FP1 MOTIONAL DISSEMINATION EVENT

7 May 2026

FP1 MOTIONAL
European Rail Network and Mobility Management

Seamless & **Inclusive Mobility**

One Europe,
One Journey,

Zero Barriers
for All Passengers

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B2B Journey Planning Services and Demand Forecast

Transforming European Mobility: Luxembourg Demonstration

Marco Ferreira
Siemens Mobility

Sofia Serrano
Hacon

Nesrine Chatelkhir
CFL

Abstract

Objective:

The objective of this demonstrations is to showcase an integrated Mobility-as-a-Service (MaaS) ecosystem that connects with regional and cross-border transportation networks—combining rail, car-sharing, P+R and on-demand transit—using an Open API for Distributed Journey Planning (OJP standard). Additionally, the project aims to demonstrate how intelligent, machine-learning-driven demand forecasting can enhance the traveler experience through proactive occupancy alerts, while equipping operators with analytical dashboards to optimize resource management.

Research and Methods :

The methodology involved deploying a scalable mobility ecosystem through B2B connections with other platforms, ingesting static planning data but also real-time data from various European sites (connecting Luxembourg ecosystem to Saarland, Germany and Madrid, Spain), testing standardized OJP message exchanges, and training a machine learning model to predict vehicle occupancy and demand. To validate the system at Technology Readiness Level 7, internal experts and travelers conducted hands-on testing of the mobile apps and operator dashboards, culminating in a structured validation event.

Results:

Successfully connected three distinct mobility platforms, seamlessly routing complex cross-border and multimodal journeys while earning high user satisfaction. Crucially, this setup allows mobility providers to seamlessly extend their service coverage to users without the heavy operational complexity of managing third-party data or maintaining multiple proprietary APIs. Furthermore, the integrated machine-learning models delivered occupancy and demand forecasts with a with 70-80% accuracy. 1-week forecasts offer a solid baseline for planning, while 1-hour predictions smartly adjust for last-minute commuter changes. , providing transport operators with highly reliable analytical dashboards to proactively monitor network capacity and streamline decision-making.

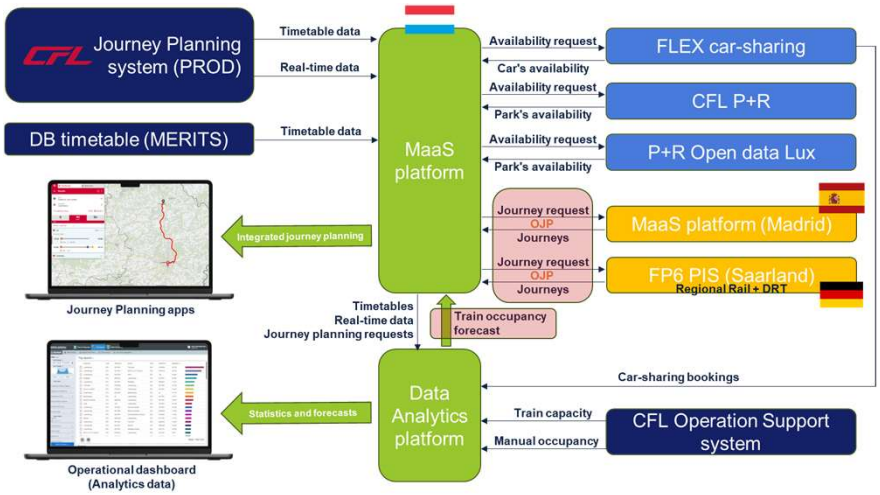
Conclusion

For Luxembourg's high volume of cross-border travelers who lack a unified door-to-door mobility provider, the implementation of OJP-based B2B connections successfully bridges this gap by enabling seamless, multimodal journeys into foreign cities. Additionally, the integration of machine-learning demand forecasting delivers a relevant operational impact, equipping transport operators with actionable, real-time analytics to optimize network capacity, mitigate overcrowding, and foster collaborative mobility management.

Demonstration partners

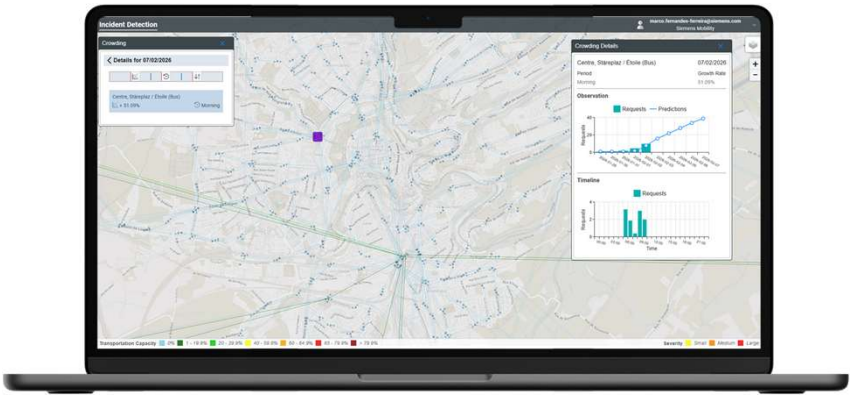
HACON CFL DB Zweckverband Personennahverkehr Saarland indra Metro

1 System Architecture and data sources



2 Demand analysis

3 Crowding forecasts



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ACCESSIBLE TOTEM T-Ais

Focus on people with divers dissabilities

Victoria Guryn
RENFE (ADIF Funding Member)

David Oliver
INECO

Antonio Sancho
INECO

Abstract

Objective:
An ergonomic, high-visibility touch device providing personalized information on schedules, platforms, and interior routes

Research and Methods:
Real-world testing was performed from July 15–17 of 2025 with users representing various disability profiles, including visual, auditory, motor, cognitive, and intellectual impairments

Results:
The prototype features a design with up to four simultaneous interaction points using touchscreens with audio support and accessible buttons. The pilot successfully validated key functionalities, including real-time schedule updates and ticket scanning for track identification

Conclusion

The totem serves as a vital prototype that addresses information gaps in complex station environments. Its connectivity with mobile guidance apps and assistive robots makes it a central hub for station accessibility

Demonstration partners

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ineco
metro Málaga

1 Totem T-Ais

2 Testing with PRM and blind end-users

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INTELLIGENT GUIDING TOOLS

Software and QR specific codes

Victoria Guryn
RENFE (ADIF Funding Member)

David Oliver
INECO

Cristian Cano Mañanes
INECO

Abstract

Objective:
To develop and validate a custom-made mobile software solution designed from scratch to provide inclusive guidance. The goal was to integrate features like voice readers and easy-to-read interfaces to ensure autonomous mobility for passengers with diverse disabilities.

