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Title
D1.3 Report on current and future common capability challenges (CCCs and FCCCs) #2

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Abstract:

In the second cycle of the project, the associated experts of each task working group, i.e. "search & rescue & emergency medical response", "structural fires", "landscape fires", "natural hazards" and "CBRNE", revisited the matrix of Common Capability Challenges (CCCs) built after the first cycle of work. They discussed the subjects that they found the most challenging. Their feedback is presented here. A cross analysis of the ten workshops (1st and 2nd cycle) results gives rise to an inclusive list of top challenges for the responders. This list clarifies the matrix of CCCs initially presented in the project.

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1.1

Executive Summary

The FIRE-IN project is an initiative funded by the European Commission and initiated on the 1st of May 2017. FIRE-IN has been designed to raise the security level of EU citizens by improving the national and European Fire & Rescue (F&R) capability development process. FIRE-IN addresses the concern that capability-driven research and innovation in this area need much stronger guidance from practitioners and better exploitation of the technology potentially available for the discipline.

The purpose of this report is to present the commonalities in the challenges identified by the experts in different fields of fire and rescue in Europe during the second cycle of the project. These common capability challenges will guide the screening of solutions and will found the research and development agenda to be developed at the European level in next programs.

Table 1. FIRE-IN partners

Participant No.	Participant organisation name	Part. short name	Country
1	Pôle de compétitivité SAFE CLUSTER (ex Pôle Pégase)	SAFE	France
2	Ecole Nationale Supérieure des Officiers de Sapeurs-Pompiers – French National Fire Fighter Officers Academy	ENSOSP	France
3	Italian Ministry of Interior	CNVVF	Italy
4	Bundesanstalt Technisches Hilfswerk	THW	Germany
5	Global Fire Monitoring Center	GFMC	Germany
6	INERIS Développement	INEDEV	France
7	Fraunhofer INT	FhG-INT	Germany
8	Fire Ecology and Management Foundation Pau Costa Alcubierre	PCF	Spain
9	Catalonia Fire Service Rescue Agency	CFS	Spain
10	Scientific and Research Centre for Fire Protection	CNBOP	Poland
11	The Main School of Fire Services	SGSP	Poland
12	Council of Baltic Sea States	CBSS	Sweden
14	KEMEA	KEMEA	Greece
15	Czech Association of Fire Officers	CAFO	Czech Republic
16	inno TSD	inno	France

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1. Introduction

In the second cycle of the project, the associated experts of each task working group, i.e. "search & rescue & emergency medical response", "structural fires", "landscape fires", "natural hazards" and "CBRNE", revisited the matrix of Common Capability Challenges (CCCs) built after the first cycle of work. They discussed the subjects that they found the most challenging.

As part 2 of this report introduces the thematic of the five workshops, their comprehensive results are presented in appendix.

In part 3, we realise a cross analysis of the ten workshops (1st and 2nd cycle) results, illustrated with figures to highlight the challenges that have appeared the most frequently.

This gives rise to an inclusive list of top challenges for the responders, presented in the table in conclusion. This list clarifies the matrix of CCCs presented in the previous phase of the project.

2. Second cycle thematic workshops

From February to March 2019, the thematic working group leaders of FIRE-IN organized five thematic workshops with associated experts and project partners.

Each workshop was divided into two parts:

1. In the first half of the workshop, the method used was similar to the one used during the first cycle: using the *World Café Method* (www.theworldcafe.com/key-concepts-resources/world-cafe-method) to engage discussion on challenges associated to a scenario of major event
2. In the second half, the experts discussed the results of the screening of projects and publications associated to the CCCs previously identified.

2.1.   Search and Rescue and Emergency Medical Response

13 associated experts, supported by 7 moderators and 2 observers met in this workshop, organized by the Catalan Fire Service (CFS) in Paris on 4-6th March 2019. The full results are presented in Appendix 1.

The scenario built by CFS to induce gaps assessment was:

> **Multiple structural collapses in buildings due to an earthquake**.

The main challenges discussed and identified were i) knowledge cycle; ii) community involvement; iii) Pre-planning.

2.2.   Structure fires crisis mitigation, prevention and protection

12 associated experts, supported by 10 moderators and 1 observer met in this workshop, organized by the National Fire Corps (CNVVF) in Praha on 11-13th Febraury 2019. The full results are presented in Appendix 2.

The scenario built by CNVVF to induce gaps assessment was:

> **Large shopping mall area fires.**

The main challenges discussed and identified were i) Pre-planning; ii) Standard; iii) Technology.

2.3.   Landscape fires

10 associated experts, supported by 10 moderators and 1 observer met in this workshop, organized by GFMC in Aix-en-Provence on 28-30th January 2019. The full results are presented in Appendix 3.

The scenario built by GFMC to induce gaps assessment was:
Evacuation of populated area impacted by a severe wildfire.

2.4. Natural hazards mitigation

THW is the lead of the TWG D. It organized for the second cycle a workshop. 14 Associated Experts and 4 experts from partner organisations worked in the TWG D workshop together. Facilitated by a moderator and 7 co-moderators/ notetakers (they changed slightly during the days). The workshop took place in Prague from 13 to 15 February 2019. The scenario for the workshop was

A winter storm.

Further results are presented in the Appendix 4.

2.5. CBRNE crisis mitigation

13 associated experts, supported by 8 moderators met in this workshop, organized by the Czech Association of Fire Officers in Prague on 12-14th February 2019. The full results are presented in Appendix 5.
The scenario built by CAFO to induce gaps assessment was:
Multiple biological and hight virulent disase threats in Europe.
The main challenges discussed and identified were i) Pre-planning; ii) Technology; iii) Guidance instruments and standards.

3. Cross-analysis of Capability Challenges

3.1. Methodology

1. Firstly, we used the table of the Common Capability Challenges (CCC) from the 1st cycle and the workshops' results document from the 2nd cycle we analysed if each of them had been already considered in the CCC.
   a. If it had been considered, we added a mark to identify the repetition with different colours related to the workshop they came from:
      a. Black: Search and rescue and emergency medical response
      b. Red: Structural fires
      c. Green: Landscape fires
      d. Blue: Natural hazard mitigation
      e. Yellow: CBRNE

      (See e.g. [IIIIIIIIIIIII] on this document)
   b. If it was new, we added the new issue to the rest.

2. Secondly, we gathered all the information distributing it on each of the columns of the table:
   I.   High flow of response in hostile environment.
   II. High impact, low frequency emergencies.
   III. Multi-agency, multi-leadership environment.
   IV. High level of uncertainty.

   We tried to grant that each column had sense reading it top-down.

3. Thirdly, we tried to recognize patterns, key words and sequences to extract concepts and we developed a new table. We tried to grant that each file of the table had sense reading it left-right.

4. Then, we assigned codes to each item to quantify times each one has appeared. We can consider two situations:
   a. Those items most repeated inside the same workshop: e.g. [IIIII].
   b. Those items repeated in different workshops: [IIIIIIIIIII]. From our perspective, these ones are the most interesting because they are cross subjects.

5. We used graphics to see if we could extract some conclusions:
   a. Graphics of columns: to detect which items were repeated along all the workshops, therefore which of them appear the most in each capability.
   b. Word clouds: to detect which concepts appeared inside each workshop. To do this we have used the information directly gathered on the paperboards of each workshop, to collect the real proportion of concepts as loyal as possible to the workshops. This means that they are made before any process of redaction or conversion. We used: https://www.wordclouds.com/

6. Finally, to raise conclusions, we reported the challenges pointed out in a minimum of three different workshops and established the top list of them.

Constrains:
We have no numbers of the coincidences before the second cycle of workshops. Therefore, we can only say which issues have been remarked several times during the second cycle of workshops.

3.2. Incident Command Organization

Items collected from the first and second cycle of workshops concerning Incident Command:

I.HIGH FLOW OF RESPONDERS IN HOSTILE ENVIRONMENT: Organize to sustain safe operations

I.1. [IIII] Identify the problem quickly, dimension, and zone. Identify potential damages/victims, order priorities, plan safe access in hostile environment, and maintain situation awareness.

I.2. [IIIII] Adapt the efforts, tempos of operations and community protection to:
- forecasted available capacities,
- forecasted potential damages that could be suffered by vulnerable populations and elements,
- forecasted changes in the scenario,
- sustainability of operations,
- grant the provisional restoring of key critical infrastructures.

I.3. [IIII] **Maintain situation awareness. Avoid the loss of information with shifts' changes.**

I.4. Build trust inside crews with different specializations, among crews and with commanders.

I.5. [I] Appoint a safety officer at highest level of decision. It is necessary to develop an exceptional organizational level of officials and of crew in operations. At the moment to decide the operations to develop in complex interventions it is necessary to take into account the balance between responders' security, responders' protection and interests involved in the emergency.

#windowofopportunity #commandpost #timeofarrival #integralcontrolofresources #restwork #extendcommunicationcoverage #medicalcare #mobilelocation #SafetyOfficer #minimizeexposure

II. HIGH IMPACT, LOW FREQUENCY EMERGENCIES: Anticipate to avoid the collapse of resources

II.1.a. Boost the public information function. Develop a specific communication strategy to maintain credibility, including social media.

II.1.b. Psychological support.

II.1.c. Boost the support/advisory/analyst function to focus on key relevant intelligence to anticipate relevant changes.

II.2. [IIIII] Prioritise response and resources allocation to avoid the collapse of the emergency response system:

II.2.a There is a need to shift the focus from minimizing potential damages to reducing the collapse of the emergency response system for the final scenario, considering different values, applying triage techniques.

II.2.b Anticipate probable alternative final scenarios.

II.2.c Prioritize to grant the availability of responders, logisticians, other resources and key specialists (mobility, effort management, external aids, responders' health…) and also grant a shared understanding.

II.2.d. [IIII] Identify, differentiate and deactivate critical points that can propagate the emergency, especially those vectors of propagation that could lead to domino effect.

II.3. Integrate feedback from community.

#informationofficer #riskanalyst #decisionmaking #pscicologicalcare #forensics #credibility #callcenters #predictivetools #busisnesscontinuitymanagementISO

III. MULTI-AGENCY/MULTI-LEADERSHIP ENVIRONMENT: Coordinate for a decision making process distributed

III.1. Identify roles and capabilities from the different agencies and stakeholders in the emergency.

III.2.a. [I] Build a shared understanding concerning the scenario and strategy across responders to synchronize simultaneous decision-making. Manage complex information focusing on the multiple levels of decision-making.

III.2.b. Distributed decision-making based on assigned missions, on common objectives and a shared understanding on situation.

III.2.c. Management by objectives, giving flexibility and autonomy in decision making.

III.2.d. Lower decision making.

III.3.a. [IIIII] **Identify points of coordination in the different zones: from local (hot zone, warm zone ...) to regional and to national. Establish different levels of liaison officers, translators (III.3.d); communication; entrance points; and infrastructures (III.3.e) as needed.**

III.3.b. [I] Establish the level of command, coordination and support to intervention and identify the standards (**III.3.c**) for information exchange.

III.4. [I] Be aware and know the cultural diversity and your role in the situation.

#ICS #EuropeanInteragencyFramework #cross-borderaids #liasonofficer #interoperatibility #eucpm #entrancepoints #intelligencesharing #entrancepoints #missioncommand

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IV.   HIGH LEVEL OF UNCERTAINTY: Create certainty through resilient strategies

IV.1. [I] Strategies shift from minimizing damages towards increasing resilience, choosing scenarios where efforts will work safely, reducing potential chain events, involving safely stakeholders and reducing complexity.

IV.2. Focus on maintaining or restoring initiative in decision-making, on providing a predictable environment for operations. Build an organizational structure to overcome uncertainty, based on anticipating the scenario's probable evolution and the strategies and tactics to deal with it.

IV.2.c. Adapt warning systems and strategies to probabilistic forecasted scenarios.

IV.3. To reduce the uncertainty that could appear if the decision-making is taken with out of date information (**decision-lag**), it is necessary to lower the decision-making to commands on-field that have the real situation at sight, bet for a management based on objectives assigning missions to different teams that will need to synchronize between them (mission-command).

IV.4. Collapse. There are sequences that lead to catastrophes so detecting the critical points that lead to the final collapse could represent opportunities to operate/to action. It is necessary to negotiate ways to deactivate critical points for catastrophic scenarios.

IV.5. Maintain credibility and reach the population specifically affected and also all the public.

#costofopportunity #decisionlag #simultaneity #missioncommand #leadarship #commandsintent #EUWarningSystem #crowdcontrol #protecthospitals #proactivepolicies

Graphic 1. Total number of times a coded item has been repeated when talking about Incident Command along all the workshops.
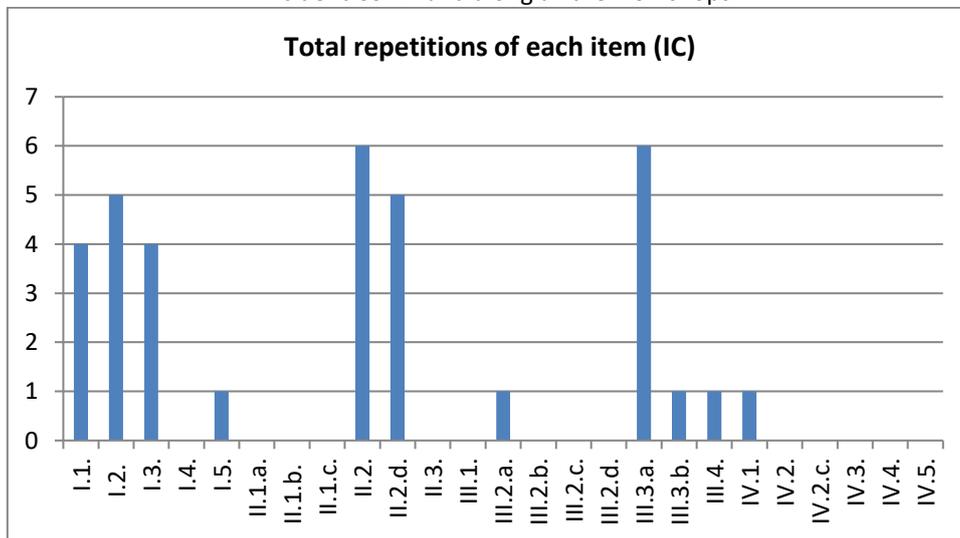
Graphic 2. COMMON CHALLENGES (IC). The graphic depticts the most repeated coded items per workshop addressing the Incident Command topic. The graphic only shows the items that have appeared 3 or more times totally (see graphic 1).

Table 1. Conceptual compilation of the results collected from the first and second cycle of workshops about Incident command organization.

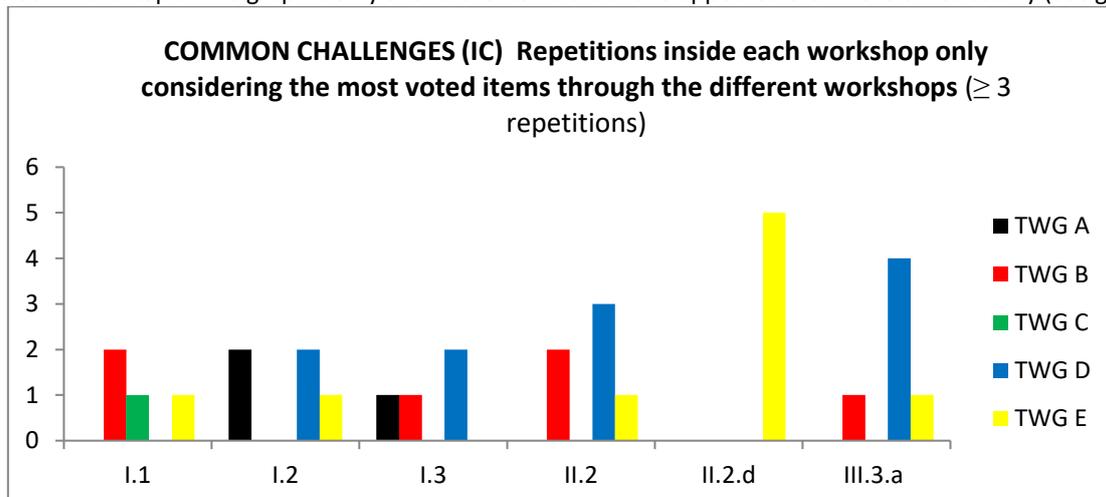| I. HIGH FLOW OF RESPONDERS IN HOSTILE ENVIRONMENT	II. HIGH IMPACT, LOW FREQUENCY EMERGENCIES	III. MULTI-AGENCY/MULTI-LEADERSHIP ENVIRONMENT	IV. HIGH LEVEL OF UNCERTAINTY
ORGANIZE TO SUSTAIN SAFE OPERATIONS	ANTICIPATE AVOIDING THE COLLAPSE OF RESOURCES	COORDINATE FOR A DECISION MAKING PROCESS DISTRIBUTED	CREATE CERTAINTY THROUGH RESILIENT STRATEGIES

1. **Quickly identify and forecast for a time frame.**
2. **Decision Making** (DM) on Tempos:
  a) Minimum potential damages
  b) Window of opportunity
  c) Safety of operations
3. **Integral control of resources**
  ▪ Shifts → Situation awareness
4. **Build trust**
  a) Teambuilding
  b) Balance Safety
5. **Safety officer**
	1. **Boost**:
	  a) Public information officer
	  b) Psychological support
	  c) Analyst
	2. **DM** to avoid collapse:
	  a) Triage (Method)
	  b) Alternative probabilistic scenarios where safety protocols will work (Scenario).
	  c) Availability of responders (Prioritization).
	  d) Deactivate triggers/chain events (Prioritization).
	  e) Translate into common objectives and a shared understanding.
	3. Integrate feedback from communities
	4. Resilience of responders
		1. **Roles and capabilities.**
		2. **DM** on objectives:
		  a) Shared understanding.
		  b) Synchronize simultaneous DM.
		  c) Flexibility and autonomy of DM to develop objectives.
		  d) Lower DM.
		3. Structure of coordination:
		  a) Points of coordination.
		  b) Level of command.
		  c) Information standards.
		  d) Specialists.
		  e) Infrastructure.
		4. **Cultural diversity.**
			1. **Resiliency.**
			2. **DM** maintaining initiative:
			  a) Create safe strategic scenarios.
			  b) Involve communities.
			  c) Warning systems/self-protection.
			3. Reduce uncertainty by reducing:
			  a) Mission command decision-lag and info-toxicity.
			  b) On field DM, missions.
			4. **Critical points** detection.
			5. **Credibility**

3.3. Pre-planning

Items collected from the first and second cycle of workshops concerning Pre-planning:

I.HIGH FLOW OF RESPONDERS IN HOSTILE ENVIRONMENT: Pre-plan a time-efficient, safe response, minimizing responder's engagement.

I.1.a. [II] Plan mobilization, communications, legal and economic issues, the logistics for specific scenarios. Understand possible help from outside the regional system.

I.1.b. [III] Package and pre-positioning modules of resources, equipment and logistics for quick transport, and easy tracking. Plan its mobilization.

I.1.c. [I] Be sure that there are at your disposal a minimum of logistical resources and supplies to provide the population during long duration emergencies.

I.2. [I] Gather and share relevant information of local hostile scenarios, and its pre-planned response measures.

I.3. [I] Focus efforts on passive prevention for safe access.

I.4.a. Identify who can perform key specific roles.

I.4.b. Create networks of experts that exchange knowledge, experience and best practices.

I.4.c [III] Coordination between cross-border crews.

#communicationtools #accessibilitytools #specificSOP #recognizionofexpertise #minimizeexposition #equipmentnests #vulnerablepeople

II. HIGH IMPACT, LOW FREQUENCY EMERGENCIES: Negotiate solutions with stakeholders for anticipated scenarios.

II.1.a$_1$. [III] Base the prediction of scenarios on historical events and on statistics (baseline), including the modelling of the actual conditions (at local level) and the human factor.

II.1.a$_2$. [II] From a local to a regional level, base pre-planning on a range of probable scenarios and negotiate the accepted level of risk based on them.

II.1.b. [III] In their planning, responders' agencies should include low frequency, high impact emergencies, those that are probable at long term, investing in knowledge and skills and being prepared by a flexible and modular approach (external and internal facilities, strategic communication plans, reception of logistical aid…).

II.1.c. In the planning integrate the different disciplines based on the scenarios and strategies chosen in each of them.

II.2. [I] Regulate the expectations about the communications coming from the emergency systems depending on the size of the emergency, small and big emergencies (multiple victims accidents, AMV).

II.3.a. [I] Change the focus towards active prevention, self-protection and risk mitigation. Increase efforts on improving prevention towards safe access, self-protection, facilitating firefighters' capacity.

II.3.b. At a regional scale, harmonize prevention and preparedness measures in cross-border/cross-regional areas.

II.4.a. [III] Involve risk owners, control owners, technical experts and other stakeholders, including designers, enterprises, firefighters, authorities… Ask different agencies and stakeholders for their capacity to solve gaps.

II.4.b. Exchange experts in large events in other places (countries?) when timely possible.

II.4.c. Build communities of practice of experts.

II.5.a. [I] Clarify/negotiate the role and the responsibilities of organizations involved in the anticipated scenarios.

II.5.b. Involve society in choosing between alternative strategical scenarios and negotiate solutions.

II.6. At a national scale, promote context-specific guidelines on best practices in planning, preparedness and prevention.

II.7. Adapt the pre-plans to usable tools at the moment of the emergency.

#standardizedriskmap #mobilizationprocedures #planningscales #communityofusers #certifyselfprotection #vulnerablepopulation #urbanism #landuse #communicationstrategy #unawarestakeholders #enforcement #communityofpractice #buildtrust #prestationaldesign #camphospitals #camplaboratories

III. MULTI-AGENCY/MULTI-LEADERSHIP ENVIRONMENT: Pre-plan interoperability and enhance synergies.

III.1.a. It is necessary to have a legal framework for cross-border help, emergency support, victim transportation, recognition of qualifications...

III.1.b. Pre-plan should be known by all agencies and stakeholders

III.2. [I] Emergency preparedness should be dealt with international / European perspectives.

III.3.a. Enhance synergies between experts, including first responders, planners, engineers, specialized industries, land and infrastructure managers; between agencies and from regional, to national and international level. Share specialists and experts.

III.3.b. [I] Plan strategic ownership.

III.3.c. Boost the exchange of aid-teams with the objective to practice in emergencies of low and medium complexity (monitoring, shadowing, exchanges…) with the aim to train themselves and be useful in aiding at the big ones.

III.4.a. Agreed chain of command, specifying roles and capabilities in advanced.

III.4.b. [III] Establish agreements and structures for cross-collaboration between entities (private and public) with specific key intelligence on the risk, with those who have power of decisions on factors that modify the risk and with those who have influence on the management of the risk.

III.5. European interagency round tables for lessons learned processes and the generation of new standards.

#communication #jointexercise

IV.   HIGH LEVEL OF UNCERTAINTY: Focus on governance and integral risk management.

IV.1.a. Promote quick adaptation to changes in scenario through situation assessment and decision-making structures.

IV.1.b. Focus on small window of opportunities to change policies and governance processes.

IV.2.a. Pre-plan communication management for specific scenarios. Include post-accident procedures.

IV.2.b. Promote the growth of sustainable, risk-decreasing activities via policies, certifications, insurances...

IV.3.a. [III] Involve key stakeholders (risk owners, control owners...) in action-based strategies, considering integral risk management opportunities. Identify strategic ownership.

IV.3.b. [II] To be resilient in front of uncertain risks, the development own skills and community skills should be encouraged fostering habits focused on the adaptation to risk scenarios and on the robustness in front of the risk. Communities should get ready tools alternative to technology that allow them be resilient when technology fails.

IV.3.c. Plan improving the resilience among responders to maintain their response capacity.

IV.4.a. Identify and reduce bureaucracy and other inhibitors that slow progress.

IV.4.b. Pre-plans should be flexible, focused on indicators of key changes and providing tools for alternatives and contingency plans.

#transdisciplinarytables #Insuranceincentives #fundingcapacitybuilding #ethcialprivacyissues

Graphic 3. Total number of times a coded item has been repeated when talking about Pre-planning along all the workshops.

Graphic 4. PRE-PLANNING (PP). The graphic depticts the most repeated coded items per workshop addressing pre-planning. The graphic only shows the items that have appeared 3 or more times totally (see graphic 3).

Table 2. Conceptual compilation of the results collected from the first and second cycle of workshops about Pre-planning.

