

TRUSTED  
EXTREMELY PRECISE  
MAPPING AND PREDICTION  
FOR EMERGENCY  
MANAGEMENT

# Deliverable 7.7: First report on dissemination and communication activities, clustering, and standardisation recommendations

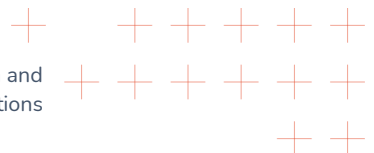




# Project Information

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D7.7 - First report on dissemination and communication activities, clustering and standardisation recommendations			
<b>Executive Summary:</b>	This public deliverable presents a detailed report on the activities and key performance indicators (KPIs) for the Horizon Europe project TEMA, during the first 18 months (M1-M18) of the project (December 2022-May 2024).		
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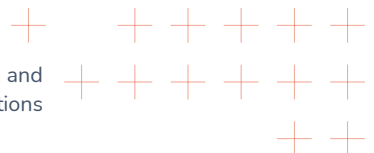


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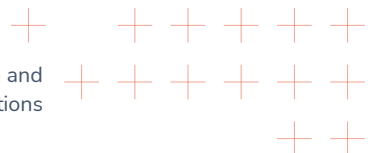
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4	ATOS IT SOLUTIONS AND SERVICES IBERIA SL	ATOS IT	ES
4.1	ATOS SPAIN SA	ATOS SP	ES
5	UNIVERSIDAD DE SEVILLA	USE	ES
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9	THE LISBON COUNCIL FOR ECONOMIC COMPETITIVENESS ASBL	LC	BE
10	LATITUDO 40 SRL	LAT40	IT
11	NELEN & SCHUURMANS TECHNOLOGY BV	NS	NL
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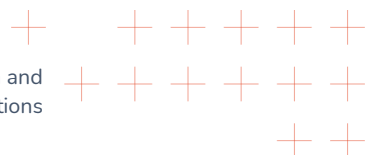
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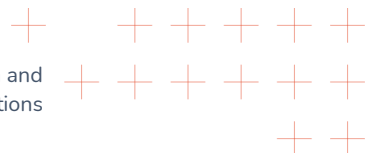
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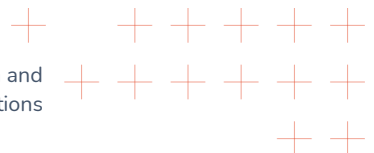


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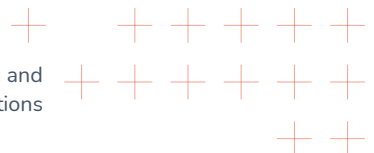




# List of Terms and Abbreviations

Abbreviation	Description
CPA	Civil Protection Agency
CREXDATA	Critical Action Planning over Extreme-Scale Data
CTA	Call to Action
DCP	Dissemination and Communication Plan
EU	European Union
EMS	Emergency Management Service
ExtremeXP	EXPeriment driven and user eXPerience oriented for eXTremely Precise outcomes and decisions
GDACS	Global Disaster alert and Coordination System
HCI	Human-computer interaction
HE	Horizon Europe
interTwin	An interdisciplinary Digital Twin Engine for science
IR	Infrared
KPI	Key Performance Indicators
RGB	Red, Green and Blue
SEO	Search Engine Optimisation
TEMA	Trusted extremely precise mapping and prediction for emergency management
XAI	Explainable Artificial Intelligence

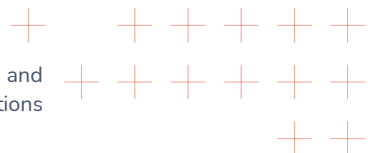
Table 1 - List of Terms and Abbreviations





# Executive Summary

This public deliverable presents a detailed report on the activities and key performance indicators (KPIs) for the Horizon Europe project TEMA, during the first 18 months (M1-M18) of the project (December 2022-May 2024). It covers the progress in implementing the project's planned activities, including outreach initiatives, stakeholder engagement, and emphasising on clustering and early actions in standardisation. The report highlights significant achievements and milestones reached during the reporting period and provides an in-depth analysis of the KPIs that gauge the effectiveness of these efforts. It offers stakeholders a clear view of the project's progress, including refined outreach methods, adjusted communication tactics, and optimised stakeholder engagement strategies aligned with the project's goals and objectives. Overall, this deliverable is a valuable resource for stakeholders, offering transparency on project progress and performance metrics, thus driving TEMA towards its intended outcomes. The current version consists an updated version of the initial report submitted on May 2024, containing corrections and updates as requested by the project reviewers during the first technical review meeting.



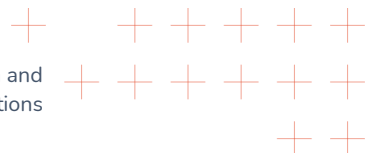


# 1 Introduction

This public document presents the reporting of dissemination and communication activities led in the TEMA project, during the first 18 months (M1-M18) of the project (December 2022-May 2024), based on the dissemination and communication plan (DCP).

It thus reflects the efforts of the project consortium partners into ensuring the proper communication of the project in order to inform, promote and communicate the activities of the project to the targeted audiences through a strategy for engagement with stakeholders and enlargement of its stakeholder database through multiple communication channels. It equally outlines the dissemination activities directed at specific stakeholders who can benefit out multiply the impact of the project and its sustainability, focusing on the strategies for making knowledge developed in the lifespan of the project available through its research outcomes and results of activities.

In this sense, this deliverable is structured into four main sections: this introduction constitutes section one, the second section is the presentation of the Dissemination and Communication Plan (DCP), which presents the objectives of dissemination and communication activities and the monitoring of their success through the Key Performance Indicators and description of means; the third section presents the development of standardisation and clustering activities that contribute to the synergies with other European initiatives and brings more impact potential to the project's outcomes; section four concludes and summarises the document.





# 2 Dissemination and communication plan

This project deliverable presents the first report on DCP. The DCP is the result of the work carried out by the Work Package leader in collaboration with the other partners in the first 18 months of the project's lifespan.

The DCP guides the effective communication and dissemination of project progress and outcomes, which contribute to the definition of the exploitation of results. It presents the achievements of the project's strategy for raising awareness and engaging stakeholders in the project's activities, outlining the specific actions for each target audience. It underscores the active involvement of TEMA in utilising communication tools and dissemination channels to create impacts that are consistent with the project's objectives and goals.

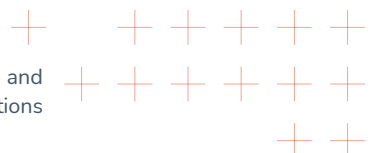
The success of the DCP implementation relies on the engagement of target audiences across various communities to bolster knowledge sharing and the dissemination of results and ultimately ensure the exploitation of the project's results to positively impact society in alignment with the European Union's objectives. The means for dissemination and communication encompass various means of information dissemination, such as publications, exhibitions, conferences, workshops, seminars, press releases, promotional materials, and dedicated website and social media channels that work in favour of the project's visibility.

## 2.1 Objectives and Key Performance Indicators

The dissemination and communication plan's main objective is to:

raise awareness on TEMA by communicating the project developments and engaging its stakeholders to maximise the impact of the project by laying down the foundation for the effective dissemination of the project's results and the use thereof for the benefit of society.

The components part of DCP, namely the communication, dissemination, and exploitation, is aligned with the overall work led in Work Package 7 of the project, as proposed in its strategy:



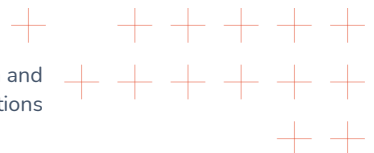


to effectively communicate the project’s concept, developments and findings to identified stakeholders while integrating feedback from relevant communities;

to create and disseminate scientific contributions;

to collaborate with other European projects, to participate in appropriate events, to address future adoption and ensure sustainability of the project results by developing close collaboration and alignments with standardisation bodies and policymakers.

In order to monitor and ensure the accomplishment of such objectives, the project has defined the Key Performance Indicators (KPIs). They are organised according to specific targets in Table 2:



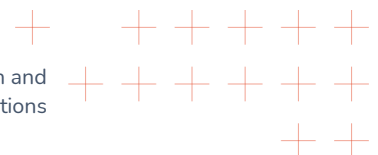


Measure	Indicator	Target	Reporting period 1 (M18)	Gap to target	Completion percentage
Scientific and technical publications	Keynote talks	>10	5	-5	50%
	Tutorials and review articles	>4	1	-3	25%
	Research articles	>40	13	-27	32.5%
	Conference tracks	>6	7	+1	116.6%
	Journal special issues	>3	0	-3	0%
Website	Users	>15000	10219 unique visits	-4781	68.1%
Social Media	Followers	>800	LinkedIn: 236	-442	44.75%
			X: 99		
			Mastodon: 9		
			YouTube: 14		
YouTube presentation videos	Views	>5000	95 (3 videos)	-4905	1.9%
Community	Newsletter editions	4	1	-3	25%
Events	Events organised with other EU projects	>3	4	+1	133.3%
	Workshops organised	4	5	+1	125%
Knowledge sharing	Policy briefs	1	0	-1	0%
	Students enrolled to a TEMA-related course	>20	Two courses: (26 + 66)	+72	460%

Table 2 - TEMA Key Performance Indicators for dissemination and communication activities

As presented in Table 2, TEMA 's DCP has allowed for the achievement of many of the KPIs, whilst others shall follow a structured and tailored strategy until the end of the project for achieving the targets.

A set of communication materials have been developed for supporting the awareness of the project and engaging stakeholders in multiple channels to facilitate the dissemination of TEMA 's





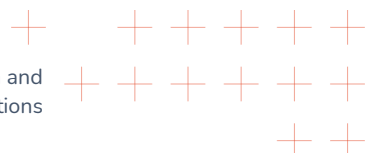
developments and results through the project’s lifespan. Namely, in the first year of the project, the communication material developed refer to the creation of a TEMA branding, which was transmitted along the establishment of the project’s presence in the form of a [website](#), social media channels, [dissemination materials](#) including a project introduction PowerPoint, flyers, banner, poster and brochure, as well as [YouTube videos presenting the project](#).

## 2.2 Dissemination

The dissemination activities refer to the sharing of knowledge and the results of the project towards stakeholders, in order to maximise the impact of the project's outcomes in society. This section is dedicated to the reporting of such activities that were hitherto led, presenting the different forms of dissemination and communication to stakeholders that have contributed to the achievement of the KPIs presented in section 2.1.

During the initial awareness (M1-M12), the different means of communication target a general audience, raising awareness about the issues the project addresses and the scientific and technical means of the project to address them, which were linked to the broader European and international agendas.

In order to attract stakeholders to the project’s website, the consortium developed an editorial calendar to ensure the constant update of the website's content relying on partners expertise and work in the project, which resulted in 51 blog posts related to natural disaster management in the scope of the project as well as specific posts about the project meetings and advancements. All blog posts can be accessed through the dedicated website page “[Articles](#)”.



