FOR-FREIGHT PROJECT

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FOR-FREIGHT Snapshot

Project: Flexible, multi-mOdal and Robust FREIGHt Transport (101069731)

Topic: HORIZON-CL5-2021-D6-01-07 - More efficient and effective multimodal freight transport nodes to increase flexibility, service visibility and reduce the average cost of freight transport
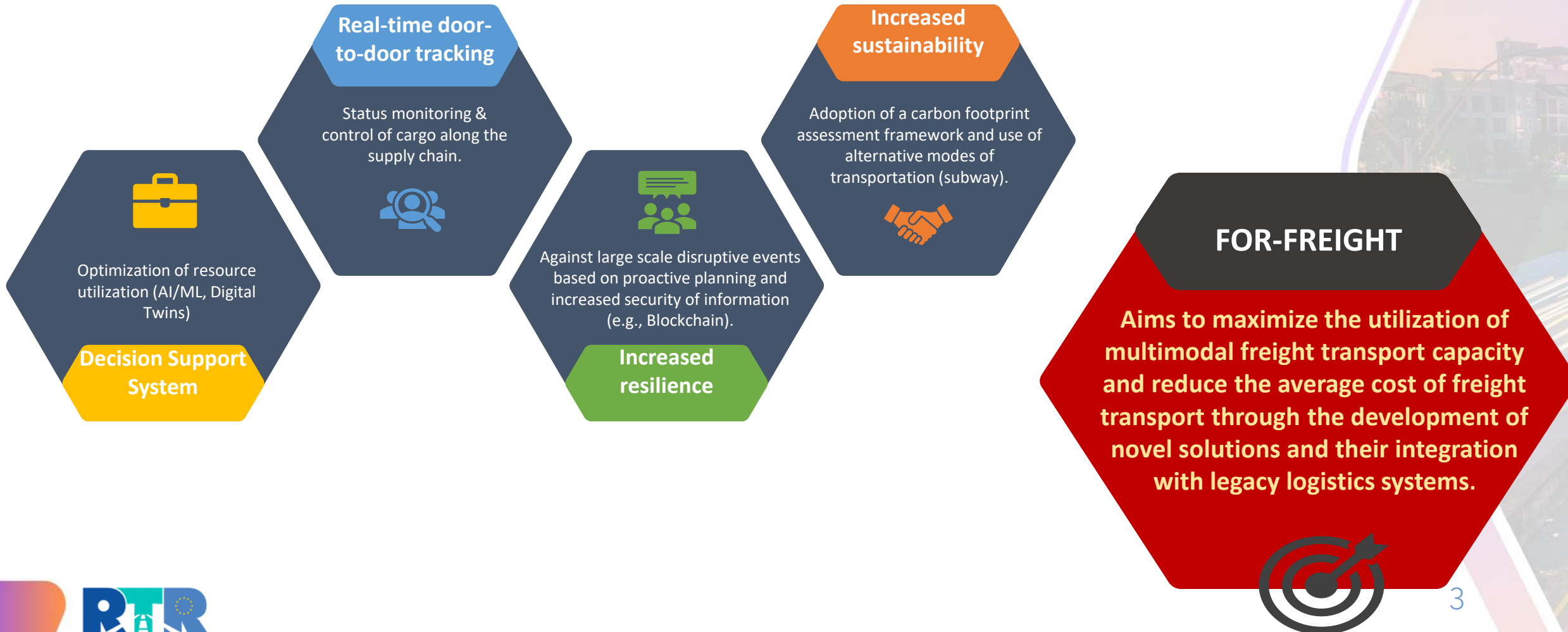
Duration: September 2022-December 2025 (40 months)

Budget: 7.151.677,5 €

Partners:

FOR-FREIGHT Objectives

Real-time door-to-door tracking

Status monitoring & control of cargo along the supply chain.

Increased sustainability

Adoption of a carbon footprint assessment framework and use of alternative modes of transportation (subway).

Optimization of resource utilization (AI/ML, Digital Twins)

Decision Support System

Against large scale disruptive events based on proactive planning and increased security of information (e.g., Blockchain).

Increased resilience

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Aims to maximize the utilization of multimodal freight transport capacity and reduce the average cost of freight transport through the development of novel solutions and their integration with legacy logistics systems.

