driver+

Driving Innovation in Crisis Management for European Resilience

D942.24 – REPORT ON THE APPLICATION OF THE SOLUTIONS IN TRIAL 3

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

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

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

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

Executive summary

This document reports on the application of solutions in Trial - Austria (project internally also named Trial 3), the main functions of the solutions which were applied, the preparation activities for the Trial and the way they were finally integrated into the crisis management (CM) procedures of the participating practitioners during the Trial itself. It also aims at drawing lessons learnt from the experience of Trial - Austria for the benefits of future DRIVER+ and other Trials. Its intended audience is non-technical readers interested in Trial - Austria and Trials in general. It is focused on the application of solutions and closely connected to the DRIVER+ deliverables **D945.11** ***Report on Trial Action Plan – Trial -3*** (1), **D942.12** ***Report on review and selection process (Trial 3-4-demo)*** (2) and the upcoming **D945.12** ***Report on Trial evaluation – Trial 3*** (3).

The general purpose of the Trial - Austria was to improve current crisis management capabilities by identifying solutions for shortcomings in the management and monitoring of spontaneous as well as affiliated volunteers on the crisis scene in terms of location, tasking, capabilities and duration of operations, the ability to merge and synthesise disparate data sources and models in real time (e.g. visualisation of resources, critical assets map, damaged objects/infrastructure, etc.) to support incident commander decision making, situation assessment and exchanging crisis-related information.

The Trial was organised by the Austrian Institute of Technology and hosted by the Austrian Red Cross in Eisenerz/Münichtal from Thursday 12 to Saturday 14 September 2019. The Trial was conducted as a multi-day field exercise run in parallel to the large-scale European Civil Protection field exercise IRONORE2019.

The scenario focused on a severe earthquake and subsequent heavy rains simulated in the central area of Austria. The local region of Eisenerz (in Styria, Austria) was one of the most affected with missing persons, casualties, collapsed buildings, blocked roads, and endangered industries working with hazardous substances. Inhabitants have left their houses for fear of aftershocks and collapsing buildings. Lifelines such as water, food, shelter, transportation and medical care have been disrupted. Electricity and mobile networks have also been severely damaged.

CM practitioners from several Red Cross branches were involved to work with and evaluate the solutions. Further-on affiliated volunteers as well as un-affiliated volunteers (spontaneous / emergent groups) were involved to asses on the one hand the management and tasking of the volunteers and on the other hand the psychological first aid (as a non-technical solution) training.

The following solutions were applied during Trial - Austria:

- CrowdTasker (AIT), for management and tasking of affiliated and non-affiliated volunteers (emergent groups), and to test the social media component therein for self-organisation of emergent groups.
- Airborne & Terrestrial Situational Awareness (DLR), for providing real-time areal images and analysis in order to support assessment of the overall situation on the ground.
- vieWTerra Evolution (VWORLD), virtual 3D/4D representation and visualisation of the crisis area. Global repository of data (i.e. images, photos, videos, messages) and provides a common operational picture.
- Psychological First Aid (DRC), (PFA), provides training for spontaneous volunteers (emergent groups) and also a leadership seminar (e.g. for group leaders) engaging with spontaneous volunteers.
- ASIGN (AnsuR) helps reduce critical emergency and disaster response time. Reduce disaster response time, by enabling effective and precise communication of photos, videos and other data forms from the field to remote headquarter.

Further details can be accessed via the DRIVER+ Portfolio of Solutions website (https://pos.driver-project.eu/en/PoS/solutions).

The face-to-face meetings (TIM, Dry Run 1 and Dry Run 2) were recognised to be time-consuming, but very valuable for preparation, since working on the spot and dealing with issues together with all involved parties proved to be very efficient compared to virtual meetings. Backup solutions were also invited to

participate in these meetings, which proved to be very beneficial, due to the fact that one solution resigned before the Trial and the backup solution was already integrated and could take over with little effort.

Solution providers also reported that changes between Dry Run 2 and the Trial led to some confusion. This was mostly influenced by the interaction with IRONORE exercise, which was very participant-driven and some injects happened earlier or were delayed compared to the original timing which made an impact on Trial organisation.

In order to connect all solutions to the Test-bed substantial effort was required, but this was solved by all technical solutions without any major issues. The necessary adapters were provided and adjustments had to be made only with regards to updates in new versions of the Test-bed in its development cycle.

Practitioners were in general very positive about the application of the solutions during the Trial and gave valuable recommendations for further improvement to each solution provider. They also stated that having solution operators assisting them was a very good idea, since they could focus on using a solution to solve the crisis and not having to struggle with operating it. Some practitioners indicated that they would like to get in contact with specific solution providers for further cooperation and to get more detail insight into their offers.

All practitioners were impressed by the engagement and spirit of the solution providers working together in the Trial - Austria. One of the statements was "*I got in contact with great experts of different countries professionals and researchers from all over EU!*" (Statement after Trial - Austria according to results of the evaluation survey conducted by ARTTIC).

Solution providers found it very valuable to see practitioners interacting with the operators of the solutions, on the one hand commanding them (learning the commander's speech) and on the other hand getting immediate recommendations and insight what functionality could be improved or was missing in their solution. This helped each solution provider to identify room for improvements and implement additional functionalities. Some solution providers discussed with practitioners possibilities to continue collaboration (e.g. to organise a workshop) to provide more training and hands-on on the solutions. The good networking opportunities during the Trial were appreciated and especially by external solution providers that wanted to have more time for their commercial activities.

Finally, all of the solutions providers stated that they would recommend attending a DRIVER+ Trial to partner organisations and colleagues. (Statement after Trial - Austria according to results of the evaluation survey conducted by ARTTIC).

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List of Acronyms

Acronym	Definition
AAR	After Action Review Tool
C/DM	Crisis / Disaster Management
CfA	Call for Application
CM	Crisis Management
CMINE	Crisis Management Innovation Network Europe
COP	Common Operational Picture
CoW	DRIVER+ online Collaborated Workspace
CT	Crisis Team
DR	Dry Run
DR1 / DR2	Dry Run 1 / Dry Run 2
D&C	Dissemination and Communication
EU	European Union
EUCPx	European Civil Protection Exercise
GIS	Geographical Information System
GT	Guidance Tool, a part of TGM
KPI	Key Performance Indicator
OST	Observer Support Tool
PFA	Psychological First Aid
POI	Point of Interest
PoS	Portfolio of Solutions
PR	Public Relations
RQ	Research Question (TGM)
TAP	Trial Action Plan
TIM	Trial Integration Meeting
TGM	Trial Guidance Methodology
TGT	Trial Guidance Tool
TMT	Trial Management Tool
TRL	Technology Readiness Level
UN	United Nations

1. Introduction

The main objectives of this document are to describe the solutions used during Trial - Austria, explain the preparation work and discuss how the prepared solutions were applied during the Trial. It also aims at drawing lessons learnt from the experience of Trial - Austria for the benefits of future DRIVER+ and other Trials. Its intended audience is non-technical readers interested in Trial - Austria and Trials in general.

To develop, prepare and execute a Trial, the Trial Guidance Methodology (TGM) (4) was developed as part of the DRIVER+ project. According to this methodology, Crisis Management (CM) gaps described in the **D922.11 *List of CM gaps*** (5) were identified together with CM practitioners for Trial - Austria.

Subsequently, a first draft of a realistic scenario was developed to serve as a test case for the solutions that could fill these identified gaps and improve practitioners' work. Finally, DRIVER+ internal as well as external solutions could apply for participating in Trial - Austria (2) and the following five solutions were initially selected:

- CrowdTasker by AIT - Austrian Institute of Technology GmbH.
- Airborne & Terrestrial Situational Awareness by DLR (German Aerospace Centre).
- vieWTerra Evolution by VWORLD.
- Psychological First Aid by the Danish Red Cross (DRC).
- GINA by GINA Software s.r.o. (later ASIGN by AnsuR, as GINA withdrew their participation).

During the preparation phase of the Trial the Trial Integration Meeting (TIM) was held in Vienna, where a first introduction of the solutions and discussions about the upcoming work on the connection to the DRIVER+ Test-bed Technical Infrastructure was given. Thereafter, the original scenario design could be adapted to the selected solutions in order to optimise their contribution possibilities.

The solution GINA decided to leave Trial - Austria after this meeting. The decision by GINA to leave made the participation of the ASIGN solution (from AnsuR) possible. Preparation and execution of Dry-Run 1, Dry-Run 2, and the Trial followed, which are described below with regard to implementation and use of the solutions.

Figure 1.1: Trial - Austria Banner

The document is structured as follows:

- This introduction discusses the **purpose, scope and structure** of this document.
- Section 2 presents an **overview of the defined gaps** as a decisive factor for the development of Trial – Austria, **the scenario as well as the participating solutions.**
- Section 3 serves as main section of this document. It provides a **description of the solutions, their role during the preparation phase, their technical deployment and their application** during the Trial.
- Section 4 discusses the **achievements and lessons learnt** regarding the application of the selected solutions during the preparation and execution of Trial - Austria.

2. Scenario overview and selected solutions

According to the DRIVER+ deliverable **D922.11** ***List of CM gaps*** (5) five gaps were defined and served as a basis for the definition of the scenario and the selection of solutions:

- Gap 1: Volunteer Management: Insufficiencies in the management of spontaneous and affiliated volunteers on the crisis scene in terms of location, tasking, capabilities, and shift duration.
- Gap 2: Real-time data and information fusion to support incident commander decision-making: Limitations in the ability to merge and synthesise disparate data sources and models in real time to support incident commander decision making.
- Gap 3: Incorporating information from multiple and non-traditional sources: Insufficiency in the ability to report dangerous areas and situation overview from multiple and non-traditional sources (e.g. crowd- sourcing and social media) into response operations.
- Gap 4: Psycho-social support: Lack of having the capability to measure stress and/or improving the communication and the awareness of psychological stress of those affected, especially spontaneous and affiliated volunteers.
- Gap 5: Interaction with the population: Improving the process of communicating with the population.

