the incident log, to locate it using GPS data coming from the victims, and to assess the severity of injuries based on pictures sent from the victims (Figure 3.13).

In the second session where it was used, the MDA system was used in order to allocate resources (EMS units) to the incident location, to route the vehicles to the hospitals -avoiding the danger area defined in the COP-, to log the status of casualties being transported in each unit, and to report on additional description of the victims' injuries.

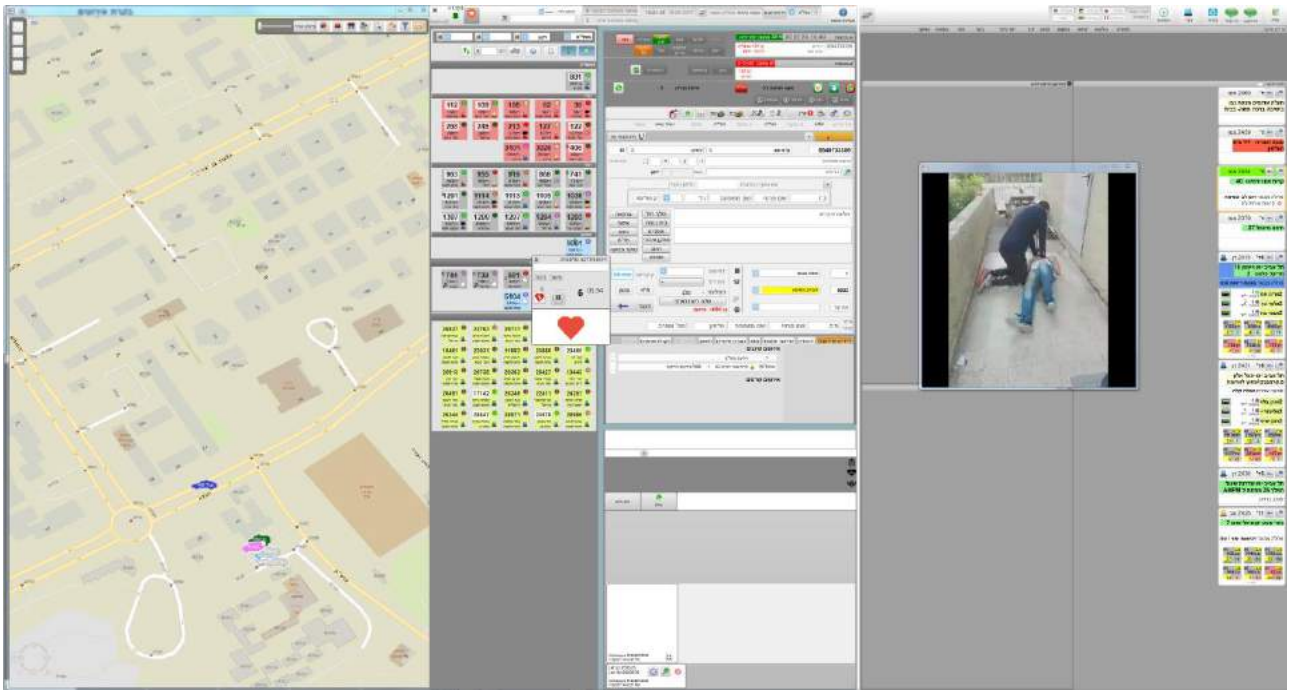

Figure 3.13: Pictures and location messages pop-ups

Using the system, the operators were able to mark the status of the active units (e.g. available, on site, transporting, etc.), and to follow the live movement of the units on the map.

The inputs and outputs of MDA are described in section 2.6.

3.2.3.2 Other functions not used in Trial

Except for the functions that were in use in Trial 2, MDA command and control enables full operation of the entire crisis circle, from receiving the call and creating the incident, through auto-activation of units (based on expected time of arrival) and follow-up on the active units.

The system also enables activation of first responders, sends messages to managers, receives medical data from the units and logs it, presents units from other emergency organizations on the map, enables MCI module for large scale incidents.

3.2.3.3 Adaptations made for Trial

This section describes the adaptations which were made on MDA for Trial 2 which had to do with opening of MDA to a Command Post Exercise type of Trial, make it interact with other solutions and work with simulated resources. Adaptations related to the integration to the Test-bed, are being reported in (4).

The following adaptations were required by the Trial 2 scenario and made on MDA's command and control solutions:

- Installation of workstations and connection to the network.
- Preparation of the French and Italian environments: Maps and sets of ambulances.
- Interface between XVR and MDA for the management of simulated resources (ambulances), informing XVR of the incident creation, location, location update, dispatching of specific ambulance.
- View of the danger area in MDA's map, Routing of ambulance avoiding the danger area, visualisation of moving ambulances.
- Interface to Test-bed: preparation of the casualty report, sending of casualty report.

3.2.3.4 Support during DR and Trials

Support for MDA command and control was provided by MDA team during the DRs and the Trial execution for practitioners using the solution. The provided solution support was mainly in the following areas:

- Log-in and start-up handling.
- Sending request for a picture from the incident location (when user forgot how to do it).

3.2.4 SMAP

This section describes the SMAP solution. Some complementary information on the role of social media managers their current practice and importance of various social media can be found in Annex 4, and information related to the injection of tweets in accordance to the Trial scenario in Annex 5. As the use of SMAP in Trial 2 was identified as GDPR sensitive, a specific section (section 3.2.4.5) is dedicated to this topic, and the complete analysis can be found in Annex 2.

Social media contains precious information which can bring an important contribution to situation assessment. This information can concern the incident(s) itself, the impact, or the needs of the population affected by the crisis. When trying to take this information into account, social media managers face a major challenge which is finding relevant piece of information in a -potentially- huge volume of information.

SMAP (Social Media Analysis Platform) is a solution developed by Thales which enables the analysis of Twitter messages for crowd sourcing purposes. Its big data architecture helps managing and processing important flows and quantities of tweets. Developed using web technology SMAP only requires a web navigator on the client side. Its big data architecture enables, if necessary, to handle large volumes of tweets.

SMAP provides social media managers the ability to collect social media posts related to certain topics of interest, store them, display them in a dashboard, filter them to find the tweets of interest and report on the information found. These main functions are illustrated in Figure 3.14.