I. HIGH FLOW OF RESPONDERS IN HOSTILE ENVIRONMENT	II. HIGH IMPACT, LOW FREQUENCY EMERGENCIES	III. MULTI-AGENCY/MULTI-LEADERSHIP ENVIRONMENT	IV. HIGH LEVEL OF UNCERTAINTY
Pre-plan a time-efficient, safe response, minimizing responder's engagement	Negotiate solutions with stakeholders for anticipated scenarios	Pre-plan interoperability and enhance synergies	Focus on governance and integral risk management
1. Plan logistics & legal issues a. For specific scenarios. Consider help from outside the regionals System. b. Package and pre-positioning modules of resources. c. Available mínimum of logistical resources and suplies.	1. **Plan scenarios:** a. Based on: a1. **Historical events, statistics (baseline), modelling actual conditions and the human factor.** a2. On a range of **probable scenarios**, from a local to a regional level b. Including scenarios **probable at long term**, investing in knowledge and skills and being prepared by a **flexible and modular approach**. c. **Integrate the different disciplines** based on the scenarios and strategies.	1. **Create a transboundary framework** a. **Legal framework for cross-border** help, emergency support, victim transportation, recognition of qualifications... b. Pre-plan should be known by all agencies and stakeholders	1. **Create a flexible and fast framework** a. Quick adaptation to changes through situation assessment and decision-making structures. b. Focus: **small window of opportunities** to change policies and governance processes.
2. Information – Awareness – Communication: Share information of **local hostile scenarios**, and its pre-planned **response measures**.	2. **Information – Awareness – Communication: Regulate the expectations about the communications coming from the emergency systems.**		2. **Information – Awareness – Communication:** a. **Communication management** for specific scenarios. Include post-accident procedures. b. Promote the growth of **sustainable, risk-decreasing activities**
3. Prevention & Preparedness: Passive prevention for safe access.	3. **Prevention & Preparedness** a. Change the focus towards active prevention, self-protection and risk mitigation. Facilitate firefighters' capacity. b. At a regional scale, harmonize P&P measures in cross-border/cross-regional areas.	2. **Prevention & Preparedness: Emergency preparedness should be dealt with international / European perspectives.**	
4. People: Roles & Experts a. Key specific roles. b. Networks of experts that exchange knowledge, experience and best practices. c. Coordination between cross-border crews.	4. **People: Comunities** a. Involve actors and agencies for **their capacity to solve gaps**. b. Exchange experts in **large events** in other places (countries?). c. Build **communities of practice of experts**.	3. **People: Synergies** a. Enhance synergies from regional, to national and international level. Share specialists and experts. b. Plan **strategic ownership.** c. Boost the exchange of **aid-teams to train themselves**.	3. **People: Resilience** a. Involve key stakeholders in action-based strategies, considering integral risk management opportunities. Identify **strategic ownership.** b. Encourage own skills and community skills fostering habits focused on the adaptation to risk

I. HIGH FLOW OF RESPONDERS IN HOSTILE ENVIRONMENT	II. HIGH IMPACT, LOW FREQUENCY EMERGENCIES	III. MULTI-AGENCY/MULTI-LEADERSHIP ENVIRONMENT	IV. HIGH LEVEL OF UNCERTAINTY
Pre-plan a time-efficient, safe response, minimizing responder's engagement	Negotiate solutions with stakeholders for anticipated scenarios	Pre-plan interoperability and enhance synergies	Focus on governance and integral risk management
	5. Negotiate/Agree: a. **Responsibilities** of organizations involved in the anticipated scenarios. b. Involve society in **choosing between alternative strategical scenarios** and negotiate solutions. c. Negotiate the **accepted level of risk** on a range of probable scenarios considered in the pre-planning (This phrase comes from II.1.b). **6. Best practices & Lessons Learnt:** Context-specific guidelines on best practices in planning, preparedness and prevention at a national scale. **7. Pre-planning vs response:** adapt the pre-plans to usable tools at the the emergency.	**4. Negotiate/Agree** a. Chain of command, specifying roles and capabilities. b. Establish agreements and structures for cross-collaboration between entities (private and public): ▪ with specific key intelligence, ▪ with those who have power of decisions ▪ with those who have influence on the management **5. Best practices & Lessons Learnt: European interagency round tables.**	scenarios and on the robustness in front of the risk. c. Improve the resilience among responders to maintain their response capacity. **4. Pre-planning vs response:** a. Reduce bureaucracy and other inhibitors. b. Pre-plans: Flexible, focused on indicators of key changes and providing tools for alternatives and contingency plans.

3.4. Guidance instruments and standards

Items collected from the first and second cycle of workshops concerning Guidance, instruments and standards:

I. HIGH FLOW OF RESPONDERS IN HOSTILE ENVIRONMENT: Establish specific procedures and guides facilitating operations

I.1. [I] Standardize response in front of specific hostile environments (division into zones, safety, techniques...).
I.2. [I] Procedures and guides for fast response to minimize total damages in a time-efficient way (mobilization, arrival, command, transfers and turn-overs, work-rest balance, briefings, documentation, maps, logistics, communication, coordination, cross—border procedures...).
I.3. Pre-stablish scenarios using statistics as a baseline and recent incidents and accidents to define which scenarios are probable.
I.4. Build techniques for planning and for adjusting the use of resources with enough time, with the objective to maintain the sustainability of the work effort for long periods.
#Europeanguides   #safetystandards   #mobilizitaion   #transferofcommand   #mandatorydrills   #SOPdecontamination #FFAccountabilityBoard #StagingAreas #mandatorydetectors #PublicProcurementInnovation

II. HIGH IMPACT, LOW FREQUENCY EMERGENCIES: Standardize capabilities in front of pre-established scenarios

II.1. [I] Standardize competences to respond and prevent risks, also to respond to the exchanges, lessons learned, drills and evaluations processes to maintain them.
II.2. [I] Build specific SOP and doctrine for specific scenarios with high impact.
II.3. [I] Establish useful criteria for decision makers in order to measure and compare approaches in front of this sort of emergencies.
II.4. [III] Adapt the legal framework and requirements on prevention and self-protection of infrastructures and activities to first responders' needs, lessons learned from past events... Plan the implementation of laws and plans. Adapt the regulations to emergency situations.
II.5. a. Involve firefighters in establishing doctrine and build a proactive approach to risk.
II. 5. b. Doctrine and procedures should focus on protecting firefighters and the rest of people, but should not focus on avoiding and correcting legal conflicts.
II. 5. c. Therefore they should be simple and allow freedom and adaptability to reality.
II.6. [I] In a situation of crisis, the data protection legislation should facilitate the availability of information in order to make easy to take decisions shared with multiple agents, it should also allow the individual and organizational learning.
#EuropeanPolicyFramework #whopays #CommonTrainingAllAgencies #quarantineshelters

III. MULTI-AGENCY/MULTI-LEADERSHIP ENVIRONMENT: Establish an interagency framework

III.1.a. Standardize fluxes of information and decision-making between private, civil and military environments, reducing bureaucracy.
III.1.b. [III] **Establish standards of roles, capabilities, competencies and processes for a multi-agency framework and the mechanisms to certify them. Nowadays under similar names, there are different capabilities, competencies and processes.**
III.1.c. Cross-border logistical aid standards.
III.2.a. The standards of aid-teams should assess their autonomy to develop tasks with quality and without generating noise or extreme effort in the organization, which receives the aid. The team's standards should asses the efficacy and quality of the capacity to reach the tactical objectives and to contribute to the resolution of the emergency.
III.2.b. Boost modules and capacities that provide intelligence and strategy on the resolution of the emergency.
III.3.a. Integrate specialists and non-specialists in operations, in the command post and in the chain of command.
III.3.b. Establish quality control systems of the pre-planning tasks.
III.4.a. Regulate cross-border plans and aids.
III.4.b. Regulate the jurisdictional responsibilities. It should be a mandatory unified communication system at least in cross-border scenarios. Integrate responders in the elaboration of legislation, norms and elements of risk planning: land use, building technical codes/norms, etc.
III.4.c. [I] **Towards a 'bottom-up' approach in order to harmonise legal aspects of prevention-protection measures, emergency management, work framework, terminology and procedures at a European level.**
III.4.d. Increase flexibility in the European normative/regulations when there is a situation of emergency in order to integrate non-public actors. Modify the public policies (education, landscape, urban planning, industries…) including the integration of scenarios of big emergencies (HILOFs) that have likely return periods of decades.
III.5. [I] Certify/validate models (when there is a need to assume judicial responsibilities it is necessary to have robust models to help the decision-making).

IV.HIGH LEVEL OF UNCERTAINTY: Build doctrine for resilience in emergency services and societies

IV.1. Ensure that doctrine gives space for safe decisions towards solving the incident in unexpected scenarios.
#simultaneity #StandardWarnigSystem

Graphic 5. Total number of times a coded item has been repeated when talking about Guidance, Instruments and Standards along all the workshops.

Graphic 6. Guidance instruments & Standards. The graphic depticts the most repeated coded items per workshop addressing Guidance instruments & Standards. The graphic only shows the items that have appeared 3 or more times totally (see graphic 5).

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Table 3. Conceptual compilation of the results collected from the first and second cycle of workshops about Guidance, instruments & Standards.

I. HIGH FLOW OF RESPONSE IN HOSTILE ENVIRONEMNT	II. HIGH IMPACT, LOW FREQUENCY EMERGENCIES	III. MULTI AGENCY / MULTI-LEADERSHIP ENVIRONMENT	IV. HIGH LEVEL OF UNCERTAINTY
STABLISH SPECIFIC PROCEDURES AND GUIDES FACILITATING OPERATIVITY	STANDARDIZE CAPABILITIES IN FRONT OF PRE-ESTABLISHED SCENARIOS	STABLISH AN INTERAGENCY FRAMEWORK	BUILD DOCTRINE FOR RESILIENCE IN EMERGENCY SERVICES AND SOCIETIES

1. **Standardize** response (hostile environments).
2. **Procedures – SOP** and guides for fast response minimizing damages in a time-efficient way.
 	
3. **Stablish criteria**: Pre-stablish scenarios (base-line statistics, last incidents & accidents). Knowledge about probable scenarios.
 	
4. **Techniques** for planning and for adjusting the use of resources.
	1. **Standardize** competences to respond
	2. **Procedures – SOP** for specific scenarios with high impact.
	
	3. **Stablish criteria**: for decision makers to measure/compare approaches.
	
	4. **Legal Framework** and requirements to first responders needs, lessons learned, past events, etc.: on prevention and self-protection of infrastructures and activities
	
	5. **Doctrine**:
	  a) Involve fire fighters in stablishing doctrine.
	  b) Aimed at protecting fir-fighters and people not focusing on correcting legal conflicts.
	  c) Simple, adaptable to reality, boosting freedom to act/operate.
	
	6. **Flexibility in data protection legislation** in a situation of crisis to extract useful information.
		1. **Standardize**:
		  a) Fluxes of information and decision-making.
		  b) Roles, capabilities, competencies and processes.
		  c) Cross-border logistical aids.
		2. **Procedures – SOP**
		  a) Team-standards should focus on efficacy & quality on reaching tactical objectives.
		  b) Boost modules and capacities that provide intelligence & strategy.
		3. **Stablish criteria**
		  a) Integrate specialists and non-specialist in operations.
		  b) Quality control systems for planning.
		4. **Legal Framework: regulate:**
		  a) Regulate Cross-border plans and aids.
		  b) Regulate jurisdictional responsibilities.
		  c) Apply bottom-up approach.
		  d) Increase flexibility in emergencies.
		  e) Include HILOs.
		
		5. **Certify/validate models.**
			1. **Standardize** warning system
			
			2. **Doctrine**: ensure that gives space for save decisions.

3.5. Knowledge cycle

Items collected from the first and second cycle of workshops concerning Knowledge cycle:

I.HIGH FLOW OF RESPONDERS IN HOSTILE ENVIRONMENT: Train specific roles and risks.

I.1.a. [II] Develop, evaluate and maintain the skills of responders involved, specialists and non-specialists, and also their knowledge of the local scenarios and techniques.

I.1.b. [I] Assign tasks considering the qualifications achieved by each individual.

I.2. [III] Differentiate between operational, tactical, strategical and chain-of command training, including courses, visits, drills and exercises. Do courses to learn; visits to acquire local knowledge; drills to acquire individual's and crew's skills; to learn Standard Operational Procedures (SOPs); do exercises to train/evaluate flexibility, team building and performance; explain lessons learned to raised awareness. Also consider to train new skills/tools, capacities and procedures.

I.3. [III] Responders should invest in new technologies (give financial support, personnel, innovation capacity, knowledge, implementation procedures...): with the aim to solve specific problems about the resolution of incidents but without letting technology being an obstacle. That is because focusing extremily in the technological solutions could distort the resolution of the emergency.

I.4. [I] Do 'Command post' tactical training to maintain a sustainable flow of tools and equipment, responders, in-out communications of information and orders...

I.5. [II] Population should be train to act as firs-responders with the limits required to the situation. Consider the difficulties to manage volunteers.

#pre-hospitalprocedures #onsitevisits #exerciseevaluatorsandassessors #tabletopexercises #virtualreality #onlinetraining #selftraining #redcells #HRBcategorization #lackbetforI+Dnewknwoledge #safetytraining

II. HIGH IMPACT, LOW FREQUENCY EMERGENCIES: Organizational learning focusing efforts in key risks and opportunities.

II.1.a. [II] Towards a complete cycle of knowledge. Adjust Standard Operational Procedures (SOPs), doctrine and pre-plans using the feedback from real incidents and from exercises testing them (evaluators, assessors, statistics…) and identify the main gaps to focus efforts in training, procedures, personnel and equipment. Evidence based on fire scenarios. The process learning of an organization goes through the identification of own 'best practices' and the external ones:
-   to collect experiences and convert them into guides,
-   to collect 'lessons learned' and transform the best points into protocols,
-   to share experiences with the aim of generating standards.

II.1.b. [III] Study and learn from research, from private enterprises, from incidents occurred in the past and/or in other places…

II.2.a. [IIIII] Combine experts and specialist who accumulate knowledge with an increase in knowledge and skills of firefighters, and with the involvement of stakeholders in prevention visits and exercises. Boost multidisciplinary teams of experts either scientist, specialists, firefighters or stakeholders to focus specific and particular problems.

II.2.b. [I] Keep the knowledge of the organization as a priority (avoid the loss of experience with the generational change).

II.3. Focus on the improvement of the cost-efficiency of trainings, exercises, practices…

II.4. [II] **Optimize** the collection of lessons learned processes (=implemented) inside the organization and between organizations. Look for specialists in those areas.

II.5. [I] Broaden the focus of learning, involving situation awareness at all levels, and specially on prevention and self-protection. Focus on rapid recognition of the scenario; on anticipation of the **behaviour** of the fire/water/chemical/radiation; on anticipation of opportunities and risks.

#organizationallearning #knowledge=responsibility #disseminatedexpertise #descapitalization #bestpractices #trainedevaluators #EuropeanTrainersGuides #SpecificOperationalGuides #cost-efficienttrainings #learningoutcomes #science-policy-practitionner-interphase #newknowledgeasprotocolsandnorms #fireengineers #modellingimprovement

III. MULTI-AGENCY/MULTI-LEADERSHIP ENVIRONMENT: Build a shared understanding of emergency, and train interagency scenarios.

III.1. Provide a shared understanding of the emergency behaviour, of the roles, terminology, capabilities, decision-making and other specific processes, and do it before, during and after the emergency to all the involved.

III.2.a. [I] Standardize competences for specific positions at European Level, and its certification processes.

III.2.b. [I] Create an archive/catalogue of experiences, best practices and lessons learnt. Incorporate it to the data and knowledge of previous incidents existent platforms at a European level.

III.3. Train values such as empathy, adaptability, proactivity, collaboration and leadership, and promote trust building.

III.4.a. [II] Map existing networks and stakeholders at national, regional and local level.

III.4.b. [III] Engage network of experts on in-site based activities.

III.4.c. [I] Map centres of knowledge and capabilities (theoretical, practical and interface) at an international level and considering the comparison of capabilities.

III.4.d. [I] Share the knowledge cycle with scientists with the aim to guide the world of science to the real needs.

III.4.e. [I] Encourage the creation of exchange of experience networks covering different sort of emergencies.

III.5. [IIIIII] Once the standard roles of different actors have been trained and drilled inside each agency, organize multiagency joint trainings and exercises with the focus on decision-making, coordination and interactions between agents. Train in overlapped competences and limits of competences. Train the trainers of the different agencies. Share on-line training and exercises.

III.6. Liaison officers as 'translators' (language, cultures...) in different decision levels.

#EuropanSharingKnowledgePlatforms   #EuropeanDisasterManagementSchools   #scales   #buildingmanager #CommonInteragencyTraining #skilledtrainners #jointtraining

IV.HIGH LEVEL OF UNCERTAINTY: Focus on capacity building towards more resilient societies.

IV.1. Study integral risk management at a large scale, involving stakeholders, and focus on the interphase between different incidents, changes of behaviour, domino effects and uncertainties.

IV.2. Understand probabilistic forecast of different scenarios, compare alternatives and have contingency plans.

IV.3. It is necessary to understand the drivers, challenges and constrains that make successful some best practices and lessons learned in order to extrapolate other scenarios, risks and situations.

IV.4. In front of emergencies that set out uncertain problems that overwhelm the management capacity, it is necessary a close collaboration between research and responders, directed to specific problems, concerning responders decision-making process, keeping in mind the drivers of change of behaviour and effects, and tools to respond to the emergency (e.g. treatments):

  a. Redefine constrains.
  b. Integrate research laboratories as responders.
 c. Develop basic science concerning drivers of the risk phenomena.

IV.5. Certify/validate models (when there is a need to assume judicial responsibilities it is necessary to have robust models to help the decision-making).

IV.6. Train crews and commanders in decision-making and communication in uncertain, dynamic, unexpected scenarios, adapting tempos and synchronizing activities with other agents. Cultivate this kind of mentality. Facilitate the improvement of existing doctrine.

#dominoeffects #ptsd #decisionlag #humanfactors #simultaneity

Graphic 7. Total number of times a coded item has been repeated when talking about Knowledge Cycle along all the workshops.

Total repetitions of each item (KC)
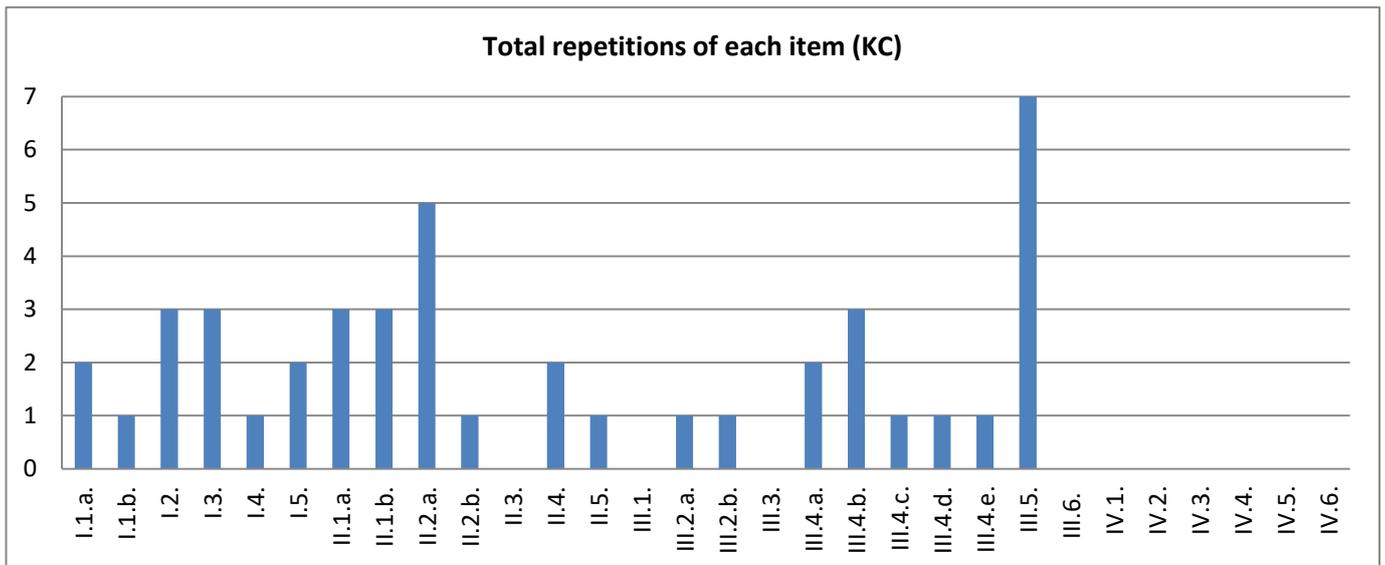
Graphic 8. Knowledge cycle. The graphic depticts the most repeated coded items per workshop addressing Knowledge Cycle. The graphic only shows the items that have appeared 3 or more times totally (see graphic 7).
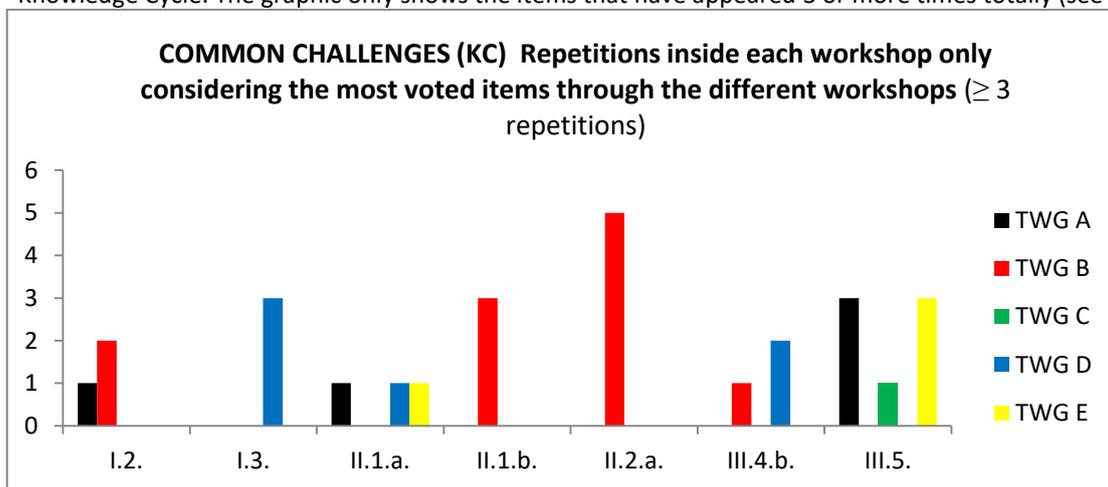

COMMON CHALLENGES (KC) Repetitions inside each workshop only considering the most voted items through the different workshops ($\geq$ 3 repetitions)

- TWG A
- TWG B
- TWG C
- TWG D
- TWG E

Table 4. Conceptual compilation of the results collected from the first and second cycle of workshops about **Knowledge Cycle.**

I. HIGH FLOW OF RESPONSE IN HOSTILE ENVIRONEMNT	II. HIGH IMPACT, LOW FREQUENCY EMERGENCIES	III. MULTI AGENCY / MULTI-LEADERSHIP ENVIRONMENT	IV. HIGH LEVEL OF UNCERTAINTY
Train specific roles and risks	*Organizational learning focusing efforts in key risks and opportunities*	*Build a shared understanding of emergency, and train interagency scenarios*	*Focus on capacity building towards more resilient societies*

1. **Skills:**
a. Evaluate and maintain
b. Assign tasks considering the **qualifications.**
2. **Standard Operational Procedures (SOPs):** Differentiate between operational, tactical, strategical and chain of command training
 	
3. Responders should invest in new **technologies.**
 	
4. **Training:** Command post tactical training
5. **Population** should be train to act as first-responders
	1. Towards a Complete cycle of knowledge.
	  a.**SOPs**: Adjust Standard Operational Procedures:
	b. **Study and learn** from differnt actors
	  - Collect experiences
	  - Collect lessons learned
	  - Share experiences
	
	2. **Sources of knowledge**:
	  d. Combine experts and specialist who accumulate knowledge.
	  e. Keep the knowledge of the organization as a priority
	
	3. **Training**: Cost-efficiency of trainings, exercises, practices…
	
	4. **Optimize** the collection of lessons learned
	5. Broaden focus learning: Focus on behaviour of risk elements
		1. **Shared understanding.**
		
		2. **Experiences:**
		  a. Standardize **competences** for specific positions at European level.
		  b. Create a catalogue of experiences, best practices and lessons learnt
		
		3. Train **values** → Human factor
		
		4. Sources of **knowledge**:
		  a. Map with existing networks
		  b. Engage network of experts
		  c. Map centers of knowledge and capabilities
		  d. Share the knowledge cycle with scientists
		  e. Exchange of experience networks
		
		5. Organize multiagency joint **trainings.**
		
		6. Laison officers
			1. **Study integral risk management** at a large scale, focus on the interphase.
			2. Understand **probabilistic forecast of different scenarios.**
			3. **Understand the drivers, challenges and constrains** that make successful some best practices and lessons learned.
			4. **Close collaboration between research and responders**:
			  a. Redefine constrains.
			  b. Integrate research laboratories as responders.
			  c. Develop basic science concerning drivers of the risk phenomena.
			5. **Certify/validate models**.
			
			6. **Train crews and commanders in decision-making and communication** and synchronizing activities with other agents.

