



H2020 VALKYRIES Project - White Paper

Title: Harmonization and Pre-Standardization of Equipment, Training and Tactical Coordinated procedures for First Aid Vehicles deployment on European multi-victim Disasters

Type of action: Innovation Action

Topic: SU-DRS03-2018-2019-2020 **Grant number:** 101020676

Start Date: 01/10/2021

End Date: 30/09/2023

Duration: 24 months

Project Web Site: <https://www.valkyries-h2020.eu/>

Key Words: Emergencies, Multi-victim disasters, Cross-border, Cross-sectorial, Reference Integration, Harmonization

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1. Introduction to VALKYRIES

The management of Multi-Casualty Incidents (MCI) presents a great challenge among emergency medical teams due to resource insufficiency, breakdowns in health care facilities or malfunctioning in communication infrastructures. Despite the efforts performed in the EU, there are still challenges to be addressed, specially related to harmonization of technology, procedures, and training domains between emergency agencies and EU members.

To address these limitations, VALKYRIES analysed the state of the art from the previous domains, identifying existing gaps in the EU and opportunities for improvement. After that, VALKYRIES aggregated the resulting opportunities, then prioritising them based on impact and feasibility scores to then select six opportunities per domain. For each opportunity, VALKYRIES offered pre-standardisation roadmaps and a SWOT analysis (“strengths, weaknesses, opportunities, and threats”). Based on the above, VALKYRIES provided key pre-standardization and harmonization actions to be implemented in a reference integration platform and demonstrated in four different cross-border and cross-sectorial scenarios. The consortium was coordinated by Indra and bring together 17 partners from eight EU countries.

2. ICT results

The technological analysis performed offered a total of **141 gaps and 135 opportunities**, of which **eight gaps** and eight opportunities were related to first aid vehicles and supportive autonomous units. Moreover, **43 gaps and 42 opportunities** focused on trusted communication infrastructure and end-user terminals, 47 gaps and 32 opportunities were associated with mobile command and control and operational coordination technologies, **15 gaps and 18 opportunities** were related to digitalization on first aid actuations, and 28 gaps and 35 opportunities referred to instrumentation and health support wearable devices.

The implementation of the selected six opportunities at the EU level is essential as they represent current issues that emergency agencies face. Thus, the standardisation of these opportunities would greatly benefit emergency services to make them work better, resulting in improved citizenship as more lives could be saved. In addition, the following solutions or platforms have been harmonized:

- **Sigrun Framework** - an open standard and open model to federate MCI responders' heterogenous technological solutions.
- **Sigrun Implementation** - a unique implementation of SIGRUN framework that establishes a vision of SIGRUN concept.
- **Global COP** - a unique service enabling situational awareness of the MCI scenarios across multiple entities.
- **iSafety** - is a Command-and-Control (C2) tool for emergency management that is integrated in the SIGRUN reference model and with the rest of the applications.
- **TASSICA 3 Triage Card** - is a standardized triage card designed for first responders in emergency services, specifically for use in mass casualty incidents (MCI) and disasters.

3. Procedures results

Despite the existence of several standards related to disaster management, first responders continue to identify **common symbology and terminology** in planning, preparedness and execution of the emergency response as a crucial gap that needs to be filled through ongoing and future standardisation activities. This seems to reflect that for some reason the existing proposals do not fully meet their specific needs or are not easily accessible. VALKYRIES Project proposes the **VALKYRIES COLLABORATIVE GLOSSARY**, a freely available comprehensive multilingual web-based collaborative terminology database that will serve as a universal reference for emergency and disaster planning, preparedness and response.

Most national and regional **emergency response plans (ERP)** are standardized at EU level. However, transnational plans are rare despite the potential involvement of multiple territories in a disaster. It is necessary to progress in the standardisation of ERP, to promote the implementation of inter-territorial ERP, and to implement tools that allow real-time management of information related to these ERP to facilitate decision-making. The VALKYRIES Project proposes the implementation of an **EU STRUCTURED REPOSITORY OF EMERGENCY RESPONSE PLANS (EUR-ERP)** in the framework of the European Civil Protection Mechanism, providing command and control (C2) managers in real time with the ERP information necessary to effectively coordinate cross-border emergencies.