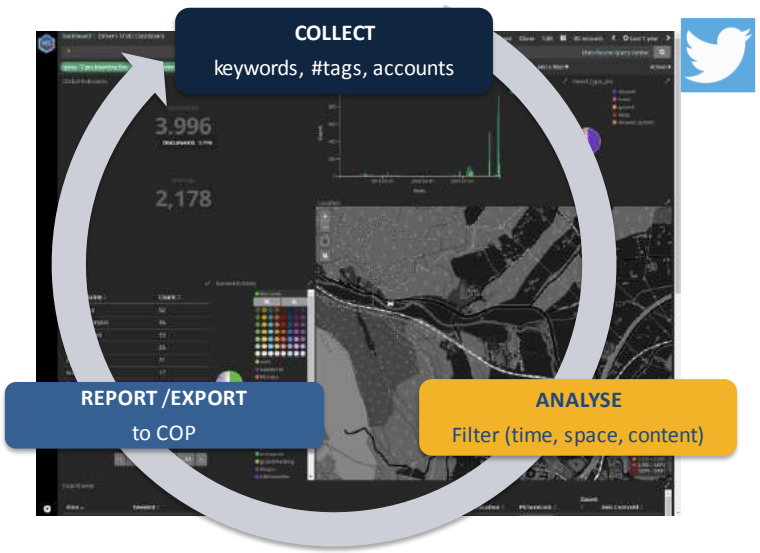

Figure 3.14: SMAP main principles

The collection can be done according to specific accounts or keywords. The filtering can be done according to geography, time slots, topics and other criteria such as suspended accounts or tweet/retweets. The reporting can be done by either sharing a Dashboard, or pushing a tweet of interest to the COP.

3.2.4.1 Role in Trial

SMAP was activated (cf. section 2.2) during the SM session and during sessions B, D and E sessions.

Its role during session SM and its role during the scenario related sessions (B, D, E) were the same: to find information of interest for the Crisis Management team. Yet, the set-ups in which SMAP operated during these two types of sessions differed: in session SM SMAP was used as a standalone solution. When sessions B, D and E, SMAP was connected to the COP, and was asked to push information of interest on the COP (and contributing in this manner to the COP).

The principle of SMAP as compared to the legacy solution (Tweetdeck) is that is performs first a large bandwidth query on the Twitter interface, and stores the collected tweets, to enable the user to mine this set of tweets by filtering and searching.

The version of SMAP implemented in Trial 2 the following functions:

- Collect.
- Dashboard.
- Search & filter.
- Export to COP.

Each of these functions is detailed in the following paragraphs.

The **collect** function starts when SMAP is activated. It is based on list of terms which were defined with Valabre based on the interviews of the social media manager: "crue, incendie, inondation, innondation, pluie+Inondation, vaguessubmersion, flamme, feu, phénomène+violent, MSGU, SDIS, SMEM, Vigilance+Rouge, forêt, panache, fumée, Marseille, Alpilles, Valabre, pompier, FDF2018, FDF, respirer, explosion, Apocalypse, Urgent, Help, Au secours, SapeursPompiers, FeuxDeForêts, Canadair".

The collection query starts collecting tweets from the past (completed in less than 3 minutes) and new incoming tweets (Figure 3.15). All collected tweets are then stored in SMAP and can be viewed in the Dashboard and searched.

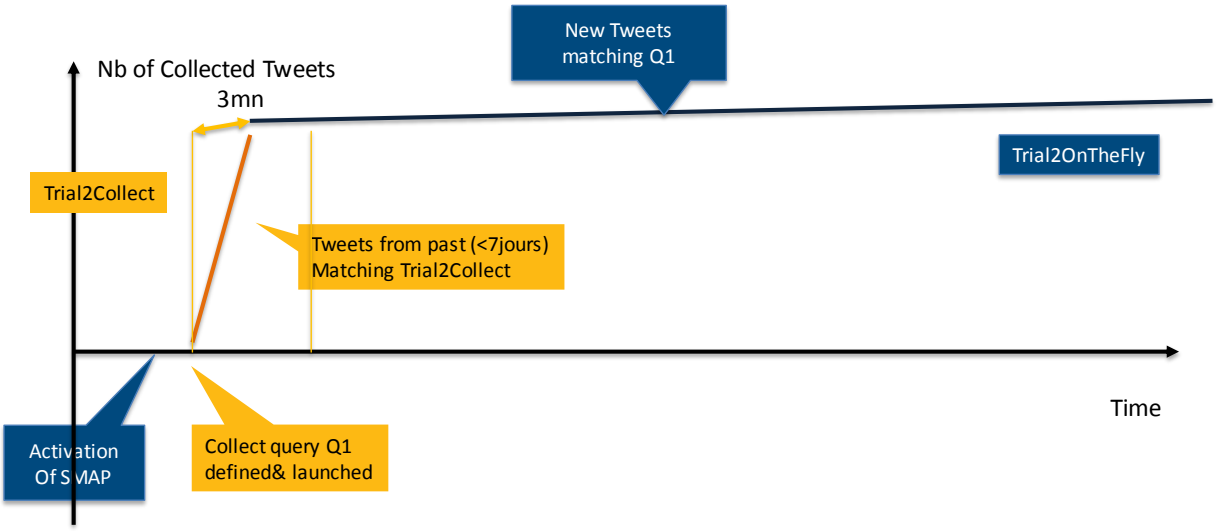

Figure 3.15: SMAP collect function

The **dashboard** (Figure 3.16) provides an overview of all collected tweets. It is composed of several lists, pie charts, bar charts, time charts, and a map. All of these are active and can be selected for filtering purpose.

The **search** can be done through a "Google like" text search, enabling logical expressions (e.g.: AND, OR, NOT)**,** and the **filtering** can be done according to the content (keywords), named entities (e.g. organisation, places) space (drawn area on map), time (selected time slot in timeline window), and other dimensions such as tweet/retweets.

