



Proactive Asset Life Extension Strategy Driven by In-Pipe Fiber Optic Sensing Data Valencia Case Study

Global Leakage Summit – 2/9/2026

Miguel Ángel Ayllón Mesa, Industrial Engineer, Global Omnium/Emivasa, Spain

Rick De Visscher – CEO & Co-founder Fiberflux | DALI Pipeline Monitoring | rick.devisscher@fiberflux.be

AGENDA

1. Introduction to DALI
2. Introduction to Global Omnium & Emivasa
3. Overview of the Digitalization Project
4. Why Fiber Optic Sensing?
5. Project Execution
6. First Results, Outcomes & Next Steps

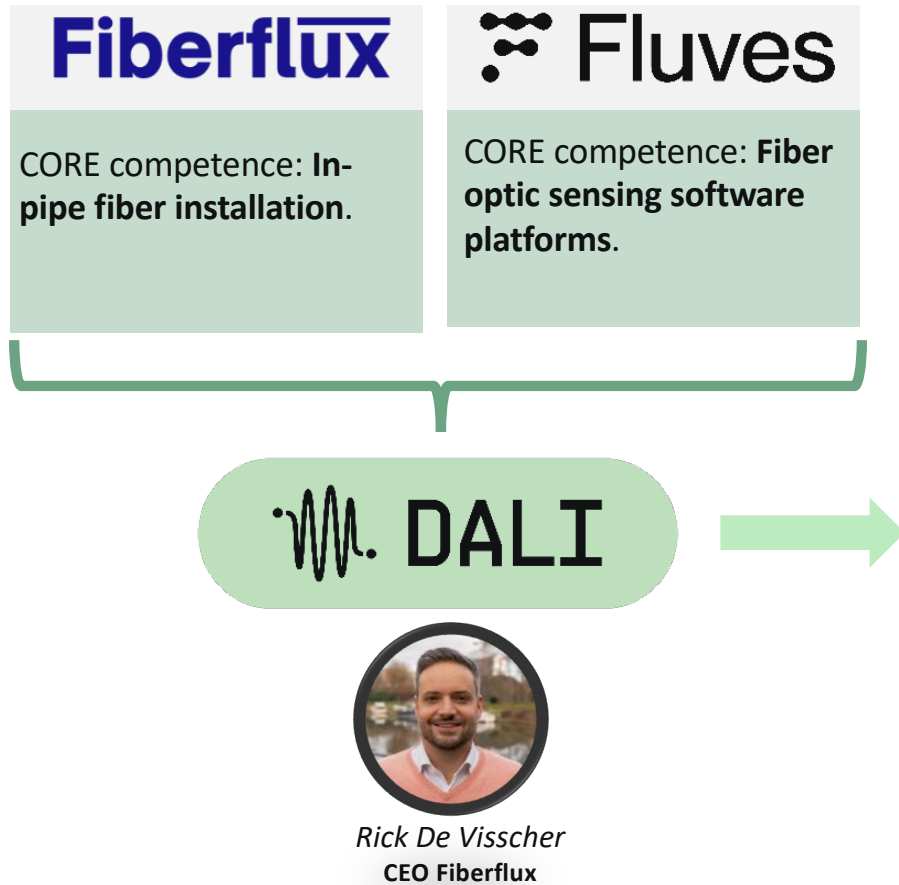


 DALI

Introduction to DALI

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Who's who?

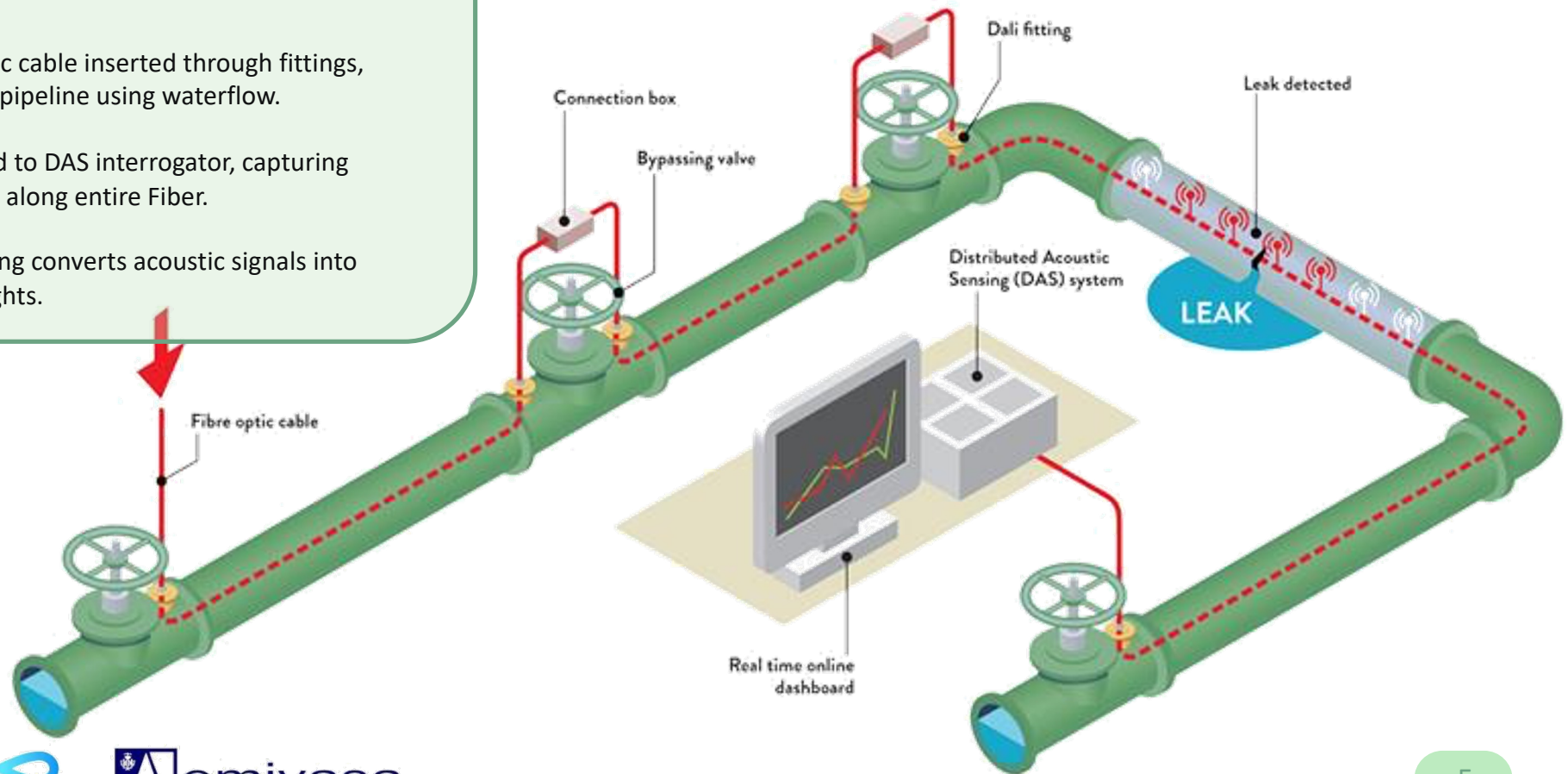


Miguel Ángel Ayllón Mesa
Engineering Director



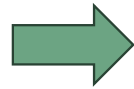
Real-time pipeline monitoring through a 'virtual chain of microphones'

1. Custom fittings installed (pressurized), bypassing valves.
2. Multi-fiber-optic cable inserted through fittings, pulled through pipeline using waterflow.
3. Fiber connected to DAS interrogator, capturing acoustic signals along entire Fiber.
4. Machine-learning converts acoustic signals into actionable insights.

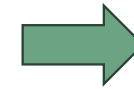


DAI = one fiber with 3 layers of Value

FOUNDATION LAYER
Secure connectivity



INTELLIGENCE LAYER
Monitoring & detection



VALUE LAYER
Business outcomes

Dedicated Fiber backbone

- *Commercial telecommunications*
- *Remote control of valves & sensors*
- *Secure internal communication*
- *Future-ready platform for new applications*

Real-time monitoring & event detection

- *Leak detection*
- *Pressure transient monitoring*
- *Wire breaks*
- *Intrusion detection*
 - *Trespassing sensitive areas*
 - *Manhole cover openings,*
 - *Vehicle and machine detection*
 - *Asset manipulations*
 - *Illegal tapping*

Measurable value

- *OPEX savings*
 - *Optimized maintenance*
 - *Reduced water loss*
- *CAPEX savings:*
 - *True asset condition based investment strategy*
- *Risk & Reliability improvement*



DALI's in-pipe sensing technology is being adopted worldwide at large scale

- 7 years of development by a dedicated, multidisciplinary team of 15+ engineers
- In-pipe FOS has shifted from pilot stage to large scale deployments (100km+)
- 75 successful deployments worldwide, with solid monitoring results
- 40+ projects (1000km+) in preparation, also through international partner network



 DALI

Introduction to Global Omnium & Emivasa

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Global Omnium, Emivasa & València drinking water network



+130yrs
GO + City Council



+850k residents
(~1.7M Metropolitan)