Table 2.1 displays the selected solutions and the gaps they address.

Table 2.1: Selected solutions and relevant gaps

Solution name	Solution provider	Relevant gap (s)
CrowdTasker	AIT	1, 2, 5
Airborne and Terrestrial Situational Awareness	DLR	2
vieWTerra Evolution	VWORLD	2,3
ASIGN	AnsuR	2, 3, 5
Psychological First Aid	DRC	4

Together with practitioners from the Austrian Red Cross also involved in the IRONORE EUCPx an earthquake scenario was developed to address these gaps in the most realistic way.

Figure 2.1: Earthquake Scenario – Search and Rescue operation (6)

The scenario dealt with an earthquake. Background: The central area of Austria has been struck by a severe earthquake and subsequent heavy rain. The local region of Eisenerz (in Styria, Austria) is one of the most affected with missing persons, casualties, collapsed buildings, blocked roads, and endangered industries working with hazardous substances. Inhabitants have left their houses for fear of aftershocks and collapsing buildings. Lifelines such as water, food, shelter, transportation and medical care have been disrupted. Electricity and mobile networks have also been severely damaged.

All local and national emergency response organisations have been deployed on site (Austrian Red Cross, fire brigades, police and the army); however, due to the extension of the affected area and overwhelmed national response capacities, the Union Civil Protection Mechanism was activated. A request of international assistance was made with regards to medical treatment, water purification as well as search and rescue.

Due to the difficulty of accessing the affected area and considering the impact of the disaster, there is an urgent need for humanitarian assistance and assessment. A large number of volunteers and rescue equipment is needed to deal with the increasing number of affected people i.e. search and rescue, shelter, medical care, water food and transportation. Additionally, there is also an urgent need for the management of spontaneous volunteers.

The scenario will require a commitment of stakeholders from every Crisis Management level and from all the agencies participating in the response: Austrian Red Cross, Austrian Fire Brigades, Police, Army, decision-makers and authorities. Other emergency response organisations from neighbouring countries are expected to participate following the procedures from the Union Civil Protection Mechanism (UCPM).

The Trial intends that actions will be taken by the stakeholders in a realistic information environment, based on currently available means, Crisis Management plans, rescue procedures and good practices of participants. Various exercises will serve as the testing environment for the introduction and establishment of the standard operational procedures (SOPs) standards and concepts, of the UCPM within the central European region.

The scenario covered the impact phase after the earthquake and was split into five different blocks described in

Table 2.2, where blocks 4a and 4b happened in parallel but can also be considered as two different blocks.

Table 2.2: Defined blocks and their objectives

Trial Day	Block	Objective
1	**1:** Emergent groups (Telegram)	Interaction with emergent groups, coordination of their actions in setting up a shelter
1	**2:** Situation assessment	Assessment of situation, identification of potential damages in Eisenerz and Vordenberg
1	**3:** Confirmation	Activation of remote volunteers and confirmation of potential damages in the area of Hinterholz, Eisenerz and Präblich
2	**4a:** Chemical spill	Assessment of the condition of a factory working with hazardous materials and establishment of a virtual dangerous zone
2	**4b:** Emergent groups (PFA)	Assessment of a psychological first aid training
2	**5:** USAR Teams	Establishment of a communication via sat link and acquiring of a status of ongoing operations in the area of Münzboden and Vordenberg

3. Application of the solutions

This section describes the use of the solutions during the preparation phase and during the Trial. It includes the technical setup and the technical integration into the Test-bed Technical infrastructure, the integration into the scenario, and the actual use of the solutions by the users in the command centre and in the field. Some of this information has already been included in the DRIVER+ deliverable **D945.11** ***Report on Trial Action Plan – Trial 3*** (1), but as that report represents preliminary results only, the following information, tables and figures must be considered for final information.

3.1 Solutions overview

3.1.1 CrowdTasker

CrowdTasker is a solution for citizen involvement and community interaction. It supports informing citizens, eliciting contributions to the common operational picture by pre-registered parties and integrating efforts of self-organisation. This is achieved by issuing assignments and situational information to a selected crowd of citizens based on their location and skill set, as well as offering a chatbot interface for emergent groups to participate using their own organisational infrastructure (such as social media groups).

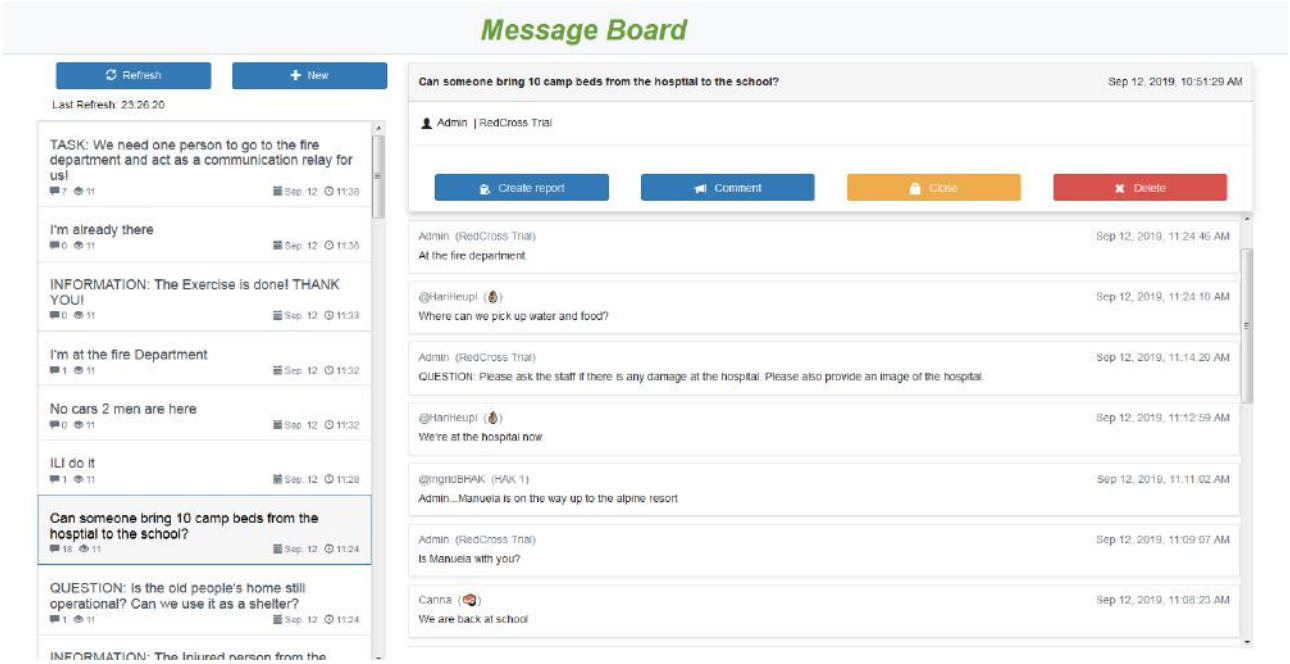

Figure 3.1: Screenshot of the CrowdTasker message board, as seen by the crisis managers

The objective of CrowdTasker is to improve informed decision-making of both crisis managers and citizens. It enables professionals to rapidly query information from users at relevant locations and to provide meaningful assignments to citizens during preparation, mitigation and response. CrowdTasker helps to unify several crowd tasking processes into an overall relief effort: spontaneous contributions of individual citizens, requests for contribution that originate from the crisis manager and are then executed by volunteers or even the integration of existing groups for guidance and support.

Objectives towards emergent groups aim to facilitate the interaction between crisis managers and citizens in such a way that the efficiency of the relief efforts is increased. Response efforts of civil society to crises and disasters provide an important contribution for effective relief. However, due to a lack of coordination and a dearth of information, informal relief efforts can put a strain on professional responders on site and decrease the overall effectiveness of relief efforts. CrowdTasker ultimately aims to include the emergent efforts of citizens to cope with crises and disasters in such a way that their contributions provide the best

benefit for the overall response operation; thereby decreasing the strain on the resources of official emergency response organisations and increasing the efficiency of relief missions.

The platform's features and workflows were developed under continued involvement of end users to assure a high degree of relevance for crisis managers and volunteers alike.

During the Trial: CrowdTasker was used to coordinate preregistered volunteers as well as to evaluate computer-supported interaction with spontaneous, emergent groups that are not registered. Preregistered volunteers were tasked with confirming observations on site both via the smartphone application and a chatbot interface. Emergent groups were guided in their activity as well as supported in coordinating amongst each other to achieve certain goals such as setting up tents, picking-up water or hygienic articles, and providing them to victims.

CrowdTasker offers a high technological readiness level (TRL 7 – System prototype demonstration in an operational environment). The solution has been deployed and evaluated in multiple national and international research projects under field conditions with up to 200 users.

More information can be accessed via the DRIVER+ Portfolio of Solutions website: https://pos.driver-project.eu/en/PoS/solution/20

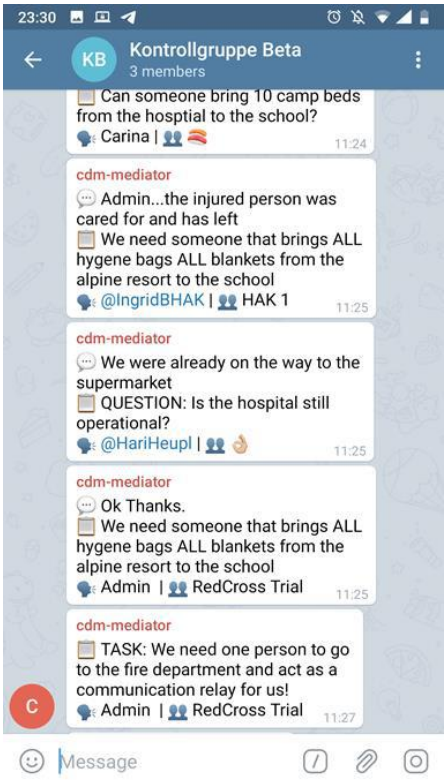

Figure 3.2: Screenshot of CrowdTasker's Telegram view of the message board (as seen by volunteers)

3.1.2 vieWTerra Evolution

vieWTerra Evolution is a 4D Earth Viewer and data integration platform allowing free navigation and querying of the World in different Crisis Management phases. It presents an ellipsoidal model of the Earth allowing its users to integrate their own precise data and assets anywhere on the Globe, without any area coverage limitations (Imagery, cartography layers, 3D objects/buildings, geotagged information, photos, etc.).