3.6. Information management

Items collected from the first and second cycle of workshops concerning Information management:

I. HIGH FLOW OF RESPONDERS IN HOSTILE ENVIRONMENT: Information cycle.

I.1. [III] Compile and validate dynamic data flows. Focus on having a big-picture view, on a timely verification of too-much information, on distinguishing noise from useful information, and on identifying targets and sources of key information.
I.2. Provide clear instructions to potential victims.
I.3. Do specific communications with the participation of responders, stakeholders, politicians and media.
I.4. Improve the ability to extract useful information from crowd-sourcing, from the field and from other sources (distinguish useful information from noise).
I.5. Create interoperable sharing platforms to circulate common information and to establish a common framework for the decision-making.
#technicalexpert #informationmanager #mobilejurisdiction #laboratories #fakenews #alarmsystem #weatherforecast #legalaspectsofsocialmedia #112infotodispatchers #EuropeanRelevantInformationDatabase #checklists

II. HIGH IMPACT, LOW FREQUENCY EMERGENCIES: Manage key information focused on decision-making.

II.1. [I] Circulate information to develop legal standards for prevention and response.
II.2.a. [I] Be prepared to extract useful information from crowd-sourcing.
II.2.b. [I] Build systems (persons-tools-processes) to integrate and analyse information from different channels, to manage information overload, to anticipate probable scenarios. Build them with comparative results. The aim is to provide a shared understanding of the scenario and operations focusing on anticipated risks and opportunities, and focusing on tracking resources, actions and damages (**II.3**).
#avoidnoise #analyst #socioculturals #commondatarepository #realtimedatacollection

III. MULTI-AGENCY/MULTI-LEADERSHIP ENVIRONMENT: Define common information management processes between agencies.

III.1.a. [I] Define the information to be shared among agencies, and share a database (cartography, plans, lessons learned,...).
III.1.b. Define the evaluation process and each agency role on it.
III.2.a. Relevant procedures and terminology should be known by all responders.
III.2.b. [III] Share needs and limitations from different agencies (format, procedures, legal aspects…).
III.2.c. [I] Standardize the shared information between the Call Centres, Dispatch Centres and the Command Post.
#EuropeanCommunicationSystem

IV. HIGH LEVEL OF UNCERTAINTY: Provide an efficient, flexible flow of information for a shared understanding.

IV.1. [II] Manage information in scenarios with domino effect which are time-constrained, or scenarios of risk that could lead to collapse, in order to avoid disinformation that could result in to panic and to the system collapse.
**IV.2.** [I] Identify the uncertain scenario and sources of uncertainty by way of monitoring the situation.
IV.3. Share key intelligence to facilitate synchronized actions and to maintain the initiative on a changing scenario.
#dominoeffectcommunication #intelligencesharing

Graphic 9. Total number of times a coded item has been repeated when talking about Information management along all the workshops.

Total repetitions of each item (IM)
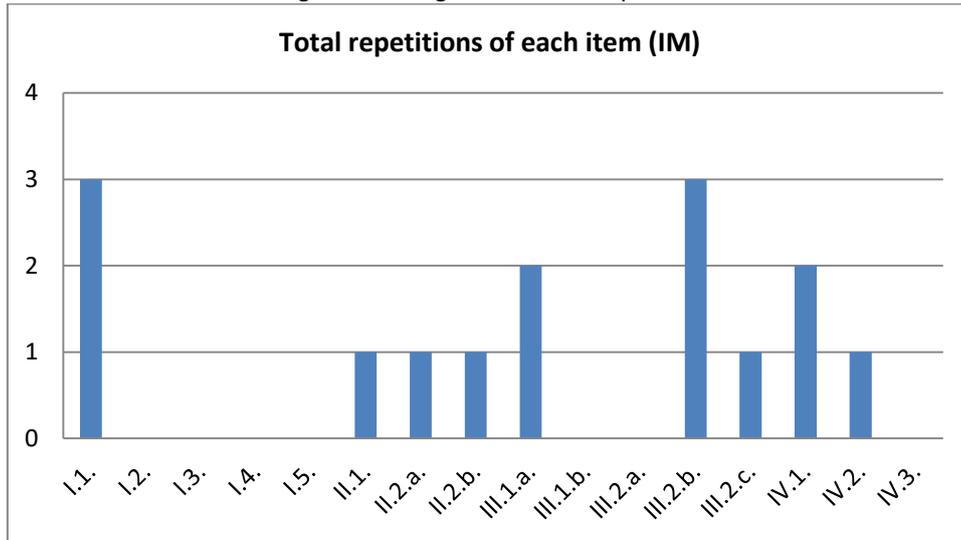
Graphic 10. Information management. The graphic depticts the most repeated coded items per workshop addressing Information management. The graphic only shows the items that have appeared 3 or more times totally (see graphic 9).
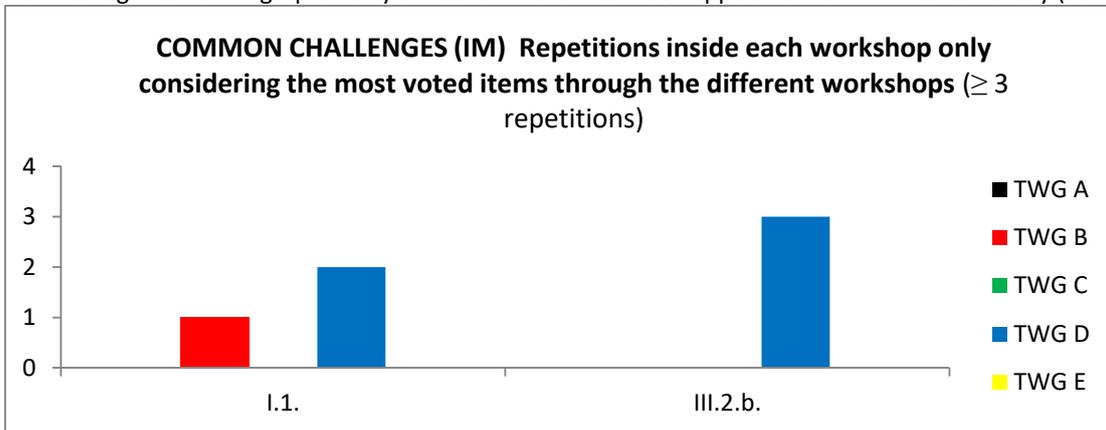
COMMON CHALLENGES (IM) Repetitions inside each workshop only considering the most voted items through the different workshops (≥ 3 repetitions)

Table 5. Conceptual compilation of the results collected from the first and second cycle of workshops about **Information management**.

I. HIGH FLOW OF RESPONSE IN HOSTILE ENVIRONEMNT	II. HIGH IMPACT, LOW FREQUENCY EMERGENCIES	III. MULTI AGENCY / MULTI-LEADERSHIP ENVIRONMENT	IV. HIGH LEVEL OF UNCERTAINTY
Information cycle	Manage key information focused on decision-making	Define common information management process between agencies	Provide an efficient, flexible flow of information for a shared understanding
1. **Compile and validate** dynamic data flows. 2. **Provide clear instructions** to potential victims. 3. Specific communications (involving different agents) 4. **Extract useful information from crowd-sourcing**: Improve the ability. 5. **Common framework/shared understanding**: a) Interoperable sharing platforms. b) Common information.	1. **Circulate information** to develop legal standards. 2. **Extract useful information from crowd-sourcing**: a) Be prepared. b) Build systems with comparative results. 3. **Common framework/shared understanding**: Information from different channels.	1. **Manage the information**: a) Define agency role/paper. b) Define the evaluation process. 2. **Common framework/shared understanding**: a) Relevant procedures and terminology should be known by all responders. b) Share needs and limitations. c) Standardize the shared information between Call Centres, Dispatch Centres and Command post.	1. **Avoid disinformation to**: a) Avoid panic. b) The system collapse. 2. **Monitor the situation** to identify uncertain scenario and sources of uncertainty. 3. **Share key intelligence** to: a) Facilitate synchronized actions. b) Maintain initiative.

3.7. Community involvement

Items collected from the first and second cycle of workshops concerning Community involvement:

I. HIGH FLOW OF RESPONDERS IN HOSTILE ENVIRONMENT: Develop public self-protection to minimize responders' exposure

I.1. [III] Focus on prevention, self-protection and risk awareness of population. Encourage self-protection measures (subsidy, exceptions in regulations…) Create a culture of emergency.

I.2. [IIIIIIIIIIIII] *Train/educate/inform* general population starting from scratch and in a basic and easy way, about knowledge of risk and appropriate behaviours, specially targeting those more exposed and vulnerable. Address all phases of emergency and the different levels of risk. Provide tools to facilitate adequate decision-making: checklists, emergency kits …

I.3. Agree with public and private stakeholders on accepted risk and self-protection measures reaching pacts and deals. Do mandatory exercises financed by the owners of high risk activities. Focus on crowd management and panic.

I.4. [II] Disseminate instructions to apply in case of risk, in order to strengthen the appropriate population reactions.

#voluntaryinvolvement #PressConferenceArea #floatingpopulation

II. HIGH IMPACT, LOW FREQUENCY EMERGENCIES: Involve communities in preparing population for the worst scenario before it happens, for low frequency, high impact.

II.1.a. [IIIIIII] Change of paradigm. From *'We, authorities, will protect you'* to '*You, citizen, should be actively involved*'. These affirmations mean that you should be prepared to be self-sufficient concerning to your own protection and your community protection always inside the framework of the emergency. Be used to this sort of situations normalizing them.

II.1.b. [II] Educate kids and the young ones.

II.1.c. Explain clearly that responders cannot protect everybody in case of major incident. Self-protection and prevention are keys.

II.2. [IIIIIII] Build trust involving communities and key stakeholders in risk management permanently: from risk awareness to the preparation of scenarios, to the decisions and behaviour during the emergency, to verifications, to drills and exercises.

II.3.a. [III] Perform communication campaigns targeted to specific communities, with messages, exchanges and media carefully studied. Generate multi-language apps, with standardized symbology. Consider community's lessons learnt by past disasters, collective memory, community's values.

II.3.b. Manage and involve mass media. Perform training on means for mass information (social media, smartphones...).

II.3.c. [II] Be prepared to provide massive alerts to population.

II.4.a. [I] Plan and prepare the involvement of volunteers and other civil society members in the emergency.

II.4.b. Identify key stakeholders and increase their understanding about the risk, either those with power to create opinion and those that take key decisions.

#EuropeanPolicyFramework #TrainJournalists #trainlocalstakeholders #educatekids #eventmemory #disastersafetyweek

III. MULTI-AGENCY/MULTI-LEADERSHIP ENVIRONMENT:

III.1. [II] Unify messages (of alert) directed towards public, between agencies, regions and countries.

#EuropeanAlertSystem

IV. HIGH LEVEL OF UNCERTAINTY: Cultural change in risk tolerance and resilience.

IV.1.a. [IIIII] Encourage the change culture of risk in an integral way:
- Educating children and the young ones.
- In an integrated way: at home, inside the community, at work, free time, ad campaigns, journalistic information.
- Understanding how risks could affect the citizens, assuming the implications of their own decisions.
- Transforming the memory of historical catastrophes in values for the most resilient communities.
- Training/educating the next generation of technicians that will take decisions about planning, education, management, risk culture and risk management.
- Broadening the scope of the first-responders towards the proactive management of risk: risk knowledge, encouraging community self-protection, prevention…

IV.1.b. [II] Use all opportunities for cultural changes in risk awareness and policies.

IV.2.a. Communication in uncertain events (chained events, dynamic environments…) is crucial; it has to be prepared, trained and stakeholders should be involved.

IV.2.b. [I] Focus on credibility and resilience.

IV.3.a. Empower communities and stakeholders. Recognize and partner with existing civil-society initiatives addressing critical issues.

IV.3.b. [II] Reach population that has no trust in government authorities through non-governmental stakeholders.

#panicmanagement #understandsocioeconomicchallenges #awarenessofhistory

Graphic 11. Total number of times a coded item has been repeated when talking about Community involvement along all the workshops.
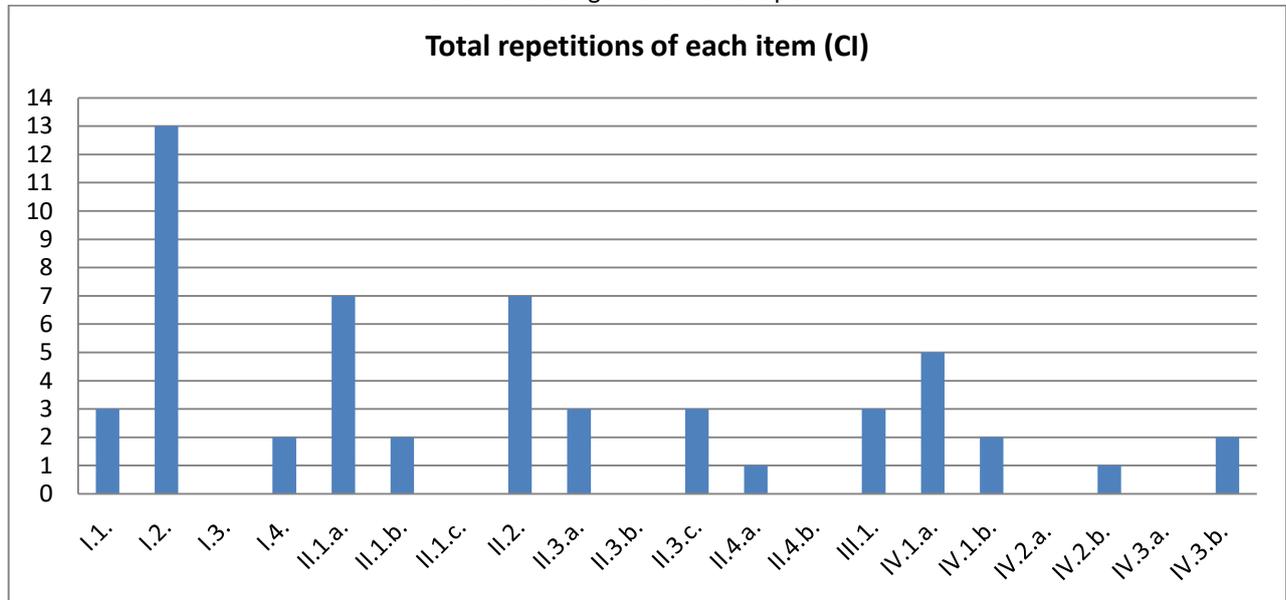
Graphic 12. Community involvement. The graphic depticts the most repeated coded items per workshop addressing Community involvement. The graphic only shows the items that have appeared 3 or more times totally (see graphic 11).
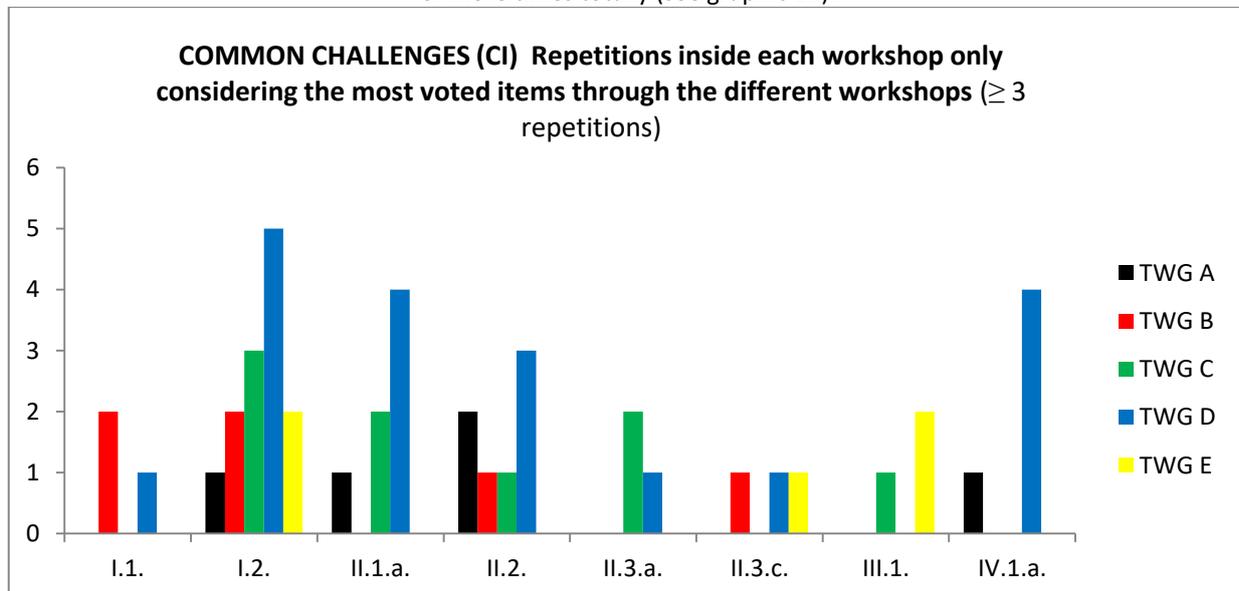
Table 6. Conceptual compilation of the results collected from the first and second cycle of workshops about **Community involvement**.

High Flow of Responders in Hostile Environment	High Impact, Low Frequency Emergencies	Multi-agency / Multi-leadership Environment	High Level of Uncertainty
Develop public self-protection to minimize responders' exposure.	*Involve communities in preparing population for the worst scenario before it happens, for low frequency, high impact.*		*Cultural change in risk tolerance and resilience.*
1.Self-protection - Focus on prevention, self-protection and risk awareness of population. - Encourage self-protection measures. **2. Train/educate/inform:** - General population. - Adressing all phases and levels of emergency - Provide decision making tools **3. Negotiate/agree: on accepted risk and self protection measures** - with public and private stakeholders - mandatory exercises financed by the owners of high risk activities. **4. Population:** disseminate instructions.	**1. Change of paradigma:** a. From *'We, authorities, will protect you'* to *'You, citizen, should be actively involved'*. These affirmations mean: - be prepared to be self-sufficient inside the framework of the emergency. -be used to this sort of situations. b. Educate kids and the young ones. c. Explain clearly that responders cannot protect everybody in case of major incident. Self-protection and prevention are keys. **2. Build trust:** Build trust involving communities and key stakeholders in risk management permanently. **3. Emergency messages:** a. Perform, manage and consider: - Communication campaigns targeted to specific communities. - Multi-language apps, with standardized symbology. - Community's lessons learnt by past disasters, collective memory, community's values. b. Manage and involve mass media. Perform training on means for mass information. c. Massive alerts to population. **4. Population:** a. involvement of volunteers and other civil society members in the emergency. b. Identify key stakeholders and increase their understanding: - those with power to create opinion - those that take key decisions.	1. **Emergency messages:** Unify messages (of alert) directed towards public, between agencies, regions and countries.	**1. Change of culture:** a.Encourage the **change culture of risk**: ▪ Educating children and the young ones. ▪ In an integrated way. ▪ Understanding how risks could affect the citizens, assuming the implications of their own decisions. ▪ Transforming the memory of historical catastrophes in values. ▪ Training/educating the next generation of technicians that will take. ▪ Broadening the scope of the first-responders towards the proactive management of risk. b.Use all opportunities for cultural changes in risk awareness and policies. **2.Emergency messages:** **a.**Communication in uncertain events has to be prepared, trained and stakeholders should be involved. b.Focus on credibility and resilience. **3.Population:** a.Empower communities and stakeholders. Recognize and partner with existing civil-society initiatives addressing critical issues. b.Reach those with no trust in government authorities through non-governmental stakeholders.

3.8. Technology

Items collected from the first and second cycle of workshops concerning Technology:

I. HIGH FLOW OF RESPONDERS IN HOSTILE ENVIRONMENT: Use technology to assess risks and minimize responders' engagement.

I.1. Tools for situational assessment and risk awareness.
I.1.a. [I] Locate responders (and victims) at all times, anywhere and be aware of how long they can sustain efforts (**I.1.b**).
I.1.b. [I] Identify and map the exposure.
I.1.c. [I] Unmanned terrestrial and aerial tools to assess the risk and unmanned tools to transport equipment on the field.
I.2. [IIIIIIII] Technologies used in interventions should be:
- ✓ Useful.
- ✓ Simple, intuitive and easy to use.
- ✓ Easy to integrate and interoperable.
- ✓ Easy to transport, deployable on field, light, with high autonomy.
- ✓ Robust, resistant, long duration, able to tolerate severe/harsh conditions.
- ✓ Open access.
- ✓ Usable by people with disabilities

I.2.a. [I] Have available and reliable tools for rapid diagnostic.
I.2.b. [I] Assure the maintenance/continuity of the energy (electricity, fuels…) and communications.
I.2.c. Intelligence applied to materials and tools used in operations.
I.3.a. Responders should invest in the development of new technologies (procurements of innovation, public-private network…).
I.3.b. Involve the users from the beginning, at the designing phase of new tools and services.
I.4. Adequate forecasts and simulations to local scale and microscale, including smoke/evacuation modelling
#language Fflocation #newtechnologiesasanatractor #robots #PPE #smartPPE #firefightingsensoring #userinterface #technologywatch #uavlegistalationinemergency #SmokeModelling #FireModelling #NewMaterials #e-learning #massiveopenonlinecourses #MOOC #openaccess

II. HIGH IMPACT, LOW FREQUENCY EMERGENCIES: Forecast and simulate complex scenarios

II.1.a. [I] Tools and mechanism to monitor that the operation/response progresses as planned.
II.1.b. [III] Tools to massively alert population in real time.
II.1.c. [III] Quick screening tools for triage.
II.2. [I] It is necessary to have Big Data and certified artificial intelligence (AI) tools and validated models that simulate the evolution of the scenario, both for the decision-making process. It is necessary to develop processes to asses, validate and/or certify the level of TRL and the operative application level of services and tools used by responders (EPIs, models of behaviour, AI, etc.). End-users should be an active part of this process.
II.2.a. [I] Virtual reality to train responders.
II.3. [I] Crowd-sourcing and multiform data integration tools.
#BIM

III. MULTI-AGENCY/MULTI-LEADERSHIP ENVIRONMENT: Technological tools to support data sharing between agencies or companies.

III.1. [III] European procedures for cross-border technology transfer. Common platform and software to share information about emergencies and resources across Europe
HEIMDALL #UE-UAVlegislation in emergencies #bigdatasharing #massivedatasharing

IV.HIGH LEVEL OF UNCERTAINTY: Get a clear picture of the risk evolution.

There were no comments to include here in the workshops.

Graphic 13. Total number of times a coded item has been repeated when talking about Technology along all the workshops.

Total repetitions of each item (Technology)
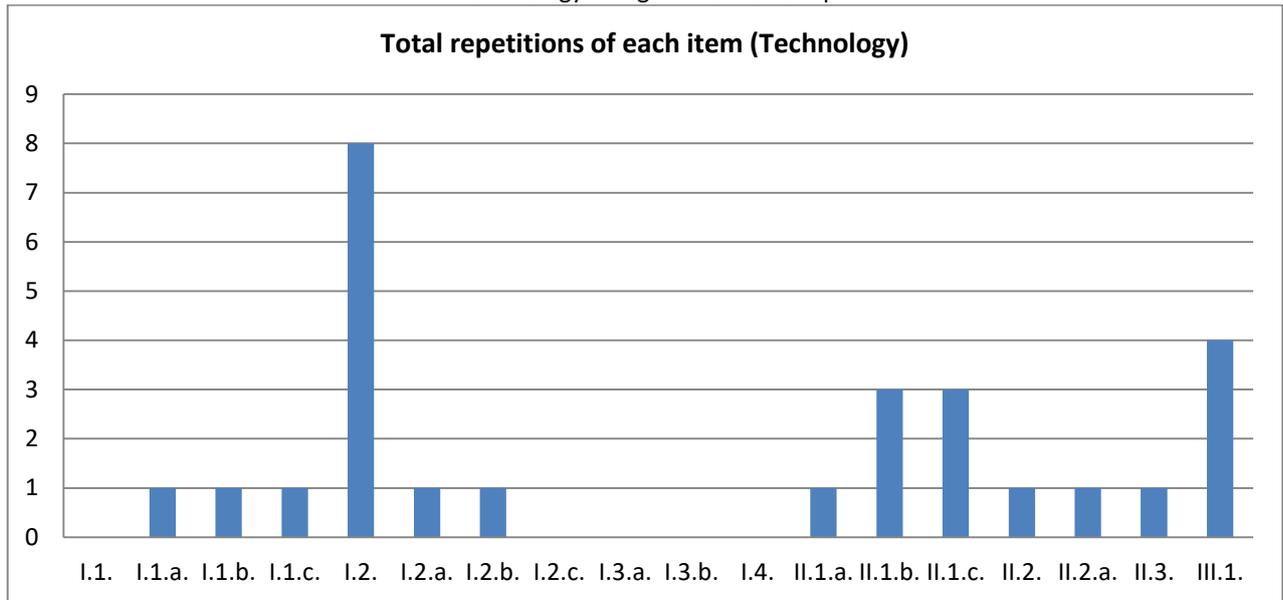
Graphic 14. Technology. The graphic depticts the most repeated coded items per workshop addressing Technology. The graphic only shows the items that have appeared 3 or more times totally (see graphic 13).

COMMON CHALLENGES (T) Repetitions inside each workshop only considering the most voted items through the different workshops (≥ 3 repetitions)

Table 7. Conceptual compilation of the results collected from the first and second cycle of workshops about **Technology**.

