EUROPEAN COMMISSION
DIRECTORATE-GENERAL FOR EUROPEAN CIVIL PROTECTION AND HUMANITARIAN AID OPERATIONS (ECHO)
Strategy and Policy
Prevention and Preparedness Capacity Building

Brussels
ECHO.B.3/EM/AB

WORKSHOP REPORT: ARTIFICIAL INTELLIGENCE FOR DISASTER RISK MANAGEMENT

22 October 2024
09:00 – 12:45
Room SICCO MANSHOLT, Charlemagne

1. INTRODUCTION

On 22 October, the European Commission (DG ECHO) held a scoping workshop on the use of Artificial Intelligence & Machine Learning (AI & ML) for Disaster Risk Management (DRM), under the umbrella of the UCPM Knowledge Series. **AI & ML have the possibility to become true force multipliers for the UCPM and DRM once fully realised.** Tapping into their potential opens possibilities to enhance our understanding of natural disasters and improve the level of preparedness in Member and Participating States and the Union as a whole, for example in early warning systems or forecasting. However, AI & ML are not yet part of the modus operandi in DRM.

Based on this premise, the objectives of the workshop were to:

1. *Present the state of the art in AI & ML initiatives from the EU side that are particularly relevant for DRM; and*
2. *Discuss what does the future hold and what is needed to make the most of these technologies to advance the DRM agenda.*

The workshop was attended by over 50 colleagues in person from various European Commission services, such as DGs CNECT, ECHO, HOME, JRC, and RTD, as well as external participants. Additionally, 100 persons joined the panel sessions of the workshop online. The recording of the workshop is available on the webpage of the streaming service of the Commission.

2. PANEL SESSIONS

The workshop was opened by **Erwan Marteil**, Head of Unit DG ECHO.B3, who welcomed the participants and set the stage for the discussions. Two panel sessions introduced the state of the art in AI for DRM is. The first panel presented an overview of the formal landscape and some key European Commission initiatives on the topic. **Martin Bailey**, Head of Unit DG CNECT.A5, discussed the European AI Office's role in implementing the AI Act and fostering the development and use of trustworthy AI, **Andrea Toreti**, Team Leader DG.JRC.E1, presented the "UN Focus Group on AI for Natural Disaster Management", highlighting the collaborative initiative's background and

outcomes, such as the standardization roadmap. Lastly, **Stephan Siemen**, ECMWF, introduced Destination Earth, a flagship initiative of the European Commission to develop a digital model of the Earth to model, monitor and simulate natural phenomena, hazards, and the related human activities.

The second group of panellists then introduced several use cases which already integrate AI into DRM. **Michele Ronco**, DG JRC.E1, showcased how AI and ML advancements enhance, for example, drought risk evaluations, predict food crises, and bolster wildfire response systems. **Elena Xoplaki**, Justus Liebig University Giessen, presented the Horizon Europe project MedEWSA, the objective of which is to reduce the vulnerability of local communities to hazards and create a suite of comprehensive AI-based products for innovative forecasting and impact assessment. Furthermore, **Francesco Focacci**, Università eCampus & **Francesco Pistolesi**, University of Pisa, presented on the UCPM Prevention & Preparedness project MEDEA, which is building an AI-combined system to estimate earthquake-related losses & damages along with their psychological consequences.

Slide by Michele Ronco on the application of AI tools in DRM

The workshop also included a commentary from the ERCC Analytical Team, Team Leader **Spyros Afentoulidis**, DG ECHO.A2, who commented on the different initiatives from a UCPM perspective and introduced needs from an operational viewpoint.

3. BREAKOUT SESSION

Following the panel sessions, participants were divided into breakout groups to draft follow-up recommendations, discussing a range of guiding questions.

The participants highlighted the importance of harnessing the potential of AI/ML in DRM by building capacity to understand AI risks and principles at all levels and streamlining AI/ML activities and projects. **To achieve this, it is essential to provide more training materials, open resources, and co-designed EU learning materials, as well as to develop explainability of AI outputs, guidelines, and criteria for AI-based models.** AI has the potential to support the fundamental democratisation of the access to data which will allow well-trained personnel to locally access data to enhance their decision making without dependency on institutionalized scientific centres. Participants highlighted the importance of further developing Destination Earth and its components.

However, the workshop also identified several challenges that need to be addressed, including uncertainty quantifications, the importance of explainability, trust and considering artifacts of AI generated outputs. To mitigate these risks, it is necessary to manage data gaps, balance stakeholder engagement and transparency, and control bias in AI models and algorithms. **Additionally, the need to invest in necessary computing power was highlighted as well as the responsibility to support actors with limited resources.** Several ethical considerations were also raised, such as the limits we should set on AI-powered data collection and analysis, for example, with regards to psychological vulnerabilities or the economic impact on areas when declared exposed to specific risks.

The workshop highlighted the importance of ensuring trustworthiness of AI models for both scientists/decision-makers and citizens, acknowledging and checking biases in AI models, and validating data and accounting for extreme events. Several methods for controlling bias were brought forth by the participants such as reinforced learning, agent based modelling and statistical approaches. By addressing these challenges and opportunities, the Commission can harness the potential of AI/ML to enhance DRM and ultimately save lives.

In terms of partnerships and capacity building, participants emphasized the need to engage with relevant stakeholders, including the private sector and research institutions, and to foster public-private partnerships. However, competition between major private companies was noted as a challenge for engaging in public-private partnerships. Supporting open data and common standards for DRM data, as well as incentivizing private sector investment in AI, new technologies and capacity building, are also crucial steps. **Additionally, developing interfaces easily handled by authorities and addressing the lack of capacity are essential to accelerate AI uptake in the public sector.**

4. OUTCOMES AND FOLLOW-UP

The workshop provided fruitful ground for a first discussion on the topic within DG ECHO, in consultation and collaboration with colleagues from different Commission services. It is clear, that further conversation will be needed to identify the most promising avenues to integrate AI and new technologies into DRM frameworks and into the work within DG ECHO and beyond.

Participants highlighted a need for more training materials, open resources, and learning opportunities. As a first step, several existing resources have been highlighted on the newly created Artificial Intelligence for DRM Knowledge Page on the UCPKN website.

Organizing follow up events or workshops to build and engage stakeholders within and outside the Commission was identified as a possible area of intervention for the Knowledge Network. For example, integrating a higher-level event on AI in conjunction with meetings of the new Global Initiative on Resilience to Natural Hazards through AI Solutions – possibly in the second half of 2025. In addition, follow-up could also take the form of an introductory training on AI tools and resources targeted at civil protection professionals.