



## WP6: EXTERNAL MOBILITY EFFECTS

CENIT

Center for Innovation in Transport





## WORK PACKAGE OVERVIEW

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- The **main objective** of WP6 is to analyze the impact of intermodal terminal operations on the surrounding road network mobility
- In particular, WP6 will be focused on the **definition of the traffic simulation models** for the case studies of La Spezia and Melzo terminals



- The **impact (external costs)** will be assessed through the use of indicators to support decision-making



## DELIVERABLES AND MILESTONES

Deliverable	Month	Risks	Milestone
D6.1: Demonstrator of traffic simulation model	18	R21: Failure in the simulation techniques and framework	
D6.2: Demonstrator of pilot cases	24	R22: Difficulties in calibration and validation and on collecting data from traffic demand	MS14: Launch of the simulation model
D6.3: Assessment procedure of external costs	30		MS15: Presentation of the simulation results of the pilot cases



## Task 6.1 Simulation model setting

Task	Description of Work
T6.1 Definition of the simulation model and data setting	<ol style="list-style-type: none"><li>1. Benchmark traffic simulation software and define framework</li><li>2. Define an <b>input data model</b> for the EMS module in order to be adapted for any kind of terminal</li><li>3. Define the <b>interfaces</b> between TOS and BIM models (input/output data)</li><li>4. Set up the <b>methodology to estimate the number of trucks entering/leaving the terminal</b> as a function of the freight terminal demand</li><li>5. Define how <b>KPI</b> and <b>KRI</b> will be integrated in the model and introducing them</li></ol>
T6.2 Calibration and validation	Starts in <b>M18</b>
T6.3 Assessment of external mobility	Starts in <b>M24</b>



## Task 6.1.1 Benchmark traffic simulation SW

	Year 1												Year 2												Year 3														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36			
<b>T6.1 Definition of the simulation model and data setting</b>																																							
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6.1.5. Define how KPI and KRI will be integrated in the model and introduce them																																							
<b>T6.2 Simulation of study cases (validation and calibration)</b>																																							
6.2.1. Collect data from the Melzo dry port and La Spezia container terminals																																							
6.2.2. Develop both external mobility simulation models (EMS)																																							
6.2.3. Validate and calibrate the simulation models in collaboration with partners (CONTSHIP and AP La Spezia)																																							
6.2.4. Presentation of the simulation models																																							
<b>T6.3 Evaluation of external effects on mobility</b>																																							
6.3.1. Estimation of external costs																																							
6.3.2. Analyze the indicators and compare with reference cases																																							
6.3.3. Recommendations and definition of threshold values																																							

1<sup>st</sup> 6-month plan



### EMS wanted features

- Accuracy → **Microscopic level** of simulation with proven internal models such as *car-following* or *lane-changing* and **built-in environmental models** (fuel consumption and pollution emission)
- **Automation** mechanisms such as unattended execution mode or easy ways for carrying out repetitive actions.
- Possibility to **extend features** using external programming
- Other topics to take into account:
  - Do we have expertise with the tool?
  - Has *user-friendly* interface?
  - “Last but not least...”: under license or free?



# Main results of the benchmarking

Software	Comments
Dynameq	Intended to support <b>large-scale urban planning</b> in metropolitan areas
Vissim	<p>Offers an <b>API package</b> to integrate own or external applications by means of <i>DLL dynamica libraries</i> but only for:</p> <ul style="list-style-type: none"><li>• traffic signals</li><li>• driver behavior model (<i>car-following</i> and <i>lane-change</i>)</li><li>• emissions (although this last one limited to some vehicle attributes and dynamic parameters).</li></ul> <p>BIM importer but for pedestrian simulation purposes</p>
Transmodeler	Traffic <b>microscopic simulator</b> that takes advantage if you are a current user of <i>TransCAD</i> software



### Main results of the benchmarking (cont.)

Software	Comments
Transyt	Traffic simulator <b>specific for signalized junctions</b> or middle/large mixed networks of junctions (signalized or not).
Sumo	<b>Open source microscopic</b> package composed of several applications  Includes the following <b>emission models</b> : <ul style="list-style-type: none"><li>• Derivation of the versions 2.1 and 3.1 of the <i>Handbook Emission Factors for Road Transport</i> data base (<i>HBEFA</i>)</li><li>• A <u>non open source</u> derivation of the <i>Passenger Car and Heavy Duty Emission Model</i> (<i>PHEM</i>)</li></ul>





