COVALEX

Funded by
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Civil Protection

Knowledge Network Oriented Exercise Management Guidelines

PARTNERSHIP

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Executive Summary

The Knowledge Network Oriented Exercise Management Guidelines provide a comprehensive framework for designing, conducting, and evaluating exercises that focus on the testing and validation of innovative good practices in disaster preparedness and response. These guidelines, developed under the COVALEX Project, aim to advance emergency management by integrating untested methodologies and promoting collaboration among diverse stakeholders.

Unlike traditional exercises, the Knowledge Network Exercises emphasize adaptability, scalability, and replicability, providing stakeholders with tools to refine good practices and integrate them into operational frameworks. The guidelines are structured around a lifecycle approach, covering all aspects of exercise management, from initial planning to after-action reviews.

Key Outputs from the Guidelines:

- Lifecycle-Based Framework:
  - Step-by-step guidance on designing, implementing, and evaluating exercises, ensuring a systematic and consistent approach.
- Innovative Focus:
  - Clear methodologies for identifying and prioritizing good practices to be tested during exercises, fostering innovation and adaptability in emergency management.
- Stakeholder Engagement:
  - Emphasis on inclusive planning processes that involve scientific institutions, civil protection agencies, community representatives, and international partners to ensure diverse perspectives.
- Scenario Design:
  - Detailed techniques for developing realistic and scientifically grounded scenarios tailored to specific risks, with a focus on enhancing decision-making and operational effectiveness.
- Evaluation and Continuous Learning:
  - Frameworks for comprehensive evaluations, capturing lessons learned, and integrating findings into future iterations of operational protocols and exercise planning.
- Practical Tools:
  - Templates and practical examples for defining objectives, allocating resources, and conducting debriefings, enabling users to tailor exercises to their unique contexts.

The guidelines emphasize the importance of aligning exercises with real-world challenges, integrating scientific expertise, and leveraging advanced tools such as Geographic Information Systems (GIS) and predictive models. These principles ensure that exercises not only validate good practices but also foster continuous improvement and innovation in disaster preparedness and response. By providing this structured approach, the Knowledge Network Oriented Exercise Management Guidelines serve as a vital resource for stakeholders seeking to enhance their disaster resilience capabilities through targeted, innovative exercises. They are designed to be a living document, evolving with the needs of the emergency management community and the increasing complexities of global risks.

Introduction

Purposes of the Guidelines

The COVALEX Project

The COVALEX project (Community of Valued Experts in Hydrometeorological and Technological Multi hazards) is an innovative initiative designed to create a unified and expansive community of experts, dedicated to enhancing responses to hydrometeorological and technological disasters. The project's mission is to harness the collective experience, geographical reach, and diverse sectoral networks of professionals in this field to create knowledge network that can favor the streamlining of evidence-based risk governance and improvement of communication interoperability among decision-makers, rescue teams, and humanitarian actors.

At the core of COVALEX is the objective to simplify complex phenomena for decision-makers and crisis managers, thereby bolstering prevention, preparation, and process testing strategies. This approach emphasizes the importance of integrating practical applications of scientific knowledge when preventing, preparing and responding to disasters.

COVALEX is anchored in a community-building approach and includes 6 across 10 countries, along with their networked members. This collaboration brings together academia, practitioners, and decision-makers in a multidisciplinary and cross-sectoral effort. By applying scientific knowledge to disaster risk management (DRM), COVALEX places a special focus on disasters driven by hydrometeorological and technological factors.

Key initiatives of COVALEX include the development of a comprehensive databank of experts, facilitating their involvement in international and local case studies and events. This effort aims to promote and enhance the capacities and knowledge of a diverse group of stakeholders, including experts, decision-makers, politicians, public service providers, media personnel, and NGOs.

COVALEX strives to create a platform where scientific knowledge and practical expertise converge, leading to more effective and informed disaster risk management practices, particularly in the context of increasingly complex hydrometeorological and technological challenges.

Introducing the concept of Knowledge Network Exercise

The COVALEX project is strategically structured around a series of activities, with dual primary objectives. Firstly, these activities are meticulously crafted to facilitate robust knowledge exchange and enhance expertise in mitigating, preparing for, and responding to hydrometeorological and technological hazards. Secondly, they aim to cultivate and strengthen a comprehensive network of experts in these fields. To achieve these goals, COVALEX organizes an array of thematic webinars, interactive workshops, specialized training sessions, and practical simulation exercises, each designed to foster collaboration, knowledge sharing, and skill development among professionals.

These activities are structured around a set of good practices sourced from the partners of the project and their network. Good practices can be defined as a set of actions, methodologies, or techniques that have been proven through experience and research to be effective, efficient, and ethical in preventing, preparing for, and responding to hydrometeorological and technological hazards. Good practices in this context are characterized by their innovativeness,

adaptability to different geographical and cultural settings, and ability to enhance collaboration among various stakeholders. They represent best-in-class approaches that not only address current challenges in disaster risk management but also offer scalable and sustainable solutions for future applications.

In order to evaluate and test a set of good practices, it is crucial to analyze how scalable and replicable they are across different contexts and scenarios; and most importantly how sustainable they are in terms of resources and processes needed to implement and maintain them. Simulations and exercises can be effective in achieving this, provided that they are tailored to the evaluation and testing of good practices. Within the COVALEX project, simulations and exercises designed to test the implementation of good practices are referred to as Knowledge Network Exercises. Knowledge network exercises are different from standard exercises in the sense that they are not designed and conducted to test already existing procedures and emergency plans, but rather to assess the replicability, scalability and sustainability of innovative good practices that are not in place yet or formalized in a set of standard operating protocols.

The goal of knowledge network exercises can be two-fold. First, it is possible to conduct a Knowledge Network Exercise within the country or region that has created the good practice. In that case, the objective is to translate the use of the good practice into Standard Operating Procedures (SOPs), and one main output can be that of integrating it into an emergency response plan to improve it. The second option is testing a good practice that has been successful in one country in another to assess its scalability, replicability, sustainability.

The primary purpose of these guidelines is to provide a structured approach for conducting exercises specifically designed to test and evaluate innovative good practices in the field of emergency management. Unlike traditional exercises that focus on rehearsing and validating existing procedures and emergency plans, these guidelines are tailored to explore and assess novel practices and methodologies that have not yet been widely implemented or may be entirely new to the field.

The innovative aspect of these guidelines is central. They aim to foster a proactive and forward-thinking approach in emergency management, encouraging the exploration of untested but potentially transformative practices. By focusing on innovation, these guidelines serve as a catalyst for change, driving the advancement of emergency management strategies and ensuring preparedness in the face of evolving challenges. The intent is to not only assess the feasibility and effectiveness of these novel practices but also to understand their scalability, replicability, and sustainability in various contexts.

Ultimately, these guidelines are designed to provide a robust framework that enables emergency management professionals to systematically test, evaluate, and refine innovative practices, thereby contributing to the enhancement of overall emergency response capabilities and resilience.

Scope and Applicability

These guidelines, developed under the COVALEX project funded by the European Union, are specifically tailored for civil protection exercises within the EU. They are designed to ensure that good practices, particularly those that are innovative and untested in the EU context, are rigorously evaluated under conditions conducive to their potential implementation.

The applicability of these guidelines extends to scenarios where the testing of new practices can be conducted in environments that closely mirror real-life situations. This is to ascertain that the practices are not only theoretically sound but also practically viable in diverse EU settings. The guidelines are intended for use by EU civil protection agencies, emergency response teams, policy-makers, and other stakeholders involved in disaster risk management. Their use will help in fostering a culture of innovation and continuous improvement in civil protection practices across the EU.

Methodology

These guidelines align with established frameworks used for standard civil protection exercises, particularly those focused on testing and evaluating existing SOPs and emergency plans. This alignment was achieved through a comprehensive literature review of existing civil protection exercise management guidelines, details of which are included in *Annex 7 - References*. However, it is crucial to emphasize that these guidelines are distinct in their focus and purpose. They are specifically designed to facilitate the testing and implementation of innovative good practices, diverging from traditional exercise management approaches in their emphasis on novelty, adaptability, and forward-thinking strategies in civil protection.

A rigorous process based on several iterations and multi-stakeholder consultations has been used to draft these guidelines with contributions from all the COVALEX project partners and their extended network. Most importantly, these guidelines have been updated based on the output and evaluations of the design, conduct and after-action reviews of the three Table Top Exercises conducted within the COVALEX project.

Scenario of the COVALEX Exercise	Location	Date	Good practices tested
Flash flood	Spain	April 2024	
Urban multi-incident	Italy	October 2024	
Wildfire	Greece	November 2024	

Table 1 – The COVALEX Exercises

The approach used to draft these guidelines is exemplified by the methodology used to construct the exercise scenarios. These were developed using the draft guidelines, incorporating lessons learned from the COVALEX exercises specifically focused on testing and evaluating good practices. Feedback from diverse sources was continually integrated into the guidelines, enriching their content and relevance. Similarly, the training materials for the exercise preparation were crafted based on these guidelines, with insights from trainers and trainees subsequently fed back into the document. This iterative process of experimentation, learning, and refinement was a cornerstone throughout the project, embodying our commitment to continuous improvement and hands-on learning. As a result of this approach, the guidelines include several practical tools designed to facilitate the management of Knowledge Network Exercises. These tools can be found in the Annexes.

Defining Good Practices

Overview of Good Practices

Good practices can be defined as a set of actions, methodologies, or techniques that have been proven through experience and research to be effective, efficient, and ethical in preventing, preparing for, and responding to hydrometeorological and technological hazards. Good practices in this context are characterized by their innovativeness, adaptability to different geographical and cultural settings, and ability to enhance collaboration among various stakeholders. They represent best-in-class approaches that not only address current challenges in disaster risk management but also offer scalable and sustainable solutions for future applications.

Across Europe, a wealth of good practices in emergency management exists, each reflecting the unique challenges and solutions developed within different countries. Recognizing and capitalizing on these varied experiences is fundamental. By establishing knowledge networks and tools that draw upon these diverse efforts, we can consolidate and enhance these practices. The key lies in evaluating their scalability, replicability, and sustainability across various contexts. Such an approach not only fosters a unified and effective response to emergencies but also ensures that these good practices evolve, adapt, and remain relevant in the face of changing circumstances and emerging challenges.

Within COVALEX we also take advantage of the methodological approach proposed by the DG-ECHO KN Projects ROADMAP and ROADMAP2 Leaded by the Italian Civil Protection Department. In particular, the good practices collected follow the methodological framework developed in these projects as well as a structure that will guarantee their integration within the Solutions Explorer (solutionsexplorer-roadmap.ci3r.it/) developed by these projects.

Importance in Emergency Management

The escalating frequency and intensity of extreme events, often carrying a multi-hazard dimension, underscore the critical role of effective emergency management. These events, ranging from natural disasters to technological crises, increasingly stress the response capacities of emergency management stakeholders. Furthermore, the transboundary nature of many emergencies, due to their extensive geographical coverage, necessitates a multi-stakeholder approach that transcends regional and national boundaries. The integration of advanced technologies such as information management, artificial intelligence, remote sensing, data fusion, and open data is revolutionizing our ability to prevent, prepare for, and respond to crises.

These technologies offer unprecedented opportunities to enhance situational awareness, streamline decision-making processes, and improve resource allocation. However, the full potential of these advancements can only be realized through the development of comprehensive guidelines and tools. These tools should not only facilitate the incorporation of these technologies into emergency management practices but also ensure their ethical and effective use. By doing so, we can significantly improve our readiness and response to complex emergencies, ultimately safeguarding communities and enhancing resilience in the face of increasingly unpredictable and multifaceted crises.

Examples from the COVALEX Project

A crucial phase in the COVALEX project involved systematically collecting good practices from partner countries to form an extensive knowledge base. This task, leveraging a multi-stakeholder approach, led to the creation of *Annex 2 — Good Practices Assessment Template*, a dedicated

tool for gathering comprehensive data on these practices. This rich dataset informed the design of the project's webinars and workshops. More critically, it guided the structuring and execution of the exercises, which were centered around these collected good practices. This integration ensured that the exercises were deeply rooted in practical, diverse, and tested strategies, enhancing their relevance and impact in real-world scenarios.

Example 1 – Integrating UAV Imagery and Forest Fire Propagation Models to improve situational awareness in Forest Fire Search and Rescue Operations

Good practice description

How does a fire evolve? There is no unambiguous answer. There are many parameters that can be considered, hence, fires are all different. The humidity of the air and the soil have their own weight, as does the wind, which can push the fire one way or another at different speeds. The slope is also a parameter that influences the speed and the prevailing direction of propagation. Moreover, the type of vegetation present, which can be more or less flammable, depending on the species and on its phenological state (i.e. the life cycle stage it is in: is the vegetation full of leaves and rich in water or dry and bare?).

Notwithstanding these limitations, estimations of fire behavior, based on the values of these parameters in a given area and at a given time, provide an important support for civil protection activities, to evaluate if and when a fire can approach infrastructures, houses or areas with an important frequency of tourists, but also for the management and containment of the spread of the flame front.

The PROPAGATOR model is a fire simulator that, starting from a fire ignition, probabilistically determines how the fire can move based on specific parameters, which are provided by the user or taken from monitoring stations or other models. For example, data on vegetation humidity are provided by RISICO, another model developed by CIMA Research Foundation, which allows for the integration of information on air humidity and other meteorological parameters on dried fine plant materials present on the ground.

To function, PROPAGATOR requires the GPS coordinates of fire ignition points. Acquiring these coordinates can be done using the geotagged photography of drones and other UAVs.

In a search and rescue scenario where a victim is stranded in a given location in proximity to a fire, the output of the PROPAGATOR model on fire propagation generated thanks to the input coordinates of the UAV imagery can be used to inform the search and rescue team on an estimate of the time available to initiate the search and rescue operations.

Scalability, Replicability and Sustainability

This good practice relies on a series of tools and methodologies developed by CIMA Research Foundation and the Italian Red Cross. It has been proven to be an efficient good practice in enhancing situational awareness for search and rescue operations during a full-scale exercise in Georgia which used drones from the Italian Red Cross and multiple search and rescue teams. But is it replicable to other countries and regions? Is it scalable to larger and more complex emergencies? Is it sustainable from a financial, human resources and IT resources perspective?

Other examples can be annexed from other partners once data collection of GP is done. They can be added as annexes but it would be nice to have one or two here to illustrate.

Exercise Design and Development

This section outlines the essential steps for planning exercises, focusing on establishing clear objectives and designing realistic scenarios. It emphasizes the importance of engaging all relevant stakeholders to ensure a collaborative and effective exercise. The goal is to create a structured environment where innovative good practices can be tested for their applicability and effectiveness in real-world emergency situations. Through this process, the section aims to provide a clear framework for organizing exercises that contribute to the advancement of civil protection efforts. The core components of design include clarifying the aim, establishing the exercise scope, setting objectives, developing evaluation parameters, identifying the stakeholders, creating a scenario and the right documentation.

