

# INTERMODEL EU

**Simulation using Building Information Modelling Methodology of Multimodal, Multipurpose and Multiproduct Freight Railway Terminal Infrastructures**

**Grant agreement: 690658**

**MINUTES 3<sup>rd</sup> PLENARY MEETING 12-14 March 2018 Barcelona**

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0.1	21/03/18	Gisela Soley	IDP	Draft
0.2	26/03/18	Cornelis Versteegt	MAC	Comments on WP5-WP7
0.3	27/03/18	Pau Morales	CENIT	Minor typos and editing WP6 / WP8 / workshop WP8
1.0	29/03/18	Gisela Soley	IDP	Final version

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## 1 Agenda

The meeting was held in CENIT-CIMNE, Campus Nord (Universitat Politècnica de Catalunya), Barcelona (Spain), and in Hotel Abat Cisneros, Montserrat.

### **1<sup>st</sup> day: 12<sup>th</sup> March 2018 (Monday)**

**Address:** Campus Nord C1 building, Barcelona (**Place 1**)

### **2<sup>nd</sup> day: 13<sup>th</sup> March 2018 (Tuesday)**

**Address:** Hotel Abat Cisneros, Montserrat (**Place 2**)

### **3<sup>rd</sup> day: 14<sup>th</sup> March 2018 (Wednesday)**

**Address:** Campus Nord C1 building, Barcelona (**Place 1**)

### 1.1 First Day Agenda

<b>Monday 12<sup>th</sup> March 2018 – CAMPUS NORD, BARCELONA</b>		
<b>Time</b>	<b>Topic</b>	<b>Responsible(s)</b>
09.00 – 11.30	Short introduction to Viasys applications Short introduction to IDP Intermodel pilot models Viasys installations to developer computers Hand-on session with pilot models (importing current pilot models) Questions Lessons learned, close-up and next steps	<b>Only VTT, VIASYS, MAC, IDP</b>
<b>12.15</b>	<b>Welcome and opening of the meeting</b>	<b>IDP</b>
12.30 – 14.30	WP meetings (60 min per WP)	WP2, WP4 leaders
14.30	<i>Lunch (1 hour)</i>	
15.30 – 17.30	WP meetings (40 min per WP)	WP5, WP6, WP7 leaders
17.30	<i>Coffee break (15 min)</i>	
17.45 – 18.15	WP meeting	WP8
18.15 – 18.50	Project management Risks and contingency measures	IDP, All
18.50 – 19.30	Bulk transport and logistics	BED

## 1.2 Second Day Agenda

Tuesday 13 <sup>th</sup> March 2018 – MONTSERRAT		
Time	Topic	Responsible(s)
08.05	<i>Plaça d'Espanya Railway station (train to Montserrat)</i>	
10.00 – 10.45	Demonstration of the simulation platform	MAC
10.45 – 11.45	Workshop for integrated multimodal terminal planning	VTT, MAC, VIASYS, IDP
11.45 - 12.30	WP9 - Dissemination and communication	IDP, ZNIK
12.30	<i>Chance to go to the Basílica to listen to the Virolai</i>	
14.00	<i>Lunch (1 hour)</i>	
15.30 – 16.30	WP8 Workshop (Functional, economic and environmental analysis)	CENIT-CIMNE DHL
17.30	<i>Return to Barcelona</i>	
21.00	<i>Social dinner (BocaBoca Tapas&amp;Cocktails)</i>	

## 1.3 Third Day Agenda

Wednesday 14 <sup>th</sup> March 2018		
Time	Topic	Responsible(s)
9.00 – 10.00	Financial and technical progress report preparation	IDP
10.00 – 11.00	WP9 – Exploitation workshop	IDP, All
11.00	<i>Coffee break (30 min)</i>	
11.30 – 12.15	Next steps Decision about next meeting: Dates and venues Project risk update Challenges found and necessary actions Any other issue	IDP, All
12.15 – 13.30	Justification and project review – 12 <sup>th</sup> April, Brussels	<b>Only WP leaders</b>
13.30	<i>Lunch (1 hour)</i>	

