WP2: INTEGRATED PLANNING ENVIRONMENT AND DECISION SUPPORT

VTT Technical Research Centre of Finland

2nd global meeting

Espoo, September 2017

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- WP2 aims is to develop **a holistic integrated planning environment** to increase interaction
  - Enables technical management with models and supports making decisions
- **Life-cycle from planning**, design and construction **towards the operational** analyses
  - Utilization of models (design)
  - Coupled with indicators (WP3), pilot modelling (WP4) and operational simulation (WP5).

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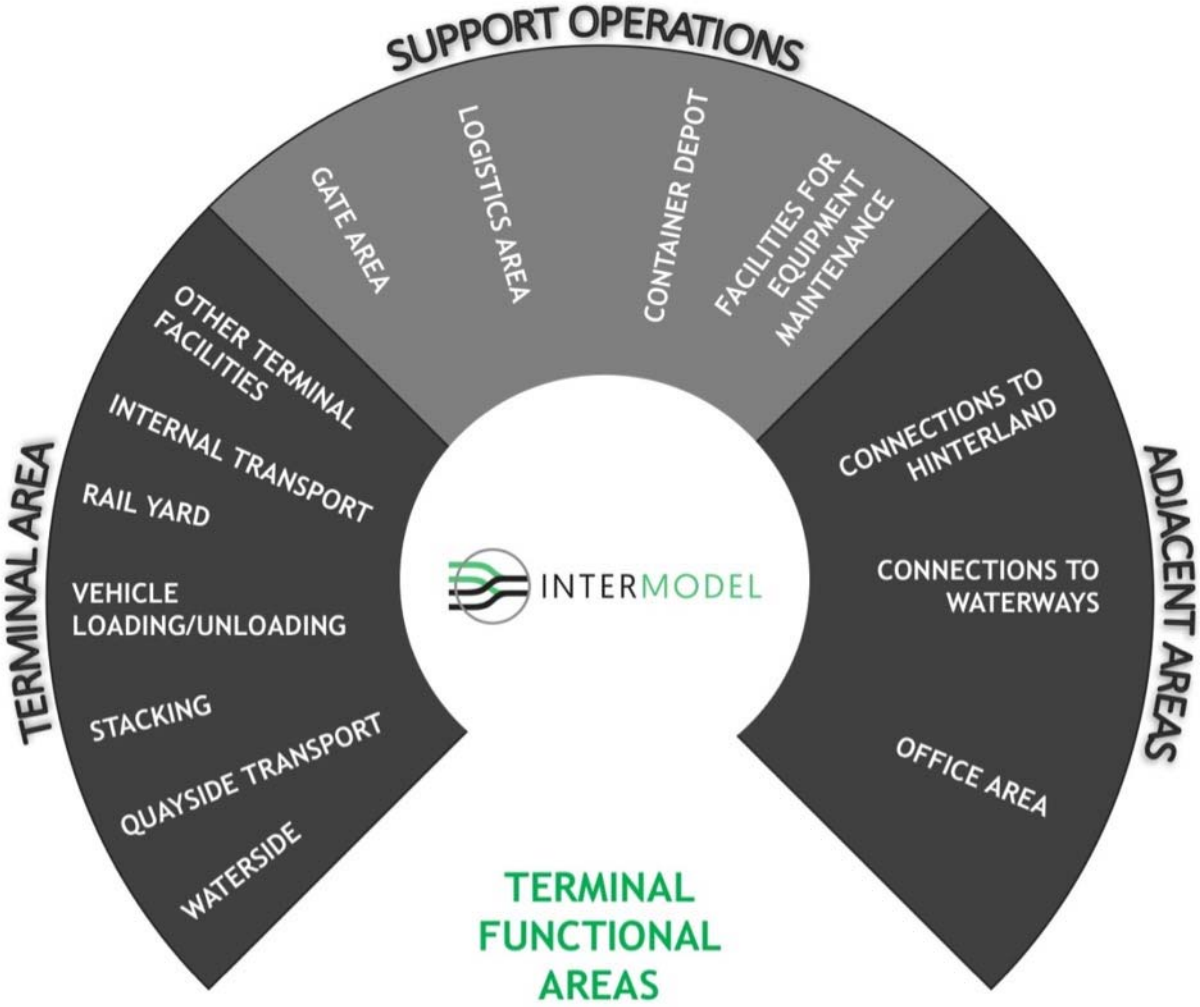
1- STATUS OVERVIEW



