



EU-CIRCLE

A pan-European framework
for strengthening Critical
Infrastructure resilience to
climate change

D8.7 Final Project Workshop Report

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Statement

This deliverable presents an overview of the EU-CIRCLE: Dresden Case Study and Final Workshop which was held on the 29th August 2018 at the premises of Fraunhofer IVI in Dresden.

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Executive Summary

The EU-CIRCLE final workshop has been conducted in the premises of Fraunhofer IVI at Dresden, Free State of Saxony on August 29, 2018. The workshop has been conducted in parallel as the main dissemination event of the project's "Case Study 5: Rapid Winter Flooding around Dresden, Germany", which gave the opportunity to invited guests and participants to get a deeper understanding on the EU-CIRCLE achievements over its course.

The Workshop was conducted in five parts as follows:

Part A: Overview of EU-CIRCLE, where a brief overview of the project achievements and results obtained in the various case studies was presented

Part B: Dresden – Flood hazards and case study, where Fraunhofer IVI presented the policy questions, background of the Case Study,

Part C: Case study Dresden results, building on the previous section, results obtained were presented and discussed

Part D: Research dissemination , where external projects of similar scope were presented, including all a clustering event with H2020-DRS9 projects, and

Part E: Group discussions where participants were provided with a theme that included the area of resilience of cities and infrastructures and the role of the user community.

Additionally, during lunch break there was an Interactive Session with "Live demo of tools and technologies" from participants of the workshop, providing everyone a chance to showcase state of the science tools and applications.



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1 EU-CIRCLE final Workshop

The EU-CIRCLE project organised the final workshop in the premises of Fraunhofer IVI at Dresden, Free State of Saxony on August 29, 2018. The workshop has been conducted in parallel as the main dissemination event of the project's "Case Study 5: Rapid Winter Flooding around Dresden, Germany", which gave the opportunity to invited guests and participants to get a deeper understanding on the EU-CIRCLE achievements over its course.

According to the GA the workshop was set with the following objectives: be the final outreach event of the project, where the 4th International Case Study and SimICI will be officially presented to the CI community. It was conceived as a unique opportunity to open the outcome of the project to the widest possible scientific and CI audience.

However, given the fact that the 4th International Case Study, had already been conducted in Bangladesh and that SimICI had been presented to the community since March 2017 event of DRMKC in Brussels, and thus these objectives had already been met, it was linked to the "5th Case Study: Rapid Winter Flooding around Dresden, Germany". The workshop was designed and implemented with the above objectives and the consortium invited representatives of the scientific community, national and regional authorities and CI operators. Additionally it featured a clustering event with other DRS9 projects, namely RESIN, RESCUE and BRIGAD.

The invitations to the workshop had been sent early on to numerous participants and there was a good acceptance and participation rate. The invitation to the workshop is presented in Annex – 1. Thus following received responses, and in order to maximise the engagement of the invited persons, it was decided to split the event into five different sessions, as follows:

Part A: Overview of EU-CIRCLE, where a brief overview of the project achievements and results obtained in the various case studies was presented. The presentations involved the key project outcomes, the developed software (CIRP, SimICI, visualizations), and the results obtained in the three conducted case studies.

Part B: Dresden – Flood hazards and case study, where Fraunhofer IVI and representatives from state of Saxony presented an overview of the flooding issues within the State of Saxony, the policy questions relevant to the case study, background of the Case Study.

Part C: Case study Dresden results, building on the previous section, results obtained were presented and discussed.

Part D: Research dissemination, where external projects of similar scope were presented, including all a clustering event with H2020-DRS9 projects, furthermore DAREnet, STRIMA II, M&S RUE and FloRiCiMo.

Part E: Group discussions where participants were provided with a theme that included the area of resilience of cities and infrastructures and the role of the user community.

Additionally, during lunch break there was an Interactive Session with "Live demo of tools and technologies" from participants of the workshop, providing everyone a chance to showcase state of the science tools and applications.



2 Agenda



AGENDA

EU-CIRCLE: Dresden Case Study and Workshop

Date: 29th August, 2018

Location: Fraunhofer Institute for Transportation and Infrastructure Systems IVI
Zeunerstrasse 38
Dresden

Tuesday, 28 August 2018

Social Event	
18:15 – 18:30	Meeting at entrance of Hotel Pullman (if rainy: inside)
18:30	Walk to Restaurant “1900” An der Frauenkirche 20, 01067 Dresden https://goo.gl/maps/mABFgXVskPG2
19:00 – 21:00	Social dinner at restaurant “1900”
20:30 – 21:00	Walk back to hotel