## 2 Participants

NAME	INST.	Attended 20/09/17	Attended 21/09/17	Attended 22/09/17
Cornelis Versteegt	MAC	YES	YES	YES
Ana Jaime	IDP	YES	NO	NO
Luis Ibañez	IDP	YES	NO	NO
Gisela Soley	IDP	YES	YES	YES
Joachim Ritzer	DHL	YES	YES	NO
Carles Cots	BASF	YES	YES	YES
Francisco Rodero	CIMNE-CENIT	YES	YES	YES
Pau Morales	CIMNE-CENIT	YES	YES	YES
Pietro De Michieli	BED	YES	NO	NO
Manuel Menéndez	VIAS	YES	YES	NO
Miguel Ángel Dombriz	FGC	NO	YES	YES
Nicolò Marrali	CSI	YES	NO	NO
Antti Autio	VIASYS VDC	YES	YES	YES
Simo Nurmi	VIASYS VDC	NO	YES	NO
Juha Hyvärinen	VTT	YES	YES	NO
Donata Strycharczyk	ZNIK	YES	YES	NO
Marta Szalecka	ZNIK	YES	YES	NO
Janne Porkka	VTT	YES	YES	YES
Eduard Loscos	IDP	YES	YES	YES
Daniel Kangas	KIR	YES	YES	YES
Fredrik Kangas	KIR	NO	YES	YES
Marcel Sanz	IDP	NO	YES	YES

### 3 Discussions/decisions about each agenda item

#### FIRST DAY, 12/03/2018

##### 3.1 Welcome act and presentation of the event and agenda items

- The meeting was opened by Gisela Soley as project manager and representative of IDP.

##### 3.2 WP2 Integrated planning environment and decision support overview

- Janne Porkka, from VTT, provided a general overview of the work package, explained the work done during the first year and a half (18 months) of the project and immediate objectives for the next 6 months, and identified any changes from the envisaged plan, risks and opportunities.
- Key issues: 3-week delay for submission of deliverable D2.3 (committed to submit the report before 25/03/2018). How are we going to integrate detailed models in other phases of the project lifecycle but the planning/feasibility study? How will the interface show the results obtained? With the Integration SIM – BIM, necessary to see where the bottlenecks are so that we can face problems encountered and at the same time propose solutions to improve operation performance/layout.
- Needs: agree open formats used and agree interface and API development.
- Challenges: difference between design coordination and integrated simulation? When making a decision which is the information needed by the user/client? i.e. peak hour, may we see the bottleneck? Reasons why there is a bottleneck
- Discussion on if we can work with more detailed models and go through a very detailed level. Which type of information are we going to show? Information from a high level? If we want too specific data, can we capture that within the models?
- Potential risks: strategic indicators in assisting decision making and information on used software and tools (information has been given taking into account the different phases of a project lifecycle).
- Question raised: detail vs no detail. From coping with peak hour volumes or with annual throughputs.
- Is the 3D view simulation giving added value? Goal should be obtain the strategic KPIs.

### 3.3 WP4 BIM Intermodal terminal overview

- Gisela Soley, from IDP, provided a general overview of the work package, explained the work done during the first year and a half of the project (18 months) and immediate objectives for the next 6 months, and identified any changes from the envisaged plan, risks and opportunities.
- Facility management dimension should be improved when receiving information from the real terminals. As maintenance costs associated to terminal equipment is related to units handled per year, there is the need to be 'coordinated' with the simulation carried out by Macomi.
- Gisela Soley, from IDP, agreed providing an excel file with the specific information previously required to CSI and APSP regarding maintenance tasks and costs (technical specifications of the equipment present at the terminals has been requested earlier on).
- Main challenges: developing new libraries for the export/import of supported formats between BIM models and simulation software. Currently models have been created in Revit and QGIS so that WP5 and WP6 can work according to schedule. However, the goal is to achieve exporting supported formats directly from Revit to simulation software. Progress has been done, but further development is required.
- Reasons for asking for an extension on WP4: IDP explains that more time is needed to develop the new libraries abovementioned and a better analysis for the optimization of KPIs can be done if we can work altogether with WP5 and WP8. This would allow to improve the models.
- Luis Ibañez and Ana Jaime, from IDP, show the tool developed to create and design an intermodal railway terminal.
- Key issue: for the development of new libraries for improving the connection between BIM and simulation, and for the development of the layouts in QGIS, IDP is requesting 5 extra PM.

### 3.4 WP5 Terminals operational simulations overview

- Corné Versteegt, from MACOMI, explained the status of the deliverables under this work package.
- Validation has been done by experts from universities and research centers. Corné shows simulation experiment components: Case 1 – Melzo (new functionalities through feedback received from partners. Updated model with the new gate and a third rail crane, so that we will obtain new KPIs). Some difficulties related to the difference between reality and theory). Case 2 – La



Spezia (results will be shown the day after). Nicolò, from CSI, gives some advices about La Spezia layout according to the future new railway terminal.

