

# Pods4Rail Mid-Term Event

## *EU-Rail Cross-Collaboration and further Opportunities*

04. February 2025

# Europe's Rail Joint Undertaking (*EU-Rail*) Projects (I)



Flagship Project 1 - Mobility management multimodal environment and digital enablers



Flagship Project 2 - Rail to Digital automated up to autonomous train operation



Flagship Project 3 - Holistic and Integrated Asset Management for Europe's Rail System



Flagship Project 4 - Sustainable and green rail systems

# Europe's Rail Joint Undertaking (*EU-Rail*) Projects (II)



Flagship Project 5 - Transforming Europe's Rail Freight



Flagship Project 6 - Delivering innovative rail services to revitalise capillary lines and regional rail services



Flagship Area 7 - Maglev-Derived Systems for Rail



Flagship Area 7 - Concept Development of a System for Pods and Pod-Carriers to be used as Moving Infrastructures mainly for Rail, but as well for Road and Ropeways

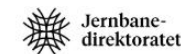
# Exchange with Rail4Earth (FP 4) Topics and Overall Objectives

- Improve the existing **sustainability** performance of railways
- Build a more **attractive and resilient** transport mode
- Contribute towards the objectives of a **climate neutral Europe** for 2050
- Activities cover **rolling stock, infrastructure, stations**, and all their **related sub-systems** (traction, bogies, motors, brakes, energy storage systems, HVAC, etc.) → Development of 32 demos
- 29 different work packages focus on:
  - Smart and sustainable infrastructure and stations
  - Low carbon trains
  - High performance and airless components
  - Train attractiveness

COORDINATOR

**ALSTOM**

OTHER PARTNERS



# Exchange with Rail4Earth (FP 4) Identified Topics

- Initial topic: Energy management models and optimization
- Energy in rail infrastructure and stations (focused)
- Electro-mechanical components and sub-systems for the rolling stock
- Healthier and safer rail system
- Trains Attractiveness (Interiors) (focused)

## Status:

- Exchange ongoing (personal union)
- further Exchange planned



# Exchange with FutuRe (FP) Topics and Overall Objectives

- lower usage lines and lines for reactivation play crucial role for the transport  
→ connection of rural areas and as feeder for main network
- economically, socially and environmentally sustainable railway transport while meeting current customer needs and challenges.
- ensuring long-term viability of the regional railway by reducing total cost of ownership (TCO), high attractiveness, service quality and operational reliability

## → Systematical approach necessary

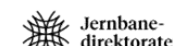
- Goals to be achieved through concept tailored to regional railways
- Work Packages focused on
  - Regional Rail Assets (e.g., switches, level cross., obstacle detection)
  - Rolling Stock (Small, lightweight, automated vehicle)
  - Regional Rail CCS & Operations for G1 Lines (e.g., ATO, RTO)
  - Regional Rail Services (Interaction passengers, goods)



### COORDINATOR



### OTHER PARTNERS



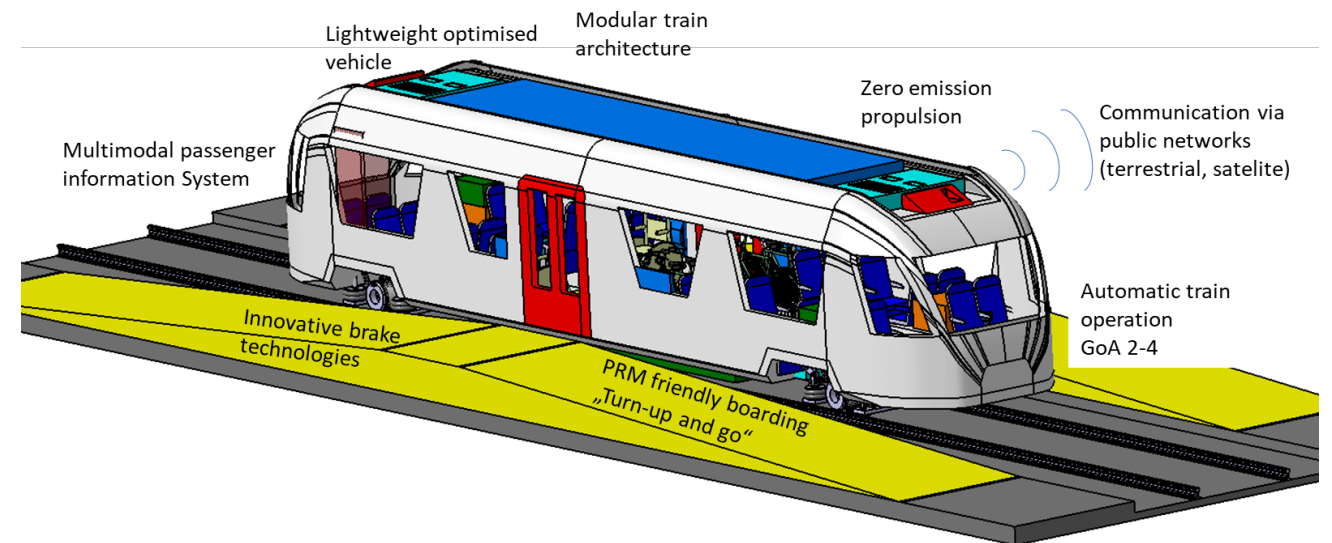
# Exchange with FutuRe (FP) Identified Topics