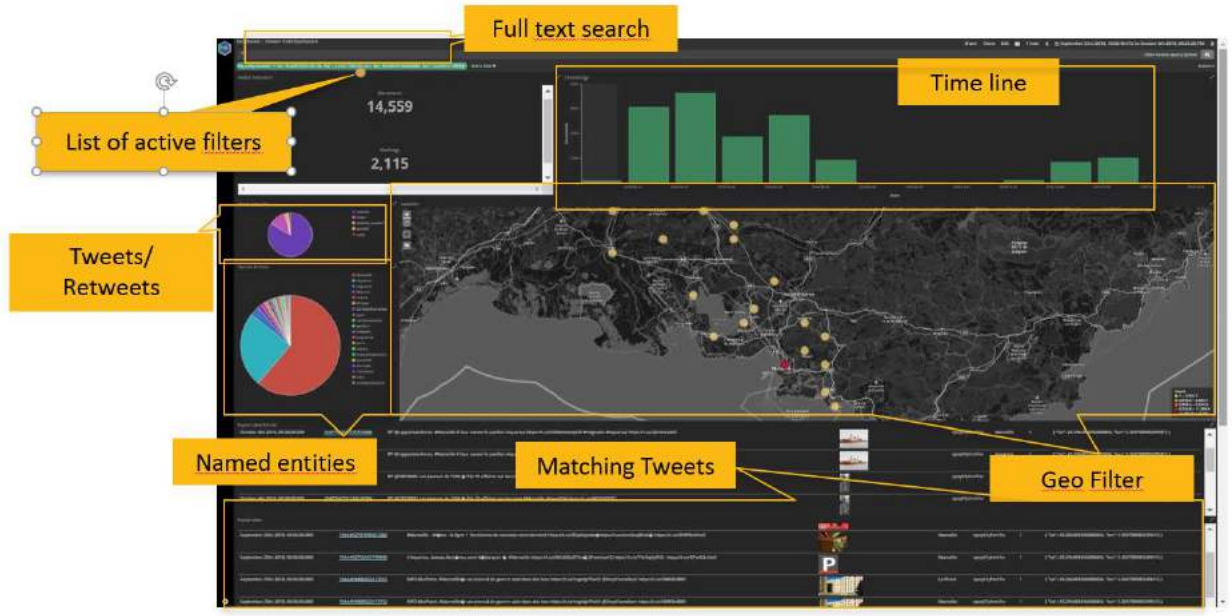

Figure 3.16: SMAP search and filtering tools on the dashboard

Tweets of interest can be exported to the COP. Technically the information is sent via a CAP message but the user does not need to know about it.

The **inputs** of SMAP in Trial 2 are the incoming tweets. The **outputs** are the tweets of interest pushed to the COP.

3.2.4.2 Other functions not used in Trial

This section describes the additional functions which exist in SMAP but were not activated during Trial 2. In this case, part of them were not activated because they were not needed the objective SMAP had (crowdsourcing), and some of them because the GDPR analysis revealed that their inclusion could have been sensitive and not proportionate to the research goal.

SMAP in its complete version contains other functions which were not activated by the Trial 2 scenario. These additional functions are:

- The calculation of communities of accounts interacting with each other.
- The detection of events, based on statistical burst in the frequency of certain terms.
- The detection of similar accounts (based on their descriptions, avatar and way they are positioned in their surrounding network).

Combined with the functions that were activated in Trial2, these additional functions can support the detection of rumours.

3.2.4.3 Adaptations made for Trial

This section describes the adaptations which were made on SMAP to participate in Trial 2. It does not describe the adaptation made to integrate SMAP to the Test-bed, which are described in (4).

The adaptations performed on SMAP had the following objectives:

- Connect SMAP to the Test-bed as described in (4)
- Enable SMAP to export information as described in (4).
- Simplify the GUI of SMAP: Considering the limited time available for the training, the initial GUI (Dashboard) of SMAP was simplified. Event detection and community detection were removed, as well as the filtering on account names (which presented the risk of functional drift that searching on specific accounts would contain).
- On the fly collect optimisation (required by Trial 2): Because of the GDPR analysis (cf. section 3.2.5.9) which advised for reduced retention time, it was decided not to store in advance, but to start the collection at the moment the social media manager is activated. This in consequence required to improve the velocity of the collection and required the technical optimisation of the collection process.

Some additional work was also needed to test the injection of tweets as described in Annex 5.

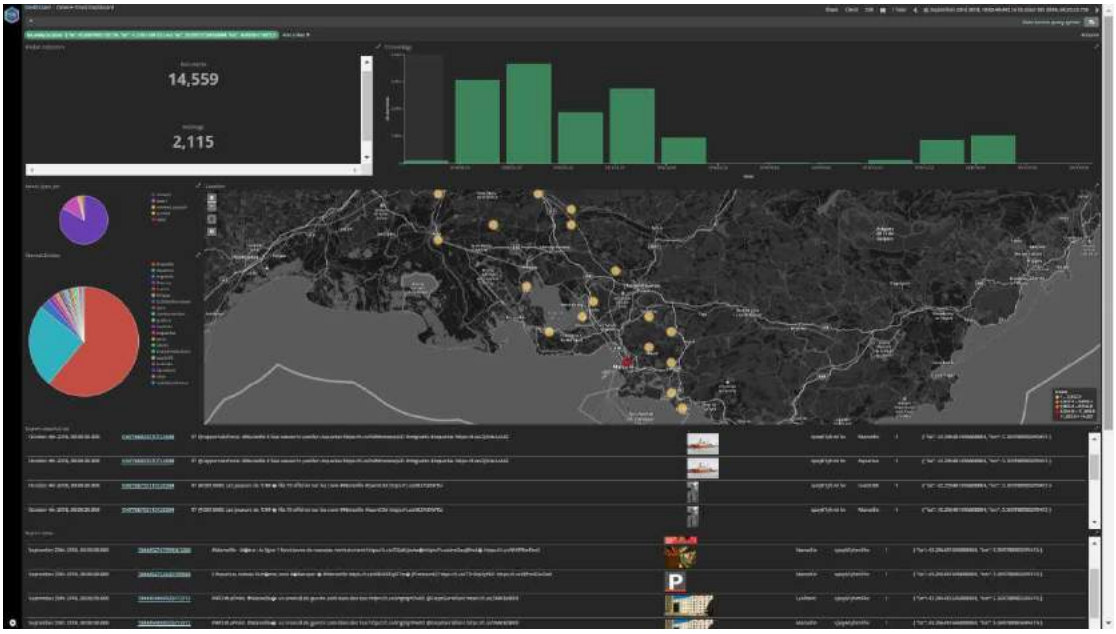

Figure 3.17: SMAP simplified Dashboard for Trial 2

3.2.4.4 Support during DR and Trials

The following support was provided to the player by the SMAP team during the execution time:

- During session SM, some technical support was provided to avoid any blockage during the usage of the SMAP solution.
- During the B2, D2 and F2 sessions during which SMAP was used, no support was provided to the social media manager.
- The usage of the solution was monitored on the server side by the SMAP team working along with the Test-bed team.

3.2.4.5 GDPR compliance analysis

This section describes the GDPR compliance analysis that was performed on the use of SMAP in Trial 2. SMAP was the only solution to have been identified in Trial 2 as GDPR sensitive. This section is thus specific to SMAP.

Social media data being considered as personal data, a GDPR analysis has been performed with Thales legal department in order to ensure that the use of SMAP in Trial 2 was compliant to the GDPR. This analysis was submitted to the project.

This analysis was performed based on Legal template (called “reflex sheet” provided by the Thales Legal department so support the GDPR analysis for all concerned Thales projects.

The full text of this analysis can be found in Annex 2.

This analysis contains the following main chapters:

- Why is the project collecting personal data? (analysis of the purpose)
- What data will have to be processed?
- Who will have access to this data?
- What is the retention period of the data?
- Which security measures protect the data?

This analysis led to implement several important adaptations in the use of SMAP:

- The functions of SMAP which enable to search communities have been disabled.
- The ability to search by account names has been disabled.
- The anonymization of screen names after the Trial has been decided.

