

SARIL - Sustainability And Resilience for Infrastructure and Logistics networks

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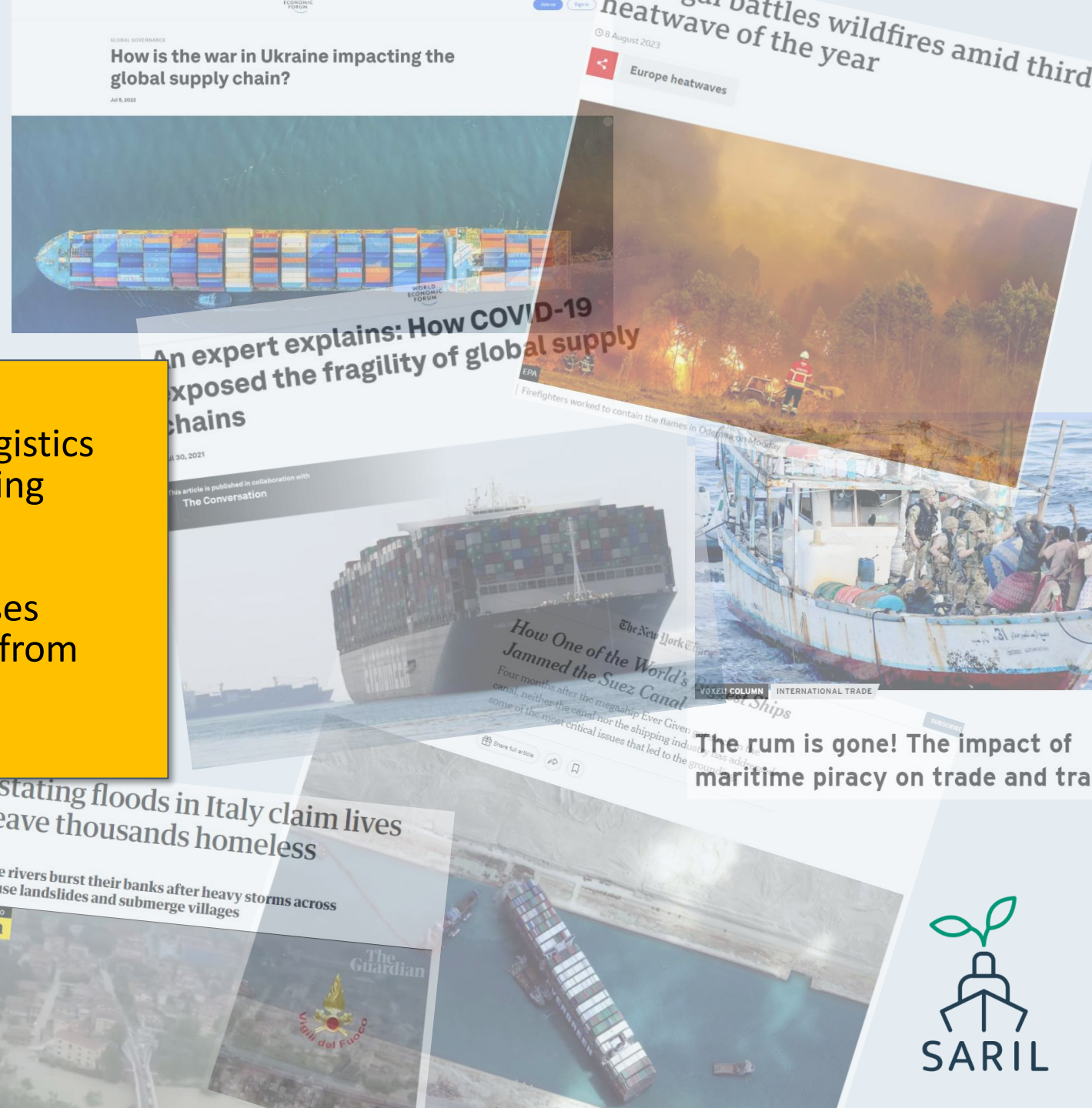
10'th June 2025



The SARIL Project

Improve decision-making in transport and logistics systems in the face of disruptions by combining resilience and sustainability.

The system is resilient and sustainable if it uses minimal resources to withstand and recover from disruptions



Together towards Sustainable Resilient Logistics



Decision support systems and concepts for resilience and sustainable logistics during disruptions

Recommendations for disruption management and green business models for logistics operators and governments.