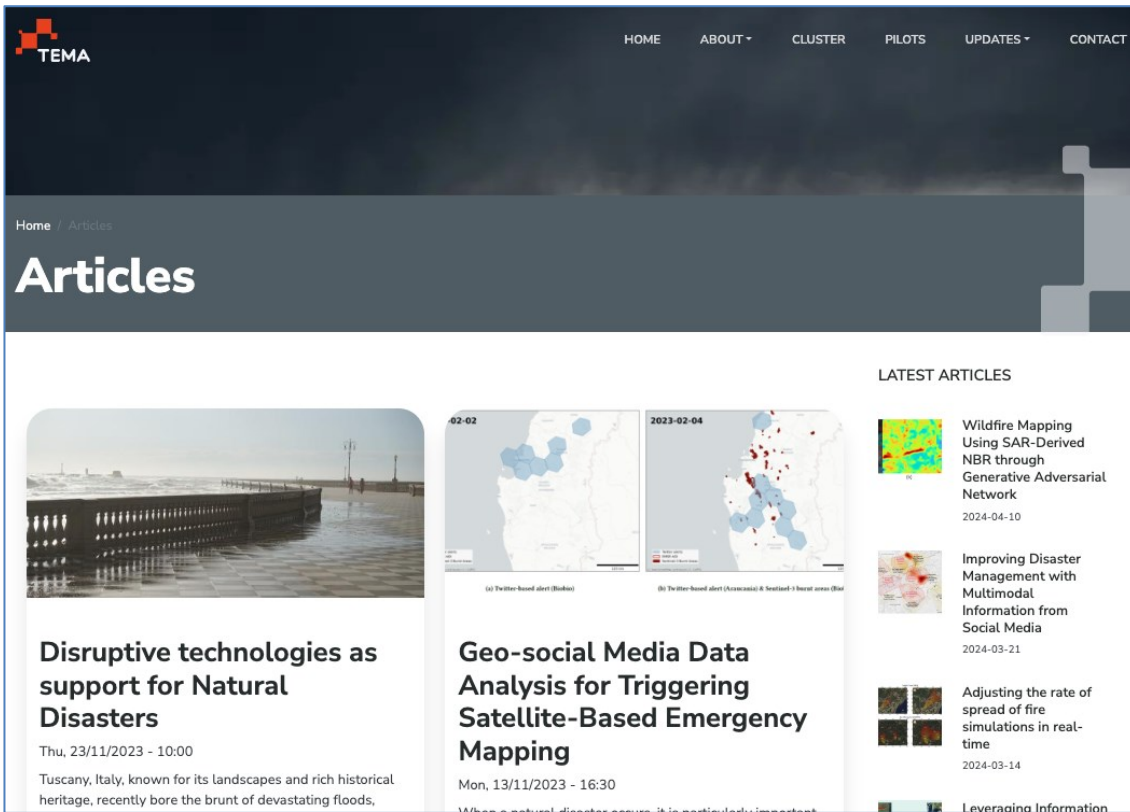


Figure 1 - Blog posts on TEMA website

A sample of blog posts published on the website is presented in Figure 1 above.

The articles produced for the website benefited from an SEO strategy, which included in each one of them the key words for search engines optimisation. They were equally shared on the project's social media.

During the same period, project partners attended and organised events and conferences, in addition to giving keynote talks in some of them. In total, partners attended **eleven events** and **three conferences**, and in **five of them partners gave a keynote talk**. **TEMA partners equally participated in five conference workshops organised in peer-review and four joint events with other EU projects**. On the project's website, a [dedicated page](#), which is regularly updated, provides information on the events and conferences attended and organised by the project partners.

As the TEMA project progresses, participation in upcoming events remains a vital component of our dissemination and engagement strategy. These events provide platforms for networking, knowledge exchange, and showcasing our project's advancements to a wide audience, including policy makers, academics, industry professionals, and the general public.



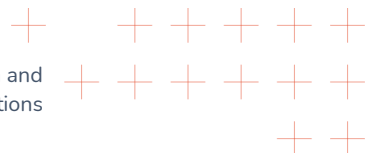


Participation in these events is crucial for several reasons:

1. **Networking Opportunities:** These events bring together experts and stakeholders from various fields, providing invaluable opportunities for networking. Engaging with other professionals fosters collaboration and the exchange of ideas, which can lead to new partnerships and innovative approaches.
2. **Knowledge Dissemination:** Presenting at conferences and workshops allows TEMA partners to share their latest research findings, methodologies, and technological advancements. This dissemination is essential for advancing the field of natural disaster management and for ensuring that the project's innovations reach a wide and relevant audience.
3. **Visibility and Recognition:** Being actively involved in prominent events helps raise the profile of the TEMA project. It demonstrates the project's commitment to contributing to the scientific community and highlights its role in addressing critical issues in disaster management.
4. **Feedback and Improvement:** Presenting at these events provides an opportunity to receive feedback from peers and experts. This feedback is invaluable for refining research and improving project outcomes.

A comprehensive list of future and past events and conferences attended, as well as scientific articles and news items published, can be found in Annex A.

By the end of the first year, the first newsletter of the project was disseminated containing the project's main achievements, such as the mass data collection and updates on the multi-tech architecture developed under Work Package 2 and the market detection for technological tools developed under Work Package 7. The scientific and technical developments and next steps were included in the newsletter, as well as featuring blog posts and events.



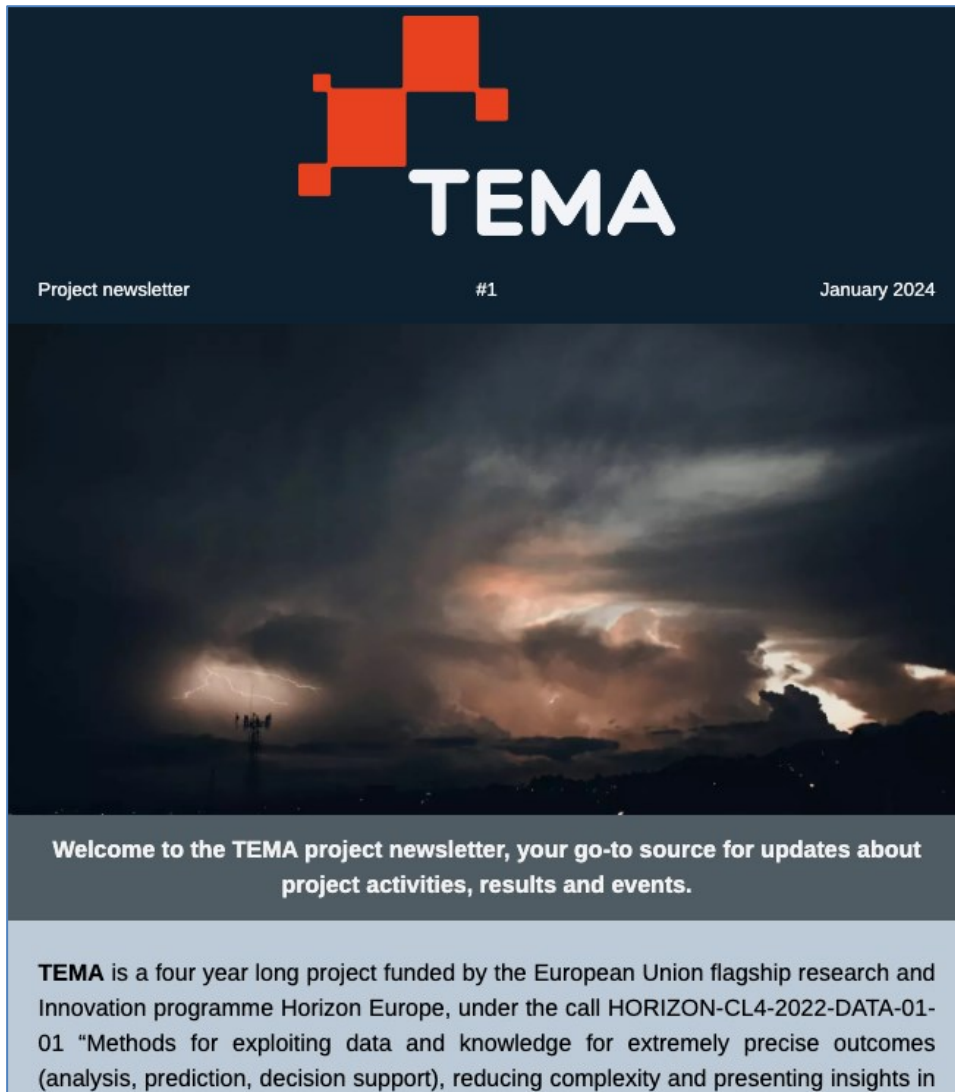
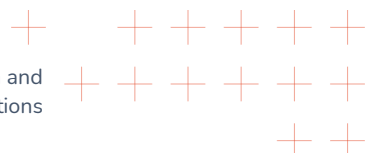


Figure 2 - Extract from TEMA newsletter

### 2.2.1 Dissemination to policy makers

The dissemination to policymakers during the “initial awareness” phase brought awareness of the project’s activities through the dissemination of specific international policy-related blog posts shared both on the project's website and social media channels as well as through the promotion of the TEMA in events where policymakers were part of target audiences.

During the first months of the second year, the dissemination has sought to raise awareness among policymakers through communication and dissemination strategies related to “interoperability”. A specific communication campaign was carried out through social media channels and a blog post





with a duration of seven weeks in order to present interoperability as a way of thinking, state of play of interoperability governance and present TEMA as a project based on interoperability, as the subject strongly relates to digital public services and cross-border cooperation, both related to TEMA 's development and results. The campaign was led benefiting from external resources such as available articles as well as internal drafting of specific contextualisation and conceptualisation of the topic. It took into consideration interoperability as a “hot topic” due to the policy and regulation discussions on the “Interoperable Europe Act” and led to the development of an article on “Interoperability Governance in Emergency Services in the European Union”.

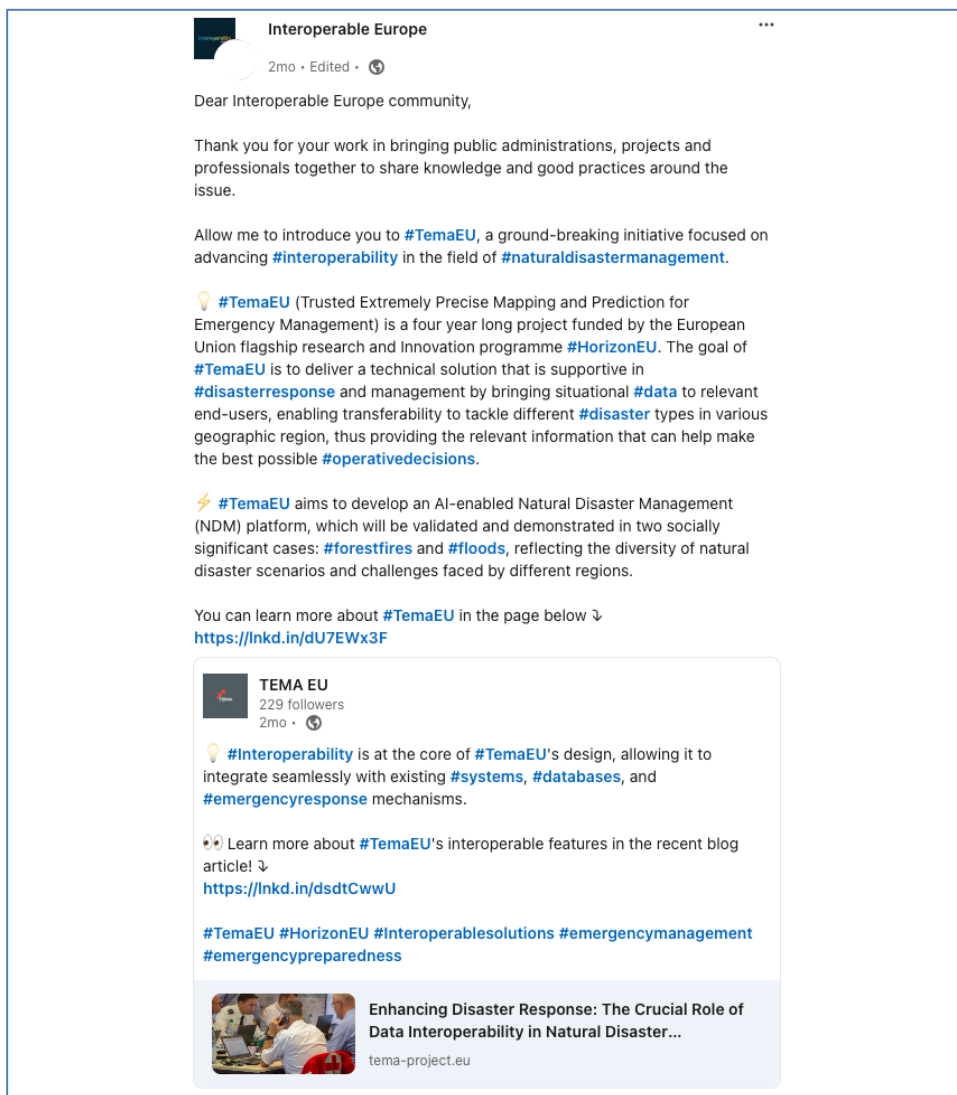
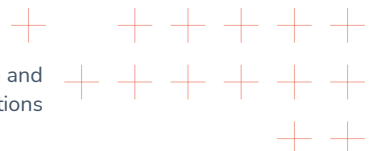