1,320 km
Drinking Water Network



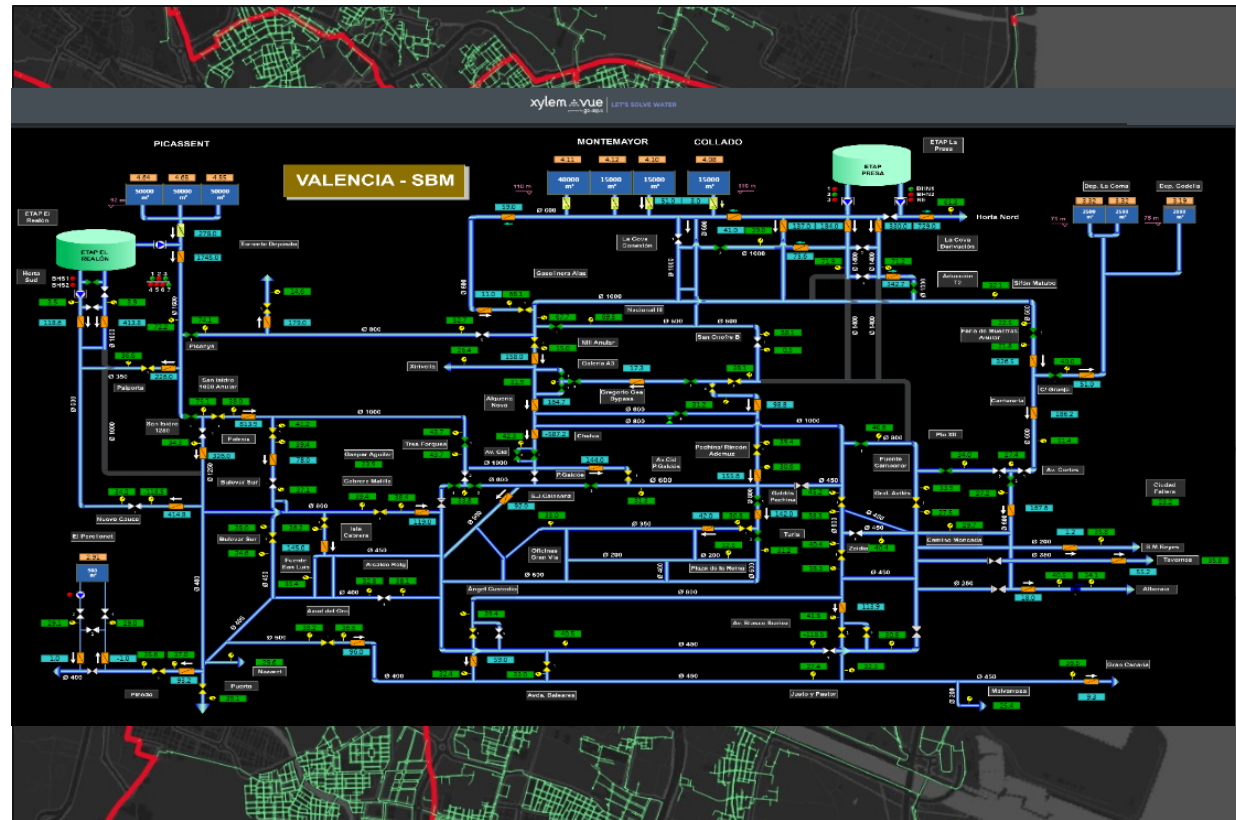
46k connections
(~463k accounts)