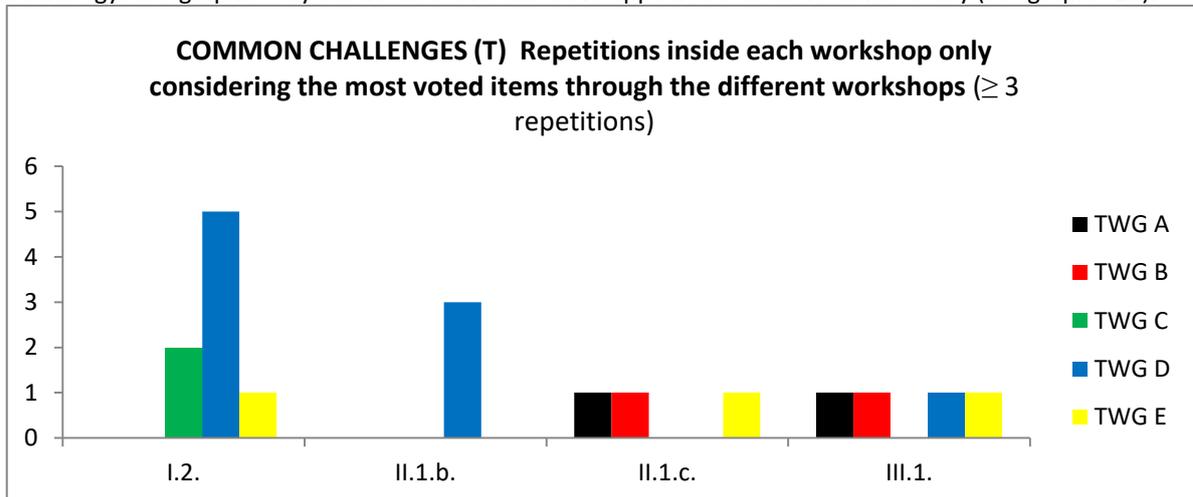| I. HIGH FLOW OF RESPONSE IN HOSTILE ENVIRONMENT	II. HIGH IMPACT, LOW FREQUENCY EMERGENCIES	III. MULTI AGENCY / MULTI-LEADERSHIP ENVIRONMENT	IV. HIGH LEVEL OF UNCERTAINTY
Use technology to assess risks and minimize responders engagement	Forecast and simulate complex scenarios	Technological tools to support data sharing	Get a clear picture of the risk evolution
1. **Technology focused on obtaining the vision of the situation:** a) Continuous responders' location. b) Awareness of the time efforts could be sustained. c) Map de exposure. d) Unmanned tools. 2. **Suitable for emergencies:** a) Reliable tools for rapid diagnostic. b) Energy and communications maintenance/continuity. c) Intelligence applied to materials and tools. 3. **End-users/responders:** a) Inversion in new technologies. b) User's involvement in all the design process. 4. **Forecasts and simulations adapted to local scale and microscale.**	1. **Technology focused on reaching big amounts of data:** a) Tools to monitor operations response progress. b) Tools to massively alert population in real-time. c) Quick screening tools for triage. 2. **Certification/validation:** a) AI b) Models c) TRL of services and tools 3. **Crowd-sourcing and multiform data integration tools.**	1. **Cross-border technology transfer.**	

3.9. Communication

Items collected from the first and second cycle of workshops concerning Communication:

I. HIGH FLOW OF RESPONDERS IN HOSTILE ENVIRONMENT:

I.1. [III] Proactively maintain the citizens continuously informed (feedback) during all the duration of the emergency.
I.2. Train first-responders in using assertive communication.

II.HIGH IMPACT, LOW FREQUENCY EMERGENCIES:

II.1. [III] Search the most effective communication' channels to disseminate messages for the population during an emergency (TV, Radio, social networks...).

III. MULTI-AGENCY/MULTI-LEADERSHIP ENVIRONMENT:

III.1. [I] Ensure that local/regional administrations are able to communicate adequate messages to the population during emergencies.

IV.HIGH LEVEL OF UNCERTAINTY:

IV.1. [II] Build trust explaining in a transparent way 'what can happen', explaining the final possible scenarios of the emergency taking into account the strategical objective to resolution.

Graphic 15. Total number of times a coded item has been repeated when talking about Communication along all the workshops.

Graphic 16. Communication. The graphic depticts the most repeated coded items per workshop addressing Communication. The graphic only shows the items that have appeared 3 or more times totally (see graphic 15).

Table 8.Conceptual compilation of the results collected from the first and second cycle of workshops about **Communication**.

I. HIGH FLOW OF RESPONSE IN HOSTILE ENVIRONMENT	II. HIGH IMPACT, LOW FREQUENCY EMERGENCIES	III. MULTI AGENCY / MULTI-LEADERSHIP ENVIRONMENT	IV. HIGH LEVEL OF UNCERTAINTY
1. **Population:** Proactively maintain the citizens continuously informed (feedback) during all the duration of the emergency. 2. **First-responders:** Train first-responders in using assertive communication.	1.**Channels:** Most effective communication' channels to disseminate messages.	1.**Local/regional administrations:** Ability to communicate appropriate messages.	1.**Build trust:** a) Transparently b) Final possible scenarios considering the strategical objective.

3.10. Human factor

Items collected from the first and second cycle of workshops concerning Human factor:
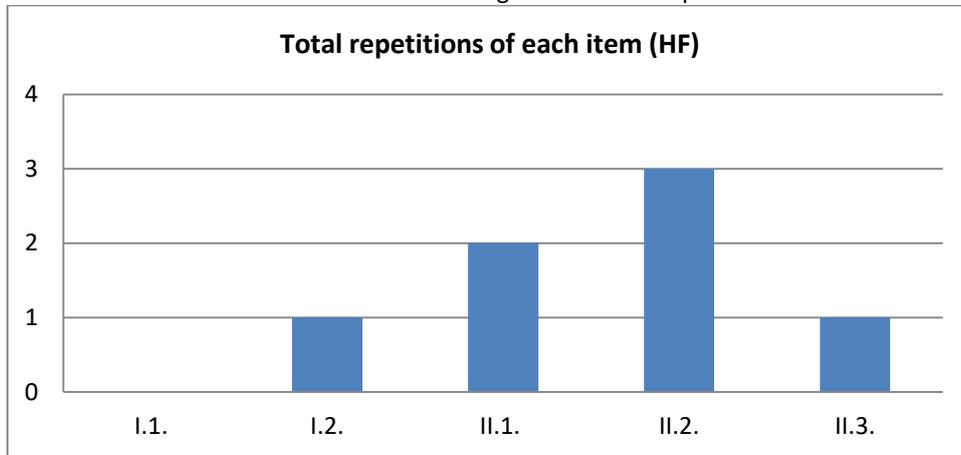**I. HIGH FLOW OF RESPONDERS IN HOSTILE ENVIRONMENT:**

I.1. Differentiate subgroups of population (from the most vulnerable to the most autonomous) and their specific characteristics.
I.2. [I] Train tolerance to frustration boosting psychological resilience between volunteers and first-responders.

II. HIGH IMPACT, LOW FREQUENCY EMERGENCIES:

II.1. [II] It is necessary to go in depth in the human factors that determine the expectations, in the decision-making processes and reactions not only of the people and communities but also of responders and policy makers.
II.2. [III] Integrate information about human behaviour patterns (community, geographic…) to define the framework of the decision-making process.
II.3. [I] It is necessary to define a governance framework in order to facilitate the decision-making process to solve emergencies, but going beyond the assumption of individual responsibilities.

III. MULTI-AGENCY/MULTI-LEADERSHIP ENVIRONMENT:

There were no comments from the workshops to include here.

IV. HIGH LEVEL OF UNCERTAINTY:

There were no comments from the workshops to include here.

Graphic 17. Total number of times a coded item has been repeated when talking about Human Factor along all the workshops.

Total repetitions of each item (HF)

Graphic 18. Human Factor. The graphic deptics the most repeated coded items per workshop addressing Human Factor. The graphic only shows the items that have appeared 3 or more times totally (see graphic 17).
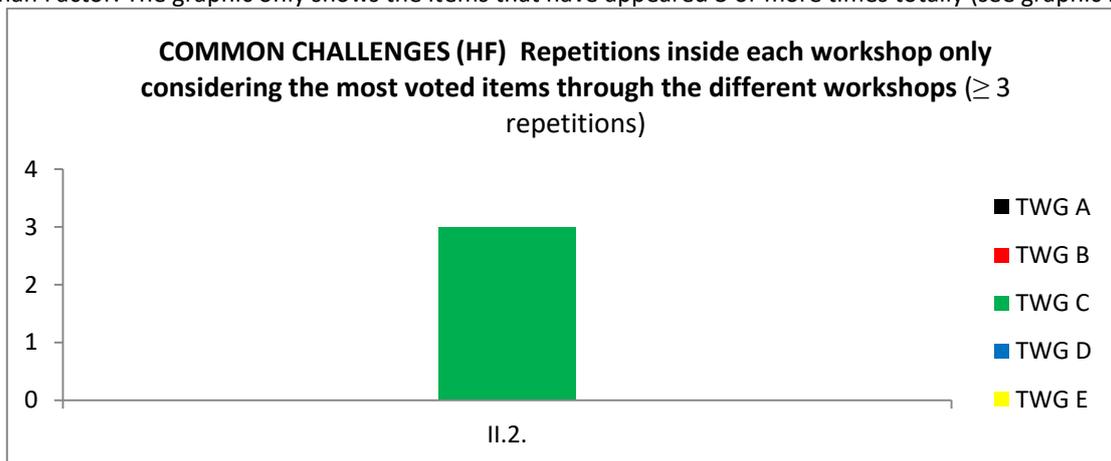

COMMON CHALLENGES (HF) Repetitions inside each workshop only considering the most voted items through the different workshops (≥ 3 repetitions)

- TWG A
- TWG B
- TWG C
- TWG D
- TWG E

Table 9. Conceptual compilation of the results collected from the first and second cycle of workshops about **Human factor**.

I. HIGH FLOW OF RESPONSE IN HOSTILE ENVIRONMENT	II. HIGH IMPACT, LOW FREQUENCY EMERGENCIES	III. MULTI AGENCY / MULTI-LEADERSHIP ENVIRONMENT	IV. HIGH LEVEL OF UNCERTAINTY
Use technology to assess risks and minimize responders engagement	Forecast and simulate complex scenarios	Technological tools to support data sharing	Get a clear picture of the risk evolution

1. **Population:** Subgroups and specific characteristics.
 	
2. **Volunteers and first-responders:** Train tolerance to frustration boosting psychological resilience between.
	1. **Responders and Policy makers:**
	  a) Expectations on decision-making processes
	  b) Reactions not only of the people and communities but also of responders and policy makers
	2. **Decision making framework:** Integrate human behaviour patterns information.
	3. **Governance framework:**
	  a) That facilitate the decision-making process to solve emergencies
	  b) Beyond the assumption of individual responsibilities.		

4. Conclusion

As a result of this process of cross analysis of the challenges raised by the practitionners during the ten workshops of the two first cycles of the project, here is the prioritised list of concerns:

	Description	Topic	Magnitude of importance for experts
1	Train/educate/inform general population starting from scratch and in a basic and easy way, about knowledge of risk and appropriate behaviours, specially targeting those more exposed and vulnerable. Address all phases of emergency and the different levels of risk. Provide tools to facilitate adequate decision-making: checklists, emergency kits …	Community involvement	13
2	Technologies used in interventions should be: • Useful. • Simple, intuitive and easy to use. • Easy to integrate and interoperable. • Easy to transport, deployable on field, light, with high autonomy. • Robust, resistant, long duration, able to tolerate severe/harsh conditions. • Open access. • Usable by people with disabilities	Technology	8
3	Change of paradigm. From 'We, authorities, will protect you' to 'You, citizen, should be actively involved'. These affirmations mean that you should be prepared to be self-sufficient concerning to your own protection and your community protection always inside the framework of the emergency. Be used to this sort of situations normalizing them.	Community involvement	7
4	Build trust involving communities and key stakeholders in risk management permanently: from risk awareness to the preparation of scenarios, to the decisions and behaviour during the emergency, to verifications, to drills and exercises.	Community involvement	7
5	Once the standard roles of different actors have been trained and drilled inside each agency, organize multiagency joint trainings and exercises with the focus on decision-making, coordination and interactions between agents. Train in overlapped competences and limits of competences. Train the trainers of the different agencies. Share on-line training and exercises.	Knowledge cycle	7
6	Identify points of coordination in the different zones: from local (hot zone, warm zone ...) to regional and to national. Establish different levels of liaison officers, translators; communication; entrance points; and infrastructures as needed.	Incident Command Organization	6

| 7	Prioritise response and resources allocation to avoid the collapse of the emergency response system: triage, build alternative scenario, identify trigger points…	Incident Command Organization	5
8	Base the prediction of scenarios on historical events and on statistics (baseline), including the modelling of the actual conditions (at local level) and human factors	Pre-planning	4
9	Maintain situation awareness. Avoid the loss of information with shifts' changes	Incident Command Organization	4
10	Adapt the legal framework and requirements on prevention and self-protection of infrastructures and activities to first responders' needs, lessons learned from past events... Plan the implementation of laws and plans. Adapt the regulations to emergency situations.	Guidance instruments and standards	3
11	Towards a complete cycle of knowledge. Adjust Standard Operational Procedures (SOPs), doctrine and pre-plans using the feedback from real incidents and from exercises testing them (evaluators, assessors, statistics…) and identify the main gaps to focus efforts in training, procedures, personnel and equipment. Evidence based on fire scenarios. The process learning of an organization goes through the identification of own 'best practices' and the external ones: o to collect experiences and convert them into guides, o to collect 'lessons learned' and transform the best points into protocols, o to share experiences with the aim of generating standards.	Knowledge cycle	3
12	Be prepared to provide massive alerts to population	Community involvement	3

Appendix 1: TWG A, Search and Rescue and Emergency Medical Response

Participants

Partners	Associated Experts
Andrea Bonetto (CNVVF)	Stefania Fiore (CNVVF)
Giovanni Fresu (CNVVF)	Ana Karin Coll Erikson (Madrid firefighters)
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FIRE-IN WP 1 Workshop Implementation Reporting Template

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Workshop dates and location:	**04-06.03.2019 PARIS**
Submission date:	**11.04.2019**
Submitted by:	**Laia Estivill, Claudi Gallardo (CFRS)**
Reviewed by:	**Marta Miralles, Carles Garcia (CFRS)**

Identification of capability challenges

Background

Introduction

Every year, there are a lot of earthquakes that affect different locations around the world. When an earthquake occurs, there are a lot of damages to the people, buildings, core services...

For this, it's very important the organization of the emergency services of the countries, because these situations are a very big emergencies. There are a lot of important phases to prepare this type of emergency:

- Planning the situation before the earthquake: prevention to make buildings more resistant's, trainings to prove the situation, have guides and protocols as a types of work...
- Planning the situation after the earthquake: what the intervention of emergency services should be like, mechanisms to repair the situation...

For this, the topic of this workshop is: **Multiple structural collapses in buildings due to an earthquake**

The details of the scenario are:

- Earthquake with a magnitude of 7 on the Richter scale.
- 80% of buildings with damage (150 buildings collapsed).
- A lot of people disappeared (400 aprox).
- A lot of people died and injured.
- High effects to the core services.
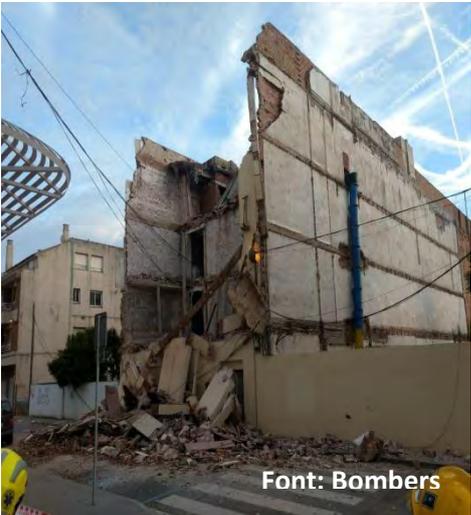
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Improvement opportunity / Capability Challenge:

Pre-planning
- Difficulty to link different agencies at different level (local-regional-national).
- Worst scenario & most reasonable scenario (evaluate a reasonable range of them), (practical experience point of view).
- Data base of past events for lessons learned.
- Necessity of a law to clarify who is involved in pre-planning and which responsibility.
- Planning of resources and available resources.
- Census of primary structures (airport, electric power lines, public offices etc.etc.).
- Need to know in real time the situation to classify the problem and then standardize the reaction.
- Difficulty in making the decision about how many resources we need and time of arrival for these resources.
- Responsibility for managing the various Agencies involved.
- Lack of community involvement in pre-planning prevention.
- Necessity to build a resilient community.

Community involvement
When there is an event, we have too many victims and not enough first responders. We have two situations, so two challenges:
- Too many people / citizens involved
- Not enough first responders

How can we manage / overlap the gap?

We are used to seeing solidarity =>
- before the responders arrive, most people try to help
- but sometimes you have to explain that some people can't help, not now or not at all

How can we have working hands instead of passive people?

How to train people? How to motivate people? How to prepare people?
- It depends on the region?
    - If you live in an area where nothing is happening, it might be more difficult to be aware
    - In some areas, people have everything and they may think that it isn't their problem
- We must think of all the risks (e.g. a building collapse could occur even without an earthquake, because of a gas explosion, the collapse of a bridge, etc.)
- When you are a tourist, you don't really know the local risks and you don't know what to do, how can we send them information? Who can do that?
- First aid training is important: How many people can we train?
- How can we involve the education system / schools? What information can be given to young people?
- When thinking about a scenario, you probably can't have all the way of thinking, all the ideas, all the situations

If we can train some people, we need to think about continuity => How to maintain the level of knowledge? How can we explain to the population / public what information is useful to first responders? What is needed? How I can share this information?
About GIS: how can we collect information and insert it into a GIS? Could the population send information? The population doesn't know what type of rescuer arrives and probably doesn't know what an ambulance can do, what a USAR can do, etc

How can we have coordination between population and local authorities and perhaps between population and European level? The population and sometimes the local level of rescuers want to help, but they could be a problem for specialized teams.

You must prepare your home, your family: the preparation of the community must be thought and several steps are necessary=> How can we classify the population by category?

For example, the ABC system exists:

- A, I'm fine (my family too) and I can help
- B, I'm fine but I'm busy (I need to help my family)
- C, I need help

How can we involve the media? Can we use social media to obtain information? In real time? Bottom-up? From top to bottom?
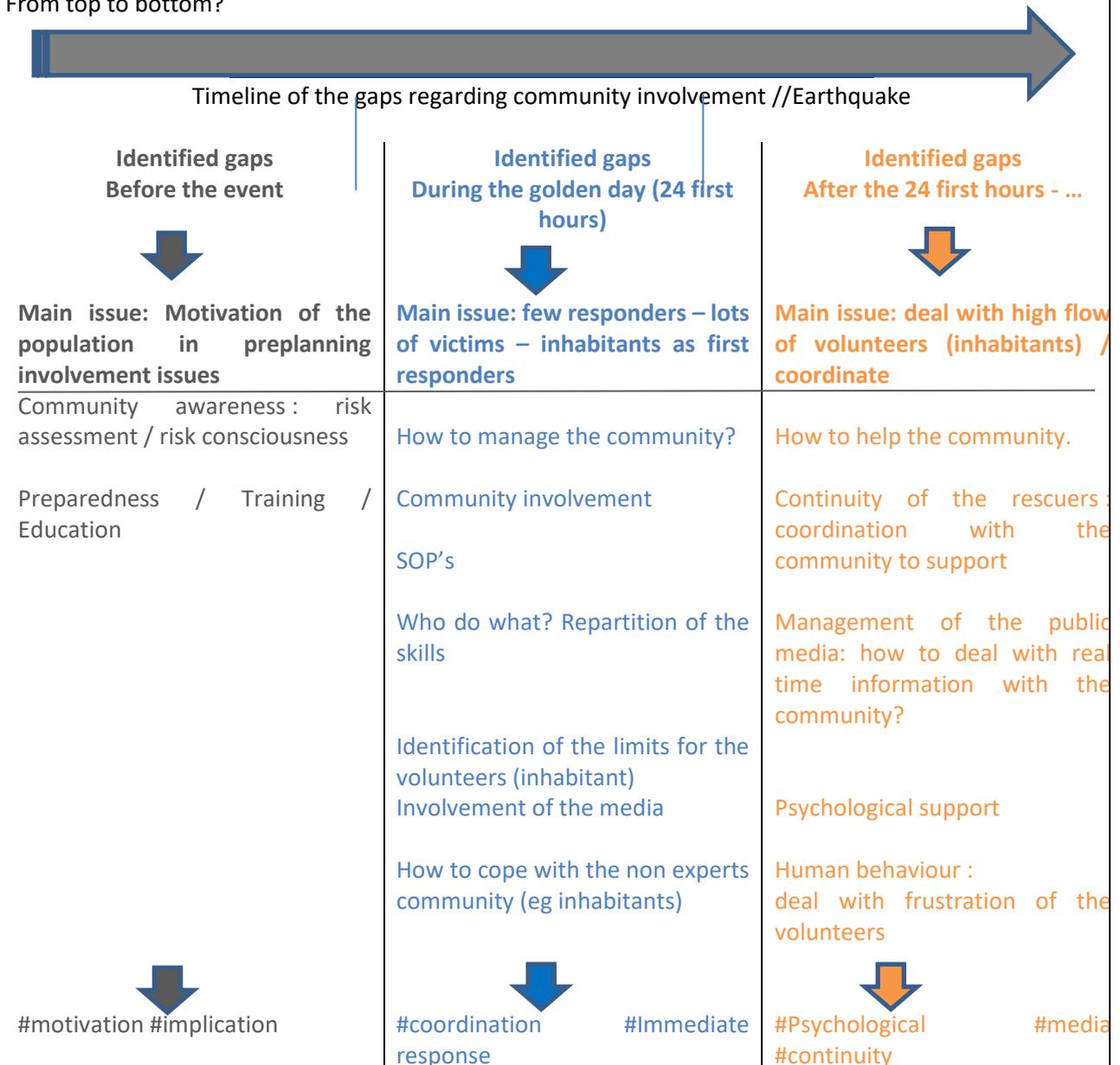
Timeline of the gaps regarding community involvement //Earthquake

Identified gaps Before the event	Identified gaps During the golden day (24 first hours)	Identified gaps After the 24 first hours - …
Main issue: Motivation of the population in preplanning involvement issues	Main issue: few responders – lots of victims – inhabitants as first responders	Main issue: deal with high flow of volunteers (inhabitants) / coordinate
Community awareness : risk assessment / risk consciousness	How to manage the community?	How to help the community.
Preparedness / Training / Education	Community involvement	Continuity of the rescuers : coordination with the community to support
	SOP's	
	Who do what? Repartition of the skills	Management of the public media: how to deal with real time information with the community?
	Identification of the limits for the volunteers (inhabitant)	
	Involvement of the media	Psychological support
	How to cope with the non experts community (eg inhabitants)	Human behaviour : deal with frustration of the volunteers
#motivation #implication	#coordination #Immediate response	#Psychological #media #continuity

Table 1: Template to structure Flip Chart for Step 3 (Improvement opportunity from different perspectives)
Knowledge cycle

- Low frequency of learning opportunities.
- The golden day. Percentage of survival decrease in 24 h.
  - ➔ Training (not only technical)   Activation,

<u>Decision process interagency – info, Procedures</u>

- <u>Diversity</u> of expert's capacities. <u>How to match</u> experts, between them and with operations. <u>Transversal teams</u>.
- <u>Funding.</u> How to justify funds for <u>low frequency.</u>
- <u>Link trainings with risk analysis</u>, at a national, regional, local level.
- There are <u>inter-operational</u> barriers.
  - Some nations have lots of FF, resources with same standards
  - Different realities, but ready to exchange → standards
- Combine common /expert skills.
- Unrealistic training.
- Lessons learned processes are often unplanned
  - Lack of SOP on lessons learned process
- Truthful communication on lessons learned.
  - Very high pressure:
    - Political level
    - Professional level:
      - Exposition to liability
      - Confidence on the other experts in the room.
  - How to validate information → agreed → integrate in system.
- **Context –specific lessons**.
- **Interoperability** needs common harmonise:
  'language' → | terminology
  | framework
  | mind-set
  | procedures
- Lack of system to **capture** these lessons and **transfer** them.
  - High turnover of personnel with skills.
  - Keeping skills in the organisation is not a priority.
- Integration between operations
  Team: EMS + FF + Army
  - Needs specific training to understand one another → SOPs...
  - Need to be done form planning, training
- How do you integrate volunteers?
- Lack of routine | Different frequencies
- From drills on individual skills (good performance) exercises combining them:

  fre

- Exercises should not be demonstration for media and politics:
  - They are expensive → should be focused
- We want to feel good → the objective should not be good performance but how many gaps we find and learning opportunities → to drill again.

Constraints / Best practices

The opportunity from different perspectives

Pre-planning

Procedures
- Common structures of command coordination & control procedures between different agencies.
- Shared and validated procedures.
- Create guidelines to make procedures.
- Debriefing procedures to evaluate a planning.
- Entry Points.
- Mobilization "Timing".
- Host Nation support.
- Smooth transition between rescue and humanitarian phases.
- Make a report on how to communicate (Media impact factors).

Knowledge/personnel
- How to involve different agencies.
- Establish who is in charge of…
- Education of Different Actors.
- Training and Maintaining Knowledge.
- Certifications of competences.
- Database of Volunteers and their Skills.
- Lessons Learned, systematic collections of data.
- Quality of incoming resources. (How to define the quality).
- Initial "Matrix" that is used in FIRE-IN project, Training for Common Approach," Related to Country Organization.
- How to take into account resources exceeding the minimum.
- How to measure the follow up of projects.
- Interoperability among the teams different countries and different level of standards level (Volunteers could be a resource in helping to find solutions)

Tools/equipments
- Updates maps
- Technologies are changing too fast and they are too expensive
- Interoperability of different agencies
- Scenario simulation for pre planning
- Common terminologies
- System to control the quality of pre planning
- Energy – Communication Infrastructure (priority).
- Shared Specific technical language Glossary.

