



SPACE4Cities

Opening satellite data for city planning

EUSPA AI week 2026

Forum Virium Helsinki:

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SPACE4Cities' mission

Via a Pre-Commercial Procurement of innovative and smart use of satellite data, the SPACE4Cities project aims to build replicable solutions for better and more dynamic management of public areas, green spaces, transport infrastructure and city maintenance – and cities' overall resilience and functionality.

SPACE4Cities in Short

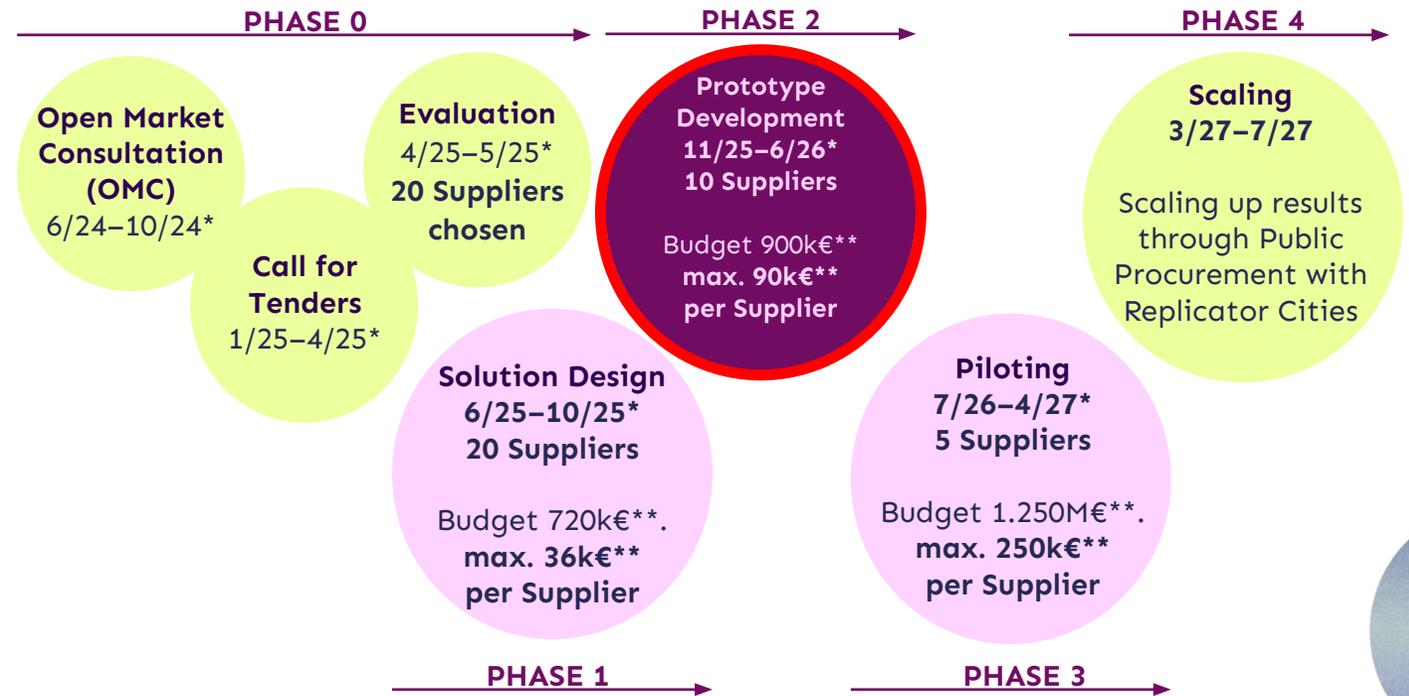
Pre-Commercial Procurement, funded by EUSPA, Coordinated by Forum Virium Helsinki

Timeline: February '24 to July '27

Partnership: 6 Procuring partners + 1 expert organisation

Budget: 5.2 M€, incl. 2.87M€ for Suppliers.

Max. funding per Supplier: 390k€



(*) Dates, number of suppliers and budget are indicative until the Call for Tenders is published.

(**) Financial figures are VAT 0%. Total maximum budget per supplier 376 000€.

Three SPACE4Cities Challenge themes

The **objective** of solving the Challenges is to enable European cities to manage urban spaces better and more dynamically over time, utilising satellite data.

Suppliers are required to use Copernicus EO and/or Galileo GNSS data/services as part of their proposed solutions.

Buyers' Group cities offer local & national (open) data sources to be used by Suppliers.

- **Sustainable Mobility, 1 solution:**
 - Traffic emissions monitoring
- **Climate Resilience & Adaptation, 5 solutions:**
 - Monitoring & managing urban greenspaces
 - Monitoring environmental risks
 - Preventing & managing wildfires
- **Urban Planning & Management, 4 solutions:**
 - Monitoring ground deformation & infrastructure damage, incl. cultural heritage site along service infrastructure
 - Monitoring water pipe leaks



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Solutions developed in SPACE4Cities Phase 2

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A closer look at 8 of the 10 solutions developed in SPACE4Cities Phase 2 (Prototype Development)





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Sustainable Mobility Solutions in Phase 2



This project has received funding from the European Union for the Space Programme Agency (EUSPA) via the Horizon Europe research and innovation programme under grant agreement No. 101131955.



DYNAMO - SM

Unlocking Carbon Emission Monitoring Intelligence

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Everimpact



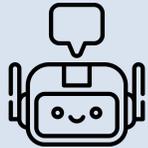
DYNAMO-SM

A Software as a Service Platform to Unlock Carbon Emission Monitoring Intelligence



Follow your city CO2 emission with unprecedented precision.

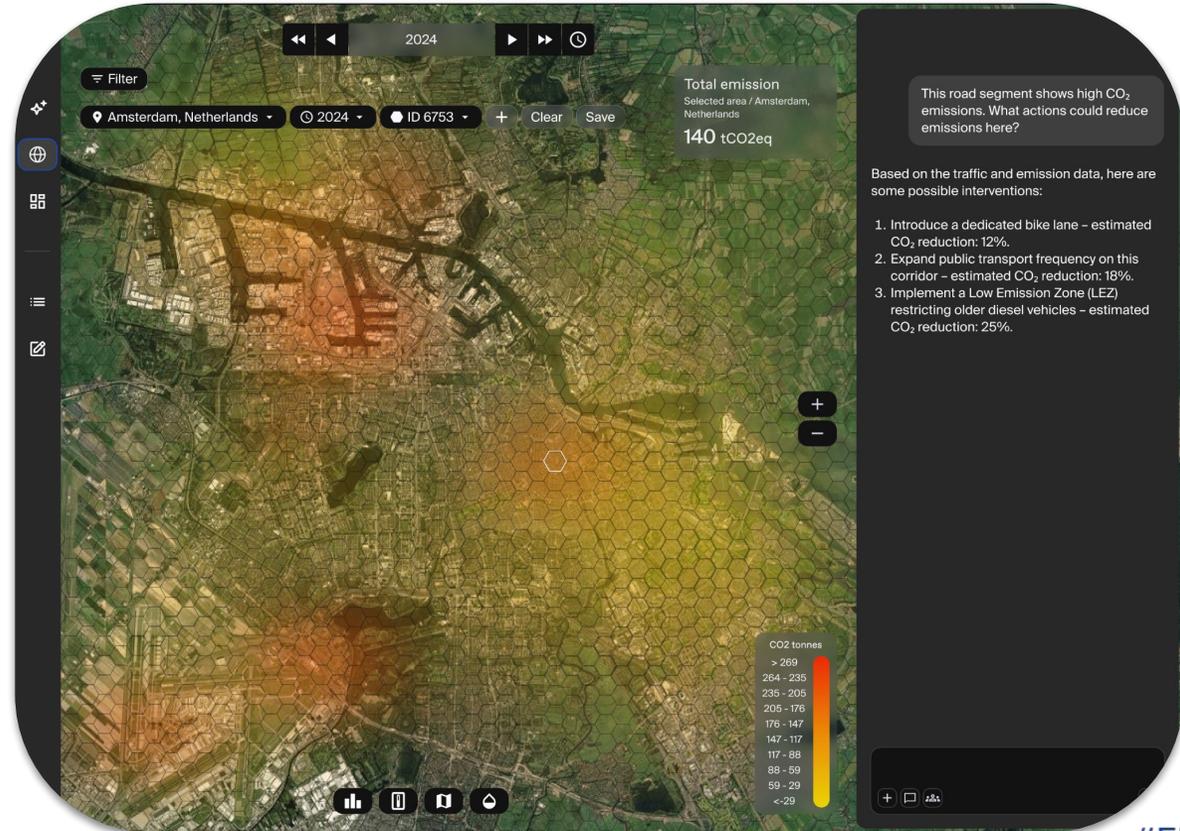
Explore hourly CO2 city maps at 10x10m spatial resolution.



