Co-funded by the European Union

Europe's Rail

FP1 MOTIONAL

European Rail Network and Mobility Management

Seamless & Inclusive Mobility

7 May 2026

One Europe, One Journey,

Zero Barriers for All Passengers

FP1 MOTIONAL

Agenda

Start	Duration	Description	Who
10:00-10:10	10 min	**Welcome and opening remarks**	**ADIF:** Mariano Martínez Lleido
10:10-10:20	10 min	**Opening remarks from ADIF & RENFE**	Representatives of ADIF & RENFE
10:20-10:35	15 min	**Storyline presentation** "A Seamless Rail Journey: Connecting Travellers and Operators" (video showcase)	**HACON:** Marco Ferreira **RENFE:** Victoria Guryn
10:35-11:12	37 min	**Demonstrations Showcase: Spain**	**INDRA:** Enrique Jiménez **ADIF FM**: Victoria Guryn **ETRA**: Elena García
	7 min	**Q&A (Spain demonstrations)**	
11:12-11:45	33 min	**Demonstrations Showcase: Luxembourg, Germany, Sweden**	**HACON:** Marco Ferreira **SJ:** Elin Beijer **DB:** Christopher Schubert
	7 min	**Q&A (Luxembourg, Germany & Sweden demonstrations)**	
11:45-12:15	30 min	**Coffee break**	
12:15-12:50	35 min	**Demonstrations Showcase: Paris, Amsterdam, Munich, Italy**	**Hitachi GTS:** Nihad Bahri **Hitachi GTS:** Nicolas Germain **Hitachi STS:** Yasmin Andalib & Pietro Calcagno
	9 min	**Q&A (Paris, Amsterdam, Munich & Italy demonstrations)**	
12:50-13:50	60 min	**Lunch break**	
13:50-14:50	60 min	**Roundtable discussion** Challenges, lessons learned, collaboration opportunities and EU added value	**Moderator:** Yasmin Andalib **Panellists:** Nesrine Chatelkhir; Almudena Alcaide Raya; Carlos Miranda
14:50-15:00	10 min	**Closing remarks**	Mariano Martínez Lleido

Magazine

Magazine includes use cases part of the demonstration showcase presentations.

https://rail-research.europa.eu/pages/fp1-motional/other-documents

Flagship Area 1:

Network management planning and control & Mobility Management in a multimodal environment

FP1 Event 2 - Seamless, inclusive mobility & predictive services

Seamless Mobility & Inclusive Travel Experience

Disruption Management through Transport Data Hub

Enrique Jiménez (INDRA)

Seamless Mobility & Inclusive Travel Experience

Anna, a passenger with reduced mobility, faces barriers when planning, navigating stations and accessing gates.

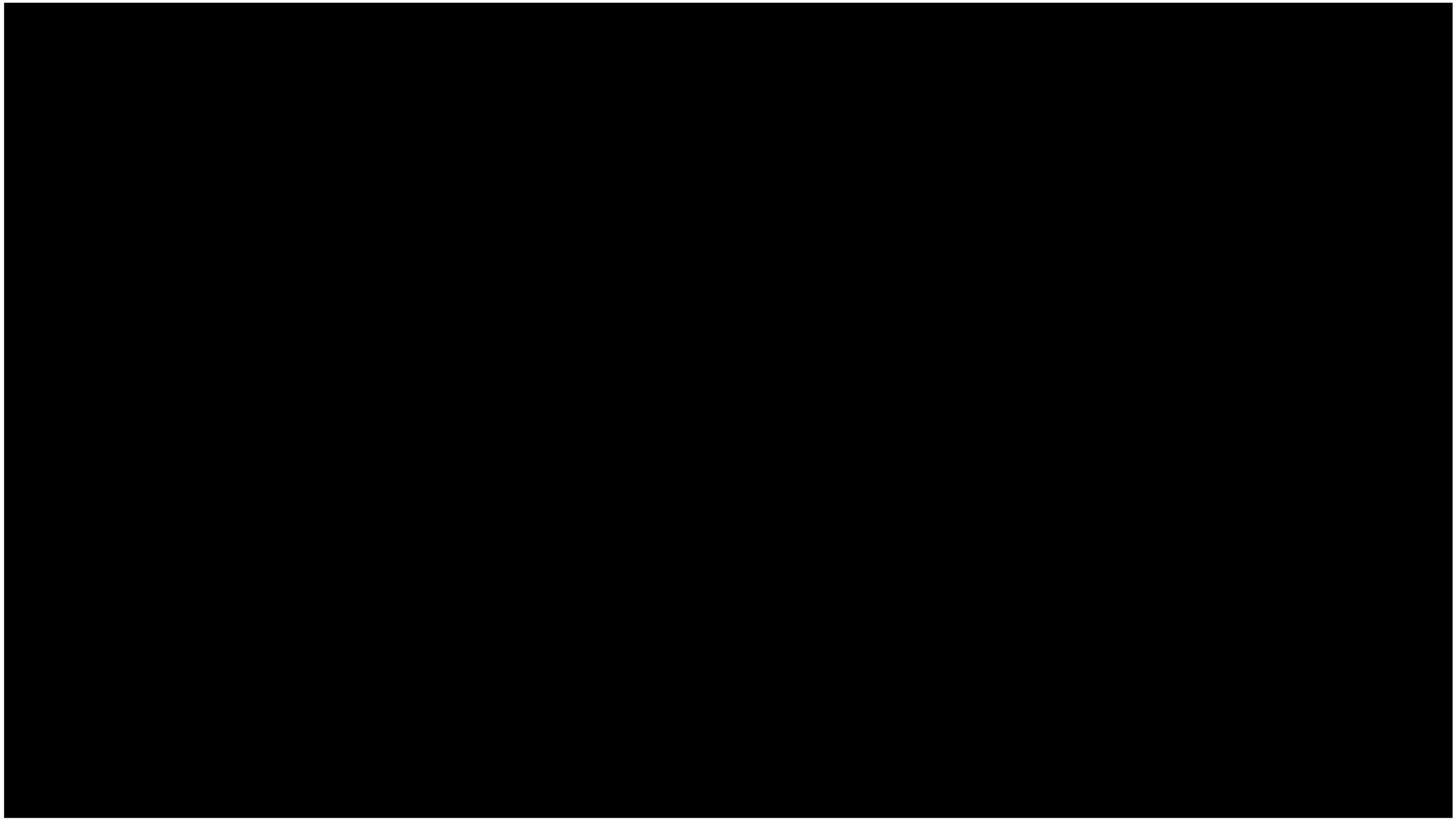
How can we help Anna?

1. Single MaaS app for the full journey

2. Indoor guidance with accessible routes

3. Ticketless travel using frictionless validation and ABT

Demo Madrid – Indra / Metro de Madrid



Impact on Anna / Pain points addressed

Anna's pain points

- Fragmented journey planning and multiple apps
- Lack of accessible guidance inside stations
- Stressful and complex ticket validation

What we solved

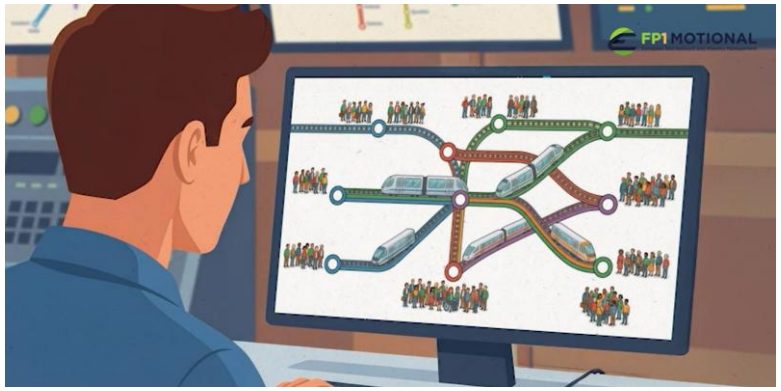
- One single MaaS app covering the entire journey
- Accessible indoor guidance with PRM-friendly routes
- Ticketless and frictionless access without physical actions

Disruption Management through Transport Data Hub

During disruptions, Anna receives unclear or inconsistent information, while **Luca** lacks a real-time, integrated view to manage incidents effectively.

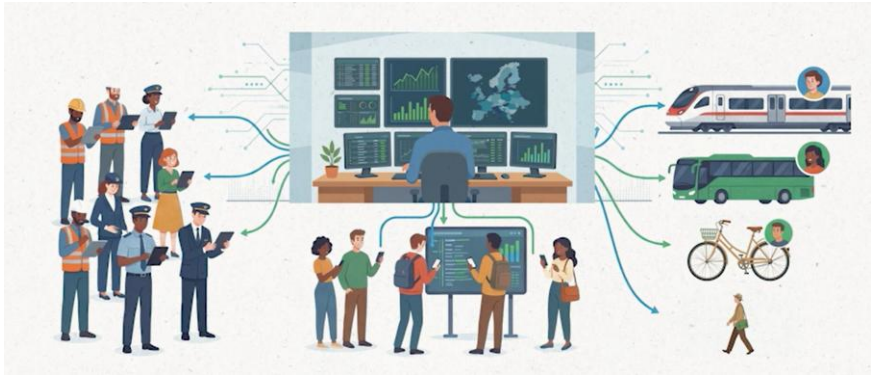
How can we help Luca?

1. Real-time visibility of disruptions across services



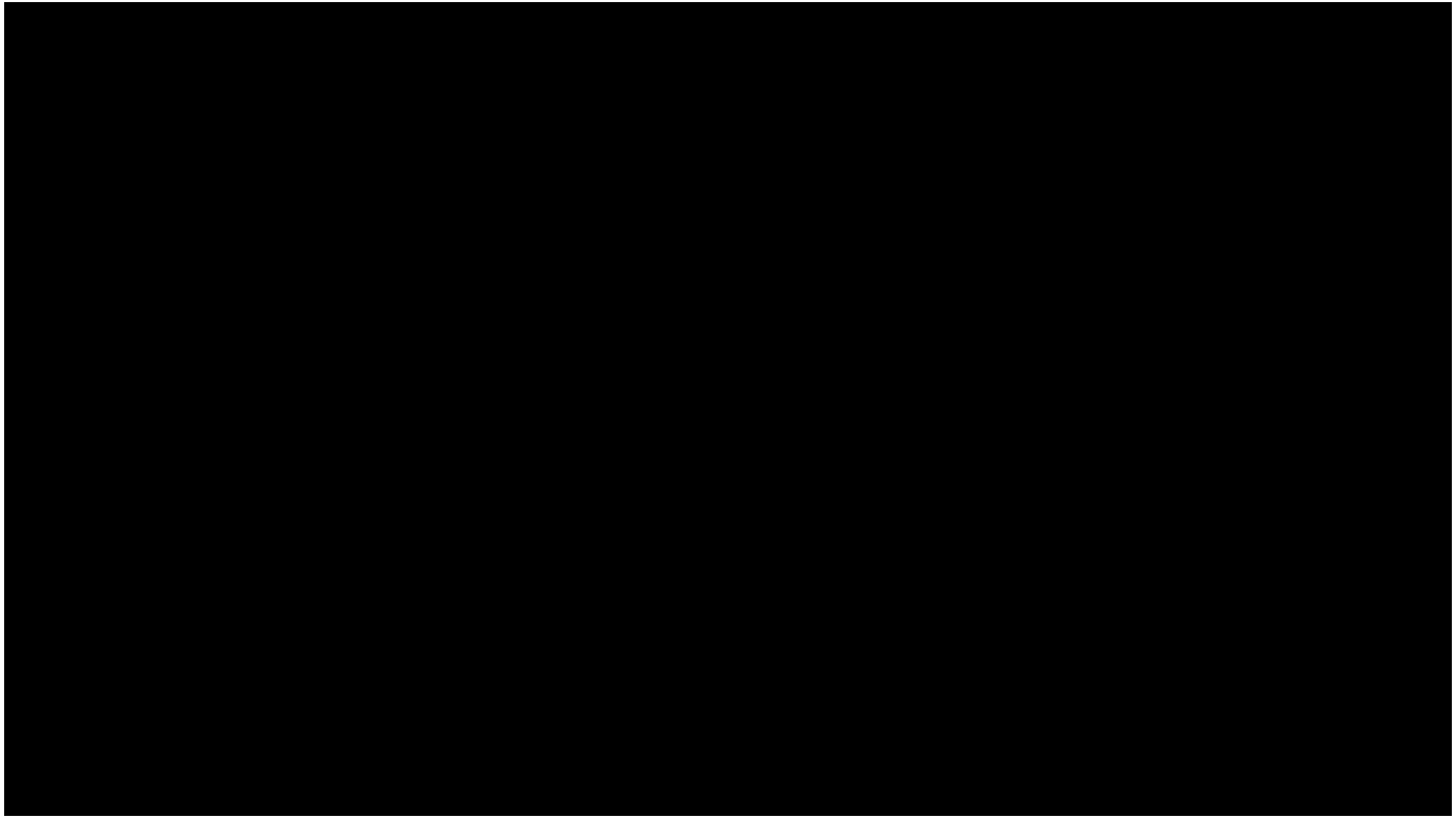
2. Centralized and consistent incident management

3. Faster decision-making and passenger display



FP1 MOTIONAL

Demo Madrid – Indra / Metros Ligeros de Madrid



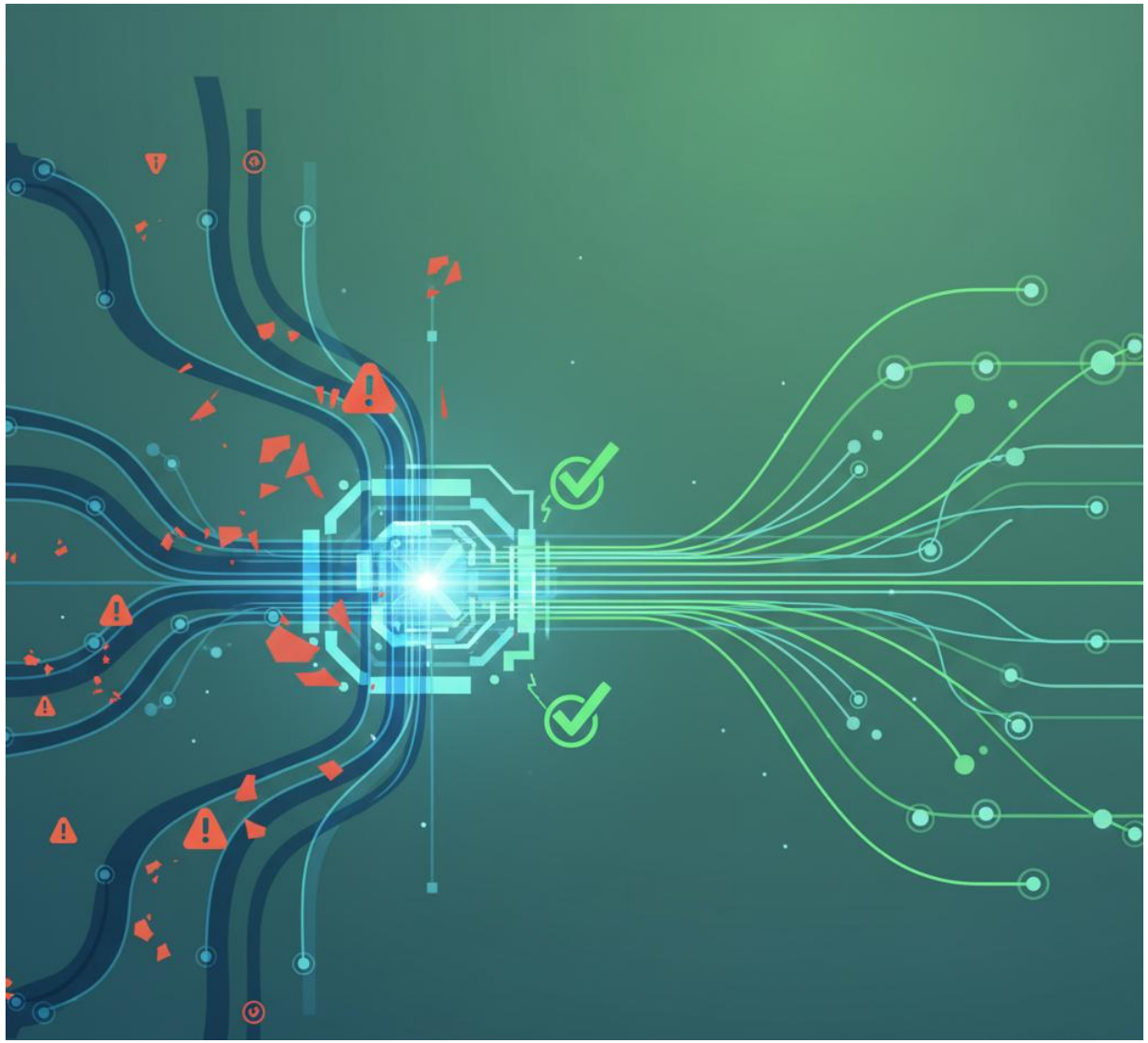
Impact on Luca / Pain points addressed

Luca’s pain points

- Limited real-time visibility during disruptions
- Dispersed incident information across systems
- Difficult coordination of services and responses

What we solved

- Real-time, integrated view of multimodal disruptions
- Centralised and consistent incident management
- Faster and more informed operational decisions