Research and Methods:
Field validation at Málaga María Zambrano Station, testing the software's interaction with specific QR codes (NaviLens) and evaluating its usability across different user profiles, including blind, partially sighted, deaf, and cognitively disabled passengers.

Results:
Users were able to identify tracks, view accessible routes on their mobile devices, and access real-time information regarding train cancellations and metro frequencies.

Conclusion

The project has established a scalable foundation for multimodal transport, while identifying clear technical pathways to further refine inclusive features for all disability profiles.

Demonstration partners

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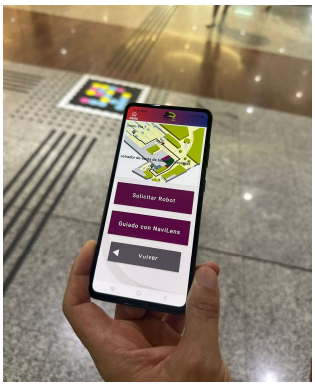
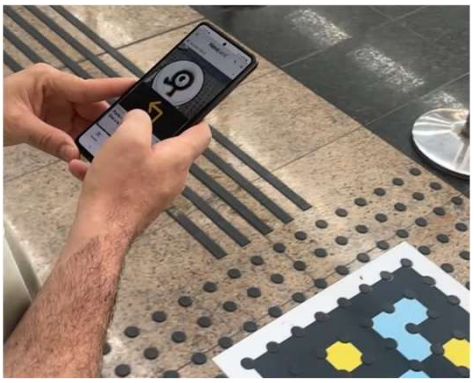
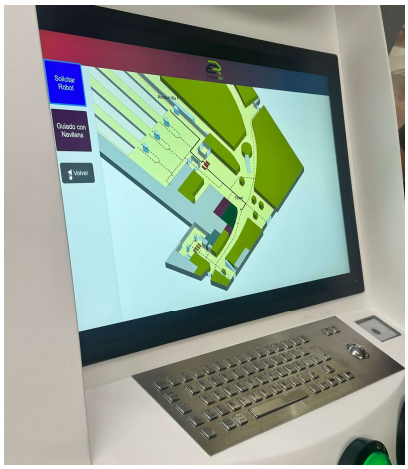
1 **Accessible sofware connected to NaviLens codes for blind people on mobile devices**



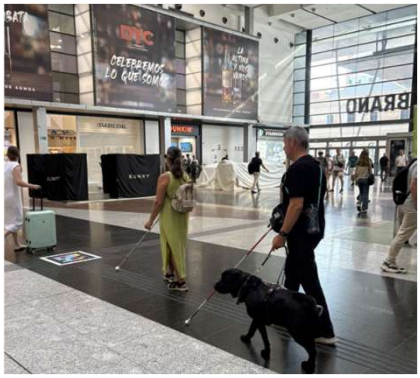


2 **Accessible software on the T-Ais hardware**



Here you can briefly describe what is shown in the figure. **Remember, this is a poster, not a deliverable**. Keep it short.

3 **End users during the testing process**



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ASSISTIVE ROBOTICS

Autonomous Assistance for Every Traveler

Victoria Guryn
RENFE (ADIF Funding Member)

Almudena Alcaide
Inserta Innovación (Fundación ONCE)

José Antonio Gutiérrez
Inserta Innovación (Fundación ONCE)

Abstract

Objective:
To deploy autonomous robots capable of guiding passengers with any disability from the station entrance to commercial areas, platforms, or metro lines.

Research and Methods:
Real-environment pilots with several associations (Agrupación de Desarrollo Málaga Accesible, ONCE, FIAPAS, etc.), where users booked and interacted with the robot via a dedicated mobile app.

Results:
The robot successfully navigated complex station areas. Feedback indicated that while the robot is a great asset, the mobile app interface needs to be more accessible for users with fine motor skill impairments.

Conclusion

This breakthrough in assistive robotics enhances independence for many travelers. Future development will focus on easier luggage placement and a more inclusive mobile control interface.

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1 Validation with a blind end user

2 Validation with PRM end user

The activities combined live demonstrations carried out in real operational environments. The demonstrations involved users with different disability profiles, including people with **visual, motor, cognitive, and hearing disabilities**, sometimes in combination. While the images mainly show participants with visual and motor disabilities, the validation process also included users with cognitive disabilities and deaf users. Participants were able to interact with the system either independently through the Access Robot's app or by requesting the service via the station totem or by the accessible mobile app developed by RENFE during this project.

3 Validation with a visually impaired end user before accessing the platforms

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GAP FILLER

Optimizing Safety on Curved Platforms

Victoria Guryn
RENFE OPERADORA

Inés Vadillo
ADIF

Antonio Sancho
INECO

Abstract

Objective:
To reduce the horizontal gap between the platform and the train at Villalegre station, specifically addressing the technical challenges posed by curved platforms to enhance safety and universal accessibility.

Research and Methods:
Installation of a high-resistance, flexible rubber platform at the platform edge. Validation focused on maximizing gap reduction while strictly adhering to safety clearances (gauges) required for curved track sections with multiple types of trains circulation.

Results:
The pilot achieved an improvement in boarding proximity. While curve-specific technical constraints do not always allow the gap to be completely reduced, the installation successfully minimized the distance, supporting loads of up to 300 kg and ensuring a safer transition.