EU emergency services generally exhibit high homogeneity in terms of assigned responsibilities for responding to emergencies, but there are notable divergences among agencies and territories regarding **operating procedures**, with infrequent inter-agency protocols. It seems virtually impossible to establish fully standardised operating procedures between the various emergency services, because of different environment, composition, structure, competencies, resources. However, several simple steps can be taken to significantly improve interoperability and the effectiveness of mass casualty incidents (MCI) response. Some of these simple but highly effective steps do not require major changes in the way the emergency services involved operate, and rely heavily on low complexity, widely available, and low-cost resources. In this line, the VALKYRIES project proposes two enablers:

- Establishment of **standardised EU categorisation and labelling of casualties** to identify their priority for care/evacuation in an MCI or disaster, building on previous consensus efforts: **PT1 (immediate, red colour); PT2 (delayed, yellow); PT (minimal, green); PT4 (expectant, blue); D (deceased, black colour)**.
- Use of an **EU standardised triage tag, the TASSICA 3 TRIAGE CARD**, as a simple cross-cutting element that has proven to be effective in facilitating interoperability between different emergency services working simultaneously with different operating procedures in MCI and disasters, while ensuring the recording of clinical information and the traceability of victims and improving the quality and equity of healthcare.

The EU Civil Protection Mechanism promotes common practices for coordinating and deploying disaster response, but local procedures dominate MCI and disaster management, resulting in non-standardized workflows and communications across systems. The **standardisation of data and of information exchange processes** between emergency services, supported by technological advances, is the essential way to improve the efficiency and interoperability of disaster response, including C2. As a starting point to advance this standardisation, the VALKYRIES Project proposes two specific enablers:

EMS MINIMUM DATA SET (EMS MDS), as the set of data deemed necessary to be exchanged in MCI and disasters between emergency services to provide proper casualty management.

Adoption in the EU of the M/ETHANE model, proposed by JESIP for the UK, as a minimum data set for appropriate initial alerting and notification between emergency services in the early stages of any major incident.

Finally, in line with the ICT outcomes of the Project, VALKYRIES proposes **SIGRUN as the common federated system for sharing information in cross-territorial or inter-agency emergency response in the EU**. By using SIGRUN as a common reference, it will be possible to develop operating procedures which, although different, will allow emergency services (both first responders and C2 personnel) to work together more effectively in responding to MCI or disasters.

4. Training results

The analyses made in the framework of the VALKYRIES project about Education and Training (E&T) for first aid responses identified several groups of capability gaps.

There is a **need to standardise the E&T of first aid responders** within the European Member States (MS) and to create a Common curriculum for Basic First Aid in emergency medicine to ensure a comparable knowledge base and to provide equivalent services between the MS. Besides, there is a lack of standard for cross-border recognition of first aid courses in the EU. It is necessary to define minimum required competencies for training for Multi Casualty Incidents (MCI) and disasters.

Paramedics' training varies in the EU MS regarding the level of teaching, the content of the courses, their length, etc. At the same time, there is a growing need for highly trained paramedics to have comparable knowledge base and to be able to provide equivalent services in cross-border incidents.

There is a **lack of standardisation of the operative procedures** in response to cross-border MCI at the EU level. In some cases, procedures exist at the regional level but there is no standardisation at the national level. This lack of standardisation is a hindrance to cross-sectoral and cross-border cooperation.

One of the most important capability gaps is related to the **lack of certification in the E&T of medical first responders** at the EU level to improve cross-border cooperation.

There are no lessons learned system at the EU level that can improve collective learning among EU MS to strengthen the preparedness and joint response to cross-border emergencies.

Based on the analysis of the identified gaps and needs, the following harmonisation opportunities were identified.

The creation of a common core curriculum to be used as a basis for the implementation of emergency medicine as a speciality and the paramedic's training. The experience of the World Health Organisation (WHO) that provides a classification and minimum standards for emergency medical teams can serve as a basis for a European classification. Besides, the EU institutions will have to work to establish a commonly valid European First Aid Certificate to guarantee the minimum knowledge base in first aid responses at the European level. The training to get this kind of certificate should be recognised via the European Qualification Framework and can be conducted by the European Agency for Health and Safety at Work, based on the guidelines of the European Resuscitation Council. One of the important contributions of the VALKYRIES team is the developed, demonstrated and tested Training kit for Joint Multinational Course for first aid responses. The content of the training, the methodology and the teaching materials for a short 3-day training are available for further pre-standardisation actions.

