Digitalization and Optimization of Railway Last Mile Operation inside ports areas

Gdynia 23/10/2019

3rd Baltic Ports & Shipping 2019

Marika Gillardo

CIRCLE - GEOGRAPHICAL PRESENCE

- **Italy** (Genoa, Milan and Trieste)
- **Belgium** (Bruxelles – also with ADS Insight)
- **Portugal** (Porto - with Magellan)
- **Romania**
- **Bulgaria**
- **Turkey** (Istanbul, Ankara and Mersin)
- **Saudi Arabia** (Riyad, Jeddah)
- **Spain** (Barcelona)

MAIN NETWORK PARTNERS

- **Log@Sea** (with Aitek and IB)
- **Alice**
- **Innovazione Energia Ambiente e Sviluppo Sostenibile**
- **Distretto Ligure delle Tecnologie Marine**
- **TRANSIT**
- **Competence Center Industry 4.0**

Index

- Rail Freight scenario in Poland
- Rail Last Mile Management Model:
  - Operative Level
  - Actual SW Scenario
  - Digitalisation and Automation
  - Optimization SW solution
- Future Roadmap

RAIL IMPROVEMENT WORKS AT GDAŃSK AND GDYNIA PORTS

The intermodal traffic on the Polish railway is growth of **14.7% in 2017** and of **17% in 2018**.

In September 2019, the **EUR 600 million** railway access projects at Gdańsk and Gdynia ports have started: in particular

For the **Port of Gdansk**, the project on improving the infrastructure of rail access to the port of Gdańsk includes:

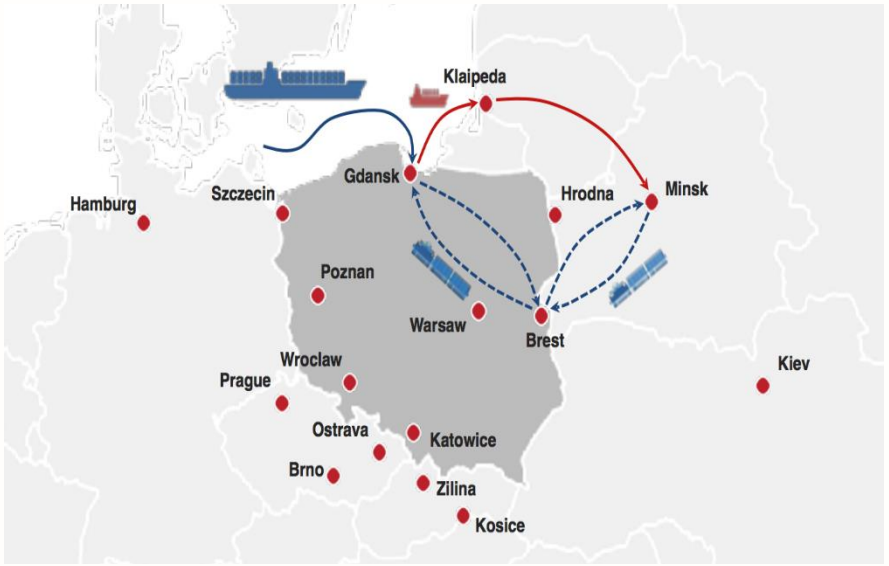
- reconstruction of over 70 km of tracks,
- 13 level crossings and pedestrian crossing
- Replacement of 221 turnouts
- Modernisation of three stations
- Electrification works

The **Port of Gdynia** will improve its capacity and will shorten the travel time:

- 115 km of tracks will be reconstructed
- 356 turnouts will be installed
- Electrification works will be performed at the port
- railway bridge will be also reconstructed

NEW RAILWAY CONNECTIONS

The port of Gdansk is also preparing two direct rail link, one with **Zilinia** and the other with **Minsk** to tap into the booming rail freight traffic between China & Europe



Since October 2019, the **Baltic Train**, will offer a new railway connection for the transport of containers between Małaszewicze and the ports of Gdańsk and Gdynia. The train serves customers in the Baltic States, Scandinavia and the UK, offering not just container yard solutions, but also a full door-to-door service for one fixed price.