Rely on scalable physics-aware model and on AI Agents to translate complex data into actionable insights.

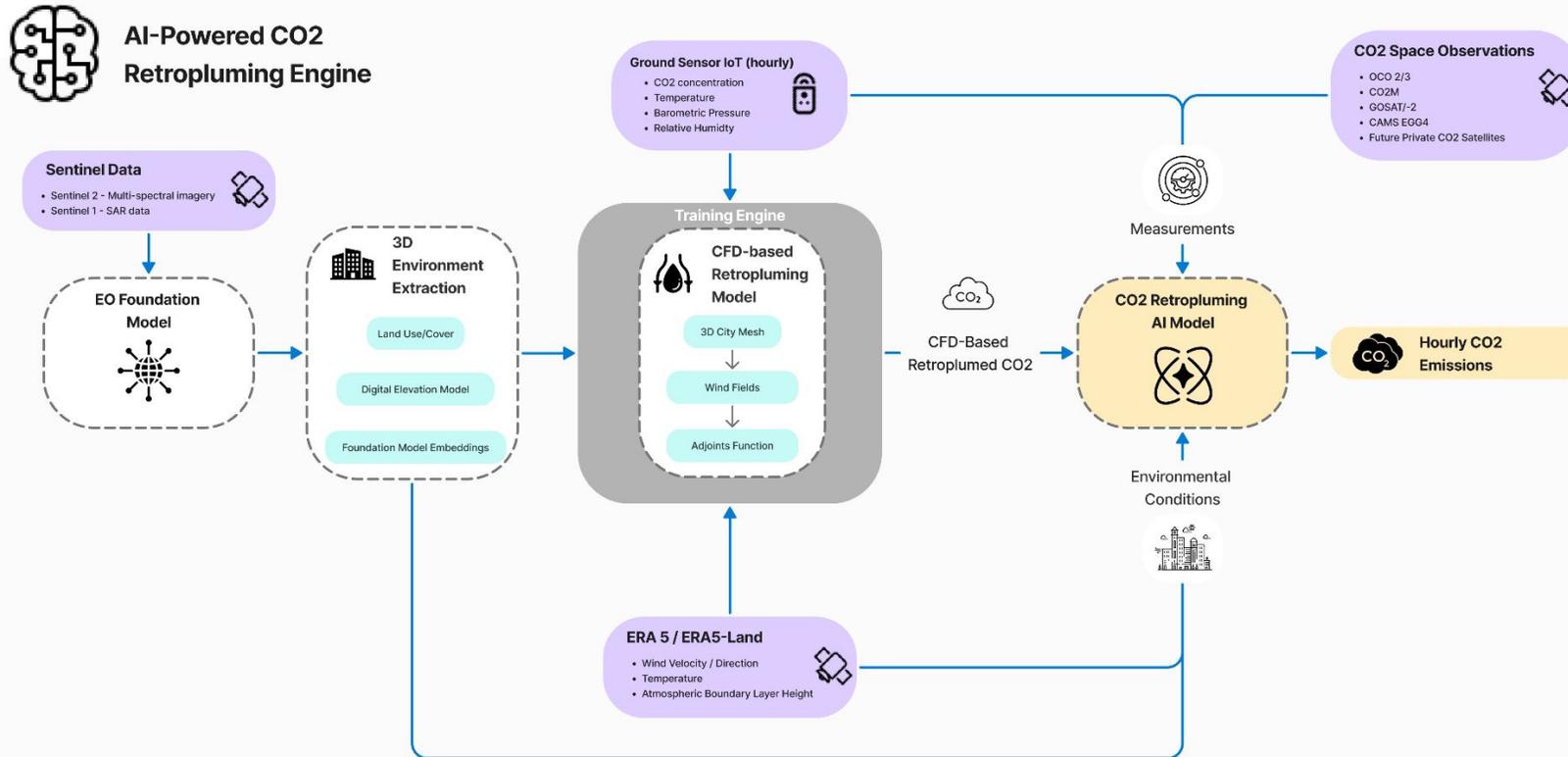


Play with an intuitive dashboard specifically developed for innovative policy-makers.



The ingredients for Innovation

A combination of space data, IoT, AI, and user-centric design



Everimpact AI enables...

1. Running complex physical aware CFD models in **milliseconds**
2. Achieving unprecedented **precision, hourly updates and global coverage**
3. Non technical users to easily extract **actionable insights**



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Urban Planning & Management Solutions in Phase 2



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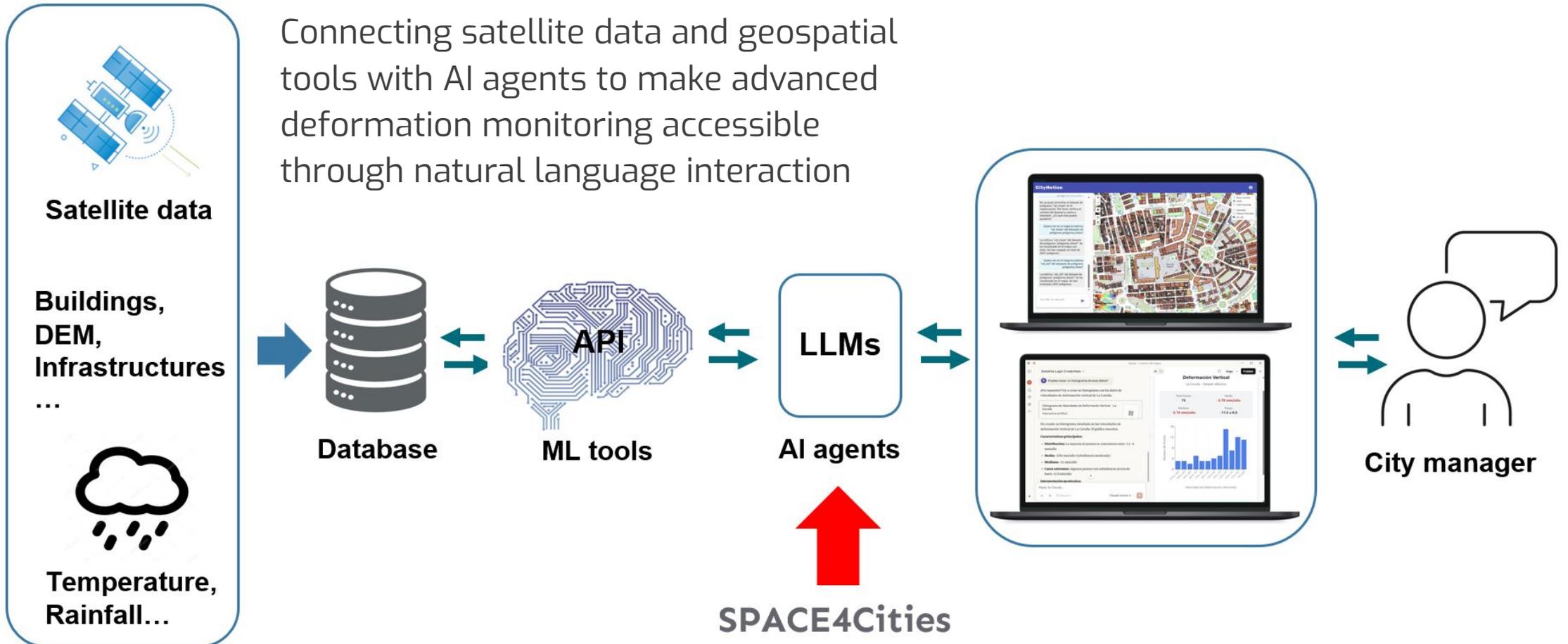
CityMotion

