



PLOT0: Deployment and Assessment of Predictive modelling, environmentally sustainable and emerging digital technologies and tools for improving the resilience of IWW against Climate change and other extremes

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PLOTO in a nutshell



Project facts

- **Project name:** Deployment and Assessment of Predictive modelling, environmentally sustainable and emerging digital technologies and tools for improving the resilience of IWW against Climate change and other extremes
- **Start date:** 01/09/2022
- **End date:** 28/02/2026
- **Grant Agreement number:** 101069941
- **Maximum grant amount:** 7.497.694,38 EUR
- **Topic:** HORIZON-CL5-2021-D6-01-09 - Climate resilient and environmentally sustainable transport infrastructure, with a focus on inland waterways
- **Number of partners:** 20
- **Number of countries:** 8

Vision



PLOTO aims to **leverage**:

- Existing **tools** and **services** (e.g., climate models, extreme events modelling, etc.)
- **Emerging** solutions (e.g., water, terrestrial and satellite imaging, enhanced data fusion techniques, etc.)

in order to develop an **integrated risk assessment platform** that can be primarily applied to **Inland Waterways (IWW) infrastructures**

Aims towards the:

- **Reduction of Climate Change (CC) related risks**
- **Improvement of the IWW resilience**
- **Protection of the biodiversity** and other environmental parameters



Methodology



PLOTO is a pure technological project, but driven by the actual needs of the end-users via:

- **Designing pilot activities** (scheduled within the project lifetime)
- **Adopting an agile development and start-up mentality**
- **Producing early prototypes** validated with stakeholders in **intermediate** schedules for **continuous amelioration**
- **Engaging an interdisciplinary** team of experts



Use cases and scenarios



PLOTO will perform extensive tests in **three** different demo sites (Belgium, Hungary, Romania)

- **Case Study A:** Danube Area, including the waterways and inland ports
- **Case Study B:** Budapest port (inland) connected to the railway
- **Case Study C:** Region of Wallonie in Belgium

The demonstration will focus on the following **main objectives**:

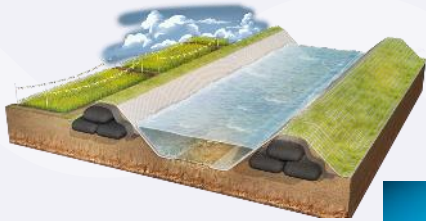
- Improve **multiple-hazard assessment** and **strategic management** for **protection** of the IWW sections and hinterland infrastructure
- Improve **strategic** and **operational decision making**
- Test the various **PLOTO outcomes** in **real-scale critical parts** of the IWW



PLOTO modular design



Hazards



Exposure model



Network



Interconnected Networks



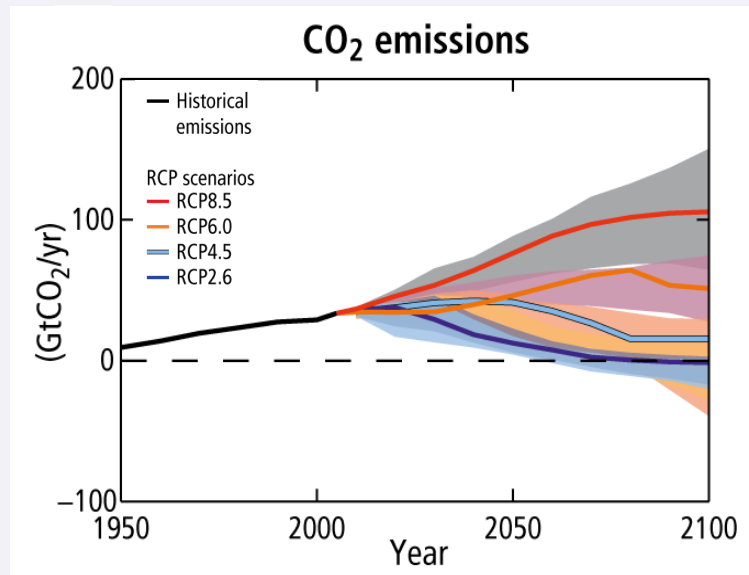
IWW and hinterland infrastructure integrated model