It can be used to model any type of 3D scene on Earth and create scenarios at their real- world location to simulate events in the Crisis Preparedness phase, and to serve as a global repository for building a custom Earth-wide GIS, either used perfectly off-line or ported on an on-line architecture in order to allow the

sharing of multiple information, data and assets from disparate sources between all stakeholders in the Crisis Response phase (3D entities, icons, shapefiles, geotagged reports, photos, videos, sound, multiple overlays such as disaster maps, heat maps, tactical situation etc.).

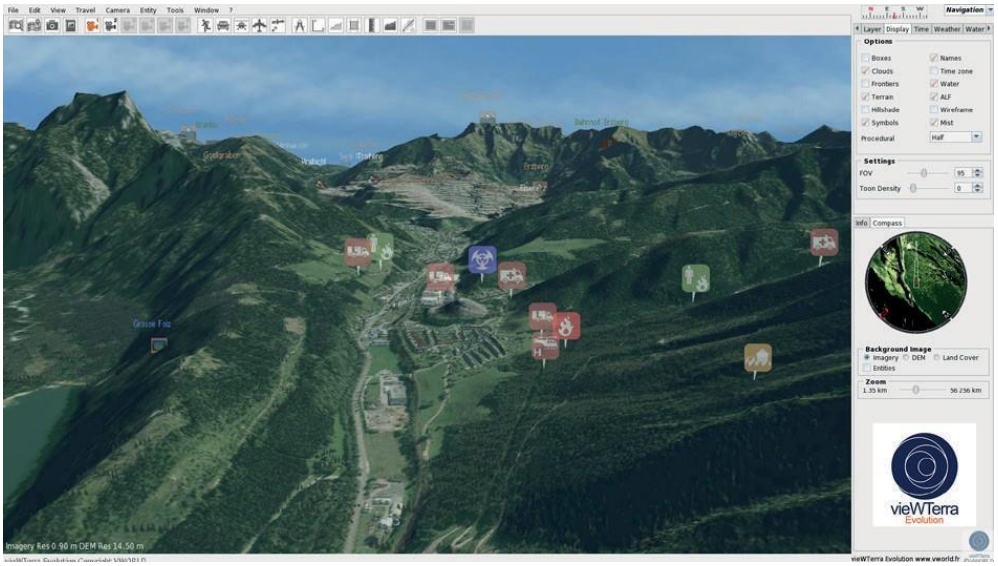

Figure 3.3: vieWTerra Evolution – spots of crises information

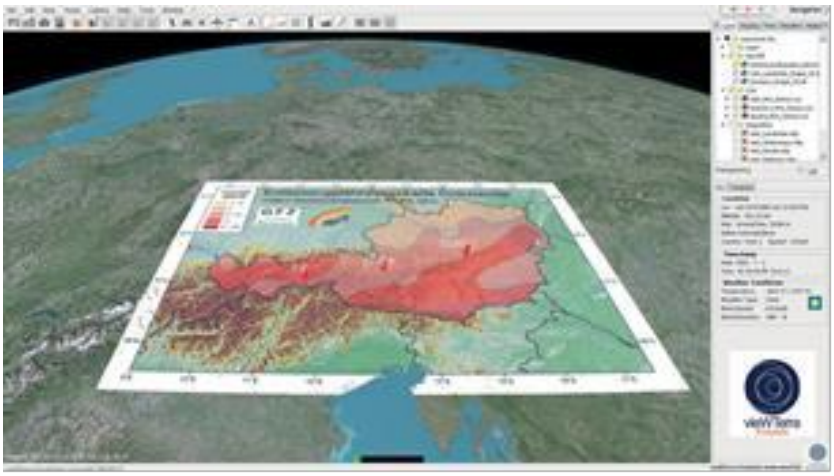

Figure 3.4: vieWTerra Evolution – photo overlay

During the Trial: vieWTerra Evolution was mainly used as an "interactive" GIS for situational awareness/ situational assessment and decision-making and acted as the data sink for all solutions connected via the Test-bed. Main operations and/or features used:

- Querying the system about a specific location (showing the area of operations/tracing a circle around the location/marking the area with a given colour).
- Finding, marking (adding a pin) and entering the names of indicated critical infrastructure places (hospital, supermarkets, factories, gas station, train station, etc.).
- Newly-acquired Imagery from Airborne and Terrestrial Situational Awareness solution was also displayed as a newly-entered streaming layer (automatically retrieved through the online Test-bed/ Geo-server and displayed in real-time into vieWTerra Evolution as a clickable new layer in the Layer Tab Page, and as a Pin into the 3D).
- Using various measuring, terrain querying, or terrain marking tools (GIS Measuring Tools, Target Tool, 3D Editor Tool), for example, measure the distance between 2 GPS locations, show the type of ground at a given location, show a point's altitude, profile the terrain and show height difference to assess difficulty of taking a given path.

- Using the Weather Menu and the 4D aspect of the software (Time based system), notably using the wind parameter (setting the wind speed to a given value, setting the wind direction, and counting the time it takes for an entity left to drift in the wind from a given location (e.g. a reported chemical hazard area) to reach a given point (e.g. a densely populated area) so as to estimate time to evacuate an area or necessity to order the evacuation.

More information can be accessed via the DRIVER+ Portfolio of Solutions website https://pos.driver-project.eu/en/PoS/solution/94.

vieWTerra Evolution is on a high technological readiness level at TRL 7 – (System prototype demonstration in an operational environment).

3.1.3 Psychological First Aid (PFA)

The psychological first aid (PFA) training for spontaneous volunteers is a one-day training course, in which you learn and get to practise the main skills needed to give good PFA in a crisis situation. You will learn the internationally recognised principles of Look Listen Link, developed by the World Health Organisation (WHO). The training includes sessions on these three principles as well as role plays, discussion sessions, sharing knowledge and experience between participants. Organisations responding to a crisis can implement the training to leverage the resources that spontaneous volunteers bring to a crisis in a positive and safe way.

By building the capacity of its existing field level leaders, the solution enables organisations to use the resources represented by spontaneous volunteers in a safe way. It fosters resilient societies by enabling spontaneous volunteers, who are most often a part of the affected community, to be part of response and recovery in a safe and constructive way.

Figure 3.5: PFA training using virtual reality environment

The Leadership seminar for engaging with spontaneous volunteers in crisis response combines the WHO's Look Listen Link principles for PFA, knowledge of caring for volunteers and theory on power relations to build the skills of field level leaders working for crisis response organisations to engage with spontaneous volunteers during crisis response. Through a series of exercises, analytical sessions, roleplays and discussion and reflection sessions, the participants activate their own experience and knowledge and learn from each other to be better placed to engage positively and constructively with spontaneous volunteers.

The solution's main objective is to alleviate human suffering and foster resilient societies. The training contributes to this goal by supporting Crisis Management organisations' staff, so they can engage positively with spontaneous volunteers, and by building the capacity of PFA providers to deliver quality support.

Psychological first aid is a method of helping people in distress, so they feel calm and supported in coping with their challenges. It is a way of assisting someone to manage their situation and make informed decisions. The basis of psychological first aid is caring about the person in distress. It involves paying attention to the person's reactions, active listening and, if needed, providing practical assistance, such as problem solving or help to access basic needs.

During the Trial: Two groups of spontaneous volunteers were trained in PFA. One group supported by virtual reality tooling (XVR), the other without. In parallel, a group of field level leaders were trained in engagement with spontaneous volunteers in crisis response by taking part in the leadership seminar.

The trained spontaneous volunteers were exercising their newly acquired skills in a realistic scenario (when getting in touch with victims), supported by a field level volunteer leader from the Austrian Red Cross that attended the leadership seminar.

The Technology Readiness Level of the PFA training (including the virtual reality Tool of XVR) is already at TLR 7 – (System prototype demonstration in an operational environment).

More information can be accessed via the DRIVER+ Portfolio of Solutions website: https://pos.driver-project.eu/en/PoS/solution/61.

3.1.4 ASIGN

ASIGN is a solution that helps reduce critical emergency and disaster response time. It is a complete all-in-one disaster assessment software tool for easy collection, optimal communication and effective management of operationally relevant critical information. ASIGN supports collection and communication of photos, videos, geo-texts, tracking, geo-zones, geo-alerts and assessment forms in a very bandwidth-efficient manner. Specifically, it can communicate photos and video with 99% band-width reduction, enabling communication even through low bandwidth cellular and satellite communication networks while maintaining full precision and accuracy.

While the ASIGN Apps work perfectly with regular mobile networks, they also allow satcom to be used when needed, with a lower cost, taking cost and delay concerns away, while leaving the core benefit: Always being able to communicate.