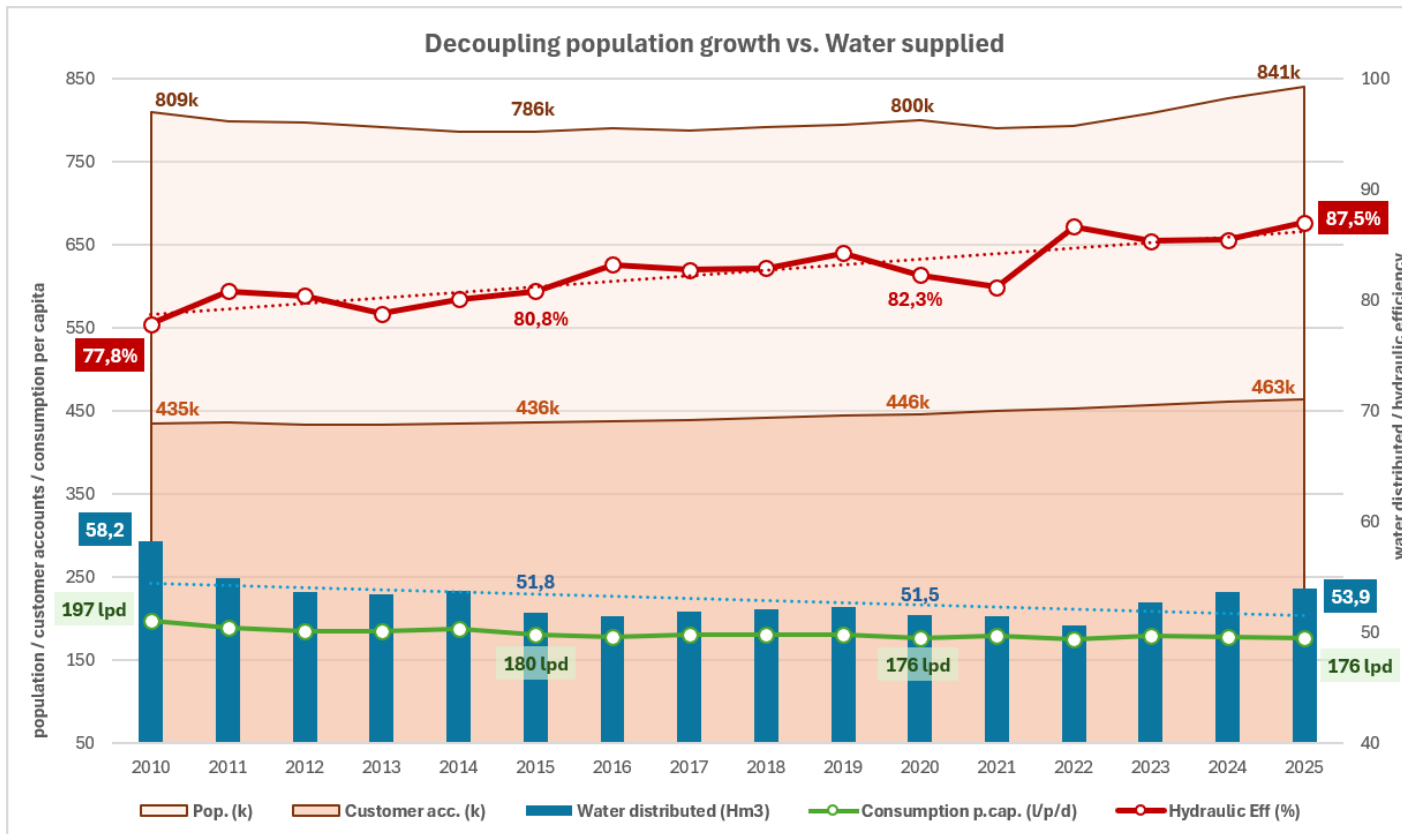
84 DMAs
98% Smart Meters



88% Hydraulic Eff.
53.9 Hm³ supplied



Global Omnium, Emivasa & València drinking water network



Hydraulic efficiency +10%



Customer accounts +6.5%

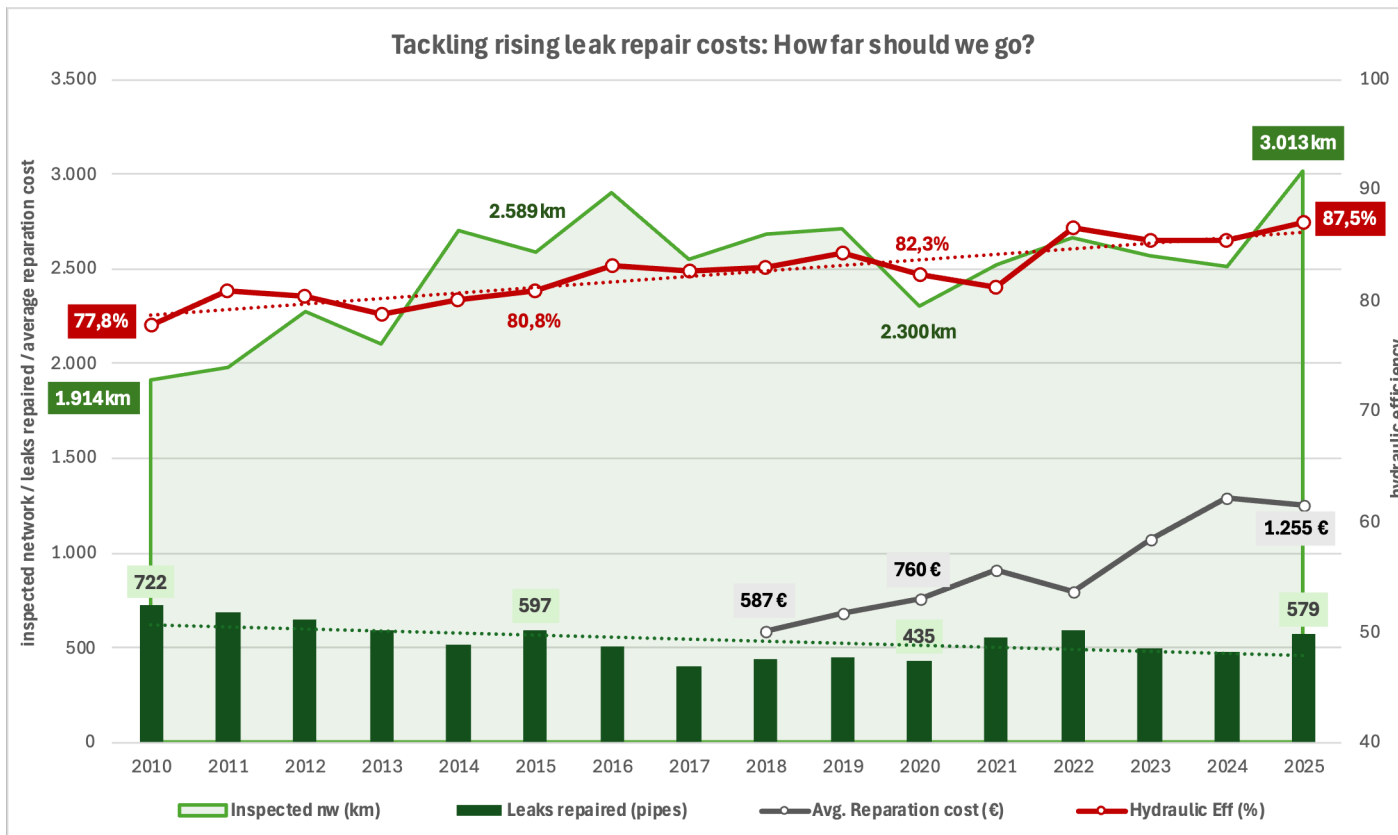


Water supplied -7.3%



Consumption per cap. -10.8%

Global Omnium, Emivasa & València drinking water network



Hydraulic efficiency +10%



Network inspected +58%



Reparation cost (avg.) x2.1



Leaks repaired -20%

Overview of the Digitalization Project

PERTE SHiNE-AMV. Project Overview & IoT Digitalization Scope

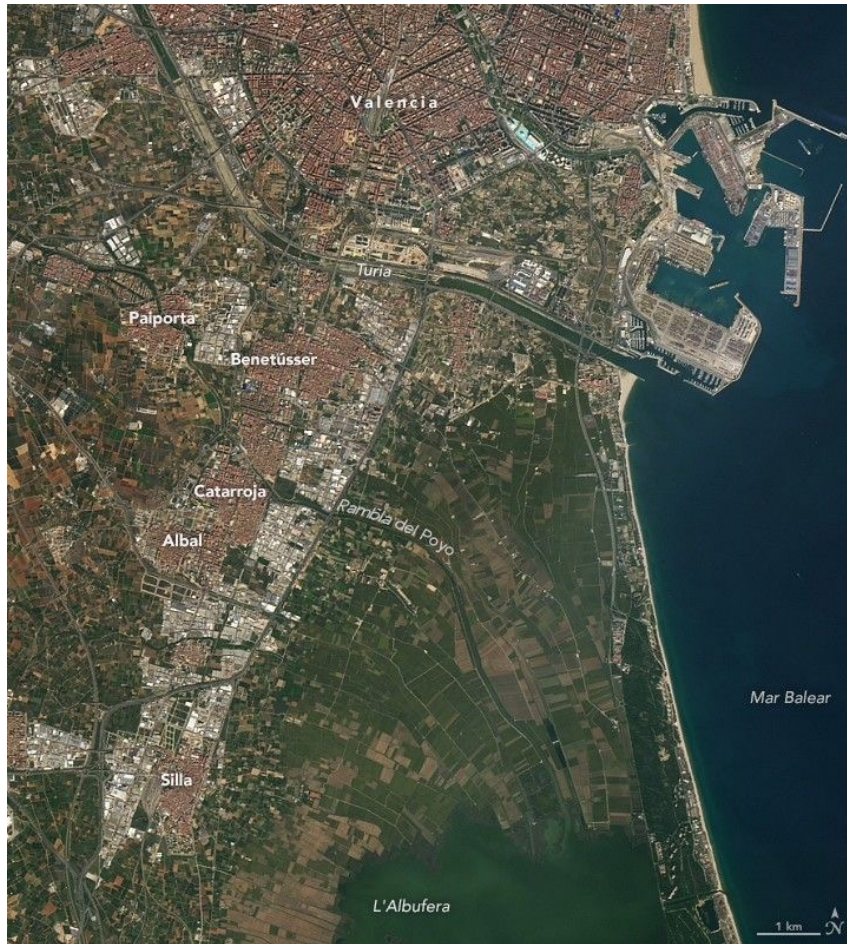
 Digitalization and optimization of hydraulic networks through IoT devices in the Metropolitan Area of Valencia Funded by the European Union View project					 14.2 M€	 6 M€	 +2.1k	 1.9M/day
 DWTP Optimization ➤ DSS in 2 DWTP ➤ Energy efficiency ➤ Process optimization ➤ Chemical dosage predictive control	 Service Network Digital Twin ➤ 144 IoT Sensors ➤ Expert management system ➤ Full DT integration	 Water Quality Predictive Control ➤ 27 multiparametric mon. units ➤ AI based predictive module ➤ Connection to main DT	 Smart Pressure Management ➤ 300 IoT manometers in DMAs ➤ Dynamic pressure setpoint ➤ Expert system for background leak reduction	 Leak Monitoring ➤ 900 IoT acoustic loggers & hydrophones in distribution network ➤ 21 km in-pipe fiber optics (DAS) in network mains 				

 DALI

Why Fiber Optic Sensing?

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Why fiber optic sensing? Beyond NRW



Southern floods (November 2024)



Why fiber optic sensing? Beyond NRW

Southern floods (November 2024)



Why fiber optic sensing? Beyond NRW

Southern floods (November 2024)



Why fiber optic sensing? Beyond NRW

Blackout (April 2025)



COU

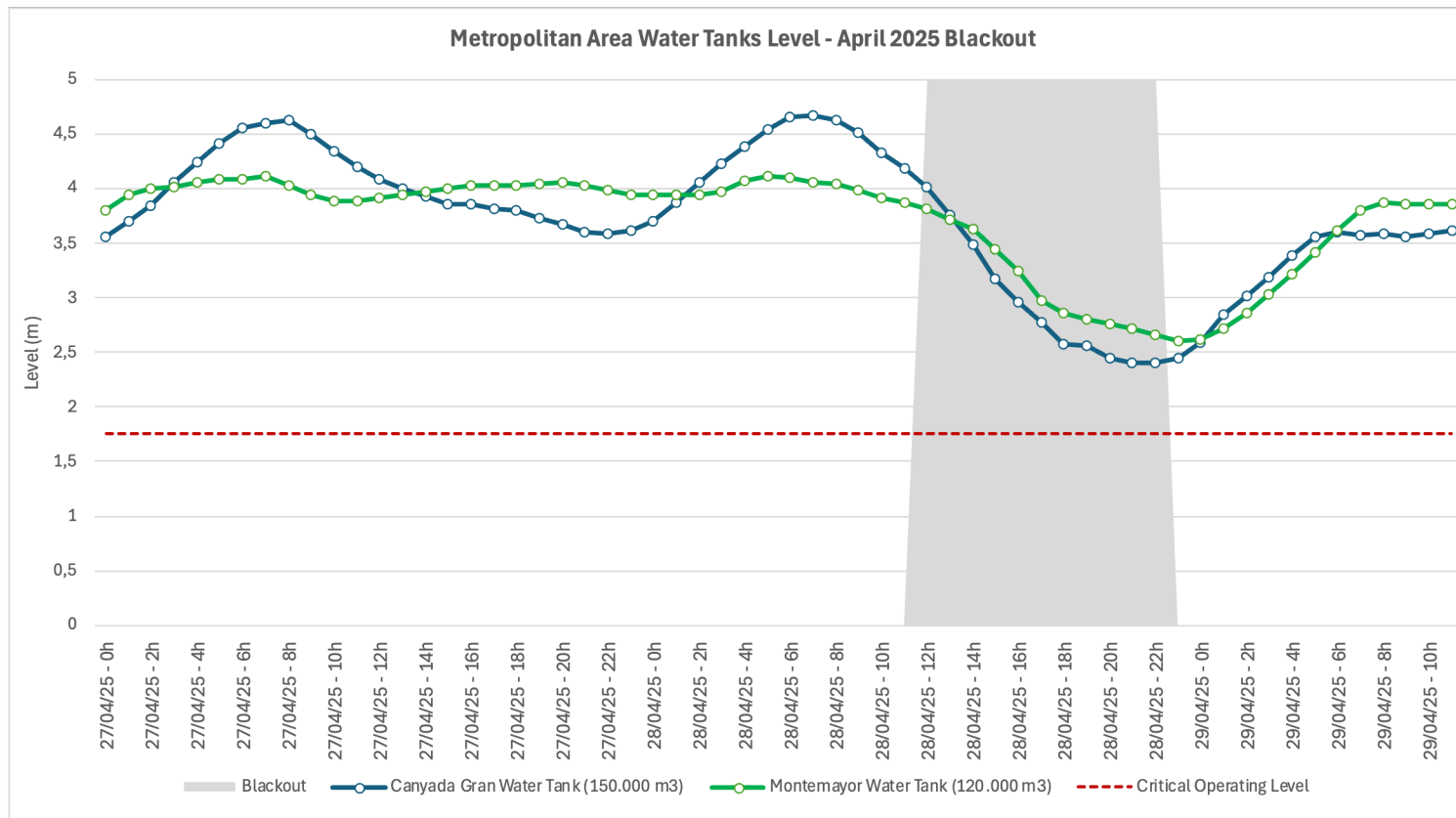


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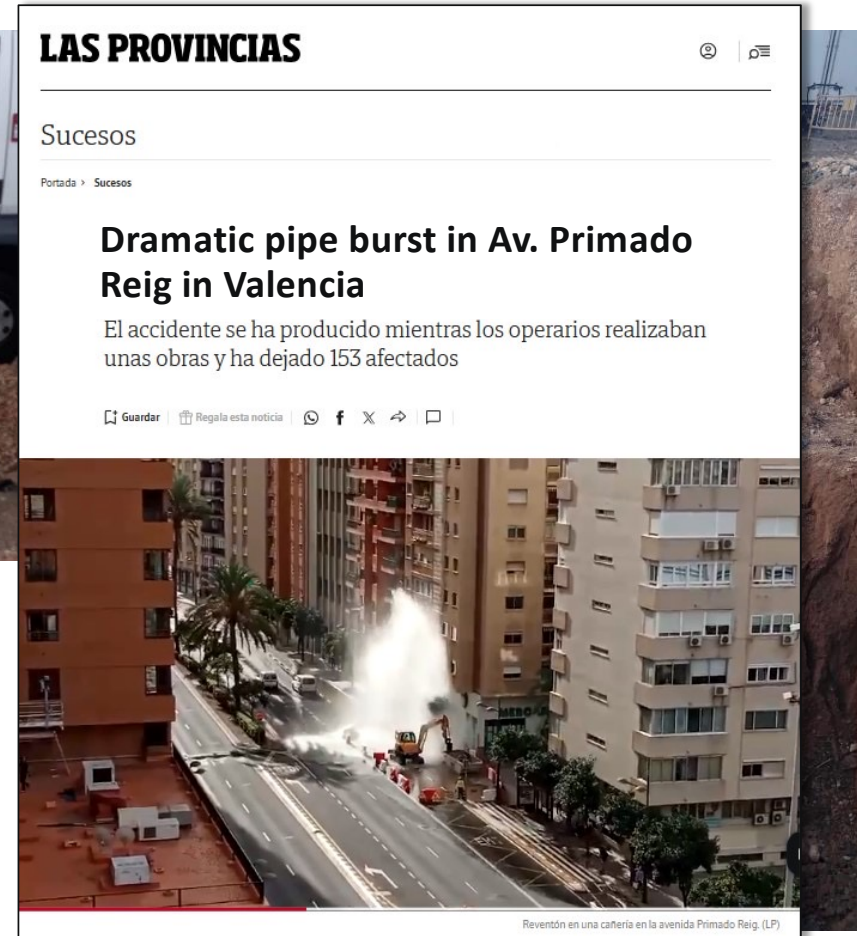
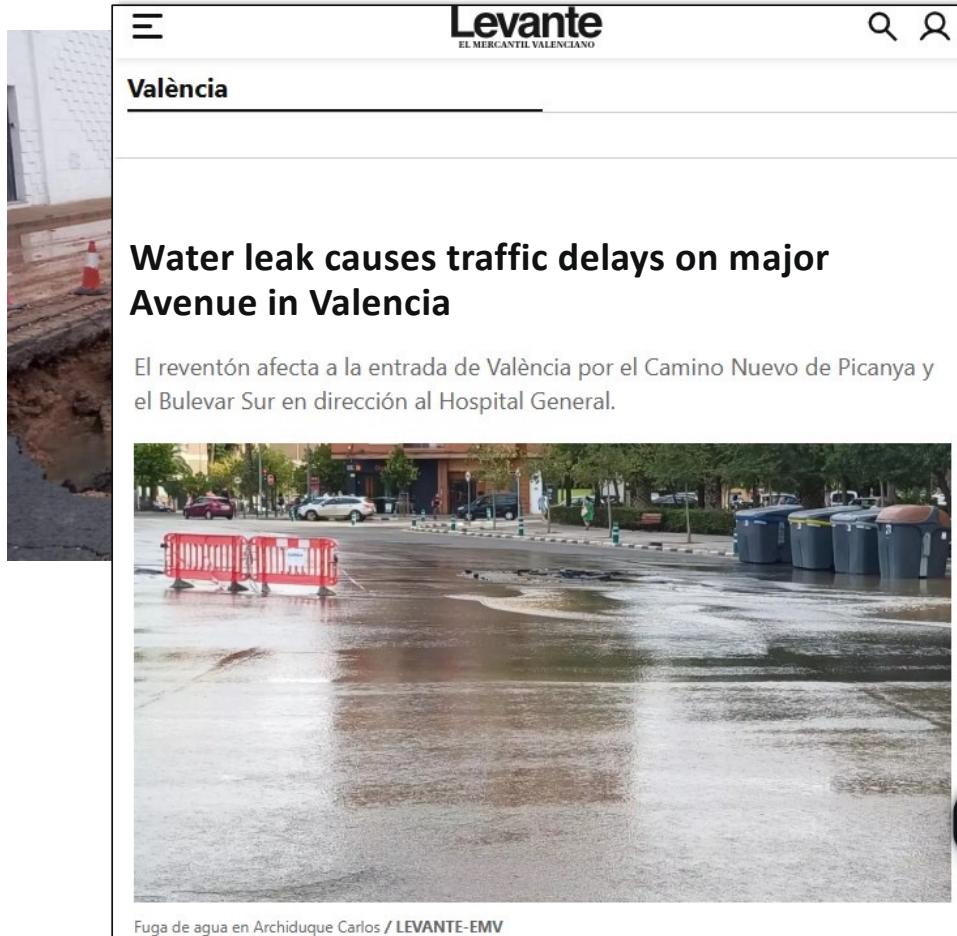
Why fiber optic sensing? Beyond NRW