Setting the aim and objectives for innovation testing

Setting the aim

The aim of a knowledge network exercise, particularly one designed to test good practices and innovation, is a targeted declaration of what the exercise intends to accomplish, focusing on the exploration and evaluation of new methodologies and strategies. Unlike traditional exercises, the aim here should encapsulate both the innovative essence and the collaborative spirit of the exercise, directing the initiative towards enhancing emergency management practices through novel solutions. Collaboration is crucial to the multi-stakeholder approach advocated in these guidelines. The level of collaboration will depend on the main stakeholders participating in the exercise. It can be an international collaboration, for example in the case where country X is testing the transferability of good practices to country Y, or it can be more localized, for example in the case where several actors that are part of the same system but are not used to work together participate in the same exercise. The aim should remain singular to maintain focus, but it should encapsulate the broader goals of fostering innovation and collaborative knowledge sharing among various stakeholders.

The core elements of such an exercise aim include 'innovation' and 'collaboration'. For instance:

- **Innovation**: Evaluate the efficacy of utilizing AI-driven predictive analytics for fire propagation
- **Collaboration**: Leveraging the collective expertise of research/competence centers, private companies and civil protection authorities

The aim must start with an action-oriented verb that underscores the forward-thinking and experimental nature of the exercise, and it should be straightforward, succinct, and realistic. This approach ensures that the objectives derived from the aim are aligned with the exercise's innovative goals, guiding the choice of exercise format, scale, and complexity appropriately. Here is a suggested format for such aims, highlighting the focus on innovation and collaboration followed by a concrete example:

> **Innovation/Good Practice being tested** through **Method/Tool** in a **Collaborative Context/Network**, aiming to **Specific Outcome**.

Pilot the integration of drone technology for rapid damage assessment post-fire through a collaborative simulation with local emergency response teams and technology partners, aiming to enhance real-time decision-making and resource allocation.

This aim clearly articulates the innovative practice being tested (integration of drone technology for rapid damage assessment), the method/tool involved (collaborative simulation with emergency response teams and technology partners), and the specific outcome desired (enhancement of real-time decision-making and resource allocation). This format ensures that the aim is action-oriented, focused on innovation, and rooted in a collaborative approach, aligning perfectly with the objectives of knowledge network exercises designed to test good practices and innovation

By tailoring the aim to emphasize innovation and collaborative testing of good practices, the exercise becomes a powerful vehicle for advancing the state of emergency management, pushing the boundaries of traditional practices and fostering a culture of continuous improvement and shared learning.

Verb	
Pilot	refers to the action of conducting a preliminary trial or test of a new method, technology, or practice within a controlled setting. The purpose of piloting is to evaluate the feasibility, effectiveness, and potential impact of the innovation before broader implementation or adoption
Assess	underscores a critical and analytical approach to understanding the value and impact of innovations, guiding decision-making on their future application and improvement.
Explore	signifies the process of investigating or examining new methods, technologies, or strategies with an open and inquisitive approach. This exploration aims to uncover potential benefits, challenges, and applications of innovative solutions in emergency management, enabling stakeholders to assess the viability and impact of these solutions in real-world scenarios.
Demonstrate	involves showing the practical application and effectiveness of innovative good practices, methods, or technologies within a controlled setting. It goes beyond theoretical exploration to provide tangible evidence of how these innovations work in practice, highlighting their benefits, efficiencies, and potential for integration into existing emergency management systems.
Validate	Validation seeks to establish that these innovations meet predefined criteria for success, are compatible with existing emergency management frameworks, and can consistently perform under various conditions.

Table 2: Exercise verbs

Setting Objectives

For a knowledge network exercise designed to test good practices and innovation, setting objectives is a critical step to guide participants towards the desired purpose. While the exercise has a singular aim focused on innovation, multiple objectives should detail the specific achievements sought through participant engagement. These objectives:

- Must be established at the onset of the concept development phase, ensuring they align with the exercise's innovative focus
- Need to be articulated clearly and succinctly, avoiding complexity and ensuring they are understood universally
- Should exclude vague terms like ‘timely’, ‘effective’, and ‘efficient’ unless these can be defined in measurable terms

In crafting objectives for exercises that emphasize good practices and innovation, the SMART model remains pivotal but is adapted to underscore the unique aspects of innovation and collaborative exploration:

- **Specific** underscores the objective's clarity regarding the innovation or good practice being tested. This clarity is crucial for guiding focused exploration and evaluation
- **Measurable** incorporates criteria that enable the quantification of innovation's impact, facilitating the assessment of how well the new practices meet the exercise's goals
- **Achievable** underlines setting realistic objectives that consider the innovative nature of the practices and the collaborative environment in which they are tested
- **Relevant** ensures that each objective directly contributes to the exercise's aim to test and refine innovative practices, making sure they are meaningful and directly connected to the overarching goals of enhancing emergency management
- **Task-related** emphasizes the objectives should be centered around specific actions or innovations participants will explore, allowing for observable and measurable engagement by the exercise control (EXCON) team and participants, thus driving progress towards the innovative aim

By applying this adapted SMART framework, objectives for knowledge network exercises not only guide the testing of innovations but also foster an environment where collaborative exploration and validation of good practices can thrive, ensuring they are practical, effective, and capable of being integrated into broader emergency management strategies.

To illustrate these concepts, let's take the example of the good practices described in the section Defining Good Practices:

Objective	Description	Indicator
Evaluate the Improvement in Situational Awareness	To determine the extent to which integrating UAV imagery and the PROPAGATOR model enhances situational awareness for search and rescue operations in forest fire scenarios.	**Response Time Reduction**: The decrease in time taken to initiate search and rescue operations after integrating UAV and model data, compared to traditional methods.
		Increased Operational Area Awareness: The percentage increase in the area for which search, and rescue teams have accurate situational awareness, facilitated by UAV imagery and model predictions.
		Accuracy of Risk Assessment: Assess the accuracy of risk evaluations for search and rescue operations based on model predictions, including safe pathways, estimated times before fire impact on specific locations, and identification of high-risk zones.
Assess the Operational Feasibility of the Integration	To evaluate the practicality of implementing UAV imagery and PROPAGATOR model integration in real-world search and rescue operations.	**Implementation Time**: The time required to integrate UAV imagery with the PROPAGATOR model and generate actionable data for search and rescue teams.
		Resource Efficiency: Evaluation of the resources (e.g., personnel training, equipment costs, operational time savings) required versus benefits gained from the integration.
		User Feedback: Collect qualitative feedback from search and rescue personnel on the usability, reliability, and overall impact of the integrated system on their operations.

Table 3: Good Practice Definition

These objectives and indicators are designed to comprehensively test the innovative practice of leveraging UAV imagery and advanced fire propagation models to improve decision-making and effectiveness in forest fire search and rescue operations. By focusing on situational awareness improvement and operational feasibility, this approach ensures a thorough evaluation of the practice's benefits and areas for further refinement.

Defining the Scope and Scale

Defining the scope and scale of a knowledge network exercise aimed at testing good practices and innovation is crucial for aligning the exercise with its objectives while adhering to available resources and the capacities of participating entities. The exercise scope delineates the operational boundaries within which the innovative practices will be explored and evaluated.

When outlining the scope of such an exercise, it's essential to specify the innovative elements and practices to be included, as well as explicitly stating any areas or practices that fall outside the exercise's focus. This clarity helps in maintaining a tight focus on innovation and prevents the dilution of exercise goals.

For a knowledge network exercise focused on innovation, the scope should:

- Be sufficiently broad to encompass the diverse range of innovative practices under consideration, ensuring a comprehensive exploration of new ideas.
- Reflect the commitment level of all key participants, including entities from the public sector, private sector, academia, and non-governmental organizations, fostering a rich, multi-faceted collaborative environment.
- Remain within the participants' capabilities, challenging them to stretch their competencies without overwhelming them, thereby facilitating meaningful learning and constructive feedback on the tested innovations.
- Account for the depth of participant involvement, ranging from frontline application of innovative practices to their integration and coordination at higher levels of decision-making and strategic planning.

This approach ensures that the exercise remains focused on its primary goal of fostering the development, testing, and refinement of innovative practices within a collaborative, multi-stakeholder setting. Here is an example based on a good practice shared by the Italian Red Cross:

Good Practice to be Tested: The primary innovative practice under examination involves mobilizing community volunteers to gather critical data on emergency hotspots, utilizing mobile technology and social media platforms for real-time monitoring and reporting.

Geographical Area: The exercise will be conducted across selected sites within the Liguria coastal region, chosen for their high risk of wildfires and the active involvement of local communities in emergency response efforts.

Main Stakeholders:

- Local Emergency Management Agencies: Responsible for coordinating the overall emergency response efforts and integrating volunteer-collected data into their operations.
- Volunteer Organizations: Including community groups and NGOs, tasked with recruiting, training, and managing volunteers for data collection activities.
- Technology Partners: Providing the necessary mobile applications and platforms for data collection, reporting, and analysis.
- Academic Institutions: Offering expertise in emergency management, volunteer coordination, and data analysis, and evaluating the effectiveness of the practice.

The exercise will deliberately exclude the direct involvement of large-scale international response teams to maintain a focus on local capacities and the integration of volunteer efforts into existing emergency management frameworks. By setting these boundaries, the exercise aims to achieve a clear understanding of how volunteer involvement can enhance hotspot monitoring, assess the scalability of this practice to other high-risk areas, and identify potential challenges and solutions for its wider adoption.

Choosing the right Exercise Style

Having established the aim, objectives and scope of your exercise, the style is determined and the exercise planned and written to achieve the objectives. The aim and objectives of the exercise will help you determine the most appropriate style or styles needed.

The exercise management team does not have to restrict itself to only one style. Building progressive exercise programs or using several different styles is often useful.

The style chosen will be influenced by other factors that may include:

- skills or experience of the exercise management team
- training needs
- commitment of key staff
- venue availability
- availability of participants
- other commitments
- lead-time
- time available to conduct the exercise
- resources available
- budget

Exercises can be simple or complex. They might involve a small team practicing a relatively simple drill, or a range of organizations simulating a major emergency. Two main exercise styles:

Discussion-based	Operations-based

When deciding on an exercise style, exercise designers should consider the existing level of capability. It may be appropriate to conduct a series of exercises to build capability; starting with simple, discussion style exercises and building up to more complex, deployment style exercises.

Regardless of whether an exercise is discussion-based or operations-based, it should be structured in four distinct steps to maximize the effectiveness of testing and implementing innovative good practices. This structured approach ensures comprehensive understanding, training, application, and evaluation of the practices within the knowledge network.

➔ **Step 1: Introduction and Familiarization**

Begin with an introductory phase dedicated to presenting the innovative good practices to all stakeholders. Utilize case studies and demonstrations to showcase successful implementations, providing a clear understanding of how these practices operate and their potential benefits. This phase aims to build a foundational knowledge base and generate understanding and possibly enthusiasm among participants for the innovative solutions.

➔ **Step 2: Training**

Proceed with a focused training session for exercise participants who will directly engage with the good practices. Tailor the training to cover operational details, expected outcomes, and potential challenges. Ensure that participants are equipped with the necessary skills and knowledge to effectively test and utilize the practices during the exercise. Utilize interactive methods, workshops, and simulations to facilitate in depth learning.

➔ **Step 3: Implementation**

Implement the good practices within the exercise scenario, allowing participants to apply their training in a controlled, yet realistic environment. This hands-on experience is critical for assessing the practicality, effectiveness, and adaptability of the innovative practices in real-world settings. Monitor the implementation closely to gather data on performance and participant engagement.

➔ **Step 4: Debriefing and After-Action Review**

Conclude with a comprehensive debriefing and after-action review session focused on lessons learned and opportunities for iterative improvement. Encourage open and constructive feedback from all participants, highlighting both successes and areas for enhancement. Analyze the exercise outcomes to identify best practices, challenges encountered, and recommendations for integrating the innovative solutions into broader emergency management strategies.

Discussion-based Exercises

A knowledge network discussion-based exercise, such as a Tabletop Exercise (TTX), is crafted to foster constructive discussions among participants on the integration and effectiveness of innovative solutions and good practices in emergency management. This exercise leverages a carefully designed simulated scenario, enhanced with a series of planned prompts or injects, to explore the implications of introducing novel approaches on current plans, processes, and capabilities. The primary aim of the TTX is to bolster the preparedness and adaptive capacity of organizations to manage emergencies by embracing innovation. It provides a platform for participants to collaboratively scrutinize and refine response strategies, understand their roles in the context of innovative practices, and address challenges through guided dialogue.

The TTX is particularly effective for simulating the adoption of new technologies or methodologies in a risk-free environment, promoting engagement from strategic, operational, and tactical staff across various sectors involved in emergency response. These exercises are tailored to the complexity of the objectives and the majority of time is allocated to active discussion followed by a comprehensive debriefing.

Essential resources for a successful TTX include a skilled facilitator with experience in innovation within emergency management, supported by subject matter experts in the relevant innovative practices and logistical personnel. The success of the IGP-TTX hinges on the inclusion of diverse, relevant stakeholders, clear articulation of the exercise’s innovation-driven objectives, and equitable representation from all critical functional areas involved in emergency response.

This guideline emphasizes the necessity of meticulous preparation, strategic attendee recruitment, and explicit goal definition to maximize the TTX's utility in promoting the adoption of innovative practices and enhancing overall emergency response effectiveness.

Here is an example of a good practice that would be more suited to a TTX type of exercise: Predictive Analytics for Disaster Risk Reduction

Utilizing predictive analytics to forecast disaster impacts and optimize response strategies is an innovative practice well-suited for a TTX. This approach involves analyzing vast datasets, including historical weather patterns, social media trends, and IoT sensor data, to predict where and when disasters are likely to occur and their potential severity. A TTX can simulate scenarios where stakeholders use predictive models to make informed decisions about pre-disaster preparations and resource allocation. Participants can discuss the integration of analytics into

existing disaster management plans, evaluate the reliability of predictive models, and explore the implications of data-driven decisions on public safety and emergency response efforts. This theoretical exploration allows for the examination of the effectiveness, challenges, and ethical considerations of relying on predictive analytics in emergency management.

Operations-based exercise

Operations-based exercises within the context of a knowledge network focused on innovation and good practices are structured to assess and enhance the application of novel strategies, technologies, and collaborations in real-world emergency response scenarios. These exercises, which encompass drills, functional exercises (FE), and full-scale exercises (FSE), aim to test and refine the integration of innovative practices within existing frameworks, ensuring that roles, responsibilities, and resource allocations are clearly understood and effectively executed. Characterized by the active deployment of communication systems, mobilization of both traditional and novel resources, and the utilization of command and control structures, these exercises unfold in realistic, time-constrained settings to simulate actual incidents.

Key objectives for these operations-based exercises in a knowledge network include:

- **Validating innovative response mechanisms** to emergencies, ensuring that new technologies and methodologies seamlessly integrate into and enhance existing response systems.
- **Assessing the adaptability and functionality** of operational plans when incorporating innovative practices, with a focus on improving the overall efficiency and effectiveness of emergency responses.
- **Fostering enhanced coordination and communication** among diverse stakeholders, including public agencies, private sector partners, volunteer groups, and academic institutions, to leverage a wide range of expertise and resources.
- **Identifying opportunities for improvement** in the application of innovative solutions, particularly in terms of strategy development and resource optimization.