Europe's Rail

FP1MOTIONAL

European Rail Network and Mobility Management

ADIF FM: ADIF – RENFE - INECO

7 May 2026

FP1 MOTIONAL

Europe's Rail

TWO REALITIES. ONE JOURNEY

FP1MOTIONAL
European Rail Network and Mobility Management

FP1 MOTIONAL

Europe's Rail

FP1MOTIONAL
European Rail Network and Mobility Management

INDEPENDENT MOBILITY

FP1 MOTIONAL

INTELLIGENT ORIENTATION

FP1 MOTIONAL

Europe's Rail

FP1MOTIONAL
European Rail Network and Mobility Management

Europe's Rail

FP1MOTIONAL
European Rail Network and Mobility Management

THE ACCESSIBLE TOTEM T-AIS

FP1 MOTIONAL

Europe's Rail

FP1MOTIONAL
European Rail Network and Mobility Management

TOTEM T-AIS: THE INTERACTIVE CORE

- Multi-Sensory Interface
- Real-Time Intelligence
- Validation

FP1 MOTIONAL

Europe's Rail

FP1MOTIONAL
European Rail Network and Mobility Management

EMPOWERED AUTONOMY

FP1 MOTIONAL

Europe's Rail

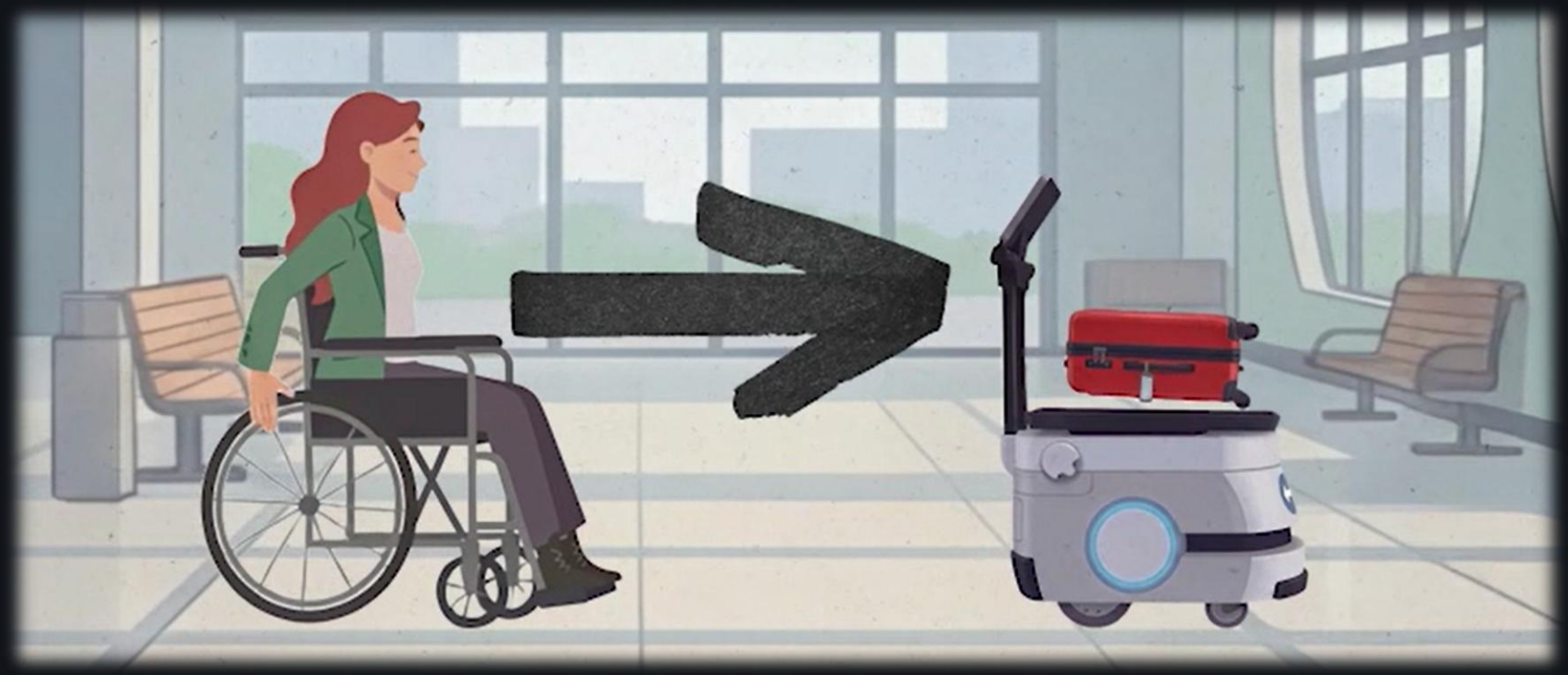
CONNECTED NAVIGATION

FP1MOTIONAL
European Rail Network and Mobility Management

FP1 MOTIONAL

Europe's Rail

FP1MOTIONAL
European Rail Network and Mobility Management



FP1 MOTIONAL

Europe's Rail

FP1MOTIONAL
European Rail Network and Mobility Management

ACCESS ROBOTS

FP1 MOTIONAL

GOBOS: POSITIONING IN PLATFORMS

Europe's Rail

FP1MOTIONAL
European Rail Network and Mobility Management

GOBOS PROJECTION: ANTICIPATING BOARDING

The Challenge

The Solution

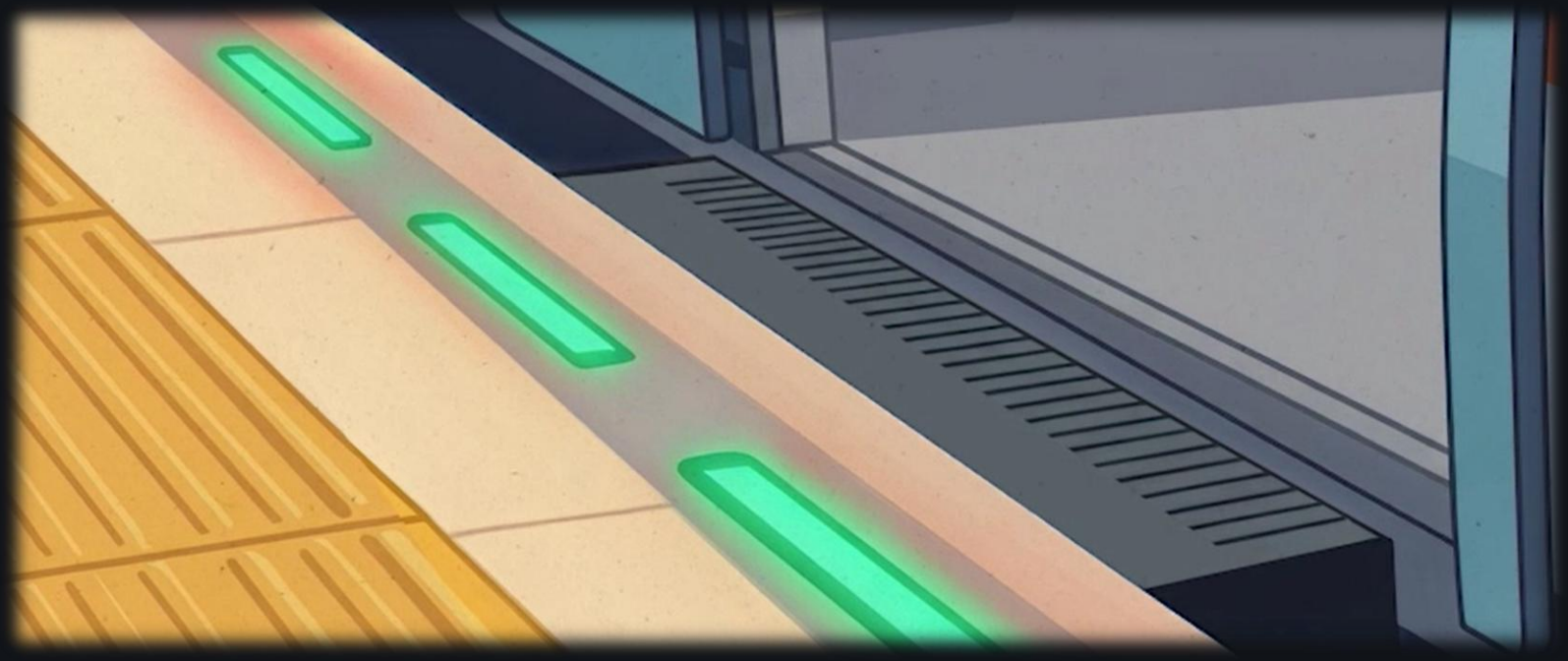
The Result

FP1 MOTIONAL

Europe's Rail

FP1MOTIONAL
European Rail Network and Mobility Management

GAP FILLER: SAFER BOARDING IN PLATFORMS



FP1 MOTIONAL

Europe's Rail

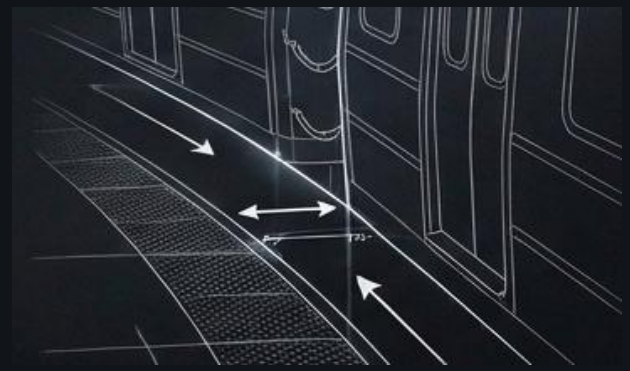
FP1MOTIONAL
European Rail Network and Mobility Management

GAP FILLER: CURVED PLATFORMS WITH DIFFERENT ROLLING STOCK MATERIAL

The Challenge

The Solution

The Result



FP1 MOTIONAL

Europe's Rail

FP1 MOTIONAL
European Rail Network and Mobility Management

FP1 MOTIONAL

VIDEO
MALAGA
DEMOS

Europe's Rail

FP1MOTIONAL
European Rail Network and Mobility Management

FP1 MOTIONAL

Europe's Rail

FP1MOTIONAL
European Rail Network and Mobility Management

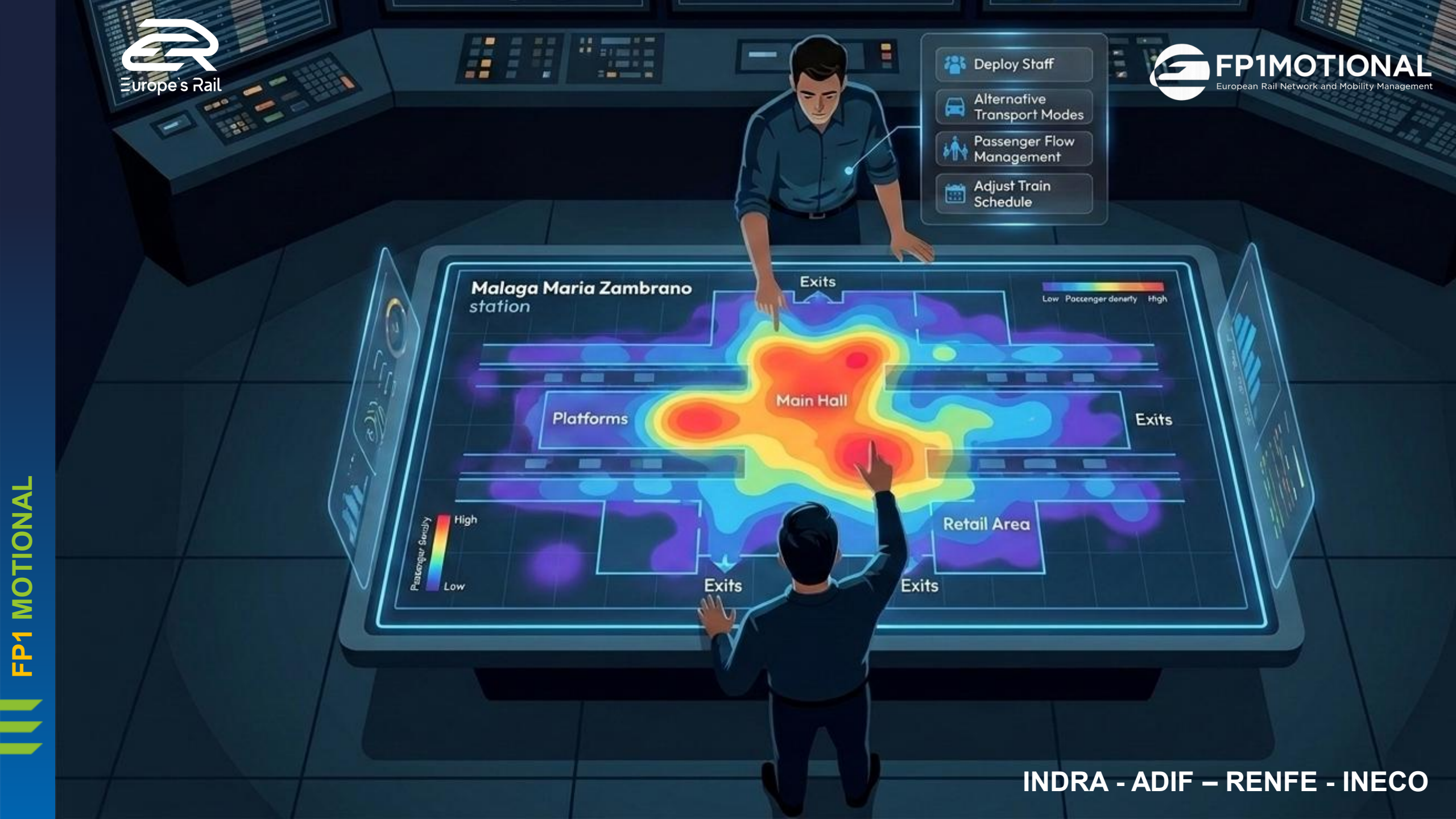
OPERATIONAL INTELLIGENCE: SHORT-TERM AND LONG-TERM DEMAND ESTIMATION

System Inputs

Operational Outputs

INDRA - ADIF – RENFE - INECO

FP1 MOTIONAL


Europe's Rail
FP1MOTIONAL
European Rail Network and Mobility Management
Deploy Staff
Alternative Transport Modes
Passenger Flow Management
Adjust Train Schedule
Malaga Maria Zambrano station
Exits
Low Passenger density High
Main Hall
Platforms
Exits
Retail Area
Exits
Exits
Passenger Density
High
Low
FP1 MOTIONAL
INDRA - ADIF – RENFE - INECO

Europe's Rail

FP1MOTIONAL
European Rail Network and Mobility Management

ONE EUROPE. ONE JOURNEY. ZERO BARRIERS

THANK YOU!

FP1 MOTIONAL

FP1 Event 2 - Seamless, inclusive mobility & predictive services

Demo 25.4:

Demand forecast to support operators in the service management

Elena García (ETRA)

Demo 25.4 Demand forecast to support operators in the service management

LUCA:

Railways manager

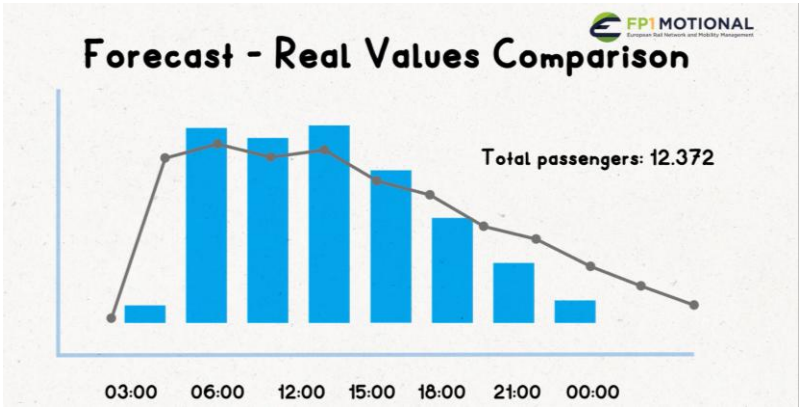
Pain points

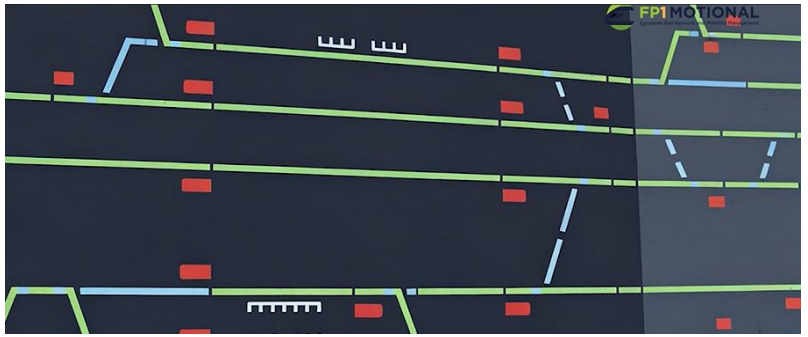
- **Difficult to anticipate demand**
- **Inability to manage disruptions**
- **Lack of coherence in the decisions to solve issues**
- **Time consuming in the decision taken**

ETRA has developed a tool to support LUCA - the railway manager, in managing station operations:

- **Demand prediction** per line and per station, which helps operators adjust train services in advance. This allows for optimizing the number of trains or adding other transport options, such as buses, to accommodate additional passengers.

- **Situation library**, which provides managers with guidance to respond quickly to changing conditions based on demand, weather, or special events.





Together, these tools enable proactive, data-driven decisions, improving operational efficiency and ensuring passengers enjoy a reliable, well-managed travel experience.

Demo 25.4 Algorithms for forecasting short-term demand and detecting situations

PREDICTOR MODEL – SHORT TERM FORECAST

- The Predictor Model is a centralized hub for managing the lifecycle of prediction passenger demand, encompassing model training, evaluation, and inference. It is made of two subcomponents that trains the model by using historical data and updating the database of demand (Trainer) and also the Predictor that interfere the data to predict the demand in the upcoming hours.
- The Model makes the prediction every time the data corresponding to the last available period is received and makes use of the data from several periods prior to this until the time interval considered in the model is completed.

SITUATION MANAGER – DISRUPTION MANAGEMENT

- The Situation Manager oversees identifying the situations that occur in multimodal mobility and activating strategies that carry out the most appropriate management of mobility, adapting to the needs of each of the situations. It is made up of components for the identification of situations from historical and real-time data (Situation Detector), store the identified situations (Situation Library), and activation of the strategy associated with the situation detected as a decision-making system (Strategic Manager)

FP1 MOTIONAL
European Rail Network and Mobility Management

etra I+D

TRAIN RISK MANAGEMENT SYSTEM

Real-time monitoring and risk assessment

Pain points

- ~~Difficult to anticipate demand~~
- ~~Inability to manage disruptions~~
- ~~Lack of coherence in the decisions to solve issues~~
- ~~Time consuming in the decision taken~~

Together, these tools enable proactive, data-driven decisions, improving operational efficiency and ensuring passengers enjoy a reliable, well-managed travel experience.

Transforming European Mobility: The FP1 Motional Demonstration in Luxembourg

FP1 MOTIONAL
European Rail Network and Mobility Management

HACON

CFL

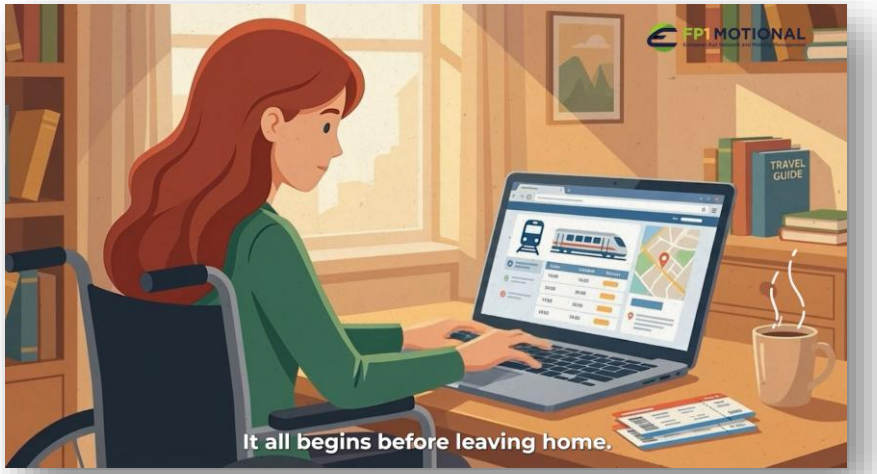
Co-funded by the European Union

Orchestrating multimodal Journeys across mobility platforms

&

Demand forecast and disruption management

Anna



- Fragmented Journey Planning across modes
- The "First and Last Mile" are disconnected
- Cross-Border Blind Spots
- The "Surprise" of Overcrowded services

Pain Points

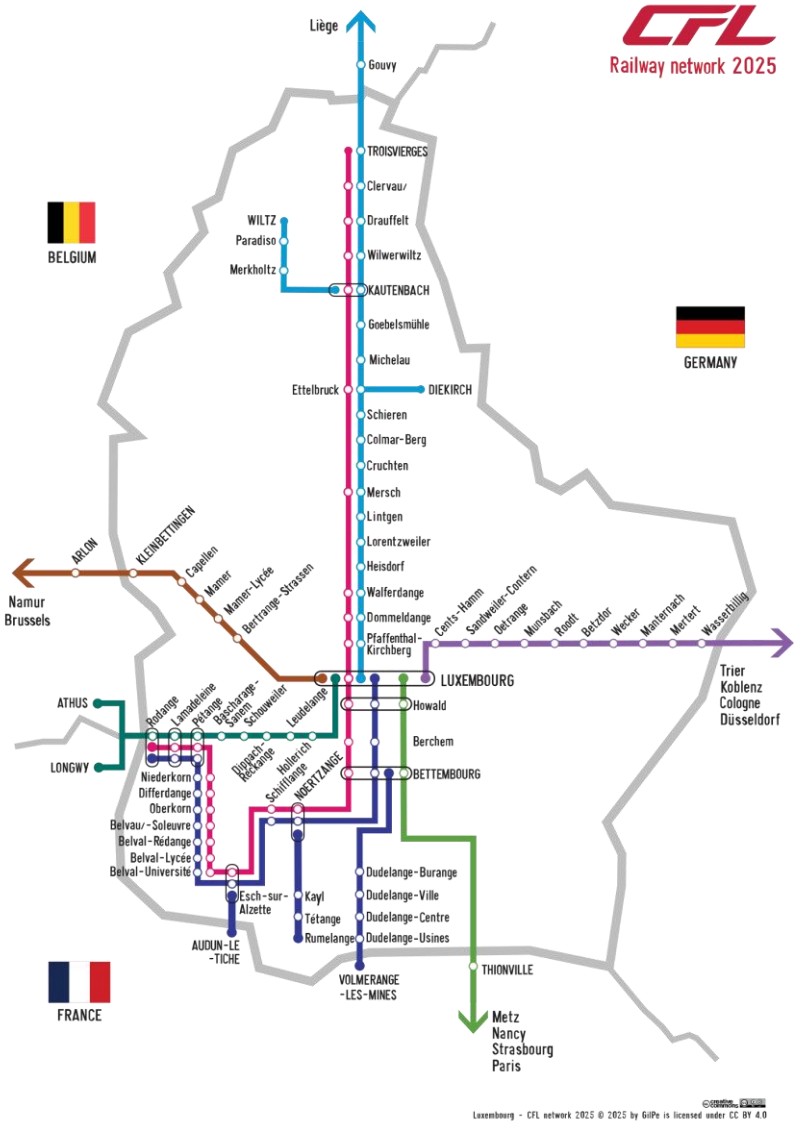
Luca

- The Burden of Data Ingestion and Maintenance
- Loss of Data Sovereignty and Control
- Lack of Visibility into Intermodal Performance
- Inability to Anticipate Demand Anomalies

Orchestrating multimodal Journeys across mobility platforms

✓ Web/Android app + MaaS platform

- ❑ Multimodal Journey planning (CFL + P+R + FLEX)
- ❑ Cross-platform Journey planning (Luxembourg + Saarland + Madrid)



Luxembourg demo | Journey Planning

Journey Planning system (PROD)

Timetable data

Real-time data

DB timetable (MERITS)

Timetable data

MaaS platform

Availability request

Car's availability

FLEX car-sharing

Availability request

Park's availability

CFL P+R

Availability request

Park's availability

P+R Open data Lux

Journey request

Journeys

MaaS platform (Madrid)

Journey request

Journeys

FP6 PIS (Saarland)

