

# MultiModX

1st Industry Board Meeting Feedback Report



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# Contents

<b>Station 1: Future of Regulation 261 and Multimodal Passenger Rights .....</b>	<b>2</b>
1. The future form of Regulation 261 is much debated. From your perspective, what should the new Regulation 261 look like?.....	2
2. What aspects of Regulation 261 can we use to create a new regulation for multimodal passenger rights? .....	3
3. What obstacles do you foresee to extending the forced air-to-rail shift to also include connecting flights and long-distance flights? .....	3
<b>Station 2: Navigating Multimodal Performance: Assessing Deepened Air-Rail Cooperation.....</b>	<b>4</b>
1. What are a good multimodal indicator (reflecting multimodality per se) and a good corresponding indicator for ATM (i.e. the contribution to the same multimodal indicator coming from ATM)? .....	4
2. Is the target for 90% of trips in 4 hours door-to-door still relevant? .....	5
3. Key Performance Indicators (KPIs) Prioritization .....	5
<b>Station 3: Coordinating Air and Rail Schedules for Seamless Travel .....</b>	<b>6</b>
1. What is an optimal schedule? .....	6
2. How to compare the “optimality” level of the two schedules? Which indicators? .....	7
3. What flexibility does an operator have to change schedules? .....	7
4. Which constraints are to be taken into account when scheduling? .....	8
5. Which limitations do you have today in building your schedules?.....	9
<b>Station 4: Strategies for Improved Disruption Management in Multimodal Travel .....</b>	<b>10</b>
1. How to deal with light or medium delays?.....	10
<b>Conclusions .....</b>	<b>12</b>
Key takeaways include:.....	12

In accordance with the objectives of the SESAR 3 Joint Undertaking, the MultiModX project (Integrated Passenger-Centric Planning of Multimodal Transport Networks), successfully organised the first meeting with the members of the MultiModX Industry Board meeting. The event centred around the theme of integrated and coordinated air-rail networks for seamless passenger journeys, was held on February 20th, from 09:00 to 16:00, at the headquarters of the International Union of Railways in Paris, located at 16 Rue Jean Rey, 75015.

The Industry Board in the MultiModX project plays a crucial role in providing expertise and feedback throughout the project's duration. Comprising members from the aviation, railway, transportation industry, GDS organisations, and scientific community, the board assesses project results, validates models and frameworks, and evaluates proposed key performance indicators. By engaging with stakeholders such as policymakers, transport experts, and industry representatives, the board ensures the comprehensive development and validation of MultiModX solutions. Through webinars, workshops, and working sessions, the board facilitates a continuous consultation process, fostering the transfer of solutions to subsequent stages of the research and innovation cycle.

The workshop is the result of the collaborative effort by Bauhaus Luftfahrt (Project Coordinator), Airport Regions Council (Project Dissemination Manager), and the International Union of Railways (Project Communication Manager), and it was facilitated by the overall project consortium. It aimed to delve deeper into MultiModX solutions and multimodal transport scenarios, offering specific presentations to the audience.

The event's format fostered dynamic exchanges among attendees, who were actively encouraged to provide feedback. Through a 'World Café' format structured around four thematic stations, participants engaged in dialogue, enabling a rich exchange of ideas and perspectives.

Throughout the meeting, attendees had the opportunity to explore innovative solutions and scenarios aimed at enhancing passenger-centric planning in multimodal transport networks. The presentations provided valuable insights, prompting discussions on the future of integrated air-rail networks and their impact on passenger journeys.

The 1st MultiModX Industry Board meeting proved to be a successful gathering, fostering collaboration and knowledge-sharing among stakeholders in the transportation sector. During the event, feedback from the board members was collected. The event's outcomes and the feedback received are presented in this report.