Community involvement

Procedures
- Can we have procedures for the community? What can we expect? Can we have lists of things to do? How to evaluate the possibility of bad / irrelevant actions?
- Does the community need to know if an organization is needed? How to organize?
- E.g. CPR => if too complicated, you won't do it => the procedures should be as simple as possible
- SOP: can we integrate the community?
- How to integrate specialized profession? How to disseminate information and emergency trainings to these people?
- What do we want from the community? Can we have a policy?
- Can we think about zoning for the community? For example, specific actions in the red zone, etc.
- Should we think of time scales? Do we need the community during the golden day? What can we expect during the golden day? And after?

- Easy rescue could be done by the population => basic training could be enough
- Red Cross or other organization like that => do they have to manage the community?
- We also need procedures for communication? How to communicate to the community?
- What is the appropriated scale for procedure/organization? The city is probably too big. Is this a procedure per building?

Knowledge/personnel
- How can we share the specific vocabulary?
- We must think of the level of complexity => as simple as possible (Keep It Short and Simple / be general) and repeated a lot of time
- If someone wants to help, how do you know if it's possible? If not, how to handle frustration?
- Social / cultural studies could identify
    - Changes.
    - Competencies / skills (doctor, English speaking, etc.)
    - The needs.
- Positive attitude: how can we keep it? How can we have it?
- How to keep the people involved active?
- We should explain what could be done? How long does it take (per year, etc.)?
- What kind of knowledge is useful? It may not be about using tools, but about marking (here is a victim, etc.)
- Can we rank the capabilities of the people in the community involved?
    - Alarm phase.
   - Emergency response.
   - Return to normal phase.

Tools/equipments
- Can we use basic personal tools? Private generators for example, all the tools you can have at home
- What kind of equipment could be used if we run out of electricity?
- How long can we use our mobile phone?
- What types of tools could provide information in the event of an earthquake?
- Communication with the population: what kind of alarm? Light system? Amplifier?

Knowledge cycle

Procedures
- Need a liaison in command centre as procedure in each local command points.
- Political/**Operational**/HOST SUPPORT - Cell of help (Specific need of humanitarian help).
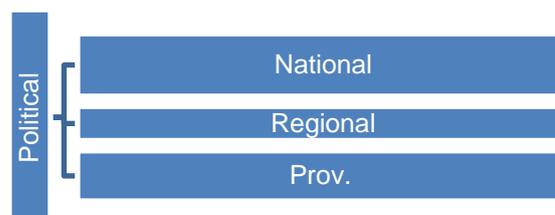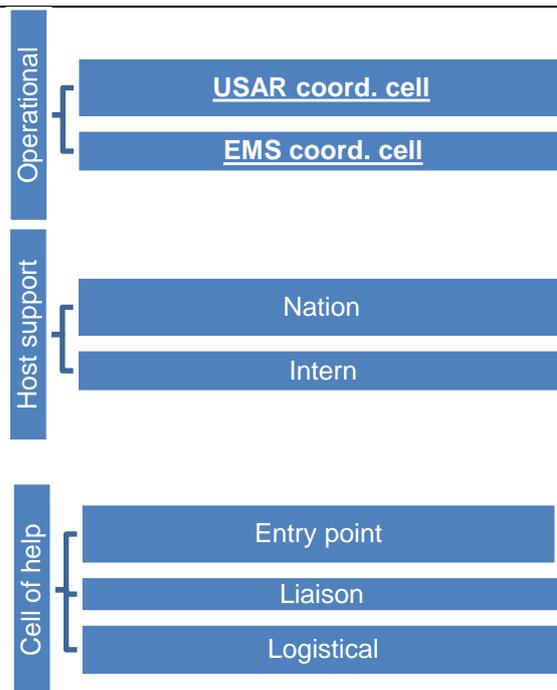
- Communication with incoming forces procedure.
- Train on:
    - Knowledge gaps between organisations.
    - Each org. procedures and operational needs.
- Different level of Authority - Develop SOP checked.
- Distinguish different coordination and operational.
- Connect different level of coordination.
- Accept the same structures of CCC.
- Structure of procedures.
- **Establish who is in charge of…**
- Make a report how to communicate.
- Create a procedure to create the procedure.
- Same language
    - Procedures on how to involve different agencies.
    - Make the IC and the management visible.
    - Procedures to check the pre-planning.
    - We haven't many events to evaluate Procedures.
    - Simulated evaluation System.
- Entry points ▪ MOBILIZATION 'TIMING'   HOST NATION SUPPORT
                ▪ SMOOTH TRANSITION BETWEEN RESCUE
                  AND HUMANITARIAN PHASE
- Learn efficient way:
    - Past events
    - Futures
    ➔ Integration with scenario.
- Worst scenario & most reasonable scenario
- Module scenario
- Workflow
- Sharing information
- Strategic plans of knowledge cycle

Knowledge/personnel

> EQ don't move Affect large

- Involve in lessons learned ALL personnel involved, from logistics to coordinate. To operations to volunteer. Decision – Expert – Volunteer.
- Cultural and religious culture when you have national and international level. From bottom to top, they should know. In general, need that everybody understands who can come, what can happen → X hours training mandatory in EU.
- Role: Understand in each scenario what your role in this scenario is.
- In table-top exercises, play different roles to understand POV.
- Packages of training, mandatory, easy to translate.
    - E-learning easy to implement in EU.
    - Including aspects that all should know.
    - Play scenarios.
    - Not to repeat efforts on creating scenarios:
        o Cost-effective
        o High quality
        o Loot of repeated effort between organisations.
- Responsibility for services.
- System coordination.
- Education of actors.
- Assessment competence.
- Training and maintaining knowledge.
- Certification of competence (Standard).
- Liaison Officer.
- Scenario for planning.
- Signature of agreement.
- Forecast Database.
- Involving volunteers.
- Skills.
- **Debriefing procedures to <u>evaluate</u> initial planning.**
- Lessons learnt – Systematic collections of data
- Quality of incoming resources:
    - How to define the quality → Related to the country organisation.
    - How to take into account resources exceeding the minimum.
- Initial 'matrix? That is used in FIRE-IN Project → Training (TOT) for common approach (EU Standards) → Interoperability among the teams (different countries, different levels of governance).
- How to measure the follow up of the projects.
- Costs-efectivity of training. Keep fresh.
- Motivate people to work integrated with each other.
- Community of volunteer.

Tools/equipments
- Information management tool → Implies harmonizing info/decision process.
    - Record
    - Filter
    - Share

- Use for decision making.
1. Agency
2. Interagency manage

➔ GIS-based apps:
  ▪ Each agency fills layers.
➔ Connect:
  ▪ Field with high level DECICIONS making.
  ▪ Infrastructures.
  ▪ Provide info to media.
  ▪ Collect info on hazards.
➔ Need a liaison in command centres.

- Knowledge of existing tools at national and international level. Catalogue of resources listed in the **risk assessment**.
- Share knowledge cycle with scientists:
  - Include scientists in emergencies to break a bit the wall.
  - So they don't imagine.
- Maps – Technologies are changing too fast – Sharing of technology.
- Sharing data – Sharing photos and all needs – Interoperability – System to know how many. resources are on the field – Appropriated combination personal-equipment.
- Different way to reach the scenario.
- Span of equipment.
- Some languages/vests.
- **PRIORITY**: Energy, communication infrastructures-start filling this gap.
- Choosing scenario to be training.
- NIMS workshop.
- Too many information systems/need of a common.
- Simulation tools.

Related/Other opportunities:

Further questions:

Keywords:

Basic services, SOPs, triage, data collect, golden day, multiagency, interoperability, humanitarian help, planning, GIS.

2nd part: Evaluation of solutions

Polling

Due to problems with the polling system a different process was done.
The list of solutions presented was little described and so generalist. As a consequence, the experts were asked some questions in order to boost new ideas about solutions.

Solution collection

In this workshop, 9 experts showed solutions that appear in the previous section ' **Solution collection'.**

Pre-planning

**Are solutions known? Are solutions applied? Why (not)?**

- Maps of earthquake Risk and Buildings Vulnerability.
- Historical way to release energy (Aftershock) in different parts of the territory, earthquakes has a different historical sequence especially for the way of releasing energy after the first shock.
- Shake Effects Maps after the initial shocks
- A system for a bidirectional information flow from the citizens to the authority regarding actual damage after an earthquake is working in Italy with the platform www.haisentitoilterremoto.it
- Shake Energy and Effects thresholds for activation of different level of response and Predefined Thresholds for automatic activation of emergency response plans.
- Interaction between "Actors" at different level should be pre-planned (By all stakeholders) and tested frequently.
- Pre-defined arrangements (Political Decision)
- Different " Local" adaptation of general preplanning
- High level Commander e control.
- Involve in the pre planning also Humanitarian Actors
- Learn and Prepare how to receive support from other countries
- Pre planning resource " Grid "
- Multiple Layers Grid (Needs interoperability) – Coordination Point
- Preparedness cycle , Plan-Act-Do (feedback)
- Predefined assembly meeting point.

Are solutions suggested contributing to closing the capability gaps? Why? Why not?
Community Preparedness = Training, Task, Capabilities, Integration with system.
Rapid Information to Politicians (R.I.P.)
D.V.I. = Disaster
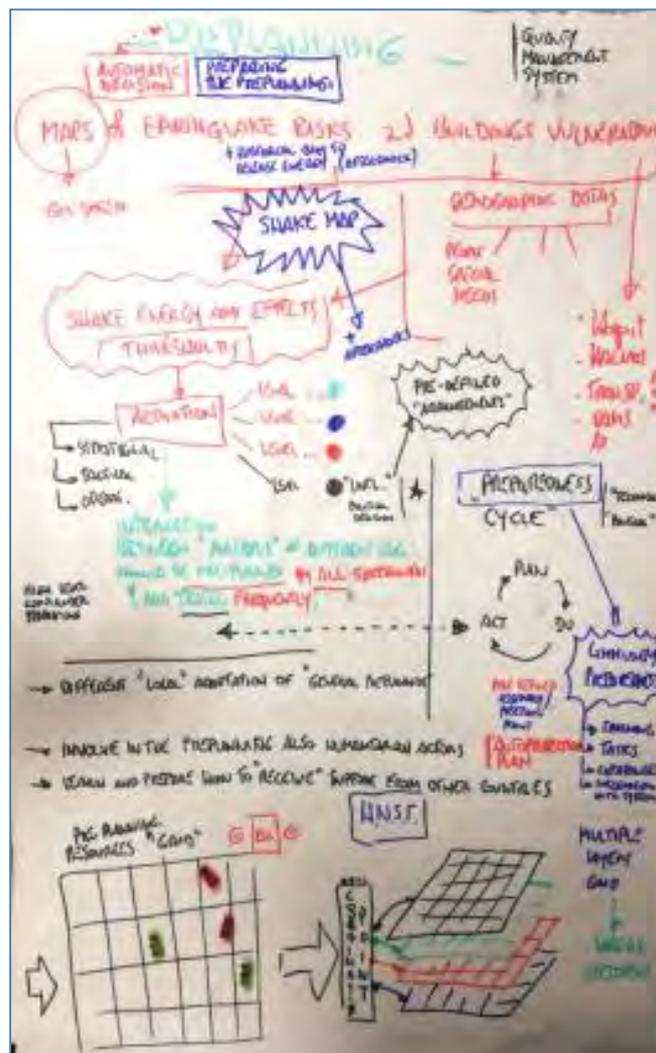
Community involvement

The solutions / resources must take into account the three phases: before, during and after and we need solutions for the four points:

- Training
- Motivation
- Preparation / operation / organization
- Communication

Community involvement should be considered during the pre-planning:

- In Italy, a spokesperson is designated / appointed at each level (municipality, prefecture) to explain the natural and man-made risks, sensitize / make aware of the risks, the right behaviors, and there is a national campaign,
- How to improve the crowd management? How to choose the leader?
- Can we have an online registration system for the community?

What is the official channel for exchange between community and authority?

- TV,Twitter, etc.
    - How to communicate with people who are not at ease / comfortable with new technologies?
    - How to collect information?
- Can we use an App on a mobile phone that aims to provide advice during the pre-event / before phase and that could alert, repeat advice and give instructions in case of emergency? We probably need a European platform.
    - Where are you?
    - How many people are with you?
    - How are you? How many people are injured?
    - Do you see the collapse of a building, a fire, etc. (primary assessment)?
- We need a European alert: the sirens are not enough / additional lighting system.

We should use the education system: what can we do at school? It's the right platform to motivate, give good information, spread / disseminate the right / appropriated behaviours.

- How to be involved: from high school? Before?
- First information in first grade / paintings about it in the elementary / primary school
- How much time? 55 minutes a week?
- Part of the curriculum about emergency?
- External teachers? Class should be done by professionals
- To give specific information, we should focus on a defined community => doctors, nurses, electricians, etc.

Can we use the insurance system to educate the population? If you don't have a smoke detector, if you don't participate in an exercise, then you have to pay more

Multiculturalism should be taken into account:

- For example, the majority of information is given in French and Dutch in Brussels
- People from the local community should be registered as a translator for foreign reinforcements

Knowledge cycle

- Practice on destroyed buildings → Simulation with population.
- Need a legal base.
- Frequency of training.
- Short simple videos.
- Platform to share past events → lessons learned:
    - INSARAG
    - Moderator to resume some key words
- International training Academy: shared strategy, tactics.

- Integration of scientists and practitioners → Filtered, evidence-based.
- Online virtual – reality training – UN

Try Test my competence ⇔ Building my competence.
Integration skills between experts with same function.   EU – MECHANISM
Standard – common understanding how to work.
Cultural awareness → mandatory training   **DG ECHO** on-line

General vs. specific scenario for uncertainty.
Quality management system ISO 9000.
Capacity building approach (teach by doing) → merge different agencies / scientists and practitioners.
Increase interoperability capabilities.

Appendix 2: TWG B, Structure fires

FIRE-IN WP 1 Workshop Implementation Reporting Template	
Title:	Workshop TWG B
Document version:	v. 1.1
Workshop dates and location:	11-13.02.2019 PRAGUE
Submission date:	26.04.2019
Submitted by:	Giovanni Fresu (CNVVF)
Reviewed by:	Andrea BOZZO (CNVVF)
Identification of capability challenges	
Background	

Large shopping mall area fires.
The construction and extension of large shopping is an area of commercial development which is being pursued actively in Europe.
The satisfaction of the fire safety performance depends on many factors, including the correct choice of materials of construction, appropriate egress requirements, adequate fire suppression, and appropriate structural fire resistance.
These large buildings often include specialty shops, major stores, department stores, supermarkets, cinemas, car-parks and offices.
It is recognized that both life safety and property protection are of importance in shopping center buildings. A large fire in these buildings may present a major threat to life and may result in significant direct property losses.

Introduction.
Shopping centers contain a wide variety of occupancies including business offices, many different shops with different fire load, many communications and sometimes odd architectures. Common features in such buildings include: community rooms, restaurants, huge vertical volumes with any compartment, electrical power plants, but also parking garages, trash rooms, compactors, dumpsters. Typically, these areas/rooms are located on the lower floors.
Further, because the open areas in common even for many floors, a fire could produce a stratification related to the movement of smoke and heated gases even far from the fire.
Personnel must be aware of the time needed to assess the situation upon arrival of the first units, gather information from the panel or fire control room and building personnel, identify and confirm the fire position, proceed to that portion, locate the fire, and prepare to operate.
This is known as "reflex time," and may vary depending on the size of the building and complexity of the situation.
This is the reason why a fire suppression plant is really important in order to promptly fight the fire.
Furthermore, a smoke control system should be considered as imperative in order to save lives giving more time to evacuate and much more visibility.

Hazards
Experience has shown that there is the potential for a high loss of life in this buildings; fires in both shop and warehouse situations could have disastrous outcomes.
Fires in commercial occupancies have the ability to involve an entire floor, or large portion thereof, since often there is little or no compartmentation. Fires that occur in such buildings lacking in compartmentation have significantly potential for both horizontal and vertical fire extension.
Due to smoke contamination of stairwells, elevator shafts, and other common areas, occupants may panic as smoke spreads through the structure and elevators are recalled to the lobby. Smoke entering any floor is likely to cause occupants to attempt self-evacuation.

Communication via the public address system, if available, can help to allay some of the occupants' fears.

It is imperative that personnel quickly identify and establish evacuation routes to enable the safe and orderly movement of building occupants to locations below the fire. Firm direction from the fire department is crucial and should be pre-planned and practiced prior to an emergency incident.

Evacuation of a shopping center requires the commitment of a substantial amount of resources. Because the complexity of this kind of structures, a Search and Evacuation Branch should be established with a chief officer in charge. A BIM (Building Information Modeling) could help both personnel and rescue team to understand where fire and smoke could extend and fight it in advance.

Fire Operations.

The unique features of high-rise buildings result in strategic and tactical challenges. A working fire in a shopping center often is not always apparent from the exterior of the building. Serious fire can develop in a location that is remote from the exterior skin of the structure; as such, a report of "nothing showing" needs to be aggressively investigated. Additional signals that are received on the panels in the fire control room are a strong indicator of an advancing fire.

If smoke or fire is showing or once a fire is confirmed within the structure, requests for additional resources must be considered quickly. Experience has also indicated that a routine fire in a mall will require more resources than a similar fire in other structures. The Incident Commander should evaluate the need for additional resources and make requests for additional alarms commensurate with the severity of the situation, including SAR team.

Due to the need for an unusually high commitment of resources, the process of control and accountability of each unit is of paramount importance. An exceptionally high level of discipline will be required of all officers and personnel during high-rise operations. Failure to follow any portion of the operational plan can lead to a breakdown of the entire operation and could result in fire-fighter casualties.

The operational plan for shopping centers fires must consist of five basic points:
1. Determine fire position.
2. Verify fire position.
3. Control occupants.
4. Control of building systems.
5. Confine and extinguish the fire.

Each of these five issues must be considered in advance and planned in order to avoid lack of organization and mess on the field of operations.

And this requires time to train fire-fighters, even on site.

Improvement opportunity / Capability Challenge:

Pre planning
- Teach about the presentation tools for the firefighters
- Liaison persons
- Connections with designers-constructions-firefighters
- Confidence of the owners
- For catalogue the buildings, can be an option to put a evaluate system (1-10)
- Feed-back → With the past fires we have made the actual laws
- We need fire engineers

Standard

The experts pointed put out the following aspects that have to be taken into account during the developing stages of a fire safety standard for shopping malls:

- Fire safety requirements for people with disabilities;
- Human behavior;
- Safety targets (Life safety, Property protection, Safety of rescue teams);
- "SIZE" of shopping malls;
- Standardisation should take in account last fire accidents in shopping malls and buildings.

The first aspect underlines the actual necessity of addressing people with disabilities in order to develop as much as possible inclusive fire code. In developing emergency exodus measures it is of paramount importance also to deal with human behaviour of people that could be present at any time in shopping malls. Furthermore, the standards should be based on these three main safety targets: Life safety, Property protection and last but not least adequate provisions for the safety of rescue teams. In general, simple shops should be ruled by simple standards, this is the reason the experts wanted to highlight talking about shopping malls size. As in any risk fields, statistics and assessing of past accidents must be taken as a baseline for fire codes and standards developing.

Technology
1st thing: we must define strategies before technologies!
- Mapping / cartography
  Building Information Modeling (BIM): where is the problem?
  We need a map of the building => simple, on a mobile phone, a tablet?
  Digital mapping?
  Tablet in each engine: with planning (only the largest/biggest building? (GIS1.1.2? With GPS) created by firefighters with owners => but who is the contact person? How to get this information? How to update it?
- Modeling (evacuation / smoke / sprinkler)
  Advanced modeling (evacuation / smoke) => How to implement these models? What is the strategy?
  Can firefighters interact/manage the evacuation system? Do they know scenarios?
  Smart/intelligent evacuation: can we use sensors? But where? How?
  We may have problems with large commercial signs => safety signs must be visible! Digital commercial signs should become emergency signs in the event of fire
  How can we control/monitor compliance with prevention measures? Can technologies help? Do we need a common tool with insurance companies?
  The sprinkler must be well adjusted and maintained => must it or not become a complicated technology? Not sophisticated? How can we have good coordination with the smoke extraction system?
  We have the problem of cold smokes/fumes (with multi-levels / several levels) => what kind of technology could improve the ventilation system? How is geometry taken into account?
  About modeling: it's often too complicated for firefighters, it should be easier to understand
  What is the good/correct compartment size? There is a balance between evacuation and conservation of property
- Rescue
  How can we know where are the people in the building/mall? => it is necessary to analyze the human factors and to find a transcription with the technologies) => it depends on the culture / the country
  Can we communicate with people in the mall in case of fire? Can we send a message on a mobile phone?
  How can we reduce the reaction time of the public? What kind of alarm do we need? What kind of sound? Light? => people with disabilities are the main target

Constraints / Best practices

Human behaviour module needs validation from FF

- Define safety's goals in collaboration with owners in the pre-planning process
- Need of guidelines for drafting of emergency plan
- Implement a branch of fire-scientists in each Authority involved in fire safety issues
- Fire is a very complex phenomena, so we not able to forecast during the operations where the fire will go, we are quite comfortable assessing how smoke will travel in the building. Software is very well validated, but trust to users is very difficult
- Firefighter are responsible in front of a judge what happens inside this building so need some certification that the tools who we are using is good enough to base decision.
- In maritime industry have an evacuation model validated
- BIM is a good solution to train responders

The opportunity from different perspectives
Procedures and Organisation:
Pre-planning
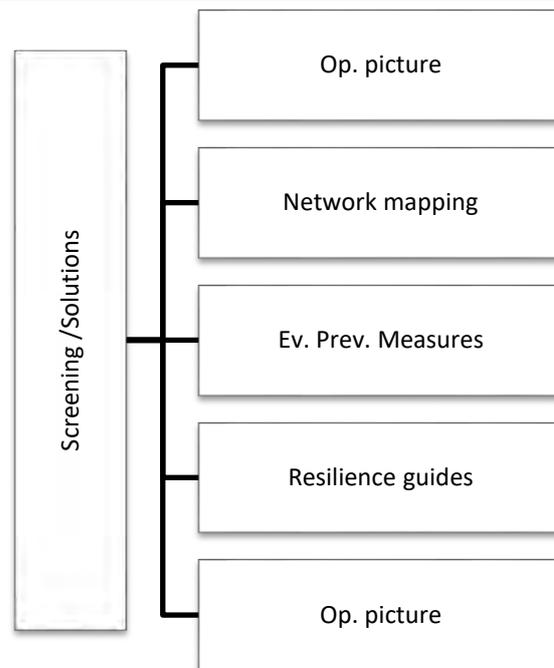
- The process is fine but the **presentations** of solutions are difficult to understand. Time and content limited.
- A good option will be to **ask the experts before** the WS.
- There is a Project (FIEP) that started 1 year ago → Data collection, fire engines…
- A good option is to include the fire officers or fire fighters in the moment to define the methodology.
- Need a supervisor to validate or check the safety issues. → Cross all the process.
- The problem is the visibility with smoke. The tools in evacuation should be adapted to the "eye" of evacuation.
- CATNIP !! Optimize for the most economical solutions.
- Need to **open access** to the **technical papers**.
- There are more targeted.
- Standards, like ISO… can be an option to implement the technical characteristics → compromise
- Visit, before the incident, all things of the prevention
- Necessity to have an engineering team in the buildings

Standard
- A bottom up approach
Since a pan European standard or a fire code could be difficult to reach a consensus among European countries, it should be used a bottom up approach. In other words, standard developing should start dealing with simple and detailed issues in order to harmonise safety targets and prevention, protection and fire managements measures among European countries.

- To develop a fire risk assessment tool
A first important step for fire code and standard development could be represented by a fire risk assessment tool, the expert said. Using a common base for assessing the risk of fire could lead the standard developers in a common direction for selecting the appropriate fire safety prevention, protection and management procedures.

- One single regulation for shopping mall in the EU

Following the bottom up approach and the development of a unified fire risk assessment tool should facilitate a single regulation for shopping mall in the EH countries.

- Saving money for company
  Fire code standardisation development could represent a major factor for saving money in building, plants and infrastructures for assuring the fire safety of shopping mall within European countries.

- Less time less design cost
  Having the possibility of basing the fire design on a single EU standard or guideline could save design cost for EU companies.

- Pay attention of manufactures in developing product standards

- Fire products standard (They – Fire industry – try(ies) to sell as money items as they can)
  Fire industry and Product standard development should be monitored also by the end used and according to the practitioners needing. Fire hazard and fire representative scenarios for fire product standards assessment sometimes could be far away from the actual fire scenario and could not give any help in satisfying the fire performance required by the building and plants of an actual shopping mall in a real fire situation.

Technology
- Strategy: purpose/aim/objectives? Do we need standards/regulations or only insurance rules?
- What kind of detection system do we need?
- If the evacuation is over, are the firefighters going inside? Where can we go? How can we assess the risks? There is a balance between "firefighter safety" and "property protection" (can we preserve the building?)
- Are we still able to fight the fire? How can we adapt the strategy?
- How can we improve training? Can we evaluate the effectiveness of our training?
- Can we use the drawing/computerized drawing (with drawing technology) to help the incident commander?
- Where are the firefighters inside the building? Could we adapt their missions with this information?
- Evacuation strategy: how many scenarios are needed?