→ Focus on vehicle on technical level

- Standard analyses and selection of suitable Requirement (TSI-update)
- Running gear approaches
- Propulsion system
- Braking System
- Control, Command, Signalling (CCS)

Status:

- Exchange ongoing (personal union)
- further Exchange planned



# Why is this exchange so important?

- Knowledge exchange needed and useful regarding
  - Solutions for correlated/same challenges
  - existing/developed approaches, methods, technologies which could be transferred (standardization, automation, lightweight design, etc.)
- different topics from other FPs were identified which could be relevant for Pods4Rail and/or Pods4Rail could be relevant for them
- Transfer of approaches/solutions is needed and partial possible (adaptions seems to be needed)
- further exchanges planned in identified topics → in most cases continuous exchange secured due to personal union
- **Pods4Rail** is a far going approach and farer in the future  
→ Analysis and selection of common and transferable approaches/solutions necessary





# What will the next few months bring (I)

- continue the concept development for a Mobility Management System
- detail the concept of a Transport Unit for one Use Case
  - Visualisation of the interior and exterior
- detail the concept development for equipment of a Transport Unit
  - Energy, HVAC, interfaces between pod and carrier, localisation and communication



# What will the next few months bring (II)

- define and develop a concept of the coupling system
- define and develop a concept for the handling, loading/unloading technologies



Source: AI generated picture by <https://magicstudio.com/de/ai-art-generator/>

# What will the next few months bring (III)

- start the development of the “moving infrastructure” carrier for rail, road and ropeway
  - create concept studies for carriers, 3D and scaled models



Source: AI generated picture by <https://magicstudio.com/de/ai-art-generator/>

# Next project phase

**We hope to continue the work after February 2026 with the focus on three pillars:**

Detailed technical development of Transport Units, Carrier and Handling System

Detailed development of a Mobility Management System

Detailed investigation of the boundary conditions for the realisation of a Pod System

# That means ...

## We will **continue** to drive the **development** of **Transport Units, Carrier and Handling System**

- We will **deepen** the development of Rail Carrier and/or key components, incl. research and discussion of the aspect “Active versus passive safety” to **create the basis** for lightweight vehicle construction
- We want to **investigate**, how Transport Units can be manufactured, what **materials** are usable for a sustainable construction, and investigate **passenger passive safety** by a crash simulations
- We need to think more about how a multipurpose handling system should **work**, and **build a scaled model**
- We will **finalise** the Transport Unit design and **build a Mock Up** for one Transport Unit

... also ...

We will **continue development** of the **Mobility Management System**

- Among other things, we will **explore the topic of digital maintenance planning** of the Pods rail network in more detail
- We will **explore how Artificial intelligence and Quantum Computing can help** for more optimised and high-performance Pods coordination and information

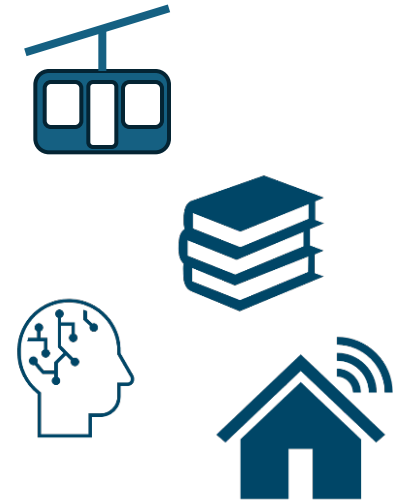
## ... and last but not least

### We will pay **further attention to the boundary conditions**

- We will think about design concepts for conventional stations, hubs and logistical hubs
- We will make a proposal for Industrialisation and Manufacturing Technologies for Transport Units
- We will look in detail at what the normative boundary conditions look like and provide input to the standards committees for the realisation of a pod system
- Based on the better available technical details, we will again analyse the economic advantages of the system
- This also includes a sound quantitative detailed Business Case Studie
- And we want a to do an operational flow analyses integrating the pod systems

# All this implies for the new team...

- to delve deeper into the technical fields
- it needs broader expertise in the field of logistics, materials or other means of transport
- to explore new technologies in the field of ICT
- to analyse and utilise new trends





# And to conclude, a little story ...

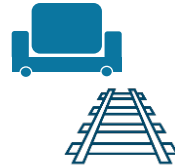
A chicken felt the urge to get to the other side of a fence. It runs back and forth along the fence, but there is no gap. The chicken does the most unnatural thing: With extreme courage it flies over the fence. It is a case of heuristic success. The animal was committed.

We will encounter problems that are almost as difficult. They are all solvable! And we will deal with these cases as long as we believe in their solvability!



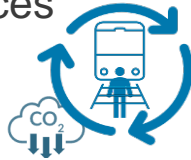
# Make Smart Mobility Real!

Optimal combination of passenger  
and freight transport



Existing infrastructures will be used  
and further developed

Sustainable use of resources  
enables environmentally  
friendly mobility



Creating new Business Opportunities



High-tech from Europe is the  
chance in global competition

Ensuring basic digital  
services through  
resilient mobility



Open, flexible  
and secure system



Partnerships of an Innovation  
Alliance bring technological  
advantage

# Let's work together!



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LEARN MORE  
ABOUT THE  
PROJECT



# Pods4Rail Mid-Term Event

*Addressing interdependencies and opportunities*

*Wolfgang Knöbl  
Weitzer Woodsolutions*

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