D2.1.1

Pilot Sites description

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LIST OF ABBREVIATIONS

A	Activity
AB	Advisory Board
AC	Advisory Circular
and	International Carriage of Dangerous Goods by Inland Waterways
ADR	International Carriage of Dangerous Goods by Road
AEOLIX	Architecture for European Logistics Information exchange
AHP	Analytic Hierarchy Process
APA	Antwerp Port Authority
API	Application Program Interface
ASR	Action Status Report
AT	Austria
ATA	Actual Time of Arrival
ATD	Actual Time of Departure
BB	Building Block
B2A	Business to Administration
B2B	Business to Business
B2G	Business to Government
BE	Belgium
BIFA	British International Freight Forwarding Association
BO	Barge Operator
BRUcargo	Brussels cargo
CAA	Carrier Assignment Advices

CB	Customs Broker
CCP (1)	Capture Project
CCP (2)	Capacity Control (Corridor) Platform
CEA	Cost-effectiveness analysis
CEF	Connecting Europe Facility
CEREMA	Centre d'études et d'expertise sur les risques, l'environnement, la mobilité et l'aménagement
CFS	Container Freight Station
CH	Switzerland
CI5	Cargo Intelligent system
CMP	Corridor Monitoring Platform
CO_2	Carbon Dioxide
COVID-19	COronaVIrus Disease 19
CT	Combined Transport
C-ITS	Cooperative Intelligent Transport Systems
CW1	OIA Global’s operating system
DC	Distribution Centre
DE	Germany
DIH	Data Intelligence Hub
DIR	Mediterranean Road Directorate
DTLF	Digital Transport and Logistic Forum
DG MOVE	Directorate-General Mobility Transport, MOVE
DG TAXUD	Directorate-General for Taxation and Customs Union
DSS	Decision Support System

EC	European Commission
ECN	Electronic Consignment Note
eDGT	e-Dangerous Goods Transport
EDI	Electronic Data Interchange
EDIFACT	Electronic Data Interchange For Administration
EDP	Electronic Data Processing
eFTI	electronic Freight transport information
EGNOS	European geostationary navigation overlay system
EGTC	European Grouping of Territorial Cooperation
EMSA	European Maritime Safety Agency
eMSWe	European Maritime Single Window environment
ePOD	Electronic Proof of Delivery
ERP	Enterprise resource planning
ERTICO	European Road Transport Telematics Implementation Coordination Organisation – Intelligent Transport Systems & Services Europe
ETA	Expected/ Estimated Time of Arrival
ETL	Extract, transform, load is the general procedure of copying data from one or more sources into a destination system which represents the data differently from the source(s) or in a different context than the source(s).
ETD	Expected Time of Departure
EU	European Union
e-CMR	Electronic Convention des Merchandises
FAL	Facilitation of International Maritime Traffic

FEDeRATED	Develop tangible and future (federative platform) proof data sharing practices in transport and logistics with the direct participation of Member States and the involvement of the business.
FENIX	European FEderated Network of Information eXchange in Logistics
FESTA	Field opErational teSt supporT Action
FMCG	Fast-moving consumer goods
FOT	Field Operational Tests
FP7	7th Framework programme
FR	France
GHG	Greenhouse Gases
GISIS	Global Integrated Shipping Information System
GNSS	Global Navigation Satellite System
GDP	Gross Domestic Product
HPCS (1)	High Port Community System (Trieste Port)
HPCS (2)	Hellenic Port Community System
HAZMAT	hazardous material
ICCS	Institute of Communication & Computer Systems
IDS	International Data Spaces
IMO	International Maritime Organisation
INEA	Innovation and Networks Executive Agency
IOD	Information of delivery
IoT	Internet of Things
IPBO	Interporto Bologna

ITS	Intelligent Transport Systems
ITSS	C-ITS Station
ITU	Intermodal Transport Unit
IWW	Inland WaterWay
GA	General Assembly
GHG emissions	Greenhouse Gas Emissions
GDPR	General Data Protection Regulation
GE	Germany
INEA	Innovation and Networks Executive Agency
KPI	Key Performance Indicator
K+N	Kuehne Nagel
LCA	Logistik Centre Austria
LCC	Load Control Centre
LCMP	Logistics Corridor Management Platform
LL	Living Lab
LOG	Logit One
LoI	Letter of Intent
LSPs	Logistics Service Providers
L&T	Logistics & Transport Technology
KPIs	Key Performance Indicators
MCA	Multi-Criteria Analysis
MDLZ	Mondelez
MEU	Mondelez Europe
MGI	Marseille Gyptis International

MOS	Military Occupational Specialties
MSC	Mediterrean Shipping Company
MSRS	Massive Status Reporting System
MSW	Maritime Single Window
MTO	Multimodal Transport Operator
NAPA	North Adriatic Ports Association
NAP	National Access Point
NO	Nitric Oxide
OBB	Österreichische Bundesbahnen
OC	Ocean Carriers
OCR	Optical Character recognition
OIA	OIA Global
OJ	Ordre du jour
PC	Project Coordinator
PCS	Port Community System
PIMS	Profit Impact of Market Strategy
PCDC	Piraeus Consolidation and Distribution Centre
P&G	Procter & Gamble
P&O	Pay & Go Freight
PNAEAS	Port Network Authority of Eastern Adriatic Sea
PO	Purchase Order
PoC	Proof of Concept
PS	Pilot Site
RAML	RESTful API Modelling Language

RCA	Rail Cargo Austria
RCO	Rail Cargo Operator
REN	Rail Net Europe
RFC	Rail Freight Corridor
RFD	Reporting Formalities Directive
RID	International Transport of Dangerous Goods by Rail
RIM	Railway Infrastructure Manager
RMP	Raw & Pack Material
RU & EE	Russia and Eastern Europe
SaaS	Software as a Service framework
ScanMed	Scandinavian-Mediterranean
SCN	Supply Chain Community Nodes
SEA	Società per azioni Esercizi Aeroportuali
SELIS	Shared European Logistics Intelligent Information Space
SME	Small and Medium Enterprises
SMIP	Smart Multimodal Operations Platform
SPA	Società Per Azioni
SRL	Società A Responsabilità Limitata
STO	Stock Transfer Order
QAT	Quality Assurance Team
TCT	Trimodal Container Terminal
TEN-T	Trans-European Transport Network
TIS	Train Information System
T&L	Transport and Logistics

TRL	Technology Readiness Levels
TMCC	Traffic Management Control Centre
TMS	Transport Management System
TM2.0	Traffic Management 2.0 is focused on multimodality and logistics
TEN-T	Trans-European Transport Network
TFA	Telematics Applications for Freight
TOS	Terminal Operating System
TRAN	The Committee on Transport and Tourism
TSA	Terminal Service Austria
TSI	Technical Specification for Interoperability
TSP	Transport Service Provider
TXL	TX Logistics
UC	Use Case
UCC	Union Customs Code
UNECE	United Nations Economic Commission for Europe
VBS	Vehicle Booking System
VGM	Verified Gross Mass Weight
V2I	Vehicle to infrastructure
V2X	Vehicle-to-Everything
VPN	Virtual Private Network
WHS	Web Hub Service
WMS	Warehouse Management System
WP	Work Package

XML	eXtensible Markup Language
YTM	You Truck Me APP
4PL	Fourth Party Logistics
5PL	Fifth Party Logistics

1. INTRODUCTION

1.1 Purpose of the document

The purpose of the FENIX Deliverable D2.1.1 “Pilot sites description” is to provide the description and first technical definitions of FENIX Pilot Sites. In particular, this document will provide the technical and conceptual details that will be implemented by each FENIX Pilot Site.

D2.1.1 is part of FENIX Activity 2, which is titled “Strategic dialogue, cross-corridors collaboration and pilot roll out preparation”. The main objective of this activity is to implement an iterative approach to develop "corridor information systems" as a federated network of information exchange platforms, in line with DTLF recommendations. Interoperability across the TEN-T corridors is developed along three lines: technology, services and implementation, specification and recommendations for standards.

In particular, the objective of Sub-activity 2.1 “High level specifications for L&T corridor information systems services”, to which D2.1.1 belongs, is to specify the set of relevant services, including the information systems and data to be used and exchanged.

In this document, chapter 3 presents an overview of the FENIX approach and FENIX Pilot Sites, which are further described from chapters 4 to 14; each chapter presents the situation of each Pilot. Moreover, chapter 3 introduces the application of the electronic Freight Transport Information (eFTI) in FENIX and the European Maritime Single Window environment (eMSWe) regulations. Chapter 15 presents possible scenarios of interconnections among different FENIX Pilot Sites.

The FENIX Pilot sections are articulated as follows:

- Pilot Site description;
- Pilot Site working group definition;
- Pilot Site Use Cases.

1.2 Contractual references

FENIX stands for “A European **FE**derated **N**etwork of **I**nformation e**X**change in Logistics”. FENIX is an action 2018-EU-TM-0077-S under the Grant Agreement number INEA/CEF/TRAN/M2018/1793401 and the project duration is 36 months, effective from 01 April 2019 until 31 March 2022. It is a contract with the Innovation and Networks Executive Agency (INEA) under the powers delegated by the European Commission.

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2. EXECUTIVE SUMMARY

The aim of this deliverable is **to introduce for each FENIX Pilot Site its description, use cases identification and working group definition**.

The FENIX Pilot Sites are:

- *Austria*, on Fürnitz Pilot Site (south Austria) the Baltic-Adriatic corridor;
- *Belgium*, Aircargo Pilot Site;
- *Belgium*, multimodal inland hub-Procter & Gamble-Mechelen-Willebroek Pilot Site;
- *France*, French Mediterranean – North Sea Pilot Site;
- *Germany*, Rhine-Alpine corridor;
- *Greece*, Greece Balkan-TEN-T network, Adriatic-Ionian corridor-Cyprus multimodal Pilot Site;
- *Italy*, Trieste Pilot Site: Mediterranean and Baltic-Adriatic and the Motorway of the Sea of South-East;
- *Italy*, Milan/Genova: the Italian Rhine Alpine Pilot Site – Dynamic Synchromodal Logistic Modules;
- *Netherlands* (DUTCH pilot site, SMART MULTIMODAL OPERATIONS PLATFORM (SMIP));
- *Slovakia*, all TEN-T corridors and multimodal Pilot Site;
- *Spain*, the Spanish-Atlantic Corridor Pilot.

It is important to underline that this analysis takes place in collaboration with each Pilot Site, which has provided a detailed description of its planned FENIX activity.

These contributions have been collected in this document, which is composed of a section for each PS in order to foster their comparison.

Each PS is described and its own working group defined, specifying every single Partner involved.

Then, in every PS section, a very detailed description of the Use Cases is presented to demonstrate the interconnection between different platforms in FENIX' future federated architecture.

Examples of Use Cases are:

- Expected Time of Arrival (ETA);
- Reduction of CO_2 & NO_x emissions;
- Track & trace vehicle/shipment Dangerous goods/eCall EGNOS/Galileo;
- TM2.0 for multimodality;
- Urban & interurban integration environment;

- Reservation of time slot to deliver or pick-up for road services;
- Integration track and trace tools/black boxes trucking companies;
- Elimination of waiting times for trucking companies at ground handling facilities;
- Better capacity management by ground handling agents;
- Integration with driver security checks at ground handling agent facilities.

3. THE FENIX APPROACH

3.1 Introduction

The overall aim of FENIX is to develop the first European federated architecture for data sharing serving the European logistics community of shippers, logistics service providers, mobility infrastructure providers, cities, and authorities by developing and implementing digital corridor information systems.

FENIX does not strive to develop a new centralised solution with its own specific functionalities and does not create a platform.

FENIX Project aims to create a federation of IT platforms to be able to deliver “Transport & Logistics digital corridor information systems" among stakeholders in the supply chain and authorities. FENIX federation involves the main actors of mobility and logistics operating on the TEN-T corridors by land, water and air, throughout the European territory.

All 9 TEN-T corridors are included in the FENIX project, meaning that the whole European Network will be pre-deployed with the entire solution. An overview of how the FENIX Pilot sites will bring innovation and added value to the T&L communities is presented in detail in Chapters 4-14.

FENIX aims to create interoperability, focussing on quick visible wins in line with the Digital Transport and Logistics Forum (DTLF) implementation (DTLF recommendation, Brussels, June 2018).

This goal is accomplished through interoperability testing, security and certification, operation, maintenance and validation of the common service specifications. Innovative logistics services and multimodal traffic management are developed and pre-deployed in FENIX.

The specific objective “digital information systems” mentions the achievements of DG MOVE’s DTLF. FENIX contributes to this objective by creating a federated network of platforms.

3.1.1 Added value of FENIX compared to AEOLIX and SELIS

The AEOLIX and SELIS are publicly visible open source platforms and deliverables, which include applications. This issue ensures complete transparency of the work carried out and guarantees that FENIX’ achievements, starting from the SELIS & AEOLIX outputs, are not ‘double funded’.

All the Pilot Sites guarantee that they will not replicate or duplicate the work carried out in AEOLIX and SELIS projects. For further information relating to the relationship between the existing systems and FENIX, please refer to the D2.1.1 Annex.

3.2 EFTI and EMSWe regulations in FENIX

3.2.1 FENIX and EMSWe regulation

The Pilot Sites of FENIX aim to address the full supply chain maritime-port-hinterland B2A operations, including customs aspects. To this scope, the European Maritime Single Window environment (EMSWe) regulation is taken into consideration, in particular (EU) 2019/1239 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 20 June 2019 establishing a EMSWe and repealing Directive 2010/65/EU.

While the focus on the transport mode may be different, FENIX and EMSWe regulations share the same goal. The EMSWe regulation establishes a framework for a technologically neutral and interoperable EMSWe with harmonised interfaces, in order to facilitate the electronic transmission of information in relation to report obligations for ships arriving, staying and departing from an European port. Such information includes data about cargo, next transport mode, etc.

In addition, EMSWe regulates (among others) the establishment of EMSWe data sets to be exchanged, the harmonisation of reporting interfaces and the availability of Maritime National Single Windows.

Also common services are defined, such as EMSWe user registry, access management system, common addressing service, EMSWe Ship Database, Common Location Database (IMO database GISIS), common HAZMAT database, Common Ship Sanitation Database (extremely actual in times of COVID-19) and cooperation with other trade and transport facilitation systems or services.

The EMSWe is based upon the "*Reporting Formalities Directive*" (RFD), which stipulates the reporting obligations stemming from legal acts of the Union (A), FAL documents[1] and reporting obligations stemming from international legal instruments (B), and reporting obligations regulated by national legislation and requirements (C). These reporting obligations (A) and (B) concern the issues described in Table 1.

Through this regulation, Member States with a maritime port were obliged by 15 February 2020 to notify the Commission of any reporting obligations stemming from national legislation and requirements, as well as of the data elements to be included in the EMSWe data set.

[1] http://www.imo.org/en/OurWork/Facilitation/FormsCertificates/Pages/Default.aspx - FAL - forms

Reporting Obligations A	Reporting Obligations B
Notification for ships arriving, departing form Member States ports	FAL 1 General Declaration
Border check on persons	FAL 2 Cargo Declaration
Notification of dangerous or polluting goods carried on board	FAL 3 Ship's store declaration
Notification of waste and residues	FAL 4 Crew's effects Declaration
Notification of security information	FAL 5 Crew list
Information on persons on board	FAL 6 Passenger list
Customs formalities: notification of arrival, presentation of goods to customs, temporary storage declarations, custom status of goods, electronic transport documents used for transit, Exit notification, exit summary declaration, re-export notification	FAL 7 Dangerous Goods
Safe loading/unloading of bulk carriers	FAL 8 Maritime Declaration of Health
Port State Control	
Maritime Transport Statistics	

Table 1: EMSWe Reporting Obligations

These data elements had to be identified precisely. Examples are the data elements Verified Gross Mass weight, the name of the ship, Certificate of Origin, etc. After this date, Member States may request the Commission to introduce or amend data elements in the EMSWe data set, in accordance with the reporting obligations contained in their national legislation and requirements.

Member States are to implement a Maritime National Single Window by 2024, as per EMSW regulation.

In today's practice, the majority of these data elements are already available in local Port Community Systems, National Single windows, and SAFESEANET[2].

The eManifest Pilot Project provided important inputs for the development of EMSWe[3].

Clearly, FENIX and the Pilot Sites[4] will work with data sets that will contain similar data elements as the ones already listed by EMSWe regulation. Moreover, non-maritime states will exchange information with EMSWe for their respective import & export cargo streams through Europe's maritime ports.

As these pilots and living labs will provide more details on the used IT infrastructure and the exchanged data elements, FENIX partners affected by the EMSWe will align with the to-be-defined data set of EMSWe to facilitate the interaction between the hinterland transport leg and the maritime leg of their supply chains.

Table 2 provides an initial summary combining information from all (non-air) Pilot Sites of potential data elements or datasets that may be in common with data-elements of the EMSWe.

Data elements (existing ones or to be created) that may be in common with FENIX pilots and EMSWe
Barge, rail capacity planning
Cargo specification
CO_2 & NO_x emission reduction
Consigner/Supplier
Custom status
Dangerous goods notification

[2] SafeSeaNet, a traffic monitoring vessel and information system is established by EMSA (European Maritime Safety Agency) to enhance: maritime safety, port and maritime security, marine environment protection, efficiency of maritime traffic and maritime transport. It was set up as a network for maritime data exchange, linking together maritime authorities from across Europe. It enables EU Member States, Norway, and Iceland, to provide and receive information on ships, ship movements, and hazardous cargoes.

[3] http://www.emsa.europa.eu/related-projects/emsw/emsw-documentation/download/5744/2834/23.html

[4] All pilots except for the air cargo related ones.

Destination
Driver security check
e-call
e-cmr
e-invoice
Empty container depot
ETA
Gate-in/gate out time at container terminal
Next mode of transport
Notifications (receipt, departure, …)
Ocean carrier booking
Origin
Parking booking service
Pre-gate operations
Proof of delivery
Road traffic information
Secure Container release
Shipper
Sustainability certification
Time slots reservation trucks, barges, trains
Track & Trace
Transport company
VGM (verified gross mass weight) of containers
Waiting time/loading time
Warehouse availability

Table 2: Data elements of FENIX pilots in common with EMSWe.

Within DG MOVE, the High-Level Steering Group for Governance of the Digital Maritime System and Services is to assist the EC on maritime transport questions (see tasks Commission Decision of 11 April 2016 (OJ L96/46 12.04.2016). Within this group, the expert sub-group on Single Window deals with the harmonisation process of all combined Member States MSW data sets. Finally, this activity will result into one Harmonised EMSWe data set for all Member States by 2024. The exact content of

the EMSWe data sets was not yet defined at the moment of writing this document, as the data harmonisation process is ongoing. Table 2 will need further cleansing as new information becomes available from the expert sub-group. By now, the FENIX project considers the bold data elements of Table 2 to be required, in a minimum scenario, and to be compliant with the EMSWe regulation. Moreover, Table 2 by no means aims to be comprehensive or entirely accurate at this stage of FENIX. The alignment will be an on-going process as FENIX progresses and EMSWe regulations develop.

The to-be performed activities related to the alignment with EMSWe for all non-air cargo and dealing with FENIX Pilot Sites may comprise the following (non-exhaustive) list:

- Identifying data elements to be shared;
- Data element definitions;
- Identification of related platforms;
- Advise to concerned Member States to amend data elements in the EMSWe data set.

Also, other FENIX activities will consider the EMSWe regulation:

- Activity 2: Strategic dialogue, cross-corridors collaboration and pilot roll out preparation;
- Activity 3: Technology integration;
- Activity 6: Working groups, recommendations and best practices share, including standardisation.

As such, the need for the FENIX consortium to align better to EMSWe and its potential impact on the FENIX Pilot Sites and specific Use Cases requires the formation of a small taskforce.

3.2.2 FENIX and eFTI regulation

The Digital Transport & Logistics Forum, DTLF (http://www.dtlf.eu) is an Expert Group of the European Commission that brings together stakeholders from different transport and logistics communities, from both the private and the public sector, to build a common vision and a roadmap for digital transport and logistics. DTLF also contributes to identify, support, develop and implement the needs for measures at EU level and where relevant.

In particular, the DTLF Forum shall assist the Commission in implementing the Union's activities and programmes aimed at fostering more efficient exchange of electronic information in transport and logistics, with the objective of removing technical, operational and administrative barriers between

and within transport modes.

Associated to this activity, the Regulation on electronic freight transport information (eFTI) was adopted by the Commission in May 2018, as part of the Third Mobility Package. This proposal is an important legal instrument to ensure and guarantee that authorities recognise and accept freight transport information as required by EU and Member States legislation, when it is presented in electronic format. This will represent a big leap forward in digitalising the transport sector. It will also considerably reduce the administrative costs.

Electronic Freight Transport Information (e-FTI) concerns a proposal as part of the Third Mobility Package to create a digital environment to exchange B2A freight information according to the following EU legislation:

1. **Regulation No 11/1960 on tariffs** (Article 6.1)
2. **Combined Transport Directive No 92/106** (Article 3)
3. **Road Cabotage Regulation No 1072/2009** (Article 8.3)
4. **Waste Shipments Regulation No 1013/2006** (Articles 16(c) and 18.1)
5. **Dangerous Goods Directive No 2008/68/EC** (chapter 5.4 of the Annexes to RID, ADR and AND)
6. **Aviation Security Regulation No 300/2008**
    a. **Implementing Reg. 2015/1998** (Article 2.2 (b))
7. **Rail Interoperability Directive No 2016/797**
    a. If any future implementing or delegated act provides for B2A information

The regulation would oblige Member State authorities to accept electronic freight information. It also specifies the electronic format in which regulatory transport information (e-FTI) should be made available and asks the Commission to establish common data sets and procedures to process the information. Furthermore, it aims to ensure the availability, integrity, confidentiality and security of the data managed. The entry into force is June 2020 with a full implementation in June 2025.

3.2.3 Application in FENIX UCs

Within FENIX, the Pilot Sites have pointed out possible applications of the eMSWe and eFTI regulations in the Use Cases dealing with them. In particular, the Pilots that aimed at addressing maritime-port-hinterland B2A operations, including customs, have been encouraged to

take into consideration the framework provided in the recent EMSWe regulation. At the same time, the Pilot Sites dealing with other B2A operations will take due account of the future framework to be set out by the EFTI regulation, mainly focussing on the CT Directive, Dangerous Goods and Waste.

The Use Cases are presented for the involved Pilot Sites from Sections 4 to 14 and contain a reference to the possible application of the regulations. Many Pilot Sites are not planning to use these regulations in the current set of Pilot Site use cases. With the progress of FENIX, the use of EU regulations will be further encouraged.

In particular, reference is made to the following Use Cases, presented in the following sections:

FENIX Pilot Site	EMSWe	eFTI
PS AT	UC1, UC2	UC1, UC2
PS IT1	UC4a, UC4b, UC4e, UC7b, UC7c	UC4a, UC4b, UC4e, UC7b, UC7c, UC8a, UC9,
PS IT2	UC6	UC4
PS NL	-	UC3
PS SP	-	UC2, UC3

Table 3: eFTI and eMSWe in FENIX UCs

3.3 FENIX Pilot Sites overview

This section presents an overview about the FENIX Pilot Sites, bringing innovation and added value to the Transport & Logistics (T&L) communities. More specific information about each Pilot Site is provided in Chapters 4-14. FENIX Pilots and the relative base corridor are listed as follows:

Pilot Site Austria

PS AT, Fürnitz Pilot Site (South Austria) on the Baltic-Adriatic corridor.

Base TEN-T corridor: Baltic-Adriatic Corridor.

Pilot Sites Belgium

PS BE1, AirCargo Pilot Site: implement/pre-deploy/deploy specific use cases for the Brussels air cargo community linked to the other transport modes across TEN corridors.

Base TEN-T corridor: Rhine-Alpine.

PS BE2, Multimodal inland Hub-Procter & Gamble (P&G)-Mechelen-Willebroek Pilot Site: centralised data processing for and situation specific messaging to stakeholders, allowing coordination and visualisation of container movements, reducing, which reduces inefficiencies in operations caused by existing non-synchronised processes.

Base TEN-T corridors: Base TEN-T corridors: North Sea – Mediterranean; Scandinavian Mediterranean.

Pilot Site France

PS FR, French Mediterranean – North Sea Pilot Site.

Base TEN-T Corridors: North Sea – Mediterranean Ten-T corridors.

Pilot Site Germany

PS DE, Rhine-Alpine Corridor: Capacity Control (Corridor) Platform ("CCP") for the Rhine-Alpine Corridor.

Base TEN-T corridor: Rhine-Alpine Corridor.

Pilot Site Greece

PS GR, Greece-Balkan-TenT network, Orient/East-Med corridor - Cyprus multimodal Pilot Site

Base TEN-T corridor: Orient/East Mediterranean.

Pilot Sites Italy

PS IT1, Mediterranean and Baltic-Adriatic and the Motorway of the Sea of South-east - The Trieste Pilot Site.

Base TEN-T corridors: Mediterranean corridor and Baltic-Adriatic corridor.

PS IT2, The Alpine-Rhine corridor – Dynamic Synchro Modal Logistic Modules for security and efficiency in Genova and in Milan.

Base TEN-T corridor: Rhine Alpine.

Pilot Site Netherlands

PS NL, DUTCH Pilot Site, Smart Multimodal Operations Platform (SMIP).

Base TEN-T corridors: Baltic – Adriatic; Rhine – Alpine; Scandinavian Mediterranean.

Pilot Site Slovakia

PS SK, All TEN-T corridors and multimodal Pilot Site.

Base TEN-T corridors: All the TEN-T corridors.

Pilot Site Spain

PS SP, The Spanish-Atlantic Corridor Pilot.

Base TEN-T corridors: Atlantic.

4. FÜRNITZ PILOT SITE (SOUTH AUSTRIA) ON THE BALTIC-ADRIATIC CORRIDOR

4.1 Pilot Site description

The **terminal in Villach/Fürnitz** is the most important intermodal node in the south Austrian region, perfectly connecting the Baltic Adriatic corridor with other major traffic routes and serving as a hub for industrial regions in the catchment area as well as the urban areas of Villach and Klagenfurt. The terminal is integrated into the Logistics Hub "Logistics Centre Austria South" which is located on two main transport axes: The Tauern (Munich – Istanbul) and the Baltic-Adriatic (Gdańsk - Bologna) axis.

In order to provide the link between maritime shipments and European supply chains, the **section of VILLACH/Fürnitz – UDINE – TRIESTE on the Baltic Adriatic corridor** is crucial, aiming at an improved modal split by taking advantage of rail freight services and reducing emissions in the freight transport sector. Several NAPA ports are important for this region, especially regarding intermodal shipments. The forecast for those ports is showing enormous growing rates of containerised freight. These rates are leading to capacity problems in specific ports, an issue which can be solved through dry ports in the Hinterland and an enormous transport potential for rail freight.

Actions & Business opportunities

The Austrian Pilot Site will deal with the following Use Cases:

1. implementation of information services for intermodal transport;
2. further work to establish a customs corridor between Austria and Italy.

Base TEN-T corridor: Baltic-Adriatic Corridor.

4.2 Pilot Site working group definition

The partnership between ECONSULT and Logistics Centre Austria South (see application form part D) will be supported by:

- TSA ÖBB;
- Shipping company (presumably MSC);
- TRAXENS;
- GS1 Austria;
- Several members of the ÖBB group (e.g. TSA, RCG).

Partner name	Pilot Role
Shipping company MSC	MSC is a world leader in global container shipping and plays an important role at the port of Trieste. MSC is aiming to implement the terminal Villach Süd as major hub for container traffic on the axis Villach – Trieste.
Traxens	Traxens is a technology provider for container tracking and tracing and is a partner of MSC.
GS1 Austria	GS1 is a not-for-profit organisation that develops and maintains global standards for business communication. The best known of these standards is the barcode, a symbol printed on products that can be scanned electronically.
TSA ÖBB (exemplary)	Terminal Service Austria (TSA) as part of the ÖBB (Austrian Federal Railways) is responsible for the Terminal Villach Süd, which is a core element in the Austrian Pilot Site.
RCA/RCO (exemplary)	As a member of the ÖBB Group, Rail Cargo Austria (RCA) is an important train operator for the port of Trieste and for the Villach Süd terminal.

Table 4: PS AT Working Group

4.3 Pilot Site Use Cases

Use Case ID	Use Case Name	Description	Contributors
UC1	Information services	Implementation of information services for intermodal transport: rail freight transport will be made more effective and therefore economically attractive by implementing digital information services along corridors and between the partners in the transport and supply chains. Furthermore, digital information services (e.g. monitoring/tracking, ETA, event	LCA South Railway undertaking shipping company

		alert) will improve the quality of the data available and make rail transport faster and thus more competitive with road transport. Furthermore, the investigated corridor (Baltic-Adriatic; Villach-Fürnitz – Port of Triest) is currently implementing a border-crossing customs corridor. UC1 and UC2 shall be connected to each other.	
UC2	Customs corridor	Supporting the implementation of a customs corridor: Customs clearance at the Villach terminal allows NAPA-ports to concentrate on their core competencies and provides fast transhipment and thus lower space requirements in the ports. This makes the port activities more effective and the port more attractive, especially thanks to the easy access to rail freight. In addition, it gives customers further incentive to transport the goods by rail, which reduces environmental pollution.	LCA South Authorities

Table 5: PS AT Use Cases

UC1 & UC2 Information Services and Customs Corridor

Use Case	**UC1 & UC2**
Title	**Information services** - Implementation of information services for intermodal transport
Description	The Austrian partners in the FENIX AT test site Fürnitz will bundle and coordinate activities of the regional working groups in this section of the

	Baltic Adriatic corridor, to implement digital information services (e.g. monitoring/tracking, ETA, event alert) along the corridor sections. In the phase of the pilot implementation support, the Austrian partners in FENIX will define a pilot operation framework and KPI guiding the pilot operations in the light of evaluation and impact assessment. Following the pilot roll out plan, this operation will cover the framework to establish a collaborative business environment, a connectivity gap analysis and data identification of logistics business needs. At the implementation stage, the ongoing pilot activities are monitored, and the working group will define an interface with the information network of FENIX. Potentials for cross site tests of a pilot implementation will be evaluated according to needs and requirements of the operative stakeholders.
Partner role	ECONSULT and LCA SOUTH will coordinate and manage the stakeholders/partners, who will be involved in the implementation of the use case. LCA SOUTH will coordinate the activities and companies involved at the terminal. Railway undertaking/Shipping line: concept/test site implementation of service (e.g. monitoring/tracking, ETA, event alert). TRAXENS will provide knowledge about sensor technology and container transport.
Goal of the use case	• Setting up a concept of digital connection in the section between Trieste and Fürnitz;

	• Strengthen the Baltic-Adriatic Corridor through electronic support systems and information systems by coordinating the partners (terminal, rail operators, shipping lines etc.) along the intermodal supply chains to interlink information and new services; • Speed up supply chains and freight transport through the digitalisation and interconnection of information and processes; • Improve data quality and interconnection of systems within supply chains and solve administrative and technological problems which prevent modal shift from road to rail; • Support the implementation of systems compliant with federated networks to improve efficiency along freight corridors; • Observe and review the necessary requirements, expertise, data and analysis regarding the pilot activity in context to the FENIX framework; • Describe the state-of-the-art situation regarding data systems, data standards, regulatory framework; • Implement the support, monitoring and impact assessment of prototypical services carries out by operational partners, including requirements analysis and recommendations for scale-up and roll-out scenarios;

	• Results of the implementation of the customs corridor shall be used and further developed (i.e. further digitalisation of processes).
Actors	Terminal and railway undertakings, forwarding companies, intermodal operators, infrastructure companies, port authorities, shipping companies, software and service providers.
Preconditions (optional)	The LCA South and the involved stakeholders are aware of the EMSWe regulation. The terminal operators in Fürnitz, including freight forwarders, operators, railway undertakings, like the Rail Cargo Austria (main railway undertaking on the route between the LCA in Fürnitz and the Port of Trieste on the Baltic-Adriatic corridor) are well aware of the upcoming eFTI regulations. The solution provided by Rail Cargo Austria ("eFrachtbrief") is in fact already strongly promoting the use of electronic (paperless) approaches instead of paper-based approaches. Therefore, the RCA solution is well-placed to quickly comply with the upcoming regulations around eFTI.
Main Flow	1. Use of a tracking system (e.g. inclusive sensors) on rolling stock and/or containers; 2. Implementation of a monitoring system in defined (pilot) sections; 3. Tracking of (real time) data; 4. Definition of a system access policy; 5. Definition and testing of services (e.g.

	monitoring/tracking, ETA, event alert).

Table 6: PS AT UC1 and UC2

Note that the actions of the Austrian Pilot Site have been adapted slightly, with respect to the previous version of this document. One major change is the following: the direct connection to the Port of Trieste (naming the port as an active partner) has been removed, as the actions done in the UC2 are affecting only the Austrian part of a cross-border customs corridor. This circumstance has not been clear in the previous version. Furthermore, the given name of the Austrian Pilot Site has been changed to AUSTRIA-FÜRNITZ PILOT SITE (SOUTH AUSTRIA) ON THE BALTIC-ADRIATIC CORRIDOR.

5. BELGIUM, AIRCARGO PILOT SITE

5.1 Pilot Site description

Belgium Pilot Site: Air Cargo Belgium: Implement/pre-deploy/deploy specific use cases for the Brussels' air cargo community linked to the other transport modes across TEN corridors.

The **Air Cargo Belgium Pilot Site** will focus on the implementation and the roll-out of an application that will allow trucking companies, that are doing airport to airport transport, to book a flexible time slot at the ground handling agents.

Today, the waiting times for freight delivery or pick-up by trucking companies from outside BRUcargo (coming to the premises of Brussels cargo's ground handling agents) appears to be one of the biggest bottlenecks. Moreover, there is no standard procedure to support the process of slot bookings, which results in inefficiencies. The information exchange is done either manually, via email or phone. Mismatching in supply and demand, waiting times and inefficient staff planning all results in spillage of resources for the stakeholders.

This application should reduce the waiting times for the trucking companies, as it will allow ground handlers to optimise their personnel planning for pick-up and delivery of freight of trucking companies coming from outside BRUcargo.

Base TEN-T corridor: Rhine – Alpine

Actions & Business opportunities

The current pick-up and delivery process results in:

- Idle times: Trucking companies sometimes need to wait for hours at the truck parking before they can pick or deliver freight;
- No transparency: No transparency on which trucking company will pick-up or deliver freight, resulting in a reactive approach at the GHA and operational inefficiencies;
- No information exchange between partners.

The proposed use cases will allow more data exchange between trucking companies and ground handling agents, which will lead to the optimisation of the current process.

Use Cases:

- Reservation of a time slot to deliver or pick-up freight for Road Feeder services;
- Nearly real-time update ETA at BRUcargo by feeding info about the status of the truck;
- Elimination of waiting times for trucking companies at ground handling facilities;

- Better capacity management of the ground handling agents;
- Access to parking or specific area at BRUcargo;
- Integration with driver security checks at ground handling agent's facilities.

5.2 Pilot Site working group definition

Partnerships:

- Jan De Rijk (Trucking Company)
- H.Essers (Trucking Company)
- Ninatrans (Trucking Company)
- Aviapartner (Ground Handling Agent)
- Be-Mobile (Mobility Service Provider)
- Brussels Airport Company (Airport)

The Pilot Site can be extended to more members when there is an interest of a certain partner.

Partner name	**Pilot Role**
Air Cargo Belgium	Air Cargo will be the only partner in this Pilot who is part of the FENIX consortium and will receive funding. Air Cargo is also responsible for the management and coordination of the Belgian Pilot Site at BRUcargo.
Aviapartner (Local partner)	Aviapartner is a Ground Handling Agent that will make available certain capacity/gates that can be reserved by the trucking companies in the application implemented in the Pilot Site to pick-up and deliver cargo.
Jan De Rijk (Local partner)	Jan De Rijk is a trucking company that will book flexible slots at the ground handling agent via the application implemented in the Pilot Site, eliminating their waiting times.
Ninatrans (Local partner)	Ninatrans is a trucking company that will book flexible slots at the ground handling agent via the application implemented in the Pilot Site to eliminate their waiting times.
H. Essers (Local partner)	H. Essers is a trucking company that will book flexible slots at the ground handling agent via the application implemented in the Pilot Site, eliminating their waiting times.

Be-Mobile (not beneficiary in FENIX)	Be-Mobile is a mobility Service Provider that will provide information about real-traffic about the trucking companies to the ground handling agent.
Brussels Airport Company (Local partner)	This company is the strategic leader a behind BRUcloud's data sharing platform and different applications. Brussels Airport is responsible for the follow up and delivery of the application's development.

Table 7: PS BE1 Working Group

5.3 Pilot Site Use Cases

Table 8 presents a list of FENIX use-cases related to Air Cargo Belgium

Use Case ID	Use Case Name	Description	Contributors
UC1	Reservation of time slots	Today, no central system is available to control the freight delivery or pick-up process at the gates of the ground handler's facilities. In this Pilot Site the aim is to implement an application for trucking companies to reserve a time slot for pick-up or delivery of freight at the ground handling agent's.	FENIX partner: Air Cargo Belgium. Local Partners: Aviapartner, Jan De Rijk, Ninatrans, H. Essers, Brussels Airport Company.
UC2	ETA service	ETA is completely depending on traffic conditions. Through the availability of Real Time Traffic Information, ETA can be delivered for trucking companies to the ground handling agent.	FENIX partner: Air Cargo Belgium. Local Partners: Aviapartner, Jan De Rijk, Ninatrans, H.

			Essers, Brussels Airport Company, Be-Mobile.
UC3	Capacity management	It implies better capacity and personnel planning for the ground handling agents, based on the reserved slots by the trucking companies.	FENIX partner: Air Cargo Belgium. Local Partners: Aviapartner, Jan De Rijk, Ninatrans, H. Essers, Brussels Airport Company
UC4	Elimination of waiting times	Waiting times for trucking companies can be eliminated at the ground handlers facilities when they book a time slot, based on the trucking company's ETA and the ground handling agent's personnel planning.	FENIX partner: Air Cargo Belgium. Local Partners: Aviapartner, Jan De Rijk, Ninatrans, H. Essers, Brussels Airport Company.
UC5	Parking service	It decrease the waiting times for parking in BRUcargo. Based on accurate ETA and the reservation of a slot, parking spaces can be distributed to trucking companies.	FENIX partner: Air Cargo Belgium. Local Partners: Aviapartner, Jan De Rijk, Ninatrans, H. Essers, Brussels Airport Company.
UC6	Driver security check integration	The Road Feeder Management App, which will be implemented in this Belgian pilot, can be connected via an API call with the driver security database. When trucking companies add driver	FENIX partner: Air Cargo Belgium Local: Brussels Airport Company

		information in the Road Feeder Management App, the ground handling agents know if the driver has a security clearance to pick-up or drop-off the cargo.	