FUTURE RAILWAY INFRASTRUCTURE PROJECTS FOR POLAND

Poland is improving and actively investing in railway infrastructure:

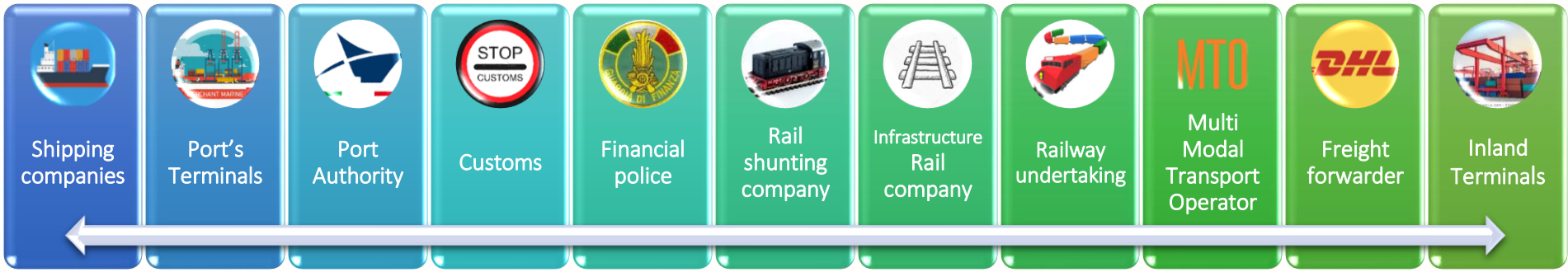
the Polish national railway program up to 2023, estimated at **€ 15.5 billion**, is a modernization program that will improve rail freight connections within ports. A total of **18,000 km** of railway track will be modernised

Among the railway infrastructure projects, one of the most important project is the new bridge over the **Bug River** that marks the border between Poland and Belarus

Other improvemets regarding:

- The extension of Kobylany station in 2019-2023
- The construction of nine tracks at Terespol broad-gauge station in 2018-2023
- The construction of ten tracks at Biała Podlaska Towarowa station in 2018-2020.

RAIL LAST MILE MANAGEMENT – WHAT IS?



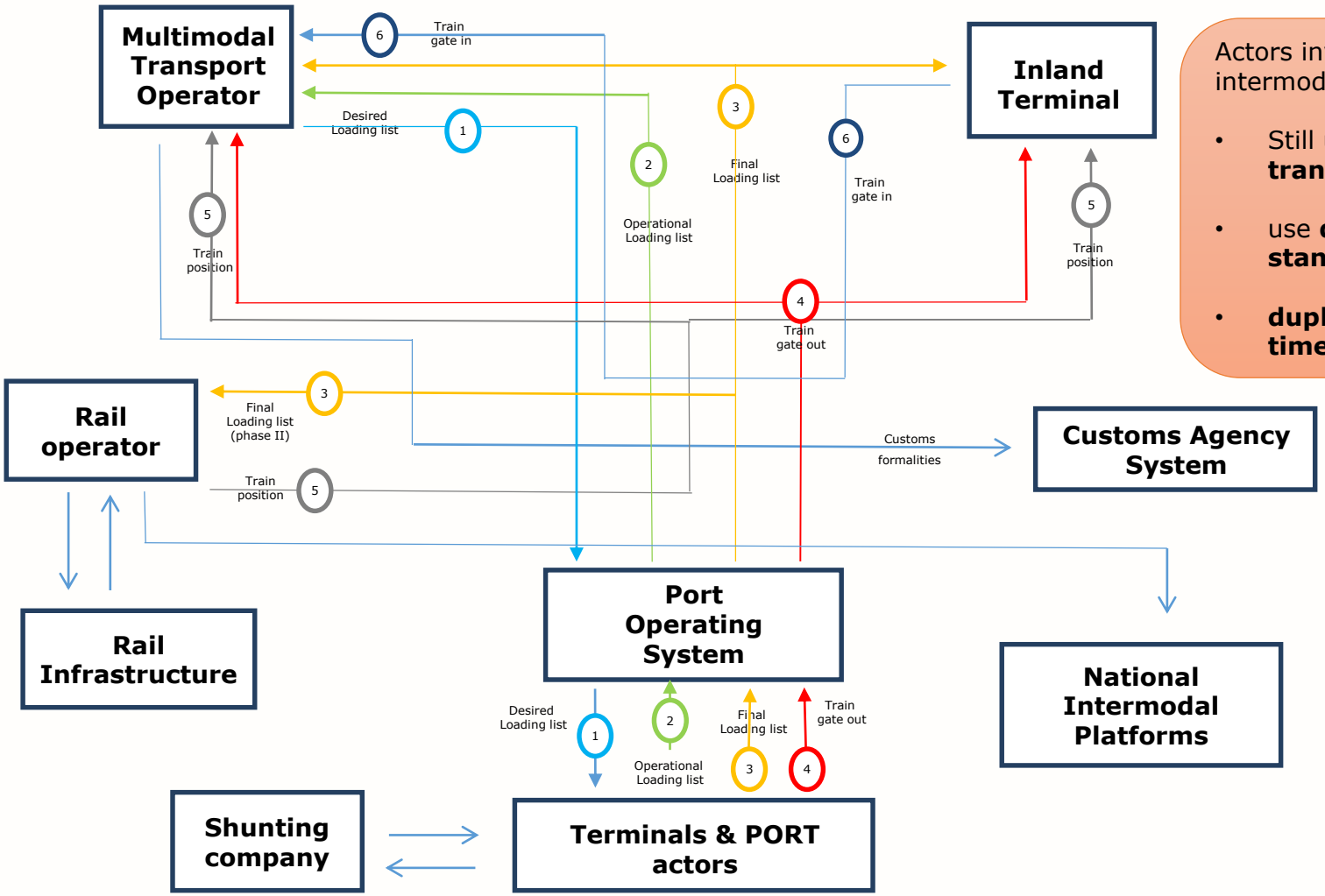
Informatics and informative **interoperability model** among the subjects involved in the optimal **Rail Last Mile management**, considering as last mile the way between **port's and inland terminals.**

