CERIS
Community for European Research and Innovation for Security

EVENT REPORT

Community of European Research and Innovation for Security (CERIS) Disaster Resilient Societies (DRS)

European Forum on Risk Governance & Societal Resilience

16th – 17th May 2023 Toulouse
Notes from the event

Contents

Authorship

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Acknowledgements

This report is the result of cooperation among event participants such policy makers, representatives from cities and municipalities, European and French funded projects in a collective effort to improve disaster resilient societies. We thank all contributors for their valuable input. We would also like to thank Kim Davis for constructive editing.

Disclaimer

1 Welcome

City of Toulouse, Johnny Dunal, City Counsellor in charge of Civil Protection

The city of Toulouse has undergone several major events in the past: the flooding of the Garonne in 1875 (208 deaths and more than 1,200 houses destroyed), the explosion at the AZF factory in 2001 (300 to 400 tonnes of ammonium nitrate exploded), the flooding of the Garonne in January 2022 (the instantaneous flow rose from 131 m3/s to 3,415 m3/s). A tax (Gemapi) was established in 2022 to finance the management of watercourses and to implement urban planning to enable better water infiltration of soil. Societal dimensions are increasingly recognised as a key element in risk management. It is a goal that elected representatives, civil society, practitioners, risk managers and the scientific community work together to exchange knowledge and experience.

Marta Cygan, European Commission, Director DG HOME (on-line)

Recent crises linked to industrial accidents or natural disasters have shown the need for more interactions among diverse stakeholders involved in crises management. The European Commission, through Horizon Europe, particularly the Cluster 3 work programme addressing Civil Security for Society, funded a range a multidisciplinary and intersectional project to enhance citizen awareness and disaster preparedness. That project, the Community for European Research and Innovation (CERIS) umbrella, is a very specific platform for dissemination and interactions among all stakeholders, policymakers, practitioners, industry, scientists, and citizens. The involvement of practitioners allows promotes the operational results of research and makes the results readily available and relevant to policymakers. Focus on local level projects and practical use, where decisions are made on the ground, elevates the idea that the importance of the local level is significant. With opportunities to act, urban risk managers and practitioners are crucial to achieve the objectives of the Commission and reach a higher level of innovation and uptake. National projects will also be part of this endeavour, networking diverse stakeholders including cities and research projects is needed to have a more impact. European Disaster Risk Reduction is of concern at national, regional and local levels, requiring research initiatives, and our programme propose projects. However, experience suggests that flexibility is required to tackle emergent challenges. There is a new topic for a better coordination of the DRR management cycle and research results, including knowledge transfer, intersectoral cooperation, whishing fruitful discussion and interesting conclusions.

Géraud Canet, Min. Recherche (France)

Within Cluster 3, the role of Member States and Associated Countries in the work programme is essential, on security aspects of regalian nature particularly, which distinguishes it from the other clusters. They also have a fundamental role defending the work programme and integrating the view of their participant countries. CERIS is a cross-disciplinary and informal forum, open to all communities. It is a space for free exchanges and open gatherings. Its activities are considered as key to the success of the programme and to everything we can build together at EU level and beyond. Decision makers and authorities from cities have limited access to research results. The forum is an opportunity to gather feedback from audience to better involve citizens which require out of the box thinking.

Nathan Clark (LINKS project) introduction

The cluster of DRS projects addresses societal resilience from diverse perspectives. For instance the Horizon 2020 project LINKS focuses on how social media can act as a bridging mechanism among different actors in DRM. Other projects focus on ways to empower local actors, engage volunteers, and better communicate risk knowledge among local communities. It is not surprising then that the DRS projects also cover a wide policy landscape, from the Sendai framework and associated EFDRR Roadmap, to the EU strategy on adaptation to climate change. In this landscape, we see different language and terminology used, but find the same needs, gaps and questions emerging e.g. around inclusive citizen-oriented decision making, improvements to early-warning and response systems, and new ways to address systemic risks. Moreover, there is an increased understanding of the importance of translating and contextualizing solutions to meet these challenges at national and local levels, to answer needs grounded in recent disasters and experiences. And we see this event, and this audience, as the perfect opportunity to engage in that work.

2 Panel – Communication with the public

Session moderated by Chiara Fonio, LINKS project. Panellists: Betsabée Haas, City of Tours – Lene Stople Meyer (LINKS project/ Frederiksberg Municipality) – Maike Vollmer (RiskPACC project)

Chair: co-produce solutions to better engage citizens. The ambition of the panel was to offer three perspectives on communication to the public, two from the urban perspective – policy makers at local level from France and Denmark – and one from the research perspective.

Betsabée Haas, City of Tours

At local level, the city of Tours is not well prepared for climate change. It has been challenging for the city council to communicate these risks to citizens. There are some institutional tools available such as IT communication, but communication is difficult. In case of floods, 1400 persons would need to leave within 24 h. If we fail to democratize DRR, there is the temptation to rely only on professionals and technology providers. For example, the probability of events such as the 1910 Paris and 2021 Belgian floodings has increased nine times owing to climate change. In this sense, technological solutions are not enough.

Figure 1. Trees in blue – The Loire River in all its states

Building on the cultural identity is a strength of the Loire River. The Touraine region is known as the "garden of France" by the artists, film makers, festivals and gastronomic events. Incorporating physical and metaphysical elements around the river is a way to democratize the issues of risks, i.e. people are able to physically feel that the river is both a friend and a risk. It is important to go back to the close link between inhabitants and nature. The Loire is known the "last wild river" in France. Communication is a tool to accept the link to the river that can be a possible risk, communication cannot work if people don't feel the river.

Question: Which tangible actions can be taken to address this gap?

Manage to communicate in a way that is not stressful. A question of knowing better and ensuring that science adapts to people, and not the usual solution of people adapting to science. We need to mix science and culture. Engage people so that they become part of the story, feel empowered and own the risk, through opening up everything from history to gastronomy so that people are engage. DRM is transversal, it has to be in everything, including culture, food.