# Station ①

## Future of Regulation 261 and Multimodal Passenger Rights

*At Station 1 of the World Cafe, moderated by Ram Kamath and with Kay Ploetner as the note-taker, the future of Regulation 261 and multimodal passenger rights was under scrutiny. Participants engaged in lively discussions on key elements of the regulation, including liability definitions, compensation thresholds, and extraordinary circumstances. They also explored how Regulation 261 could serve as a foundation for new regulations tailored to the complexities of multimodal journeys. Insights were shared on liability distribution, incentivising re-routing, and overcoming obstacles to successful implementation. This session provided a starting point for deeper dives into the intricacies of regulation and implementation challenges in the field of multimodal transportation.*

### ① The future form of Regulation 261 is much debated. From your perspective, what should the new Regulation 261 look like?

**Liability Definition:** Participants suggested a clearer definition of liability, particularly in cases involving missed connections due to delays.

For example, in the cases of air-to-air connections where the incoming and outgoing airlines are different, or when the connecting flight is missed because the incoming flight was late, it sometimes happens that the incoming airline refuses to provide any form of compensation or duty-of-care.

**Threshold for Compensation:** Many participants advocated for lowering the thresholds for compensation, suggesting that the current proposed delays for compensation are too high.

For example, the threshold for arrival delay is 5/9/12 hours for short/medium/long-haul flights. This threshold should be lowered to 3 hours (i.e. to the threshold in the current regulation).

**Definition of “Extraordinary Circumstances”:** There was a consensus on the need for a clearer definition of „extraordinary circumstances”.

For example, a numbering system for “technical defects” would be useful, so that the severity of the defect can be more easily communicated to the passenger.

## 2 What aspects of Regulation 261 can we use to create a new regulation for multimodal passenger rights?

**Definition of Multimodal Journey:** Differing opinions exist on how to define a multimodal journey, particularly regarding the inclusion of short-distance train journeys.

Some participants said that trains should only be considered as a leg of a multimodal journey if they are long-distance trains (e.g.  $\geq 500$  km) or international trains. Others said that even if it is a short journey (such as commuting from the airport to the city), a train should be a leg of a multimodal journey.

**Liability Split:** Participants discussed two approaches to splitting liability: based on journey duration or cost of the ticket. The consensus favoured the agency selling the multimodal ticket as being responsible for compensation.

To be precise, sharing liability based on duration would mean that if a flight is 66% of the journey, the airline will have to provide 66% of the reimbursement or duty-of-care in case of an arrival delay.

In case liability is shared based on cost-of-ticket, then if a train delay causes passengers to miss a flight, the train company only provides compensation proportional to the share of the train ticket cost in the total cost of the journey.

Regardless of how liability is split, it was suggested that the point of contact and provider for any form of compensation should be the agency that sold the multimodal ticket.

**Incentivising Re-Routing:** Suggestions were made to incentivise as-soon-as-possible re-routing over other forms of compensation (such as reimbursements).

**Steps for Successful Implementation of a Multimodal Network:** Participants highlighted the need for open itineraries, incentivising airlines to be part of multimodal journeys, and making itinerary data open for flight-train interlinking.

## 3 What obstacles do you foresee to extending the forced air-to-rail shift to also include connecting flights and long-distance flights?

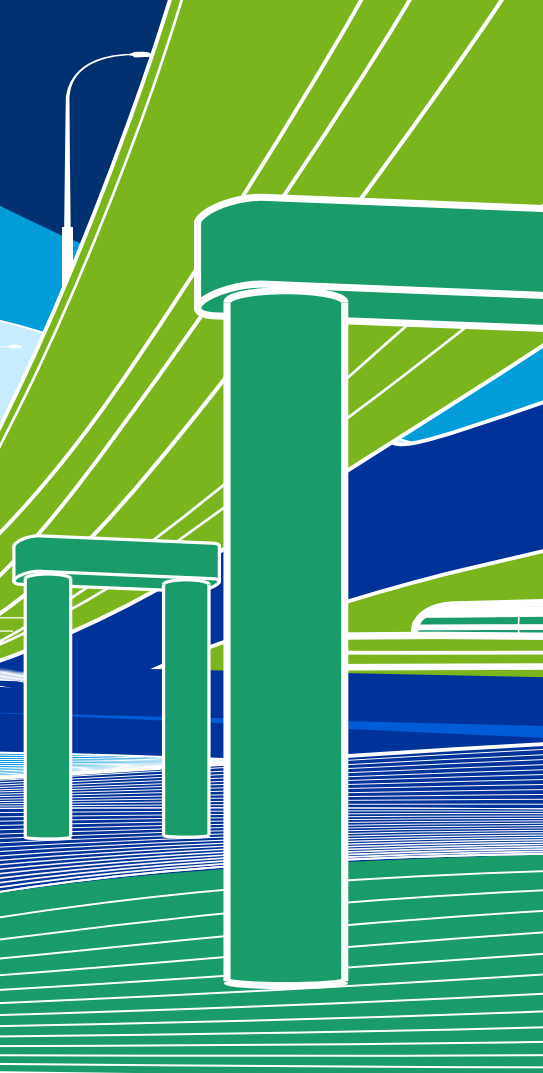
### Obstacles to Connecting Flights:

- lack of high-speed train connections at all EU airports
- supply constraints for trains, especially late at night
- lack of open itinerary data that allows for flight-train interlinking that will facilitate streamlined journeys
- the forced shift tends to focus on distance, whereas it should focus on passenger convenience
- no widely available platform informing passengers of all possible modes of transportation
- potential airline lobbying against the regulation due to loss of customers.

### Obstacles for Long-Distance Flights:

- lack of liability
- insufficient supply of trains with layouts suitable for long journeys.

Overall, participants provided valuable insights into various aspects of regulation and implementation challenges concerning multimodal passenger rights, emphasising the need for clearer definitions, fair liability distribution, and incentives for multimodal integration.



# Station ②

## Navigating Multimodal Performance: Assessing Deepened Air-Rail Cooperation

*At Station 2, moderated by Luis Delgado and with Javier Burrieza Galán as the note-taker, participants explored the complexities of multimodal transportation. The discussion centred around defining suitable multimodal indicators, the relevance of ambitious door-to-door travel targets, and the prioritisation of key performance indicators (KPIs) to enhance the passenger experience. The session revealed challenges in defining indicators for multimodality, the need for different targets for diverse operations, and the importance of efficiency, resilience, and cost-effectiveness in multimodal networks.*

### 1 What are a good multimodal indicator (reflecting multimodality per se) and a good corresponding indicator for ATM (i.e. the contribution to the same multimodal indicator coming from ATM)?

**Defining Multimodal Indicator:** Participants discussed the challenge of defining a suitable multimodal indicator. There was uncertainty regarding what constitutes multimodality and how it differs between air and rail systems.

Even though an indicator for multimodality per se was not defined, the following potential indicators were suggested:

- **Single Ticket Requirement:** The necessity of a single ticket for multimodality was acknowledged, suggesting it could serve as a measure. The number of passengers using integrated multimodal tickets was considered a potential indicator.
- **Luggage Solution:** Participants highlighted the need for a solution regarding luggage in multimodal journeys.
- **Benefits of Multimodality:** While a specific indicator for multimodality was not defined, there was consensus on the importance of measuring the benefits of multimodality. These benefits might vary depending on stakeholders' characteristics, and their different views coming from different transportation modes. The stakeholder perspective is critical when defining the benefits and considerations of multimodality.
- **Passenger Experience and Satisfaction:** Participants proposed measuring whether passengers „notice“ or „care“ about multimodality as indicators of passenger satisfaction. The focus was on ensuring passenger needs were met and operations ran smoothly, or in the case of disruption, were recovered smoothly.

Measuring multimodality remained a challenge. For example, it was highlighted that it is difficult to measure door-to-door mobility and rail mobility due to the openness of the system. However, capturing passenger satisfaction and preferences was deemed crucial when it came down to multimodality. Further general discussion focused on the difficulty of using data. For example, a consistent system for multimodal node identifiers (stations, airports, etc.) is required. Simply measuring the amount of data shared/available could be considered an indicator. The rail industry has more country-specific standards, so European-wide solutions can be challenging to deploy.

It was clear that using indicators already used in policies and regulations would be useful (e.g. environmental indicators). However, capturing passenger satisfaction and preferences was deemed crucial when it came down to multimodality.