By participating in these operations-based exercises, stakeholders from across the knowledge network gain valuable hands-on experience in implementing cutting-edge solutions under pressure. This approach allows for a comprehensive evaluation of both individual and collective abilities to manage intricate and evolving emergencies, highlighting the potential for innovation to transform emergency management practices.

Here is an example of a good practice that would be more suited to a operations-based type of exercise: Drone Deployment for Rapid Damage Assessment and Resource Delivery

The use of drones to conduct rapid damage assessments following disasters and deliver critical supplies to inaccessible areas represents an innovative practice ideal for testing in an operations-based exercise. This practice involves deploying drones equipped with cameras and sensors to gather real-time data on affected areas, assess infrastructure damage, and identify safe routes for responders. Additionally, drones can be used to deliver medical supplies, food, and water to survivors cut off by debris or flooding. An operations-based exercise can simulate the activation and coordination of drone operations, allowing participants to practice the logistical aspects of drone deployment, including communication and interoperability protocols, airspace management, and integration with ground-based response efforts. This hands-on exercise helps evaluate the operational effectiveness of drones in disaster scenarios, their

impact on response times, and the challenges of integrating new technologies into traditional emergency management frameworks.

Exercise Documentation

Exercise Concept Document

The development of an exercise concept document is a crucial step in outlining the framework and obtaining the necessary approval to proceed. This document should be comprehensive, detailing the foundational aspects of the exercise and its operational structure.

- **Exercise Need**: Identify the specific gap or opportunity within emergency management that the exercise aims to address through the testing of innovative good practices, emphasizing the importance of collaborative knowledge sharing and the application of new solutions.
- **Exercise Aim**: Clearly state the purpose of the exercise, focusing on evaluating and enhancing the effectiveness of innovative good practices within a specified emergency management scenario, with a particular emphasis on volunteer involvement for data collection and monitoring.
- **Exercise Objectives**: List specific, measurable objectives that align with the aim, such as demonstrating the effectiveness of volunteer data collection, assessing the integration of this data into emergency response frameworks, and identifying best practices for volunteer engagement.
- **Exercise Scope**: Define the boundaries of the exercise, including the good practices to be tested (e.g., volunteer data collection and hotspot monitoring), the geographical area covered (e.g., Mediterranean coastal region), and the main stakeholders involved (e.g., local emergency management agencies, volunteer organizations, technology partners, and academic institutions).
- **Participating Organizations**: Detail all entities involved in the exercise, from local community groups to academic researchers, outlining their roles and contributions to the testing and evaluation of innovative practice.
- **Governance and Management Structure**: Describe the organizational framework for planning and conducting the exercise, including leadership roles, decision-making processes, and coordination mechanisms among the participating organizations.
- **Public Information Requirements**: Specify the strategies for communicating about the exercise to the public, including objectives, expected outcomes, and how the public can stay informed or get involved.
- **Proposed Evaluation Methodology**: Outline the methods and criteria for evaluating the exercise outcomes, including data collection techniques, analysis procedures, and benchmarks for success.
- **Proposed Budget**: Provide an estimated budget that covers all aspects of the exercise, from logistics and technology support to participant training and evaluation activities.
- **Proposed Timelines**: Set forth a detailed timeline for the planning, execution, and post-exercise analysis phases, including key milestones and deadlines.

Creating a detailed exercise concept document ensures that the knowledge network exercise is well-planned, focused on innovation, and aligned with the overarching goals of enhancing emergency management practices through collaborative efforts and the integration of new solutions.

Master Scenario Events List (MSEL)

In a knowledge network exercise, the Master Scenario Events List (MSEL) serves as a dynamic guide, outlining a series of planned actions and innovative scenario injects designed to stimulate participant engagement and interaction. This document, or system, sequences these actions chronologically to ensure the exercise flows smoothly and all innovation-focused objectives are addressed. Unlike traditional exercises, the MSEL for a knowledge network might also integrate scenario branches that allow exploration of various outcomes based on the adoption of new practices or technologies. It connects theoretical innovation concepts with practical application, enriching the participant experience and encouraging active problem-solving and collaboration. The MSEL, therefore, not only schedules events to guide the exercise but also includes potential innovations and their impacts, acting as a critical tool in facilitating the exploration of new ideas within the structured format of the exercise.

There are three types of Event types:

Event Types	Description
Inject	A MSEL event introduced to a player by the control staff, representing non-playing entities, to build the exercise environment based on the exercise scenario and to drive operations-based exercise play.
Contingency Inject	A MSEL event introduced to a player by the control staff when a key player expected action did not occur as planned, to provide an additional opportunity to meet exercise objectives
Expected Action	A MSEL event that represents an anticipated action to be taken by a player during the exercise.

Table 4: Event types

Each MSEL entry should include at least the following:

- Event number
- Designated scenario time
- Event type
- Inject mode
- From (Non-playing entity delivered by the Control Staff)
- To (Intended player)
- Message
- Expected participant response
- Exercise objective
- Notes section (for controllers and evaluators to track actual events against those listed in the MSEL, with special instructions for individual controllers and evaluators).

Scenario timelines listed in the MSEL should be as realistic as possible and based on input from SMEs. If the activity occurs sooner than the MSEL writers anticipated, then controllers and evaluators should note the time the activity occurred, but play should not be interrupted.

Designing Scenarios to test innovation

The scenarios provide simplified and generic description of future possible disaster events in terms of their magnitude (impacts) and probabilities (likelihood), making the hazards become tangible. The scenario development process requires input from scientists, practitioners, policymakers and community experience on past events and knowledge of social, cultural, economic, and political context (JRC, 2021). In preparing for potential catastrophic events, it's crucial to methodically construct a scenario that encompasses various elements, ensuring a thorough evaluation of readiness and response capabilities.

The risk scenario is the inbuilt product of a descriptive activity, accompanied by explanatory maps, and an evaluative activity concerning the effects that may be produced on humans , goods, settlements, animals and the environment, attributed to the evolution in space and time of an event linked to one or more types of risk, namely: seismic, volcanic, tsunamis, hydraulic, hydrogeological, adverse weather phenomena, water deficits and forest fires. These types of scenario can include avalanches, storm surges and potential events linked to dams. (*PPRD South 3 Guidelines document to support partner countries in the preparation of Civil Protection Emergency Plans, Regional Guidelines document on Civil Protection Planning, 2021)*. In order to achieve the set objectives in the training activities, it is necessary to construct the exercise scenario. The training scenario serves to create the background for the actions that participants will take during the activities.

The master scenario should be based on the identified risks of the target group/ organization and the plans that are meant to be tested. (Words in Action, UNDDR, Design and conduct of simulation exercises – SIMEX, 2020)

A scenario should be:

- Plausible / credible: historic, model based, expert based (on average occur once or more often in 100 y.)
- Complete, pertinent, practical (Methodology to determine consequences and probabilities should be clear and sound)

The scenarios types of events should be:

- the most probable adverse event
- the event with the worst possible consequences
- Complex events such as, cascade events, cross-border etc

The scenario may be:

- an event which may arise in short time period with a certain probability (floods, earthquakes, forest fires...);
- a risk preceded by certain changes, i.e. when certain events may become real in a longer period of time (for example, if the scenario is based on climate changes).

The scenario contains a sequence of events to lead the participants through the simulation exercise. Each event is separated into several incidents and these incidents are communicated to the participants by specific injects, such as phone calls, emails and reports. The master scenario gives the guideline, but depending on how the simulation develops, flexibility in the prepared injects are necessary. (Words in Action, UNDDR, Design and conduct of simulation exercises – SIMEX, 2020)

During a design of a scenario of an event, it could be necessary to determine the specific goals and the learning objectives to better understanding how a system or an organization could improve by using an innovative practice to manage an event.

It could be necessary to define the key elements of the scenario, including the location, time, magnitude, and specific circumstances surrounding the event. Furthermore, consider factors such as population density, infrastructure vulnerabilities, and environmental conditions could be relavant to better identify the impacts of the event.
Specifically, a training scenario is characterized by the following elements:

- Historical event
- Activation of the exercise scenario

Regarding the historical event, it is useful to emphasize that this must be chosen from events that have occurred in the reference area in order to simulate an event with a certain probability of occurrence. In relation to risk, the essential elements of a historical event can be listed as follows:

- Geographical area where the events occurred;
- Representation of the conditions that led to the event (e.g., meteorological conditions or conditions conducive to fire ignition);
- Alerting activities (e.g., weather bulletins and/or susceptibility bulletins);
- Description of ground effects or representation of event occurrences (e.g., representation of recorded rainfall data or wind speed recordings);
- Description of damages (e.g., reports or documents related to quantified damages).

The reference historical event is used to activate the exercise scenario, which can be of two main types:

- Modeled
- Historically based

In the first case, through the use of scientific models and high technical competence, it is possible to construct the entire phenomenon related to the analyzed risk. For example, in the case of wildfires, fire propagation models can be used, or in the case of floods, numerical hydraulic propagation models can be used. In order to stimulate training processes and activate actors in different processes, it might be useful to "stress" the model to exaggerate the impacts to evaluate the system's response to event management.

In the second case, the scenario is related to a past event, so the chronology of events must be constructed through primarily reconstructing the events and facts that occurred. Craft a detailed narrative outlining the sequence of events leading up to, during, and after the catastrophic event. This narrative should encompass warning signs, emergency response actions, evacuation procedures, and post-event recovery efforts, providing a comprehensive overview for participants.

Incorporate realistic challenges and complexities into the scenario to thoroughly test participants' critical thinking, problem-solving, and decision-making skills. Consider constraints such as limited resources, communication failures, coordination issues, and unexpected developments to provide a comprehensive evaluation.

Example: Developing a Flood Scenario – PPRD EAST 3 - Moldova

In August intense thunderstorm rains over north Moldova and western Ukraine causes a significant increase in the water level of the rivers and leads after 3 days to a 200-years flood in Soroca District, affecting more than 2500 people. The flooding of the Dnister river occurs during the night. The first settlement to be affected is Cosăuți: especially R14.1 road (M2) and residential area with about 1000 people along the right bank of the river are flooded. The border crossing station PCTFS Internațional fluvial "Cosăuți-Iampol" and the quarry Cariera de Granit şi Pietriş din Soroca are heavily damaged. After 1 hour the river overflows in Egoreni area, destroying a tourist info point. After half an hour, the river floods Soroca city, affecting about 1350 people and damaging buildings, commercial and touristic activities, services and the stadium Soroca City. After half an hour the farmland and buildings in Trifăuți are seriously flooded. After half an hour the river overflows in Vasilcău affecting a residential area with around 240 people.

Example: Developing a widlfire Scenario – PPRD EAST 3 - Georgia

Local citizens report explosions on Friday evening at a campsite on the mountain around Borjomi. A fire breaks out in the forested area near the city. There is a massive tourist presence in the city of Borjomi on the occasion of a local festival. The management and the evacuation of people in the campsite make the local fire brigade operators busy and unable to operate in extinguishing fires. Some human losses are expected after the explosion. During the night the wildfire appears to be out of control, burning at least 100 ha of forest. Wind began to blow in the area, fueling the fire and rapidly spreading near the city early Saturday morning. The Mountain Road network and some economic activities are damaged. On Saturday night, the fire reaches the city of Borjomi. In the early hours of Sunday, without immediate intervention by the firefighters, the fire destroyed and damaged most of the businesses in the area, such as restaurants, bakeries and accommodation facilities. The fire spreads to the ecosystem of the Borjomi Nature Reserve, causing enormous losses to the local biodiversity. The fire damaged the local television communication tower on Sunday, cutting out communication with the people. The fire reaches the high-density residential area on Sunday afternoon: at least 1500 people are affected. The fire spread out of control on Sunday night. Local authorities report damage to the Borjomi Water bottling plant. Black smoke is reported near the industrial plant. In the first hour of Monday, the major impacts are reported to local authorities. A large number of guesthouses and hotels are affected by the wildfire. Many tourists and citizens are missing. Much of the city is affected by the wildfire, causing loss of human life and goods. Primary and secondary road networks are destroyed. The railways are damaged. Much of the forested area has burned. Losses in the historical heritage are reported.

Multi-stakeholders approach, roles and interoperability

Multi-stakeholders approach

As part of the activities that CIMA Foundation carries out for the Civil Protection department, there was a synthesis of literature reviews to define the stakeholder mapping concept and in particular how to apply it in civil protection activities.

First of all, it is necessary to find a common definition of 'interested parties', 'stakeholders' and 'social actors'?

Generally, the concept of **interest categories** identifies "Any subject (person, group of persons, institution, association or company) whose interests, opinions, contribution may favor or hinder the achievement of the objectives of the process." (RTI EUROCUBE srlcr & Area Europa scrl, 2017). In the context of risk management, a definition can be given as "all individuals, groups of individuals or organizations that may influence, be influenced by or perceive themselves to be influenced by the impacts of a disaster, as well as any type of entity that is actively involved in disaster management before, during and after events or whose interests may be negatively or positively affected as a result of a disaster" (Mojtahedi et al., 2017).

However, further investigation is necessary to better understand this concept and its facets, and consequently to develop effective participatory processes that take them into account. In this regard, we use the definitions proposed by Newton et al. in 2016, which distinguish between “stakeholders,” “social actors,” and “interested parties.”

- **Social actors:** these can be those with a legal mandate, those who actively influence the course of social action and/or those who are passively affected by the actions of others rather than actively influencing outcomes. This term is mainly used in sociology and therefore of less interest for our purposes, contrary to the next two definitions; Mehrizi et al. (2009)
- **Interested parties**: existing management bodies or structures. Many other 'stakeholders' or 'social actors' would also be 'interested parties' with regard to the implementation of a management directive (e.g. Flood Directive 60/2007/EC), if they have an interest in or influence on the outcome; (Semeoshenkova and Newton, 2015).
- **A stakeholder** is a person, organization or group with an interest (professional or societal) or an influence on the marine environment or who is influenced directly or indirectly by activities and management decisions.” Mehrizi et al. (2009)

After clarifying the definitions, of the parties involved, it is necessary to understand how they interact with each other.

According to Newton et al, 2016 for stakeholder involvement in a participatory process within the decision-making processes of managing the various phases of the risk cycle, some questions need to be asked.

- What types of stakeholders exist?
- What is the role of each of these types?
- Are all stakeholders equivalent?
- How can stakeholders and interested parties be involved?

The structured answer to these questions will make it possible to map stakeholders in a manner consistent with the territorial context of reference and thus structure a process capable of considering the different contributions deriving from the territory in which the process will take place.

Examples and proposals for stakeholder mapping

Numerous examples and proposals for stakeholder mapping exist in the literature. An attempt has been made to summarize some key elements that are useful for the purpose and functional for the Civil Protection sphere.