Wednesday, 29 August 2018

Transport to Fraunhofer		
8:30	Meeting at entrance of Hotel Pullman (if rainy: inside)	
8:45 – 9:00	Transfer by Fraunhofer’s electric bus to institute	
09:00 – 09:30	Registration	
Part A: Overview of EU-CIRCLE		
9:30 – 9:40	Opening, welcome & agenda	Thanasis Sfetsos (NCSRD), Ralf Hedel (IVI)
9:40 – 10:00	Introduction to EU-CIRCLE project and case studies	Thanasis Sfetsos (NCSRD), Alice Clemenceau (VALABRE), Dave Steward (Torbay Council), Fuad Ali (USAL)
10:00 – 10:15	Introduction to EU-CIRCLE CIRP and flood visualization techniques	Antonis Kostaridis (SWTS), Mike Gibson (UNEXE)

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Part B: Dresden – Flood hazards and case study		
10:15 – 10:30	Flood hazards in the Dresden region – Experiences, strategies, and further steps	Frank Frenzel (City of Dresden)
10:30 – 11:00	Case study Dresden – Objectives, methodology, threats and area (Ralf Hedel)	Ralf Hedel (IVI)
10:30 – 11:00 Coffee break		
Part C: Case study Dresden results		
11:30 – 11:45	Case study Dresden: tools and results	Stefan Hahmann and Emily Kast (IVI)
11:45 – 12:15	Open discussion of findings and experiences in case study Dresden	Ralf Hedel (IVI)
12:15 – 13:45 Light Lunch		
Interactive Session – Live demo of tools and technologies		
Part D: Research dissemination		
13:45 – 15:30	Presentations on key findings from resilience-related research	RESCCUE, RESIN, BRIGAD, DAREnet, STRIMA II, M&S RUE and FloRiCiMo
15:30-16:00 Coffee Break		
Part E: Discussion and closing Session		
16:00 - 16:45	Open discussion on climate change, resilience of critical infrastructures, cities and urban areas; joint distillation of key issues	Moderation: Louisa Shakou Thanasis Sfetsos
16:45 – 17:00	Closing remarks	Thanasis Sfetsos, Ralf Hedel
17:00	Transfer to Hotel Pullman by Fraunhofer's electricbus	
Social Event		
18:00	Meeting at entrance of Hotel Pullman Walk to "Terrassenufer" https://goo.gl/maps/pzh8wsApKqD2	
19:00-21:30	Boat trip with old steam boat through case study Dresden area Social dinner on board	
21:30-22:00	Walk back from "Terrassenufer" to Hotel	

❖ all times are local

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**Part D - Key findings from resilience-related research, Short introduction of presenters****Gerardo Anzaldúa (MEB, MSc)**

Affiliation: Ecologic Institute

Project: BRIGAD – Bridging the gap for innovations in disaster resilience

Contact: gerardo.anzaldua@ecologic.eu



Gerardo Anzaldúa is a Fellow at Ecologic Institute. He leads the institute's consultancy work on business development and open innovation, supporting environmental technology firms on product- and business strategy development. On the research front, he has focused on assessing the economic aspects of the EU Water Framework Directive's implementation and the operationalization of the ecosystem services approach.

During the workshop, Gerardo presents the BRIGAD project. The 4-year project under EU Horizon2020 aims to effectively bridge the gap between end-users and innovators creating solutions to address floods, droughts and extreme weather events.

P.R. (Peter) Bosch

Affiliation: TNO

Project: RESIN – Climate resilient cities and infrastructures

Contact: peter.bosch@tno.nl



Peter Bosch is most active in climate change adaptation in cities and several projects dealing with mitigation options for cities. Between 2010 and 2015 Peter Bosch was scientific coordinator of the Climate Proof Cities project, a large-scale research project in The Netherlands aimed at generating knowledge for preparing Dutch cities for the impacts of climate Change. Peter is co-organiser of the yearly Open European Day, back-to-back to the ICLEI Resilient Cities conference. Before joining TNO, he was coordinator and editor of the 2007 report of the Intergovernmental Panel on Climate Change (IPCC) working group III on mitigation of climate change.

He is coordinator and presents the H2020 project RESIN - Resilient Cities and Infrastructures on standardizing adaptation strategies for European cities.

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**Walter David (MSc Eng.)**

Affiliation: Ronin Institute

Project: M&SRUE - M&S Technologies to support disaster & climate change resilience of urban environments

Contact: walter.david@ronininstitute.org



Walter David is a geospatial, modeling and simulation expert and research scholar of Ronin Institute. He is currently Lieutenant Colonel of the Italian Army working as Chief of the Analysis and Lessons Learned section at NATO Modelling and Simulation Centre of Excellence, Rome. He has a master degree in Engineering and his studies and training include geospatial sciences, project management, civil-military coordination, strategic decision-making for crisis response operations, disaster management.

Walter David presents a research initiative on M&S support to disaster & climate change resilience of urban environments.

Ignasi Fontanals

Affiliation: OptiCits

Project: RESCCUE – Resilience to cope with climate change in urban areas – a multisectoral approach focusing on water

Contact: ifontanals@opticits.com



Ignasi Fontanals is CEO at OptiCits, a start-up from Barcelona born at Universitat Ramon Llull to develop new tools to improve city resilience. He is WP leader at the EU H2020 project RESCCUE and member of the Smart City Group at the Engineer Association from Catalonia. He promoted the BCN Urban Resilience Partnership with UN-Habitat actually known as Urban Resilience Hub. He is associated teacher in different "Smart City" Masters from universities in France and Spain. He has engineering applied experience and professional background in urban services management working for multinationals and SMEs companies. In recent years has attended different startup accelerator programs in US and Europe.