## 2 Is the target for 90% of trips in 4 hours door-to-door still relevant?

**Ambitious target:** Participants agreed that the 4h door-to-door is a very ambitious target. While ambitious, this target was seen as a threshold for demand to shift from air to rail. Participants noted country-specific considerations due to varying rail infrastructures. The concept is driven to push for a European territorial cohesion policy. Discussion centred on potential challenges in achieving the target, including the readiness of rail infrastructure and the risk of penalising shifts to multimodality.

In a multimodal concept, aspects such as frequency of service by ground systems should be considered, but the rail infrastructure might not be ready for this level of performance.

There is also a risk that this target might penalise a shift to multimodality as it would encourage point-to-point flight operations, highlighting that this goal was set from an air perspective and might not be suitable for multimodal operations. Different targets might be needed for different types of operations.

## 3 Key Performance Indicators (KPIs) Prioritization

**Efficiency Focus:** Participants prioritised KPIs related to efficiency, such as journey duration and passenger time efficiency.

**Resilience and Reliability:** The importance of resilience, variability, and seamlessness of travel in ensuring reliable and flexible journeys was emphasised.

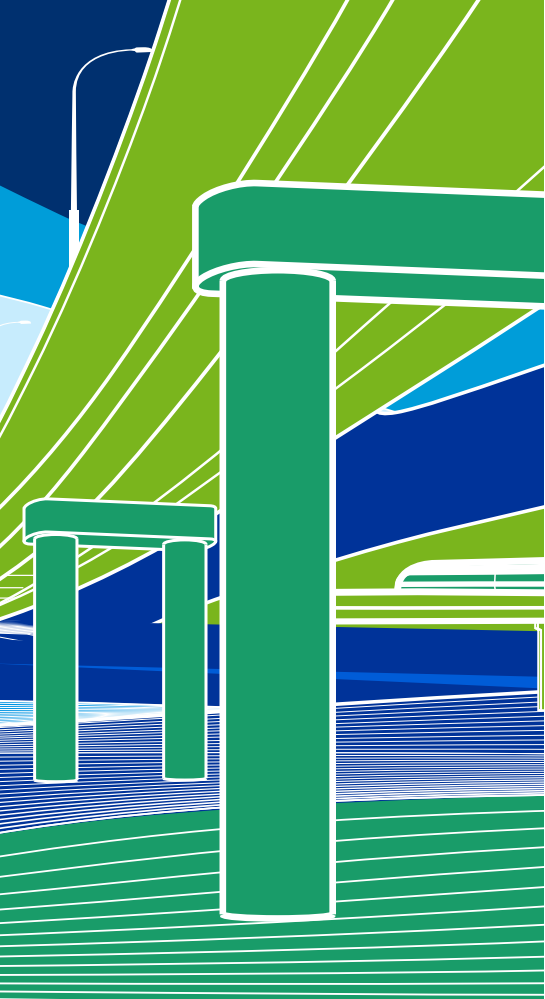
**Cost Consideration:** Direct operating cost per user was identified as a crucial factor, along with modal share across transport modes.

### *Further Discussion on KPIs:*

**Interoperability:** Real-time multimodal passenger information and revenue increase were suggested as additional considerations for interoperability and cost-effectiveness.

**Revenue as an Indicator:** It was proposed that revenue increase could be a significant KPI, indicating support for multimodality from stakeholders.

In conclusion, participants highlighted the complexity of defining indicators for multimodality and emphasised the importance of considering various stakeholders' perspectives, measuring passenger satisfaction, and ensuring efficient, reliable, and cost-effective journeys in multimodal transport networks. This comprehensive discussion highlighted the multifaceted nature of assessing and improving the passenger experience in multimodal transportation.



# Station ③

## Coordinating Air and Rail Schedules for Seamless Travel

*At Station 3, moderated by Marine de Boissieu and with Jerónimo Bueno González as the note-taker, participants delved into the complexities of optimal scheduling in multimodal transportation. Discussions encompassed various perspectives, including those of railways, airlines, passengers, and infrastructure operators. From defining what constitutes an optimal schedule to examining constraints and limitations faced by operators today, the session provided a holistic overview of the challenges and considerations involved in scheduling for multimodal transport networks.*

### 1 What is an optimal schedule?

An optimal schedule is essential for efficient and effective transportation operations, but what constitutes „optimal“ can vary greatly depending on who you ask.