Mojtahedi and Oo proposed in 2017 a stakeholder classification based on the three characteristics of power, legitimacy and urgency, which play a key role in the reactive or proactive approach of stakeholders towards risk management.

Another possible classification of stakeholders is that proposed by Newton et al., which in turn is based on the Driver-Pressure-State-Impact-Response (DPSIR) framework (Gari et al., 2015; Patrício et al., 2016; Scharin et al, 2016), according to which: "Drivers (basic human needs, individual and social aspirations) require activities (by users, developers, industries, etc.), which in turn generate Pressures, i.e. the mechanisms to cause adverse changes in the state of the natural environment (physical, chemical, biological). If not considered, these create an Impact (on human well-being) that must be addressed by Responses (involving measures)'.

The Primes project identifies as a mapping and classification tool the relevance of the stakeholders for the resolution of the problem posed in the participatory process. According to this methodology, it is necessary to identify a range of actors/stakeholders who 'caused' the problem, as well as those who are socially and economically affected by it and those who seek to regulate it.

Based on the interest and influence that each stakeholder group has, it is possible to identify the need for involvement. Here are some examples:

- Stakeholders with high influence and high interest are classified as 'ESSENTIAL'. They must be managed with the utmost care. They must be involved as they have a strong influence on decisions
- Stakeholders with low influence and high interest are classified as 'DEBUILD'. They must be kept informed about the progress of the project. They must be involved because they do not have the means to strongly express their interests (they often coincide with the beneficiaries of the process/project)

Modes of involvement

How can stakeholders and interested parties be involved?

In order to involve stakeholders relevant to the achievement of a given outcome, it is advisable, once stakeholder mapping has been completed, to understand which categories are essential and to size the working group accordingly. One criterion that can be used is proposed by Newton et al. and stipulates that the working group, which they call a 'stakeholder forum', should be:

- Balanced between the different types of stakeholders
- Relevant in the context of problem and system definition
- Representative of a stakeholder group rather than individuals
- Meaningful
- Informed about the all-encompassing and specific issues
- Participatory and accountable

Effective stakeholder management strategies should be developed that are specifically based on their needs and the potential impact of their involvement.

Once the activities and thus the objectives for which stakeholders are involved have been identified, the methods of involvement should be identified.

Different stakeholders have different needs and demands and therefore need different engagement strategies.

Three different research approaches and methodologies can be distinguished, which can be applied in the study of stakeholder involvement:

- Quantitative approach: the information collected is presented in numerical form. Generally, standard methodologies are used that are the same for all participants (such as tests and closed-ended questionnaires) which allow the data obtained to be categorized, ordered, classified and represented with graphs or tables
- Qualitative approach: information is collected using a series of 'labels' or classifications. Various methodologies are used, such as open questionnaires or interviews. The data obtained are descriptive and not numerical, so their use is much more complex and requires elaborate processing
- Mixed methods: integrated use of qualitative and quantitative methods (Ryan et al., 2020)

Based on the approach one decides to follow, different engagement techniques can be used:

- Workshops
- Exercises
- Exercises information
- Seminars
- Community coalitions
- Home visits
- Gamification
- Community champions
- School programs
- Focus groups
- Storytelling (Ryan et al., 2020)

Roles

Dicussion-based Exercices

Facilitation is key in a knowledge network discussion-based exercise. The facilitation structure for knowledge network discussion-based exercises is a tailored framework designed to support dynamic collaboration and innovation among participants. This structure is vital for guiding the exchange of ideas and ensuring that the exercise remains focused on exploring and integrating innovative practices within emergency management.

- Lead Facilitator Role: The Lead Facilitator plays a crucial role in steering discussions towards the objectives centered around innovation and good practices within the knowledge network. They are responsible for maintaining the momentum of the exercise, ensuring that discussions not only stay on course but also delve deeply into the innovative aspects being explored
- Coordination Among Facilitators: Facilitators must work closely with one another within this structured network to foster an environment of open exchange and collaboration. This coordination is essential when the exercise involves multiple breakout sessions, each focusing on different facets of innovation within emergency management
- Breakout Session Structure: Breakout sessions can be organized around specific themes of innovation or challenges that the knowledge network aims to address. These can be categorized into:
    - Innovative Functional Areas: Groups based on shared expertise in emerging fields or technologies (e.g., data analytics, drone operations, social media for

emergency communication) that are pushing the boundaries of traditional emergency response roles
    - Collaborative Organizational Areas: Groups formed around the purpose of integrating innovative practices across different sectors (e.g., public safety partnerships with tech companies, community organizations contributing to emergency management through innovative practices)
- Facilitator Selection and Training: Facilitators for these exercises should be selected based on their expertise in the specific innovative practices being explored as well as their ability to encourage productive dialogue. Training for facilitators should include an overview of the innovative practices in focus, along with techniques to manage discussions that foster collaborative problem-solving and idea generation
- Enhancing the Exercise Through Technology: Utilize digital platforms and tools to facilitate discussions, especially when exploring technology-driven innovations. This can include using collaborative software for real-time idea sharing, voting systems to prioritize discussion points, or virtual breakout rooms for remote participation

Operations-based exercises

Constituting the organizational structure for an operations-based exercise involves meticulous planning and coordination to ensure that the exercise's design, development, conduct, and evaluation are effectively managed.

- Define the Organizational Structure:
    - Adhere to a clear organizational structure that delineates roles and responsibilities. This structure should be flexible enough to accommodate the scale and complexity of the exercise while ensuring adequate span of control and meeting the requirements necessary for the exercise type
    - An Exercise Director should provide strategic oversight and direction, supported by an Exercise Planning Team Lead responsible for managing the planning team and coordinating with senior leaders and the Exercise Director

- Assign Specific Functions:
    - Safety/Security: Assign a team or individual to ensure the exercise is conducted in a safe and secure environment
    - Design and Development: This function involves compiling and developing all exercise background and documentation, providing technical or functional expertise for scenario development, and ensuring all exercise design and development needs are met
    - Scenario Development: Tasked with developing a model or outline of the simulated sequence of events that drive the player's discussion or actions
    - Control: Responsible for the control structure needed for an operations-based exercise, including master control cell, individual venue control, and simulation and modeling requirements
    - Modeling and Simulation/GIS: Coordinates the use of modeling, simulation, and GIS to ensure these elements are integrated with the scenario and control elements during exercise design and development
    - Master Scenario Events List (MSEL): Designs and develops the MSEL timeline and events to properly drive exercise play
    - Evaluation: Develops the overall exercise evaluation construct, evaluation documentation, and assigns evaluation staffing

- Resource Support and Facilities: Manages logistics, administration, facility, and finance support for planning meetings and exercises. Also responsible for coordinating the needed venue locations

♦ Utilize Proven Project Management Practices: Implement project management practices, processes, and tools, such as project plans, timelines, status reports, and other communications, to ensure efficient planning and execution of the exercise

Ensuring Interoperability in Knowledge Network Exercises

In the context of knowledge network exercises, interoperability refers to the ability of diverse participants from various countries and systems to work together seamlessly. This encompasses the harmonization of different operational procedures, communication protocols, and technological platforms to ensure effective collaboration and understanding. Interoperability is critical for ensuring that all stakeholders, despite their varied backgrounds and practices, can engage productively in the exercise, share knowledge, and collectively develop and test innovative good practices in emergency management. It lays the foundation for a unified approach to exploring and integrating new solutions across different jurisdictions and disciplines.

Interoperability should be factored in the designo f the exercise from the start, independently of the type of exercise (discussion or operations-based). The following actions can be implemented:

Step 1: Pre-Exercise Assessment - Conduct a thorough assessment of all participating entities' operational procedures, communication standards, and technological platforms to identify potential interoperability challenges.

Step 2: Standardization of Communication - Develop a common communication protocol that includes agreed-upon terminologies, languages (with provisions for translation services if necessary), and formats to ensure clear and consistent messaging.

Step 3: Technology Compatibility - Ensure all technological tools and platforms used in the exercise are compatible across the board. This might involve using widely accessible or adaptable software solutions and ensuring that all participants have access to the necessary technology.

Step 4: Joint Training Sessions - Organize pre-exercise training sessions that allow participants to familiarize themselves with each other's operational procedures and the tools and technologies that will be used during the exercise.

Step 5: Integration of Observers - Include observers from all participating entities who can provide real-time feedback on interoperability issues during the exercise, facilitating immediate adjustments.

Step 6: Debriefing and Feedback Mechanisms - Plan for comprehensive debriefing sessions that specifically address interoperability challenges encountered during the exercise. Use these sessions to gather feedback for improving future exercises.

Here is a checklist template that can be used to factor interoperability into the exercise:

✓ Assess operational procedures of all participants.
✓ Identify potential interoperability challenges.

- ✓ Establish a common language and terminology.
- ✓ Set up translation services if needed.
- ✓ Verify compatibility of software and platforms.
- ✓ Provide access to necessary technology for all participants.
- ✓ Schedule pre-exercise joint training sessions.
- ✓ Familiarize participants with each other's procedures and exercise tools.
- ✓ Assign observers to monitor interoperability.
- ✓ Establish a mechanism for real-time feedback during the exercise.
- ✓ Conduct debriefing sessions focused on interoperability.
- ✓ Collect and integrate feedback for future exercises.

Here is an example of a survey that can be implemented during the preparation phase of the exercise to collect data on interoperability between partners:

Group 1: Operational Procedures

Q1.1: Please describe the primary operational procedures your organization follows during emergency response scenarios.

[Open text field]

Q1.2: Do you have any specific operational protocols for integrating innovative practices or technologies during emergency responses?

- ☐ Yes
- ☐ No

If Yes, please specify:
[Open text field]

Q1.3: How familiar are you with the operational procedures of other participating organizations?

- ☐ Very Familiar
- ☐ Somewhat Familiar
- ☐ Slightly Familiar
- ☐ Not Familiar

Group 2: Communication Protocols

Q2.1: What are the primary communication protocols used by your organization in emergency management operations? (Please list all that apply.)

[Open Text Field]

Q2.2: How does your organization handle communication with international or external partners during joint operations?

[Open Text Field]

Q2.3: Does your organization have experience using a common communication protocol with international partners?

- ☐ Yes, extensively
- ☐ Yes, but limited experience
- ☐ No experience
- ☐ Unsure

Q2.4: Can your organization adapt to a standardized set of terminologies and potentially operate in a second language if required?

- ☐ Fully adaptable
- ☐ Somewhat adaptable
- ☐ Slightly adaptable
- ☐ Not adaptable

Group 3: Technologies used

Q3.1: What technologies and platforms does your organization currently use for emergency management and response? (e.g., GIS, drone technology, social media monitoring)

[Open Text Field]

Q3.2: Are there any innovative tools or technologies your organization is exploring or looking to implement?

- ☐ Yes
- ☐ No

If Yes, please describe: [Open text field]

Q3.3: How does your organization ensure technology interoperability with other agencies or partners?

[Open Text Field]

Q3.4: Please list any challenges or barriers your organization faces in adopting new technologies or practices for emergency management.

[Open Text Field]

Q4.4: Are your current technological tools and platforms compatible with widely used international standards?

- ☐ Fully compatible
- ☐ Mostly compatible
- ☐ Somewhat compatible
- ☐ Not compatible

End of survey

Pre-exercise preparations

Training and familiarization with innovative good practice

Before arriving at training and familiarization of innovative good-practice, it's appropriate the set-up of an inter-institutional working group. In addition to its creation, a formalization of the group must also be carried out. Following these steps, it's possible to carry out training sessions.

In details:

Inter-institutional working group: when carrying out a participatory civil protection path, the establishment of the inter-institutional working group is a very important step for the effectiveness of the path, because it consists in the identification of the individuals who commit to following the participatory path, guaranteeing its progress. A central element for the constitution of the group is its formalization which can also take place through a formal act of commitment. This act must contain the taking charge of the path by the different subjects, the specific tasks of each subject, the adherence to the objectives of the path itself and the commitment to collaboration for the realization of the path. The different stakeholders identified in the mapping referred to in the previous points must participate in the working group. The formalization in fact initiates a process of greater responsibility of the individuals who in this way officially become part of the path and for which they have recognized a nomination and the objectives to be achieved.

Training of the inter-institutional working group: another key element for the effectiveness of the interinstitutional process is the construction of a common and appropriate language on risk and its management by the working group. For this reason, it is important, once the working group has been formalized, to carry out training sessions on the topic of risk management and civil protection.

These moments should include in-depth analysis on some topics as a priority and also on the basis of internal skills:

- basic concepts relating to flood risk, municipal civil protection planning
- national and regional warning and monitoring system
- intervention model and operational phases
- risk scenarios
- risk and emergency communication/information flow management (at municipal and interinstitutional level)
- how to organize exercises and why
- how to experiment the participation and why
- reference regulatory and political-institutional framework and flood risk management policy.

These training moments must be administered with frontal teaching techniques and active teaching techniques, which actively involve the participant in the learning process. These moments also make it possible to create greater cohesion in the working group and to leave strong civil protection expertise in the administrations to which they belong.

The training moments, in general, should also be carried out through moments of discussion and workshops on specific topics in order to be able to test and better deepen the knowledge administered in frontal mode.

In particular, in some different projects, the trainings had as their object:

- the analysis of the tourist flow in the Cinque Terre territory, read and analyzed through the risk component grid (exposed, vulnerability and capacity). This laboratory made it possible to create qualitatively an updated framework with respect to flood risk scenarios (**BETTER DEFINITION OF RISK SCENARIOS**)
- the mapping of civil protection actions - contained in the municipal civil protection plans, with particular attention to actions linked to the management of tourist flows both in ordinary and in the event - and the prevention actions implemented in the area. This laboratory allowed us to have a greater understanding of the coping and adaptation capacity of the local civil protection system and to identify the points of fragility of the civil protection system with respect to the objective of the path. These elements also contributed to the better definition of risk scenarios **(BETTER DEFINITION OF COPING CAPACITY AND ADAPTIVE CAPACITY**)
- the mapping of the monitoring and surveillance equipment present in the area and the related alert procedures. This laboratory allowed for a more detailed understanding of any shortcomings of the civil protection system, linked to the preparation and response phase (**BETTER DEFINITION OF COPING CAPACITY AND AVAILABLE RESOURCES**).

Through these training moments, it was therefore possible to further learn about the local civil protection system and at the same time map new elements of fragility and strength of civil protection systems.

Logistics and resource allocation

Effective logistics and resource allocation are pivotal to the success of knowledge network exercises, whether they are discussion-based Tabletop Exercises (TTX) or more dynamic Operations-based Exercises. Creating an optimal working environment for all participants, including the Exercise Control (EXCON), simulants (role players), evaluators, and observers. Their contributions are crucial, and facilitating their roles with the right support is essential for a successful exercise.

Discussion-based Exercise

Effective logistics are crucial for the success of discussion-based exercises, such as Tabletop Exercises (TTX), within knowledge networks. These exercises rely heavily on a conducive environment that fosters open dialogue, collaboration, and the deep exploration of innovative practices.

