Project acronym:	FORTRESS
Project title:	Foresight Tools for Responding to cascading effects in a crisis
Call identifier:	FP7-SEC-2013-1
Contract type:	Capability Project
Start date of project:	01 April 2014
Duration:	36 months
Website:	www.fortress-project.eu

This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no 607579.

Deliverable D5.2:

Report on Information and Communication Demands of risk professionals

Author(s):	Frank Wilson, Rob Peters (IFV), Massimo Migliorini (SiTi)
Dissemination level:	Public
Deliverable type:	Report
Version:	01
Submission date:	31.05.2016

CHANGE RECORDS

Issue	Date	Description	Author (Company)
01	21.5.2016	First draft	Frank Wilson, Rob Peters, Piet Sellke, Massimo Migliorini
02	25.5.2016	Chapters revised	Piet Sellke
03	28.5.2016	Partners' review	Piet Sellke
04	30.05.2016	Final copy	Piet Sellke

Chapter	Main authors responsible	Contributors
1	Piet Sellke	Frank Wilson, Rob Peters, Massimo Migliorini
2	Frank Wilson / Rob Peters	
3	Massimo Migliorini	
4	Piet Sellke	

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EXECUTIVE SUMMARY

This reports lays out the information and communication demands of risk professionals in a crisis situation. For this task, case studies have been discussed in workshops together with risk managers.

The first case study uses the scenario of a flooding in the dutch-german border region with impacts on both countries. The second scenario is using a flooding scenario in the border region of Italy and France.

Results of both case studies show that information needs concentrate first of all on general crisis information (e.g. what is the area, how many are affected). Further, specifics of the situation do play an equally important role (e.g. when is heave rain to be expected, timing of the flooding). A third part of information needs centered around critical infrastructures / sectors (e.g. what critical infrastructures are in a specific area, what effect is to be expected). Fourth, information needs were articulated on critical zones, which refers to geographical or functional areas of concern. Fifth, the organisation of the crisis management itself during and before an event was identified as an area with information needs (e.g. how to organise the collaboration between countries). As a sixth field of information needs the after-care phase was discussed (e.g. how long does it take to go back to normal).

1 INTRODUCTION

The collaboration between different actors of risk and crisis management is of crucial importance to deal with an actual crisis or prepare for a future event. How actors define their respective roles, what they want to know and who they want to communicate to shows how interactions would take place in a real-world setting.

This report summarizes findings from workshops with actors from different fields in the context of crisis response. A special emphasis was given to cross-border interactions, in one case study it was simulated in the Dutch-German border region, whereas in the second case study in the Italian-French border region. Participants discussed different issues while simulation the specific scenario.

The following chapters first describe the outcomes of the case study in the Netherlands, followed by the Italian report in chapter 3.

2 WORKSHOP OUTCOMES: THE NETHERLANDS

2.1 THE SCENARIO

The focal scenario was established in Workshop 1 (See D5.1, Netherlands Section) and is summarised here as the basis for debates in Workshop 2 as reported later:

We have only 4 days till we see highest predicted water level in The Netherlands.

An extremely cold winter provides frozen ground where subsequent high rain runs off, unable to penetrate the ground, producing very high levels in rivers heading towards The Netherlands from the Rhine Basin.

In addition, massive rain in The Netherlands puts pressure on local rivers and water containments, such that there is now very little spare capacity to deal with what is expected to come towards us.

It seems now that critical dikes could be quickly under threat.

Information requirements shift as the situation progresses. Initially we are concerned to get better intelligence from cross-border sources concerning the state of rivers at different parts of the chain (to help prediction).

Locally, we are then concerned to consolidate intelligence from different agencies so that we better understand the latest status on rivers, canals, dykes, harbours, bridges, sluices (gates), and managed run-off (areas where water can be allowed to go to ease pressure - sacrifice).

As the higher water approaches the focus then shifts to additional critical infrastructure (CI) such as hospitals, housing areas, power lines, and so on. We are aware that power from cross-border lines may be lost as flooding upstream increases (Germany to Netherlands power supplies).

All of these critical issues are addressed as part of a process chain, and we seek to identify what information is needed and in what form, because we are trying to support those people who will use it to maximise safety.

In the above scenario, the information users are our customers (the ones we “customise” information for), and include not only crisis mangers and responders, but also external partners.

The scenario suggests a strong need to ensure inter-sectorial exchange (e.g. water, power, public safety), as well as cross-border (Germany, Netherlands) to ensure mutual awareness, supported by inter-organisational and cross-border crisis communication.

2.2 THE WORKSHOP FOCUS AND PARTICIPANTS

The workshop was conducted February 28th in The Netherlands. The attendees represented the key safety stakeholders for The Netherlands who identify the main partners as shown:

	Abbreviation	Meaning of Abbreviation	Translation
1	RWS	Rijkswaterstaat	Dutch National Authority, part of I&M below
2	WS	Waterschap(pen)	Waterboards
3	PRV	Provincie(s)	Province
4	WMCN	Watermanagementcentrum Nederland	Water Management Centre , part of RWS
5	Multidisciplinaire	Samenwerking tussen alle relevante crisispartners	Collaboration group between partners
6	V&J	Ministerie van Veiligheid en Justitie	Dutch Ministry of Safety and Justice
7	CdK	Commissaris van de Koning	Provincial Political Authority
8	BM	Burgemeester	Mayor
9	VR	Veiligheidsregio(s)	Safety Regions, in charge of regional safety
10	GEM	Gemeente(n)	City or Municipality
11	ILT	Inspectie Leefomgeving en Transport	Inspection transport
12	KNMI	Koninklijk Nederlands Meteorologisch Instituut	Royal Weather Forecast Agency
13	LNV	Landbouw Natuur en Voedsel	Dutch Ministry of agriculture
14	NCSC/IRB	Nationaal Cyber Security Centrum/ ICT response board	National Cyber Security Centre IRB
15	POL	Nederlandse Politie	Dutch National Police
16	DEF	Ministerie van Defensie	Minstry of Defense
17	CVR	Coordinerende Veiligheidsregio	Coordinating Safety Region
18	KNRM	Koningklijke Nederlandse Reddingsmaatschappij	Voluntary Water Rescue Agency
19	GHOR	Geneeskundige Hulpverleningsorganisatie in de Regio	Regional Medical Crisis Management Agency
20	LVNL	Luchtverkeersleiding Nederland	Air Traffic Control
21	EZ	Ministerie van Economische Zaken	Minstry of Economic Affairs
22	I&M	Ministerie van Infrastructuur en Milieu	Ministry of Infrastrcuture and Envrionment
23	OCW	Minister van Onderwijs Cultuur en Wetenschappen	Minstry of Education and Science
24	Prorail	Prorail	National Rail Company

Table 1: Participants in the workshop

The above main partners are noted in the following tables on who has / needs information.

2.3 WORKSHOP GENERAL FINDINGS

The workshop addressed the agreed standard topic list and then moved on to investigating information requirements in finer detail, also including further topics identified by NL safety stakeholders present (see later sections).

2.3.1 Knowledge of the scenario and Primary Concerns

Here the participants discussed the scenario and its threats: what it is, what it would affect, what cascading effects it could have, nature of risk to humans, how mitigation would be organized, how effective mitigation would be.

It was agreed that the scenario is the "worst case" scenario for The Netherlands, because much of the country is below water level. Substantial areas are made safe and usable only because of the most advanced water management in Europe. In the event of a massive Rhineland surge, whereby Dutch capacities could not cope, then the loss of Dikes (accidentally or organised to protect inhabited areas) would be a major catastrophe.

The primary concerns debated, indicate that while it is unlikely in totality (in extremis), it is nonetheless of extreme importance for two reasons: if it happens it is a major national disaster affecting all Dutch people, and destroying the waterways that are depended on by Germany and other countries who rely on inland shipping to deliver raw materials inward, and to deliver products outward; even a partial realisation of the scenario would cause major damage and disruption to at least some areas, with risks to life, health and economy.

Key actions were considered and described in 2.3.2.

2.3.2 Organising Preparation and Response

Here the participants discussed the organisation of safety: statutory approach, response from authorities, precautionary measures, inter-regional and international collaboration.

In 2010, The Dutch Government initiated the Safety Regions Act, whereby responsibility for safety was placed at regional level. Twenty-five (25) safety regions were established, wherein a common partnership approach is evident. The local mayors take leadership, and are joined by all safety services, as well as key safety partners such as industries representing critical infrastructure. A typical region (e.g. VRK) can be seen to have a joint command centre, and each safety region is supported by the national safety institute (IFV).

Dutch law mandates each safety region to identify all risks, and to form partnerships addressing such risks, and involving all relevant safety partners. In the case of a critical infrastructure like Schiphol Airport or Tata Steel, the major infrastructure operator is supported by relevant partners: For Schiphol that includes air traffic control, customs, airlines, regional police, fire, ambulance etc., and key research institutes addressing relevant issues; for Tata this includes regional fire, police ambulance, and researchers addressing issues such as toxic gas escape, gas cloud modelling etc.

For flood, there is a national partnership, plus a set of regional partnerships, all addressing flood risks. These operate within the safety regions arrangements, but also at national level since water management and flood risk are a major issue for the whole of The Netherlands.

2.4 OVERALL INFORMATION REQUIREMENTS

Here the participants discussed information requirements: what is needed, where to find it, and who is a trusted provider. This led to an analysis within the workshop identifying a set of specific needs for information exchange between actors at the different event stages.

2.4.1 General Crisis Scenario Information

Here, the debate addressed the general features of information exchange relating to the previously described crisis scenario.

	General Crisis Scenario Information	Threat of Acute Rain / Flood	Acute Rain / Flood	Water Shortage / Drought
1	What area is the flooding area?	RWS, WS, VR	RWS, WS, VR	
2	At what time did the situation of extreme water occur?		RWS, WS	
3	Who will be responsible for providing information about the water situation in the coming days?	RWS, WS, WMCN	RWS, WS, WMCN	RWS, WS, WMCN
4	Agreements or procedures required, given the scenario time frame?	Multidisciplinary	Multidisciplinary	Multidisciplinary
5	When is the decision to evacuate to be expected?	Min V&J, CdK, BM	Min V&J, CdK, BM	Min V&J, CdK, BM
6	How many citizens are affected where in the area?	GEM, VR	GEM, VR	GEM, VR
7	Are there any special events occuring in the area?	GEM, VR	GEM, VR	GEM, VR
8	How many immobile and vulnerable citizens are in the area?	GEM, VR	GEM, VR	GEM, VR
9	How many animals are in the area?	GEM, LNV	GEM, LNV	GEM, LNV
10	In what way are we going to impose order in the area?	POL, DEF	POL, DEF	POL, DEF
11	**How will we deploy our means for crisis communication to the public?	VR, RWS, WS	VR, RWS, WS	VR, RWS, WS
12	Any available info/analysis on state/ mood of the public using social media?	VR, RWS, WS	VR, RWS, WS	VR, RWS, WS
13	Is there cultural heritage to protect/rescue in the area?	GEM, VR, OCW	GEM, VR, OCW	GEM, VR, OCW
14	Is there any cultural heritage damaged in the area?	GEM, VR, WS	GEM, VR, WS	GEM, VR, WS
15	**Which emergency laws or regulations are required?	VR, GEM, RWS, WS	VR, GEM, RWS, WS	VR, GEM, RWS, WS
16	**Where is the public care taking to be organised?	VR, GEM, RWS, WS	VR, GEM, RWS, WS	
17	Which water vehicles are available for operations in the area?	CVR, RWS, KNRM	CVR, RWS, KNRM	
18	Which aerial vehicles are available for operations?	DEF, GHOR, LVNL	DEF, GHOR, LVNL	
19	What do we know about the cause of the situation?	RWS, WS, WMCN	RWS, WS, WMCN	RWS, WS, WMCN
20	What area is affected by the drought?			RWS, WS, WMCN
NOTE:	**Questions marked ** are 'judgement' rather than 'common picture'.	The above organisations have the information available		