Figure 3 - LinkedIn post presenting TEMA in the “Interoperable Europe” LinkedIn group





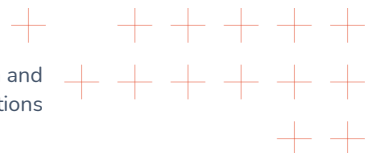
### 2.2.2 Scientific and technical dissemination

TEMA's efforts for the scientific and technical dissemination has taken place through active **participation in significant events and conferences** in the fields of disaster risk management, civil protection, Explainable AI (XAI), Big Data, amongst other related subjects. The participation in events and conferences allows partners to share components of the TEMA project with scientific and technical added value with other stakeholders from the scientific community, facilitating dialogue and networking with experts and relevant stakeholders. In addition, **scientific articles published by partners in journals or presented as conference papers** contributed to the dissemination of scientific and technical knowledge. Consortium partners have equally engaged the scientific community through the organisation of workshops and short courses, such as the CVML Programming Short Course and Workshop on Deep Learning and Computer Vision 2024, and the Short Course on Big Data Analytics for Natural Disaster Management 2023.

TEMA has actively utilized blog posts as an essential communication tool to share insights, progress, and achievements related to its scientific and technical activities. These posts highlight key project milestones, pilot implementations, and the advanced use of AI, Explainable AI (XAI), Big Data, and other technologies in the field of natural disaster management. By publishing regular updates, the blog engages a wide range of stakeholders, including civil protection agencies, policymakers, and members of the scientific community, offering detailed information on the development and application of TEMA's innovative tools and technologies.

In addition to blog posts, TEMA's scientific publications and datasets are critical components of its dissemination strategy. Partners have published numerous research articles in leading journals and presented findings at major conferences, contributing significantly to the body of knowledge on disaster risk management and big data applications. These publications, along with the datasets generated throughout the project, are openly accessible through the [TEMA Zenodo community](#), ensuring that valuable resources are available to researchers, policymakers, and other interested stakeholders.

As part of its commitment to transparency and knowledge sharing, TEMA has also made available its key outputs on the project website. The "Outcomes" page includes two tabs: "[Datasets & Publications](#)," where visitors can access the project's scientific publications and datasets, and "[Deliverables](#)," which contains the three deliverable reports published on the CORDIS website for project 101093003. These resources offer an in-depth view of the project's progress, milestones, and contributions to the field.



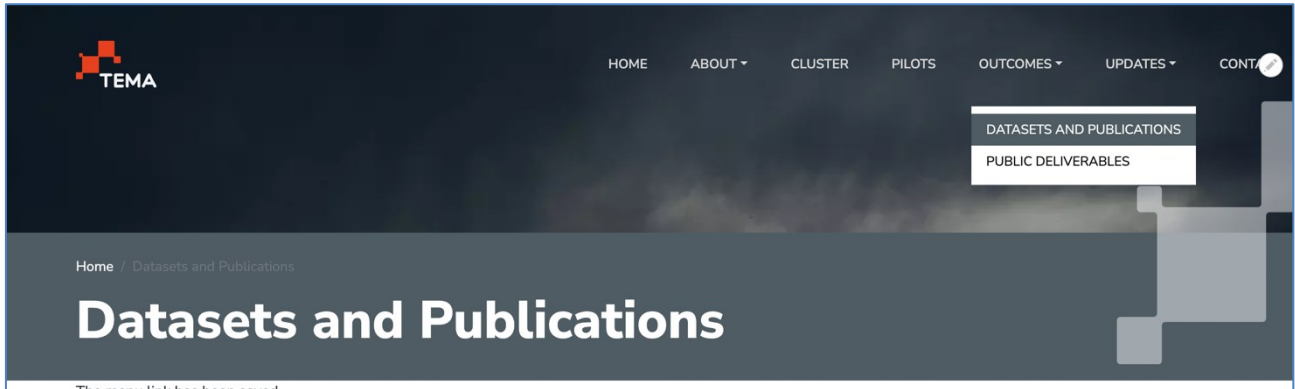


Figure 4 - TEMA Datasets and Publications

### 2.2.3 Private sector dissemination

The dissemination towards the private sector will be more active after the second half of the project, when the technological solution under development by TEMA will have reached enough maturity. During the first 18 months of the project, however, the private sector has been subject to the project's awareness through **social media communication and participation in conferences and events.**

More information can be found at the project's social media pages:

X: [https://twitter.com/temaproject\\_eu](https://twitter.com/temaproject_eu)

MASTODON: [https://mastodon.uno/@temaproject\\_eu](https://mastodon.uno/@temaproject_eu)

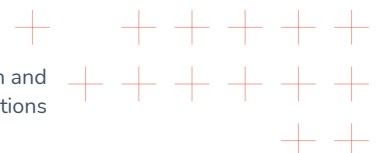
LINKEDIN: <https://www.linkedin.com/company/tema-project/>

YOUTUBE: <https://www.youtube.com/@tema-project>

### 2.2.4 TEMA Website: A long-lasting knowledge repository

The TEMA website is designed to serve as a sustainable knowledge repository, ensuring the continuation and accessibility of project outcomes beyond the project's end, in accordance with the Grant Agreement expectations. The website will remain operational for **at least** three years after the project completion, preserving the valuable resources, research findings, publications, and tools developed throughout the TEMA project.

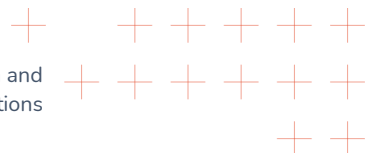
In addition to maintaining the existing content, the website will continue to provide regular updates and news contributed by project partners, ensuring that the latest developments, results, and





activities related to the project are shared. Moreover, the website will be open to updates and contributions from third-party sources, allowing for the inclusion of relevant news, advancements, and collaborations in AI, big data, and emergency management. This approach will help the website remain a dynamic and evolving platform, offering new insights and fostering continued engagement with a broader community.

Through this sustained effort, the TEMA website will continue to serve as a valuable resource and communication tool, supporting the long-term impact and relevance of the project while encouraging knowledge exchange and collaboration across various sectors.





# 3 Clustering and standardisation activities

Clustering and standardisation activities refer to the work carried out under T7.4 “Collaboration, clustering activities and standardisation”, which include a stakeholder mapping exercise to better target the dissemination and selection of high-profile stakeholders to engage with the project. In addition, it benefits from the identified synergies to create clustering and networking activities, as well as identify and liaise with standardisation bodies to ensure the project’s results will be aligned with recognised standards in the domains covered by the project.

## 3.1 TEMA Synergies with Other Projects – AI.BIG

The TEMA project aims to foster collaboration and engagement with stakeholders and establish strategic partnerships with related projects and initiatives in the fields of Natural Disaster Management (NDM), AI, and Big Data analytics. To this end, TEMA has played a leading role in the formation of a dedicated cluster of EU funded projects called **AI.BIG Cluster** focused on disaster risk management and data-driven technologies. It was formed during the very first months of the project. Initially known as the NDM Cluster, this initiative has expanded to include Horizon Europe projects, reflecting the growing interest and engagement in the field.

The TEMA Cluster community currently counts over **3 active members**, TEMA, [CREXDATA](#) (Critical Action Planning over Extreme-Scale Data), [ExtremeXP](#) (EXPeriment driven and user eXPerience oriented analytics for eXtremely Precise outcomes and decisions), that regularly participate in collaborative efforts to engage relevant stakeholders.

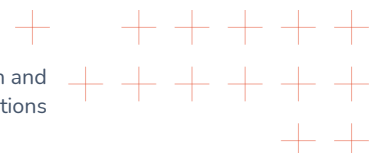


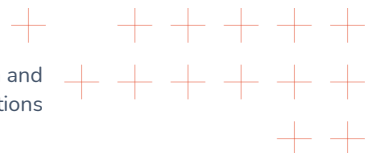


Figure 5 - AI.BIG members

These collaborations aim at facilitating the exchange of information on communication, dissemination strategies, and technological innovations, knowledge, as well as information on the standardisation processes and related joint activities, allowing cluster members to support and assist each other. This collective environment encourages the development of new approaches to NDM, fostering a dynamic space for exploring innovative disaster management solutions through AI and Big Data analytics.

The primary goals of these clustering activities are twofold. First, the cluster promotes information exchange on communication and dissemination strategies, enabling TEMA and other projects to collectively share their results and experiences. This approach enhances the visibility of project outcomes, creating a shared platform for the promotion of best practices and emerging technologies. Second, the cluster serves as a forum for exchanging ideas on methodologies and exploring opportunities to coordinate pilot and development activities across different projects. By identifying synergies and leveraging joint efforts, cluster members are better positioned to generate innovative solutions and achieve more impactful outcomes.

Moreover, the cluster offers a space for collaborative policy discussions, facilitating the development of evidence-based recommendations to support long-term sustainability and ensure the effective exploitation of project results. Through these coordinated efforts, TEMA aims to maximize its impact, contributing to the European community's disaster resilience and advancing expertise in the field of data-driven disaster management.







To enhance visibility and foster collaboration, TEMA has created a dedicated section on the project website under the "Cluster" tab, highlighting its participation in the cluster and providing regular updates on ongoing collaborative activities. The communication team produces relevant content for online channels to emphasize the collective nature of these events and engagements.



Figure 6 - AI.BIG Cluster dedicated page on the website

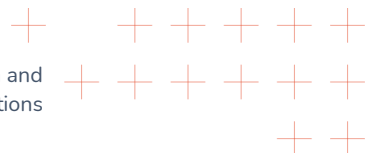
## 3.2 AI.BIG Cluster: Strategy and next steps

### 3.2.1 Future Strategy

The TEMA AI.BIG Cluster, comprised of EU-funded projects focused on Natural Disaster Management (NDM) and related fields, has outlined a forward-looking strategy to foster community building and collaboration among stakeholders.

#### 1. Defining the Audience and Mission

The strategy begins by clearly identifying the cluster's target audience, which includes AI.BIG project partners, researchers, external NDM policymakers, and other key stakeholders involved in disaster management, technology development, and public policy. The cluster establishes a shared mission and set of core values that provide a sense of purpose and direction, ensuring that all





member projects work towards common goals within the broader context of disaster risk management and technological innovation.

## **2. Effective Communication Plan**

A crucial element of the strategy is the establishment of a robust AI.BIG communication plan. This plan outlines the tools, platforms, and frequency of updates to ensure efficient and transparent information sharing among cluster members. By facilitating regular and streamlined communication, the AI.BIG Cluster promotes an environment where all members stay informed about each other's activities, progress, and challenges, fostering a culture of openness and collaboration.

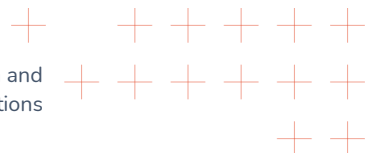
## **3. Leadership and Governance**

So far, AI.BIG is managed by a committee formed by the 3 AI.BIG member representatives chaired by Dr. A. Filograna (TEMA and Engineering). To ensure smooth coordination and active participation, a dedicated AI.BIG leadership team will be assigned (once additional projects join the cluster) in the upcoming period of the current deliverable report, representing the participating projects to oversee community-building activities. This leadership team – task force will be responsible for facilitating collaboration, encouraging knowledge exchange, and ensuring that overall project progress aligns with the cluster's goals.