SARIL Scenarios

Regional scenario

- Small-scale scenario
- Flooding events and unavailability of data



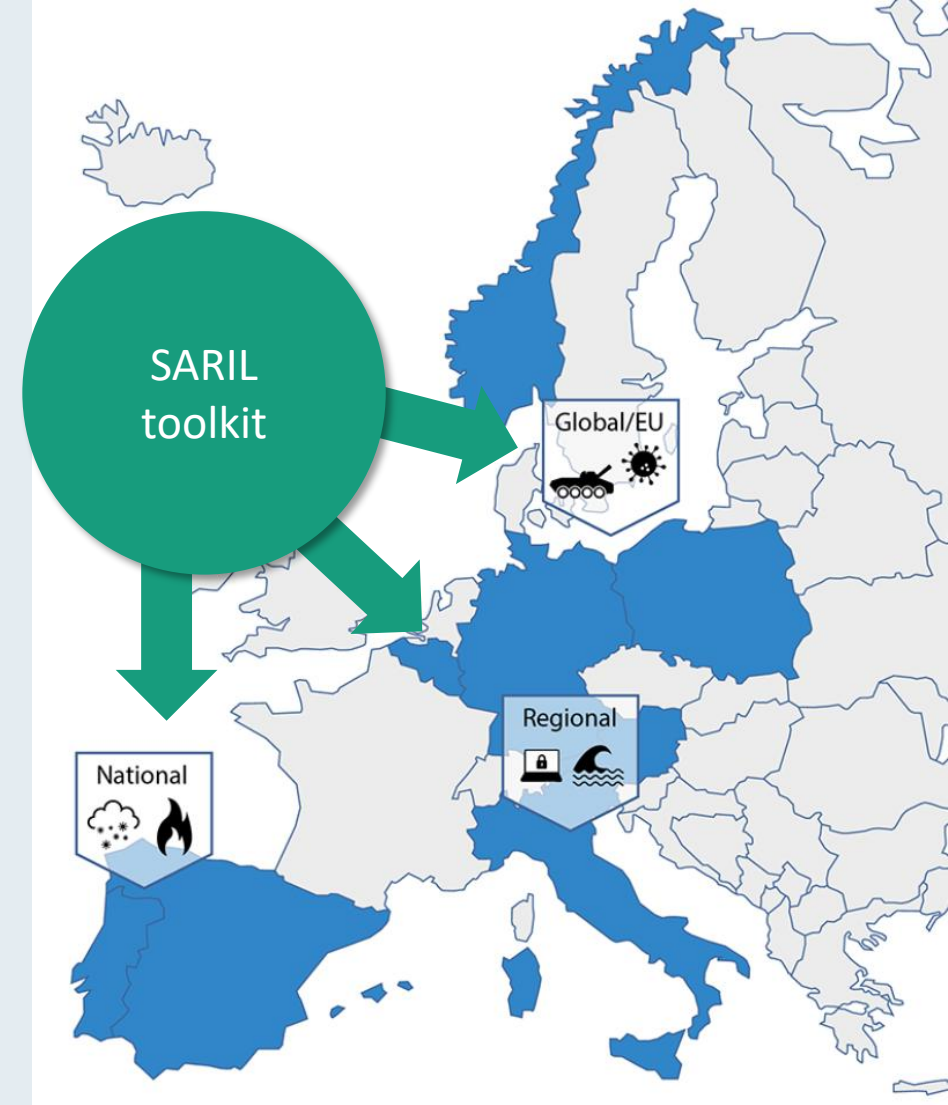
National or cross-border scenario

- Medium-scale scenario
- Prediction of fire risk via satellite data



European scenario

- Large-scale scenario
- Real-time data availability



European Scenario

Assumptions:

- Containerised cargo from the Far East to Northern Europe
- Sea / Rail route
- Group of disruptions – Pandemic / War

Indicators/ measurements:

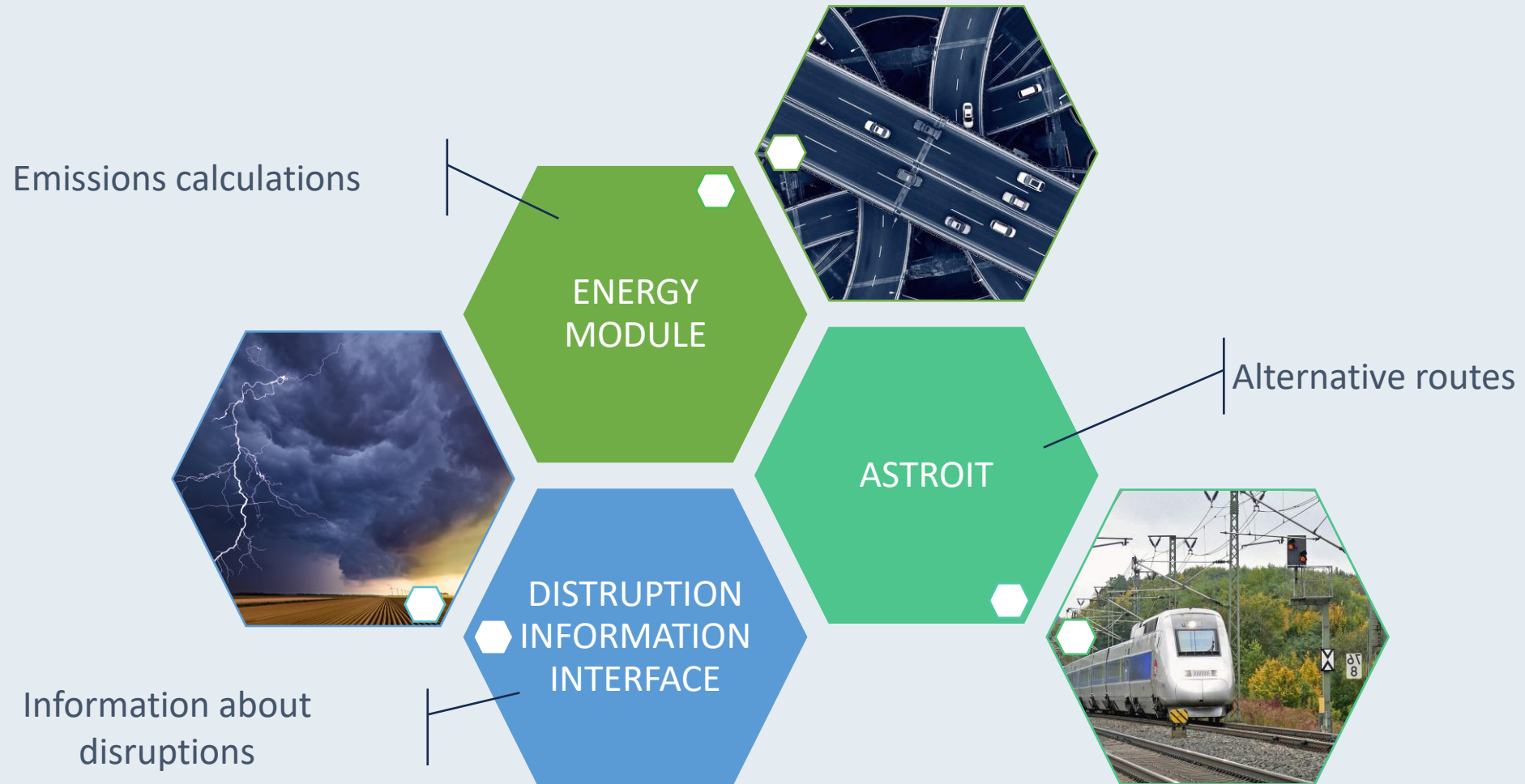
Time/ cost/ effective/ use of sources/ CO2 emmisions