FOR-FREIGHT Objectives

Multimodal T&L use cases

- Multimodal & transhipment ITU logistics
- Upgrade existing infrastructure and legacy systems
- Collaborative logistics operations
- Process automation

Interoperable T&L solutions

- Increased T&L node operational capacity
- Increased efficiency and sustainability
- Reduced freight transport costs
- Reduced environmental footprint

Real-life multi-stakeholder logistics management

- **Real end-user data**
- **Validation of the maturity and business-readiness of the solutions (TRL≥7)**

Novel business models and collaborative approaches

- **Utilization of new modes integration (e.g. Subway)**
- **Interoperable, integrated & cooperative services**
- **Comprehensive data governance**
- **Analysis of socio-economic & environmental impact**

Compatibility with existing logistics standards

- **Standardisation of multimodal, multi-stakeholder end-to-end freight management solutions**
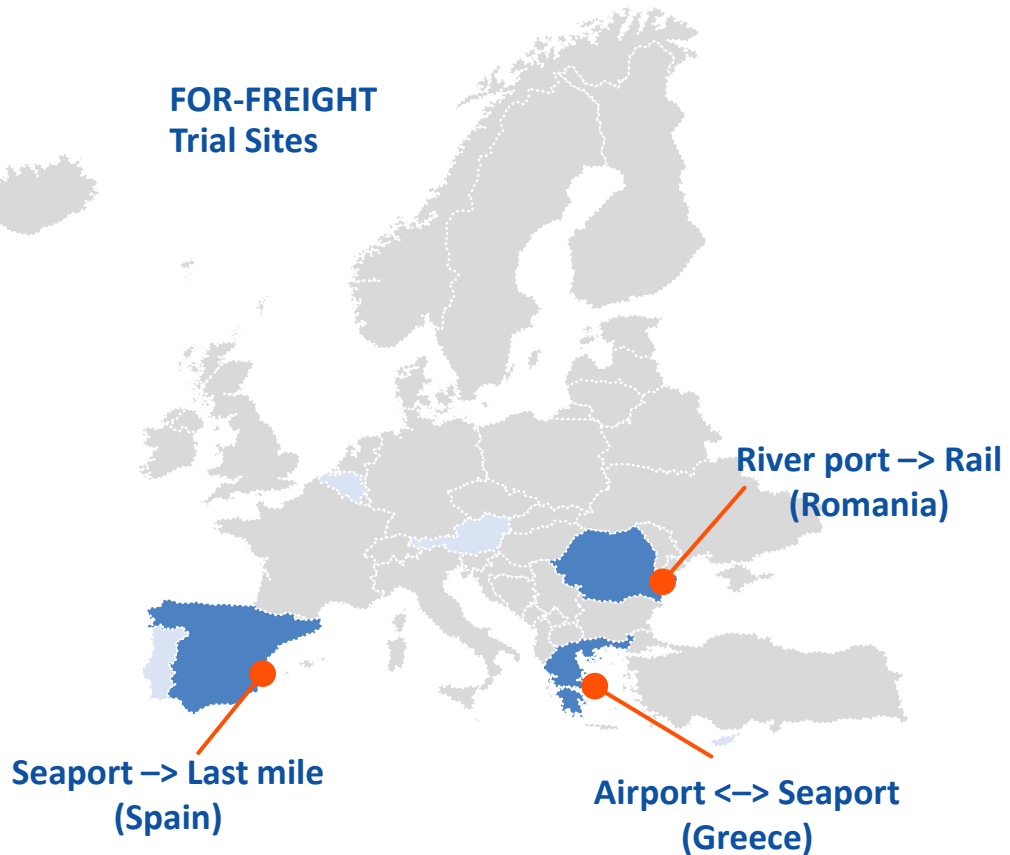- **Support a T&L cantered ecosystem bringing together key stakeholders (port/airport/rail/road operators)**

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Results & achievements so far

FOR-FREIGHT Achievements

FOR-FREIGHT Trial Sites

River port –> Rail (Romania)

Seaport –> Last mile (Spain)

Airport <–> Seaport (Greece)