Ignasi presents the RESCCUE project that aims to help cities around the world to become more resilient to physical, social and economic challenges. RESCCUE will generate models and tools to bring this objective to practice, while delivering a framework enabling city resilience assessment, planning and management.

**Torsten Heyer (Dr.-Ing.)**

Affiliation: Technische Universität Dresden, Institute of Hydraulic Engineering and Technical Hydromechanics (IWD)

Project: FloRiCiMo – Flood risk analysis based on semantic 3D city models coupled with hydronumeric models

Contact: torsten.heyer@tu-dresden.de



Torsten Heyer is a research associate at the Institute for Hydraulic Engineering and Technical Hydromechanics (IWD) of Technical University of Dresden. He finished his studies of Civil Engineering at TU Dresden in 1999. Besides lecturing in the field of hydraulic engineering, with focus on river, navigational and coastal engineering, he worked on several projects related to flood hazard and risk analysis, often utilizing hydronumeric models. He obtained his PhD from TU Dresden in 2010 ("Reliability analysis of river embankments using logistic regression"). Current research keeps focusing on flood related issues, such as levee stability analysis considering biological impacts (e.g. burrowing animals), the numeric modeling of hydro-morphodynamic interactions or inundation modeling in urban areas.

Within the workshop and during the interactive demo, Torsten Heyer gives an overview regarding the ongoing research project FloRiCiMo that aims for flood risk analysis in urban areas by coupling 3D digital city models with hydronumeric models (2D, 3D).

Katrin Hänsel (Dipl.-Hydrol.)

Affiliation: Saxon State Office for the Environment, Agriculture and Geology

Project: STRIMA II – Saxon –Czech flood risk management, INGE – Interactive risk mapping

Contact: Katrin.Haensel@smul.sachsen.de



Katrin Hänsel studied hydrology at the Technical University in Dresden and achieved her diploma thesis at the NTNU Trondheim (Norway) in 2007. Following to that, she worked as a Scientific Associate at Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research from 2007-2009. She has been a paramedic at German Red Cross until 2016. Since 2017, she is an approved engineer, Project Coordinator and Scientific Officer within the STRIMA II Project at the Saxon State Office for the Environment, Agriculture and Geology.

Katrin Hänsel presents the project STRIMA II, a German-Czech cooperation project of the European Union for the improvement of damage prevention in the event of flooding and heavy rainfall and for the intensification of cross-border cooperation, especially at a local level. Furthermore, she demonstrates the platform INGE, a free software for the visualization of disaster management plans of local authorities and operational commands and a useful tool for decision-making in planning, implementation and follow-up of disaster management.

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**Christian J. Illing (Dr. rer. nat)**

Affiliation: Federal Agency for Technical Relief
(THW)
Headquarters

Project: DAREnet – Practitioner Network to
Strengthen Flood Resilience in the
Danube Region

Contact: Christian.Illing@thw.de



Christian J Illing is project coordinator at the THW headquarter and a member of the staff unit "strategy and coordination, research" working in the field of security research. He has a broad experience in the field of civil protection due to his engagement for more than 15 years with the German Red Cross in different fields and all command levels. He is specialized in coordination, command & control and water rescue. He is also a trained intermediate EMT and active as trainer in leadership courses. Prior to his position at the THW, he was a researcher in the field of fossil energy resources. He received a doctoral degree in natural sciences from the University in Münster, Germany. During his academic training, he studied and researched at the university of Cologne, the German Federal Institute for Geosciences and Natural Resources in Hannover, the University of Münster and the Massachusetts Institute of Technology.

Christian presents the DAREnet project that aims to support flood management practitioners across the Danube River region and from different disciplines to deepen and broaden their Research, Development and Innovation related collaboration.

Reinhard Schinke (Dr.-Ing.)

Affiliation: Leibniz Institute of Ecological Urban and
Regional Development (IOER)

Project: STRIMA II –
Saxon – Czech flood risk management

Contact: r.schinke@ioer.de



Reinhard Schinke studied civil engineering at the Technical University of Dresden and obtained his doctoral degree from the Brandenburg University of Technology in Cottbus. Since 2007, he works as research associate and project manager at the IOER in the research area "Environmental Risks in Urban and Regional Development". His main research interests include (i) vulnerability analyses on buildings with regard to natural hazards and climate change impacts (flood, heavy rain, and heat), (ii) the assessment of mitigation measures on building structures to improve their resilience as well as (iii) geospatial modelling of potential damage to buildings caused by floods and rising groundwater.

He explains the research approach used in the project STRIMA II – Saxon –Czech flood risk management.



3 Participants

The final list of participants is presented in the following Table.