- WP5 is over. However, as explained by Corné, MAC proposes to extend the duration of the task (from M17 to M28) so that it will be possible to simulate also virtual cases and improve the simulation library. In addition, connection between simulation and BIM is still under development (data structure has been well defined, but what we are trying is to export/import files directly without developing a model in QGIS), and connection between simulation results and overall architecture requires some more time.
- Key issue: in case of simulating virtual cases, MAC would request 2 extra PM.

### 3.5 WP6 External mobility effects overview

- The main aim of this presentation was to describe the major objectives and deliverables for this work package, the progress during the first period and the work to be done.
- Francisco Rodero, from CENIT, explained that the framework for the simulation and coupling BIM and simulation has been completed. However effort is being made to be able to exchange information required without going through QGIS.
- Deliverable D6.1 has been submitted and ongoing work is done for the completion of D6.2.
- Calibration and validation: Italian partners' help will be required.
- Pending: some information must be provided by CSI and APSP in order to finish the development of the simulation models (mainly traffic signaling, configuration of parameters to develop environmental data, etc.). Also, there is no information about volumes in each entry point of the model for La Spezia and Melzo (how many vehicles enter in each segment and their circulation behavior – turning at junctions – within the model. CENIT is proposing solutions to both partners in order to get some reliable data.
- Question raised: How the KPIs will be integrated in the model?

### 3.6 WP7 Interconnection simulation overview

- The main aim of this presentation was to describe the major objectives and deliverables for this work package, the work done and to be done, and risks and opportunities.

- Corné Versteegt, from Macomi, comments that some of the information/data is very difficult to obtain. Some of the data collected is not usable and that there is few information about the trains, so it is a quite big challenge because it must be considered that there are also trains at the terminals that are not running in the interconnection (i.e. trains to Rotterdam, Milan, etc.).
- IDP and VIAS comment the current problem with using Optirail models within INTERMODEL project. First, there is a problem with the degradation models that should be adapted to the rail network; second, lack of data to be able to use the models; and third, IPR issue which makes difficult to use the Optirail results. This issue was communicated to the PO and it is said that an amendment is required so we will have to wait for the approval from the EC. MAC will check needed requirements together with VIAS as technical documentation will be sent to the PO before April and the amendment will be send after the review meeting.
- Getting information of the railway interconnection (traffic, geometric data of the layout, etc.) is really difficult. Should we also take into account the integration with other train services? As there is no enough information MAC proposes together with VIAS a deviation plan (new approach for the development of WP7) consisting on collecting data within the network through a point cloud (work to be done by VIAS), developing the BIM model with the information gathered and simulation, calibration and validation once the layout has been imported by MAC. Timing is crucial to be able to submit deliverables according to schedule. The new approach requires some additional time. The tasks 7.1/7.2 will be extended. The overall WP7 will still be delivered according to the original schedule (mentioned in DoA).

### 3.7 WP8 Functional, economic and environmental analysis overview

- The main aim of this presentation was to describe the major objectives and deliverables for this work package, the work done and to be done, and risks and opportunities.
- Pau Morales, from CENIT, explains that T8.1 and T8.2 have already started.
- Task 8.1 provides a high-level vision on the assessment of terminal planning and operational from a functional, economic and environmental point of view. DHL and CENIT are working in the deliverable with the goal to link the high-level vision with the list of KPIs defined in WP3, and assess the influence of any major design element within the intermodal terminals to its functional, economic and environmental aspects.
- As a complementary exercise, CENIT and DHL assess the influence of modifying one design aspect of the terminals and qualitatively assess the expected impact on the indicators. Other design variables are kept stable and just one aspect is

changed at a time to construct cause-effect relationships between design aspect and indicators.