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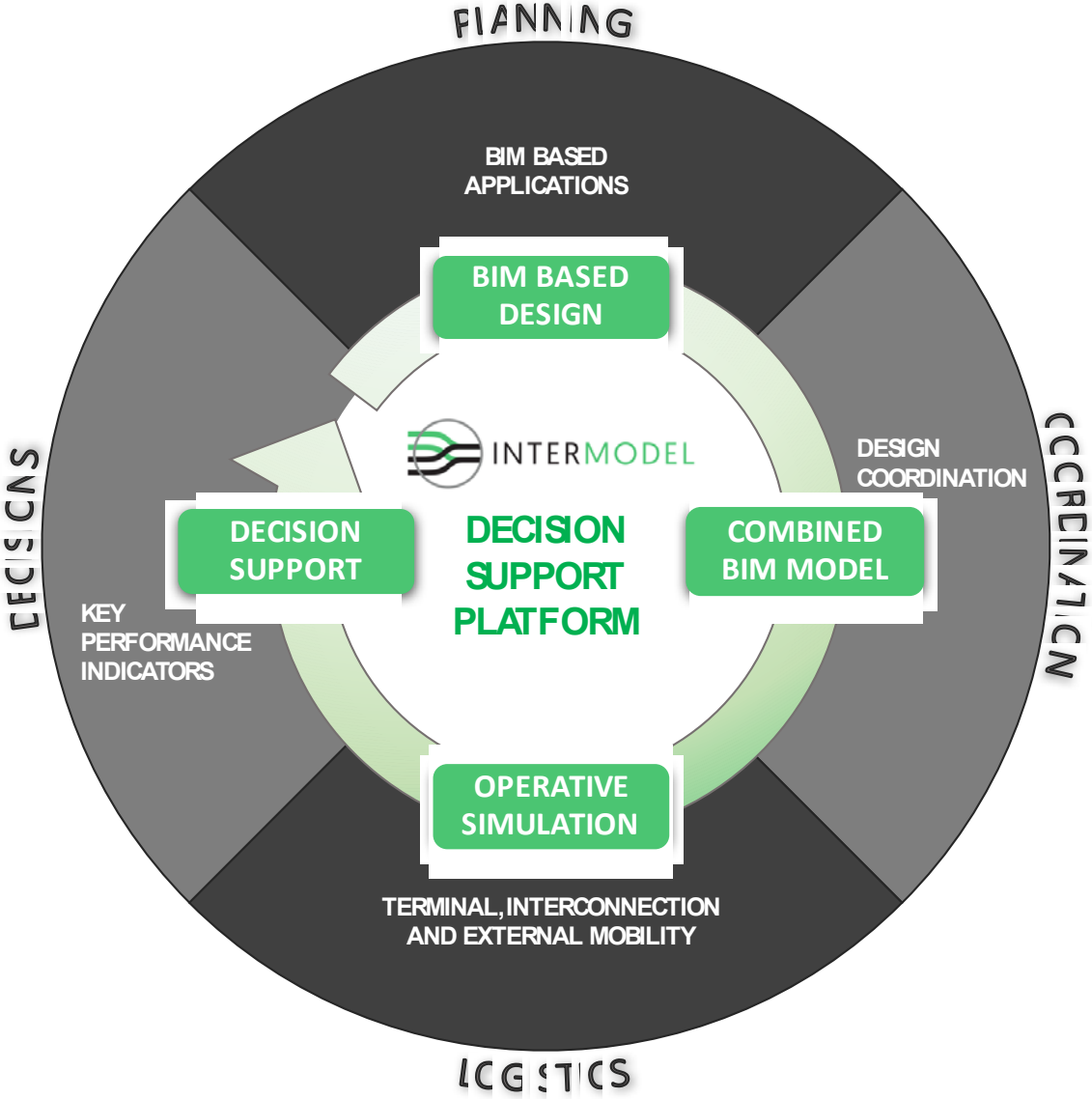
1- STATUS OVERVIEW



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- WP2 is **progressing on time** (VTT, VIAN, IDP, MAC, CENIT)
- **2 deliverables published**
  - Data requirements D2.1 (M9)
  - Integration environ. architecture D2.2 (M12)
- **1 conference paper sent**
  - TRA2018, Vienna Austria 16-19.2.2018
  - D9.13 (M12): Terminal Planning: The Selection of Relevant KPIs to Evaluate Operations
- **Pilot terminals visited** May 2017
- Regular online meetings (e.g. interfaces and software tools).

