



# **Scientific Advice Mechanism**

## **Specifications of work for a Scientific Input Paper**

### **Artificial Intelligence in Emergency and Crisis Management**

*June 2025, Brussels*

Research and  
Innovation

**Specifications of work: Scientific Input Paper on**  
**‘The role and use of artificial intelligence for emergency and crisis management’**

This document explains the rationale behind the request, specifies the evidence needed, defines the type of scientific product required, and frames the questions for the Scientific Advice Mechanism (SAM) to address. It is the outcome of the discussion between DG ECHO and the SAM. It is based on a Background Note drafted by DG ECHO and on the outcomes of a 3-day workshop organised by DG ECHO and held in Brussels on 16-18 June 2025.

**1. Background to the request**

There are many ongoing discussions on how to use AI in emergency and crisis management at both national and European levels. AI is rapidly changing the way that data is collected, analysed and processed. This rapid development of AI has led to a sprawling number of applications and scientific publications in the area of emergency and crisis management. However, literature reviews and evidence-synthesis on the application of AI in crisis management field are limited and fragmented for different hazards or AI technologies.

Currently, the use of AI technologies for analytical purposes and for early warning services in the Emergency Response Coordination Centre (ERCC) is limited. There are discussions to include AI technologies to assist visualisation efforts and facilitate and compile reports in the Global Situation System (GSS). The use of AI within Copernicus Emergency Management Services (CEMS) for drought assessment, and for decision support for wildfires emergency is also being explored. Developments of ongoing initiatives and projects exploring the use of AI for weather forecast models, impact assessments, response operations etc, are also being closely followed. First results from the development of these technologies are expected to be available soon.

Given the recent developments and the plethora of tools, there is a need to **synthesise the evidence on AI performance across different crisis management tasks**; to survey current frameworks for assessing AI capabilities based on different applications; **and outline lessons learned about the current reliability and maturity of such applications** in view of experience from real-world implementation.

The rapid evolution of AI coincides with the major EU regulations on AI and data, such as the AI Act and the General Data Protection Regulation (GDPR), creating both opportunities and constraints for crisis management applications. This regulatory context, combined with the high-stakes nature of emergency and crisis management response, require a careful, evidence-based approach to AI adoption.

**The ERCC is therefore requesting the SAM to deliver an evidence-synthesis report that consolidates current knowledge on AI applications in crisis management and provides frameworks for understanding their capabilities and limitations based on existing literature. This can inform how to advance the integration and use of AI in emergency and crisis management, both for the ERCC and, more generally, for crises centres in Europe.**

## 2. Scope

This evidence-synthesis report aims to provide a broad overview of current knowledge regarding AI applications for crisis management, **with a focus on preparedness and response**, that are relevant for the ERCC's operations.

The report will examine documented applications of AI, develop conceptual frameworks for categorising and analysing the impact of AI based on the available evidence, and identify lessons learned in reported experiences across different applications. The report will consolidate findings from academic and grey literature to provide an overview of the current state of the art.

The context of this work is **focused on Europe**, both in terms of hazard as well as for the regulatory context (e.g., AI Act, GDPR), but **will integrate evidence from international applications where relevant**.

The hazard scope includes natural hazards and may extend to Chemical, Biological, Radiological, and Nuclear (CBRN) risks where evidence exists.

## 3. Questions to be addressed

### Main questions

***Based on the evidence, what are the characteristics, opportunities and risks associated with the use of artificial intelligence in crisis preparedness and response? According to the literature, how can these risks be mitigated?***

This question will require a combination **of crisis management and computational / AI expertise, with behavioural, governance, environmental, ethics and legal research**.

The report should particularly address the following points:

### 1) **Definition and framing of the emerging topic of AI for emergency & crisis management**

- Establish conceptual boundaries and develop a taxonomy for AI in crisis management practice
- Define different AI tools and families of tools in a way that is short and accessible to non-expert audiences; list basic requirements for AI use in crisis management contexts. This should cover, for example:
  - Rule-based systems vs. machine learning approaches
  - Predictive models vs. pattern recognition
  - Decision support tools vs. autonomous systems
  - Large language models and generative AI
- Map out requirements for AI tools to be used in the preparedness and response phases of crisis management, broken down by tasks (e.g., collection, sharing, analysis, reporting, decision-making);
- Highlight evidence and knowledge gaps in the current use of AI in the different crisis management phases.

### 2) **Using AI for crisis management: challenges and potential ways forward**

- Legal requirements, with particular attention to the AI Act as a comprehensive legal framework.
- Governance challenges, especially those relevant to public–private partnerships in the EU context.
- User uptake challenges, including trust dilemmas, explainability and human-AI teaming

- Data-preparedness related challenges, including access (before and during crises), quality standards, availability, and interoperability issues.
  - AI safety
  - Environmental impacts (incl. emissions) of the use and deployment of AI as a trade-off
- 3) **Performance of AI in different tasks related to crisis preparedness and response**, especially for: **(a) Monitoring, predicting and anticipating; (b) Assessing and reporting; (c) Decision-making**
- Compare AI capacity and capability to human-driven processes across dimensions such as accuracy, reliability, speed, and adaptability (using HABA/MABA frameworks); include coverage of hybrid intelligence (human–AI interaction) for the different phases of crisis management, especially preparedness and response.
  - Based on the requirements for AI in crisis management and the capabilities, identify tasks where AI is not currently used or is not (yet) applicable.
  - Provide examples from other sectors to illustrate potential applications that could be mapped across disaster risk management.
- 4) **Case studies**
- Illustrate the potential use of AI (and its limitations) through case studies (to be defined in discussions with ECHO) in specific crisis management tasks or types of disasters (e.g. wildfires, floods, storms, droughts).
  - Compile a (non-exhaustive) list of types of tools that have shown their applicability and/or that are promising for future use (incl. stage of development/TRL and examples of past use cases).
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- 5) **Evidence-based conclusions**
- Summarise key findings from the synthesis in the form of clear, actionable, and evidence-based conclusions.

This list of areas to be covered serves as guidance for the Working Group, which may choose to address these topics through alternative approaches.

#### 4. Process

The SAM will set up a small interdisciplinary Working Group – composed of independent experts - who will develop a synthetic evidence-based report to answer DG ECHO's request. The Working Group will draft the report based on their knowledge in the field, literature reviews, and an expert's workshop to be held tentatively in September. The paper will not be peer-reviewed, and the experts' workshop will also act as a review step in the process, for wider expert validation.

**A first draft report is expected in September 2025, with a reviewed and final version ready by end November 2025**, in time for the next meeting of the UN Global Initiative on Resilience to Natural Hazards through AI Solutions, to be hosted by DG ECHO (B3) in Brussels.