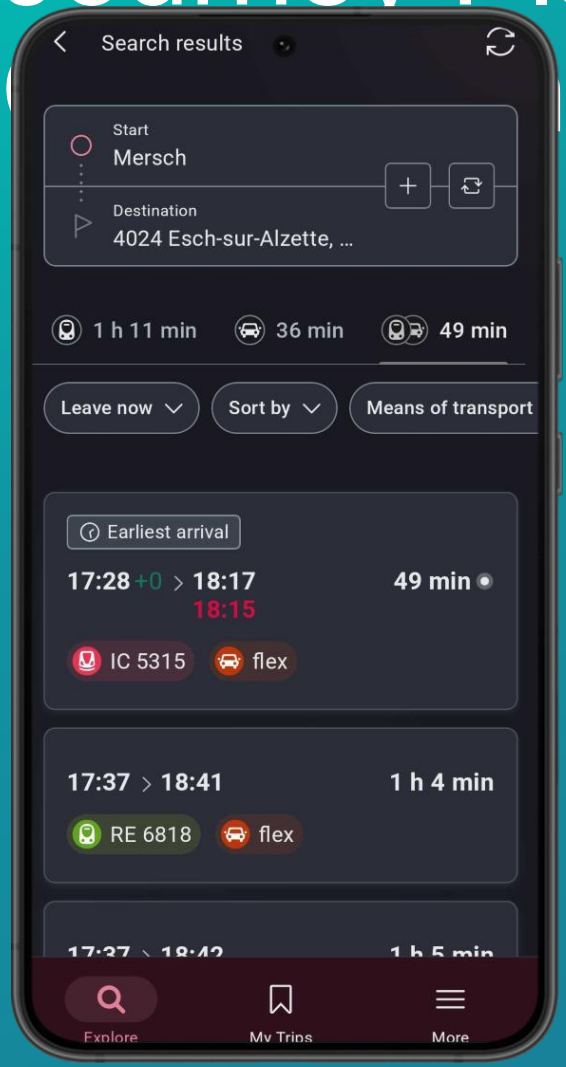
Regional Rail + DRT

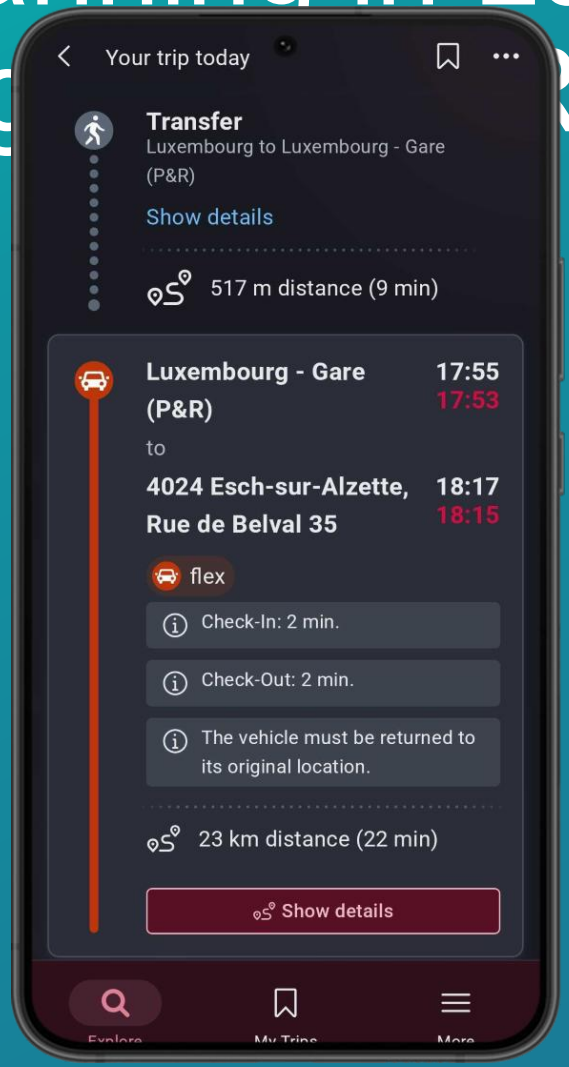
Integrated journey planning

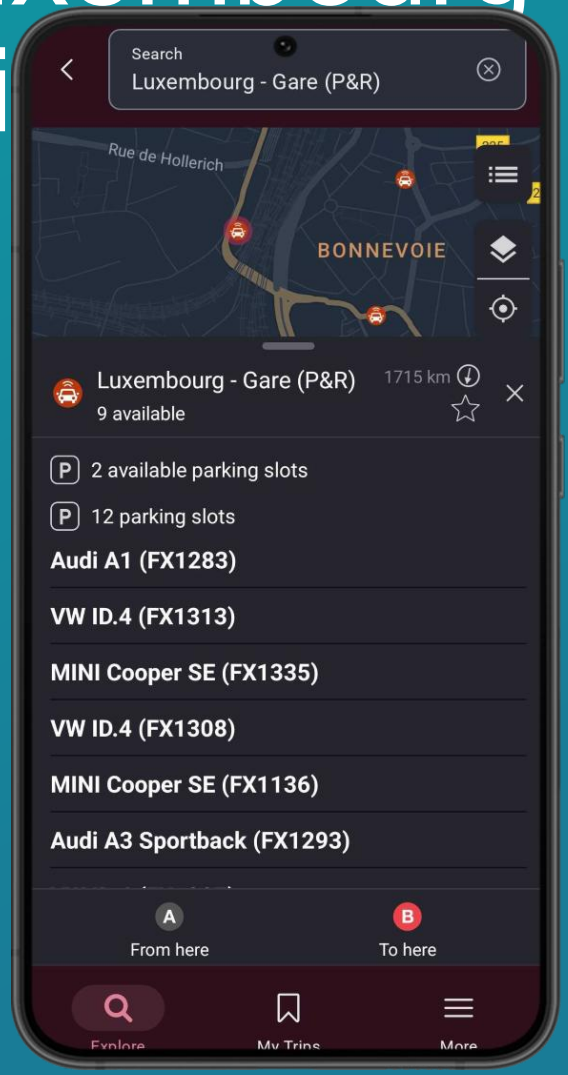
Journey Planning apps

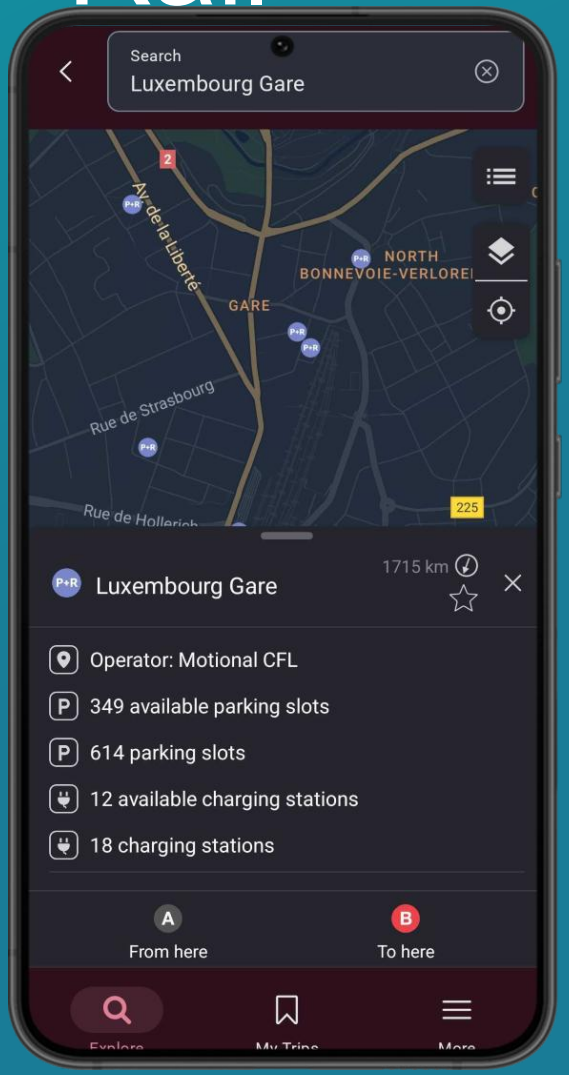
Powered by OJP

Journey Planning in Luxembourg – Rail +









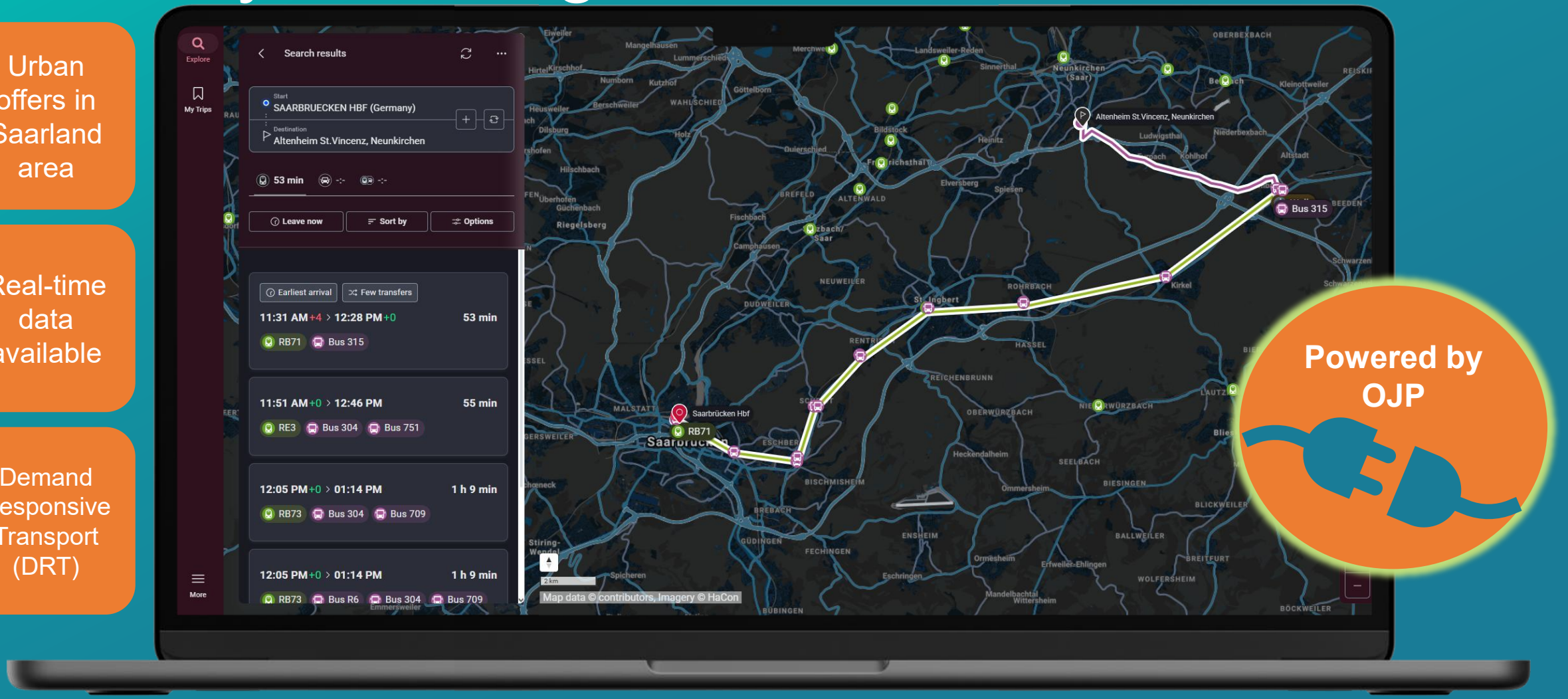
Journey Planning in Saarland

From: Saarbrücken Hbf
To: Altenheim St.Vincenz, Neunkirchen

Urban offers in Saarland area

Real-time data available

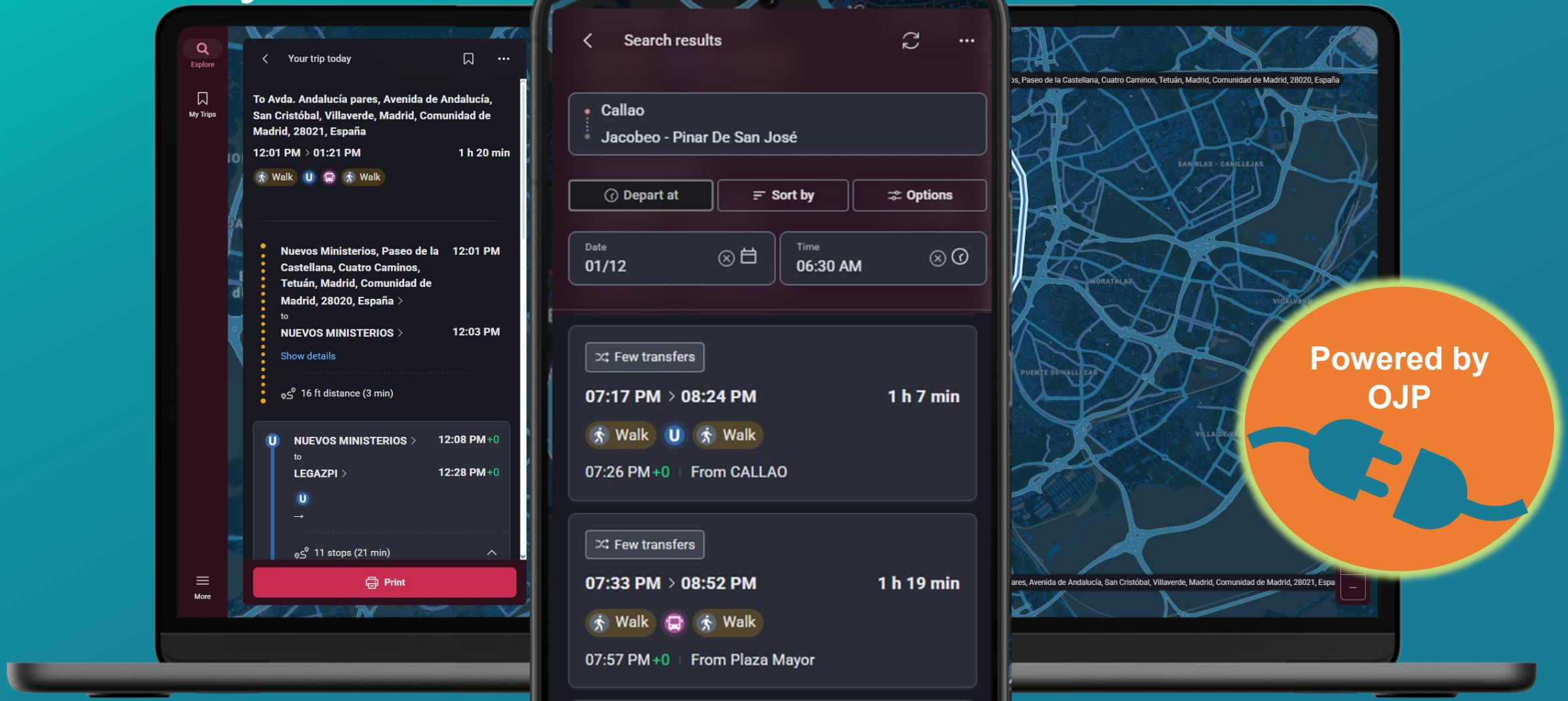
Demand Responsive Transport (DRT)



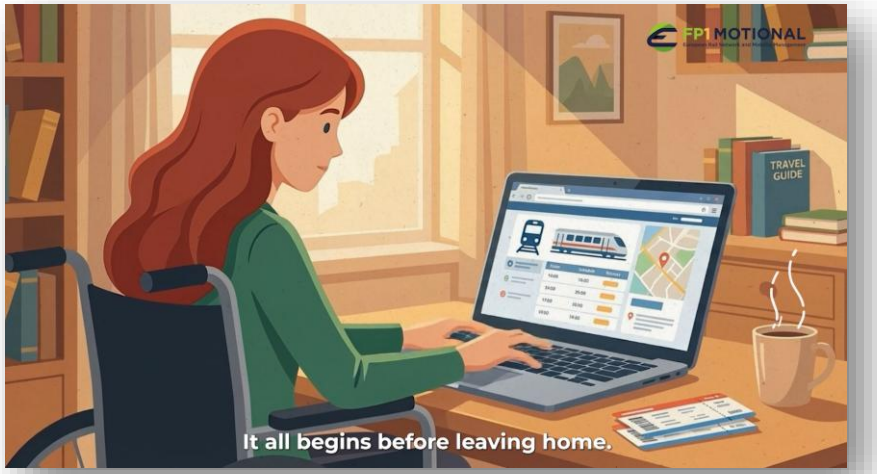
Powered by OJP

Journey Planning in Madrid

From: Callao
To: Jacobeo – Pinar de San José



Anna



- ~~Fragmented Journey Planning across modes~~
- ~~The "First and Last Mile" are disconnected~~
- ~~Cross-Border Blind Spots~~
- **The "Surprise" of Overcrowded services**

Pain Points

Luca

- ~~The Burden of Data Ingestion and Maintenance~~
- ~~Loss of Data Sovereignty and Control~~
- **Lack of Visibility into Intermodal Performance**
- **Inability to Anticipate Demand Anomalies**

Demand forecast and disruption management

- ✓ Analytics dashboards
  - ❑ Statistics from Journey planning requests
  - ❑ Demand forecast analysis
  - ❑ Alerts on overcrowding situations

Luxembourg demo | Journey Planning

Journey Planning system (PROD)

DB timetable (MERITS)

Timetable data

Real-time data

Timetable data

MaaS platform

Availability request

Car's availability

FLEX car-sharing

Availability request

Park's availability

CFL P+R

Availability request

Park's availability

P+R Open data Lux

Journey request

OJP

Journeys

MaaS platform (Madrid)

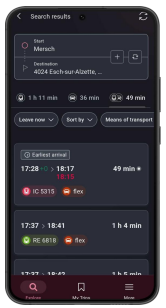
Journey request

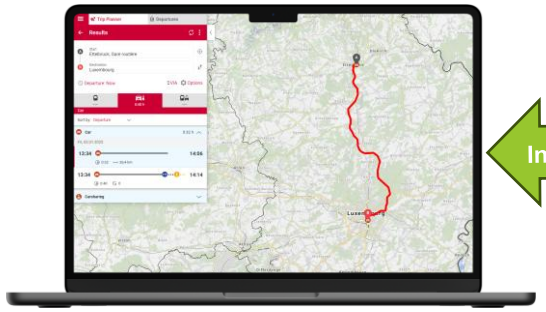
OJP

Journeys

FP6 PIS (Saarland)

Regional Rail + DRT





Integrated journey planning

Journey Planning apps

Timetables

Real-time data

Journey planning requests

Train occupancy forecast

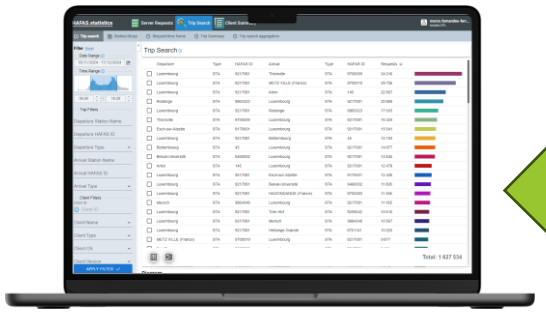
Car-sharing bookings

Data Analytics platform

Train capacity

Manual occupancy

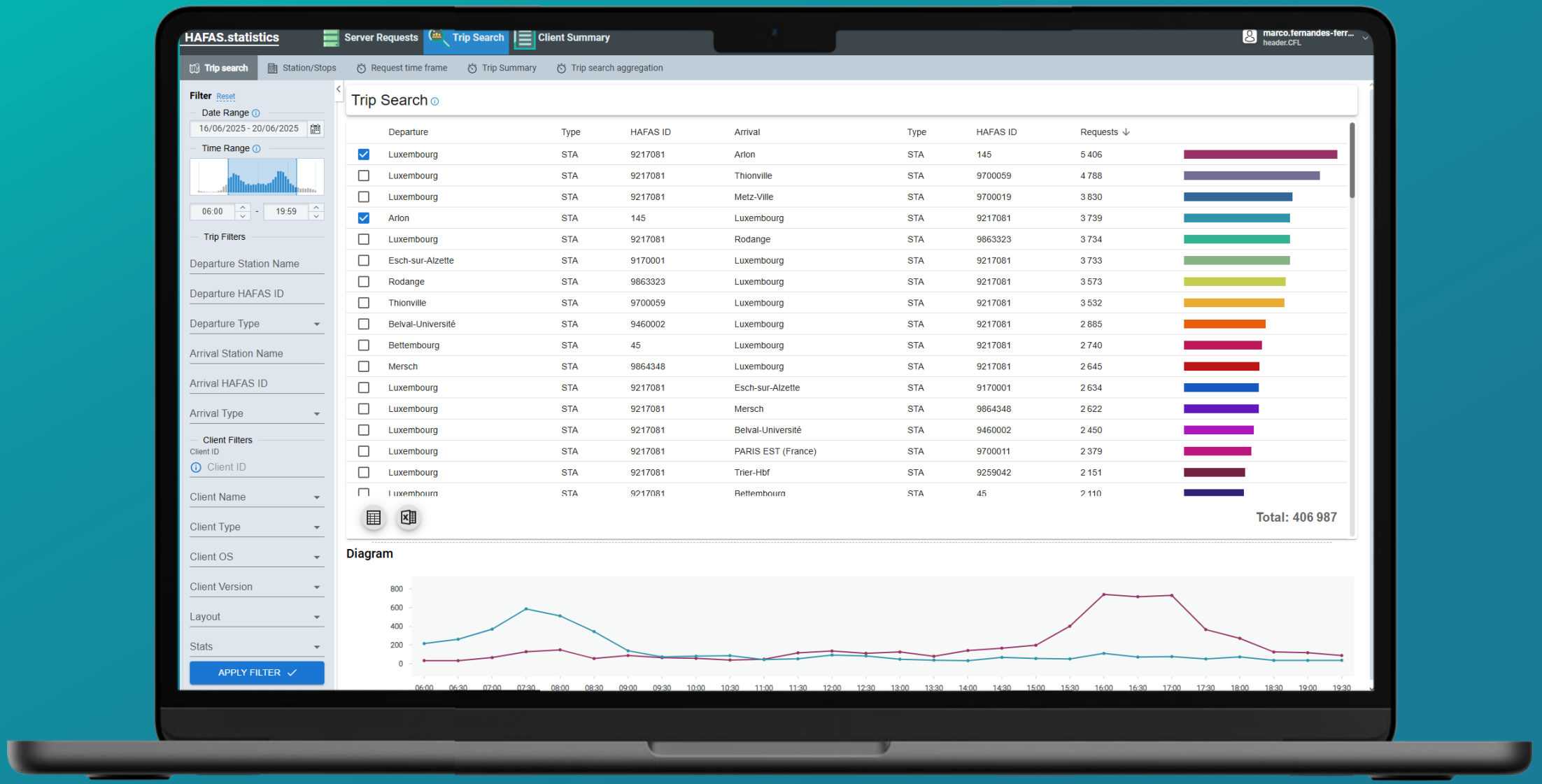
CFL Operation Support system



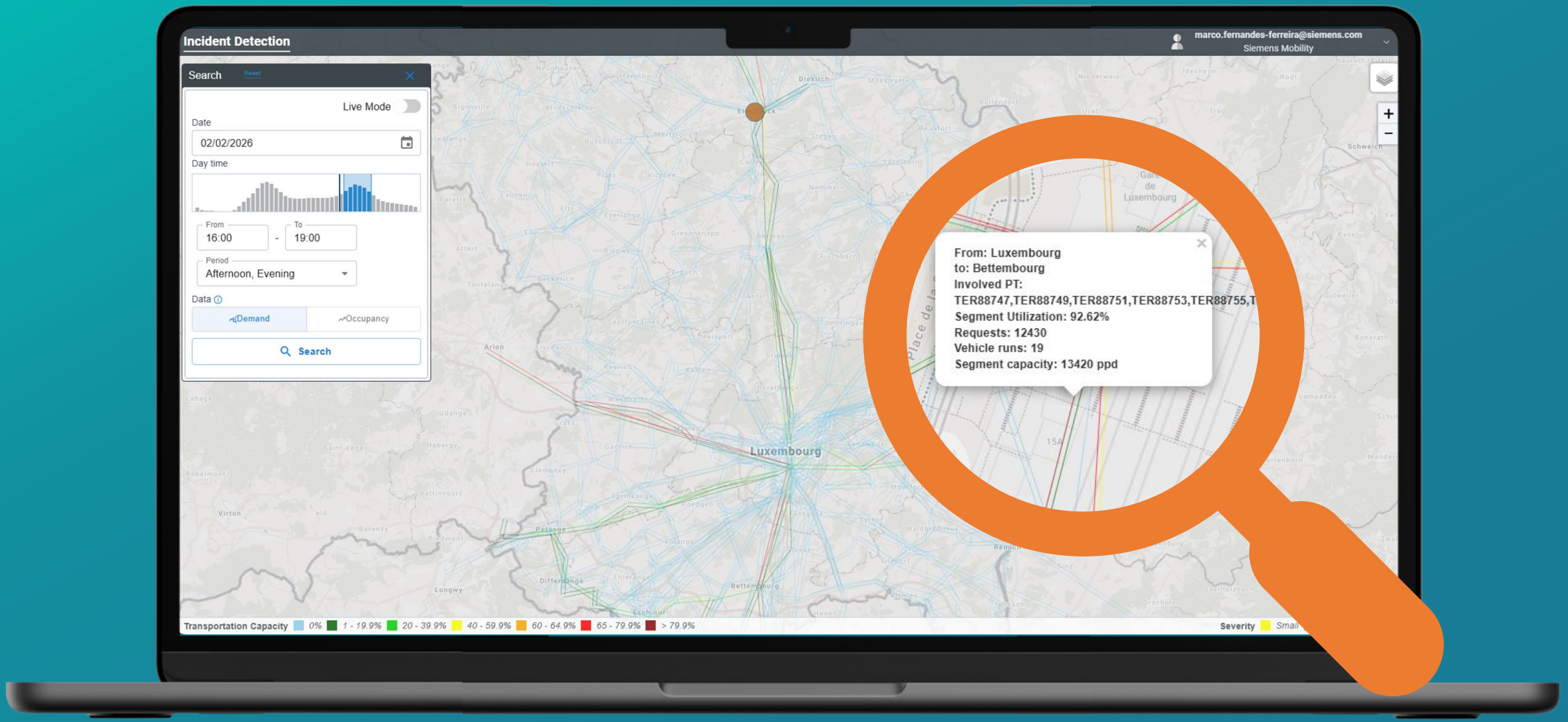
Statistics and forecasts

Operational dashboard (Analytics data)