Provided these adaptations, the analysis led to the following conclusions:

- As the Trial works at improving the efficient of Crisis management in Europe, and the role of social media manager is already activated it can be considered that the use of SMAP in this Trial aiming at supporting this social media management function is in the legitimate interest of the European citizens.
- As the processed data are collected based on their relation to natural disasters, their processing serves the legitimate objective mentioned above.
- As the data are protected by security measures (login password) proportionate to a research project, and are accessible only by the Thales development team, and because their retention period is reduced to the duration of the analysis (plus they will be anonymized after Trial time) the security measured can be considered proportionate to the low criticality of these data.

Consequently, the Thales legal department decided that provided the decided measures were implemented, the usage of SMAP was in line with the GDPR, and no other measure was required (in particular no Impact Analysis) to meet GDPR requirements.

This analysis was submitted to **T913.1** leader, and the analysis was considered in line with (17) which discusses the implications of GDPR on DRIVER+.

4. Execution phase

This section reports on the execution phase of the Trial. It encompasses all aspects related to the execution, from the deployment, the monitoring of the solutions during the execution, to the actual use of the solutions.

It also includes some lessons learnt during the execution of the Trial which derive from the feedback received from the players or the observers during the execution phase, or the hot debriefing.

In short, the execution phase went well from a technical perspective. The solutions were performing well and exchanged information according to plan. Some issues, which mostly take their roots in the preparation phase, and have to do with the more general aspects of the Trial came out and are discussed in the following sections.

4.1 Physical and technical deployment

The physical and technical deployment of solutions consists of:

- Deploying the actual machines and workstations in the rooms planned at preparation time, with the actual screen and keyboard.
- Connecting the machines to the network according to the plan.
- Testing the success of this deployment.

This deployment was performed under the coordination of the Test-bed infrastructure support with the close support of Valabre technical team and the cooperation of solution technical teams.

All solutions servers were installed in the DIREX, along with the Test-bed server and the XVR Simulation servers. Because of tests showing several failures of the Wi-Fi during Dry Run 2, all machines that ran either solution tool or simulator (both server and clients) were connected to the Local Area Network of CESIR directly.

All solution clients were installed according to the floor plan, except for one workstation of the MDA solution which was deployed at the Italian Operational Centre instead of (as planned), at the Italian Red Cross. As a consequence, the Italian Red Cross officer went to the CODIS room to dispatch the Italian Red Cross ambulances which reduced the impact of this error on the Trial's course. Some lessons to be learnt were identified based on this incident (cf. section 5).

4.2 Back-end technical support

This section describes the technical support that was performed before and during the execution phase.

The back-end technical support of the Trial is the invisible but crucial part of the Trial execution that is part of the solutions application. It was performed by the joint cooperation of Test-bed infrastructure support team and the solutions technical teams, with a support of Valabre infrastructure's technical team.

All solutions servers were connected to the same Local Area Network, made available by CESIR. During the Dry Runs 1 and 2 and the actual Trial execution, the Test-bed infrastructure and support team and the solutions owners performed the monitoring of the Technical set-up.

The Test-bed infrastructure team primarily monitored the activity of the Test-bed services in use and the load generated on the Local Area Network by the information being exchanged via the Test-bed between

solutions, and between the simulators and the solutions. The solution owner technical teams monitored the activity of their own application and the interconnectivity between their server and clients.

Figure 4.1 provides an overview of the Technical set-up of Trial 2 with the connections between the solutions (in green, cyan, orange and purple), participants (yellow above), the test-bed (in outlined yellow), and the XVR simulators (in blue below) as well as an overview of the exchanged information.

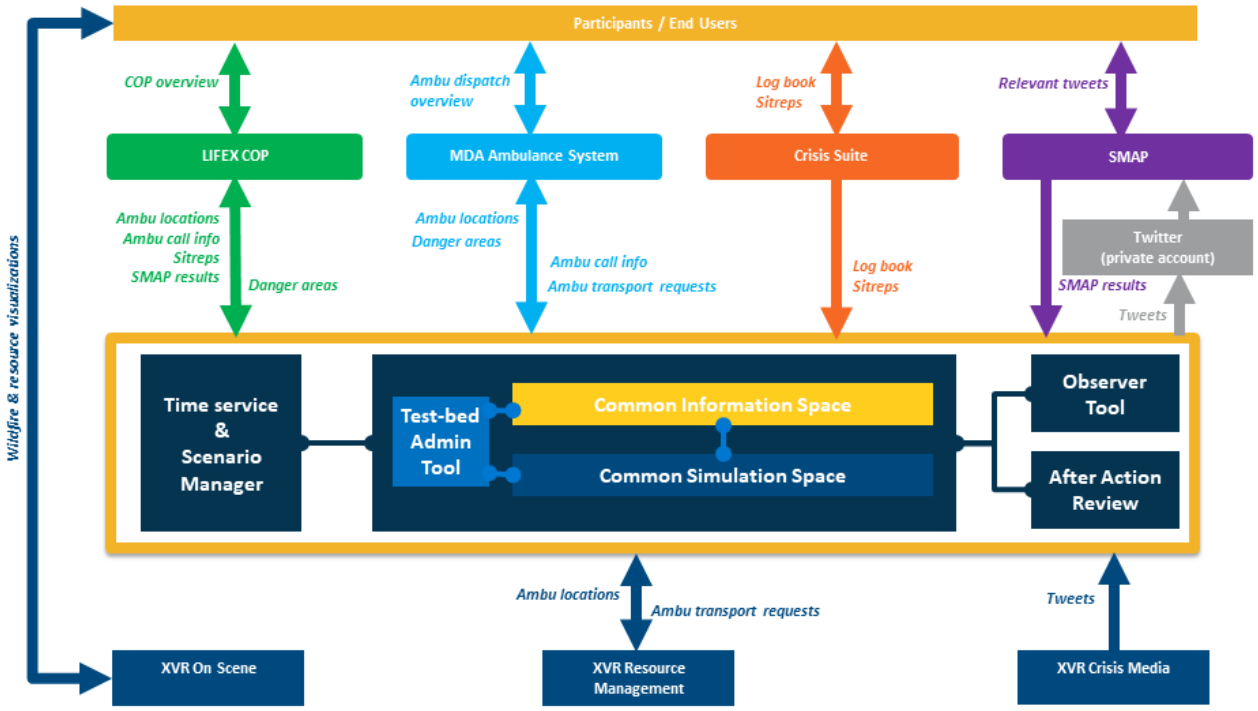

Figure 4.1: Trial 2 technical set-up overview

4.3 Actual run of scenario

This session discusses the impact of solutions on the actual run of the Trial: their availability, their ability to actually support the scenario and the various sessions.

Regarding the availability, thanks to good team cooperation between the solution owners and the infrastructure and Test-bed support team, although the number of solutions and the number of interactions with the simulation were quite high, the execution phase did not suffer from any major execution problems.