Advanced deformation monitoring

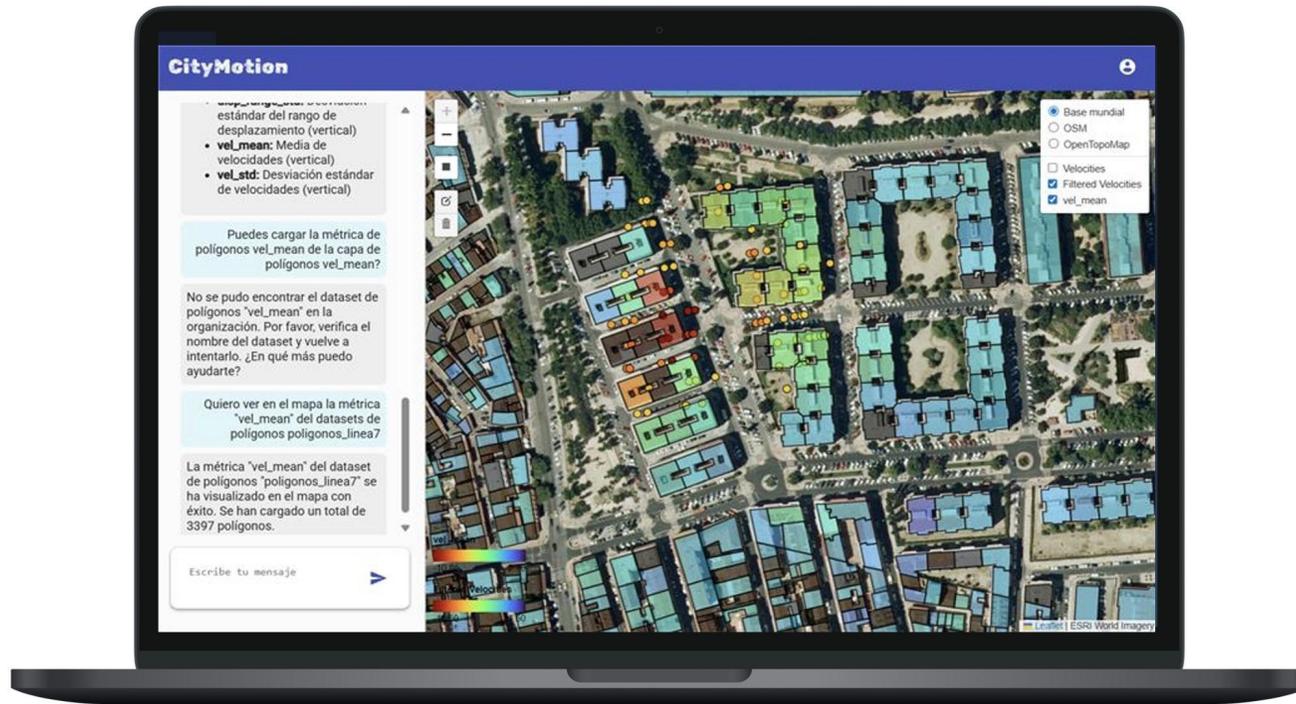
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CityMotion: AI agents for urban stability



AI & LLM-Agnostic Geospatial Agent Architecture



Detektia is developing a model-agnostic geospatial AI agent system, independent of any specific LLM.

It supports commercial models (ChatGPT, Mistral, Gemini, Claude) and open-source LLMs (LLaMA, Mistral, DeepSeek).

LLMs orchestrate geospatial tools and APIs, ensuring flexibility, interoperability, and future-proof AI integration.



GeoRisk Monitor

From Cracks to Clarity: Saving Cities Millions with Accurate Geotechnical Insights