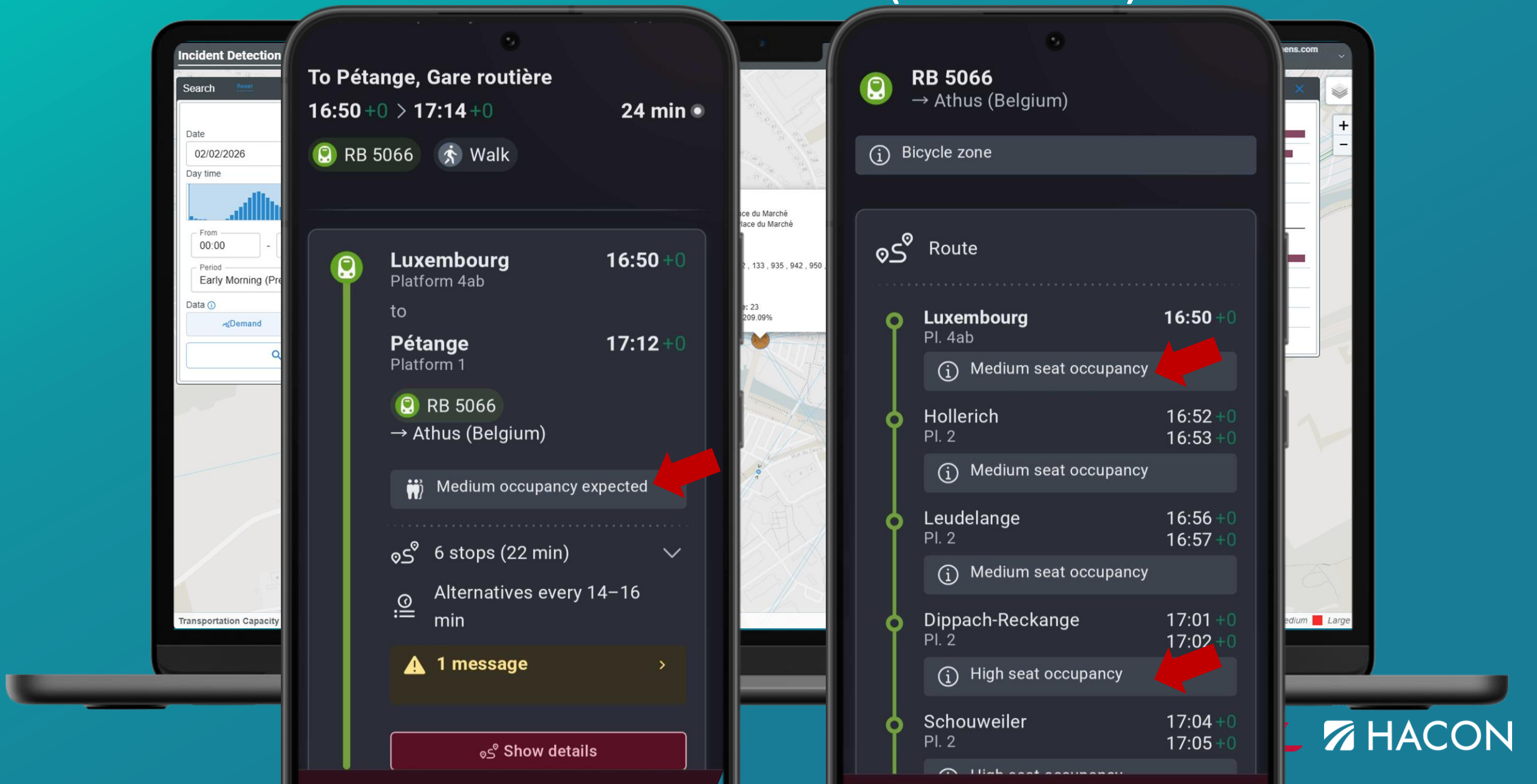
Demonstration – Demand (statistics)



Demonstration – Demand forecast analysis



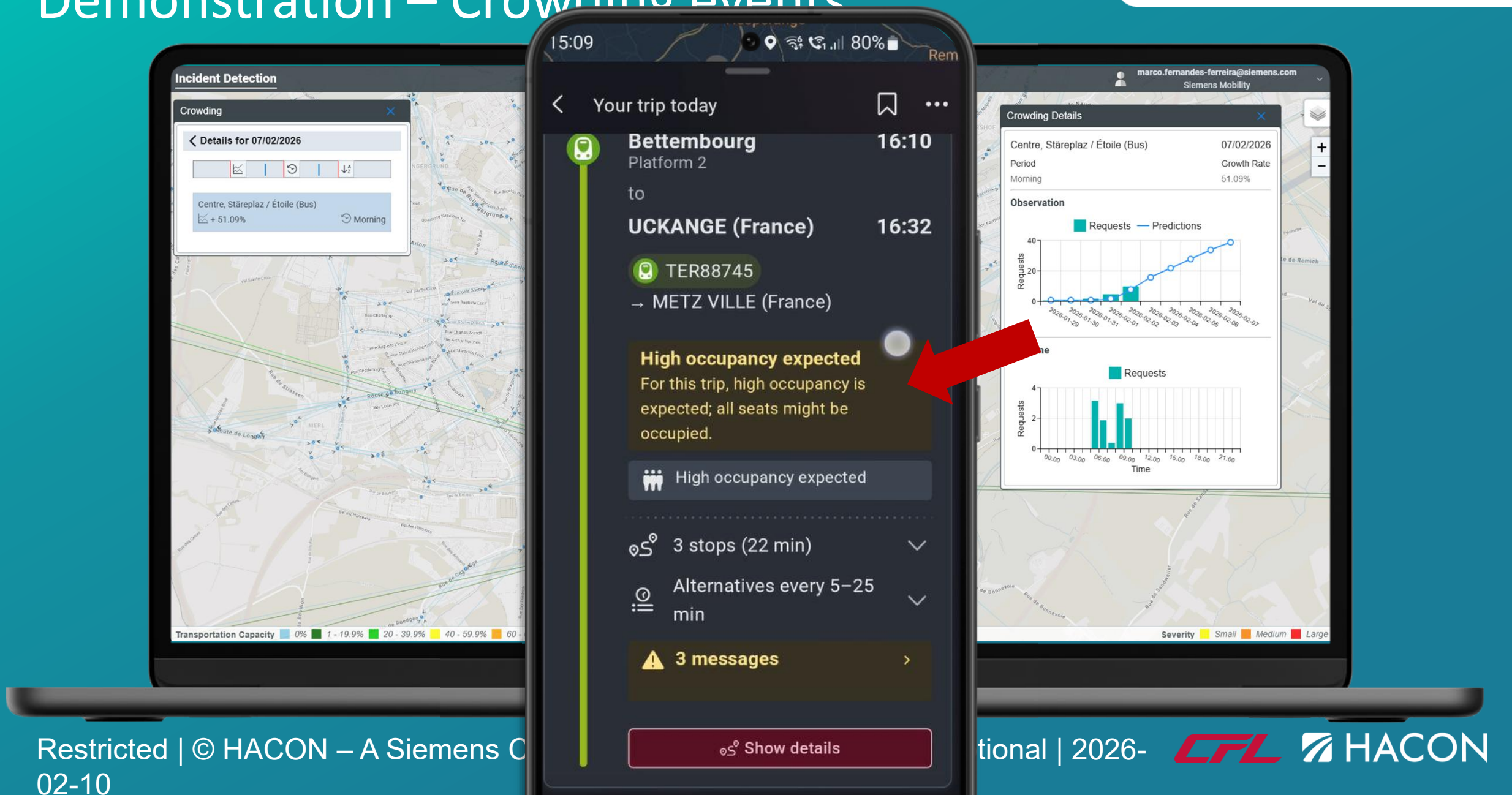
Demonstration – Demand forecast (Incidents)



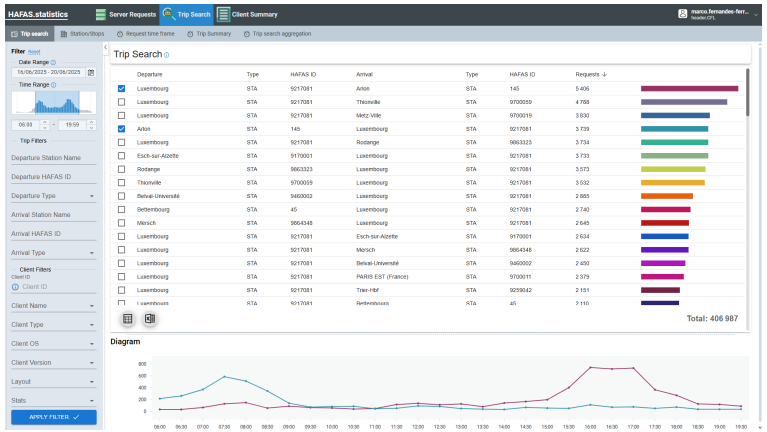
FP1 MOTIONAL
European Rail Network and Mobility Management

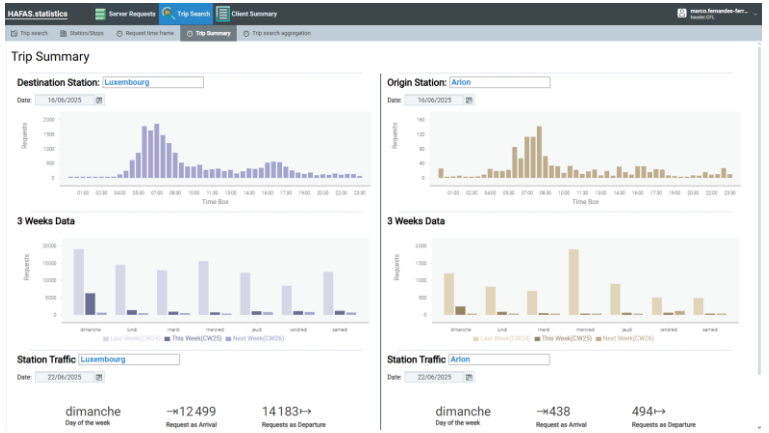
HACON

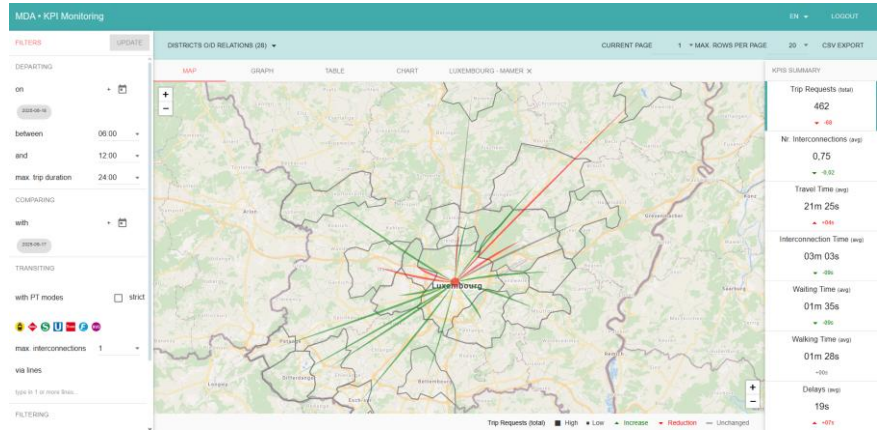
Demonstration – Crowding events

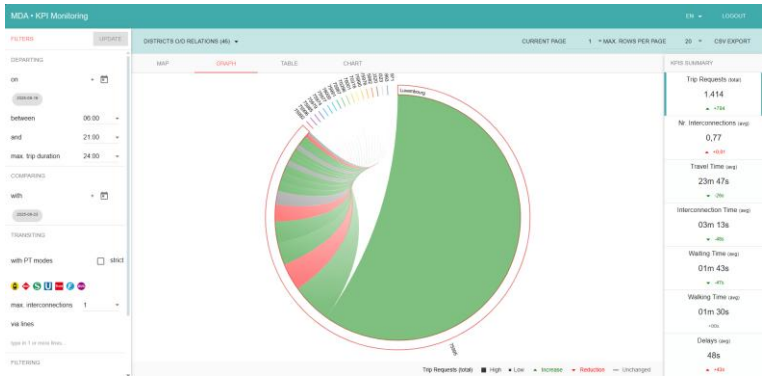


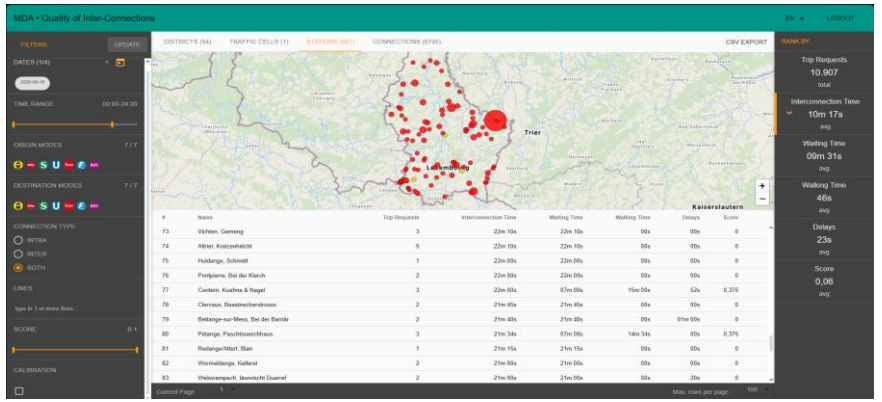
Analytics dashboards

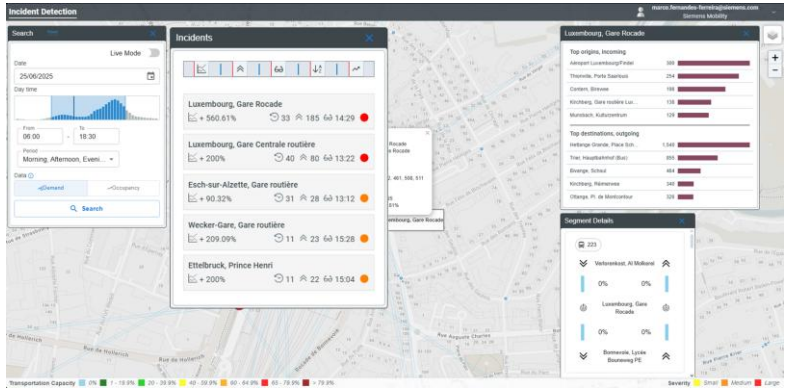


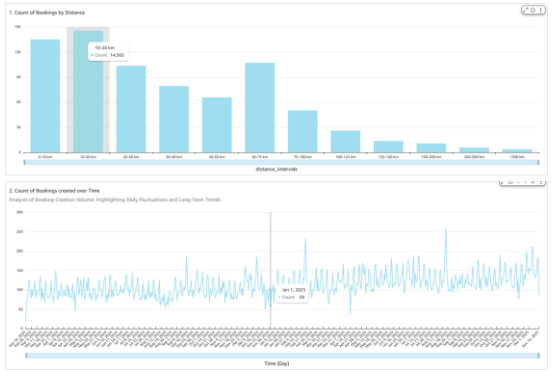




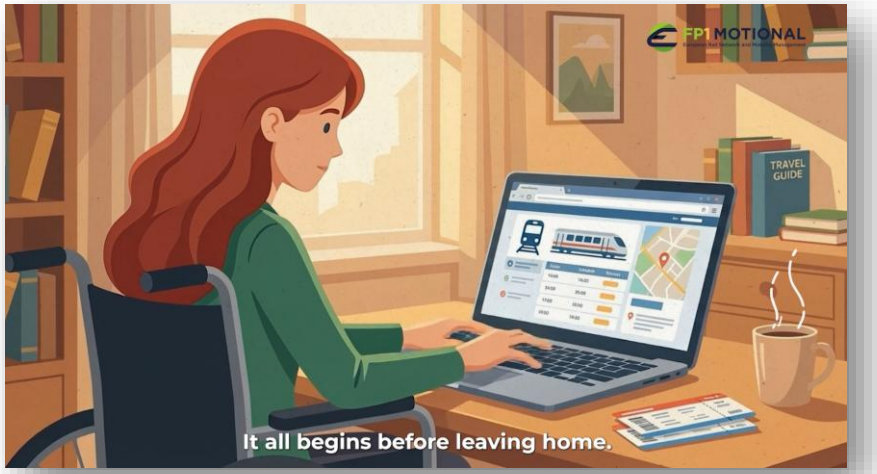








Anna



- ~~Fragmented Journey Planning across modes~~
- ~~The "First and Last Mile" are disconnected~~
- ~~Cross-Border Blind Spots~~
- ~~The "Surprise" of Overcrowded services~~

Pain Points

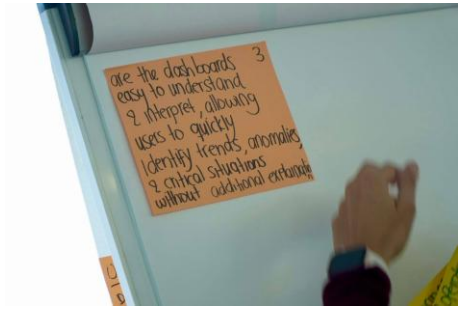
Luca

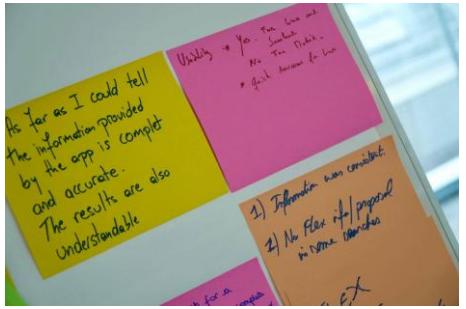
- ~~The Burden of Data Ingestion and Maintenance~~
- ~~Loss of Data Sovereignty and Control~~
- ~~Lack of Visibility into Intermodal Performance~~
- ~~Inability to Anticipate Demand Anomalies~~

Validation Event

10th February @ CFL premises














End user feedback

1. Strong validation of multimodal & cross-border journey planning

- All respondents used and valued journey planning features.
- Multimodal and cross-border routing (e.g., Luxembourg ↔ Germany) highlighted as major strengths.
- Satisfaction consistently ranged from somewhat to very satisfied.

2. Clear interest in Demand Statistics & Forecasting

- Demand analytics widely used and appreciated.
- Dashboards rated as accurate, intuitive, and consistent.
- Key uses: OD flow analysis, mobility pattern insights, operational decisions, and tracking planner performance.

3. Positive cross-border insights

- Strong appreciation for visibility into where customers come from and go—especially across borders.
- Expectation for better integration with neighbouring countries.

4. High usability

- Dashboards and data tools described as intuitive, excellent, and user friendly.
- Journey planning UX rated somewhat to very easy.

5. Proven operational value

- Supports enhanced data analysis and intermodal improvements.
- Helps streamline operator workflows.
- Several respondents noted significant improvements in decision support.

6. Issues & improvement needs

- Some POIs couldn't generate multimodal journeys (isolated).
- Initial dashboard learning curve for one user → need onboarding.
- Cross-border gaps: some neighbouring regions missing (except Saarland).

Video with demo description and end user interviews

https://rail-research.europa.eu/pages/fp1-motional/multimedia

Europe's Rail

FP1 MOTIONAL
European Rail Network and Mobility Management

FP1 MOTIONAL
European Rail Network and Mobility Management

7TH MAY | DISSEMINIATION EVENT | SJ, DB AND SQILLS

Booking journeys cross-border

DB SJ sqills

FP1 MOTIONAL

Europe's Rail

FP1 MOTIONAL

FP1 MOTIONAL
European Rail Network and Mobility Management

BACKGROUND

Anna’s struggles

- Booking cross-border or multimodal trips is fragmented, forcing travellers, like Anna, to juggle multiple platforms to build her journey.
- The process is time consuming and requires collection of a lot of information.

BACKGROUND

Luca’s struggles

- Enabling inventory from other carriers requires custom integrations, as operators and resellers use different APIs and standards.
- This makes onboarding of new partners slow, costly, and hard to scale.

OUR SOULTION

OSDM: A new standard made for Anna and Luca

Thanks to a common language customers can to book journeys end-to-end in both DBs and SJs sales channels. **This was enabled in three steps**:

SJ selling multimodal journeys in Sweden (2022-24)

- Migration to new platform (S3 Passenger) provided Sqills
- Connection to other carriers through Samtrafiken's platform NDS
- New sales channels and integrations in order to create combined journeys incl. All rail and bus operators, called Resplus.
- **Live April 2024** 🎉

DB selling SJ (2025)

- Direct integration DB and SJ reseller API: total content of SJ including both day- and night trains
- **Live December 2025** 🎉

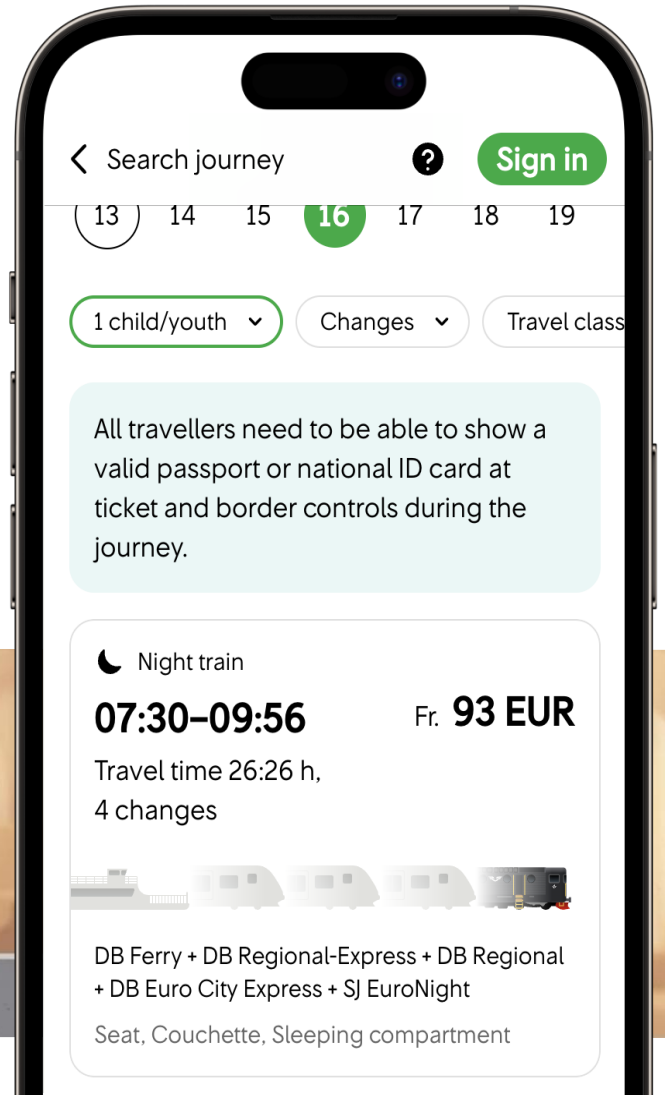
SJ selling DB (2025 -...)