From a **railway perspective**, it's about ensuring trains run on time, maximising the number of passengers transported while minimising service disruptions, and considering the diverse range of rail services, including normal and night trains.

**Airlines**, on the other hand, are primarily concerned with maximising revenue, achieved through strategic scheduling that optimises aircraft and crew utilisation, makes the most of valuable airport slots, and provides connectivity to attract passengers, particularly for traditional carriers.

**Passengers**, of course, have their own priorities. They want schedules that align with their travel needs, offering flexibility, convenience, and reliability. This includes factors such as frequency of service, availability of direct connections, and reasonable transfer times.

For **airports and train stations**, managing the flow of passengers throughout the day is crucial. They need schedules that balance peak demand periods with maintaining a steady stream of travellers, ensuring smooth operations and a positive passenger experience.

In summary, an optimal schedule takes into account a multitude of factors – from operational efficiency and revenue generation to passenger convenience and infrastructure management. Achieving this balance requires careful consideration of the needs and perspectives of all stakeholders involved in the transportation ecosystem.



## 2 How to compare the “optimality” level of the two schedules? Which indicators?

When comparing the optimality of two schedules, several indicators are considered, including associated costs, feasibility, and robustness/resilience. Simply choosing the less expensive timetable may not always be the best option, as it may lack feasibility or robustness, leading to unexpected costs in case of disruptions. For instance, airlines often include buffers in their schedules to account for potential issues, while rail systems may keep slots open for the same purpose, despite the expense.

Cost efficiency is crucial, aiming to cover the same service with minimal fleet size or vehicles. Costs can vary based on the time of day, such as more expensive slots for planes or changing toll prices for trains. Seasonality also plays a role in determining a good schedule. Additionally, a good schedule should facilitate seamless connections for passengers.

## 3 What flexibility does an operator have to change schedules?

When considering scheduling, the timing is crucial, with airlines often planning six months due to the expense of rescheduling. It's generally more feasible to modify existing schedules rather than completely overhaul them. However, in the long term, there are opportunities to adapt schedules for multimodality, potentially leading to significant market benefits by 2035.

Creating new multimodal schedules is an intriguing prospect, as existing ones may not accommodate multimodal transportation effectively. Quantifying the impact of such schedules is the first step, followed by a thorough analysis to determine if the benefits justify the effort.

When modifying existing schedules, a 15-20 minute adjustment window is generally acceptable, considering that planes are typically around 17 minutes late on average in European skies. Airline slots are valuable assets, and airlines are reluctant to lose them.

Scheduling is typically not done from scratch due to its difficulty, and some rail schedules are decided by the government or region. The frequency of transportation services also influences scheduling decisions.