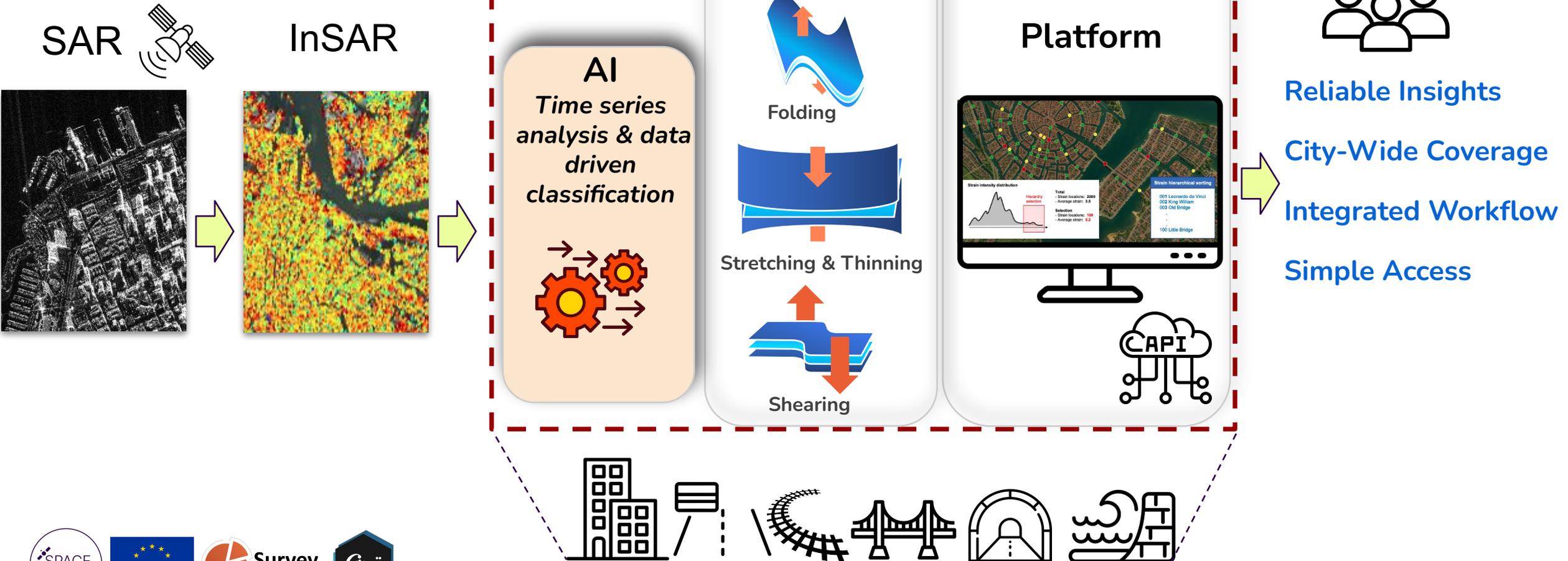
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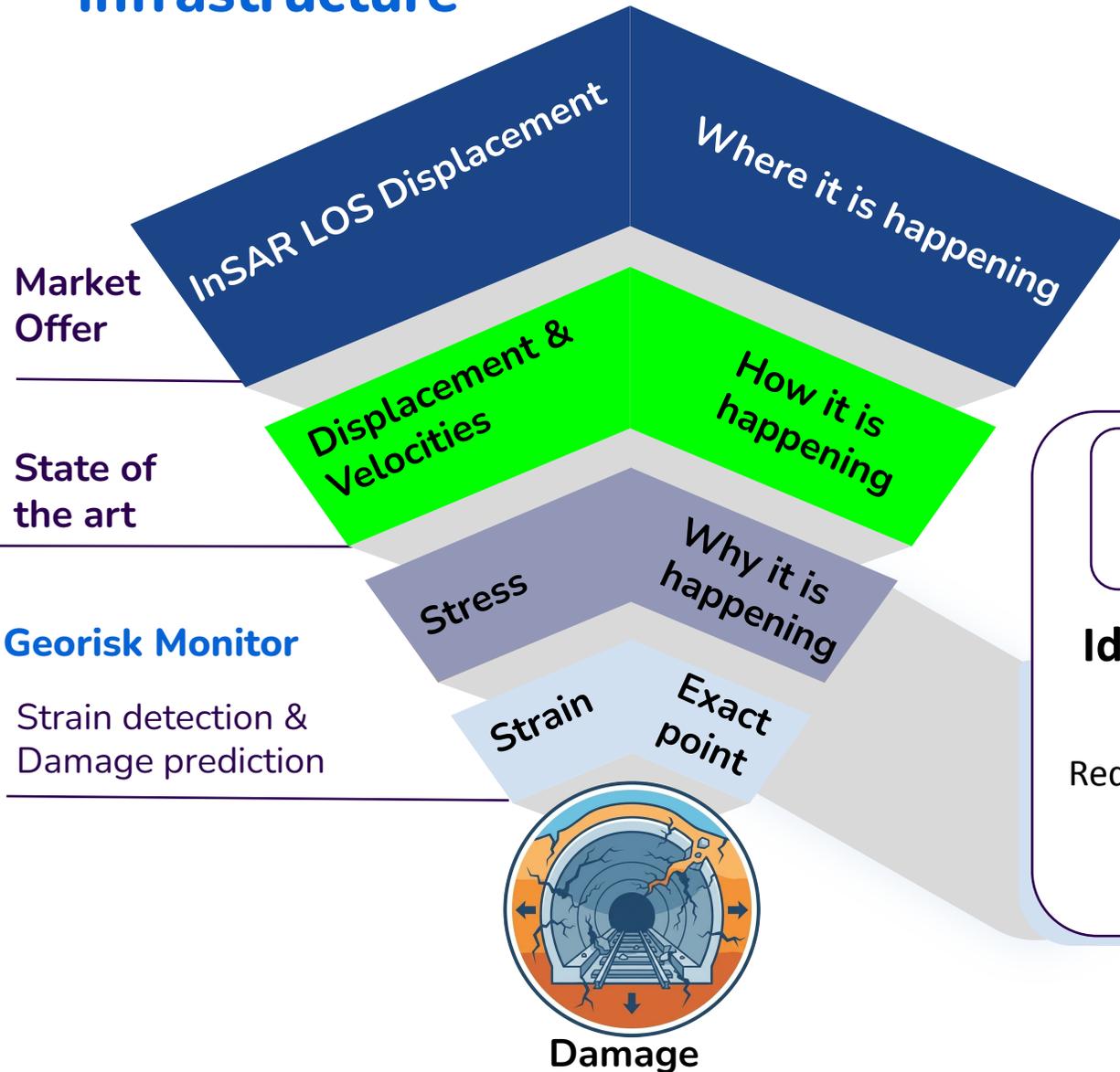
What is GeoRisk Monitor? Monitoring the condition of bridges, roads, and railways



Georisk Monitor



AI that Accurately Predicts Damage on Any Civil Infrastructure



BENEFITS

Identify stress areas
Reduce inspection by 90%

Predictive maintenance
Reduce Cost by 50%

6 to 12 months forecast
Buying time for remediation plan



URBAN-LENS

Satellite-Powered Leak Detection for Smarter Cities

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Urban Water Loss: An Invisible Crisis

European cities **lose 20–40% of treated water through underground leaks** before it reaches homes and businesses. These leaks remain undetected for months, only surfacing when roads collapse or pressure drops dramatically. ***Could satellites help cities manage their underground water networks?***

Urban Lens fuses two major European space assets into a powerful detection system that transforms how cities monitor water infrastructure.

- **Copernicus Sentinel-1:** InSAR radar interferometry detects millimeter-level ground deformations indicating subtle subsidence or uplift from persistent underground leaks;
- **GNSS-R Reflectometry:** Multi-constellation reflectometry measures soil moisture changes by analysing satellite signal reflections from the ground surface.

When combined, deformation and soil moisture data reveal leak locations with significantly higher confidence. Our platform automatically processes this information, creating a unified geospatial model with anomaly confidence scores for every pipe segment.

From Orbit to Street-Level Action

- Space Data Collection: Copernicus and GNSS continuously provide orbital data, analysed automatically for anomalies.
- Ground Validation: Drive-by GNSS-R sensors on existing city vehicles—buses, waste trucks, taxis—gather complementary data with zero new infrastructure.
- Intelligent Fusion: Our platform automatically combines all datasets and generates prioritised alerts.
- Actionable insights: City engineers access the Viewer to see anomaly maps, filter by district or time, and receive ranked leak locations with confidence scores.

TARGET END-USERS:

- Municipal water utilities and infrastructure operators;
- Local authorities and environmental agencies;
- Urban planning and resilience departments.

EXPECTED IMPACTS:

- –50% detection time for hidden leaks;
- –30% reduction in non-revenue water;
- Fewer emergency excavations and traffic disruptions;
- Long-term benefits: predictive maintenance, lower energy use, improved CO₂ balance and citizen trust.





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Climate Adaptation Solutions in Phase 2



This project has received funding from the European Union for the Space Programme Agency (EUSPA) via the Horizon Europe research and innovation programme under grant agreement No. 101131955.



VISTA

From raw data to practical urban nature intelligence using AI/ML

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VISTA's approach to turning raw data into practical **urban nature intelligence**: assessment of tree response to extreme events through satellite data