Table 8: PS BE1 Use Cases

Use cases

UC1-Reservation of time slot

Use case	**UC1**
Title	**Reservation of time slot**
Description	Air Cargo Belgium will implement an application at BRUcargo in which trucking companies coming from outside BRUcargo can reserve a time slot for airport to airport transport pick-up and deliveries.
Partner role	Air Cargo Belgium is responsible for the coordination, implementation and roll-out of the application.
Goal of the pilot	The goal of this Use Case is to: • Map the market; • Analyse which trucking companies book a lot of slots; • Create a link between trucking companies, ground handling agents and airlines; • Gather data from local partners to get more insight on how and when data is available.
Actors	Community operators, airports, ground handling agents and trucking companies.
Main flow	1. An airline places an order with a trucking company; 2. The trucking company creates the order; 3. The trucking company books a slot; 4. The trucking company arrives and BRUcargo and picks-up or delivers the cargo.

Table 9: PS BE1 UC1

UC2-ETA service

Use case	**UC2**
Title	**ETA service**
Description	The application implemented by Air Cargo Belgium will allow truck drivers to receive real-time information about traffic and the status of their trip to their final destination.
Partner role	Air Cargo Belgium is responsible for the coordination, implementation and roll-out of the application and its function. A local partner will be the service provider.
Goal of the pilot	The goal of this Use Case is to: • Check which ETA integration systems are available on the market; • Check with the trucking companies how to link their internal system to an ETA system and to the BRUcloud; • Making sure ground handling can also send updates via the ETA service to the trucking companies; • See how many times ground handling agents will send updates.
Actors	Community operator, airport, ground handling agent, trucking companies, mobility service provider.
Main flow	1. The trucking company's internal system is linked to an application; 2. The driver is on his way to BRUcargo; 3. The ground handling agents get updates on ETA about the trucking company; 4. The ground handling agents send updates to the trucking company about the gate or parking availability; 5. The trucking company arrives at BRUcargo and can go to the correct gate or to the parking zone.

Table 10: PS BE1 UC2

UC3-Capacity management

Use case	**UC3**
Title	**Capacity management**
Description	Due to the possibility of trucking companies to reserve time slots, the ground handling agent will have an overview of which trucking company is picking-up or delivering cargo at a given moment. Based on the overview of the booked time slots, the ground handling agents can better optimise their personnel planning to give a better and faster service.
Partner role	Air Cargo Belgium is responsible for the coordination, implementation and roll-out of the application. A local ground handling agent will make capacity available for the trucking companies to reserve a slot.
Goal of the pilot	The goal of this Use Case is to: • Check how the personnel planning can be based on the reserved slots by the trucking companies; • Integrate slots of trucking companies outside BRUcargo with the slots booked by freight forwarders from inside BRUcargo; • Find a correct balance between the capacity that needs to be offered by the ground handling agents and the demand of the slots by the trucking companies.
Actors	Community operators, airports, ground handling agents and trucking companies.
Main Flow	1. The ground handling agents enable the booking capacity for available slots; 2. The trucking companies reserve their slots; 3. The ground handling agents review the reserved slots in the application; 4. The ground handling agent plans the personnel based on the reserved slots.

Table 11: PS BE1 UC3

UC4-Elimination of waiting times

Use case	**UC4**
Title	**Elimination of waiting times**
Description	The application that will be implemented will allow trucking companies to reserve a time slot and ground handling agents to optimise their personnel planning. Both of these actions will result in less waiting times for the trucking companies when they pick-up or deliver cargo. The ground handling agents know when the truck driver will arrive and will have made its personnel available to handle the freight.
Partner role	Air Cargo Belgium is responsible for the coordination, implementation and roll-out of the application and will monitor the evolution of the waiting time together with the trucking companies.
Goal of the pilot	The goal of this Use Case is to: • Book slots based on ETA; • Re-book slots based on ETA updates; • Eliminate waiting times through transparent communication between the ground handling agent and the trucking company; • Reduce CO_2 thanks to less waiting times.
Actors	Community operator, airport, ground handling agent, trucking companies.
Main flow	1. The trucking company reserves a slot (slots get rebooked based on the update); 2. The truck driver arrives at BRUcargo; 3. The truck can immediately go the gate of the ground handling agent to pick-up or deliver the cargo (no waiting time).

Table 12: PS BE1 UC4

UC5-Parking service

Use case	**UC5**
Title	**Parking service**
Description	This service makes the parking operations easier and smarter. It provides a convenient and easy to use application for drivers to park and dedicated services related to the rest areas and similar facilities. Moreover, the service gives the possibility to link parking spaces to slot booking reservations in advance.
Partner role	Air Cargo Belgium is responsible for the coordination, implementation and roll-out of the application. The Airport and the ground handler will have to foresee the dedicated parking for partners who book a slot.
Goal of the pilot	The goal of this Use Case is to: • Optimise the use of the existing parking infrastructure; • Provide cross-border, seamless and consistent information and forecasts on available parking places to truck drivers; • Offer the possibility of reserving parking spaces; • Improve the parking operations (booking, looking for parking, payment); • Improve the current information about the rest area with other useful information (kind of services, useful numbers, multimodality information, etc.). • Reducing/optimising the daily operations; • Increase safety.
Actors	Community operator, airport, ground handling agent, trucking companies.
Main flow	For the Belgium Pilot Site (this flow can change if there is a booking of a parking lot or not): 1. The trucking company books a slot for freight pick-up or delivery; 2. Based on the reserved slots, a parking space will be reserved for the trucking company;

	3. The truck driver arrives at BRUcargo; 4. The access control system checks the truck driver slot booking reference and opens the parking gate.

Table 13: PS BE1 UC5

UC6-Driver security check Integration

Use case	**UC6**
Title	**Driver security check Integration**
Description	Via an API call with the application implemented in the pilot case, it is possible to check the driver's security status in a central driver database. When trucking companies add driver information to the application, the ground handling agents know if the driver has a security clearance to pick-up or drop-off the cargo.
Partner role	Air Cargo Belgium is responsible for the coordination, implementation and roll-out of the application and coordinates the link with the central driver database.
Goal of the pilot	The goal of this Use Case is t connect the driver security check application to the application implemented in this Pilot Site.
Actors	Community operator, airport, ground handling agent, trucking companies
Main flow	1. The trucking company reserves a time slot; 2. The trucking company adds the driver to the booked slot; 3. Via an API call, the driver security status is checked in the central driver data base application; 4. Ground handlers immediately see the driver's secure cargo delivery via the booked slot.

Table 14: PS BE1 UC6

6. BELGIUM, MULTIMODAL INLAND HUB-PROCTER & GAMBLE-MECHELEN-WILLEBROEK PILOT SITE

6.1 Pilot Site description

PS BE2: Centralised Data Processing for and Situation Specific Messaging to Stakeholders, allowing the coordination and visualisation of container movements, reducing inefficiencies in operations caused by existing non-synchronised processes.

The strength of this pilot is characterised by the fact that it develops a centralised data hub to coordinate and visualise the movement of both empty and full containers between the port of Antwerp, then Willebroek barge terminal and the Willebroek distribution centre.

The overall aim of this Pilot Site is to provide several tools to optimise the coordination and the visualisation of container movements across the chain.

Specific focus will be set on the implementation of data driven and situation specific messaging and exchange of data among stakeholders, securing optimal and collaborative execution of activities and resulting in a significant reduction of inefficiencies in operations. Due to the nature of the pilot and the customs data exchange potentially involved, great potential of collaboration with the The FEDeRATED (IT) project can be seen, in the terms that the coordinators consider appropriate to the funding scheme.

Base TEN-T corridors: North Sea – Mediterranean; Scandinavian Mediterranean

Scope

To transport ocean containers, loaded with P&G products, by barge and truck. The transport should take place between P&G's distribution centre and the Port of Antwerp for both international import and export purposes.

Problem

Lack of integrated visibility on ocean carrier bookings, empty container depot, container loading, barge capacity planning and sailing details for haulage to and from the Port of Antwerp. Linked activities such as dangerous goods notifications and customs clearance are negatively impacted by this situation. This results in multiple manual checks, stand-alone reports, inefficiencies in operation and customs conflicts due to non-synchronised processes.

Solution

To create a central data hub in order to coordinate and visualise the movement of empty and full containers between the Port of Antwerp, the Willebroek barge terminal and the Willebroek distribution centre.

Powered by OIA Connect

Solution Backbone

OIA Connect is the solution backbone for OIA Global 4PL and 5PL customer implementations. OIA Connect was designed for the supply chain but, over the last three years, it has enabled multiple business models to leverage its flexibility and provide data visibility, creative business solutions and multi-party collaboration.

OIA Connect is a cloud native visibility application that consumes and renders data agnostically. This strategic position regarding data enables OIA Connect to consume limitless data sources such as ERP, PIMS, WMS and TMS. The agnostic stance enables OIA Connect to serve as a "data control tower" for customers seeking a cloud based multimodal visibility solution while enabling multiple parties to participate collaboratively with data, actions and other critical business decisions.

For each customer instance, multiple data sources can be ported and then normalised for OIA Connect through various modern data ingestion techniques and stored in OIA Connect's cloud database. This enables customers to use OIA Connect as a "single source of truth." The platform is fully interoperable and enables limitless platforms to send and consume data over standard EDI and API connections using OIA Connect as the single source of visibility.

OIA Connect provides customers with a robust workflow management functionality in conjunction with pro-active alerting for each participant. Roles and responsibilities of workflow participants can be managed at a micro level (individual) and at a macro level (team). Milestones and other KPIs can be directly tied to specific businesses and actors in the solution, enabling up-to-the-moment business processing. All KPIs and real time calculations are continuously updating within OIA Connect 4PL/5PL solutions.

Data visualisation platforms such as Power BI can be leveraged where visualising KPIs and calculations are required. Charts, graphs and other interactive data visualisations can consume customer data from any 4PL/5PL OIA Connect implementation. This duality provides both a single source of truth for the implementation team as well as a customer specific data visualisation solution based on OIA Connect.

P&G Atlas leveraging OIA Connect

OIA Global has provided global logistics consulting services to P&G since 2015, followed by supporting the Atlas initiative in early 2018. Multiple logistics parties in P&G's supply chain have been collaborating on a global initiative to digitise P&G's global supply chain. In the case of OIA Connect and P&G Atlas, OIA Global's operating system CW1 is just one source of data for the global P&G Atlas 4PL solution.

For TMS Atlas, OIA Connect is ingesting shipments and messaging data through CW1 limiting human data entry, but at the same time, enabling multi-party collaboration and accurate actions. Additional data sources from P&G systems are consumed within the Atlas Connect 4PL implementation, bringing external third parties, carriers and other data sources into the solution. Real time calculations and KPIs on milestone data are surfaced to the frontend of Connect, enabling participants to act with accuracy. For P&G, OIA Connect provides a federated platform solution for multiple parties around the globe and is the single source of truth for the Atlas initiative.

Logit One extending OIA's visibility: Empowering Logistics with Intelligence™

Logit One's mission is to translate data into real-time insights for decision makers, contributing to customer experience, efficiency and sustainability targets.

Logit One's industry-leading visibility solution delivers in a fully automatic way high-quality insight into one's end-to-end shipment. This solution consults multiple data sources and interprets these data in order to establish a single truth, calculating knock-on effects. Information is automatically fed back into OIA's operational system and/or the shipper's portal. One's control tower can be alerted. All of this is targeted at achieving Early Accurate Complete Data.

The solution is data driven – not depending on expensive tracking devices. It uses multiple data sources and artificial intelligence for data quality:

There are two important added-value components: its modules for (i) data analysis and management reporting, and (ii) demurrage & detention monitoring.

SaaS Solution Architecture

Cloud Native Architecture

The future evolution of OIA Connect will leverage the business models and growth from both OIA's 4PL/5PL implementations (2017 – present) and the knowledge gained from customer solutions such as the P&G Atlas program. OIA Connect 2.0 will extend the "single source of truth" platform concept for federated multi-modal logistics strategies that involve multiple parties within the supply chain to

a cloud native application design.

Moving the application stack to a cloud native solution is part of the core vision of OIA Connect 2.0. A native cloud solution will enable OIA Connect to achieve:

- faster releases and a superior customer experience;
- lower overhead footprint (ease of management);
- reduced costs through containerisation and cloud standards;
    - cloud computing best practices, hence, charges based on usage;
- automated process repair, scale, and faster system deployments;
- managed services providing high operational savings for all participants.

The benefits of a cloud native architecture with OIA Connect 2.0 will be passed on to all OIA's customers and partners. Building within cloud native principals will also provide a deeper level of interoperability with external platforms (via cloud native API's), data sources, and systems on behalf of brands, customers, LSP's, governments and local municipalities.

<u>Modern UI, Core Features & SaaS</u>

Connect 2.0 will supply a white labelled interface enabling external parties to apply their own branding to a co-hosted solution. Additionally, partners will have the ability to extend their instance of OIA Connect 2.0 to their partners as well creating an affiliate model benefitting both parties.

The primary features of the original platform will be extended in OIA Connect 2.0:

- limitless data source integrations
    - third party systems and platforms
    - logistics operating systems (cw1, tms, etc.);
    - back office systems and data processing.
- process automation, algorithms and KPIs;
- continuously updated KPIs and calculations;
- data visibility, interactive reporting and visualisations;
- collaboration via workflow through real-time alerting.

These core features repurposed within a cloud native application framework will be managed within a software as a service framework (SaaS) enabling all partners of OIA to leverage the same feature stack. For OIA's partners, new features will be proven and tested within a rigorous quality assurance process ensuring that the highest quality and standards will be followed with future developments of the 2.0 platform. Custom implementations will be achievable as a unique "branch" off the primary SaaS offering, being however carefully considered and planned.

The Belgium Pilot Site will deal with the following Use Cases:

1. Expected time of arrival (ETA);
2. Reduction of $CO_2$and NO_x emissions;
3. Track and trace vehicle/shipment;
4. B2A, A2B services: customs;
5. Dangerous goods;

6.2 Pilot Site working group definition

Partner name	Abbreviated	Pilot Role
Procter & Gamble	P&G	shipper and consignor
Barsan	DC	distribution centre
TCT Barge Terminal	TCT	container & barge terminal
Barge Operator	BO	operating WLB - ANT barge movement
Antwerp Port Authority	APA	port authority ANT
Customs Broker	CB	perform export and import customs activities
Ocean Carriers / terminals	OC	perform ocean carrier and terminal activities
OIA Global	OIA	4PL / Incubator / IT Provider
Logit One	LOG	IT Provider

Table 15: PS BE2 Working Group

6.3 Pilot Site Use Cases

Use Case ID	Use Case Name	Description	Contributors
UC1	ETA	Pro-active guidance and promotion of data exchange within all parties involved smoothens the operations planning and the execution for export and import containers. *Solution direction:*	TCT OIA

		Real-time detail sharing of location and goods allows the movement of (DG) processed products for export from EU in compliance with Customs and Port Authorities regulations.	
UC2	Reduction of CO_2 & NOx emission	Emissions reduction. Already considered in AEOLIX with the target of 20% reduction, it will be enhanced in FENIX with the target of 30% reduction. Related to export and import containers. *Solution direction:* *Full visibility of location of goods, vessel schedules and transit updates allow less use of trucks / more use of barge for short timeframe container movements.*	P&G DC TCT OC OIA
UC3	Track & trace vehicle/shipment	Create visibility for all involved stakeholders on the status of shipments, milestones and progress updates, pro-active alerts and adding alerts where necessary for export and import containers. *Solution direction:* *Connectivity with multiple partners creating "single source of truth" for visibility and decision making.*	P&G DC TCT APA CB OC OIA LOG
UC4	B2A, A2B services like Customs	Trigger customs clearance instructions to customs brokers for clearance at the port or site, based on true location of goods for export and import containers. *Solution direction:* *Using real-time planning and location of containers from barge operators and terminals to*	P&G TCT CB OIA

		allow accurately timed customs clearance.	
UC5	Dangerous Goods	Automatic notification to port authorities (harbour captain process) regarding the details of dangerous goods for export containers. *Solution direction:* *Based on cargo details provided by the distribution centre and the initial planning and real-time vessel schedule, details from the Barge Terminal and Operator inform the Port Authority with plan and updates on actual scheduled arrival at the Port of Antwerp.*	P&G DC TCT APA OIA

Table 16: PS BE2 Use Cases

UC1-ETA

Use Case	**UC1**
Title	**ETA** - Pro-active guidance and promotion of data exchange within all parties involved smoothens the operations planning and execution.
Description	Export flow The 4PL has created an international transport booking with the ocean carrier, including the pre-carriage from the distribution centre to the Port of Antwerp. Whilst the ocean carrier confirms the booking and provides the vessel and sailing details for the main transport leg, which is departing from the Port of Antwerp to a final destination, all pre-carriage leg details are omitted. Instead, only CFS Antwerp cut off dates are provided. The 4PL organises the empty container pull from the Container & Barge Terminal in Willebroek, manages the loading at the distribution centre and the return of the full container to the Terminal in Willebroek. The Technological Provider will give shipment and cargo details to the Container & Barge Terminal, including ocean carrier booking reference

	and CFS cut-off dates in Antwerp. In return, the Container & Barge Terminal will provide a sailing plan to the Technological Provider. Upon actual departure from the terminal the Container & Barge Terminal provides the actual departure update to the Technological Provider, including any potential revised vessel, quay and arrival date/time details. Upon the unloading of the container at the requested quay, the Container & Barge Terminal will send the actual arrival update to the Technological Provider. <u>Import flow</u> The 4PL receives a pre-alert from the origin 4PL on shipments destined to Antwerp port and/or the distribution centre in Willebroek, depending on the incoterms (to port or to door). The 4PL organises the full container pull from the Port of Antwerp, manages the on-carriage from port to inland terminal, the unloading at distribution and the return of the empty container to the terminal in Willebroek. The Technological Provider will provide shipment and cargo details to the Container & Barge Terminal, including ocean carrier booking reference and expected delivery dates to distribution the centre. In return the Container & Barge Terminal will provide a sailing plan to the Technological Provider. Upon actual departure from the Port of Antwerp the Container & Barge Terminal provides the actual departure update to the Technological Provider, including any potential revised vessel and arrival date/time details. Upon unloading of the container at the inland terminal, the Container & Barge Terminal will send the actual arrival update to the Technological Provider.
Partner role	Container & Barge Terminal: TCT Belgium Technological provider: OIA Global
Goal of the use case	Real-time location and sharing of details of goods allow for movement of (DG) products processed for export from the EU in compliance with Customs and Port Authorities regulations.

Actors	**The Container & Barge terminal** shares barge planning information and vessel details for haulage to and from the Port of Antwerp. **The Technological Provider** combines all data flows and shares information with all relevant actors to allow the seamless movement of the container.
Analyses & Evaluation	**University of Genoa:** Undertakes the cost-effectiveness analysis of the pilot. **University of Modena and Reggio Emilia:** Leads the evaluation process.
Main flow	1. The container is picked up at the Barge Terminal in Willebroek. 2. The container is brought to the distribution centre, loaded and brought back to the Willebroek terminal. 3. The App will provide shipment and cargo details to the Container & Barge Terminal, and the Container & Barge Terminal will provide a sailing plan to the App. 4. Finally, the App communicates the information about the ship departure and related parameters to the FENIX federative platform.

Table 17: PS BE2 UC1

UC2- Reduction of CO_2 & NOx emission

Use Case	**UC2**
Title	**Reduction of CO_2 & NOx emission** - Emission Reduction by providing full Visibility and Situation Specific Messaging to Stakeholders involved.
Description	The following information provided by actors in this Use Case inform the Technological Provider as follows: • the Container & Barge Terminal operator provides vessel sailing schedules and available capacity per vessel; • the Consignor / Supplier provides a weekly forecast of expected loads that will depart from the distribution centre;

	• the distribution centre provides direct updates upon loading completion; • the Ocean Carriers provide arrival notifications for import shipments. Bringing this information all together allows the Technological Provider to create weekly forecasts for the Container & Barge Terminal in terms of capacity management and make adjustments throughout the days when actual load plans have changed. By having direct access to available capacity and sailing schedules for both regular planned traffic and events changed on the day of the loading, decisions can be made to move containers by vessel to the Port of Antwerp or vice versa for import shipments. This will create a lesser number of containers to be moved to the Port of Antwerp by truck and an increase use of barge.
Partner role	• Consignor / Supplier: Procter & Gamble • Distribution Centre: Barsan • Container & Barge Terminal: TCT Belgium • Ocean Carrier: Multiple Carriers • Technological provider: OIA Global
Goal of the use case	Full visibility of location of goods, vessel schedules and transit updates allow less use of trucks / more use of barge for short timeframe container movements.
Actors	**The Consignor / Supplier,** providing weekly shipping forecast; **The distribution centre,** providing daily updates on actual loading and unloading; **The Container & Barge terminal,** sharing vessel sailing schedules and available capacity for haulage to and from the Port of Antwerp; **The Ocean Carriers,** providing arrival notifications for import shipments; **The Technological Provider,** performing the multi modal transport planning for transport of containers between the distribution centre and the Port of Antwerp.
Analysis &	**University of Genoa:**

Evaluation	Undertakes the cost-effectiveness analysis of the pilot. **University of Modena and Reggio Emilia:** Leads the evaluation process.
Main Flow	1. The Container & Barge Terminal operator provides vessel sailing schedules and available capacity per vessel; 2. The Consignor / Supplier provides a weekly forecast of expected loads to depart from the Distribution Centre; 3. The Distribution Centre's decisions can be made to move containers by vessel to the Port of Antwerpor vice versa for import shipments. 4. The Distribution Centre loads the container in the most environmentally friendly mode of transport based on capacity. The Ocean Carriers provide arrival notifications.

Table 18: PS BE2 UC2

UC3-Track & trace vehicle/shipment

Use Case	**UC3**
Title	**Track & trace vehicle/shipment** - Create visibility for all involved stakeholders on status of shipments, milestones and progress updates, pro-active alerts and adding alerts where necessary.
Description	By combining all data from the shipper, distribution centre, container & barge terminal and ocean carrier into a single shipment data source, all participating partners are able to obtain online visibility access to data and related documentation. Further on, if and where needed, stand milestone push alerts or exception-based alerts can be setup to support timely action. Relevant details for participants can also be exported to external systems upon request. Benefit of this setup is that data duplication and re-entry is avoided. When data or documents are renewed, this is also immediately available

	to all participants.
Partner role	• Consignor / Supplier: Procter & Gamble • Distribution Centre: Barsan • Container & Barge Terminal: TCT Belgium • Harbor Captain: Antwerp Port Authority • Customs Broker: Geodis • Ocean Carrier: Multiple Carriers • Technological provider: OIA Global
Goal of the use case	Connectivity with multiple partners creating "single source of truth" for visibility and decision making.
Actors	**The Technological Provider**, enabling all partners to obtain up-to-date status information on any shipment at any given time in the process.
Analysis & Evaluation	**University of Genoa:** Undertakes the cost-effectiveness analysis of the pilot. **University of Modena and Reggio Emilia:** Leads the evaluation process.
Main flow	1. The Container is picked up at the Barge Terminal in Willebroek. 2. The Container is brought to the distribution centre, gets loaded and brought back to the Willebroek terminal. 3. The container is moved to the Port of Antwerp. 4. The App will provide visibility to all involved stakeholders on status of shipments, milestones and progress updates. 5. Finally, the App communicates the information of related parameters to the FENIX federative platform so other stakeholders can benefit from it.

Table 19: PS BE2 UC3

UC4- B2A, A2B services like Customs

Use Case	**UC4**
Title	**B2A, A2B services like Customs** - Trigger customs clearance instructions

	to Customs Broker for clearance at port or site, based on true location of goods for export & import containers.
Description	By combining all data from the shipper, distribution centre, container & barge terminal and ocean carrier into a single shipment data source, all participating partner are able to obtain online visibility access to data and related documentation. ***See Use Case #1 for base process description*** <u>Export Flow</u> Related to the exact location of the container for export customs clearance (on site, at Container & Barge Terminal or at port of Antwerp) clearance preparation instructions can be provided to the Customs Broker. This will be followed up with a ready for clearance instruction when based on information received from the Container and Barge Terminal, the actual arrival of the container at the place of customs clearance has occurred. <u>Import Flow</u> Related to the exact location of the container for import customs clearance (on site, at Container & Barge Terminal or at port of Antwerp) clearance preparation instructions can be provided to the Customs Broker. This will be followed up with a ready for clearance instruction when based on information received from the Container and Barge Terminal, the actual arrival of the container at the place of customs clearance has occurred.
Partner role	• Consignor/Supplier: Procter & Gamble • Container & Barge Terminal: TCT Belgium • Customs Broker: Geodis • Technological provider: OIA Global
Goal of the use case	Utilizing real-time planning & location of containers from Barge Operator and Terminal to allow for accurately timed customs clearance.
Actors	**Consignor/Supplier** providing detailed product information as needed for customs clearance

	Container & Barge terminal sharing barge planning information and vessel details for haulage to & from Antwerp port **Customs Broker** receiving information to allow for accurately timed customs brokerage related to exact location of goods, providing proof of customs clearance details **Technological Provider** combining all data flows and sharing information with all relevant actors to allow for seamless movement of container
Analysis & evaluation	**University of Genoa:** Undertakes the cost-effectiveness analysis of the pilot. **University of Modena and Reggio Emilia:** Leads of the evaluation process.
Main flow	1. The container is picked up at the Barge Terminal in Willebroek. 2. The Container is brought to the distribution centre and loaded. 3. Export customs clearance instructions are sent to the customs broker. 4. The container is brought back to the Willebroek terminal. 5. The container arrives at the place of customs clearance. 6. The container is cleared. 7. The container is moved to the Port of Antwerp. 8. The App will provide visibility to all involved stakeholders on the status of shipments, milestones and progress updates.

Table 20: PS BE2 UC4

UC5-Dangerous Goods

Use Case	**UC5**
Title	**Dangerous Goods** - Automatic notification of dangerous goods details to port authority (harbour captain process).
Description	***See Use Case #1 for base process description*** Where the container contents are classified as dangerous goods, based on the planned barge sailing details, the Technological Provider is able to send a pre-notification of arrival for dangerous goods to the Port of

	Antwerp's authority. Any changes to the sailing details as received from the Container & Barge Terminal will be passed on as well. Later on, the final delivery details will be confirmed.
Partner role	• Consignor / Supplier: Procter & Gamble; • Distribution Centre: Barsan; • Container & Barge Terminal: TCT Belgium; • Harbour Captain: Antwerp Port Authority; • Technological provider: OIA Global.
Goal of the use case	Based on cargo details provided by the distribution centre and the initial planning and real-time vessel schedule, details from the Barge Terminal and Operator inform the Port Authority with a plan and updates on actual scheduled arrival at the Port of Antwerp.
Actors	**The Consignor/Supplier,** providing detailed product information as needed for dangerous goods declaration to Antwerp port authority. **The Distribution centre,** providing detailed product information as needed for dangerous goods declaration to the Port of Antwerp's authority. **The Container & Barge terminal,** sharing barge planning information and vessel details for haulage to and from the Port of Antwerp. **The Harbour Captain,** obtaining timely and accurate planning and actual vessel and sailing details related to containers with Dangerous Goods content. **The Technological Provider,** combining all data flows and sharing information with all relevant actors to allow the seamless movement of containers.
Analysis & evaluation	**University of Genoa:** Undertakes the cost-effectiveness analysis of the pilot. **University of Modena and Reggio Emilia:** Leads the evaluation process.
Main flow	1. The Container is picked up at the Barge Terminal in Willebroek. 2. The Container is brought to the distribution centre and loaded and

	brought back to the Willebroek terminal. 3. As the container is classified as Dangerous Goods the Terminal notifies the Port of Antwerp. 4. The Container arrives at the Port of Antwerp. 5. The App will provide visibility to all involved stakeholders on plan and updates on actual scheduled arrival at the Port of Antwerp.

Table 21: PS BE2 UC5

7. FRANCE, FRENCH MEDITERANEAN – NORTH SEA PILOT SITE

7.1 Pilot Site description

Geographic, functional and technical dimensions of the French Pilot Site

The French Living Lab is **geographically** conceived around the Southern, Central and Northern tip of the French leg of the Mediterranean – North Sea corridor. In the south, Marseille and Fos-sur-Mer are major ports for the entire region. In the centre, the port of Strasburg represents an important freight hub, as in the north the sea port of Dunkirk, the Calais Eurotunnel site and the region's interior ports and platforms around Lille (including Dourges, Valenciennes, Bethunes, …). This large coverage of the national leg of the Mediterranean – North Sea corridor is ambitious and was made possible by the direct involvement of actors active in all of these ports.

The **functional** focus will be on intelligent multimodal freight transport in order to demonstrate the optimisation potential of smart and optimised freight transport movements. All of these ports are multimodal with maritime and inland waterways navigation, rail and road traffic. The proposal is to demonstrate multimodal interoperability between the actors, transport modes and ports, in response to the challenges that freight transport faces in these logistics regions. Ultimately, the French Pilot Site will provide end-to-end visibility by integrating the partners' innovative solutions for service integration to achieve multimodal delivery optimisation (thus including modal shift and lesser environmental impact of freight movements). A strong collaboration with several other existing C-ITS deployment projects is planned, permitting data and service exchanges thanks to connections with the French national ITS-S ("noeud national"). These existing projects are ongoing projects SCOOP@F, InterCor and C-Roads, as well as new Objective 8 project InDiD. A Mediterranean Pilot Site around Marseille metropolis adds up to deploy several Day1 & Day 1.5 C-ITS services and prepare the infrastructure for autonomous driving. This will permit the demonstration of C-ITS benefits for logistics, but also the benefits of data provided by logistics companies for traffic management.

Technically, the French Pilot Site will continue integrating the AEOLIX platform and more specifically the MyAEOLIX connectors, the Data Transformation service and the toolkit. AEOLIX partner and Living Lab leader NeoGLS will take care of this integration and complete the platform by continuing the adaptation of its IT logistics tool NOSCIFeL. NeoGLS will propose an intelligent Dashboard MCTO (Multimodal Cargo Transport Optimisation). This generic tool will be made available for all Living Labs in order to facilitate interoperability and data visibility. Project partner MGI will adapt its

innovative Cargo Community service called AP+/CI5, currently used in most of the ports, and render it interoperable with the AEOLIX platform. In addition, MGI will provide the SELIS project use cases for integration in the global FENIX architecture.

Expected results to integrate into FENIX

Dangerous goods transport: FENIX project will also consider the results of European CORE and French GeoTransMD projects, which have demonstrated the feasibility of the architecture agreed by the UNECE-Working Party on the Transport of Dangerous Goods - Joint Meeting RID/ADR/ADN (WP.15/AC.1). During its autumn 2019 session, the Joint Meeting agreed on the proposed guidelines for the use of RID/ADR/AND 5.4.0.2[5] of the informal working group on telematics. These guidelines are published on the UNECE website[6]. They need to be taken into account, and the French Living Lab will work closely with the working group to properly implement this new feature by organising common workshops and data model consolidation. This architecture and its data exchange format will allow the digitalisation of the mandatory transport documents describing the dangerous goods (or DG) loaded on the transport unit (road, rail and waterway). On a voluntary basis, transport companies involved in DG transport from and to the ports, terminals and/or logistics zones (for easier reading, we will mainly use the term "Terminal" in this document, while all of them are valid) will have the opportunity to make their DG declaration electronically. Through the AP+/CI5 and the AEOLIX platform, data exchange with the IT systems of these transport companies will receive the DG description. In case of control, authorities can directly access the data by request through the architecture.

Multimodal freight C-ITS: With the deployment of C-ITS equipment in various contexts (at the ports and terminals gates, on board of trucks, barges and potentially trains, and in the back offices of transport companies), the French Living Lab will deploy the first part of the general C-ITS network in the logistics sector. This will happen of course in cooperation with local infrastructure operators,

[5] The use of electronic data processing (EDP) or electronic data interchange (EDI) techniques as an aid to or instead of paper documentation is permitted, provided that the procedures used for the capture, storage and processing of electronics data meet the legal requirements as regards the evidential value and availability of data during transport in a manner at least equivalent to that of paper documentation.

[6] https://www.unece.org/fileadmin/DAM/trans/doc/2019/dgwp15ac1/ECE-TRANS-WP15-AC1-2019-44e.pdf

such as road directorates, port authorities, possibly the national authorities for IWW and railways, particularly with regards to the installation of C-ITS equipment. This architecture will help understand the capability of combining road management for dedicated transport, managing statistics on the route of goods, allowing green lanes and extra authorisation for road transport.

Base TEN-T corridors : North Sea – Mediterranean

PORTS : Marseille, Fos sur mer, Dunkerque, Lille - Dourges, Eurotunnel site (Calais-Coquelles)

Actions & Business opportunity

The French Pilot Site will deal with the following use cases (an executive resume of those use cases is present in Table 2, with detailed Use Case descriptions in the following tables):

- Dynamic status slot verification;
- Slot management;
- Multimodal ETA for cargo optimisation;
- Dangerous goods;
- CO_2 reduction;
- Customs optimisation;
- C-ITS for logistics.

7.2 Pilot Site working group definition

Partner name	Pilot Role
NeoGLS	NeoGLS is the French Pilot Site leader and will handle the management of the use cases and their deployment. NeoGLS is also the provider of several of the platforms and tools which will be adapted and used in the defined use cases. The iMCTODashboard will be highly adapted in order to permit its use in all use cases but also as a tool for other Pilot Sites.
Bogaert	As a truck company, Bogaert will deploy the French Pilot Site use cases which are of interest to them. They will also adapt their internal TMS in order to exchange data with the FENIX ecosystem.
Cerema	Cerema will be performing the following actions: • Taking into account the Dangerous Goods regulation and

	electronic DGT Information based on the Guidelines approved by the UNECE Joint Meeting WP15/AC1; • Liaising with UNECE and the French Authority in charge of the implementation of the Dangerous Goods regulation; • Developing Use Case for C-ITS and Dangerous Goods; • Evaluating the proof of concept by linking C-ITS and EFTI (beginning with Dangerous Goods) for road operators.
I-Trans	i-Trans will provide logistics expertise to the services and applications developments to meet the industry's needs and overcome the challenges. Building on the InterCor project's experiences, i-Trans can also be useful in the definition and execution of the non-technical evaluations of C-ITS solutions (impact, user acceptability, etc.). For the Pilot preparation, i-Trans will be in charge of identifying, aiding and following up with the real-life logistics companies that will participate in the pilots.
Marseille Gyptis International	MGI is the owner of the Cargo Community System CI5 which is used in all of the ports belonging to the French Pilot Site. They will adapt the system in order to take into account some of the use cases and permit data exchange with the FENIX ecosystem. They will also participate in the add-ons of C-ITS to logistics.
Université Polytechnique Hauts de France	This stakeholder will work on the test, evaluation and validation for the French use cases: Multimodal ETA for cargo optimisation, Dangerous Goods, CO_2 reduction and C-ITS for logistics.

Table 22: PS FR Working Group

7.3 Pilot Site Use Cases

Use Case ID	Use Case Name	Description	Contributors
UC1	Dynamic status	Optimisation of cargo transport to	**NeoGLS**

	slot verification	terminals by improving the predictability of the dock's availability in time. Often truck drivers have to wait upon their arrival at the terminal. This service is meant to optimise the planning for (un)loading trucks at terminals.	Bogaert MGI I-Trans
UC2	Slot management	This consists in the optimisation of cargo transport to terminals by slot reservation. The UC proposes the slot reservation at a given terminal (including date and time) to achieve this optimisation.	**NeoGLS** I-Trans
UC3	Multimodal ETA for cargo optimisation	This consists in the optimisation of cargo transport to logistic hubs by providing ETA in a single point of visualisation (dashboard) of all the transport modes related to the given cargo transport mode (truck, train, barges and sea-going ships).	**NeoGLS** Bogaert MGI UPHF I-Trans
UC4	Dangerous goods	Services for Dangerous Goods management. Monitoring on highways, in tunnels and parking for the purpose of regulation compliance.	**Cerema** NeoGLS MGI UPHF
UC5	CO_2 reduction	CO_2 consumption will be calculated in each port and for each transport mode by applying CO_2 calculation algorithms. The objective of this calculation will be the ultimate reduction of emissions through the smart use of the French PS use cases.	**MGI** NeoGLS Bogaert UPHF
UC6	Customs optimisation	This will enable a safer and more transparent risk analysis shared by private bodies, in order to detect any risk that could affect supply chain fluidity at the	**MGI** NeoGLS

		earliest convenience. A wide range of risks will be covered from special cargo and intermodal connections.	
UC7	C-ITS for logistics	Cooperative ITS solutions will be deployed in order to provide pertinent information to trucks and optimise the transport operations. Virtual Message Signs, truck parking information, road events will be available and provided by the French C-ITS-C (“*noeud national*”).	**NeoGLS** Cerema MGI UPHF

Table 23: PS FR Use Cases

<u>UC1- Dynamic status slot verification</u>

Use Case	**UC1**
Title	**Dynamic status slot verification** - Optimisation of cargo transport to terminals by dynamic status slot verification.
Description	During the road leg of a cargo transport, the transport unit (container or trailer) is to be programmed on another transport mode for the continuation of the trip. This is done with a slot at a terminal, with the loading date and time. Reservation before departure is optimal, but can be done during the transport, at the latest before the arrival at the terminal. If this is not completed before the arrival, the transport unit arrives without any preparation, which generally leads to waiting times and even perturbations.
Partner role	• NeoGLS will adapt tools, platforms and services in order to permit the deployment of this use case. NeoGLS will also provide connections with the French National Node. • MGI will adapt its CCS and provide the necessary information on slot verification to the use case. • Transports BOGAERT will engage their drivers to use the MCTO

	App, and specifically to enter the slot number and check status. • i-Trans will coordinate the identification, contacts and implication of pilot participants, and assure the dissemiation and communication.
Goal of the use case	To decrease waiting times at terminals and to simplify access to the port terminal.
Actors	Vehicle drivers, road operators, terminal operators, port authorities, truck companies and terminal operator carriers.
Main flow	1. An ETA is calculated for a truck for a given slot managed terminal. 2. When a slot reference becomes valid, the terminal or terminal operated carrier broadcasts this valid slot reference to the national node. 3. The service receives a valid slot reference and adds it in the corresponding list. 4. The truck driver enters a slot reference. 5. The service checks the validity of the slot reference with reference to the list of valid slot references. 6. The service displays the slot validity status to the terminal operator or the terminal-operated carriers as well as to the truck driver. 7. If the validity status is not OK, the truck driver can submit another reference and restart the process at step 3.
Secondary flow	1. The secondary flow comprises the following steps: 2. The truck driver does not have a slot reference; 3. The service asks for a slot reference with the terminal, or with the terminal operated carrier (Eurotunnel, ferry lines or oversea shipping lines); 4. The service displays the list of slots to truck driver on the driver's HMI; 5. The truck driver chooses and reserves a slot; 6. The service sends reserved slot to the terminal;

	7. The service displays the slot reference and validity status to the truck driver; 8. The service displays the slot reference and validity status to the terminal operator or terminal operated carriers; 9. The presence of the slot reference is checked at each geofence zone crossing.
Analysis & evaluation	The KPIs are the following: • Visibility/Data sharing; • Interoperability; • Average waiting time; • Average loading/unloading time; • Modal shift.