Table 2: General exchange of information

2.4.2 General Water Information Needs

The discussion clearly identified a range of general information concerns around water (timing, ingress, egress, risk level, damage, rate of change, etc.).

	Information needs concerning water	Threat of Acute Rain / Flood	Acute Rain / Flood	Water Shortage / Drought
1	Within how many days is a break through of the Dike to be expected?	RWS, WS	RWS, WS	
2	When is the extreme rain to be expected?	KNMI		
3	At what time will the chance of flooding become realistic?	RWS, WS, WMCN		
4	At what time is the extreme rain becoming a real problem?	RWS, WS, WMCN		
5	What weather is to be expected in the forthcoming 24 hours?	KNMI	KNMI	KNMI
6	What is the weatherforecast for the coming days?	KNMI	KNMI	KNMI
7	What is the picture provided by the monitoring of the river output?	RWS, WMCN	RWS, WMCN	RWS, WMCN
8	What is the worst case scenario?	WS, RWS, WMCN	WS, RWS, WMCN	WS, RWS, WMCN
9	To which level of water will the areas be submerged?	WS	WS	
10	Where are the weak spots in the weir (Dike constructed to hold water)	WS, RWS	WS, RWS	WS, RWS
11	Is the water authority able to guarantee the water safety?	WS, RWS	WS, RWS	
12	Are there preventive measures that water managers can take to protect areas?	WS, RWS, WMCN	WS, RWS, WMCN	WS, RWS, WMCN
13	How much time between the breach (break through) and the water reaching the city?	WS, RWS, WMCN	WS, RWS, WMCN	
14	How soon after the start of extreme rainfall is the area impassable?	WS, WMCN, KNMI	WS, WMCN, KNMI	
15	What is the current situation in the flooding/flooded area?		WS, DEF	
16	What is the size of the breach (point of break through?)		WS, RWS, WMCN	
17	Is the breach growing in size, and if yes to what extent?		WS, RWS, WMCN, commercial sector	
18	Which area will be affected by the extreme water?	WS, GEM, KNMI	WS, GEM, KNMI	
19	Where is the water front?		WS, DEF	
20	Which measures would the water authority be able to enact to protect the areas that are not yet flooded?	WS, RWS, advisers commercial sector	WS, RWS, commercial sector	
21	How does the water front develop within 2-4-6-8-10 hours?	WS, RWS, WMCN	WS, RWS, WMCN	
22	Which locations are now to be considered as very dangerous in the area ?	WS, RWS, WMCN	Multidisciplinary	

	Information needs concerning water	Threat of Acute Rain / Flood	Acute Rain / Flood	Water Shortage / Drought
23	How is the water front developing of the region with extreme downpoor?	WS, RWS, WMCN	WS, RWS, WMCN	
24	How many casualties or victims are we to expect?	WMCN	WMCN	
25	Is there any information about the level of damage?		WMCN	WS
26	What companies are in the affected area?	WS, BRW	WS, BRW	
27	What information is available from sources on the ground?	WS	WS	
28	What information is available through aerial reconnaisance?	DEF	DEF	
29	How long will an area take to dry?	WS, RWS	WS, RWS	
30	How long will it take to make the area habitable again?	WS, RWS	WS, RWS	
31	Which areas will be habitable or not after the crisis?	WS	WS	
33	When is extreme drought to be expected?			KNMI
34	Which area is affected by the shortage?			WS, RWS
35	Which effect will the water shortage have on the area?			WS, RWS
36	What is the situation concerning the water temperature?			RWS, WS

Table 3: General water information needs

2.4.3 Information about Critivcal Infrastructures / Critical Sectors

The workshop participants identified a broad range of issues around Critical Infrastructure (CI) and Critical Sectors (e.g. Telecoms, Power, etc.).