Done Active Upcoming

- Tasks:
  - Information requirements for terminal use cases (Task 2.1)
  - Architecture and interfaces for integrated planning environment (Task 2.2)
  - **Integrated planning environment prototype with new functionalities** (Task 2.3)
  - **Model coordination in pilots** (Task 2.4)
  - Decisions with integrated planning and enhanced interaction (Task 2.5)

2- OBJECTIVES AND DELIVERABLES

INTERMODEL

● *Done* ● *Active* ○ *Upcoming*

	Deliverable	Month	Important
●	D2.1 Requirements for terminal projects	M0-M9	Describe information requirements for terminal use cases.
●	D2.2 Integrated planning environment architecture	M4-M12	Describe architecture, based on Viasys VDC.
●	D2.3 Interoperability and data exchange specification	M4-M18	Specify interfaces, open formats.
●	D2.4 Documentation of implemented integrating ICT env. prototype	M12-M24	Guide and coordinate modelling.
○	D2.5 Interactive decision making with integrated planning environment	M16-M30	Collaborative planning, decision processes, technology utilisation
○	D2.6 Gaming technology in interactive operational visualisation	M16-M30	Based on terminal 3D models (WP4) and operational simulation (WP5).

	Milestone	Month	Related deliverables
○	M2.1 Prototype for integrated planning for terminal projects	M24	D2.1, D2.2, D2.3, D2.4
○	M2.2 Video for interactive operation. game technology visualisation	M24	D2.5, D2.6

D2.1 – Information requirements for terminal use cases

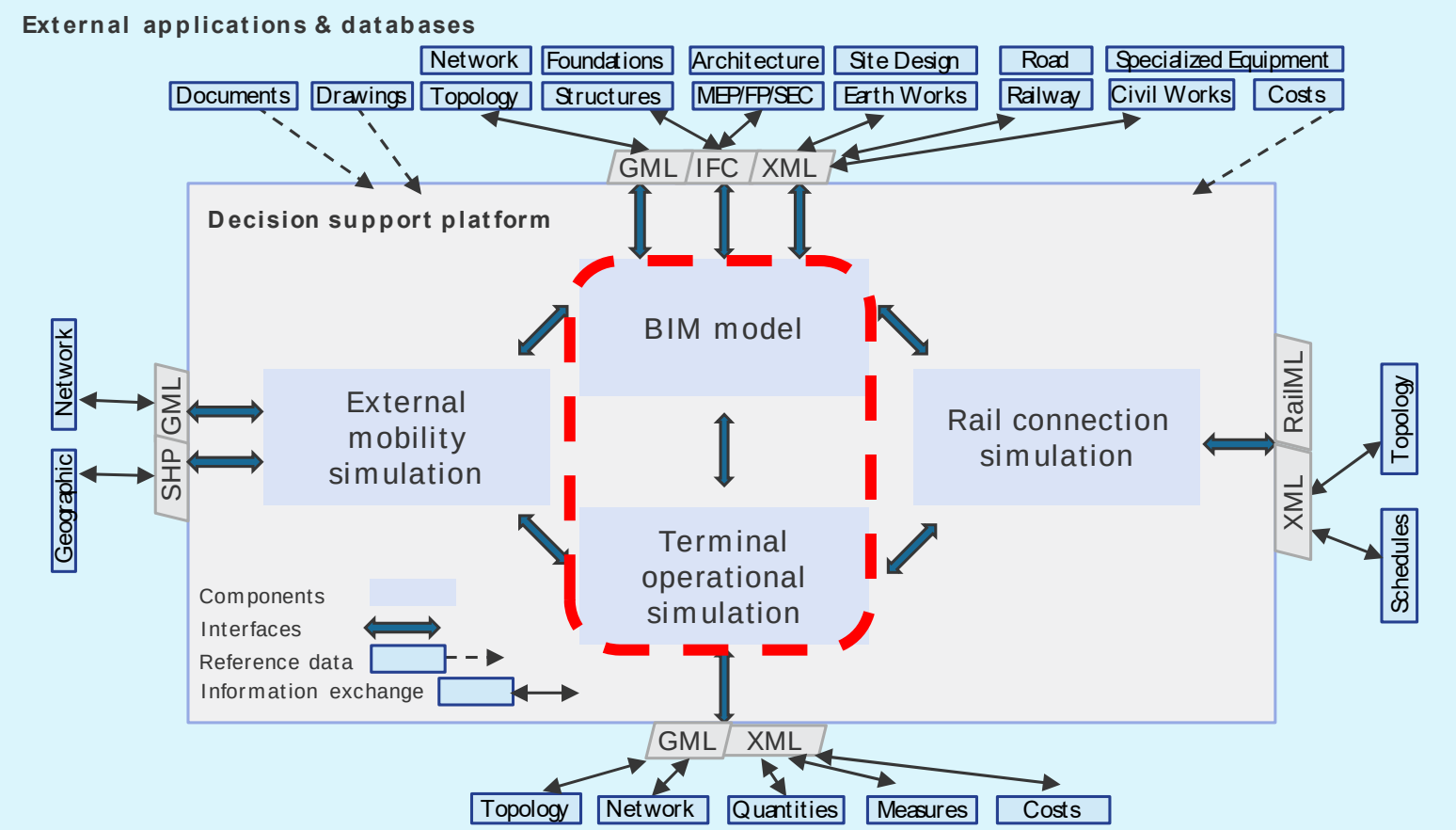
- **D2.1 published** (M9)
- Terminal is distributed into **functional areas**
- **3 use cases** introduced
  - UC1: Strategic indicators
    - Develop strategic needs into indicators to cover terminal life cycle
  - UC2: Design coordination
    - Use integrated model for design coordination for planning a better terminal
  - UC3: Integrated simulation coordination
    - Use BIM-based design practice together with an operational simulation to enhance logistical solution and decision support