## 4 Which constraints are to be taken into account when scheduling?

**Fleet Type:** Different types of vehicles may have different capabilities and limitations.

**Minimum Connection Times:** Ensuring sufficient time for passengers to transfer between modes of transport.

**Rolling Stock:** Availability and suitability of trains or other rolling stock.

**Capacity of the Network:** Ensuring that the network can handle the planned services without congestion.

**Demand-Time Sensitivity:** Adapting schedules to match peak demand periods.

**Maintenance Constraints:** Scheduling downtime for maintenance and repairs.

**Airport or Train Station Capacity:** Ensuring that stations or airports can accommodate the planned traffic.

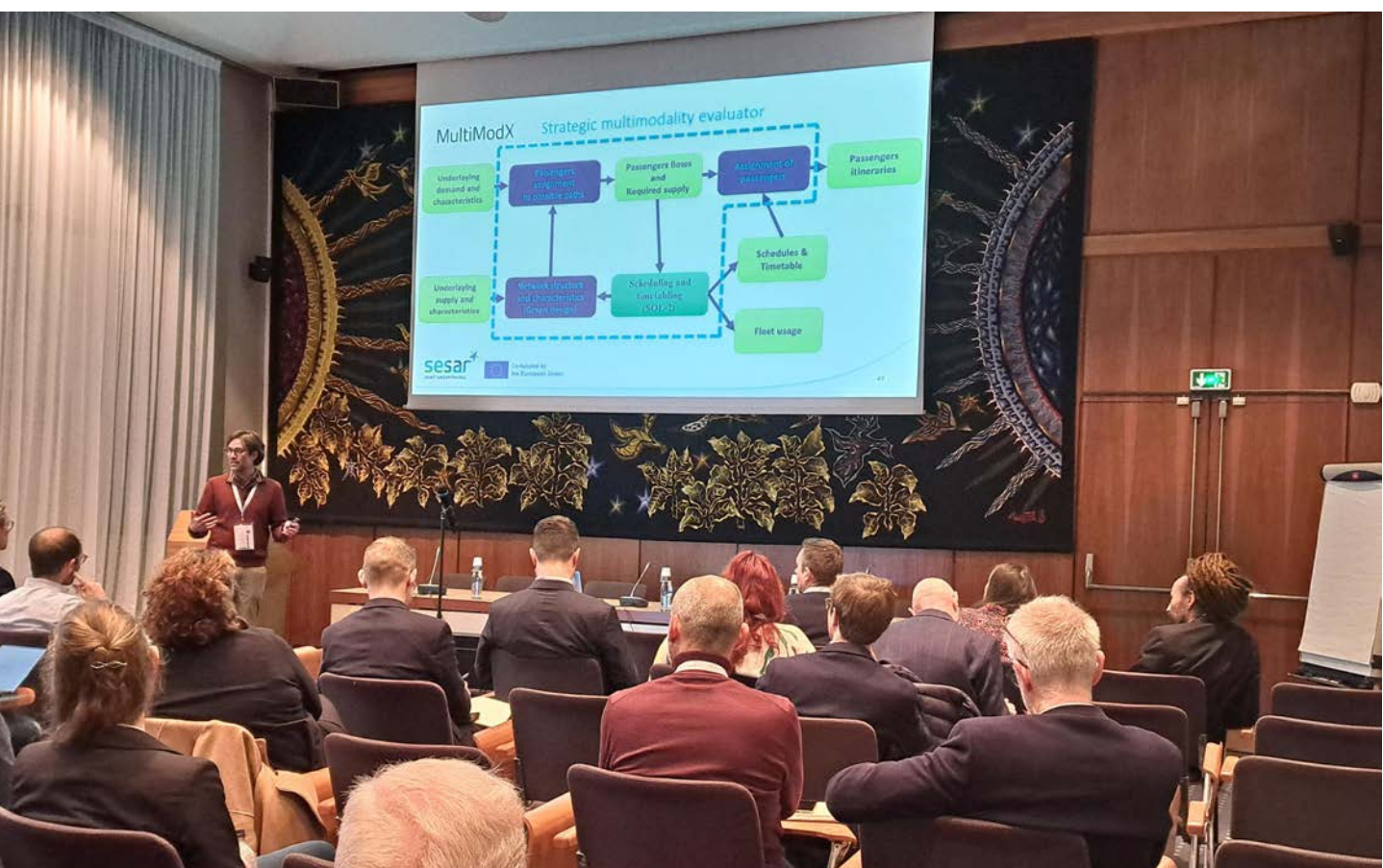
**Airport Slots:** Limited slots at airports, often historically acquired and difficult to obtain or relinquish.

**Construction Works:** Taking into account ongoing construction projects that may affect schedules.

**Punctuality Pressure:** Particularly for trains, where being on time is crucial, considering factors that affect punctuality.

**Amenities at Hubs:** Considering social and commercial activities available at hubs, such as airports or train stations, for passenger convenience.

*FYI: Other constraints, such as crews and fleets, will not be considered within the MultiModX project.*



## 5 Which limitations do you have today in building your schedules?

- Limitations in building schedules today include:

**No fully integrated ticketing for trains:** Expected to be available by 2025, this would streamline ticketing processes and improve passenger experience.

**Availability of slots:** Limited availability can restrict scheduling options, especially for airlines operating at congested airports.

**Construction works:** Ongoing construction projects can disrupt schedules and limit route options.

- Barriers to multimodal scheduling:

**Data issues:** Problems with data availability, reluctance to share, and inconsistency in formats and standards hinder effective scheduling.