Result #01

Analysis & Generalization of real operational cases for solving/facilitating deployment of efficient **intermodal interfaces** between different modes (air, road,river waterborne), nodes and operators
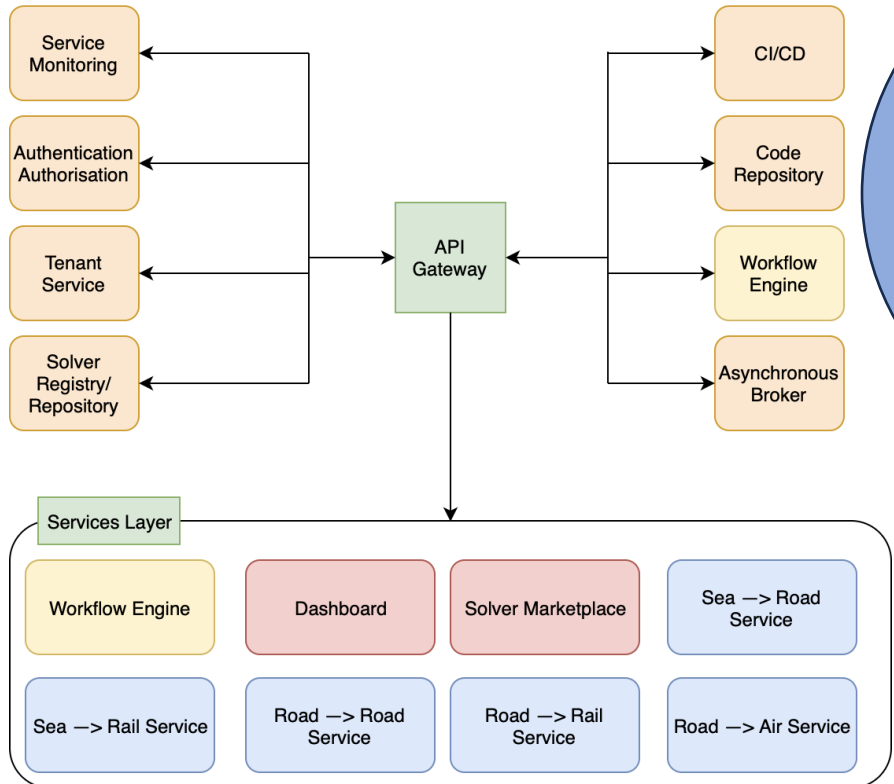
Result #02

Exploring needs of emerging intermodality using new capacities and efficient long to short SC intermodal interfaces. Utilization of a **Subway-Based Network** as sustainable alternative for last mile distribution

FOR-FREIGHT Achievements
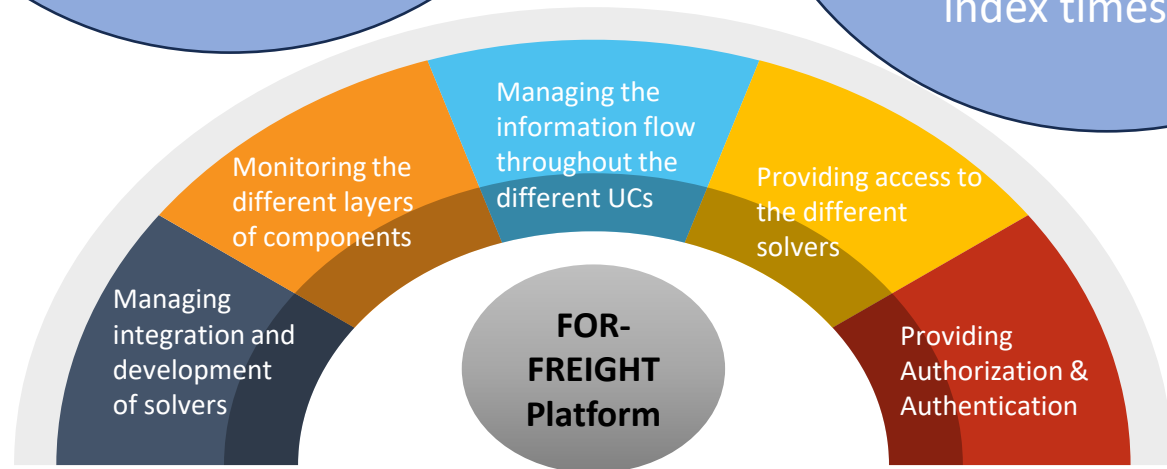
FOR-FREIGHT Platform Architecture

Result #04

Efficient Intermodal Operation Decision Support System architecture enabling solvers integrated operation for inter-disciplinary/ multi-domain resource utilization optimization & monitor & planning

Result #03

Comprehensive technology-driven solvers library & easy to expand & to use that includes monitoring & prediction of CO_2 footprint, costs, capacities, forecasts,resilient index times, etc.