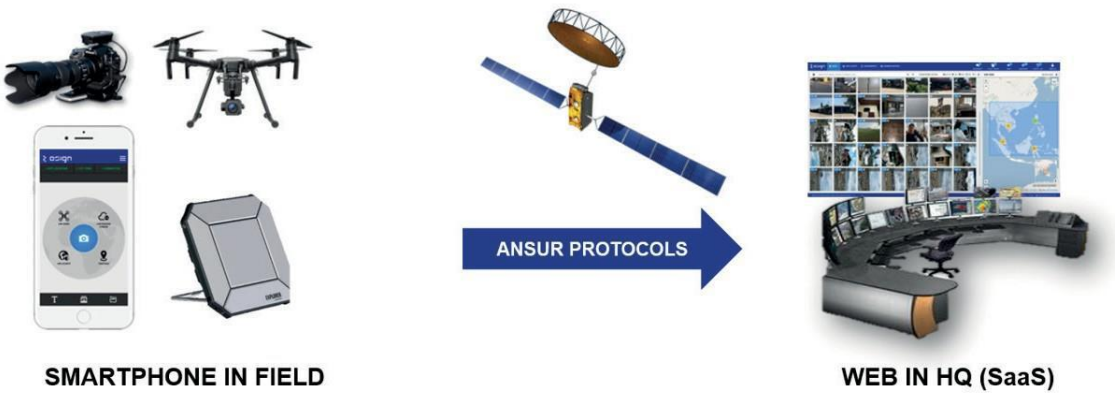

Figure 3.6: ASIGN

ASIGN is comprised of the ASIGN Server, a cloud-based platform from which the incoming information is managed, plus the field user applications ASIGN PRO and UAV-ASIGN, which collect and send information from the field to the Server, all with end-to-end encryption. With up to 99% saving in cost and capacity, ASIGN photos and videos from the field can arrive 100x faster at their coordination centre destination.

The ASIGN software also provides an information management platform to analyse, filter and manage the collected data to aid in decision- making. ASIGN data can also be easily exported onto further mapping platforms for the provision of a combined and comprehensive situational picture.

During the Trial: ASIGN solution performed the following tasks:

- Use of safe zones / geo-zones and geo-alerts functionality.
- Communication of photos, videos, text and tracks using smartphones with ASIGN software applications.
- User and team management plus analysis of incoming data using the ASIGN Server.
- Geo-spatial photo and video clip communication, with mapping integration, for providing improved visual situational understanding.
- Use of 360^0 videos in addition to regular photos.
- Testing in different scenarios, including scenarios where little bandwidth may be available, or where satellite communication may be necessary (using a portable sat link tool from Inmarsat called BGAN).

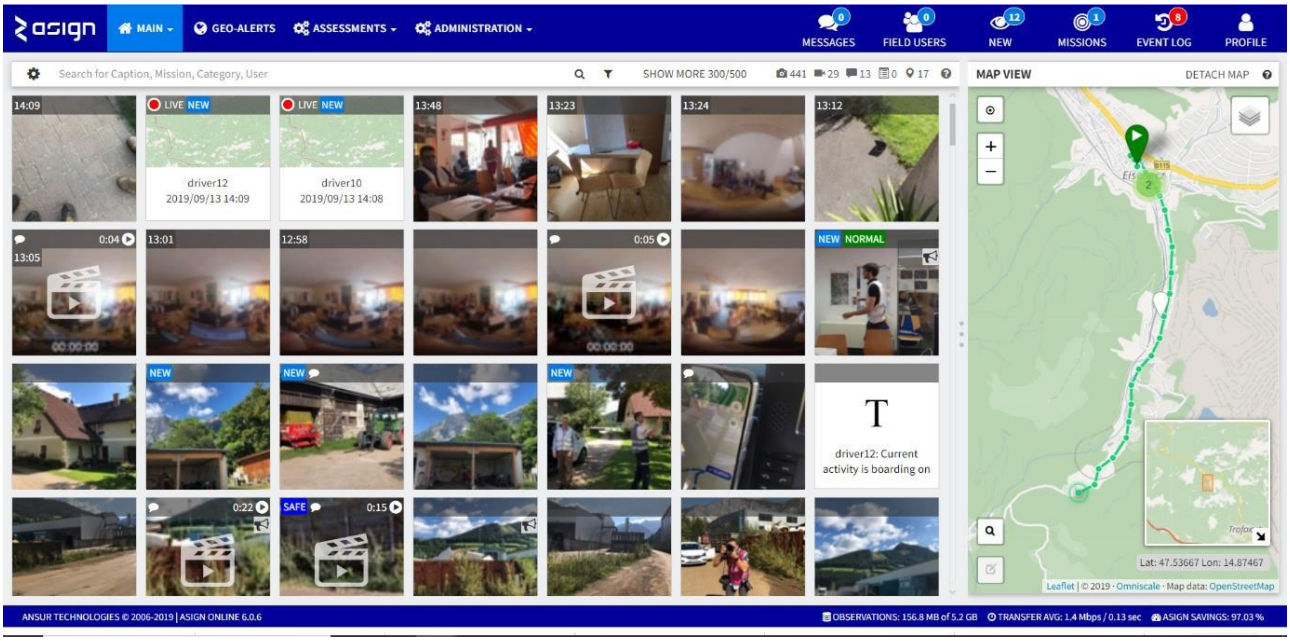

Figure 3.7: ASIGN admin panel

The Technology Readiness Level of ASIGN is TRL 8/9 – (Actual system proven in operational environment). ASIGN has been actively developed with and used in the field by the United Nations.

More information can be accessed via the DRIVER+ Portfolio of Solutions website: https://pos.driver-project.eu/en/PoS/solution/22.

3.1.5 Airborne and Terrestrial Situational Awareness

This solution provides real time areal images. Real-time aerial imaging significantly enhances situational awareness during major and large- scale disasters. DLR's solution "Airborne and Terrestrial Situational Awareness" comprises of four modules to provide such a real-time aerial imaging and analysis system.

Module 1 is the ground control station U-Fly, used to plan, engage and monitor aerial missions. The full-size research aircraft D-CODE, which is operated as a drone demonstrator with safety pilots on board, allowing drone-based missions to be executed without regulatory restrictions or safety concerns, executes the missions.

Module 2 is the 3K aerial camera system, specifically developed to acquire and evaluate aerial photographs in near real-time. In addition, it can transfer aerial imagery via data link directly from the aircraft to a mobile ground station to provide the data to decision makers and rescue forces immediately.

Module 3 is the Centre for Satellite based Crisis Information, which analyses aerial imagery and generates crisis information maps.

Module 4, called “KeepOperational”, has traffic analysis and route planning capabilities.

The solution can be applied as a complete system or the individual modules can stand alone.

During the Trial: the ground control station U-Fly and the 3K system were used to demonstrate their capabilities, i.e. to provide near real-time information for situation assessment (damage assessment, identification of access routes and equipment, localisation of volunteers) and monitoring; to acquire tailor-made data according to the requirements of the responsible parties; to provide aerial imagery (GeoTIFF) and reference map products (JPG, GeoPDF).

The operational command requested aerial images of a certain area by informing the U-Fly remote pilot. The remote pilot created a mission based on this request and activated the mission. The drone demonstrator (a modified Dornier Do228 with a digital autopilot), equipped with the 3K system, collected aerial images of the area and sent them to the ground immediately. The geo-referenced aerial images were displayed in U-Fly in near real-time and were provided to practitioners and other solutions.

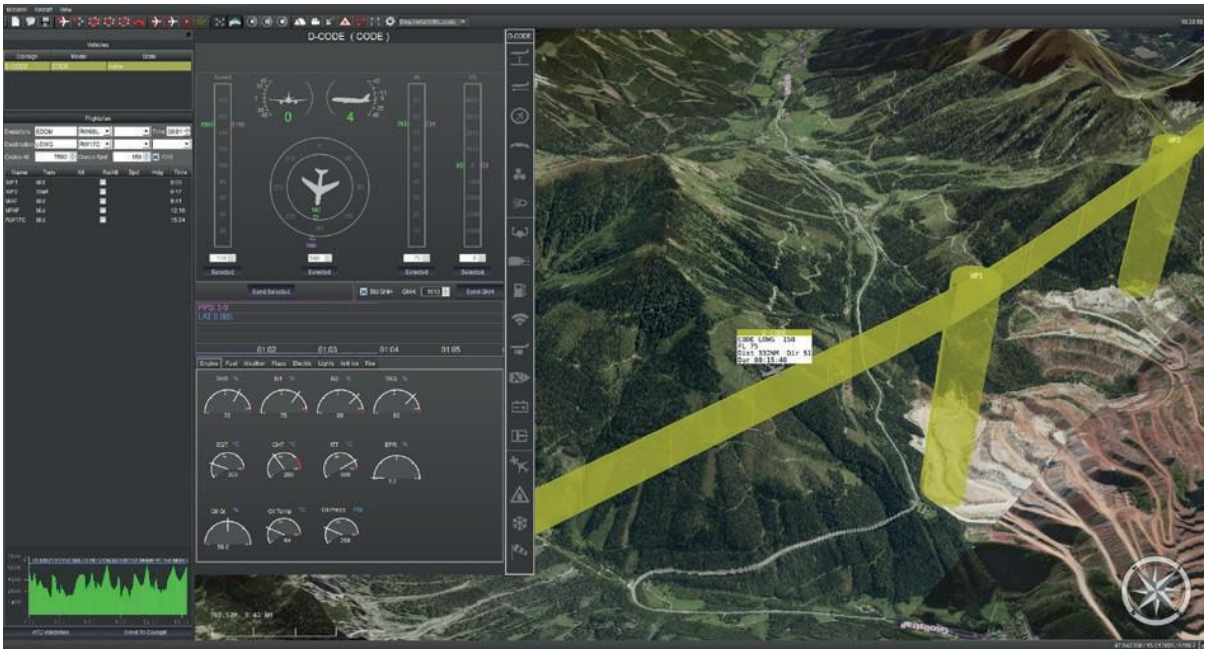

Figure 3.8: Module 1 - U-Fly of DLR’s solution

2D maps and interactive 3D visualisations were provided for professional responders to improve situational awareness, to support damage and needs assessment and to facilitate decision making processes.

From a maturity point of view, the solution relates to stage 2 (“Research and Development”) of the stages of innovation. However, the solution has an overall technology readiness level of TRL 6, which means it has already been demonstrated and tested in a relevant environment.

More information can be accessed via the DRIVER+ Portfolio of Solutions website: https://pos.driver-project.eu/en/PoS/solution/24.