The availability of the solutions and the Test-bed was very high. Only two disturbances due to the solutions were observed:

- A delay of 10 minutes at the start of session E2 was due to the fact that a restart was needed to enable the MDA solution to change the danger area. This issue will be explained in more details in section 5.2.2.
- A three-minute interruption in session B2 was observed. This was due to an application server collapse because of message with unexpected length had been generated by mistake by a user. This brief interruption did not significantly disturb the Trial's course nor endanger its future results.

Regarding the ability of solutions to support the scenario, all aspects of the story could be played and interactions actually could happen as planned.

4.4 Use of the solutions

This section is based on remarks made by some observers during the execution and on the feedback of observers during the hot wash-up feedback.

In some place, like the Command Posts, where the management of the incident, the feedback of observers was that players did not use innovative tools as much as expected. This phenomenon has been discussed during lessons learnt and the three main potential causes were identified:

- Players did not feel confident in using the new solutions.
- Player did not see any benefit in using the new solutions.
- Players were caught in the decision making (especially due to the complexity of the scenario) more than on the use of solutions.
- Players were not very well aware of the way the innovative tools were interoperating (the training was focused on single tools).
- The players, who were officers, are not usually using the solutions themselves (especially when they are in a commanding position), but work with an operator who enter things for them.

Only the last point is related to the application of solutions. The other ones are related to training and Trial design.

Regarding this last point, which is regarding the support that could be provided on solutions, during the Trial preparation the Trial Committee considered inviting operators, but concluded that it would have been too heavy to ask for that many resources to the civil protection organisations. Consequently, it was decided that officers would use the solutions themselves, and solutions owners would help them to avoid them being blocked.

According to the players and observers' feedback, this problem was faced mainly in the Field Command Post (where the decision making was made) and with LifeX and CrisisSuite solutions. SMAP and MDA which relate to specific tasks – which could not be performed without them- were more used by "their" respective players.

After observers reported on this issue to the Trial Committee, the Field Command Post did not use the CrisisSuite solution. In order to mitigate this major risk for the Trial, a CrisisSuite solution owner was assigned as operator for the rest of the Trial.

The solution utilization proved again the importance of preparing the Trial with an active interaction with the future players.

5. Achievements and lessons learnt

This section lists the achievement and lessons learnt regarding the application of solutions in Trial 2. Achievements and lessons learnt are presented in two different sections. Achievements are simply listed, each one pointing to the section where it was first mentioned and explained. Lessons learnt are discussed in more details.

5.1 Achievements

The main achievements of the application solutions in Trial 2 were made:

- In spite of a tight schedule, and even though the scenario was being finalized, the Test-scenarios could be defined and solutions could be adapted and tested in time for the Trial This was made possible by a quick start (cf. section 2.8.1) an iterative approach and some flexible interpretation of the Dry Runs.
- The commitment of Merlin Software as external partner, which was perceived as a risk, proved to be strong. The partial financing of their integration efforts and the perceived interest of their participation to the Trial probably helped (cf. section 2.8.3).
- The solutions performed well, and the information exchange between them performed according to plans. Solutions were able to support the scenario (cf. section 4.3).
- The availability of the solutions, and the technical set-up (solutions, Test-bed, simulator) as a whole was good. Only one very short interruption was observed (cf. section 4.2).

5.2 Lessons learnt

This section describes the main lessons learnt which were drawn from the application of solutions in Trial 2. Each lesson learnt is described in a short section.

5.2.1 Organisation

Because of the complex structure of DRIVER+ the organisation during the preparation phase involving the solution coordinator leader of the applying solutions task, the integration coordinator, the Test—bed infrastructure coordinator and the solution providers was a challenge.

A lesson learnt was identified to improve the coordination: The Trial Committee may decide to assign one coordinator for the integration meetings where all these stakeholders meet. This could possibly be the solution coordinator in the preparation phase.

During the execution phase, it is advised that like in Trial 2, the coordination of all these actors is taken by the Test-bed infrastructure coordinator.

5.2.2 Missing test-scenario

At some point in the scenario execution it was discovered that MDA, that received the danger area from Life-X COP, could not modify it by receiving an update, and could not delete the existing danger area. This required a restart which caused de 10 minutes delay in a start of the next session.

This can be identified as a missing or incomplete test-scenario, on the technical side. When the creation of an object is part of the scenario, both its creation and its update should be tested by the test-scenarios.

5.2.3 Non optimal deployment of solutions

The feedback of the Social Media Manager was that SMAP would have been more suitably deployed at prefect level than at CODIS (local level) where it was actually deployed. This option had been foreseen by the solution team during the preparation phase but playing the prefect level was not regarded as possible in the framework of this Trial.

Similarly, the deployment of MDA at PMA was considered as not useful by the PMA players as receiving calls or dispatching ambulances is not part of PMA's normal activities.

During the lessons learnt exercise, it was identified that the organization of a desktop exercise with the future players, explaining the scenario, the role and deployment of solutions and their interactions, and/or a demonstration of the solutions at an earlier stage in the process would help mitigate this risk of a non-optimal deployment of solutions.

5.2.4 Inadequate physical deployment of MDA workstation

As mentioned in section 4.1, no MDA solution workstation was deployed in the Italian Red Cross box, when the plan said it should have been.

During the lessons learnt exercise, it was identified that this mistake could have been avoided by clearer responsibilities regarding the physical deployment of the solutions and the checking of the actual deployment. For example, the infrastructure coordinator could be responsible for the actual deployment of workstations and servers according to the plans, and the solution coordinator could be responsible for checking that deployment.

5.2.5 Session change

Regarding the sessions, one adjustment to the Trial's process was made: Sessions D1 and E1 were played without Tweetdeck. This change was made to take into account a remark by the Social Media Manager. After session B, he expressed that due to the fact that the injected Tweets were the same for Tweetdeck (B1) and SMAP (B2), after he had played with Tweetdeck, he already knew all the injected tweets and finding them with SMAP was made much easier.

This effect was even amplified by the fact that in Tweetdeck the injected Tweets – because they are collected through a private account- are very visible, when SMAP they were hidden in a large number of other Tweets and looking for them still is a challenge.

This change in the way sessions were organised was made in concertation with the methodology team and the project management. The evaluation of SMAP that will be made in (3) should not be impacted by this change. In addition to this it shall be noted that the SM session was the main session for the evaluation of SMAP with regard to the search function.

5.2.6 Use of solutions

The fact that some solutions were not used as much as they could have been is an issue, particularly for evaluation. As it involves many dimensions (complexity of scenario, briefing of the players, training on solutions and their interactions, solution deployment adequacy) (cf. section 5.2.6) this lesson does not belong only to the task *applying solutions* and should not be discussed here, but is currently discussed at Trial level.

6. Conclusion and way forward

Trial 2 offered the opportunity to trial four diverse innovative solutions (CrisSuite, LifeX COP, MDA, SMAP) and compare them with the corresponding legacy solutions (Synergi, Sinus, Tweetdeck).