Table 24: PS FR UC1

UC2-Slot management

Use Case	**UC2**
Title	**Slot management** - Optimisation of cargo transport to terminals by improving real time predictability of dock availability.
Description	Terminal operators provide timeslots for (un)loading trucks at the terminal's docks. The transport company's planner makes a reservation for a specific timeslot, plans for a truck to arrive within that time slot and transmits this information to their truck driver.
Partner role	• NeoGLS will adapt its tools, platforms and services in order to permit the deployment of this use case. NeoGLS will also provide connections with the French National Node. • i-Trans will coordinate the identification, contacts and implication of pilot participants, and assure diffusion and communication.
Goal of the use case	To decrease waiting times at terminals and thus also help optimise operations at the terminal for their activity planning.
Actors	Vehicle drivers, terminal operators, transport companies.

Preconditions (optional)	Available docks and timeslots should be counted in a correct manner. Reserved docks should be available at the reserved timeslot.
Main flow	The main flow comprises the following steps: 1. Terminal operators provide available docks and timeslots for (un)loading trucks; 2. The service receives this information and provides it to the transport planners; 3. Transport planners use this service to assign docks and timeslots to trucks; 4. Transport planners reserve docks and timeslots for (un)loading trucks; 5. Truck drivers receive the reserved docks and timeslots on their HMI.
Analysis & evaluation	The KPIs are the following: • Visibility/Data sharing; • Interoperability; • Average waiting time; • Average loading/unloading time;

Table 25: PS FR UC2

UC3-Multimodal ETA for cargo optimisation

Use Case	**UC3**
Title	**Development of a multi-channel ETA collector and calculator**
Description	The ETA (Estimated Time of Arrival) is a key information for operation planning at strategic points of corridors. Through the ability of several data sources, accurate and significant volume of ETA will be delivered through a multi-source ETA collector and calculator, in order to provide terminal operators with a clear visibility of in- and outgoing cargo flows. An intelligent interface allowing to collect data from the CI5 Cargo Community System will be developed in order to provide qualitative and

	quantitative data to maritime and inland terminals to plan their activity. This data will be shared within the AEOLIX platform and displayed in the multimodal dashboard.
Partner role	• MGI will develop a data collector from multiple data sources and an AEOLIX Platform connector; • NEOGLS will integrate multimodal data and to display it after extraction from the AEOLIX Platform; • BOGAERT will use the navigation system of the service App to calculate the ETA before going to the port; • i-Trans will coordinate the identification, contacts and implication of pilot participants, and assure the dissemination and communication; • Polytech HdF will work on the test activities, the evaluation and validation for this Use Case.
Goal of the use case	To optimise operations at maritime and inland terminals on the North Sea – Mediterranean corridor with better information management through an exhaustive data collection process and real time applications.
Actors	Terminal operators, truck companies and drivers, road authorities.
Preconditions (optional)	Barge, rail and road operators must be connected to CI5 via AEOLIX in the FENIX ecosystem. Barge and road operators must be equipped with the android App. The final destination of the operator must be available/declared in the service.
Main flow	The main flow comprises the following steps: 1. Barge operators submit in- & outgoing cargo for a given inland or maritime terminal on the CI5 platform; 2. The barge operator indicates the port of destination in the barge android App; 3. Rail operators submit in and outgoing cargo for an inland or maritime terminal on the CI5 platform; 4. The road transport company submits I and outgoing cargo for a

	given inland or maritime terminal on the CI5 platform; 5. Upon his/her departure to the port of destination, the truck driver opens the App and enters the port address on the navigation system which will launch the ETA calculation; 6. CI5 collects data and publishes it on the AEOLIX platform; 7. The AEOLIX dashboard is updated quantitatively (volume) and qualitatively (cargo detail).
Analysis & evaluation	The KPIs are the following: • Visibility/Data sharing; • Interoperability; • Average waiting time; • Average loading/unloading time; • Modal shift.

Table 26: PS FR UC3

UC4- Dangerous goods

Use Case	**UC4**
Title	**Dangerous goods multimodal traceability and compliance**
Description	The MGI-managed Cargo Community System CI5, used by the ports on the North Sea – Mediterranean corridor, supports the dangerous goods regulation and collaborative work between authorities and actors in the Marseille-Fos terminal. The NOSCIFeL platform allows truck drivers and authorities to access the documentation generated by CI5 by mobile services. NOSCIFeL will be the link with the architecture defined in the guidelines of UNECE for the

	transport of dangerous goods. The use cases to be defined within FENIX will be implemented with the Scoop@F and C-Roads methodology, by NeoGLS as ITSS-Road and ITSS-V[7] provider. That will allow the communication of the minimum set of data to access the electronic document which describe the transported goods. NEOGLS operates: 1. the platform to pilot and supervise the ITS Station. 2. the TP1 of the architecture of UNECE. Simulation of authorities, road operators and/or traffic managers' access to the eDGT information will be conducted, where CEREMA will extract the information through the web service to simulate real-time use as well as post-treatment (this based on archive data base).
Partner role	• MGI (CI5 manager) will develop data extractions from CI5 system in order to share with the NOSCIFeL platform data and documents related to dangerous cargo management. • NeoGLS (NOSCIFeL manager) will be in charge of mobile service solution to be used by truck drivers as well as control bodies to check dangerous cargo compliance. • CEREMA will work on the simulation of authorities' access to eDGT information. They are also in charge of engaging road operators in the ITSS-R deployment along their road network in order to integrate specific dangerous cargo information in generic traffic management system. For this task a liaison will be establish with InDiD project. CEREMA will also conduct the analysis and evaluation work. • Polytech HdF will work on the test activities, the evaluation and

[7] ITS-S meaning ITS Station, acronym for C-ITS Station as defined by the CRoads Platform. With extension –R they are roadside equipment and -V vehicle onboard equipment.

	validation for this use case.
Goal of the use case	To increase the visibility, reliability and compliance of dangerous cargo management at various points along the corridor, and to prove the concept of its integrating in existing traffic and cargo management systems.
Actors	Truck drivers, terminal operators, public authorities / agencies.
Preconditions (optional)	The place to deploy the ITSS-R along the road network must receive the agreement of the road operator, be energy powered and covered by mobile telecom network.
Main flow	The main flow comprises the following steps: 1. The shipping agent submits dangerous cargo declaration on the CI5 platform; 2. The authority of the Port of Marseille gives its agreement for dangerous goods importation; 3. The CI5 system sends data to AEOLIX platform; 4. The terminal operator discharges the cargo and sends the information to the CI5 platform; 5. The customs agent proceeds with the customs clearance (on the CI5 platform); 6. The shipping agent releases the cargo in the CI5 system with road trucker company identification; 7. CI5 sends information to AEOLIX; 8. The truck driver comes to pick up dangerous cargo at the terminal and activates the NOSCIFeL mobile App; 9. Terminal operators send gate-out report to the CI5 system; 10. The driver can access documents online; 11. Traffic control bodies control the truck driver's documents online as well as outside the terminal.
Analysis & evaluation	Analysis and evaluation are to be conducted on: • The messages received from the dangerous goods transport unit

	along the road network, the eDGT Information downloads thanks to these messages, the use of this information in real-time and the storage by road operators, traffic managers and statistic providers
	• The potential benefits of this information in real time and post treatment to consolidate the use cases that FENIX will help to define.
	• That will show opportunities for:
	  ○ Qualitative knowledge of the traffic (in addition to numbers of vehicles, C-ITS information is expected to provide more qualitative knowledge, for instance about the type of goods, volumes, weight, etc.);
	  ○ Evaluation of the traffic weight (e.g. for road or bridge maintenance).

Table 27: PS FR UC4

UC5-CO_2 reduction

Use Case	**UC5**
Title	**CO_2 reduction - Development of Sustainability decision support system and certified CO_2/SO_X/NO_X certificate**
Description	Through the CI5 Cargo Community System used by the Port of Marseille/Fos Terminal, real-time date can be extracted to calculate and certify environmental footprint of multimodal transport. The NOSCIFeL platform allows to calculate CO_2/SOX/NO_X values generated by various combinations of transport modes. This platform is also connected with a mobile App for exact calculation of road traffic.
Partner role	• MGI (CI5 manager) will develop data collectors from CI5 to start the process of footprint calculation. MGI will also integrate in its process the result of the calculation. • NeoGLS (NOSCIFeL manager) will adapt the NOSCIFeL platform to calculate the footprint from CI5 data and will develop

	interfaces to share it to the AEOLIX platform • Transports BOGAERT will test the App and provide real transport data for environmental footprint calculation. This will be linked to other actions already in place at company level, such as drivers' training in economic & ecological driving, fleet renewal with less polluting trucks • Polytech HdF will work on the test activities, the evaluation and validation for this use case
Goal of the use case	To integrate environmental footprint at the earlier stage of modal choice decision-taking so as to act efficiently in the decisional process for more sustainable cargo routing. Following that, to certify that sustainable transport, solutions have been operated, with a certified evaluation.
Actors	Shippers, shipping agents, freight forwarders, inland carriers (rail/river/road), government bodies
Main flow	The main flow comprises the following steps: 1. The shipping agent submits a cargo announcement on the CI5 platform; 2. The freight forwarder selects the transport legs of the supply chain in CI5; 3. The shipping agent selects the transport legs of the supply chain in CI5; 4. CI5 sends the selected transport definition to AEOLIX platform; 5. NOSCIFeL calculates the selected transport's environmental footprints from data collected from AEOLIX platform; 6. The shipping agent or freight forwarder accesses the footprint evaluation and chooses a cargo routing option; 7. The shipping agent or freight forwarder launches the transport operations in CI5; 8. NOSCIFeL calculates the transport leg's footprints from the data collected from AEOLIX platform;

	9. The shipping agent or freight forwarder accesses footprint evaluation.
Analysis & evaluation	The KPIs are the following: • Average fuel consumption; • Average CO_2 emission; • Average NOx emission.

Table 28: PS FR UC5

UC6-Customs optimisation

Use Case	**UC6**
Title	**Customs optimisation – Multi-factors risk analysis for sustainable control operations**
Description	Through the CI5 Cargo Community System used at the Port of Marseille, an anticipated risk analysis for import traffic is possible, even with huge cargo volumes and short-term ship ETA. The multi-factor risk analysis is especially focused on risks potentially affecting fluidity. The NOSCIFeL platform connected to AEOLIX will display the high-risk level cargo in the dashboard. The evaluated and presented information will help control agencies to better plan their controls by taking into account sustainability factors like inter-modality.
Partner role	• MGI (CI5 manager) will develop and deploy the multi-factor risk analysis from import manifest and a data connector to transfer the data to the AEOLIX platform. • NeoGLS (NOSCIFeL manager) will develop and deploy the specific dashboard within the NOSCIFeL platform where high risk cargo will be presented according to fluidity and sustainability objectives.
Goal of the use case	To optimise the checks by the control agencies under sustainability criteria, presented with risk-analysed and categorised information. The planning can take into consideration sustainability factors like inter-

	modality.
Actors	Shipping agents, freight forwarders, inland carriers (rail / river), control agencies, port authorities.
Main flow	The main flow comprises the following steps: 1. The shipping agent sends/submits import manifest to CI5 platform; 2. Rail / river operators submit loading lists to CI5; 3. MGI proceeds to the multifactor risk analysis; 4. MGI sends the analysed manifest to the AEOLIX platform; 5. NeoGLS displays the risk analysis documents in the dashboard and presents the risk cargo according to the risk level, taking into account sustainability.
Analysis & evaluation	The KPIs are the following: • Visibility/Data sharing; • Interoperability; • Average waiting time; • Average loading/unloading time.

Table 29: PS FR UC6

UC7-C-ITS for logistics

Use Case	**UC7**
Title	**C-ITS for logistics – Real-time Terminal accessibility conditions messaging systems**
Description	Channel 5 is deployed at the Port of Marseille / Fos Terminal; it is an intelligent system to detect terminal access problems due to a large number of factors like weather, social, IT problems, etc. Once a risk is detected, an alert is generated and displayed in the system or sent to another information system. The NOSCIFeL platform is connected to AEOLIX which will display the alert to truck drivers once they will come near to the terminal for which

	the alert has been generated.
Partner role	• MGI (Channel 5 manager) will develop the data alert connector from Channel5 a data connector to transfer the data to AEOLIX platform. • NeoGLS (NOSCIFeL manager) will develop the specific messaging system within the NOSCIFeL platform where alerts will be presented in order to avoid parasite movements. • Polytech HdF will work on the test activities, the evaluation and validation for this use case.
Goal of the use case	To avoid unnecessary freight and vehicle movements around the Terminals on the North Sea – Mediterranean corridor with real-time information. Thus, enhance efficiency of road transport and improve its environmental impact by avoiding unnecessary trips.
Actors	Terminal operators, truck companies and drivers.
Main flow	The main flow comprises the following steps: 1. Channel5 detects a risk and sends the alert to the AEOLIX system; 2. NOSCIFeL detects the alert; 3. The dashboard is updated with the alert with precise location, expected duration and severity; 4. When the truck driver crosses a geofence zone, the message appears on his/her mobile phone.
Analysis & evaluation	The KPIs are the following: • Visibility/Data sharing; • Interoperability; • Average waiting time.

Table 30: PS FR UC7

8. GERMANY, RHINE-ALPINE CORRIDOR

8.1 Pilot Site description

PS DE: Capacity Control (Corridor) Platform ("CCP") for the Rhine-Alpine Corridor

The **German Pilot Site/"CCP"** will demonstrate an integrated intermodal capacity and corridor management along the Rhine-Alpine corridor in the context of FENIX.

For the dynamic freight management resulting from volatile freight demand, digital approaches to optimise freight capacity will be demonstrated within a federated architecture context. This comprises the visualisation of available freight *capacities*, both on intermodal trains as well as for first/last mile terminal trucking services. Freight *capacities* are embedded into an end-to-end data management for relevant procurement-to-pay procedures, e.g. freight exchange platforms, short-term e-tendering, etc. With regards to *corridor management*, available status data information from already existing platforms (e.g. RNE-TIS) will be integrated into the FENIX setup. Thorough visibility and multi-layered data analytics will be provided as a dashboard enabling process, leading to transparency and optimisation of freight operations.

Both, capacity and corridor management will allow to apply sophisticated services for an enhanced corridor setup by introducing the concept of *synchromodality*, which shall allow a mod- free capacity planning.

Base TEN-T corridors: Rhine-Alpine

Actions & Business opportunity

The German Pilot Site will deal with the following Use Cases:

1. Multimodal Freight Capacity (first/last mile);
2. Intermodal Railway Capacity;
3. Intermodal Corridor Data Hub;
4. Mode Free Capacity Planning (Synchromodality).

8.2 Pilot Site working group definition

Partner name	Pilot Role
PTV	As a Shared Pilot leader, software and technology developer for the transport industry, PTV contributes with services for routing, planning

	and optimisation for intermodal transport.
TX Logistik	A Shared Pilot leader and a railway undertaking and intermodal operator, TX Logistik defines technical and operational requirements and demonstrates solutions in operational settings.
T-Systems	T-Systems is an IT Service Provider who's role is to deploy and run the Pilot Site services together with the Pilot partners. Within FENIX and the Pilot Site T-Systems will contribute the 'International Data Space' approach of a trustworthy data economy by capabilities of the Data Intelligence Hub – DIH by T-Systems within the federated network of platforms FENIX. For the Rhine -Alpine Pilot Site the Use Case services will be deployed within this environment and operated.
JandeRijk	JandeRijk is an Intermodal Freight forwarder that defines technical and operational requirements and demonstrates solutions in operational settings.
Uniontrasporti (EGTC Affiliated Entity)	Uniontrasporti is the Italian Chamber of Commerce Competence Centre on transport, logistics and innovation technologies. It involves Italian actors and performs analysis of the logistic scenario of the Italian portion of the Rhine Alpine corridor. Moreover, it acts to facilitate synergies with the North West Italy pilot.
Rapp	Rapp will support the setting up of an operation and evaluation framework, based upon current corridor characteristics, KPIs and developments, by integrating knowledge from the TEN-T corridor studies. Furthermore, Rapp takes on the coordination with potential Swiss corridor stakeholders, infrastructure managers, terminal/port operators and logistics service providers. It collects and coordinates the accessibility data on Swiss hubs and urban nodes, supports the aggregation of data, connects existing data sources and links available information from Switzerland, supporting the knowledge transfer and implementation along other TEN-T corridors.
Regione Piemonte	Involves and coordinates the participation of Italian affiliated entities (IT Pilot sites) and related activities in the Piedmont territory, the

(EGTC Affiliated Entity)	involvement of possible stake holders, like inland ports, within the regional authority policy framework.
LINKS	1. FENIX scale-up and transferability plan to inland nodes: • North-West Italy operators' involvement; • As is analysis in North-West Italy; • User needs gathering; • Fostering acceptance on collaborative models and data sharing. 2. Study of the potential of FENIX dashboard for planning authorities: • Gathering of planning authorities' needs; • Guidelines for the implementation of a DSS for regional freight transport planning.
TU Eindhoven	Implementation partner: support the adaptation of a software at Jan de Rijk, to incorporate ETA service and carrier capacity planning services. Planning expert: adapts existing planning systems at Jan de Rijk, to make use of ETA and capacity planning services, and supports a mode-free booking.
EGTC	Dissemination activities, potentially with related partners to Rhine Alpine Corridor. Support in acquisition of users of "CCP" or data from the Rhine-Alpine Corridor, organising of information events, dissemination of test results to potential further users in the corridor.

Table 31: PS DE Working Group

8.3 Pilot Site Use Cases

Use Case ID	Use Case Name	Description	Contributors
UC1	Multimodal Freight Capacity (first/last mile)	Data exchange for local carriers to share capacity on regional freight operations (i.e., linked to intermodal operations).	JdR; TU Eindhoven; PTV; T-Systems;

			Uniontrasporti; Rapp.
UC2	Intermodal Railway Capacity	Makes the intermodal railway capacity visible to relevant partners and improve the use of intermodal trains.	TX; PTV; T-Systems; JDR; Rapp.
UC3	Intermodal Corridor Data Hub	Integrates the available status of data along the Rhine-Alpine corridor for intermodal trains, end-to-end.	PTV; TX; T-Systems; JdR; TU Eindhoven; Uniontrasporti; Rapp.
UC 4	Mode free capacity planning (Synchromodality)	Demonstrates that mode free capacity planning will be implemented for the Rhine-Alpine corridor.	TU Eindhoven; JdR; PTV; TX; Uniontrasporti; Rapp; T-Systems.

Table 32: PS DE Use Cases

UC1- Multimodal Freight Capacity (first/last mile)

Use Case	**UC1**
Title	**Multimodal Freight Capacity (first/last mile)**
Description	This UC demonstrates a regional capacity management approach to include local carriers for sharing capacity on regional freight operations (i.e., linked to intermodal operations). Pre- and post-haulage trucking is a crucial step in intermodal transport and usually operated with third parties to a high degree. Needed capacities

	can be a bottleneck and visibility on available resources is only given to a small degree and usually are not integrated into lead freight forwarders TMS. Furthermore, crucial parameters (e.g. “move-to” and “security pre-advise” notifications) regarding the respective loading unit are today manually exchanged with relevant partners.
Partner role	• JdR: contributes with operational and technical specifications/requirements. • TU Eindhoven: adapts existing planning systems at Jan de Rijk, to make use of capacity planning services. • PTV: will facilitate the setup and integration into the federated network. • T-Systems: will contribute to the ‘International Data Space’ approach of a trustworthy data economy by using the capabilities the Data Intelligence Hub. • Uniontrasporti: contributes to the involvement of possible Italian stakeholders and acts to facilitate synergies with the North West Italy pilot. • Rapp: evaluates the framework and coordinates with Swiss corridor stakeholders.
Goal of the use case	The goal is to demonstrate how capacities for pre-/post haulage can be made visible and lead to a more efficient transport setup and information exchange by integrating local platforms into a federated network.
Actors	(Lead) freight forwarders, local third party carriers, IT solution providers, Service Providers, 3PL, 4PL.
Preconditions (optional)	4PL Control Centre balances freight requests from shippers into groups related to the type of freight, service levels and region. This leads to transport capacity requests – what, when, how freight has to be transported – including a set of Carrier Assignment Advices (CAA). TSP will provide transport frequently updated capacity information.
Main flow	The main flow comprises the following steps:

	1. 3PL/4PL will publish initial requests on transport capacity to TS GE DIH; 2. 3PL/4PL will perform a planning on related set of Carrier Assignment Advices (CAA) and will publish these in order to the initial capacity requests to XXX; 3. 3PL/4PL will iterate for optimisation (determine best ETA) until a final set of CAA in order to generate supply chains for transport execution; 4. DIH will provide updated transport capacity information including CAA; 5. TSP provides information to 3PL/4PL on 'Transport' done.

Table 33: PS DE UC1

UC2 – Intermodal Railway Capacity

Use Case	**UC2**
Title	**Intermodal Railway Capacity**
Description	Today, available capacity on intermodal trains usually is locked into the respective operator organisation and not available to relevant/interested parties. At the same time, intermodal operator needs full use of available slots in order to provide an efficient and profitable service. An exchange on available, remaining slots is missing, which leads to a suboptimal setup in intermodal transport.
Partner role	• TX: will provide information about available, remaining slots for intermodal trains; • PTV: will include the information of railway operator to service offer in order to facilitate; • T-Systems will contribute the 'International Data Space' approach of a trustworthy data economy by using the capabilities of the Data Intelligence Hub – DIH by T-Systems within the federated network of platforms FENIX; • JdR: will focus on container optimisation for train use;

	• Rapp: evaluation framework, coordination with Swiss corridor stakeholders.
Goal of the use case	The goal is to demonstrate how to improve visibility by sharing intermodal railway capacity in the setting of a federated network. Remaining capacities on intermodal trains shall be made visible to the market in near-time and in order to improve the use of intermodal trains.
Actors	Railway operators, IT solution providers, Service Providers, TSPs.
Preconditions (optional)	Railway operators, TX Logistik, balances committed vs available capacity slots on intermodal train on given points in time. Available slots are consolidated in railway operator ERP and enriched with additional information (e.g. cut-off times).
Main flow	The main flow comprises the following steps: 1. Railway operators will publish initial intermodal capacity slot information to TS GE DIH; 2. DIH will provide an intermodal capacity slot information to Service providers, TSPs etc. or these actors will subscribe to an intermodal capacity slot information data source; 3. Railway operators will publish updates on the intermodal slot information to TS GE DIH; 4. DIH will provide intermodal capacity slot information to Service providers, TSPs etc. or these actors will subscribe to an intermodal capacity slot information data source.

Table 34: PS DE UC2

<u>UC3 – End-to-End Intermodal Corridor Data Hub</u>

Use Case	**UC3**
Title	**End-to-end Intermodal Corridor Data Hub**
Description	Despite today many platforms for intermodal transport status data exist, they are not integrated. Thus, actors in the intermodal supply chain need to retrieve information from various sources, which leads to a delay in

	processing operational data and hinders to improve quality in intermodal transport by using advanced services, like ETA. In this use case, relevant platforms shall be integrated into a "Corridor Data Hub", in the setting of a federated network. This includes platforms/systems from stakeholders like Railway Infrastructure Managers (RIM), private RIMs, terminals, operators, railway undertakings, etc. This integrated Corridor Data Hub serves as a prerequisite in order to implement advanced services. A corridor information dashboard shall be setup, which could become a central element of a corridor wide collaboration management system. Federated platforms scenarios will be tested and demonstrated using the different data sets.
Partner role	• TX: will provide status information for intermodal trains and loading units, terminal-to-terminal; • PTV: orchestrates and manages the integration of various platforms; • T-Systems will contribute the 'International Data Space' approach of a trustworthy data economy by using the capabilities the Data Intelligence Hub – DIH by T-Systems within the federated network of platforms FENIX; • JdR: defines the operational requirements and provides status about intermodal shipments; • TU Eindhoven: adapts existing planning systems at Jan de Rijk to make use of ETA and capacity planning service; • Uniontrasporti: contributes to involving possible Italian stakeholders and acts to facilitate synergies with the North West Italy pilot; Rapp: evaluates a framework and coordinates with Swiss corridor stakeholders.
Goal of the	• Integration into the Corridor Data Hub of an available relevant

use case	data platform for intermodal transport along the Rhine-Alpine corridor; • Testing and demonstrations of federated platforms using the different data sets; • Demonstration of a corridor information dashboard.
Actors	Railway undertakings, intermodal operators, intermodal freight forwarders, IT service providers, TSP and service provider.
Preconditions (optional)	Train resource and capacity management by railway undertaker must be in place.
Main flow	The main flow comprises the following steps: 1. A Pre-Haulage status information (loading unit) will be published by the TSP; 2. An initial train timetable data will be published by railway undertakers to a DIH Corridor Data Hub source; 3. A train timetable source will be subscribed by TSPs, service providers etc.; 4. Confirmed loading units are linked to respective train timetable by intermodal operator; 5. Status information of loading units will be confirmed by intermodal terminal operators; 6. Train Status information is captured by railway operators during train rides by consolidating various sources, e.g. RNE TIS, national IM railway and railway undertaking operational systems; 7. Post Haulage status information (loading unit) will be published by TSP; 8. Status information of respective loading units will be published in DIH Corridor Data Hub dashboard or can be subscribed by e.g. service providers.

Table 35: PS DE UC3

UC4 – Mode free capacity planning

Use Case	**UC4**
Title	**Mode free capacity planning**
Description	Based on the available data along the Rhine Alpine corridor, a tool for mode free capacity planning will be implemented. The tool takes orders from shippers, as they are collected by a third-party logistics provider, and finds an optimal allocation of those orders to available capacity as it is provided by the federated platforms in real-time. The tool uses the relevant information that is available through the federated platform on availability of transport resources, as well as the transport orders that must be planned as they are developed in the previous use cases. The planning services are made available based on that.
Partner role	• JdR: demonstrates mode free capacity planning in an operational setting; • TU Eindhoven: adapts existing planning systems at JdR to support mode-free booking; • PTV: provides planning services to be integrated into JdR systems; • TX: provisions of relevant information to support use of intermodal transport resources for mode-free booking, overall conceptional support and definition of requirements (focus on rail combined transport (CT)); • EGTC: supports the provision of relevant information to support the use of transport resources for mode-free booking; • Uniontrasporti: acts to facilitate synergies with the North West Italy pilot; • Rapp: supports the provisioning of relevant information to support the use of transport resources for mode-free booking; • T-Systems will contribute the 'International Data Space' approach of a trustworthy data economy by using the capabilities of the Data Intelligence Hub – DIH by T-Systems within the federated

	network of platforms FENIX.
Goal of the use case	• To integrate a planning service for mode-free booking of transport orders; • To demonstrate the effect of mode-free booking on transport efficiency.
Actors	Freight forwarders, Planning Services Provisionings, System Integrators, Transport Information Provisionings.
Preconditions (optional)	Intermodal transport options (e.g. train) are requested for transport orders via the FENIX network (see UC2). Transport is optimised for the given options. Required transport capacity is calculated based on Freight Optimisation, carriers are determined and a Carrier Assignment Advice (CAA) is generated (UC 1). ETA is requested for the selected carriers (see UC4). CAA is optimised for the retrieved ETA
Main flow	The main flow comprises the following steps: 1. The intermodal operator espose data (via DIH); 2. The service provider subscribe to the data of step 1. for logistics planning and optimisation; 3. 3PL/4PL plans transport orders using planning and optimisation services for intermodal transport; 4. The sssignment planning first/last mile and main haulage.

Table 36: PS DE UC4

9. GREECE, GREECE BALKAN-TEN-T NETWORK, ADRIATIC-IONIAN CORRIDOR-CYPRUS MULTIMODAL PILOT SITE

9.1 Pilot Site description

PS GR: Greece-Balkan-TenT network, Orient/East-Med corridor - Cyprus multimodal Pilot Site

The Greek Pilot Site – from now on **FENIX^{GR}** – will operate as an open innovation community – a Living Lab – within which private enterprises, public authorities and research institutions collaborate to facilitate research-practice integration, and develop solutions for real-life, transport and logistics (T&L) business scenarios and use cases.

FENIX^{GR} foresees the enhancement of the competitiveness and ecological footprint of the Greek part of the Orient/East-Med Corridor emphasising in the part of the corridor that connects the biggest and busiest port of Greece, Piraeus, the capital city Athens and the Thessaloniki to borders area. This will be achieved through the digital transformation of logistics operations and the provision of smart supply chain solutions for real time information and data exchange -that refer to both rail and road operations- along the corridor.

FENIX^{GR}'s main goal is to achieve integrated T&L operations along the Greek part of the Orient/East-Med Corridor and to the rest of TEN-T corridors towards North and Central Europe through the federation of three local logistics platforms:

1. **Port Community Node;**
2. **Corridor Monitoring Platform;**
3. **Collaborative meta-services Platform.**

These platforms will exchange on-demand information along two main strategic axes:

1. **Terminal and Corridor operations status**: Real time information exchange about the logistics processes that take place in and out of the Port of Piraeus and along the Corridor, i.e., cargo monitoring, alerts, truck & rail availability, status of customs etc.
2. **Added value Services & Infrastructure**: Real time information about the availability and traffic status of logistics services along the Greece-Balkan Corridor, i.e., rail and truck availability, directory of logistics and transport services, on-demand warehousing.

This will be facilitated through the provision of interoperable planning and optimisation tools, i.e.: transport analytics, key performance indicators, etc.

Locally, FENIX^{GR} partners – beneficiaries and implementing bodies – are in charge of identifying,

recording and integrating the local platforms and services that are deemed as the most appropriate to facilitate T&L operational efficiency and a paperless T&L future along the corridor. The specific services that will be developed will focus on data collection and availability of information related to the transport process or the traffic conditions corresponding to demand and available capacity for optimisation usage.

Figure 1 presents an overview of the services that will be provided by the Greek Test Site and will be federated to the FENIX network of platforms.

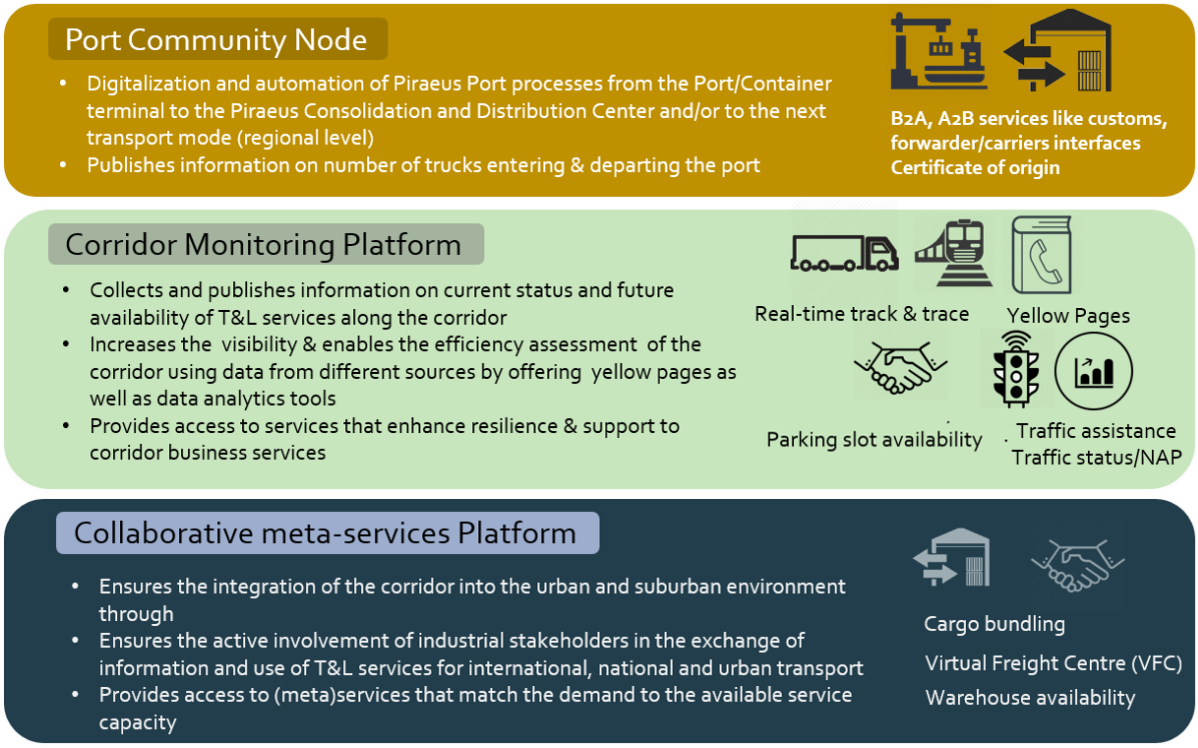


Figure 1: Services to be provided by the Greek Pilot and the interrelation

FENIX[GR] is organised in five main operational modules/components (here called Ci) and related services*[8]

- **Module 1 (C1)**: A platform for the digitalisation and automation of Piraeus Port processes from the Port/Container terminal to the Piraeus Consolidation and Distribution centre and/or to the next transport mode (regional level) (i.e. B2A, A2B services, certificate of

[8] The services of FENIX[GR]'s component are complementary to each other.

origin).

- **Module 2 (C2)**: A logistics corridor management platform (LCMP) for collecting and publishing information on the availability and status of road and rail services (i.e., track & trace, time stamp of delivery, request fulfilment time).
- **Module 3 (C3)**: A collaborative meta-services platform that ensures the effective integration of the corridor to the urban and inter-urban environment through the active involvement of industrial stakeholders in the use of international and urban T&L services (i.e., virtual freight centre, cargo bundling and other AEOLIX services).
- **Module 4 (C4)**: A corridor monitoring platform (CMP) for services along the tested corridor to support cooperation and enhance multimodal transport and supply chain planning along the TEN-T corridor (i.e., offered services, actors and service providers info, capacity of services, status info, quality, warehouse availability, parking slot availability and traffic assistance for truck services).
- **Module 5 (C5)**: A set of tools and services that act as technology enablers and facilitate added value creation for the rest modules (C1-C2-C3-C4) (i.e., Key Performance Indicators and Data Analytics, other SELIS services).

The final architecture of FENIX^{GR} ends with the integration of the described five modules (service enablers) on the following three platforms, which will enable the federation of multiple public and private platforms (i.e., traffic management centres, the national access point, etc.) to the FENIX network:

1. **Port Community Node**
    - Supports the digitalisation and automation of Piraeus Port processes from the Port/Container terminal to the Piraeus Consolidation and Distribution centre and/or to the next transport mode (regional level);
    - Publishes information on number of trucks entering and departing the port;
    - Module 1 (C1) is connected and provides information to this platform.
2. **Corridor Monitoring Platform**
    - Collects and publishes information on current status and future availability of T&L services along the corridor;
    - Increases the visibility and enables the efficiency assessment of the corridor using data from different sources (i.e. offered services, actors & service providers info, capacity of

services, status info, quality) by offering yellow pages and data analytics tools;

- Provides access to services that enhance resilience and support corridor business services (warehouse availability, parking slot availability, traffic assistance for truck services);
- Modules 2 (C2), 4 (4) and 5 (C5) are connected and provide information to this platform.

3. **Collaborative meta-services Platform**

- Ensures the integration of the corridor into the urban and suburban environment;
- Ensures the active involvement of industrial stakeholders in the exchange of information and use of T&L services for international, national and urban transport;
- Provides access to (meta)services that match the demand to the available service capacity and adds value services such as cargo bundling and virtual freight centre (VFC);
- Module 3 (C3) and other AEOLIX services are connected and provide information to this platform.

The above platforms and services are existing or under-development and their connection to the FENIX infrastructure is expected to facilitate and enhance the operational efficiency and visibility of logistics operations along the Orient East-med corridor. In this way, an interconnected Greek Transport Network will be established enabling the movement of goods from ports and airports to every city and receiver destination in ways that optimise environmental performance.

Specifically, the proposed infrastructure will:

1. Ensure interoperability between supply chain partners' systems, lowering the barriers to collaboration and information sharing and creating trust in the complexity of multi-modal transport;

2. Deliver connectivity solutions and tooling that will allow low-cost integration of transport actors in Greece including SMEs in supply chain, supporting the horizontal two-way communication and information exchange between collaborating partners for the efficient planning of their operations;

3. Provide integration tools and solutions as a service for the cost-effective integration of sensors and smart devices deployed in IoT and ITS solutions, for efficient supply chain data management;

4. Integrate open/linked data sources, creating a Greek aggregation and monitoring subscription service, providing information, notifications and alerts to stakeholders

(according to their profiles and specific concerns) on possible events that may impact freight movement and influence their operations;

5. Integrate event management capabilities to accelerate visibility and transparency in the execution of plans, and to allow real-time reaction for faster supply chain reconfiguration and increased resilience;
6. Provide KPI targeted orchestration of logistics processes with the advantage of using elasticity of the infrastructure, allowing scale up or even switching planning applications at minimum cost. This facilitates entering new markets or launching new services;
7. Ensure total visibility, proactive and feedback driven decision making as well as flexible collaborative planning along the Greek part of the Orient East-Med Corridor. Proactive decision-making combines current knowledge of SC needs (derived from a cloud-enabled real time view) with the understanding of key lead times, enabling optimisation of KPIs. Better end-to-end visibility carries over to the financial side of operations, allowing monitoring financial performance of the transport operation.

The successful completion of Living Lab activities will result in enhanced end-to-end visibility along the corridor supply chains based on the real time data availability. In addition, it is also expected to significantly simplify and reduce the time needed to complete the freight transport procedures from and to large logistics hubs (ports, airports, distribution centres).