Simulations:

- Port closure
- Closure of North path of New Silk Route



Combination of 3 tools in EU scenario



ASTROIT

Purpose

Support strategic decisions to optimize efficiency or sustainability of transport network in question.

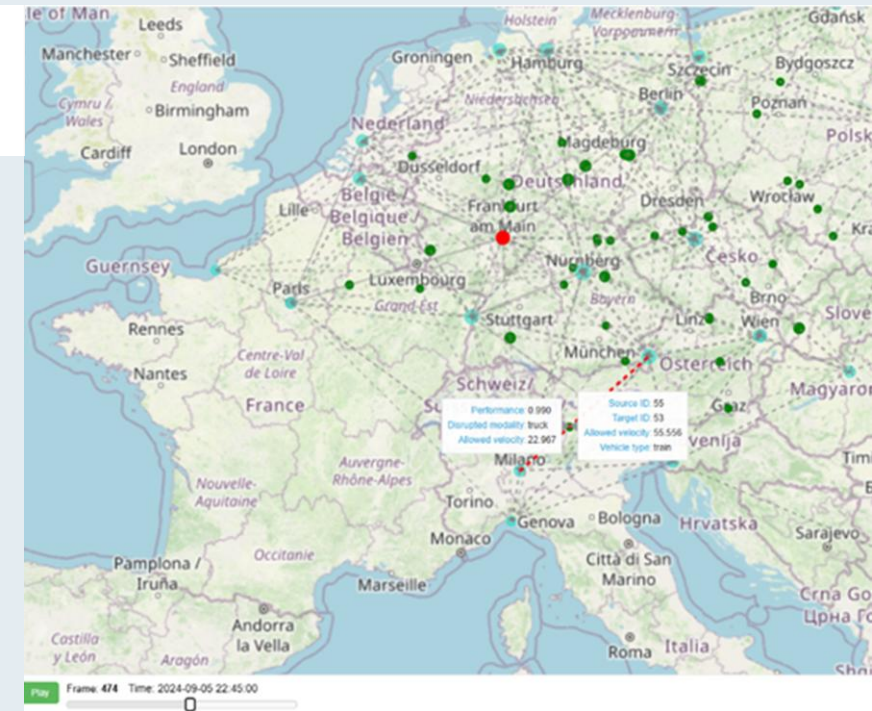
Who benefits from the tool

Stakeholders in transport sector who need to develop resilience strategies

- Strategic planners in transport companies
- Infrastructure planners (public authorities)

How is it used

- Enables disruption & future scenario simulations of multi-modal transport systems
- Graph- and Agent-based algorithm.
- Rerouting starts, if performance of a network component drops to zero.
- Rerouting can be optimized regarding different criteria (CO2- emission, cost, time)
- Calculates key performance indicators (KPIs) of the transport system for each simulation scenario