Ali, Fuad	USAL - University of Salford
Anderssohn, Frank	MRK
Anzaldua, Gerardo	Ecologic
Babeniuk, Ganna	Fraunhofer IVI
Backhaus, Lars	TU Dresden - Hydraulic Engineering
Bosch, Peter	TNO
Bousis, Vasilios	HNMS - Hellenic National Meteorological Service
Brausewetter, Patrick	Fraunhofer IVI
Cesarec, Ivana	DUZS - National Protection and Rescue Directorate Croatia
David, Walter	Ronin Institute
Diagourtas, Dimitris	Satways
Duce, Elenia	RINA-C
Eftychidis, George	KEMEA - Center of Security Studies
Facco, Lorenzo	RINA-C
Fontanals, Ignasi	OptiCits
Freissinet, Catherine	ARTELIA
Frenzel, Frank	City of Dresden - Environmental department
Fritsche, Gerold	SE DD - Stadtentwässerung Dresden
Gibson, Mike	UNEXE - University of Exeter
Gkotsis, Ilias	KEMEA- Center of Security Studies
Güttler, Ivan	DHMZ - Croatian Meteorological and Hydrological Service
Habermann, Nadine	Fraunhofer IVI
Hahmann, Stefan	Fraunhofer IVI
Hänsel, Katrin	LfULG - Saxon Flood Forecasting Centre
Hedel, Ralf	Fraunhofer IVI
Hentschke, Stefan	County Bautzen- Department for fire and civil protection
Heyer, Torsten	TU Dresden - Hydraulic Engineering
Holcinger, Nataša	DUZS - National Protection and Rescue Directorate Croatia
Illing, Christian	THW Headquarter
Ingirige, Bingü	HUD - University of Huddersfield
Kalin, Ksenija Cindrić	DHMZ - Croatian Meteorological and Hydrological Service
Karatarakis, Nikolaos	HNMS - Hellenic National Meteorological Service
Kast, Emily	Fraunhofer IVI
Kerl, Florian	LfULG - Saxon Flood Forecasting Centre
Kostaridis, Antonis	Satways
Küster, Andreas	MRK
Lecroart, Jean	ARTELIA
Matijaš, Maja	DUZS - National Protection and Rescue Directorate Croatia
Meier, Martin	County Bautzen - Department for fire and civil protection
Mita, Tina	HNMS - Hellenic National Meteorological Service
Neubert, Marco	IOER - Leibniz Institute of Ecological Urban and Regional Development
Olfert, Alfred	IOER - Leibniz Institute of Ecological Urban and Regional Development
Ortlepp, Regine	IOER - Leibniz Institute of Ecological Urban and Regional Development
Oßwald, Frank	County Meissen - Department for fire and civil protection
Petrović, Nenad	VVG - University of Applied Sciences Velika Gorica



Ritter-Kittelmann, Kai	County "Sächsische Schweiz-Osterzgebirge" - Department for disaster and civil protection German Red Cross
Schinke, Reinhard	IOER - Leibniz Institute of Ecological Urban and Regional Development
Sfetsos, Thanasis	NCSRD - Demokritos
Shakou, Louisa	EUC- European University of Cyprus
Skitsas, Michael A.	ADITESS
Stewart, Dave	Torbay Council
Stranjik, Alen	VVG - University of Applied Sciences Velika Gorica
Strazza, Carlo	RINA-C
Tönjes, Stefan	MRK
Ullrich, Susann	County "Sächsische Schweiz-Osterzgebirge" - Department for disaster and civil protection
Voigt, Ronald	County Meissen - Department for fire and civil protection
Wood, Mike	Torbay Council
Zimmermann, Rocco	TU Dresden - Hydraulic Engineering



Figure 1. EU-CIRCLE Workshop Group Photo

4 Part A: Overview of EU-CIRCLE

During the first session the following presentations were made

Dr. Athanasios Sfetsos (NCSR) presented an overview of the project starting with the policy objectives behind EU-CIRCLE and proceeding with the project definition of resilience within the climate change context. The presentation also described the implementation framework of EU-CIRCLE and the virtual dataset.



Figure 2. Introductory Presentation, Dr. Athanasios Sfetsos (NCSR)

Dr. Jean LeCroart (ARTELIA) presented an overview of the 1st Case Study Case “Heat Wave and Forest fire impacts on electric and road transport networks Provence - Alpes-Côte d’Azur Region (France)”, by presenting the main objectives and work done that included the application of the software and the feedback from the participants.



Figure 3. Introductory slides from Dr. J. Lecroart (ARTELIA) and Mr D. Stewart (TROBAY)



Mr Dave Stewart (Torbay City Council) introduced the participants to the Effects of climate change on coastal flooding – Torbay Case Study. He presented an overview of recent events at Torbay and the adaptation options examined in order to achieve the objectives, which were to build defences. He concluded with Lessons Learned & Recommendations from the case study.