## **4. Future Impact and Adaptation Across Fields**

Moreover, the AI.BIG Cluster has been identifying future opportunities for collaboration in technical sponsorship and being elaborating a strategic planning for clustering activities. Based on mutual discussions, the following domains have been targeted to be the basis for collaboration: "Data Catalogue for AI training model", "Data Catalogue for improved decision making", "NDM-aaS Platform in emergency management operations", "Advance state-of-the-art in Edge Computing", and "Standardisation of emergency operations".

In addition, by fostering collaboration, innovation, and the exchange of best practices, the cluster will provide a model for successful community building and enhanced project outcomes across a variety of sectors. This approach not only maximizes the impact of NDM-related projects but also offers a scalable framework for building strong communities in other domains of EU-funded research and innovation.





### 3.3 AI.BIG Activities

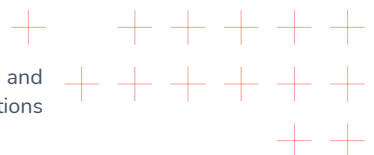
In order to publicise the cluster, TEMA's website incorporated a dedicated section to present the cluster as well as the projects participating in it. Figure 6 presents a snapshot of the website already containing the logo of the cluster, while figure 5 its current members.

To advance the synergies among the cluster partners and create synergies with other projects, joint activities have already been carried out and of course continue in the future. During the communication campaign "AI4 Sustainability", a joint Webinar involving the cluster partners and the DECIDO and interTwin projects was convened on November 15th, 2023, focusing on "How can Artificial Intelligence be used to increase societal resilience to climate change and extreme natural events". The Webinar worked as a tool for dissemination of the work carried out in TEMA, engaging similar communities brought together by participating projects, while also creating knowledge exchange and background for future activities through a panel debate. [The Webinar is available on the project's YouTube channel.](#)

**Additionally, the cluster is consolidating a productive relationship in terms of scientific and technical outreach for what concerns sponsorships of conferences and collaboration on educational courses and training activities. A great example of those can be found below. In the context of the AI.BIG cluster, AUTH – (TEMA Coordinator) has organized the following three courses:**

**1. Short course on Big Data Analytics for Natural Disaster Management, 13/12/2023**

This short course provided an in-depth overview of advanced technologies for acquiring and analyzing Big Data in the context of Natural Disaster Management (NDM). It focused on the use of diverse data sources, including autonomous devices, smart sensors, satellite images, meteorological data, and geosocial media, to improve disaster response through real-time semantic mapping and predictions of disaster evolution.





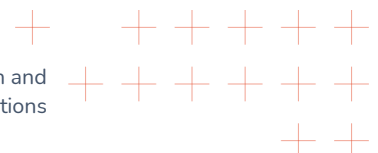
PROGRAM		
Time (EET)	Lecture	Lecturer
08:35-09:05	Sensors and Big Data Analytics for NDM	Ioannis Pitas (AUTH)
09:05-10:00	Drone imaging for NDMs	Nikolaos Miliotis, (AUTH)
10:00-11:00	Forest Fire Monitoring and Measuring with Multiple Cooperating Drones	Jose Ramiro Martinez De Dios (U Seville)
11:00-11:30	Break	
11:30-12:30	Maestro: Forecasting and Risk Management in Forest Fires via IoT Technologies	Panagiotis Katsaros (AUTH)
12:30-13:30	Deep Learning for Post-Earthquake Safety Evaluation of Masonry Buildings	Giovanni Giacco (Latitude40)
13:30-14:00	Break	
14:00-15:00	Data Storytelling and Big Data value chain in Natural Disaster Management	Antonio Filograna (Engineering)
15:00-16:00	Multimodal Analysis of Geo-social Media Data for Improved Disaster Management: From Science to Digital Practice	Resch Bernd (PLUS)
16:00-17:00	From Cloud to Edge through Microservices	Massimo Villari (UNIME)
17:00-18:00	Flash flood modeling and in urban areas using High Resolution hydrodynamic model and machine learning models	Jacques Coves (CS GROUP)
18:00-18:30	Simulation of forest fires and floods (demo presentation)	Evangelos Spatharis (AUTH)

Figure 7 - Short course on Big Data Analytics for Natural Disaster Management Agenda

Key topics covered during the course included Big Data acquisition using drones, satellites, and social media; deep learning methods for analyzing large datasets; and forecasting and risk management technologies for improved NDM. Ten lectures were presented by experts in the field, with practical applications discussed, such as forest fire monitoring, post-earthquake safety evaluations, and flood simulations. The course had 66 registrants. It was delivered in the framework of the International AI Doctoral Academy (AIDA) as an AIDA short course. The course highlighted the integration of AI, machine learning, and edge-to-cloud computing as transformative tools for processing extreme data and providing real-time disaster management solutions.

Course materials, including presentations and video lectures, were made available for attendees. The course was jointly disseminated and supported by the TEMA project, the AI.BIG cluster, and AIDA, and held as a hybrid event on December 13, 2023, with participants able to attend in person or via Zoom. Additional information can be found [here!](#)

## 2. Short e-course on Cloud/Edge Computing for Deep Learning and Big Data Analytics, 19/3/2024





This short e-course provided a comprehensive overview of the advanced technologies utilized in distributed computational systems, particularly for Cloud and Edge Computing in the context of Deep Learning and Big Data Analytics. The course emphasized the critical role of distributed computing in handling large datasets efficiently across multiple nodes, enhancing scalability, reliability, and performance.

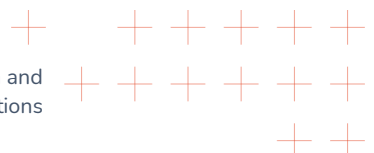
The course consisted of six lectures and a workshop, covering popular tools such as Docker, Kubernetes, and Apache Airflow for containerization, automated workflow scheduling, and interoperability with JSON-LD via the Orion Context Broker. Additionally, the course explored decentralized Deep Neural Network (DNN) architectures through a research-oriented approach, highlighting how distributed systems can drive innovation and improve the effectiveness of real-time data processing.

Participants were introduced to practical applications of these technologies, including examples from Natural Disaster Management (NDM), with a focus on enhancing disaster response through advanced data analytics and AI-driven solutions. The course had 110 registrants. It was delivered in the framework of the International AI Doctoral Academy (AIDA) as an AIDA short course. The event was jointly disseminated and supported by TEMA, AI.BIG cluster, AIDA, and other European R&D projects.

The e-course took place on March 19, 2024, as an online event via Zoom, and welcomed participants from various scientific disciplines with a focus on those with a background in computer science, AI, and related fields. Additional information can be found [here!](#)

### **3. CVML Programming Short Course and Workshop on Deep Learning, Computer Vision and Big Data Analytics 2024, 27-29/8/2024**

This three-day short course provided an in-depth exploration of programming tools and techniques for addressing key challenges in deep learning and computer vision, particularly in the context of Natural Disaster Management (NDM). As this short course was planned before M18 and was executed after M18, its details will be included in the deliverable D7.8 (M36).





## 3.4 TEMA, AI.BIG and the bridge with Policy Makers

### 3.4.1 Connection and synergies with Stakeholders and Policy Officials

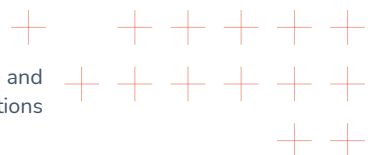
TEMA project has been actively engaging with key stakeholders and policy officials to ensure that its advancements in AI and big data for Natural Disaster Management (NDM) are aligned with both policy frameworks and practical needs in disaster response. Through strategic collaborations with various European and international bodies, TEMA is targeting towards the development of meaningful partnerships to influence policy, enhance standardization, and ensure the integration of its technological innovations into broader disaster management strategies.

TEMA's ongoing efforts to connect with policymakers and stakeholders from the disaster management ecosystem—ranging from national to EU agencies to global initiatives—highlight the project's commitment to contributing to evidence-based policies that drive disaster resilience. These engagements are designed to ensure that TEMA's outcomes directly inform policymaking, support the development of new standards, and respond to the real-world challenges faced by disaster managers, scientists, and decision-makers.

This section provides an overview of TEMA's recent collaborations and meetings with major policy organizations, showcasing the project's expanding influence and future plans for ongoing engagement. Key examples include participation in the ITU AI Sub-Group on Early Warnings, collaborations with the European Union Space Programme (EUSPA), and discussions with the European Commission's Disaster Risk Management Knowledge Centre (DRMKC) and DG ECHO, among others. **These engagements and the mapping of the landscape and of relevant contacts along with the development of a stakeholders community reflect TEMA's strategic approach to embedding its innovations within both national and international disaster management frameworks, furthering its impact on policy development and implementation.**

- **JRC - Disaster Risk Management Knowledge Centre**

The European Commission Disaster Risk Management Knowledge Centre (DRMKC) integrates existing scientific multi-disciplinary knowledge and co-develops innovative solutions for existing needs. Activities of the EC DRMKC support the translation of complex scientific data and analyses into usable information and provide science-based advice for DRM policies. In May 2024, LC and ENG representatives met with officers from the DRMKC to discuss and find possible alignment of objectives between the TEMA project and DRMKC. It was agreed that further discussions will be held in a later stage of the project.





- **European Commission’s Civil Protection and Humanitarian Aid Operations department (DG ECHO)**

In April 2024, LC and RAS representatives met with EC officers from Unit B.3 - Prevention and Preparedness Capacity Building of DG ECHO to present the TEMA project and the implications it can have in DG ECHO’s objectives. As a result of this discussion, the TEMA project was invited to participate in the Union Civil Protection Knowledge Network (UCPKN), a hub that connects first responders, disaster risk managers, scientists, and decision-makers and matches their needs for expertise and good practices with methodologies, tools, solutions, and resources. In autumn 2024, TEMA is planning on furthering its participation in UCPKN with the publication of end-users stories in the “Story Collection” section of the online hub. Furthermore, TEMA was invited to participate in the 8th edition of the European Civil Protection Forum, which took place in June 2024, where TEMA was represented in a booth run by LC.

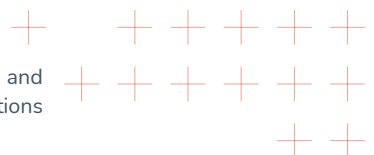
**More information on DH ECHO contacts after M18 will be included in D7.8. The same stands for the following upcoming activities relevant at the time of update of the deliverable report but not within the period of interest of the current report.**

- **European Big Data Value Forum**

TEMA under the Cluster umbrella is expected to participate in a jointed session with CREXDATA in October 2024 at the European Big Data Value Forum ([EBDVF](#)). European Big Data Value Forum is BDVA’s flagship event, bringing the whole European data-driven AI research and innovation community together. TEMA's presence will provide an opportunity to share its achievements, foster collaboration, and engage with influential stakeholders.

- **Upcoming Presentation at the World Telecommunication Standardization Assembly, New Delhi, India (17 October 2024)**

TEMA has been invited to participate in the **World Telecommunication Standardization Assembly** in New Delhi, India, which will take place during the **Indian Mobile Congress**. This session, titled “Reimagining Disaster Risk Reduction: The Role of Standardization and Innovative Technologies,” is co-organized by ITU, UNDRR, and other key UN agencies. With over 10,000 participants expected, this event presents a significant opportunity for TEMA to showcase its role in advancing AI technologies and their alignment with international standards for disaster management.