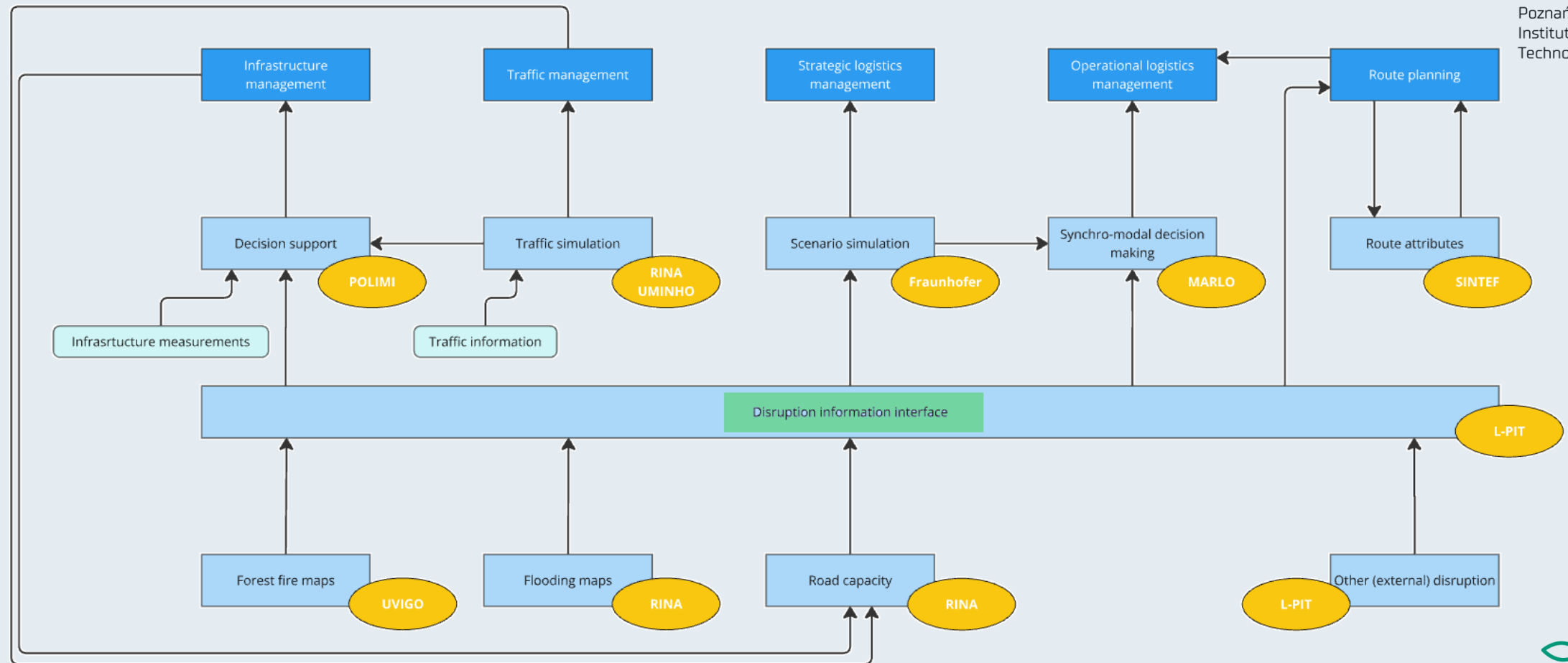
DISRUPTION INFORMATION INTERFACE



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Disruptions Information Interface



Disruption Information Interface

Purpose

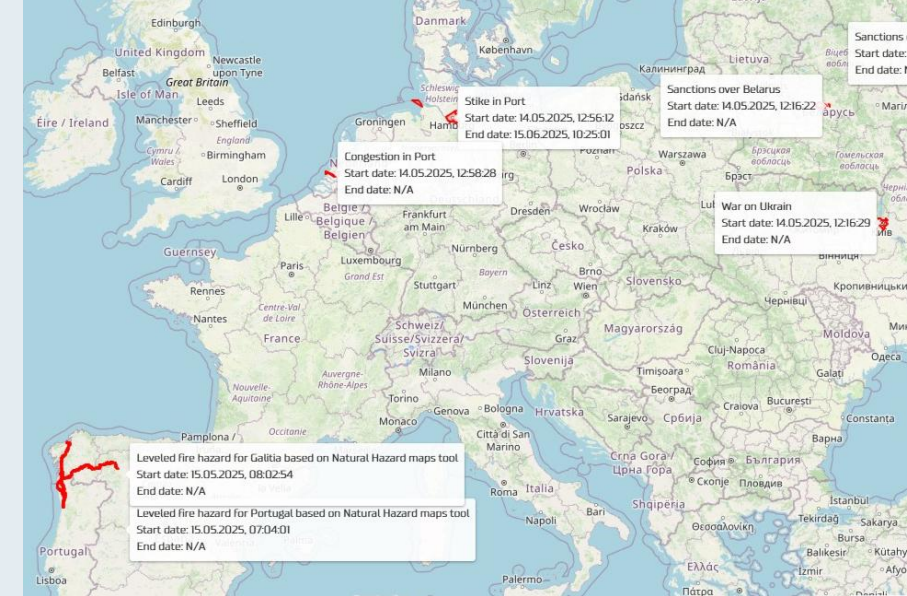