The Greek Pilot Site covers all phases and activities of the project FENIX from research and development to implementation, validation and dissemination.

Base Ten-T corridors: Orient/East Mediterranean

Regions: Attiki (EL30), Ipeiros (EL54), Kentriki Makedonia (EL52), Sterea Ellada (EL64) & Thessalia (EL61)

Figure 2 presents which part of the Greek corridor covers each of the services that will be developed in the frame of the Greek Pilot.

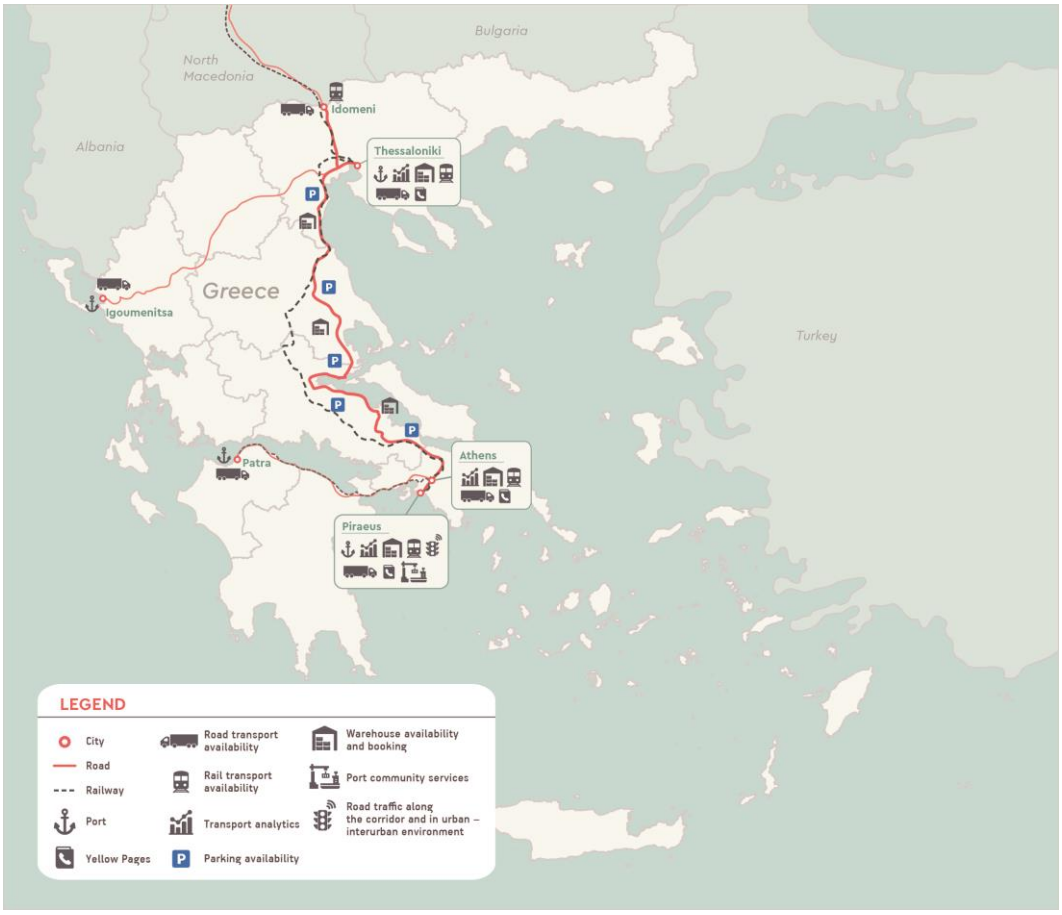


Figure 2: The scope and geography of the FENIX GR components

9.2 Pilot Site working group definition

FENIX^{GR} developed a partnership that consists of a mixture of private and public entities with specified role and responsibilities. The partnership consists of eight beneficiaries and two implementing bodies. Their role in the Greek pilot and in FENIX is described in the table below.

Partner name	**Pilot Role**
Greek Ministry of Infrastructure and Transport (Greek Ministry) • Ministry	The Greek Ministry is a member state beneficiary of the project. The Greek Ministry is responsible for the management and coordination of the Greek Pilot Site and its connection to the project's operations.
ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS	CERTH/HIT is an implementing body on behalf of the Greek Ministry.

ANAPTYXIS (CERTH/HIT) • Research Organisation	Alongside POLIBA (PS IT1) and ICCS, CERTH/HIT, it is responsible for the coordination and specification of the evaluation framework in each pilot test site. Alongside ICSS, CERTH/HIT, it is responsible for the technical coordination and operational evaluation of all pilot test sites. The Greek Ministry and the rest of the Greek beneficiaries have designated CERTH/HIT as the leader of the Greek Pilot Site. CERTH/HIT is responsible for the development, implementation and validation of modules 3 and 4, and participates in the development, implementation and validation of modules 2 and 5 of the Greek Pilot Site.
INSTITUTE OF COMMUNICATION AND COMPUTER SYSTEMS (ICCS) • Research Organisation	ICCS is an implementing body on behalf of the Greek Ministry. Alongside POLIBA (PS IT1) and CERTH/HIT, ICCS is responsible for the coordination and specification of the evaluation framework in each pilot test site. Alongside ATOS, T-Systems, Ebos, CLMS & INLECOM, ICCS is responsible for the coordination and implementation of technology integration. Alongside CERTH/HIT, ICCS is responsible for the coordination of technical and operational evaluation of all pilot test sites. ICCS is responsible for the development, implementation and validation of Module 1, and participates in the development, implementation and validation of Module 5 of the Greek Pilot Site.
KUEHNE+NAGEL SOCIETE ANONYME FOR TRANSPORTS & LOGISTICS	K&N is a beneficiary of the project and is responsible for the development, implementation and validation of Module 2. K&N participates in the development,

(K&N) • Transport Operator	implementation and validation of Modules 3 and 4 of the Greek Pilot Site.
DIEVROPAIKI ETAIRIA SYMBOULON METAFORON ANAPTIXIS KAI PLIROFORIKIS AE (TREDIT) • Technology Provider	TREDIT is a beneficiary of the project and is co-responsible for the development, implementation and validation of Module 2 alongside K&N. TREDIT participates in the development, implementation and validation of Modules 3, 4 and 5 of the Greek Pilot Site.
INLECOM INNOVATION (INLECOM) • Technology Providers	INLECOM is a beneficiary of the project. Alongside ATOS, T-Systems, Ebos, CLMS and ICCS (cslab), INLECOM is responsible for the coordination and implementation of technology integration. INLECOM is co-responsible for the development, implementation and validation of Module 5 alongside CLMS, and participates in the development, implementation and validation of Modules 3, 4 and 5 of the Greek Pilot Site.
CLMS (UK) LIMITED – YPOKATASTIMA ELLADAS (CLMS) • Technology Providers	CLMS is a beneficiary of the project. Alongside ATOS, T-Systems, Ebos, INLECOM & ICCS (cslab), CLMS is responsible for the coordination and implementation of technology integration. CLMS is co-responsible for the development, implementation and validation of Module 5 alongside INLECOM, and participates in the development, implementation and validation of Modules 3, 4 and 5 of the Greek Pilot Site.
PIRAEUS EUROPE ASIA RAIL LOGISTICS S.A. (PEARL S.A.) • Rail operator	PEARL S.A. is a beneficiary of the project. PEARL S.A. participates in the development, implementation and validation of Modules 1, 2 and 5 of the Greek Pilot Site.
STATHMOS EMPOREYMATOKIBOTION	PCT is a beneficiary of the project. PCT participates in the development, implementation and

PEIRAIA A.E. (PCT) • Port Operator	validation of Modules 1 and 5 of the Greek Pilot Site.
KENTRO DIAXIRISIS KAI DIANOMHS EMPOREYVATOKIVOTION PIREA ANONIMI ETAIRIA (PCDC) • Distribution and consolidation operator	PCDC is a beneficiary of the project. PCDC participates in the development, implementation and validation of Modules 1 and 5 of the Greek Pilot Site.

Table 37: PS GR Working Group

9.3 Pilot Site Use Cases

Use Case ID	Use Case Name	Description	Contributors
UC1	Digitalisation of port processes (A2B, B2B, B2A processes)	Digitalisation and monitoring of the import process for cargo arriving at the Piraeus Port and imported via rail/road. The Use Case involves monitoring the status of the cargo from the unloading of a container in the port of Piraeus, to the transfer, consolidation and distribution centres, until the departure from the port. The digitalisation of documentation and processes is expected to reduce the required time from about six hours today to less than thirty minutes. This will provide secure access to the Free Zone and eliminate the need for physical presence of stakeholders in the port, thus improving efficiency and reducing cost, traffic and	ICCS

		relative fuel emissions. UC1.1 Import Cargo UC1.2 Export Cargo	
UC2	Balanced use of modal availability along the corridor – Intermodality	A cargo matching service on truck and train availability, with messages arriving to the freight forwarders and the business enterprises via the Corridor Monitoring Platform and the Cargo Bundling Marketplace. The efficiency of the T&L operations is optimised by enabling the cargo bundling on available trucks and trains along the corridor through the Corridor Monitoring Platform.	K&N, TREDIT, CERTH/HIT
UC3	Monitoring of status of transport operations	The UC deals with the status creation throughout the value chain of the corridor, including last mile and the publishing of the statuses through the Corridor Monitoring Platform. B2B solutions will be developed so that businesses can get statuses and documents related to their orders in massive mode and be able to integrate them into their operational Systems. Most of the existing solutions regarding the status reporting and the gathering of documents are B2C. The End User must either give the order number one-by-one, or for a period of time give the order number via a User Interface and then get statuses through the User Interface in a proper format. Therefore, the resulting set of data and	K&N, TREDIT, CERTH/HIT

		documents are unable to be integrated into the customers' operational systems as a B2B solution would require. A B2B solution will be developed, where the system could be setup. This way, and given certain parameters, statuses and documents related to the customer's orders can be gathered and then sent to the customer via a proper connector/interface. The consumers of the information will be able to integrate the information smoothly into their operational environment. Information (statuses and documents) will be collected from various sources, including smartphones, desktops, scanners or even manual entry, and placed in a central repository. The customer will be able to register to the system and define various parameters and choose which statuses, documents and between which time frames the information should be collected. The information will be extracted according to the parameters in a format that is appropriate to be integrated into the customer's operational system. The system will include a User Interface for: • Setting up the system; • Entering the statuses and documents. All security aspects must be respected and integrated into the system. UC3.1 Common notification generation	

		UC3.2 B2B Massive Status Reporting System (MSRS) to Customers.	
UC4	Traffic management & parking availability	Provision of traffic information on monitored nodes and traffic management services to ease the traffic congestion at the gates of the Port of Piraeus.	TREDIT, CERTH/HIT
UC5	Yellow Pages & KPIs	Provision of information for available logistics and transport services in the Greek T&L corridor and nodes via a digital inventory.	CERTH/HIT, TREDIT
UC6	End-to-end provision of logistics services for SMEs along the corridor	This Use Case will cover all modules developed in FENIX for the Greek Pilot. The Use Case involves an SME located in Northern Greece wishing to import goods via the port of Piraeus, combining them with a smaller shipment already located at the Free Zone of Piraeus and move them to a warehouse near its premises.	ALL

Table 8 PS GR Use cases

UC1- DIGITALISATION OF PORT PROCESSES (A2B, B2B, B2A services)

Use Case	**UC1**
Title	Digitalisation of Port Processes (A2B, B2B, B2A services)
Description	**UC1.1 Import Cargo** The pilot will involve the development of several modules that will be integrated with the Hellenic Port Community System (HPCS). More specifically, the following services will be developed: 1) A digital preparation of proof of delivery notes from the Piraeus Container Terminal to the Piraeus Consolidation and Distribution Centre and to the next transport mode (rail transport operator, airport, transport company). The module will involve the identification and

	setup of trigger points from different systems (i.e. terminal operating system, warehouse management system, rail operator schedules, various port community system modules) that will use the notifications module of the HPCS in order to notify all involved parties (cargo owners, customs brokers, transport operators). 2) A customs electronic notification for pending customs clearance. The module will be integrated with the customs module of the HPCS to send the documentation required for Customs Clearance Requests (i.e. Certificate of Customs Status) and receive notifications regarding the relative process. The module will also be integrated with the notification module of the HPCS to provide involved parties (cargo owners, customs brokers) with visibility of the process. 3) Sending electronic notifications to transport companies, road and rail transport operators and cargo owners for pending actions. This module will be integrated with the HPCS notifications module in order to send requests to logistics stakeholders for any pending action (i.e. documentation requirements, ETAs for trucks etc). 4) The implementation of a secure entry system of truck drivers to the distribution and consolidation centre. This module will be based on the generation of unique PIN codes that will be linked to cargo pickup and delivery orders registered in the Warehouse Management System. The module will also interface with the HPCS Notifications module in order to distribute PIN codes. 5) Cargo monitoring and electronic notifications for cargo status throughout the arrival, stay and are transported to the next mode. This module will collect route and status information from all stakeholders of the Piraeus Port Community to provide visibility of cargo operations (i.e. discharging from the vessel, warehouse delivery, consolidation status, next mode delivery times, customs clearance process, etc.). 6) Provide analytics capabilities using the collected data from previous cargo monitoring. The analytic capabilities will be made available with

	the use of SELIS' big data analytics infrastructure via the Corridor Monitoring Platform. The analytics will offer two distinct features: a) descriptive analytics that present visualisations in the form of bars, charts, etc. regarding typical KPIs with business value (i.e., mean delay, etc.) b) predictive analytics that will consume historical data, train the necessary machine learning model and predict KPIs of incoming cargo, such as ETA, etc. During the course of the project, the needs for data exchange with other FENIX platforms will be evaluated and implemented. **UC1.2 Export Cargo** 1) Electronic notifications to transport companies, road transport operators, rail transport operators, cargo owners for pending actions. This module will be integrated with the HPCS Notifications module in order to send requests to logistics stakeholders for any pending action (i.e. documentation requirements, ETAs for trucks etc). 2) Implementation of a secure entry system of truck drivers to the distribution and consolidation centre. This module will be based on the generation of unique PIN codes that will be linked to cargo pickup and delivery orders registered in the Warehouse Management System. The module will also interface with the HPCS Notifications module to distribute PIN codes. 3) Cargo monitoring and electronic notifications for cargo status throughout the arrival, stay and transport to the next mode of transport. This module will collect route and status information from all stakeholders of the Piraeus Port Community to provide visibility of cargo operations (i.e. warehouse delivery, consolidation status, vessel loading etc.). 4) Provide analytics capabilities using the collected data from previous cargo monitoring. The analytic capabilities will be made available with the use of SELIS' big data analytics infrastructure via the Corridor

	Monitoring Platform. The analytics will offer two distinct features: a) descriptive analytics that present visualisations in the form of bars, charts, etc. regarding typical KPIs with business value (i.e., mean delay, etc.) b) predictive analytics that will consume historical data, train the necessary machine learning model and will be used to predict KPIs of incoming cargo, such as ETA, etc. During the project, data exchange needs with other platforms participating in FENIX will be evaluated and implemented.
Partner role	• The role of PCDC and PEARL will be to provide requirements and specifications for the modules relative to their operations; • The role of PCT and ICCS will be to perform the analysis, development and integration of the modules with the required platforms; • The role of INLECOM, CLMS and ICCS-cslab will be to provide added value services (i.e. Big Data Analytics, Normalisation data services) to support the data scheme and analytics recipes for the specific use case.
Goal of the use case	To optimise the import process at the Port of Piraeus via the digitalisation of information exchange among port stakeholders and the access to real-time data on status of the cargo. Interoperability with other platforms will also be evaluated.
Actors	Shipping lines, shipping agents, terminal operators, warehouse operators, freight forwarders, shippers/consignees, customs brokers, customs offices, transport companies, truck drivers and rail operators.
Phase (optional)	A phase to collect requirements has been initiated and initial feedback has been gathered.
Preconditions (optional)	The availability of the Hellenic Port Community System and the relative infrastructure.
Main flow	**UC1.1 Import Cargo**

	The main flow comprises the following steps: 1. A container arrives at PCT; 2. Registered users of the Hellenic Port Community System (HPCS) that have declared interest for the container are notified about the discharge of the container in Piraeus via the HPCS notifications module. The action is registered in the new FENIX HPCS Cargo Monitoring and Status module; 3. The freight forwarder or authorised party uses the new FENIX process for digital preparation of delivery notes from the Piraeus Container Terminal to the Piraeus Consolidation and Distribution Centre (PCDC); 4. The container is forwarded to the PCDC (warehouse operator) for consolidation and distribution. The action is registered in the new FENIX HPCS Cargo Monitoring and Status module; 5. The freight forwarder and authorised parties are notified via the HPCS notifications module; 6. The container is opened, and the cargo is recorded in the PCDC inventory; 7. The freight forwarder and authorised parties are notified via the HPCS notifications module. The action is registered in the new FENIX HPCS Cargo Monitoring and Status module; 8. The freight forwarder issues a Customs Clearance request for part or the whole cargo via the new FENIX module for pending customs clearances; 9. A Customs clearance request is forwarded to the relative Customs Office via the HPCS Customs module; 10. The customs Clearance ID is received by the Customs Office; 11. The freight forwarder and authorised parties are notified via the HPCS notifications module. The action is registered in the new FENIX HPCS Cargo Monitoring and Status module; 12. The freight forwarder uses the new FENIX process for the digital

	preparation of delivery notes from the Piraeus Consolidation and Distribution Centre to the next transport mode; 13. The next transport mode is notified via the HPCS notifications module through the new FENIX HPCS module for electronic notifications; 14. If the next transport mode is a truck, the declared transport company receives a PIN code generated by the new FENIX HPCS modules for secure access to allow access to the Piraeus free zone and entry to the PCDC; 15. The cargo is picked up and heads for the mainland. **UC1.2 Export Cargo** 1. The freight forwarder or authorised party generates a pre-advice to deliver a container; 2. If the transport mode is a truck, the declared transport company receives a PIN code generated by the new FENIX modules for secure access to allow access to the Piraeus free zone and entry to the PCDC; 3. The transport company / rail-operator is notified via the Hellenic Port Community System (HPCS); 4. The container arrives at the Free Zone of the Port of Piraeus; 5. Registered users of the Hellenic Port Community System (HPCS) that have declared interest for the container are notified about the discharge of the container in Piraeus via the HPCS notifications module. The action is registered in the new FENIX HPCS Cargo Monitoring and Status module; 6. The container is loaded on a vessel; 7. The relative shipping agent is notified via the HPCS notifications; 8. The vessel departs for the next port; 9. The relative shipping agent is notified via the HPCS notifications.

Table 38: PS GR UC1

UC2- BALANCED USE OF MODAL AVAILABITY – INTERMODALITY

Use Case	**UC2**
Title	**Balanced use of modal availability along the Corridor – Intermodality**
Description	This case consists in a cargo matching service on truck and train availability, with messages arriving via the Corridor Monitoring Platform and the Cargo Bundling Marketplace to freight forwarders and business enterprises. The efficiency of the T&L operations is optimised by enabling the cargo bundling on available trucks and trains along the corridor through the Corridor Monitoring Platform.
Partner role	• PEARL and K&N will provide train capacity availability and plan; • K&N will provide truck capacity availability and plan; • K&N will provide notification lists through the upgraded Advanced Logistics Information System – Alas; • TREDIT will develop the matching of cargo to the available slots of the route plan (covering road and rail); • TREDIT will develop the Interfaces between the collaborative meta-services platform and the Cargo Bundling Marketplace; • The role of INLECOM, CLMS and ICCS will be to provide added value services (i.e. KPIs) to support the data schema and analytics recipes for the specific use case.
Goal of the use case	• To support intermodality and the balanced use of modal capacities along the corridor; • To optimise the efficiency of the T&L operations by enabling the cargo bundling on available trucks and trains along the corridor through the Corridor Monitoring Platform.
Actors	Freight forwarders, shippers/consignees, transport companies, truck drivers and rail operators.
Phase (optional)	A requirement collection phase has been initiated and initial feedback has been gathered.
Main flow	The main flow comprises the following steps:

	1. The transport operator creates the transport plan (road and/or rail) for the next time window (will be defined) and provides this information to the Transport Manager (i.e. K&N and/or PEARL); 2. The Transport feeds the system (Routing system) with appropriate parameters such as length, volume, destination, deadline; 3. Upon the creation of a plan the freight forwarder's routing system publishes the transport plan via the Corridor Monitoring Platform; 4. The extended Collaborative meta-services Platform submodule of Cargo Bundling (covering road and rail operations) will receive the information through the Corridor Monitoring Platform regarding the transport plan; 5. A business enterprise needs to transport goods and since it doesn't have an agreement with a freight forwarder, it checks the «Cargo bundling» module for possible alternatives; 6. Cargo and availability slots will be matched by the Cargo Bundling Marketplace and the matching opportunity will be received and evaluated by the Transport Manager; 7. Upon possible updates on availability slots (available cargo and slots have been matched either via UC3.2 or directly in the Transport Manager's system) a new notification lists containing a new snapshot of slot availability will be published.

Table 39: PS GR UC2

UC3- MONITORING OF STATUS OF TRANSPORT OPERATIONS

Use Case	**UC3**
Title	**Monitoring of status of transport operations**
Description	The UC deals with the status creation throughout the value chain of the corridor including last mile and publishing of the statuses through the Corridor Monitoring Platform. Moreover, UC concerns B2B solutions so that businesses could get statuses and documents related to their orders in massive mode and be

	able to integrate them into their operational Systems. Most of the existing solutions regarding status reporting and documents gathering are B2C. The End User must either give the order Number one-by-one or for a period of time via a User Interface and then get statuses through the User Interface in a proprietary format. Therefore, the resulting set of data and documents are unable to be integrated into the customers' Operational system as a B2B solution would require. A B2B solution will be developed, where the system could be setup, so that given certain parameters, statuses and documents related to the Customer orders can be gathered and then send to the Customer via a proper connector/interface. The consumer of the information will be able to integrate the information smoothly into their operational environment. Information (statuses and documents) will be collected from various sources, including smartphones, desktops, scanners or even manual entry and placed in a central repository. The customer will be able to register to the system and define various parameters and choose which statuses, documents and between which time frames the information should be collected. The information will be extracted according to the parameters in a format that is appropriate to be integrated into the customer's operational system. The system will include a User Interface for: • Setting up the system; • Entering the statuses and documents. All security aspects must be respected and integrated into the system. UC3.1 Common notification generation UC3.2 B2B Massive Status Reporting System (MSRS) to Customers.
Partner role	• HPCS (PCT, PCDC) is responsible for the creation of all notifications from PCT to PCDC and to the next transport mode, as described in UC1; • The role of KN is to provide requirements and specifications for

	the modules relative to the operation system and also the data to run the pilot; • K&N provides requirements and specifications for the modules relative to the operation system and also the data to run the pilot. It also provides services to create notifications for the next transport mode and for the warehouse as part of its upgraded Advanced Logistics Information System – Alas; • K&N, TREDIT, INLECOM and CLMS develop the interfaces/services needed from/to the Corridor Monitoring Platform and to/from the Advanced Logistics Information System – Alas, as well as the B2B services for UC3.2; • The role of INLECOM, CLMS and ICCS will be to provide added value services (i.e. Transport Analytics, Normalisation data services) to support the data schema and analytic recipes for the specific use case.
Goal of the use case	• To optimise the visibility and increase the efficiency of T&L Operations along the corridor; • To improve the corridor-urban interface and reduce congestion in the premises of the monitored nodes; • To optimise the status and document gathering in the logistics chain.
Actors	Warehouse operators, freight forwarders, consignees, shippers, transport companies and truck drivers.
Phase (optional)	A requirement collection phase has been initiated and feedback has been gathered.
Preconditions (optional)	The availability of the Advanced Logistics Information System of KN and the relative infrastructure.
Main flow	**UC3.1 Common notifications generation** The main flow comprises the following steps: 1. The freight forwarder (i.e. K&N) is notified via the HPCS

	notifications module that the container has been discharged in Piraeus; 2. The freight forwarder is notified via the HPCS notifications module that a Customs Clearance ID has been received by the Customs Office; 3. The next transport mode – truck – is notified via the HPCS notifications module through the new FENIX HPCS for electronic notifications; 4. The declared transport company receives a PIN code generated by the new FENIX HPCS modules for secure access to allow access to the Piraeus free zone and entry into the PCDC. *Alternative scenario 1:* a. The cargo is picked up by the truck and heads for the freight forwarder (i.e. K&N)'s warehouse; b. The cargo is delivered by the truck to the designated warehouse. The The cargo status is created: Cargo Delivered to Warehouse; c. Status Creation: Cargo delivered/iOd; d. ePod Creation; e. The relevant status updates the messages which are sent to the final customers from the new (FENIX) module of the Logistics Corridor Management Platform. *Alternative scenario 2:* a. The freight forwarder requests to the HPCS possible loading slots; b. The freight forwarder is notified via the HPCS notifications module about possible loading slots; c. The freight forwarder checks the Corridor Monitoring Platform for historical data (predictive analytics module) for the level of service on the road network adjacent to the port and identifies when the level of service is usually low; d. The freight forwarder chooses a loading slot at a time-slot with low level of service and notifies the HPCS about the chosen

	loading time slot; e. The cargo is picked up by a truck and heads for the transport company's warehouse. The cargo status is created: the cargo is shipped by the new module of Logistics Corridor Management Platform; f. The cargo's ETA is estimated and published on the new module of the Logistics Corridor Management Platform; g. The cargo is delivered by the truck to the designated warehouse. The cargo status is created: The cargo is delivered to the warehouse; h. Status Creation: the cargo is delivered/iOd; i. ePod creation. **UC3.2 B2B Massive Status Reporting System** 1. Orders arrive into the KN System (Advanced Logistics Information System – Alas). This can be done through FENIX via an appropriated connector; 2. Alas processes the orders, checks the stock availability of the goods in the warehouse; 3. Pick-up orders are released; 4. Orders are being picked-up; 5. Orders are loaded on the trucks; 6. Truck is ready to deliver – The status is sent to FENIX MSRS; 7. The orders are delivered – The status is sent via smartphone to MSRS (or other statuses related to the delivery); 8. The POD is scanned via the smartphone – the POD is sent to the MSRS; 9. The orders are forwarded to the agency – status back to MSRS; 10. The order is delivered by the Agency – status back to MSRS; 11. The POD is scanned and the delivery status is sent by the Agency – the POD is sent to the MSRS; 12. A hardcopy of the POD returns to the warehouse and is scanned. The

	POD is sent to the MSRS; 13. Additional statuses are entered into MSRS according to customer set-up; 14. The MSRS is set-up according to the customer's requirements; 15. The MSRS sends the statuses and documents via a FENIX Connector to the customer.

Table 40: PS GR UC3

UC4- TRAFFIC MANAGEMENT & PARKING AVAILABILITY

Use Case	**UC4**
Title	**Traffic management & parking availability**
Description	Provision of traffic information on monitored nodes as well as traffic management services to ease the traffic congestion at the gates of the Port of Piraeus.
Partner role	• CERTH & TREDIT will develop the necessary interfaces for gathering information from the Traffic Management Control Centre (TMCC) of Piraeus and/or the National Access Point (NAP) regarding the current traffic conditions around the monitored node of port of Piraeus; • CERTH & TREDIT will develop the service to identify traffic anomalies on a cargo's expected depart/arrival time from/to the port of Piraeus; • The role of INLECOM, CLMS and ICCS will be to provide added value services (i.e. Big Data Analytics, Normalisation data services) to support the data schema and analytics recipes for the specific use case; • CERTH & TREDIT will develop the API to provide the information to the TMCC and to the NAP regarding expected traffic anomalies; • CERTH, TREDIT & ICCS will develop the API to provide information regarding traffic conditions of the road network around monitored nodes to the HPCS and/or the Corridor Management Platform;

	• CERTH & TREDIT will develop the necessary interfaces to gather information from the NAP regarding the parking locations along the corridor; • CERTH & TREDIT will develop the API to provide the following service to the Corridor Management Platform regarding parking information: 1. Parking in a selected area; 2. All parking areas at a certain distance (time or length).
Goal of the use case	• To improve the reliability of the freight transport services that take place along the corridor through the provision of real time information about the traffic status and conditions; • To ease the traffic congestion at the gates of the port through the provision of information about the current level of service on the road network; • To improve corridor-urban interface for congestion reduction.
Actors	Freight forwarders, shippers/consignees, transport companies, truck drivers and drivers.
Phase (optional)	A requirement collection phase has been initiated and feedback has been gathered.
Preconditions (optional)	• TMCC monitors the road network of the adjacent area to a monitoring node; • NAP.
Main flow	The main flow comprises the following steps: 1. The information on traffic conditions of the road network around the monitored nodes is collected periodically and originating from TMCC and/or NAP; 2. The information on the cargo expected to depart/arrive from/to a monitored node is collected periodically and originating from the HPCS; 3. The check for possible traffic anomalies is based on the input from steps 1 & 2 and functions as an input for a revised traffic

	management plan; 4. If the current level of service on the road network is low, the HPCS and/or the Corridor Monitoring Platform must respectively be informed to revise the notification of trucks; 5. If anomalies have been forecasted from step 3, the TMCC and HPCS must be informed; 6. The HPCS, if necessary, revises the trucks' appointment schedule and notifies them for new slots; 7. A forecasted level of service on the road network adjacent to the monitored node is sent to NAP. The above procedure runs constantly in a loop. Parking sub-use case: • To optimally plan the trip and respect the regulation on resting times for truck drivers, he/she may use the parking place made available by the Corridor Monitoring Platform, based on NAP information. This applies if the driver is coming from any point along the corridor and is headed to the Port of Piraeus; • A truck driver who has already been assigned a pick-up slot and was notified of a change due to traffic conditions, can enter the CMP to identify the parking locations for his/her waiting time.

Table 41: PS GR UC4

UC5- YELLOW PAGES & KPIs

Use Case	**UC5**
Title	**Yellow Pages and KPIs**
Description	Provision of information for available logistics and transport services in the Greek T&L corridors and nodes via a digital inventory.
Partner role	• CERTH & TREDIT will develop a digital inventory, where available logistics and transport services will be registered; • CERTH will collect and provide input on as much information as

	possible regarding the existing logistics and transport services; • INLECOM will develop an I/F to collect all necessary information to provide Technology Enabling Services; • The role of INLECOM, CLMS and ICCS will be to provide added value services (i.e. Big Data Analytics, Normalisation data services) to support the data schema and analytics recipes for the specific use case.
Goal of the use case	To create a national digital inventory of services and infrastructure information to support the cooperation and multimodal freight transport and logistics planning.
Actors	Service providers.
Main flow	The main flow comprises the following steps: 1. The existing historical data are coupled with information collected during the operation of the previous UCs and creates the digital content of corridor operations; 2. The information is maintained using the digital inventory content management system; 3. The data analytics is implemented on this digital content; it calculates corridor T&L KPIs - Technology Enabling Services (C5) and collects all necessary information to produce KPIs; 4. A user looking for T&L service provision enters the Corridor Monitoring Platform and the Yellow Pages service to receive information upon request; 5. Users of T&L services along the corridor may evaluate these services and populate the user database for corridor performance; 6. The KPI information is collected periodically; 7. The digital inventory is updated with qualitative information from the KPIs.

Table 42: PS GR UC5

UC6- END-TO-END PROVISION OF LOGISTICS SERVICES FOR SMEs ALONG THE CORRIDOR

Use Case	**UC6**
Title	**End-to-end provision of logistics services for SMEs along the corridor**
Description	This use case is an example which aims to show how all the modules that will be developed in the frame of the FENIX Greek Test case can be connected. The use case involves an SME located in Northern Greece wishing to import goods via the port of Piraeus and to combine them with a smaller shipment already located at the Free Zone of Piraeus, to then move them to a warehouse near its premises.
Partner role	• All partners of the Greek pilot will provide requirements and specifications for the integrated Use Case; • CERTH and ICCS will review and analyse the integration requirements both for communications between the Greek pilot modules and the FENIX Network of platforms; • The role of INLECOM, CLMS and ICCS will be to provide added value services (i.e. Big Data Analytics, Normalisation data services) to support the data scheme and analytics recipes for the specific use case. KN will provide the slot management and matching module and respective communication of the internal system to FENIX; • KN will provide the status reporting for the cargo until its delivery.
Goal of the use case	To optimise the logistics services on the south part of the Orient/East Med TEN-T corridor and provide and end-to-end demonstration of the most common business case on this corridor.
Actors	Shipping lines, shipping agents, terminal operators, warehouse operators, freight forwarders, shippers/consignees, customs brokers, customs offices, transport companies, truck drivers and rail operators.
Phase (optional)	A requirement collection phase has been initiated and initial feedback has been gathered.
Preconditions	Availability of the FENIX partner platforms and provision of the relative

(optional)	data.
Main flow	The main flow comprises the following steps: 1. An SME located in North Greece checks the «Yellow Pages» module for vessel services, calling at the port of origin of transported goods to the port of Piraeus via the FENIX module for «Yellow Pages»; 2. The SME communicates with the shipping line and books a slot for the transport of a container. The container is loaded at the port of origin with Piraeus as the port of destination; 3. While on route, the SME checks for the available transfer modes to Northern Greece via the FENIX module for «Yellow Pages» and identifies a rail and truck service; 4. The SME accesses the FENIX Rail Availability module and finds out that the service on the day of arrival is fully booked; 5. The SME accesses the module of the FENIX Capacity Availability for Trucks and finds out that the services on the day of arrival are fully booked; 6. The SME accesses the FENIX Rail Availability module and finds out that there is a service on the day after the arrival, with available capacity; 7. The SME submits a request on the FENIX Cargo Matching module for the train slot*; 8. The container arrives at the Port of Piraeus; 9. Registered users of the Hellenic Port Community System (HPCS) that have declared interest for the container are notified that the container has been discharged in Piraeus via the HPCS notifications module. The action is registered in the new FENIX Cargo Monitoring and Status module; 10. The freight forwarder or the authorised party uses the new FENIX process for the digital preparation of delivery notes from the Piraeus Container Terminal to the Piraeus Consolidation and Distribution Centre (PCDC); 11. The container is forwarded to PCDC (warehouse operator) for

	consolidation and distribution. The action is registered in the new FENIX Cargo Monitoring and Status module; 12. The freight forwarder and authorised parties are notified via the HPCS notifications module; 13. The container is opened, and the cargo is recorded in the PCDC inventory; 14. The freight forwarder and authorised parties are notified via the HPCS notifications module. The action is registered in the new FENIX Cargo Monitoring and Status module; 15. The freight forwarder issues a Customs Clearance request for part or for the whole cargo via the new FENIX module for pending customs clearances; 16. The Customs Clearance request is forwarded to the relative Customs Office via the HPCS Customs module; 17. The Customs Clearance ID is received by the Customs Office; 18. The freight forwarder and the authorised parties are notified via the HPCS notifications module. The action is registered in the new FENIX Cargo Monitoring and Status module; 19. The SME checks the FENIX Warehouse Availability module for capacity to store the goods near its premises along the corridor; 20. The information on warehouse availability is routed through the network of platforms (also including the possibility to receive this information from WMS systems); 21. The information is presented in VFC system, where various search criteria may be selected by the end-users (e.g. industrial users); 22. Requests for warehousing services are routed through the network of platforms (originating from industrial users' proprietary systems); 23. Matching/suggestions are provided by the VFC platform; 24. A booking is being facilitated via the VFC platform; 25. The freight forwarder uses the new FENIX process for digital preparation of delivery notes from the Piraeus Consolidation and

	Distribution Centre to the next transport mode. *Alternative scenario 1:* a. notifying the PCDC to consolidate the current shipment with the one already located in the warehouse; b. the next transport mode is notified via the HPCS notifications module through the new FENIX module for electronic notifications; c. the Rail Operator is notified via the HPCS notifications module; d. the cargo is picked up and heads for the mainland; e. the SME views the FENIX Corridor Monitoring module to monitor the cargo until the delivery to the warehouse. *Alternative scenario 2:* a. the next transport mode is notified via the HPCS notifications module through the new FENIX module for electronic notifications; b. the cargo is picked up and heads for the mainland; c. the cargo is transferred to the Freight Forwarder's warehouses/premises where it is consolidated in the available truck/train slot (abovementioned step 7); d. the SME views the FENIX Corridor Monitoring module to monitor the cargo until the delivery to the warehouse. *only for Alternative scenario 2.

Table 43: PS GR UC6

10.ITALY, TRIESTE PILOT SITE: MEDITERRANEAN AND BALTIC-ADRIATIC AND THE MOTORWAY OF THE SEA OF SOUTH-EAST

10.1 Pilot Site description

PS IT1: Mediterranean and Baltic-Adriatic and the Motorway of the Sea of South-east -The Trieste Pilot Site

The **Trieste Pilot Site** will operate as a Living Lab, with all the Implementing Bodies collaborating in a systematic co-creation approach and integrated innovation and research processes.

Specifically, Trieste is a cosmopolitan city of 207,800 inhabitants, the capital of the autonomous region Friuli-Venezia Giulia, a north-eastern Italian region of about 1.2 million inhabitants.

Trieste is one of the main Italian ports, positioned into two TEN-T EU corridors (Figure 3):

- The Mediterranean corridor;
- The Baltic-Adriatic corridor.

Figure 3: Trieste Pilot

Important logistics assets are located in this area: the Motorway of the Sea of south-east Europe and the Port of the Silk Road.

It is important to underline the strategic cross border issues: Slovenia is located at 10 km, Croatia at 50 km and Austria at 100 km (Figure 4).