3.2 Preparation phase

To coordinate the preparation for the Trial, especially the integration of the solutions into the Test-bed, a separate weekly solution coordination meeting was established and about 26 meetings (teleconferences) were held, starting with the first on 17. April 2019 and ending with a final meeting after the Trial week on 18. Sept. 2019. Also, a slack-channel was created to document technical requests and support (e.g. for adapters).

These telephone conferences were attended by the solution providers as well as the technically responsible persons, and if needed practitioners in order to exchange information and to clarify technical as well as content-related questions.

Adapters required for the connection to the Test-bed were discussed and the integration status was tracked. Communication details between several solutions were clarified. Minutes of the meetings were prepared, circulated, and stored on a website for everyone to read, correct and comment. Action items were defined and tracked at the beginning of each telephone conference.

In addition to the regular telephone conferences, three online test sessions were organised (by XVR and FRQ), bringing together all solution providers for tests before Dry Run 2 and the Trial, respectively. These test sessions made most problems and needs for adaptations visible and served as additional preparation for the face-to-face meetings.

3.2.1 Technical integration

The technical integration and testing of the solutions is described in the DRIVER+ deliverable **D934.24** ***Solution testing procedure*** (7). According to this procedure, the standalone solutions need first to be integrated into the Test-bed reference implementation. This was followed by a Trial-specific integration and testing against Trial-specific requirements.

Test-cases for each technical solution were defined by the technical coordinator (XVR). That formed the basis at each step of testing and was enhanced after each test (i.e. the Dry Run 1 and Dry Run 2). Finally, multiple solutions got tested in the Trial set-up.

Figure 3.9 provides the final data exchange diagram for Trial - Austria. It shows all solutions to be used during the Trial and which output they give to participants and how these participants interact with them. It also provides the data flows of these solutions to/from the Test-bed Technical infrastructure and which components of the Test-bed Technical Infrastructure were used.

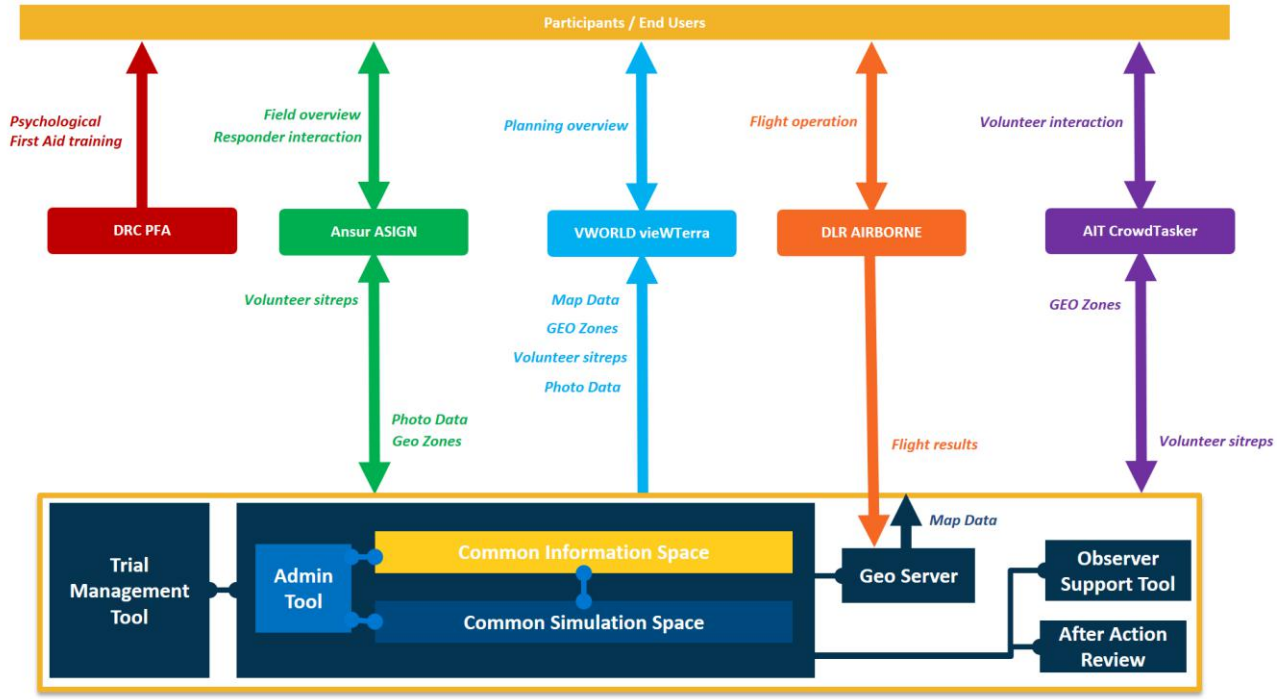

Figure 3.9: Data Exchange Diagram for Trial - Austria

3.2.2 Trial Integration Meeting (TIM): 11-15/03/2019, Vienna

Trial - Austria was the second DRIVER+ Trial with a Trial Integration Meeting before the dry runs. The need and necessity for this was a result of the lessons learnt from the previous Trials. During the TIM, the technical as well as more detailed scenario aspects were introduced to the solutions. The technical experts of the solutions got introduced to the Test-bed Technical Infrastructure in advance and performed first installations and connections. During the TIM they were supported by the Technical Coordination Team (from XVR and FRQ) and got a hands-on experience.

Discussions about required adapters were raised as well as a discussion on other technical constrains. In addition, the baseline was introduced by ARC to the solutions and first ideas were collected together with practitioners on where to implement the different solutions' features for the innovation line and the development of the scenario.

3.2.3 Dry Run 1: 13-17/05/2019, Pfarrzentrum Münichtal/Erzberg, Styria

During Dry Run 1, the solutions were set up and functional tests of the solutions as well as of their Test-bed connections and the ability to exchange data were conducted. A technical play-though was performed following pre-defined workflows. Open issues and needs for change were identified during these tests. In addition to technical tests, the planning of solution trainings for practitioners was started.

3.2.4 Dry Run 2: 19-23/08/2019, Pfarrzentrum Münichtal/Erzberg, Styria

Dry Run 2 was conducted as a full Trial simulation including internal and external observers. First, the practitioners were introduced to the solutions during dedicated solution training blocks. These training sessions were prepared as a general introduction as well as hands-on trainings. In parallel the observer training was performed. The second step was the play-through of the Trial scenario (i.e. Trial simulation) with practitioners.

Each practitioner was using each solution (which where operated by a solution operator made available on the solution providers' side in the command centre). In the field, the operation of the solutions was executed by either the emergent groups (i.e. CrowdTasker) or spontaneous/affiliated volunteers from the Red Cross (i.e. ASIGN as well as CrowdTasker).

Table 3.1 lists the players and the solutions they used. Fields in light blue indicate that results of the solutions were used or displayed, while yellow fields show where players could directly work with the solutions in the field and influence their output.

Table 3.1: Use of solutions during Trial - Austria

Player(s)	CrowdTasker	CrowdTasker (Field)	Airborne	vieWTerra Evolution	ASIGN	ASIGN (Field)	PFA
Incident commander and operators							
Incident commander with operators							
Volunteers							
Emergent Groups		*)					

*) Social media component of CrowdTasker (Chatbot/Telegram) is addressed

3.3 Application during the Trial

3.3.1 Physical set-up

Trial - Austria was conducted as a field exercise with table-top elements at the premises of Pfarrzentrum Münichtal / Eisenerz.

DRIVER+ staff, solution technicians and practitioners from the Red-Cross were located on one floor (ground floor) as displayed in the floor plans in Figure 3.10 and Figure 3.11. The figures show the use/presence of the solutions all set-up in the command room.

The DRIVER+ Test-bed Technical infrastructure together with support components (e.g. TMT, AAR, OST, etc.) have been set up in the technical room (having a window out to view the activities in the command room).

Briefing and trainings of spontaneous volunteers as well as debriefing session were held on the first floor, where the room was split (by a foldable wall) as needed for the different types of trainings (e.g. observer training, practitioners training), briefings and debriefings.

A separate room was available for the Trial Committee or emergency meetings (e.g. red vest meetings).

Note: Briefing and debriefing of the emergent groups as well as the PFA training of the emergent groups was done at the Bundeshandelsakademie Eisenerz (BHAK / Young business school / https://www.bhak-eisenerz.at/home/) which is close to the Pfarrzentrum Münichtal. Two rooms with IT equipment have been provided by the BHAK with full support of the teachers and head of the school.