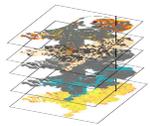
Data

Information

Insights



Earth
observation



Geospatial
information

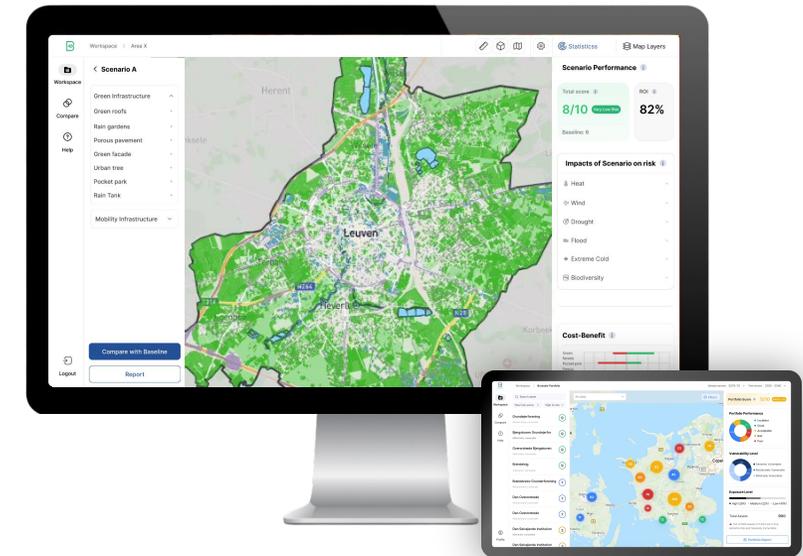


In-situ
sensors

- Vegetation health indices
- Land surface temperature
- Climate projections

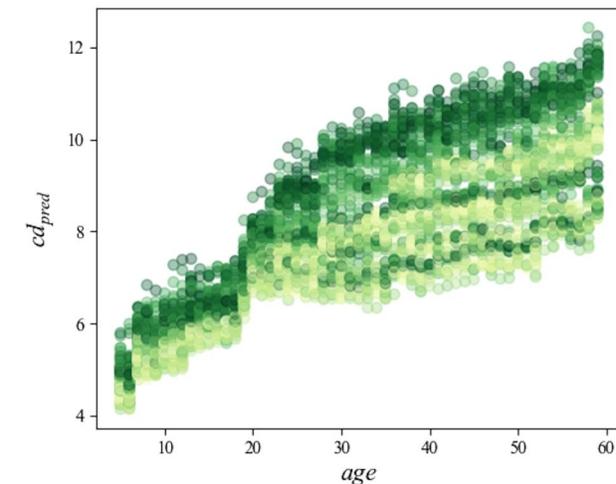
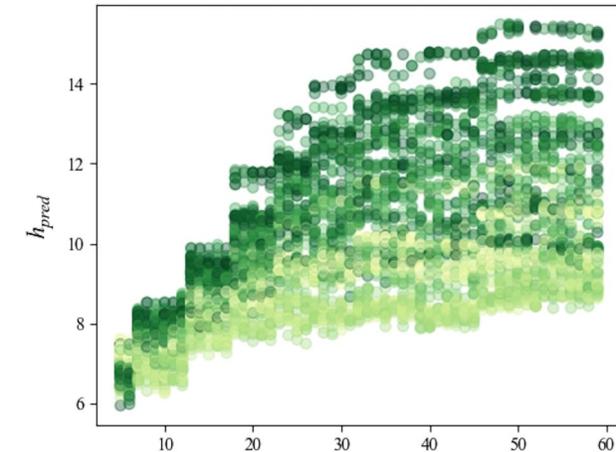
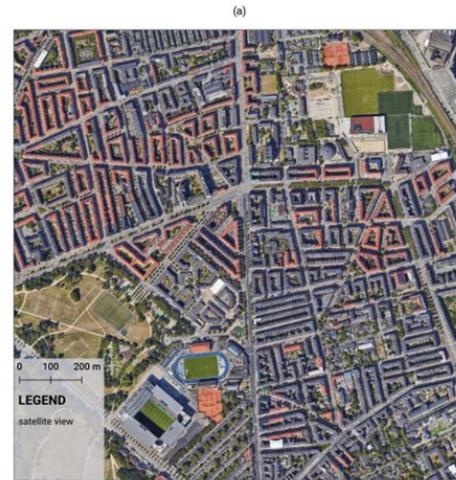
- Land use
- Building footprint
- Road network

- Tree vitality
- Vegetation stress
- Irrigation needs



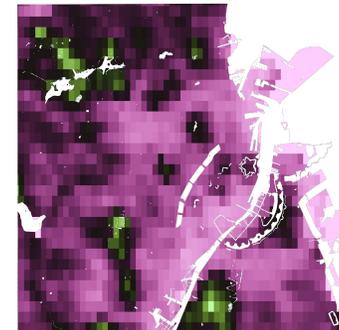
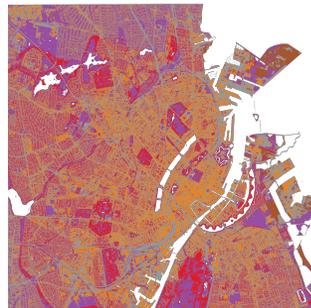
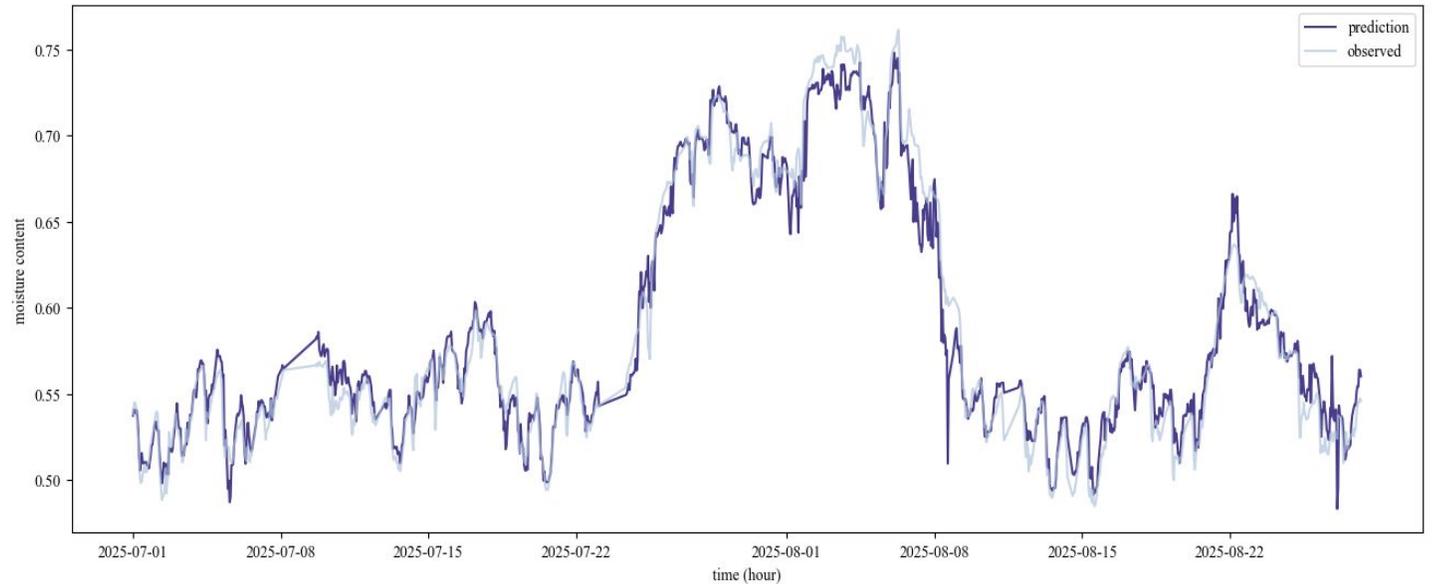
Urban tree growth ML model using remote sensing data

- Model trained on selected tree species and local environmental features through semi-supervised learning
- Sunlight exposure, distance to buildings
- Projected tree growth over years after plantation



Vegetation monitoring through weather data and sensor measurements

- Data-driven models for predicting tree level health using historical weather data
- Hourly sensor measurements on tree moisture content
- Time varying moisture content prediction for single trees
- High resolution land cover combined with temporal NDVI and LAI





UrbanROOTS

From Observation to Action

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Use of European Satellite Data

The Solution: *UrbanROOTS is an integrated urban planning and monitoring platform that enables: 1) Continuous monitoring of urban green areas and land-use change; 2) Quantification of carbon sequestration and ecosystem services; 3) Early detection of unauthorized development.*

UrbanROOTS is fundamentally driven by European Earth Observation data to ensure continuous, scalable and objective monitoring of urban green infrastructure.

Copernicus Sentinel-1 and Sentinel-2: Provide systematic, pan-European coverage for land use, vegetation dynamics and change detection, enabling consistent monitoring across cities and over time.

GEOSAT-2 (Very-High Resolution): Complements Sentinel data (it is a Copernicus Contributing Mission) with sub-metric (<1m) detail to support tree-level analysis, fine-scale vegetation mapping and verification of zoning/land-use compliance.