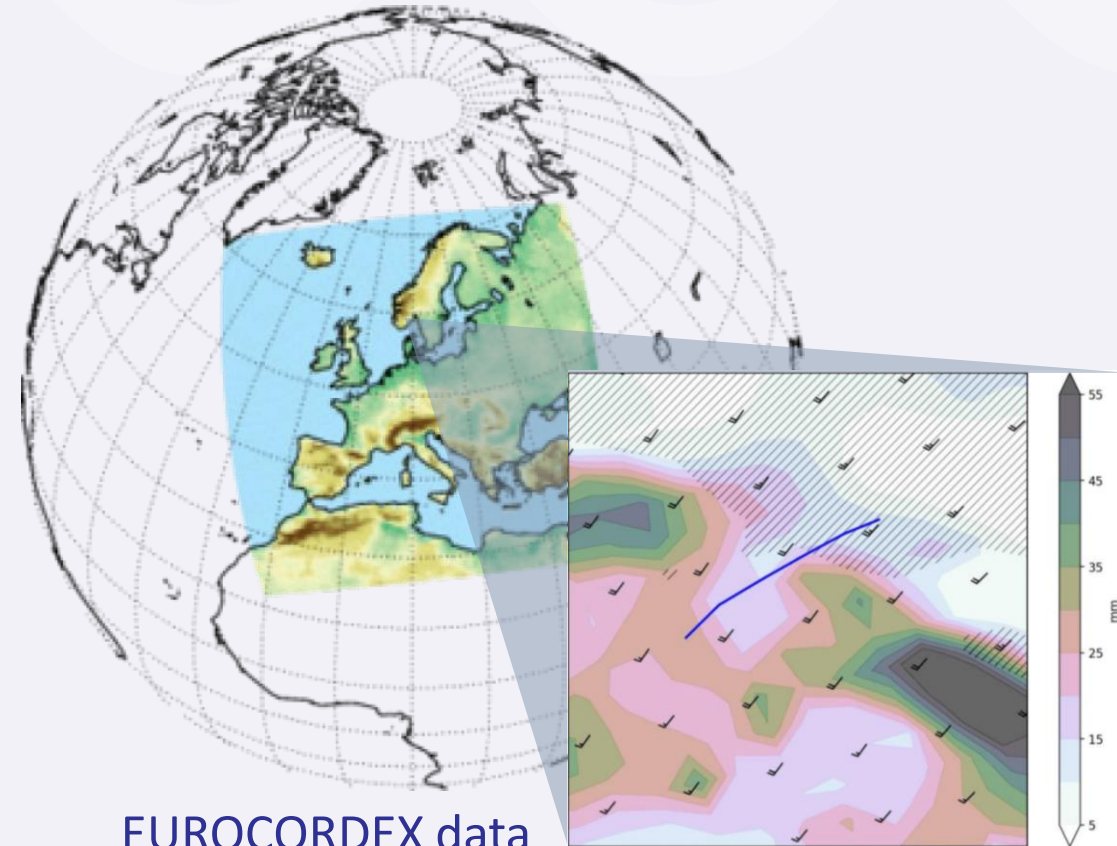
IWW and hinterland infrastructure resilience assessment

Key topics & innovations

- **IWAT:** Decision support system and enhanced visualisation interface
- **Hazard – Climate change:**