Lene Stople Meyer (LINKS project/ Frederiksberg Municipality, Denmark)

38% have experience of flooding, 15% are worried, 55% have responsibility, 46% believe they have no influence to prevent flooding. When people are not worried, maybe they are not that interested or involved. We need to find new solution to increase social listening, move from one-way to two-way communication, we want to know what the people are doing out there in their own properties, set up a tool to search all social media platform "social

listen" to collect and compile posts from the area, we haven't done that much yet, used some search words, flood, fire, storm, to see what is going on, but it have been quiet, so we hope there will be a lot of rain during the summer. Every time a project is funded, the municipality invites citizens to engage but not many people show-up. Maybe, there is a need to reach the population where they are, such as kinder garden. The focus now is to find ways to better reach the citizens. The social listening can be used as tool to learn areas of interest for citizens.

Figure 2. Citizens survey on flooding

Some recurrent issues of trust and communication should be multidimensional, take into account diversity and diverse needs as well, there is a potential role of social media and crowdsourcing in DRM.

Maike Vollmer (RiskPACC project)

For effective communication to the public, a mutual understanding, especially between civil protection authorities and citizens, is crucial. RiskPACC addresses the so-called „Risk Perception-Action Gap", which covers a misalignment of risk perceptions of citizens and their subsequent actions, differences in risk perception among citizens and civil protection authorities, as well as a misalignment of expectations among these two groups. To address these issues, two-way communication shall be strengthened. RiskPACC uses a co-creation approach to facilitate interaction between citizens and civil protection authorities, in order to jointly identify needs, and to jointly develop conceptual and technical solutions. This co-creation approach means to bring all relevant stakeholders together, including citizens + civil protection authorities, which happened in RiskPACC in a series of workshops. Within this workshop series, needs were identified, and then both technical and non-technical (conceptual) solutions were tested and jointly further developed. The conceptual solutions encompass especially workshop methodologies that are useful for this context as well as a framework to identify specific gaps and possibilities for action. The technical solutions encompass mobile apps and platforms that are based on crowdsourcing and VGI.

Discussion

Citizens do not have an official voice, so understanding their point of view, the variety of their opinions is very difficult. Do social media have a potential about lessons learned? We have to take into account the off-line communication, which is not a silver bullet, it really depends a lot of the context. In Italy, memory can be very strong, so people do remember, especially in the mountains there is this legacy and memory. In specific small areas mountains with older people, social media are meaningless, all best practices and lessons learned should be understood in their context, it does not mean that they are not transferable. Tools provide nice opportunities but they are not inclusive tools, so they have to be used carefully and in combination with other tools, that are relevant to each target group. About future research, meeting people and involving people is a challenge, is there a possibility for cities to involve people, interactions with their citizens and try to involve them in research actions. Involving citizens is difficult, the question is whether there any chance to rely on cities, decision makers to involve their citizens in research.

City of Tours: People are very interested and ready to do anything that is about science and popular science is always welcome. They want to know what is happening and be part of a society. Meeting people and discussing with people physically is a major challenge. What are the opportunities for cities and decision-makers to reach and physically involve citizens? Science and citizen science is already working, "*les jeudis de la science*" in Tours, people are ready for that and they want to be part of it, it's also about dealing with being together.

3 Panel – Spontaneous volunteers

Session moderated by Matthieu Branlat, ENGAGE project. Panellists: Elodie Boileau (VISOV association) – Alexandre Ahmad (INTREPID project) – Claudio Rossi (LINKS Foundation)

Chair: When an event strike such as earthquakes, COVID-19, the population does not stay idle, the population acts. Research shows that the impact of spontaneous volunteers can be extremely significative, "*anonymous individuals account for finding 50% to 95% of survivors following earthquakes*" (Peleg, 2015). The ENGAGE project is interested in supporting formal actors interacting with the population, produce a catalogue of solutions, chatbot, policies. There are diverse type of "spontaneous volunteers" from formal with legal mandate and high levels of training (Red Cross) to volunteers with special resources or expertise, to informal, no mandate, no specific training. The term of spontaneous volunteer remains controversial in the literature, other terms are used such as unaffiliated volunteer or informal actors.

Elodie Boileau (VISOV association)

Virtual Operation Support Team (VOST) uses what is posted on social networks to manage crises, in conjunction with government bodies (fire brigade), link what is posted by citizens on social networks with crisis managers to help without disrupting.

Alexandre Ahmad (INTREPID project)

Crismon, CS Group, Defense & Security, innovative software solutions, used by half of SDIS in France, multiple experiments to integrate volunteer information.

"20 years ago, there was a industrial disaster in Toulouse and a lot of people died. The technical company was not helping and we wonder how can we help. With the help with European projects, we have now a product that is used by almost half of the of the fire fighters during the summer, also by the police and the military. So this is a success story in terms of European projects"

Figure 3. Testimonial – success story from research to practice

The control system receives information from volunteers. This poses a set of questions, is it useful information, how to handle this? Is there another opportunity?

Claudio Rossi (LINKS Foundation)

Sharing experiences and lessons learned on working with social media after a disaster is essential. Chatbot for volunteers and first-responders management, citizens awareness and engagement, IA solutions, open-source factory, app for citizens engagement and awareness, just by having tips and tweets, send Geo localized reports, pictures and videos on what is happening, via multimedia content, manage communications, A chatbot is being tested by Civil protection actors from the Piedmont region, more than 1500 volunteers have been trained, three in-field exercises (FASTER & SAFERS projects). The app was difficult for people not familiar with IT while the chatbot has been more successful. The platform has capability to integrate weather and other data.

What are the main challenges and opportunities to the participation of unaffiliated (emergent) members of the population in disaster management?

One of the main challenges is that it is difficult to guess where they will appear and how much they will be, e.g. for Hurricane Katrina more than 50.000 people were ready to help. If not structured properly, this capability might be lost and even counterproductive. Consequently, the opportunity should be available to increase the capacity, especially in big events that are overwhelming to first responders.