Conclusion

Villalegre Station proves Gap Filler excels in complex geometries. It streamlines boarding and enhances safety, even when complete gap elimination is not technically feasible.

Demonstration partners

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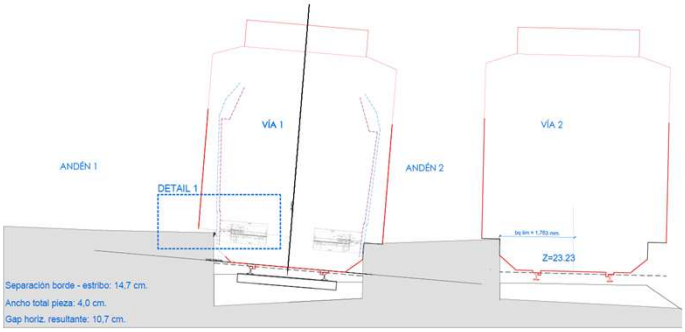
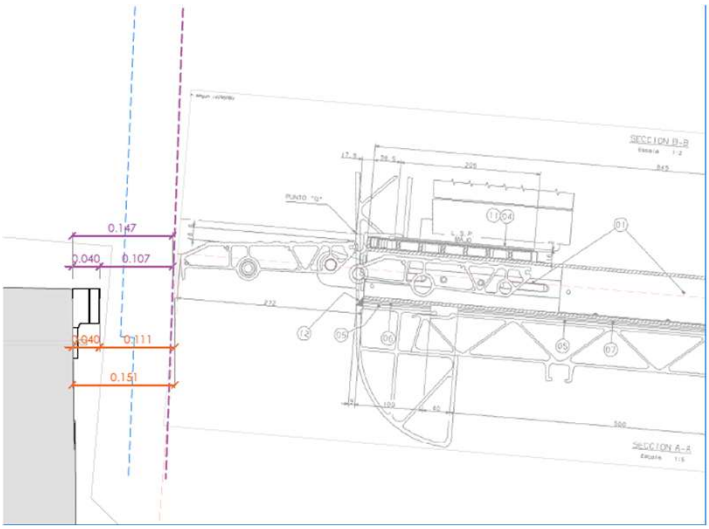
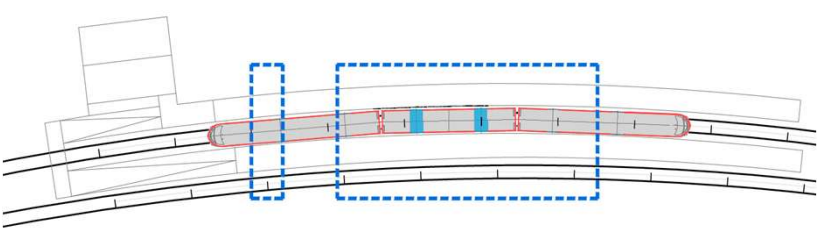
1 **Cross-section of the limiting kinematic gauge study**



2 **Detailed view of the component within the limiting kinematic gauge**



3 **Station layout showing curvature, accessible doors, and Gap Filler installation area**



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Demonstration in Malaga

Anticipating Passenger Demand for Improved Station Operations

Gustavo Hernández
INDRA

Enrique Jiménez
INDRA

Victoria Guryn
RENFE (ADIF Funding Member)

Abstract

Objective:
Demonstrate how passenger demand forecasting supports proactive station management and multimodal coordination. Enable earlier operational decisions in response to demand variability. Improve safety, service quality and resource planning at station level.

Research and Methods:
Demand forecasts are generated from schedules, passenger counts, weather and events. Short- and long-term predictions are combined in a single system. Results are visualized in an operational dashboard with automatic alerts.

Results:
Advanced predictive models generate demand forecasts that provide early insight into passenger flows, helping operators optimize planning, allocate resources efficiently, reduce congestion, and enhance the passenger experience.

Conclusion

Passenger demand forecasting enables proactive, safer and more efficient station operations. The solution strengthens coordination between infrastructure managers and transport operators.

Demonstration partners

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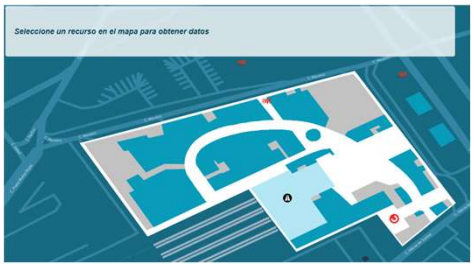
1 Home screen

The main screen is the primary interface where users access key features and navigate the system.

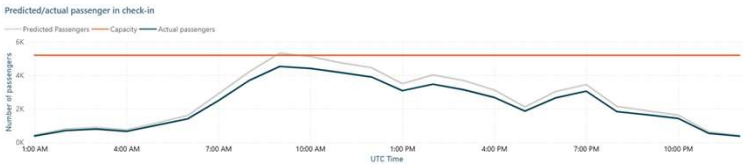


2 Predicted Passenger by Interval Time

In the table, we can see the forecasts by time interval.

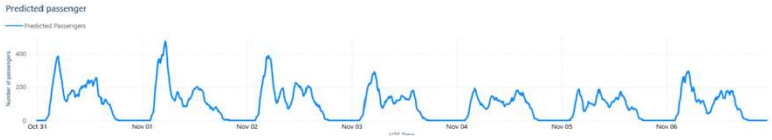
Date	12:00 AM	1:00 AM	2:00 AM	3:00 AM	4:00 AM	5:00 AM	6:00 AM	7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM
10/31/2025	0	10	267	929	1238	1154	781	772	634	783	781	844	854
11/1/2025	0	12	292	970	1301	1152	761	667	829	743	682	934	946
11/2/2025	0	18	359	1096	1382	1118	577	660	656	668	763	811	878
11/3/2025	0	11	237	812	1080	841	524	589	637	657	723	800	801
11/4/2025	0	8	196	669	860	749	372	551	490	373	338	426	519
11/5/2025	0	9	208	685	881	791	409	482	575	386	325	499	606
11/6/2025	0	10	238	868	1045	949	536	554	576	507	515	629	742
Total	0	78	1775	6019	7327	5354	4060	4275	4397	4119	4127	4943	5348

3 Short-term Predictions



The chart shows passenger forecasts and their comparison with actual passengers in the short term.