Blackout (April 2025)

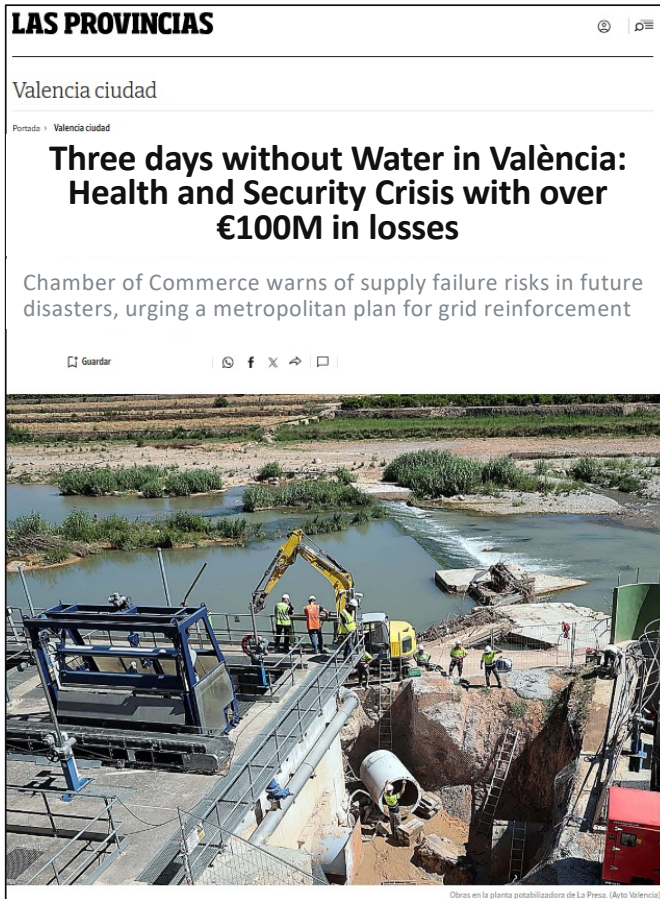


Why fiber optic sensing? Beyond NRW

Unpredictable Pipe Failures



Why fiber optic sensing? Beyond NRW



ECONOMIC IMPACT: THE COST OF A WATER SUPPLY FAILURE Valencia Chamber of Commerce Study (Dec 2025): Water as a Critical Strategic Asset



€106 Million

**Gross Value Added (GVA)
loss in just 3 days
of water supply disruption**



**82% Commercial &
Industrial Consumption**

**Potable water used by businesses,
amplifying economic downtime**



**Critical Sector
Vulnerability**

**Healthcare, public safety,
commerce & tourism severely
compromised**



Why fiber optic sensing? Beyond NRW



Traditional Driver: NRW Reduction

- 87.5% efficiency and growing
- Small volume reduction (water saving/scarcity)
- Questionable ROI: water costs vs. repair cost



Real Driver: Supply Security & Resilience

- Prevent any event, no matter its origin
- Strategic 24/7 monitoring in critical mains
- ROI: Risk Mitigation & Reputational Cost



Smart Management

- Enable proactive life-extension for older mains
- CAPEX savings: invest based on true asset condition instead of theoretical lifecycles