Online, a lot of information will be passed on, people of goodwill will be asking how they can help, initiatives will be taking hold of their own accord, such as the #PortesOuvertes hashtag, where people are trying to help people who do not know how to go there. This is something new, something that we could not be anticipated, but which raises the question of the legal framework and not discouraging people. A framework should be provided while still allowing freedom of action, considering that capacities exist but without appropriate training.

Most people are willing to help, some people are trained in rescue. Sometimes despite the goodwill of the population, it is important for them to understand that the people with the right training should take the difficult decisions. The right decision needs to be found and considered reliable. Spontaneous volunteers can report a situation through social networks, but it is also a challenge to qualify information, there is a lot of disinformation.

What are successful approaches to better account for and integrate spontaneous volunteers?

People sometimes appear and self-organise through social media such as WhatsApp or Facebook. People could state their needs and others could offer solutions to these needs. These approaches are successful but disappear. There is no standardized approach, this is context dependent. This is gap practice and police. We cannot impose a framework, we will lose them or limit the spontaneity. By raising awareness in advance, e.g. in schools, people would know how to react. There is hence a need to conduct awareness campaigns, organize joint exercises, keeping in mind the difficulties and the fact that they are time- and resources consuming.

Comment: The discussions so far focus (very correctly) on response and recovery, perhaps we are missing a learning from spontaneous volunteers regarding preparedness.

What are the main gaps in existing solutions and approaches?

There are no institutionalized approaches, no resources to support, people are not trained. In Italy, the Civil protection code (Art. 31) leaves this to the regional level, this kind of openness at the national level has still not been operationalized after 5 years, while it could be institutionalized in the preparedness phase for floods, involving volunteers do some surveillance of some areas. This cannot be achieved without these spontaneous initiatives, and no framework can be imposed on them. Therefore, there is no other choice but to learn to work with them, perhaps by providing training in safety and risk education, so that people are more are of what they can and cannot do, and better identify the different players.