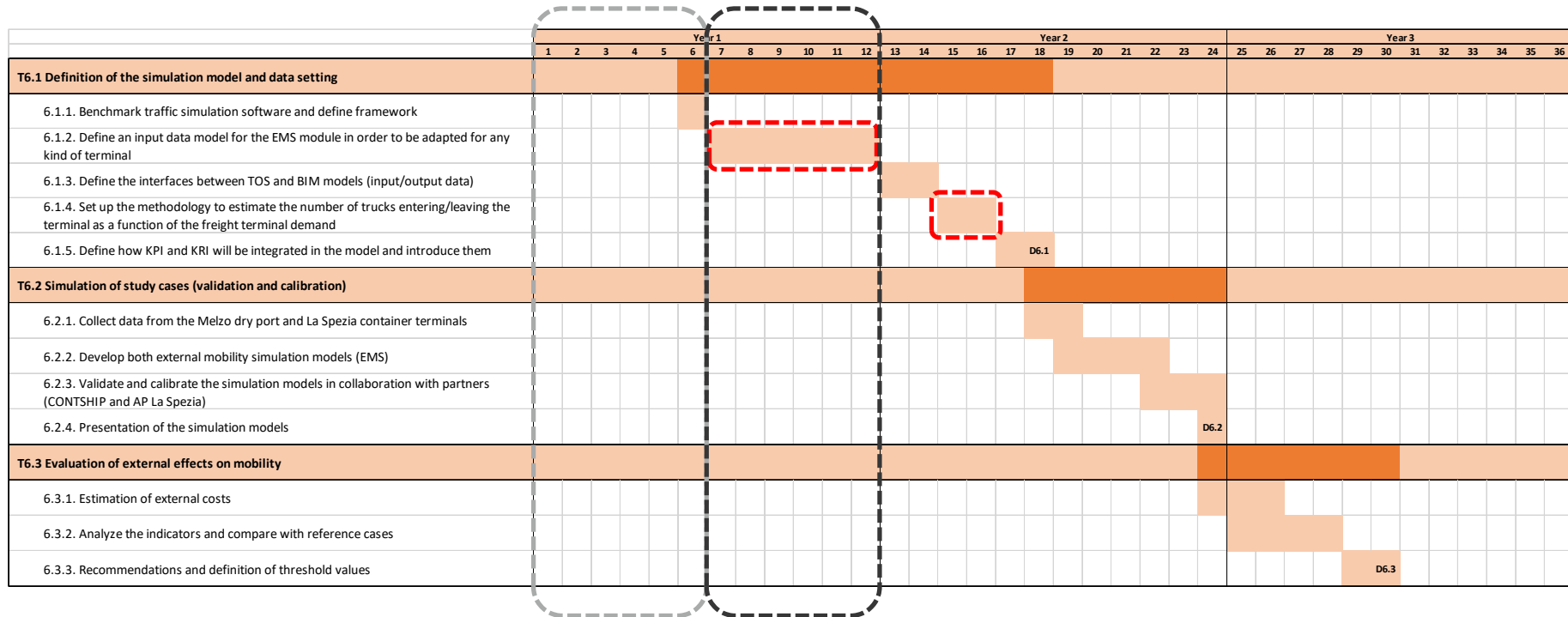
# Main results of the benchmarking (cont.)

Software	Comments
Aimsun	<ul style="list-style-type: none"><li>• Powerful <b>unattended batch mode</b> (once the model is built, it can be simulated without GUI) and <b>automation</b> (using built-in support for <i>Python</i> scripting)</li><li>• <b>Includes fuel consumption model and environmental models:</b><ul style="list-style-type: none"><li>• QUARTET</li><li>• Panis et al, <i>"Modelling instantaneous traffic emission and the influence of traffic speed limits"</i></li></ul></li><li>• Powerful <b>possibility to extend features</b> by means of C++ or <i>Python</i> custom API (e.g. programming of new environmental models)</li><li>• Very <b>user-friendly interface</b></li><li>• The Project can take advantage of the expertise that CENIT has using this software for years</li><li>• TSS headquarters are located in Barcelona and have good level of technical support</li></ul>



# ONGOING WORK AND TO BE DONE

## Task 6.1.2 and Task 6.1.4



2<sup>nd</sup> 6-month plan



### Task 6.1.2 and Task 6.1.4

Task	Description of Work
Task 6.1.2	<ul style="list-style-type: none"><li>• Draft of a Technical Note sent to IDP on 20th March about requirements for <b>input data</b> to the model (road network and demand by means of OD matrices or traffic states).</li><li>• Best way to dynamically load a <b>network</b> (in case to be needed to adapt EMS to <i>any kind of terminal</i> or just to ease the creation of the network for the case studies)</li></ul>
Task 6.1.4	<ul style="list-style-type: none"><li>• Find out how to inject single vehicles in case to be needed if <b>generated mobility</b> (trucks entering/leaving the terminal as a function of the freight terminal demand) is defined apart of <b>current demand</b></li></ul>



## WHAT CENIT EXPECTS FROM INVOLVED PARTNERS?

Partner	Main role / tasks / work to carry out
MACOMI BV	<ul style="list-style-type: none"><li>• Task 6.1.2: feedback from previously mentioned Technical Note about <b>input data</b> requirements of the traffic simulation model</li><li>• Task 6.1.3: definition about interfaces to other project components (<b>output data</b>) → end of this 2<sup>nd</sup> 6-month plan</li></ul>
AP SPEZIA	<ul style="list-style-type: none"><li>• To be established during 2<sup>nd</sup> Plenary Meeting → 3+ months before planned start of Task 6.2 where traffic and road information about case studies will be needed</li></ul>
CONTSHIP IT	



QUESTIONS?  
10'

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**THANKS!**

