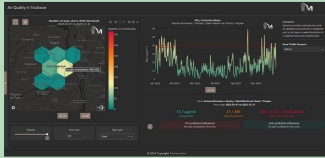


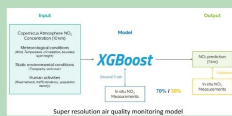
AIR QUALITY

A comprehensive analysis tool of air pollution within a given territory, offering both historical insights and present time data.

Assess the situation at neighbourhood scale (1-km spatial resolution) with historical data and near-real-time delivery.



High-resolution modelling: Machine learning model combining Copernicus Atmosphere data with influential factors (weather conditions, human activities) validated with in situ measurements.



What-if scenario: by adjusting input datasets, the model can simulate specific scenarios and predict air pollution maps based on various hypotheses (climate change, population density, car traffic).

URBANSQUARE

Climate resilience decision-support Tool

Designed to help urban stakeholders assess and manage environmental risks, which are intensifying due to climate change and urban population growth.

Combines real-time monitoring with predictive scenario modelling

Evaluate current conditions and simulate "what-if" scenarios for future risks, helping decision-makers plan effectively for both immediate responses and long-term urban adaptation strategies.

Powered by European space data and advanced digital infrastructure

Includes Copernicus services, Sentinel satellite products and DestinE Digital Twins. These technologies enable high-resolution, science-based assessments tailored to local needs, aligning with EU climate and adaptation strategies.

Developed by a consortium of Murmuration, Sistema, Mozaika and Imperative Space

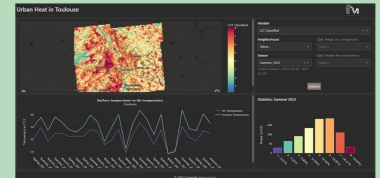
UrbanSquare is deployed on the Destination Earth platform. It provides a complete operational workflow, from data access and processing to visualisation and user interaction, supporting cities in transitioning toward more sustainable and climate-resilient futures.

URBAN HEAT

Project and visualise Land Surface Temperature (LST) during heat waves to characterise the urban heat island.

Perform a before/after analysis to assess the efficiency of public policies in priority neighbourhoods.

Provide projection scenario to assess the impact of future heat waves on the urban heat island.



The approach involves using historical data to train a pixel-wise regression model linking air temperature (ERA5) with land surface temperature (Landsat), then applying climate projections to estimate future LST and analyse extreme heat days under different SSP scenarios.



SEA LEVEL RISE & STORM SURGES

Understanding of inundation risk in coastal areas, with the opportunity of running hundreds of different future what-if scenarios.

Multiple scenarios based on key parameters: 5 global SSPs, 7 storm surge height options (0-5m), 7 model years (2040-2150) and 2 levels of confidence (low, medium).

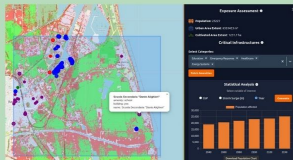


Example inundation maps for 2080 (left) and 2150 (right) for the SSP 5RS scenario

Exposure assessment: Affected population, urban area and cultivated area.

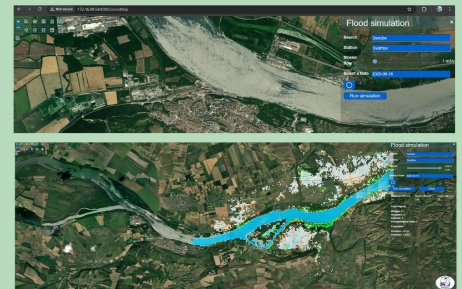
Critical infrastructures: Education (i.e. schools), Emergency Response (i.e. fire stations), Healthcare (i.e. hospitals), Energy Systems (i.e. power plants).

Statistical analysis of the scenarios: i.e. number of people affected by inundation over time.



FLOOD & RESOURCES

Forecast and simulate flood situations and visualise their span based on hydrological, hydrodynamic and elevation features analysis, combined with meteorological features like precipitation, soil moisture and vegetation index.



Flood simulator application

The flood service uses an Earth Observation for AI (EO4AI) method to forecast water levels and river discharge for up to 30 days ahead. This method integrates satellite imagery, in situ measurements, and machine learning to enhance flood forecasting accuracy.

The Resources component provides a visualisation of the flooded land objects - roads, buildings, forests, and allows to estimate the potential damages of the incurred flood event.

INFRASTRUCTURES

Accurately detecting and assessing damaged roads after a disaster.

The solution relies on high-resolution satellite-based land cover mapping (< 1m resolution).

It provides before-and-after disaster comparisons.

It enables the detection of obstructed road after the incident.