Multi-Resolution Data Strategy: Combines frequency and coverage (Copernicus) with spatial precision (VHR) as well as LiDAR, where applicable, allowing UrbanROOTS to scale from city-wide monitoring to asset-level urban management.

Satellite data is used as an operational input for urban decision-making, not as static imagery.

How AI is used in UrbanROOTS



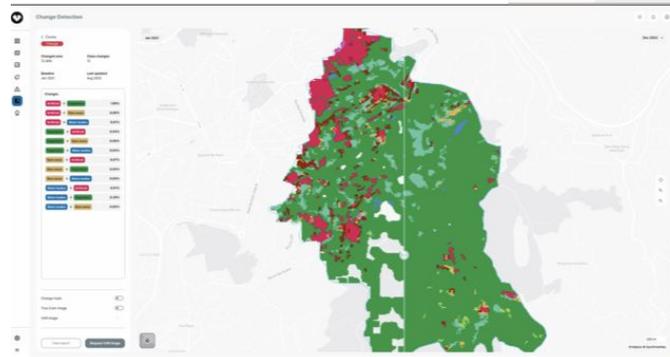
UrbanROOTS uses **AI to transform continuous satellite data streams into consistent, comparable and actionable information for city authorities.**

AI for land-use and vegetation analysis: Machine learning models process multi-temporal satellite data to classify land use, detect vegetation change and identify trees at urban scale.

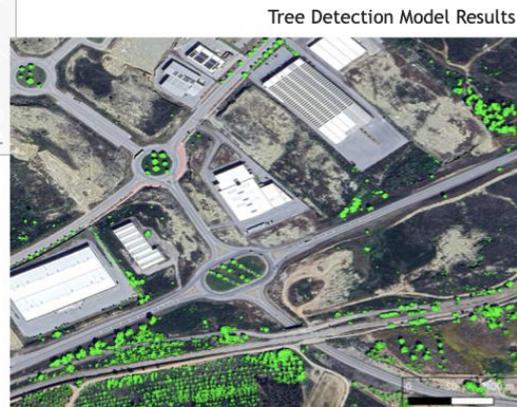
AI for change detection and early warning: Time-series analysis highlights relevant deviations from baseline conditions, supporting early identification of green space loss or unauthorized development.

AI embedded in operational workflows: Models are integrated into automated EO pipelines, ensuring repeatability, traceability and regular updates rather than one-off analyses.

AI is used to **support informed urban decisions, not to automate enforcement.**



Detect changes in Land Usage





CLIMAPS

From space data to climate action

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SPACE4Cities: CLIMAPS solution

Multi-risk AI Climate Models

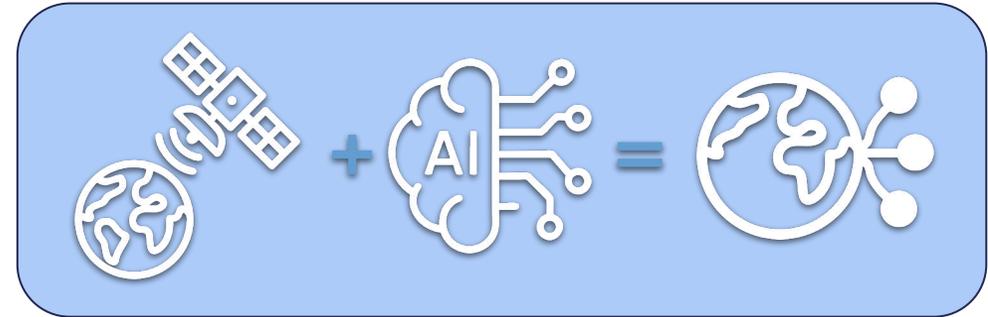
AI-powered, multi-parametric models tailored to key urban climate risks (Urban Heat Island, flooding, vegetation stress), dynamically updated with Copernicus, IRIDE and open data.

AI-driven Decision Support Platform

An integrated decision-support dashboard for urban planners and policymakers, enabling scenario analysis, climate KPIs monitoring and evidence-based planning.

Generative Urban Climate Simulator

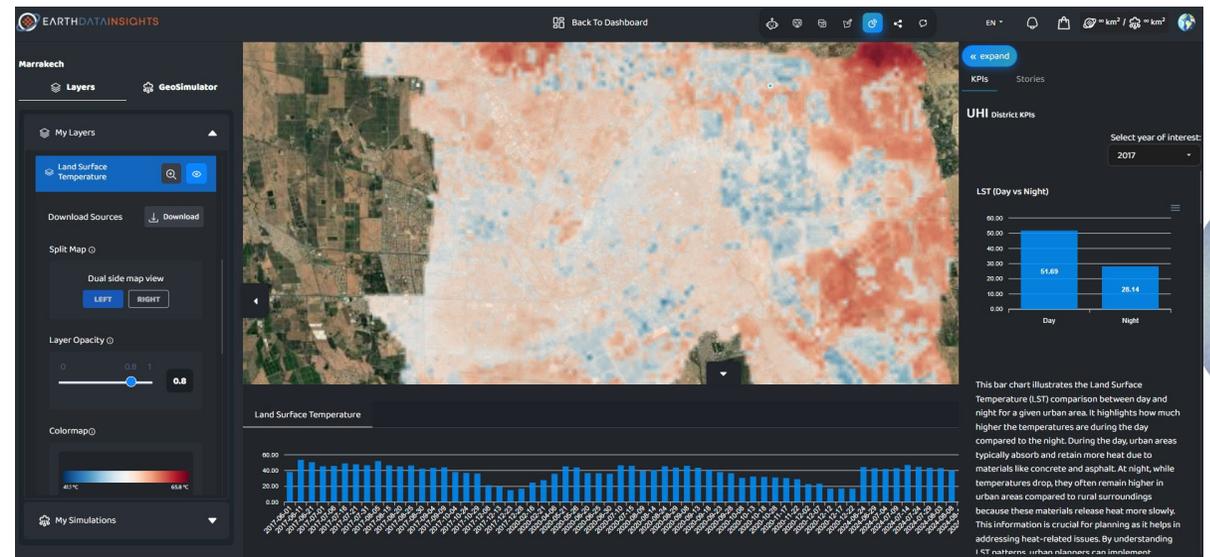
Using Generative AI to visualize future satellite imagery under various mitigation scenarios, enabling spatial and visual comparison of interventions



RAW DATA FROM SPACE

AI PIPELINES

ACTIONABLE INSIGHTS & SIMULATIONS



CLIMAPS AI-powered Solutions

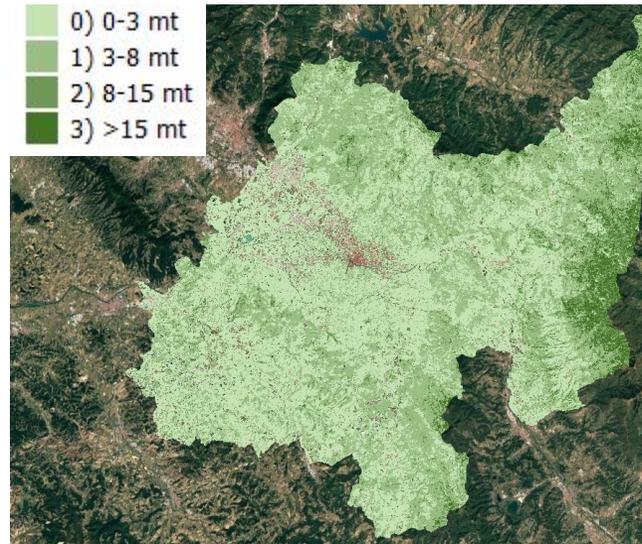


Urban Impermeability



Unet (Deep Learning)

Urban Greenery Analyzer



Pixel-wise XGBoost applied to Multispectral and SAR imagery

Urban Simulator



Generative AI to evaluate the impact of mitigation actions

And more..