- The final output expected from Task 8.2 will be the identification and classification of the main logistic trends affecting the performance and planning of intermodal terminals and from there, establish the relationship between trends, measures to adapt to them and KPIs. Additionally, statistics on trade evolution are to be considered.
- Tasks 8.3 and 8.4 have not started yet. They are linked to validation of results. A set of interviews will be carried out to do a final selection of KPIs (shortlist of worthwhile KPIs or aggregated weighed formula). Approach being considered: evaluation and weighing of KPIs through interviews to stakeholders using a stated preference game (successive choices of two-three alternatives with varying sets of indicator values).
- Challenge: which will be the available KPIs from the original listings from D3.1? We should be realistic about which KPIs we will be able to provide. Also real calculation and results for KPIs so that we can think and analyse which values could be good or not and to make comparison of alternatives.
- Needs: it is necessary to identify stakeholders (a sample selection must be provided by all partners involved, about 10 candidates per partner). In this way, we will obtain a consistent list of stakeholders to interview/conduct the game to. CENIT and DHL propose that interviews could be web-based although face to face should be better for being more effective.
- In order to process the information gathered in Task 8.3, CENIT and DHL propose using some software (TBD). It will be taken into account what is said in the data management plan regarding data protection.
- A first draft of deliverable D8.1 will be sent to all partners in M20 (April 2018). An inconsistency found in the DoA is that deliverable D8.1 is due on M20 and the task finishes in M28. It is considered that for the appropriate development of the whole work package, the deliverable should be finished in M28.
- Next steps before next general assembly: approach development for Task 8.3, produce a list of 10 candidates for interviews (M25), and consent template to be distributed among interviewees.

### 3.8 Project management. Risks and contingency measures

- Gisela Soley, from IDP, explains main project management issues and changes proposed according to progress done and difficulties found.

- Deliverable D2.3 new due date: 25<sup>th</sup> March (3-week extension). It is a must to submit it on time.
- Activation of risks 4 'coordination, coherence and synchronization of progress on work packages', risk 6 'under resourced partner/task/WP', risk 11 'failures in the software interoperability text' and risk 17 'data collection difficulties' is explained.
- Solution proposed by VIAS as alternative of using Optirail results within WP7 requires an amendment and a redistribution of effort within WP7. The PO was informed about the alternative proposed by VIAS and an amendment will be required. It should be submitted immediately after the periodic report is closed.
- WP4 and WP5 ask for extension until M28 so that optimization of KPIs can be done in a proper manner and work together with WP6. They should be parallel tasks. This delay does not affect the initial work plan and the development of other work packages. Also, within WP4, the development of new libraries for the export of .sqlite and .shp files is being carried out.
- Discussions on the redistribution of effort within WP4, WP5 and WP7.
- An inconsistency found in the DoA is that deliverable D8.1 is due on M20 and the task finishes in M28. It is considered that for the appropriate development of the whole work package, the deliverable should be finished in M28. In addition, it is asked to start work on Task 8.2 and Task 8.3 earlier than originally planned (M9 and M21, respectively).

### 3.9 Bulk transport and logistics

- Pietro de Michieli, from BED, explains main issues concerning bulk transport and logistics: equipment and infrastructure required in terminals (feeders, conveyors, belt conveyors, pipe conveyors, etc.); stacking methods and types of stackers; intermediate storage; vessel size group and shiploaders; possible focus: coal, fertilizer, grains; need for differentiating export and import terminals.
- Possible benchmarking and how meaningful including bulk in a multipurpose terminal is. Also considering environment and standards in Europe.
- BED stated that multipurpose terminals are unrealistic in Europe. What about including bulk inside a container? Daniel Kangas, from KIR, says that they combine transport of bulk wagons within mixed trains, and also transport in semi-trailers.
- We should try to forecast what is going to happen in the future (equipment to transport bulk in future, modular wagons and multipurpose trains).

- **Pietro de Michieli and Daniel Kangas (BED and KIR) will write a report about what is expected in the future and try to forecast future trends.**
- Liquid bulks in tanks; and solid bulk containerized is more feasible in inland terminals (it is difficult to see in seaport terminals).

## SECOND DAY, 13/03/2018

### 3.10 Demonstration of the simulation platform

- Corne Versteegt from Macomi, presents the simulation demo for La Spezia Container Terminal.
- Some comments: Higher volume meant more complexity. The simulation was done for a whole year. For each crane, about 6 terminal tractors are required to operate very to it. In case of MT containers, less space is needed between them when being stacked and it is possible to pile more in height. Annual throughput volume about 1.125.000 TEUs/year. TEU factor  $\sim 1,52$  (in Melzo it was  $\sim 1,8$ ). The filling rate of the stacking blocks shows if the terminal can handle higher quantity of TEUs, and results show that La Spezia could increase the handled volume. During peak hours, the main gate usually (about 80%) presents problems (sometimes long queues interfering city streets). Simulation run tries to reduce unproductive moves.