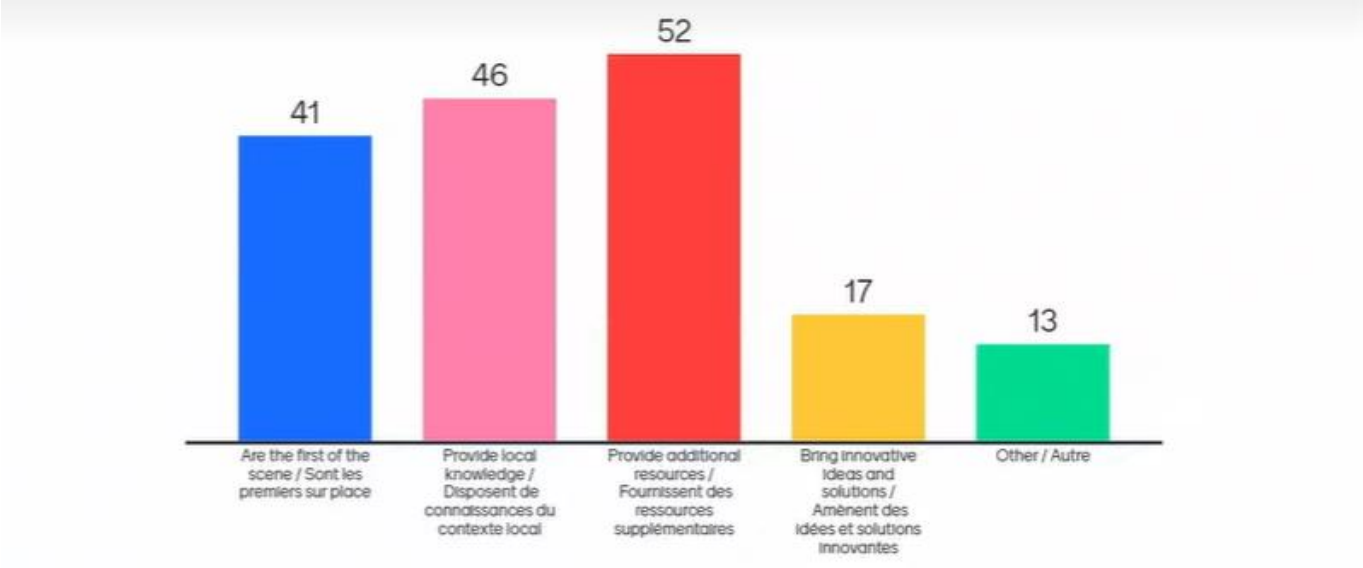

Figure 4. Top contributions from spontaneous volunteers

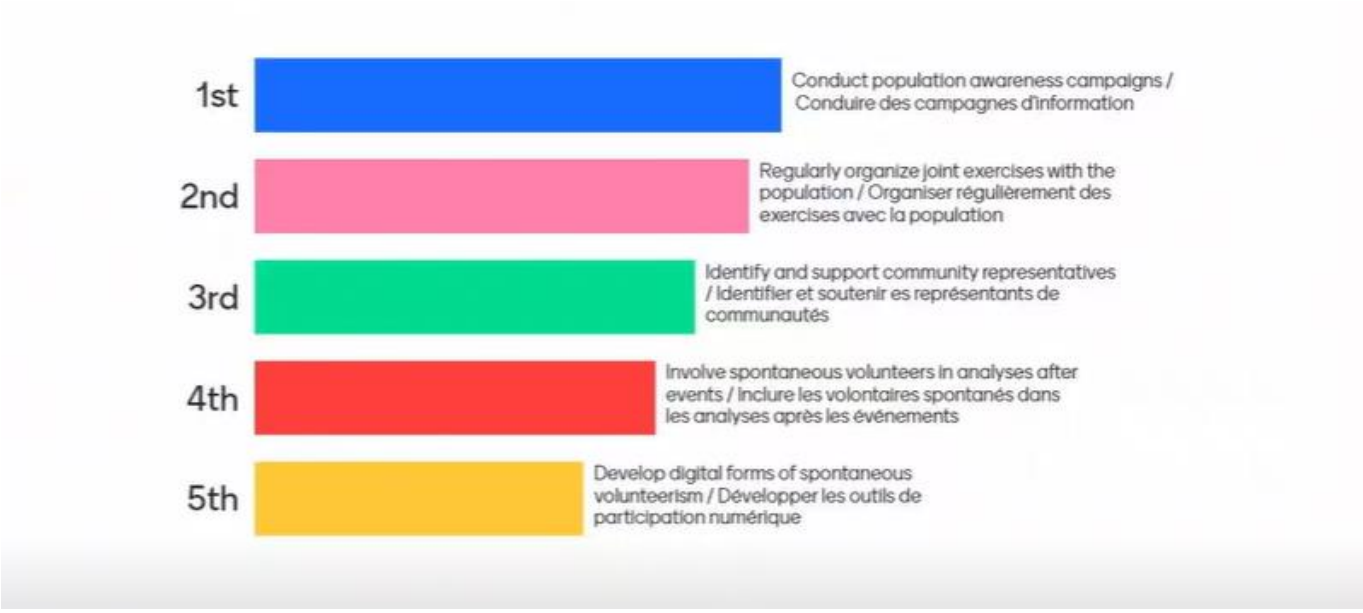

Figure 5. Approaches to better integrate spontaneous volunteers.

Figure 6. Different views on spontaneous volunteers

4 National initiatives

Session moderated by Christian Desprès, Min. Ecology, LaboCrise. Panellists: Claire Menon (HCFRN, France) – Didier Soto (RESALLIENCE)

Chair: The innovation spirit at the Ministry was, in the aftermath of the pandemic, to declare "nothing will ever be the same again", a crisis that has lasted for a long time requiring citizens to learn how to live with it. This was not the only event of social unrest, e.g. the *gilets jaunes*, disrupting everyday life. There have been repeated terrorist attacks, but each time different, with very different modus operandi, low-cost terrorism with a cutter. An event must be understood if it is to be dealt with, formatting the response, what kind of world are we living in? In order to discussion the complex responses, a forum was created, the Crisis Lab, and a White Paper on crisis management for security was produced.

Figure 7. LABO CRISE – pluridisciplinaire France

Claire Menon (Haute Comité Francais pour la Résilience Nationale - HCFRN, France)

The challenge is preparing towns and mayors for major risks, taking account of dependence on globalisation and energy. The Label *Résilience France Collectivité* has existed for 14 years. Organisational resilience is the ability to absorb and respond to shocks, while structural resilience is the ability to adapt on the long term. It is the reduction of vulnerability over the medium and long term, adaptation to climate change, sustainable development, cross-sector vision, anticipation, levels of strategic choices to make the organisation resilient and reduce vulnerability. In terms of prevention and reduction of vulnerability, the question is whether there is a service in the municipality, resilience in the population, information such as the municipal information document on major risks (DICRIM) distributed each year, events in schools… Then actions of training, exercises, the PCS, alerts, require human resources, while operations management is under civil protection prerogatives. The evaluation of the situations allows to make a diagnosis, which leads to enhanced crisis communication about different themes on capacities, terrorism, pandemics. The label is evolving and is being enriched as feedback is received from 70 municipalities in France. The label is a free online tool. The idea is to communicate on these subjects, to carry out a diagnosis, reach out to the population through the press and social networks, with a quality approach, with strengths and weaknesses, recognition of the work of the teams, a tool for sharing good practice, a documentary database, etc.

Didier Soto (RESALLIENCE)

Resallience, is a resilience performance diagnostic solution, developed from a consultancy firm specialising in adaptation to climate change, applicable at building, city and regional level. It is a web platform for assessing the resilience of assets and activities. For example, there is the CDC habitat with 500,000 housing units, where the tool assesses the effects of climate change on all their assets, as well as the financial impacts and preserving the group's image in relation to CSR issues, maps with indicators, multi-hazard maps on a national scale on the web platform, to see the most vulnerable assets, the most impacted. Another feature is the Ougadougou project developed with UN, using satellite images, nature-based solutions, training activities in schools, location of areas in the city to develop SBN on flooding.

Comment: The challenge is to move from local authorities at French level to the European level; but national sensitivity means that the European Commission cannot easily support this type of networking, so it has to be spontaneous and coming from the grassroots. Europe can facilitate these exchanges, keeping in mind possible limitations linked to sovereignty.

5 Return of experiences and R&D feedback

Session moderated by Anastasios Dimou. Round-tables on two examples (flood disaster, major industrial accident) involving city representatives, first responders, scientists (from iProcureSecurity PCP, TeamAware, LINKS, RiskPACC, CORE projects) about the question "would the disaster risk management have been more efficient with tools/methods developed by current European research"?

The Earthquake situation in Turkey / Syria and the role of R&D as supporting actions by Zeynep Sofuoglu (iProcureSecurity project)

On February 6th, 2023, Türkiye faced two consecutive earthquakes of 7.7 Mw and 7.6 Mw. in Kahramanmaraş, then another one in Hatay. These earthquakes have caused destruction in eleven provinces. More than 50.500 people have lost their lives, and 100,000 have been seriously injured. More than a half million structures have been damaged, and critical infrastructures such as telecommunication, transportation, healthcare, water, and energy have been harmed. International rescue teams from 74 countries responded. Lessons learned: 1. Climate change and population growth cause an increase in disasters, 2. Learning and teaching are essential for pre-disaster risk reduction activities, sustaining resilient communities, and smart cities, 3. There is a need for a "Triage Management System." The iProcure Security PCP Project will provide an innovative "Triage Management System" that could help with Challenge i: a quick and accurate overview of casualties and their status, ii. Decision support for the allocation of available resources and quick support for causalities, (role allocation, and on-site management) iii. Improved coordination and communication with EMS stakeholders, (data sharing, and communication) iv. Reduced handover times between ambulance transport and hospitals; v. Insights for quality assurance and training measures, evaluation (automated reporting). All of these were important in the emergency health response to the casualties. 4. First responders' (FR) safety and protection are important to rescue the casualties. FRs' capabilities need to improve Situational Awareness, Decision Making, Safety, and Teamwork. The TeamAware Project supports FRs' technologies for Disaster Resilient Societies, 5. Training all health professionals (including those who work in hospitals) for disaster response is critical, 6. A false positive case sample (rescuing a teddy bear after a 5-hour rescue operation instead of a baby) and many other examples/experiences show the importance of pilot (field) testing and the participation of FR organizations in EC projects.