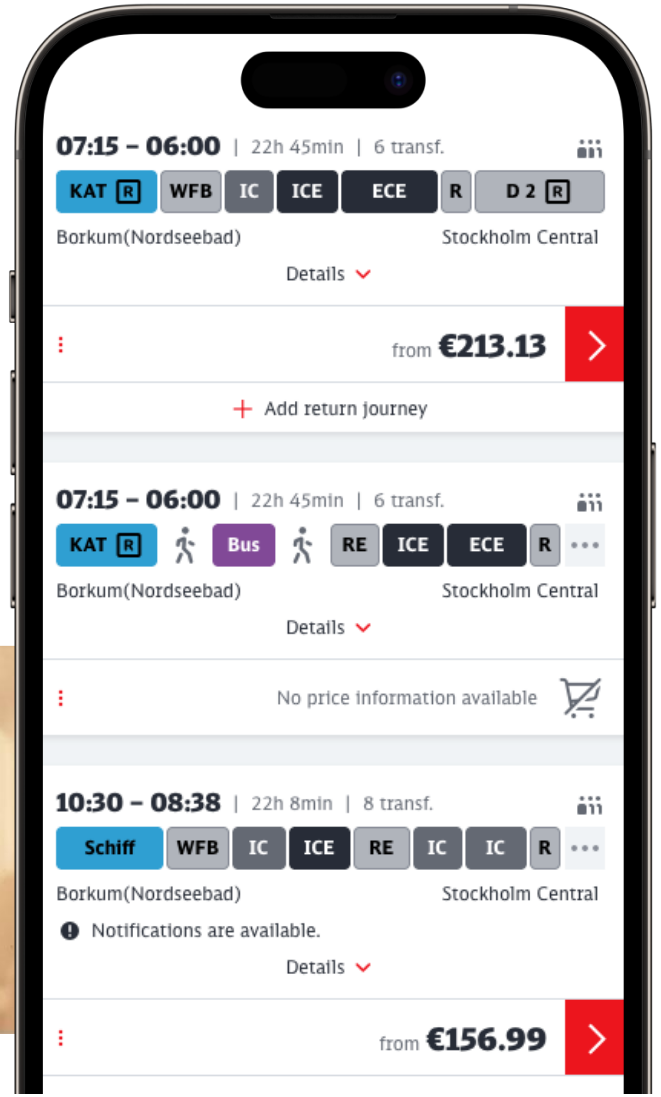
- A selection of DB's offerings to explore technical possibilities and customer needs.
- **Proof of Concept – Feb 2026** 🧪

INSIGHTS AND CONCLUSIONS

Benefits for Anna

- An end-to-end search
- Multimodality
- One platform, one payment, one booking reference





INSIGHTS AND CONCLUSIONS

Benefits for Luca

- Easy integration
- Common language
- No customizations – faster time to market
- Faster connections for settlements minimizing risks or errors and time outs.

Through a smooth process
- We are ready for expansion in Europe!

Co-funded by the European Union

Europe's Rail

FP1 MOTIONAL

European Rail Network and Mobility Management

Seamless & Inclusive Mobility

7 May 2026

One Europe, One Journey,

Zero Barriers for All Passengers

FP1 MOTIONAL

WP23 Demos – Services for inclusive rail-based mobility

Dissemination Event 2

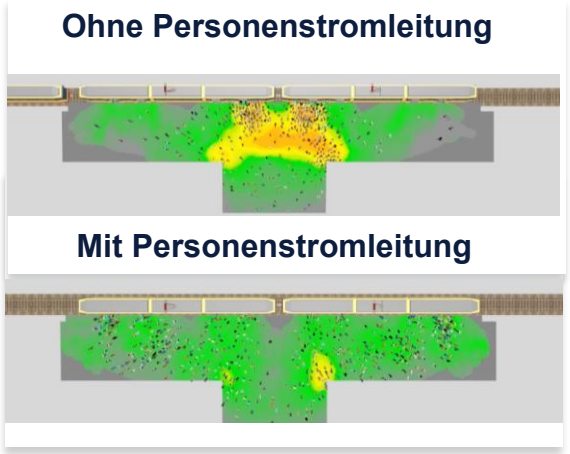
Deutsche Bahn: Illuminated Platform Edge

Demo Leaders: DB, 07.05.2026

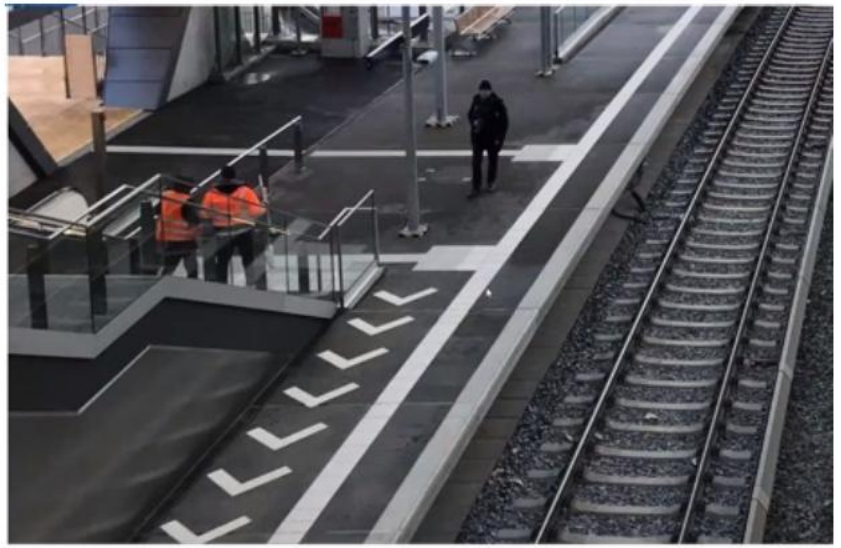
WP23 Demo – Illuminated Platform Edge
Initial Situation: Rising Number of passengers

- The number of rail passengers is expected to double over the next ten years.
- Crowded platforms can lead to dangerous situations and reduce attention and orientation.
- In metropolitan areas, capacity limits like train length, frequencies and infrastructure are limited.
- When passenger volume is high, stop times are extended. Every delay leads to further delays.

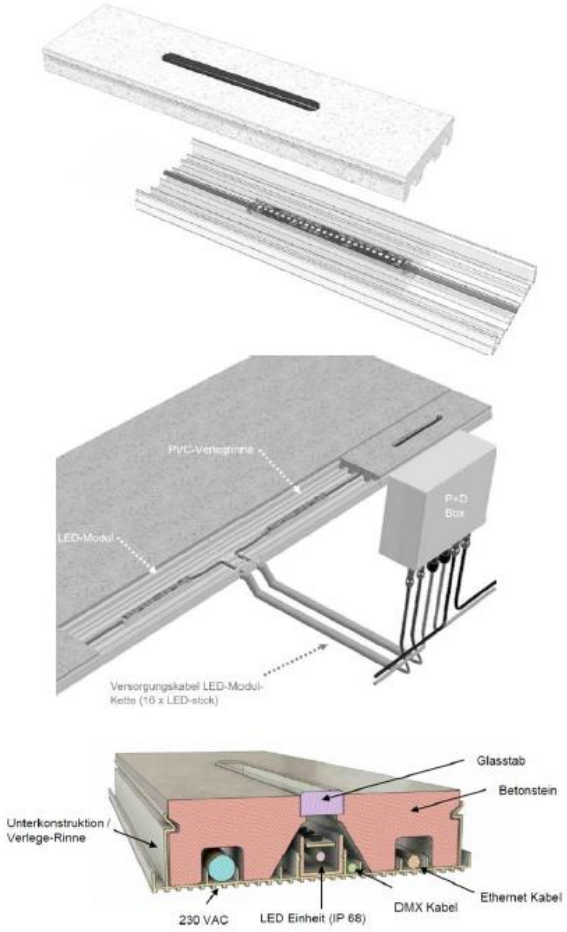
- From Anna's perspective, traveling with limited mobility, especially at busy train stations, poses a major challenge.
- Clear customer information and a good passenger guidance on the platform is essential.
- Especially for a better positioning on the platform (train occupancy, availability of multi-purpose compartments) and a greater sense of safety.

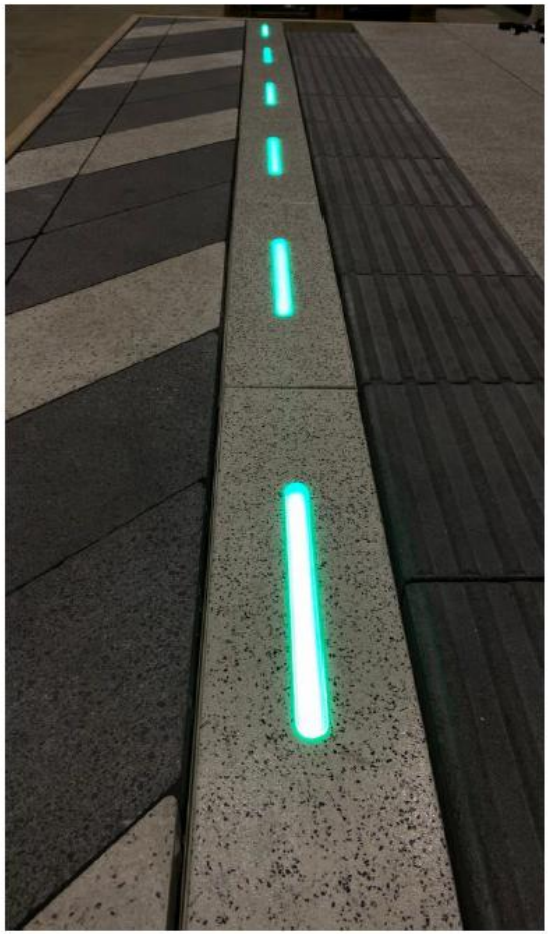


WP23 Demo – Illuminated Platform Edge
Current solutions for passenger guidance are not optimal



WP23 Demo – Illuminated Platform Edge
Technical Solution: Smart concrete LED-floor tiles





WP23 Demo – Illuminated Platform Edge
Target: Evaluation in terms of:

Security: Increasing attention on the platform

Punctuality: Optimization of stopping times and handling

Capacity: Improving the distribution of travellers

Customer satisfaction: Improving the orientation

WP23 Demo – Illuminated Platform Edge Video

Services for Inclusive Railbased Mobility **WP23**

WP23 Demo – Illuminated Platform Edge
Possible Use Cases

Punctuality / capacity	Attention / security
Display of train stop position	Track area warning
Display of train capacity	Warning train entry/departure
Door position indicator	Warning door closure
Display of multipurpose compartments	Distribution of people in narrow places

WP23 Demo – Illuminated Platform Edge
Differences of the pilot projects

1. Berlin-Südkreuz ✓

- Berlin Metro (S-Bahn)
- 1 Track, 140m
- Outside Station
- Middle passenger frequency
- Usecases: Proof of concept, structural integration, costumer satisfaction, capacity

2. Leipzig Hbf. (tief) →

- Leipzig Regional Traffic
- 2 Tracks, 210 m
- Underground Station
- High passenger frequency
- Usecases: Attention, stopping position, IT-development (data connectivity, sensors)

WP23 Demos – Illuminated Platform Edge
Functional system architecture

Data collection

Data matching with sensor manufacturer

Data transmission via mobile radio

Data transmission via cable/Internet

Data acquisition and processing at the station (SIUT)

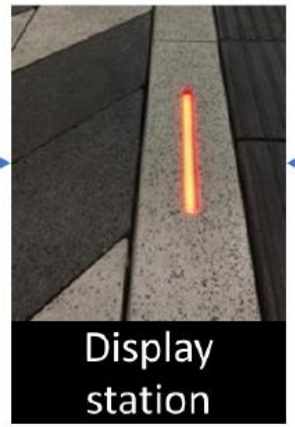
Capturing train stop and departure

Data transmission via LAN

Backend / Monitoring SIUT

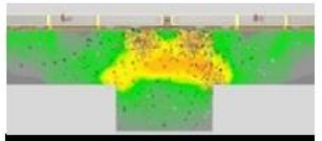
Data transmission via cable/Internet

Data transmission via LAN



Display station

244 luminous blocks, 8 P&D boxes



Video + WLAN-Monitoring

WP23 Demo – Illuminated Platform Edge
Innovation process and results

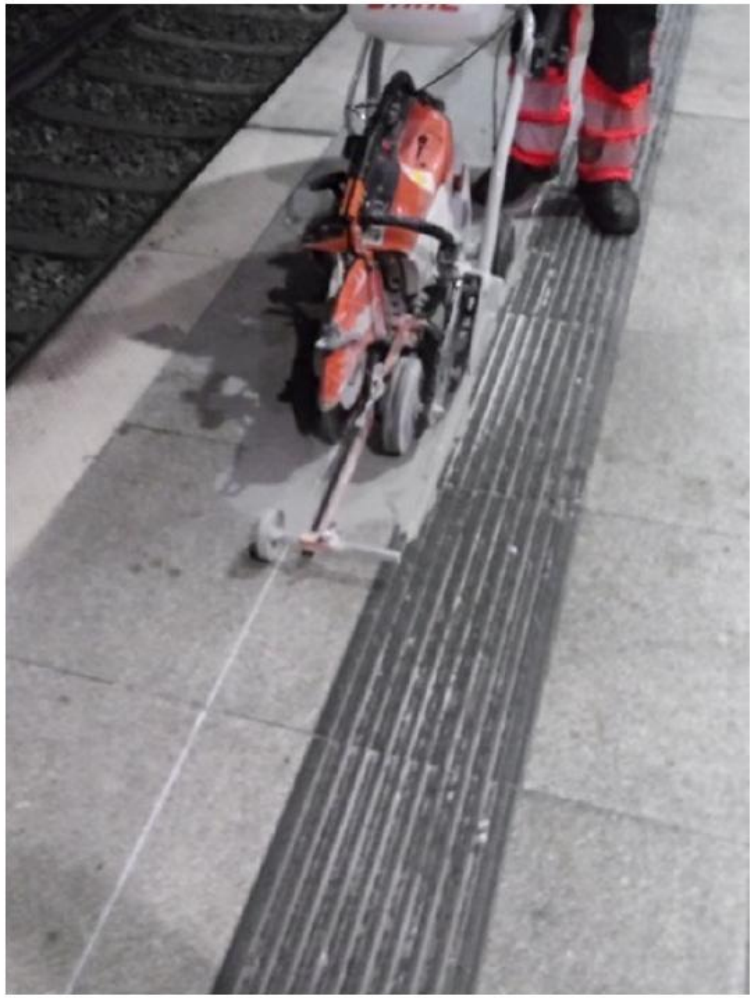
Planning and certification
▪ Further development with experts ▪ Construction and electrical planning ▪ Display concept ▪ Operating concept ▪ IT concept ▪ Monitoring concept ▪ Customer information concept ▪ Risk management procedure (CSM) ▪ Certification/ user approval

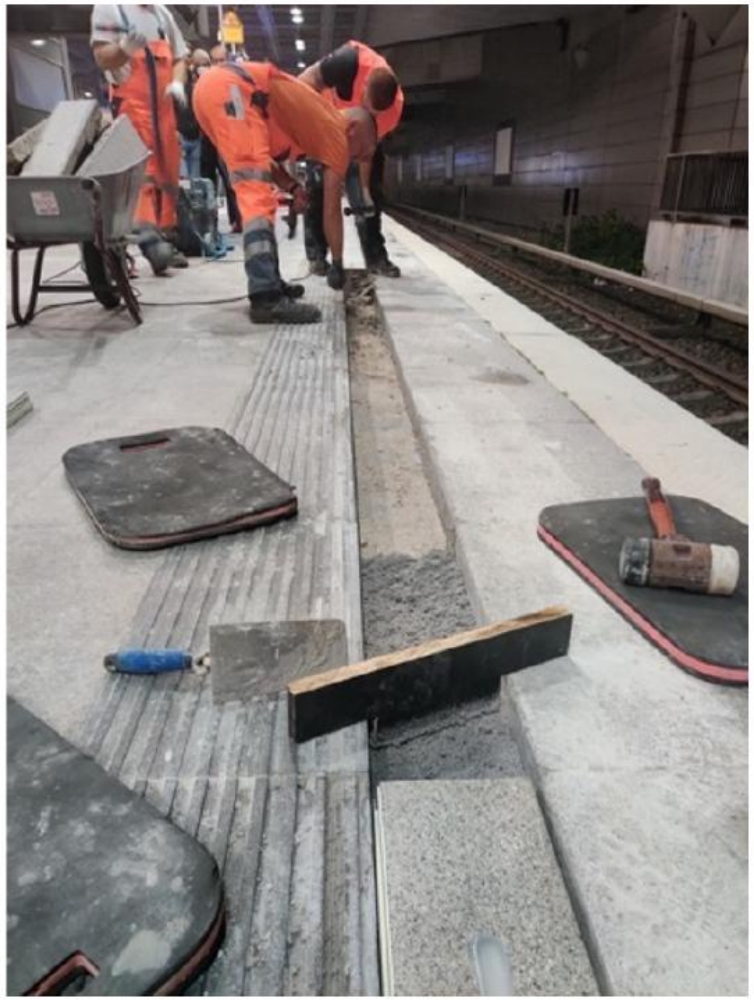
Operational testing and monitoring
Zero measurements and control measurements ▪ Traveler distribution via heatmaps (video) ▪ Traveler distribution via WLAN (RECAP) ▪ Data analysis (hold time, SQF) ▪ Customer observations ▪ Customer surveys (ZI) current

Results Report
1. **Product Certification** 2. **Structural Integration** 3. **Risk Management (CSM)** 4. **Operability (operation and maintenance)** 5. **Increasing the passenger attention on the platform (e.g. 50% “step back”)** 6. **better distribution along the platform (e.g. 25% “following”)** 7. **Costumer satisfaction on a top level**

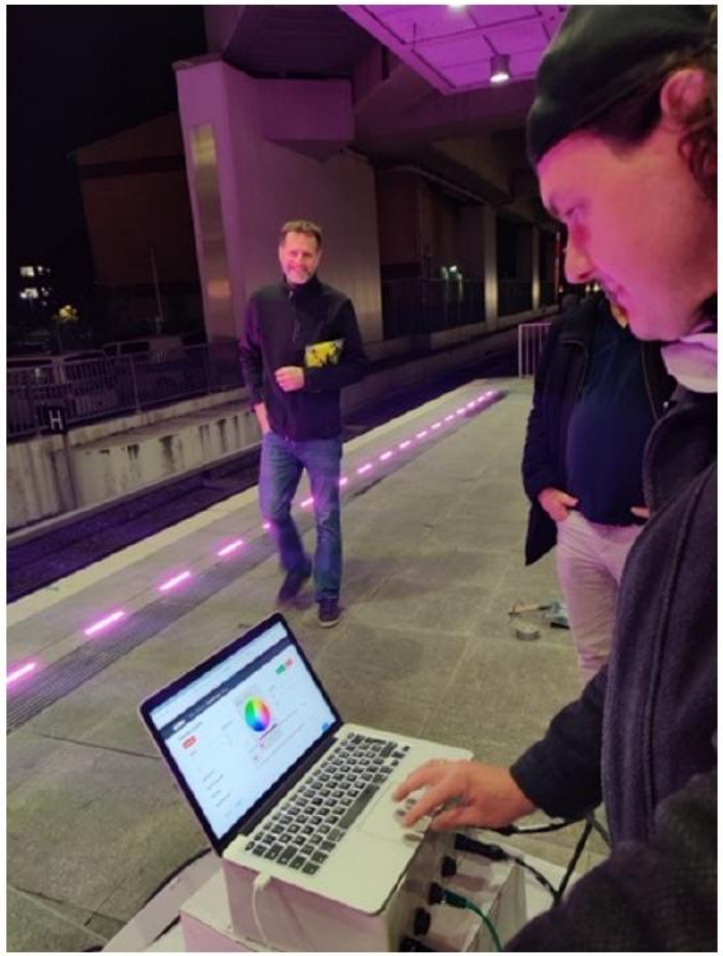
Challenges:
- **IT-configuration and data availability**
- **Supervisory authority regarding risk management (CSM)**

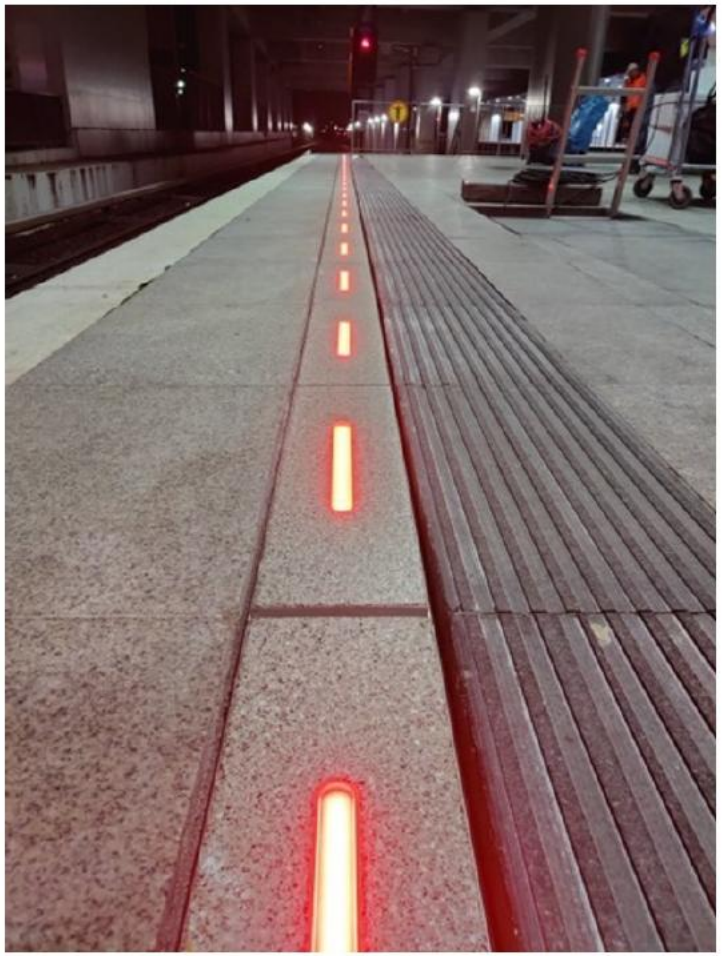
WP23 Demo – Illuminated Platform Edge
Pictures: Construction Site