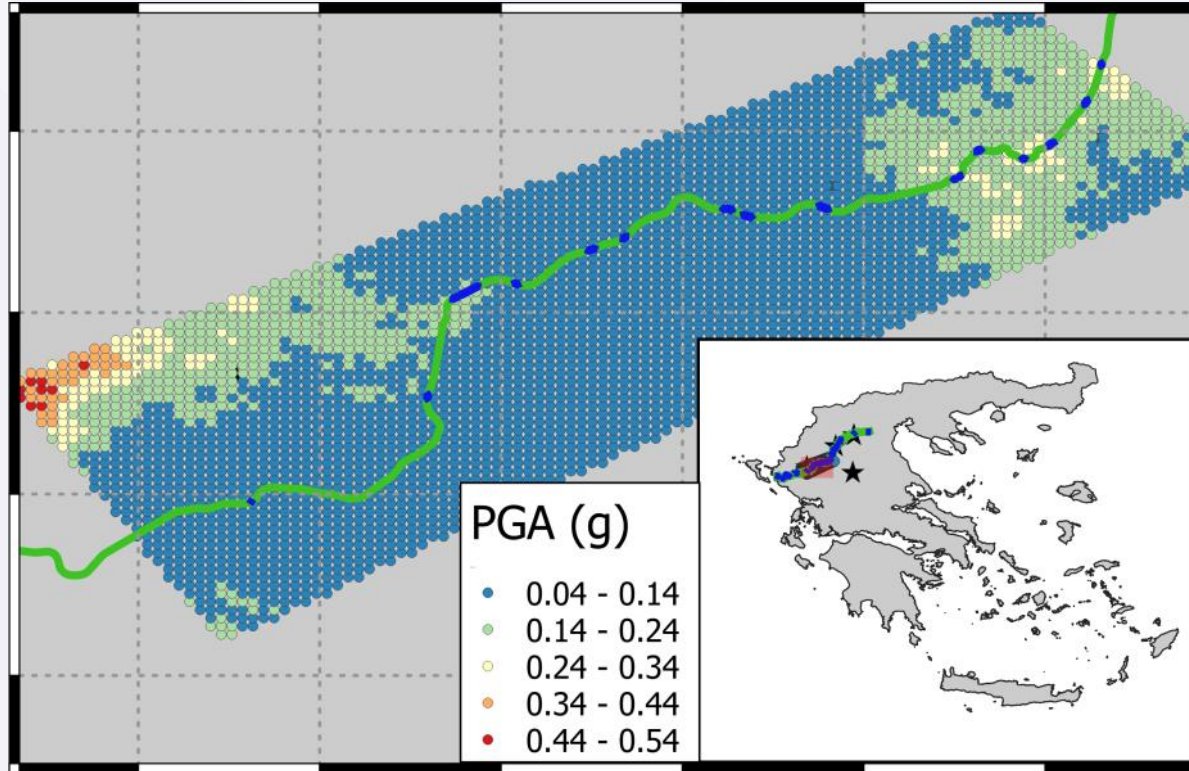


Alternative Climate Change scenarios

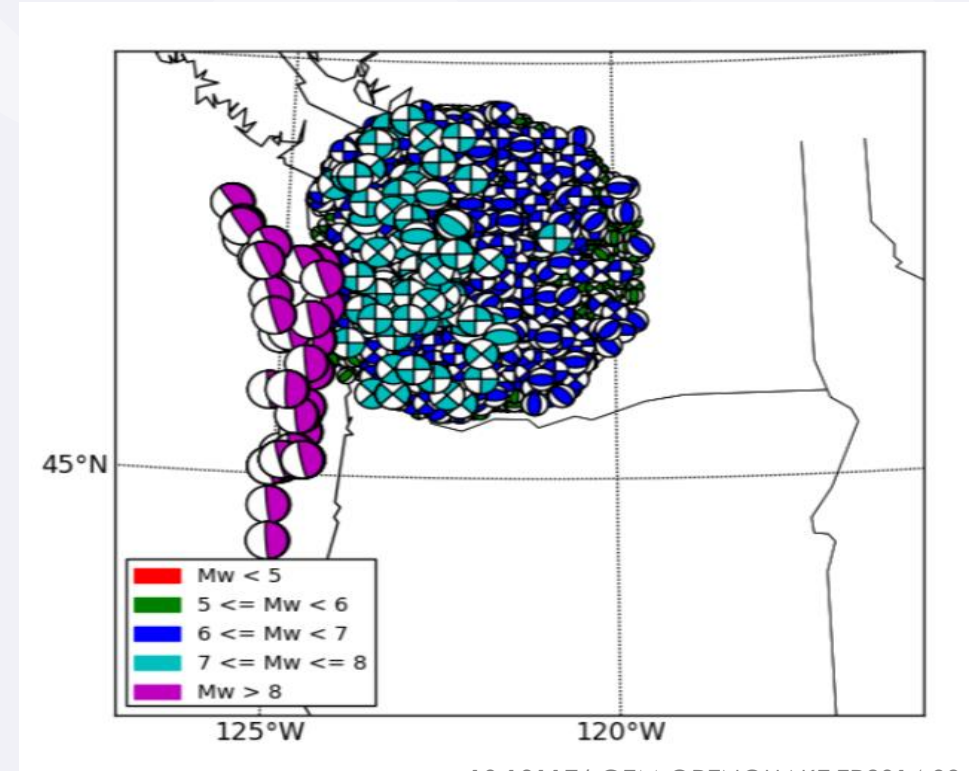


Key topics & innovations

- Hazard – Earthquake:



Ground Motion Field
Spatially correlated intensities

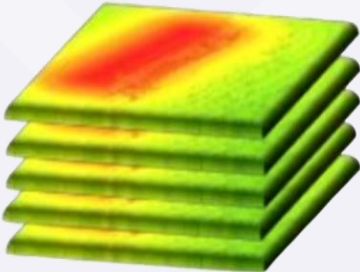


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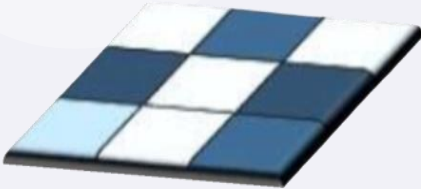
Stochastic event set
Each event = one GMF

Key topics & innovations

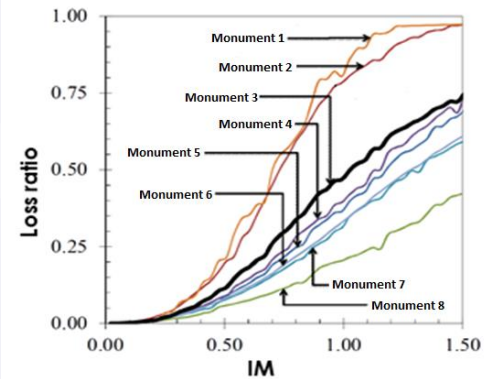
- Impact per hazardous event & aggregation:



Intensity Measure fields

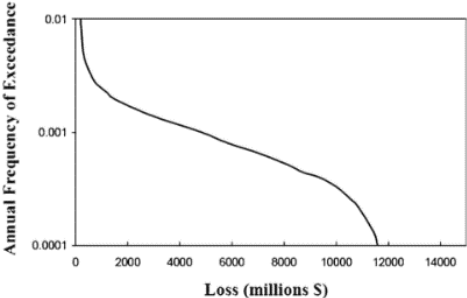


Exposure model

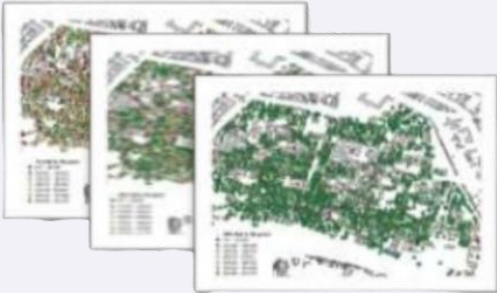


Vulnerability functions

Analysis...



