Gaia-X Voices:
Use-Case Testimonial

iris360 Data Space: Turning City Data into Decisions

Libelium

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1. Introduction

a. *Brief overview of organisation and Industry*

Libelium acts as an Accelerator of the digital transition. Our mission is to build a more sustainable, resilient, and datacratized world by creating environmental digital twins that help companies and cities in decision-making.

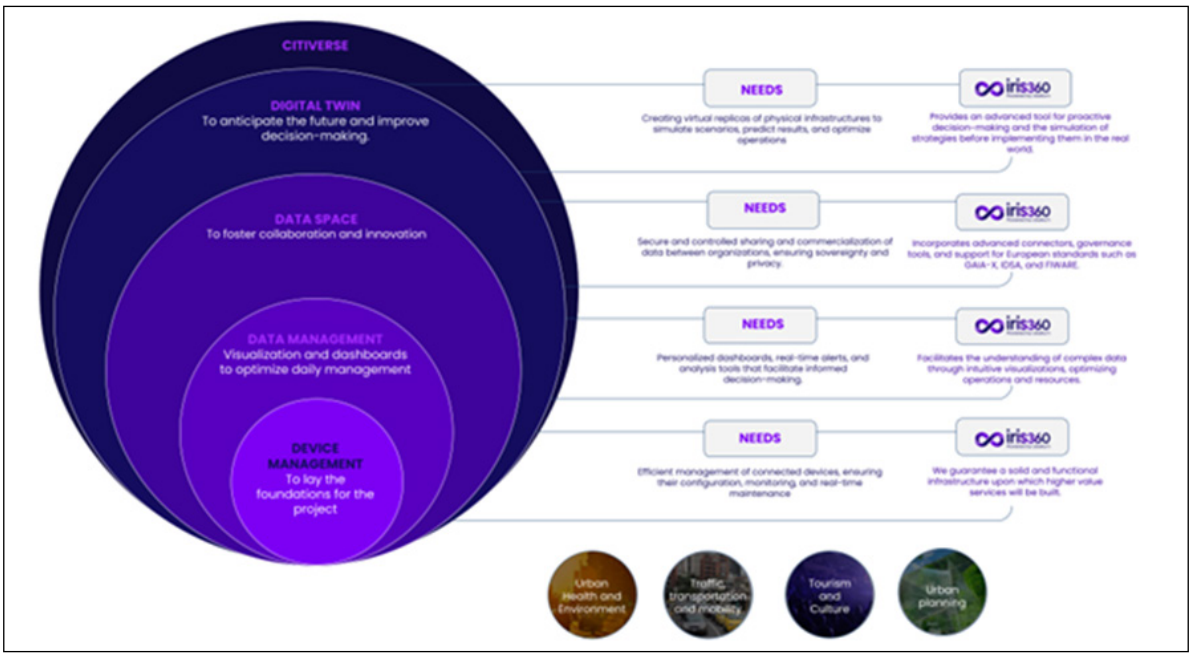
Through our iris360 business line, we connect Local Digital Twins, geointelligence, and market-ready data spaces. We help cities discover, trust, and safely use data and AI services to simulate climate and operational scenarios. We are active members of Gaia-X and collaborate with the Eclipse Foundation, IDSA, and FIWARE to drive the data economy.