D2.2 - Integrated planning environment architecture

- **D2.2 published** (M12)
- Trends and challenges in terminal development
- Model based work practices in terminal development
  - **Planning -** advanced tools have potential to save money and time, and to improve communication.
  - **Coordination** - various domain and discipline models (open standards) integrated into a single combination model.
  - **Logistics** – change in design choice typically means extensive financial repercussions.
  - **Decision making** – use KPI's to evaluate solution in plan.

D2.2 - Integrated planning environment architecture

- **D2.2 published** (M12)
- Software architecture for Decision Support Platform



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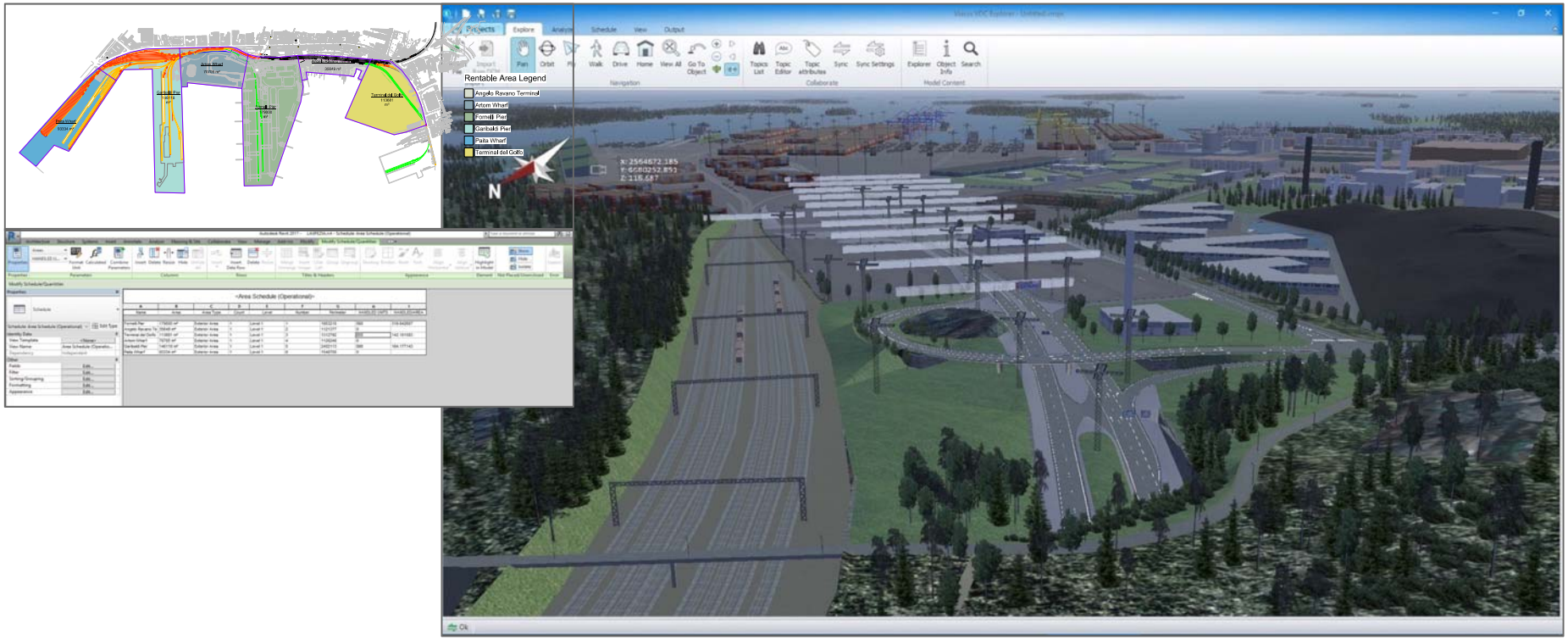
D2.2 - Integrated planning environment architecture

