

DigLogs

WP5 Pilot implementation

Progress Report #2

5.1.1. PCS Automation - Deliveries Planning

Responsible partner: Polo Inoltra			
Involved partners: All			
Version	Status	Date	Author
0.1	Draft	04.06.2021	Polo Inoltra
0.2	Draft	07.06.2021	Polo Inoltra
Notes:			

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1. Reporting period

Reporting period	01.01.2021 - 31.05.2021
Date of the report	04.06.2021

2. Pilot action progress status

2.1 Pilot Implementation schedule

The pilot action implementation follows the previously defined roadmap, as described below.

Please note that the roadmap tasks are not strictly sequential, as many of them are going to be carried out jointly with other activities.

(completed task reported in bold)

P1. Pilot Planning & Control

- a) **Pilot Concept Drafting**
- b) **Pilot Functional Design**
- c) **Pilot Work Plan**

CHECK OFF MILESTONE 1 - PLANNING (FEB 2021): COMPLETED

P2. Technical Development

- a) **Technical Functional Specification**
- b) **Input Process**
- c) **Output Process**
- d) **Backend Solution**

e) Track&Trace, Traffic&Weather and RT Modules

f) Re-routing Parameters checklist

g) Frontend Solution

CHECK OFF MILESTONE 2 - TECH DEVELOPMENT (MAY 2021): COMPLETED

P3. Configuration & Internal Testing

Variables/Set of data checklist

Booking&Transport Orders Pilot Function Configuration

ITUs Pilot Function Configuration

Travel Sections&Nodes Pilot Function Configuration

Vessels, Ports and Terminals Pilot Function Configuration

Trains, Stations and Rail Terminals Pilot Function Configuration

Re-routing parameters Pilot Function Configuration

CHECK OFF MILESTONE 3 - CONFIGURATION (JUL 2021)

P4. Final (User) Testing

Actors mapping & Selection

Actors instructions

Deliveries Planning System User Testing

Pilot Application Delivered and Completed

Data/Results Analysis

Dissemination

CHECK OFF MILESTONE 4 - FINAL TESTING (OCT 2021)

2.2 Progress status

P1, related to the Pilot Planning & Control Activities has been completed, following a regular schedule:

- The Pilot Concept Drafting activity has been completed by Polo Inoltra by following the research workflow and considering the stakeholders expectations;
- The Pilot Functional Design has been completed with the help of Actual IT, defining the potential software capabilities in relation to the proposed functions;
- The Pilot Work Plan has taken into account the previous two points and it has allowed to define a pilot timescale for the implementation of the various activities.

P1 has respected the estimated deadlines, with the actual completion in Feb 2021.

In relation to **P2**, the Technical Development of the pilot action, starting from a draft Technical Functional Specification, it was possible to define the following pilot parts:

Input Process:

User-data input process has been defined per category, with data-sets based on the shipment and further choices in relation to the ITU. Once the routing process has been set, the system allows further inputs in relation to the re-routing of the shipment.

Output Process

The system output is related to the different multimodal options available for the user and after the routing selection process the system provides the user with the shipment monitoring and the eventual system calculations for re-routing.

Backend Solution

The backend solution allows the system administrator to monitor the status of the system, evaluate the options chosen by the user and to intervene in case of non-conformity.

Track&Trace, Traffic&Weather and RT Modules

In terms of Track&Trace, a checkpoint system based on test-user activation has been applied. For Traffic&Weather a system-admin induced lab-based event system will be used during the pilot testing in order to simulate random event of a real-life implementation scenario. RT modules will be therefore lab-simulated, though the system will react to the unexpected circumstances by offering re-routing options or a new ETA for the shipment, depending on the consequences the unexpected event had on the planned routing.

Re-routing Parameters checklist

Re-routing activities will be based on the user decisions based on the lab-simulated track&trace (checkpoints) and traffic&weather (lab simulated by system-admin) situations. The user will be informed about the shipment non-compliance and will be offered either facultative or compulsory re-routing options (being the compulsory options shown only in case of long-delays making the originally selected routing option unavailable for service prosecution).

Frontend Solution

The frontend solution is related to the main system interface, guiding the user throughout the shipment management & reporting. It has been chosen a user-friendly interface, with clear indications for the routing in terms of transport modality and multivariable ranking options.

P2 has respected the estimated deadlines, with the actual completion in May 2021.

P3, related to the pilot configuration & internal testing activities, is currently ongoing, with tests being currently made on the first pilot prototype on the routing activities, while the re-routing part is under construction.