4 Long-term Predictions



The chart shows the predicted number of passengers per day in the long term.

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GOBOS

PRM PROJECTION ON PLATFORMS

Victoria Guryn
RENFE OPERADORA

Abstract

Objective:
A projected light symbol on the platform to indicate the stopping position of the accessible train carriage for wheelchair users, supporting easier identification and boarding for passengers with disabilities or special needs.

Research and Methods:
Demonstrator developed with the support of members of the Málaga Accessible Development Group (**Agrupación de Desarrollo Málaga Accesible**), representing 72 associations of persons with diverse disabilities.

Results:
End-user validations confirmed that the projected platform indication helps users anticipate and position themselves in advance, particularly on busy platforms. This early guidance reduced uncertainty and unnecessary movement and allowed potential improvements to be identified for future refinements.

Conclusion

The projected indication allowed users to anticipate the correct positioning on the platform for the accessible carriage; however, some improvement points were identified.

Demonstration partners

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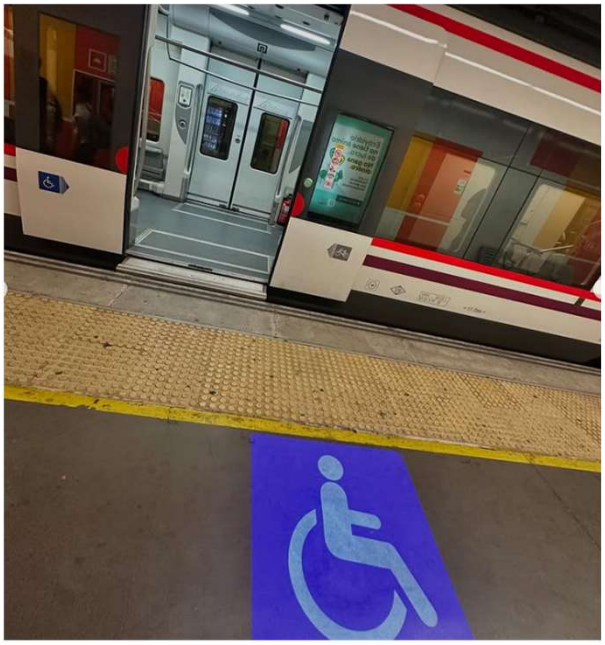
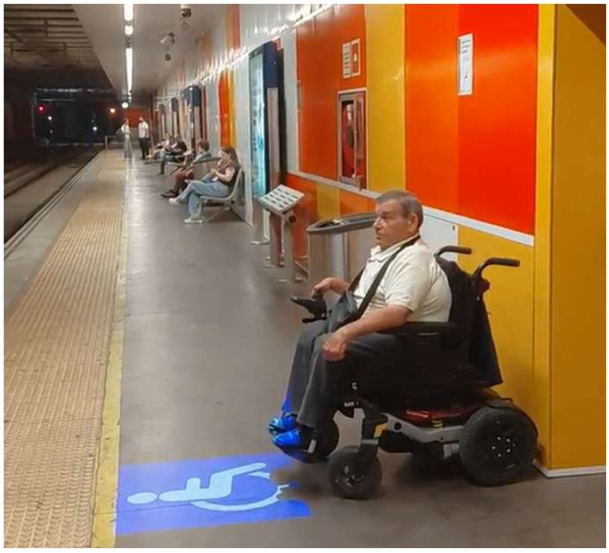
1 **Gobos projection on the platform in commuter services. Málaga - María Zambrano Station**



2 **Gobos projection testing with an end user. Málaga - María Zambrano Station**



User-centred field validation with a participant from the Málaga Accesible Development Group (**Agrupación de Desarrollo Málaga Accesible**), testing the projected light guidance system on the platform to assess accessibility, usability, and correct identification of the accessible carriage stopping position.

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Demonstration in Madrid

Seamless Mobility & Inclusive Travel Experience

Enrique Jiménez
INDRA

Abstract

Objective:
Demonstrate an integrated travel experience where users can plan their route, navigate within stations, access gates frictionlessly and complete their trip without buying a ticket in advance. The goal was to validate the combined use of planning, OSDM booking and purchasing, indoor guidance, frictionless validation and ABT as a unified solution for seamless and accessible mobility.

Research and Methods:
Real users, including PRM participants, tested a full journey inside Metro de Madrid using one MaaS application. The demonstration included journey planning, optional OSDM German ticket purchase, indoor guidance, UWB/BLE frictionless validation and account-based ticketing. All steps were completed consecutively in real station conditions.

Results:
All features worked successfully, and feedback was strongly positive. Users valued the simplicity of a single app, the comfort of ticketless access, and the clarity of indoor guidance. PRM were participants especially benefited.

Conclusion

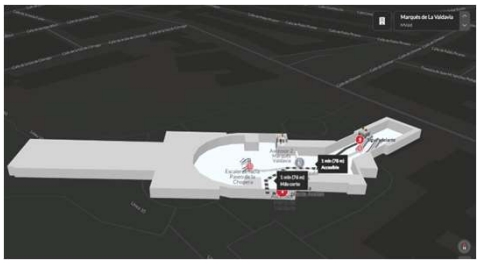
The demonstration validated that seamless, accessible and ticketless mobility is technically achievable and well-accepted by travelers, supporting Europe's goal of barrier-free, interoperable travel.