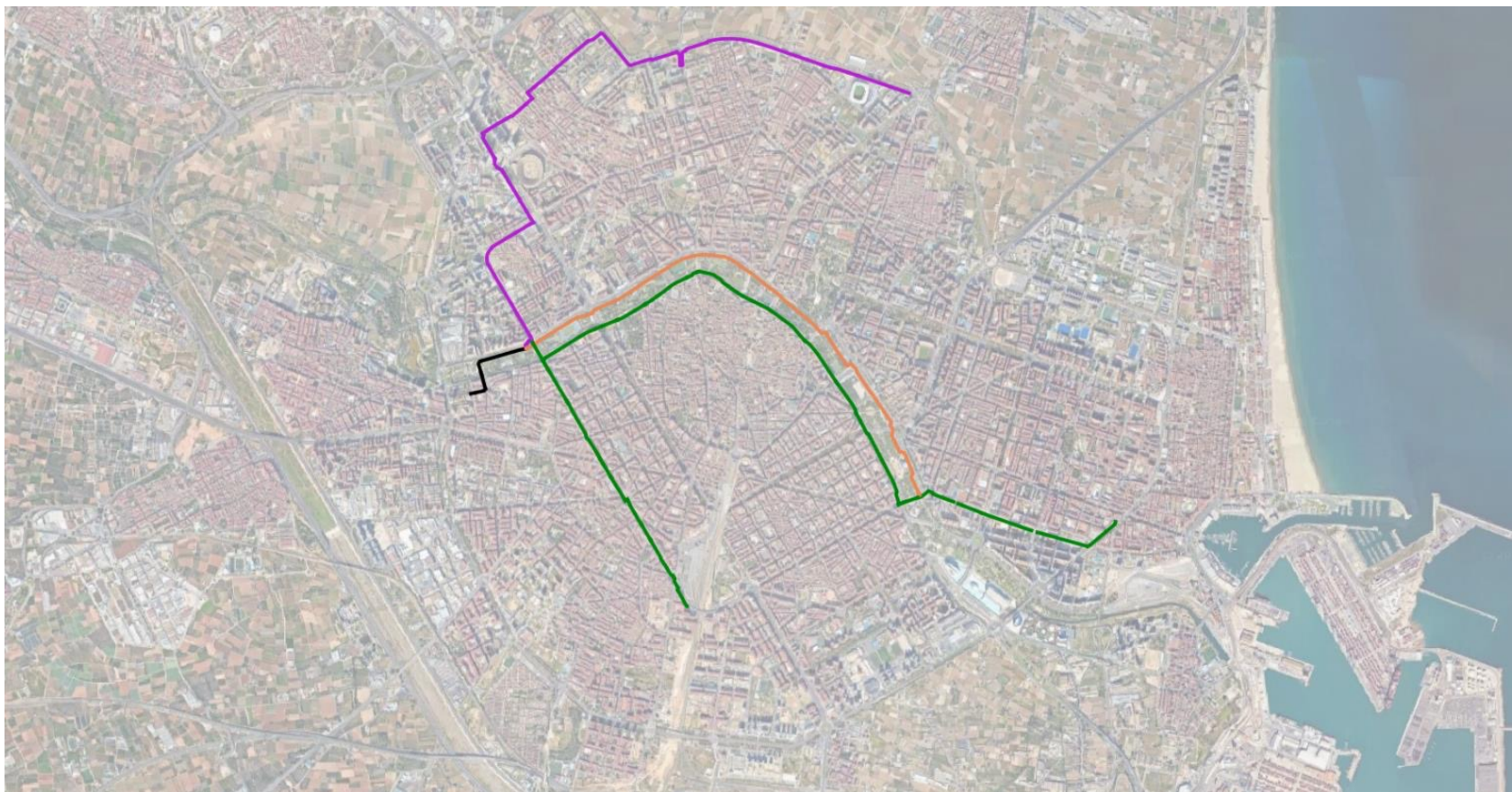


 DALI

Project Execution

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Project Scope



Valencia network
1,320 km

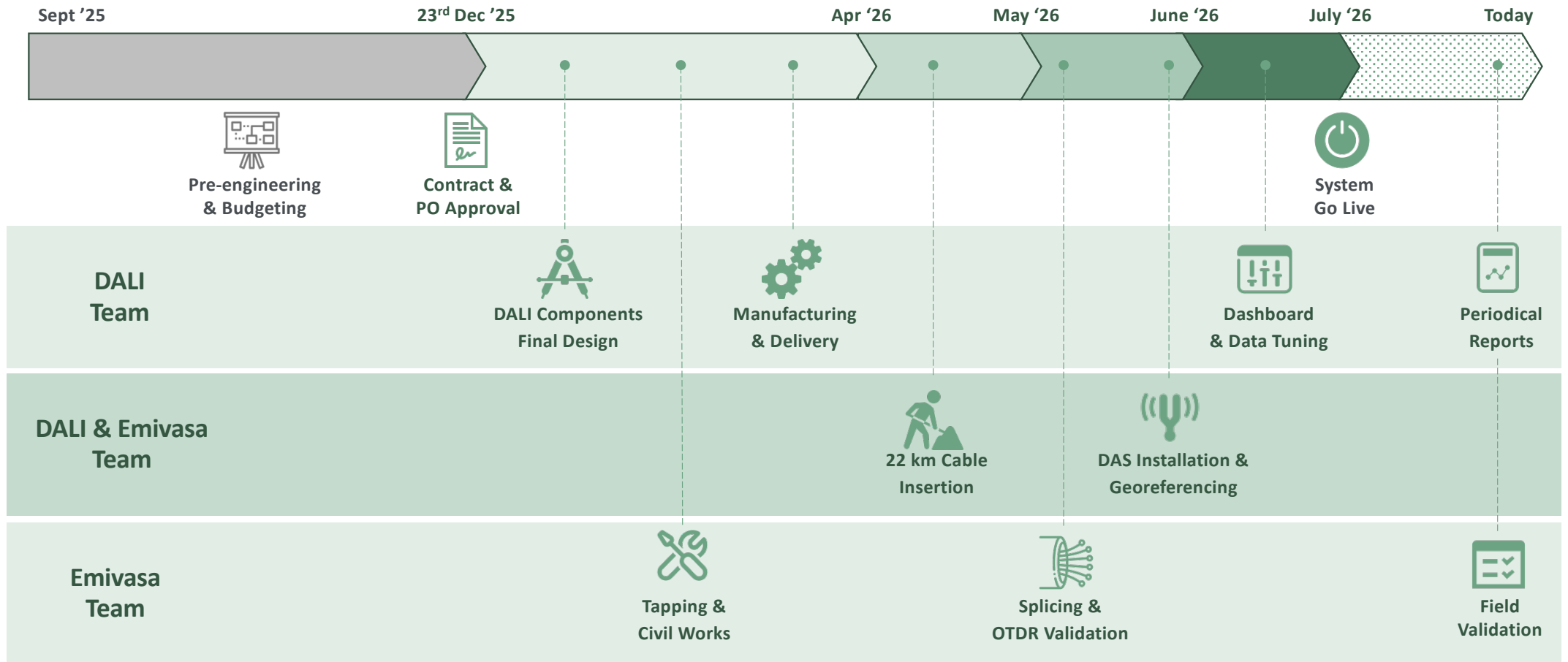
Network mains
45 km

Mains monitored w/DALI
21 km

- Line 1: 8,817 m. (green)
- Line 2: 6,760 m. (purple)
- Line 3: 4,680 m. (orange)
- Line 4: 785 m. (black)
- Total cable: ~ 27 km
- Total sections: 44
- Total fittings: 92
- Total fiber splices: ~700
- DAS interrogators: 1



Project Timeline & Implementation



Project Implementation – Previous Works



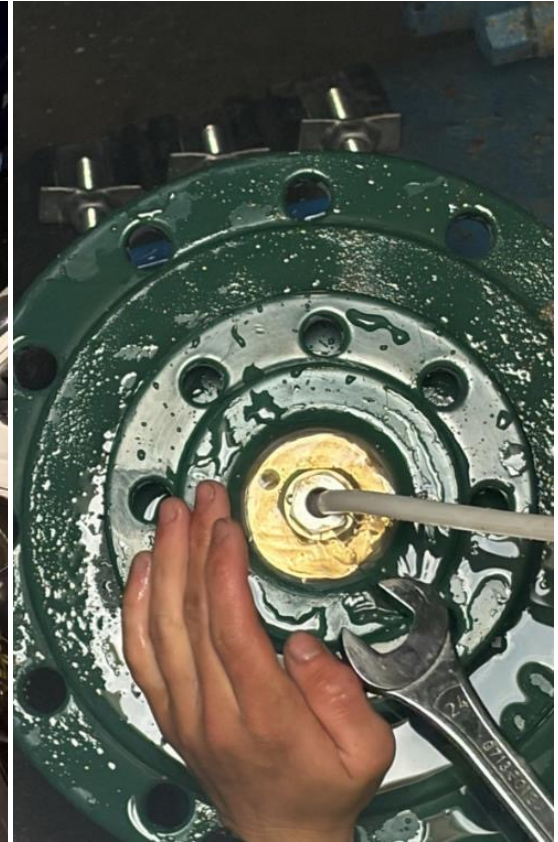
Project Implementation – Material



Project Implementation – Cable Insertion



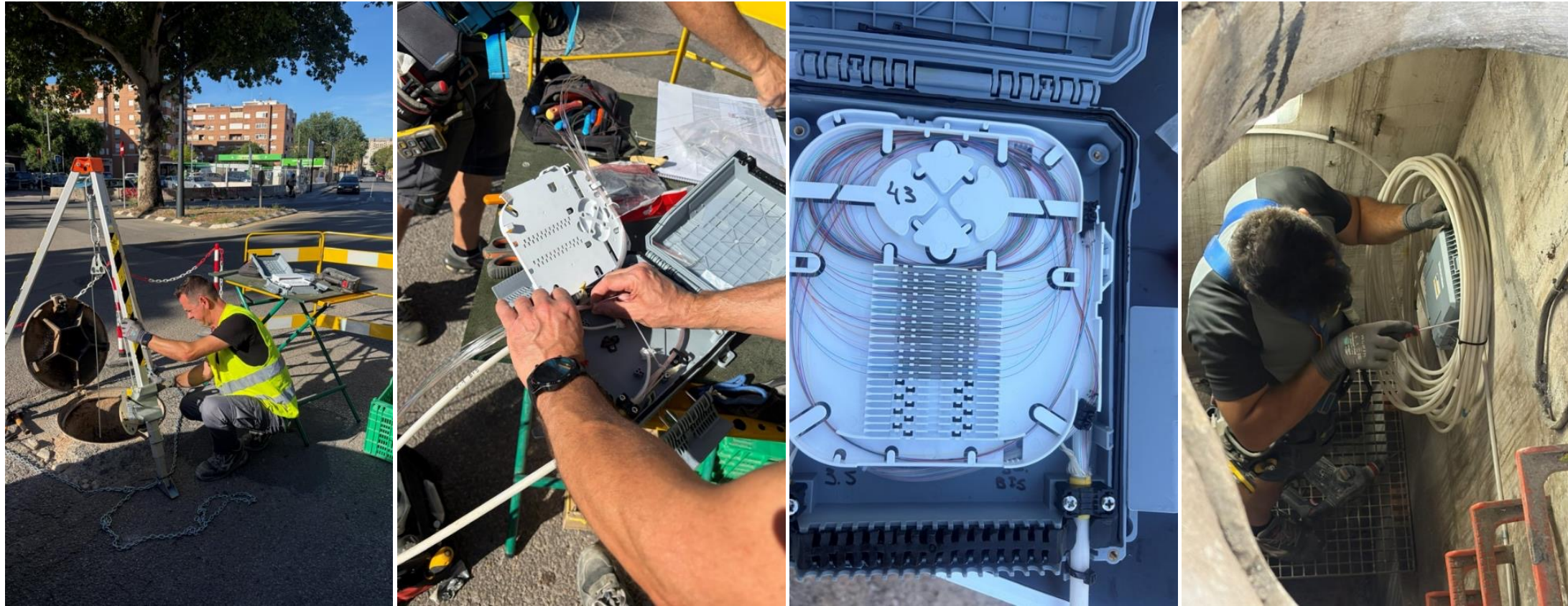
Project Implementation – Cable Extraction



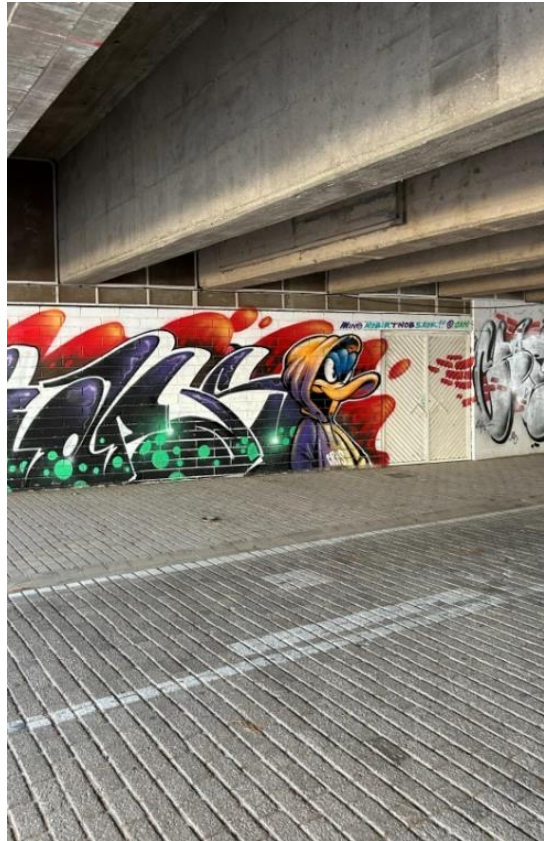
Project Implementation – Always have a Plan B!