Port Terminal Infrastructure

Port Rail Infrastructure

Rail National Infrastructure

RAIL LAST MILE - EXAMPLE OF INFORMATION FLOW COMPLEXITY



Actors involved in the intermodal transport process:

- Still use **Paper transport documents;**
- use **different standards**;
- **duplicate** and share **not timely information.**

RAIL LAST MILE MANAGEMENT – GENERAL OVERVIEW

1. OPERATIVE LEVEL — Definition of the **processes in detail**

2. ACTUAL SW SCENARIO — Analysis of the **AS-IS SW scenario**

3. DIGITALIZATION AND AUTOMATION SW — **Digitalization and automation** of information flow

4. OPTIMIZATION SW — Implementation of **Optimization Tool**

Port Terminal Infrastructure

Port Rail Infrastructure

Rail National Infrastructure

Rail Last Mile Management – 1. Operative Level

We focused on the main **rail operation** involved in the Rail Last Mile inside the port area

Rail Handling operation inside port terminal → Primary and secondary Shunting operation → Train gate in/out in port area

Port Terminal Infrastructure

Port Rail Infrastructure

Rail National Infrastructure

RAIL LAST MILE MANAGEMENT – 2. ACTUAL SW SCENARIO

Shipping companies | Port's Terminals | Port Authority | Customs | Financial police | Rail shunting company | Infrastructure Rail company | Railway undertaking | Multi Modal Transport Operator | Freight forwarder | Inland Terminals

OR

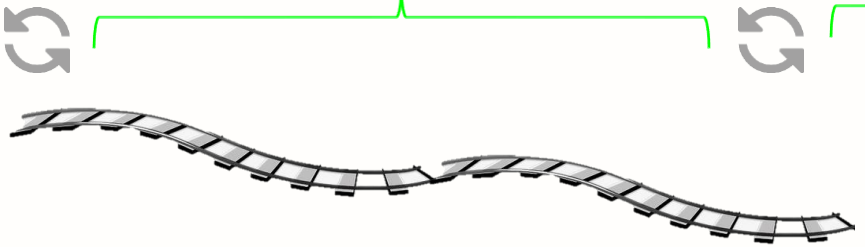
Port Community System

- Did **not digitalize** all information flows
- Using **different standards**;
- Sharing **not timely information.**