Demonstration partners

INDRA · Metro · DB

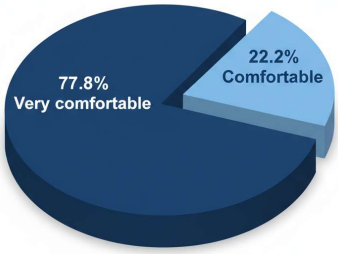
1 Indoor Guidance

3D model of the station and directions



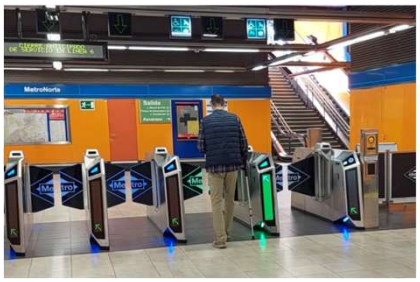
2 User's feedback

Comfortability of the users while using the MaaS app



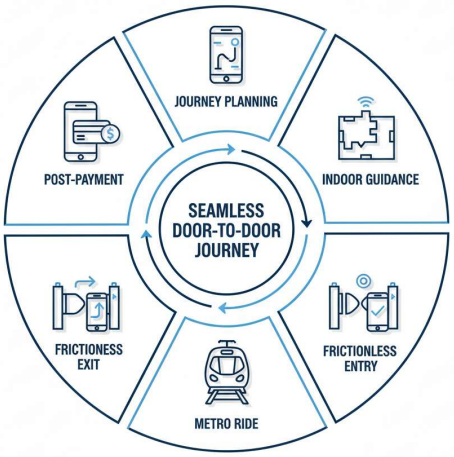
The first images illustrate the inside the station 3D visual model with clear, accessible routes. Alongside this, user feedback confirms high levels of confidence and comfortability in the usage of the MaaS app and all its functionalities.

3 Frictionless Validation



These images capture key moments of the on-site pilot: the initial briefing where participants were introduced to the MaaS app, and the successful hands-free validation at the station gate, demonstrated in real conditions by a PRM user.

4 One trip, zero barriers



One seamless journey delivering accessible routes, ticketless validation and effortless travel for everyone, redefining mobility with a smooth, integrated experience.

DB · INDRA · Metro

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Railway disruption management through optimization processes

Yasmin Andalib Pietro Calcagno
HITACHI RAIL

Abstract

Objective:
The Disruption Management use cases aim to support rail operators in planning, evaluating, and executing effective mitigation strategies during service disruptions, across both operational and strategic horizons.

Research and Methods:
The methodology focuses on validating mitigation algorithms and generating feasible real-time solutions under finite resource constraints, using scenario analysis and KPI-based benchmarking. Disruption inputs and selected mitigation decisions can be potentially shared via SIRI SX messages, ensuring alignment with standardized disruption information flows.

Results:
The Disruption Management demo enables KPI-based comparison of mitigation strategies across real-time and scenario-based modes, including estimation of required bus resources under average and worst-case disruptions.

Conclusion

The Disruption Management demo shows that mitigation strategies can be consistently evaluated using shared KPIs across unconstrained and real-time, resource-limited modes, while ensuring interoperability through SIRI SX messages that convey both disruption information and the operator's selected mitigation decision, supporting data-driven operational and strategic planning

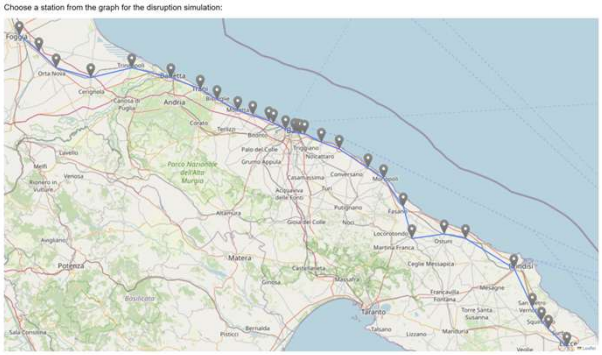
Demonstration partners

HITACHI

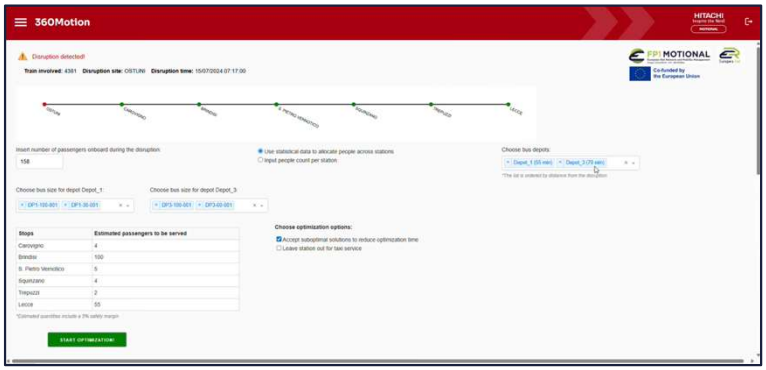
TRENITALIA

1 **Foggia - Bari - Lecce (Puglia region, Italy)**

The selected line for Disruption Management Demo

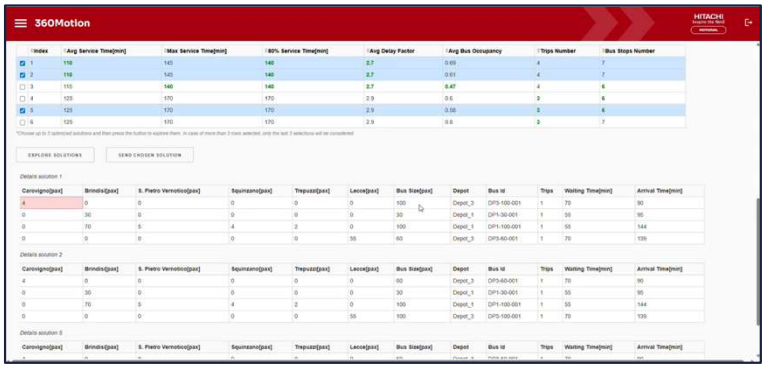


2 **The Operator receives the Disruption information**



After receiving disruption information, the operator selects the depots from which buses are deployed to transport passengers to their destinations

3 **Comparison of mitigation strategies based on KPIs**



Scenarios can be explored to support selection of the most suitable mitigation strategy.