	Information about Critical Infrastructures / Sectors	Threat of Acute Rain / Flood	Acute Rain / Flood	Water Shortage / Drought
1	What Critical sectors or infrastructures are in the area?	VR	VR	VR
2	What effect is to be expected regarding the base-infrastructure of the waterboards?	WS	WS	WS
3	What effect is to be expected National water infrastructure?	RWS	RWS	
4	What is the impact of the flood on the wastewater treatment?	WS	WS	WS
5	What effect is to be expected regarding the infrastructure of gas/heating/electricity?	Gas/ Electricity company network admin, EZ	Gas/ Electricity company network admin, EZ	Gas/ Electricity company network admin, EZ
6	What effect is to be expected regarding the infrastructure of drinking water?	Drinking water companies ILT	Drinking water companies ILT	Drinking water companies ILT
7	What effect is to be expected regarding the Telecom infrastructure?	ICT Telecom companies NCSC/IRB, EZ	ICT Telecom companies NCSC/IRB, EZ	ICT Telecom companies NCSC/IRB, EZ
8	What effect is to be expected regarding the financial infrastructure?	EZ	EZ	EZ
9	What roads are usable and what roads are not?	RWS, PRV, GEM	RWS, PRV, GEM	RWS, PRV, GEM
10	What effect is to be expected regarding the rail road infrastructure?	Prorail, I&M	Prorail, I&M	
11	What effect is to be expected regarding the infrastructure of transport and sailing routes?	RWS	RWS	RWS
12	What efect is to be expected upon Air Transport?	LVNL, luchthaven, I&M, DEF, V&J	LVNL, luchthaven, I&M, DEF, V&J	
13	**What effect is to be expected regarding the road infrastructure?	RWS, PRV, GEM	RWS, PRV, GEM	
14	How do you ensure mobility in the dry area?	RWS	RWS	
15	What extra danger is to be expected regarding any form of transportation?	Multidisciplinary	Multidisciplinary	RWS
16	What effect is to be expected regarding nuclear plants and cooling systems?			Gas Electricity companies EZ
NOTE:	**Questions marked ** are 'judgement' rather than 'common picture'.	The above organisations have the information available.		

Table 4: Information needs on critical infrastructures

2.4.4 Information About Critical Zones

The discussion emphasised the need to identify different "zones" or geographical / functional areas of concern. That debate produced the following table.

	Information about Critical Zones	Threat of Acute Rain / Flood	Acute Rain / Flood	Water Shortage / Drought
1	Can the area be divided into safety zones of different character: what is going to be submerged and what is not?	WS	WS	
2	What are the dry zones or spots that will remain?	WS	WS	
3	In what area is a cascading effect to be expected?	WS, vital sectors, water/environmentally hazardous enterprises	WS, vital sectors, water/ environmentally hazardous enterprises	
4	Which zone will be submerged to a maximum of 1 m ?	WS	WS	
5	Which zone will be considerably submerged or will have a fast increase of depth?	WS	WS	
6	What is the use of the area (industry/living/recreation, etc)?	VR	VR	VR
7	Is the water authority able to guarantee water safety?	WS, RWS, WMCN	WS, RWS, WMCN	
8	Are there preventive measures that water managers can take to protect areas?	WS, RWS	WS, RWS	WS, RWS
9	How much time will we have to warn/inform the public in an area?	Multidisciplinary	Multidisciplinary	
10	** What will be the evacuation strategy?	Multidisciplinary	Multidisciplinary	
11	How much time will citizens and critical infrastructure providers have to react /evacuate?	Multidisciplinary	Multidisciplinary	
12	Are there secure/safe areas in the neighborhood?	WS	WS	
13	** What evacuation routes are organised?	WS, RWS	WS, RWS	
14	** Where will the shelters be installed (in our out of which zone)?	GEM, VR	GEM, VR	
15	** Is there a traffic management plan available?	RWS	RWS	
16	What companies are in the area that have a high risk of water or pollution?	WS, BRW	WS, BRW	
17	What will be the effect of such damage or pollution?	WS, BRW	WS, BRW	
18	Are there any critical pipings affected in the area?	WS, GEM, BRW, RWS	WS, GEM, BRW, RWS	
19	What will be the effect of such damage or pollution?	GEM, BRW, RWS	GEM, BRW, RWS	
20	Which protocols, agreements or procedures will be necessary given the different timeframes in different zones?	Multidisciplinary	Multidisciplinary	Multidisciplinary
21	** Where will the public caretaking be installed?	WS, GEM, VR	WS, GEM, VR	
22	What line of action will be available for different target groups such as self reliant and non self reliant people, and for companies?	Multidisciplinary	Multidisciplinary	
23	Which companies are depending on cooling water and could become a problem for the environment?			GEM, BRW, PRV
24	How will agriculture be affected?			WS, RWS, WMCN, Min. EZ
25	What will be the effect on nature?			WS, RWS, WMCN, Min. I&M
NOTE:	**Questions marked ** are 'judgement' rather than 'common picture'.	The above organisations have the information available		

Table 5: Information needs on critical zones

2.4.5 Organising Crisis Management During an Event

The discussion of organising crisis management (organising ourselves) during a specific event revealed the following key issues to be addressed during any FORTRESS exercise.

	Information about the organisation of crisis management	Partners in managing the crisis
1	At what level have the water authorities raised the level of crisis?	WS, RWS, WMCN
2	What safety regions, cities, provinces and waterboards are involved?	VR, WS, PRV, GEM
3	Which other crisis partners are involved? (police, military, BRZO, red cross, etc)	See summary.
4	Which safety region can act as sheltering region?	VR
5	In what way will we organise cross region collaboration? Upscaling?	VR, POL, WS, RWS, WMCN, ISM (ministries)
6	In what way will we organise collaboration with the National level?	Conform GRIP
7	In what way will responders be able to work safely?	Multidisciplinary
8	What activity is going to be taken up by which organisation?	Multidisciplinary
9	What special actions/measurements/equipment is required?	RWS, WS, LOCC
10	In what way will we handle power failure in the area?	Electricity companies EZ, Multidisciplinary
11	In what way will capacity planning and continuity be taken care of?	Multidisciplinary, LOCC
12	Are we going to request assistence?	Multidisciplinary, LOCC
13	Can we get logistic support?	Multidisciplinary, LOCC
14	Are all coordinates/tel. numbers of all organisations involved made available to the relevant people?	Multidisciplinary
15	What agreements/procedures are required given the timeframe of the incident?	Multidisciplinary
16	At what point in time will a pre-warning regarding drought be given?	WMCN, RWS, WS

Table 6: Information on the organizatation of the crisis management

For a specific scenario the lead partner has to be identified, and this is generally pre-defined in the specific “crisis plan” (see earlier).