Dr Fuad Ali (HUD) introduced the Khulna City Case Study 4, starting from the selection of the climate hazard and how Cyclone Vulnerability could be linked to the regional hydrological context. Then the focus shifted on the application of CIRP to respond to the questions posed by local stakeholders and can be used to assess cascading impact on power distribution due to inundation.



Figure 4. Introductory Slide for Khulna Case Study, Dr. Fuad Ali (USAL)

Then there was a set of two presentation by Dr. Antonis Kostaridis (STWS) and Dr. Mike Gibson (UNEXE) about the developed software of the project. Dr. Kostaridis introduced the key features of CIRP and the workflows that can be generated. Then the key functionalities and user interface of CIRP were presented supported by sample results. Dr. Gibson presented high end visualization products to support the Torbay case study based on Unity3D engine and the procedures to introduce visual narrative framework.



Figure 5. Presentations by Dr. A. Kostaridis (STWS) and Dr. M. Gibson (UNEXE)

5 Part B: Flood hazards and case study

For the 2nd part of the programme, Dr R. Hedel introduced the 5th case study “Flooding in the City of Dresden” – Objectives, methodology, threats and area. The presentation started from the 2013 flooding which was the ignition point. The overall objectives were then described that included to demonstrate capabilities of holistic analysis system, an entire chain from the hazard simulation to the damage considering interdependencies in critical infrastructures.

Dr. Hedel presented the background information on the case study that included the geographical, climatological and historic flooding events of Dresden. This gradually led to the way the case study was implemented , from the selection of the participants, specification of the test study area, collection of data, flooding scenarios and chain of potential impacts. Then he described how in collaboration with the local stakeholders adaptation measures were selected, and which CIRP analyses were implemented.



Figure 6. Presentation by Dr. R. Hedel (IVI) on Case Study Objectives

6 Part C: Case study Dresden results

For the 3rd session, Dr Stefan Haman (IVI), building upon the previous presentation introduced the performed analysis within CIRP and the obtained results. These included: Directly affected inhabitants by flood event, Infrastructure scenarios with and without adaptation measures, Inundation of critical infrastructure network entities, cascading effect analysis such as Unsupplied critical infrastructures due to loss of connection to source of service, Interdependencies models that included the offline critical infrastructure entities due to dependency on other infrastructure, models for waste water flow, Inhabitants affected by offline CI-entities and associated loss of revenue for CI provider. The analyses were performed with and without adaptation measures to highlight differences and determine optimal ones.



Figure 7. Dr. S. Haman (IVI) presenting the EU-CIRCLE Dresden Case Study

Then, in a last minute replacement for the city of Dresden representative, Mr. Florian Kerl from the Saxon State Office for Environment, Agriculture and Geology, Saxon Flood Center introduced the Heavy Rain Events in Saxony and beyond and regional policy objectives for flood management. Then he proceeded to present the project RAINMAN which is an Early Warning system as part of Risk Reduction and how effective Risk Communication can be achieved.



Figure 8. Mr F. Kerl presenting heavy rainfall events in Saxony

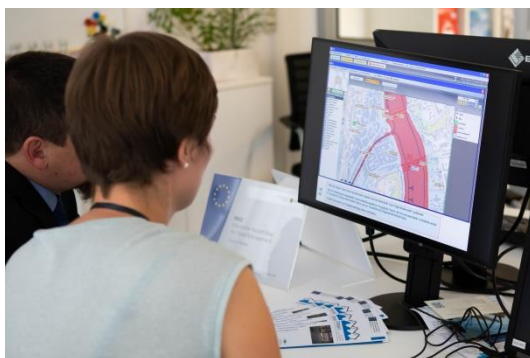


7 Interactive demo session

During lunch break there was an interactive demo session with the following participants.

Table 1. Participants of interactive session

Theme	Presenters	Organization	Affiliated Project
EU-CIRCLE - CIRP Overall system and Dresden case study tools	Antonis Kostaridis	Satways	EU-CIRCLE
	Stefan Hahmann	Fraunhofer IVI	
EU-CIRCLE - Flood visualisation	Mike Gibson	University of Exeter	EU-CIRCLE
INGE - Interactive hazard map for flood management	Katrin Hänsel	State Office for Environment, Agriculture and Geology	STRIMA II
HAZUR® ASSESSMENT city resilience assessment	Ignasi Fontanals	OPTICITS	RESCCUE
Coupling of 3D city models and hydro-numeric models	Torsten Heyer	TU Dresden, Hydraulic Engineering	FloRiCiMo
Web based tools on urban adaptation and climate risk topology	Peter Bosch	TNO	RESIN







8 Part D: Research dissemination

In the afternoon session, the workshop participants had the opportunity to meet other projects that included the H2020 - DRS9 projects – RESIN, RESCCUE and BRIGAID, and topics dealing with simulation of hazards, early warning systems and flooding with emphasis in Central Europe.