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

Philippe BERNARD Nicolas GERMAIN
Hitachi Rail GTS

Abstract

Objective:

This study aims to enhance the alignment between transport supply and passenger demand, both during timetable planning and in real-time traffic management.

Research and Methods:

The study focuses on integrating short and long-term demand forecasts into a multimodal digital twin. Combined with timetable data, these forecasts enable coherent traffic simulations and a reliable reproduction of passenger flows. The work also aims to improve rail capacity planning and enhance disruption management strategies across different mobility modes.

The digital twin developed in this study provides a detailed and realistic representation of passenger dynamics, accurately modelling boarding and alighting times in metro environments, as well as passenger behaviour during incidents or operational disturbances.

Results:

The macro simulation enables the planning operator to observe, on an interactive city scale map, the alignment between public transport supply and demand for each mode, hour by hour and for every road segment (Fig. 1).

The micro simulation provides the traffic operator with a detailed synoptic representation of a metro line, including current and short-term passenger densities on platforms and on-board trains (Fig. 2).

The results also demonstrate the ability to test timetable adjustments within a sandbox type environment, allowing the operator to immediately visualise the impacts of these changes on passenger density and flow indicators (Fig. 3)

Conclusion

The results show that the proposed solution effectively enhances the planning of a city-wide multimodal public transport offer through long-term forecasting. It enables operators to anticipate future demand, allocate resources more efficiently, and design a more coherent and resilient mobility strategy.

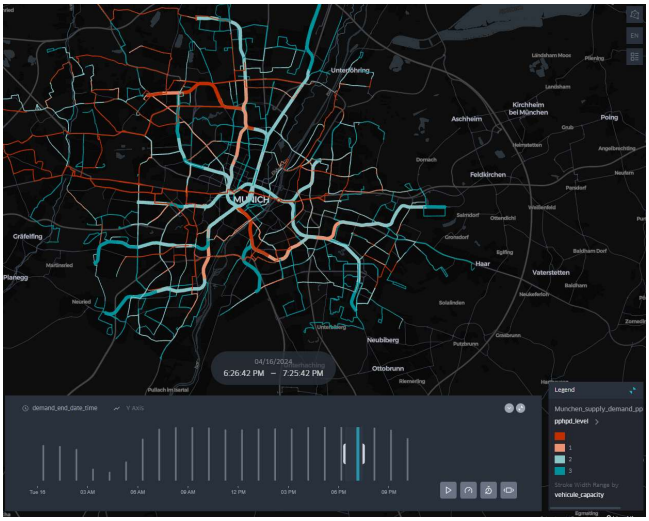
Moreover, the approach supports a shift from a traditionally reactive management model to a genuinely proactive one in the operation of metro line traffic. By anticipating disruptions, fluctuations in demand, and real-life operational uncertainties, the system equips operators with the ability to respond more quickly and effectively. This increased foresight ultimately strengthens network resilience and improves the quality of service delivered to passengers.

Demonstration Partners

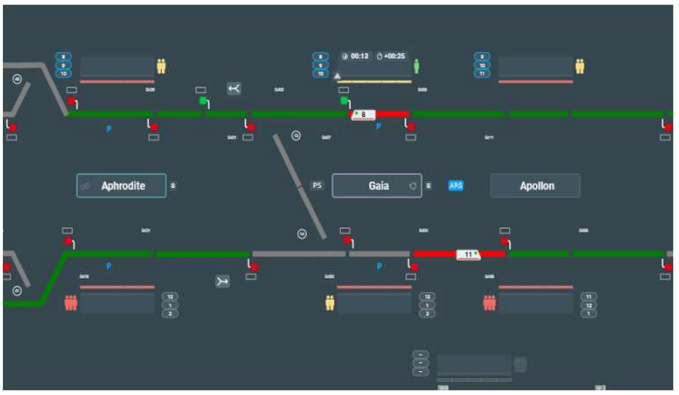
HITACHI

The partner participating in the demo was Hitachi Rail RCS.

1 Citywide Multimodal Public Transport Supply–Demand Alignment



2 Metro Line Synoptic Showing Passenger Density



3 Timetable Experimentation Sandbox

Europe's Rail

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ETRA Demo - Short-term demand forecast and situations detection

Elena García Jiménez Miguel Company Soler Sergi Grau Dalmau
ETRA I+D

Abstract

Objective:
Railways serve thousands of passengers every day who rely on a reliable service. Accurately predicting demand and automating operational protocols are essential to maintain this level of service.

Research and Methods:
3-years historical demand data per line and station in the FGC network was used for training the neural network model which was evaluated by using Mean Absolute Error (MAE).

Results:
1. Demand prediction 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.
2. Situation library, which provides managers with guidance to respond quickly to changing conditions based on demand, weather, or special events.

Conclusion

The tools developed by ETRA enable proactive, data-driven decisions, improving operational efficiency and ensuring passengers enjoy a reliable, well-managed travel experience