Knowledge:

Pre planning
- It's important that people know what they do in an emergency → know the human factor. The rationality in emergency situations depends on the knowledge of the people (previous education). → **MARKETING**
- **Life, property, environment, business community, social consequences**. The level depends on the type of buildings. Last days to open a center, are crazy, principally for the safety conditions.
- Video to learn → if there are this → You should make this. → Specific instructions.
  - In the hotel, when you turn on the TV, a safety message appears.
- For people, to see the safety instructions is not a priority. → Example of Japanes and earthquakes. → Permanent training.
- Need measures (simples) for all Europe to educate the population on this.
- Create educational materials (leaflets, videos …) for kids (school education) and other people. → All supports (paper, media …). There are visiting days at fire fighter facilities.
- In the Baltic zone (Estonia) the fire fighters make prevention activities (schools, companies…).

- A good prevention is the key to reduce the emergencies, fires, problems…. → Special type of measures (apartments or venues with high people movement).
- In Germany a detector is mandatory. EU can provide smoke detection.
  - Problem of trainings for the small contracts of the people
  - Importance to make a educational trainings with children
  - The knowledge of emergencies it's a general problem in the society

Standard

The experts pointed out the following items:

- Do we have idea of what is "the minim level of fire safety"? Evidence based fire scenario
- Simple buildings → Simple Numbers
- Measure any how the value of a "life" we could develop a good standard
- More knowledge on fire and smoke modelling
- Tools to know quickly the fire behaviour of new materials

In order to quantify the minimum level of fire safety requirements, each standard should have to be developed on evidence based fire scenarios. Following that way, simple shopping malls will be ruled by simple numbers; on the other hand, complex buildings will require more complex tools for satisfying the required fire safety level. Among fire scenario evidence based configuration, experts highlighted that a more adequate understanding and modelling of smoke dynamic in shopping mall have to be addressed. Moreover, a common understanding of the fire behaviour on new advanced technological materials in case of fire should also be taken into consideration for standard and fire code development (HRR, toxicity hazard, smoke yield, …).

Technology
- Malls/shopping centers are complex: we need a simple way to understand the configuration, how to use B.I.M.?
- Can we assess the risk of collapse?
- How to improve the level of knowledge of firefighters in the field of new technologies? Is a certain level of knowledge needed in this area for the public?
- We must take into account that there are so many differences between the large/big fire departments/stations and the others?
- Building Management System (building automation system): what type of expert is needed to assist the incident commander? A firefighter or someone else?
- There is a lack of knowledge about water mist (sprinklers are well known)
- Can we improve the models to have a better prediction? For example: interactions between fire and water (consequences on the development of the fire), interactions between evacuation and fire

Equipment & Tools / Technologies:

Pre planning
- More tools are need that combine evacuation and fire.
- The modelling tools need to run with "real" situations.
- Standards in selected scenarios.
- Estonia → Detectors are connected to the calling centers.

Standard
- Fire "BIM" for responders (Big involment Of Many People) for training reality based on tech, (Inf of BIM):The new emerging tool Building information management could be really useful for first responders and fire rescue teams. In complex and very polupated shopping buildings

BIM could be helpful in addressing the needing of the occupants in case of emergency and help first responders and rescue teams.

- Improve the design as a complex (electrical material fire behaviour serial plants. For an holistic fire design approach it is of paramount importance the understanding of the technological plants that could be present in a shopping mall. Nowadays we can have complex electrical systems, infrastructures for sending data, Heat and venting systems (HVAC), escalators and tread mill to facilitate people movement whose design should be based on precise fire safety requirements in terms of lowering the probability of ignition and to spread fire and smoke when these plants are hit by a fire.
- Case studies and statistics (EU data) and EU Network for sharing experiences: Once again the experts stated that case studies and EU statistics of shopping mall fires have to be addressed suggesting to build up an EU network for sharing experiences among EU countries.

Technology
- Can we use people's mobile phones inside the building? Is there a regulation issue/problem?
- Water mist systems: it could be useful to compare them with sprinkler systems (electrical issues, water tank capacities, public perception/sensation) and it is important to define the aims/objectives (do we want to contain the fire, stop growth? Contain smokes/fumes? Extinguish the fire?) and also strategies (can we combine water mist and sprinkler? How do we take into account the upper/higher smoke layers?)
- We need technologies for B.I.M.
- Robots: they could be useful but this point is related to the procedures
    - For what? To extinguish the fire? If it's too dangerous for firefighters?
    - And what kind of robots? Could we use UAVs with sensors? What kind of sensors? Thermal/infrared camera? Gas detection? Detection of people? A technology to forecast/predict where the fire will expand?
- Could we have technologies to evaluate the performance of our equipment? Do I have the right pressure to extinguish the fire?
- If we can have these technologies: how to implement the new tools? It can't be too sophisticated; firefighters need simple things. The human-machine interface should be thought.
-

Related/Other opportunities:

- Very important question is Standard vs Best Practices, do we need a standard or a written best practices, does the FF need a standard to operate in shopping centres, probably not because standard is a cost? Do we need formalized procedures? The key point is in the practitioners community "Where do we want standard and where do we want best practices"
- Needs to involve fire fighters in studying architectural standards.
- Fire is localized but smoke spreads. Smoke is very important it should managed by previews overview from local FF.
- Large mall vs small mall. There is a contradictory opinion between fire-engineers and fire-fighters on the size of the shopping control. In my opinion from smoke control design point of view the bigger is better. The worst thing you can do is to compartiment the shopping mall in too small sections because this potentially increases difficulties in removing the smoke and heat from the building. The high of the compartment is the most significant variable in this aspects.

Further questions:

Maintain a good level of training to manage every king of emergency

Keywords:

- Human behaviour
- Smoke management

• B.I.M.
• Case studies
• Size of buildings

Evaluation of solutions

Polling

- The process is fine but the **presentations** of solutions are difficult to understand. Time and content limited.
- A good option will be to **ask the experts before** the WS.

Solution matching

- The screening process seems to be ok
- But not enough time to explain the resources
- Information on resources must be sent before the workshop

Solution collection

Pre planning

OPERATIONAL VALVE OF EXISTING SOLUTIONS**:**

- Reactions of materials to the fire. → Validate new materials.
- Work with evacuation simulators and alarm smoke control.
- In pre-planning is very important the uses of the building. → Table with different profiles of awareness. →To everyone.
- Work with different **models** (Modelling)
  - ○ Automatic systems – intervention with fire → Virtual reality // Prepare people to react → Different scenarios.
  - ○ Validation of the models.
- The idea is to …
- Investigate new extinguishers.
- BIM tool. → It's difficult to work in the fire fighters' system. **It is necessary to learn the system and to have a support (ex. Tablet) – Education –**
- Important thing: Project validation.
- The **education** to react to the fire it's very important → Connect people with the safety of the building.
- Certification → Need to **standard** to certify. → Problem: Who is **responsible** of that?
- Data loose of materials for the models and certifications.
- It is difficult to know which will be the fire reaction in a sector.
- Designers (architects) should design the buildings thinking with the fire → Need to have fire engineers among designers that have knowledge about the fire reaction.
- The **fire fighters** who make fire prevention, normally they demand a lot of requirements.
- More education (Fire Dynamics for fire fighters → Book).

Standard

The final experts' discussion has been focused on the following items:

- Needing of fundamental research in (Heat transfer, Combustion, Compartment fire dynamic)
- Collecting data of large scale test for model validation
- Research should rely on new materials; cannot be simply transferred to glulam
- Reaction to fire for a complete system
- Compare the different fire suppression systems
- Validation of human behavior modelling, especially large scale evacuators
- For shopping malls a way of counting how many people are inside with new tech. (Wi-fI cellular phdaes face rec,..)

Technology

- Procedures:
  Virtual reality: useful for training but with limits (the human factor must be taken into account)
  Augmented reality could be useful in the field
  How do we communicate between firefighters inside a building? (=> tools)
  How to use social media (for incident commander)?
  How to integrate UAVs into our organization?

- Knowledge
  Fire extinguishing: laboratory research is needed and tests are useful and necessary
  How much information can a firefighter receive from these technologies during his mission?
  Research in human factor/cognitive psychology
  Maybe the research is more relevant for buildings than for first responders?
  Maybe the research could aim to achieve to same level of safety, but at a lower cost?
- Tools
  Clothes: some technologies could be useful for firefighters but what for? What information?
  Information displayed on the mask: air level for example, thermal/infrared camera => this could be useful but are the firefighters able to use it?
  Transmission of information about the firefighter (temperature, heart rate…), for example with pills to be ingested?
  Communication equipment (with Bluetooth, automated with voice recognition "ok Google/hi Siri") (=> procedures)
  We need to be careful that we do not become overly reliant on technology. Also, more protection leads sometimes to a false sense of security – e.g. firefighting clothes hardly catch fire but rather lead to internal heat buildup with damaging consequences for the firefighters.

Proposed solutions

Pre planning
SOLUTION MATURITY (TRL) AND INDUSTRIALISATION LEVEL (TTM)
- Important thing: What's the change in fire behaviour when fire fighters start to work.
- The firefighters need 'simple' systems about fire prevention, to introduce this thematic to them.
- More education:
  - Fire officers
  - Fire fighters

  - Different levels of necessities.

- Need to guidelines of fire prevention documentation.
- **Education** for kids, fire fighters…it's **the key**:
  - Important to know the human behaviour (fire fighters)
  - Civil people:
    - Not conscience about the danger of fire.
    - Importance of "clerks".
- Modelling small scale.
- Difficult to check the fire prevention things in the heterogeneous group (architects, fire engineers …).
- **More science and more knowledge** → focusing.

Standard
- Operational value of existing solutions

Understanding the fire dynamic is a very complex matter, therefore a request of more fundamental research in heat transfer mechanisms, combustion, compartment fires development, smoke productions and so on should be addressed by the European Union. Fire research should lead to collecting data of large scale test for developing more reliable fire simulations tools. Furthermore, reaction to fire of material have to be addressed in product standard development as a system and not looking to the fire behavior of a single component. In addition, fire suppression systems should be analyzed and compared in order to give the opportunity to asses and choice the best solution for the actual activity one is designing.

- Solution maturity and industrialization level
  Human behavior models should also be validated and new technologies for counting and addressing people could represent a new tool for fire safety requirements of shopping malls

- Interoperability and standardization
  none

Technology

- Operational value of existing solutions
  Fire modeling: the calculation takes too much time and it is necessary to test it in real buildings (validation of the models)
  Training is important: whatever the solutions
  And confidence/trust in solutions is also a key point: are additional tests done? If yes, why? (it must be explained)
  Mobile phones tracking: without using GPS? By downloading an application? This system seems to be used in a museum. What about the protection of privacy?
  NL-Alert also seems to be an interesting solution => but what message? If a manual action is needed, it might be less interesting
  Drones could be very useful in the future for scanning buildings and developing 3D models that can be used for training and in real events

- Solution maturity and industrialization level
  Evacuation modeling: it should be improved (=> link to B.I.M.)
  A certification is necessary: same configuration, same scenario…
  There is a problem with the price for fire and rescue services…
  And it takes a lot of money for real tests (these tests must be repeated because of the number of variables, and there is no collaboration or coordination between universities, only competition)
  Big data seems to be interesting for improving the models or making them easy to use for the incident commanders
  FIEP (Fire Information Exchange Platform) could be an interesting EU project (scopes: people, facade, fire engineering, statistics)
  A big challenge: transfer existing technologies into simple technologies for firefighters
  Need for smarter, more resilient buildings to reduce necessity of firefighters to go inside

- Interoperability and standardization
  The certification is necessary (even if the research is still necessary and the certification arrives at the end) => the same tests must be carried out in different countries
  We probably need a platform for data sharing in the EU:
  - Statistics could be useful (eg data on evacuation drills/exercises across the EU)
  - The community needs to be managed and protocols are needed

-   Standard methods of data collection would be useful, methods should be clear and written, collaboration should be encouraged/promoted -   What about a real fire engineering university? Not just part of a multi-area university NFPA vs CFPA or CEA?

Appendix 3: TWG C, Landscape fires

FIRE-IN WP 1 Workshop Implementation Reporting Template	
Title:	*Dangerous Landscape Fires, Public Security and Evacuation: Europe at Crossroads for Innovative Concepts*
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Submission date:	**March 2019**
Submitted by:	**Lindon Pronto (GFMC)**
Reviewed by:	**Carles Garcia (CFS), Marta Miralles (CFS), Claudia Berchtold**
Identification of capability challenges	
Background	

Over the last couple of years, Europe has experienced some explosive wildfires which have forced the evacuation of thousands – extreme situations such as Portugal last year and Greece this year, have left hundreds dead as they unsuccessfully attempted to evacuate (not to mention the recurrent parallel scenario in California). In less extreme scenarios, countries usually spared from wildfire outbreaks such as Germany or Sweden also experienced numerous situations which required evacuations – a relatively uncommon procedure for mid-to-northern European countries. The numerous aspects of evacuations merit focused attention due to severe failures, as a pressing issue facing public policy and responders, but also because the evacuation of people / homes / towns / cities is a cross-cutting challenge, many facets of which fall outside of the purview of Fire and Rescue (F&R) responders.

Main barriers and drivers discussed are:
- Landscape fires are having a high cost, unbalanced between response and prevention, preplanning, etc. The results are losses in human lives and livelihood, infrastructures and private companies' business continuity, houses, personal goods… That should be reduced with better planning Landscape fires are moving emergencies, that interconnect risks and communities, presenting different challenges in different landscapes.
- The range of scales and instruments of planning, from the more local to international; from next day to next season to next decade; from formal to informal; from the one focused on landscape fire risk, to the ones focused on other topics, where fire is an externality; from top-down approaches to bottom-up ones.
- A range of uncertainty on where, when and what scenario should we prepare for in any particular point, both in forest fire behavior and people behavior. We can prepare for a range of predictable scenarios, with estimated frequencies, known triggers, and expected behaviors and rhythms, and with different costs for different actors; those are based on scenarios seen the last years and modelled in present conditions. But also, some new unexpected ones are emerging, with a complex interaction of drivers in the global change scenario, that are forcing changes in the way the EU is managing emergencies.

- The complex 'ecosystem' of actors owning controls of risk, with very different knowledge of the risk and its treatment, different sense of responsibility on this risk…. Different agents come from different governance frameworks, size, interests, interoperability capabilities... Also, there is a large range of treatments of risk available for each actor, from preparedness to prevention to mitigation; from codes of edification to forest management to alerts to police investigation. and many others. All these actors interact between them and with new socio-ecological realities in complex ways.
- The disconnection between decisions on the controls of risk and its consequences: either the prevention measures are never felt (its effects expires before the fire happens), or they are felt much later in time, and often are not easily measurable; often people owning controls of risk are not the ones feeling its consequence, so the incentives of decision-makers are about public perception, liability, immediate interests, etc.
- The disconnection between research focus and the drivers and barriers of effective planning, preparedness and prevention.
- The different level of knowledge between different regions, agencies, research institutes, landscape planners and practitioners, depending on the local fire reality for the last 20 years.

Improvement opportunity / Capability Challenge:

Capability #1 "Community involvement"
- **Ownership** emerged as central issue: Who owns what? (drives interests)
- **Engagement** & individual involvement difficult and communities are diverse and respond differently, have different challenges and structures for dealing with them (e.g. associations); community involvement is often understood as failure in planning so more dialogue needed
- **Communications** a challenge (e.g. age groups consume different sources of media, critical information; consider cultural and language barriers as well); consider
  o Timely warnings
  o Minimize response time through notifications that are clear and concise
  o Information exchange between relevant actors to get common operations picture
  o Authorities: which information to withhold so people don't "panic" (considering: information is important to act; information from social media cannot be withheld)
  o Difficult to communicate to population quickly (e.g. fire too fast in Mati)
  o E.g. for earthquakes in Greece, people are well educated but not for fires.
  o Evacuation plans need to be drafted & communicated –which should be developed by local communities but in accordance to a legal basis! Then they must be exercised!
- Determine role and scope of **social media** (what if cell towers are down?)
- "**Solutions**" must be equally diverse or adaptive
- **Community definition:** How does one engage different groups such as transient, tourists, part-timers etc.? Sense of community is important for facilitating action / involvement; how can community networks be strengthened to better facilitate emergency cooperation?
- Need **shelter** in place options or other **self-defense** strategies or,
- **Safe sites** - have central safe sites (e.g. stone buildings) instead of evacuation (which can be dangerous) in municipalities but also in rural area (e.g. church or warehouse) as well as someone /entity to oversee – especially to assist vulnerable people
- Special contingencies for **vulnerable demographics** (elderly, disabled, etc.)
- **Address** behavior (general), response, education (in schools) and training (who should or shouldn't evacuation
- **Building codes** – there should be mandatory requirements if building in dangerous zones and different types of buildings should be assessed against wildfire risk
- Consider **secondary impacts** such smoke pollution
- Communities in higher fire-risk zones should be targeted for action; however also recognize that these communities may therefore have more awareness and experience while communities less accustomed to fire are likely more vulnerable

- **Inter-organization competence** should extend down to local level (where local knowledge is greater); for instance, Incident Commander to request evacuation (not top down only)
- **Preparedness and cultural change** - explain dangers to the public regarding the use of candles, BBQs, campfires, burning organic waste etc., but especially communicate that people need to act themselves not wait for authorities (take responsibility for fire prevention *and* recognizing and acting in an emergency)

Capability #2 "Human Factors"
- Human factors = human behavior, e.g. "erratic" behavior of people in crisis events
- Human factors have three 'arenas': general population, crisis management / chain of command, and policy makers
- **Lack of information** often lead to confusion and a breakdown of communication; information needs to be simple and authoritative
- **How to reach people**? How to convey information and get desired response? Consider:
    o language barriers (e.g. tourists, immigrants etc.)
    o psychological, sociological factors; physical abilities
    o lack of awareness, experience, responsibility or initiative
    o know who needs to be protected (population is not a homogenous body)
- Return to the **basics of communication**: e.g. church bells, sirens (not only relying on technology) can simplify a situation, but protocols must be known
- **Expectation management** on both sides is important:
    o There need to be realistic expectations about how people will react
    o Even Community-specific approaches
- Remember: Training and preparation can **break down** during a crisis
- **Behavior is a result of information received**, it might be "wrong", but is "rational" and based on that information:
    o Actual panic is very rare
    o Behavior is therefore predictable (according to models)
- **For responders:**
    o Prioritization of action can be difficult and can be counterintuitive
    o Abilities can be overestimated (e.g. over-confidence) (behavioral training could help mitigate this)
- Pace of events makes decision-making difficult and the chain of command often too slow
- **General population**:
    o Behavior is influenced by experience
    o People often don't listen to advice / instructions by professionals (e.g. homeowners don't evacuate, if they fear for their property). There is a need to understand underlying motivations for behavior
- COP / sense-making to allow responders to make decisions, applies to strategic level as well
- Pace of events makes decision-making difficult and the chain of command often too slow
- Individual responsibility can result in reluctance to take decisions; to risk averse behavior
- This is also a question of governance: is the system loyal to people making decisions?

Capability #3 "Pre-planning"

Capability #1 Pre-plan a time-efficient, safe response, minimizing responder's engagement
- Proactively plan infrastructure usage depending on risk.

Capability #2 Negotiate solutions with stakeholders for anticipated scenarios.
- Ask different agencies and stakeholders for their capacity to solve gaps.

- At a local scale, involve all different local actors for a shared understanding of the probable worst-case fire scenarios. Local planning should take into account the interaction between different risks, involving different stakeholders
- At a local scale, involve society to choose the strategic scenario. Negotiated solutions. Involve soft-science in these processes.
- At a regional scale, harmonize prevention and preparedness measures in cross-border, cross-regions areas.
- At a national scale, promote context-specific guidelines on best practices in planning, preparedness and prevention.

Capability #3 Plan interoperability and enhance synergies
- Give opportunities to involve and build synergies between actors that own controls of risk.

Capability #4 Focus on integral risk management and governance framework
- Classify fires and treatments (response, prevention, preparedness) by criteria that are relevant to decision-makers, that can be measured and compared. Research should be linked to users decision-making processes, to the drivers of change of fire behaviour and fire effects, etc. Part of the research should be focused in producing usable results, instead of concluding 'more research is needed'.

Related Capabilities discussed
Communities #1 Develop public self-protection
- Public
Communities #2 Involve communities in preparing population for the worst scenario before it happens.
- Public
Information #1 Information cycle
There are too many "wikis", each project has or creates its own wiki of terms. There is the need to have tools to filter the existing information. *Information #2 Focus on key information on for decision-making*
- Need demonstrations of usable tools to have a common picture of scenario, so all agencies making decisions can see them. Interoperability tool for a common frame on decision making.

Information #3 Define common information management processes between agencies
- Public
Knowledge #1 Train for specific roles and risks
- Guides on competences for specific profiles

Knowledge #2 Organizational learning focusing efforts in key risks and opportunities
- There is the need of a systematic investigation on lessons to be learned and best practices, understanding its context, and on producing meta-analysis, synthesising what happened in past fires in terms of fire behaviour and its rate of change, the effectiveness of prevention and response, the context in which challenges, drivers and constraints allows some best practices to succeed.

Constraints / Best practices
Summarize the aspects mentioned in World Café (Step 2 of the Workshop Methodology) and additional aspects as mentioned in the plenary (Step 4 of the Workshop Methodology)   **The Polygons methodology** was highlighted as an excellent tool for land – and emergency planning. It was emphasized that the method provides an added value to decision makers, because it increases the credibility of their decisions. Additionally, credibility comes from the engagement of all actors that might be involved in the decision-making process during an emergency situation (including property owners, land planners, responders, etc.) and the support these actors offer to decision-makers.   The method was seen as an excellent way to explain the decisions that are needed to be taken during a forest fire situation and a tool to put value to the landscape

> - An expert highlighted that the method is valuable if you have the proper information to carry out the methodology (weather, past fire events, recurrence, etc.).
> - Some experts (France) pointed out that this method is not suitable for land-planning in their regions, nevertheless, seems to be very useful for emergency planning.

The opportunity from different perspectives

Procedures and Organisation:

Summarise the aspects mentioned in World Café (Step 3 of the Workshop Methodology) → Differentiate according to the tasks discussed

Capability #1 "Community involvement"

Capability #2 "Human Factors"
- Need to address different communities (e.g. tourists, elderly)
- Community outreach, trust building, liaison officers
- Public education
- Crowd-sourced information: gathering, verification, use/implementation
- Highly skilled coordination to provide guidance
- Risk analysis needs to take into account human factors
- Plan for the worst-case scenario: not just the incident, but also from the human perspective
- Public policy on housing needs attention
- Behavior that is conducive of a crisis situation needs to be 'normalized'
- Create trust in crisis by projecting protection because people need to feel safe
- Authorities need to proactively provide information and "train" the public
- Spatial dimension of human factors: demographics differ between rural/urban areas
- Building on existing structures and norms is important!
- Ensure consistency without relying too much on individuals

Capability #3 "Pre-planning"

Pre-planning = Prevention + Planning ≠ Preparedness
- EU Level:
  - Sharing the expenses
  - Guidelines. "Prevent measures" between regions
  - Fragmentary of the end-users
    - create fragmentary of the marker
  - EU has ho focus on Risks on affairs & operations, not so much in pre-planning
    - Adapt the guidelines to the country
    - UE must impose regular + local individual
    - Give them training or subcontractor
    - UE has to ensure a minim of training for preparedness for local authority of the major is the into declare evacuate
  - Harmonizer not shared by all de Associated Experts.
    - Except for Cross-borders
  - Balanced uniformity (=Challenging)
- Fragmentation
- Harmonization OP. Lessons // Risk analysis // Regional
- Sharing best practice => Context
- Integrated approach to risk manage (legal framework)
- Scale => effectiveness, trust, sense making fragmentation accountability
- TOP-DOWN // BOTTOM-UP

Personnel:

Summarise the aspects mentioned in World Café (Step 3 of the Workshop Methodology)→ Differentiate according to the tasks discussed

Capability #1 "Community involvement"

Capability #1 Integrated risk management
Owners of forest fire risk are different from those in charge of prevention and different from those in charge of extinction.

Capability #2 "Human Factors"
- Better awareness of risks; risk culture; education
- Special training for local dignitaries / community leaders, which is important to lead others and to be competent leaders
- Better understanding / preparedness of decision makers
- Train first responders to communicate assertively in crisis situation – contributes to crowd management
- Simple checklists for population to enhance preparedness, i.e. "so simple, anybody can do it"!