b. *Main stakeholders and the roles they play in designing the use-case*

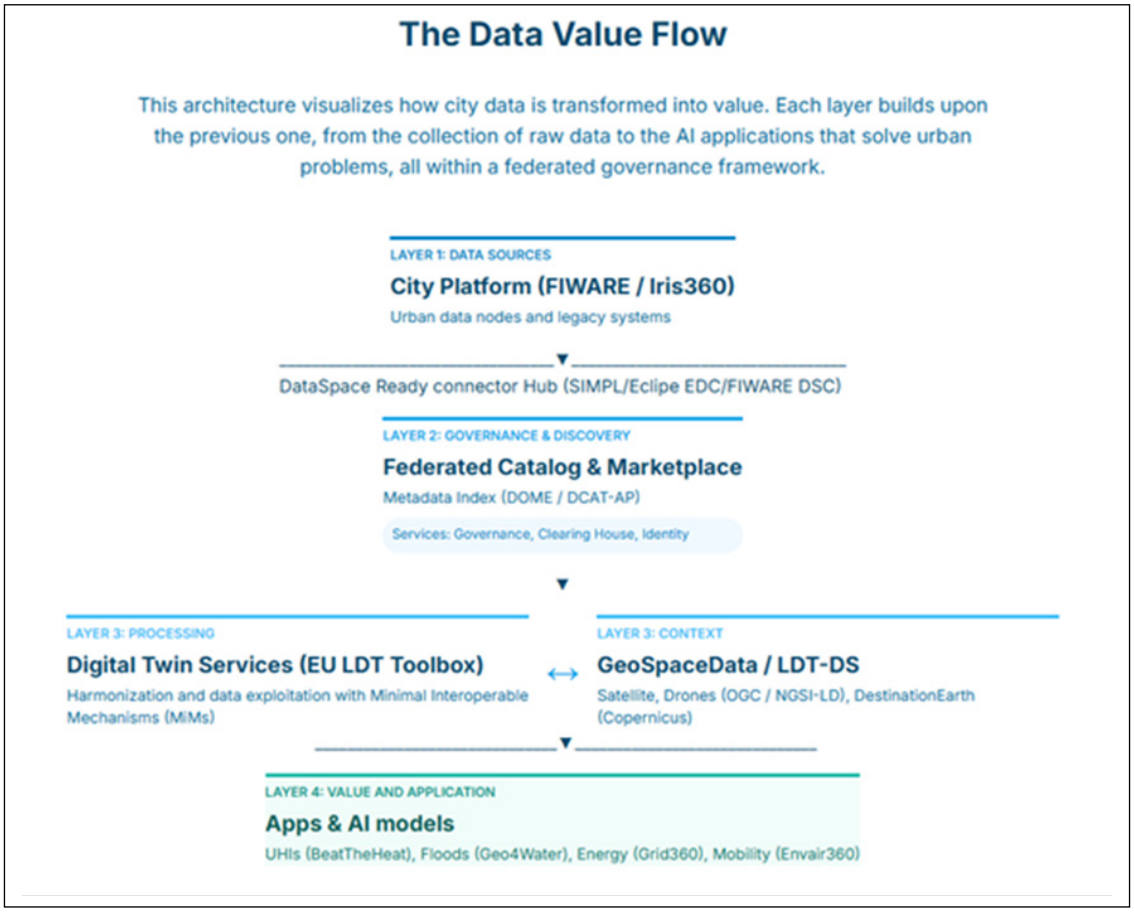
This use case is not theoretical; it is alive in the City of Valencia. The main stakeholders are:

- **The City (Valencia)**: Acting as the data owner and space governor, Valencia defines local policies and consumes "data products" to drive decisions with precision.
- **Technology Provider (Libelium -iris360)**: We play the role of the Accelerator, impulsing and connecting the ecosystem. We deploy the "Data Space Ready" connectors, the federated catalogue, and identity mechanisms.
- **Data Providers**: Utilities and agencies providing satellite and drone data to capture the pulse of the environment in real-time.
- **Service Providers**: Partners like Nunsys (AI models) and academia (Polytechnic University of Valencia) who create value on top of raw data.

iris360 follows a layered approach by taking the IoT data and transforming it into knowledge. All this data is exploited thanks to the Digital Twin capabilities to bring AI into action, that are finally valorised with data-driven and AI-empowered services in the Citiverse as SENSE Citiverse and Data Space (https://portal.senseverse.eu/).



A simple map of the moving parts in this stack can be in detail in the following data value flow.



From the current Smart City and Urban platforms based on FIWARE to the capacity with the Data Spaces using the Data Space Ready Connector Hub developed in the context of the EU LDT Toolbox to connect to multiple catalog/marketplaces using the FIWARE Data Space Connector and the Eclipse DataSpace Connector (EDC), thanks to this interconnection we have access to high-value datasets as the geospatial layers (satellite, LiDAR, drones) from DestinationEarth via OGC and NGSI-LD standards to enable the integration of different as timeseries from IoT from DS4SSCC DataSpaces.

2. Context & Challenge

a. *Brief description of the problem that the use-case addresses*

Cities face growing environmental urgency: heat waves, flood risks, and traffic emissions. To address this, they need a profound, hyperlocal understanding of their environment. However, the urban data needed is fragmented across silos.

Currently, combining satellite, drone, and IoT sensor data with administrative records is costly and lacks governance. Without a shared trusted identity, valuable datasets remain underused. Cities struggle to move beyond data, finding it difficult to anticipate disasters or justify infrastructure investments effectively.