The list of the projects is :

- **BRIGAID** – Bridging the gap for innovations in disaster resilience, *Gerardo Anzaldúa, ECOLOGIC*
- **RESCCUE** – Resilience to cope with climate change in urban areas – a multisectoral approach focusing on water, *Ignasi Fontanals, OPTICITS*
- **RESIN** – Climate resilient cities and infrastructures, *Peter Bosch, TNO*
- **DAREnet** – A practitioner network to strengthen flood resilience in the Danube region, *Christian Illing, THW*
- **FloRiCiMo** – Flood simulation, risk analysis and visualisation for urban regions, *Torsten Heyer, TU Dresden*
- **M&S RUE** – M&S Technologies to support disaster & climate change resilience of urban environments, *Walter David, Ronin Institute*
- **STRIMA II** – Saxon –Czech flood risk management, *Katrin Hänsel, SMUL & Reinhard Schinke, IOER*

Dr Ignasi Fontanals (OPTICITS) provided an overview of the DRS9-RESCCUE project which focuses on urban resilience against natural hazards, with different examples such cascade effects of pipe burst in Barcelona. Then Dr Fontanals introduced the RESCCUE concept on how can we build resilience through holistic models, starting from a strategic analysys and stakeholders identification to the definition of impacts and what if analysis leading to their simulations and cascading effects to assess urban resilience



Dr. Peter Bosch (TNO) introduced the DRS9-RESIN project, focusing on the weak connection between infrastructure and city adaptation and silos in the administration that can distract the process of DRR vs CCA. He then proceeded describing RESIN objectives that include getting a better overview of vulnerabilities and risks, choosing the best (climate effective, cost effective) adaptation options, in addition to one-stop-shop for all you need in creating an adaptation strategy. He then proceeded to describe the four case studies of the project Manchester, Bratislava, Bilbao, Paris.



Dr. Gerardo Anzaldúa (Ecologic Institute) introduced the BRIGAIID concept that focuses from innovation to market application for disaster solutions and increase the socio-technical readiness of innovations by optimizing the performance of the innovation. He introduced they key elements of the concept that include the Testing and Implementation Framework (TIF) that supports innovators to increase TRL and associated tool, the Market Analysis Framework which is an online facility for collaboration between innovators and business development experts in addition to the Business Development Approach that helps innovators turn their technologies into marketable products and services by:

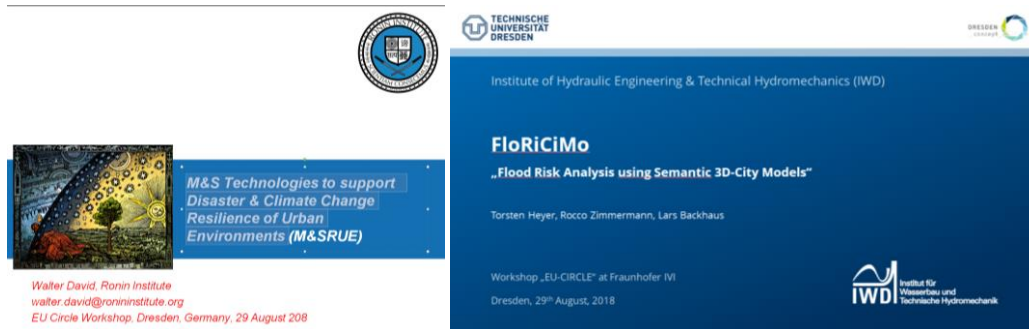


Dr. Christian Illing (THW) presented the DARE-NET project a practitioner Network to Strengthen Flood Resilience in the Danube Region. He introduced the concept of creating a trans-boundary and multi-disciplinary Community building that will identify practitioner needs, fuse lessons-learned and best practices that will lead to the innovation priorities. The collected information will be then given to the local and national authorities and EU agencies to shape political, industrial and research agendas for the Danube region.



Dr. Katrin Hänsel (State of Saxony) introduced the STRIMA II project that focuses on risk prevention through improvement of the damage prevention of fluvial and heavy rain induced flood events, taking into account a climate change-induced increase in intensity and frequency. She introduced the project's approach for the reduction of flood damage to residential properties, to environmental goods and land use and to technical infrastructure. Finally she described the recommended ways of communicating the flood risk.

Dr Walter David (Ronin Institute) presented how modelling and simulation technologies may help disaster resilience that should include a real time disaster prediction and management system focusing on the interconnectivity between societal functions in addition to highly detailed scenario building accounting for extreme events, e.g. optimal dispatching of personnel and maintaining a supply chain of response equipment and material.



Finally, Dr Torsten Heyer, Dr. Rocco Zimmermann, and Dr Lars Backhaus (IWD) introduced the FloRiCiMo project that performs flood risk analysis (from **River/Fluvial**, Flash/Torrential, Coastal/Surge and Urban/Pluvial floods). They proceeded on how a simulation procedure for improving flood risk analysis in urban regions by coupling hydronumeric models and semantic 3D-city models was developed. Then they demonstrated workflows, model chains, urban and hydraulic models and high end visualization techniques.