P3 is following a progressive construction and test method, based on each system variable:

Variables/Set of data checklist

In order for the pilot to function, it was essential to insert some real data in relation to each infrastructure node, travel leg, ITU and transport modality.

In particular, set of potential ITUs were identified, with several lengths (20'-45'), typology (containers, swap bodies, semitrailers), structure (standard, HC, bulk, tank, open top, etc.), EN13044 standards for semitrailers (gabarit profile and wagon compatibility, to be used for intermodal shipments across different transport modalities (road, rail, sea), making use of pre-defined travel legs (a selection of sea and rail routes across Central and Northern Italy, and Croatia, between Italian and Croatian ports for the sea routes while inland routes for the rail part), each with assigned infrastructure node (inland terminals & ports) and mean of transport (actual vessels were assigned to both RoRo and container services between ports, while actual wagons, typology 60', 80', 90', pocket wagons T3000 and MF wagons, were assigned to the rail travel legs).

The set of data was prepared by Polo Inoltra and validated by Actual IT, that included the set of data in the main system algorithm.

Booking & Transport Orders Pilot Function Configuration

User-data input process for the Booking & Transport Order has been defined per category, with the main data source being start and end point of a shipment (on this point for the first and last mile of the intermodal service it has been decided to use a province-based system across Italy and Croatia), ETD and ETA of service with requested Transit Time for the shipment, maximum cost for the shipment and maximum emission category.

ITUs Pilot Function Configuration

Expanding the functionalities of the pilot, it is possible for the user to either select an intermodal shipment routing based on a pre-defined ITUs (e.g. from Split to Milan with a 40' HC container) or to ask the system which ITUs should be used to obtain the best transit time, cost or emission range with an open-selection of the ITUs available. The system will then generate all the routing options per each ITU type, leaving to the user the task to select the preferred routing option.

Travel Sections & Nodes Pilot Function Configuration

A total of 14 nodes were identified in relation to ports and inland terminals, with 16 different travel legs of the rail and sea modality were defined, from a selection of existing and lab-created services.

In addition to what mentioned above, related only to rail and sea routes, there is the possibility for the system to include the road travel legs across any of the 14 nodes and from any province of Italy and Croatia towards any travel node. This way, the road modality is used to fill eventual gaps in the shipment routing and to allow the user to select a first and last mile by road, connecting a factory or a warehouse to the main travel nodes.

Vessels, Ports and Terminal Pilot Function Configuration

A total of 12 actual vessels were included in the system, each with a different assigned travel leg, service type (RoRo, container, bulk etc.), vessel GT, vessel DWT, draught and emission class. The data is actual and it has been obtained by the official registry.

A total of 5 ports and inland terminals were selected, all existing in real-life, and per each infrastructure it has been assigned a working schedule, with DG restrictions, storage and THC fees, reach stacker working hours and terminal opening hours.

Train, Stations and Rail Terminals Pilot Function Configuration

A total of 9 inland terminals and rail stations were selected, all existing in real-life, and per each infrastructure it has been assigned a working schedule, with DG restrictions, storage and THC fees, reach stacker working hours and terminal opening hours.

Re-routing parameters Pilot Function Configuration

Re-routing parameters are currently under construction, as well as the whole re-routing system interface. The construction activity is progressing fine, with the expectation to meet the milestone deadline.

P3 is respecting the estimated deadlines, with the projected completion in July 2021.

P4 activities, related to the Final User Testing, have not started yet, they will begin as soon as P3 activities will have been completed.

2.3 Milestones and actions

Milestone/action	Responsible partner/external resource	Deadline, as defined in PWP	Predicted or achieved completion date	Estimated completion %	Progress status
Milestone 1	Polo Inoltra	Feb 2021	Feb 2021	100%	COMPLETED
Milestone 2	Polo Inoltra	May 2021	May 2021	100%	COMPLETED
Milestone 3	Polo Inoltra	Jul 2021	Jul 2021	80%	ONGOING
Milestone 4	Polo Inoltra	Oct 2021	Oct 2021	0%	SCHEDULED

3. Risks

Risk description	Solution suggestion	Status
No risks were encountered	n/a	Risks monitored

4. Next steps

The next planned steps will be the following:

- a) Complete the re-routing interface and algorithm at P3;
- b) Start the User Actors mapping & selection;
- c) Provide actors with pilot instructions;
- d) Start the Pilot User Testing Phase;
- e) Complete Data/Results Analysis, arrange eventual corrective measures and finalize the Pilot Application;
- f) Start the dissemination process.