### 3.11 Workshop for integrated multimodal terminal planning

- Antti Autio, from Viasys, presents the 3D viewer by Viasys. Discussion on how the connection could be (it only requires an internet connection, and could be on-line or downloadable). Best option website access.
- Usability of the tool from Viasys, you can choose what you want to see in a model. What do we want to visualize with the 3D viewer?
- One of the challenges is in the indicators. Some indicators require data coming from BIM model and from simulation. Additional calculations should be done within the integration.
- **Format on how to provide the indicators to VTT. VTT will prepare a template on how IDP, MAC and CENIT will provide the indicators.**
- Joachim Ritzer, from DHL, explains that the platform should not just store the value of the KPIs but also the background information of that specific scenario.

We need a description of the scenario as well. The system has to be able to store the information (functionality to store scenario and values).

- Chance to assess most important indicators according to the different stakeholders.
- Vessels and trucks should be included within the model.

### 3.12 WP9 Communication and dissemination overview

- ZNIK presents main issues concerning Intermodel EU communication and dissemination.
- Newsletters: in the 18 upcoming months 5/6 newsletters must be published. Newsletters could be also sent through each partner company. ZNIK proposes to send an email each month to partners in order to get more information to write appropriate newsletters. CENIT proposes to ZNIK to take into consideration the list of milestones and then asking to partners in charge of the milestone if they achieve it.
- ZNIK must upload the public deliverables on the webpage.

### 3.13 WP8 Workshop

- Joachim Ritzer (DHL) and Pau Morales (CENIT) present a workshop for the development of WP8. Based on what kind of development is foreseen and what we should be prepared for (size of vessels, new cranes, etc.).
- Topics mentioned: increasing scale of transports, evolution of trade flows, vehicle automation, automation of operational processes, optimization and integration of supply chains, transparency and exchange information, climate policies and targets for 2050, new means of transportation.
- Questions raised to be answered by each project partner: Which trends do you see?; Which current and future trends have the biggest impact?; What will be the impact on intermodal terminals?; Which dimensions (if possible to identify KPIs) will be affected?
- **Partners will send their answers to DHL and CENIT.**

## THIRD DAY, 14/03/2018

### 3.14 WP9 Exploitation workshop

- Gisela Soley, from IDP, presents the second exploitation workshop for developing Exploitation Agreement version 2 within next 6 months.
- IDP will send a questionnaire to all project partners to be answered with main project objectives, main key exploitable results, etc.
- IDP explains that it is important that partners read initial version and asks for contribution in the development of the Exploitation Agreement as everybody must be involved. Initial key exploitable results identified could be different now as the project is more mature.
- VTT thinks that MAC and Viasys are the ones that could have more clear goals and results. Janne Porkka proposes to do a video (maybe better for dissemination).
- Miguel Ángel Dombriz, from FGC, considers that better defining few results and be clear.

### 3.15 Next steps and other issues

- IDP summarizes upcoming action: alternative to Optiral proposed by VIAS, some changes in the initial Gantt, and redistribution of effort requested by partners in WP4, WP5 and WP7.
- IDP explains that an amendment is required as change in using results from Optirail represents an important change (PO was already informed about the solution proposed by VIAS but technical justification is being written by them).
- TEN-T Days: partners may present some results from the project and development done up to now.
- Pending: WP2 leader (VTT) must present a template for the KPIs. How to integrate all the information coming from the simulation?. CENIT requires some data from Italian partners for WP6 progress (they were asked during the first meeting day).
- Janne Porkka proposes to do meetings more often. CENIT says that it should be according to the WP as not all of them require the same follow up level.
- Upcoming work: mid-term review preparation, preparation of the amendment (modifications on due dates, inconsistencies in the DoA, relevant changes – VIAS)

- Next general meeting: MELZO and LA SPEZIA (26-28 September).

### **3.16 Justification and project review**

- IDP will send a template for WP presentation. Important to explain well work performed during the period covered (M1-M18), list main results achieved (deliverables and objectives reached).
- Janne Porkka proposes that each WP leader write a summary of the content of his work package in the agenda distributed by IDP.
- IDP will send an email with the presentation template and deadlines to be able to do a peer review among all partners before the mid-term review in Brussels (12<sup>th</sup> April).