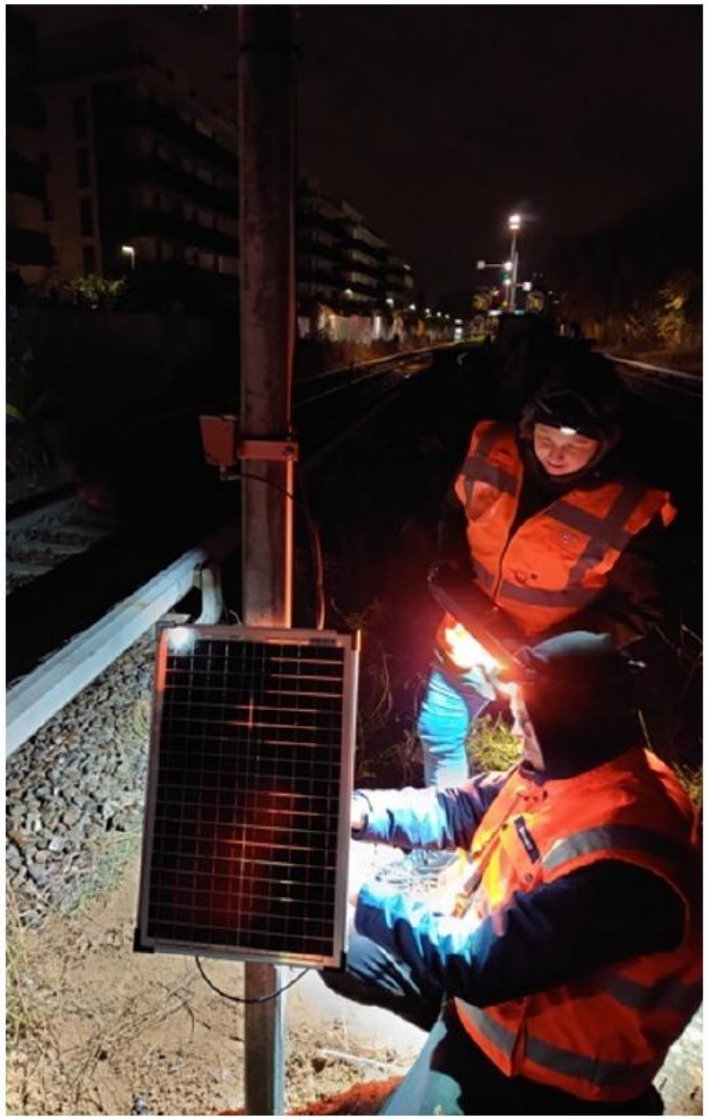


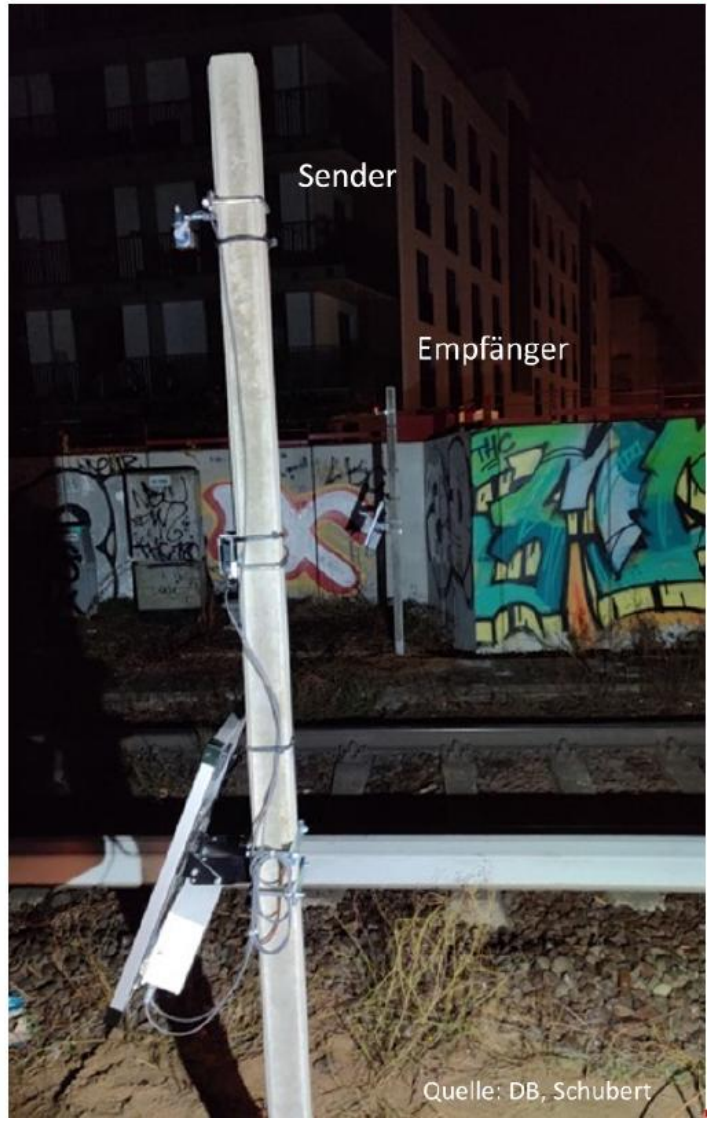
WP23 Demo – Illuminated Platform Edge
Pictures: Operation Tests





WP23 Demo – Illuminated Platform Edge
Pictures: Sensor Installation





WP23 Demo – Illuminated Platform Edge
Pictures: Illuminated Platform Edge

Flagship Area 1:

Network management planning and control & Mobility Management in a multimodal environment

FP1 Event 2 - Seamless, inclusive mobility & predictive services

Demo 23.3 Hands-Free Seamless Travelling

Demo 21.5 Financial platform for multimodal mobility integration – Pay-as-you-go settlements

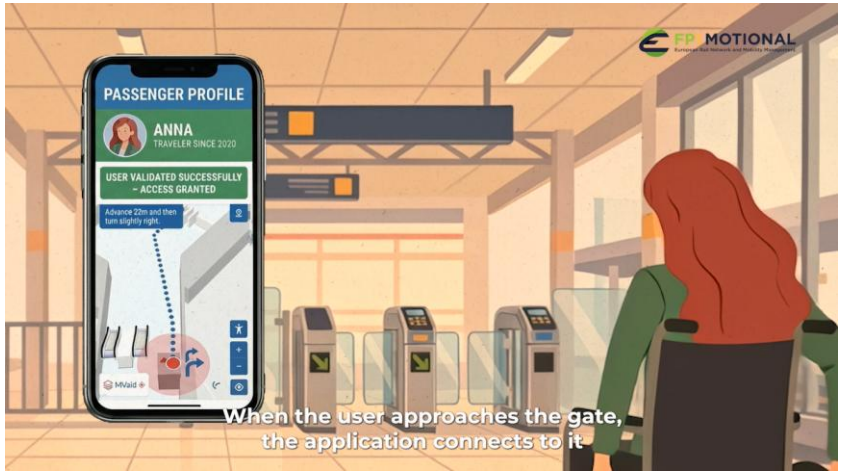
Nihad BAHRI (Hitachi GTSD-RCS)

Services for Inclusive Rail-Based Mobility

Demo 23.3 Hands-Free Seamless Travelling

Anna, a passenger with reduced mobility, faces barriers when navigating stations and accessing gates.
Travelling well means autonomy and zero barriers.

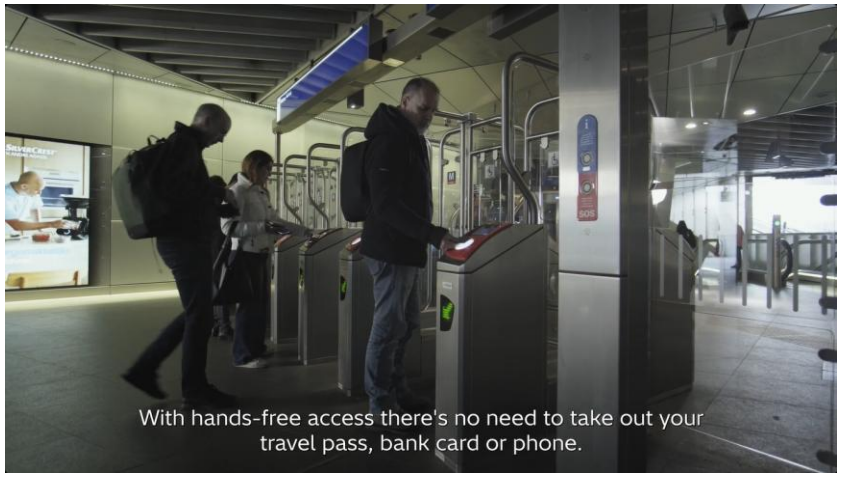
How can we help Anna?



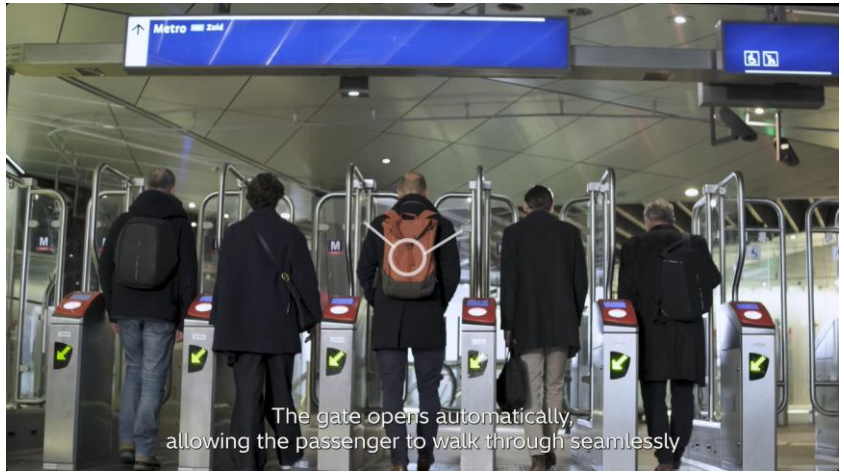
Hands-free interaction solution designed to support in-station assistance for passengers with disabilities. The scenario enables automatic detection of the passenger's arrival, combined with real-time notification to station staff, ensuring timely and efficient support.

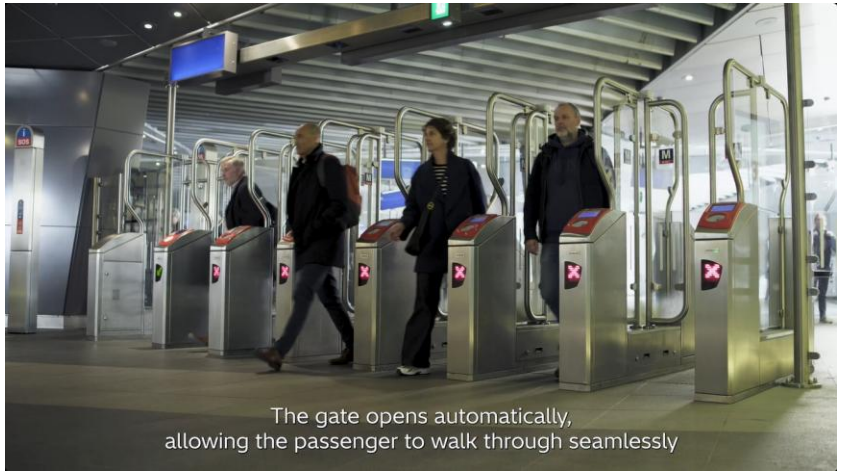
Seamless and contactless access, where passengers can pass through turnstiles without having to take out their device. This improves the fluidity of passenger flows, particularly in high-traffic areas.

Demo 23.3 Hands-Free Seamless Travelling



Evry day, millions of passengers pass through metro gates.
Our goal is to remove a friction point in the passenger journey.
Even with modern ticketing, the gate is still a place where travelers have to slow down and present something.





The implemented solution is really accurate and fast.
Passengers with a registered UWB tag can check-in and check-out completely hands-free.
With hands-free access, there’s no need to take out their travel pass, bank card, or phone.
As you approach, the gate opens automatically—making access faster, smoother, and effortless.

The demonstration confirms that UWB can effectively enable hands-free access in a real operational environment. Hitachi continues to collaborate with key stakeholders, such as the FiRa UWB Consortium and smartphone manufacturers, to ensure broad compatibility and further develop a ready-to-use mobile-based solution.

Demo 23.3 Hands-Free Seamless Travelling

Hitachi Hands-Free Seamless Traveling Demo

Demo 23.3 Hands-Free Seamless Travelling

Enhancing Anna's Journey – Pain Points Addressed

Anna's Pain Points

- Limited availability of in-station assistance for passengers with disabilities
- Stressful and complex ticket validation processes impacting the travel experience

What We Solved

- Seamless, automated in-station assistance tailored to Anna's specific needs as a passenger with disabilities
- Ticketless and frictionless access, enabling a smooth journey without any physical validation actions

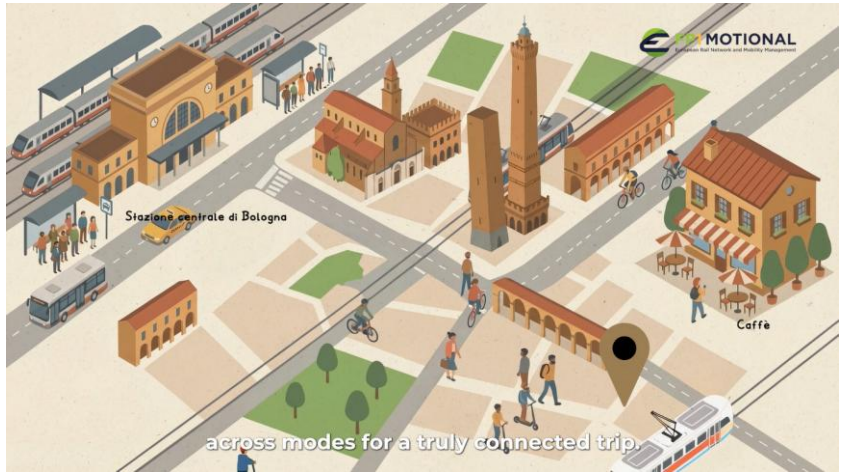
Integrate Rail with Other Transport Modes

Demo 21.5 Financial platform for multimodal mobility integration – Pay-as-you-go settlements

Luca — a railway manager working for a transport service provider operating a segment of Anna's multimodal, multi-operator journey — focuses on the financial side of the trip. His objective is to ensure that the revenues generated from the segments operated by his company have been correctly apportioned and settled, in full compliance with the agreed rules between all participating transport service providers.

How can we help Luca?

The solution demonstrates both on-sale (prepaid) and pay-as-you-go apportionment, including revenue distribution based on actual usage.
It also provides a secure and auditable trail of financial transactions, to ensure transparency, trust, and full traceability.



Ultimately, Luca can verify that each operator receives its fair share of the revenue, and that the entire process — from ticket purchase to final settlement — is accurate, automated, and fully compliant across the multimodal ecosystem.

Demo 21.5 Financial platform for multimodal mobility integration

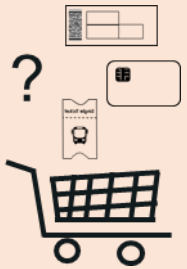
FP1 MOTIONAL
European Rail Network and Mobility Management

Sales & Distribution, Rail as the Backbone of Multimodality

Evolution of Models & Offers

Growing Number of Business Actors

Multiple Offers & Packages



Various Payment Solutions

Need for a Trusted and Secure Revenue Repartition

Manage Financial Flows Smoothly & Efficiently

Deliver Fast Revenue Settlement

Secure and Audit Flows

Foster Green Efficiency

Combine Private and Public

Provide Configuration Flexibility

Integrated Revenue Management is a Key B2B Service for the Evolution of Mobility

Demo 21.5 Financial platform for multimodal mobility integration

Goal & Definitions

Revenue Repartition, a B2B Service for Multimodality

- Referring to sales and distribution in land passenger transport industry (Rail, Urban…), there are several solutions and standards **allowing to manage global and cross selling**.
- However, there are **no or limited cross-accounting solutions** allowing to redistribute the revenue collected at retail channels.
- The general objective is to **make the market smoother and more efficient by centralizing financial flows** and hence preventing participants from making transfers to each party with which they have transacted.

Clearing and Settlement → *General process by which an organization acts as intermediary body between trading parties, apportions the revenues when applicable and settles accounts.* *This intermediary body is usually called 'Clearing House' 'Clearing Houses' are commonly used in Stock Market and to promote national and international trade. Even if this is at a smaller scale than trading "Clearing Houses", mobility may require clearing and settlement functionalities to apportion and settle the revenue between participants*

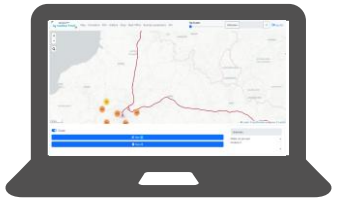
Apportionment → *Apportionment is the business logic for re-distributing revenue.* *There can be many rules such as the distribution of the price of an inter-modal product based on agreed percentages (e.g. bus-train pass apportioned at 40% to bus operator and 60% for train operator), dynamic distribution based on the use of the service (i.e. apportionment at the expiration of the product), post-payment apportionment based on distance. Also, there can be fees charged on the paid amounts to reward Retailers.*

Settlement → *Settlement is the transfer of funds between creditor and debtor entities.* *The frequency of the process is usually adjusted according to the business needs. Frequency should not be too low as to remain fair to all participant cash flow positions but shall not be too high to minimize the administrative work.*

Demo 21.5 Financial platform for multimodal mobility integration

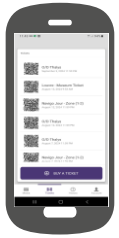
Demonstration Platform

Multimodal Travel Simulator



Web Shop

App



Cloud Platform

Microsoft Azure

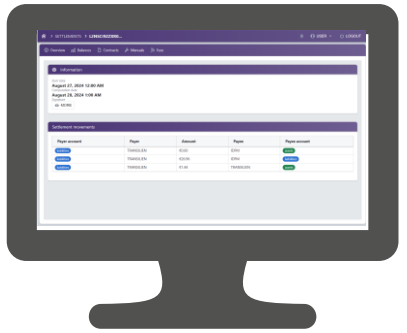
TRANSCITY my seamless travel

Welcome ! Please Log in

Financial Platform for Mobility Integration

FP1 MOTIONAL
European Rail Network and Mobility Management

- Transaction Processing
- Revenue Management



Operation Portal

Qortal

Distributed Ledger

Demo 21.5 Financial platform for multimodal mobility integration

Demonstration Use Cases

Mobility Offer Retail

Purchase of a Multi Service Combo:

Apportionment and settlement of the revenue collected by the retailer to the Service Providers.

Multimodal Pay-As-You-Go

Pay-As-You-Go Mobility Revenue Apportionment with the following journey experience:

Travel transactions collected by the Mobility Account Provider that then apportions and settles the revenue.

Demo 21.5 Financial platform for multimodal mobility integration

	Apportionment context	Apportionment name	Validity end date	Product price
⌄	Product	O/D Thalys	August 12, 2024 11:59 PM	€132.00

Rules

Rule "Commission for retailer and product owner"

Payer account	Payer	Payer role	Amount	Payee role	Payee	Payee account
liabilities	SELECTOUR	Product retailer	€122.76	Mobility Service Provider	Thalys	liabilities
liabilities	SELECTOUR	Product retailer	€6.60	Product retailer	SELECTOUR	assets
liabilities	SELECTOUR	Product retailer	€2.64	Product owner	Thalys	assets

Liabilities after rule
Thalys
€122.76

	Apportionment context	Apportionment name	Validity end date	Product price
⌄	Product	Navigo Jour - Zone (1-2)	August 12, 2024 11:59 PM	€8.65

Rules

Rule "Commission for retailer and product owner"

Payer account	Payer	Payer role	Amount	Payee role	Payee	Payee account
liabilities	SELECTOUR	Product retailer	€0.43	Product retailer	SELECTOUR	assets
liabilities	SELECTOUR	Product retailer	€0.18	Product owner	IDFM	assets
liabilities	SELECTOUR	Product retailer	€8.04	Mobility Service Provider	IDFM	liabilities

Liabilities after rule
IDFM
€8.04

	Apportionment context	Apportionment name	Validity end date	Product price
⌄	Product	Louvre - Museum Ticket	August 13, 2024 9:53 AM	€22.00

Rules

Rule "Special le Louvre - Commission for retailer and product owner"

Payer account	Payer	Payer role	Amount	Payee role	Payee	Payee account
liabilities	SELECTOUR	Product retailer	€1.10	Product retailer	SELECTOUR	assets
liabilities	SELECTOUR	Product retailer	€20.90	Product owner	LE LOUVRE	assets

Following the check-out, sales transactions are processed, and the collected amount is apportioned to service providers

Demo 21.5 Financial platform for multimodal mobility integration

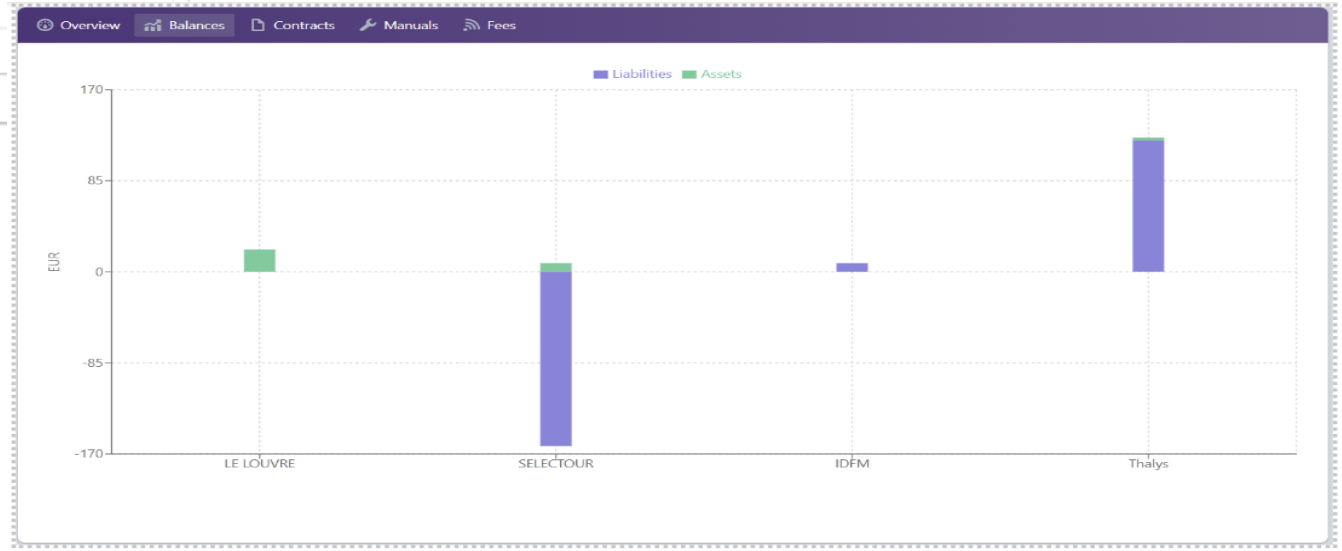
Typical Use Case – Mobility Offer Retail

Apportionment rules are configurable. In this use case, there is a fee attributable to the Retailer.

Then, and typically at the end of the settlement period, there is a settlement between participants resulting in fund transfers.