TOS ***Port Terminal***

SW ***Shunting Company***

SW ***Rail Infrastructure***



Port Terminal Infrastructure

Port Rail Infrastructure

Rail National Infrastructure

Rail Last Mile Management – 3. Digitalization & Automation

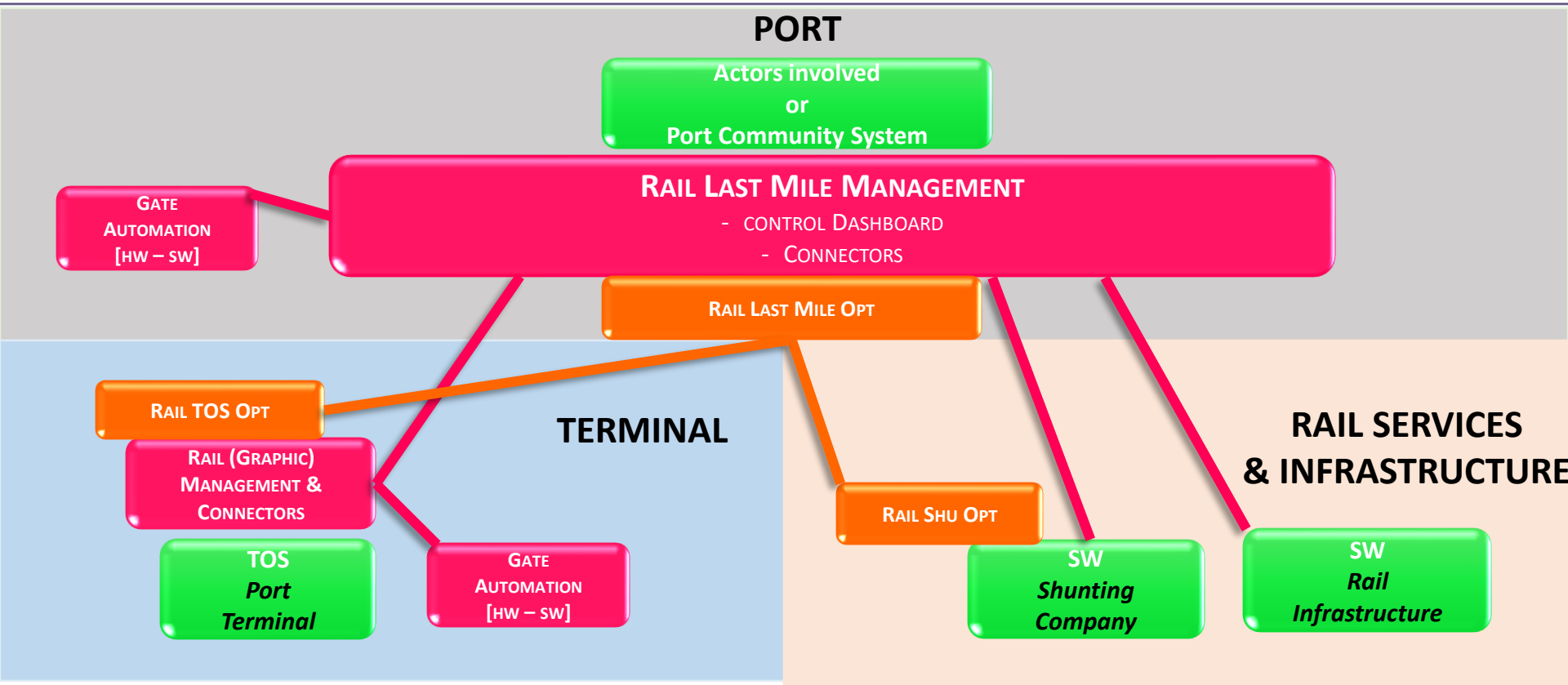
Digitalization & Automation SW

Port Terminal Infrastructure

Port Rail Infrastructure

Rail National Infrastructure

3A. General SW Overview



Legenda:

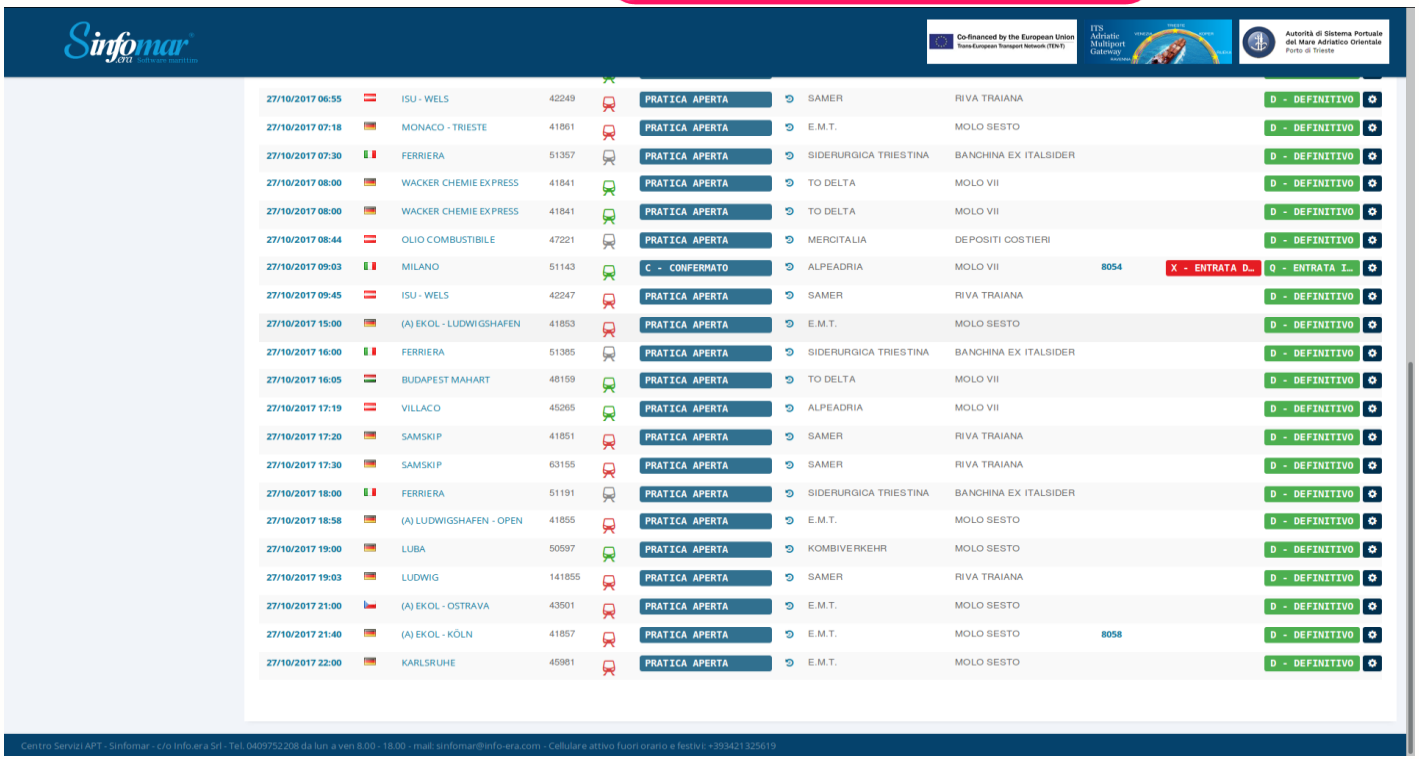
- SW present in the AS-IS Scenario
- Digitalised modules implemented by us
- Optimisation tools

3B. Rail Last Mile Management

PORT

Port Community System
Port Authority

Rail Last Mile Management
- Control Dashboard
- Connectors



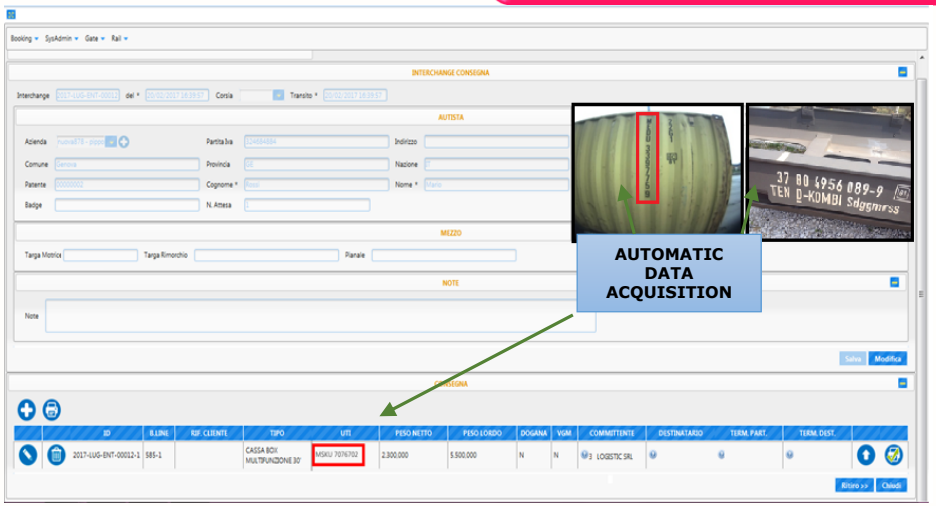
- Real time status of the rail yard inside port
- It provides Alert and statistics
- Full control over the rail process inside port