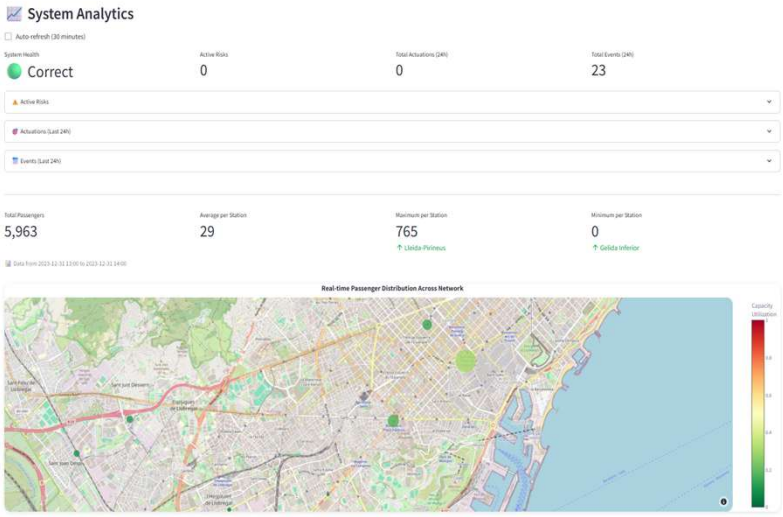
Demonstration partners

etra

FGC Ferrocarrils de la Generalitat de Catalunya

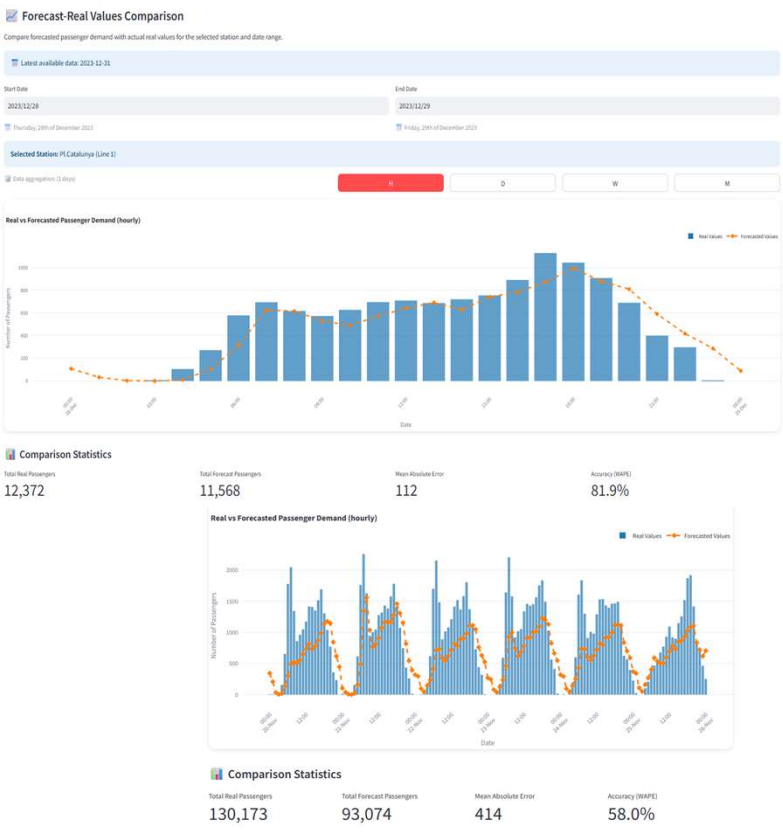
1 Main dashboard

Map representation of the network and relevant information in a nutshell



2 Short-term demand prediction

Demand prediction vs real number of passengers per day, line and station in a daily, weekly and monthly-bases)



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Booking Cross-Border

Integrated cross-selling of transport products

Elin Beijer Klara Gustafsson Clemens Gantert
SJ AB | DB | Sqills

Abstract

Objective:
Booking cross-border or multimodal trips is still fragmented, forcing travellers to juggle multiple platforms and tickets. The goal of this demonstration is to prove how the OSDM API enables integrated cross-selling of transport products — rail and beyond.

Research and Methods:
The demonstration shows OSDM integration in action – allowing customers to book journeys in both DB and SJ platforms:

- SJ selling one combined ticket for multimodal journeys in Sweden.
- DB selling SJ tickets
- SJ selling DB tickets (POC)

Results:
The key benefit for the customer is seamless end-to-end travel: one search, one booking, one ticket across operators and modes – all within platforms they know and like.

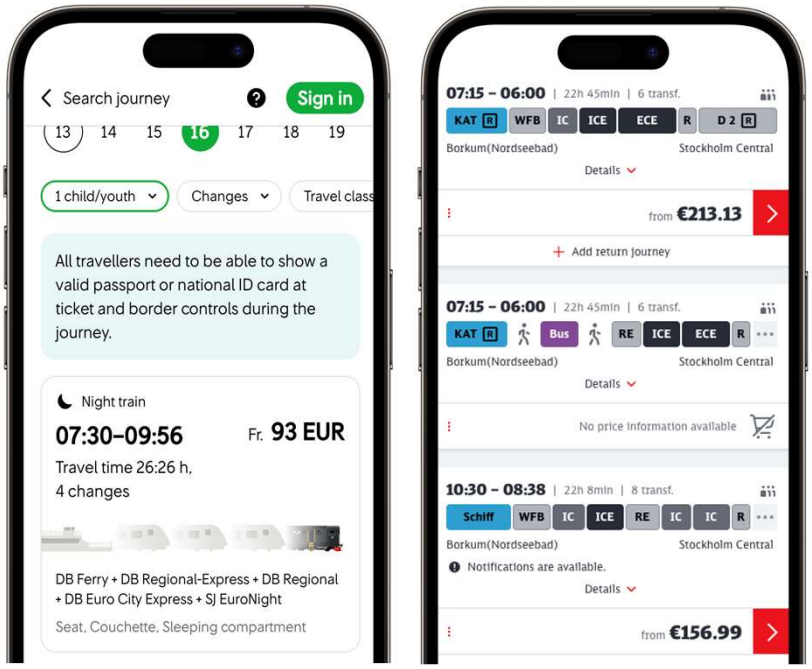
Conclusion

The use of OSDM enables easy integration to other operators expanding and enabling increased offering for travels in Europe.

Demonstration partners

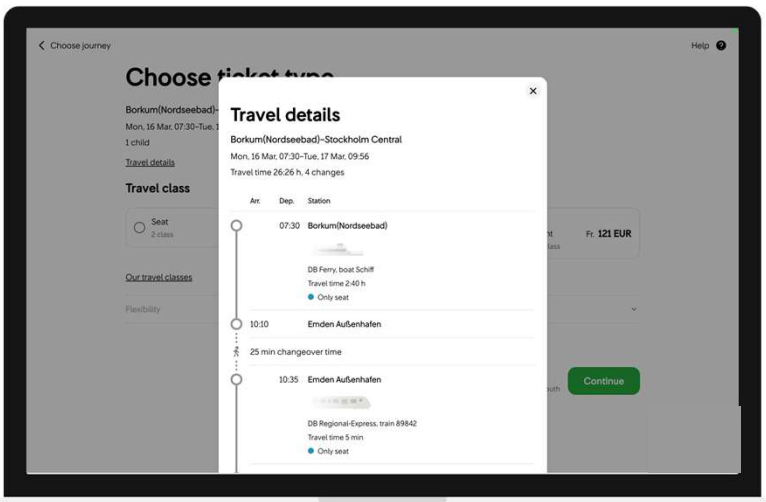
1 An end-to-end search

The search results in combined journeys end-to-end



SJ Sales channel DB Sales channel

2 Detailed route description for the complete journey



The customer can see all segments of the journey. This demo also support several transport products apart from train, such as ferry, bus and tram.