2.4.6 After Care Phase

The discussion of the after-care phase (recovery) identified the following set of items.

	Information requirements in after-care phase
1	How long will it take to pump the area dry?
2	How many casualties are there?
3	How many citizens suffered damage?
4	What level of damage is recorded?
5	How long will it take to reestablish the normal water levels?
6	Will it be possible to revitalise the area?
7	Within what span of time can the area be made habitable again?
8	How long will it take to rebuild the area?
9	What provisions will have to be implemented in the meantime?
10	What long term shelter accomodation is required?
11	What is the nature of the rebuilding organisation?

Table 7: Information requirements in after care phase

All above are debatable by the crisis partners, and are scenario dependent.

This may be of less interest to FORTRESS, because it comes after the cascade analysis, preparation, and response, which is where FORTRESS support is primarily applicable.

2.4.7 Cold Phase – Interplay Between Partners

The table below shows the scope for interplay between partners in the Cold Phase (preparatory phase), and will be used to support planning of the test scenarios later in the project.

Cold Phase Information Requirement (1)	**Main regional crisis partners**															
Crisis management planning	RWS	WS	GEM	VR	KNMI	BRW	POL	DEF	LOCC	Gas Electric	Drink Water	ICT Telecom	LVNL	Pro rail	KNRM	PRV
Regional planning																
Inter regional planning																
Uniform use of terms																
Coordinates and tel. numbers of organisations involved																
Regional exercises																
Realistic flooding scenarios																
Evacuation strategy for the area																
Public risk communication strategy																
Public crisis communication strategy																
After care strategy																
Information about covenants and procedures																
Information about existing coalitions																
Plan for disaster mitigation in power failure																

Table 8: Information requirements in cold phase (1)

Cold Phase Information Requirement (2)	**Main regional crisis partners**															
Risk management and preparation of crisis management	RWS	WS	GEM	VR	KNMI	BRW	POL	DEF	LOCC	Gas Electric	Drink Water	ICT Telecom	LVNL	Pro rail	KNRM	PRV
Underground map layers, such as aerial photography and Andes 2000																
Interactive map layers with actual floodings																
Thematic map layers (electricity, flood sensitive objects, post codes)																
Preparative map layers (inc. flood risk zones, critical infrastructure, postal codes)																
Population information for the area																
Maps with critical infrastructure in the area																
Maps with risk objects in the area																
Maps with information about water sensitive objects in the area																
Offcial borders/boundaries in the area																
Map with heights																
Maps with depths after flooding																

Table 9: Information requirements in cold phase (2)

The above tables provide a basis for current/future debate about information improvement. This discussion space is highly relevant to FORTRESS, which can add value. FORTRESS tools can be useful in support of planning (FSB) and exercises (FIET).

2.5 SUMMARY AND NEXT STEPS

IFV has conducted a series of workshops in support of FORTRESS, each contributing to the WP5 information gathering. The abovementioned workshop was specifically targeted at information needs and the manner of provision, in support of FORTRESS task T5.2.

IFV will continue this line of work, since the initiative has been internalised by IFV as part of its ongoing support for safety partnerships nationwide.

Continuity of these partnering discussions will also prepare the way for testing of tools developed in FORTRESS later in the project.

The information provided here is intended to support further analysis supporting definition of information exchanges (candidate) that can be considered in the FORTRESS test phase. Not all can be supported, since they are so many and so varied. However, they do provide a broad opportunity for selecting those items that could be built into a realistic and convincing demonstration to support Dutch sfatey partners (as mentioned above) in testing and validating FORTRESS tools.

3 WORKSHOP OUTCOMES: ITALY

3.1 THE SCENARIO

The following report describe the results obtained in the Simulation Exercise performed for the Italian-French case study: the collapse of Mont Cenis Dam and the consequent flooding. A collapse of a dam on the Italian-French trans-boundary area affects several civil infrastructures that can result in several negative impacts, such as a blackout in both countries, pollution due to flooded industrial sites, breakdown of transportation networks and telecommunication, and also the need of evacuation of the affected area. As the event affects both Italy and France, stakeholders on both sides will have to cooperate in order to deal with the emergency. This will be a challenge in many respects: the scale of both sides operational picture may differ, both sides speak different languages and the functional roles of the responsible authorities differ significantly. Both sides follow their own protocols and regulations for intervention priorities and managing the deployment of necessary means and resources. As the media does not stick to national boundaries, the need for a common
communication strategy emerges. The following stakeholders will be involved: Civil protection forces in both countries, Local Authorities (Municipalities, Province and Region Authorities), fire departments, the Red Cross and utility network providers of affected infrastructures.

3.2 THE WORKSHOP FOCUS AND PARTICIPANTS

Participants of the workshop are detailed in the following table:

Sector represented	Organization	Organization Description	Name
POLICE	NIST	Scientific Police of Turin	Gianfranco Todesco
			Luca Zigiotti
INDUSTRY	LD Multimedia	Industry operating in the field of telecommunication & visual communication	Luca Licata
			Fulvio Castellano
			Myriam Kunz
CULTURAL HERITAGE	Turin Polytechnic	Working in R&D of cultural heritage protection technologies such as photogrammetry and 3D digitalization of artworks	Andrea Lingua
FIRST RESPONDERS	SDIS04	French Civil Protection & Firefighters, from High Provence Alps Department (Paca Region)	Emmanuel Clavaud
			Henri Couve
			Philippe Sansa
			Jean-Christophe Julien
CITIZENS	ITHACA	NPO working in the field of emergency response planning, with focus on GIS mapping and resources assessment	Andrea Ajmar
	TORINO SMART CITIES	Private organization working for the City of Turin with the aim to increase innovation and citizens involvement in Turin City development	Donatella Mosso

Table 10: Workshop participants (Italy)

The focus of the workshop is to explore communication demands of crisis managers in different sectors during inter-sectoral, cross-border crises as well as to explore the communication problems evolving in this situation. The outcome will define further requirements for the FIET tool, which involves a "common" operational picture to share information about incidents and criticalities between different organisations.