3C.GATE AUTOMATION

PORT

Port Community System
Port Authority

GATE AUTOMATION [HW – SW]



AUTOMATIC DATA ACQUISITION OF TRAIN COMPOSITION, DAMAGE, ETC.

INTEROPERABILITY WITH PORT ACTORS AND CUSTOMS ADMINISTRATION

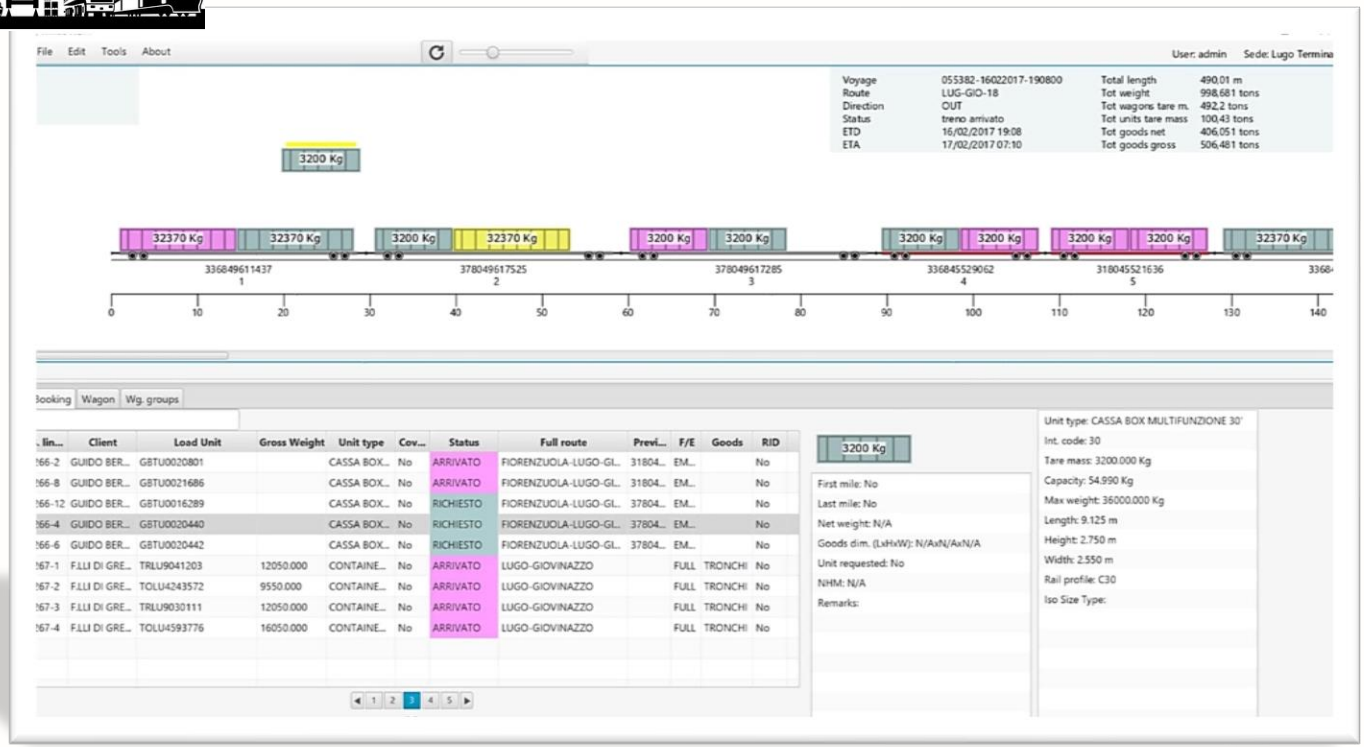
Port Railway gate infrastructure OCR / RFID