Managing the information flow throughout the different UCs

Monitoring the different layers of components

Providing access to the different solvers

Managing integration and development of solvers

Providing Authorization & Authentication

FOR-FREIGHT Platform

FOR-FREIGHT Achievements

Result #05

Setting a "common ground" for logistics communication

Expansion of TIC4.0's common language to hinterland actors (warehouse, dry port, airport, land transport)

Semantics to represent the reality - **status oriented data model**

Ecosystems focused Standardization Activities
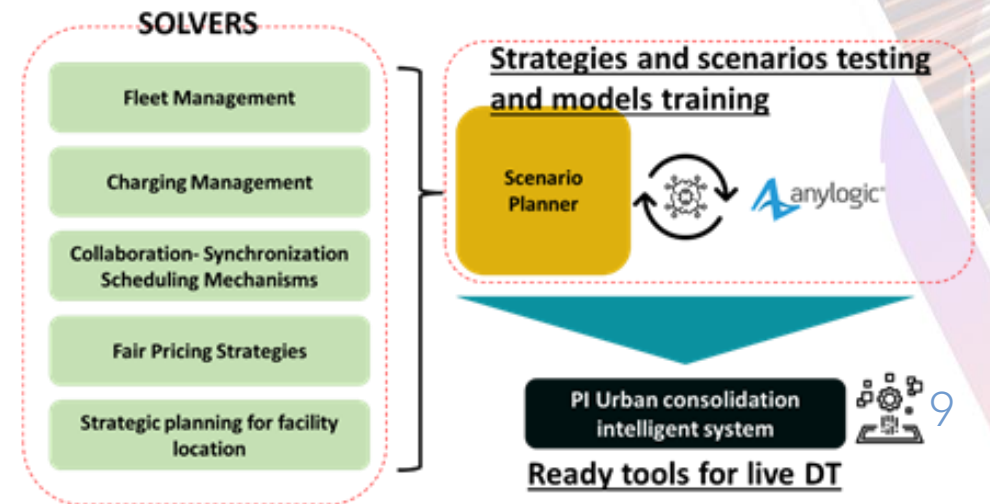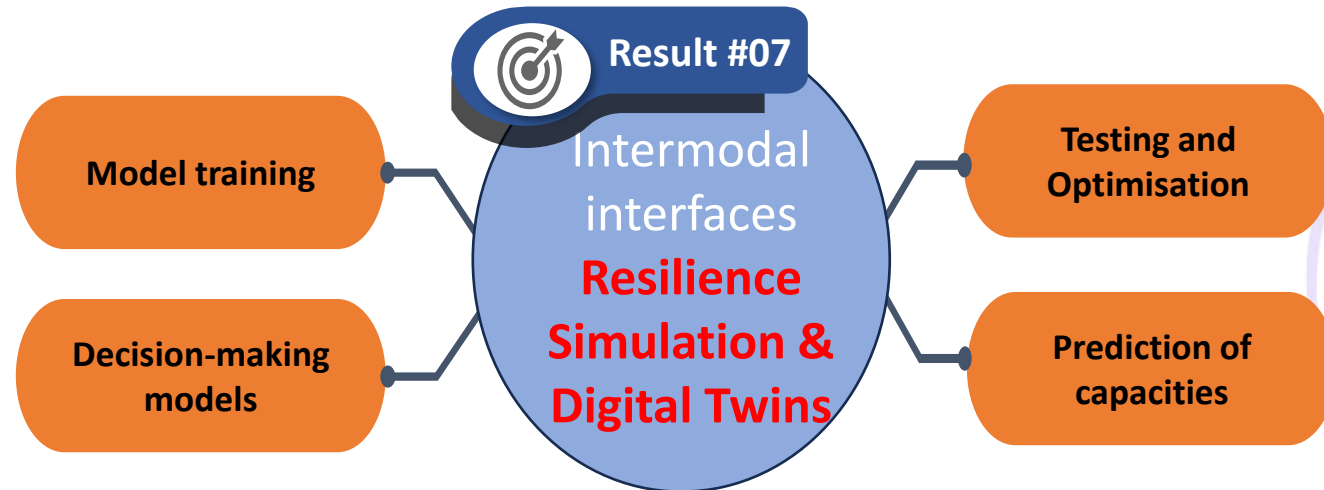
Result #06

Enhance logistics operations by leveraging real-time data from sensors installed beneath trucks (patenting potential)

- Detailed information about the initiation of loading and unloading activities
- Monitoring of warehouse personnel efficiency
- Reduction of idle times
- Targeted resource allocation

Patenting Activities

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FOR-FREIGHT Achievements

Result #07

Intermodal interfaces
Resilience Simulation & Digital Twins

- Model training
- Decision-making models
- Testing and Optimisation
- Prediction of capacities

Digital Twins of the Spanish Use Case

- DHL Warehouse-> Metro de Madrid
- Valencia port-> DHL Warehouse (Madrid)

