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WORKSHOP REPORT: AI FOR PREPAREDNESS - BUILDING CAPACITY FOR AI-POWERED DISASTER RISK MANAGEMENT

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Townhall Europe
Sq. de Meeûs 5, 1000 Bruxelles

Executive Summary

The workshop aimed to explore the integration and operationalisation of Artificial Intelligence (AI) and Machine Learning (ML) in Disaster Risk Management (DRM). Over 100 participants, including 50 representatives from UCPM Member and Participating States, wide-ranging representation of EU services as well as the private sector, attended panel discussions on the current landscape of AI for DRM. Four technical sessions provided in-depth overview of specific EU-based technologies, such as flagship initiative Destination Earth, developments by the Joint Research Centre and EU-funded projects.

Discussions among participants revolved around identifying critical areas where AI adds value, such as expedited data processing for **improved forecasting, situational awareness, and simulation** as well as applications for AI enhanced response capacities such as **autonomous drones or robotics**. Participants recognised the promising potential of AI solutions but highlighted barriers including the need for **user-friendly designs** and **greater involvement of end-users**, particularly civil protection authorities, in the developmental stages. Moreover, challenges such as varied solution maturity, **procurement complexities**, and **limited awareness of EU support instruments** were identified. The workshop underscored the need for stronger partnerships to bridge the gap between academic research and operational application. Based on these discussions, several areas of follow-up were identified:

- The Commission will explore the possibility of a dedicated **Pre-Commercial Procurement** for innovative DRM solutions (such as AI) to facilitate operationalisation and market uptake;
- An introductory **AI for DRM e-learning course** to address training needs of Member States is already ongoing;
- The workshop sets the stage for ongoing collaboration, which will continue at the upcoming **UN Global Initiative on Resilience to Natural Hazards through AI Solutions meeting, which DG ECHO will be hosting on 11-12 December 2025**.

1. INTRODUCTION

Artificial Intelligence (AI), Machine Learning (ML) and other new technologies have the potential to transform the way disaster risk managers and other civil protection (CP) professionals operate on a day-to-day basis.

The Preparedness Union Strategy states that "the EU's research and innovation sector has an essential contribution to make, allowing continuously adapted, optimised and state-of-the-art responses to crisis." The AI for preparedness activities detailed here contribute to implementing the Strategy's key actions on, among others, foresight and anticipation, population preparedness, public-private cooperation, and crisis response ([1]). The EU's AI Continent Action Plan includes EUR 200 billion to boost AI development in Europe, EUR 20 billion to finance up to five AI gigafactories, and 13 AI factories to support startup, industry, and research activities. The Disaster Risk Management (DRM) Science and Planning working group validated AI/ML as one of the cross-cutting priorities for DG ECHO's research & innovation activities in 2024-2025.

An initial EU scoping workshop was held on 22 October 2024 and marked a first stepping stone in the exploration of the potential of new technologies within DRM for the Commission as a whole. One of the main outcomes identified by participants was a need for capacity-building for the use of artificial intelligence for DRM. Following this, the Commission organised a two-day capacity-building workshop with the objective to:

1. *Showcase concrete EU-based AI and ML tools and applications in the field of DRM which show potential for future operationalisation or uptake; and*

2. *Explore avenues for innovation uptake and integration of new technologies in CP and DRM systems across the Union.*

The workshop was attended by over 100 participants, including 50 representatives from UCPM Member and Participating States and wide-ranging EU services (DGs CNECT, ECHO, HOME, GROW, JRC, RTD, the Research Executive Agency and European Environment Agency) as well as representatives from the private sector. All material shared during the workshop is available on the Union Civil Protection Knowledge Network website.

2. PROCEEDINGS

The workshop was opened by DG ECHO Deputy Director-General Hans Das who set the scene and highlighted the urgent context these discussions were taking place in: an era marked by escalating climate-related hazards, renewed security threats, and increasing budgetary pressures, where innovation is essential for enhancing our efficiency and effectiveness in disaster risk management and crisis preparedness. Artificial intelligence and new technology offer already today powerful tools to improve the efficiency, accuracy, and timeliness of our prevention, preparedness, and response efforts.

2.1. Panel Discussions

Two panel discussions outlined current developments and set the scene for discussions during the technical sessions on the following day.

([1]) See e.g., key actions 1, 3, 12, 26, 31, 36, 48, and 56 in the Strategy's annexed Action Plan.

During the first panel discussion **"EU Institutional Landscape of AI developments for DRM under the Preparedness Union Strategy"** different Commission Services and Agencies presented their work on integrating AI into DRM/CP-relevant portfolios.