AI-WUIFIRE

Satellite data for Wildfire Prediction

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V E X I Z A



AI Applications in Wildfire Prediction

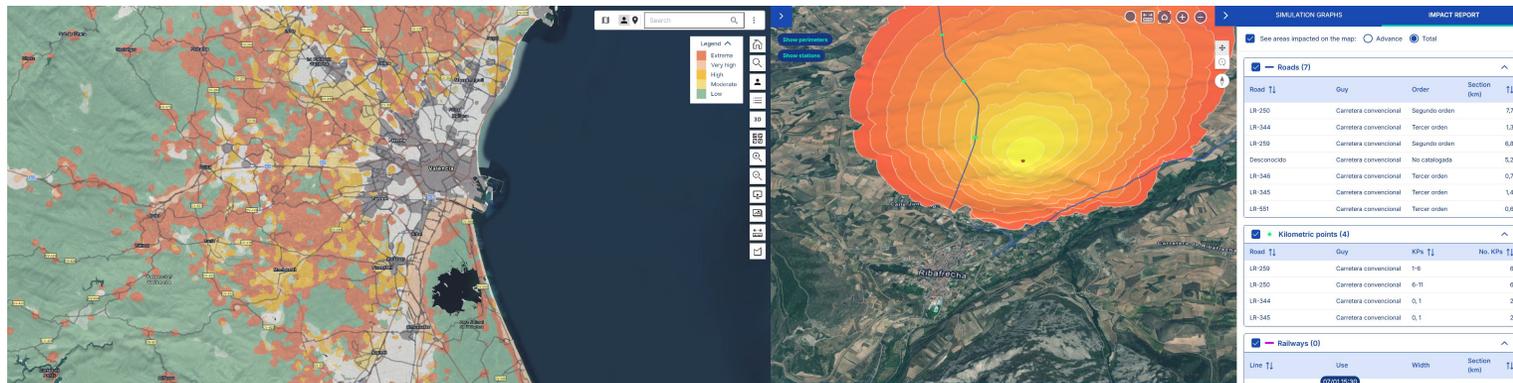
The solution utilizes AI algorithms to predict the risk and dynamics of fire behavior (crown, surface, intermittent):

- **Key Input data:** Sentinel-1 (to analyze forest fuel structure and load; Sentinel-2 (to derive vegetation biophysical indices); Sentinel-3 (fuel moisture) Canadian Fire Weather Index (forecasts up to 10 days ahead, sourced from Copernicus); Copernicus DEM GLO-30
- **Machine Learning - Random Forest (RF):** Chosen for its ability to handle high-dimensional data and model nonlinear interactions between fuel, weather, topography, and fire behavior
- **Extensive training set for the AI:** >100,000 ground-truth points derived from the Spanish National Forest Map. The region's climatic and vegetation heterogeneity covers Mediterranean, Atlantic(oceanic), and even boreal ecosystems. Training the model under these diverse conditions ensures its broad transferability to other contexts across Europe.

Main features

The primary output of the AI-WUIFIRE solution is a set of spatially explicit raster data products that predict the potential fire type near WUIs areas. These outputs will be updated with the latest available satellite imagery and meteorological forecasts.

- **A categorical fire type map:** Each pixel is classified into one of three potential fire types.
- **Probabilistic fire type maps:** Three separate raster files (1 per fire type). The pixel values will range from 0 to 1, representing the probability of that specific fire type occurring at that location under the given conditions.



This information is complemented by other **GIS tools**, such as a **Wildfire simulator**, Post-fire satellite imagery...



Conclusions and Key Takeaways

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Use of Satellite Data and AI in SPACE4Cities



Solution	Use Case	Satellite Data	Use of AI
AI-WUIFIRE	Wildfire prevention	Sentinel-1, and -2, CEMS, Copernicus DEM GLO-30	Machine learning: Random Forest; Support Vector Machines; Deep Neural Networks.
CHERISH (not presenting)	Cultural Heritage protection	Sentinel-1, EGMS	Unsupervised Machine learning (unsupervised, Moran's I and LISA).
CityMotion	Infrastructure monitoring	Sentinel-1, EGMS	Geospatial AI agents (Model Context Protocol), Unsupervised machine learning, Large Language Models (multiple options).
CLIMAPS	Climate / environmental risk monitoring	Sentinel-1, -2 and -3, C3S, ERA5, PlanetScope VHR, IRIDE	Machine learning (multiple models), Generative AI to visualisation and modeling.
DYNAMO-SM	Traffic emissions monitoring	Sentinel-1, -2, and -5P, ECMWF, CAMS, Galileo GNSS	EO Foundation Model (Thinking Earth TerraMind), Computational Fluid Dynamics (CFD), LLM Co-Pilot (Mistral AI).
GeoRisk Monitor	Infrastructure monitoring	Sentinel-1, CLMS & EGMS	Stochastic methods and InSAR algorithms.
OPTIM-Green (not presenting)	Green space monitoring	Sentinel-1, -2, -3 and -5P, Copernicus CDS and SMOS	Machine learning: Random Forest, physics models.
URBAN LENS	Water leak detection	Sentinel-1, Galileo multi-freq signals (E1, E5a, E5b)	Statistical models: Bayesian inference and probabilistic fusion.
UrbanROOTS	Monitoring greenspaces	Sentinel-1 & -2, CEMS, GEOSAT-2 VHR	Machine learning: Random Forest; Mask Region-based Convolutional Neural Network
VISTA	Monitoring greenspaces	Sentinel-2, C3S, CLMS	ML predictive modules, Mask Region-based Convolutional Neural Network

Use of Satellite Data in SPACE4Cities: Key Takeaways

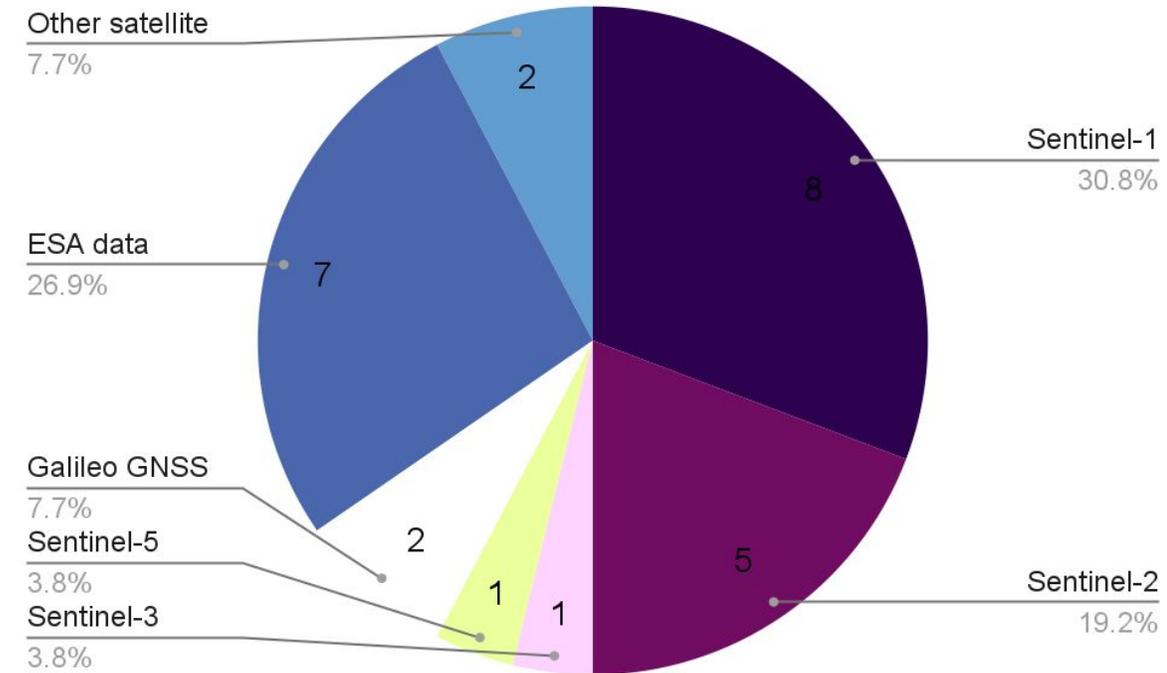
Cities underuse satellite data, that offers affordable and useful insights.