SOLVERS
- Fleet Management
- Charging Management
- Collaboration- Synchronization Scheduling Mechanisms
- Fair Pricing Strategies
- Strategic planning for facility location

Strategies and scenarios testing and models training

Scenario Planner

Aanylogic

PI Urban consolidation intelligent system

Ready tools for live DT

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FOR-FREIGHT Cooperations

Joint Special Session at EuCNC & 6G Summit 2024

"Enabling innovation in Transport and Logistics operations: a 5G approach"

Award & MultiRELOAD Projects

- Joint webinar about standardisation

ALICE & MultiRELOAD Projects

- Joint webinar about TIC4.0 standards
- Participation at TRA 2024 with a shared pod at ALICE Booth

Admiral Project

- Discussions for initiatives like technical collaboration, dissemination, publications, etc.

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Mid-to-long term expected impacts of the project

Medium Term Impacts

Achieve objectives in intermodal environments /operations of different technological & infrastructure maturity

EO1: More efficient, effective and sustainable management of goods and freight flows in (air)ports and inland terminals

1. Economic
+20% Capacity utilization
+20% Truck & train load factor
-20% (Un)Loading terminal time
+15% Storage area efficiency

2. Social
>15% Prediction of ETAs & delivery reliability
-20-30% Errors, accidents & error caused delays

3. Environment
-15% GHG emissions
+20% Energy consumption using last mile resources & optimization
-20% Multimodal supply chain environmental

EO2: Expanded throughput of the nodes thanks to increased operational efficiency and optimised use of assets and infrastructures

4. Efficiency
+25% Through reduction of the ITU Dwell time in port and airport
+80% Through a higher load factor for the shuttle services
+10% By raising the number of combined multi-modal transports
+15% Through increased accuracy of forecast planning
+20% Through the reduction of the customs clearance process time

EO3: Improved access to transhipment services at reduced costs

5. Loading and storage Times
-20% Loading/unloading time
-25% Transit storage time

6. Admin & OPEX Costs
+20% Document digitalization
-15% OPEX Costs

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Medium Term Impacts

Achieve confirmed impacts at the supply chain actors operations being guided by global players and local actors

EO4: More visible and standardised services provided within the multimodal freight transport nodes

7. Accessibility

-25% Time to set-up an end-to-end multimodal freight transport with multiple stakeholders - Single point of entry
24/7 Real-time, door-to-door cargo tracking & conditions monitoring

8. Delivery Times

85% on-time delivery ranges (currently 30% - 70%)
-50% Trucks arriving at the terminal after cut-off time
-30% Trucks waiting time at the Terminals
-15% Delivery times in urban areas
-25% Container idle time at the port and airport

EO5: Increased automation, digitalisation, standardisation and interoperability of processes, technologies and equipment in multimodal freight transport nodes.

9. Throughput

+20% End-to-end throughput due to optimization of combined resource utilization
+25% Throughput rates due to the reduction of ITU idle times
+20% Throughput due to reduction of the customs clearance time
+20% Throughput due to reduction of errors/mistakes

EO6: Better integration of the various freight transport nodes into overall logistic chains

10. TRL

❑ TRL5 -> TRL7 End-to-end integrated multimodal platform by M28

Long Term Impacts

EI1: Upgraded and resilient physical and digital infrastructure for clean, accessible, affordable, connected and automated multimodal mobility

11. Clean mobility

>25% Reduction of GHG emissions due to more effective and sustainable management of goods and freight flows

12. Connected and automated mobility

>30% of T&L operational vehicles to be connected and automated in EU
+25% offerings of integrated/combined T&L services by different stakeholders

Exploiting interconnectivity & enriching platform solvers

EI2: Sustainable and smart long-haul, regional and urban freight transport and logistics, through increased efficiency, improved interconnectivity and smart enforcement
EI3: Reduced external costs (e.g., congestion, traffic jams, emissions, air and noise pollution, road collisions) of urban, peri-urban (regional) and long-distance freight transport as well as optimised system-wide network efficiency and resilience

Intermodal Interface Digital twin (as a) service

13. Operational efficiency

>30% Improved operational efficiency through the optimized utilization of assets

14. Supply chain optimisation

>50% Overall supply chain optimization based on the DSS and real-time information

EI4: : Enhanced local and/or regional capacity for governance and innovation in urban mobility and logistics

15. Connected logistics services

>30% Increase in connected logistics services by traditional and non-traditional logistics stakeholders (e.g., SMEs) with the use of heterogeneous multimodal data

Community based standardization & TIC4.0 new semantic

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THANK YOU

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