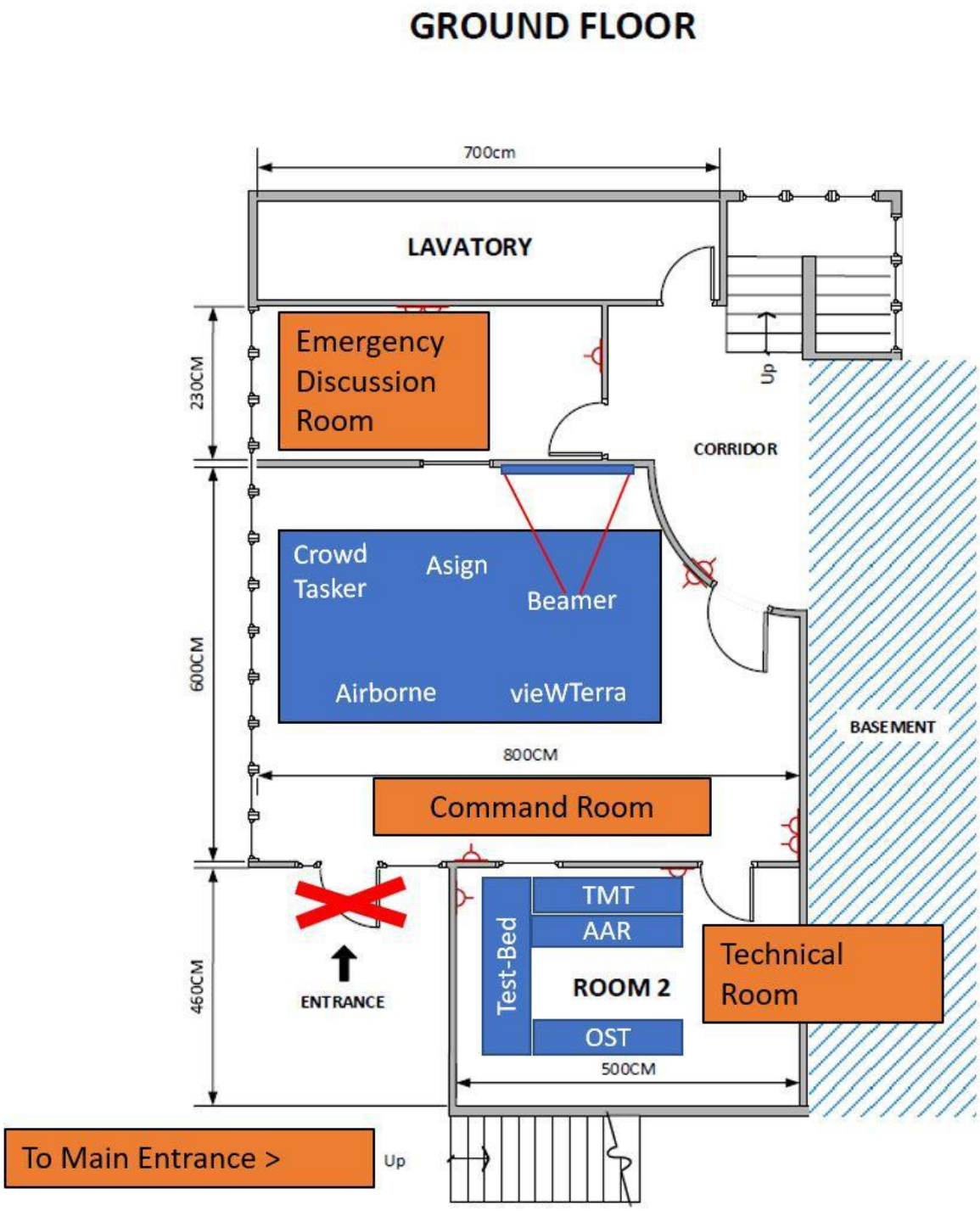

Figure 3.10: Physical layout Trial - Austria (Ground Floor)

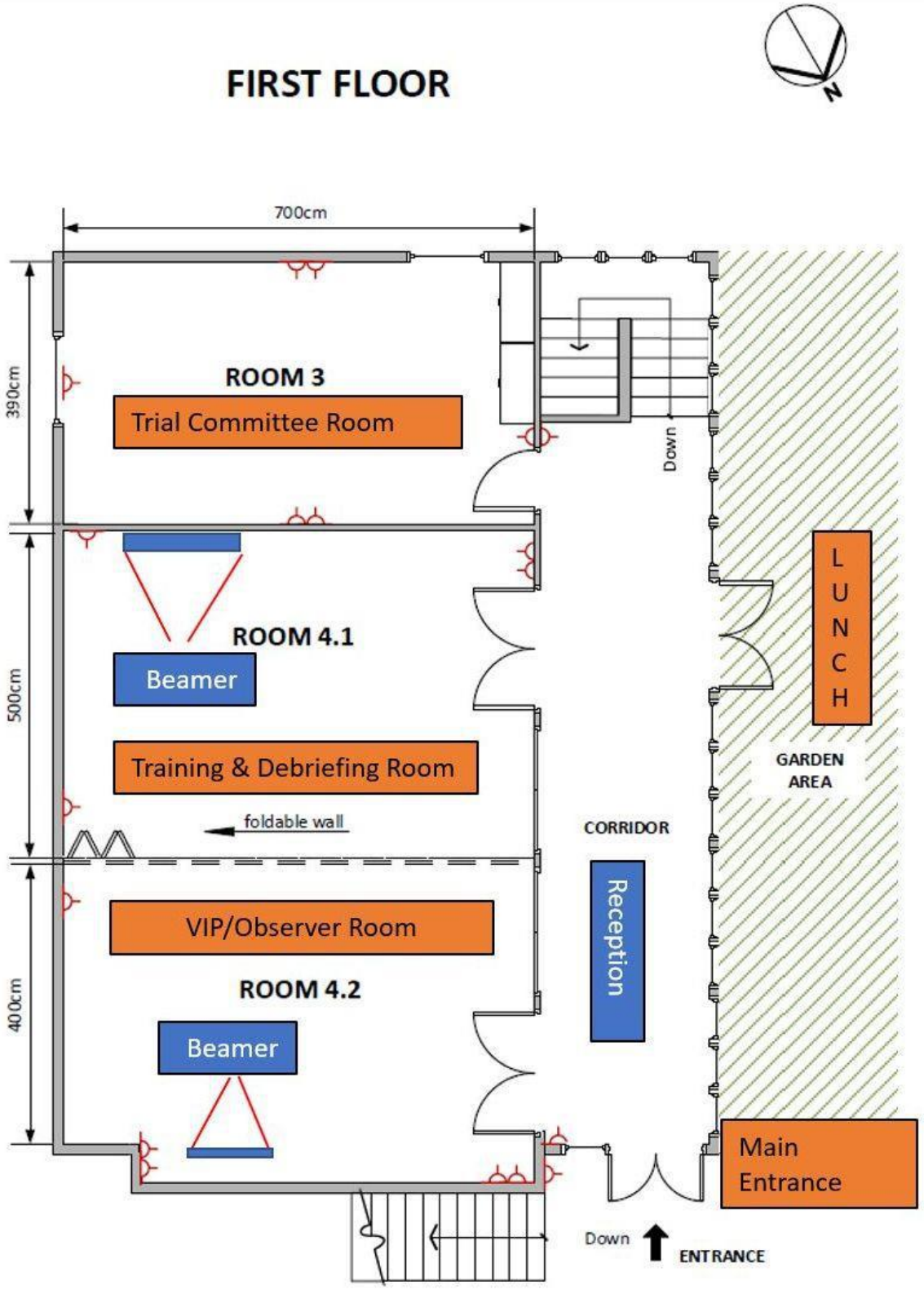

Figure 3.11: Physical layout Trial - Austria (First Floor)

3.3.2 Solution Training

Day 1 of the Trial served as preparation day for installing the solutions and technical checks. Day 2 served as play-through of all test-cases (as was done during Dry Run 2) and final adjustments also for the different DRIVER+ tools like the Test-bed Technical Infrastructure, OST and the TMT.

On day 3 of the Trial the solution trainings took place. First there was a general training block providing a short introduction (approx. 10 mins) about all solutions to all participants. Then the training session was split into two parallel parts, one for the solutions and one for the observers. The hands-on trainings had to be divided into several sessions for all participants taking about 30 minutes for each technical solution.

Figure 3.12: Solution training, Trial - Austria (Ground Floor)

The observer training was also divided into several sessions where on the one hand an introduction to the OST as well as a hands-on on the Tool was given and on the other hand an introduction to the various blocks and injects that would happen during the Trial was provided. Each session was also around 30 minutes long.

Figure 3.13: Observer training, Trial - Austria (First Floor)

Since the same (solutions and OST) technical training had already been conducted during Dry Run 2 it was decided to shorten the sessions and to train only certain specifics of solutions, e.g. functionalities, OST improvements, etc. according to the needs of practitioners.

The PFA training for the Emergent Groups (Volunteers) was conducted also in parallel in the nearby school (Bundeshandelsakademie Eisenerz (BHAK/Young business school/https://www.bhak-eisenerz.at/home/)). It started early in the morning and took until late afternoon. On day 4 the PFA leadership seminar for the group commanders (e.g. volunteers for Red-Cross Austria) accompanying the emergent group volunteers into the field, took place. On the same day a training for CrowdTasker's social media component took place at the school (in the morning) before it was deployed into the field.

An online-survey was filled by all participants after the trainings and served as input for the upcoming deliverable **D942.31** ***Report on trainings for the selected Solutions*** (8).

3.3.3 Information flow and interactions of solutions

Table 3.2, Table 3.3, Table 3.4, Table 3.5 and Table 3.6 illustrate how the solutions were used by the different actors during the five blocks of the scenario.

The pictures of Figure 3.14 provide an impression about interaction between solutions and practitioners during the Trial.

In case of an earthquake, it is necessary to share crisis-related information and also collect it from various sources. For this purpose, viewTerra Evolution was used to unify information coming from other solutions, where the Airborne was used to provide real-time satellite imagery of the affected area and CrowdTasker and ASIGN to provide detailed information about specific points of interest (POI). Other than that, CrowdTasker and ASIGN shared virtual danger-zones with viewTerra Evolution, and ASIGN was used to test communication in no-reception areas. The PFA (as in Block4b, see Table 2.2), being a non-technical solution was used in parallel, to deal with affected population but didn't have any interaction with other technical solutions. Interaction and data exchange between individual solutions in each of the scenario blocks is shown in Table 3.2, Table 3.3, Table 3.4, Table 3.5 and Table 3.6.

Block 1 summary:

The background idea for this block was to see how spontaneous volunteers that organised themselves on social media can be managed and integrated into CM relief activities. A group of emergent volunteers was sent out into the field equipped with mobile devices with CrowdTasker's Telegram feature installed. Commanders at the command centre, with the help of a CrowdTasker operator were interacting with them, assigning different tasks, such as collecting medical equipment or groceries from one spot and bringing them to another one. All communications were logged in the Test-bed.