- **TEMA Presentation at the ITU - AI Sub-Group of Early Warnings for All Initiative (12 September 2024)**

On 12 September 2024, the TEMA project was presented during a session of the AI Sub-Group of the Early Warnings for All (EW4All) Initiative, organized by ITU. FHHI and LC delivered a ten-minute presentation on TEMA's AI-driven innovations for disaster management. The presentation focused on how TEMA contributes to structuring AI applications to support the goals of the EW4All Executive Action Plan. By demonstrating TEMA's capabilities in utilizing AI and big data analytics for real-time decision support, the project aligned itself with the global objectives of early warning systems.

- **EU Agency for the Space Programme**

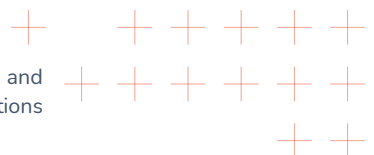
In late August 2024, LC representatives met with European Union Agency for the Space Programme (EUSPA) officers to discuss possible synergies. TEMA has agreed to participate in EUSPA's User Consultation Platform (UCP) on 8 October 2024.

**Looking ahead**, TEMA and AI.BIG Cluster are committed to strengthening their connection with policymakers to ensure that AI and big data innovations inform the future of disaster management policies. The project along with the cluster will also align their work with standardization efforts, providing a dual approach that integrates cutting-edge technologies into both policy frameworks and recognized standards in Natural Disaster Management (NDM).

**The AI.BIG Cluster, led by TEMA, will form a dedicated Policy Makers Working Group (PMWG), designed to foster continuous interaction between AI.BIG's technological advancements and policymakers. This group will provide a platform for aligning the cluster's solutions with the emerging needs and policy priorities in disaster management at national, European, and international levels.**

**Future Activities: The PMWG working group will be a platform for:**

- **Engagement with Policy Stakeholders:** By actively inviting policymakers to participate in AI.BIG's workshops, conferences, and roundtable discussions, the cluster will ensure that insights from the policy field directly inform the development and deployment of AI-driven disaster management solutions. This will also provide an opportunity for policymakers to discuss their challenges and needs, fostering a two-way dialogue that ensures AI.BIG's innovations are both relevant and practical.
- **Events for Policy Engagement:** AI.BIG will host targeted events, such as policy roundtables and strategic workshops, to engage stakeholders from the policy field. These events will focus on exploring the implications of AI and big data in disaster management, providing







policymakers with firsthand access to the latest innovations and their potential applications. Policy-focused sessions will be incorporated into future AI.BIG events, ensuring that disaster management policies benefit from the latest advancements in AI and data science.

- **Collaborative Policy Impact:** The working group will develop recommendations for integrating AI-driven technologies into national and EU-level disaster management policies. These will be presented at dedicated events aimed at policymakers, fostering opportunities for policy shifts that align with cutting-edge technological capabilities.

### Role of the Task Leader - Lisbon Council

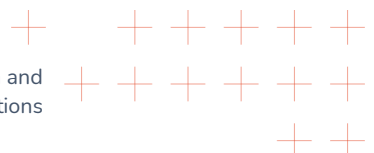
The Lisbon Council under the realm of AUTH (Project Coordinator) will lead the coordination of these efforts, leveraging its extensive experience in public policy and innovation to ensure that AI.BIG's work directly supports and influences relevant policy frameworks. The Lisbon Council's involvement will ensure that AI.BIG's technological solutions not only inform policy discussions but also contribute to shaping the standards that underpin future AI applications in disaster preparedness and response.

## 3.5 Standardisation

The objective of TEMA is to align the outcomes and technologies of the project with existing or new standards, ensuring interoperability, data harmonization, and compliance with the relevant regulatory frameworks.

The technological solutions developed in TEMA will be showcased, highlighting how they can contribute to or enhance existing standardization processes, with particular emphasis on natural disaster management data models, decision-making tools, and real-time data processing. The standardization strategy of the TEMA project includes the following steps:

1. Identifying relevant international (ISO, IEC), European (CEN, ETSI), and domain-specific standards related to TEMA activities. This can include standards related to data models, real-time mapping, UAV image analysis, interoperability, and ethical use of AI in emergency scenarios.
2. Analysing gaps in the current standards landscape where TEMA work could provide value. This includes identifying areas where there is no NDM standard or where existing standards can be updated or expanded, particularly concerning data integration, AI applications, and cross-border emergency response systems.
3. Mapping of relevant stakeholders and Collaborating with relevant standardization bodies, policymakers, and other EU projects to ensure alignment with broader





standardization efforts. Hold joint webinars and workshops to gather feedback from the community.

4. Identifying specific NDM standardization bodies to target, communicate project results, activities, outcomes and white papers.<sup>1</sup>
5. Proposing concrete contributions to existing standards, such as updates to data models or ethical frameworks for AI-driven emergency response systems.

This section will show the data types/models involved in the project and related data standards.

### 3.5.1 TEMA Data models

In an era where natural disasters are becoming increasingly frequent and devastating, the need for a standardised approach to data collection and management has never been more critical. The activity carried out investigates into the intricate world of standardisation and data modelling specifically tailored for natural disasters. By establishing a cohesive and uniform framework, this initiative aims to enhance the efficiency, accuracy, exchange and accessibility of disaster-related data. Such a standardised approach not only facilitates timely and effective response efforts but also empowers policymakers, researchers, and emergency responders with the insights needed to mitigate risks and improve disaster resilience. Through meticulous analysis and innovative methodologies, this work paves the way for a more coordinated and data-driven approach to managing the profound challenges posed by natural disasters.

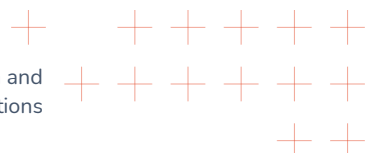
The idea was to understand what kind of data the TEMA platform will deal with. A TEMA data model structure was defined to have a common vocabulary among the technical components. Future activities will address comparing the defined data models with the standards already used in the Natural Disaster ecosystem. This will allow to understand the standards that can be adopted or the standards where TEMA can make contributions.

Below is the list of TEMA data models that have been defined so far:

- **Drone Imagery:** RGB and IR Images, videos captured by Unmanned Aerial Vehicles (drones).
- **Satellite:** Data originating from various sources (e.g. Copernicus, Google Earth Engine Data).

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<sup>1</sup> A white paper on TEMA data models and standardization will be disseminated on relevant European (or even national) NDM standardization authorities, towards facilitating, among others, the NDM data exchange, sharing and aggregation at European level.





- **Meteorological:** Time-stamped weather measurements and hydrological data originating from various sources.
- **Social media:** Textual and/or visual data collected from social media platforms.
- **Public Alerts:** Time-sensitive alerts and notifications related to public safety, natural disasters, weather events and others.
- **Digital Terrain Models:** 3D models representing the topography and elevation of the terrain, Forest Density and Vegetation Models.
- **Geospatial data:** Geospatial Vector data that highlight locations and areas of interest (Public Halls, Hospitals, Schools, etc.) to be projected on Digital Terrain Models.

These models were defined with the purpose of identifying the main components of TEMA, as well as the required metadata that will assure interoperability and maximise data exchange and re-use amongst TEMA technologies, according to the Digital Enabler (SV-tech-02, owned by ENG).

Further characteristics, data types and metadata are required to be defined for each model to create the common vocabulary among the technical components. Below, these data models are described more extensively including their types and formats.

**Drone Imagery:**

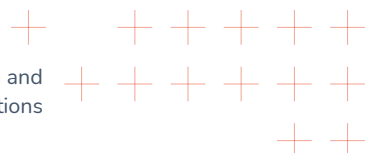
Source/Sensors	Drone sensors
Raw Data Format	jpeg, tif, png, heic, dng, Mp4, mkv
Metadata	Metadata required for Geospatial Information Retrieval. <ul style="list-style-type: none"> <li>● GPS Coordinates: json, geojson, csv, txt</li> <li>● Gimbal Parameters: json, csv, txt</li> <li>● Camera Calibration Settings: json, csv, txt</li> </ul>
Annotations	Segmentation, Object Detection

**Satellite:**

Source/Sensors	Copernicus (Sentinel-1), Google Earth Engine Data
Raw Data Format	tif, jp2
Annotations	Segmentation, Object Detection

**Meteorological:**

Source/Sensors	Weather Stations, Satellite data, Weather Balloons
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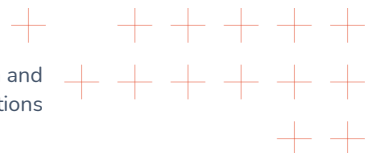
<b>Raw Data Format</b>	json, csv, xml
<b>Measurements</b>	<p>Various measurements depending on sensors</p> <ul style="list-style-type: none"> <li>● Temperature</li> <li>● Humidity,</li> <li>● Wind Speed - Wind Direction</li> <li>● Atmospheric Pressure</li> <li>● Precipitation</li> <li>● Cloud Cover</li> <li>● Water level</li> </ul>
<b>Metadata</b>	<ul style="list-style-type: none"> <li>● Timestamp</li> <li>● Location: GPS Coordinates</li> <li>● Elevation</li> </ul>

**Social Media:**

<b>Source</b>	URL, Social Media Platforms, API Feeds, Web Scraping
<b>Raw Data Format</b>	json, xml, txt, csv, jpeg, tif, png, Mp4, mkv
<b>Metadata</b>	<p>Various Metadata depending on source</p> <ul style="list-style-type: none"> <li>● Timestamp</li> <li>● GPS Coordinates</li> <li>● Post Type</li> <li>● User ID</li> <li>● Engagement Metrics: likes, shares, comments</li> </ul>

**Public Alerts:**

<b>Source</b>	Government agencies, emergency services, weather monitoring systems
<b>Raw Data Format</b>	json, xml, txt, csv
<b>Metadata</b>	<p>Various Metadata depending on source</p> <ul style="list-style-type: none"> <li>● Timestamp</li> <li>● Location, GPS Coordinates</li> <li>● Alert type: e.g. severe weather warning, evacuation order</li> <li>● Severity level</li> <li>● Instructions of Action</li> </ul>





### Digital Terrain Models:

Source	Photogrammetry, Satellite Imagery
Raw Data Format	dem, dsm, tiff
Metadata	<ul style="list-style-type: none"> <li>● Spatial resolution</li> <li>● Coordinate reference system (CRS)</li> <li>● Accuracy assessment</li> <li>● Data acquisition method and processing description (e.g., Aerial photogrammetry, Satellite Imagery)</li> </ul>

### Geospatial Information:

Source	Google Maps, Openstreet Map
Raw Data Format	shp, shx, dbf, geojson
Metadata	<ul style="list-style-type: none"> <li>● Coordinate reference system (CRS)</li> <li>● Location, GPS Coordinates</li> <li>● Datum, reference surface and orientation</li> </ul>

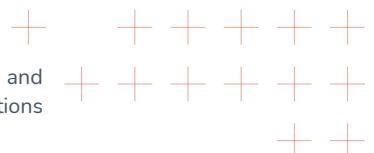
All raw data and metadata defined in the aforementioned TEMA data models adhere to one or more data and metadata standards defined in the following Section.

#### 3.5.2 Data and Metadata Standards and Formats

The following is a list of standards that have been considered when defining the data models listed above, for each one the TEMA data models that may be impacted are highlighted:

- **OGC Simple Features Specification<sup>2</sup>:** This standard defines a model for the representation of geographical vector data, such as points, lines and polygons. It is particularly useful for the TEMA project's **Geospatial information** data model, which represents vector data highlighting places and areas of interest, such as hospitals, schools and other critical infrastructure. The adoption of this standard ensures that the data can be easily shared and integrated with other GIS (Geographic Information Systems).