**Legal complexities:** Legal frameworks may complicate coordination among different transport modes and operators.

**Lack of agreements among operators:** Cooperation among various transportation providers is essential for seamless multimodal scheduling.

**Challenges with information sharing:** Limited sharing of critical information among stakeholders can hinder effective coordination.

**Different strategic planning horizons:** Varying planning timeframes among stakeholders make collaboration challenging, although planning a year in advance is considered beneficial.

**Absence of coordinating institutions:** Lack of an overarching organisation to coordinate scheduling efforts can lead to inefficiencies.

**No fully integrated ticketing:** Expected to be available by 2030, integrated ticketing would simplify travel across multiple modes.

**Power dynamics:** Airlines often have more influence and freedom compared to rail, which is more dependent on government and infrastructure, and serves broader social goals.

**Different logics:** Private and public entities have different perspectives on service requirements and punctuality pressures.

**Need for political courage:** Overcoming entrenched interests and implementing systemic changes requires significant political will.



# Station ④

## Strategies for Improved Disruption Management in Multimodal Travel

*This station focused on managing disruptions, the discussion was moderated by Andrew Cook and Christopher Szymula and the notes were taken by Michal Weiszer. Participants were tasked with devising solutions for a scenario where they arrived by TGV at CDG for onward flights but faced delays of either ,light' (e.g., 20 minutes) or ,medium' (e.g., 60 minutes) nature.*

### 1 How to deal with light or medium delays?

#### **Adapting to delay:**

- Aircraft waiting at gate
- Automatic rebooking (need codesharing/integrating air and rail data)
- Compensation (increased scope cf. Regulation 261)
- Baggage needs to be considered

#### **Recovering from delay:**

- Speeding up security checks or adapting connection times
- Special or dedicated lanes for multimodal travellers
- Taking baggage directly to the aircraft instead of checking it in

#### **Arriving at the destination with minimum delay:**

- Considering onward journey connectivity and late-night transport options

#### **Operational decisions:**

- Deciding whether to wait for passengers or rebook them

#### **Responsibilities to passengers:**

- Single ticketing to facilitate solutions
- Providing information and reassurance in a user-friendly, advanced, and timely manner
- Offering assistance with baggage and personal needs

To implement these ideas, participants identified the need for certain technologies and regulations:

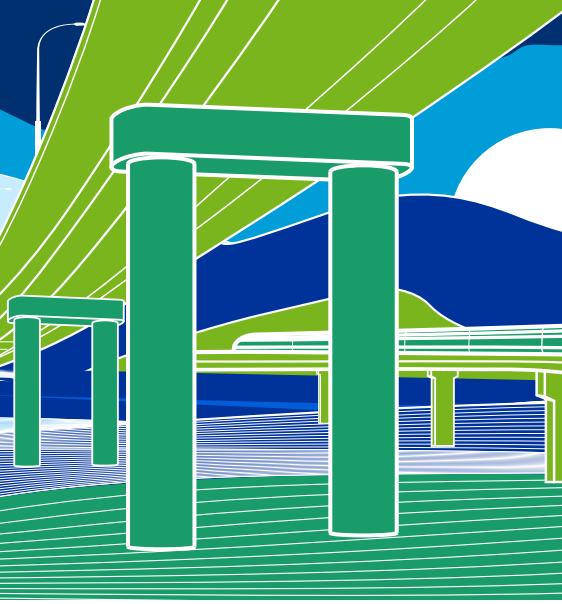
- A common data space, like the European data space, linking air-rail data, delay forecasting, and passenger information.
- Technologies for delay forecasting, passenger data accounts, and enabling regulations to support new market entrants.
- Funding mechanisms such as Public Service Obligation (PSO) models.



Potential barriers include differing business cultures, GDPR regulations, and commercial pressures for maximum load factors.

Responsibilities for rebooking, service adjustments, and information distribution could be handled by multimodal network managers, third parties, locally coordinated teams, or whoever caused the delay. This could be supported by open seat allocation, agreements like the Agreement on Journey Continuation (AJC), Airport Collaborative Decision Making (A-CDM), and Traveler Assistance Mode (TAM).