The role of eyewitnesses in Rapid Earthquake Impact Assessment by Rémy Bossu (CSEM)

LastQuake is a multi-component information and crowdsourcing system, which does not require to harvest information on social media. People are invited to share their data with the system and to confirm the potential detection. Connections are detected through the app well before any other sensor. If the precise location is unknown, a notification is send, asking for a confirmation within 10 minutes, enabling to confirm location and in half an hour to collect half of the data, geolocated pictures, collected information about building collapse, mixed data, from the seismic data the epicentre is geolocalised, from the crowdsource the full extent of the rupture and impact intensity is obtained. First 10 minutes of felt reports only. Live information needs to be made accessible to people to have them use the app, if data are provided to them, then their own report can be asked for confirmation. Detect landslides with the hashtag on Twitter, global landslide detector, expanding on Telegram and WhatsApp. 1. The challenge is to have people come to the app to collect the data, 2. Understand and satisfy their evolving needs and habit to offer a service. 3. Mixed data and cross-confirmation.

Impact forecasting of flash floods by Alix Roumagnac (PREDICT)

Predict is an Airbus subsidiary, less than one country in two has an early warning system for extreme climate events. Storm Ale occurred in October 2020 on the Mediterranean, the result of climate change, where more than 600 mm rainfall in less than 8 hours, which is a tropical type intensity. An example was given of the PCS is Breil-sur-Roya, where the mayor was 25 years old and had only been elected 3 months earlier; 2 weeks before the event, an exercise had been planned in the Roya valley. The system was used to keep track of all mitigation actions taken, in partnership with the prefectures and the fire brigade, and was visualised in real time for all the supervisory authorities. High-quality photos from the Pleïades satellite were used to identify all the buildings affected by the flooding, and the roads were closed for several days, so there was no access to the sites. Solution is used by more than 25,000 municipalities in France, global rainfall estimates every half hour (Cosparin project), integrated with other European projects, EW4MED, Gobeyond project.

Flood disaster, French flash flood in 2018, Raffaella Russo (CORE project)

The CORE project, Aude region case study, developed a harmonized vision of crisis management awareness and capability through a transdisciplinary collaboration. Aude is a flood prone area, something went wrong, the disruption was quickly solved, air support was effectively used, topography limited the impact of air support, satellite imagery (Copernicus) was available very quickly. Critical vulnerability indicators and drivers (CVIs) were developed: background, human-environment, governance, instrument-means. Safety culture for disaster risk management webinar.

6 Round table on AZF Industrial accident, Toulouse 2001

Session moderated by Olivier Balet), with the participation of François Chauvet (Mairie Toulouse), – Christophe Ghiani (SDIS31) – Vincent Boune (SAMU Haute Garonne)

The AZF disaster occurred 10 days after the attacks of 11 September 2001, raising a feeling of panic, with initial thoughts of multiple attacks, saturation of the main roads, population movements that were difficult to manage, difficult routing of emergency services, triggering of different plans, geographical sectorisation, functional sectorisation, an opportunity to see the extent of human adaptability and resilience. 31 people died and 2,500 were injured, trauma remained for many years after the event. The site of the event left a crater of 70 m long by 40 m width by 6 m depth. This event required a quick reaction from the first responders and management of the victims who evacuated on their own, towards the town centre, while at the same time responding to numerous requests without having the means to do so. There was a lot of solidarity, there were problems with the interdependencies across networks, in particular communication networks. “Do it yourself” - DIY with low tech used, because this is what works in all cases (pencil and paper, whiteboard, point-to-point radio), but then a waste of time reporting using more sophisticated tools in the evening, it's all about people, men and women working together. The impact of technologies and European projects is essential, e.g. software development for Crismon tactics, drones and remote measurements, but there are still expectations, digital radio, satellite communications, the mobile hospital prototype, which is now being exported. Video protection provides invaluable information, training to develop a culture of safety, preparedness to expect and cope with the exceptional, having access to communication and visualisation, geolocation bracelets for victims, just as for convicted offenders, tracing victims for better treatment, swarms of drones working together, a network of cameras with AI algorithms to locate people, interpreting images, communication tools to provide feedback, without too much supervision to maintain spontaneity.

Low tech training is required for all firefighters, the day lives are threatened, people are prepared, depending on technologies that can backfire, when lives are at stake, and all the available tools are faced with regulations and GPRD. Firefighters want to focus on casualty counts and bodies still moving on the ground rather than facial recognition. Disasters reveal the blind spots of plans. What has changed in the way plans were designed? The lesson has been to get out of the routine, from the status quo, from domino effects, to ask the right questions, *to learn to be surprised*, to set up exercises that may seem far-fetched, to surprise our teams, to get away from the common field of safety management. There is now a clear move from the checklist, from aviation, to adaptation, to motorbikes, relying on the PCs for the pandemic, in a toolbox approach, the most important thing is to learn from is what was done badly, from what did not work.

7 Panel on assessment of disaster risks and disaster risk management for local/regional authorities

Session moderated by moderated by Selby Knudsen, RiskPACC project. Panellists: Abdelghani Meslem (MEDiate project) – Tamanna Khan (C2IMPRESS project) – Funda Atun (PARATUS project)

Disaster risk assessment challenges at the local and regional level varies from place to place. The presented projects identify and address the major challenges that affect multiple local authorities. Each project is designed to ensure engagement of the end users through co-design, co-development and co-evaluation and multidisciplinary approach. All projects recognised it is not sufficient to only consider the past to handle the future because there are other new factors, such climate change and rapid urbanisation. It is necessary to understand the past and new approaches are needed to be implemented to understand the future.