Settlement movements

Payer account	Payer	Amount	Payee	Payee account
liabilities	SELECTOUR	€20.90	LE LOUVRE	assets
liabilities	SELECTOUR	€8.13	SELECTOUR	assets
liabilities	SELECTOUR	€0.18	IDFM	assets
liabilities	SELECTOUR	€8.04	IDFM	liabilities
liabilities	SELECTOUR	€2.64	Thalys	assets
liabilities	SELECTOUR	€122.76	Thalys	liabilities

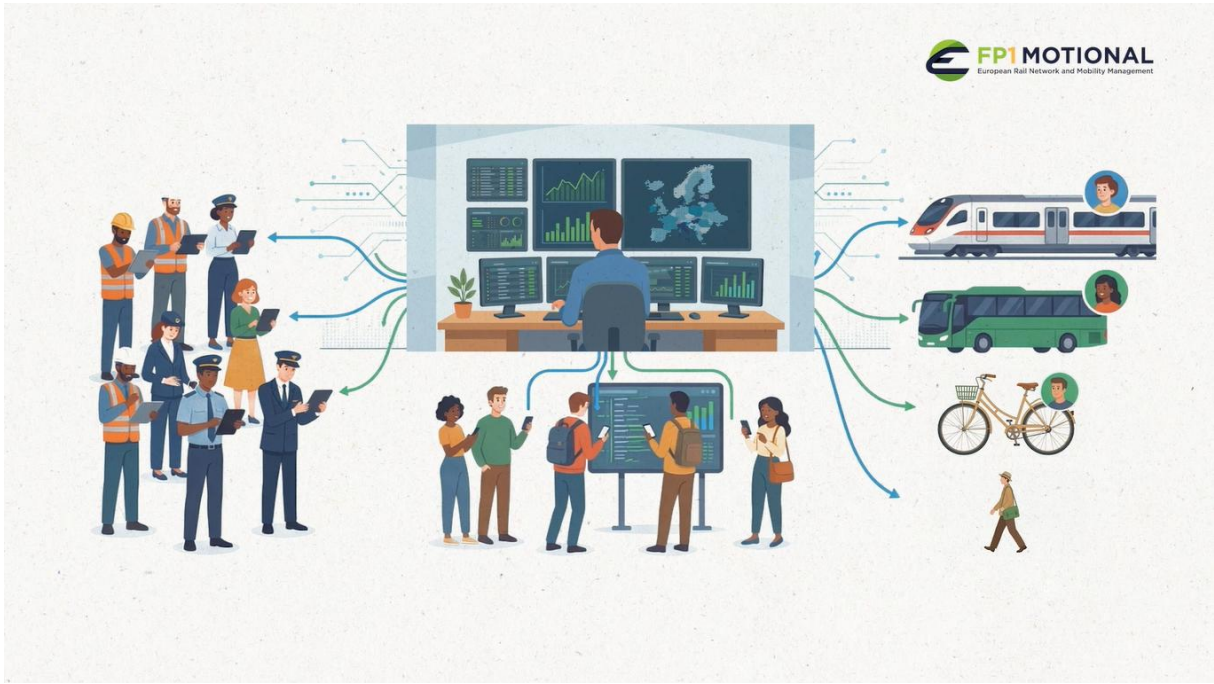


Demo 21.5 Financial platform for multimodal mobility integration

Enhancing Luca's Experience – Pain Points Addressed

Luca's Pain Points

- Limited visibility on how revenues are shared across multiple operators
- Manual, slow, and error-prone reconciliation processes
- Delayed settlements impacting cash flow and financial control



What We Solved

- End-to-end automation of revenue apportionment and settlement across all operators
- Real-time visibility and full traceability of financial flows
- Faster, reliable settlements improving cash flow and operational efficiency

Flagship Area 1:

Network management planning and control & Mobility Management in a multimodal environment

FP1 Event 2 - Seamless, inclusive mobility & predictive services

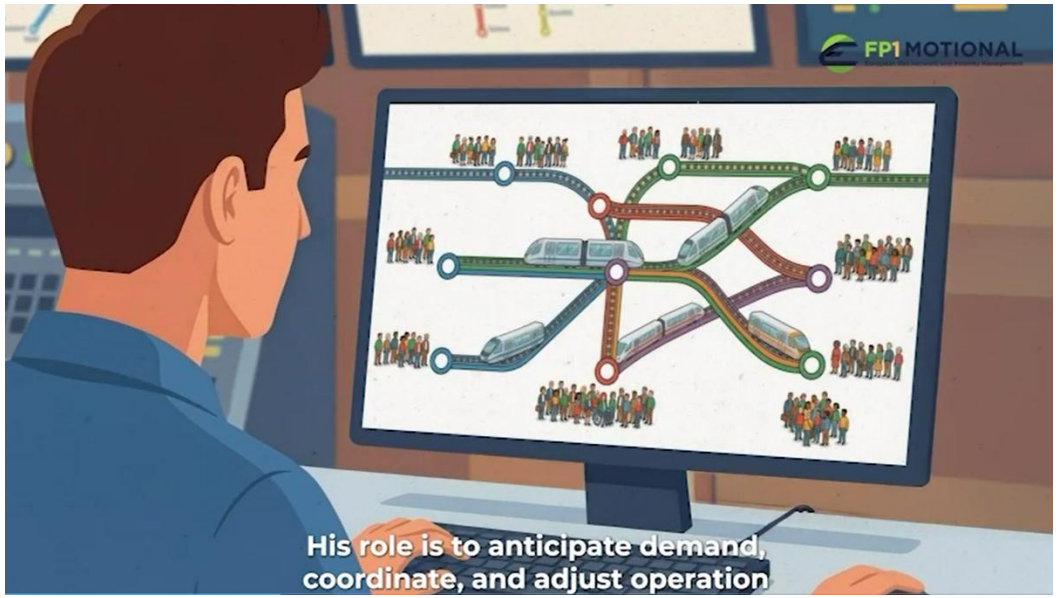
Demo 25.5: Digital twin with integrated demand forecasting

Improving Transport Service Alignment Using Short- and Long-Term Demand Forecasting

Nicolas GERMAIN (Hitachi Rail GTSD-GTS)

Managing a Railway Network Under Constant Uncertainty

- Passenger demand is hard to anticipate (short & long term)
- Fragmented visibility between supply and demand
- Incident management is mostly reactive
- Critical decisions made with limited passenger insight



Lucas: Railway Manager

What Lucas Expects from Decision Support Tools

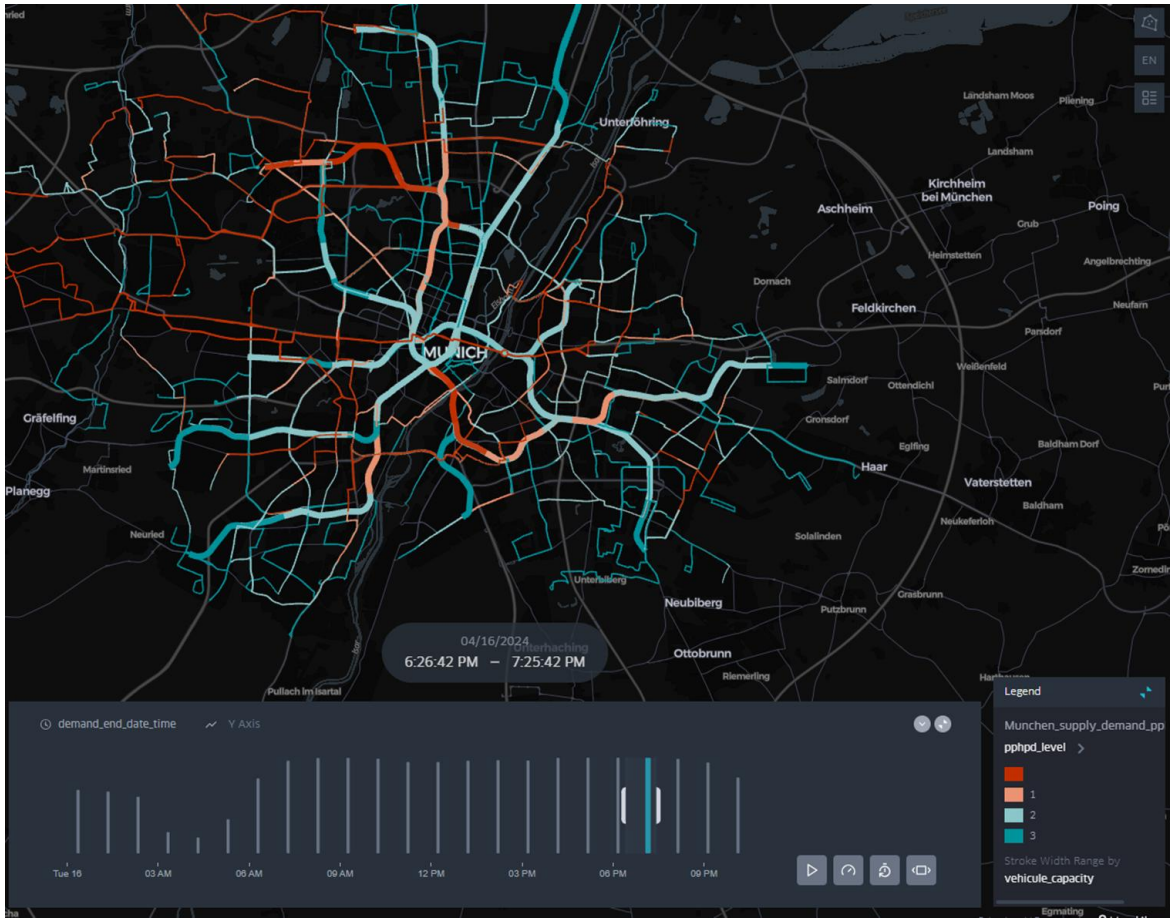
- Anticipate future passenger demand
- Understand mitigation strategies passenger flows in real time
- Test without operational risk
- Improve network resilience

A Passenger Centric Multimodal Digital Twin

- Integration of short & long-term demand forecasts
- Multimodal digital twin (macro + micro)
- Tight coupling between timetable and passenger flows
- Passenger behaviour models
- Sandbox for scenario testing

Citywide Multimodal Public Transport Supply–Demand Alignment

Macro simulation: city-scale view of supply vs demand



Europe's Rail

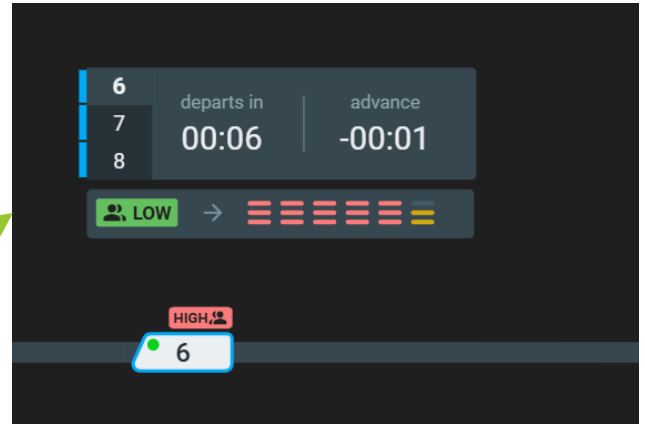
FP1 MOTIONAL
European Rail Network and Mobility Management

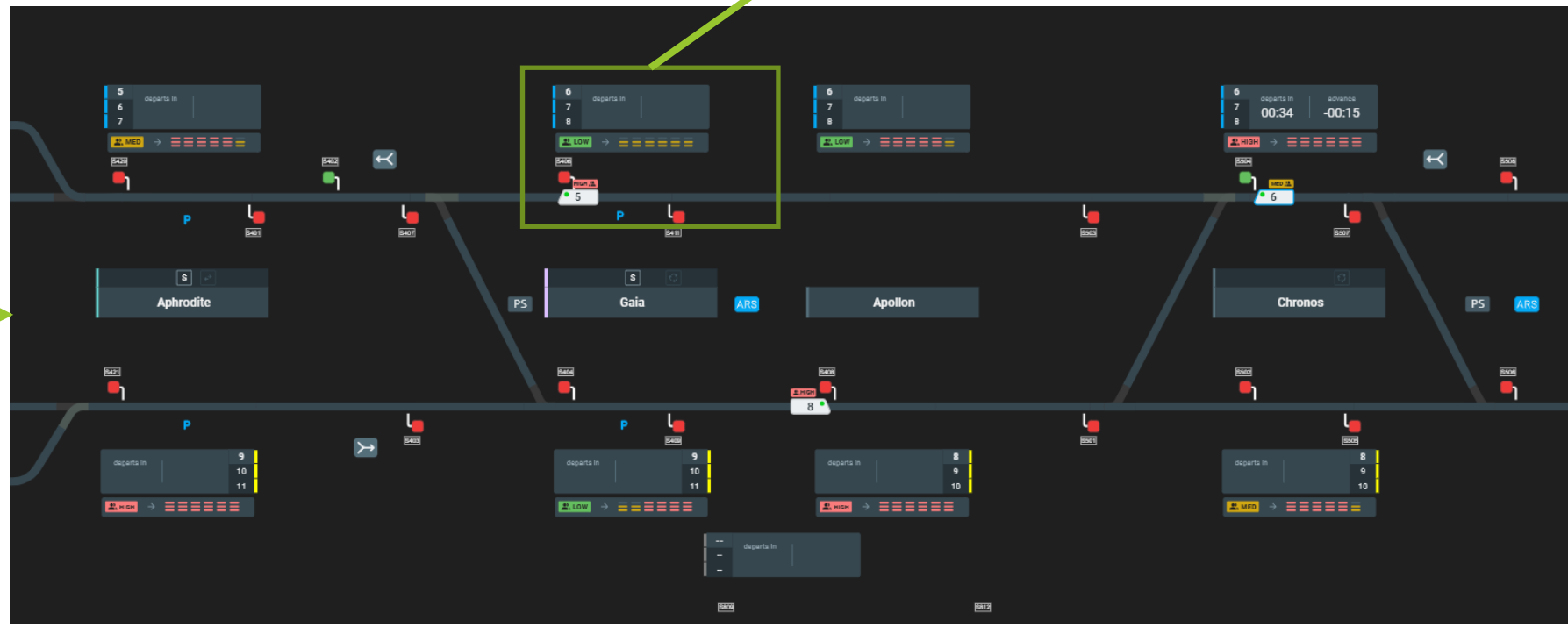
Metro Line Synoptic Showing Passenger Density

Micro simulation: metro line view with platforms and trains

Platform

Train





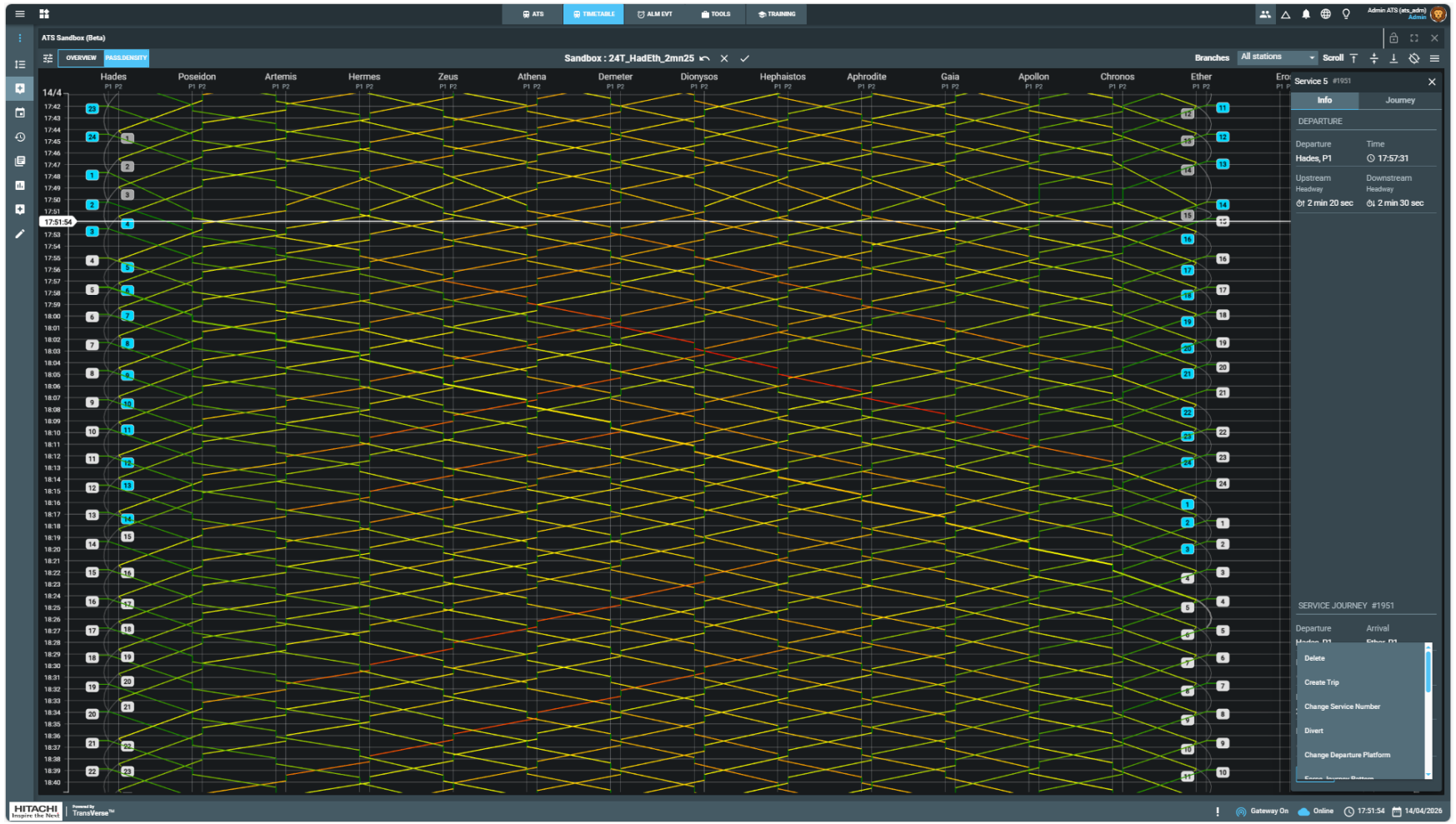
FP1 MOTIONAL

Europe's Rail

FP1 MOTIONAL
European Rail Network and Mobility Management

Timetable Experimentation Sandbox

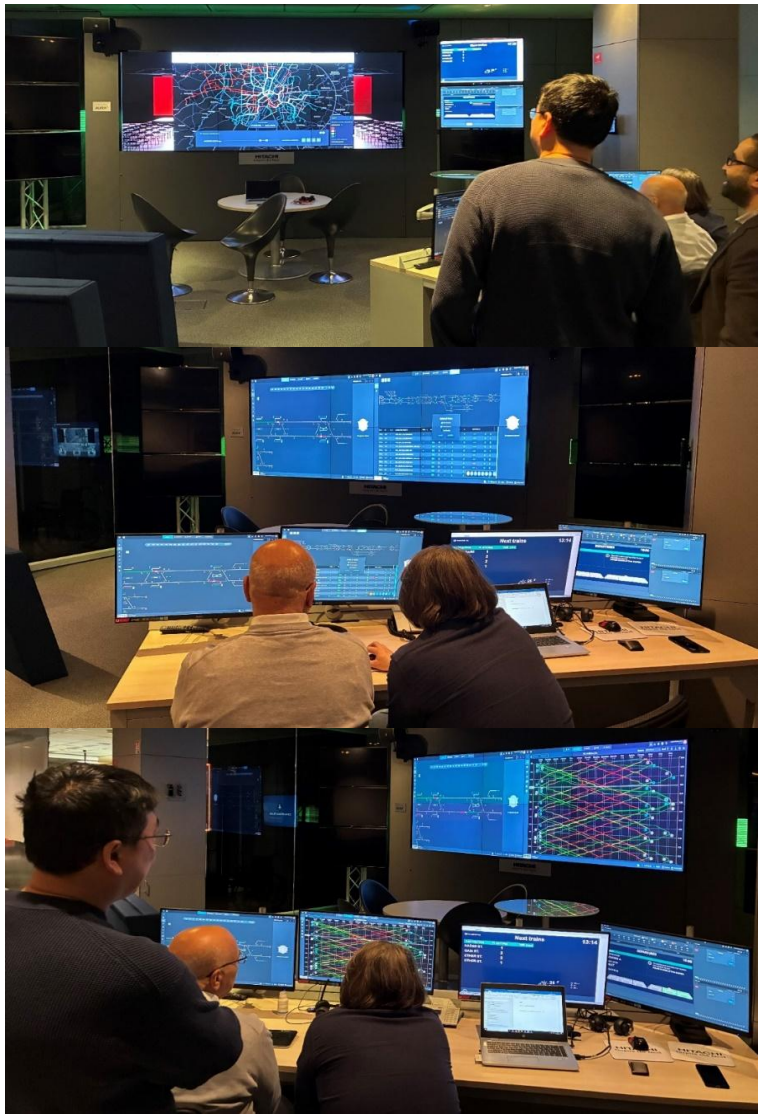
Micro simulation: Immediate visualisation of the impact of decisions



FP1 MOTIONAL

Validated Through a Realistic Simulated Operational Environment

- Demonstration conducted in a **simulated OCC environment**
- Representative operational scenarios (planning & incident management)
- Overall positive feedback on usefulness and clarity
- Identified improvement areas: ergonomics, comparisons, KPIs
- **Technology validated at TRL 5**



Business Impact and Added Value

- Better resource allocation
- Anticipation of disruptions and demand peaks
- Faster, more reliable decision-making
- Improved passenger service quality

Flagship Area 1:

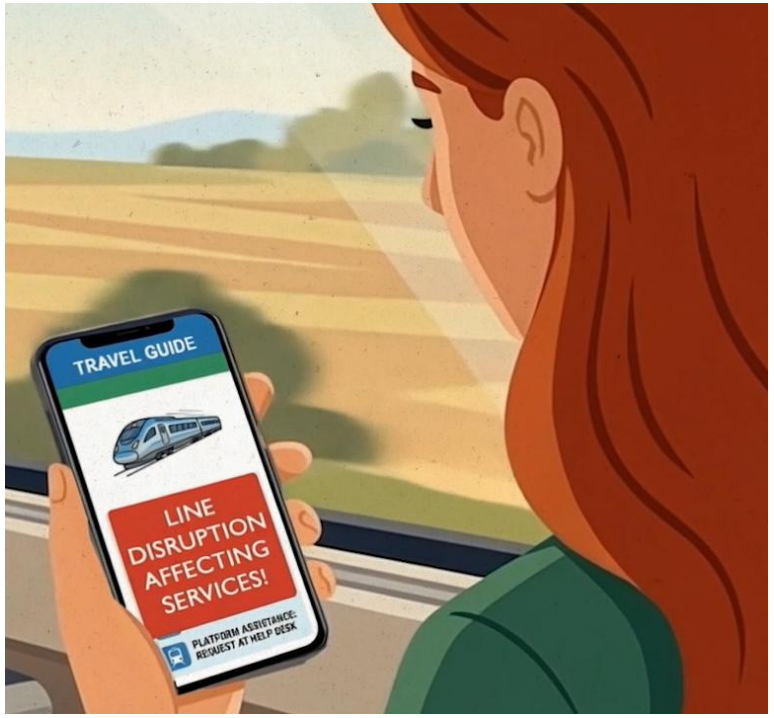
Network management planning and control & Mobility Management in a multimodal environment

STS WP21-25 DISSEMINATION EVENT

2026-05-07

For Anna, the disruption means uncertainty, stress, and loss of control over her journey

- Anna receives a disruption notification but **does not know what will happen next**
- She is unsure how she will reach her final destination
- Alternative options (bus, taxi, re-routing) are unclear or uncertain
- She worries about long delays, overcrowding, or **missed connections**
- Information may arrive too late, inconsistently, or without clear guidance



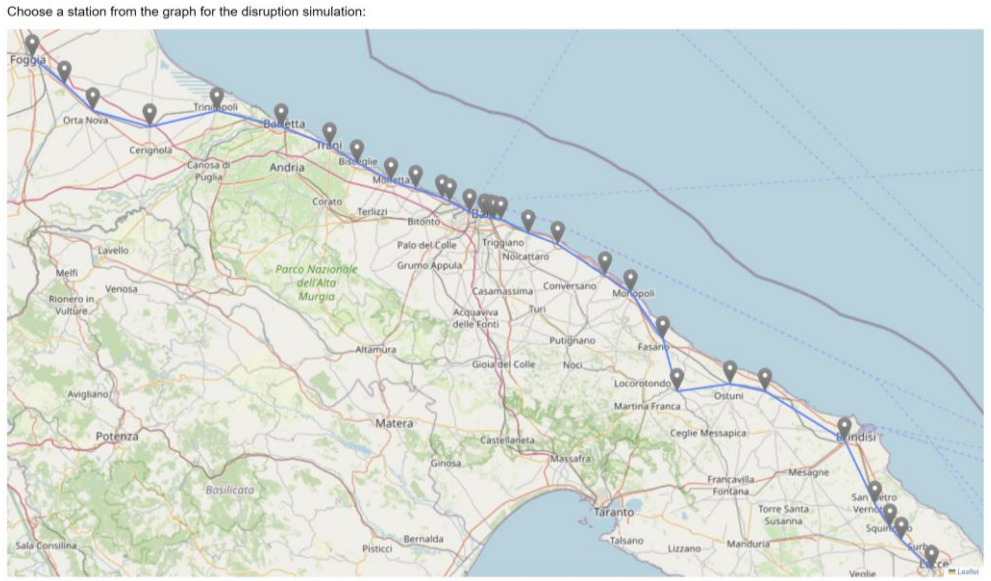
Behind the scenes, Luca must quickly decide how to bring Anna to her destination

- Luca must act immediately, under strong time pressure
- He has limited visibility on all possible mitigation options
- Comparing alternatives (bus, taxi, rerouting) is manual and complex
- Decisions are constrained by available vehicles, depots, and timing
- Choosing a sub-optimal solution risks:
  - longer delays for Anna
  - overcrowded services
  - inefficient use of resources

Unconstrained Disruption Management

In an ‘Ideal World’: How would Anna reach her destination during a disruption?