Support strategic and operational decisions

Who benefits from the tool

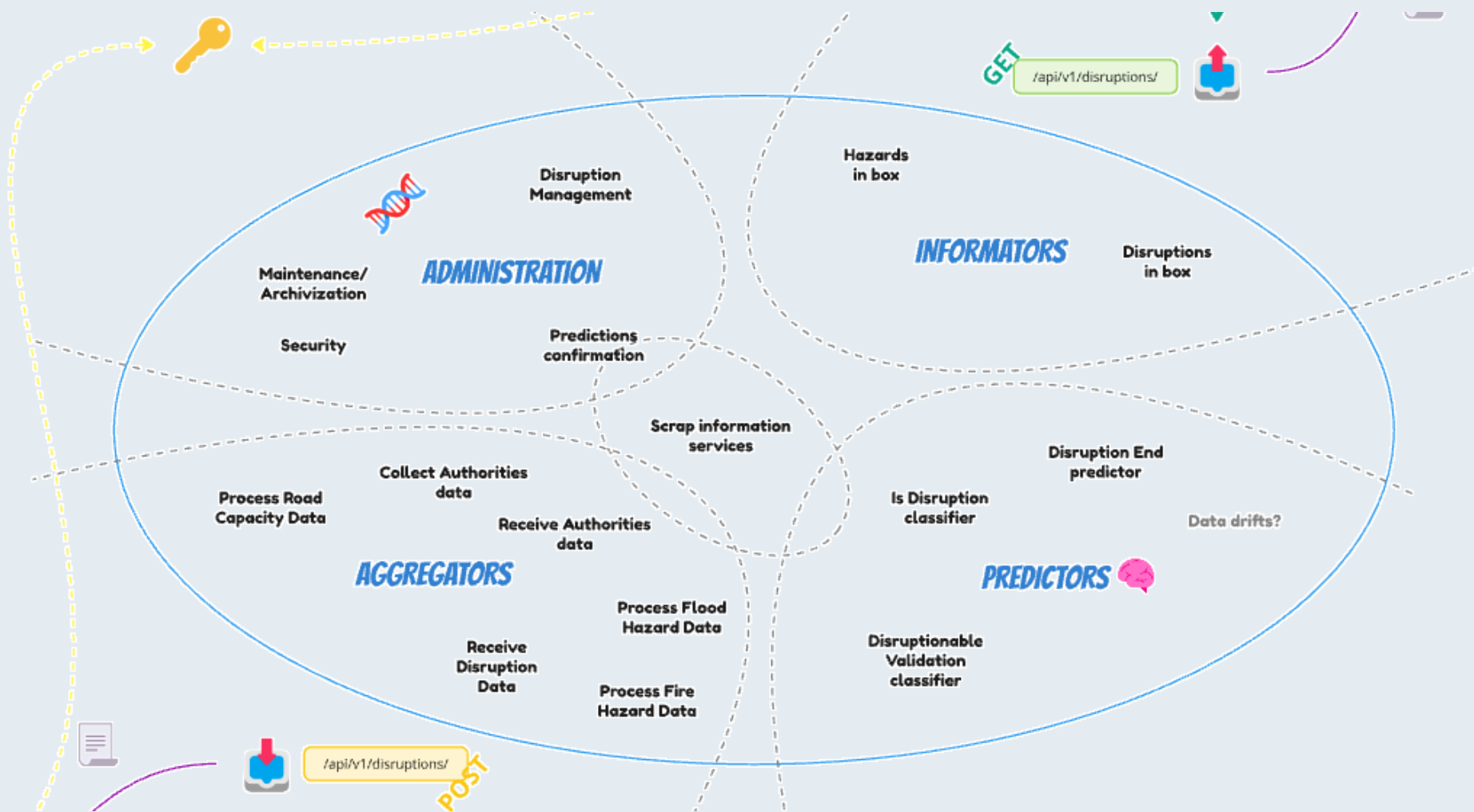
Stakeholders trying to avoid disruptive events or predict end of disruptive events on planned route