3. Solution description

a. *Solution implemented to address the identified challenges*

The iris360 solution creates a federated, standards-based fabric that allows cities to join a data ecosystem with minimal disruption. We use a replicable architecture called LDTDS (Local Digital Twins Data Space). Instead of building a giant centralized platform, iris360 connects the city's existing platform to a federated marketplace via a "Connector Hub". This enables the city to securely discover and purchase AI services from third-party providers. The solution integrates geospatial data (GeoSpaceData) and EU LDT Toolbox tools, BeatTheHeat (for urban heat islands) and Geo4Water (for flood risks), allowing for advanced "what-if" simulations with full data sovereignty.

b. *Role of technology in the development and deployment of the solution*

iris360 technology aligns with the Gaia-X Trust Framework to ensure sovereignty, transparency, and federation. The use of open connectors (such as Eclipse EDC and FIWARE) and identity standards (OIDC) allows different actors to exchange data under clear usage rules (ODRL). This eliminates vendor lock-in and ensures the legal traceability of every data transaction, from source to consumption in an AI model.

- **Connect**: We connect reality with insight. Using open connectors (Eclipse EDC, FIWARE) and identity standards (OIDC), we integrated Valencia's sensors with EU-level datasets like **Destination Earth**.
- **Empower**: We empower decisions with precision. By aligning with the Gaia-X Trust Framework, we ensure transparency, giving city officials the power to act with confidence.
- **Transform**: We transform data into sustainable impact. The technology moves the city from simple measurement to "what-if" simulations, accelerating the path to resilience.

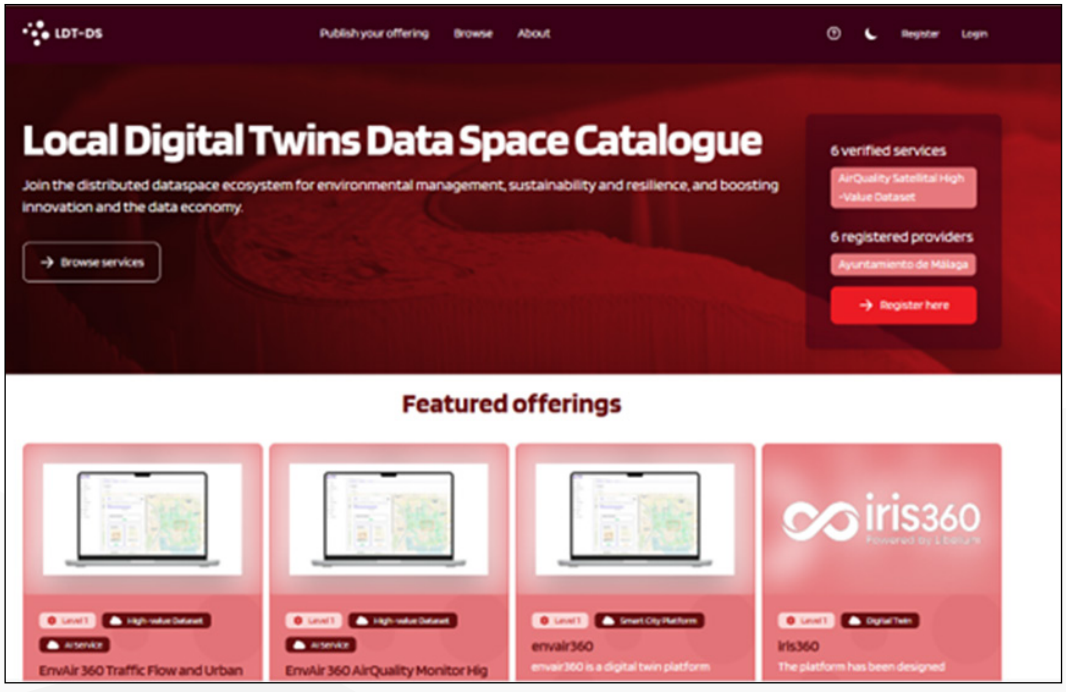
4. Implementation

a. *How the solution was integrated into the use-case organisation's existing systems or processes*

