

Screening of market/close to market solutions (D3.1)



EXECUTIVE REPORT



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DIREKTION Project

The number and severity of disasters are increasing in Europe, due to climate change, ageing of industrial facilities and infrastructures, geo-political instability, poor knowledge management for critical activities and the vulnerability of the population exposed (density, age, migration...). To face these challenges, firefighters, rescuers, emergency medical responders and civil protection staff, have to implement effective and affordable solutions to support their operations. The DIREKTION project has established and implemented mechanisms and procedures to enhance knowledge sharing by directing the development of innovative technologies answering the needs of practitioners and policymakers. The steering role of international organisations (CTIF, FEU) and end-users in the project guarantees useful and practical results.

The project has started with the deployment of tools assessing the relevance and interoperability of innovative technologies developed by EU Horizon projects. A structured analysis of needs and gaps and the screening of potential solutions has then been undertaken. The procedures has used the outcomes of projects like FIRE-IN, DRIVER+ / CMINE, MEDEA, the pilot for the Network of European Hubs for Civil Protection and Crisis Management and has followed the taxonomy of the EU security market study to ensure a structured use of results. Based on the capability-driven evaluations and a detailed analysis of the opportunities and constraints for the uptake of innovative solutions, DIREKTION has established priorities for future research programming and capacity building. Moreover, the project continues to further establish networking and dissemination opportunities of interest for the DRS community in close collaboration with existing communities of users. They involve industry, SMEs & start-ups, research organizations and practitioners, at EU and national levels. DIREKTION strengthens current practice and future research and innovation planning in disaster resilience.

Introduction

The DIREKTION project, which follows a similar methodology to its predecessor FIRE-IN, aims to address and prioritize capability gaps in disaster management and first responder operations. The structured methodology (Figure 1) begins by establishing a Methodological Framework that defines the tools and processes for identifying these gaps, screening relevant technologies, and assessing the results of our projects.

It is followed by three cycles, each focused on identifying gaps, screening solutions and assessing how well the solutions address those gaps. The first cycle begins with the identification and prioritisation of existing gaps based on desk research, stakeholder inputs and validation workshops. This resulted in a list of 30 capability gaps, prioritised by end-users. This is followed by the 2nd Circle, where the project conducts an in-depth analysis of these gaps, screening potential solutions and examining the drivers and barriers to their implementation. Looking ahead to the future, the 3rd Circle focuses on anticipating capability needs beyond 2035, identifying key technological trends that will shape the next generation of disaster response. Finally, the sustainability phase ensures that the framework remains adaptable and transferable, with ongoing updates and a handover to responder associations for continued use and refinement.