How is it used

- Gathering disruptive events data from sources important to stakeholders
- Discovering disruptive events data
- Predicting disruptive events attributes
- Allow to exchange disruptions data between partners or tools
- Simulating scenarios with different disruptive events
- Understandable API and Graphic User Interface



Disruptions Information Interface



Data Collecting







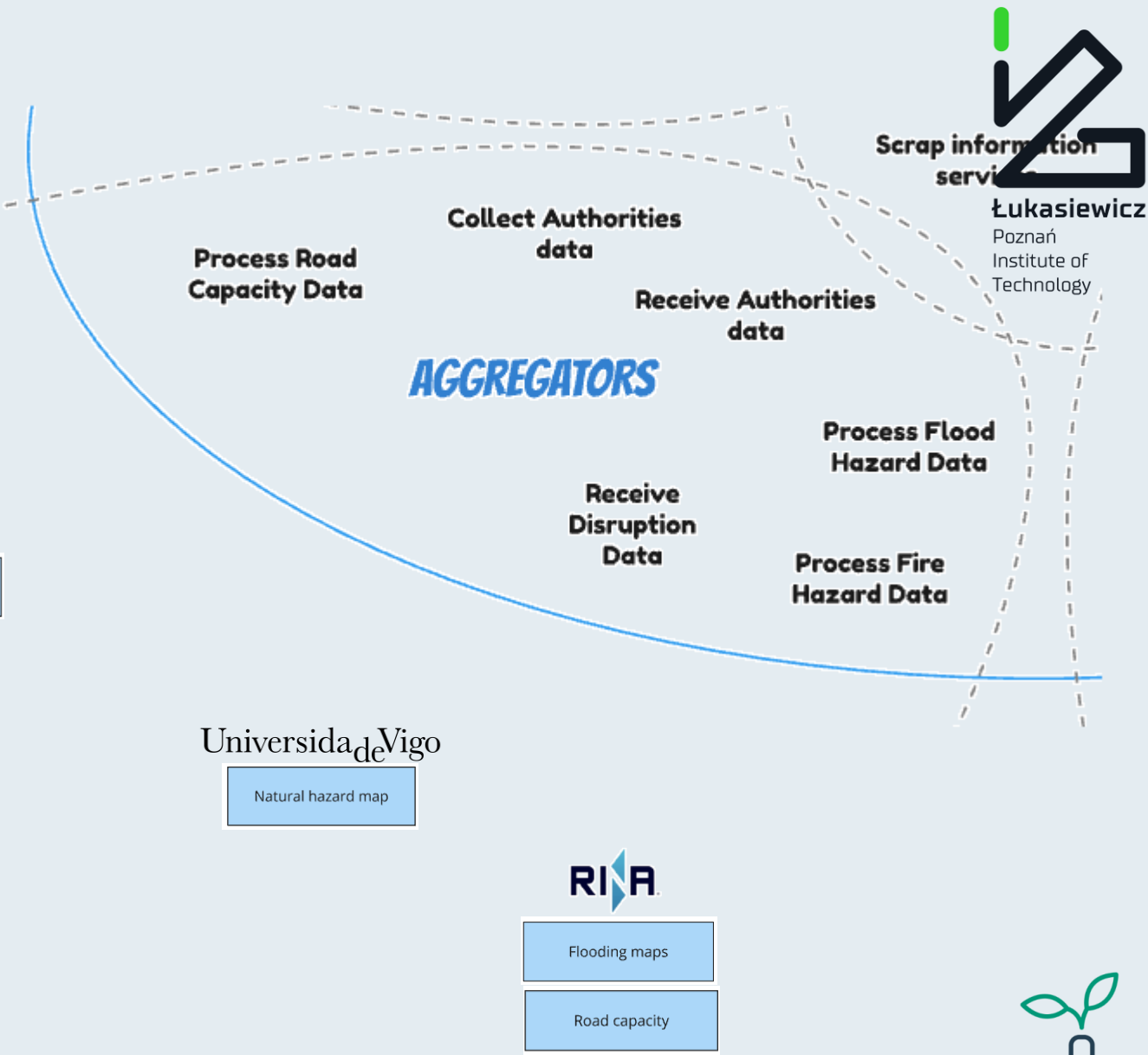






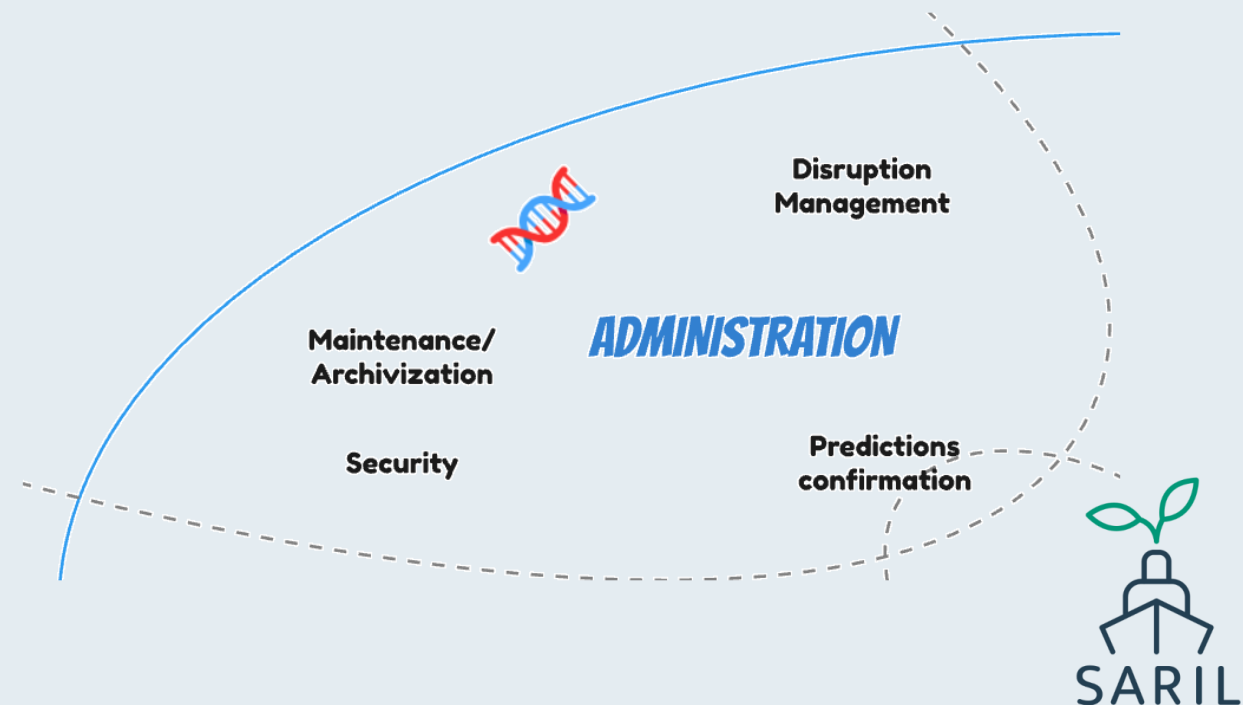

Other (external) disruption



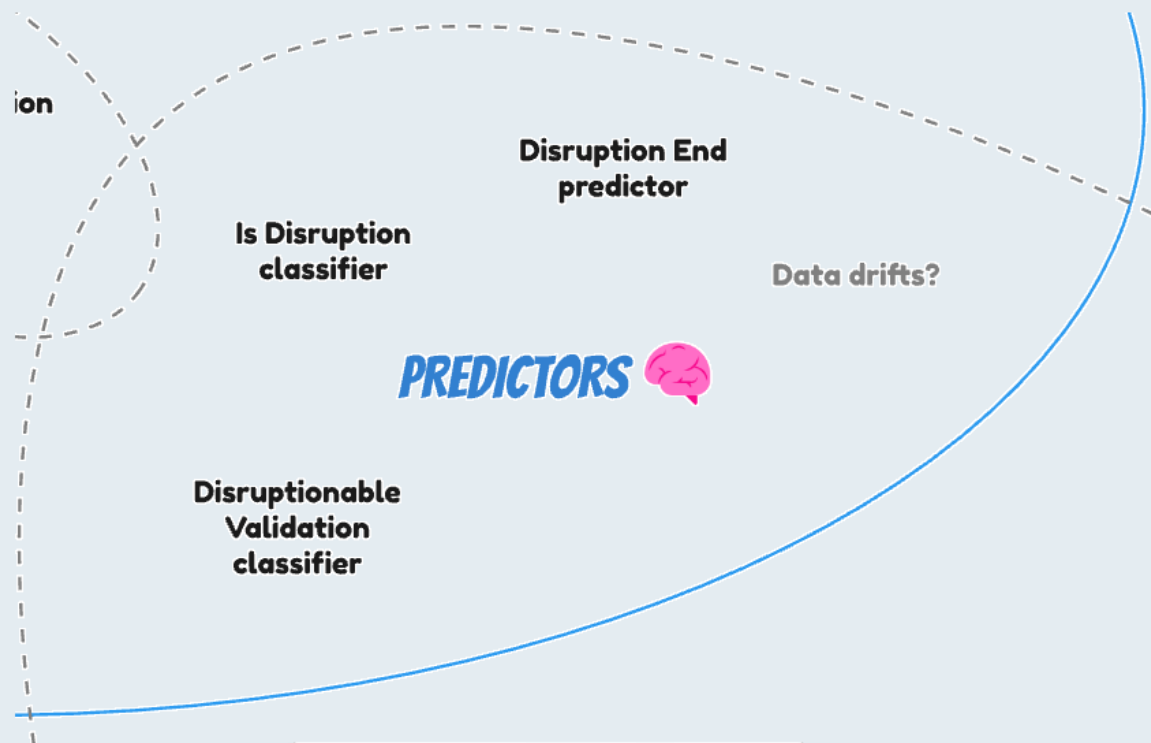


Supervisor's Responsibilities

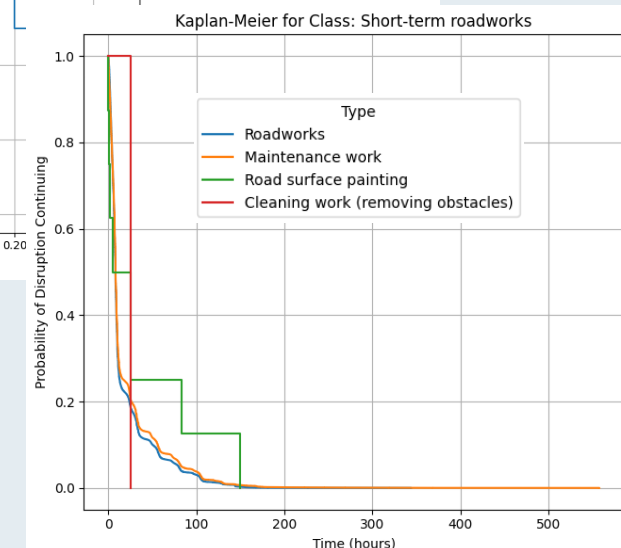
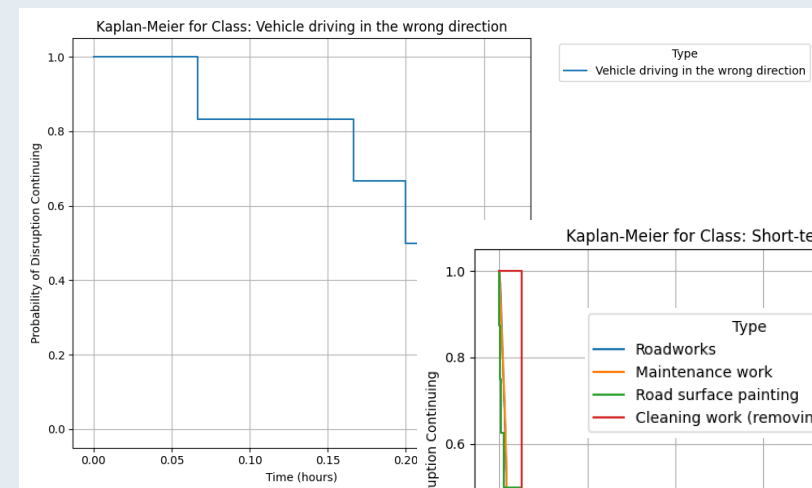
-  Basic Disruption Management – Create, Update, Archive
-  Media monitoring tools administration – automatic tasks
-  Validating incoming data
-  Data exchange security management
-  Models finetuning
-  Extending data resources



Attributes Predictions



Traffic Jam on I-95 – Heavy congestion due to an earlier incident. Traffic moving at 10 mph.
Bridge Closure on 5th Ave – Structural maintenance is in progress; detours available via Elm Street.
Train Crossing Delays – A malfunctioning railway signal is causing frequent traffic stops.
Strong container throughput drives Port of Antwerp-Bruges growth despite challenging market conditions – Positive trend in container throughput continues...
Protest Blocking Downtown Roads – Demonstrators have occupied Main Square; police redirecting traffic.
HHLA presents hydrogen projects at Hydrogen Technology Expo Europe – Hamburger Hafen und Logistik AG (HHLA) presented its hydrogen projects...
Accident on Highway 50 – A multi-vehicle collision has blocked two lanes, causing major delays. Emergency crews on site.
Roadwork on Main Street – Expect slow traffic due to ongoing road resurfacing. Estimated completion: 3 days.



LLM-Based Attribute Extraction and Validation



SVM and Random Forest on the TF-IDF representation of text



NER-Based Attribute Tagging (Fallback Mechanism)