9 Part E: Group discussion on climate change, resilience of critical infrastructures, cities and urban areas

The last part of the day was devoted to the focused discussion of four highly interrelated topics on smaller groups in an effort to bring closer different expertise and disaster cultures. Participants were split into four groups with equal numbers and expertise. The topics were also linked to the discussions and presentations held during the day and included a free discussion format, with the requirement to report 2-3 key agreed key findings

- **Modelling:** The objective was to analyse what will be the requirements and possible pathways for introducing advanced modeling tools in the responsible organizations. Moderators were Drs. Mike Gibson and Antonis Kostaridis

	Name	Organisation
1	Stefan Hahmann	IVI
2	Walter David	COE M&S / Ronin Inst.
3	Michael Skitsas	ADITESS
4	Ignasi Fontanals	OptiCits
5	Katrin Hänsel	LfULG
6	Regine Ortlepp	IOER
7	Torsten Heyer	TU Dresden
8	Gerold Fritsche	SS DD
9	Patrick Brausewetter	IVI
10	Ganna Babeniuk	IVI
11	Ilias Gkotsis	KEMEA

- **Stakeholder engagement, incl. training:** the objective was to identify how stakeholders with different background, knowledge and training could be made familiar and participate in research projects. Moderators were Dr Ralf Hedel, and Mr Dave Stewart and Mr George Eftychidis

	Name	Organisation
1	Maja Matijaš	DUZS
2	Nikolaos Karatarakis	HNMS
3	Christian Illing	THW
4	Fuad Ali	USAL
5	Florian Kerl	LfULG
6	Ksenija Cindrić Kalin	DHMZ
7	Reinhard Schinke	IOER
8	Andreas Küster	MRK
9	Martin Meier	County Bautzen
10	Ronald Voigt	County Meissen

- **Urban climate change resilience challenges:** the objective was how to identify and address the main urban climate change challenges and what tools and approaches would be needed to tackle them. Moderator was Ms Louisa Shakou

	Name	Organisation
1	Mike Wood	Torbay Council
2	Ivana Cesarec	DUZS
3	Tina Mita	HNMS
4	Lorenzo Falco	RINA
5	Kai Ritter-Kittelmann	County "Sächsische Schweiz-Osterzgebirge"
6	Ivan Güttler	DHMZ
7	Alfred Olfert	IOER
8	Stefan Tönjes	MRK
9	Peter Bosch	TNO
10	Rocco Zimmermann	TU Dresden
11	Stefan Hentschke	County Bautzen
12	Alen Stranjik	UVG

- **Climate Change Adaptation – Decision making under uncertainty:** the objective was how to make adaptation decisions and policies under the uncertain knowledge that is a characteristics of future climate. Moderators were Drs Jean Lecroart and Thanasis Sfetsos

	Name	Organisation
1	Nataša Holcinger	DUZS
2	Carlo Strazza	RINA
3	Susann Ullrich	County "Sächsische Schweiz-Osterzgebirge"
4	Marco Neubert	IOER
5	Gerardo Anzaldua	Ecologic
6	Lars Backhaus	TU Dresden
7	Catherine Freissinet	ARTELIA
8	Frank Anderssohn	MRK
9	Nenad Petrovic	UVG
10	Frank Oßwald	County Meissen