3D. RAIL (GRAPHIC) MANAGEMENT & CONNECTORS

TERMINAL

TOS
Port
Terminal

RAIL (GRAPHIC) MANAGEMENT & CONNECTORS



- REAL TIME STATUS OF RAIL YARD
- EASY PLANNING OF HANDLING OPERATION
- DIGITALIZED FLOWS TO THIRD SYSTEMS

RAIL LAST MILE MANAGEMENT – 4.OPTIMIZATION TOOLS

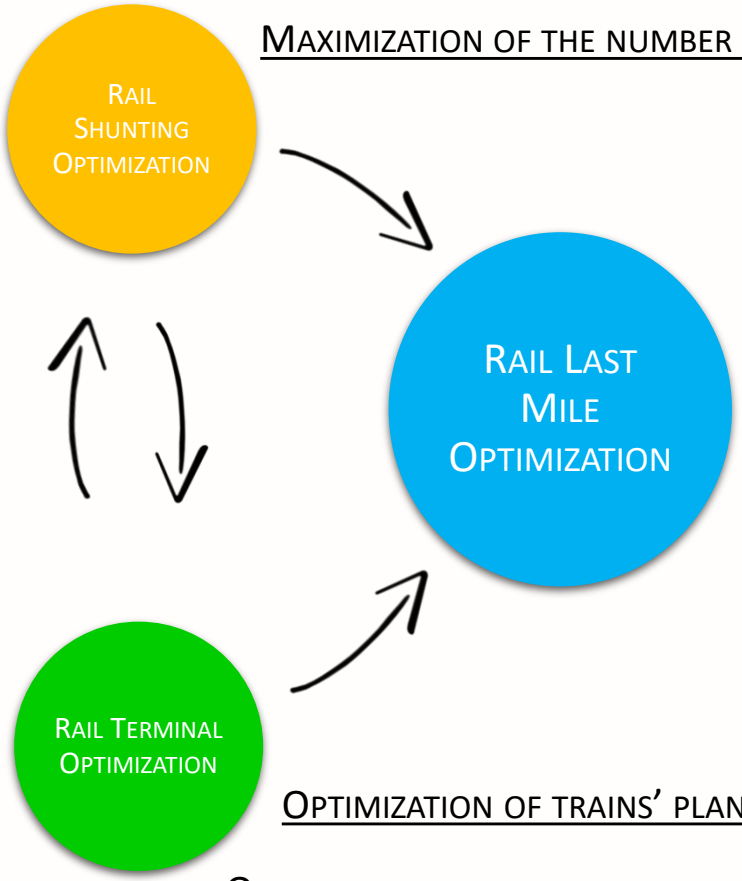
OPTIMIZATION TOOLS

Port Terminal Infrastructure

Port Rail Infrastructure

Rail National Infrastructure

4A. Optimization SW Modules



Maximization of the number of trains to/from the port

Optimization of trains' planning activities

Optimization of infrastructure's utilization

Rail Last Mile Optimization tool provide the optimized solution in case of conflicts

- Reducing Port Congestion
- Reducing dwell time
- Increasing train operated

MILOS RAIL LAST MILE MANAGEMENT ROADMAP

Roadmap 2020

UNIVERSITÀ DEGLI STUDI DI GENOVA

C.I.E.L.I.
Centro Italiano di Eccellenza sulla Logistica i Trasporti e le Infrastrutture

SCIENTIFIC RESEARCH ACTIVITIES IN PROGRESS

MILOS OPTIMIZATION

BIG DATA

AI

DATA ANALYSIS

MILOS FOR BLOCKCHAIN

SUPPLY CHAIN 4.0 OPTIMIZATION

CONCRETE PROPOSAL

Within the next few months the ***digitalisation and optimisation of rail last mile transport operations and documents*** are further used and tested in ongoing **EU projects** and also in new **CEF proposals**

More than 28 international actors of the Rail Transport industry have already signed an Expression of Interest

Contact us at gillardo@circletouch.eu **Or**

visit us @ our stand 11