Venue Selection:

- Choose a venue that is easily accessible for all participants, including those with disabilities. Ensure the space is comfortable, with adequate heating, cooling, and lighting, to facilitate prolonged discussions
- Opt for a venue with a flexible seating arrangement that encourages interaction among participants. Roundtable setups or U-shaped configurations are ideal to facilitate visibility and engagement
- Ensure the venue can comfortably accommodate all participants and support staff, without overcrowding, to maintain a focused and interactive environment

Technology and Communication Tools:

- Secure high-quality audio visual equipment, including projectors, screens, and sound systems, to display scenarios, data analyses, and presentations clearly to all participants
- Provide reliable internet access to facilitate the use of online tools, access to digital resources, and, if necessary, participation of remote attendees. If your good practices involve the use of any particular software, make sure to cover the potential purchase of licenses and set-up costs
- Have backup equipment and technical support on standby to address any technical issues promptly without significant disruption to the exercise

Materials and Documentation:

- Distribute pre-exercise reading materials and agendas well in advance to allow participants to prepare for the discussions. Include summaries of the innovative practices to be discussed and any relevant case studies
- Provide comprehensive exercise packages on the day, including detailed scenarios, discussion questions, and any additional reference documents necessary for productive discussions
- Supply materials for note-taking and feedback collection to capture insights and recommendations from the discussions. Feedback can be capture digitally through forms in order to facilitate análisis at a later stage

Catering and Refreshments:

- Schedule regular breaks and provide refreshments to keep participants energized and engaged throughout the exercise. For full-day sessions, arrange for catering that accommodates dietary restrictions and preferences

Facilitation and support staff:

- Engage skilled facilitators who are knowledgeable in the exercise's focus area to guide the discussions, ensure all voices are heard, and keep the exercise on track
- Assign support staff to manage registration, direct participants, and handle any immediate logistical needs or inquiries during the exercise

Environmental Considerations:

- Aim for eco-friendly logistics where possible, including digital materials over printed, reusable name tags, and catering that minimizes waste
- Ensure the venue complies with health and safety regulations, including emergency exits, first aid availability, and adherence to any current public health guidelines

Operations-based Exercise

Operations-based exercises, including drills, functional exercises (FE), and full-scale exercises (FSE), demand robust logistical planning to simulate real-world emergency scenarios effectively. These exercises are critical for testing the practical application of innovative practices in a dynamic, often unpredictable environment.

Venue and Site Preparation:

- Location Selection: Choose sites that accurately represent the exercise scenario's geographical and environmental conditions. Ensure the location offers the necessary space and features for the activities planned, including any specific settings required for testing innovative practices
- Safety and Accessibility: Prioritize participant safety by selecting venues that comply with health and safety regulations. Ensure accessibility for all participants, including those with disabilities
- Site Setup: Arrange for the setup of any temporary structures, staging areas, and command centers required for the exercise. Consider the need for power sources, lighting, and shelter for participants and equipment

Area	Description	Type
Exercise Play Area	A location where player activities and tasks are demonstrated during an exercise.	Player Venue
Response Route	A location for responding emergency units from the assembly area to the staging area or other exercise sites during a response-focused exercise.	Player Venue
Exercise Assembly Area	A location for participants and resources to gather and dispatch, managed by controller(s).	Controller Venue
Master Control Cell	A location where overall coordination is managed between venue control cells, simulation cells, and other control areas.	Controller Venue
Venue Control Cell	A location where controllers manage individual injects designed for their relevant players.	Controller Venue
Simulation Cell	A location from which controllers deliver messages representing actions, activities, and conversations of an individual, agency, or organization that is not participating in the exercise.	Controller Venue
Emergency Medical Services Area	A location for real-world response support, such as treatment sector areas, ambulance staging, and transportation coordination points.	Controller Venue
Observer and Media Area	A location where observers and real-world media representatives can view the exercise but not interfere with exercise play.	Controller Venue

Table 5: Facilities and Exercise Areas, Descriptions, and Types (taken from Homeland Security Exercise and Evaluation Program)

Technology and Equipment:

- Specialized Tools and Devices: Procure or rent specialized equipment needed to test the innovative practices, such as drones, communication systems, or simulation software. Ensure compatibility and interoperability among technologies
- Communication Infrastructure: Establish reliable communication networks to support coordination and information sharing during the exercise. This may include radio systems, mobile apps, and temporary internet access points

- Radio frequencies: It is necessary to ensure that radio frequencies used by exercise controllers and evaluators are distinct from those used by players or emergency services. The list of telephone numbers and radio frequencies to be used by controllers would be available and distributed in advance. All numbers and frequencies would be tested one day prior to the exercise
- Technical Support: Arrange for on-site technical support to troubleshoot and manage any technology-related issues that arise during the exercise

Transportation and Logistics:

- Participant and Equipment Transport: Transportation to and from the site must be addressed. This is particularly important for exercise team members who would travel with the players. Plan and coordinate the transportation of participants and necessary equipment to and from the exercise location. Consider the logistics of moving specialized equipment safely and efficiently
- Emergency Access: Ensure that emergency vehicles and services have clear access to the exercise site at all times

Materials and Supplies:

- Exercise Documentation: Provide participants with maps, operation plans, role cards, and any other materials required for their specific tasks within the exercise. It is important that spare copies of the exercise instructions be brought to the briefing the day before the exercise
- Resource Allocation: Distribute resources such as water, first aid kits, and any specialized supplies needed for the innovative practices being tested

Personnel and Support Staff:

- Role Assignment: Clearly define roles for all exercise participants, including the EXCON team, evaluators, and simulants. Provide training as needed, especially for roles critical to testing the innovative practices
- Identification: All controllers and evaluators would wear some sort of identification. This could be a vest, armband, badge or a distinctive hat
- Support Services: Ensure adequate support staff are available for logistics, safety monitoring, and participant welfare throughout the exercise

Health and Safety Measures:

- Safety Briefings: Conduct comprehensive safety briefings for all participants, outlining potential risks and the measures in place to mitigate them
- Emergency Protocols: Establish clear emergency protocols, including communication procedures and evacuation routes
- Protective equipement: It is necessary to determine, ahead of time, who will need special protective equipment wherever safety requirements are in place

Debriefing and Recovery:

- Debriefing Facilities: Designate areas for post-exercise debriefings that allow participants to gather, discuss the exercise outcomes, and provide feedback
- Site Restoration: Plan for the cleanup and restoration of the exercise site to its original condition, respecting environmental considerations and property agreements.

Safety considerations

Ensuring the safety and security of all participants during knowledge network exercises is paramount. These guidelines are designed to establish a secure environment, whether the exercise is conducted in a physical location or virtually. They cover pre-exercise preparation, real-time monitoring, and post-exercise review to address potential risks and ensure the well-being of all involved.

- **Pre-Exercise Preparation:**

Assign a Safety Officer: Designate a safety officer to collaborate with all exercise safety partners, including local and community partners.

Develop a Safety Plan: Include guidance on the use of firearms, hazardous materials, evacuation procedures, and real-world incident responses. Ensure compliance with federal, state, local, tribal, and territorial regulations.

Assess the Venue: Conduct a site visit to assess access control, physical security, evacuation routes, and accessibility for individuals with disabilities.

Registration and Access Control: Develop a registration process that includes a sign-in sheet for access control and accountability. Assess occupancy requirements against local and state fire codes.

Participant Briefing: Brief all participants on safety protocols, emergency procedures, and security measures. Include guidance on cybersecurity best practices if the exercise involves digital platforms.

Risk Assessment: Conduct a thorough risk assessment for the exercise, identifying potential safety and security issues related to the venue, technology, and nature of the exercise. Consider both physical and cyber risks.

Compliance with Health Guidelines: Emphasize compliance with environmental health and safety plans per federal, state, and local guidelines.

- **Exercise Conduct**:

Communication: Implement a policy for clear communication, including using a safety word to pause or cancel activities in case of a real-world emergency. Establish clear, secure communication channels for reporting and responding to safety or security incidents. Ensure all participants know how to report concerns.

Emergency Preparedness: Have an EMS team on standby for basic medical assistance. Provide participants with information on responding to no-notice incidents during the exercise.

Real-Time Monitoring: Monitor the exercise environment continuously for safety and security issues. This includes physical surveillance of the venue and cybersecurity monitoring of digital platforms.

- **Post-exercise activities:**

Feedback and Documentation: Request feedback on the exercise safety plan's effectiveness and gather all documentation for secure disposal. Gather feedback from participants on the effectiveness of safety and security measures. Use surveys or debriefing sessions to collect insights.

Venue Check: Conduct a final check of the venue to confirm everyone has safely departed and disinfect surfaces, including manikins and props.

Incident Review: Conduct a thorough review of any safety or security incidents that occurred during the exercise. Analyze what happened, why, and how effectively the situation was managed.

- **General Considerations:**

Cybersecurity: For exercises that utilize digital tools or platforms, ensure robust cybersecurity measures are in place. This includes the use of encrypted communication channels, secure login procedures, and regular security audits.

Participant Well-being: Prioritize the physical and psychological well-being of participants. Provide support for stress management, especially in high-intensity scenarios or when dealing with sensitive topics.

Confidentiality and Data Protection: Maintain strict confidentiality and data protection standards, especially when handling personal information of participants or sensitive exercise data.

Exercise Conduct

Overview

The exercise conduct phase includes starting, managing and finishing the exercise. The principles outlined during the conduct phase may be applied across discussion and operations-based exercices.

Regardless of the size of the exercise being conducted, exercise managers should be aware of a range of exercise management issues to be managed, including but not limited to:

- pre-exercise activities
- roles of exercise staff during the conduct of the exercise
- Security and safety issues
- briefings
- debriefings

Pre-Exercise Activities

In preparation for a knowledge network exercise, a series of tailored pre-exercise activities are essential to ensure that all participating entities and individuals are adequately prepared. These activities not only aim to familiarize participants with the exercise framework and innovative practices to be tested but also to foster an environment conducive to collaboration and knowledge sharing. Here's a non-exhaustive list of pre-exercise activities:

- **Notifications**: Extend invitations and provide detailed briefings to agency heads, political leaders, senior officials, community stakeholders, and media partners. Emphasize the innovative aspects and collaborative nature of the knowledge network exercise to garner support and interest.
- **Customized Rehearsals/New Training**: Organize specialized training sessions or workshops that focus on the innovative good practices and technologies to be

implemented during the exercise. These sessions should aim to bridge any knowledge gaps and ensure all participants are comfortable with new tools and concepts.

- **Comprehensive Review of Exercise Documentation**: Conduct a thorough review of all exercise materials, including scenarios that incorporate innovative practices and guidelines for their application. Ensure that these documents reflect the collaborative objectives of the knowledge network exercise.
- **Technology and Communication Checks**: Perform detailed checks of all technological platforms and communication systems to be used, ensuring they support the collaborative and innovative aspects of the exercise. This includes verifying interoperability and functionality for collaborative tools, data sharing platforms, and any specialized software.
- **Establishing Collaborative Facilities**: Set up facilities or digital platforms that encourage interaction and collaboration among participants. This may involve configuring physical spaces to facilitate group work or setting up virtual collaboration environments.
- **Equipment Familiarization**: Schedule sessions for participants to become acquainted with any new or specialized equipment, particularly technologies that are novel or central to the innovative practices being tested.
- **Pre-Exercise Collaborative Sessions**: Host discussion exercises, seminars, and workshops that allow participants to engage with the concepts and methodologies of the innovative practices in a low-stress environment. These sessions can serve as platforms for initial knowledge exchange and team-building.
- **Cross-Cultural and Interdisciplinary Integration**: Given the diverse participation in knowledge network exercises, include activities that promote understanding and integration of different cultural and disciplinary perspectives. This could involve briefings on cultural competency or interdisciplinary collaboration techniques.

Exercise Staff Roles

In a knowledge network exercise, the exercise control (EXCON) staff plays a crucial role in steering the exercise towards its innovative goals while fostering an environment conducive to collaboration and knowledge exchange. Adapted from traditional exercises, the roles and structure of EXCON in knowledge network exercises are tailored to support the unique dynamics of testing and implementing innovative practices.

Early Identification and Training: EXCON staff, comprising individuals from participating agencies with expertise in innovative practices and emergency management, should be identified early. This allows for comprehensive training on the exercise's objectives, innovative practices being tested, and the digital platforms or technologies used. Establishing clear command lines and communication channels is crucial for seamless coordination.

Minimizing Interference: While EXCON staff are essential for guidance and support, they should minimize direct interference with participants to allow for organic problem-solving and innovation testing. They should, however, be easily identifiable, possibly through distinctive attire or digital markers in virtual settings, to ensure participants can reach out for assistance or clarification as needed.

Creating a Realistic Atmosphere: EXCON staff should help create an atmosphere that simulates real-world conditions for testing innovative practices, adjusting the scenario as needed to ensure realistic challenges are presented. This involves a delicate balance of maintaining the exercise's flow while allowing space for participant-driven innovation.

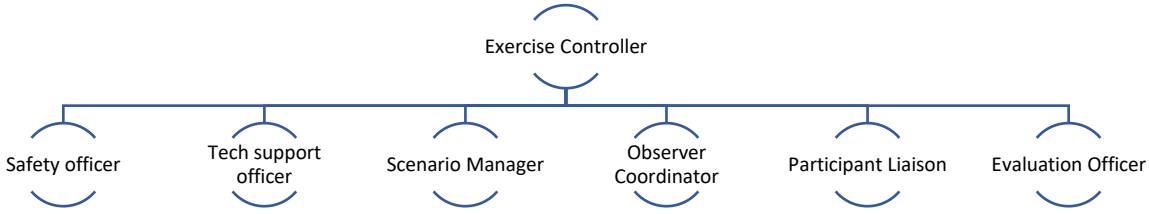
Guidance Towards Objectives: The primary role of EXCON is to guide participants towards achieving the stated objectives of testing and evaluating innovative practices. This may involve providing hints or nudging discussions in directions that explore the full potential of these practices.

Adapted Control Structure: While some roles are common across all exercises, knowledge network exercises may require additional functions such as Innovation Facilitators or Technology Integration Specialists, depending on the specific practices being tested and the exercise format.

By adapting the roles and responsibilities of EXCON staff to the specific needs of knowledge network exercises, organizers can ensure a supportive environment that maximizes the opportunity for participants to engage deeply with innovative practices and contribute to the exercise's overall success. Here is an example of list of roles and structure:

Roles and Responsibilities:

- **Exercise Controller**: The exercise director(s) appoints an exercise controller who is in turn responsible for selecting and appointing people to the functions required to conduct the exercise. The exercise controller leads the EXCON team, which is responsible for: overseeing the conduct of the exercise; ensuring that participants have the opportunity to achieve the aim and objectives; managing the master schedule of events; simulating activities not performed by the participants.
- **Safety Officer**: Ensures that all aspects of the exercise adhere to safety protocols, including physical safety in operational exercises and cybersecurity in virtual components.
- **Technology Support Officer**: Provides technical assistance, ensuring all digital platforms and technologies function correctly and assist in troubleshooting any issues that arise.
- **Scenario Manager**: Manages the flow of the exercise scenario, introducing innovative practice tests and scenario injects at planned intervals to simulate real-world challenges.
- **Observer Coordinator**: Organizes and briefs observers on their roles, focusing on evaluating the integration and impact of innovative practices during the exercise.
- **Participant Liaison**: Serves as the primary point of contact for participants, offering guidance on the exercise's innovative aspects and facilitating collaboration among diverse teams.
- **Evaluation Officer**: Collects and organizes feedback from participants and observers, focusing on the effectiveness and applicability of the tested innovative practices. The exercise evaluation coordinator or team will manage the evaluators during the conduct of the exercise. This includes ensuring that evaluators are able to move between venues to observe key parts of the scenario and be present at the various debriefs. The evaluation coordinator also ensures the relevant evaluator reports are submitted in a timely fashion at the conclusion of the exercise.