- Charalampos Tsitlakidis, Head of Sector **DG CNECT.C.1**, introduced the Destination Earth (DestinE) flagship initiative;
- Alessandro Carrotta, Policy Officer **DG ECHO.B.2** introduced the Preparedness Union Strategy highlighting its aspects on public-private cooperation;
- Christina Corbane, Deputy Head of Unit **DG JRC.E.1**, outlined ongoing efforts within the Joint Research Centre on the development of AI tools and presented a new policy brief on AI approaches for DRM;
- Rodrigo Gutierrez-Dominguez, Head of Sector at the **Research Executive Agency**, gave an overview of recent project funded under Horizon Europe which explore AI dimensions for disaster preparedness and response; and
- Eva Ivits, Expert at the **European Environment Agency**, presented the upcoming European Climate Risk Assessment and how it will be supported by new technologies such as the Destination Earth initiative.

The second group of panellists focused on **"From innovation to market: Integrating public and private initiatives into action"**.

- Cesare Dunker, Policy Officer **DG GROW.H.2**, presented developments in the field of industrial AI, competitiveness potential and barriers in Europe;
- Elena Xoplaki, Vice Chair of the **UN Global Initiative on Resilience to Natural Hazards through AI Solutions**, presented ongoing work of the Global Initiative particularly on international standardisation efforts;
- Alessandro Paciaroni, Public Sector Innovation Expert at Horizon Europe project **TEMA**, spoke about capacities and capabilities necessary for public sector uptake of AI for DRM;
- Jussi Sainio, Senior Project Manager for Natural Catastrophe Solutions at **ICEYE,** presented the company's solutions particularly for flood and wildfire monitoring and impact assessment; and
- Julia Gottfriedsen, Head of Data Science & AI at **OroraTech,** presented commercially developed wildfire detection, monitoring and modelling solutions.

On the last day of the workshop a final panel outlined **next steps for the DRM Science and Planning Working Group** of the Union Civil Protection Knowledge Network Board:

- Jaime Abad Perez, Scientific Analyst **DG ECHO.A2,** presented activities for the integration of AI in the Global Wildfire Information System (GWIS) and further development of the system;
- Giannis Skiadaresis, Policy Officer **DG HOME.F2,** outlined Commission tools and support instruments for innovation uptake for DRM such as Pre-Commercial Procurement (PCP) and Public Procurement of Innovative Solutions (PPI);
- Juha-Pekka Jäpölä, Project Officer **DG ECHO.B3,** presented updates on past and upcoming deliverables under the working group.

2.2. Technical Sessions

The core part of the workshop consisted of four Technical Sessions during which participants gained more in-depth understanding of how specific EU-based new technologies can support and fill gaps in disaster management operations.

Two technical sessions covered advancements of DG CNECT's **flagship initiative Destination Earth** (DestinE), organised in collaboration with the three implementing entities, the European Centre for Medium-Range Weather Forecasts (ECMWF), the European Space Agency (ESA), and the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT). The first of these introduced attendees to the **DestinE Digital Twins and their potential applications in disaster management**. Presentations highlighted examples from extreme weather and floods, exploring how AI can contribute to predicting hydrologic extremes, anticipating cascaded-event scenarios and supporting urban health initiatives. The session concluded with a discussion on the integration of ML tools into DRM, identifying needs for future advancements.

The second session presented **ongoing and future AI activities on the DestinE platform**. Participants learned about the platform's tools for early detection and damage assessment, including interactive training of an AI model for ad-hoc purposes. They also explored the benefits of DestinE edge services for application development, such as cloud forecasts based on Earth observation and the DestinE digital twin of extreme-weather events. The session featured user feedback on data portfolio and platform services, identifying opportunities for enhancing AI applications in assessing events like droughts and improving geo-spatial analysis capabilities.

In the technical session run by DG JRC, participants explored the transformative potential of AI, particularly **Large Language Models (LLMs) and Explainable AI (XAI)**, in constructing and analysing disaster narratives. Colleagues presented AI tools currently under development by DG JRC. The discussion centred on expert validation of AI-generated causal graphs and the importance of maintaining human oversight in AI-driven processes. Practical applications of AI in accelerating data analysis and modelling agricultural risks were demonstrated, emphasising transparency and ethical considerations.

The final technical session, "Innovative Solutions for DRM Developed by EU Funded Projects and Member States", showcased **successful projects utilising AI to improve disaster resilience and preparedness**. Projects discussed included:

- Horizon Europe funded **C2IMPRESS** developing a System-of-Systems for Multi-Hazard Risk Intelligence Network platform;
- UCPM funded **SAFE-LAND** developing an AI-supported landslide risk assessment tool;
- The French National Fire Officers Academy and Entente Valabre presented ongoing initiatives on AI tools to, for example, predict operational pressure and efforts to support AI uptake in the national system;
- Horizon Europe project **CARMA** developing semi-autonomous and autonomous UGVs capable of working in symbiosis with humans to support and supplement first responders; and
- Horizon Europe project **SYNERGISE** developing an integrated toolkit for collaborative response and enhanced situational awareness.

Participants examined how these projects harness AI technologies for response efficiency, enhanced situational awareness, and multi-hazard risk governance, reinforcing the importance of strategic partnerships and citizen engagement.

3. BREAKOUT DISCUSSIONS

On the last day of the workshop participants were asked to reflect on the input provided along four guiding questions to help identify gaps and shape the next steps to be taken.