Table 3.2: Use of solutions and their interactions during block 1

Users	Solution	Input from	Output to
Incident commander	legacy	legacy	coordination team
Volunteers	preparations	Telegram	Volunteers
Coordination team	speaking	CrowdTasker (CB)	Volunteers
Volunteers	CrowdTasker	CrowdTasker (CB)	Volunteers
Incident commander + CrowdTasker operator	CrowdTasker	CrowdTasker	CrowdTasker operator
Incident commander + CrowdTasker operator	CrowdTasker	CrowdTasker (CB)	Volunteers

Users	Solution	Input from	Output to
Volunteers	CrowdTasker (CB)	CrowdTasker (CB)	Volunteers
Volunteer Groups	CrowdTasker (CB)	CrowdTasker	CT Operator / Liaison
Incident commander + CrowdTasker operator	CrowdTasker	CrowdTasker (CB)	Volunteers
Incident commander + CrowdTasker operator	CrowdTasker	CrowdTasker	CrowdTasker operator
Volunteers	CrowdTasker (CB)	CrowdTasker (CB)	CrowdTasker operator
CrowdTasker operator	CrowdTasker	-	Test-bed
CrowdTasker operator	CrowdTasker	CrowdTasker	CrowdTasker operator

Figure 3.14: Usage of solutions during the Trial

Block 2 summary:

Background idea for this block was to improve situation assessment and decision making of the commander about the real damages at specific locations to get more detailed information in order to prepare further actions. Real-time images of the Eisenerz region were requested and taken by Airborne and Terrestrial Situational Assessment solution and transferred via Test-bed to vieWTerra Evolution to be overlaid using geo-information and then visualised in a 3D environment. Commanders, with the help of solution operators, were able on one hand to request flight paths and on the other hand to navigate the received imagery in a 3D model.

Table 3.3: Use of solutions and their interactions during block 2

Users	Solution	Input from	Output to
Incident commanders	legacy	legacy	Incident commanders
Incident commander	Airborne	Airborne	Incident commander + Airborne operator
Incident commander + Airborne operator	Airborne	Airborne	Airborne operator
Airborne operator	Airborne	Airborne	Airborne operator
Airborne operator	Airborne	Airborne	Airborne operator
Airborne operator	Airborne	-	Test-bed
Test-bed	Geo-server	-	Test-bed
Test-bed	Geo-server	vieWTerra Evolution	vieWTerra Evolution operator
vieWTerra Evolution operator	vieWTerra Evolution	vieWTerra Evolution	vieWTerra Evolution operator
vieWTerra Evolution operator	vieWTerra Evolution	vieWTerra Evolution	Incident commander
Airborne operator	Airborne	Airborne	Airborne operator
Geo Server	-	Geo Server	Geo Server Operator
ASIGN Operator	ASIGN	ASIGN	ASIGN Operator
vieWTerra Evolution operator	vieWTerra Evolution	vieWTerra Evolution	vieWTerra Evolution operator

Block 3 summary:

Background idea for this block was that sometimes more details (e.g. photos, information) of a specific point of interest (POI) are needed to continue with the situation assessment and decision making. Pre-registered volunteers were sent out into the field equipped with mobile devices with CrowdTasker application. Commanders were able to interact with them with the help of CrowdTasker operator, to issue tasks to them and volunteers responded by providing images of certain POIs. Images were transferred via Test-bed to vieWTerra Evolution and overlaid using geo-information and displayed in a 3D model.

Table 3.4: Use of solutions and their interactions during block 3

Users (AC / CT)	Solution	Input from	Output to
Incident commander	legacy	legacy	Incident commander
Incident commander	vieWTerra Evolution	vieWTerra Evolution	Incident commander
Incident commander	vieWTerra Evolution	vieWTerra Evolution	Incident commander + CrowdTasker operator
CrowdTasker operator	CrowdTasker	CrowdTasker	Incident commander-
Incident commander + CrowdTasker operator	CrowdTasker	CrowdTasker	CrowdTasker operator
Incident commander + CrowdTasker operator	CrowdTasker	CrowdTasker	CrowdTasker operator
Incident commander + CrowdTasker operator	CrowdTasker	CrowdTasker	CrowdTasker operator
CrowdTasker operator	CrowdTasker	CrowdTasker	Volunteers
Volunteer	CrowdTasker	CrowdTasker	CrowdTasker operator
Volunteer	CrowdTasker	CrowdTasker	CrowdTasker operator
CrowdTasker operator	CrowdTasker	CrowdTasker	CrowdTasker operator
CrowdTasker operator	CrowdTasker	-	Test-bed
CrowdTasker operator	CrowdTasker	-	Test-bed
Test-bed	-	vieWTerra Evolution	vieWTerra Evolution operator
Test-bed	-	vieWTerra Evolution	vieWTerra Evolution operator
vieWTerra Evolution operator	vieWTerra Evolution	vieWTerra Evolution	Incident commander-
CrowdTasker operator	CrowdTasker	CrowdTasker	CrowdTasker operator
vieWTerra Evolution operator	vieWTerra Evolution	vieWTerra Evolution	vieWTerra Evolution operator
vieWTerra Evolution operator	vieWTerra Evolution	vieWTerra Evolution	vieWTerra Evolution operator

Block 4a summary:

Background idea for this block was to mark areas which are dangerous for passing through and send this information to people that are inside or entering it based on their geo-location. Two groups of Red Cross volunteers were sent out into the field equipped with mobile devices, one group using CrowdTasker and the other using ASIGN application. Hazardous areas in the region of Eisenerz were identified and marked using ASIGN application. This information was transferred via the Test-bed to vieWTerra Evolution and displayed to the commanders, where they could see changes of the dangerous areas when influenced by different factors (e.g. strength and direction of wind). Commanders calculated the spreading of dangerous materials and with the help of solution operators, issued a task to warn all people in the area. Users of both applications received the warning messages.

Table 3.5: Use of solutions and their interactions during block 4a

Users (AC / CT)	Solution	Input from	Output to
Incident commander	legacy	legacy	Incident commander
Incident commander	vieWTerra Evolution	ASIGN	Incident commander + ASIGN operator
ASIGN operator	ASIGN	ASIGN	Incident commander-
Incident commander + ASIGN operator	ASIGN	ASIGN	ASIGN operator
Incident commander + ASIGN operator	ASIGN	ASIGN	ASIGN operator
ASIGN operator	ASIGN	-	Test-bed
Test-bed	-	vieWTerra Evolution	vieWTerra Evolution operator
vieWTerra Evolution operator	vieWTerra Evolution	vieWTerra Evolution	Incident commander-
Test-bed	-	CrowdTasker	CrowdTasker operator
CrowdTasker operator	CrowdTasker	CrowdTasker	Volunteers
volunteers	CrowdTasker	CrowdTasker	Volunteers
ASIGN Automatically	ASIGN App	ASIGN	Responders
Responders	ASIGN App	ASIGN App	Responders
ASIGN operator	ASIGN	ASIGN	ASIGN operator
vieWTerra Evolution operator	vieWTerra Evolution	vieWTerra Evolution	vieWTerra Evolution operator
ASIGN operator	ASIGN	ASIGN	ASIGN operator
vieWTerra Evolution operator	vieWTerra Evolution	vieWTerra Evolution	vieWTerra Evolution operator
CrowdTasker operator	CrowdTasker	CrowdTasker	CrowdTasker operator

Block 5 summary:

Background idea for this block was to find a zone with no reception (no internet – no mobile connection but with GPS reception) and to test exchanging information for situation assessment (photos, 360^0 videos) using sat link communication. A group of Red Cross volunteers equipped with portable sat link tool and a 360^0 camera entered a no reception area and established communication with the command centre, where commanders were able to interact with them and receive information from the site which was transferred via Test-bed and overlaid to vieWTerra Evolution.

Table 3.6: Use of solutions and their interactions during block 5

Users (AC / CT)	Solution	Input from	Output to
Incident commander	legacy	legacy	Incident commander
Incident commander + ASIGN operator	ASIGN	ASIGN	USAR
USAR	ASIGN	ASIGN	USAR
USAR	ASIGN	ASIGN	ASIGN operator
USAR	ASIGN	ASIGN	ASIGN operator
USAR	ASIGN	ASIGN	ASIGN operator
USAR	ASIGN	ASIGN	ASIGN operator
ASIGN Automatically	ASIGN server	ASIGN	ASIGN operator
ASIGN operator	ASIGN	-	Test-bed
Test-bed	-	vieWTerra Evolution	vieWTerra Evolution operator
vieWTerra Evolution operator	vieWTerra Evolution	vieWTerra Evolution	Incident commander
Incident commander	vieWTerra Evolution	vieWTerra Evolution	Incident commander + ASIGN operator
Incident commander + ASIGN operator	ASIGN	ASIGN	ASIGN operator
ASIGN operator	ASIGN	-	Test-bed
Test-bed	-	vieWTerra Evolution	vieWTerra Evolution operator
vieWTerra Evolution operator	vieWTerra Evolution	vieWTerra Evolution	Incident commander-
Incident commander	vieWTerra Evolution	vieWTerra Evolution	Incident commander + ASIGN operator
Incident commander + ASIGN operator	ASIGN	ASIGN	ASIGN operator
ASIGN operator	ASIGN	ASIGN	USAR
ASIGN operator	ASIGN	ASIGN	ASIGN operator
ASIGN operator	ASIGN	ASIGN	Incident commander-

Users (AC / CT)	Solution	Input from	Output to
Incident commander + ASIGN operator	ASIGN	ASIGN	Incident commander-
ASIGN operator	ASIGN	ASIGN	ASIGN operator
ASIGN operator	ASIGN	ASIGN	Incident commander-
ASIGN operator	ASIGN	ASIGN	ASIGN operator
ASIGN operator	ASIGN	ASIGN	ASIGN operator
ASIGN operator	ASIGN	ASIGN	ASIGN operator
vieWTerra Evolution operator	vieWTerra Evolution	vieWTerra Evolution	vieWTerra Evolution operator
vieWTerra Evolution operator	vieWTerra Evolution	vieWTerra Evolution	vieWTerra Evolution operator

4. Achievements and lessons learnt

During Dry Run 2 and the Trial, dedicated debriefing sessions as displayed in Figure 4.1 were conducted with practitioners, observers as well as with solution providers to gather feedback, discuss new or open issues and requests of the solution providers. The main goal of these sessions was to identify shortcomings and improve the application of selected solutions in the Trial, by actively taking into account the feedback of the participants. During Dry Run 2, practitioners gave suggestions how to make a better use of the solutions, observers gave insights into what would help them seeing how solutions are used and solution providers gave recommendations how different features of their solutions could be better presented to the practitioners.