Briefings

For knowledge network exercises, particularly those focusing on the exploration and implementation of innovative practices, comprehensive and well-structured briefings are pivotal. These briefings ensure that all participants, including role players, EXCON staff, evaluators, and observers, are fully prepared to engage effectively in the exercise. Here's how the briefing guidelines can be adapted for knowledge network exercises:

Consistency and Preparation: Ensure all briefings maintain a consistent format to enhance understanding and align with pre-exercise instructions. This consistency is crucial for integrating participants from diverse backgrounds and expertise, especially when innovative practices and technologies are involved.

Briefings should be accurate, concise and sequential. The SMEACS format is recommended because it presents the important information in a logical sequence and is currently used by many emergency management agencies.

SMEACS

- Situation: Clearly outline the current scenario, including the background of the innovative practice or technology being tested. Describe the context and any preliminary actions or research that has set the stage for the exercise.
- Mission: Define the exercise's aim and objectives, emphasizing the exploration, testing, and evaluation of innovative practices within the knowledge network. Ensure the mission is aligned with the overarching goals of enhancing emergency management through innovation.
- Execution: Describe the approach for achieving the objectives. While focusing on what needs to be accomplished, tailor this section to highlight the collaborative exploration of innovative solutions and the expected contributions from participants.
- Administration and Logistics: Detail any specific administrative and logistical arrangements unique to the knowledge network exercise, such as access to digital platforms, distribution of innovative tools or resources, and arrangements for virtual participation.
- Command and Communication: Outline the command structure, emphasizing the collaborative and networked nature of the exercise. Explain the communication arrangements, especially the use of new technologies or platforms that facilitate innovation testing and feedback.
- Safety: Address safety considerations, including both physical safety measures for in-person components and cybersecurity measures for digital engagements. Include guidance on ensuring participant welfare and explain any protocols for handling real-world emergencies during the exercise.

Targeted Briefings for Diverse Roles: Given the varied functional roles within a knowledge network exercise, provide targeted briefings to ensure each group understands their role in testing and evaluating innovative practices. This includes:

- Exercise Staff: Focus on coordination and support for implementing innovative practices.
- Observers: Emphasize what to look for in terms of innovative practice integration and participant engagement.

- Role Players: Prepare them for realistic portrayal of scenarios that include innovative practices.
- Participants: Guide them on how to engage with and evaluate the innovative practices.
- Evaluators: Offer criteria and metrics for assessing the effectiveness and impact of the innovations.
- Media (if involved): Provide context on the exercise's innovative aspects and its significance for emergency management.

This structured approach to briefings is instrumental in setting the stage for a successful and productive exploration of new emergency management solutions.

Starting the Exercise

To initiate a knowledge network exercise effectively it's essential to ensure all logistical and preparatory activities are completed prior to the scheduled start. This preparation sets the foundation for a smooth execution and encourages active participation. Here are the adapted guidelines for starting a knowledge network exercise:

1. **Final Systems Check**: Conduct a comprehensive final test of all information, communication, and technology systems, ensuring they are fully operational and accessible to all participants. This includes any specialized software or digital platforms central to the innovative practices being explored.
2. **Pre-Start Briefing**: Hold a last-minute briefing for all exercise staff to confirm readiness and address any outstanding questions. This briefing should reinforce the exercise's innovative focus and ensure that all staff are aligned with the objectives and prepared for their roles.
3. **Preparation of Simulation Elements**: Arrange any simulated elements necessary for the exercise, such as digital data sets for analysis, virtual environments, or other props and special effects that support the testing of innovative practices. Ensure these elements are realistic and ready for use.
4. **Positioning of Personnel**:
    a. Position EXCON staff and support personnel at their designated posts, ensuring they are equipped to manage the exercise and provide support as needed.
    b. Place exercise participants in their starting locations, whether in physical spaces for hybrid exercises or in virtual settings, ensuring they have access to necessary resources and information.
5. **Final Confirmation**: Inform the exercise controller that all preparatory steps have been completed and the exercise infrastructure is fully ready. This confirmation should come from a comprehensive check of all logistical, technical, and personnel arrangements.

Initiating the Exercise: The start of a knowledge network exercise can vary based on its format and the innovative practices being tested. However, coordination by the exercise controller is key to a unified commencement. For discussion-based exercises, the facilitator might introduce the innovative topic or scenario to participants, setting the stage for collaborative exploration and problem-solving. In more dynamic or simulated operational exercises, the initiation could come from a digital prompt, such as a simulated emergency alert or scenario update, designed to engage participants immediately in the innovative practice testing. For exercises incorporating field components, a virtual or real-world signal (e.g., a message or alert) can mark the start, simulating an incident that requires the application of new strategies or technologies

by participating agencies. This structured approach to starting the exercise maximizes participant engagement and facilitates a productive testing environment.

Managing the Exercise

Managing a knowledge network exercise requires a dynamic and responsive approach by the Exercise Control (EXCON) team, tailored to foster innovation and collaborative problem-solving.

Exercise Management by EXCON: EXCON staff oversee the exercise in line with a meticulously planned schedule, emphasizing the integration and evaluation of innovative practices. The exercise controller has the authority to adjust the flow of the exercise—pausing, accelerating, or decelerating activities—to ensure the objectives, particularly those related to exploring and applying new solutions, are met.

Adaptive Response to Participant Engagement: EXCON staff must remain vigilant, ready to respond to how participants interact with the innovative practices being tested. This involves:

- Facilitating adjustments based on participant feedback and the unfolding dynamics of the exercise.
- Ensuring inputs and scenario injects occur as planned, yet remain flexible to adapt to the unique course of action driven by innovative problem-solving.

Regular Briefings for Cohesive Management: To manage the exercise effectively:

- Conduct regular briefings within the EXCON team to review progress, ensure the exercise maintains momentum, and confirm that the objectives, especially those related to innovation, are being pursued.
- Maintain open lines of communication for a comprehensive overview of the exercise, enabling EXCON to guide the exercise strategically.

Enhancing Situational Awareness: Situational awareness is critical for the nuanced management of knowledge network exercises and can be achieved through:

- Close monitoring of participant and role player engagement with the innovative practices.
- Utilizing audio/video technology and information technology aids to capture the exercise's progress.
- Gathering field reports from EXCON staff positioned across the exercise environment.

Strategic Intervention by EXCON: Depending on the exercise's direction and participant responses, EXCON may:

- Temporarily pause and provide guidance to realign activities with the exercise's innovative objectives.
- Stop, debrief, and reset if the direction significantly diverges from intended goals or an innovative solution emerges that warrants deeper exploration.
- Terminate the exercise in case of significant safety concerns or if a critical learning moment necessitates collective reflection.

Additionally, EXCON may:

- Allow challenges to play out, observing if participants can navigate obstacles using innovative practices, potentially revealing new pathways to achieving objectives.

- Recognize that deviations from expected responses might not be mistakes but innovative approaches to problem-solving, warranting further exploration and learning.

In managing knowledge network exercises, the EXCON team's role evolves to not just oversee but actively facilitate an environment where innovation can be tested, learned from, and iteratively improved, all while staying aligned with the exercise's overarching aim and objectives.

Exercise Communication: Communications during the exercise should be divided in two different components: one for participants and one for exercise staff. This segregation ensures clarity and efficiency in information flow throughout the exercise. EXCON staff require a seamless communication system to coordinate effectively during the exercise. This is typically facilitated through the use of dedicated mobile phones and/or a separate radio or digital communication network. It's imperative that these communication tools are set up to avoid interference from external calls, ensuring EXCON's focus remains undivided. Pre-exercise, establish clear communication protocols for EXCON, detailing procedures, channels, and backup options. Ensure these protocols are communicated to all EXCON members well in advance. Participant communication should leverage channels that allow for real-time interaction and monitoring by EXCON and, if applicable, other participating entities. Radios are usually the preferred choice but given the innovative focus of knowledge network exercises, consider incorporating other means that support collaborative problem-solving and idea sharing. To mitigate any confusion, especially in scenarios that closely mimic real-life operations, prefix all exercise-related communications with the word ‘exercise’. This clarifies that the communication is part of the simulated scenario. For exercises that blend fieldwork with functional or tabletop discussions, maintaining a dedicated communication network between participants and EXCON is crucial. This network serves as the conduit for introducing innovative concepts, scenario injects, and managing the exercise's flow.

Finishing the Exercise – EndEx

Concluding a knowledge network exercise is a deliberate process that requires careful planning and clear communication from the exercise controller. The term "ENDEX" signifies the official end of the exercise.

Determining the conclusion: The exercise concludes at a predetermined time outlined in the master schedule, ensuring all participants are aware of the timing from the onset. Alternatively, the exercise may end upon the achievement of all its objectives, particularly those related to the testing and evaluation of innovative practices within the knowledge network. Completion of specific tasks or scenarios designed to explore innovative solutions can also trigger the end of the exercise. Safety is paramount; the exercise should be concluded if continuing poses any risk to participants or if unforeseen circumstances—such as safety breaches or real-world events—compromise the exercise's integrity or objectives.

ExCON role: The exercise controller is tasked with deciding when to end the exercise, employing pre-determined strategies for an orderly conclusion, whether at the scheduled time or due to other factors. They must communicate the ENDEX clearly to all participants, ensuring everyone understands that the exercise has officially concluded.

Progressive stand-down: In exercises that include practical or field components alongside discussion-based activities, a progressive stand-down allows agencies or groups to conclude their participation once their objectives are met. This should not disrupt ongoing activities and must receive explicit approval from the exercise controller. This approach facilitates a smooth

transition from active exercise participation to post-exercise activities, including debriefing and feedback collection.

Post-exercise Activities: While logistics personnel primarily handle the restoration of the exercise environment and the return of equipment, the importance of these tasks should not be underestimated. Adequate time and resources must be allocated to ensure a thorough and efficient stand-down process. All staff, including those involved in logistics, should have the opportunity to engage in post-exercise activities such as debriefings and evaluations. This inclusion ensures comprehensive feedback and learning opportunities for all participants. An immediate hot debrief should be provided for all participants and staff to capture information and feedback while it is still fresh in people's minds. This debrief would normally be conducted by the team leader or supervisor of a functional area or capability to help identify issues or concerns. After the hot debrief there should be a formal debrief that provides an opportunity for key agency representatives and exercise staff to highlight areas of concern, as well as the positive outcomes of the exercise. This debrief is more formal and is led by an experienced facilitator. It should focus on strategic multi-agency aspects of the exercise that may require further discussion and clarification, and possibly recommend future actions. Participants' contributions to debriefings can be verbal or written. In either case information collected at formal debriefings must be recorded so it can be used in the exercise report.

Exercise Evaluation

The evaluation of a knowledge network exercise is a critical phase where the effectiveness of tested good practices, participant performance, and overall exercise outcomes are assessed. This section of the guidelines provides a structured approach to evaluating the innovative practices explored during the exercise, ensuring a comprehensive understanding of their impact, scalability, and potential for broader implementation. The evaluation process is designed to be rigorous, transparent, and informative, supporting continuous improvement and fostering a culture of innovation within emergency management.

Criteria for evaluating good practices

Evaluating good practices within knowledge network exercises demands a well-defined set of criteria that reflect the objectives of testing innovative solutions in emergency management scenarios. This subsection provides detailed guidelines on establishing these criteria to ensure a thorough and meaningful assessment of each practice's potential and efficacy.

Let's use the following good practice to illustrate this section:

> Utilizing drone technology to perform rapid damage assessment in post-disaster scenarios. Drones equipped with high-resolution cameras and sensors fly over affected areas to collect data on infrastructure damage, environmental impact, and potential hazards to public safety. This innovative practice aims to provide emergency management agencies with accurate, timely information to guide response efforts and resource allocation.

1. Relevance to Emergency Management Challenges:

- Assessment Focus: Evaluate how the good practice addresses current and emerging challenges in emergency management. Consider the practice's ability to solve real-world problems, enhance response capabilities, or fill existing gaps in knowledge and operations.

- Criteria: Alignment with emergency management needs, applicability to real-world scenarios, and the ability to address specific challenges identified by participating agencies or stakeholders.

Application: Drones offer a swift and effective means to assess damage in areas that may be inaccessible to ground teams due to debris or flooding, addressing a critical need for immediate data post-disaster.

2. Innovativeness and Originality:

- Assessment Focus: Determine the novelty of the practice and its contribution to introducing new ideas, methods, or technologies within the field of emergency management.
- Criteria: Degree of innovation, differentiation from existing practices, and the introduction of unique solutions or approaches.

Novelty: The use of drones introduces a new approach to damage assessment, leveraging aerial perspectives and advanced imaging technology to enhance situational awareness beyond traditional methods.

3. Scalability and Adaptability:

- Assessment Focus: Assess the practice's scalability, or its ability to be expanded or adapted for use in different contexts, regions, or scenarios without significant alterations to its core components.
- Criteria: Ease of scaling up or down, flexibility to adapt to different environments or challenges, and applicability across various operational scales.

Flexibility: Drone operations can be scaled to cover large affected areas or focused on specific sites of interest. The practice is adaptable to various disaster types, from natural events like hurricanes to man-made crises.

4. Implementation Feasibility:

- Assessment Focus: Examine the practical aspects of implementing the good practice, including resource requirements, training needs, and integration into existing systems or protocols.
- Criteria: Resource efficiency, simplicity of implementation, compatibility with current systems, and minimal training requirements for effective deployment.

Practicality: Implementing drone technology requires moderate investment in equipment and pilot training but is feasible within current emergency management budgets. Drones integrate well with existing geographic information systems (GIS) for data analysis.

5. Collaboration and Communication Enhancement:

- Assessment Focus: Evaluate the practice's impact on improving collaboration and communication among emergency management stakeholders, including cross-agency cooperation and public engagement.
- Criteria: Facilitation of information sharing, enhancement of collaborative decision-making, and improvement in coordination mechanisms.

Impact on Collaboration: Drone footage and data can be easily shared among emergency management agencies, non-governmental organizations, and the public, enhancing collaborative decision-making and community awareness.

6. Measurable Impact and Effectiveness:

- Assessment Focus: Determine the tangible outcomes and benefits of the practice, based on measurable indicators of success in improving emergency response and management.
- Criteria: Quantifiable improvements in response times, reduction in incident impacts, increased stakeholder engagement, and evidence of enhanced preparedness or resilience.