The least anticipated suggestions in the workshop included improvements in baggage handling, delay forecasting for specific legs, dedicated fast tracks for multimodal passengers, and a focus on minimising arrival time at the destination.



# Conclusions

The MultiModX workshop brought together valuable insights from the roundtable discussions, covering future policy options, regulations, and passenger rights. Participants proposed solutions for enhancing air-rail cooperation and aligning flight and rail schedules optimally.

## Key takeaways include:

### 1. Regulation and Passenger Rights:

- A clear understanding of liability in multi-modal journeys is essential. Participants emphasised the need for clarity, especially in scenarios involving missed connections due to delays from different carriers.
- Suggestions were made to explicitly state passenger rights on tickets to ensure awareness and enforceability.
- Participants recommended lowering compensation thresholds in proposed regulations, citing current thresholds (2, 3, or 4 hours) as too high. A consensus emerged around reducing it to three hours.
- There was a call to define „extraordinary circumstances“ more precisely to avoid ambiguity and ensure consistent passenger treatment.

### 2. Multimodal Passenger Rights:

- Participants discussed incentivising providers to join multi-modal networks, proposing government subsidies as a potential mechanism.
- Debate ensued regarding the definition of a multi-modal journey, with differing opinions on what constitutes inclusion.
- Suggestions were made to distribute compensation liability based on either journey duration or ticket cost, with varying viewpoints among participants.
- Regarding reimbursement, participants agreed that the point of contact should be the ticket seller, facilitating smoother resolution and cost-sharing among service providers.

### 3. Air-to-Rail Shift Obstacles:

- Identified obstacles to the air-to-rail shift included insufficient train connections at airports, time constraints, and data accessibility issues.
- The lack of open data and integration challenges for long-range flights were also highlighted as barriers.
- Participants stressed the need for regulatory and infrastructural improvements to facilitate smoother transitions between air and rail travel.

### 4. Multimodal Indicator and ATM Indicator:

- Discussion centred on defining multimodality and its associated benefits, considering factors such as connectivity and network topology.
- Participants suggested revising aspirational targets to account for multimodal journeys and proposing differentiated targets based on modal combinations.
- Key indicators identified included efficiency, flexibility, and predictability, with an emphasis on balancing passenger experience with operational realities.

## 5. Optimal Schedule Perspectives:

- Perspectives on optimal schedules varied across rail operators, airlines, passengers, airports and train stations.
- Rail operators prioritise timeliness, capacity maximisation, minimal service coverage, and schedule robustness.
- Airlines focused on maximising yield, connectivity, slot utilisation, and crew efficiency.
- Passenger preferences highlight the importance of flexibility, arrival time alignment, stress-free transfers, and accessibility considerations.

## 6. Constraints and Limitations:

- Constraints included time pressure for trains and capacity constraints for both trains and airlines.
- Limitations such as data accessibility, synchronisation challenges, and GDPR compliance were identified.
- Participants emphasised the need for infrastructure upgrades and regulatory alignment to effectively address these constraints and limitations.

## 7. Disruption Management:

- Strategies for disruption management included adapting to delays, providing reassurance to passengers, and streamlining information provision.
- Three pillars for improvement were identified: technology enhancement, enabling regulations, and funding support.
- Advanced passenger preferences and delay forecasting emerged as innovative approaches to enhance passenger experience and manage disruptions effectively.

## 8. Responsibilities and Liabilities:

- Participants discussed liability frameworks, considering both ticket service providers and open seat allocation models.
- Suggestions were made to establish a multimodal network manager to streamline operations and ensure accountability.
- Participants proposed the creation of fast-track channels for multi-modal passengers to incentivise sustainable travel choices and expedite journey processes.

These discussions highlighted the importance of addressing regulatory frameworks, incentivising cooperation, and ensuring passenger satisfaction in the evolving landscape of integrated transportation systems.



# MultiModX

## Consortium



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# NOMMON



MultiModX official website:  
<https://multimodx.eu/>

MultiModX on official SESAR website:  
<https://sesarju.eu/projects/>



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