The MEDiate project improves information exchange and shapes a common understanding of risk among policymakers, academia and practitioners, a critical prerequisite for risk prioritization and effective mitigation activities. The focus is on user led solutions that fit local conditions. Results include future-centric risk framing tools, considering multiple hazards.

The PARATUS project is concerned with integrating the dynamic drivers of risk into policy-design and implementation. Result is an open online platform. Though developing dynamic multi-hazard impact chains and future scenarios, the project team co-developed planning alternatives and policies, from which the most cost-effective solutions will be put into implementation.

The C2IMPRESS project is focused on raising public awareness and understanding on multi-hazard risk through support of technology, exploring scenarios with fire, earthquakes, landslides, heat waves, and wildfires. Several solutions, such as multi-actors decision support tool powered by big data and citizen engagement platform.

What are the biggest challenges for risk assessment at local and regional levels?

- The complexity of risk is not appropriately considered by the scientific community. Risk is not addressed as a multidisciplinary parameter but rather as a mono-disciplinary with static parameters. This undermines capturing the cascading impact, which limits adequate disaster risk management activities.
- There is limited knowledge of local context when risk assessment is being conducted, which limits the value of the assessment. It is vital to have two-way knowledge transfer to understand the context. The scalability of data, transferability, and dynamic environment of different geographical characteristics.
- Availability and accuracy of data
- Community engagement: not much interest to be engaged in risk assessment due to various barriers, e.g. culture, language, etc.
- Limited resources: not all local authorities have same budget or priorities therefore risk assessment varies.

What are the biggest challenges for disaster risk management at local and regional levels?

- Different languages/vocabulary employed by academia and difficult to communicate to policymakers, and practitioners.
- Lack of communication among representatives of local and regional authorities on the priority risks
- Complexity of the existing governance and coordination structures
- Lack of knowledge of who are the target users, what are their needs, which resources are available for various response agencies, etc.
- Lack of links among different digital platforms of various service providers and users

What research can do to overcome these challenges?

- Involve end users in every stage of a project.
- Understand the needs of different stakeholders.

What're the barriers for end users to be involved in research?

- End users need immediate and applicable solutions, while research might take longer perspective.
- High cost of solutions provided by research can make it less attractive for end users.
- Ownership of solutions by end users is usually missing.
- Lack of standardization of the solutions might slow their uptake.

What can research do to improve situation?

It is important that technology is understandable and transferable. There is a general tendency to develop a 'multi-everything' platforms, which even if achievable in theory cannot be fully implemented in practice by one project and one consortium.

How to help politicians to understand technical language of risk assessment?

The tools offered within the presented projects take into consideration the specific needs and capabilities of various audiences, however, there is an important concern raised: should we do things differently to maximize the benefits of various solutions for practitioner? The first steps could be built upon existing solutions that practitioners are already familiar with, to minimize the gap between preparedness plans and their implementation.

Public question: We often hear about these multi everything platform, is this possible or do we need a more diverse set of solutions to encounter systemic risks? Do the carrots from funding programmes need to be diverse?

This cannot be done by one consortium. Technology is easy but to make people use is the most difficult part. There exist early detection systems that are not often accepted. The problem is adaption and adoption. Current project, build on previous projects and build synergies with ongoing projects.

Public question: Most of the time, we have politicians, when you think on end-users do you think of politicians? Is not possible to think that a politician with no technical background will use these platforms. Do you make distinction to political persons?

The different operations have diverse users. Normally, the politician asks opinion of experts that have knowledge on tools.

8 Panel – Systemic risk assessment

Session moderated by moderated by Funda Atun. Panellists: Frédéric Guyomard (Electricité de France) / Christophe Mignot (SDMIS Rhônes Alpes) – Seda Kundak (PARATUS project) – Kati Orru (BuildERS project)

PARATUS project discussions evolved around various aspects of systemic risk in and around megacities conceptualized in three systems ways: (i) its inner system (e.g. the polycentric nature of their governance and management), (ii) the systems that are affected by (e.g. climate change) and (iii) the systems that they effect on (e.g. migration). The emphasis was on ensuring balance among all three systems to minimize systemic risks.

Christophe Mignot – The systemic risk of critical infrastructures (CIs) was addressed from the perspective of the importance of cybersecurity and increased dependency of CIs across borders. The focus of systemic risk management was on understanding (i) the core values for society, (ii) the critical functionalities of CIs, and (iii) the power of adversary to exercise their intentions. Societal resilience is possible when cybersecurity and crisis management are aligned through coordinated efforts of tech companies, academia and practitioners.

BuildERS project: The link of systemic risk and societal vulnerabilities was discussed. It was emphasized that societal vulnerabilities should been seen beyond the traditional concept of 'vulnerable groups', recognizing that the variety of people that become vulnerable due to systemic risk is very diverse.

Is it possible to quantify systemic risk?

The BuildERS project attempted to quantify systemic risks through web-based dynamic vulnerability assessment tools. PARATUS suggested tracing the propagation of systemic impact but with the need of strong feedback mechanisms.

How to reduce the impact of the risks of cascading effects on CIs?

- Ensure coordinated response
- Prepare scenarios
- Train the operators of CIs
- Ensure strong contribution from end users
- Know how to alert end users

How can research and innovation meet the needs of reality?

In reality, CIs are always in crisis situation and all the services face difficulties. In this context, CIs cannot improve resilience of their services without research and innovation, however, the research should always take the end users into perspective.

What are the benefits/challenges of being an EU-funded research partner?

It gives an opportunity to demonstrate how a tech solution can work in real life and shows the necessity of the CIs. It is important to note that the predominant focus of CIs is to attend their operation issues, which requires a cultural change to factor future challenges in their daily operational concerns.

How to deal with 'sacrifice decision' for CIs when a part of the system is under attack and might affect the whole system?