1. In the context of the Disaster Risk Management cycle, where do you see AI adding the most value? What are the **main gaps that it could fill**? What, in your experience, are the **main challenges and barriers** to using AI and/or integrating into your work?
2. Do you see **potential for any of the presented solutions** to be taken up in your national systems and why? If not, what is the barrier?
3. Are you familiar with the presented **EC tools to support innovation uptake**?
   How would you integrate and procure innovative solutions in your national systems? What assistance would you need from the COM in this regard?
4. The COM is planning to develop an introductory **e-learning course on AI for disaster preparedness**. How should this course be designed to have the biggest impact (target audience, topics covered, etc.)?

Discussions centred around the following themes:

3.1. Areas of potential

Participants identified several key areas where AI may bring the biggest added value, such as by providing faster **processing of large data sets** to improve **forecasting and early warning** capacities, **situational awareness, impact and damage assessment**, **hazard simulation** and evolution and **scenario building**. Several other technologies would benefit from being enhanced by AI such as **autonomous drones and robotics**, response vehicles and equipment, such as firefighting planes or pumps. Furthermore, **knowledge management** could be enhanced with the use of AI to overcome the fragmentation of knowledge and information, for example, through the creation of a Large Language Model (LLM) focused on CP and DRM.

Participants noted that the solutions presented over the two days of the workshop are promising and present real avenues to fill existing gaps in national and European CP and DRM systems. They emphasised appreciation for showcasing examples and use cases to illustrate the concrete usability of solutions in operations.

3.2. Challenges in operationalisation

However, several challenges were identified which inhibit stronger uptake of new solutions. A stronger focus on the target audience already during the development process will help to deliver solutions that are fit-for-purpose. **End-users,** like civil protection competent authorities in Member or Participating States, **should be involved from the early stages of product development** and not only in the final testing phase. Ensuring that systems are understandable and usable by operational staff who do not have AI expertise is vital. A key issue for the uptake of AI solutions remains the **ethicality, explainability** and security issues of the employed tools. Participants highlighted a need for clear guidance, through regulatory frameworks such as the AI Act.

Participants highlighted that there are many solutions available on the market, however, they vary vastly in their level of maturity and potential for operationalisation. **Identification of the correct solution** to fill a concrete gap remains challenging. Further **guidance at European level on the procurement of innovative solutions** as well as mapping of existing solutions and the identification of good practices could be beneficial.

The presented Commission-funded avenues to support innovation uptake, specifically **Pre-Commercial Procurement (PCP) and Public Procurement of Innovative Solutions (PPI)**, are well placed tools that have the potential to facilitate uptake of new solutions, such as AI for DRM applications. However, awareness of these tools in Member and Participating States remains limited. Simpler and more targeted communication around these tools would be beneficial. While being a suitable avenue to stimulate fit-for-purpose development and future uptake of solutions, current funding opportunities for DRM related tools and systems through PCP are limited.

3.3. Possible solutions

Participants identified a **dedicated PCP procedure for DRM as a suitable avenue to de-risk the development of new technologies and facilitate their uptake** into national systems. Such a procedure should result in new tools and systems which may be of use on a European level and priorities for it should be set in conjunction with Member States.

Training was identified as another important step towards AI integration in national systems. To date there is no dedicated training on AI applications for DRM. Following the identification of this gap in a previous scoping workshop on the topic, the Commission is now aiming to develop an introductory course. Discussion around this potential **e-learning course on AI for DRM** resulted in a preliminary draft including topics, audience and structure recommended by participants. Participants noted there should be a focus on concrete examples and use cases to make the course as impactful as possible and expressed policymakers as the desired target audience.

4. CONCLUSIONS AND NEXT STEPS

During the workshop participants were introduced to key initiatives and projects at European level, aiming to drive forward AI applications for CP and DRM. Participants expressed appreciation for the presented tools and how they may fill gaps in CP systems across the Union. While many of the presented tools are promising, significant challenges remain.

The **gap between academic actors and operational staff** in Member States persists. Closing this gap by involving end users from the beginning stages of product development would result in solutions being designed fit-for-purpose. A **lack of training**, insufficient budgets and an increasingly demanding and **changing risk landscape** deter from high-risk investments into the procurement of innovative solutions by authorities in Member States.

An **introductory e-learning course on AI applications for DRM** is already under procurement by the Commission. This course will be aligned with the priorities laid out by representatives at the workshop and aim to provide a starting point for staff at all levels to familiarise themselves with AI and its areas of applications for DRM. Further modules on specific areas of application may be designed depending on interest of Member States.

The Commission will also explore the possibility of opening a dedicated **Pre-Commercial Procurement** for DRM. In such a procedure innovative solutions could be further developed and operationalised, de-risking the development for individual Member States and providing a first step towards market integration.

To continue the exchange with relevant stakeholders and bring in further contributions also from the private sector, academia and the public, DG ECHO will host the upcoming **meeting of the UN Global Initiative on Resilience to Natural Hazards through AI Solutions on 11 – 12 December 2025 in Brussels**.