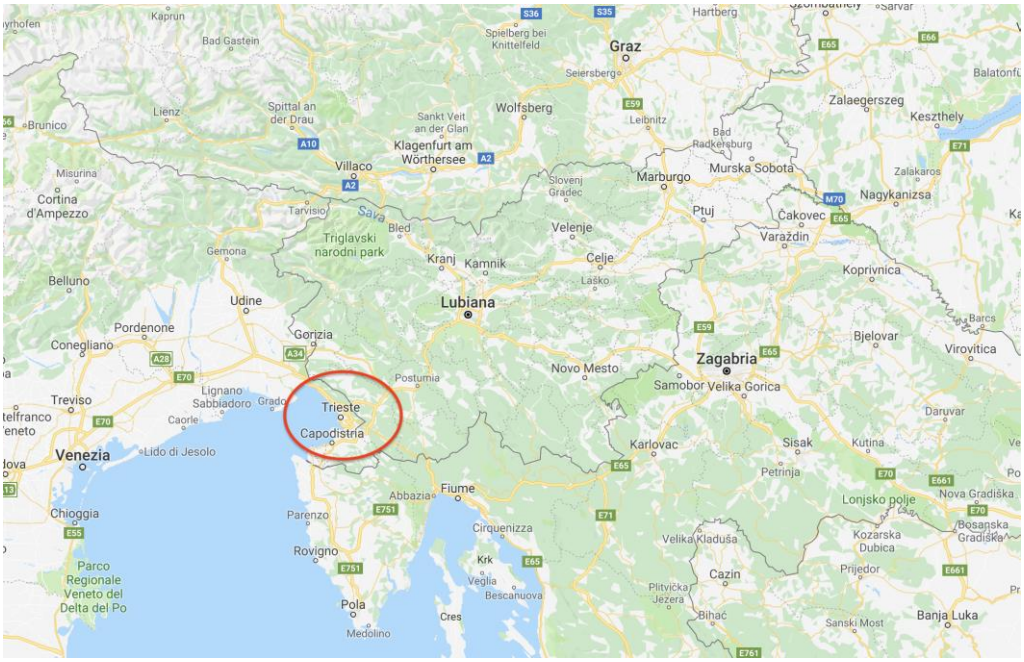


Figure 4: Trieste geographic area

Trieste has appeared as Pilot in Co-GISTICS (PF7) and as Living lab in AEOLIX (H2020). In these contexts, the role of the following operators has been crucial:

- the port of Trieste;
- the inland terminal;
- the highway.

The Trieste Pilot Site's activities are organically integrated in real Use Cases that involve user communities as sources of creation. The Pilot Site covers all the phases of the project, from the research and development to its implementation and validation.

The Pilot scope can be outlined as follows:

- **Platforms integration**: integration of the existing pilot platforms in FENIX IT federation;
- **Intermodal transport services**: synchronisation of vessels, trucks and railways transport;
- **Cross border interoperability**: interoperability with Austria's Pilot;
- **Improving Custom procedures**: HPCS involvement;
- **Dangerous goods**: transport management and monitoring;

- **Parking services;**
- **CO_2&NO_x emissions** monitoring.

The Trieste Pilot Site will deal with the following Use Cases:

- Expected time of arrival (ETA);
- Reduction of CO2 & NOx emission;
- Multimodal route planning;
- Track & trace vehicle/shipment;
- TM2.0 for multimodality;
- Parking booking service;
- B2A, A2B services such as Customs;
- Dangerous goods/eCall EGNOS/Galileo;
- Carrier certification & eCMR testing.

Base TEN-T corridors: the Mediterranean corridor and the Baltic-Adriatic corridor.

10.2 Pilot Site working group definition

Partner name	**Pilot Role**
Polytechnic University of Bari (POLIBA)	POLIBA is responsible for the management and coordination of the Trieste Pilot Site. POLIBA is also responsible for the coordination and specification of the evaluation framework in each Pilot Site.
Autovie Venete	A Road Infrastructure operator, Autovie Venete operates within the Trieste Pilot Site for what concerns the Trieste-Udine-Venezia motorway, which is part of the Mediterranean and Baltic-Adriatic corridors. It provides traffic, environment (CO_2 and NO_x) and weather data, collaborates in the Vehicle Track and Trace service and ETA services using its systems of cameras placed on the overall area of competence. Moreover, it contributes to the dangerous goods service.

Italian Ministry of Infrastructures and Transports	The Ministry coordinates and manages the two Italian pilots.
TTS Italia	TTS Italia is an association that supports the MIT in the management activities.
Interporto Trieste	Is an Inland terminal which operates within the Trieste Pilot Site for what concerns the Dry Port activities for the Port of Trieste (leading to the Motorway of the Sea of the south-east Europe) and the parking services along the Mediterranean and Baltic-Adriatic corridors. It collaborates in the Track and Trace vehicle/shipment service, ETA services and parking booking services. It will use its systems of cameras placed on the overall area of competence. It has a role in the B2A and A2B service for the custom corridor for trucks leading to the Port of Trieste to embark for Turkey. For this task it uses the OCR-camera plate recognition system at its gates.
Port Network Authority of the Eastern Adriatic Sea (PNAEAS)	The Port Authority operates within the Trieste Living Lab for what concerns the Port of Trieste, the south-east Europe and the Mediterranean and Baltic-Adriatic corridors Motorway of the Sea. Furthermore, it also manages the Ports of Monfalcone and Nogaro. It collaborates in the Track and Trace vehicle/shipment service, ETA services, custom procedures services and multimodality. It has a central role in modal shift from route to rail with its connections to several destinations, especially in central and eastern Europe (nearly 10.000 trains/year) and from route to sea, especially on the Turkey/Europe routes (more than 300.000 trucks/year). Moreover, it owns the HPCS System “Sinfomar”, which has to be

	connected to the FENIX federation.
Adria Intermodale srl	A Logistic company, Adria Intermodale S.R.L.U. is 100% owned by Alpe Adria S.p.A, which collaborates with Alpe Adria in the coordinated management of the railway, road and maritime carrier, as well as in the organisation and management of intermodal and combined transport services. In order to fulfil the requirements of an even more complex environment and supporting the operational activities, the company is changing its current IT system with a new solution, highly integrated and interoperable with the Port Community System Sinfomar. Moreover, the company has access to all relevant information regarding the technological implementations realised in the EU project AEOLIX "Architecture for European Logistics Information exchange" in which the owner company Società Alpe Adria is committed as an associated partner.
Codognotto Italia spa	A Transport operator, Codognotto Italia spa develops an automated tool for the federative IT platform able to certify sustainability level of transport and logistics operators.
Info.era srl,	Info.era srl is a software house which provides IT platforms and integration services to local public and private logistics stakeholders. It collaborates in the Track and Trace vehicle/shipment service, ETA services, custom procedures services, multimodality.
MATRAS Logistica srl	A Transport operator, MATRAS Logistica Srl is a logistic operator providing regional, national, international and direct deliveries, as well as Logistics services. It operates within the Trieste Living Lab to identify needs and operational requirements for the FENIX federation and to verify the effectiveness of the proposed solutions. Moreover, it contributes to business models for the FENIX services.

SWARCO Mizar srl	SWARCO is a company that will prove the outcome study providing an advanced integrated platform (based on a Big Data platform) to integrate different types of transport and logistics information systems, establishing real-time information exchange in support of logistics-related decisions.
Pluservice srl,	A software house, Pluservice operates within the Trieste Living Lab for the parking booking services and, more in general, the management of the information concerning the parking facilities along the European corridors.
DBA Lab spa	*A software house*, DBA Lab operates within the Trieste Living Lab for what concerns the Port of Trieste, on the south-east Europe and the Mediterranean and Baltic-Adriatic corridors' Motorway of the Sea through the connection with FENIX with its TOS system developed for EMT Terminal in Trieste (one of the most active Ro-Ro Terminal in the port) and the HPCS of Koper. It collaborates with the Pilot by developing a decision support system (DSS) to support the Track and Trace vehicle/shipment through smart vehicle booking services, multimodality and the evaluation of environmental impacts.

Table 44: PS IT1 Working Group

10.3 Pilot Site Use Cases

Use Case ID	Use Case Name	Description	Contributors
UC1	ETA	The ETA (Estimated Time of Arrival) completely depends on traffic conditions. Through the availability of Real Time Traffic Information and the forecast models, an accurate ETA can be delivered for logistics vehicles. Moreover, Probe	POLIBA AUTOVIE VENETE INFO.ERA PNAEAS MATRAS

		Vehicle Data coming from the logistics fleets can be integrated as new data sources for a more precise estimation.	
UC2	CO_2 & NOx	Emissions reduction. Already considered in AEOLIX with the target of the 20% reduction, it will be enhanced in FENIX with the target of 30%. Smooth travel decreases CO_2 & NOx emissions. TM V2X services, such as Traffic Light Assistance and speed recommendations, ensure a smooth/eco driving for logistics trucks.	POLIBA DBALAB AUTOVIE VENETE
UC3	Multimodal route planning & re-routing	Goods transported by trucks and vessels in the port area need to benefit from a smooth and efficient intermodal exchange. It allows guidance and enabling of data exchange within the port area for smooth operations planning. TM services can provide forecasted times of trucks arrivals.	INFO.ERA ADRIA
UC4	Track & trace vehicle/shipment	Real-time vehicle traces. Real-time Probe Vehicle Data can be integrated for complete fleet monitoring and management. The information about the localisation of the vehicle it is useful for the real-time management of the parking lots availability, the occupancy and timing. Real time localisation of trucks it is useful to evaluate the ETA at the terminal and real time management of shipments.	POLIBA INFO.ERA PNAEAS ADRIA DBALAB INTERPORTO
UC5	TM2.0 for	Goods transported by trucks and vessels	SWARCO

	multimodality across the TEN-T corridors	in the port area need to benefit from a smooth and efficient intermodal exchange. Guidance and enabling of data exchange within the port area for smooth operations. TM services, distributed across all available channels, including V2X are able to optimise the operations and guarantee the minimum travel time.	INFO.ERA PNAEAS DBALAB
UC6	Parking booking service	Decrease of waiting times for parking in the port areas. Based on accurate ETA and on V2Xtechnologies, parking spaces can be distributed in the most efficient way. Starting from the scenario performed in the previous project, CO-GISTICS, Pluservice will provide and improve the current status with other services such as: parking availability (integration with cameras), estimated time of permanence in the parking lot and booking the parking in advance in the dryport/port/rest area in the highway and smart payment (B2c or B2B).	PLUSERVICE
UC7	B2A, A2B services such as Customs	Needs to continue towards further digitalisation of the exchange (business-to-administration/B2A), and acceptance (administration-to-business/A2B) of information for the purposes of regulatory compliance in transport and logistics.	PNAEAS INFO.ERA DBALAB
UC8	Dangerous goods/eCall	Services for the management of Dangerous Goods management.	POLIBA MATRAS

	EGNOS/Galileo	Monitoring in highways and parking.	
UC9	Carrier certification & eCMR testing	Developing an automated tool for the federative IT platform able to certify sustainability level of transport & logistics operators.	CODOGNOTTO

Table 45: PS IT1 Use Cases

UC1 - ETA

Use Case	**UC1 a – PNAEAS/Info.Era**
Title	**Development of an App for optimisation of operations related to inbound trucks**
Description	The port of Trieste will develop an App allowing truck drivers to receive real-time information about the status of their planned trip from the port to the final destination (e.g.: booking number and ticket).
Contributors	**DBA Lab**, **Interporto**, **Autovie**, **Info.era**
Partner role	The role of **PNAEAS** is to develop the App described above. The role of **Info.era** (IT system integrator, IT solutions provider) is supporting the Port Trieste with the development of an App for the optimisation of operations related to inbound trucks. This shall be done by enabling interoperability with IT platforms (e.g. inland terminal IT systems, TOS, etc.) to local actors, in case of emerging data exchange flows requirements. **Autovie** will be a data provider.
Goal of the use case	To optimise the management of the inbound trucks having access to real-time data about the number of vehicles and their final destination, as well as about the coherence between bookings and available slots. In case of emerging requirements for data exchange flows, the interoperability between IT platforms provided by Info.era, and used by local actors and the PNAEAS App, is developed to fulfil data gaps in the PNAEAS IT system.

Actors	Terminal operators, haulers, shipping agencies and inland terminal.
Main flow (PNAEAS)	The main flow comprises the following steps: 1. The truck approaches the Port of Trieste; 2. The driver starts the mobile PNAEAS App; 3. The Port Authority views the ETA of a truck moving to a port and checks the information on the booking and the tickets; 4. The driver checks his/her booking and information regarding his/her terminal of destination on the PNAEAS App; 5. The PNAEAS App connects with Sinfomar HPCS to check whether all necessary formalities have been finalised; 6. The driver reaches the terminal of destination according to the booking; 7. Finally, the PNAEAS App communicates the information about ship departure and related parameters to the FENIX federation.
Main flow (Info.era)	The main flow comprises the following steps: 1. The manual data entry in Info.era platforms in use by local actors; 2. There is a potential outcoming of data flow to PNAEAS App (e.g. booking and tickets data); 3. After the PNAEAS verification and notice to the driver, potential incoming data flow to local actors is in use by the IT platforms (e.g. truck ETA).

Table 46: PS IT1 UC1a

Use Case	**UC1 b - POLIBA**
Title	**ETA of trucks**
Description	POLIBA will develop an App (named guide.me App) allowing truck drivers to receive real-time information about traffic, status of their generic trip to their final destination also in collaboration with the Road Authority.

	The problems related to the transport of dangerous goods will be considered. Galileo i.e. Europe's Global Navigation Satellite System (GNSS), will be used as localisation tool, providing improved positioning and timing information.
Contributors	Codognotto, Autovie
Partner role	**POLIBA** will develop guide.me App and to manage the development of the UC. **Codognotto** and **Autovie** will be data providers.
Actors	Haulers, possibly also motorway concessionaires.
Main flow of guide.me App	The main flow comprises the following steps: 1. The truck driver starts the scheduled trip; 2. The driver starts the mobile App and inserts the destination; 3. The driver views the ETA estimated via the App; 4. The fleet manager can monitor the status of trip on a Dashboard; 5. Finally, the App communicates the information about the trip and related parameters to the FENIX federation.

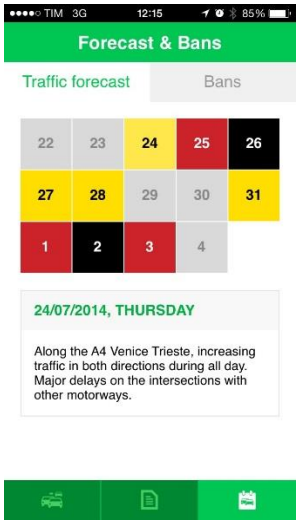
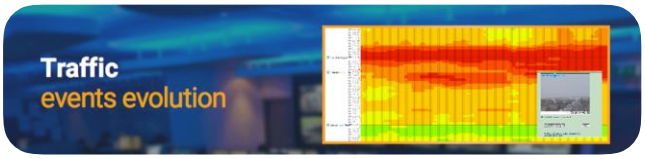
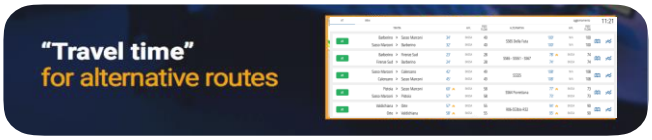
Table 47: PS IT1 UC1b

Use Case	**UC1 c – MATRAS**
Title	**ETA of trucks, the App will provide to the tracking of trucks and loading chance**
Description	MATRAS has already developed an App (named You Truck Me) allowing truck drivers to receive real-time information about the traffic status of their trip from the port to their final destination (but also for many other location/destination). There are available services related to the transport of dangerous goods. A relevant issue is the information exchange by the "social" users of the network YTM.
Contributors	Actually no one, but could be all actors of the Trieste Pilot.

Goal of the use case	To optimise the management of the inbound and trip trucks having access to real-time data about the number of vehicles on the roads and their final destination as well as about the coherence between bookings and available slots.
Actors	Terminal Operators in Trieste and EU Port, National and International Haulers Companies, National and EU motorway concessionaires as Autovie Venete.
Main flow of the mobile APP YTM	The main flow comprises the following steps: 1. The truck approaches the Port of Trieste; 2. The driver starts the YTM mobile App; 3. The forwarder views the ETA of the vessel where the truck has to be loaded; 4. The driver checks his/her ETA or loading availability on the App; 5. The App suggests the best velocity profile to reach the port or the inland terminal to also minimise the fuel consumption, or the best place for loading in respect of his/her actual position; 6. Finally, the App communicates the information about the ship departure and related parameters to the FENIX federation.

Table 48: PS IT1 UC1c

Use Case	**UC1 d – AUTOVIE VENETE**
Title	**ETA on Highway**
Description	This Use Case will design and analyse the possibility to provide an estimation on the time of arrival at the port and logistics hubs in the Pilot. This use case will enhance and improve the study and implementations done and tested during previous projects by the road concessionaire. The system will give the possibility to the drivers and the haulier company to plan and define the best route to the final destination and can collaborate with the DSS also for complex route guidance. The system will be able to distinguish different classes of vehicles and

	define the average speed of trucks on some sections of the motorway. This will be done with high definition (sections of 500 mt) and updates every three minutes, making it possible to compare data on highway and rural roads to suggest the best route in case of traffic congestion. According to the historical data about traffic, events, road design and capacity, the system will be set up for processing the real time data coming from FVD and static sensors. The results of this process will be a now-cast and forecast of traffic conditions and travel times on the motorway. Of course, the Probe Vehicle Data coming from the logistics fleets can be integrated as new data sources for a more precise estimation for specific classes of vehicles and to define the traffic model of the system. The pictures below show the existing services, which provide information on the traffic forecast, transit ban and travel time.    
Partner role	Autovie Venete is responsible for the ETA service. Autovie will analyse the scenario with the users and, thanks to the previous integrations done during CO-GISTICS and other projects, will implement the solution according to its experience in this field and. Autovie has experience in traffic management and collection of data on traffic and weather events, road works planning and forecast and data models for traffic. Autovie Venete, the port authority and haulier company will be the main end-users of this service along highway.

Goal of the use case	The main aims are: • To optimise the use of the roads; • To optimise the travel plans; • To provide cross-border, seamless and consistent information and forecasts on motorways to truck drivers, hauliers and service providers; • To build a more affordable planner for trip for truck drivers; • To improve the current information about the ETA; • To recude/optimise the travel time and congestion on the motorway; • To increase safety (e.g. along highways).
Actors	Autovie Venete, Poliba, Pluservice, Codognotto, Port Authority, MATRAS and Interporto of Trieste.
Phase (optional)	• For the highway and the road approaching the Port and logistics hub; • Information to the driver about the ETA; • Integration with DSS.
Preconditions (optional)	• The route and class of vehicles shall be defined; • Setting parameters done; • The hauliers company shall be qualified.
Main flow	For the highway area: 1. Via the App, truck drivers check the real-time traffic conditions, such as: 1.1. Traffic events; 1.2. Traffic flows; 1.3. Traffic restrictions and/or transit ban; In particular: 1.4. Truck drivers should set up push-up notification for some advices on specific sections of highway and in specific time slot; 1.5. Suggestion regarding route planning including rest areas should be given.

	2. Integration with PluService's system; 3. Development of services for third party (e.g. web services) to include this innovative service into other service providers and for stakeholders; 4. Integration with DSS for reports, data and the deployment of traffic plans.

Table 49: PS IT1 UC1d

UC2 – CO2 & NOx

Use Case	**UC2a – POLIBA**
Title	**CO2 & NOx emission reduction**
Description	Already considered in AEOLIX with the target of the 20% reduction, the target will be enhanced in FENIX reaching the 30% reduction. Smooth travel decreases CO2 & NOx emissions. The guide.me App will provide speed advice and velocity profiles in order to reduce emissions and fuel consumption. Galileo i.e. Europe's Global Navigation Satellite System (GNSS), will be used as localisation tool, providing improved positioning and timing information.
Partner role	**POLIBA** will design and implement guide.me App connected with the DSS.
Goal of the use case	• Providing TM V2X services like Traffic Light Assistance and speed recommendations in order to ensure a smooth/eco driving for the logistics trucks. • Estimating the CO_2 emissions of trucks visit the port facilities.
Actors	Road authorities, carriers, forwarders, haulers.
Main flow by POLIBA	The main flow comprises the following steps: 1. The truck driver starts the scheduled trip; 2. The driver starts the mobile App and inserts the destination; 3. The driver views the ETA estimated via the App; 4. Through the ETA (in terms of distance and speed), the guide.me

	App suggests the speed advice and velocity profiles in order to reduce emissions and fuel consumption.

Table 50: PS IT1 UC2a

Use Case	**UC2b – DBA Lab**
Title	**CO2 & NOx**
Description	The actors use the environmental monitoring platform DBA Green+, an existing software owned by DBA Lab, to represent the environmental impact of trucks managed by the Vehicle Booking System (VBS) system into the port facilities.
Contributors	Autovie Venete, Port Authority (PNAEAS) and Codognotto.
Partner role	**DBA Lab** will make its own software DBA Green+ available, to elaborate environmental data collected from VBS system. **PNAEAS** and **Autovie Venete** will be data providers.
Goal of the use case	To estimate the CO2 emissions of trucks visit the port facilities.
Actors	Port Authority (PNAEAS), Terminal Operator.

Table 51: PS IT1 UC2b

Use Case	UC2 c – AUTOVIE VENETE
Title	**CO_2 & NO_x MONITORING ON HIGHWAY**
Description	The use case will design, implement and analyse the system for detection of environmental and pollution data related to traffic on the highway. This use case will improve the implementations done during the construction phases (major road works) by the road concessionaire. The system will offer the possibility to know better the effect of traffic of HGV and trucks from and to the ports and logistics hubs. The objective of the UC will be the reduction of CO_2 and NOx emissions on the route to the

	Pilot, adopting speed recommendations, enhanced trip planning according to ETA and ensuring a smooth/eco driving for the logistics trucks. The system will be implemented in different phases on the roadside, particularly in parking and rest areas, toll stations and in the neighbourhood of the highway axis. The design and definition of the system will be set up by Autovie Venete, in cooperation with specialists of the monitoring and data acquisition service, including public authorities (e.g. the regional authority for the environment). The system should be integrated in the highway's communication and data transmission services, and the data collected will be processed by dedicate servers in the road operator's data centre. The data output will be used to define the effect of travel plans and should be offered to other services, such as the DSS and to the logistics operator and the hauliers and truck companies. The goal is to also define the best model of traffic, to compare data from trucks. All data should be available for public consultation, in relation to environmental issues, and for study purposes. The system will be implemented in the second phase of FENIX, according to the construction plan of the road operator. The installations of environmental and pollution detection stations should be defined according to the needs of the local and regional authority. The data collected and processed will be available for the integration in the platform, for analysis and to define the model of mobility and trips.
Partner role	• Autovie Venete is responsible for the design, implementation and the system functionality. • The road operator contributes with specialists and a department for environmental and pollution study. The road operator will be responsible for the design and implementation of the system and further services.

	• Autovie Venete, POLIBA and DBALAB will be the main end-users of this service.
Goal of the use case	The main aims are to: 1) reduce the impact of traffic in terms of pollution; 2) provide more accurate data on CO2 and NOx emissions in the area of the highways.
Actors	Autovie Venete, Poliba, Codognotto, MATRAS and DBALAB.
Preconditions (optional)	• The highway sections are to be defined; • To define the setting parameters; • The haulier company shall be qualified.
Main flow	For the highway area: 1) definition of parameters and areas of detection a. design and implementation of sensors and data transmission services: i. one station for each section of the motorway in the pilot from Latisana to Sistiana; ii. sensors in the rest and parking areas; iii. data transmission on fiber optic channel; iv. servers and network devices in the data centre. b. collection and processing of data. 2) integration with data form hauliers and the platform; 3) analysis of data and to compare it with traffic flow, events and environmental data; 4) integration with DSS for reports, data, deployment of traffic plans.

Table 52: PS IT1 UC2b

UC3 - Multimodal route planning & re-routing

Use Case	**UC3 a – ADRIA**
Title	**Development of a model and simulation for optimising multimodal first mile/last mile**

Description	Adria Intermodale will develop a pre-investment study for a model able to support the optimisation of multimodal logistic flows related to first mile / last mile connections.
Contributors	POLIBA
Partner role	Adria Intermodale will implement the activities described above.
Goal of the use case	To optimise the management of the first mile / last mile multimodal logistic flows in order to increase monitoring, reduce idle times and improve the asset use.
Actors	Terminal operators, logistic companies and shippers/clients.
Main flow by Adria Intermodale	The main flow comprises the following steps: 1. Analysis of available multimodal bookings (e.g. trains, trucks etc.); 2. Analysis of available resources (e.g. available containers, trucks, etc.); 3. Activity pre-plan validation; 4. Information and document sharing with logistic operators; 5. If implemented, the model would share the planned ETA/ETD of logistic operations with the FENIX federation.

Table 53: PS IT1 UC3a

If implemented, the model would share with the FENIX federation the first/last mile planning data.

Use Case	**UC3b – INFO.ERA**
Title	**Interoperability with multimodal transport optimisation modules**
Description	Based on a micro service architecture framework, Info.era will study and eventually test a potential integration between optimisation modules, aiming to optimise the multimodal first/last mile planning, and the platforms provided and currently in use by logistics operators.
Contributors	POLIBA
Partner role	IT system integrator and the IT solutions provider.
Goal of the use case	To study and eventually test a micro service architecture enabling data exchange between Infoera's IT platforms and optimisation modules

	aiming to increase efficiency in the multimodal first/last mile planning.
Actors	Multimodal transport operators, shipping agencies and shunting companies.
Main flow	The main flow comprises the following steps: 1. Operational data input flow to optimisation module; 2. Algorithm processing; 3. Optimised solution proposal; 4. User acceptance; 5. If implemented, the model would share the final output data with the FENIX federation.

Table 54: PS IT1 UC3b

UC4 - Track & trace vehicle/shipment

Use Case	**UC4a – PNAEAS**
Title	**Track & trace of trains to/from the port of Trieste**
Description	Through the implementation of full interoperability with the HERMES/H30 standard, commonly used among railway undertakings for exchange of information on trains (e.g.: composition, freight, etc.), full communication with the network of the companies managing trains to/from the port of Trieste is foreseen. This is done to have anticipated information in Sinfomar HPCS about their ETA, freight, customs situations, etc. Additionally, these data are associated to data declared from operators into the pre-arrival module in Sinfomar HPCS, in order to reduce errors and inconsistencies.
Contributors	Adria Intermodale and possibly EU external contributors.
Partner role	The port of Trieste develops interoperability mechanisms with the HERMES/H30 standard.
Goal of the use case	To automate the procedures related to inbound trains thus reducing human errors and speed up the entrance operations.

	To support MTO in train composition operations.
Actors	Port of Trieste, MTOs, Adriafer (shunting company), railway undertakings.
Preconditions (optional)	All new HPCS systems and modules developed within FENIX, and all the ones which will be updated/upgraded (even those not involved in FENIX Ucs) will be created or modified after careful analysis of all relevant EU directives (in primis: EMSWe and EFTI) in order to be fully compliant with all EU and national directives and regulations.
Main flow	The main flow comprises the following steps: 1) The logistic unit information is loaded on the pre-arrival module on Sinfomar HPCS; 2) The train enters Italy; 3) Port of Trieste has access to train information through HERMES/H30; 4) MTO composes train information on Sinfomar HPCS, dragging and dropping the information received at the train departure; 5) The information is checked for possible inconsistencies between the H30 and pre-arrival data; 6) The train arrives at the port; 7) Finally, the information about the train and related parameters is shared with the FENIX federation.

Table 55: PS IT1 UC4a

Use Case	**UC4b – ADRIA/Info.era**
Title	**Track & trace of trains to/from the network of the Port of Trieste**
Description	With reference to the similar activity implemented by the Port of Trieste (interoperability with HERMES/H30), Adria Intermodale supports the MTO in the train composition and the monitoring of the logistic unit through automated interoperability flows between the Sinfomar HPCS and the IT solution currently in use. Info.era, in coherence with activities performed by PNAEAS and Adria

	Intermodale (in the FENIX project referring to interoperability via HERMES (H30)), will support the study and testing of interoperability channels between IT platforms currently in use and the HERMES IT system environment to enable an H30 train composition document exchange. All the new systems and modules developed within FENIX, and all the ones which will be updated/upgraded (even those not involved in FENIX UCs) will be created or modified after careful analysis of all relevant EU directives (in primis: EMSWe and EFTI) in order to be fully compliant with all EU and national directives and regulations.
Partner role	• Adria Intermodale develops interoperability mechanisms with Sinfomar HPCS for train composition, monitoring and pre-arrival notice. • Info.era is an IT system integrator and IT solutions provider.
Goal of the use case	• To automate the procedures related to inbound trains thus reducing human errors and speed up the entrance operations; • To support MTO in train composition operations; • To automate the procedures related to inbound trains referred to Trieste port thus reducing human errors and speeding up the entrance operations.
Actors	Info.era, Port of Trieste, MTOs, Shunting company, railway undertakings.
Main flow (ADRIA)	1. The main flow comprises the following steps: 2. The train departs from the logistic node of origin; 3. The train position and composition is constantly monitored by the logistic operator; 4. The logistic unit information is loaded on the pre-arrival module on Sinfomar HPCS; 5. The train enters Italy: the train composition is checked; 6. The Port of Trieste has access to the train information through HERMES/H30; 7. MTO composes the train information on Sinfomar HPCS, dragging

	and dropping the information received at the train departure through the developed interoperability mechanism with proprietary software; 8. The information is checked for possible inconsistencies between the H30 and pre-arrival data; 9. The train arrives at the port; 10. Finally, the information about the train and related parameters is shared with the FENIX federation.
Main flow (INFO.ERA)	The main flow comprises the following steps: 1. The train departs from the logistic node of origin; 2. The train's position and composition is constantly monitored by the logistics operator; 3. The interoperability flow between the Sinfomar HPCS pre-arrival module and the IT solution are currently in use by Adria Intermodale; 4. The train enters Italy: the train composition is checked; 5. The Port of Trieste has access to the train information through HERMES (H30); 6. MTO composes the train information in its currently-in-use IT solution and flows it into Sinfomar HPCS, dragging and dropping the information received at the train departure through the developed interoperability mechanism with proprietary software; 7. The information is checked for possible inconsistencies between the H30 and pre-arrival data; 8. The train arrives at the port; 9. If implemented, the information about the train and related parameters is shared with the FENIX federation.

Table 56: PS IT1 UC4b

Use Case	**UC4c – POLIBA**
Title	**Track & trace vehicle**
Description	POLIBA will perform the trace of trucks in collaboration with the road managers in order to validate their travel. Moreover, POLIBA will focus on the track and trace service for HAZMAT transport. To this aim, the analysis of the risk evaluation will be applied and implemented in the DSS. Galileo i.e. Europe's Global Navigation Satellite System (GNSS), will be used as localisation tool, providing improved positioning and timing information.
Contributors	Autovie Venete
Partner role	POLIBA will integrate the DSS with the Guide.me App and the data coming from the road authorities.
Goal of the use case	To monitor, trace and validate the travel of trucks.
Actors	POLIBA and the Road Company.
Main flow by POLIBA	The main flow comprises the following steps: 1. The truck driver starts the mobile App; 2. The trip is recorded by the mobile App; 3. The trip is sent to POLIBA DSS; 4. POLIBA DSS matches the trip data (coordinates) of trucks with the ones coming from the road companies (vehicle plates number of the trucks crossing through the road tutors, also as for HAZMAT transport trucks); 5. In this way, it is possible to check if the trip is valid or not.

Table 57: PS IT1 UC4c

Use Case	UC4d – DBA Lab
Title	**Track & trace vehicle/shipment**

Description	The actors use the VBS-App, a web-App which is software integrated with TOS system of EMT Ro-Ro Terminal or a new developing terminal and logistics platform, that will allow haulers to: i) access to the terminal for pick-up or drop-off of ITU (Intermodal Transport Unit); ii) gather information about the status of accessibility to the port gate and terminal gate; iii) manage a possible delay compared to the slot appointment. The VBS-App could exchange data with other port applications regarding i.e. the ETA of a truck at the terminal gate or Vehicle to Infrastructure (V2I). The information useful to corridor information systems will be exchanged with the FENIX federation.
Contributors	PNAEAS, Swarco, Codognotto*and Autovie Venete.
Partner role	DBA Lab will design and develop the VBS-App.
Goal of the use case	To synchronise the arrival of the truck compared to the booking and slot assignment and to improve the efficiency and personnel organisation in the Terminal.
Actors	Haulers and the terminal operator.
Preconditions (optional)	The user must be registered and profiled on the VBS systems.
Main flow	The main flow comprises the following steps: 1. The hauler has access to the VBS-App; 2. The hauler selects from a list his/her job activity (pick-up and/or delivery of ITU); 3. The hauler has information about status of shipment, status of port and terminal congestion and slot booking confirmation; 4. The hauler can change his/her slot booking; 5. The Terminal operator confirm or change the slot required by hauler.

Table 58: PS IT1 UC4d

Use Case	**UC4e – INTERPORTO TRIESTE**
Title	**Inbound and outbound vehicle movement track & trace between the Trieste port and the FreeEste dry port area**
Description	Interporto of Trieste, manager of the FreeEste dry port area located eight kilometres far from the Port of Trieste, will deploy, test and validate an intelligent gate automation solution enabling vehicle/shipment traceability among Trieste's logistics hubs. Within the Trieste pilot activities, an upgrade of current IT systems and interoperability flows with other platforms and solutions will be studied, implemented and tested to fulfil data visibility gaps from local to TEN-T corridor level.
Partner role	Infrastructure Manager
Goal of the use case	To automate the procedures related to vehicle gate in/gate out at the FreeEste dry port area and share the vehicle movement data with the interested stakeholders (e.g. trucking companies, shippers, etc.) to speed up inbound and outbound transport operations.
Actors	Infrastructure Manager and trucking companies.
Preconditions (optional)	• Data and technology standardisation. • All the new systems and modules of Sinfosec developed within FENIX, and all the ones which will be updated/upgraded (even those not involved in FENIX UCs) will be created or modified after careful analysis of all relevant EU directives (in primis: EMSWe and EFTI) in order to be fully compliant with all EU and national directives and regulations.
Main flow	Inbound: 1. Vessel unloading operations at Trieste port; 2. Trucking intermodal unit pick up at the maritime terminal; 3. Truck gate goes in at FreeEste dry port area; 4. Track gate goes out from FreeEste dry port;

	5. If implemented, the information about the vehicle movement is shared with the FENIX federation. Outbound: 1. Truck gate goes in at FreeEste dry port area; 2. Truck gate goes out from FreeEste dry port area; 3. The truck intermodal unit drops off at maritime terminal at Trieste port; 4. Vessel loading operations at maritime terminal at the Port of Trieste are carried out; 5. If implemented, the information about the vehicle movement is shared with the FENIX federation.

Table 59: PS IT1 UC4e

Use Case	**UC4 f – MATRAS**
Title	**ETA of trucks**
Description	MATRAS has already developed an App (named You Truck Me) allowing truck drivers to receive real-time information about traffic, status of their trip from the port to their final destination (but also for many other location/destination), available services including notification of problems related to the transport of dangerous goods. By the information exchange, sharing ("social" users) is performed by the users of the network YTM.
Partner role	MATRAS will develop an App and to manage the development of the UC.
Goal of the use case	To optimise the management of the inbound and trip trucks having access to real-time data about the number of vehicles on the roads and their final destination, as well as about the coherence between bookings and available slots.
Actors	Terminal Operators in Trieste and European Ports, National and International Hauler Companies, National and EU motorway

	concessionaires (such as Autovie Venete).
Main flow of APP YTM	The main flow comprises the following steps: 1. The truck approaches the Port of Trieste or any other place; 2. The driver starts the mobile YTM App; 3. The forwarder views the ETA of the vessel where the truck has to be uploaded; 4. The driver checks his/her ETA on the App; 5. The App suggests the best velocity profile to reach the port or the inland terminal, to also minimise the fuel consumption or to reach any best loading availability; 6. Finally, the App communicates to the FENIX federation the information about a ship's departure and related parameters.

Table 60: PS IT1 UC4f

UC5 - TM2.0 for multimodality across the TEN-T corridors

Use Case	**UC5a – PNAEAS/Info.era**
Title	**Slot management at the terminal – interoperability with TOS**
Description	The TOS and Sinfomar HPCS exchange data about container planned position in the terminal. Sinfomar HPCS sends this information to the PNAEAS App used in UC1 giving the driver timeslot to pick up the container (and possibly further information to facilitate operations). Info.era, in coherence with the activities performed by PNAEAS in the FENIX project, will support the development of the App for the optimisation of operations related to inbound trucks. This will be done by enabling interoperability with IT solutions that are currently in use and are supplied to local actors.
Contributors	INFO.ERA, DBALAB and Interporto
Partner role	• Port of Trieste develops interoperability with TOS;

	• Info.era is IT system integrator, IT solutions provider.
Goal of the use case	• To reduce the waiting times to enter in the terminal. • To optimise the flows transport and the port's overall capacity • To exchange data between PNAEAS HPCS and Info.era IT solutions currently in use by local actors and data integration with added value information for truck driver advice via PNAEAS App.
Actors	Port of Trieste, terminal operators and haulers.
Main flow (PNAEAS)	The main flow comprises the following steps: 1. The truck approaches the Port of Trieste; 2. The driver starts the mobile PNAEAS App; 3. The Port Authority views the ETA of a truck moving to the port and checks the information on the booking and the tickets; 4. The Sinfomar HPCS sends to the PNAEAS App the information about time-slot for picking up the container; 5. The PNAEAS App connects with Sinfomar HPCS to check whether all necessary formalities have been finalised; 6. The driver reaches the terminal of destination according to the timeslot; 7. Finally, the PNAEAS App communicates the information about the waiting times to the FENIX federation.
Main flow (INFO.ERA)	The main flow comprises the following steps: 1. The manual data entry in IT systems is currently in use by local actors; 2. Data exchange occurs with PNAEAS HPCS; 3. Data integration occurs in order to enrich data available for PNAEAS App notice to truck drivers (e.g. booking and tickets data, time slot for picking-up container); 4. Notice is given to the driver.