Inside the CIs essential functionalities would be under attack. The solution could be to develop marks for the CIs' operators to act accordingly not to compromise the whole system and to isolate the parts that could be isolated. The new EU Directive on CIs resilience from 2022 (https://data.consilium.europa.eu/doc/document/PE-51-2022-INIT/en/pdf), has enhanced the importance of cybersecurity for the CIs and made it mandatory for all CIs operators. Both cybersecurity and safety are now considered pillars of societal resilience.

Additional comments:

1. About the importance of avoiding false tendency towards precision and need to shift our data-based modelling (many researchers abscesses with) towards more pattern recognition. This is particularly important given that the decision-makers and practitioners needs to make decisions under high degree of uncertainty. This brings to the importance of being very careful with standardization requests and attempts.

2. The criticality to ensure coherence across EU policies through EU funded initiatives and especially so when it comes to methodologies for risk assessment (especially, impact assessment part of it) to ensure shared approach to risk assessment and, therefore, increased synergies of risk management efforts.

9 Panel – Mitigation / adaptation decision making

Moderated by Keith Jones, MEDiate project. Panellists: Femke Mulder (MEDiate project) – Servane Gueben-Venière (PROJECTIONS project) – Philippe Limousin (CRIZ'INNOV project) – Ivan Van Bever (MEDiate project)

The critical factor in mitigation and adaptation decision-making is a time dimension. The presented projects explore how they factor time in their analysis and solutions.

(MEDiate) The project developed multi-criteria decision-making methodology exploring compound hazards and cascading impacts. The project employed the Participatory Action Research (PAR) approach was to reach out to its end-users while developing solutions. (PROJECTIONS project) The project explores what policymakers and practitioners need to see in the map for decision-making and concluded that it is critical that maps provide not only 'what' information but also 'when'. While the project is still at the stage of 'proof of concept', the purpose is to

accelerate decision-making through adding time dimension to the GIS data. (CRIZ'INNOV project) The project provides generic and collaborative tools for the different phases of crisis management.

How end users interpret time scale?

The dilemma lies in short-term vs. long-term actions. Physical mitigation efforts require a longer time period and to make valid decisions about time scale there is a need to better account for the investment period, the project design period, the return of investment period.

Can the proposed solutions be transferred to different Hazards?

All projects confirmed that it is possible to transfer their solutions to different hazards.

Can (not trained) people use maps?

The maps are designed to be intuitive and support decision-making even for untrained users.

10 Open discussion – City's risk managers and R&D activities

Moderated by Christian Sommade, HCFRN). Panellists: Gilbert Sandner / Christian Derler (City of Graz, Austria) – Denis Hameau (City of Dijon, France) – Bamba Niang (RiskPACC project)

During this panel the city of Graz (Austria) and the city of Dijon (France) shared their experience in exploring research & development (R&D) and building resilience in their cities. Each of them is involved in various R&D projects.

Gilbert Sandner / Christian Derler (City of Graz)

The city council is involved in the B.Prepared project, enhancing planning and decision support. Among the challenges they face are tedious information gathering, availability of information, media disruption, incompatibility of various tools. The project relies on the heavy involvement of citizens.

Denis Hameau (City of Dijon)

There are 23 cities in the Dijon metropolis. The local authorities embarked on full re-configuration of the decision-making support systems in the metropolis by designing a whole ecosystem of various initiatives, e.g. on a sustainable food system, open data, control rooms, etc. Through that ecosystem of projects, a variability of tools (e.g. apps, innovative data platform, etc.) were designed, tested and put in use in the metropolis. The purpose is to create a common shared knowledge among people and foster cooperation among service providers at the metropolis level.

Bamba Niang (RiskPACC project)

The project presented the European Forum for Urban Security (Efus), the only European network dedicated to fostering discussion, cooperation and support among local and regional authorities in the field of crime prevention and urban security. For over 30 years, Efus has been working on cross-cutting topics linked to urban security such as nightlife, risky behaviours, gang violence, violent radicalisation, new technologies, violence against women, etc. Through RiskPACC project, Efus explores various tools for risk management in urban settings.

Why EU programme are important for municipalities?

They allow developing solutions, risk assessments, explore rapid needs for adaptation through technologies and strategies, improve preparedness. The dilemma is that R&D is a business model for research organizations but not for their partners. For researchers it remains important that the research results are taken into implementation by partners and through feedback mechanisms could be further improved. But without long-term focus the research might not have expected results. The EU projects help to find the balance between short-term exploration and longer-term focus of the research.

Challenges include the difference in vocabulary of politicians and researchers and there is a need for translation. Importantly, politicians need to have a clear political vision for resilience building for the whole ecosystem.

11 National disaster risk management networking initiatives – opportunities for synergy building

Moderated by Christian Resch, CERIS Expert Group. Panellists: Alexander Rösner / Jens Koester (ForAn Network, Germany – Sandra Moreno Spanish CoU) – Régis Thépot (AFPCNT)

The panel presented different networks and explored their views on how to increase synergies across different partners for resilience building purposes.

ForAn is a German network developed by professionals and for professional to promote German practitioners towards the EU market. It includes law enforcement agencies, operators of CIs, fire services. With a grant from the German government, the network helps the German practitioners to actively engage in EU projects.

The Spanish Community of Users presents a wide range of academia, practitioners, and policy-makers in Spain. The network members explore resilience building in Spain among each other and actively engages in various EU funding.

AFPCNT is a French disaster risk reduction (DRR) platform to increase public risk awareness and resilience in France.

How to involve citizens?

(Spain) We actively promote citizens engagement to bring their ideas and to explore various solutions. (Germany) It is not yet in the mandate of the network as agreed with the German Government. (France) While it is important to engage citizens in the dialogue, the first step should be made between researchers and practitioners.

Do we have enough networks at EU level and don't know about them?

It is a puzzle. While there is some lack of general overview of all available networks at the EU level, there is also some degree of 'territorial fights' when networks try to distinguish their 'territories'. What we miss is a mechanism for complementarity to connect all those networks. We need national initiatives (such as Spanish Community of Users) that work together, while the EU-wise network to be focused on influencing EU policy. Only through national initiatives citizens involvement could be fully possible.