Capability #3 "Pre-planning"

Capability #3 Public/key stakeholders' awareness
- Profiles
- Technical training
- Cultural change
- Duties and competencies
- ≠Actors (Owning risk control)
  - Coordinator
  - Accepting gaps,
  - Common competences,
  - Trainers education mat.
- UE Agrees on "what is a risk?"
  - Who will make the risk analysis

Equipment & Tools / Technologies:

Summarise the aspects mentioned in World Café (Step 3 of the Workshop Methodology) → Differentiate according to the tasks discussed

Capability #1 "Community involvement"

Capability #2 "Human Factors"
- Means of conveying risk info to different communities
- Training / education methods for the public, e.g. training facilities or e-learning (also for larger populations)

- Open access technology to involve people
- Mainstreaming topics across media platforms
- Community-based infrastructure maintenance
- Creation of authoritative platform to disseminate information
- Need to test procedures, training, etc. by providing facilities and platforms
- Emergency kits could be prepared for the public (see also, checklists)

Capability #3 "Pre-planning"

Capability #1 Integrated risk management
There are good "GIS" tools to share a lot of information and tools. There are also tools for scenario analysis to support the decision making process.
Capability #2
There is the problem, that some information reaches the final users once the solution is outdated
Capability #3 Public/key stakeholders awareness
Centralize contracting to avoid subcontractors & prices

- Contractor for ID ≠ Vegetable pands "Type of equip"
- Centralize contracting to avoid subcontractors & prices
- Make prevention efforts visible
- Share GIS
  - o info, tools
  - o analytics => Scenario decision making

Related/Other opportunities:

Further questions:
As identified by your TWG.
Keywords:

Evaluation of solutions
Polling
Record any discussions that took place during the polling session (Step 5)
Solution matching

Follow the discussion during the World Café (Step 6) and the following plenary session (Step 7) with regard to the matching of solutions and capability gaps for the 3 perspectives (procedures and organisations, personnel, equipment, & tools). Collect any additional solutions that are mentioned. Please report them according to the capabilities selected for your TWG:

Capability #1 – "Community involvement"
- Not enough time to get the solutions
- Information on resources should be sent before the workshop in order to asses them

Capability #2 "Human Factors"
- EXODUS
  - o Can provide very important information to support decisions
- Australian Evacuation Model
  - o Provides information instead of pre-determined solutions
  - o Places responsibility on citizens
  - o Embedded in a long-term education and awareness strategy (which is relevant for any aspect related to human factors
  - o Like a "contract" between citizens and the state
- Polygon model

- o Reduces responder liability by giving basis for judgements / decisions
- o Open question: how are values assigned?
- o Can be used for pre-planning, in discussions and with decision-makers
- Interoperability
  - o Can be used as a basis (e.g. ICS)

-Solutions do not directly address human factors, but need to be long-term to influence the behavior of the population
-Regardless of the tool: responsibility rests with humans (opportunity, or weakness)
-Objectives for responders are political decisions (for better or worse)

Capability #3 "Pre-planning"

Capability #1 Integrated risk management
TRL (Technological Readiness Level) is a good indicator of "operatively level" of tools, but this TRLs are not "suitable" or validated by responders. → how users can assess the operational validation?
Capability #2
It is crucial to have the final users involves since the designing phase of tools/services, and this must be explained to other users, that might be potential future buyers/owners of those services/tools.
Capability #3 Public/key stakeholders awareness
Xxx

- Polygon method (as a pre-plan tool)
  - o Not full filling all the gaps
  - o Give "Comfort" to decision makers
  - o Also to engage all actors (+credibility)
  - o Give value to landscape
  - o As a DSS (Decision Support Service)
  - o "Polygon models" need + data/info compiled
    - ▪ past events
    - ▪ weather, etc…
- Gap between users (responders) and tools developers
  - o Lack of information (to users / stakeholders)
    - ▪ What they offer?
    - ▪ Strength / options to improve?)
  - o "User-oriented" info
- How to keep visible projects outcomes, afterlives
- Too many "Wikis" => wehere /who has the right info?
- A lot of information => tools to filter it?
  - o Info must be addressed to its user
- Tools/solutions
  - o How to asses it's validation (added value?)
  - o Why never are been used.
  - o Info/data behind (database?)
  - o TRL => good, but to "operational" validation
  - o Addressed regionally? Fits locally /regional
  - o Is there any interest to publish solutions?
    - ▪ to other users?
    - ▪ Society?
    - ▪ Some solutions are publish once outdated
- Harmonization solutions
  - o Land-use planning

- o Fighting fires not same everywhere
  - ▪ Rate fire trucks/ha
- o Interoperability
- o Needs of population evolves more quickly than the capacity to define standards
- o Difficult to apply al local scale
- o Application of standards depends on political choice
  - ▪ Sometimes decisions regarding standards disconnected for users
- Suggestion to organize TWG discussions based on DRM Cycle

Solution collection

Collect any additional solutions that are mentioned during the World Café (Step 6) and plenary (Step 7). Please report them according to the capabilities selected for your TWG:

Capability #1 – "Community involvement"
-Harmonize laws, National Plans and Cross border cooperation. It would be necessary to match the local laws and the national plans. In case of the cross-border cooperation, the national plans should be submit to the others countries and multilateral meetings to fit them.
- Community disaster communication and information is key. Social media is a powerful tool, although it is necessary to control the fake info and to teach people to use in case of emergency.
- Meetings to present projects to the community and policies to involve the community in the developing and implementation.

Capability #2 "Human Factors"
SOLUTIONS (mis)matches and additions

- EXODUS: good for buildings, integrates human behavior. Has potential, but not "there" yet
- Question was raised: Is it even possible to model human behavior? … Perhaps for training and planning, but for response, validation is required!
  - o At least some gaps could be filled for decision-makers (if at least some of the "know unkowns" were mapped)
- Australian [evacuation] model: perhaps not applicable for Europe. Still leaves open the question whether or not to evacuate in the first place (i.e mandatory evacuation versus rubric for judgement, checklist etc. for stay and defend, shelter in placed, etc.)
- Polygon model: Viewed favorably, but requires lots of resources and prior work
- Interoperability: But dire improvement needed across the board

==Capability #3 "Pre-planning"==
- Rapidly deployed predicative tools
  - o Are under development, can be demonstrated
  - o Transboundary aspects: Collaboration, interoperability, exchange of information /expertise
- Need to better link existing projects, initiatives, knowledge, etc. And make them available
- Unknown risks are important: require better understanding of changing circumstances, review extreme events and interlinkages of risks
- Human factors: Society needs to be part of solution
- Creation of integrated approaches
- Change in policy: Don't focus too much on tools, resources for knowledge Exchange are needed
- Better understanding of fires to properly compare events and find/match solutions
  - o Classification of fires needs to be integrated into Project, but also established publically

• Base research on incident investigations/reports

Proposed solutions

Record what participants argue are needed solutions to close the capability gaps in Step 8:

Capability #1 – "Community involvement"
- There is a system in USA to guide families to make a plan just in case it happens and emergency. A template where every member of the family write where they are going to be. There are apps that they give similar solutions.
- Promoting solutions among different projects: fostering synergies

Capability #2 "Human Factors"
NEXT STEPS / IDEAS FOR RESEARCH / PRIORITIES

- Rapidly deployed predictive tools (are under development, can / should be demonstrated)
- Transboundary aspects: collaboration, interoperability, exchange of information / expertise
- Need to better link existing projects, initiatives, knowledge, etc. and to make them available
- Unknown risks are important: require better understanding of changing circumstances, recent extreme events and interlinkages of risks
- Human factors: society needs to be part of solution
- Creation of integrated approaches
- Change in policy: don't focus too much on tools, resources for knowledge exchange are needed
- Better understanding of fires to properly compare events and find/match solutions
  o Classification of fires needs to be integrated into prospect, but also established publically
- Base research on incident investigations / reports

==Capability #3 "Pre-planning"==
Harmonisation solutions
- Fighting fires is not the same everywhere: i.e. the rate of deploying trucks/ha of fire is not the same everywhere.
- The needs of population evolve quickly than the capacity to define standards
- Some standards are difficult to apply at large scale (national / transnational)
- Application of standards depends on political decisions. Sometimes decisions regarding these standards are disconnected from users

Additional Workshop Discussion (at request of participants)

DISCUSSION (Primary basis for the discussion, which included a presentation from a Portuguese Utility Company, focused on the role of the Private Sector: Needs, Contributions, Outlook)

- Utility company: Application of tools and technology can help authorities: two-way sharing beneficial
- Shared experience + best practices
- More fluidity of information exchange needed with command centers (private companies have their own command centers etc.). E.g., company could assist first responders by tapping into (private) water resources / infrastructure
- Communication networks are well established within private sector, basic training and cross-exchange (for employees) could benefit public safety
- Research needs: Understanding the parameters of individual / group behavior w/relation to crisis, fear, etc.
- Apply tested tech expertise of private sector
- Save costs: share maps and co-develop maps

- Gap (potentially): Field-level access of fire and rescue personnel to utility / hazard maps (e.g. gas); missing high resolution vegetation maps
- Clarifications needed as to the responsibility and functions of the company / private sector, versus the government

Additional Workshop Feedback

WORKSHOP FEEDBACK (collected during the workshop)

What went well?
- Useful way to work to manage multi-level experiences
- Very useful discussions and information exchange; very good level of expertise of participants; very good sharing of knowledge and lessons learned
- Exchange points of view thinking in different groups, and --- the world café --- by other groups
- Structured sharing of views
- Exchange of ideas, knowledge, concepts from dedicated experts and stakeholders
- Presentations of use cases and solutions by different countries
- Useful discussions and recommendations with the different working groups
- Information exchange (different expertise for a common goal)
- High level of expertise / knowledge exchange = great job!

What didn't go well?
- The workshop was too intensive and during the last hour the participants were very tired
- There was no time to deeply go into the solutions and tools for better evaluation
- Previous preparation of the participants would be better, by sending information to be able to digest and prepare for the sessions.
- The project should be present on a different level because the knowledge of experts were different ---- ----- --
- Not focus on evacuation issues
- No clear presentation of the solutions asked to be evaluated
- Handling solutions not emerging from specific issues and not vice versa is at least not efficient

Suggestions for improvements?
- Need more info/demonstrations of solutions being developed in parallel
- Create a frame of discussion than can be used after, where we could express ourselves about suggestions
- Clarify more process segments
- It would be good for experts to read and evaluate the presented solutions before the workshop
- Engage more actors that will be important on all aspects of preventing forest fires
- A bit more time for short and relevant presentations of "the best" [solutions] and structured discussion around them (potentials for transferring etc.)

Appendix 4: TWGD, Natural Hazard Mitigation

Participants

Associated Experts

Name	Organization
Bosenbecker, Veith	City of Frankfurt (Firefighters), (D)
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Paternolli, Alex	Proviincia Uatonomoa di Bolzano, (I)

Moderators

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Garcia Lieiva, Carles	CFS
Gnecchi, Gianmario	CFS
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Walter, Gerald	Fraunhofer – INT

Observers / Others

Name	Organization
Freso, Giovanni	CNVVF
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Beyer, Ralf	THW
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FIRE-IN WP 1 Workshop Implementation Reporting Template

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Workshop participants and affiliation	**See attached list**
Submission date:	**1rst April 2019**
Submitted by:	**Iris Schneider**
Reviewed by:	**Gianmario Gnecchi, Giovanni Fresu**

Identification of capability challenges

Background

WINTER STORM Scenario – Community involvement

Improvement opportunity / Capability Challenge:

Capability #1 – Community involvement

Information management:
- Existing websites for weather information and **forecast not adequately used** by authorities and citizens
- Be able to reach out with the information also to the part of population which is not used to social media
- Alert messaging: There is a need for **good quality of the message** ("credible messages") and need for a reception and adapted behaviour of the population
- Evaluation assistance (tool, checklist etc.) of sources for the delivery of crisis information to the citizens is needed

Societal change:
- Creating a culture for a "societal cultural change"- a **societal culture raises awareness is needed**
- Different communities may have **different perceptions**
- People do not care enough about **"authorities'" messages and don't follow "orders"**
- Risk perception (need of exercises: informing, understanding, acting). **Upgrade of resilience** in the communities

Learning from the past:
- Requirement for capabilities of responders to a certain emergency can affect the outcome of the emergency management if responders are not adequately prepared
- There is always the need to be prepared to decide to **evacuate or protect-in-place**
- Involving Communities in prevention and planning is key
- There is less "attention" to a scenario that is "worst but remote" and more attention to scenarios that are more frequent.
- In places where emergencies happen more frequently it is easier to prepare the population
- Prepare for the decision between EVACUATE or PROTECT-IN-PLACE
- ONE alert system for the European Union is needed

Raising preparedness/ resilience via learning:
- Need of Cultural Awareness on Disaster Management starting from schools
- Need to **brief/ teach communities during "peace time"** on the subject of risk and disasters
- **Common terminology** and unified alarm code are important to use resources efficiently

The template is based on D4.2 ACRIMAS Requirements Specification Report v2

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- **Technology for alert**: alter systems need to be pre-installed in mobile phones and not to be installed by the customer. In some countries (Norway) the Authority can mandate to the telephone companies to send emergency messages to their customers
- **A need to inform the population about snow plans, evacuation plans and guidelines**
- **Priorities in alerting** and supporting the needs of population in case of evacuation/protection-on place (e.g.: hospitals, elderly care facilities, schools…)
- Network between authorities and cross communications capabilities is needed
- Give the population the obligation to have capabilities to stay isolated for a days or weeks starting from public buildings or hotels

Why do you see the need to discuss this task with respect to capability needs?

- Need to cultural/ societal change: Cultural awareness raising: It should be **mandatory "by law" to teach into the schools** these subject like disaster preparedness because most of the population is not enough sensibilized.
- Event memory: People don't know about **past events** (people that have already experienced a similar event are more willing to understand and be prepared)
- Risk awareness: Knowledge of the scenarios that are possible in a certain area or region "where I live" is not adequately spread.
- Information loop: A **form of feedback from the population** is needed in order to know if the population has received the alert or not.

Constraints / Best practices

The opportunity from different perspectives
Procedures and Organisation:

Capability – Community involvement
- Need to remember what are the Community "memories": what communities are able to do on their own and how to protect themselves. Smallest communities can be more resilient compared to large cities. Lessons learnt by past disasters: We should trigger the community memories speaking with elderly: "how did you experience the last disaster"?
- Transform the "history" in community values that make the community more resilient.
- Forecast for contingency planning. Weather forecast (e.g. for snow) containing also information on history of avalanches in that area can be more effective.
- Organize "disaster safety week".
- Standard on level of expectation: In "average dimensions of emergencies" response expectations are fulfilled but in case of large emergencies the population needs to know that the same level and quality of response cannot be reached in the same timeframe.
- Permanent residents and tourists: need to manage the information given to tourists that may decide to move (or not to move) to (and from) the affected areas. Insurances can help to cope with all the issues related to reservation / cancellations. Should these be mandatory
- Different "level" of risk/danger needs different "level" of alert.
- Frequent updates of the information coming officially from the Authority will help to mitigate rumours and fake news. Even if there are not jet new steps further, keep informing on what is happening. Joint/Unified information, coordinated between all the different Authorities is better than information given separately. Choose the right time when to give the information: not too early and not too late.

This project has received funding from the European Union's Horizon 2020 Coordination and Support Action programme under grant agreement No 740575.

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– Regulations that work well in "non-emergency time" need to be adapted to "emergency time". Example truck drivers that need to drive with tire chains will drive more slowly and consequently will spend more time driving. There should be an "exception" to the rule of maximum driving time. (change of driving rules in case of snow) – Assisting isolated people bringing food (and water) – Assisting isolated farms (more difficult)

Personnel:

Capability #1 – "Community involvement" – Prepare communities to the worst scenario before it happens

- Availability of Specialists: (emergency responders; doctors, nurses, in the hospitals or elderly board and care personel; bus drivers etc.) are not able to reach their worksites (or are not able to get back home)
- Risk communication: Municipalities are often not so effective in communicating the risk/danger. (The mayor need to be "convinced" that there is the need to communicate)
- Reaction time: The reaction time of the population after an alert is generally long
- Situation reports: Citizens need to receive constant feedback on how the emergency evolves
- Assisting neighbours: Neighbours need to know how to help their neighbours
- Risk awareness: People should be more prepared and informed on the risks in their area

Equipment & Tools / Technologies:

Capability #1 – "Community involvement" – Prepare communities to the worst scenario before it happens

- Integration of resources: In order to raise the level of resources available for emergency response, to fulfill the expectations of population, responders should be used to integrate other resources coming from "outside"
- Electricty dependency:
  - o Satellite communications and modern alert systems, (all need electricity available to the end user)
- Raw technology will be helpful and will work also with limited electricity available to the end user (sirens and bells for example)
  - o With no electricity most of the "tools" we use are not functioning anymore after a few hours- preparation is needed

- Different means of communication in different moments of emergency:
  - o Graphic with number of communication means available well before emergency happens and becoming less and less available when the emergency happens and there are disruptions)
  - o Bring the messages with the means that people use everyday
  - o Radio/TV channels to deliver emergency information (how to tell to the population that they need to switch on the radio/tv)
  - o There are lots of brochures to inform citizens but often they don't read them. This leads to a lack of knowledge

- Preposition supplies: Ready to be used locally with no need to be transported during the emergency (money to buy resources and put them already in stock, or at least make agreements with providers)

- Lifestock: Farmers live far away from cattle. They may have difficulties to reach cattles and their animals during and after a winter storm
- Lessons learned applied:
  - during previous emergencies help to identify what equipment wil be needed
  - Updated maps on avalanches risk/danger
- Real time situational awareness
- Specific scenario related requirements:
  - Reduction of heavy loads on buildings due to snow on the roofs. This load can give problem on roof resistance
  - Contingency plans for sharing "heavy" (snow) equipments for additional help (e.g. snow plowing machines)

- See some Y2K ("millennium bug") contingency planning in order to identify more problems
- Preserve the functionality of critical infrastructure
- Maps of residents in each area (permanent – inhabitants, and seasonal – tourists) help to prioritize

Related/Other opportunities:

Capability #1 – "Community involvement" – Prepare communities to the worst scenario before it happens

The availability of reliable data for weather forecast should be presented in a "probabilistic way" where a "range of uncertainty" is always present. This can allow the communities to make more "informed decision". The range of uncertainty in prevision becomes narrow as long the meteorological event is approaching in time and location. The scenario is related to the probability of happening really.

Further questions:

- Societal transformation: there is the need to involve the community in risk assessment.
- Authorities sometimes seek public complacency, and this may be also forced by the media.
- Events that happen in places where they don't happen frequently may have a bigger impact because the population (and authority too) is not prepared (example: winter storm in Croatia coasts is not frequent: there have been many injuried people due to icy walkways they were not used to deal with. (and emergency number have been saturated quickly).
- Besides the huge amount of documents which are (or can be) readily available one question is: how are we going to manage them in an effective way?
- The project(s) need to deliver "Final Products" that need to be "usable".
- Need to inform all Communities of the results of EU projects. Example was given on "RAIN" project. Have good deliverables but nobody has addressed any question to the working group after three years from the end of the project.
- The quality and type of information needed to manage "worst scenarios" should also take into account WHO is going to use that information at strategical, tactical or operational level. And how to use the available data is a further aspect to be dealt with.
- How to retain volunteers in the civil protection organizations in the different Countries? Local volunteers are the first step in being a better prepared community to worst scenarios.
- Last question: the screening of "existing solutions" was big enough?

Keywords:

societal change, upgrade of resilience, one eu- wide alert system, crises communication

Evaluation of solutions
Polling

Record any discussions that took place during the polling session (Step 5)

Solution matching

Capability #1 – "Community involvement" – Prepare communities to the worst scenario before it happens
- **The screening process needs to be implemented**
- **Not enough time to explain the resources**
- **Information on resources must be sent longer before the workshop**

Solution collection

Capability #1 – "Community involvement" – Prepare communities to the worst scenario before it happens
- Involvement of community in disaster preparedness: organise "disaster games" where local communities, schools, young people are involved and can participate and learn and share. This opportunity should come along periodic civil protection exercises.
- Write plans for sharing resources with bordering communities: Mutual aid agreements.
- Try to improve more precise risk analysis. (An example given: The Grenfell Tower Fire in London, according to existing risk analysis should have never happened).
- Good quality satellite imagery coming from ESA and Copernicus available for emergency management
- Feedback from the affected population after an earthquake: www.haisentitoilterremoto.it this can be an exemple on how to prepare similar platforms for feedback from population in other types of risk.
- Alerting population: (by Country laws or EU regulations) emergency features already "embedded in each mobile phone in EU. Possibility for the Competent Authority to deliver emergency messages (even without previous consent from the telephone owner)
- Useful a compilation of METEO INFORMATION WEB SOURCES.
- The most effective way to educate the population to be more active and reactive in disasters is to "Teach the Teachers". Promoting guidelines at EU level to deliver useful information in the schools
- Sources for solutions can come from UNITED NATIONS, NGOs, IFRC, availability of deliverables from othe EU projects.
- There are more possibility to write "GUIDELINES" before thinking to write "STANDARDS". But still there is the difficulty for each Organization to implement them.
- Check on existing projects before applying for a new one (this should be mandatory)
- Exploitation should persist beyond the life of the project. Concept of "retention".
- All available tools need to be learned by the users and this takes time and resources
- Other sources of "solutions": https://eena.org (European emergency number association) can give directions on alerting the population; http://encircle-cbrn.eu
- There might be the need for a "SUPERPROJECT" to assess all existing project (and may be FIRE-IN is in the right direction)

Proposed solutions

Record what participants argue are needed solutions to close the capability gaps in Step 8:
Capability – Community involvement

- Interoperative governmental framework developed with involvement of the public
- Knowledge manager/ management from EU side with trainers, innovation managers on state

and community level
- Teaching risk awareness by practical exercises starting from schools to universities
- Raise awareness on how politics works and how to place solutions on that level
- Community events dedicated to natural disaster prevention/ awareness raising
- Theme park for disasters preparedness
- Enhanced synthesis between academia and mathematics
- "stick and carrot" methods applied to assist public after the crises
- Help to self help enforcement
- Compulsory insurances, with costs partially covered by governments.
- Scientists need to talk more to each other to avoid excessive fragmentation of efforts
- Cost effectiveness studies, we should be able to make a very good marketing if we need to convince the political level to make good choices (level of investment connected with the level o safety)
- Promote integral changes for the population: from reactive to proactive

FIRE-IN WP 1 Workshop Implementation Reporting Template

Title:	**Workshop TWG D**
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Workshop dates and location:	**13-15 Februray 2019, Prague**
Workshop participants and affiliation	**See attached list**
Submission date:	**1rst April 2019**
Submitted by:	**Iris Schneider**
Reviewed by:	**Vassiliki Valera, Illias Gkotsis**

Identification of capability challenges

Background

WINTER STORM Scenario – Common Capability Challenge: Technology- Forecast and simulate complex scenarios

Improvement opportunity / Capability Challenge:

Capability #2 – Technology- Forecast and simulate complex scenarios

- Weather and stormeforecasts are not adequate for local level and on a microclimatic scale
- Risk assessment and impact analysis tools are not necessarily connected at national/regional/local scale despite the integration of local plans in many cases
- Data and information sharing for cross boarder events is not everywhere systematically taking place
- Lack of standards for spatial data (e.g. maps) sharing in Incident Command and Control systems
- Situational awareness in real time with usage of field data (e.g. photos)
- Resilience of technology is a necessity that is not always respected

Why do you see the need to discuss this task with respect to capability needs?

- Limitations of use of specific Technologies for search and rescue purpose in the given scenario e.g. aerial means, communication, etc.
- Lack of expertise in using technology on user side
- Lack of expertise in chosing and evaluating technological solutions on user side

Constraints / Best practices

- Documentation and proper codification of lessons learnt from previous events. Expert systems development , knowledge repository is mostly missing
- A lack of expertise in chosing and using the technology is a common phenomena
- Limited financial resources & personnel to set up/manage and maintain technological solutions
- Data format exchange constraints, including legislation issues
- Accessibility to the existing technology. Technological solutions exist but are not known. Live demos are essential.

The opportunity from different perspectives

Procedures and Organisation:

Capability – Technology Forecast and simulate complex scenarios
- Legislation and regulation on the use of UAVs and other technological tools (EU & national level)
- Training procedures at a national level for both operational people and population

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- Communication with population for providing information about the status and evolution of the event
- Integration of technology in operations
- EU level procedure for cross-national transfer of technology (platforms, communication)
- Logistics optimization
- Technology watch / Procurement procedures
- Technology to Support interoperability of procedures

Personnel:

Capability #2 – Technology Forecast and simulate complex scenarios
- Training of FRs – volunteers on the use of various technologies
- Experts to support "technology watch" procedures

Equipment & Tools / Technology:

Capability #2 – Technology
- Resilient equipment, sufficiently integrated software & hardware is needed
- Communication equipment (uninterrupted and sufficient connection with field teams for getting feedback, sharing of big data…) is required
- Quick and easy deployment of technology is needed
- Situational awareness and risk evolution tools are needed
- Platforms and integrated systems which incorporate and exploit remote-sensing data/ satellite imagery are necessary
- Equipment for supporting population safety and information is required
- GDPR compliant data collection is necessary
- Tools for supporting sequences of critical procedures and processes are required

Related/Other opportunities:

Capability #2 – Technology Forecast and simulate complex scenarios

-Repository of data and knowledge from previous events in EU-level incorporated in platforms
-ICC Information sharing /massive data sharing
-Real-time data collection

Further questions:
- The project(s) need to deliver "Final Products" that need to be "usable".
- Augmented and Virtual Reality training may have negative impact to "fatigue" and "real" experience. AR/VR are useful but should not overused against field training.