The objectives of the task **applying solutions** was to make solutions available for use and adapted to the functions they needed to perform during the Trial, for the players to be able to try them.

Even though the schedule for the preparation was tight, the execution of Trial 2 could take place as planned, and the Trial 2 script could be played entirely with all solutions up and running and effective, making the application of solutions possible.

This application could be achieved only because important challenges were met during the preparation and the execution phase of the Trial; At preparation time, the flexible interpretation of the Dry Runs served a pragmatic and iterative approach enabling to perform the adaptation and the testing of solutions within a tight schedule; At execution time, the testing and monitoring of the technical set-up with the Test-bed infrastructure support team provided the necessary yet invisible back-end support for the Trial and ensured a good availability of the solutions.

Along the way, several lessons were learnt and recommendations for future Trials were formulated. These lessons regard diverse aspects like the organisation of the technical team, the involvement of future players in the preparation process, the checking of the actual deployment of solutions, or the support to be provided to players during execution.

Thanks to this analysis, Trial 2 can be considered both as an achievement in terms of application of solutions, and a step forward in the refinement of the application of the DRIVER+ Trial Guidance Methodology.

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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[2]. 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
Organisation	Person or group of people that has its own functions with responsibilities, authorities and relationships to achieve its objectives	ISO22300 (2015)
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.	DoW
Scenario	Pre-planned storyline that drives an exercise; the stimuli used to achieve exercise objectives	ISO22300 (2015) 9 [DRAFT 2017, p 27]
Interoperability	The ability of diverse systems and organisations to work together, i.e. to interoperate.	ISO 22397
Solution	A solution is a means that contributes to a Crisis Management function. A solution is either one or more processes or one or more tools with related procedures.	Initial DRIVER+ definition.
Dry Run 1	First rehearsal of a Trial, focusing on the technical integration of solutions, reference implementation	

[2] 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.

Terminology	Definition	Source
	of the Test-bed, and scenario validation; it also serves as a readiness review to approve the maturity of technical solutions	
Dry Run 2	Full scale rehearsal of a Trial without external end-users participation, aimed at detection of technical issues and last second fine-tuning; Dry Run 2 is organised as a complete mirror of the Trial.	
Legacy system	(Crisis management) system currently in operational use.	initial DRIVER definition
Command & control	Activities of target oriented decision-making, situation assessment, planning, implementing decisions and controlling the effects of implementation on the incident (disaster).	ISO 22320
Data, personal	Information relating to an identified or identifiable individual that is recorded in any form, including electronically or on paper	ISO/IEC TR 24714-1:2008(en) Information technology — Biometrics — Jurisdictional and societal considerations for commercial applications — Part 1: General guidance, 2.9

Annex 2 – GDPR Analysis of SMAP

This document has been elaborated with Thales legal department. Its structure is based on a "reflex sheet" provided by the group to its collaborators to help them implement the necessary measures in order for their projects to respect the GDPR. N the following, the questions of this "reflex sheet" are in bold and underlined.

In conformity with the French Law, Thales, as the processor of the data is working on describing and registering this process. It has been evaluated by the Legal representative of Thales that this particular process did not require a specific Impact Analysis (CNIL).

Purpose: Consider the reason (the Purpose) why you have to collect the personal data for the customer. Why is the project being implemented?

The Customer of the project is the EU (European Commission).

The DRIVER+ project is a research project which purpose is to bring innovation to the Civil Protection in the EU. It does so through Trials which Trial certain solution which aims at bridging one or several gaps identified as important by a community of Civil Protection practitioners within the project.

Within the **Trial 2** Thales is a solution called Social Media Analysis Platform (SMAP) (based on HIS) which aims at bridging the following GAP: "Insufficiency in the ability to incorporate accurate and verified information from multiple and non-traditional sources (e.g. crowdsourcing and social media) into incident command operations."

Working at bridging this gap can be considered as an effort to improve Crisis Management in Europe, and can be considered in the **legitimate interest** of European citizens as a whole.

The purpose of the use of social media in Crisis Management is to find Incident related information that would help the Crisis Management, including factual information about the hazard's nature, location and evolution, or victims' needs or location.

For this reason, it can be considered that this processing is performed in the **legitimate interest** of particular citizens.

Trial 2 is led by Valabre, the French national research centre for the civil protection.

In many Fire department in France (Bouches-du-Rhône, Gard…) there is a social media manager which role is to find information relevant to the crisis in the social Media, and particularly in Twitter. Currently in Bouches-du-Rhône and Var, this task is supported by 2 solutions Tweetdeck and easyGeotweets. In Trial 2 the comparison is made between the work of the social media manager with the current tools and with SMAP.

Consequently, trialling such innovative solution can be considered a **legitimate effort** to **improve the current process**.

What data will have to be processed by Thales?

The data collected by Thales is social media data (from Twitter) collected by SMAP within the Framework of **Trial 2**.

The Data are collected on the public Twitter interface based on some keywords related to the type of incidents (natural disaster and particularly wildfires) and its location (the Alpilles region in France).

During **Trial 2**, the crisis is simulated and the tweets of interest are simulated (generated and injected in Twitter on a private account - to make sure that this fictitious crisis is not "seen" on Twitter by anybody else than DRIVER+). Yet some other tweets matching the keywords not related to the simulated incident will be automatically collected.

The tweets are collected, but the names of the person(s) behind the account are not formally collected, only the account name and screen name which are declared by the person. No collect related to personal opinions, political opinions, sexual orientation, health will be made. Of course, this kind of information could be published by the people tweeting and appear in some collected data, but this would be incidental.

It shall be noted that in Twitter's "Terms and conditions" it is mentioned that "You should provide content only if you don't mind sharing it with others."

The collect will be active during the Trial's duration (2 days). The collected data which will be kept for evaluation purposes will be anonymized.

People involved in the project (Identify the internal or external partners who will be involved in the project) Has a defined list of the people who have to have access to personal data been made?

The persons who access the data are the following:

- The SMAP technical team from Thales PRS.
- The social media manager(s) from the Bouches-du-Rhône fire service (SDIS13) who will use SMAP during the Trial 2, (SDIS 13, and potential end-user).
- The Trial 2 evaluation team (Consortium members: WWU, SRC, VALABRE) that will evaluate the benefit brought by SMAP to the Crisis Management process, (Consortium members) may see part of the data which is going to serve for the evaluation, but will never be able to access the full data-set, and if they access it after the Trial, the data will be anonymized.

Occasionally, some demonstrations of SMAP are made in the Framework of the project to:

- The Trial 2 Trial Committee (for the selection of SMAP as a solution to be trialled within Trial 2).
- To the audience of the I4CM conference (Warsaw 3 to 4 September 2018).

But people attending these demonstrations do not have the opportunity to actually access the data, nor even see the collected information in detail, nor to copy them.