- Defines the theoretical **optimal response** to a rail disruption
- Removes operational constraints (e.g. fleet availability, depot limits)
- Assumes **infinite resources** to focus purely on optimization performance
- Compares and ranks mitigation strategies using **performance KPIs** only
- Helps operators understand the **best achievable outcome**
- **Provides a baseline** reference to assess and improve real, resource-constrained solutions

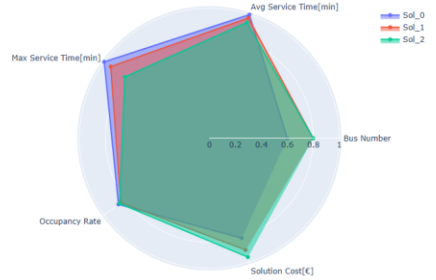


Index_sol	Avg Service Time[min]	Max Service Time[min]	Bus Number	Occupancy Rate	Solution Cost[€]
0	110	244	3	0.77	2100
1	107	229	4	0.75	2350
2	103	196	4	0.76	2500
3	91	130	5	0.89	2600

EXPLORE SOLUTIONS

*Choose up to 3 optimized solutions and then press the button to explore them. In case of more than 3 rows selected, only the last 3 selections will be considered.

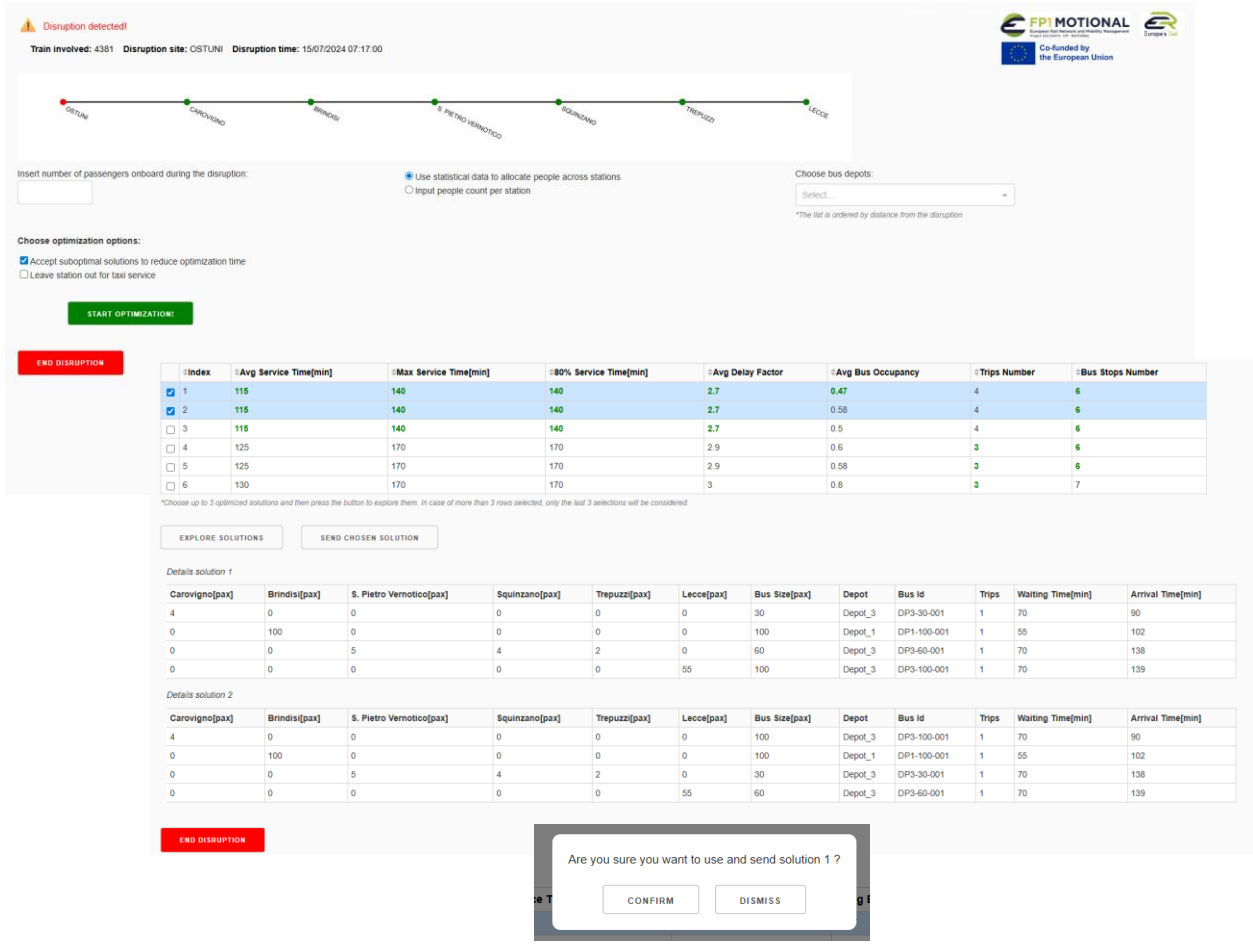
*Data in radar plot have been normalized between 0-1 on each KPI to confront KPIs with different scales.
1-0 in the following tables represents where each bus stops or not.
To compute time KPIs a descent time has been added to travel time, proportional to number of passengers and bus stops.



Real-Time Disruption Management

When Disruption Happens: How does Luca support Anna's journey

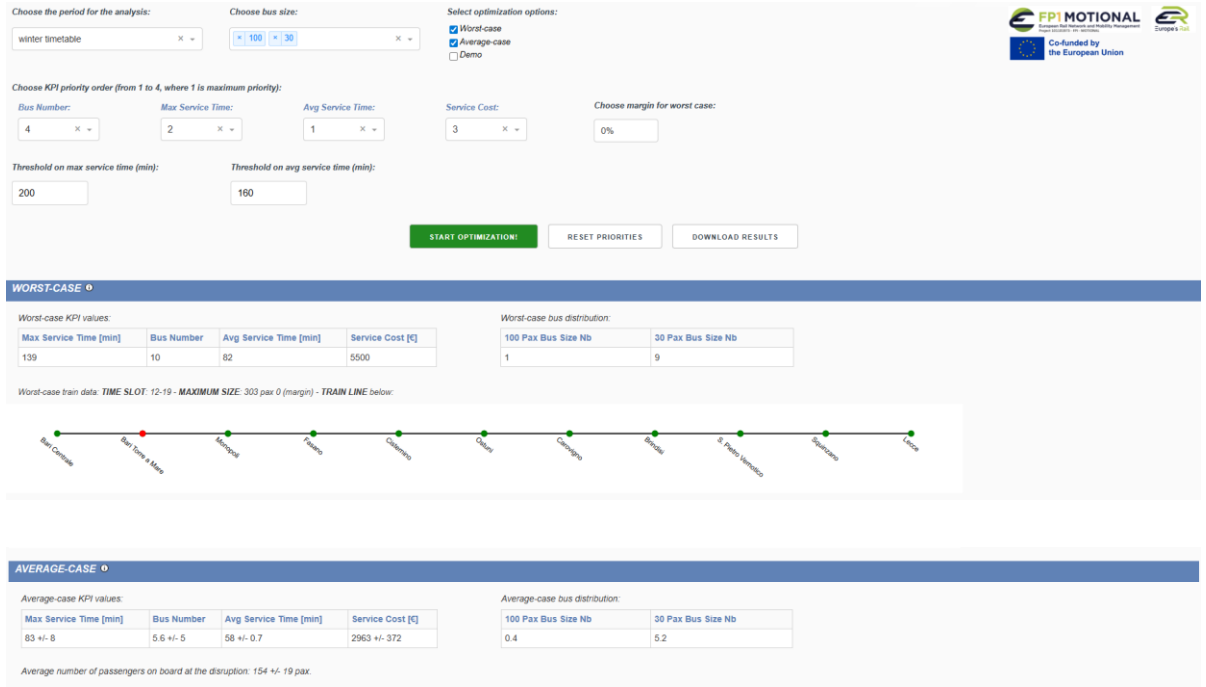
- Supports Luca during **live disruption** events
- Considers real **operational constraints** (limited vehicles, depots, travel times, capacities)
- Optimizes feasible, executable mitigation plans, **including multi-trip solutions**
- **Uses real-time data** to generate and update strategies
- **Ranks solutions** based on operational KPIs
- Enables fast, **realistic decision-making** during disruptions
- Ensures strategies are directly applicable to real railway operations



Disruption Scenario Analysis

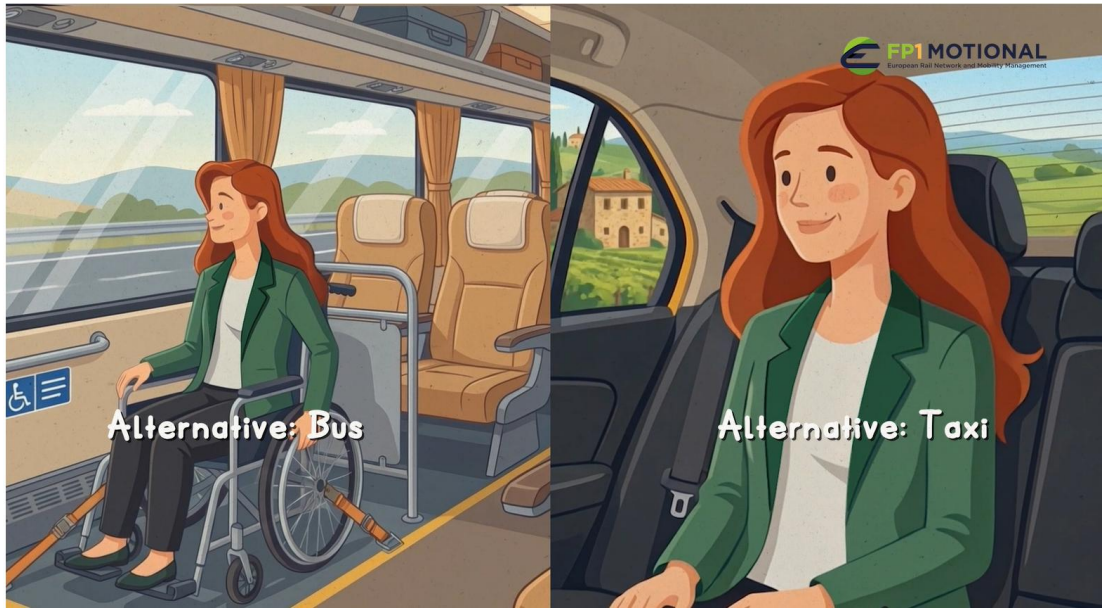
Preparing for Disruption: How does Luca ensure Anna reaches her destination

- Supports **proactive and strategic** disruption planning
- **Simulates disruption** scenarios before they occur
- **Analyzes average and worst-case scenarios**
- Estimates the number and type of **vehicles required**
- Helps **prevent service breakdowns** during real disruptions
- Enables data-driven fleet sizing and **budget planning**
- **Improves overall preparation** for future disruptions

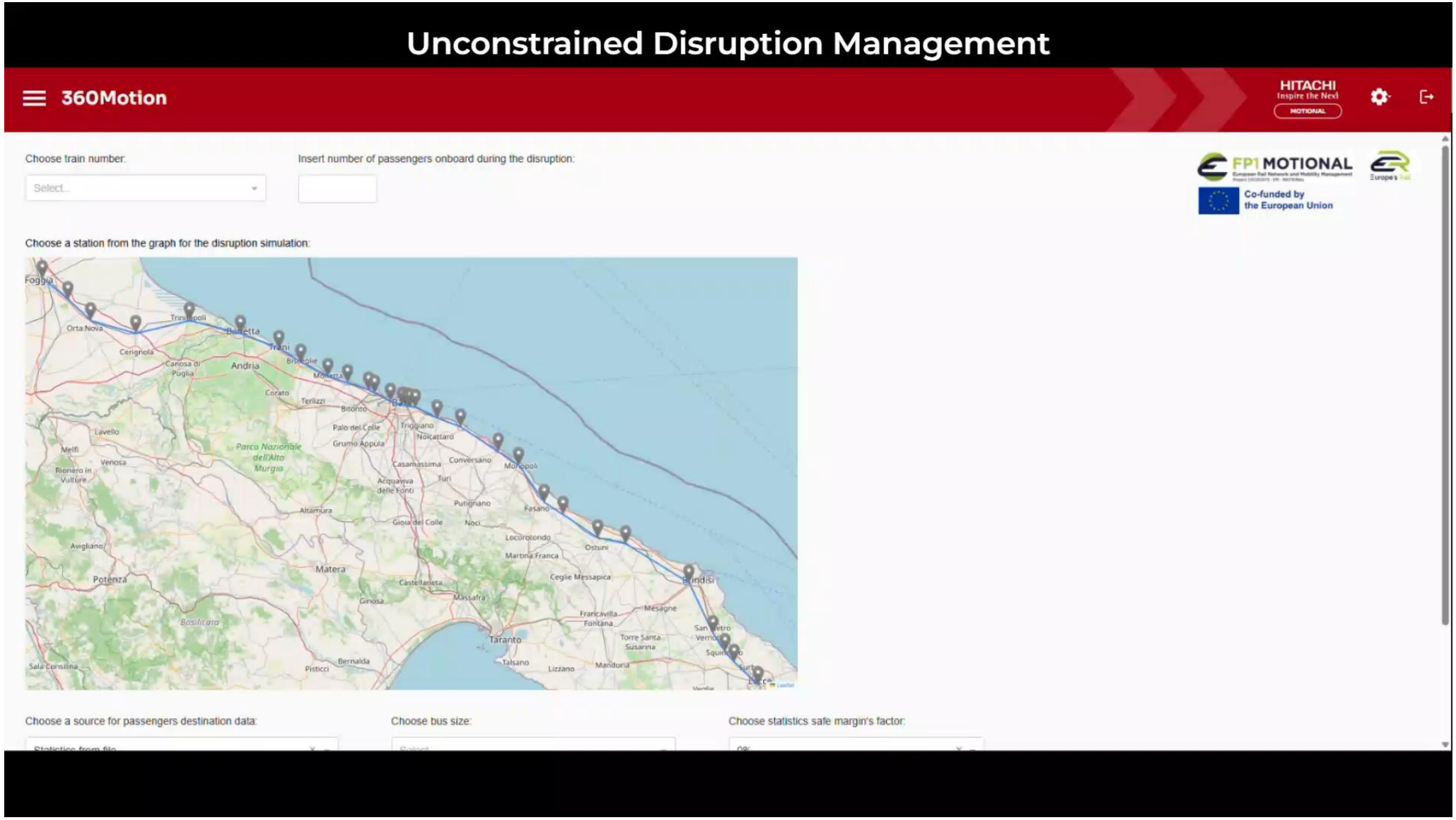


Anna continues her trip to Bologna with clarity, and confidence

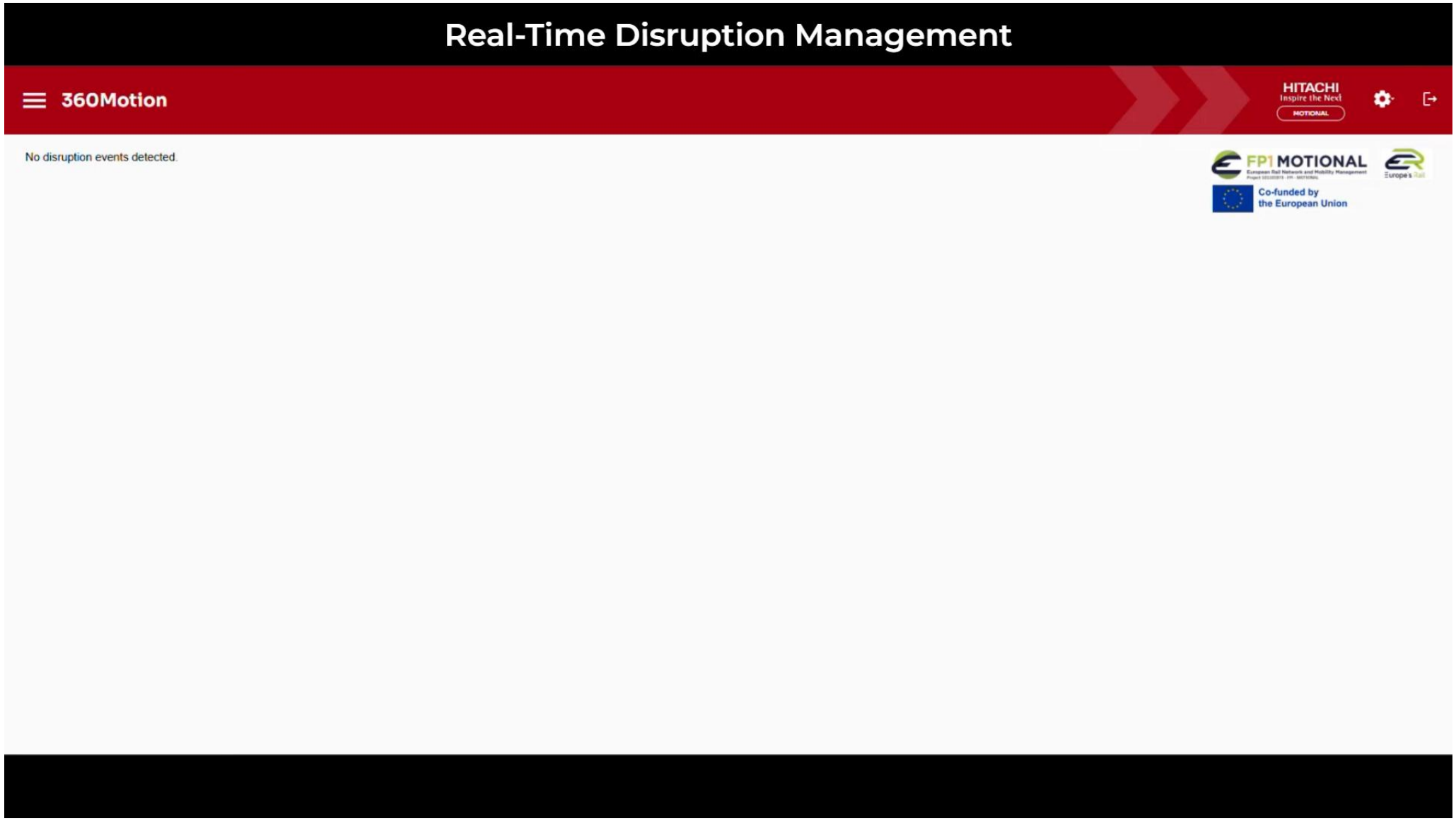
- Luca immediately sees the best possible mitigation strategies
- Optimal solutions are evaluated and ranked using KPIs
- Decisions respect real operational constraints
- Anna receives clear guidance on how to continue her journey
- An alternative is executed smoothly



Unconstrained Disruption Management



Real-Time Disruption Management



Disruption Scenario Analysis

Roundtable discussion

Seamless & Inclusive mobility in Europe

Speakers

Nesrine Chatelkhir
Project Manager at CFL

Almudena Alcaide Raya
Director at Fundación ONCE

Carlos Miranda
Head of Operational Support
at Metro de Madrid

FP1 MOTIONAL

Co-funded by the European Union

Europe's Rail

FP1 MOTIONAL

European Rail Network and Mobility Management

Feedback Survey

Thank you !

One Europe, One Journey,

Zero Barriers for All Passengers

Questions ?

FP1 MOTIONAL

Europe's Rail

Founding Members

adif

ALSTOM

mermec
AN ANGEL COMPANY

AŽD

CAF

ceit
MEMBER OF
BASQUE RESEARCH
& TECHNOLOGY ALLIANCE

CD

DB

DLR

eSGR
European Smart Green Rail

Faiveley Transport
A Wabtec Company

FERROVIE DELLO STATO ITALIANE

HITACHI
Inspire the Next

indra
Talgo

Jernbane-direktoratet

KNORR-BREMSE

ÖBB

PKP
POLSKIE KOLEJE PAŃSTWOWE
Spółka Akcyjna

ProRail

SIEMENS
Ingenuity for life

SNCF

Strukton
Rail

THALES
Together • Safer • Everywhere

TRAFIKVERKET

RAILWAY SYSTEMS
by voestalpine