Loss curve



Loss map

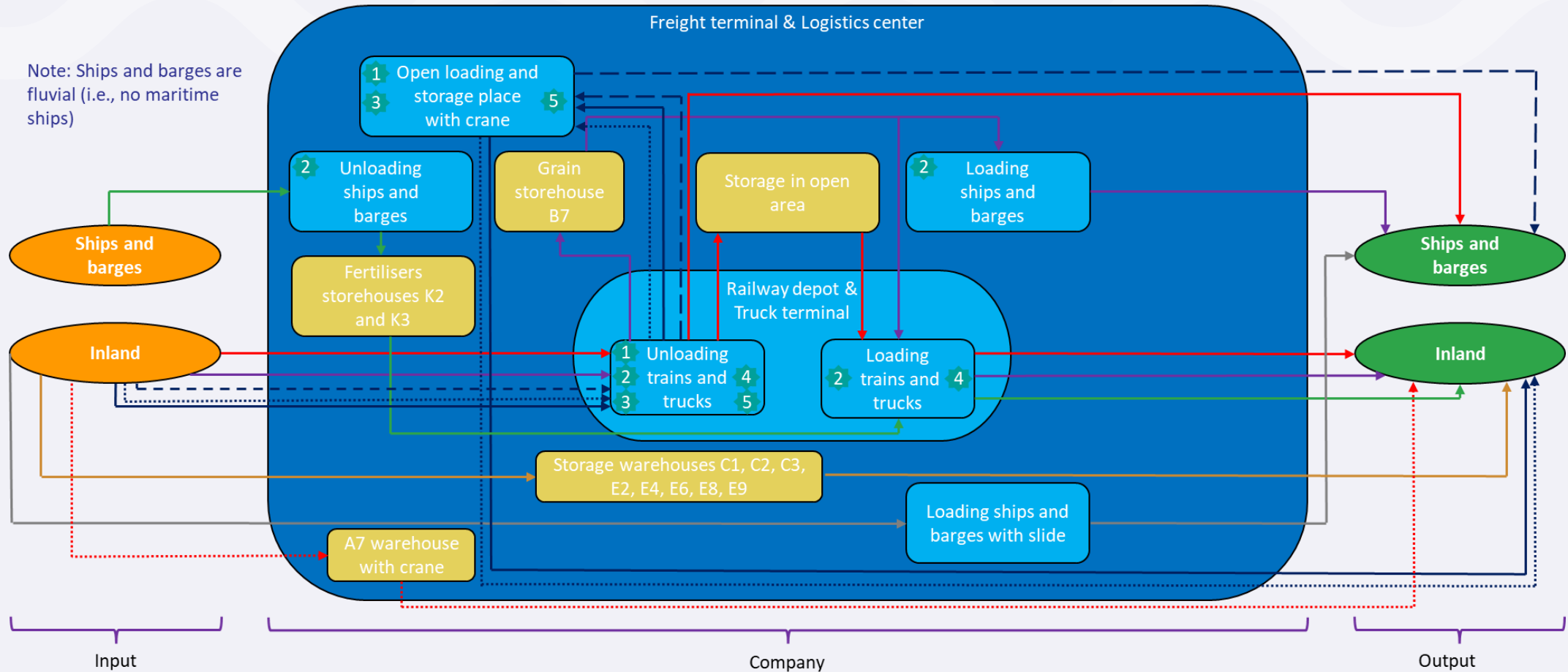
Key topics & innovations



- Business continuity models for ports:

- | | | |
|-----------------------|-------------------------------------|---|
| → Containers | → Coal, coke | 1 Overhead crane 1 for metal products |
| → Grains in bulk | → Scrap metal | 2 DEMAG crane 2 for fertilisers and grain |
| → Fertilisers in bulk | → Petroleum coke | 3 II overhead crane 3 for petroleum coke |
| → Bulk goods | → General cargo (big-bags, pallets) | 4 Crane 4 for containers |
| → Metal products | | 5 Portal crane 5 for coke, scrap metal |

Note: Ships and barges are fluvial (i.e., no maritime ships)



Key topics & innovations



- **Socioeconomic impact on communities:** Development of models to assess the socioeconomic impact of natural hazards and extreme weather events on IWW and surrounding communities
 - How the business operation of the inland port and different sectors of the economic of the city will be affected in case of an earthquake or a flooding?

Outcomes



1

Climate-aware crisis management by providing real-time information of the weather conditions

2

Risk models and assessment of the IWW elements' vulnerability under multiple hazards

3

Analysis framework to enable the flow of information from hazard to system risk/resilience

4

System that integrates data from three (3) remote sensing levels: satellites, UAVs and ground based, with the focus on optimal use of different sensor types

5

Modelling and simulation environment for assessing the resilience of IWW and potential impacts due to various hazards

6

PLOTTO integrated prototypes and execution of the project's pilots based on the defined scenarios



Impacts

1

Ensure navigability for inland waterways during extreme weather events

2

Enhance infrastructure resilience to natural hazard and extreme weather events

3

Ensure resilience and smooth functioning of passenger mobility and freight transport / logistics networks operating on these infrastructures



THANK YOU!



Horizon Innovation Actions | Project No. 101069941

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