The simulation exercise were conducted following a precise schedule:

1. **Brief presentation of FORTRESS project**: objective, partners, expected results

2. **Focus on WP 5 aims:** objective, task, expected output from the simulation exercise

3. **In-depth on the Italian case study Scenario:** presentation of the Scenario (Mont Cenis Dam Disruption), impact analysis, timeline analysis, involvement of different sectors.

4. **Detailed description of three crucial phases of the Scenario:**

1. the dam collapse warning (before the crack);
2. the dam collapse and the water flowing;
3. the flooding already spread, and local responders dealing with containing impacts;

4. **For each phase, analysis of the communication flows between different sectors**

The attendees were asked to bring their perspective on each phase, in particular answering 3 basic questions:

1. what I need to know/tell
2. by/to whom
3. how

3.3 WORKSHOP GENERAL FINDINGS

Phase 1: Dam Failure

At this stage is important to collect information coming from different sources (such as meteorological stations, EDF personnel, dam engineers, etc.) to have a general picture of the events: what is going on, how could evolve, is it a "false alert", etc.

In order to take best decisions it's necessary to collect in particular the following information:

1. Level of dam collapse risk;
2. Disaster foreseen evolution (processes, failure dynamics, related time, worst and best case)
3. Main infrastructures (potentially) involved by the flood wave.

It is important to understand as soon as possible who and/or what is/are cause/s responsible of dam collapse in order to designate an *operational leader (OL).* The OL must be chosen on the base of failure/collapse causes, in particular:

1. In case of natural disaster the operational leader will be the *Civil Protection;*
2. In case of terroristic attack the operational leader will be *Police Forces.*

Information interchange is possible through different means such as mobile phones, via web (social media), etc. In order to not overload communication lines, it is relevant to use all the

available communication systems, both fixed and mobile, but the information exchange is mainly between local/national authorities and not yet with citizens.

Actors involved in the crisis management can interact also trough 3D virtual environment (remote interaction set up through drones), to get a updated picture of the ongoing event. This phase is important both for prevention and/or crisis management.

As long as the scenario is confirmed, people located in the areas that could be affected by the flood wave are informed/alerted by different means such us social media, TV and radio advertising, newspapers.

If the disaster is happening during the night, warning by helicopters are also used. Citizen are passive actors of the information flow (they just receive information).

Cultural Heritage could be affected as well by the incoming flood wave. In order to preserve and possibly save them would be useful to know:

1. How many Cultural Heritage are located in the areas;
2. Where they are located;
3. Which typologies they belong (using for example UNESCO Standard Classification[1]), and which are their main vulnerabilities (fire, light, humidity, water, etc.)

Municipalities should be able to provide at least at local level a geo-referenced database of all Cultural Heritage located in the area. Clearly such map should be build according to European Standards for geo-spatial data sharing such as INSPIRE.

3D image should also be collected and integrated into the database, in order to facilitate eventual rescue intervention procedures, and to preserve the historical memory of artworks that could be eventually lost/disrupted in the flood. Iconography (such as UNESCO databases, public or private pictures, postcards, etc.) can be also used as a reference in the case in which these databases were not developed. Maps and risk plans should be developed and be available in pre-crisis phase.

3.4 OVERALL INFORMATION REQUIREMENTS

The following table shows information needs by the risk professionals and who the information needs are addressed to as well as the content of the information.

1 "**Convention Concerning the Protection of the World Cultural and Natural Heritage**" adopted by UNESCO on 16th November 1972

BY WHOM	TO WHO	WHICH INFORMATION	MEANS OF TRANSMISSION	DATA FORMAT
EDF personnel, engineers, technical experts, Meteorological stations	Civil Protection Regional Headquarter (Turin)	State of dam failure\condition; Disaster foreseen evolution; Main infrastructures (potentially) involved by the flood wave.	Drones, Mobile phones, phones, web (social media), satellite networks	Images, 3D Images, text, voice
First Responders (Civil Protection / Police Forces, depending on disaster cause)	Local municipalities and Regional Governmental Authority	Alert code, risks for people, which means of communication need to be used	Mobile phones, phones, web (social media), satellite networks.	Images, text, voice, report, maps
First Responders	National Civil Protection	Pre-developed risk maps and plans	Web	Text, Images, maps
Municipalities	Cultural heritage management entities	Safety Procedures enforcement	TV and radio advertising, web, phone, fax	Text, Voice
Municipalities + First Responders	Citizens	Safety Procedures enforcement	Social media, TV and radio advertising, newspapers, web, helicopter/planes	Image, 3D Images, video, text, voice, maps, signals (from helicopters/plane), remote virtual reality

Table 11: Overall information requirement (Italy)