<sup>2</sup> <https://www.ogc.org/standards/sfa>





- **OGC Web Map Service (WMS)<sup>3</sup> and Web Feature Service (WFS)<sup>4</sup>:** These standards define protocols for visualising and accessing geographical data on the web. They are particularly relevant for **Satellite** and **Geospatial information** data models, enabling the visualisation and downloading of maps and spatial data via interoperable web services.
- **ISO 19115: Geographic Information – Metadata<sup>5</sup>:** This standard defines how to describe metadata for geographic data, making it easily understandable and usable by different organizations. For **Geospatial**, **Digital Terrain (DTMs)** and **Satellite** data models, ISO 19115 ensures that metadata associated with geographic datasets are standardized, facilitating search, access and integration of data into other GIS systems.
- **OGC SensorThings API<sup>6</sup>** facilitates interoperability between IoT (Internet of Things) devices that collect meteorological and environmental data. In the context of the **Meteorological** data model, this standard enables the integration of data from various sensor sources, ensuring that meteorological information is collected, stored and shared in a standardized format.
- **OGC GeoTIFF<sup>7</sup>:** This standard is used in the case of geographic image data with known GPS coordinates in geospatial and earth science applications in the **Satellite** data model.
- **OGC COG (Cloud Optimized GeoTIFF)<sup>8</sup>:** This standard is an extension of the GeoTIFF standard with the alteration of a reduction to the **image data** resolution, thus optimizing data for **Cloud Technologies** by reducing their size.
- **GML in JPEG 2000 for Geographic Imagery Encoding<sup>9</sup>:** **Satellite** Images adheres to this standard when additional metadata should be included and displayed over the initial satellite capture.
- **W3C's XML<sup>10</sup>:** The Extensible Markup Language (XML) is a simple and flexible text standard that is both human and machine readable. It is widely used for the storing, transmission and reconstruction of data. In the context of **Social Media**, **Meteorological** and **Public Alerts** data models, its adoption ensures that data can be easily exchanged between different systems and web applications, while maintaining a high level of compatibility and interoperability.

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<sup>3</sup> <https://www.ogc.org/standards/wms>

<sup>4</sup> <https://www.ogc.org/standards/wfs>

<sup>5</sup> <https://www.iso.org/standard/53798.html>

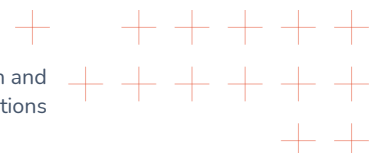
<sup>6</sup> <https://www.ogc.org/standards/sensorthings>

<sup>7</sup> <https://www.ogc.org/standard/geotiff/>

<sup>8</sup> [https://docs.ogc.org/is/21-026/21-026.html#\\_cloud\\_computing](https://docs.ogc.org/is/21-026/21-026.html#_cloud_computing)

<sup>9</sup> <https://www.ogc.org/standard/gmljp2/>

<sup>10</sup> <https://www.w3.org/XML/>





- **ECMA-404 JSON Data Interchange Standard<sup>11</sup>**: The JavaScript Object Notation (JSON) is a lightweight, text-based and language-independent data-interchange standard. Like XML it is both human and machine readable and its adoption ensures the easy interchange and high level compatibility and interoperability of **Social Media**, **Meteorological** and **Public Alerts** data models.
- **RFC 7946 geoJSON<sup>12</sup>**: This standard is a geospatial data interchange format based on JSON. It is designed for geographical data representation, portraying various types of geographic features, including points, lines, polygons, and their associated properties. It can be used for both web mapping and geographic data visualization, its flexibility allowing for easy integration with web technologies, which makes it ideal for TEMA **Geospatial information** data model.
- **OGC EO-geoJSON<sup>13</sup>**: This is an altered version of the geoJSON Specification Standard RFC 7946 and is used in the cases where strictly defined attributes-metadata should be included in a geoJSON. It provides schema definition to describe the **Geospatial information** output of various TEMA technologies.
- **ITU-T Recommendation X.1303 (CAP: Common Alerting Protocol)<sup>14</sup>**: The CAP is an international standard for the exchange of public alerts and warnings related to emergencies of all kinds. It is directly applicable to TEMA's **Public Alerts** data model, making it possible to standardise the creation and distribution of alert messages in an interoperable way, ensuring that critical information reaches all interested parties quickly.
- **ISO 19107: Spatial Schema<sup>15</sup>**: This standard defines a spatial schema for representing and querying complex geospatial data. It is particularly relevant for **Digital Terrain Models** and **Geospatial** data model, as it provides a standard framework for representing three-dimensional spatial relationships, which are essential for accurate mapping and modelling of terrain and infrastructure.
- **EU INSPIRE Directive<sup>16</sup>**: The INSPIRE Directive (Infrastructure for Spatial Information in the European Community) aims to create a European-wide spatial data infrastructure. TEMA's **Geospatial** data model and **Digital Terrain Models** can be aligned with INSPIRE to ensure that spatial data are compliant with European regulations, facilitating data sharing between European institutions and improving cross-border emergency response.

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<sup>11</sup> <https://www.json.org/json-en.html>

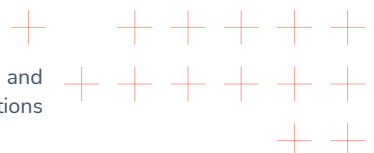
<sup>12</sup> <https://geojson.org/>

<sup>13</sup> <https://www.ogc.org/standard/eo-geojson/>

<sup>14</sup> <https://www.itu.int/rec/T-REC-X.1303>

<sup>15</sup> <https://www.iso.org/standard/66175.html>

<sup>16</sup> <https://inspire.ec.europa.eu/>





- **ISO/IEC 15938 - MPEG-7: Multimedia Content Description Interface**<sup>17</sup>: MPEG-7 provides a set of standards for describing multimedia content, making it useful for **Drone RGB Videos** and **Social Media** (e.g., videos scraped from social media) data models. This standard allows for detailed annotation of multimedia content, facilitating the storage, search and analysis of images and videos used in emergency management.
- **ISO/IEC 15444 - JPEG 2000**<sup>18</sup>: This standard is used for high-quality image compression and is relevant for **Satellite Images** and **Drone RGB/IR Images**. JPEG 2000 makes it possible to reduce the size of image files while maintaining high quality, which is essential for the archiving and detailed analysis of satellite and aerial images in emergency situations.
- **ISO 19118: Encoding**<sup>19</sup>: This standard concerns the encoding of geographic data, which is essential to ensure that data can be transferred and used correctly on different platforms. It is relevant to all spatial data models in TEMA, including **Geospatial, Digital Terrain Models (DTMs)**, and **Satellite**.

Alongside these standards, common image and video formats are used for non-georeferenced data. Such data are useful for the development of TEMA technologies, even though they will not be used in the TEMA platform:

- **ISO/IEC 10918 JPEG**<sup>20</sup>: A common digital image format that allows for lossy image compression of adjustable degrees.
- **W3C's PNG**<sup>21</sup>: This image format allows for lossless, portable, well-compressed storage of raster images, and is well adapted for use by online viewing applications.
- **Adobes' TIFF**<sup>22</sup>: A format created to store raster graphics and image information. It supports lossless compression of digital images at the cost of larger file sizes.
- **Microsoft's AVI**<sup>23</sup>: A widely used industrial format of video data, used for synchronous audio-with-video playback.

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<sup>17</sup> <https://www.iso.org/advanced-search/x/title/mpeg-7/status/P/docNumber/docPartNo/docType/0/langCode/ics/currentStage/true/searchAbstract/true/stage/stageDateStart/stageDateEnd/committee/sdg>

<sup>18</sup> <https://www.iso.org/standard/78321.html>

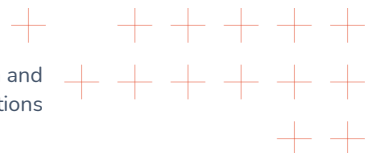
<sup>19</sup> <https://www.iso.org/standard/44212.html>

<sup>20</sup> <https://jpeg.org/jpeg/index.html>

<sup>21</sup> <https://www.w3.org/TR/2003/REC-PNG-20031110/>

<sup>22</sup> <https://www.adobe.com/creativecloud/file-types/image/raster/tiff-file.html>

<sup>23</sup> <https://www.loc.gov/preservation/digital/formats/fdd/fdd000059.shtml>







- **ISO/IEC 14496-14:2020 MP4<sup>24</sup>**: A format for digital multimedia containers. Although commonly used for audiovisual data, it can also contain text, such as subtitles.

Adopting these standards and formats enables the TEMA project to ensure that its data models are interoperable, secure and compliant with international best practices, facilitating integration with other systems and increasing the effectiveness of emergency management activities.

Furthermore, the following data management related standards will be used:

- **ISO/IEC 27001: Information Security Management<sup>25</sup>**: This international standard for information security management is crucial to ensure that sensitive data, such as from **Social Media Data and Public Alerts** data models, is handled securely and in compliance with data protection regulations. By adopting ISO/IEC 27001, the TEMA project ensures that personal and sensitive information is protected from unauthorized access, loss or other security risks.
- **ISO 14001 - Environmental Management Systems<sup>26</sup>**: This standard establishes criteria for an environmental management system. Although indirectly, it may be relevant to the **Meteorological** data model, ensuring that the collection and use of environmental data comply with sustainable practices and environmental regulations.
- **OASIS Emergency Management Standards<sup>27</sup>**: These standards, developed by OASIS (Organization for the Advancement of Structured Information Standards), include EDXL (Emergency Data Exchange Language) and other standards that facilitate emergency communication and management. They are particularly relevant to the **Public Alerts** data model, allowing standardized and interoperable exchange of emergency information between different agencies and systems.

### 3.5.3 NDM Operations Standardization

At the moment of writing, the consortium has already proceeded with the initial steps (in line with the project progress and activity) in standardisation activities for emergency management operations. Specifically, in the context of Work Package 2, partners of Task 2.3 are committed to support end users in using (new) technologies in a way that is ethical and compliant with applicable

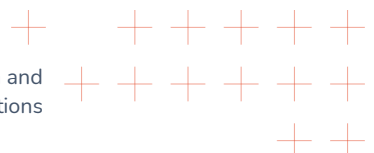
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<sup>24</sup> <https://www.iso.org/standard/79110.html>

<sup>25</sup> <https://www.iso.org/isoiec-27001-information-security.html>

<sup>26</sup> <https://www.iso.org/iso-14001-environmental-management.html>

<sup>27</sup> [https://www.oasis-open.org/committees/tc\\_home.php?wg\\_abbrev=emergency](https://www.oasis-open.org/committees/tc_home.php?wg_abbrev=emergency)





regulations. In this sense, partners developed a process to support end users seeking to use drones in their operations. In particular the process focuses on drone flights and privacy regulations, and it addresses the key aspects to consider when initiating an activity using drones. Notably, this resource was built by reusing and adapting existing resources developed by public organisations of European Union member states. This approach aims to ensure consistency across the European Union as well as reusing resources that are fit-for-purpose instead of reinventing the wheel. Relevant in this consideration is also the calibre of the owner of the solution reused, namely Smart Dublin, the office for the digital transformation of the Dublin Region. The solutions reused are precisely the handbook developed by Smart Dublin for the use of drones<sup>28</sup> and for privacy preserving approaches to the use of drones.<sup>29</sup> Notwithstanding the experience and calibre of the authors, the resources have been analysed and used only after having been deemed fit-for-purpose. Importantly, their outlook was reshaped and complemented to accommodate for the scope of the TEMA project (very specific use case).

In order to enable a standardised procedure for the TEMA trails and for (image) data collection with drones during disasters in general, based on the analysis of historical data from end users and technical partners, TEMA developed guidelines for data acquisition with drones as part of the work in Task T5.1 (for the guidelines see deliverable D5.1). In these guidelines, precise specifications are made as to how flight routes should be for the drone flights during natural disasters, which areas should be in the centre of the captured images and at what angle the images should be captured. Furthermore, information is provided on which metadata, such as georeferences, are important for generating digital twins based on the collected image data. These specifications are intended to ensure a standardised drone image collection procedure and thus the completeness and highest possible quality of the image data in an NDM context.