Project Implementation – Fiber Optic Splicing

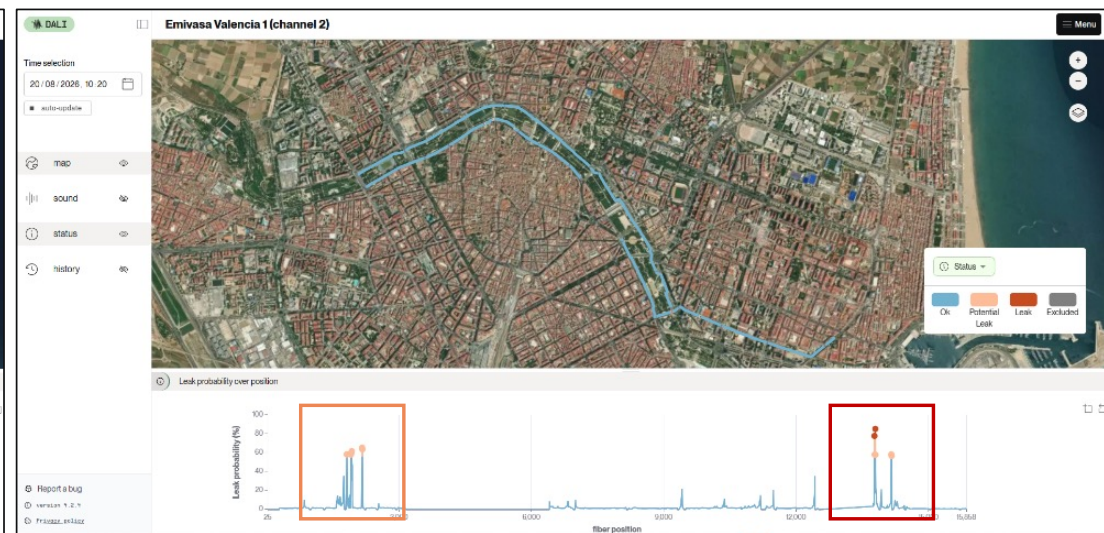
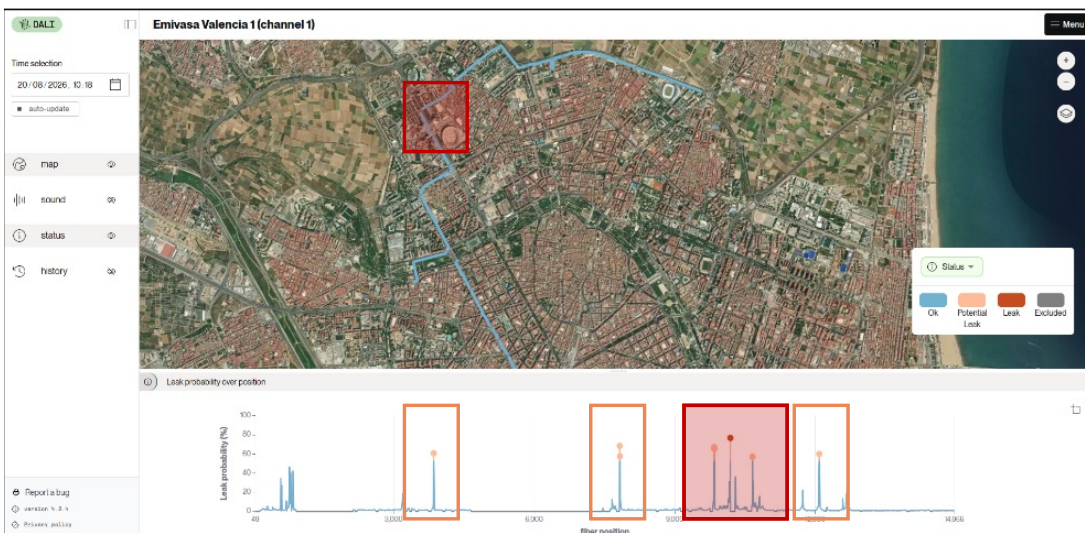


