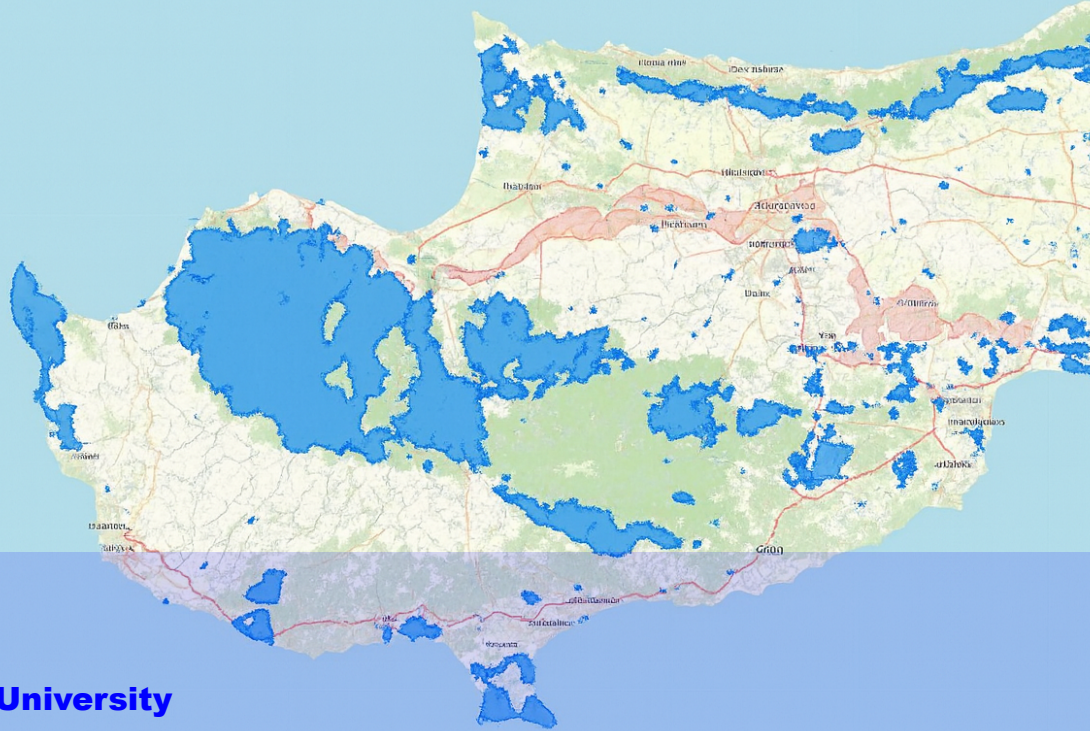




CITWIN

by KIOS CoE at Cyprus University

About

CITWIN is a digital twin platform that simulates digital breakdowns in the city infrastructure. It models geographic and infrastructure data, interdependency graphs, and enables operators to create and manipulate virtual objects for real-time crisis response strategy testing.

Rich visualization features, including live analytics and key statistics, provide actionable insights into asset vulnerabilities and enhance situational awareness for managing urban crises.

CITWIN's modular structure allows rapid adaptation to any urban context. Any city can use CITWIN so long as it provides relevant geospatial or infrastructure data (e.g. digital elevation models, power grid infrastructure, transportation infrastructure, network infrastructure, demographics).

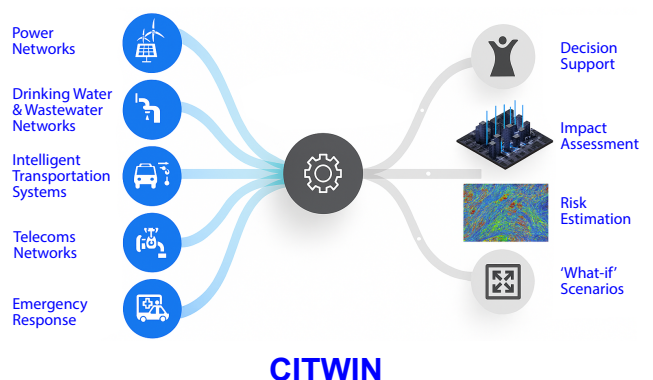
CITWIN is developed by KIOS CoE within the context of the SPARROW project it is coordinating. SPARROW aims to improve societal resilience and crisis management in the face of digital breakdowns. CITWIN aims to empower first responders with real-time insight, shared situational awareness, and scientifically grounded decision support.

Use case

A first responder operations center receives an early warning about an approaching windstorm. Using CITWIN, the operators open a digital twin of the affected region, displaying power substations, telecommunication towers, and key transport routes.

CITWIN displays this information in real time on an interactive map, showing which roads remain accessible, where outages are expected, and how service restoration should be prioritized.

The platform acts as a shared operational picture, helping first responders coordinate across agencies based on the same live situational data.



End users



Emergency frontline workers
(firefighters, medics, police officers, civil defense)



Emergency organisation support
(dispatchers, planners, coordinators, analysts)



Infrastructure operators
(electricity, water, transport, telecom)

Benefits

CITWIN is the city-scale operational visualization environment of the SPARROW platform. It transforms complex infrastructure data into clear, actionable visual insights for first responders.

CITWIN provides integrated situational awareness through a live display of interconnected power, water, and transport systems. The real-time simulation of how failures spread between infrastructures is captured in a cascading impact visualisation, while realism and accuracy are achieved thanks to KIOS's extensive domain expertise and validated models.

For first responders, CITWIN acts as a “mission map”, which helps them to see, anticipate, and respond to disruptions faster and with better coordination than ever before.



**Cascading impact
visualisation**



**Integrated situational
awareness**



**Realistic and accurate
representation**

Usage requirements

- Heavy computations and simulations are processed on SPARROW's backend servers, allowing field operators to access results quickly via secure web or desktop interfaces.
- CITWIN is designed for operational use, requiring only basic GIS and interface navigation skills. After a few training sessions, first responders can easily load scenarios, interpret indicators, and coordinate actions using the interactive map.
- CITWIN uses pre-processed and anonymized infrastructure data for visualization and training. It does not interact with live control systems, ensuring maximum safety for personnel and infrastructure.



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