How to increase the value of networks?

There could be different indicators to assess the added value of the networks, e.g. size, number of events organized, etc. Important to shape the system of benchmarks for networks to demonstrate what works and what does not and thereby, raising the interests of politicians at national and regional levels to support such networks.

What can Commission do to sustain such initiatives?

It is a delicate question – when EU touches national level it enters the sovereignty of its Member States (MSs). EC can provide fora for various national networks to come together and meet but decisions should be made by the networks on their own. "***It's very simple but it's not simple!***"

12 Conclusions and closing

Participants agreed that the meeting was very rich in ideas and provided great opportunity to meet new people, explore new opportunities and possibly, build new relationships.

Appendix A. Acronyms and abbreviations

Acronym	Explanation
CBRN-E	Chemical, Biological, Radiological, Nuclear and Explosive threats
CEN	European Committee for Standardization
CENELEC	European Committee for Electrotechnical Standardization
CERIS	Community of Research and Innovation for Security
CI	Critical Infrastructure
CIP	Critical Infrastructure Protection
CMINE	Crisis Management Innovation Network Europe Platform
CWA	CEN Workshop Agreement
DRS	Disaster Resilient Societies
DRR	Disaster Risk Reduction
ERNCIP	European Reference Network for Critical Infrastructure Protection
EPCIP	European Programme on Critical Infrastructure Protection
ER	Emergency Response
FAIR	Findable, Accessible, Interoperable and Reusable
FR	First Responder
IFAFRI	International Forum to Advance First Responder Innovation
INSARAG	International Search and Rescue Advisory Group
JRC	Joint Research Centre
NGO	Non-Governmental Agency
UCPM	Union Civil Protection Mechanism
VOST	Virtual Operation Support Team

Appendix B. Terms and definitions

Term	Definition
Disaster management cycle	It covers prevention, preparedness, response and recovery (including learning)
FAIR[1]	FAIR is an acronym composed from Findable, Accessible, Interoperable and Reusable. There is an argument that the FAIR principles do not just apply to data but to other digital objects including outputs of research.
Research output[2]	Results generated by the action to which access can be given in the form of scientific publications, data or other engineered Results and processes such as software, algorithms, protocols and electronic notebooks
Results[2]	What is generated during the project implementation. This may include, for example, know-how, innovative solutions, algorithms, proof of feasibility, new business models, policy recommendations, guidelines, prototypes, demonstrators, databases and datasets, trained researchers, new infrastructures, networks, etc. Most project results (inventions, scientific works, etc) are 'Intellectual Property', which may, if appropriate, be protected by formal 'Intellectual Property Rights'. Example: Successful large-scale demonstrator: trial with 3 airports of an advanced forecasting system for proactive airport passenger flow management.
Resilience	There is diversity and confusion around this term and the concept has exponentially increased popularity. The majority of current policies refer to resilience as the ability of systems and societies to prevent, resist, absorb and recover from disruptive events. Horizon 2020 DRS-07 projects argue that this definition can be also connected to risk management[3]. While organisations and societies need to deal with crises using a risk management approach innovations are required to deal with new type of crises. Hence, resilience can also be seen as capacity to continue operations and adapt to challenging situations whether expected or unexpected (changes, disturbances and opportunities). Therefore, organisations need to deal with trade-offs, interconnectedness, preparing to a crises through pre-defined plans and procedures as well as developing adaptable and flexible capabilities to prepare to unexpected situations or situations that challenge the established responses.

[1] EC report – 2018- Turining FAIR into reality https://ec.europa.eu/info/sites/default/files/turning_fair_into_reality_0.pdf
[2] Horizon Europe Programme Guide: https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/programme-guide_horizon_en.pdf
[3] White paper on resilience management for critical infrastructures. https://zenodo.org/record/3375338#.YnEQgdpByUk

Appendix C. Target users

The following provides an overview of users as identified in different studies

Id	Users	Definition	Reference
a	Policymakers and stakeholders	• At the international level, UN bodies are closely working with the EU in the fight against crime and terrorism (UNICRI), disaster risk reduction (UN-ISDR), transboundary industrial accidents (UNECE), environment protection (UNEP) etc. • At EU level, the main policy DGs concerned with Crisis Management are DGs HOME (migration and home affairs), ECHO (civil protection), SANTE (health), GROW (enterprise), ENV (environment), CLIMA (climate action), ENER (energy), MOVE (transport), TAXUD (customs), TRADE (export, trade), EEAS/FPI (external security, foreign policy instrument) and the SG (Secretariat General), as well as the Joint Research Centre (JRC) as supporting DG, • At the Member State's level, Ministries of Defence, Interior, Foreign Affairs, Civil Protection, Environment, Research and Industry, as well as Agencies and Regional Authorities, are concerned • Often working at the interface between policy and science, various stakeholders are involved in bridging interests of different communities, e.g. consultancy companies	• European Commission (2019) Mapping Horizon 2020 and EU-funded Capacity-Building Projects under 2016-2018 Programmes • European Commission (2020) Mapping EU policies and FP7 research for enhancing partnerships in H2020
b	Scientists	• Security research involves a wide range of scientific disciplines which have to interact, ensure complementarity and build interdisciplinary networks • Different types of scientists are to be considered (universities, research institutes, research units linked to Defence/Interior ministries or agencies)	Same as above
C	Industry (including SMEs)	• Many industry branches and stakeholders are involved in the areas of defence, forensics, civil protection etc. Research results can benefit most first responders • Different communication approaches to be followed towards large industries and SMEs often disconnected from discussions at EU level	Same as above
d	Practitioners	• First responders, i.e. fire brigades, emergency services, police forces, civil protection units, military units, laboratories, water/flood management etc. as well as Decision-makers (at national or regional levels) • Training centres for first responders, command control centres	Same as above
e	NGOs and general public	• NGOs, Civil Society Organisations, public at large, education (schools) and training	• EC Mapping EU policies and FP7 research for H2020