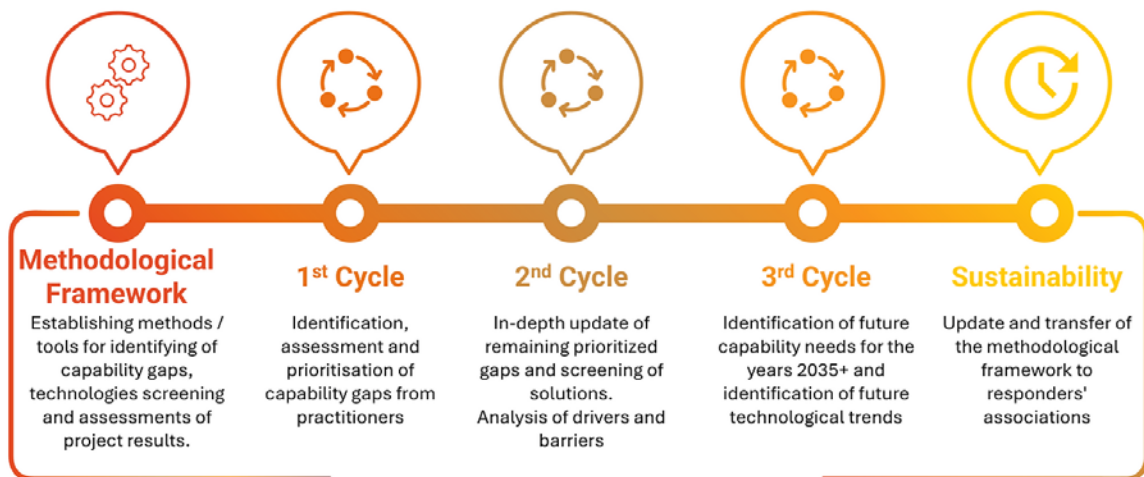


Figure 1: DIREKTION methodology based on the implementation of the framework with 3 circles

This report presents the first cycle of implementation of the screening and assessment of solutions to responder capability gaps using tools developed in the project.

In WP3 “Assessment and validation of current and expected state of the art”, the project screens solutions (e.g., technologies, software or hardware) of any TRL level through a four-step process: interacting with technology suppliers, confirming supplier interest, assessing how well the solutions address the identified gaps, and providing feedback for further iteration. The first cycle deals with market ready or near-market solutions (above TRL-8). It concludes with feedback to WP2 “Screening and mapping of capability needs & gaps”, highlighting gaps that are poorly addressed or not covered by the screened solutions.

The structure of this report (D3.1) includes the methodology, assessment results, analysis of results and feedback to WP2 to initiate the second iteration of screening and assessment of solutions. This iterative approach ensures continuous improvement in addressing capability gaps in disaster management.

Methodology

The methodology for screening and assessing solutions in the DIREKTION project involves two parallel procedures: one focuses on identifying technological suppliers and screening their solutions, while the other involves forming an expert panel to assess these solutions from the end-users' perspective.

1. Identification of Technological Suppliers: A balanced approach was used to connect the providers' and users' domains. The identification of suppliers, included private sector entities, research institutes, and EU project consortia. Tools like CORDIS, the Innovation Radar, the IFAFRI R&D repository, and the CERIS seminars were used to identify relevant research projects and solutions. Since many research projects do not meet the required TRL of 8, the focus shifted to mature solutions from individual technical partners in these projects.

2. Interaction with Suppliers: Communication with suppliers began with an invitation to familiarize them with the project's goals and challenges in solution uptake. Suppliers were asked to confirm their interest in participating and were informed about the DIREKTION Awards for the most innovative solutions (as part of WP5 "Sustainability and impact"). Further engagement involved providing details on the 30 capability gaps (CGs) and the Solution Assessment Tool available in the DIREKTION Assessment and Screening Framework (DASF)¹, which suppliers used to assess how their solutions addressed these gaps. To facilitate understanding, online meetings were organized to support suppliers in completing the tool. A total of 125 potential solution providers were contacted.

3. Formation of the Expert Panel: Concurrently, an expert panel was formed to assess the solutions based on the completed assessment tools. Experts were selected through calls from organizations such as CTIF and FEU, ensuring gender and geographical balance. Each participating organization nominated representatives with expertise in the relevant solution areas. The experts were introduced to the assessment process in a series of workshops. These workshops included discussions of the tools, solution presentations by suppliers, and a consensus-based evaluation process. The expert panel played a critical role in determining how well the solutions addressed the identified CGs.

Solution Assessment Results from the Suppliers' Side

The Solution Assessment Tool DASF from WP1 "Establishing analytical capacity for research programming" is used to gather feedback from suppliers, focusing on the relevance of their solutions to the identified capability gaps (CGs). Upon confirming their participation, suppliers received the DASF Tool, along with a user guide and a project information sheet outlining the expectations and scope of the DIREKTION project. The suppliers also signed a consent form, agreeing that the data provided would be used in the assessment.