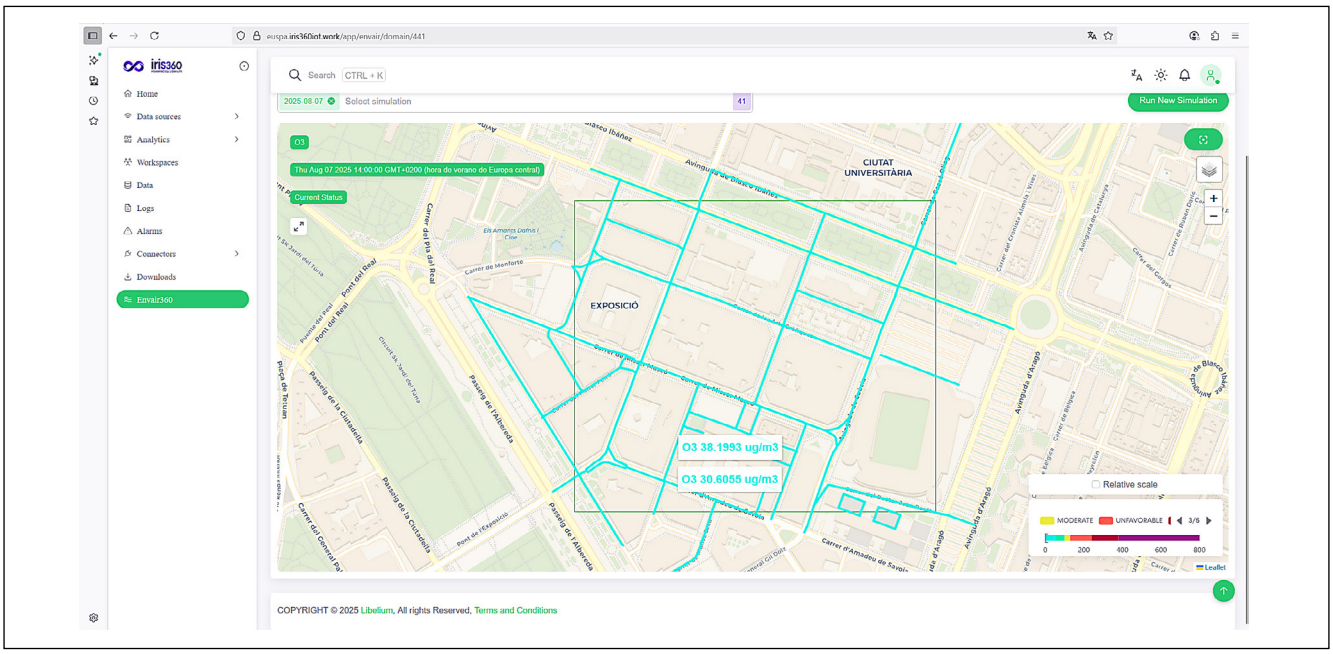
Valencia is a major consumer and generator of data, utilizing a well-established foundation for implementing and feeding AI models. This is demonstrated by their existing geospace portal, which aggregates data from various verticals.

iris360 operates as a federated, standards-based fabric that cities can join with minimal disruption:

- LDT-DS as the reference space for cities: a replicable architecture, with city-owned **iris360** installations, open-source building blocks, and a governance model compatible with DSSC/IDSA/ FIWARE/Gaia-X.



- **Data Space Ready**, a multi-connector hub that speaks FIWARE, Eclipse and SIMPL for quick and seamless data space onboarding backed on DOME Marketplace.
- **GeoSpaceData**, the **geospatial extension** for real-time context; governed and marketplace-enabled with clearing-house traceability.
- **EU LDT Toolbox** integration. Valencia can reuse AI models and tools from already tested cross-city models and data-services for sustainable urban planning. For example flood or heat simulations leveraging from DS4SSCC pilots, like BeatTheHeat and Geo4Water or air quality emissions algorithm modelling like envair360 by Libelium.



Integration is designed to be "Plug & Play". Cities can onboard their current platforms using the Data Space Ready connector. In the success story of Valencia, the city benefits from a single federated portal. Officials can use urban planning algorithms and EU building databases, correlating them with local climate data, without deep integration or re-engineering of legacy systems. Only middleware components are added to act as agents for publishing and consuming services.

b. *Significant milestones or challenges during the implementation phase*

Stakeholder	Description of challenge	Dimensions					Level of difficulty experienced (Low, Medium, High)
		Design of the use-case	Governance of participants	Development of elements & apps	Integration of systems & participants	Using the use -case	
City (Valencia)	Harmonize legacy + IoT + geospatial policies & access	✓	✓		✓	✓	High
iris360 (Libelium)	Multi-connector federation (FIWARE/ EDC) with Catalog	✓		✓	✓		Medium
Data providers	utilities, agencies, open-data portals, satellite/drone providers licensing & ODRL policies for continuous feeds		✓		✓		Medium
Service providers (AI)	AI model vendors (e.g., urban heat, mobility emissions, flood damage), visualization tools, and domain apps, packaging models as "data services" with SLAs.	✓		✓		✓	Medium
Academia / SMEs	Low-friction discovery & onboarding			✓		✓	Low