Table 61: PS IT1 UC5a

Use Case	**UC5b – SWARCO**
Title	**Implementation of TM2.0 services across the TEN-T corridors**
Description	Collaborative services for integrated port-road traffic management for the optimisation of freight transport.
Partner role	The role of SWARCO is to provide a C-ITS-S (Central ITS Station) integrated with the legacy systems and in the FENIX Federated platform. This is carried out for the provision of collaborative services implementing the TM2.0 concept based on V2X technologies and a Strategy Manager component for traffic management and operations optimisation, as well as an online dashboard constantly monitoring system performances. The implemented solution will support the fleet of Codognotto in the operations. The role of POLIBA will be to contribute to the analysis and management of data in a big data approach.
Goal of the use case	The goal of the use case is to implement collaborative schemes among the Infrastructure operators, service providers and freight fleet managers to optimise operations and traffic conditions around port area. Through the TM2.0 services implemented on the paths towards the port area – among these a stretch of road managed by Autovie Venete, part of the TEN-T Corridor 5 - the system provides guidance and enables the data exchange for smooth operations.
Actors	POLIBA, SWARCO, forwarders, carriers, DBALAB and Codognotto.
Phase (optional)	Approaching to the port area on the targeted corridor.
Preconditions (optional)	• The truck driver shall be qualified; • The truck driver shall use a mobile App integrating the V2X services (optionally the APP can be provided by SWARCO).
Main flow	The main flow comprises the following steps: 1. The truck enters the equipped area;

	2. The driver starts the mobile App; 3. The C-ITS-S periodically receives localisation information from the truck side; 4. The C-ITS-S connects to the legacy systems and constantly receives infrastructure data; 5. The Strategy Manager elaborates the optimal traffic management strategies in the controlled area (to be defined); 6. The C-ITS-S broadcasts information about events, level of service, driving advice, parking information and traffic management strategies through the V2X channel (cellular); 7. All information related to monitored systems and performance of the services is available through an on-line dashboard

Table 62: PS IT1 UC5b

Use Case	**UC5c- DBALab**
Title	**TM2.0 for multimodality across the TEN-T corridors**
Description	The actors use the Vehicle Booking System (VBS), a real-time appointment system used by hauliers wishing to deliver or collect ITU (Intermodal Transport Unit) at the specific EMT Ro-Ro Terminal or at new developing terminal and logistic platform at the Port of Trieste. VBS will allow transport operators to book a timeslot for the pick-up and/or delivery of cargo. VBS will help to cater for the increasing truck volumes to the Terminal in the Port of Trieste and ensure that the turnaround times are as fast as possible by better managing the terminal's capacity and demand. Each time the haulier creates a new booking, VBS checks and confirms that the customer's details are correct, thereby greatly reducing wasted journeys and expense caused by incorrect information. Information useful to corridor information system will be exchanged with FENIX federation.
Partner role	DBA Lab will design and develop the VBS tool and adapt it to the TOS

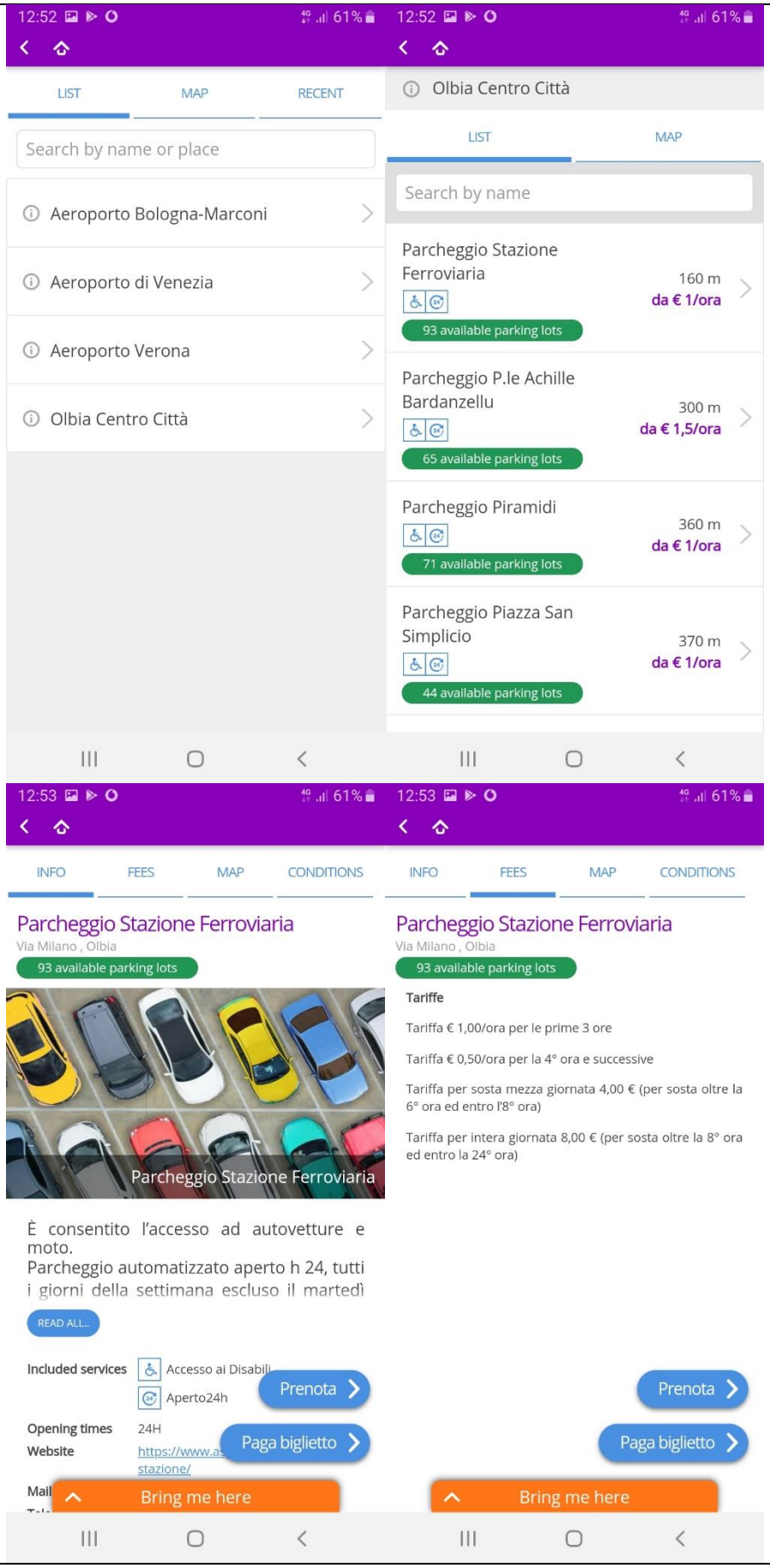
	system of the terminal considering also the Port Authority requirements.
Goal of the use case	Reducing waiting times of trucks to enter in the terminal, ensuring that hauliers have the correct information for their job and allowing a 'right first time' transaction when they arrive at the terminal gates.
Actors	Hauliers, Freight forwarders, Terminal Operators and Port Authority (PNAEAS).
Main flow	The main flow comprises the following steps: 1. The haulier selects the terminal; 2. The haulier makes a reservation for ITU; 3. The haulier adds information to the reservation regarding the truck's details and driver; 4. The haulier selects or changes the preferred slot; 5. The terminal operator confirms or changes the slot required by the haulier.

Table 63: PS IT1 UC5c

UC6 - Parking booking service

Use Case	**UC6 – PLUSERVICE**
Title	**Parking booking service**
Description	The aim of the UC is to make the truck parking operations more secure, safe and efficient, mostly along the highway within the rest areas. This Use Case will provide useful features that can support the truck drivers, making their trips more comfortable. Moreover, the UC shows convenient and easy to use applications/services for drivers concerning parking and dedicated services within rest areas and similar facilities. To improve the parking area and its operations, cameras or sensors installed in those areas can reveal in real-time the occupancy rate in each area. Actual information about the closest or next rest area available for parking is one of the most important information to give to the truck driver. This can avoid exceeding the driving time period. The driver can be informed in advance about the occupancy rate and the services offered in that area (rest area equipped with restaurants, beds, shower, etc.). This innovative integration will be possible thanks to the cooperation between Pluservice and AutovieVenete. This solution will

	also give suggestions about routing according to the available rest areas along the trip. Moreover, the Use Case will design and analyse the possibility to book in advance the parking lot for specific types of goods (for example dangerous goods), will allow to optimise the areas, the operations and the resources (in terms of time, spaces, equipment). In this case, the system could also provide an estimation about the period of time during which the parking lot is available. Of course, this use case will improve the implementations done and tested during the previous project, CO-GISTICS. Additionally, this use case will involve some specific equipment to give punctual information. The system will give the possibility to decide fare policy, discounts, packages, etc. Smart parking service can collaborate with the DSS also for complex route guidance. The back-office will be available for the truck operators and a smart parking control centre could be used by the highway operators (for example for the monitoring of the spaces and the detection of current location of each vehicle optimising the current operations, verifying some mistakes related to a missed check-in and check-out of the vehicles during the entrance or exit). The back-end services will be designed and performed to allow AutovieVenete's application to include this service in its system for a complete offer to the truck drivers. The myCicero platform will be considered as a basic reference infrastructure to develop the advanced Parking Booking Services in the Trieste Pilot Site. Below are some pictures about an existing service that provides real information on parking lots availability in the field of private cars.


12:52 61%
LIST
MAP
RECENT
Search by name or place
Aeroporto Bologna-Marconi
Aeroporto di Venezia
Aeroporto Verona
Olbia Centro Città
12:52 61%
Olbia Centro Città
LIST
MAP
Search by name
Parcheggio Stazione Ferroviaria
160 m
da € 1/ora
93 available parking lots
Parcheggio P.le Achille Bardanzellu
300 m
da € 1,5/ora
65 available parking lots
Parcheggio Piramidi
360 m
da € 1/ora
71 available parking lots
Parcheggio Piazza San Simplicio
370 m
da € 1/ora
44 available parking lots
12:53 61%
INFO
FEES
MAP
CONDITIONS
Parcheggio Stazione Ferroviaria
Via Milano , Olbia
93 available parking lots
Parcheggio Stazione Ferroviaria
È consentito l'accesso ad autovetture e moto.
Parcheggio automatizzato aperto h 24, tutti i giorni della settimana escluso il martedì
READ ALL..
Included services
Accesso ai Disabili
Aperto24h
Prenota
Opening times
24H
Website
Paga biglietto
Bring me here
12:53 61%
INFO
FEES
MAP
CONDITIONS
Parcheggio Stazione Ferroviaria
Via Milano , Olbia
93 available parking lots
Tariffe
Tariffa € 1,00/ora per le prime 3 ore
Tariffa € 0,50/ora per la 4° ora e successive
Tariffa per sosta mezza giornata 4,00 € (per sosta oltre la 6° ora ed entro l'8° ora)
Tariffa per intera giornata 8,00 € (per sosta oltre la 8° ora ed entro la 24° ora)
Prenota
Paga biglietto
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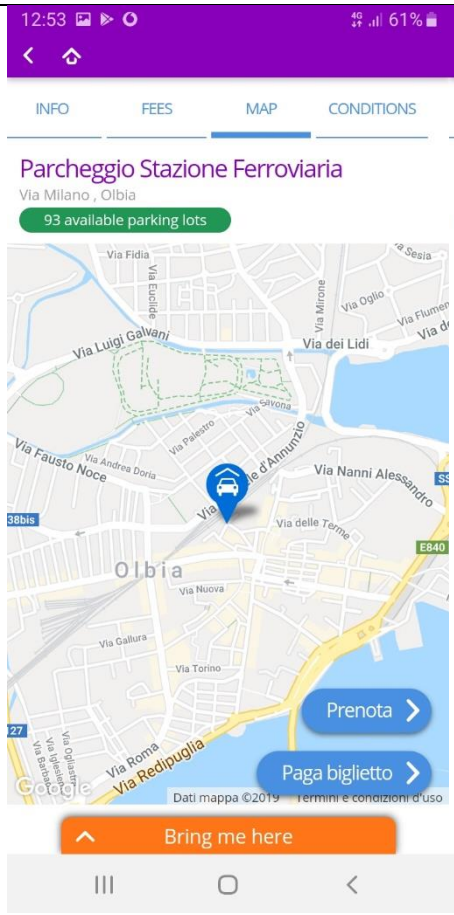
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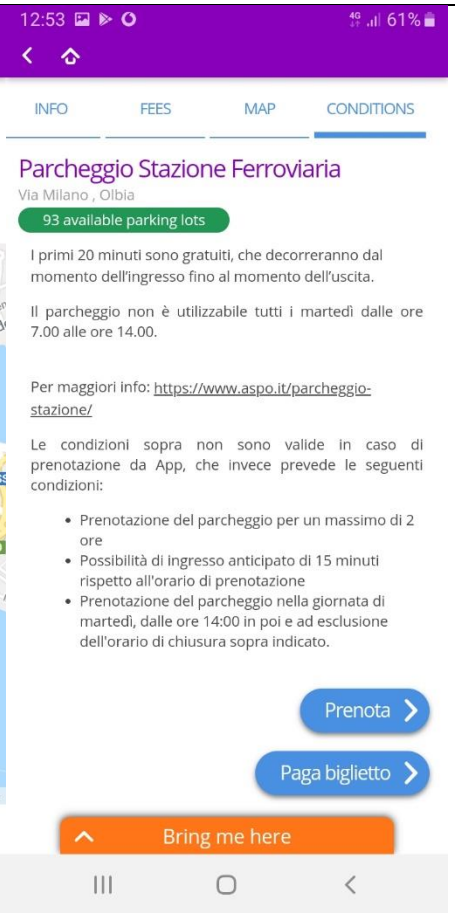
Parcheggio Stazione Ferroviaria
Via Milano , Olbia
93 available parking lots
Via Fidia
Via Euclide
Via Mirone
Via Oglio
Via Luigi Galvani
Via dei Lidi
Via Savona
Via Palestro
Via Fausto Noce
Via Andrea Doria
Via Nanni Alessandro
Via delle Terme
Olbia
Via Nuova
Via Gallura
Via Torino
Via Roma
Via Redipuglia
Prenota
Paga biglietto
Dati mappa ©2019
Bring me here


12:53
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FEES
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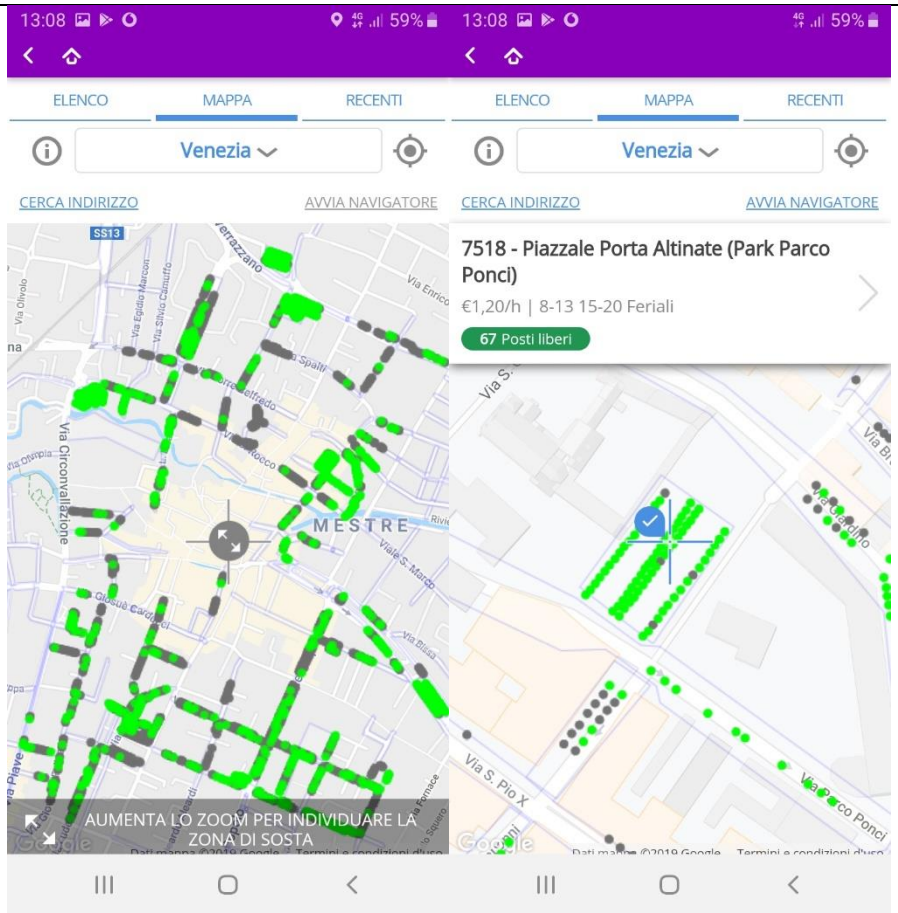
CONDITIONS
Parcheggio Stazione Ferroviaria
Via Milano , Olbia
93 available parking lots
I primi 20 minuti sono gratuiti, che decorreranno dal momento dell'ingresso fino al momento dell'uscita.
Il parcheggio non è utilizzabile tutti i martedì dalle ore 7.00 alle ore 14.00.
Per maggiori info: https://www.aspo.it/parcheggio-stazione/
Le condizioni sopra non sono valide in caso di prenotazione da App, che invece prevede le seguenti condizioni:
• Prenotazione del parcheggio per un massimo di 2 ore
• Possibilità di ingresso anticipato di 15 minuti rispetto all'orario di prenotazione
• Prenotazione del parcheggio nella giornata di martedì, dalle ore 14:00 in poi e ad esclusione dell'orario di chiusura sopra indicato.
Prenota
Paga biglietto
Bring me here

	
Partner role	Pluservice is responsible of the parking booking service. Pluservice will analyse the scenario with the users and it will implement the solution according to its experience in this field and thanks to the previous integrations done during CO-GISTICS. AutovieVenete is the main end-user of this service along the highway's rest areas.
Goal of the use case	The main aims are to: a) optimise the use of the existing parking infrastructure; b) provide cross-border, seamless and consistent information and forecasts on available parking places to truck drivers, hauliers and service providers; c) offer the possibility of reserving parking spaces, pre- and in-trip; d) build a European network of intelligent, secure truck parking areas e) Improve the parking operations (booking, looking for parking, payment); f) improve the current information about the rest area with other useful information (kind of services, useful numbers, multimodality info, etc.);

	g) reduce/optimise the daily operations; h) increase safety (e.g. along highways).
Actors	Pluservice, AUTOVIE VENETE and POLIBA.
Phase (optional)	For the highway: • Approaching to the rest area; • Information to the driver about the availability of these rest areas; • Information about services in each rest areas; • Availability to book in advance the rest area (check the feasibility about organisational level); • Integration with Autovie Venete system and DSS.
Preconditions (optional)	• The parking areas shall be defined; • Setting parameters shall be done; • The truck shall be qualified (in case specific service will be performed).
Main flow by PLUSERVICE	For the highway area (this flow can change if there is a booking of a parking lot or not): 1. The truck drivers check the following aspects via the myCicero App (truck section): 1.1. all the available rest areas and parking lots; 1.2. the occupancy rate; 1.3. the rest areas closest to their location (while driving); 1.4. the possibility to set up push-up notification for some advices to the drivers; 1.5. they can book in advance the parking lot (this is useful also for the rest areas manager and road manager to understand how many trucks are there or are approaching there); 1.6. the next parking area available and km from it; 1.7. suggestions regarding route planning, including rest areas; 1.8. all services available in that specific area (shower, etc.). 2. The integration with AutovieVenete's system;

	3. The development of services for third parties (e.g. web services) to include this innovative service into AutovieVenete's application; 4. The integration with DSS for reports and data.

Table 64: PS IT1 UC6

UC7- B2A, A2B services services such as Customs

Use Case	**UC7a – PNAEAS**
Title	**Pre-gate operations**
Description	Anticipate all the operations (such as the MRN transmission) before the arrival at port gates. This will allow to smoothen bureaucratic operations at gates and leave to the gate guards only the tasks related to security and reading of automated QR codes.
Partner role	The PNAEAS improves current ICT infrastructure to implement pre-gate operations.
Goal of the use case	To reduce the number of operations necessary at port gates (only security tasks and automated verifications via QR codes) to minimise queues at the gates and facilitate port operations.
Actors	Port Authority.
Preconditions (optional)	All the new systems and modules of HPCS developed within FENIX, as well as the ones which will be updated/upgraded (even those not involved in FENIX Ucs) will be created or modified after careful analysis of all relevant EU directives (in primis: EMSWe and EFTI) to be fully compliant with all EU and national directives and regulations.
Main flow	The main flow comprises the following steps: 1. The truck arrives at the port and stops near the ICT system placed before port gates; 2. The truck driver uses automated systems, which check all the needed documents and uploads the requested information (e.g.: using scans or QR codes);

	3. The ICT system is connected with Sinfomar HPCS to share the needed data; 4. The Sinfomar HPCS checks for possible inconsistencies and approves the entrance; 5. Finally, the App communicates the information about waiting times to the FENIX federation.

Table 65: PS IT1 UC7a

Use Case	**UC7b – DBA Lab**
Title	**B2A, A2B services such as Customs**
Description	The actors use the integration of TOS system with Sinfomar HPCS managed by PNAEAS to support the pre-gate procedure between The terminal, The Port of Trieste and surrounding logistics hubs (i.e. inland terminal). Information is exchanged on truck announcements and visits, trains and goods transported through the free trade zone in the Port of Trieste, supporting the local customs procedure. The use case will take into consideration the framework provided in the recent EMSWe and EFTI regulations, and evaluate the impacts of possible customs procedures. Agreed data will be exchanged with the FENIX platform through the federated platform of Pilot Site in Trieste.
Partner role	DBA Lab will develop the integration between TOS Terminal and Sinfomar's HPCS.
Goal of the use case	To reduce the number of operations at the Port and Terminal gates to minimise queues and improve the readiness of Terminal operations exchanging mandatory information with customs.
Actors	Terminal operators and the Port Authority (PNAEAS).

Table 66: PS IT1 UC7b

Use Case	**UC7c – INFO.ERA**
Title	**International Fast Trade Lane between Europe and Turkey**
Description	Info.era will study and test an innovative module "Corridor Management Platform" powered by MILOS, able to simplify the data managements operations of trade flows along the motorway of the sea between Turkey and Europe.
Partner role	IT system integrators and IT solutions providers.
Goal of the use case	To enable new management models designed to provide a complete vision. This allows the implementation of International Fast Trade Lanes, based on a digitalisation speed up between public and private sectors, fostering operations efficiency.
Actors	Terminal operator, Shipping Agency, Inland Terminal, Customs and PNAEAS.
Preconditions (optional)	This UC will be developed in compliance with reference to the EMSWe Regulation thanks to the fact that the customs information will be directly available from the Customs Single Windows, once this information has been firstly gathered by the National Maritime Single Window (estimated time for the new e-Manifest is beginning 2021). While the compliance with the recent eFTI regulation will be ensured by the following three major principles: • Each transport mode involved in the UC will be described informatically by a dedicated dataset based on international recognised standards; • Public Entities involved in the UC will accept and manage electronic documents to stream the transport and logistics digitalisation process; • The B2A dialogue will involve exclusively eFTI certificated stakeholders.
Main flow	The main flow comprises the following steps: 1. Interoperability between private actors and PNAEAS Hinterland Port

	Community System (HPCS) and TOS in Pendik Terminal, using existing customs procedures; 2. Interoperability with the Italian Customs Agency IT Platform (Aida and Il Trovatore); 3. Interoperability with the Turkish Customs Administration IT Platform; 4. If implemented, the information of interest managed by the Corridor Management Platform will be shared with the FENIX ecosystem.

Table 67: PS IT1 UC7c

UC8 - Dangerous goods/eCall EGNOS/Galileo

Use Case	**UC8a – POLIBA**
Title	**Dangerous goods/eCall EGNOS/Galileo**
Description	Services for the management of dangerous goods will be provided. The aim of the services will be two: 1. monitoring the HAZMAT transport in highways; 2. suggesting parking to limit the risk. In order to realise these services, an analysis of the risk evaluation for hazmat transport will be performed. The suggestions for the drivers will be provided by a suitable application. Galileo, i.e. Europe's Global Navigation Satellite System (GNSS), will be used as localisation tool, providing improved positioning and timing information.
Contributors	SWARCO.
Partner role	POLIBA will perform the risk evaluation analysis in order to provide the risk indices. SWARCO will be a data provider
Goal of the use case	To provide a service for drivers to limit and decrease the risk of hazmat transport.
Actors	Pluservice, POLIBA, Autovie Venete and SWARCO.

Preconditions (optional)	This use case will be developed according to the recently adopted Regulation on Electronic Freight Transport Information (eFTI).
Main flow by POLIBA	The main flow comprises the following steps: 1. The driver starts the mobile App; 2. The trip is recorded by the mobile App; 3. The trip is sent to POLIBA DSS; 4. POLIBA DSS matches the trip data (coordinates) of trucks with the ones coming from the road companies (vehicle plates number of the trucks crossing through the road tutors). In this way, it is possible to check if the trip is valid or not; 5. The road company tutors get information about the transported goods through the codes associated to the vehicle's plate number or through the driver's declarations, and send such information to POLIBA DSS; 6. POLIBA DSS performs the risk evaluation analysis on the basis of parameters such as wind, position, traffic conditions, urban density, proximity to other HAZMAT transport vehicles etc., estimating the risk index; 7. The risk index is visualised on guide.me App.

Table 68: PS IT1 UC8a

Use Case	**UC8b – MATRAS**
Title	**Dangerous goods**
Description	Services for the management of dangerous goods will be provided. The aim of the services will be two: 1) monitoring the transport of hazmat in highways via the YTM App; 2) suggesting parking to limit the risk. In order to realise these services, an analysis of the risk evaluation for hazmat transport will be performed. The suggestions for the drivers will

	be provided by the YTM App.
Partner role	MATRAS will be monitoring the HAZMAT trips and providing information about the risk evaluation to prevent accidents.
Goal of the use case	To provide a service for drivers to limit and decrease the risk of hazmat transport.
Actors	Users
Main flow by MATRAS	The main flow comprises the following steps: 1. The driver starts the YTM App; 2. On the specific trip the types of hazmat goods are indicated; 3. The YTM App matches the trip data (coordinates) of trucks that are coming from the Users Road companies. In this way, it is possible to check if the trip is in the ADR; 4. The road company tutors get information about transported goods through the codes associated to vehicle plates number or through the driver's declarations, and send such information to YTM DSS; 5. YTM DSS performs the risk evaluation analysis on the basis of parameters such as wind, position, traffic conditions, urban density, proximity to other HAZMAT transport vehicles etc., estimating the risk index.

Table 69: PS IT1 UC8b

UC9 - Carrier certification & eCMR testing

Use Case	**UC9 - Codognotto**
Title	Carrier certification & eCMR testing.
Description	A digitalised proof of delivery system will be tested in order to verify the possibility to implement a fully digitalised administrative process. The logistics chain is strongly affected by the paper documents that transport and logistics operators need to provide to customers and to store. The whole administrative process is then slowed down and is

	characterised by an extreme low level of automation and digitalisation. The large scale implementation of tools such as E-CMR could positively determine a change in the whole administrative connections among the companies cooperating in the chain, considering both providers and customers. Nonetheless, implementing such a system requires a sound improvement in the track and trace systems since the position of the load has to be certified, especially during loading, unloading and modal shifts. Furthermore, in order to speed up the administrative process connecting the players of the logistics chain, it is necessary to design and implement proper tools able to automatise E-CMR reading and directly managing the consequent invoicing and payment management. The last element that needs to be implemented to support the process is the providers certification through a specific and dedicated IT platform.
Partner role	Codognotto Group will define and create the necessary process design and software to support a fully certified logistics administrative process starting from the providers certification and qualification, proof of delivery, invoicing and payments. The use case will be then drive on three results: • E-CRM testing; • Implementation of a digitalised administrative system link to the E-CMR introduction; • IT platform implementation for the certification of transport providers.
Goal of the use case	To test a fully automatised system linking the certification of transport providers, digitalised proof of delivery and a fully automatised administrative process.
Actors	Codognotto Group, external transport providers and customers.
Preconditions (optional)	The use case will support a concrete implementation of the EFTI regulation and SG1 of DTLF.

Table 70: PS IT1 UC9

11. ITALY, MILAN/GENOVA: THE ITALIAN RHINE ALPINE PILOT SITE – DYNAMIC SYNCHROMODAL LOGISTIC MODULES

11.1 Pilot Site description

PS IT2: The Alpine-Rhine corridor – Dynamic Synchro Modal Logistic Modules for security and efficiency in Genova and in Milan

This pilot is divided into two different but complementary types of transports, positioned in the same corridor. Its strength is the sound connection between the objectives and needs that, by creating new ways of approaching the different obstacles, encourage the conception and the development of effective, efficient, secure and sustainable solutions.

The overall aim of this Pilot Site is to provide several tools to optimise the planning and the real-time operation of the maritime, aerial, logistics and transport operators of the Italian northwest regions. The aims are to achieve an effective and sustainable use of the whole northwest infrastructure (in the three regions of Liguria, Piedmont and Lombardy). For Liguria, in particular, the pilot needs to cope with the actual infrastructural deficit due to the collapse of the Morandi bridge.

Specific focus will be set on the implementation of the monitoring of the traffic routes along the Rhine Alpine Corridor, with a view also on traffic flows through the Scandinavian Mediterranean Corridor. All the tools will be furtherly exploited in terms of logistic optimisation, even once the new bridge will be available.

The **Milan Malpensa and the Genova Pilot Site** will operate as a Living Lab: all the involved stakeholders will collaborate for the creation of real use cases, where both implementing bodies and user communities will play an active role and complement each other in all the activities of the project.

An initial analysis will be performed to implement the scenario with all the elements needed for the selected use cases. In particular, the focus will be on the general trends characterising the transport of the goods in Europe, with special attention to road transport, intermodality and air transport, including aspects such as safety, security and climate change.

In addition to this initial analysis, a constant relationship of comparison and inspiration will be present from the beginning with the other Rhine-Alpine corridor pilots and with the air cargo Belgium pilot. This particular connection is given by the close similarity between the types of places,

obstacles, and difficulties that exist between the Belgian pilot and the Milanese pilot. In fact, both start from the assumption that it is essential to create a project that proves to be of support not only to the airports, but to the communities that surround them. The Pilot Sites will develop their new strategies and tools in close contact so that they can be a source of enrichment and inspiration for one another. Both pilots will work on the importance of the optimisation of the pick-up and delivery freight, focussing on the digitalisation of different documentation to make the various steps faster and easier.

The results of the project will be evaluated after the validation phase.

Actions & Business opportunity

The Rhine Alpine Pilot will deal with several use cases created specifically for the two realities in which they will be developed**.** In particular, Genoa will focus on multimodality and synchro modality, including optimisation of processes and safety, while Milano Malpensa will concentrate on the digitalisation of all the Import and Export procedures, with a focus on the sharing and planning of the shipment information. This will allow a timing optimisation of all the steps, on the security checks, on the safety-related activities, as well as on the emissions reduction. The following aspect will be considered to derive use cases:

- UC1: Expected Time of arrival – ETA (Milan);
- UC2: Reduction of CO2 & NOx emissions (Milan);
- UC3: Dangerous goods transport monitoring (Milan);
- UC4: B2A /A2B services such as customs (Milan);
- UC5: Safety and eCustom (Milan);
- UC6: Digital synchro modal information dashboard (Genoa);
- UC7: Synchro modality (Genoa);
- UC8: Realtime Road optimisation in ports (Genoa);
- UC9: Realtime Rail optimisation in ports (Genoa);
- UC10: FENIX scale-up and transferability plan.

To build the above-mentioned use cases, the FENIX ecosystem will be fed with the already known information and with new key items. As to the Malpensa pilot, this will result in a twofolded articulation, as the use cases are inserted in the export and import process.

Base TEN-T corridor: Rhine – Alpine

11.2 Pilot Site working group definition

Partner name	Pilot Role
Italian Ministry of Infrastructures and Transports (MIT)	FENIX Partner and Manager of the Italian Pilot Sites
SEA Milan Airports (SEA)	Airport area manager and related road and nodes expert
Port Authority of the Eastern Liguria Sea (LASPEZIA)	Port area manager and road and nodes expert
Circle SpA (CIRCLE)	Technology provider
University of Modena and Reggio Emilia (UNIMORE)	Research, analysis, management and technological support
University of Genova - Italian Centre of Excellence on Logistics, Transport and Infrastructures (UNIGE)	Research and analysis
Tarros (TARROS)	Shipping line and terminal operator
Ignazio Messina Terminal (IMT)	Terminal Operator
Links Foundation (LINKS)	Territorial Innovation, research
Rhine Alpine GECT partners (Uniontrasporti, Region Liguria, Region Piedmont, Region Lombardy, formally working under the Gect Rhine Alpine).	Experts, public authorities
PTV Group (PTV)	Technology provider

Table 71: PS IT2 Working Group

Two partners will have a transversal role in the project:

- Links Foundation will have different roles related to the Use Case Scalability and transferability;

- The Rhine Alpine GECT partners will have a horizontal role in all the uses cases supporting the Rhine Alpine pilot to cover all the national and regional strategies and to coherently develop the project with the related policy stakeholders.

11.3 Pilot Site Use Cases

This section presents the list of FENIX use-cases of the Milano-Genova Pilot Site. UC1-UC6 refer to the air cargo in Milan, while UC7-UC10 to the Genova site.

The Milan use cases refers to the synchronisation and simplification of the Import/Export operations, i.e., to the logistic operations related to the arrival of goods by plane from other sites and their delivery in the region (Import) and the reverse flow (Export). The main actors are the Malpensa cargo area managers and the freight forwarders that operate partially inside the airport area, and partially outside the airport. The synchronisation of the air cargo with the trucks that transport the goods in the region is fundamental to have an efficient process, to reduce congestion, time, costs and pollution. The reduction of paper exchanges is another aspect that can be improved. The UCs will be based on the development of a service with a mobile application ("App" in the following) as main user interface that allows the exchange of data and information between the ICT systems of SEA and of the freight-forwarders. This exchange will be powered by FENIX.

Use Case ID	**Use case Name**	**Description**	**Contributors**
UC1 (Milan)	ETA	ETA (Estimated Time of Arrival) evaluation and synchronisation of the logistic operations inside, outside the air cargo area, through the availability of real-time information and forecast models.	- SEA: airport area expert, leader and related road and nodes manager; - UNIMORE: logistics and technological support. - CIRCLE: Technology provider. - PTV: Technology provider.
UC2 (Milan)	Reduction of CO2 & NOx	Emissions reduction. The avoidance of traffic	- SEA: airport areas

	emissions	congestion and the optimisation of the route will result in safer and smoother eco-driving for trucks and vehicles. The goal is to monitor, collect and verify the data related to the CO_2 and NO_x emissions.	experts, leaders and related road and nodes managers; - UNIMORE: logistics and technological support. - CIRCLE: Technology provider. - PTV: Technology provider.
UC3 (Milan)	Dangerous goods/ transport monitoring	Services for the safety and security of the management of dangerous goods through the constant monitoring during the export process, from the warehouse, along the route, to the arrival in Malpensa Cargo City, as well as during the import process from Malpensa Cargo City to the warehouse.	- SEA: airport areas expert and leader and related road and nodes manager. - UNIMORE: logistics and technological support. - CIRCLE: Technology provider. - PTV: Technology provider
UC4 (Milan)	B2A, A2B services such as customs	Milan: exchange (business-to-administration/B2A), and tracking (administration-to-business/A2B) of the digital flow for the purposes of regulatory compliance and optimisation in terms of processes, security, safety rules and technology.	- SEA: airport areas experts, leaders and related road and nodes managers. - UNIMORE: logistics and technological support. - CIRCLE: Technology provider.
UC5		More and better-quality	- SEA: airport areas

(Milan)	Safety and eCustom	information will be provided to transport and logistic actors with new pilot tools for the efficient management of freight transport.	experts, leaders and related road and nodes managers - UNIMORE: logistics and technological support. - CIRCLE: Technology provider.
UC6 (Genoa)	Digital synchro modal information dashboard	Interoperability of the different actors on the "fast trade lane" and to develop the dashboard as the pipeline in which all the different federated systems will contribute to. This will enhance the visibility over the supply chain, integrating logistics and customs procedures and leading to a reduction of transit time and a related increased efficiency.	- CIRCLE: Technology provider. - Port actors (LA SPEZIA, IMT, TARROS) – Provision of the data to the dashboard for the related supply chains, making their system interoperable with the modules developed in FENIX. - UNIGE: undertakes the cost-effectiveness analysis of the module.
UC7 (Genoa)	Synchro-modality	Planning and optimisation modules.	- CIRCLE: Technology provider. - IMT – Provision of the data for the two modules, piloting them on a real case. - UNIGE: undertakes the cost-effectiveness analysis of the module.

UC8 (Genoa)	Real-time Road optimisation	Optimised Real-time operations in ports.	- CIRCLE: Technology provider. - LASPEZIA, TARROS: Provision of the data for the development of the module and pilot.
UC9 (Genoa)	Real-time Rail optimisation	Optimised Real-time operations in ports.	- CIRCLE: Technology provider - LASPEZIA – Provision of the data for the different submodules, piloting them on a real case. - UNIGE: undertakes the cost-effectiveness analysis of the modules.
UC10	FENIX scale-up and transferability plan	The UC will complement the technical UCs by providing an analysis of the transferability and scalability of the FENIX Italian Rhine-Alpine pilot to several other actors of North-West Italy.	LINKS: research

Table 72: PS IT2 Use Cases

FENIX will encourage existing possibilities of electronically ordering and managing multiple modes of transport will be combined with on-line freight visibility and traceability data in a single interface able to shorten the time in the decision-making, resolving incidents in real-time, including cross border and no-EU connections and finally shortening the length of stay of the goods at the port.

Use Cases:

<u>UC1-Expected Time of arrival (ETA) APP service development</u>

Use Case	**UC1**
Title	**Expected Time of arrival (ETA) APP service development**
Description	Development of an App to optimise operations related to export activities (trucks leaving the warehouse with outbound shipments to be delivered to Cargo City Malpensa) and import activities (trucks with inbound shipments leaving Cargo City Malpensa towards the warehouse). This App will allow both truck drivers and the warehouse to receive real-time traffic information concerning the itinerary to their final destination (i.e.: warehouse for import shipments and Cargo City for export shipments) and the information on the availability of the Cargo City facilities to manage the goods transported, allowing a "perfect" synchronisation.
Contributors	SEA, UNIMORE, CIRCLE and PTV.
Partner role	The technical aspect will be managed by CIRCLE and UNIMORE. The aim is to enable the interoperability of the newly developed ETA App with the "ecosistema cargo malpensa". The platform already exists and it already provides certain services to Cargo City stakeholders, as stated in the link below: http://ecosistemacargomalpensa.seamilano.eu/index.html As data providers, a Freight Forwarder and a warehouse will be selected.
Goal of the use case	The goal is to optimise the management of the outbound and inbound fleet as to their warehouse-Cargo City journey, giving access to real-time data on traffic to all the actors involved. The results of the ETA App will be integrated into the "ecosistema cargo malpensa" platform to fulfil the ETA data gaps.
Actors	Warehouse, freight forwarders and truck drivers.
Main flow (outbound/export shipment)	The main flow comprises the following steps: 1. The driver starts the mobile App; 2. The truck leaves the warehouse;

	3. All actors (the warehouse, truck driver and the freight forwarders) see the ETD of the cargo aircraft where the shipment is booked; 4. The driver checks the ETA to Cargo City; 5. The App matches continuously the ETD of the cargo aircraft where the shipment is booked with the ETA to Cargo City; 6. The App sends messages to the truck driver, to the warehouse and to the Freight Forwarder concerning a journey update due to eventual traffic problems and suggests alternative routes; 7. The driver reaches Malpensa Cargo City; 8. The App communicates the information about the shipment delivery to the FENIX federation.
Main flow (inbound/import shipment)	The main flow comprises the following steps: 1. The driver starts the mobile App; 2. The truck leaves Cargo City; 3. The driver checks the ETA to the warehouse; 4. The App sends messages to the truck driver, to the warehouse and to the Freight Forwarder concerning eventual traffic problems and suggests alternative routes; 5. The driver reaches the warehouse; 6. The App communicates the information about the shipment delivery to the FENIX federation.