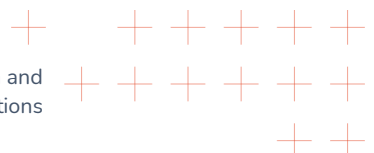
#### 3.5.4 NDM Governance of Standards and Interoperability

The overall governance of standards and interoperability appears to be paramount in emergency management services. During the initial phases of the project light was shed on the need for cross-border coordination in emergency management. The European Response Coordination Centre of the European Union stands as a testament of previous activities in this regard. Today, TEMA seeks to enhance this coordination through products, services and technologies that enable a cross-border ecosystem for emergency management. Against this ambitious objective, the governance of

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<sup>28</sup> Smart Dublin. (2021). *Regulations: Drone User Handbook*. (source: [REGULATIONS: DRONE USER HANDBOOK | Smart Dublin](#)).

<sup>29</sup> Smart Dublin. (2021). *Data Protection: Drone User Handbook*. (source: [Data Protection: Drone User Handbook | Smart Dublin](#)).





interoperability in public organisations is pivotal. With this regard, research and advocacy activities have been focused on the topic. End users have conducted interoperability assessments developed by Interoperable Europe.<sup>30</sup> The results are functional to studies whose output will be used for advocacy, however insights can be made available upon request. Some specific activities in this sense are already underway. End users have joined a call for feedback from Interoperable Europe to develop guidelines on the mandatory interoperability assessments under the Interoperable Europe Act.<sup>31</sup>

### 3.5.5 NDM regulatory bodies

In the context of Natural Disaster Management (NDM), engagement with regulatory bodies is critical to ensuring that the strategies, technologies, and methodologies developed by the TEMA project align with existing national and international frameworks. These regulatory bodies play a pivotal role in shaping disaster preparedness, response, and recovery policies, and by collaborating with them, TEMA can contribute to enhancing disaster management standards and influencing future policy development.

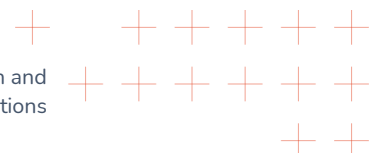
TEMA's envisages strategic partnerships with key regulatory bodies, such as the European Forest Fire Centre and the United Nations Office for Disaster Risk Reduction (UNDRR), ensure that its innovations are well-integrated into regulatory frameworks. Moreover, participation in bodies like EUR-OPA and the Emergency Response Coordination Centre (ERCC) could potential facilitate a cross-border approach to disaster management, promoting interoperability and the harmonization of standards across different regions.

By exploring the potentials of such collaborations, TEMA will ensure that its technological solutions will not only meet the immediate needs of disaster management but can also contribute to the long-term policy and regulatory landscape. This proactive engagement underscores TEMA's commitment to driving forward evidence-based policy recommendations that can improve disaster resilience on both national and international levels. Below one can find a preliminary list of stakeholders that could be targeted in the TEMA Standardisation activities. The following white paper recipients list-map can further be enlarged via the consideration of the policy stakeholders that both TEMA and AI.BIG are (and will in the period following the current report) collaborating and engaging with, ex. EBDVF.

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<sup>30</sup> Interoperable Europe. (2022). *Governance Interoperability Quick Assessment Toolkit*. (source: [Governance Interoperability Quick Assessment Toolkit | Joinup](#)).

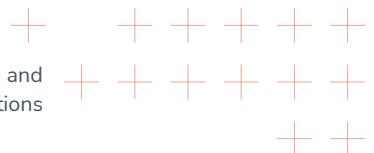
<sup>31</sup> Gaukema, L. (2024, January 26). *Call for action: Help shape the future interoperability assessment guidelines!* (source: [Call for action: Shape the future interoperability assessments! | Joinup](#)).





**List of Stakeholders and Communities to disseminate TEMA results and white papers:**

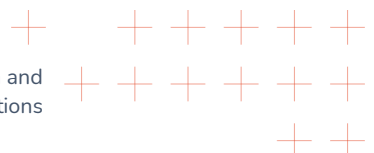
1. European Forest Fire Centre: <https://civilprotection.gov.gr/ecff/perigrifi-ekdoseis>
2. European and Mediterranean Major Hazards Agreement (EUR-OPA): <http://www.coe.int/en/web/europarisks/home>
3. Emergency Response Coordination Centre (ERCC) of the European Commission ([https://civil-protection-humanitarian-aid.ec.europa.eu/what/civil-protection/emergency-response-coordination-centre-ercc\\_en](https://civil-protection-humanitarian-aid.ec.europa.eu/what/civil-protection/emergency-response-coordination-centre-ercc_en)).
4. EXPERTS OF THE UNION CIVIL PROTECTION MECHANISM <https://civil-protection-knowledge-network.europa.eu/disaster-preparedness/union-civil-protection-mechanism-training-programme>
5. United Nations Office for Disaster Risk Reduction (UNDRR): <http://www.undrr.org>
6. Council of Europe: <http://www.coe.int/en/web/portal/home>
7. Organization of the Black Sea Economic Cooperation (BSEC) [www.bsec-organization.org](http://www.bsec-organization.org)
8. SEECF (Southeast Europe Cooperation Process): <https://www.rcc.int/pages/111/south-east-european-cooperation-process--seecfhttp://rspcsee.org/en/pages/read/>.
  - a. Secretariat for the Adriatic Ionian Initiative: <http://www.aii-ps.org/>
  - b. DPPI/SEE (South East Europe Disaster Preparedness and Prevention Initiative): <http://www.dppi.info/>





# 4 Conclusion

In conclusion, the current report on the communication and dissemination activities for the Horizon Europe project TEMA underscores significant progress and key achievements in the first 18 months of the project. The implementation of planned activities, encompassing outreach initiatives, stakeholder engagement, clustering, and early actions in standardisation, has been successfully advanced. The notable milestones reached during this period reflect the project's effectiveness, as measured by comprehensive key performance indicators (KPIs) and beyond (for instance regarding the clustering activities and the participation of end users to call for feedback opened by the European Commission). Overall, this deliverable not only highlights the progress made but also serves as a crucial resource for stakeholders, offering transparency into the project's development and performance metrics. By providing a clear view of the project's trajectory, it ensures that all parties are well-informed and engaged, thereby driving TEMA towards its intended outcomes with greater confidence and coordination.





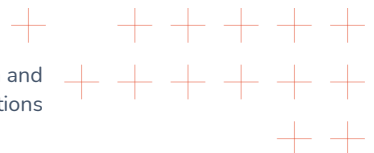
# References

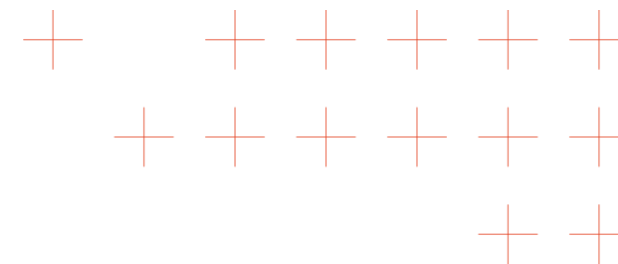
Gaukema, L. (2024, January 26). *Call for action: Help shape the future interoperability assessment guidelines!* (source: [Call for action: Shape the future interoperability assessments! | Joinup](#)).

Interoperable Europe. (2022). *Governance Interoperability Quick Assessment Toolkit*. (source: [Governance Interoperability Quick Assessment Toolkit | Joinup](#)).

Smart Dublin. (2021). *Data Protection: Drone User Handbook*. (source: [Data Protection: Drone User Handbook | Smart Dublin](#)).

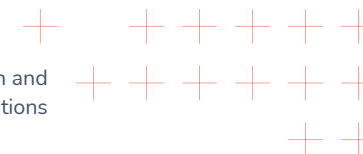
Smart Dublin. (2021). *Regulations: Drone User Handbook*. (source: [REGULATIONS: DRONE USER HANDBOOK | Smart Dublin](#)).

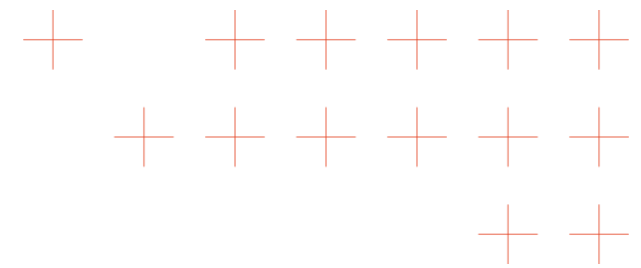




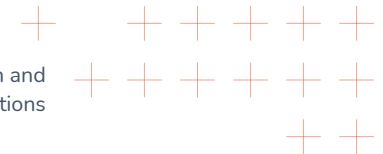
# Annex A

Date	Type of Activity	Dissemination Activity	Quantity/Audience	Partner	Description	Link
<b>Workshops (Organised)</b>						
24.10.2022	Workshop (Organised)	ITU/WMO/UNEP Workshop on Artificial Intelligence for Natural Disaster Management	Policy makers, scientific audience	AUTH	Short course and workshop	<a href="#">Link</a>
04.12.2022	Workshop (Organised)	“Introduction to drones”	Students	AUTH	Short course and workshop	<a href="#">Link</a>
30.08.2023-01.09.2023	Workshop (Organised)	CVML Programming Short Course and Workshop on Deep Learning and Computer Vision 2023	Students (26 participants)	AUTH	Short course and workshop	<a href="#">Link</a>
13.12.2023	Workshop (Organised)	Short course on Big Data Analytics for Natural Disaster Management	Students (66 participants)	AUTH	Short course on Big Data Analytics for Natural Disaster Management	<a href="#">Link</a>
32.024	Workshop (Organised)	Short e-course on Cloud/Edge Computing for Deep Learning and Big Data Analytics	Students (110 participants)	AUTH	Short course on Cloud/Edge Computing for Deep Learning and Big Data Analytics	<a href="#">Link</a>
14.06.2023	Workshop (Organised)	AI and Data Spaces for sustainable smart city – water and other key resources challenges	Policy makers, scientific audience	ENG	Fostering collaboration between related EU projects	-
<b>Events (Attended)</b>						

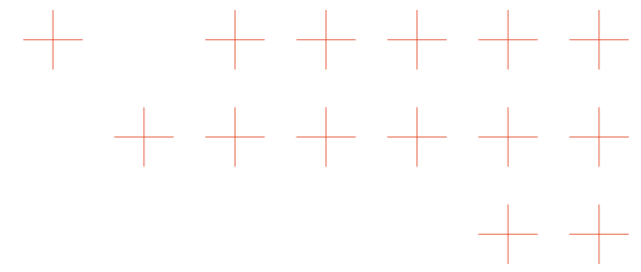




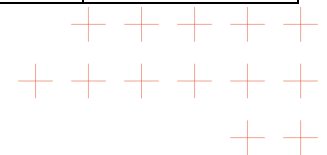
14.06.2023	Event (Attended)	Data week 2023: 'Data Meets Infrastructure at the Edge!'	Policy makers, scientific audience	AUTH	Workshop in event	<a href="#">Link</a>
25-26.05.2023	Event (Attended)	Finnish National Safety Conference	Policy makers, scientific audience, end users	KAHY	Presentation of TEMA as part of KAHY R&D activities	-
7-9.11.2023	Event (Attended)	Teknologia 23	End users, policy makers, technology developers	KAMK	Presentation and demonstration of smartdesk concept	-
11-12.10.2023	Event (Attended)	Finnsec	Policy makers, scientific audience, end users	KAMK, KAHY	Demonstration of technologies as part of a security conference held in Finland	-
11.09.2023	Event (Attended)	AI in Disaster Management	Scientific audience, disaster managers, policy makers	PLUS	Using geo-social media for analyzing geo-social media and remote sensing data for improving disaster management processes	-
15.07.2023	Event (Attended)	The Symposium on Spatiotemporal Data Science	Scientific audience	PLUS	Talk about the use of geo-social media in disaster management	-
<b>Articles (Scientific)</b>						
04.12.2023	Article (Scientific)	Evaluating Deep Neural Network-based Fire Detection for Natural Disaster Management	Scientific audience	AUTH	Recently, climate change has led to more frequent extreme weather events, introducing new challenges for Natural Disaster Management	<a href="#">Link</a>