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Illuminated Platform Edge

Smart LED passenger guidance system on the platform

Christopher Schubert
DB InfraGO AG

Christoph Hertner

Abstract

Objective:
As rail networks expand and passenger numbers increase, railway operators require innovative solutions to enhance platform capacity at heavily frequented stations while simultaneously improving passenger safety. An optimized information system enhances the early orientation of waiting passengers, enabling them to position themselves strategically on the platform. Additionally, the use of colored light signals supports barrier-free travel by increasing contrasts in hazardous areas and visually warning of approaching trains.

Research and Methods:
Developed two pilotprojects Station Berlin Südkreuz and Hbf. Leipzig to validate the indicated use cases.

Results:
The product certification, the structural integration and the operability could be validated. The system increased the passenger attention on the platform and raised the costumer satisfaction on a top level.

Conclusion

The system has a high potential and customer benefit and should be further investigated regarding to different use cases. Challenges are the data connectivity and processing of the necessary train data.

Demonstration partners

DB

SIUT
external partner

1 Pictures Illuminated Platform Edge

2 Increasing attention on the platform

Danger Area

A red luminous line along the entire platform edge indicates the danger area and advises passengers waiting not to enter.

Train entry / Train passage

A flashing red light along the entire platform edge increases passenger attention, indicating the approaching train, and urges passengers to step back from the edge.

Door Closing / Train Departure

A flashing red light while the train doors are closing increases attention and signals that the train can no longer be boarded, making the boarding process safer. It also reduces the number of times the door closing is interrupted,

3 Optimize passenger information on the platform

Stopping Position / Train Length

A green running light indicates the stopping position of the next train before it arrives, encouraging waiting passengers to move to that position in time. The stopping position is visualized with a white static line, making it easy to identify.

First Class / On-Board Restaurant / Multi Purpose Compartments

Assigning distinct colors to the different train compartments improves passenger orientation and enables them to position themselves on the platform in a timely manner.

Capacity

Using traffic light colors to visualize the capacity of the train informs waiting passengers about the availability of seats before the next train arrives, helping with an optimal and timely distribution on the platform.

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Demonstration in Madrid

Disruption management through Transport Data Hub

Enrique Jiménez Hugo Molinero
INDRA

Abstract

Objective:
Demonstrate real-time disruption management using the Transport Data Hub. Show how incidents are collected, updated and distributed automatically. Ensure users receive timely and consistent disruption information.

Research and Methods:
The Transport Data Hub ingests real-time disruption data from transport systems. Incidents are processed, monitored and updated centrally. Information is distributed in real time to transport systems and devices.

Results:
Disruption information was correctly communicated and updated in real time. Users were able to monitor incidents consistently across systems. Feedback confirmed clarity and usefulness of the disruption information.

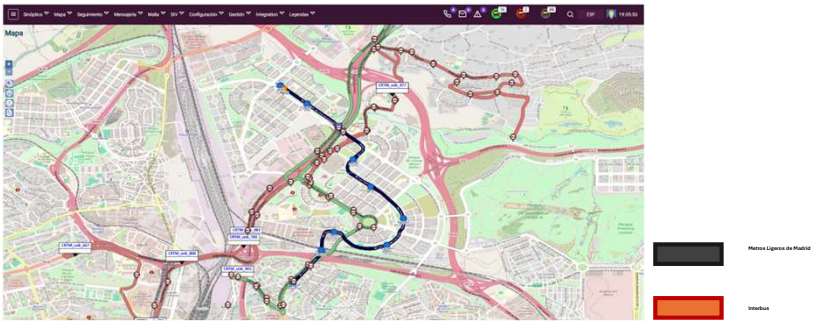
Conclusion

The Transport Data Hub enables effective real-time disruption management. It improves situational awareness and communication during incidents.

Additional Information

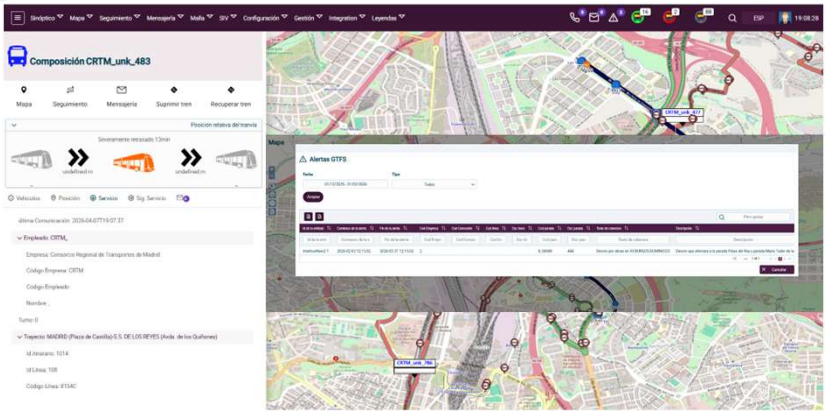
INDRA
GRUPO INTERBUS

1 Routes



Integrated real-time view of multimodal services, supporting the detection of disruptions across rail and bus operators.

2 Detailed service affected



Detailed monitoring of individual services, combining vehicle status, alerts, delays and geolocation within the Transport Data Hub.

3 Disruption information panel

The panel provides clear, real-time information about the affected line, helping users understand the disruption and its operational impact.

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