Table 73: PS IT2 UC1

UC2-CO_2 & NOx emission monitoring and reduction APP service development

Use Case	**UC2**
Title	**CO_2 & NOx emission monitoring and reduction APP service development**
Description	The ETA App will guarantee smooth travels that will contribute to decreasing the CO_2 & NOx emissions. The journey data concerning

	consumptions will be sent from the ETA App to the FENIX federation that will monitor the fuel consumption and, therefore, the level of emissions. This data collection will also be important to elaborate considerations related to intermodality, road transport sustainability and climate change impact.
Contributors	SEA, UNIMORE, CIRCLE and PTV.
Partner role	The technical aspect will be managed by CIRCLE and UNIMORE.
Goal of the use case	The goal is to estimate the CO_2 & NO_x emissions of trucks in their journeys from the warehouse to the Cargo City and vice-versa, collecting data for environmental sustainability analysis. The focus will be on weaknesses and strengths of transport considering its impact on the climate change issue.
Actors	Warehouse, Freight Forwarders and Truck Drivers.
Main flow	The main flow comprises the following steps: 1. The driver starts the mobile App and inserts the destination; 2. The truck starts the scheduled trip; 3. The driver views the ETA estimated by the App; 4. Through the ETA (in terms of distance and speed), the App will suggest the speed advice and velocity profiles to reduce emissions and fuel consumption; 5. The App communicates the journey parameters to the FENIX federation to collect data.

Table 74: PS IT2 UC2

UC3-Dangerous goods transport monitoring

Use Case	**UC3**
Title	**Dangerous goods transport monitoring**
Description	The focus of this use case is on the security and safety requirements,

	defining weak and strong aspects, as well as general trends that characterised the air and road freight transport along the main European corridors, also considering the evolution and future trends. The tool service for the monitoring of the dangerous goods transport aims: 1) to ensure the compliance of the documents for the transport of the dangerous goods with the standards required from aviation; 2) to monitor the transport of the dangerous goods along the whole journey in real-time.
Contributors	SEA, UNIMORE, CIRCLE and PTV.
Partner role	The technical aspect will be managed by CIRCLE and UNIMORE. As data providers, a Freight Forwarder and a warehouse will be selected.
Goal of the use case	The goal is to provide a monitoring tool as to the compliance of the documentation with the provisions of the regulation for air transport, providing a monitoring service of the journey of the shipments. This monitoring tool is related to export activities (trucks leaving the warehouse with outbound shipments to be delivered to Cargo City Malpensa) and import activities (trucks with inbound shipments leaving Cargo City Malpensa towards the warehouse).
Actors	Warehouse, Freight Forwarders and Truck Drivers.
Main flow	This flow is described assuming that the tool for monitoring the transport of dangerous goods will be included in the ETA App described above: 1. The driver starts the mobile App; 2. The itinerary is identified by the App and shown to the driver; 3. The status of the shipment is visible along the whole route to the warehouse and to the freight forwarder; 4. All Actors (the warehouse, the truck driver and the freight forwarders) see the ETA/ETD of the cargo aircraft where the shipment is booked; 5. (Export Shipment only) The App matches continuously the ETD

	of the cargo aircraft where the shipment is booked with the ETA to Cargo City; 6. The App sends messages to the truck driver, to the warehouse and to the Freight Forwarder concerning a journey update due to eventual traffic problems and suggests alternative routes; 7. The App communicates the information about the shipment of the dangerous goods to the FENIX federation.

Table 75: PS IT2 UC3

UC4-B2A /A2B services, such as customs

Use Case	**UC4**
Title	**B2A/A2B services, such as customs**
Description	Anticipate, before the delivery of the shipment both in the export and import phases, the digital transmission of the information related to it. The exchange (business-to-administration/B2A), and tracking (administration-to-business/A2B) of the digital information have the purpose of regulatory compliance and optimisation in terms of processes, security and safety rules. Most of the bureaucratic operations are ensured prior to the delivery of the shipment both in the export and import phases. This Use Case will be developed taking in due account the future framework set out by EFTI regulation as soon as it will define specific guidelines and rules.
Contributors	SEA, CIRCLE and UNIMORE.
Partner role	The technical aspect will be managed by Circle and the University of Modena and Reggio Emilia. As data providers, a freight forwarder and a warehouse will be selected.
Goal of the use case	Reduction of the bureaucratic operations to simplify export and import flows.
Actors	Warehouse, freight forwarders and truck drivers.
Main flow	The main flow comprises the following steps: 1. The truck arrives at Malpensa Cargo City / warehouse;

	2. The truck driver confirms he/she has arrived, and he/she is ready for the automated systems to check most of the needed documents; 3. The automated system confirms the validity of the documents; 4. The automated system sends the approval for shipment check-in(export)/check out (import) to the actors involved; 5. The automated system communicates waiting times to the actors involved; 6. The automated system communicates the information about waiting times to the FENIX federation.

Table 76: PS IT2 UC4

UC5-Safety and eCustoms operations monitoring

Use Case	**UC5**
Title	**Safety and eCustoms operations monitoring**
Description	• Integration of the "ecosistema cargo malpensa" platform with the customs system in order to reduce costs and interaction times among the actors, taking also in consideration a trend analysis on safety/security processes. • Update the status of the shipment in terms of operational issues due to safety-related problems. • FENIX will encourage existing possibilities of electronic ordering. The management of multiple modes of transport will be combined with on-line freight visibility and traceability data in a single interface. The aim is to shorten the time in the decision-making, resolve incidents in real-time, including cross border and non-EU connections and reduce the length of stay.
Contributors	SEA, CIRCLE and UNIMORE.
Partner role	The technical aspect will be managed by CIRCLE and UNIMORE. As data providers, a Freight Forwarder and a warehouse will be selected.
Goal of the use case	The goal is to analysis safety/security gaps on road freight transport in order to implement safety recommendations guidelines.

	The real-time monitoring of any issues related to safety or eCustoms will contribute to the achievement of the efficiency in the management of operations related to freight transport. This monitoring service is related both to export activities (trucks leaving the warehouse with outbound shipments to be delivered to Cargo City Malpensa) and import activities (trucks with inbound shipments leaving Cargo City Malpensa towards the warehouse).
Actors	Warehouse, freight forwarders and truck drivers.
Main flow	The following flow is described assuming that the monitoring service is included in the ETA APP described above: 1. The driver starts the mobile App; 2. The itinerary is identified by the App and shown to the driver; 3. The status of the shipment is visible along the whole route to the warehouse and to the freight forwarder; 4. All Actors (the warehouse, the truck driver and the freight forwarders) see the ETA/ETD of the cargo aircraft where the shipment is booked; 5. (Export Shipment only) The App matches continuously the ETD of the cargo aircraft where the shipment is booked with the ETA to Cargo City; 6. The App sends messages to the truck driver, to the warehouse and to the Freight Forwarder concerning eventual issues related to safety or eCustoms; 7. The App communicates to the FENIX federation the status of the shipment in terms of safety or eCustoms.

Table 77: PS IT2 UC5

UC6-Safety and eCustoms operations monitoring

Use Case	**UC6**
Title	**Digital synchromodal information dashboard**

Description	Ports and related supply chain actors need better integration of the different modes of transport achieving streamlined and digitalised processes and more advanced IT systems. The portion of the Rhine-Alpine Pilot Site centred in ports has the aim to develop and test collaborative corridor concepts grounded on the enhanced availability and use of data among logistics companies and administrations along supply chain linked to the Rhine-Alpine corridor, by means of: • Optimised transport and logistics processes in a much better and predictable way; • Simplified and enhance processes through avoidance of mistakes and errors; • Scaled up processes through harmonised collaboration structures among corridor stakeholders. The concept is centred in ports and will be specifically exploited implementing an "international fast trade lane" on a specific door to door logistics chain connecting the Rhine Alpine Corridor, the ports of Genoa and La Spezia and non-EU final destinations (e.g. Morocco, Turkey etc.). The aim is to support the digitalisation in ports as key nodes of multimodal logistics chain, piloting advanced IT solutions to improve transport connections and promoting modal integration and interoperability. Specifically, FENIX will contribute to fulfil these needs by: • improving multimodal coordination in ports and in the international logistic chain by piloting IT solutions to better integrate the different mode of transport. Pilot technological solutions will be testing connecting ports to different transport environments and to different transport infrastructure nodes (e.g. railroad terminals, shunting areas and logistical platforms); • these IT pilot solutions will contribute to removing bottlenecks as paperwork required from shippers when transporting their

	goods using intermodal chains that are broadly acknowledged as a bottleneck and major hindrance for the development of TEN-T; • FENIX will boost a more efficient coordination process between different modes of transport (road, rail and maritime transport) by channelling these processes through IT platforms, contributing to increasing their efficiency, quality of service and ease of use; • providing advanced information services: more and better-quality information will be provided to transport and logistics actors with new pilot tools for an efficient management of freight transport. • on-line freight visibility and traceability data in a single interface able to shorten the time in the decision-making, resolving incidents in real-time, including cross border and non-EU connections, finally shortening the length of stay of the goods at the port. This use case will be developed in a compliant way with reference to the EMSWe Regulation. Namely, the customs information will be directly available from the Customs Single Windows once this information has been firstly gathered by the National Maritime Single Window (estimated time for the new e-manifes is beginning 2021).
Partner role	The roles of the different Implementing bodies are the followings: • CIRCLE: Technology provider; • Port actors (LASPEZIA, IMT, TARROS) – Provision of the data to the dashboard for the related supply chains, making their system interoperable with the modules developed in FENIX; • UNIGE: undertakes the cost-effectiveness analysis of the module.
Goal of the use case	The goal is to make the different actors on the “fast trade lane” interoperable and to develop the dashboard as the pipeline in which all

	the different federated systems will contribute to. This will enhance visibility over the supply chain and integrate logistics and customs procedures, leading to a reduction of transit time and a related increase of efficiency. Logistics and security information can be shared as a digital data flow with authorised public and private operators for exploiting simplified and digitalised procedures along the Rhine Alpine Corridor and related door to door chains (with origin and destination in the northwest of Italy and using the ports of Genoa and La Spezia as a gateway).
Actors	Maritime and logistics actors on the selected corridors.
Main flow	Real-time information exchange between actors on the corridors.

Table 78: PS IT2 UC6

UC7-Synchro modality

Use Case	**UC7**
Title	**Synchro modality**
Description	**The Synchro-modal Planner** is used to manage the planning of container (and other Transport Units) handling in ports. The System will be implemented using a mix of software development with the Digital Twin approach and Robotic software process automation. The System will support the operational planning and, once the consignment is in transit, it will monitor progress and dynamically re-plan if needed. The system can, for instance, react to real-time updates about the ETA for each leg (obtained from the inland nodes logistic hub and/or, for example, from external tracking or Port Community Systems). The **Logistics Optimiser** starts its role when the container has been discharged at the destination port, or when there is a reasonable degree of certainty about the ship's berthing time. One of the key aspects of this module is the ability to re-optimise quickly if the berthing time suddenly changes– certainty can never be assumed for maritime operations. At this stage, **the logistic operator must finalise the allocation to a**

	haulier and/or train, taking account of more detailed and up-to-date information. Another possible use of the module is an inbound/import container that can be re-used after unloading for an export/outbound load from a nearby customer, saving kilometres and costs, faster-than-expected clearance through customs or a last-minute postponement by the customer that allows the switch from road to rail. **The inland nodes interface module** is the main source of information inside the *Synchro-modal Planner*, receiving information from inland terminals and logistics nodes and standardising this information and data in a common defined standard (to be defined starting from EDIFACT + TAF/TSI), making them available.
Partner role	• CIRCLE: Technology provider; • IMT– Provision of the data; • UNIGE: undertakes the cost-effectiveness analysis of the module.
Goal of the use case	The goal is to provide terminal operators with advanced planning modules, interoperable with other actors of the chain.
Actors	Maritime and logistic actors on the selected corridors.
Main flow	Real-time information exchange between actors in the port and in the corridors.

Table 79: PS IT2 UC7

UC8-Real-time Road optimisation in ports

Use Case	**UC8**
Title	**Real-time Road optimisation in ports**
Description	Hauliers and truck operators are subject to frequent changes, so it is crucial to provide them with real-time scheduling algorithms capable of meeting their needs in the synchro-modal landscape. A *Real-time Road Optimisation Module* will take the latest updates from the Logistic Optimser as input. It can use the current status of in-progress journeys, and dynamically re-plan the last-mile operations for each haulier, coping

	with the specific requirements/features of containerised freight, while enabling hauliers to respond very fast to changes. The Real-time Road Optimisation Modules will be used by terminal operators to plan vehicle movements in detail, considering real-time updates to intelligently and efficiently re-plan. The *Real-time Road Optimisation Modules* schedules and optimises the use of terminal yards in relation to the haulier's fleets according to consignment data provided by the *Synchro-modal Planner and by the Logistic Optimiser* and data provided by either the haulier or other actors (shippers, freight forwarders, agents).
Partner role	• CIRCLE: Technology provider; • LASPEZIA, TARROS – Provider of the data.
Goal of the use case	To provide terminal operators with advanced operational modules to improve the maritime/road connection, interoperable with other actors of the chain.
Actors	Maritime and logistic actors on the selected corridors.
Main flow	Real-time information exchange between actors in the port and in the corridors.

Table 80: PS IT2 UC8

UC9-Real-time Rail optimisation in ports

Use Case	**UC9**
Title	**Real-time Rail optimisation in ports**
Description	Rail operators face complex planning requirements in terms of rules for loading trains, considering weight, wagon constraints, length constraints (which vary depending on route) and other factors. Therefore, a means to seamlessly manage the synchro-modal plan is needed also for these organisations. The *Real-time Rail Optimisation Modules* are tools that allocate containers to wagons and trains, considering not only these complex rules, but also ensuring that the dynamic synchro-modal plan can actually be executed.

	The proposed approach involves three main port areas: ➢ The digitalisation of all rail last-mile information; ➢ The Rail Shunting Optimisation; ➢ The Rail Terminal Operation Optimisation; Concerning *Digitalisation and Integration of all rail last mile information* it is possible to point out: • E-manifest digital exchange with railway nodes (i.e. inland terminals, port communities, etc.); • Customs documents and e-manifest digital exchange with Customs Agency and Guardia di Finanza (Finance Police); • Train composition list, delivery note, e-manifest digital management; • Train schedules ETA/ATA information sharing among directly involved stakeholders; • Operational train information availability in real-time; • Digital planning / intermodal appointment. The *Rail Shunting Optimisation* will include optimisation models supporting the rail shunting manager decision making process concerning rail shunting tasks planning and execution. In particular, the Rail Shunting Optimisation module exploits the following features: • Daily planning: daily re-scheduling of real-time shunting operations to better manage extraordinary operational tasks based on a tool automatically suggesting priorities according to predefined criteria (operational planning); • Weekly planning: assignment of detailed available resources (i.e., human resources, locos, wagons, binaries, etc.) to scheduled shunting operations to maximise the use of the resources (tactical planning); • Long term planning: preventive sising optimisation model to determine the required resources to perform a railway shunting service in a certain logistics hub (strategic planning).

	Concerning *Rail Terminal Operation Optimisation*, the aim is to support a better planning of terminal operators by sharing information. There are different levels of planning: • Daily planning: handling operations, optimal re-scheduling (operational planning); • Weekly planning: detailed assignment of available resources (i.e., human resources, binaries, tagmasters, reachstakers, cranes, etc.) to scheduled handling operations to maximise the use of resources (tactical planning); • Long term planning: preventive sising optimisation model to determine the required resources to perform handling services in a certain railway terminal (strategic planning). Moreover, regarding the optimal planning of rail terminal operations, several aspects such as the optimal planning and management of train loading/unloading and the optimal use of terminal resources (as equipment and rail tracks) will be considered. Specifically, given a set of trains to be managed within a predefined time interval, the planning activities are devoted to: a) defining the trainload/unload plans; b) optimising the loading/unloading operations by means of the handling equipment/resources available in the terminal; c) optimally managing the possible storage areas dedicated to the terminal rail cycle; d) optimally exploiting the rail infrastructures. The definition of the train load/unload plans considers structural and stability constraints and commercial requirements (such as container/customer priorities or train destination). For the optimisation of loading/unloading operations all the activities will be scheduled to respect timing constraints and to obtain the best exploitation of terminal resources that can be shared among several terminal activities.

	The optimal management of the storage areas dedicated to the terminal rail cycle strongly depends on the terminal layout and operational procedures. Moreover, this phase is finalised to respect time constraints and safety requirements, and to maximise the performance of the whole rail cycle in terms of re-handle and travel distance minimisation. The exploitation of the rail infrastructures, which mainly consists in the assignment of rail tracks to trains, is an a-priori requirement to effectively manage all the other activities. All the optimisation activities described above will be properly integrated and interfaced according to the different operational contexts. Moreover, the design of the overall rail optimisation module is based on the identification of the most suitable key performance indicators able to support the terminal management and strategy. Finally, the terminal activities must be strictly interfaced with shunting operations timing.
Partner role	• CIRCLE: Technology provider; • LASPEZIA, TARROS – Provision of the data to different submodules, piloting them on a real case; • UNIGE: undertakes the cost-effectiveness analysis of the modules.
Goal of the use case	To provide port operators with advanced operational modules to improve the maritime / rail connection, interoperable with other actors of the chain.
Actors	Maritime and logistic actors on the selected corridors.
Main flow	Real-time information exchange between actors in the port and in the corridors.

Table 81: PS IT2 UC9

Beside the above use cases the Italian Rhine-Alpine pilot will perform a FENIX scale-up and transferability exercise.

UC10-FENIX scale-up and transferability plan

Use Case	**UC10**
Title	**FENIX scale-up and transferability plan**

Description	The UC will complement the technical UCs by providing an analysis of the transferability and scalability of the FENIX Italian Rhine-Alpine pilot to several other actors of North-West Italy.
Contributors	All the Pilot partners.
Partner role	LINKS: research
Goal	• Involving a selection of North-West Italy transport operators, who could join FENIX federated architecture. • Mapping their intermodal transport chains, processes and relations among the operators, existing tools for the optimisation of processes, data exchange and syncromodality. • Understanding the existing gaps and missing data that hinder the optimisation of the transport operator processes. • Fostering the acceptance of selected inland operators on collaborative logistics models and data sharing with reference to a selection of the UCs of the Italian Pilot and other FENIX UCs. • To experience and assess the impact following the pilots roll out. Identifying indicators, methods and tools, in order to support regional and macro-regional planning processes and decision-making.
Activities	• Identification and first contact with NW transport operators. • As is analysis in North-West Italy. • Gathering users' needs. • Fostering the acceptance on collaborative models and data sharing. • Impact assessment. • Guidelines for the implementation of a DSS for regional freight transport planning.
Target operators	MTOs, freight forwarders, intermodal terminal managers, rail-shunting operators and road transport operators (i.e. HUPAC,

	Ambrogio, Eurogateway, Mole Logistica, Fuorimuro, Gavio).
Duration	[M7-M36]
Interdependencies with other Activities/partners	Pilot leader, NW Regions, Uniontrasporti will be involved in the operator's identification and first contact.

Table 82: PS IT2 UC10

12. DUTCH PILOT SITE, SMART MULTIMODAL OPERATIONS PLATFORM (SMIP)

12.1 Pilot Site description

The vision of SMIP is to facilitate cross-border rail freight transport to create a competitive advantage against other transport modes. Enhancing flexibility and quality of rail freight services on this corridor, as well as optimising the use of scarce capacity through a high level of international cooperation will foster rail freight services as a sustainable transport mode in Europe and will make the shift from road to rail happen.

The focus of the SMIP team will be on **two TEN-T corridors**:

(1) The Rhine-Alpine corridor, which connects the Netherlands with Italy via Germany and Switzerland.

(2) The Scandinavian – Mediterranean connecting Sweden/Denmark to Italy via Austria.

In addition, the SMIP will demonstrate solutions on **two Rail Freight Corridors:**

- RFC1– **Rhine-Alpine** (https://www.corridor-rhine-alpine.eu/home.html)
- RFC 3 – Scandinavian-Mediterranean (https://www.scanmedfreight.eu/).

Both projects are to improve rail freight transport in Europe and to encourage modal shift from road to rail.

Base TEN-T corridors: Baltic – Adriatic; Rhine – Alpine; Scandinavian Mediterranean.

Actions & Business Opportunity

The SMIP Pilot Site will build the Multimodal Transport Operations platform based on the Xynaps community data platform and the Transfollow e-CMR platform. The Xynaps platform was built to connect all major stakeholders involved in the transport of goods in a digital way. It is the basis platform upon which PIONIRA is building the e-CMR/e-Document solution.

The Multimodal Transport Operations platform flows are as follows (Figure 5 and 6):

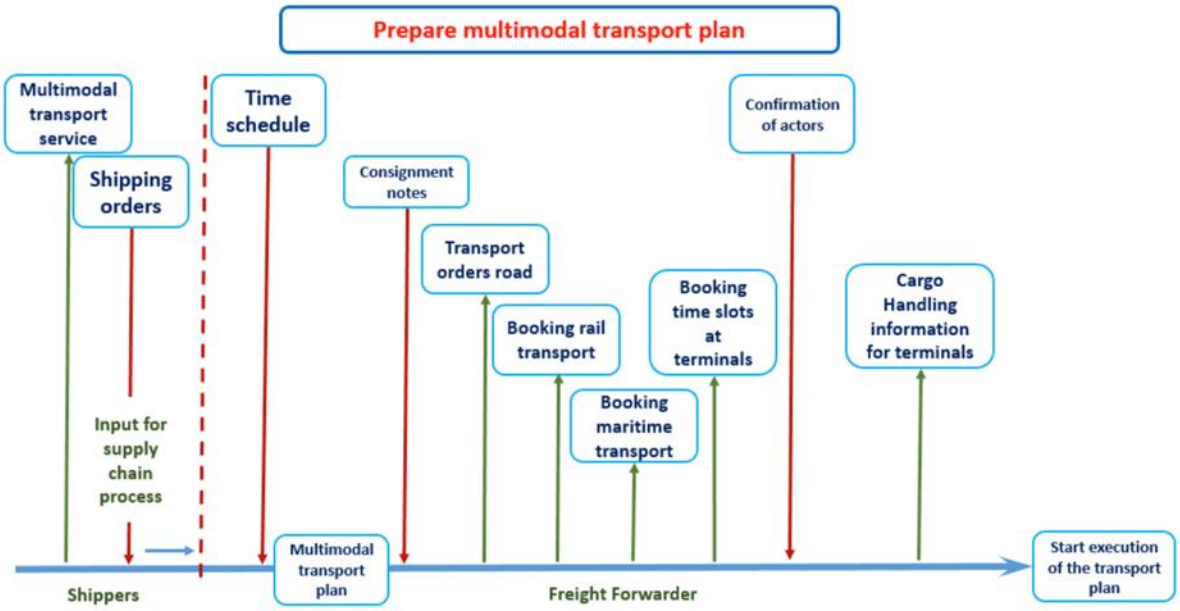


Figure 5: Multimodal Transport Operations Platform flows (1)

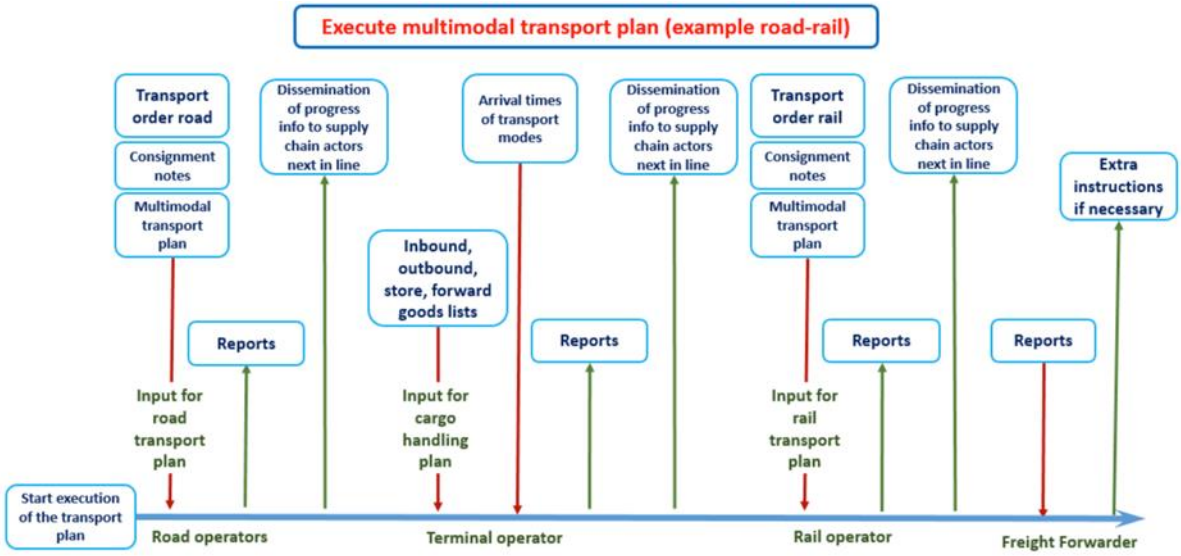


Figure 6: Multimodal Transport Operations Platform flows (2)

The SMIP team will demonstrate the feasibility of 3 Use Cases (UC):

- **UC1 – e-CMR:** Paperless transport in intermodal transport with focus on road-rail document exchanges.

The goal of UC1 is to demonstrate the exchange of consignment notes generated by individual IT systems through a federated network, involving different modes of transport (road/rail). The platforms that will be used for UC1 are:

- TMS (JdR & TXL);
- TransFollow (Transfollow);
- Orfeus (RailData).

- **UC2 – e-GATE:** Novel technologies for enhanced gate-in/out data exchanges at terminal/node.

The goal of UC2 is to demonstrate the digital exchange of data with relevant stakeholders on key terminal-related operations (gate in/out processes on road and rail side). The platform that will be used for UC2 is:

- Xynaps (Pionira);
- PIL (Terminali Italia/IPBO);
- ILU Code Application.

- **UC3 – e-FTI:** B2A novel means of digital communication based on eFTI Regulation, DTLFII and ad-hoc TAF TSI JSG activities.

The goal of UC3 is to create a digital environment for exchanging B2A freight information.

The platforms that will be used for UC3 is:

- Xynaps (PIONIRA).

The 3 UC's are described in full detail in section 12.3.

12.2 Pilot Site working group definition

Table 84 shows an overview of the current partners in SMIP and their envisaged roles within the Pilot Site.

Beneficiary name	Beneficiary number	Pilot Role
Van Looveren Consultancy BV, The Netherlands	23	Pilot Site leader
TX Logistik, Germany	34	Intermodal Operator, Railway Undertaking – coordinator of UC1
Interporto Bologna, Italy	27	Terminal Operator – coordinator of UC2
Jan De Rijk, The Netherlands	43	Freight Forwarder, Road Operator – contributor for all 3 UC's
UIRR, Belgium	35	Representatives for the CT and Terminal Operators' Association – coordinator of UC03 and support in UC1 & UC2
ESC, Belgium	36	Project management
Pionira, Belgium	30	Service provider of the interconnection platform – contributor for all 3 UC's
Transfollow, The Netherlands	TBD	Service provider and contributor to the interconnection platform for UC1

Table 83: PS NL Working Group

12.3 Pilot Site Use Cases

UC1-Paperless Transport in Road-Rail Combined Transport

Use Case	UC 1 (e-CMR)
Title	**Paperless transport in Road-Rail Combined Transport**
Goal	To demonstrate the exchanging consignment notes generated by individual IT systems through a federated network and involving different modes of transport (road/rail). This should serve as a blueprint to be used in the operational environment.
Description	Today, the handeling of consignment notes is managed in a highly manual way. Even in multimodal and intermodal transports, where the consignment note data as primary order information needs to be exchanged not only between customers and forwarders but also between

	all operating participants, the hand over is mostly paper based. There are different initiatives to establish an electronic format for consignment notes notably the eCMR (electronic United Nations Convention for the carriage of goods) format for road transports and ECN/Orfeus for rail transports. However, the information for consignment notes is often generated and distributed by individual IT systems while integration platforms for distributing consignment notes are rare (e.g. TransFollow for road and Orfeus from RailData for rail). The use case will focus on the exchange of consignment note data primarily as order information and only secondarily as replacement of paper notes as receipts for goods. It shall demonstrate an intermodal transport where individual platforms of participating parties (e.g. independent TMS of JdR and TXL) exchange consignment note data using the FENIX data exchange architecture and potentially simulating also the exchange of the representative platforms for the two modes road and rail, e.g. TransFollow and potentially Orfeus. This will cover data exchange over different platforms along the participants of the transport chain.
Platforms	• TMS (JdR & TXL) • TransFollow/Pionira • Orfeus (RailData) – potentially.
Partner role	• JdR will take the role of the freight forwarder, communicating with the consignor and defining the transport plan with different transport operators in a chain. It will simulate a consignment note exchange with other road operators via an exchange with TransFollow as integration platform for consignment notes for road transport. • TXL will take the role of the leading rail transport operator in the transport chain. JdR will transmit the relevant consignment note data to TXCore as the handling IT platform of TXL where it gets enriched with rail specific parameters and used to steer the rail

	transport. • TXCore will simulate the transmission of the finalised consignment note according to CIM regulations (Uniform Rules Concerning the Contract of International Carriage of Goods by Rail) to the Orfeus platform (potentially). As RailData is not an active participant in the FENIX pilot, this platform integration will need to be simulated. Alternatively, the finalised CIM consignment note will be transferred to a platform for handling digital consignment notes, e.g. TransFollow or Pionira. • SMIP will anyhow use real transports as demonstration cases with real consignment note data, therefore actual active transport operators will be only JdR and TXL. • TransFollow will support the complete workflow going from creation and issuing of the e-docs, to the signing for delivery. In addition, the "en route" events like digital handover of the goods between transport modes, can be registered using the TransFollow apps. • UIRR: support for the process description and requirements (railway part). VLC: technical expertise and coordination with the IT platform provider.
Main flow	The main flow comprises the following steps: 1. The consignment note information (road) is retrieved from lead freight forwarder (JdR) transport and order management system; 2. The consignment note information is sent from lead freight forwarder to TransFollow in a defined format; 3. Pre-Haulage: eCMR (road) is generated and issued; 4. A rail-specific consignment note information (CIM format) is retrieved from TransFollow to railway undertaking TX; 5. Main haulage (rail): a CIM consignment note is generated by TX and transferred to a platform for digital consignment notes, e.g. TransFollow, Orfeus (potentially);

	6. Post-Haulage: eCMR (road) is generated and issued.

Table 84: PS NL UC1

UC2-Digitalisation transformation of terminal gate-in/out processes

Use Case	**UC2 (e-GATE)**
Title	**Digitalisation transformation of terminal gate-in/out processes**
Goal	To achieve the digital exchange of data with relevant stakeholders on key terminal-related operations (gate in/out processes on road and rail side).
Description	This use case focuses on the operations at terminals, in particular on the gate-in and gate-out processes. The current processes rely mainly on manual operations and "hardware" information exchange, through paper documents, to be inserted manually in the system dedicated to Terminal Operations. The booking received from the MTOs via email or directly inserted in the TOS is verified/ matched/ integrated by the operators at the gate directly when the truck arrives. Based on the output of this process, the operator registers the data on the system. Furthermore, the operator has to perform physical checks on the loading unit to be loaded/unloaded and he/she notes possible damages. Then the operator has to send a report to the clients. The idea of this UC is to implement the required technology and IT solution to automate the acceptance of the cargo/truck entering the terminal (truck ID/Loading unit verification) and to automatically send a proper report or notification directly to the system of the MTOs. The idea is to develop a European Register of intermodal loading units as digital operational tool for safety and compatibility checks. The same procedure applies for the cargo going out from the terminal. The set of the information to be produced and sent to the MTOs (or the other relevant actors) will include confirmations on data, information on arrival/departure times and pictures certifying the physical status of the loading unit/cargo.

	Within the framework of this UC, the interactions between the terminal operations and the gate will also be considered. The information related to the loading/unloading operations coming from the terminal operations can be integrated in the digitalisation process to be automatically reported to the terminal gate and/or directly to the operators. A critical component is the creation of register with all technical characteristics of intermodal loading units as a support for an automatic check of the technical compatibilities.
Platforms	• Xynaps (PIONIRA); • PIL (Terminali Italia/IPBO); • ILU Code application.
Partner role	• IPBO will coordinate the use case, install the adequate gate-in/out technologies and create the digital environment for an enhanced data exchange with trucking companies, CT operators and railway undertakings. • UIRR will deal with the user requirements (CT operator's perspective) and design/construct the ILU Register (based on the ILU Code Register). • VLC will support the use case development by providing the technical expertise (process description). • PIONIRA will provide guidance on using pre-announcement information or using IOT sensors (beacons) to automate the process on the Yard/Terminal. • TXL and JdR will participate in the definition of the user requirements (Railway Undertaking and Trucking Company).
Main flow	The main flow comprises the following steps: 1. The booking of the loading unit and the truck service provider is received by the terminal from MTOs from TOS and from truck drivers through the e-GATE platform (Pionira); 2. The truck service provider arrives at the terminal gate for the check in;

	3. The automatic scanning and controlling of the truck ID, unit ID (based on ILU code App), loading unit scanning for damages through the e-gate solution developed takes place; 4. The automatic acquisition of the truck service provider and loading unit by the TOS at the gate, cross checking with the related booking info and elaboration of confirmation report to be sent to MTOs takes place; 5. The truck, upon the gate-in operations, enters the terminal to unload/load the cargo to be loaded/unloaded on the train; 6. The automatic transmission of the gate-in and cargo info to the terminal operator (moving the crane) takes place in order to give the terminal operator the needed information and instructions for loading/unloading operations; 7. Upon the terminal loading/unloading operations, the terminal operator will automatically confirm the execution of the terminal operations to the TOS; 8. Gate-out operations of the truck service provider will be done accordingly.

Table 85: PS NL UC2

UC3-B2A data exchange in intermodal transport

Use Case	**UC3 (e-FTI)**
Title	**B2A data exchange in intermodal transport**
Goal	To create a digital environment to exchange B2A freight information.
Description	The recently adopted Regulation on Electronic Freight Transport Information (eFTI) obliges Member State authorities to accept electronic freight information. The Regulation also specifies the electronic format in which regulatory transport information should be made available. All technical aspects such as data modelling,

	functionalities, eFTI platforms and certification are to be developed in the Digital Transport and Logistics Forum – phase II. The aim of this use case is to create a digital environment to exchange B2A freight information on three topics: (1) CT Directive (2) waste management and (3) dangerous goods, in particular by: • Analysing the mandatory regulatory freight information for road, rail, and terminal related to the three identified topics; • Analysing the content of the current used legal documents; • Identifying the current existing B2A platforms (if any); • Collecting the initial requirements of the Authorities and Stakeholders; • Defining the minimum set of data to be exchanged; • Defining the possible data exchange format (e.g. EDIGES, TAF TSI…); • Defining the role and processes of all involved parties; • Testing and validating the approach with selected Member States (link to FEDeRATED).
Platforms	Xynaps (PIONIRA)
Partner role	• UIRR will manage the development of the UC and contribute to the process description and data modelling. • TXL, JdR, and IPB will contribute to the various analysis and user requirements definition. • As an accredited e-CMR provider for the BENELUX e-CMR pilot, PIONIRA will cover the exchange to the government of waste and dangerous goods info. • ESC will contribute to the analysis and data modelling.
Main flow	TOPIC 1 - Combined Transport Directive Aim: to proof that the truck journey is part of a Combined Transport chain. A new process has to be designed and tested but would consist of the following main flows:

	1. A customer books a slot on a train of a Combined Transport Operator via an online booking platform; 2. The CT operator confirms the booking to the customer via an EDI messaging system; 3. In parallel, the CT operator will share on the eFTI platform the booking details through a harmonised EDI message (to be developed in the framework of the DTLF working party). In this message, a unique ID will be created and shared with the customer; 4. In case of control by the Authorities (for example police), the driver will communicate the unique ID and the Authority may verifiy the status of the specific transport. TOPIC 2 – Dangerous Goods in Combined Transport Aim: all regulatory information related to the transport of dangerous goods will be shared on an eFTI platform to facilitate the access for the Authorities. It means a digital transformation of existing documents into harmonised data sets for all actors. CT Customers, CT operators, Terminal Managers, Railway Undertakings and Infrastructure Managers are the key actors involved in this B2A data exchange. Depending on their legal obligations they will share all mandatory information on the eFTI platform. The Authorities will retrieve the information thanks to the unique ID identification of the loading unit (ILU- or BIC-Code). A new process has to be designed and tested. The following data sets (included in the Regulation – Annex 1) should be shared and exchange between business actors and authorities on the eFTI platform: general information required in the transport document (road and rail data extracted from the consignments notes), specific information according to the special provisions in Chapter 5.4, additional and special information required for certain classes of

	dangerous goods, container packing certificate and instructions in writing. TOPIC 3 – Waste Transport Aim: all regulatory information related to the transport of waste will be shared on an eFTI platform to facilitate the access for the Authorities. The same principle as for Topic 2 should be pursued based on the following data sets: all information contained in the Annexes IA, IB and VII of Regulation 1013/2006.

Table 86: PS NL UC3

13.SLOVAKIA, ALL TEN-T CORRIDORS AND MULTIMODAL PILOT SITE

13.1 Pilot Site description

Mondelez is representing one of the largest producing manufacturing companies across Europe. With 55 production sites across Europe, Mondelez is employing 30,000 people. Today Mondelez is shipping around 200,000 loads from production plants to the warehouses. Its own international inbound transport control and optimisation operation is based in Bratislava (SK), named Load Control Centre (LCC). LCC's operational scope covers the whole European continent and is extensively using all the nine TEN-T core network corridors on road, rail and short-sea. The Bratislava site of the LCC team is structured around these TEN-T corridors as follows: Central Europe and Eastern Europe (Baltic-Adriatic, North-Sea-Baltic Orient/East-Med, Rhine-Alpine, North Sea-Mediterranean, Rhine-Danube) South and North Europe (Scandinavian-Mediterranean, Mediterranean).