Project Implementation – DAS System

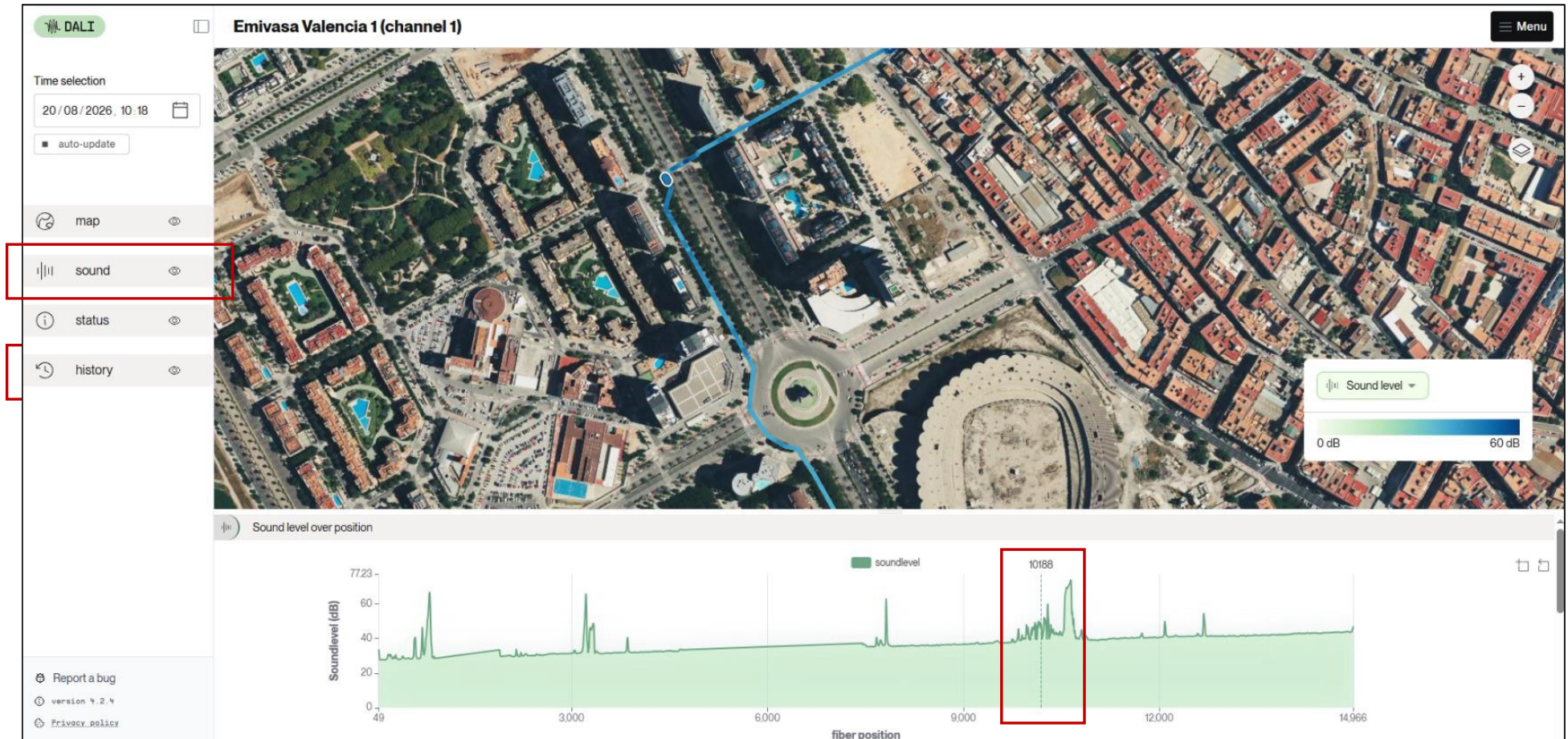


First Results, Outcomes & Next Steps

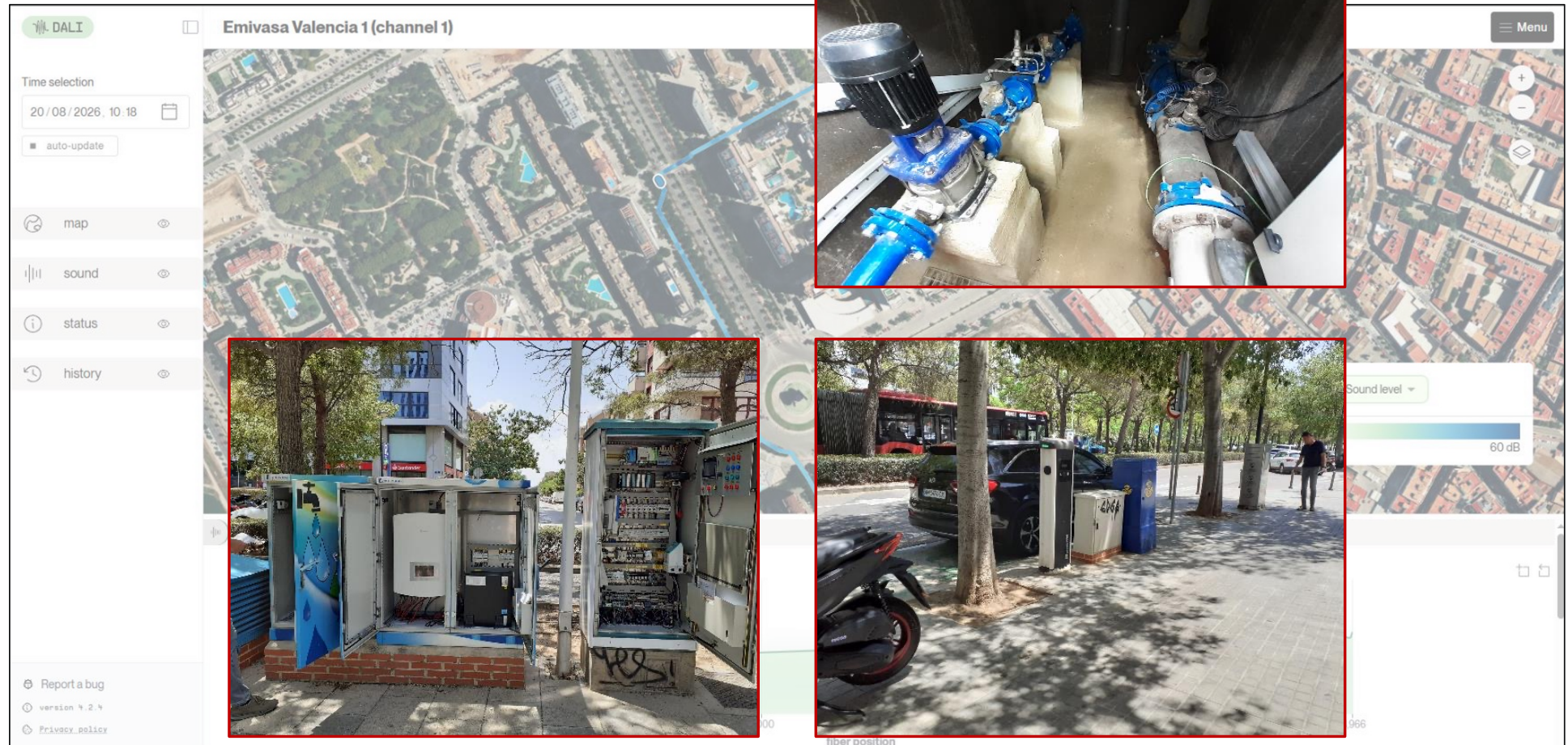
Project First Results



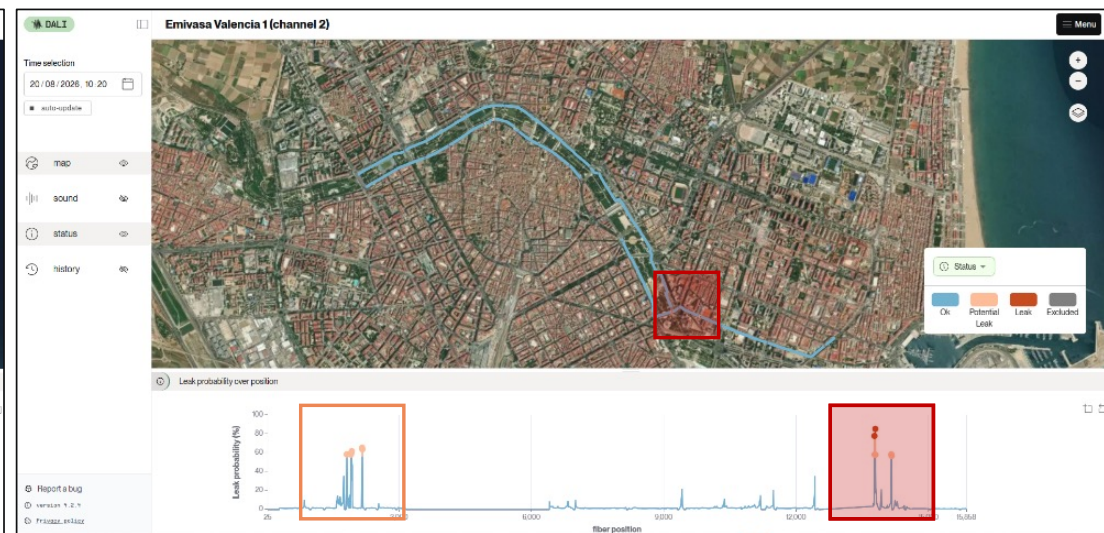
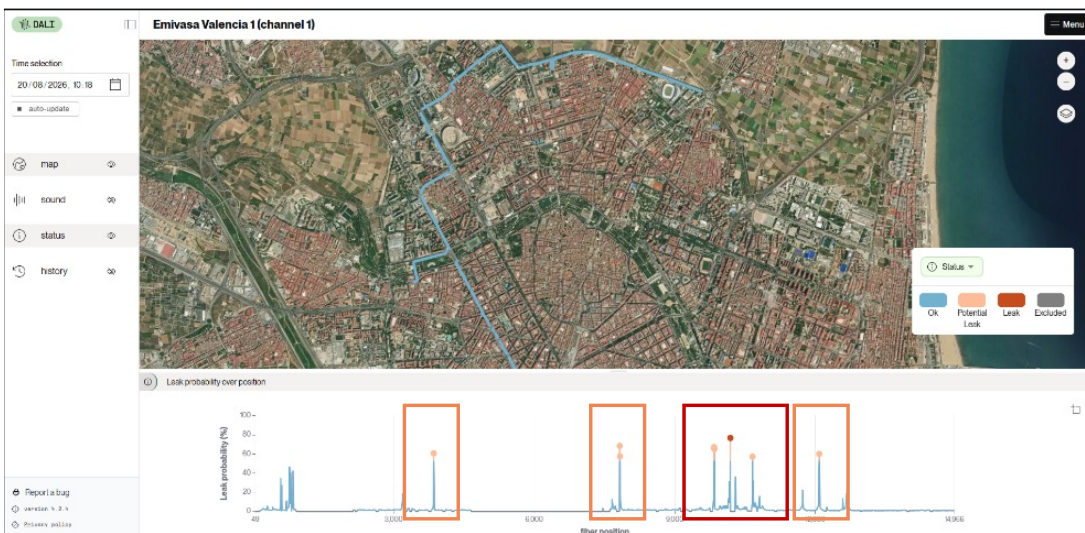
Project First Results