Phase 2: Dam Collapse

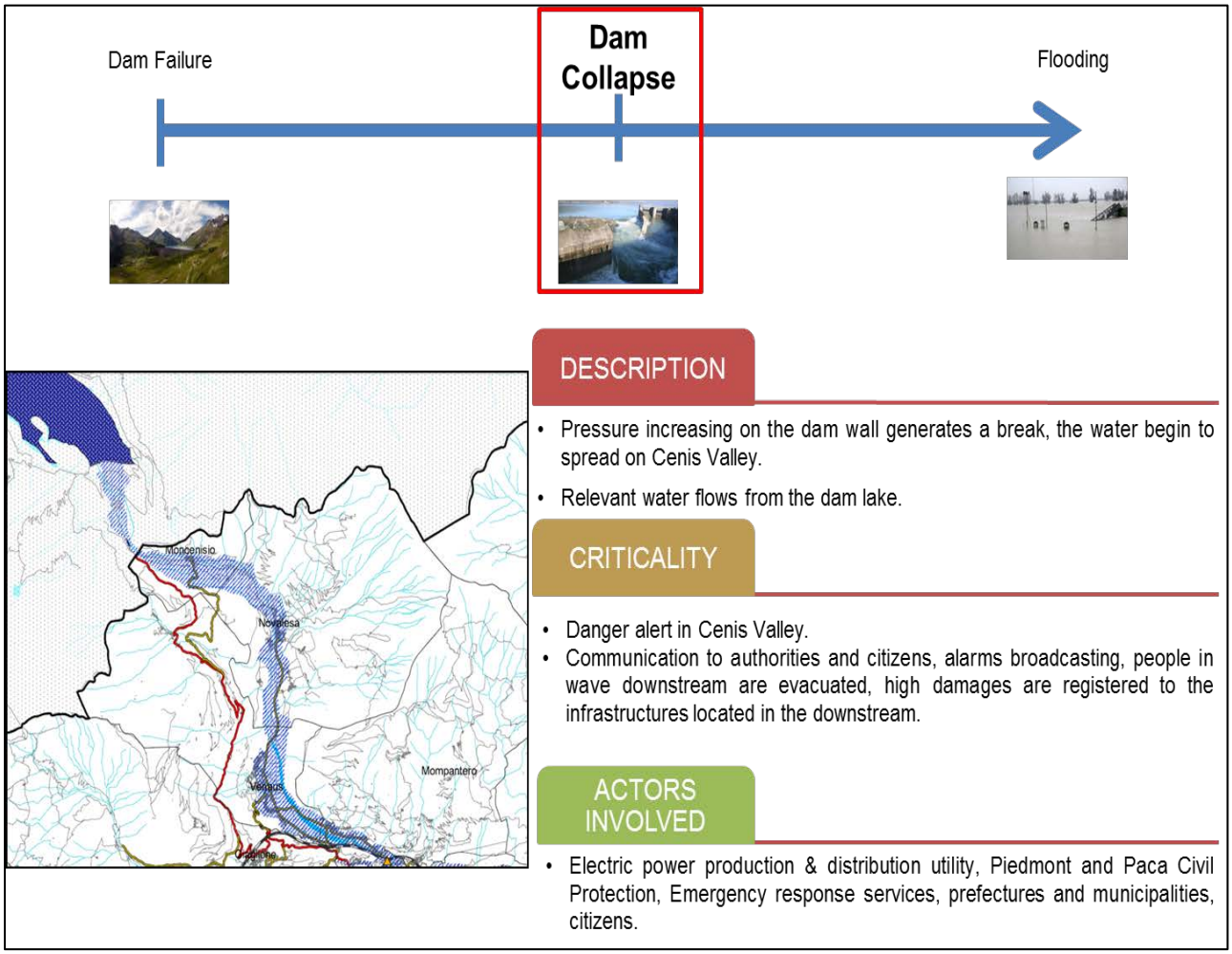

Figure 1: Dam collapse

During this phase safe communication are possible only through satellite networks. Other communication patterns could be congested or interrupted.

It's fundamental in this phase to understand how many people are involved in the disaster and try to localize survivors through mobile phone signals. Authorities involved in the information sharing are Civil Protection, Police, Municipalities, Red Cross, Piedmont Region and Lombardia Region. Also the dam management authority (EDF) is involved.

In this second phase the information flows strongly involve citizens, who are both passive (warning receivers) and active actors since they can provide local authorities with information, mainly through mobile phones (pictures, geo-localization, etc.)

Basically are two ways through which they can produce active information:

1. **structured platforms** (help request , police calling, etc.)
2. **non-structured** (social media, sms, Whatsapp, Facebook, Twitter, etc).

Structured Platforms: details

In case of dam collapse risk, as for other disasters, web-platform or mobile application are settle down by local/national authorities to allow citizens sending help requests and track information about the disaster impact. These platform are called VMC (Volunteer Mapping Community), and can exchange different type of information according to the specific purposes (maps, requests, quantitative indicators, etc.). An example of these platform can be Crisis Mapping2, Goggle Crisis Response, etc.

These platforms can be integrated/overlapped by First responders with existing database (assets, infrastructures, Cultural Heritage, residential zones, etc.) or by other means for local data collection, such as drones, 3D cameras, etc.

Non-Structured Platforms: details

The role of social media and of private-oriented communication is not to be under-evaluated during crisis, since as highlighted during the simulation exercise "people think first to warn their families than warning the police or other public stakeholders".

In this perspective *smart analysis of social media information flows* become fundamental to help rescuers in finding/searching dispersed people or spotting rapidly potential dangerous situation. Furthermore, in-cloud information are normally geo-localized: this create an indirect flow of meta-information which can be extremely helpful for response authorities, given they have enough time to properly analyze them.

A further flow of information can come also by local database for cultural heritage, such as museums, archives, etc. in order to identify the artworks damaged or exposed to flood impact.