Am I going to have recourse to a third-party service provider, or to another entity in the group, in order to complete the project?

The project is a cooperative project involving more than 30 partners. So yes, the implementation of SMAP during the Trial 2 involves the cooperation with other partners, but this cooperation is limited to interfaces. None of these partners has access to the source code of SMAP or to the repository of collected data.

The partners mentioned above.

If yes, does the contract with the customer authorise me to do so?

The project being a cooperative project it does in essence authorize us to do so.

Define the retention period. What is the retention period determined by the customer?

The customer *per se* did not choose the fact that social media was going to be used. This derived from the Trial 2 committee's choice to do so. So formally no retention period is requested by the customer.

In practice, what is necessary is to keep for the duration of Trial 2 which includes the Trial 2 evaluation, reporting. Formally the data should be kept until the corresponding deliverable (Trial report, D944.12, delivered at M57 -end of January 2019-) is accepted.

The collection will start at the beginning of the Trial 2 (22/10/2018), the actual retention period can be estimated to four months (if EU validates the Trial 2 report in March 2019).

But this retention period is divided in two periods:

- 22/102018 to 09/11/2018: data are as collected
- 12/11/2018 to acceptation of report (March 2019): account names and screen names are anonymized.

What happens to the data processed for the customer at the end of the contract?

They will be deleted before (cf. above).

Security measures. Have the teams in charge of IT security reviewed and validated the project in light of the internal policies of Thales and the customer's policies as imposed upon Thales?

The data are localized on a Thales server (laptop), which access is protected by Login /Password.

The collected data's most critical meta-data in terms of Personal Data Protection will be anonymized after the Trial's end (before 15/11/2018).

All project partners have signed a consortium agreement.

Do third parties involved in the project agree to comply with Thales internal policies and those imposed by the customer upon Thales?

The role of this (reflex sheet being filled) is to define the policy regarding these data and propose them to the Trial 2 Committee. All parties involved in the project are requested to follow the GDPR. So the policy defined by Thales for the management of the data will be presented as mandatory to the involved partners.

Annex 3 – Tweets data sets

This section contains the set of tweets which were injected by the XVR scenario injector during the runs in order to be detected by the SMAP solution. The number, style and tone of these tweets reflects what could be observed using SMAP during the summer, on some real incidents.

Table A2 presents the set of tweets which were injected during session B. Column session mentions the session's name and time (in minutes) at which it should be injected after the beginning of the sessions. Column "text" is the text of the tweet, "image" the image attached to the tweet, and "Geoloc" the geolocation of the tweet.

Table A2: Tweet data-set for session B

N	Session+ Time from start in minutes	Text	Image	Geoloc
	B (anytime)	A beautiful view over the olive trees and the smell of rosemary in the air. Wonderful!	Olive trees	
	B (anytime)	We had a wonderful Lunch at #restaurant in #Mouries. And sung Aznavour's songs for dessert.		
	B (anytime)	My favorite pizza is in Maussane. #Maussane #alpilles		
	B (anytime)	Putain il y a le feu qui s'approche du camping! #Eyguières #ausecours		
	B+3	Nouvelle fumée inquiétante plus proche de nous..?	Worrying smoke	
	B+10	#Corse – un feu de végétation menace un camping à #Cargese.		
	B+14	Le feu vient de passer la colline et s'approche de la maison. On va évacuer si ça continue. #Eygalières #Incendie #Alpilles		
	B+18 (only B1)	Very afraid for my house in the middle of the forest - I feel abandoned and sacrificed #wildfire #Aureille	House in pine trees	Mas de Pascal
	B+18 (only B2)	Y'a ma maison qui va partir en fumée. Y sont ou les pompiers? #feux #incendie #alpilles	House in pine trees	Mas de Pascal
	B+36	Un #incendie dévaste un centre de vacances à #Treveneuc suite à l'explosion d'une bouteille de gaz. L'incendie se propage au champ voisin. Le centre était vide, aucun blessé n'est à déplorer.		
	B+38	Le feu s'approche d'un groupe de maison en bas de chez moi.	House in pine trees (catalunia)	

Table A3 presents the set of tweets which were injected during session B.

Table A3: Tweet data-set for session E

	Session/ Time (from start)		Image	Geoloc
		#		
	E + 0	Le feu de forêt se dirige vers le camping des oliviers. Les consignes de sécurité sont données aux résidents du camping. #feu #campinglesoliviers #eygalières		
	E+0	Un feu s'est déclaré dans les alpilles ce matin #alpilles #feudeforêt		
	E+1	Un petit tour dans les Alpilles au départ de Maussane	Biking in the Alpilles	
	E+2	Grosse fumée, on dirait que le feu se rapproche. Pas trop rassuré.	Smoke near our house	
	E+3	Oh my god ! It looks like the wildfire is coming in our direction. But things are in control. We stay in the camping site.		Camping les Oliviers
	E+ 3	Ca crame dans les alpilles comme jamais, la provence part en fumée en plein mois d'octobre, et tout le monde s'en fou! #barbecueprovencal #urgenceclimat		
	E+5	"@afpfr Feu de forêt dans la pointe des #Alpilles. Beaucoup de mistral, et pas de Canadairs en vue." #canadairs	Fumée pointe des alpilles	
	E+7	Classe verte dans les #Alpilles. Les élèves de CE2 de l'école Cachin de Romainville découvrent les baux de Provence émerveillés. #lesbauxcbo #cachin #Romainville #Alpilles #LesBauxDeProvence.		
	E+7	Hiking in forest is your plans this weekend? Beware the risk of #Wildfire is still high due to abnormally high temperature, drought and strong winds.		
	E+9	On s'entraine pour les prochaines Olympiades camarguaises. Et ce coup-ci on va gagner! #Eyguières #Provence #Camargue		
	E+10	Do you live in Eyguières ? #Eyguières #Provence #Cowboy.		

	Session/ Time (from start)		Image	Geoloc
	E+12	On avait prévu une rando dans les Alpilles. Mais laisse tombé, avec le feu de forêt qui fait rage, il vaut mieux rester chez soi. Du coup on se fait une pétanque au son des canadairs. #petanque #rando #yalfeu		43.748026, 5.057505 (does not correspond to any key scenario location)
	E+15	Le feu s'approche du camping!! C'est l'horreur. #Aureille #Aufeulespompiers		
	E+16	Bonjour le camping en Octobre. On a fait bruler les tartines, je vais chercher les croissants et la supérette est déserte. On va manger des chocapics.;-) #chocapics #corse	closed shop	
	E+18	Les canadairs se relaient pour éteindre les flammes dans les Alpilles. #Canadairs #Feu	Canadairs	
	E+18	Some campers are getting really anxious. Although the situation seems pretty much in control by the French fireservice. We make a lot of talking. #Alpilles		
	E+22	#feudeforêt. Les campeurs quittent le camping les Oliviers		
	E+22 (only for session E1)	This "Camping des oliviers" has turned into a total nightmare to me after new year's eve fire in our house, anxiety is just too high. I take the kids and run away from here… #campinglesoliviers #escape #eygalières		
	E+ 22 (only for session E2)	I don't give a shit of what they are telling us. All these well-disciplined sheep will end-up roasted. Me and my gurl just found a way out through the bush… #campinglesoliviers #wildifre #fxxxthepolice		
	E+25	On entend des sirènes, on voir passer des ambulances italiennes. C'est la guerre du feu! #Eygalières #vivelespompiers #alpilles		
	E+27	Mouvement de panique au Camping des oliviers, avec le feu qui approche, les campeurs se sont réfugiés dans la piscine. #shark #campinglesoliviers	Shark in Swimming pool (fake)	
	E+27	Fais ch...ce vent ,le feu progresse ,des centaines de pompiers mobilisés et ça souffle, ça souffle.notre provence s envole en fumée.		