The **transformation of widely adopted national guidelines and procedures for first aid responses into standards** would solve the cross-border interoperability issues and will help the adoption of common methodologies in general, and common ways for the organisation of training exercises for first responders.

The **creation of a Register of European First Aid members** would allow the standardization of intervention protocols in MCI, optimize the resources available in each country and improve coordination and cooperation among EU MS in case of cross-border incidents.

Adoption of the procedures to use modern tools for information exchange among first aid responders and other crisis management intuitions is vital to facilitate cross-sectoral and cross-border cooperation in case of MCI. To achieve this goal, the institutions must define the data that are relevant and necessary for management in their sphere of action. Standardising the data collected would facilitate the compilation of the information and its analysis to improve response and giving recommendations to decision-makers.

The **creation of a lessons learned database for first responses** at the EU level with the standardised outcomes from debriefing reports would make easier to identify practices that could be institutionalised and procedures that require corrective action to improve the response and preparedness to cross-border MCI. Implementation of a system based on the EU Civil Protection Knowledge Network and Lessons Learned Programme or WHO Guidance for After Action Review.

5. Pre-standardisation and harmonisation results

The results in terms of pre-standardisation and harmonisation have been:

- Mapping of MCI related standards and certifiable standards
- Harmonization of the colour codes used in triage
- Harmonization in the evaluation and analysis of the drills and real emergencies.
- Harmonization on minimum required competencies for training for MCI and disasters.
- Standardization of education and training for first aid responses (Creation of a Training kit: curriculum, methodology and training manual)
- Using common procedures and standards for training and civil-military actions
- Standardization of information sharing in emergency response
- Harmonization of operating procedures in emergency response
- Harmonization of emergency response plans
- Standardisation of terms in planning, preparedness and execution of the emergency response
- Pre-standardization minimum data set to care out the emergency
- Harmonization in procedures and information exchange in MCI
- Harmonization of emergency response plans

- Use of wearables to support triage
- Harmonization for Cross border data trace
- Establishing a common federated system for sharing information in emergency response
- Minimum set of competencies and skills for volunteers and integration in the field operational procedures with adequate field exercise program and adequate protection with risk-free activities

6. Relevant dissemination and publications

One of the main objectives of the project is the dissemination of scientific results. These are the milestones achieved:

- 6 proceedings to international conferences.
- 6 papers to scientific journals.
- 5 posters on conferences.
- +20 events where Valkyries project was presented.

Read all the scientific works at: https://www.valkyries-h2020.eu/Scientific_Publications.html

7. Recommendations for policy makers, end users, etc.

Within the implementation of the project 4 Use Cases were carried out:

1. UC1 Join cross-frontier first aid response against major fire disaster (Spain-Portugal) - successfully demonstrated digitization of care processes in multi casualty incident and improved the accuracy of communication between all involved first responders.

2. UC2 Cross-border response to the disaster containing the spreading of toxic substances (Slovakia-Italy) - the exercise contributed to the practice of multi-agency cooperation and supported the exchange of experience. Finally, it demonstrated the possible technological improvements of intervention during MCI with a cross-border aspect, confirming their potential.

3. UC3 Cross-border crisis due to an earthquake, floods and chemical pollution (Bulgaria-Greece) - use of VALKYRIES tools for the fast exchange of information in a direct and rate manner, reducing the need for multiple oral exchanges, digital dimension in emergency response has evident benefits in both command and control and field operations. Besides, during the UC3 execution the Joint Multinational Training Kit for the first aid response was demonstrated and tested.

4. UC4 Rescue of people and collection of pollution on sea in international waters (Norway-Sweden-Denmark) - demonstration emphasizes the continuous need for improvement and optimization of tools and technologies, cross-border communication and comprehensive training to maximize the effectiveness of emergency response. An important lesson learned is that units like mobile phones and tablets as well as triage cards are difficult or nearly impossible to use at sea or in cold weather. 4G/5G for communication is also very limited at sea.

Implemented demonstrations/exercises confirmed:

- Potential of particular tools and opportunities to improve response action during MCI with cross-border and cross-sectorial reach, but also in general.
- Interest of end-users in further development in order to use them in practice.
- The tested solutions and opportunities offered end-users the opportunity to conduct synergistic exercises of different first responders.
- Need for training in the use of new solutions, opportunities. If the process of saving lives is to be made more effective, first responders must also be adequately trained to work with the new technologies and opportunities offered.
- 100% traceability of the casualties possible to achieve.