BY WHOM	TO WHO	WHICH INFORMATION	WHICH MEANS	DATA FORMAT
EDF Personnel	Civil Protection, Police, Municipalities, Red Cross, Piedmont Region and Lombardia Region	Dam collapse/flaring evolution	Satellite network (and all available)	Images, 3D Images, text, voice, video, reports.
Volunteers	Civil Protection, Police forces	Maps, quantitative indicators	Web, Phones, Social Media, VMC	Images, text, voice, brief reports, maps
Citizen involved	Rescuers	Help request	Mobile phones, social media	Voice, Web, geo-localization
Citizen not involved	Rescuers, Civil Protection, Citizens	local environmental information (road state, etc.)	Web, social media	Text, Voice, Images, 3D images, geo-localization
Humanitarian associations (such as WHO), Hospitals, Red Cross	First Responders, Civil Protection, Citizens	Hospitals operational Capacity, people hosting procedures coordination, support for rescue operations	Satellite network (and all available)	Images, 3D Images, text, voice, video, reports, geo-localization, maps

2 http://news.nationalgeographic.com/2015/05/150501-nepal-crisis-mapping-disaster-relief-earthquake/

BY WHOM	TO WHO	WHICH INFORMATION	WHICH MEANS	DATA FORMAT
Citizens	VMC	Impacts Assessment and environmental information	Satellite network (and all available)	Images, 3D Images, text, voice, video, geo-localization
VMC	First Responders, Civil Protection, Citizens	Impacts Assessment and environmental information	Satellite network (and all available)	Images, 3D Images, text, voice, video, reports, maps
GIS operating Entities (Research Institutes, mapping services companies, etc.)	First Responders	Environmental / Territorial information	Web	Maps
Meteorological stations	First Responders	Weather evolution	Web	Images, Maps
Municipalities + First Responders	Citizens	Safety Procedures enforcement	Social media, TV and radio advertising, newspapers, web, helicopter/planes	Image, 3D Images, video, text, voice, maps, signals (from helicopters/plane), remote virtual reality
Mass Media	Citizens	Safety Procedures enforcement, information about the disaster	Social media, TV and radio advertising, newspapers, web	News

Table 12: Social Media Information Flow

Phase 3: Flooding

During this phase, due to the failure of local communication network, the most relevant role is played by information collected via:

1. satellite and drones; these two represents the main safe ways to get detailed, localized, reliable and continuously flowing information.
2. punctual sources (citizen).

Among other actors, the role of Civil Protection becomes central, and oriented on three priorities:

1. Save lives;
2. Prevention of (further) damages to infrastructures, also including Cultural Heritage;
3. Localize pollutants materials and prevent diffusion.

If available and not damaged, existing sensors on the water networks (pipelines, treatment plants, etc.) sensing water quality and quantity (flows, pressure, etc.) are also a good source of information to understand where the water is flowing and what further damages it may create.

Furthermore information should be collected about the state of streets, buildings, deposits of pollutants, etc. During ground rescue operations, communications between operators can be done using radio station systems such as *TETRA (Terrestrial Trunked Radio)* or by movable communication stations (vehicles).

Drones equipped with LIDAR detector will allow to collect information on the territory (shape, landscape, etc.) to create high-resolution maps.

Other important information can be acquired through already mentioned VMC platforms and or by simple radio signals emitted by mobile phones (who are used by responders to locate casualties or trapped people unable to perform active communications).

BY WHOM	TO WHO	WHICH INFORMATION	WHICH MEANS	DATA FORMAT
Citizens (general)	First Responders	Help Requests, Impacts Assessment, Environmental information	Mobile phone	Image, video, text, voice
Citizens trapped, casualties	First Responders	None	Mobile phone	Geo-localization
Health Organizations	All (public diffused information)	Disaster Impact Assessment	Social media, TV and radio advertising, newspapers, web	Image, video, text, voice, reports
Cultural Heritage Management Entities	First Responders	Help Requests, Impacts Assessment, Environmental information	Mobile phone	Image, video, text, voice
Governmental Authorities	First Responders	Impacts Assessment, Environmental information	Drones	Image, 3D images, video, maps, geo-localization, LIDAR Spectrum, remote virtualization
Municipalities + First Responders	Citizens	Safety Procedures enforcement	Social media, TV and radio advertising, newspapers, web, helicopter/planes	Image, 3D Images, video, text, voice, maps, signals (from helicopters/plane), remote virtual reality
Citizens	VMC	Impacts Assessment and environmental information	Satellite network (and all available)	Images, 3D Images, text, voice, video, geo-localization
VMC	First Responders, Civil Protection, Citizens	Impacts Assessment and environmental information	Satellite network (and all available)	Images, 3D Images, text, voice, video, reports, maps
Mass Media	Citizens	Safety Procedures enforcement, information about the disaster	Social media, TV and radio advertising, newspapers, web, TV News	Voice, video images, text
International Health Organizations	Citizens	Safety Procedures enforcement, information about disease spreading risk	Social media, TV and radio advertising, newspapers, web	Voice, video images
Governmental Organizations	Other Countries Governments	Call for International Emergency	Satellite, web, phones, mobile phones	Voice, text, Images
First Responders + Municipalities	Volunteers, Citizens, Institutions also in other countries	Call for International Emergency	Satellite, web, phones, mobile phones	Voice, text, images, remote virtual reality

Table 13: Information flows by Mobiles

4 SUMMARY

Both case studies show that the preparedness phase must include the information needs and perceptions of the crisis managers and first responders. Specific routines are in place for all organisations, however these need to be transparent to the ones affected by it to overcome potential gaps. The outcome of this report is not only that information needs and routines are described and laid out for two different scenarios, which can be used as a guide for different settings. It is also that the participants of the two case-study exercises have a much better overview of their specific situation and information needs in a crisis situation. The collaboration in a workshop simulation enables the participants to discuss all potential issues in a safe setting.