	Session/ Time (from start)		Image	Geoloc
	E+28	I heard there was a huge wildfire going on somewhere around Mouries. I hope this will stopped and think of you all. #Oxford #Provence #Mouries		
	E+30	The French government only declares a few victims, but witnesses tell that more than 60 people were burnt alive a majority of whom are British citizens. They did nothing to save them! Tell us the truth! #lavérité #tellusthetruth #brexitoffire		
	E+31	Je ne voudrais pas finir mon voyage de camping en ayant à conduire à travers ce feu de forêt assez intense (ils s'en sont sortis, ne vous inquiétez pas)... quelle est votre pire histoire d'horreur de voyage?	Fire from afar	
	E+31	Incendie de 2016 en Corse. Les habitants demandent des aides à la reconstruction.	Burnt house	
	E+32	Le feu fait des ravages; Aureille souhaite force et courage aux pompiers! #Provence #PACA #Aureille		
	E+33	Merci les pompiers!! #masdupuitsblanc #incendie #alpilles #provence #pompiers	Drop	
	E+40	Plus d'une douzaine de victimes seraient à déplorer dans le feu de forêt qui fait rage dans les Alpilles.		
	E+42	Les victimes du feu de forêt des Alpilles auraient ignoré les consignes de sécurité données par la direction du camping suite à l'approche de l'incendie. #feudeforêt #Alpilles		
	E+45	The new Renault model named "Camping". A family van, of course!	Burnt cars 2	
	E+47	"Out, out, brief candle!". What was gorgeous and lively is now desolated and silent. #FeudesAlpilles #	Burnt Cars 1	
	E+50	L'émotion est grande au camping des oliviers à Eyguières. Dieu vous garde! #FeudesAlpilles #Alpilles #AvecVousParLaPensée	Camping les oliviers	
	E+50	Nous pensons aux familles des victimes du feu de forêt d'Eyguières. #MairieEyguières #MairieAureille		

	Session/ Time (from start)		Image	Geoloc
	E+52	European cooperation to save lives. Italian ambulances reinforce the French civil protection ambulances to evacuate victims of the terrible wildfire which happened in the Alpilles area, near Arles. #RedCros #TheGardian #France #Provence #Arles		

The images attached to the injected tweets are listed as figures below.

Figure A1: left: Worrying smoke; right: Smoke near our house

Figure A2: left: Smoke at Alpilles' point (no Canadair); right: Biking in the Alpilles

Figure A3: left: Canadairs; right: Drop

Figure A4: left: Fire from afar; right: Guardians

Figure A5: left: Shark in swimming pool; right: House in pine trees (catalunia)

Figure A6: left: Olive trees; right: House in pine trees

Figure A7: left: Burnt cars 1; right: Burnt cars 2

Figure A8: left: Burnt house; right: Closed shop

Annex 4 – Role of social media manager

This section explains the role and practice of social media managers. As mentioned in section Challenge relative to each solution2.8.4, this role and its current needed to be clarified. This short description is a synthesis of several interviews (by phone and mail) with the social media manager of the SDIS30. These interviews helped defining the baseline process and orienting the adaptations to be made on SMAP. The role of social media manager is not yet defined by the French doctrine and practices can vary from one SDIS to another.

The social media manager is a role which belongs to the CODIS and is activated by the CODIS, usually for large crisis. Their role consists in two main activities which are:

- Look for information in the social media, usually related to an incident. Looking for information such as details about the localisation of the incident, its nature, the number of concerned people/casualties, and the immediate environment of the incident.
- Publish information on the Social media. This activity is not represented in Trial 2.

For both activities the social media manager can get supports from Virtual Operations Support Teams (VOST) organisations (e.g. VISOV (18)).

Table A4 shows the answers given by the social media manager of SDIS30 on the share (in percentage) of the social media in the collection of information activity.

Table A4: Relative importance of social media in collection activity

Social media	Importance of source
TWITTER	80%
YOUTUBE	Between 10% and 20%
FACEBOOK	Almost negligible
SNAPCHAT	Almost negligible

Annex 5 – Injection of Tweets

This Annex describes the principles which were implemented to inject the tweets.

For the scenario related sessions (sessions B2, D2, E2), a fictitious set of 40 tweets related to the scenario was created (cf. Annex 3). These tweets were published in a Private account, so that it would be totally protected from the general public. The mechanism which led to their publication, and involved the Crisis Media module of XVR the Twitter gateway of the Test-bed is described in Figure A9: Injections of scenario related tweets

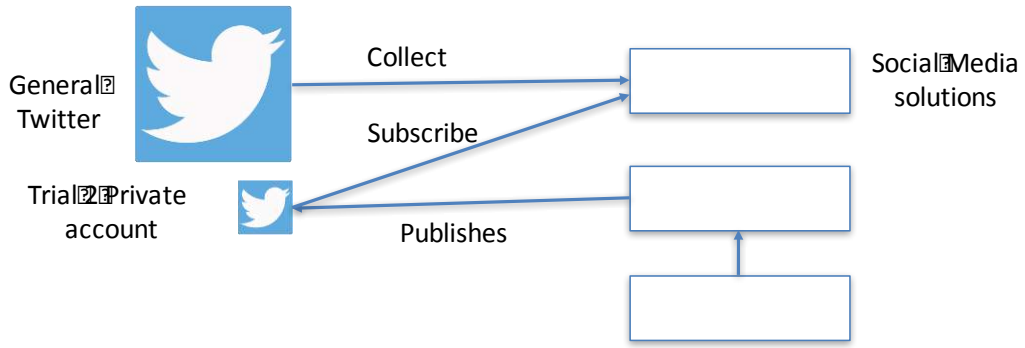

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Figure A9: Injections of scenario related tweets

The number, and style of tweets related to these sessions was inspired from tweets created by the general public during a crisis. The inspiration was drawn from tweets collected by SMAP.