The DASF Tool includes five tabs: *Introduction*, *Demand CG1*, *Demand CG2*, *Supply*, and *Solution Uptake*. While the *Demand CG1* and *Demand CG2* tabs are filled out by end-users, the *Supply* tab is for the supplier to complete. The *Solution Uptake* tab is a collaborative section, requiring input from both the suppliers and the end-users. The suppliers provide feedback about their solution's relevance to specific CGs, describe its functionality, and assess aspects such as technology readiness, security, and legal concerns. They are also asked to indicate the Disaster Risk Phase and Task their solution addresses and select up to two CGs it aims to solve.

In terms of results, although 125 suppliers were contacted, only 13 suppliers responded, submitting 16 solutions, with three organizations proposing two solutions each. Out of these, only eight solutions met the high TRL requirement (≥ 8) for the first iteration, as explicitly outlined by DIREKTION. The remaining solutions with lower TRLs will be evaluated in the second and third iteration.

The suppliers provided valuable insights, including identifying which capability gaps their solutions addressed. However, their feedback primarily focused on their solutions' functionalities and readiness, as the ultimate assessment of how well the solutions cover the CGs lies with the expert panel. This assessment from the suppliers helps inform the expert panel's later evaluations

¹ <https://www.direktion-network.org/dasf>

Outcomes, Trends and Innovations, emerging from the First Iteration of DIREKTION, to be widely considered in the DRS Domain

The first cycle of the DIREKTION project, with the screening and assessment of solutions, has provided important insights that highlight key gaps, trends and challenges that will inform the next steps of the project and its future iterations. These findings highlight areas for improvement, both in the methodology of the project and in addressing broader needs within the security sector.

The methodology used in the first cycle was enhanced by the inclusion of an award process in WP5, which successfully generated significant interest from solution providers. However, although this approach raised the profile of the DIREKTION project, the volume of solutions submitted did not meet expectations. While 125 invitations were sent out, only 13 vendors confirmed their participation.

Nevertheless, the first cycle of the project revealed some positive trends that can inform the direction of future assessments. A key finding was that the eight high TRL solutions assessed generally addressed the identified capability gaps in a satisfactory manner. The experts agreed that these solutions could improve first responders' operational efficiency and effectiveness. However, it was clear that more solutions are needed to build a comprehensive understanding of how effectively they address the critical gaps, which will be possible in future cycles as more vendors will be engaged and more solutions evaluated.

Another positive outcome was the strong indication that solutions meet compliance requirements ((Cyber)Security, Interoperability, AI act, Community engagement, GDPR, Fundamental rights, Sustainable Development Goals, National crisis management priorities, Sector specific standards, Sector laws and regulations, etc.), with many solutions demonstrating readiness to meet the required standards. This is encouraging as compliance is a critical factor in the adoption of any new technology in public safety operations. However, while there was general professional confidence in the solutions, a degree of uncertainty remained due to the absence of live demonstrations and the lack of real-world experience with the solutions. Many members of the panel of experts expressed reservations about the ease of use, maintenance requirements, and, most importantly, the compatibility of these solutions with existing systems. Although experts believed that the solutions were likely to be compatible and beneficial, the lack of firsthand experience led to mixed feedback. This highlights a critical area for future improvement: the need for more live demonstrations and pilot programmes that allow experts and first responders to test solutions in operational settings.

On the other hand, a number of challenges emerged from the finalization of the first cycle of the project. The aforementioned, lower than expected, vendor participation, highlighted the challenge of engaging larger companies that may already have well-established customer bases and R&D agendas. In contrast, smaller companies were more eager to participate, seeing the project as an opportunity to expand their networks and showcase their solutions. Going forward, the project may need to find ways to better engage larger companies or broaden its scope to attract a more diverse pool of solutions.