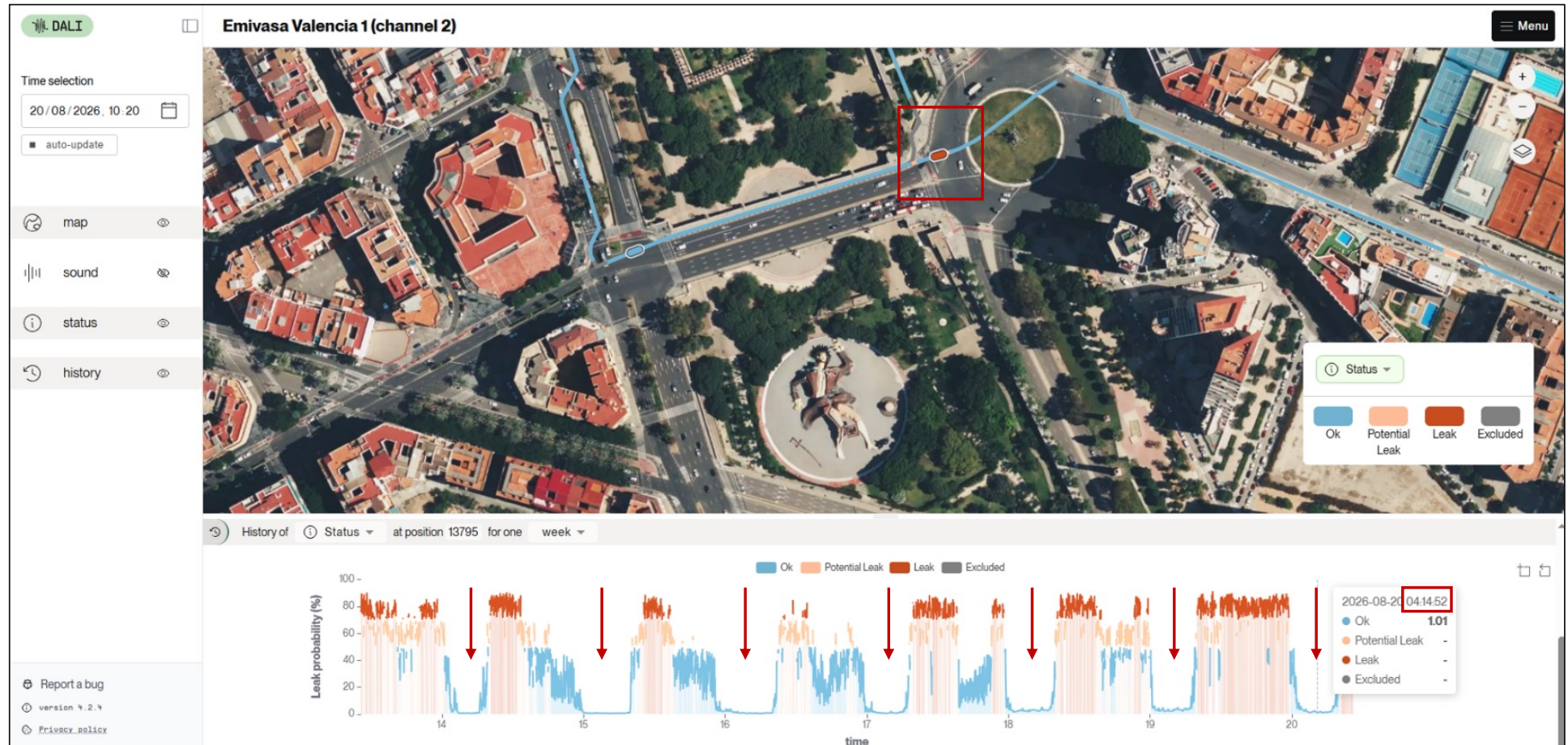
Project First Results



Project First Results



Project First Results



Project First Results

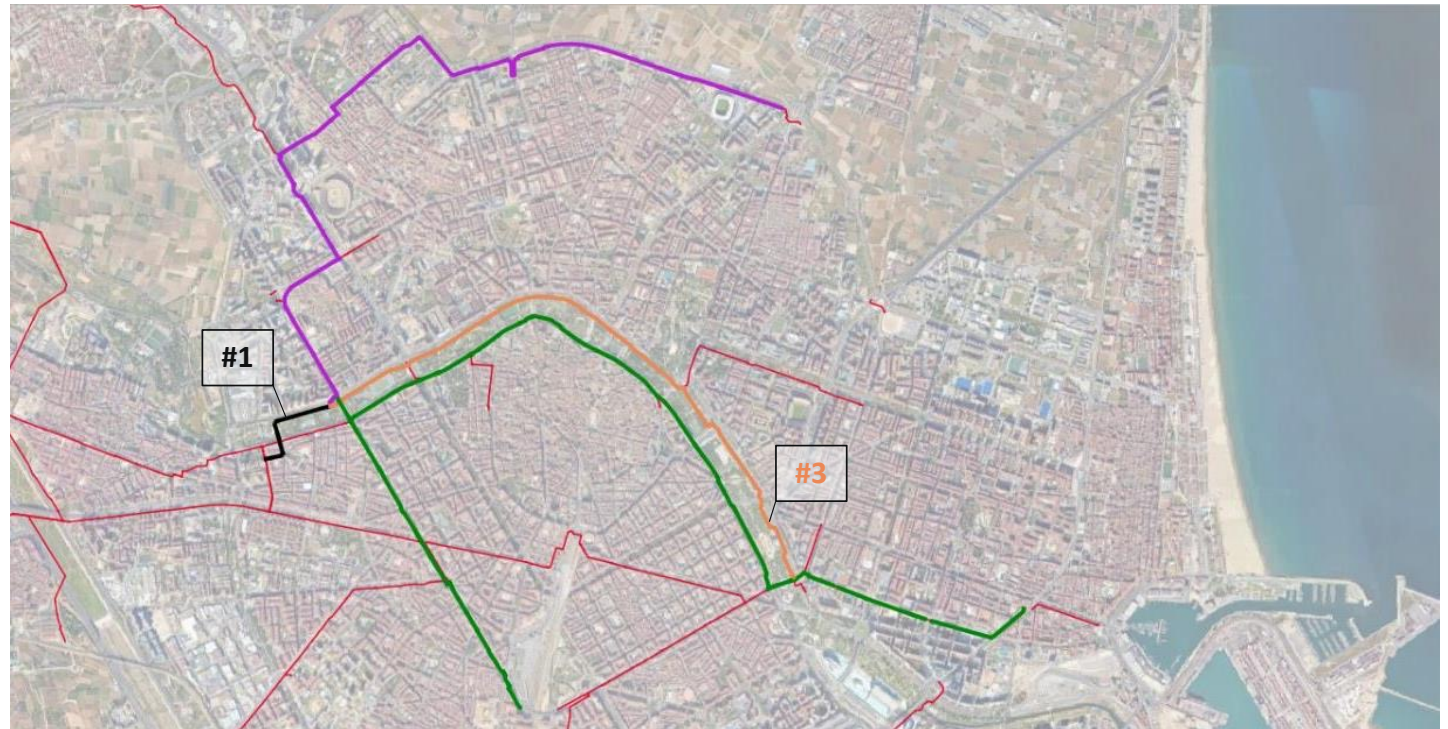


Project First Results – Leak Test

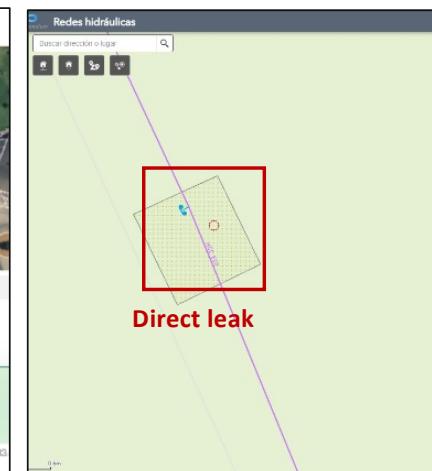
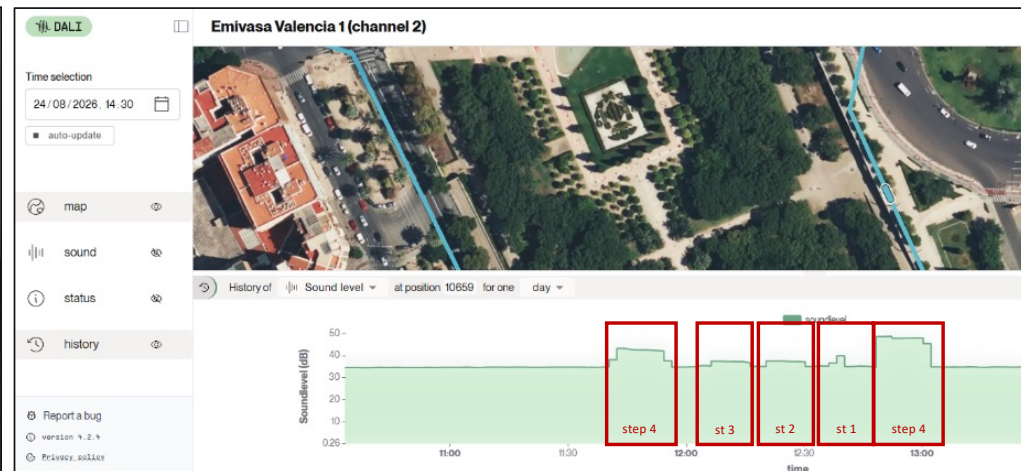
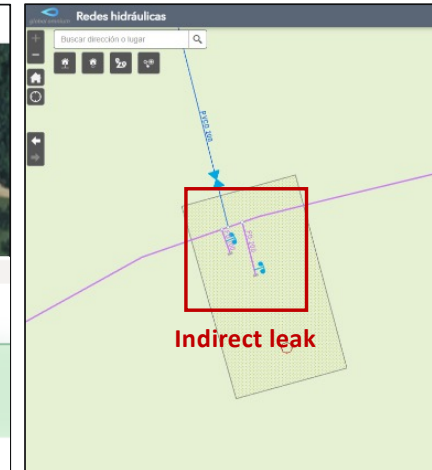
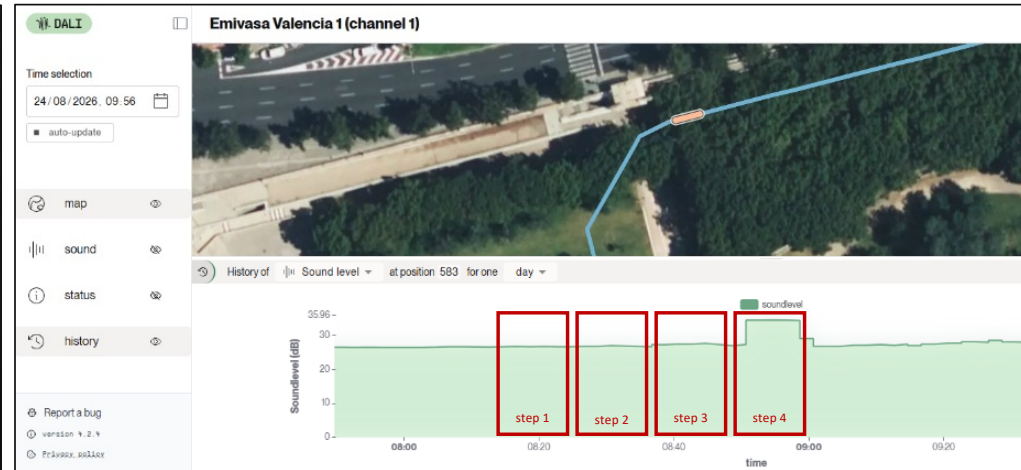


Leak Test Procedure

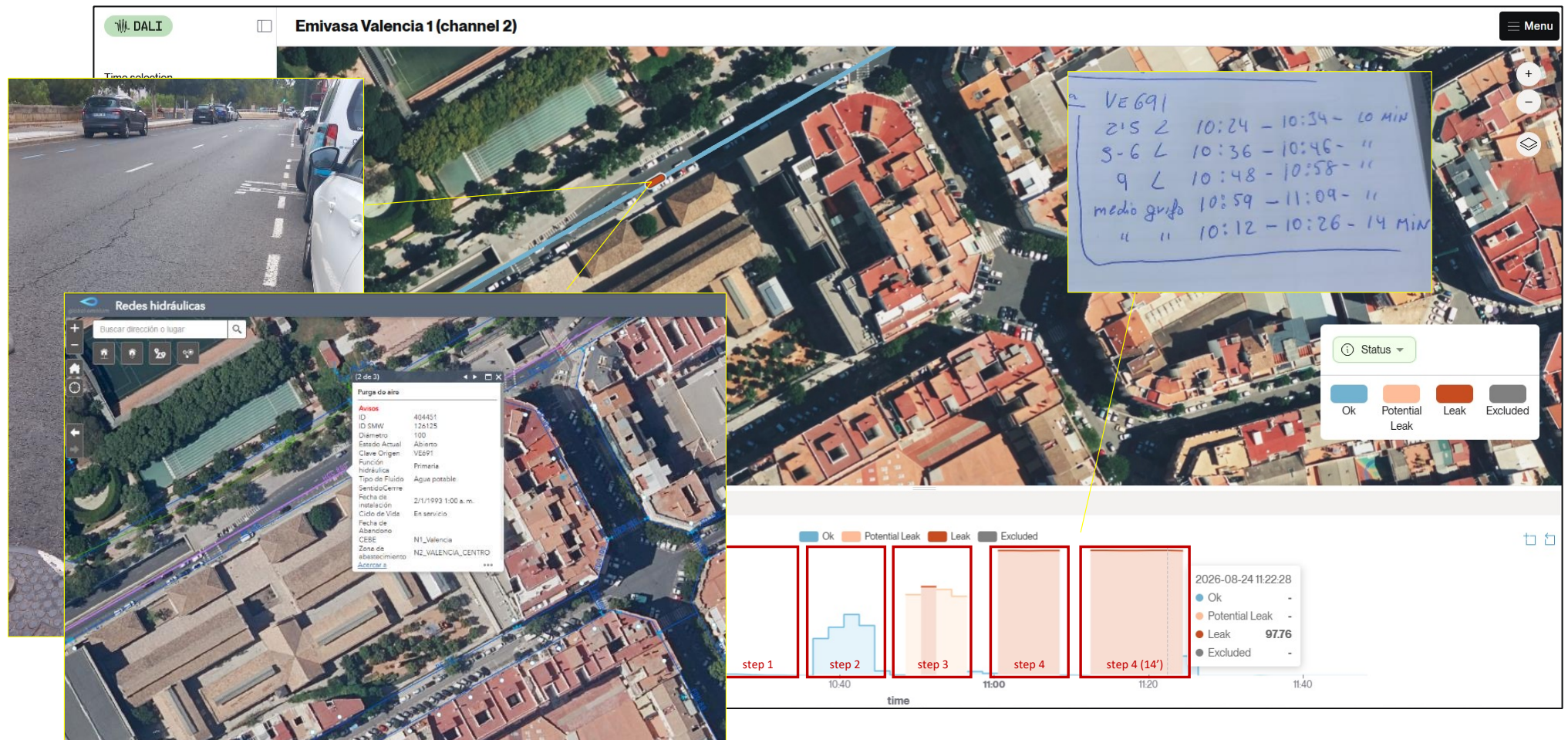
- **Objective:** validate minimum flow detection threshold and spatial location accuracy (5 m)
- **3 locations**
 - location #1 @ **line 4** (ch.1) – PCC Pipe Ø1000
 - location #2 – unknown (cat and mouse)
 - location #3 @ **line 3** (ch.2) – PCC Pipe Ø800
- **4 leak flow steps**
 - 2.5 l/min @ 10 mins
 - 4-5 l/min @ 10 mins
 - 8-9 l/min @ 10 mins
 - Max flow (half-open ball valve) @ 10-14 mins



Project First Results – Leak Test



Project First Results – Leak Test



Project Outcomes & Next Steps



Strengths & Collaboration

- **Execution Time:**
Battle-tested technology. 21 km deployed in 5 weeks.
Full project achieved in 6 months.
- **Reliable Technology:**
24/7 monitoring, with minimum detectable leak rate of 4-5 l/min with 5 m. accuracy.
- **Full Commitment from DALI Team:**
High involvement and total adaptability to field challenges with active Plan B solutions and quick response.



Lessons Learned

- **Full Process Knowledge (pre-engineering):**
Deeper understanding in advance of all the work-in-field to be done, to reduce uncertainty, waiting times and hidden costs.
- **Language Barrier:**
Manage communication gaps between field operators from both teams.



Next Steps

- **Standardization:**
After 1 year validation, set FO insertion protocols for new mains.
- **Dashboard Integration:**
Embed alerts in Global Omnium's Leak Detection DSS.
- **Advanced Features:**
Expand system capabilities (structural health, digging detection monitoring, ...).



AJUNTAMENT DE VALÈNCIA

Final Reflection



***“It is only with the heart that one can see rightly;
what is essential is invisible to the eye”***

Antoine de Saint-Exupéry | The Little Prince

In our field, the most critical risks tend to be invisible to the naked eye. Water management and leak detection are not just about looking; it is about using technology and precision to see where others see nothing.



Thank you, let's talk!

"The technology works brilliantly. It has a big potential on larger mains, also combined with telecommunication."

Victor Pelin - specialist in drinking water distribution networks, NSVA, Sweden

"DALI has the potential to bring a lot of added value in detecting leaks and intrusions in real-time on our water mains, at an affordable cost."

Wim Jacobs – Innovation Director, FARYS, Belgium

"The DALI installation went very smooth and we were impressed by the disinfection procedure used. We see great potential in the use of DALI for monitoring pipelines."

Stefan Knijnenburg - Advisor Innovation and Policy, Evides, The Netherlands