- Satellite data allows surveying large areas with consistent updates.
- Radar satellite data from Sentinel-1 is especially useful for its accuracy in monitoring 3D cityscape.
- Earth Observation data gives updates on land use, green spaces, environmental conditions in cities.

ESA data products offer great value

- CLMS, EGMS, C3S, CEMS etc.
- Copernicus Data Space Ecosystem available for public servants for free.
- Galileo GNSS offers positioning and navigation data on par with GPS.

Suppliers utilising different satellite data sources



Use of Artificial Intelligence in SPACE4Cities: Key Takeaways

Level of technical competence required to create insight from data.

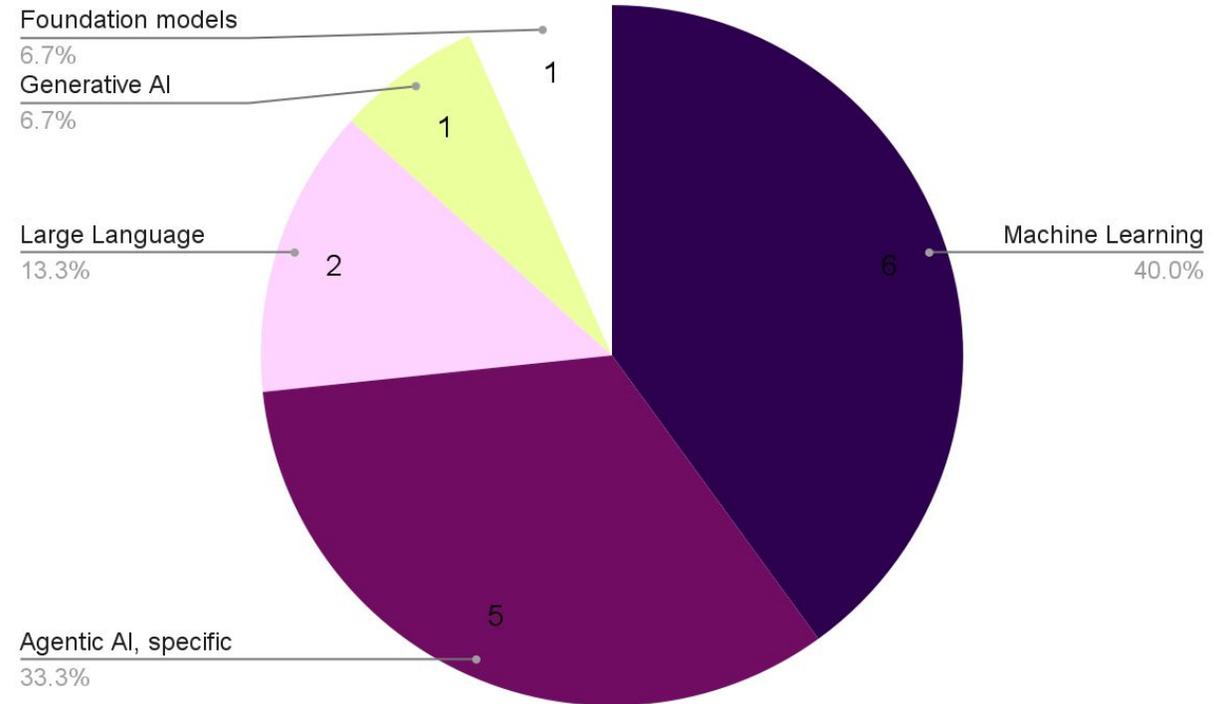
Machine learning and agentic algorithms are suited in analysing satellite data and create predictions.

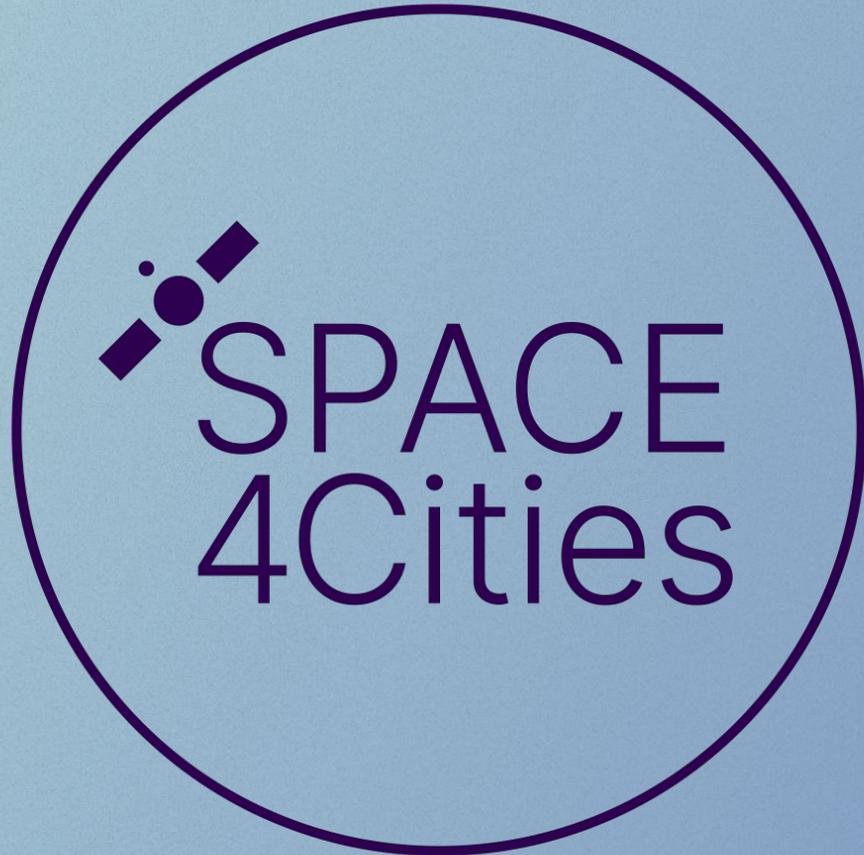
- Copernicus Foundation Models by ThinkingEarth available for free.

Generative AI and LLMs helps with usability, interpretations & predictions.

- The raw data needs processing before it is "LLM-ready".
- Gen AI and LLMs require rigorous testing to avoid mistakes.

Suppliers utilising different AI approaches





questions@space4cities.eu

Next steps:

- 10 Prototypes finished end of April 2026
- 5 winning solutions selected: June 2026
- Real-life trials between Aug. 2026 - Febr. 2027 in
 - 5 partner cities: Helsinki, Athens, Amsterdam, Ghent, Guimaraes 8/26 - 2/27
 - 10 Replicator cities 12/26 - 2/27
- Commercialisation from spring 2027 onwards
- More info: space4cities.eu
 - Call for Replicator Cities July-August 2026
 - Sign up for the [newsletter!](#)

Thank you!

Ari Kaukiainen and Renske Martijnse-Hartikka
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#EUSpace 



Linking space to user needs

Get in touch with us

www.euspa.europa.eu



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