Data Sharing



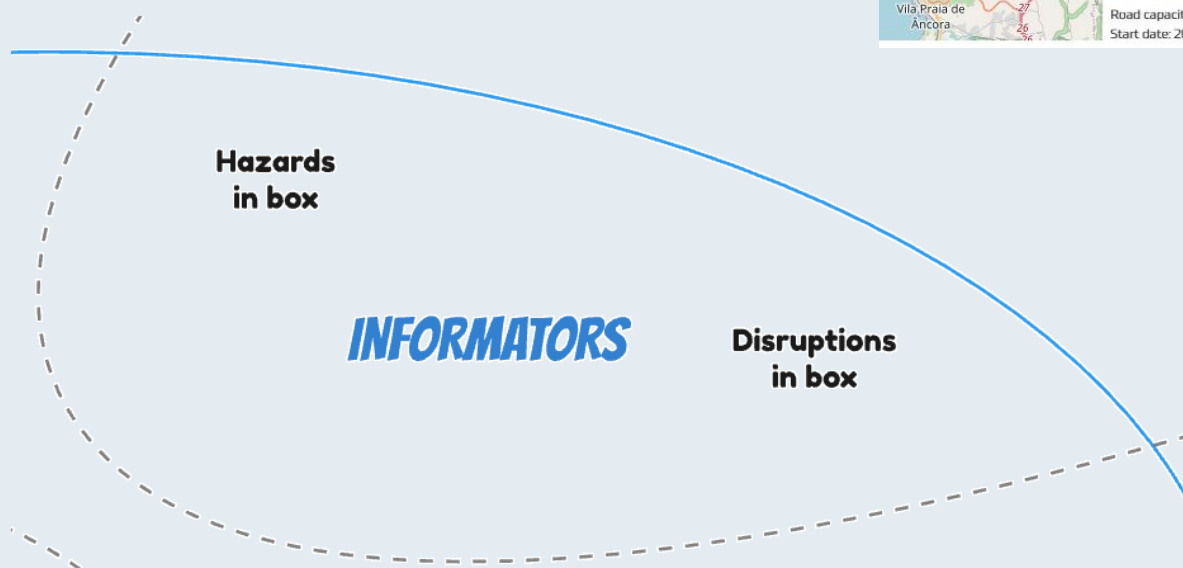
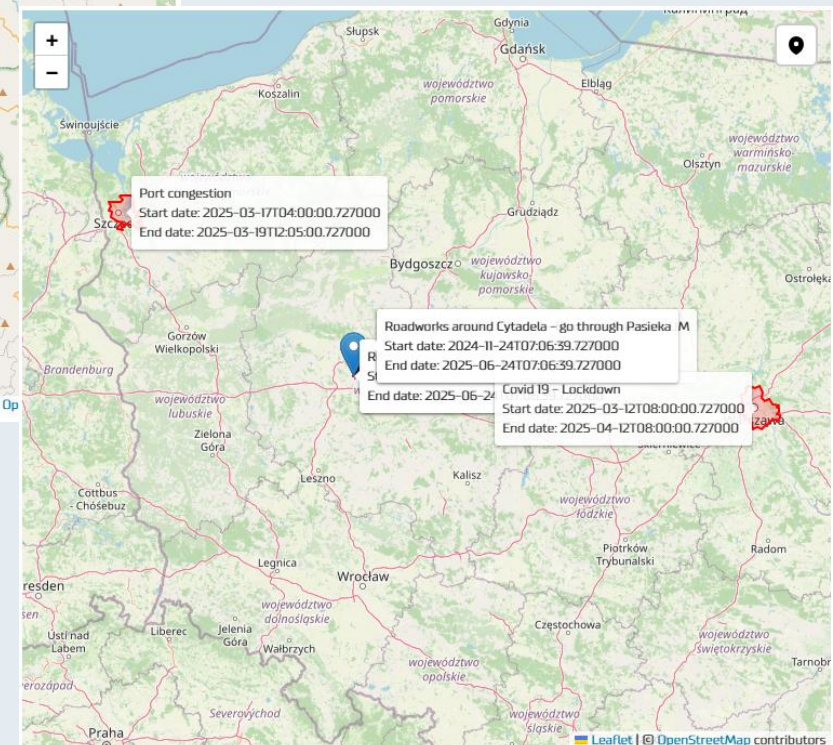
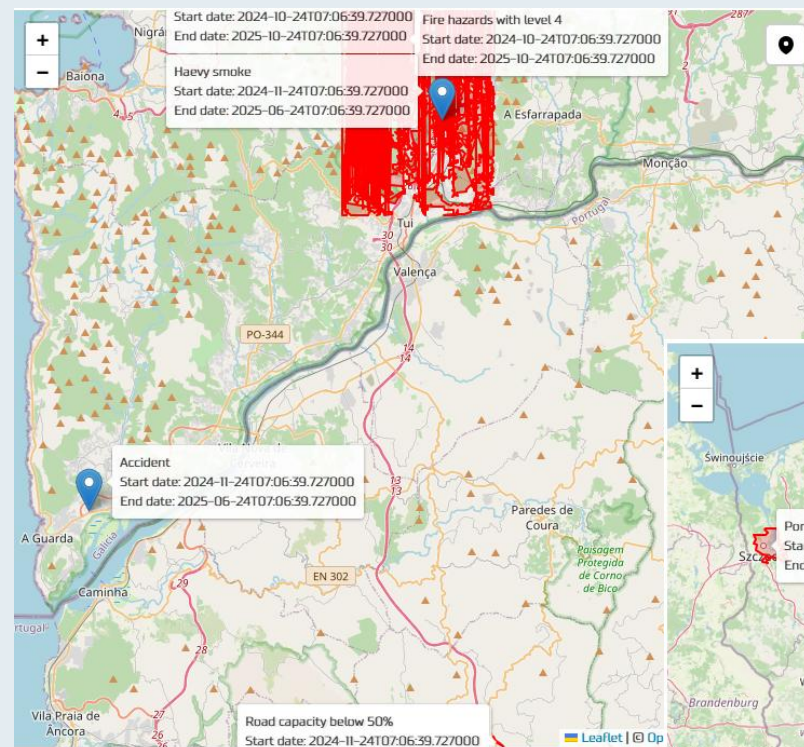
Returning the information about hazards on the map



Filtering by disruption type, severity and many others



Standardised exchange format - GeoJSON



The unique selling point of this tool



One access point for the information about disruption



Searching for the disruption in the real time



Prediction of the time of disruption



Returning the information about hazards on the map or API to the local tools