The project's identification of Capability Gaps (CGs) showed that restructuring these gaps into broader categories could be a more effective approach. Narrowing, highly specific gaps may not resonate well with solution providers, particularly in the software domain where such gaps can often be addressed as part of larger, more integrated solutions. On the contrary, specialised gaps related to hardware or materials may offer more targeted opportunities for innovation. By broadening the scope of the CGs, the project is likely to attract more suppliers and provide a clearer focus on the needs of first responders. The aim is to strike a balance between specificity and flexibility, ensuring that the gaps identified are broad enough to encourage engagement, yet focused enough to remain relevant to the needs of the sector.

Another challenge that emerged was the supplier's limited understanding of Technology Readiness Levels (TRLs), which made it difficult to accurately assess the maturity of the solutions being offered. Many vendors were unfamiliar with the TRL framework and solutions often contained multiple components at different TRLs. This led to confusion when attempting to classify the overall maturity of the solution, as well as when assessing the maturity of individual components. This issue suggests that additional clarification and guidance on the TRL would be beneficial for future cycles, to ensure that vendors and evaluators are aligned on how to assess solution maturity.

Another important theme that became apparent from the workshops was the partial coverage of identified needs. While many solutions effectively addressed capability gaps, experts noted that they did not fully meet

the specific needs of practitioners. This highlights the need for further evaluation and testing, particularly in real-world contexts. It is likely that live trials, wider demonstrations and additional information from suppliers will help to clarify how well these solutions will perform in real-world operational conditions. In addition, feedback from the first cycle suggests that future solutions may need to be more adaptable to meet the different needs of different organisations. In some cases, end-users (first responders) may need to work with solution providers to customise or tailor solutions to meet specific operational requirements.

There were also recurring concerns about the ease of use and maintenance of the solutions. These concerns highlight the need for ongoing training and support, particularly when solutions are not widely used or familiar to first responders. Ensuring that users have the resources they need to effectively implement and operate these solutions will be critical to their success.

Looking ahead, the project needs to focus on addressing these challenges to ensure that the next iterations of the DIREKTION project are more effective. A key recommendation is the importance of live demonstrations and pilot programmes. These hands-on evaluations will allow first responders to gain practical experience with the solutions, thereby increasing their confidence in the potential of the technology. In addition, the creation of simulation or sandbox testing environments where users can interact with solutions in a controlled manner prior to full implementation would be an innovative step forward in overcoming uncertainties.

Another key trend that should guide future research is a shift towards more user-centric design. Solutions that prioritise the user experience - ensuring they are intuitive, easy to use and tailored to the specific needs of first responders - are more likely to succeed. This means involving end-users more actively in the development process, particularly in the early stages, to ensure that solutions are truly aligned with their operational needs.

In terms of compatibility, solutions that integrate seamlessly with existing systems and workflows will face fewer barriers to adoption. Modular solutions that can be easily plugged into different platforms and technologies will allow for smoother transitions and upgrades, minimising disruption to ongoing operations. This trend towards greater compatibility and interoperability should be a key consideration for future development.

Moreover, an emerging trend is the increasing emphasis on interdisciplinary collaboration. The challenges faced by first responders often span multiple domains - technology, emergency management and social sciences - and require solutions that address these issues holistically. Future research should foster collaboration between academia, industry and first responders to develop solutions that draw on a wide range of expertise and perspectives.

The project also highlights the growing importance of regulatory compliance, ethical considerations and standardisation in the development of new technologies. With the increasing complexity of technologies such as artificial intelligence and data analytics, it is critical that future solutions adhere to established legal and ethical standards. The development of frameworks to help organisations assess the compliance and ethical implications of new technologies will be important to ensure widespread adoption and integration.

Finally, the trend towards continuous improvement and iteration is critical. Solutions should not be static; they must evolve based on user feedback and changing operational needs. Incorporating agile methodologies into the development process will enable rapid iterations, ensuring that solutions remain relevant and effective over time. In addition, data-driven decision making will play a key role in helping first responders assess the effectiveness of new technologies and identify areas for improvement.

Discover more by reading the full deliverable
D3.1 “Screening of market/close to market solutions” available here:

<https://www.direktion-network.org/results>