Outcomes: Early adopters have reported significant improvements in the speed and accuracy of damage assessments, leading to faster deployment of resources and targeted aid to the most affected populations.

7. Sustainability and Long-term Viability:

- Assessment Focus: Assess the sustainability of the practice in terms of its long-term viability, including considerations of ongoing resource requirements and environmental impact.
- Criteria: Long-term resource availability, minimal environmental impact, and continuity of benefits over time.

Sustainability: Drone operations, when conducted responsibly, have minimal environmental impact. The practice's benefits in enhancing rapid response and reducing the need for risky manual assessments ensure its long-term viability.

By applying these criteria, evaluators can conduct a comprehensive assessment of each good practice implemented during the knowledge network exercise. This evaluation provides critical insights into the practice's overall value, guiding decisions on further development, refinement, or broader implementation to enhance emergency management efforts.

Performance indicators and metrics

To effectively evaluate the success and impact of a knowledge network exercise, especially in the testing and integration of innovative practices, it is essential to establish clear, measurable performance indicators and metrics. These indicators provide quantifiable benchmarks that help assess whether the exercise objectives have been met and to what extent the implemented good practices have contributed to the desired outcomes. Here are comprehensive guidelines for developing and applying these metrics:

1. Identifying Key Performance Areas:

- Focus Areas: Begin by identifying the core areas of performance that are critical to the exercise's success, such as innovation integration, collaboration effectiveness, problem-solving efficiency, and communication clarity.
- Alignment with Objectives: Ensure that the performance areas are directly aligned with the exercise's objectives, allowing for a focused evaluation of the desired outcomes.

2. Developing Specific Indicators:

- Quantitative Indicators: For each key performance area, develop specific quantitative indicators that can be measured objectively. These might include the number of innovative practices successfully implemented, the speed of response actions, or the volume of information exchanged between participants.
- Qualitative Indicators: Complement quantitative measures with qualitative indicators to capture aspects like participant satisfaction, the quality of collaboration, and the perceived effectiveness of communication.

3. Setting Benchmarks and Targets:

- Benchmarks: Establish benchmarks based on past exercises, industry standards, or pre-exercise expectations. These benchmarks provide a reference point against which current performance can be evaluated.
- Targets: Set clear targets for each indicator, defining what constitutes success for the exercise. Targets should be ambitious yet achievable, motivating participants to strive for excellence.

4. Measurement Tools and Techniques:

- Data Collection: Utilize a mix of data collection tools and techniques, including surveys, direct observation, digital analytics (for virtual components), and feedback forms, to gather comprehensive data on each performance indicator.
- Real-time Monitoring: Whenever possible, incorporate real-time monitoring to capture dynamic data during the exercise, allowing for immediate insights into performance trends.

5. Data Analysis Framework:

- Analytical Methods: Define the methods for analyzing the collected data, whether through statistical analysis, thematic analysis for qualitative data, or comparative analysis against benchmarks and targets.
- Visualization: Employ data visualization techniques to present findings in an accessible and understandable format, facilitating quick interpretation and decision-making.

6. Performance Review and Feedback:

- Regular Reviews: Schedule regular review sessions during and after the exercise to assess performance data, discuss preliminary findings, and adjust strategies as needed.
- Comprehensive Feedback: Integrate feedback from participants, observers, and evaluators into the performance review process, enriching the analysis with diverse perspectives.

7. Continuous Improvement:

- Actionable Insights: Translate performance data into actionable insights, identifying areas for improvement, potential innovations, and strategies for enhancing future exercises.
- Documentation: Document the performance evaluation process, findings, and recommendations for future reference, contributing to a cycle of continuous improvement.

By following these guidelines, organizers can ensure a thorough and meaningful evaluation of knowledge network exercises, leveraging performance indicators and metrics to assess effectiveness, drive improvements, and showcase the value of integrating innovative practices into emergency management efforts.

Example: Social Media for Real-time Public Engagement and Information Dissemination

Implementing a social media strategy for real-time public engagement and information dissemination during emergencies. This innovative practice involves using social media platforms to communicate critical information to the public, gather situational awareness from user-generated content, and engage with the community to address concerns and questions during an emergency scenario.

Performance Indicators and Metrics:

- Engagement Rate:
  - Quantitative Indicator: Number of interactions (likes, shares, comments) on emergency-related posts.
  - Target: Increase interaction rates by 25% over previous non-social media communication methods.
- Reach and Dissemination Speed:
  - Quantitative Indicator: Number of users reached and the time taken for information to reach them.
  - Target: Achieve a reach of 50,000 users within the first hour of posting emergency information.
- Accuracy and Reliability of Information:
  - Qualitative Indicator: Level of public perception regarding the accuracy and reliability of information disseminated through social media.
  - Measurement Tool: Post-exercise surveys to gauge public trust in the information provided.
- Community Engagement and Feedback:
  - Qualitative Indicator: Quality of interaction between emergency management agencies and the public, including responsiveness to queries and concerns.
  - Measurement Tool: Analysis of comment sections and direct messages for responsiveness and public sentiment.
- Situational Awareness Contribution:
  - Quantitative Indicator: Number of actionable insights gained from user-generated content that contributed to situational awareness.
  - Target: Identify at least 10 actionable insights from social media content that assist in emergency response decision-making.

Data analysis and interpretation

Analyzing and interpreting data from knowledge network exercises is a nuanced process that requires a careful blend of quantitative and qualitative methods to truly understand the impact and efficacy of innovative practices tested during the exercise. The data analysis and interpretation phase is pivotal in transforming raw data into actionable insights, guiding future exercises, and refining emergency management strategies.

Initially, the consolidation of data sources is essential. This step involves integrating diverse data streams collected throughout the exercise, such as participant feedback, performance metrics, observational notes, and digital engagement analytics. A meticulous organization of this data ensures a comprehensive base for analysis. During this phase, it's critical to clean and preprocess the data, rectifying inconsistencies and preparing it for detailed examination.

Selecting the appropriate analysis methods is paramount. For quantitative data, statistical analyses can uncover patterns and trends, such as the frequency of innovative practice deployment or changes in response times due to new procedures. Techniques like regression analysis, ANOVA, or chi-square tests might be employed depending on the data type and research questions. On the other hand, qualitative data—comprising participant feedback, observations, and open-ended survey responses—demands thematic analysis or content analysis to identify prevailing themes and sentiments about the exercise's innovative aspects.

The use of analytical tools and software is indispensable in handling complex datasets. Quantitative data analysis software like SPSS or R provides robust platforms for statistical testing, while qualitative analysis tools like NVivo facilitate the coding and thematic exploration of textual data. Collaborative platforms enable a team of analysts to work simultaneously, ensuring a diversified perspective in the analysis process.

Interpreting the results is a delicate balance between statistical significance and practical relevance. It involves contextualizing findings within the exercise's objectives and the broader emergency management landscape. Analysts should discern whether observed improvements in performance indicators directly result from the innovative practices tested or if external factors may have influenced the outcomes. The interpretation phase should highlight successes and pinpoint challenges encountered during the exercise, providing a nuanced understanding of each innovative practice's potential benefits and limitations.

Validation of findings through triangulation—cross-referencing data points across different sources—enhances the reliability of the interpretations. Engaging stakeholders in validating the analysis adds depth and context, ensuring that the conclusions resonate with the participants' experiences and expert insights.

Translating analysis results into actionable insights is perhaps the most critical step. This involves distilling complex data into clear, concise recommendations for improving future exercises and emergency management practices. Analysts should articulate specific strategies for enhancing the integration of innovative practices, addressing identified challenges, and capitalizing on opportunities for improvement.

Finally, the communication of findings is crucial. Comprehensive reports detailing the analysis process, findings, and recommendations should be crafted with clarity and precision, making them accessible to all stakeholders. Utilizing data visualization techniques can aid in conveying complex information succinctly, facilitating easier comprehension of the results. Presentations,

workshops, or webinars can further disseminate the insights, fostering a shared understanding and collective action towards integrating innovative practices in emergency management.

By adhering to these detailed guidelines, organizations can ensure that the data analysis and interpretation phase of knowledge network exercises yields meaningful insights, driving the continuous evolution and enhancement of emergency management strategies through innovation.

Example: Virtual Reality (VR) Training for Emergency Response

Implementing Virtual Reality (VR) technology for emergency response training is an innovative practice designed to immerse participants in simulated disaster scenarios. This approach allows emergency responders to experience realistic conditions and make decisions in a controlled, risk-free environment. VR training aims to improve decision-making speed, situational awareness, and team coordination under stress.

Data Collection:

During the VR training exercises, several data types are collected to evaluate the effectiveness of this innovative practice. Quantitative data includes metrics such as decision-making time, the accuracy of decisions, and the number of correct actions taken by participants in simulated scenarios. Qualitative data is gathered through participant feedback surveys, focusing on perceived realism, engagement levels, and confidence in handling real-life emergencies after training.

Analysis:

Quantitative data is analyzed using statistical software to identify patterns in decision-making efficiency and the learning curve over repeated training sessions. For instance, a decrease in decision-making time with consistent or improved decision accuracy over sessions indicates a positive impact of VR training on emergency response skills. Qualitative data from feedback surveys are subjected to thematic analysis to extract common themes related to participants' confidence, perceived benefits of VR training, and suggestions for improvement.

Interpretation: Interpreting the results involves synthesizing quantitative and qualitative findings to assess VR training's overall impact. If statistical analysis reveals significant improvements in decision-making speed and accuracy, and thematic analysis of survey responses indicates increased confidence and a high valuation of the training's realism, these outcomes collectively suggest that VR training effectively enhances emergency response capabilities.

Conversely, identifying any discrepancies between quantitative performance metrics and qualitative feedback highlights areas for further investigation and refinement of the VR training program. For example, if participants report high realism but no improvement in decision-making speed, the training scenarios may need adjustments to better target critical decision-making skills.

Actionable Insights and Communication:

Based on the analysis and interpretation, actionable insights are developed. These might include recommendations for scenario adjustments to improve skill development, integrating additional feedback mechanisms during training for real-time guidance, or expanding VR training modules to cover a broader range of emergency scenarios.

The findings and recommendations are then compiled into a comprehensive report, utilizing data visualizations to depict performance improvements and highlight participant feedback themes. This report is shared with stakeholders through presentations and workshops, facilitating a collaborative discussion on the future integration of VR technology into emergency response training programs.

After action reporting

Compiling findings and insights

The process of compiling findings and insights for After Action Reporting in a knowledge network exercise is a meticulous task that involves gathering, synthesizing, and documenting all relevant information derived from the exercise. This initial phase sets the foundation for a comprehensive After-Action Report (AAR) that accurately reflects the outcomes of the exercise, offering a valuable resource for reflection, learning, and future planning.

Data and Document Compilation:

- The compilation process begins with gathering all data and documents generated during the exercise. This includes but is not limited to:
- Participant feedback forms and surveys, providing qualitative insights into the participants' experiences and perceptions of the exercise.
- Performance data and metrics, offering quantitative measures of the exercise outcomes against predefined objectives and targets.
- Observers' notes and evaluators' reports, which contain critical observations on the conduct of the exercise and the effectiveness of the tested practices.
- Communication logs and meeting minutes, documenting discussions, decisions, and incident management processes as they unfolded during the exercise.
- Training materials and exercise briefings, which are essential for understanding the context and expectations set forth for the exercise participants.

Synthesizing Data and Insights:

Once all relevant documents and data are collected, the next step involves synthesizing this information to draw out key findings and insights. This synthesis requires a detailed analysis to identify patterns, challenges, successes, and areas for improvement. It's crucial to integrate both qualitative and quantitative data sources to form a holistic view of the exercise outcomes.

The synthesis process should aim to:

- Highlight innovative practices that were tested during the exercise and assess their impact on emergency management operations.
- Identify any gaps in performance, resources, or knowledge that were revealed during the exercise.
- Acknowledge the contributions and performance of participants and the effectiveness of collaboration among different stakeholders.

Documenting Findings and Insights:

The findings and insights must then be meticulously documented in a structured manner. The documentation should be clear, concise, and accessible, ensuring that readers can easily

understand the outcomes of the exercise and the implications for future practice. The document should include:

- An executive summary that provides a high-level overview of the exercise, its objectives, and key findings.
- A detailed analysis section that delves into the specifics of what was learned during the exercise, supported by data and examples.
- Visual aids such as charts, graphs, and tables to represent data findings clearly and effectively.
- Direct quotes from participant feedback and observer notes to illustrate key points and bring personal perspectives into the report.

Ensuring Quality and Accuracy:

To ensure the quality and accuracy of the compiled findings and insights, it's advisable to involve multiple members of the exercise planning and evaluation team in the review process. This collaborative review helps to validate the findings and ensures that the report is comprehensive, reflecting the diverse perspectives and experiences of exercise participants and stakeholders.

The compiled findings and insights serve as the foundation for developing actionable recommendations and informing the broader emergency management community through dissemination of the After-Action Report. By adhering to these guidelines, organizations can ensure that the lessons learned from knowledge network exercises are captured in a manner that supports continuous improvement and innovation in emergency management practices.

Recommendations for future implementations

In the aftermath of a knowledge network exercise, formulating recommendations for future implementations is a critical step that directly influences the continuous improvement and effective application of innovative practices in emergency management. This phase involves translating the compiled findings and insights into actionable advice, guiding both immediate adjustments and long-term strategic planning.

Identifying Areas for Improvement and Innovation:

Start by thoroughly reviewing the synthesized findings and insights to identify clear areas requiring improvement, enhancement, or further innovation. Focus on aspects where the exercise revealed gaps in knowledge, resources, or performance, and consider areas where innovative practices showed potential for significant impact. It’s crucial to involve a diverse range of stakeholders in this process to ensure that recommendations are comprehensive and inclusive of various perspectives.

Developing Specific, Actionable Recommendations:

Each recommendation should be specific, actionable, and linked to the findings of the exercise. Avoid vague suggestions; instead, provide clear guidance on how identified issues can be addressed or how successful strategies can be scaled or adapted. Recommendations might include:

- The adoption of new technologies or practices that demonstrated effectiveness during the exercise.
- Modifications to existing protocols or procedures to incorporate innovative solutions tested.

- Initiatives for further training or knowledge exchange to address gaps in skills or understanding identified during the exercise.

Prioritizing Recommendations:

Given that not all recommendations can be implemented simultaneously, prioritize them based on their potential impact, feasibility, and the urgency of the needs they address. This prioritization should be a collaborative effort, involving key decision-makers and stakeholders to ensure alignment with organizational goals and capacities.

Setting Timelines and Responsibilities:

For each recommendation, outline a realistic timeline for implementation, considering the complexity of the proposed actions and the availability of resources. Assign clear responsibilities for leading and executing these recommendations, ensuring accountability and facilitating progress tracking.

Documenting Recommendations:

Compile the recommendations into a dedicated section of the After-Action Report, organizing them logically, either by theme, priority, or potential impact. Each recommendation should be accompanied by a brief rationale, explaining its basis in the exercise findings and its expected benefits.