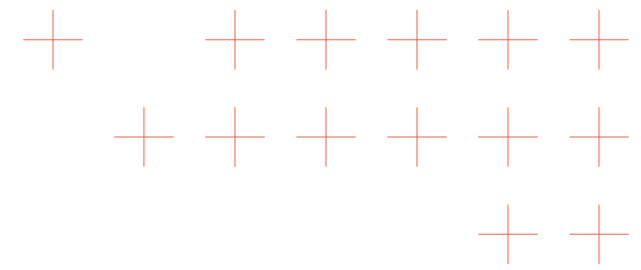




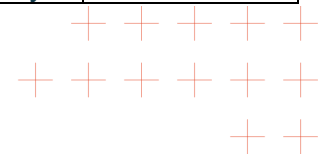


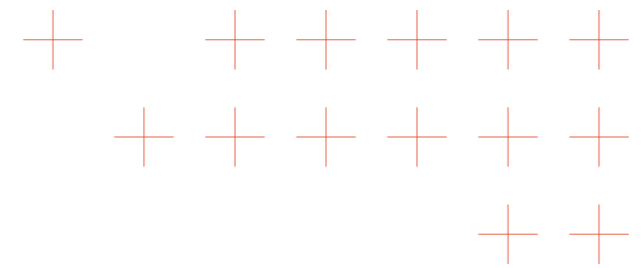
					<p>(NDM) organizations. This fact makes the employment of modern technological tools such as Deep Neural Networks-based fire detectors a necessity, as they can assist such organizations manage these extreme events more effectively. In this work, we argue that the mean Average Precision (mAP) metric that is commonly used to evaluate typical object detection algorithms cannot be trusted for the fire detection task, due to its high dependence on the employed data annotation strategy. This means that the mAP score of a fire detection algorithm may be low even when it predicts fire</p>	
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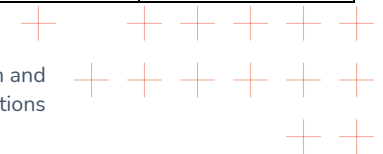


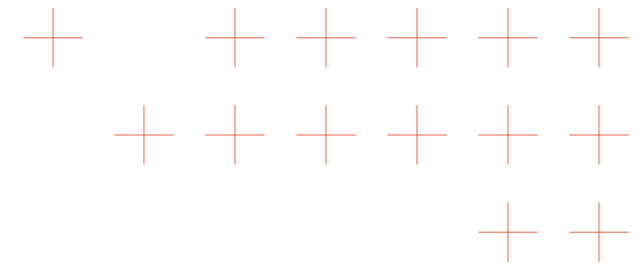
					<p>bounding boxes that accurately enclose the depicted fires. In this direction, a new evaluation metric for fire detection is proposed, denoted as Image-level mean Average Precision (ImAP), which reduces the dependence on the bounding box annotation strategy by rewarding/penalizing bounding box predictions on image level, rather than on bounding box level. Experiments using different object detection algorithms have shown that the proposed ImAP metric reveals the true fire detection capabilities of the tested algorithms more effectively.</p>	
Dec-23	Article (Scientific)	PRIVACY-SHIELDING AUTONOMOUS SYSTEMS FOR	Scientific audience	AUTH	This contribution aims to recommend a fully-	<a href="#">Link</a>



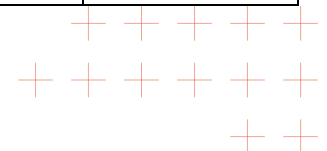


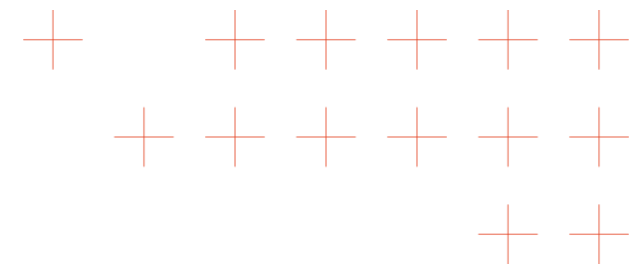
		<p><b>NATURAL DISASTER MANAGEMENT (NDM):</b>          Targeted Regulation of the use of Autonomous Systems for Natural Disaster Management Goals before the Materialization of the Privacy Harm</p>			<p>fledged privacy-assessment applicable to future uses of Autonomous Systems (AS) for Natural Disaster Management (NDM) purposes. It claims that certain implementations may interfere with the right to privacy and the protection of personal data and analyses challenges stemming from (non-) compliance with the General Data Protection Regulation (GDPR). Moreover, it subjects the use of autonomous systems to the European Court of Human Rights' (ECtHR) Legality – Legitimacy – Necessity testing (LLN-check). On this basis, it proposes a targeted and ex ante privacy-assessment to</p>	
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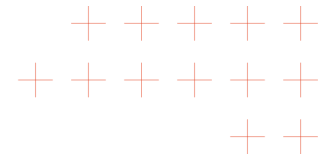


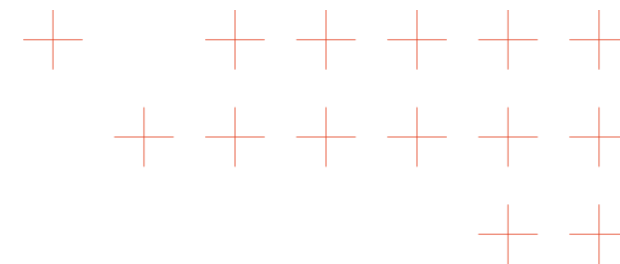
					address legal uncertainty, resulting from the GDPR's tech-neutrality and case law's ex post (after the harm) adjudication. The recommended scheme, ideally involving experts from various disciplines who would moreover be independent, could apply before the actual use of any AS and give a 'proceed', a 'proceed with conditions' or a 'do not proceed' decision.	
04.12.2023	Article (Scientific)	Matthaios D Tzimas, Christos Papaioannidis, Vasileios Mygdalis and Ioannis Pitas, Evaluating Deep Neural Network-based Fire Detection for Natural Disaster Management [IEEE/ACM International Workshop on Big Nature Data Analysis: Methods and Applications (BigNDA 2023)]	Scientists; Education/training organization/learners	AUTH	Presentation in IEEE/ACM International Workshop on Big Nature Data Analysis	<a href="#">Link</a>
01.12.2023	Article (Scientific)	Georgios Bouchagiar, Vasileios Mygdalis and Ioannis Pitas, 'Privacy-Shielding Autonomous	Scientists; Education/training organization/learners	AUTH		<a href="#">Link</a>



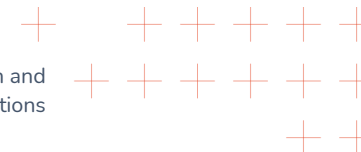


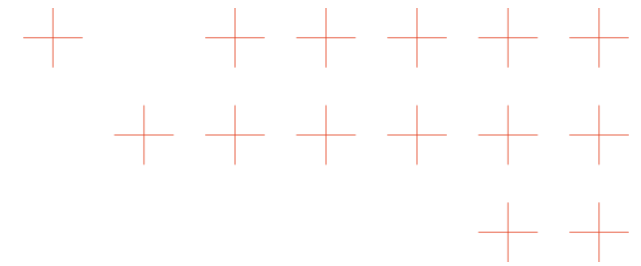
		Systems for Natural Disaster Management (NDM): Targeted Regulation of the Use of Autonomous Systems for Natural Disaster Management Goals Before the Materialisation of the Privacy Harm’ (2023) 29(4) European Public law 355				
29.02.24	Article (Scientific)	Sicen Guo, Zhiyuan Wu, Qijun Chen, Ioannis Pitas, Rui Fan, "SNE-RoadSegV2: Advancing Heterogeneous Feature Fusion and Fallibility Awareness for Freespace Detection"	Scientists; Education/training organization/learners	AUTH	Feature-fusion networks with duplex encoders for freespace detection	<a href="#">Link</a>
15.04.2024	Article (Scientific)	Improved satellite-based emergency mapping through automated triggering of processes	Scientific audience	DLR-DFD	Paper for the 21st Annual Global Conference on Information Systems for Crisis Response and Management (ISCRAM 2024)	-
<b>News Items</b>						
11.12.2022	News Item	AI in natural disaster management	Citizens	AUTH	Article in Greek newspaper “Estia”	<a href="#">Link</a>
20.01.2023	News Item	TEMA: A research project for NDM	Citizens	AUTH	Interview at DION TV	<a href="#">Link</a>
24.01.2023	News Item	AI program from AUTH can prevent a new Mati-like disaster	Citizens	AUTH	Media article (Macedonia newspaper)	<a href="#">Link</a>





29.08.2023	News Item	AIDA summer school and TEMA	Citizens	AUTH	Interview on TEMA and AIDA summer school on 102FM/ET3	-
11.09.2023	News Item	Call for data from Greek natural disasters	Citizens	AUTH	Asking local authorities and citizens to share any data they have of the recent natural disasters in Greece	-
19.09.2023	News Item	Natural disasters and Data	Citizens	AUTH	Interview on the role of data in NDM on One Channel	-
<b>Joint Events (with other EU Projects)</b>						
23.02.2023	Joint Events (with other EU Projects)	“Get-to-know” introductory and welcome day	Policy makers, scientific audience	AUTH	Online workshop (BDVA)	<a href="#">Link</a>
9-11.05.2023	Joint Events (with other EU Projects)	DEFEA - Defence Exhibition Athens	Armed forces, defence industry, and national security	KEMEA	Present the TEMA project	-
15.11.2023	Joint Events (with other EU Projects)	AI 4 Sustainability webinar	Practitioners and scientific audience	LC	Webinar with CREXDATA, DECIDO, InterTwin, and ExtremeXP	<a href="#">Link</a>
<b>Keynote Talks</b>						
27-29.06.2023	Keynote Talk	30th International Conference on Systems, Signals and Image Processing, IWSSIP 2023	Policy makers, scientific audience	AUTH	International Conference	<a href="#">Link</a>





25.05.2023	Keynote Talk	Technology as an aid in preparing for natural disasters	Policy makers, scientific audience, end users	KAHY, KAMK	Presentation on insights and experiences in R&D projects	-
7-8.06.2023	Keynote Talk	Rescue operation research and development days	Policy makers, scientific audience, end users	KAHY, KAMK	Presentation and panel discussion on current R&D activities	-
<b>Conference Workshops (Organised in Peer-Reviewed)</b>						
24-28.09.2023	Conference Workshop (Organised in Peer-Reviewed)	ITSC Workshop 2023	Policy makers, scientific audience	AUTH	Conference workshop	<a href="#">Link</a>
16.12.2023	Conference Workshop (Organised in Peer-Reviewed)	Explainable AI for Audio via Virtual Inspection Layers	Scientific audience	FHHI	Contributed talk at Neurips 2023 workshop "Machine Learning for Audio"	<a href="#">Link</a>
<b>Others</b>						
13.02.2023	Journal Special Issue	Article on civil protection magazine 112 emergencies	Public	RAS	Article about TEMA project overview	-
25-27.09.2023	Conference Track	Safe Attica 2023	Policy makers, scientific audience	KEMEA	Presentation and conference abstract on Big Data Technologies for Emergency Management	<a href="#">Link</a>