Keywords:

Lack of standards for spartial data, situational awareness in real time, knowledge repository, cross national transfer of technology, integrated CC systems, data sharing

Evaluation of solutions

Polling

Record any discussions that took place during the polling session (Step 5)

Solution matching

- ARTVA for skiing people
- Vehicles for clearing the roads and facilitate the mobility of the operational people

Solution collection

Capability #2 Technology Forecast and simulate complex scenarios

Involvement of community in disaster preparedness: organise "disaster games" where local communities, schools, young people are involved and can participate and learn and share. This opportunity should come along periodic civil protection exercises.
- Write plans for sharing resources with bordering communities: Mutual aid agreements.
- Try to improve more precise risk analysis. (An example given: The Grenfell Tower Fire in London, according to existing risk analysis should have never happened).
- Good quality satellite imagery coming from ESA and Copernicus available for emergency management
- Useful a compilation of METEO INFORMATION WEB SOURCES.
- There might be the need for a "SUPERPROJECT" to assess all existing project (and may be FIRE-IN is in the right direction)

Proposed solutions

Record what participants argue are needed solutions to close the capability gaps in Step 8:
Capability – Community involvement

- Interoperative governmental framework developed with involvement of the public
- Knowledge manager/ management from EU side with trainers, innovation managers on state and community level
- Teaching risk awareness by practical exercises starting from schools to universities
- Raise awareness on how politics works and how to place solutions on that level
- Community events dedicated to natural disaster prevention/ awareness raising
- Theme park for disasters preparedness
- Enhanced synthesis between academia and mathematics
- "stick and carrot" methods applied to assist public after the crises
- Help to self help enforcement
- Compulsory insurances

FIRE-IN WP 1 Workshop Implementation Reporting Template

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Workshop participants and affiliation	**See attached list**
Submission date:	**1rst April 2019**
Submitted by:	**Iris Schneider**
Reviewed by:	**Sébastien Lahaye**

Identification of capability challenges

Background

WINTER STORM Scenario – **Guidance instruments and standards**- standardize capabilities in front of pre- established scenarios

Improvement opportunity / Capability Challenge:

Capability #3 – Guidance instruments and standards- standardize capabilities in front of pre-established scenarios

As we are talking about a major natural disaster it implies that there are not only fire and rescue agencies but many other key presponders (public services and private operators) that are not used to Incident Command Systems and thuse need more EU directires on management and coordination rather than standards.

Why do you see the need to discuss this task with respect to capability needs?
It is a question of risk average time return. Countries and/ or regions are not all adquately prepared to face the risks and have thus no procedures in place.
Two key topics have to be looked into: Command and Control and logistics.
On logistics, standards and procedures should promote interoperability regarding plugs, maps, data sharing, telecommication to name only the most obvious ones.
On Command and Control a flexible approach that takes the local structures into account is required.

Constraints / Best practices

Regarding Command and Controll different standards are already in place or are being implemented: ICS, rescEU mechanism, NATO procedures etc.

The opportunity from different perspectives

Procedures and Organisation:

Capability #3 – Guidance instruments and standards- standardize capabilities in front of pre-established scenarios

Rather than standards, national plans and regional plans need to be developed with the policy makers (civil agency) in charge of coordination.

Appendix 5: TWGE, CBRNE

Associated Experts

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9.	KEMEA	Ioannis Galatas	Greece	igalatas@yahoo.com

1. Scenario for 2nd cycle of TWG E CBRNE workshop
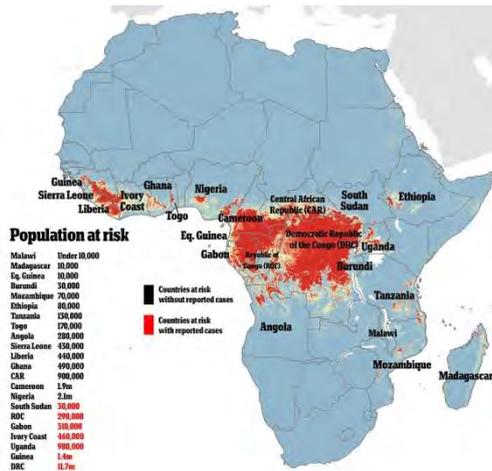
There has been a viral disease in the African continent, which has spread rapidly. Symptoms of the disease include fever, sore throat, muscle aches, nausea, vomiting and diarrhoea. Gradual bleeding and failure of the liver and kidneys. Incubation period of the disease is 14 - 21 days after contact with the infected person. The disease spreads through contact with the blood or body fluids of the infected person. Several countries in Central and West Africa have been hit.

The incidence of the disease and the situation in the affected countries has caused massive migration. Refugees mainly use the way across the Mediterranean Sea to the European mainland. Mediterranean countries report the first incidence of illness in refugee camps on the European mainland. It is likely that a large number of potentially infected refugees have reached the European continent without going through the camps.
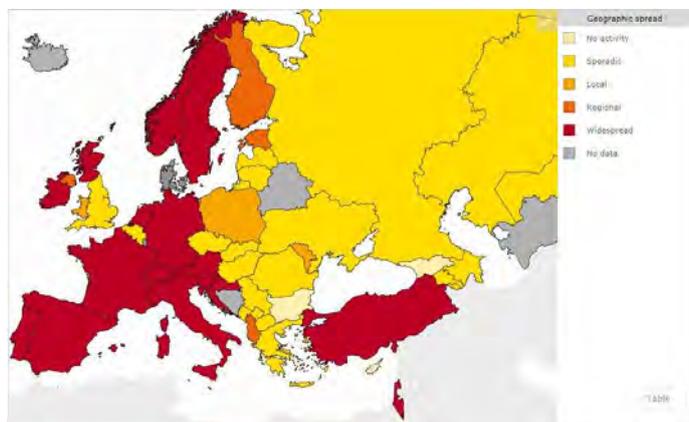
In Europe, the flu epidemic erupts annually; some countries have already declared an epidemic of influenza. Influenza illness is manifested by fever, chills and joint pains. In some cases, the disease is accompanied by diarrhoea and vomiting.

Several European governments are being blackmailed by terrorist groups with the threat of dispersal of the biological substance at the site of gathering a large number of people (airport, train station, metro, etc.). The terrorist group declares that in some cities it has already deployed or dispersed b-dispersion devices.

Title: CBRNE accidents	Workshop TWG E CBRNE
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Workshop participants and affiliation	See page 2
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Submitted by:	Petr Oslejsek (CAFO)
Reviewed by:	Vladimir Vlcek (CAFO)

Identification of capability challenges

Background

See page 3

For discussions was chosen these capability challenges
#1 Pre – planning
#2 Technology
#3 Guidance instruments and standards

Improvement opportunity / Capability Challenge:

During the 2nd step, three basic questions were discussed:

- What is the main challenge under this tasks?

- Why do you see a need to discuss this task with respect capability needs?

#1 Pre - planning

What is the main challenge under this tasks?

- Fast identification of the substances
- sharing of information
- complexity of international data gathering
- effectivity of medical care
- reorganization of personnel and material support
- mobile systems for treatment

Why do you see a need to discuss this task with respect capability needs?

Because is very important:

- to explain to the public right thinks and avoid "false messages" and procedures for control of "panic")
- We need standard operation procedures and how to handle this situation – inside First Responders and between First Responders services
- We need to have resistant population and rescue staff (vaccination, anti-serum)
- We need to know early identification or warning system - borders control system – screening, sharing information between countries

#2 Technology

What is the main challenge under this tasks?

- Identification of sick people in ports and airports and its legal/ethical issues – Quick detection screenings systems
- Need for quick screening tools, e.g. temperature checking

- Intelligence sharing to check if is a conventional (natural) or non-conventional (terrorism) Bio-hazard
- Need for A.I. or simulation software or similar tool to predict the spread of disease and the evolution of the scenario
- Need for PPE for first responders, suitable for long wearing time and severe temperature/humidity conditions, *"Smart PPE"*
- Need for research on antibiotic/antiviral products for First Responders pre-treatment

Why do you see a need to discuss this task with respect capability needs?
Because is very important:

- cross-collaboration between researchers, authorities, first responders, governments, industries
- awareness/training/information of the population in Africa and in EU
- fast reacting of pharmaceutical companies and with no money gain
- stocks of instruments/vaccines/medicines can be not enough

#3 Guidance instruments and standards

What is the main challenge under this tasks?

- Harmonization at the EU level is necessary but after the next point (or simultaneously if possible)
- Unification at the national level (tools, procedures, structures, exercises)
- Standardize the bio sample analysis procedures
- Current SOPs => evaluation, identification
- SOP for infra decontamination
- Dissemination of ECDC standards
- Definition of an EU emergency response plan
- Dissemination / information flow of standards from the EU level to the national practitioners

Why do you see a need to discuss this task with respect capability needs?

Because is very important:

- harmonization of procedures and standards – European level
- common planning – local level regional level, national level, European level, Worldwide

Constraints / Best practices
Summarise the aspects mentioned in World Café round 1 (Step 2 of the Workshop Methodology) and additional aspects as mentioned in the plenary (Step Four of the Workshop Methodology)
The need for rapid identification of biological agents and rapid identification of disease symptoms. Implementing new technologies to practice (sensors, personal equipment). Improving of collaboration between research sector and industry.   **Installation of detection systems at the entrance points to the country (airports, seaports,).**   **EU and Worldwide information network about biological and disease threats.**   **Effective relief and support in third countries affected by high infectious diseases.**   **Standard terminology and standard operational procedures. Common planning on local, national and international level. Common European approach to disease monitoring, planning, preparedness, action and prevention.**
The opportunity from different perspectives
Procedures and Organisation:

Summarise the aspects mentioned in World Café round 2 (Step 3 of the Workshop Methodology) →

Differentiate according to the tasks discussed

#1 Pre - planning

- Improving communication between countries, organizations (international, national, local)
- Systems for standardization, priorization and cross checking quality of information

#2 Technology

- Intelligence sharing to check if is a conventional (natural) or non-conventional (terrorism) Bio-hazard
- Tracking of flights/ships/people in airports and ports for quick screening and next isolation of all people with fever (maybe civil/military cooperation)
- Gap of cross-collaboration between researchers, authorities, first responders, governments, industries
- Gap of awareness/training/information of the population in Africa and in EU. Cultural aspects to take into account for training personnel to send to Africa (vaccines)
- Need for monitoring/treatment of affected people/animals, dead people, healed people (but still contagious)
- Need for a quick system for sharing information about new cases (affected people)
- Gap of fast reacting of pharmaceutical companies and with no money gain
- Stocks of instruments/vaccines/medicines can be not enough
- Gap of medicines/vaccines delivery to people and hospitals

#3 Guidance instruments and standards

- Crisis resources planning standards
- Development of quarantine shelters
- Exercises at the EU level and integrated with the ERCC
- Validation and update of National Actions Plans
- Procedures for multi-agencies trainings
- Standard decontamination procedures

Personnel:

#1 Pre - planning

- responsibility (countries, ministries, agencies)
    - competency
    - motivation
    - training
    - cooperation

#2 Technology

- Gap of education of the population (correct behaviours not to spread disease)
- Gap of fast reacting of pharmaceutical companies and with no money gain
- Need to verify effective/correct use of PPE in training

#3 Guidance instruments and standards

- Limited number of experts
- Maintain the level of expertise
- Train the trainers between different agencies

Equipment & Tools / Technologies:

#1 Pre - planning

- simulation tools
- warning systems
- unification of alert system at international level
- European warning system, Early warning system,
- Early identification system
-

#2 Technology

- All the needed technology should be transportable/light weight/resistant/easy to use

- Need for tools to sterilize surfaces/places/vehicles and to verify the effectiveness
- Need for reliable rapid diagnostic tools (test/quick treatment/vascular access)
- Need to verify effective/correct use of PPE in training
- Need for research on antibiotic/antiviral products for First Responders pre-treatment
- Need for PPE for first responders, suitable for long wearing time and severe temperature/humidity conditions
- Need for local laboratories/camp hospitals in EU
- Need for a quick system for sharing information about new cases (affected people)
- Need for quick screening tools, e.g. temperature checking
- Stocks of instruments/vaccines/medicines can be not enough
- Need for tools to sterilize surfaces/places/vehicles and to verify the effectiveness
- Need for new tools/symptoms-to-check for people screening (before fever)
- Need for Mass people screening/Bio detection systems
- Need for face/symptoms screening systems
- Need for reliable rapid diagnostic tools (test/quick treatment/vascular access)
- Need for new smart PPE that alert operator if PPE is not working well
- Need for research on antibiotic/antiviral products for first responders pre-treatment
- Big gap about finding illegal immigrants affected by disease (boundaries/cooperation)

#3 Guidance instruments and standards

- EU funding for research and development of medicine and fast diagnosis tests
- Training standards on equipment: do we need the same P.P.E.? We should adapt the P.P.E. to each end-user profile and respective training
- Standards on evaluation procedures or laboratories for sensors

---

Related/Other opportunities:

Summarize the aspects mentioned in World Café (Step 3 of the Workshop Methodology) → Differentiate according to the tasks discussed

The discussed opportunities can be divided into specific areas:
- Processes/procedures
- **Common standards and planning. Plans of medical facilities in case of a large number of potentially ill persons.**
- **Resilience of systems / services in the event of an epidemic. Preparedness of first responders (vaccinations, processes for relieving forces and means, civil-military cooperation).**
- **Public-private coherence. Vaccine stocks, dependence of vaccine production on private subjects. Globalization of pharmaceutical companies and their dominant position in the vaccine and antidotes production system.**

- **Information management**
  - **Collaborate in exchange and share information**
  - **Working with social networks information, in the event of a pandemic or biological risk, is an extreme risk of panic and misinformation affecting the functioning of the health system.**
  - **Specific aspects regard to the collection of personal information, health information and personal data protection. How much it is necessary to protect personal data in case of global threats?**
- **Medical aspects**
  - **Healthcare facilities in the event of an epidemic or biological threat**
  - **Development of means for rapid "contactless screening"**
  - **Development of vaccines and antidotes**

- **Specific processes in the management of healthcare facilities when an epidemic develops external quarantine facility, maintaining the functionality of specific healthcare facilities**

Further questions:
• There are general problems about security/public order, dealing with isolated/frantic people. There are also big ethic/privacy problems about identifying/recognizing and tracking people and this can is much more difficult for potential illegal immigrants affected by disease.

Keywords:
Quarantine, Facial rec, Panic, Emergency communication, Civil/military cooperation, Bio-containment, Contagion, Medical research, Screening systems

Evaluation of solutions - Pre-planning

Polling

Record any discussions that took place during the polling session (Step 5)

Solution matching

Follow the discussion during the World Café (Step 6) and the following plenary session (Step 7) with regard to the matching of solutions and capability gaps for the 3 perspectives (procedures and organisations, personnel, equipment & tools).
Collect any additional solutions that are mentioned. Please report them according to the capabilities selected for your TWG:
- *Screening of pre-planning systems in different countries*
- *Worldwide volunteer service*

Solution collection

Collect any additional solutions that are mentioned during the World Café (Step 6) and plenary (Step 7). Please report them according to the capabilities selected for your TWG:
- *capability (Pre-planning)*
- *data tools*
- *responsibility*
- *training*
- *education*
- *identify unique info system for data sharing*

Proposed solutions

Record what participants argue are needed solutions to close the capability gaps in Step 8:
Capability (Pre-planning)
- *1) IDENTIFICATION OF STRATEGIC OWNERSHIP (the topic was chosen by 4 experts)*
- *2) UNIFICATION OF ALERT MESSAGES TO PUBLIC (the topic was chosen by 4 experts)*
- *3) FIRST RESPONDERS RESPONSIBILITIES ON BIOLOGICAL EMERGENCIES (the topic was chosen by 3 experts)*
- *4) SCREENING OF CBRNE CENTRES- international level on biological field*
- *5) HOSPITAL CAPACITY- identification)*
- *6) COMPARISON OF MOBILE LABORATORY SUPPORT*

Evaluation of solutions - Technology
Polling
There was a discussion about the number of preferences that each AE could express. With only one or three preferences, maybe the results of the polling session can be not representative of the situation.
Solution matching
Follow the discussion during the World Café (Step 6) and the following plenary session (Step 7) with regard to the matching of solutions and capability gaps for the 3 perspectives (procedures and organisations, personnel, equipment & tools). Collect any additional solutions that are mentioned. Please report them according to the capabilities selected for your TWG: SOLUTIONS FOR "EQUIPMENT AND TOOLS" (that fill partially some gaps): *Capability #9: Gap of awareness/training/information of the population in Africa and in EU and Capability #8:* Need for a quick system for sharing information about new cases (affected people): i-REACT App (Mobile App for Disaster response, File WP 2 presentation_resources_TWG E, Slide 19); AE found out that i-React as technology is Relevant, Mature, Still not complete for the scenario, Already on the market. Note: this solution got 3 votes in the polling session. *Capability #9: Gap of awareness/training/information of the population in Africa and in EU:* FEMA's disaster app (Mobile App for Disaster response, File WP 2 presentation_resources_TWG E, Slide 19); AE found out that this solution, as technology, is Relevant, Mature, Still not complete for the scenario, Already on the market. Note: this solution got 0 votes in the polling session. *Capability #26: Need to verify effective/correct use of PPE in training and Capability #27: Need for new smart PPE that alert operator if PPE is not working well:* Firefighter Physiological Monitoring Technology (Wearable technologies, File WP 2 presentation_resources_TWG E, Slide 17); AE found out that this solution, as technology, is Relevant, Mature, Still not complete for the scenario, Already on the market. Note: this solution got 0 votes in the polling session. *Capability #26: Need to verify effective/correct use of PPE in training and Capability #27: Need for new smart PPE that alert operator if PPE is not working well:* Telemetry systems offering an overview of the status of respiratory equipment wearers (Technologically advanced clothing and equipment: Application example 3, File WP 2 presentation_resources_TWG E, Slide 21); AE found out that this solution, as technology, is Relevant, Mature, Still not complete for the scenario, Already on the market. Note: this solution got 1 votes in the polling session. *Capability #14: Need for quick screening tools, e.g. temperature checking and Capability #15: All the needed technology should be transportable/light weight/resistant/easy to use:* Thermal imaging camera and display in the fire-fighters mask (Technologically advanced clothing and equipment: Application example 1, File WP 2 presentation_resources_TWG E, Slide 21); AE found out that this solution, as technology, is Relevant, Mature, Still not complete for the scenario, Already on the market. Note: this solution got 0 votes in the polling session. *Capability #9: Gap of awareness/training/information of the population in Africa and in EU:* Google public alert (the solution is designed for floods and have to be adapted to the scenario), working with machine learning and big data mining (Big Data: Application example 1, File WP 2 presentation_resources_TWG E, Slide 20); AE found out that this solution, as technology, is Relevant, Still not mature for the scenario, Still not complete for the scenario, Already on the market. Note: this solution got 0 votes in the polling session.

Capability #4: Need for A.I. or simulation software or similar tool to predict the spread of disease and the evolution of the scenario: Application using social media and big data mining (Big Data: Application example 2, File WP 2 presentation_resources_TWG E, Slide 20); AE found out that this solution, as technology, is Relevant, Mature, Still not complete for the scenario, Already on the market. Note: this solution got 7 votes in the polling session.

Capability #24: Gap of medicines/vaccines delivery to people and hospitals and Capability #22: Need for Mass people screening/Bio detection systems: Advanced Sensing and Surveillance systems for (semi)autonomous micro-UAV/UAS (the solution is designed for fire detection and forest fires and have to be adapted to the scenario), UAV/UAS can either be used for medicines/vaccines delivery or for 3D area modelling system and people screening/Bio detection (Remote Monitoring with Sensors: Application example 1, File WP 2 presentation_resources_TWG E, Slide 18); AE found out that this solution, as technology, is Relevant, Mature, Still not complete for the scenario, Already on the market. Note: this solution got 0 votes in the polling session.

Solution collection

Collect any additional solutions that are mentioned during the World Café (Step 6) and plenary (Step 7). Please report them according to the capabilities selected for your TWG: File WP 2 presentation_resources_TWG E, Slide 21);

SOLUTIONS FOR "EQUIPMENT AND TOOLS":

Capability #26: Need to verify effective/correct use of PPE in training and Capability #27: Need for new smart PPE that alert operator if PPE is not working well: AE found out that there are many other kind of wearable technology for first responders, particularly for "Firefighter Physiological Monitoring" and maybe also better than the one proposed.

Proposed solutions

Record what participants argue are needed solutions to close the capability gaps in Step 8:

Capability #3: Tracking of flights/ships/people in airports and ports for quick screening and next isolation of all people with fever (maybe civil/military cooperation) and Capability #4: Need for A.I. or simulation software or similar tool to predict the spread of disease and the evolution of the scenario: Maybe using artificial intelligence and social media/big data mining it is possible to work on a software tool that fill the gaps, taking into account also the available resources to face the scenario.

Capability #5: Need for PPE for first responders, suitable for long wearing time and severe temperature/humidity conditions and Capability #6: Need for big (national) stocks of PPE or maybe new kind of reusable PPE and Capability #21: Need for new smart PPE that alert operator if PPE is not working well: Maybe doing research and putting together existing solutions is possible to fill gaps and design a new kind of PPE.

Capability #15: Need for new tools/symptoms-to-check for people screening (before fever) and Capability #25: Need for reliable rapid diagnostic tools (test/quick treatment/vascular access): Maybe doing research diagnostic tools can be improved for this kind of scenario.

Evaluation of solutions - Guidance instruments and standards

Note the mentioned aspects as bullet points, e.g.:

Discuss solutions available for capability "Guidance instruments and standards"

Are solutions known? Are solutions applied? Why (not)?	Are solutions suggested contributing to closing the capability gaps? Why? Why not?
- The screening process seems to be ok	

- But not enough time to explain the resources - Information on resources must be sent before the workshop
Do we have enough guidance in the field of "bio"?

Additional aspects

• Procedures: Who is responsible for what? How are the roles defined? How to implement the procedures? Stress tests could be organized The long term must be thought: how should we be organized? A specific organization exists in Germany: this is a meeting of fire chiefs => they usually talk about CBRNE Return of experiences / analyzes: could we have the same standards across the EU? Do standards change the organization? It seems that it doesn't Do we have too many measures? Maybe some are useless?
• Knowledge The dissemination of the guidelines is the main difficulty => who does it? How? Understanding the standards of another country can be difficult and more than that, it could be difficult in the same country (between different regions, between different entities, eg fire and rescue services vs law enforcement services) One thing instead of another (new standard): but why? Is it necessary? Too many standards? Guidance vs standards: guidance seems easier to deliver/provide than standards, but what are the key point indicators? How do we use resources? How many resources do we need to adopt the standards? => It's probably more difficult to provide resources in some organizations (eg at the hospital?) Are the exchange and coordination between the EU DG (ECHO, HOMES, SANTE) sufficient / good enough?
• Tools Training / table-top exercises (real drills: the scenario should not be known) are necessary to evaluate the tools => but it is important to focus on the basic standards Is the eNotice project interesting for this? Something between guidelines and standards could be useful => principles? Action plan? => first of all, the motivation to change Do European agencies have some tools? What kind of European agreement could be useful for comparing laboratories across the EU? Joint operational plan? 112: how to use it? Can we improve collaboration?
Collecting additional solutions Guidance instruments and standards

- If the gaps are too large, then it may be too complicated to focus on the standards
- Do we really need research for standards? We have plenty of in each discipline
    o We need to list, compare standards (what already exists), consolidate
    o Unification at national level and then harmonization at EU level
- ECDC standards must be disseminated before any new research
- Research is necessary on the "flow" of dissemination (think national before supra)
    o What information is exchanged?
    o How is it exchanged?
    o Knowledge sharing is a challenge (general information as best practices and also classified information)
- Standardize the bio samples would be necessary => probably not the main challenge but easy to do
- Standards for lessons learned
    o Can we do it in the same way?
    o How can we share it? With an existing platform? The UK platform (JESIP) seems to be interesting. What about ECDC?

> - Networking is needed, much more than standards
>   - The ENCIRCLE project is part of this network (the focal point?)
>   - At some point, you can't do at the national level => this network is useful for pre planning (some organizations need agreements)
>   - National focal points should be well known by other local and national organizations
>   - What are the information channels?
> - For some organizations, research and development are not going in the same direction
> - Could we explain a little more standards during training? Probably not
> - Standards for communication / information channels are necessary: can we communicate in the same way across the EU? Do we need a specific committee?

General conclusions for solutions:

During the workshop, experts were invited to prioritize the various challenges with regard to the scenario and the areas: Pre-planning, Technologies, Guidance instruments and standards

The following priority challenges have been defined in each area:

Pre-planning
- identification of strategic ownership (the topic was chosen by 4 experts)
- unification of alert messages to public (the topic was chosen by 4 experts)
- first responders responsibilities on biological emergencies (the topic was chosen by 3 experts)
- screening of cbrne centres- international level on biological field
- hospital capacity- identification)
- comparison of mobile laboratory support

Technologies
- mobile applications for disaster response
- PPE with embedded informations,
- UAV, UAS
- Wearable technologies
- Data mining applications with geos, social media

Guidance instruments and standards
- Unification at national level + tool to compare at the EU level
- Flow of dissemination
- Standards for lessons learned
- Standards for networking / knowledge sharing
- Standards for communication / information channels

Each expert had the opportunity to select one challenge from each area. The result is shown below.

Pre-planning
- identification of strategic ownership
- unification of alert messages to public

Technologies
- Data mining applications with geos, social media

Guidance instruments and standards
- Unification at national level + tool to compare at the EU level