Communicating Recommendations:

Ensure that the recommendations are communicated effectively to all relevant parties, including exercise participants, stakeholders, and leadership teams. Consider presenting the recommendations in various formats, such as executive briefings, detailed reports, or visual infographics, to cater to different audiences and maximize their accessibility and impact.

Feedback Loop for Continuous Improvement:

Establish mechanisms for feedback on the proposed recommendations from a wider audience, including potentially affected personnel and external experts. This feedback can provide valuable insights, further refining the recommendations and ensuring they are as effective and practical as possible.

By adhering to these guidelines for developing recommendations for future implementations, organizations can ensure that the valuable lessons learned from knowledge network exercises translate into tangible improvements in emergency management practices. This iterative process of evaluation, recommendation, and implementation fosters a culture of innovation and continuous enhancement, crucial for adapting to the evolving landscape of emergency and disaster management.

Example: Implementing an Integrated Incident Management Software (IIMS)

During the knowledge network exercise, participants tested an Integrated Incident Management Software (IIMS) designed to enhance coordination and communication among emergency response teams. The software enables real-time data sharing, centralized incident tracking, and streamlined resource management across different agencies.

Findings and Insights:

The exercise revealed that IIMS significantly improved situational awareness and reduced response times. Participants reported enhanced collaboration efficiency, although some faced challenges with the software's user interface and integration with existing systems.

Recommendations for Future Implementations:

User Interface Optimization:

- Recommendation: Revise the software's user interface to improve usability and accessibility, based on feedback from exercise participants. Incorporate intuitive design elements and customizable dashboard features.
- Rationale: Participants identified the current interface as a barrier to maximizing the software's potential, suggesting that optimization could lead to broader adoption and more effective use.
- Timeline and Responsibility: Assign the software development team to implement changes within the next six months, with periodic review sessions involving end-users to gauge improvements.

Integration with Existing Systems:

- Recommendation: Develop and distribute a comprehensive integration guide for agencies to seamlessly incorporate IIMS with their existing data systems and communication tools.
- Rationale: Seamless integration is crucial for ensuring that the software enhances rather than complicates current processes, addressing concerns raised about compatibility with existing systems.
- Timeline and Responsibility: Task the technical support team with creating the guide in collaboration with key agency stakeholders over the next three months, followed by training sessions for IT personnel.

Training and Knowledge Exchange:

- Recommendation: Implement a structured training program for all potential IIMS users, complemented by a knowledge exchange platform where users can share tips, challenges, and success stories.
- Rationale: Training is essential for ensuring users can fully leverage the software's capabilities, while a knowledge exchange platform encourages ongoing learning and community support.
- Timeline and Responsibility: Schedule the initial training within the next two months, overseen by the training department, and launch the knowledge exchange platform concurrently.

Scalability Assessment:

- Recommendation: Conduct a scalability assessment to determine the software's performance under varying levels of demand and across different operational scales.
- Rationale: Ensuring that IIMS can scale according to the needs of large-scale incidents is crucial for its effectiveness in diverse emergency scenarios.

- Timeline and Responsibility: Initiate the assessment within the next four months, coordinated by the software engineering team in partnership with emergency management agencies.

Feedback Mechanism for Continuous Improvement:

- Recommendation: Establish a formal feedback mechanism within IIMS, allowing users to easily report issues and suggest improvements directly within the software environment.
- Rationale: A built-in feedback mechanism supports continuous improvement of the software based on user experiences and evolving needs.
- Timeline and Responsibility: Integrate this feature in the next software update cycle, to be completed within the next six months by the development team.

Documenting and Communicating Recommendations:

These recommendations will be documented in the After-Action Report's dedicated section, clearly outlining the rationale, timeline, and assigned responsibilities for each action. The report will be presented to stakeholders through meetings and an interactive web portal, ensuring widespread dissemination and engagement.

Reporting and dissemination

The final step of a knowledge network exercise involves the careful reporting of findings, insights, and recommendations followed by strategic dissemination to ensure the valuable lessons learned reach all relevant stakeholders. This phase is crucial for promoting transparency, accountability, and the continuous improvement of emergency management practices through the adoption of innovative solutions. Here's a comprehensive approach to achieving effective reporting and dissemination:

Creating the After-Action Report (AAR):

Compile the After-Action Report incorporating all critical components of the exercise evaluation: compiled findings and insights, actionable recommendations for future implementations, and a detailed account of the exercise conduct and outcomes. The AAR should be structured logically, beginning with an executive summary, followed by an in-depth analysis, and concluding with recommendations and future action plans.

Ensure the report is clear, concise, and accessible, avoiding jargon to make it understandable to a broad audience, including those who may not have participated in the exercise or have a deep background in emergency management.

Use visuals, such as charts, graphs, and infographics, to illustrate key points and make data more digestible. This visual representation can aid in conveying complex information succinctly and effectively.

Review and Approval Process:

Subject the AAR to a thorough review process involving key exercise planners, participants, and external experts if appropriate. This review ensures accuracy, completeness, and the incorporation of diverse perspectives on the exercise's outcomes.

Once finalized, the report should be officially approved by the leading authority of the exercise, such as the exercise director or the head of the organizing committee, to validate its findings and recommendations.

Dissemination Strategy:

Develop a dissemination strategy that identifies the target audience for the AAR, which may include exercise participants, partner agencies, stakeholders in emergency management, policymakers, and the public.

Choose appropriate channels for dissemination based on the target audience. For internal stakeholders and participants, direct communication methods like email or internal networks may be suitable. For broader dissemination, consider public websites, professional networks, conferences, and workshops.

Schedule presentations or briefings to key stakeholders and decision-makers to highlight the AAR's key findings and recommendations. Interactive sessions can foster discussion, gather additional feedback, and encourage commitment to the recommended actions.

Leveraging Digital Platforms:

Utilize digital platforms and social media to extend the reach of the AAR. Short summaries or infographics highlighting the main findings and lessons learned can engage a wider audience and promote broader discussion within the emergency management community.

Create a dedicated webpage or portal where the full AAR and related materials, such as videos or training modules developed during the exercise, can be accessed. Ensure this portal allows for feedback and queries from readers to maintain an interactive dialogue.

Monitoring Impact and Feedback:

Establish mechanisms to monitor the impact of the AAR and gather feedback from its dissemination. Understanding how the report's findings are being utilized and the discussions it's generating can provide insights into its effectiveness and areas for improvement in future reporting.

Consider conducting follow-up surveys or forums to assess the changes implemented based on the AAR's recommendations and to collect stories of impact that can be shared in future communications.

By meticulously reporting and thoughtfully disseminating the outcomes of knowledge network exercises, organizations can maximize the learning opportunities presented by these exercises, fostering a culture of innovation and continuous improvement within emergency management and beyond.

Annexes

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Good Practices Assessment Template

(based on the methodological framework developed by DG ECHO ROADMAP and ROADMAP2 PROJECTS)

GOOD PRACTICES #1

"Title XXX"

0) INDICATORS

"XXX" represents a good practice because it's a _____.

This good practice achieves the following essential indicators:

Mandatory Indicators	
Effectiveness	The practice successfully achieves the objective for which it was created and the general objectives of the civil protection system, providing for the involvement and participation of interested parties
Efficiency	The practice is consistent with the implementation context and sustainable in terms of resources used and time
Transferability	The practice can be adopted to other similar contexts, with modifications

In addition to these essential indicators, good practice "XXX" has further characteristics that make it even better:

Non-mandatory Indicators	
Intrinsically participatory	The good practice is updated and customized with the involvement of the stakeholders that are using the platform
Systemic	The good practice involves multiple bodies and organizations of the civil protection system, encouraging their interaction
Consistent with international agendas	The good practice is consistent with international agendas (in particular sustainable development, adaptation to climate change and disaster risk reduction).
Innovative	Good practice modifies the content and method of something already existing for the better

The good practice “XX” is detailed below.

1. PROFILE OF RESPONDENT	
Name	
Title	
Belonging Institution	
Role/Job type	
Country	
Email contact	

2. DESCRIPTION	
Question	**Answer**
Long description of the good practice (Max 2.500 characters).	
Do you have any website related to the activities? Please specify	
Is any report available, preferably in English or at least an English summary? (if yes, please provide link/reference/document)	
Is the good practice embedded in a broader national/regional/local policy or action plan? Please describe (Max 2.500 characters)	
People involved	

Budget	
Number of trainings	
Mapped area	
% reduction in area affected by hazards	
Others	
Duration	
Number of Country involved	

3. SOLUTION TO			
Title	**Question**	**Types of answer**	**Answer**
UPCM Decision	What stage of the DRM cycle does the activity affect?	• Prevention • Preparedness • Response • Recovery • Awareness	
Disaster Resilience Goals	Which DRG is achieved?	• Anticipate • Prepare • Alert • Respond • Secure	
Achieved targets	Which targets inspired on SENDAI Framework were achieved?	**(A)** Reduce disaster mortality **(B)** Reduce the number of affected people **(C)** Reduce direct disaster economic loss **(D)** Reduce disaster damage to critical infrastructure and disruption of basic services, among them health and educational facilities	

		(E) Increase countries with DRR strategies **(F)** Enhance international cooperation to developing countries **(G)** Increase the availability of and access to multi-hazard early warning systems and disaster risk information and assessments to people	
Priorities of Actions fostered	Which SENDAI Framework priorities are addressed by the activities within the good practice (multiple choice)?	• Understanding disaster risk • Strengthening disaster risk governance to manage • disaster risk • Investing in disaster risk reduction for resilience • Enhancing disaster preparedness for effective response, and to «Build Back Better» in recovery, rehabilitation and reconstruction	

4. CHARACTERIZED BY			
Title	**Question**	**Types of answer**	**Answer**
Geographic scale	What is the level of implementation of the good practice (multiple choice)?	• International • National • European • Sub-national regional • Metropolitan areas	

		• Local (municipality level)	
Temporal scale	What is the temporal scale of implementation of good practice?	• Long term • Medium term • Short term	
Risk element	Which type of risk belongs to your good practice?	• Geological risks • Hydrological risks • Meteo-climatological risks • Biological risks • Anthropogenic risks • Cascade effects	

5. BEST PRACTICE FEATURES			
Title	**Question**	**Types of answer**	**Answer**
Beneficiaries		• Citizens/Communities • Youth • Vulnerable people • Environment ecosystems • Economic system • Politicians at EU or National level • Regional and Local Administrators • Civil Protection Authorities • First Responders • Volunteers • Academia • Scientific organizations • Others	
Stakeholders		• DRR professionals • Governmental official • Academia	

		• Humanitarian organizations • Civil society organizations • Others	
Actors		• Politicians at EU or National level • Regional and Local Administrators • Civil Protection Officials • Policy maker • Private stakeholder • Scientists • First Responders • Volunteers • Communication and Media • Others	
Challenges		• Engaged public opinion • Financial constraints • Fast evolving crises • Long-term effects of decision • High uncertainty or few data • Unexpected event • Lack of planning/Institutional framework • Others	
Solution type		• Knowledge sharing • IT-Tool • Policy Recommendation • Scientific products • Funds allocations • SOP • Guidelines • Technical regulation • National Law • Legal Framework • Public Awareness, Training and Education	

		• Others	

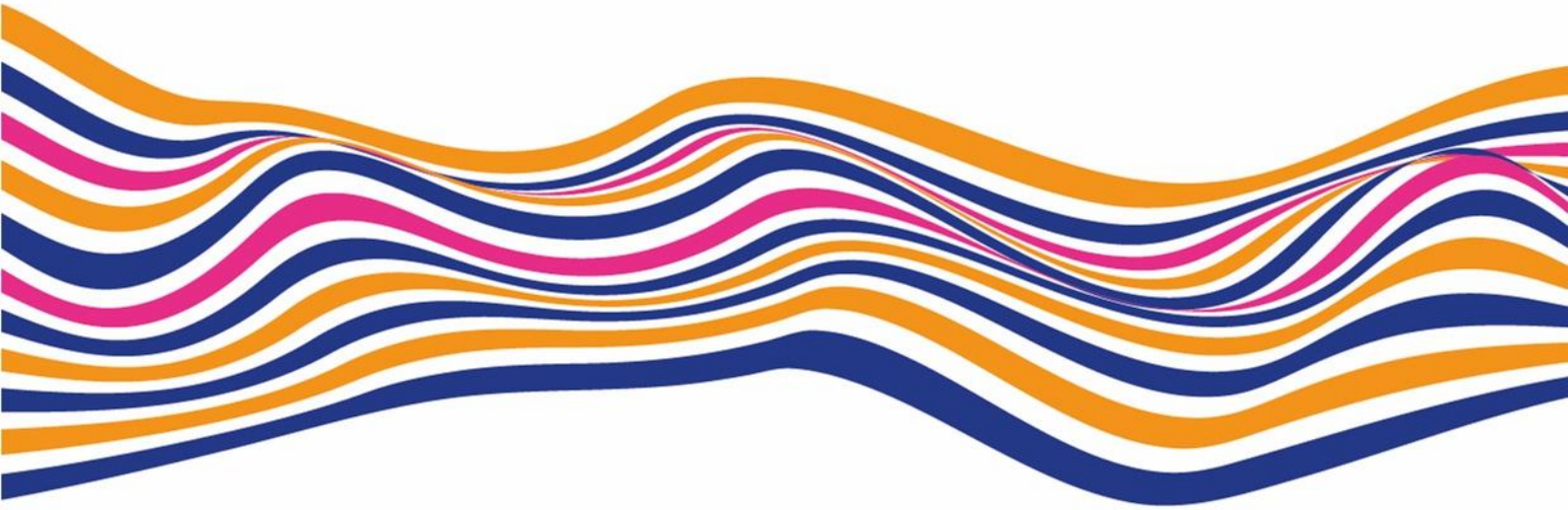
6. MONITORING AND FOLLOW UP		
Question	**Type of answer**	**Answer**
What were the initial barriers, or obstacles, for the activity (if any)?	• Lack of a shared knowledge within the team (theoretical knowledge, methods, technical language, codes and norms, ethos) • Lack of teamwork (poor communication, unclear tasks, disciplinary segregation) • Lack of, or insufficient, context-specific knowledge • Lack, or failed application of, participatory methods • Unclear regulatory frameworks and procedures (local, regional, national, supranational) • Lack of resources (budget and/or staff) • Excessive bureaucracy • Others (please specify)	
What element(s) would you change in future activities to improve the results?		
How are the long-term impacts of the activity going to be managed and monitored?		
Were follow-up activities considered?		
If yes, what did the follow-up consist of?	• Monitoring/observation	

	• Simple feedback (receive feedback and check it against expected outcomes) • Feedback loop (feedback and opinions used to shape new changes and improvements) • Others (please specify)	
Who was in charge of the follow-up?		
What were, in your opinion, the pre-conditions for success? Were there any facilitating factors?		

COVALEX

HYDROMETEOROLOGICAL HAZARDS

– RISK AND MITIGATION –



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