Figure 4.1: Debriefing sessions

According to the TGM (4) the solutions are to be observed and assessed by using defined Key Performance Indicators (KPIs). These dedicated sessions helped focusing on collecting of relevant data for the assessment. The completed evaluation of the solutions and their use during the Trial will be shared in **D945.12** ***Report on Trial Evaluation – Trial 3*** (3).

The following is a brief summary of remarks from the solution providers' perspective (and the practitioners' perspective in section 4.3) collected from telephone conferences, debriefings, an evaluation survey and personal discussions in order to support planning and conducting upcoming DRIVER+ Trials.

4.1 Organisational aspects feedback

The face-to-face meetings (TIM, Dry Run 1 and Dry Run 2) were recognised to be time-consuming, but very valuable for preparation, since working on the spot and dealing with issues together with all involved parties proved to be very efficient compared to virtual meetings. Backup solutions were also invited to participate in these meetings, which proved to be very beneficial, due to the fact that one solution resigned before the Trial and the backup solution was already integrated and could take over with little effort.

The TIM was the first possibility to get to know the other solutions directly, to exchange possible contributions of each solution and to assess if and how to connect to each other. Dry Run 1 and Dry Run 2 made the conduction and cooperation during the Trial much easier, since all technical aspects were covered in advance.

The logistics and organisation of the meetings and the Trial was perceived as very well structured. However, communication was still perceived by the solution providers to be an issue. The amount of emails and information related to the project was stated to be too much. Also, the Agenda of the Trial was seen as quite complex, which was stemming from several parallel activities especially related to the training of the Emergent Group (Volunteers) utilised by CrowdTasker and PFA solutions, which took part at different

physical locations. This was felt from both sides – the solutions providers as well as the observers found this to be quite challenging.

Solution providers also reported that changes between Dry Run 2 and the Trial led to some confusion. This was mostly influenced by the interaction with IRONORE exercise, which was very participant-driven and some injects happened earlier or were delayed compared to the original timing which made an impact on Trial organisation.

Trial - Austria scenario was perceived to be rather realistic, with exception of the situation assessment sub-scenario with the DLR solution, which was seen as hardly realistic, but creation of a realistic large-scale scenario in an exercise is almost not possible. The information and data provided in this sub-scenario were perceived as excellent, though. In addition, practitioners stated that the level of operations was not defined clearly enough.

All Trial participants reported that media presence at one moment during the Trial was very disturbing and irritating and even hindered the usage of solutions in Trial. Luckily, this was a short episode that didn't influence data collection, and the Trial continued without further interruptions. This occurred due to the fact that the command room was a bit too small for the number of diverse personnel present (Trial coordinators, observers, solution operators and practitioners) and that all media crews arrived at the same time.

4.2 Technical feedback

In order to connect all solutions to the Test-bed substantial effort was required, but this was solved by all technical solutions without any major issues. The necessary adapters were provided and adjustments had to be made only with regards to updates in new versions of the Test-bed in its development cycle.

Documentation was available for adapters used to connect to the Test-bed, but the level of detail differed across various existing adapters, so that in some cases it was insufficient and help of the technical staff was needed. A dedicated solution coordination meeting was held on a weekly basis, which aimed to identify and solve outstanding issues. Test-bed technical staff was always available to assist solution providers and when necessary, additional testing sessions were conducted between solution coordinator, solution providers and technical staff to solve problems at hand. In addition, a dedicated Slack channel for discussing technical issues and integration progress was used broadly and proved to be valuable.

Practitioners were in general very positive about the application of the solutions during the Trial and gave valuable recommendations for further improvement to each solution provider. They also stated that having solution operators assisting them was a very good idea, since they could focus on using a solution to solve the crisis and not having to struggle with operating it.

4.3 Added value for practitioners

Most practitioners were satisfied with the relevance of the Trial and the solutions for their respective organisation. It was stated that some solutions will be recommended by practitioners as a result of this Trial. Practitioners felt that their input before and after the Trial was taken into account by the solution providers.

Some practitioners indicated that they would like to get in contact with specific solution providers for further cooperation and to get more detail insight into their offers.

The innovation of the solution and their readiness was perceived as quite high by some practitioners. This was especially mentioned for ASIGN and CrowdTasker. Some practitioners see it as pity that the DLR solution is currently a research operation only.

Dealing with emergent groups, practitioners had to adapt to the new form of communication offered by the message board, which they were not used to. They gained new insights about self-organisation and coordination from their experience in the deployment of these types of volunteers.

All practitioners were impressed by the engagement and spirit of the solution providers working together in the Trial - Austria. One of the statements was "*I got in contact with great experts of different countries professionals and researchers from all over EU!*" (Statement after Trial - Austria according to results of the evaluation survey conducted by ARTTIC).

4.4 Added value for solution providers

After taking a part in a Trial, it is of course interesting to find out whether the expectations of the solutions with regards to added value have been fulfilled for them. Several solutions providers stated that they were deeply impressed on how quick the practitioners realised the functional capability each solution offers. (Note: Vice versa the practitioners were impressed by the innovative capabilities of each solution and already discussed ways how they would like to integrate them into their future work).

They found it very valuable to see practitioners interacting with the operators of the solutions, on the one hand commanding them (learning the commander's speech) and on the other hand getting immediate recommendations and insight what functionality could be improved or was missing in their solution. This helped each solution provider to identify room for improvements and implement additional functionalities.

Some solution providers discussed with practitioners possibilities to continue collaboration (e.g. to organise a workshop) to provide more training and hands-on on the solutions.

The good networking opportunities during the Trial were appreciated and especially by external solution providers that wanted to have more time for their commercial activities.

Finally, all of the solutions providers stated that they would recommend attending a DRIVER+ Trial to partner organisations and colleagues. (Statement after Trial - Austria according to results of the evaluation survey conducted by ARTTIC).

Figure 4.2: The big family represented by the Trial Committee of Trial - Austria

References

1. **DRIVER+ project.** *D945.11 Report on Trial Action Plan - Trial 3.* 2019.

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4. —. *D922.21 - Trial guidance methodology and guidance tool specifications (version 1).* March 2018.

5. —. *D922.11 List of CM gaps.* March 2018.

6. **Project, IRONORE 2019.** Ironore. *https://www.ironore.eu/.* [Online] [Cited: 11 11, 2019.] https://portal.roteskreuz.at/owncloud/index.php/s/p5SJUDZaCdPk9P2.

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8. —. *D942.31 Report on trainings for the selected Solutions.* December 2019.

Annexes

Annex 1 – DRIVER+ Terminology

In order to have a common understanding within the DRIVER+ project and beyond and to ensure the use of a common language in all project deliverables and communications, a terminology is developed by making reference to main sources, such as ISO standards and UNISDR. This terminology is presented online as part of the Portfolio of Solutions and it will be continuously reviewed and updated[1]. The terminology is applied throughout the documents produced by DRIVER+. Each deliverable includes an annex as provided hereunder, which holds an extract from the comprehensive terminology containing the relevant DRIVER+ terms for this respective document.

Table A1: DRIVER+ Terminology

Terminology	Definition	Source
Dry Run 1	First rehearsal of a Trial, focusing on the technical integration of solutions, reference implementation of the Test-bed, and scenario validation; it also serves as a readiness review to approve the maturity of technical solutions.	Initial DRIVER+ definition.
Dry Run 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.	Initial DRIVER+ definition.
Legacy system	(Crisis Management) system currently in operational use.	Initial DRIVER+ definition.
Operator	(human) operator: Person engaged in task performance, considered as a monitoring, controlling or directing element in a system or process capable of a dynamic response to system inputs and disturbances.	ISO 9996:1996(en) Mechanical vibration and shock — Disturbance to human activity and performance — Classification, 3.5. Link: https://www.iso.org/obp/ui/#iso:std:iso:9996:ed-1:v1:en:term:3.5
Portfolio of Solutions	A database driven web site that documents the available Crisis Management solutions. The PoS includes information on the experiences with a solution (i.e. results and outcomes of Trials), the needs it addresses, the type of practitioner organisations that have used it, the regulatory conditions that apply, societal impact consideration, a glossary, and the design of the Trials.	Initial DRIVER+ definition.

[1] 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
Scenario	Pre-planned storyline that drives an exercise, as well as the stimuli used to achieve exercise project performance objectives. DRIVER+ note 1: In the context of DRIVER+ scenarios are defined for Trials not for exercises.	ISO 22300:2018(en) Security and resilience — Vocabulary. Link: https://www.iso.org/obp/ui/#iso:std:iso:22300:ed-2:v1:en:term:3.217
Solution	A solution is a means that contributes to a Crisis Management function. A solution is either one or more processes or one or more tools with related procedures.	Initial DRIVER+ definition.
Test-bed Technical infrastructure	The software tools and middleware to systematically create an appropriate (life and/or virtual) environment in which the trialling of solutions is carried out. The Test-bed infrastructure can enable existing facilities to connect and exchange data. DRIVER+ Note 1: For a better understanding within the CM community the term "Test-bed Technical Infrastructure" replaces the term "Test-bed Infrastructure". These terms are synonyms.	Initial DRIVER+ definition.
Trial	An event for systematically assessing solutions for current and emerging needs in such a way that practitioners can do this following a pragmatic and systematic approach.	Initial DRIVER+ definition.
Trial Guidance Methodology (TGM)	A structured approach from designing a Trial to evaluating the outcomes and identifying lessons learnt.	Initial DRIVER+ definition.