5. Benefits & Impact

a. *Benefits for stakeholders*

Description of benefit	Dimensions				Role this benefit applies to
	End users	Legal & Governance	Functional & Participant related	Technological	
One federated catalog (Datasets + Services)	✓	✓	✓		City / Tech Provider
Multi-connector access to EU/ National spaces	✓	✓		✓	Tech Provider / Service Providers
Semantic & geospatial interoperability	✓		✓		All Participants
Sovereign data sharing with identity & policies		✓		✓	City / Data Providers
Model reuse (Heat, Floods)	✓	✓	✓		Service Providers / Cities

b. *Benefits for the end-users*

The implementation of iris360 delivers a wide array of tangible advantages directly to the final users, significantly enhancing their cities management, interaction and wellbeing.
These benefits can be categorized into several key stakeholders:

- **Citizens**: Receive clearer information on air quality and heat risks. Early flood warnings directly improve safety and mobility.
- **City Services**: Can perform evidence-based zonal interventions—such as identifying exactly where to install shading or calm traffic—optimizing resources.
- **Local Economy**: Local SMEs gain access to a federated market where they can build products on top of authoritative, trusted data. This democratizes access, fostering innovation without high barriers to entry.

6. Added Value through Gaia-X

a. *Alignment with the Gaia-X vision*

Our governance and technology approach embodies the essence of Gaia-X: data sovereignty, transparency, and federation. We aim for a datacratized world, where trust is turned into an auditable technical layer. This allows public and private organizations to collaborate without losing control over their assets.

b. *Alignment of current architecture and technology stack with the Gaia-X technology model, and any convergence needs*

We operationalize Gaia-X using Self-Descriptions, identity based on Verifiable Credentials (VCs), and federated catalogs. Our integration with Gaia-X Trust Services (GXDCH - Digital Clearing House) allows for automated credential verification, ensuring all ecosystem participants comply with European transparency and security rules.

7. Use-case scaling

a. *Requirements and steps for a new member (user, provider, or service providers) to join use-case*

The process is standardized through the iris360 portal:

1. Sign the participation agreements and ecosystem rulebook.
2. Set up a connector (FIWARE or Eclipse EDC) and publish metadata to the Marketplace.
3. Establish identity and usage policies. Once completed, the new member is visible and operational across the federated data space.

b. *Other sectors that could benefit by making use of the resources in this usecase*

Beyond urban planning, this architecture is replicable in sectors such as Tourism (flow management), Energy (smart grids), and Mobility, leveraging existing EU data space initiatives.

8. Next steps

a. *What are the next steps of your project functionally-speaking?*

Aligned with the latest Gaia-X developments, in particular the Gaia-X Trust Framework 3.0 "Danube" release, which introduces extensibility mechanisms to automate compliance and interoperability across ecosystems, and also with the new Notary opportunities and Labels, where Libelium will lead the Spanish supported entity together with GAIA-X Spanish hub for establishing a Notary with a certification Lab.

- Upgrading iris360's governance and interoperability layer to be technically compatible with the Gaia-X Trust Framework 3.0 "Danube", enabling automated evaluation of both Gaia-X requirements and city/sector rulebooks.
- Industrialize trust and onboarding by integrating the Gaia-X Digital Clearing House (GXDCH) for automated verification of identities, credentials, and compliance evidence across the ecosystem as part of making easier to use and onboarding users, for that purpose the tools as Data Space Ready Hub are going to simplify this process, together with DSIF, deltaDAO, Eclipse, GAIA-X.
- Publish Gaia-X Self-Descriptions for data products and AI services from Libelium data spaces (e.g., BeatTheHeat, Geo4Water, SENSE) into federated catalogues, improving discoverability and procurement across Gaia-X-aligned marketplaces.
- Scale the marketplace with more high-value geospatial datasets (Destination Earth, satellite, LiDAR, drones) and AI-as-a-Service offers, enforced via machine-readable usage policies (ODRL) and traceability, integrating it with the federated marketplace (DOME marketplace) and also SIMPL.

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