The LCC is one of the frontrunner projects in the manufacturing industries (shippers) and is one of the first internal Logistic Towers own and managed by the shippers itself. Mondelez was the first manufacturing company responding to the latest transport need, that shippers need to source back their responsibility and try to enhance the efficiency of freight transport themselves as much as possible, in order to give to the carriers and freight forwarders a much better utilised freight transport order for delivery.

Base TEN-T Corridors: All 9 TEN – T Corridors

Actions & Business opportunity

1. Increased efficiencies and interoperability (horizontal and vertical level) with Supply Chain partners (e.g. production plants, raw, pack and pallet material suppliers, warehouses, co-packers, carriers, forwarders, third party manufacturers, customer distribution centres, customs agencies and relevant public authorities).
2. Peer pooling with other stakeholders in a collaborative environment. Mondelez is planning to implement pilot activities in different supply chain processes, such as inbound finish goods deliveries from plants to warehouses; connectivity of raw & pack material (RMP) transport in to the TMS; connectivity of integrated multimodal services; outbound customer delivery operation based on a pre-planning process for all transports; improving the direct plant shipment (DPS) deliveries; digital freight billing for all transports. The main demonstration of this activity should be to prove interoperability with real time communication, which is enhancing ETA and ATA (Actuals Time of Arrival) parameters and

transport modalities, including change of temperature control requirements or mode of transports.

3. Increased legally compliant operational data sharing layer to achieve:
    - Reduction of waiting time and optimisation of logistics transit time for hundreds of European carriers by improving the efficiencies of the plant and warehousing loading and unloading operations;
    - Optimisation of carrier capacity management to enhance full truck load shipments.
4. Interconnect different digital platforms: the IT architecture landscape of Pilot Site Slovakia is composed of various stakeholders and only few interfaces, which are not connected and partially manually in operation (Fig. 13.1.1).

    The first pillar of key platforms is the ERP (Enterprise Resource Planning), which is a business process management software that allows manufacturing companies like Mondelez to plan the production. In addition, the suppliers who are delivering the raw and pack materials for the production are also using own ERP systems and at the warehouses across Europe also planning business operations with own customised ERP platforms.

    The second pillar of key platforms is the TMS (Transport Management System), which is using the information provided by ERP to plan the actual transport shipments. Today, there are hundreds of different TMS platforms available on the market and they are not connected with the ERP.

    Mondelez needs to be connected with the carriers to organise the transport execution and also to organise the pallet shipments, which are an important part in the FMCG industry.

    The third pillar of platforms are the added value services like real time transport information or GHG emissions monitoring.

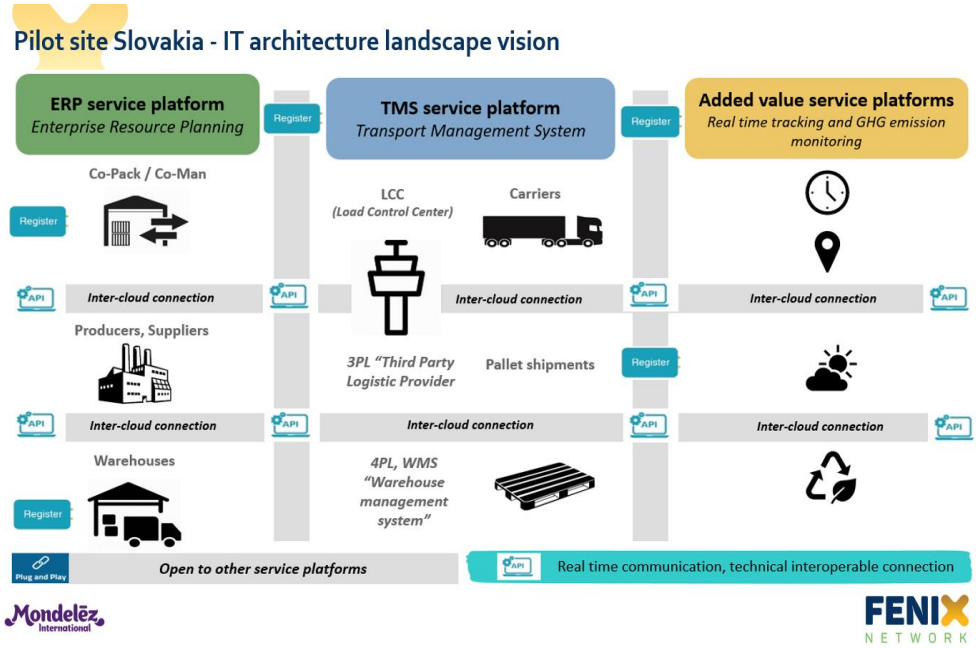


Figure 13.1.1: PS SK IT architecture landscape vision

13.2 Pilot Site working group definition

Partner name	Pilot Role
Mondelez affiliated entities	Manufacturing, service and procurement company designing the shipment order needs and ensuring service is carried out properly
IT suppliers	Offering different service applications
Carriers: 80 different European carriers road & multimodal	Freight shipment execution
TX Logistik: Rail Logistics Company	Multimodal shipment execution
Co-packers and third-party co-manufacture units	Designing the shipment order needs
Customers (Warehouse) distribution centres	Designing the shipment order needs to end customers
Customs agencies	Customs clearance regulations
Relevant public authorities	Not yet defined

Table 87: PS SK Working Group

13.3 Pilot Site Use Cases

Use Case ID	Use case Name	Description	Contributors
UC1	- **Supplier's shipments to the manufacturing plants;** - **Production location to Production location;** - **Production location to warehouse;** - **ERP "Supplier" -> ERP "MDLZ" -> TMS** - **ERP "MDLZ->ERP "MDLZ" -> TMS**	- *ERP (Enterprise Resource Planning);* - *TMS (Transport Management System);* - Connecting a production plant digital platform with a transport management cloud system; - Inbound deliveries of finished goods from plants, co-packers, co-manufactures to warehouses and customers; - Inbound liquid (choco mass) deliveries from plant to plant for production; Connectivity of raw and pack material (RMP) transport in to the TMS.	- MDLZ affiliated entities; - Co-packers and third-party co-manufacture units; - Carriers; - IT suppliers; - Customers distribution centres; - Customs agencies; - Relevant public authorities.
UC2	**Warehouse to Customer** **ERP "WHS" -> TMS -> ERP "customer"**	Outbound customer delivery operation based on a pre-planning process for all transports.	- MDLZ affiliated entities; - Carriers; - IT suppliers; - Customers

			distribution centres; - Customs agencies.
UC3	**Direct Plant shipments to Customer -> ERP "MDLZ" -> TMS -> ERP "customer"**	Outbound direct customer delivery based on actual demand	- MDLZ affiliated entities; - Co-packers and third-party co-manufacture units; - Carriers; - IT suppliers; - Customers distribution centres; - Customs agencies; - Relevant public authorities.
UC4	**Track & trace vehicle/shipment**	Interoperability with real time communication which is enhancing ETA (Estimated Time of Arrival) and ATA (Actuals Time of Arrival) parameters and transport modalities, including change of temperature control requirements or mode of transports. Including GHG emissions	- MDLZ affiliated entities - Co-packers and third-party co-manufacture units - Carriers - IT suppliers - Customers distribution centres

		monitoring and connectivity of integrated multimodal services	- TX Logistik: Rail Logistics Company

Table 88: PS SK Use Cases

UC1- ERP -> ERP / ERP -> TMS

Use Case	**UC1**
Title	**ERP -> ERP / ERP -> TMS**
Description	• ERP from supplier feeds data into ERP MDLZ production system via PO (Purchase Order) creation and actual updates. • ERP system (platform 1) feed updates of available number of pallets based on the STO. • (Stock Transfer Order) actual details into the TMS system (platform 2).
Goal of the use case	• Increased efficiencies and interoperability (horizontal and vertical level) with Supply Chain partners. • Peer pooling with other stakeholders in a collaborative environment. • Increased legally compliant operational data sharing layer. • Interconnect different digital platforms. • System integrated customs clearance instructions for the relevant shipments.
Actors	• MDLZ ERP user • Supplier ERP user • Co-Packer and Third-party manufacture ERP user • MDLZ Load Control Centre (LCC) TMS user • Carriers – Road and Multimodal • Customs agencies
Phase (optional)	• Order creation, Interface STO, Order Validation, Order release, Order enchainment,

	• Bulk plan, Shipment planning.
Main flow	The main flow comprises the following steps: 1. ERP user create STO/PO; 2. Based on STO/PO details, transport order shipment with pallet information is interfaced into TMS; 3. TMS MDLZ LCC user, plan and schedule the shipment with carrier (via road or multimodal transport mode); 4. TMS Carrier user execute the transport based on the actual details; 5. WHS ERP user performs unloading schedule planning and goods receive based on actual inbound deliveries; 6. Finally, the information about the shipment flow and related parameters is shared with the FENIX federation.

Table 89: PS SK UC1

UC2- ERP "WHS" -> TMS -> ERP "customer"

Use Case	**UC2**
Title	**ERP "WHS" -> TMS -> ERP "customer"**
Description	Outbound customer delivery operation based on a pre-planning process for all transports.
Goal of the use case	• Increased efficiencies and interoperability of transport execution from local warehouse (distribution centre) to customer; • Peer pooling with other stakeholders in a collaborative environment, example via cross dock loading; • Increased legally compliant operational data sharing layer.
Actors	• ERP WHS (Warehouse & Distribution centres) user • MDLZ Load Control Centre (LCC) TMS user • Carriers – Road and Multimodal • Customs agencies

	• Customer ERP user
Phase (optional)	Order creation, Interface STO, Order Validation, Order release, Order enchainment, Bulk plan, Shipment planning.
Main flow	The main flow comprises the following steps: • WHS ERP user, creates transport order based on pre-planning process; • MDLZ TMS user, plan and schedule the shipment with carrier (via road or multimodal transport mode); • Carrier TMS user execute the transport based on the actual details; • Customer ERP user performs goods receive based on actual deliveries; • Finally, the information about the shipment flow and related parameters is shared with the FENIX federative platform.

Table 90: PS SK UC2

UC3- ERP MDLZ -> TMS -> ERP ''Customer''

Use Case	**UC3**
Title	**ERP MDLZ -> TMS -> ERP ''Customer''**
Description	Outbound direct customer delivery based on actual demand
Goal of the use case	• To obrain increased efficiencies and interoperability of transport execution from MDLZ manufacturing unit or Co-packers / Third party co-manufacturing unit directly to customer. • Peer pooling with other stakeholders in a collaborative environment, example via cross dock loading. • Increased legally compliant operational data sharing layer.
Actors	• MDLZ ERP user • Supplier ERP user • Co-Packer and Third-party manufacture ERP user

	• MDLZ Load Control Centre (LCC) TMS user • Carriers – Road and Multimodal • Customs agencies • Customer ERP user
Phase (optional)	• Order creation, Interface STO, Order Validation, Order release, Order enchainment. • Bulk plan, Shipment planning.
Main flow	The main flow comprises the following steps: 1. ERP user, create STO (stock transfer order) based on actual demand; 2. MDLZ TMS user, plan and schedule the shipment with carrier (via road or multimodal transport mode); 3. Carrier TMS user execute the transport based on the actual details; 4. Customer ERP user performs goods receive based on actual deliveries5. Finally, the information about the shipment flow and related parameters is shared with the FENIX federation.

Table 91: PS SK UC3

UC4- Track & trace vehicle/shipment

Use Case	**UC4**
Title	**Track & trace vehicle / shipment** **Multimodal transport**
Description	Interoperability with real time communication which is enhancing ETA (Estimated Time of Arrival) and ATA (Actuals Time of Arrival) parameters and transport modalities, including change of temperature control requirements or mode of transports. Including GHG emissions monitoring and connectivity of integrated

	multimodal services.
Goal of the use case	• Increased efficiencies and interoperability in transport tracking improving from ETA to ATA. • Peer pooling with other stakeholders in a collaborative environment, for example rail terminal platform network (TX Logistik) for multimodal transport on all 9 TEN-T corridors. • Increased legally compliant operational data sharing layer.
Actors	• MDLZ ERP user; • Supplier ERP user; • Co-Packer and Third-party manufacture ERP user; • MDLZ Load Control Centre (LCC) TMS user; • Carriers – Road and Multimodal; • Customs agencies; • TX Logistik - The European Rail Company; • Customer ERP user.
Main flow	The main flow comprises the following steps: 1. ERP user, create STO (stock transfer order) based on actual demand; 2. MDLZ TMS user, plan and schedule the shipment with carrier (via road or multimodal transport mode); 3. Carrier TMS user execute the transport based on the actual details; 4. Platform (TMS) Rail Company TX Logistik; 5. Customer ERP user performs goods receive based on actual deliveries; 6. Finally, the information about the shipment flow and related parameters is shared with the FENIX federative plarform.

Table 92: PS SK UC4

14.PS SP – SPAIN, THE SPANISH-ATLANTIC CORRIDOR PILOT

14.1 Pilot Site description

The Spanish-Atlantic Corridor pilot

In the FENIX project, the Spanish-Atlantic corridor's main goal is to increase the efficiency and traceability of the rail cargo operation in the Logistic Corridor by improving the service of the import & export of goods in the intermodal modes. It is especially focused on the entrance & exit of container trains operations in the port with origin/destination in a dry port and the connection with other means of transport as road, airports or another port in the corridor. Therefore, it will improve the hinterland connectivity with more efficient links and connections between the ports and their extended hinterland.

The Atlantic Corridor connects ports from Portugal (Oporto, Aveiro, Lisbon, Sines) and Atlantic Ports in Spain (Bilbao, Huelva, Algeciras), with port in France and Germany, including three EU capital cities as Lisbon, Madrid and Paris, as well as other population concentrations as Bilbao (Spain), Mannheim (Germany) and Strasbourg (France), connecting with other Ten-T corridors.

To ensure the smart and efficient integration of the port with its extended hinterland, a new solution (CARGO2RAIL solution) and open/integrated new functionalities in the Port Community System e-puertobilbao (PCS of Bilbao Port) PCS new functionalities by integrated with Port Authorities Systems will be developed with a clear focus in rail connectivity:

- Management of train schedule provided by rail infrastructure operator;
- Validation of the authorisation to the Port in coordination with Port Operations Department to accelerate the operations of the whole cargo and improve the safety and security in the port;
- Improve loading/discharge operation in the Dry Port, minimising inoperative times and enhance the flow of vehicles in Gates;
- Management of loading lists, loading instructions and discharge lists associated with a train call declared;
- Time indicators of logistic processes related to Ship2Rail operations and its extension to other means of transports.

Such hinterland connectivity is being considered on a functional basis and will be achieved by establishing more efficient links and connections between the port and its extended hinterland.

Through an interoperable corridor information system between the port and the Rail network (Ship2Rail interface), it will facilitate the integration of the south-west Europe intermodal clusters and it will re-engineer the multimodal port operational processes.

The Atlantic Spanish Pilot Site will deal with the following Use Cases:

- Rail Planning;
- B2A & A2B services with Customs;
- Dangerous Goods Authorisation;
- Booking of slots for operations in Dry Port;
- Loading & Discharge lists management of cargo by train;
- Port2DryPort Track & Trace;
- Business Intelligence applied to intermodal operation.

Base TEN-T Corridor: Atlantic

14.2 Pilot Site working group definition

Partner name	Pilot Role
Indra	Technical pilot leader and technology provider
Atos	Link point to the FENIX ecosystem and technology provider
Bilbao Port	End-user and PCS manager
MLC ITS Euskadi	Link point with external actors of the Logistic Community

Table 93: PS SP Working Group

TEN-T corridors: EU Corridors Atlantic and rail connection with the Mediterranean Corridor

14.3 Pilot Site Use Cases

Use Case ID	Use Case Name	Description	Contributors
UC 1	Rail Planning	Management of train timetable provided by rail infrastructure operator and generation of train calls that will be shared between	Indra

		actors of the logistic chain	
UC 2	B2A & A2B services with Customs	Digitalisation of the exchange (B2A), and acceptance (A2B) of information for the purposes of regulatory compliance in transport and logistics. Any change due to Union Customs Code (UCC) will be taking into account in this UC2 if needed. Special treatment for empty containers	Port of Bilbao
UC 3	Dangerous Goods Authorisation	Automatic validation of the authorisation to the Port in coordination with Port Operations Department to accelerate the operations of the whole cargo and improve the safety and security in the port	Port of Bilbao
UC 4	Booking of slots for operations in Dry Port	Improve loading/unloading operation in the Dry Port, minimising inoperative times and improving the flow of vehicles in Gates	Indra
UC 5	Loading & Discharge Lists Management	From bookings/release order/acceptance order or form information from the Rail operators, a loading list will be created and distributed to the rest of stakeholders	Indra Port of Bilbao
UC 6	Port2DryPort Track & Trace	Track & trace of cargo that travels by train between Port and Dry Ports	Indra Port of Bilbao
UC 7	Business Intelligence applied to intermodal operation	Generation of KPIs and Dashboards that shows the operations that carries out in the CARGO2RAIL solutions as a support to decision-making based on the real-time updates of the operations such as starting time, ending time and interruption of processes	Indra

Table 94: PS SP Use Cases

UC1- Rail Planning

Use Case	**UC1**
Title	**Rail Planning**
Description	Management of train timetable provided by rail infrastructure operator and generation of train calls that will be shared between actors of the logistic chain.
Partner role	• Indra develops CARGO2RAIL solution; • PCS receives inputs/generates outputs.
Goal of the use case	To provide accurate information of rail planning to logistics stakeholders in order to coordinate and prepared in advance all the loading & discharge containers operations and consequently accelerate the flow of the rail processes in the Maritime and Inland Terminals and Port Authority Systems.
Actors	Maritime Terminal, Inland Terminal (Dry Port), Rail Operator, Administrator of Railway Infrastructure, Port Authority (PCS), CARGO2RAIL.
Main flow	The main flow comprises the following steps: 1. Trains Timetable is reported by Infrastructure Railway Operator in advance (i.e. six months). The information provided also includes the Railway Operator assigned for each train; 2. Trains Calls are generated and sent to actors involved in the rail operations; 3. Any change communicated by Infrastructure Railway Operator is updated and reported; 4. Accurate information will be used by Terminals to improve the assignment of personnel and means in each loading/discharge rail operation.

Table 95: PS SP UC1

UC2- B2A, A2B services with Customs

Use Case	**UC2**
Title	**B2A & A2B services with Customs**
Description	Digitalisation of the exchange (B2A), and acceptance (A2B) of information for the purposes of regulatory compliance in transport and logistics. This Use Case takes into account the EMSWe Regulation, the recently adopted Regulation on Electronic Freight Transport Information (eFTI) and any change in the Union Customs Code (UCC) and they will be applied if it is required.
Partner role	Port Authority develops a service for PCS to manage the entry and exit of cargo in the Port.
Goal of the use case	To improve the automatic clearance of the cargo on the train to facilitate the task of the Customs control and accelerate the movement of trains. Use of Customs Clearance data in order to speed up different events. Same applies for Road Transport companies at arrival/departure from Port/Terminals. Same applies to cargo arrival/departure on vessels. Empty containers treatment by Customs at exit included.
Actors	Port Authority (PCS), Maritime Terminal and Customs Control at the port gates.
Main flow	The main flow comprises the following steps: 1. Terminal Operator exchange information about cargo with PCS; 2. PCS provides customs clearance status to cargo on board the trains/trucks; 3. Customs validates cargo clearance allowing the cargo movement on the trains/trucks; 4. Integration AIS data with vessels pre-arrival information in order to speed up Customs clearance; 5. Customs cargo clearance validation is sent to Terminal Operator and Port Train Coordinator Department.

Table 96: PS SP UC2

UC3- Dangerous Goods Authorisation

Use Case	**UC3**
Title	**Dangerous Goods Authorisation**
Description	Automatic validation of the authorisation to the Port in coordination with Port Operations Department to accelerate the operations of the whole cargo and improve the safety and security in the port. This Use Case takes into account the EMSWe Regulation and the recently adopted Regulation on Electronic Freight Transport Information (eFTI) and they will be applied if it is required.
Partner role	Port Authority develops a service for PCS to automatic validation of the dangerous good authorisation.
Goal of the use case	To automate the process of entrance & exit of containers loading HAZMAT in the Port that uses the train as means of transport.
Actors	Port Authority (PCS), Maritime Terminals, Rail Operator and Rail Infrastructure Operators.
Main flow	The main flow comprises the following steps: 1. The Logistic Operator notifies the dangerous goods that are loaded in the containers by train/road (IFTDGN/COPRAR); 2. Port Authority verifies the information with the notification of dangerous goods available in the PCS (IFTDGN) and gives approval or refusal to enter the port (taking into account if has been authorised or not); 3. When the train arrives at the Terminal, its ATA and cargo composition is registered by the Terminal in the PCS and shared with other logistic actors.

Table 97: PS SP UC3

UC4- Booking of slots for operation in Dry Port

Use Case	**UC4**
Title	**Booking of slots for operation in Dry Port**
Description	Improve the loading/discharge operation in the remote rail Terminal, minimising inoperative times and improving the flow of vehicles in entrance and exit gates. A booking App will be provided in order to coordinate the slot for entrance and loading/unloading cargo operations in Dry Port.
Partner role	Indra develops the CARGO2RAIL solution.
Goal of the use case	To ptimise the management of the loading/unloading operations in Dry Ports.
Actors	CARGO2RAIL, Truck Drivers, Inland Terminal (Dry Port) and PCS.
Main flow	The main flow comprises the following steps: 1. The Forwarder/Shipper has to book a slot on trains; 2. Using an APP, the driver manages to pre-advice to enter the Dry Port; 3. The driver reaches the Dry Port according to the updated information of its cargo acceptance or cargo released order booking; 4. When loading/discharge operation is finished, a notification is distributed to logistic actors involved in this operation; 5. From release/acceptance order, a list of cargo can be originated.

Table 98: PS SP UC4

UC5- Loading & Discharge Lists Management

Use Case	**UC5**
Title	**Loading & Discharge Lists Management**
Description	From Bookings, Release and Acceptance Orders or form information from the Rail operators, a loading list will be created and distributed to the rest of stakeholder related.
Partner role	• Port Authority shares the lists through the PCS;

	• Indra develops the CARGO2RAIL solution.
Goal of the use case	Optimise the management of the loading & discharge in both PCS and CARGO2RAIL.
Actors	Shipping Agent, Cargo Agent, Freight Forwarder, Rail Operator, Terminal operators, Port Authority (PCS) and CARGO2RAIL.
Main flow	The main flow comprises the following steps: 1. Loading and discharge list of cargo moved by rail are generated by the rail operator; 2. Rail operator exchanges the complete circle of cargo orders to PCS; 3. When lists are closed, PCS shares to actors in the logistic chain; 4. Loading List can be converted in discharge lists from dry port to maritime port and viceversa.

Table 99: PS SP UC5

UC6 – Port2DryPort Track & Trace

Use Case	**UC6**
Title	**Port2DryPort Track & Trace**
Description	Track & trace of cargo that travels by train between Port and Dry Ports
Partner role	• Indra develops CARGO2RAIL solution; • Port Authority integrates the rail information through the PCS to improve the Ship2Rail interface.
Goal of the use case	To provide traceability of trains and cargo on board of trains and optimise the management of train arrivals & departure in Terminals that can have an impact on the train's traffic between Port and Dry Port.
Actors	Port Authority (PCS), CARGO2RAIL, Terminals, Rail Operator, Rail Coordinator Department and other local actors.
Main flow	1. Rail Operator announces the arrival of the train in the Terminal; 2. The Terminal registers the starting time of works related to the loading/unloading cargo in the train;

	3. Train Loaded Notification is registered by the Terminal. The information includes the cargo and train composition; 4. The terminal communicates the loading cargo list; 5. Rail Operator sent the notification and assigns personnel to carry out the port leaving procedure including the visual check and the Cargo and Brake Bulletin; 6. Rail Coordinator Department Operator registers the ATD; 7. The ETA to the destination of train call is generated and notified to Remote Rail Terminal.

Table 100: PS SP UC6

UC7 - Business Intelligence applied to intermodal operation

Use Case	**UC7**
Title	**Business Intelligence applied to intermodal operation**
Description	Generation of KPIs and Dashboards that shows the operations that carries out in the CARGO2RAIL solutions as a support to decision-making based on the real-time updates of the operations such as starting time, ending time and interruption of processes.
Partner role	Indra develops CARGO2RAIL solution.
Goal of the use case	To enhance the decisions taken in the Dry Port based on accurate data.
Actors	Terminals, Rail Operator, Rail Infrastructure Operator, Port Authority (PCS) and CARGO2RAIL.
Preconditions (optional)	Digitalisation of data must be registered in the solution.
Main flow	The main flow comprises the following steps: 1. Identification of business data registered automatically in the solution for each service offered; 2. Identification of manual data entry in the solution by local actors; 3. The data will be displayed in the adequate KPIs and Dashboards.

Table 101: PS SP UC7

15.CROSS PILOT INTERCONNECTIONS

The analysis carried out by each FENIX Pilot Site points out a very large variety of scenarios in terms of Use Cases and Services, as Table 102 shows. By analysing the UCs' matrix, it is possible to define a set of Use Cases which are repeat frequently.

USE CASES	**PILOT SITES (PS)**										
Information services	AT										
Customs corridor/Customs optimisation	AT			FR							
Reservation of time slot		BE1				GR					
ETA service		BE1	BE2				IT1	IT2			
Capacity management		BE1									
Elimination of waiting times		BE1									
Parking service/Parking booking service		BE1				GR	IT1				
Driver security check Integration		BE1									
Reduction of CO_2 & NOx emission			BE2	FR			IT1	IT2			
Track & trace vehicle/shipment			BE2				IT1				SP
B2A, A2B services like Customs			BE2			GR	IT1	IT2			SP
Dangerous Goods/Dangerous Goods Authorisation/ transport monitoring/eCall EGNOS/Galileo			BE2	FR			IT1	IT2			SP
Dynamic status slot verification				FR							
Slot management				F							

				R							
Multimodal ETA for cargo optimisation				F R							
C-ITS for logistics				F R							
Multimodal Freight Capacity (first/last mile)					D E						
Intermodal Railway Capacity					D E						
E-Invoicing					D E						
Intermodal Corridor Data Hub					D E						
Mode free capacity planning (Synchromodality)					D E						
Balanced use of modal availability along the corridor – Intermodality						G R					
Monitoring of status of transport operations						G R					
Yellow Pages & KPIs						G R					
End-to-end provision of logistics services for SMEs along the corridor						G R					
Multimodal route planning & re-routing							IT 1				
TM2.0 for multimodality across the TEN-T corridors							IT 1				
IT tool for sustainability certification							IT 1				
Safety and eCustom								IT 2			
Digital synchro modal information dashboard								IT 2			
Synchro-modality								IT 2			
Real-time Road optimisation								IT 2			
Real-time Rail optimisation								IT 2			

e-CMR									NL		
e-GATE									NL		
e-FTI									NL		
ERP “Supplier” -> ERP “MDLZ” -> TMS										SK	
Warehouse to Customer ERP “WHS” -> TMS -> ERP “customer”										SK	
Direct Plant shipments to Customer -> ERP “MDLZ” -> TMS -> ERP “customer”										SK	
Rail Planning											SP
Booking of slots for operations in Dry Port											SP
Loading & Discharge Lists Management											SP
End-to-End Track & Trace											SP
Business Intelligence applied to intermodal operation											SP

Table 102: FENIX Use Cases

The following UCs are the **most common UCs among the different** Pilots. These common issues can be the starting point to experiment the interconnections among different Pilot Sites through the FENIX Federative ecosystem.:

1. ETA Service (PSs BE1, BE2, FR, IT1 and IT2);
2. TMS (PSs BE2, FR, GE, NL and SK);
3. Dangerous Goods management (PSs BE2, IT1, IT2, FR and SP);
4. CO_2 and NO_X emission reduction (PSs BE2, IT1, IT2 and FR);
5. B2A, A2B Services like Customs (PSs BE2, IT1, IT2 and SP);
6. Track and trace monitoring (PSs BE2, IT1 and SP);
7. Customs corridor/Customs optimisation (PSs AT and FR);
8. Parking services (PSs BE1 and IT1).

Some of the possible interconnections are presented below. These examples highlight the added value which FENIX can provide:

1. **ETA Service**
   - Air Cargo Belgium (PS BE1, belonging to Rhine – Alpine corridor) is working with a local provider that offers ETA services to the trucking companies that will use the application. Air Cargo Belgium has the intention to collaborate with IT2 Pilot Site (PS IT2) by exchanging ETA data of trucks performing road feeder transport between the airports of Brussels (BRU) and Milan Malpensa (MXP). However, additional work from both Pilot Sites is necessary to verify if and how data exchange is actually possible. The greatest benefit is the potential cross Pilot Sites collaboration in terms of ETA data exchange for trucks performing Road Feeder transport to increase interoperability and visibility along the supply chain by means the FENIX platform [Ref. UC2 PS BE1].
   - On the other hand, according to PS IT2, ETA implementation will consider the specific information for truck drivers moving toward the airport. This information consists both of road traffic and fly schedule and the expected workload of the GHA and Ramp Operators inside the Cargo City. Interconnection with PS BE1 (Air Cargo) could be considered [Ref. UC1 PS IT2].
   - POLIBA (PS IT1, belonging to EU Corridors Mediterranean and Baltic-Adriatic and the Motorway of the Sea of South-east Europe) can collaborate with PS FR (Mediterranean and the North Sea – Mediterranean Ten-T corridors) by testing the guide.me APP which allows truck drivers to receive real-time information about traffic, status of their trip from the port to their final destination. The cross-corridor collaboration can increase interoperability and visibility along the supply chain [Ref. UC1b PS IT1].
   - On the other hand, PS FR agrees with the possibility of collaboration between PS IT1 ETA Use Case and the French UC3, i.e., Multimodal ETA for cargo optimisation [Ref. UC3 PS FR].
   - According to MATRAS (PS IT1), the APP YOU TRUCK ME uses the geolocation which can forward the location and volume data of the transported goods with the estimated time of arrival. Thus, truck drivers can receive information from other partners about traffic and ETA [Ref. UC1b PS IT1].
2. **TMS**
   - PS AT points out that since several Pilot Sites are working on TMS, synergies could be exploited through collaboration and exchange of experiences etc. (Ref. UC1 PS AT). Possible benefits of this collaboration are:
     - Cross-Pilot Site test could be fostered

    - Standardisation could be fostered
    - Use of similar techniques/technology/etc.
- Transport Management Systems of carriers are sources for information used in the supply chain process. The Dutch Pilot Site (PS NL) develops the digital supply chain process and the interface with a TMS will be defined. Possible collaboration with PS GR.
- Pilot Site Slovakia (PS SK) partnering with TX Logistik in Use Case 4 would like to enhance the potential increase of multimodal transport mode for the current Mondelez MEU road shipments. This data exchange shall give shipments input from our future TMS platform on different TEN-T corridors, for which ideally would receive from TX Logistik TMS back of data analyses and proposals where multimodal could be considered based on their rail network. With the same, PS SK could potentially collaborate with the Pilot Sites NL or DE since TX Logistik is partnering with them as well. Potential benefits are:
    - Sharing of services and experiences
    - Additional data input for our pool of carriers to consider potential switch from road to multimodal transport mode.
- According to PS GR, the possible interconnections and collaborations between Pilots deal with the TM 2.0 implementation.
- PS DE: Collaboration possible for hub – to hub scenario.

3. <u>Dangerous Goods' management</u>

- According to PS IT2, the dangerous good regulations in air transport are very strict and very specific to this domain. Collaborations are possible with similar UCs: PS BE1 Air Cargo ones. This would mean sharing of services and experiences [Ref. UC3 PS IT2].
- The Dutch Pilot Site (PS NL) participates to the task force group for the dangerous good mangement, which is related to the UC eFTI.
- POLIBA (PS IT1) can collaborate with other Pilot Sites by testing on a large scale the guide.me APP which provides a service for driver in order to limit and decrease the risk of hazmat transport [Ref. UC8a PS IT1].
- PS FR UC4 Dangerous goods management Use Case as described in France is the same as in other Pilot Sites. For example, with Italy the interoperability is well advanced. Other countries like Germany, Belgium and the Netherlands are interested by the use case. The deployment of this Use Case could be accelerated thanks to the FENIX project [Ref. UC4 PS FR].

4. **CO_2 and NO_X emission reduction**

- From the PS IT2 point of view, the Use Case provides suggestions for trucks moving toward the airport. Collaborations with similar UCs are possible and would foster the sharing of services. [Ref. UC2 PS IT2].
- According to the PS GR, interconnections would foster efficiency of truck & traffic management around the port and to CO_2 & NO_X reduction.
- POLIBA (PS IT1) can collaborate with other Pilots by testing on a large scale the guide.me APP which provide speed advice and velocity profiles in order to reduce emissions and fuel consumption [Ref. UC2a PS IT1].
- DBA (PS IT1) can collaborate with PS IT2 UC2 to estimate the CO_2 emissions of trucks in their journeys from the warehouse to the Cargo City and vice-versa [Ref. UC2b PS IT1].
- PS DE: Potential collaboration on emissions for intermodal transport (planning and optimisation data/service) [Ref. UC4 PS DE].
- PS FR UC5 CO_2 reduction calculates the global CO_2 of a trip per container and per article. This tool will be available to other Pilot Sites which want to calculate the CO_2 reduction of a trip. FENIX will give access to many users of the tool by facilitating connexions [Ref. UC5 PS FR].

5. **B2A, A2B Services such as Customs**

- Customs is a stakeholder in the supply chain process. The Dutch Pilot Site (PS NL) designs the digitalised supply chain process. It concerns the function of attaching the required documents to the consignment specification.
- DBA (PS IT1) can collaborate with PS NL UC2, managed by Interporto Bologna, to define the gate-in and gate-out processes relating pre-gate procedure [Ref. UC7b PS IT1].

6. **Track and trace monitoring**

- PS AT and PS NL are both working on digitalisation of the multimodal supply chain processes [Ref. UC1 PS AT, UCX NL]. Synergies could be exploited through collaboration and exchange of experiences. Possible benefits of this collaboration are:
    - Cross-Pilot Site test could be fostered
    - Standardisation could be fostered
    - Use of similar techniques/technology/etc.
- The track and trace monitoring function is an integral part of the digitalisation of the supply chain process which is being developed by the Dutch Pilot Site (PS NL). Other Pilot Sites, i.e. PS AT, PS SP and PS FR, will be approached for feedback on the design of the digitalised

process, and later decisions can be made on cross Pilot Site testing.

- DBA (PS IT1) can collaborate with PS NL UC2, managed by Interporto Bologna, to support the gate-in and gate-out processes relating the automation of acceptance of trucks through services offered with VBS systems in PS IT1 [Ref. UC4d PS IT1].
- The PS FR MCTO Dashboard displaying positions, information, ETA of trucks can be used by other Pilot Sites and can also display information received from other Pilot Sites. FENIX will facilitate access to the MCTO dashboard and the necessary data [Ref. UC3 PS FR].

7. **Customs corridor/Customs optimisation**
   - According to PS FR, Customs information made available by interconnecting systems could be used in other Pilot Sites [Ref. UC6 PS FR].
8. **Parking services**
   - Air Cargo Belgium (PS BE1, belonging to Rhine – Alpine corridor) could possibly collaborate with the IT2 Pilot Site (PS IT2) to exchange data concerning reserved parking space for trucks performing Road Feeder transport between BRU and MXP. However, more work of both Pilot Sites is necessary to verify if and how data exchange is possible. One of the main benefits is the potential exchange of information concerning reserved parking space for road feeder trucks between cross corridors. FENIX partners that will make use of the application rolled-out in the Air Cargo Belgian Pilot Site will be able to get dedicated and safe parking possibilities when delivering or picking up freight at BRUcargo [Ref. UC5 PS BE1].
   - Pluservice (PS IT1) can collaborate with PS BE1 providing the truck parking booking/payment service/APP developed in the CO-GISTICS Project. In addition, Pluservice can collaborate in the definition and methods of measuring the KPI for the Parking Services in order to assess the pilots. The main benefits are:
     - The implementation of a service previously used in a European project.
     - The homologation and standardisation in the assessment methods between the pilots.
   - The UC7 of PS FR C-ITS for logistics will provide in real-time parking information for rest areas. This information can be shared with other Pilot Sites through the national node. FENIX will give additional access to this service through its truck companies.

CONCLUSIONS

The scope of FENIX is to develop the first European federated architecture for data sharing serving the European logistics community of shippers, logistics service providers, mobility infrastructure providers, cities, and authorities by developing and implementing digital corridor information systems. The nine TEN-T corridors are included in the FENIX project, meaning that the whole European Network will be pre-deployed with the whole solution.

In this deliverable, the description and the first technical definitions of FENIX Pilot sites are provided. Moreover, this document outlines the technical and conceptual details of the Use Cases that will be implemented by each FENIX Pilot Site.

It is important to underline that, although a detailed description of the action plan of each PS has been provided, many partners have faced difficulties in defining their own UC since the FENIX federation does not exist yet. As the design of the federation progresses, the UCs will be refined based on the real technical functionalities of FENIX.

By analysing the large variety of Use Cases and Services proposed by each FENIX Pilot Site, a set of Use Cases are in common: ETA Service, TMS, Dangerous Goods management, CO2 and NOX emission reduction, B2A, A2B Services such as Customs, Track and trace monitoring, Customs, corridor/Customs optimisation and Parking services. These common issues can be the starting point to investigate the interconnections among different Pilot Sites through the FENIX Federative ecosystem. Some interconnection examples have been presented in order to highlight the added value which FENIX can provide.

Starting from such analysis, some of the FENIX partners agree about the necessity of a common understanding regarding the services that are more frequently proposed across the FENIX Pilot Sites and Use Cases. That enables FENIX partners to accurately identify the potential for re-use of a particular service (developed in one Use Case) in another FENIX Use Case or Pilot Site. Hence, the analysis performed in this deliverable will feed next FENIX activities, e.g. A5.2.

Moreover, on the same line of DTLF Forum, the Regulation on electronic freight transport information (eFTI) and European Maritime Single Window environment (eMSWe) have been taken into account by the FENIX Pilots for future development, with the objective of removing technical, operational and administrative barriers between and within transport modes.

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