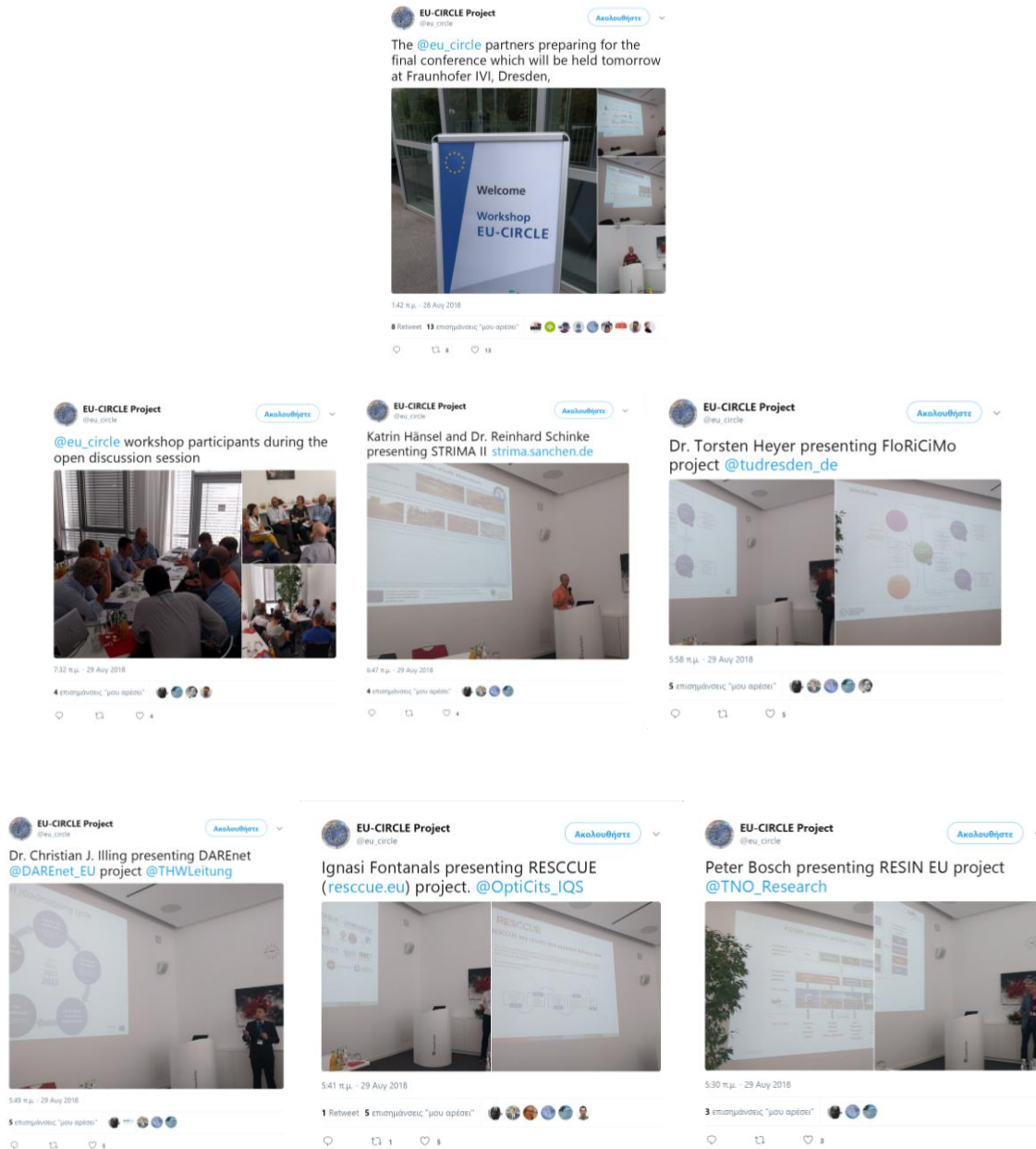
The findings and reporting from the groups, is presented in D6.11 "CASE STUDY 5: EVALUATION REPORT".





10 Dissemination of the Workshop

Social media posts





11 Annex I



Invitation to EU-CIRCLE Dresden Case Study and Final Workshop

Dear colleagues,

Critical Infrastructure (CI) play a vital role in modern communities. Destruction or failure of critical infrastructure can disrupt the smooth functioning of society, with negative impacts on our ability to continue in our daily activities; well-being; and security. Climate related hazards (e.g. floods, storms, extreme precipitation, wildfires etc.) have the potential to destroy or substantially disrupt the effective operation of European CI. With projected climate change, the frequency and intensity of climate related hazards will likely increase impacting even further on critical infrastructures and its services.

The main aim of the H2020 project EU-CIRCLE (A pan-European framework for strengthening Critical Infrastructure resilience to climate change – GA 653824) is the development of a framework and set of tools that will enhance the resilience of interconnected Critical Infrastructure Networks to climate hazards and support climate change adaptation and disaster risk reduction.

The EU-CIRCLE consortium is honoured to invite you to take part (www.eu-circle.eu) in a workshop dedicated to demonstrating and discussing the results of the project's Dresden case study related to the impacts of flooding to infrastructures. The workshop will take place on 29th of August 2018 in the conference room of Fraunhofer IVI (Zeunerstraße 39, Dresden/Germany) between 9 a.m. and 5 p.m.

Topics of the workshop include, amongst others:

- Current state of project EU-CIRCLE
- Presentation of modelling tools developed in EU-CIRCLE
- Results from the case study in Dresden and from other case studies in other regions
- Local and regional approaches to improve climate change resilience
- Presentation of further projects in the area of resilience research and discussion of potential synergies.

Invited participants to the workshop include local and regional stakeholders in the area of flood protection, disaster relief, operators of critical infrastructures, representatives from administrations (City of Dresden, State ministries, neighboring counties) and scientists related to resilience research.

EU- CIRCLE "A panEuropean framework for strengthening Critical Infrastructure resilience to climate change"
Dresden Case Study Workshop – 28-29 August 2018



The workshop will include a social programme which will facilitate networking and exchange of knowledge between participants. This will include a social dinner in the city centre, starting 8 p.m. on Tuesday 28th of August and a tour of Dresden on board an old steam boat on Wednesday, 29th of August., starting 7 p.m.. The boat trip will be in the direction of Pillnitz, thereby crossing the case study area! Participation in these events is covered by the project.

We look forward to welcoming you to our workshop and our evening events. Please RSVP by 17th August 2018 to the coordinator Dr. Athanasios Sfetsos (ts@ipta.demokritos.gr) or the local organiser Dr. Ralf Hedel (ralf.hedel@ivi.fraunhofer.de). For further information or queries please do not hesitate to contact us.

Sincerely

The EU-CIRCLE consortium
www.eu-circle.eu