- **D2.2 published** (M12)
- BIM (Revit) Combined model (Viasys VDC Explorer)



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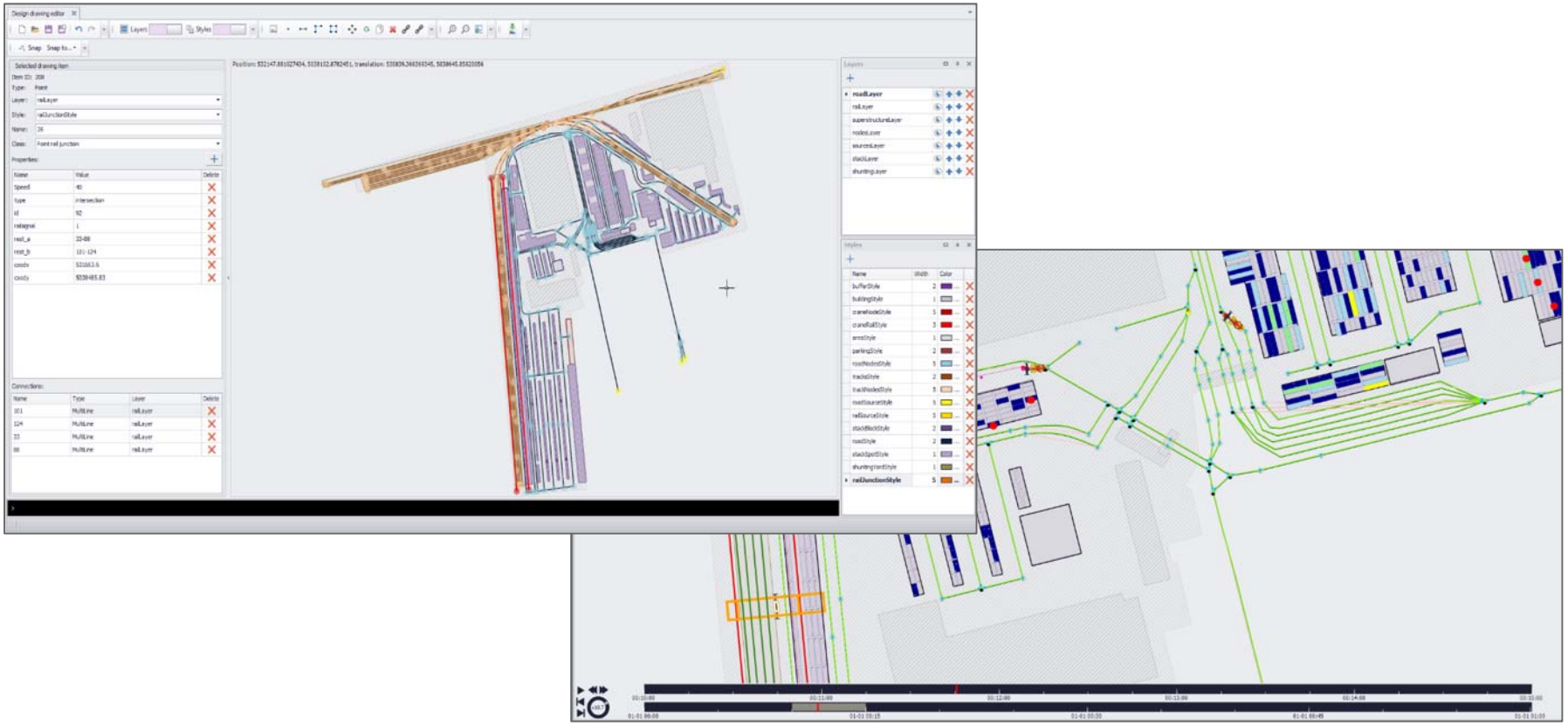
D2.2 - Integrated planning environment architecture

- **D2.2 published** (M12)
- Terminal operational simulation (Macomi)



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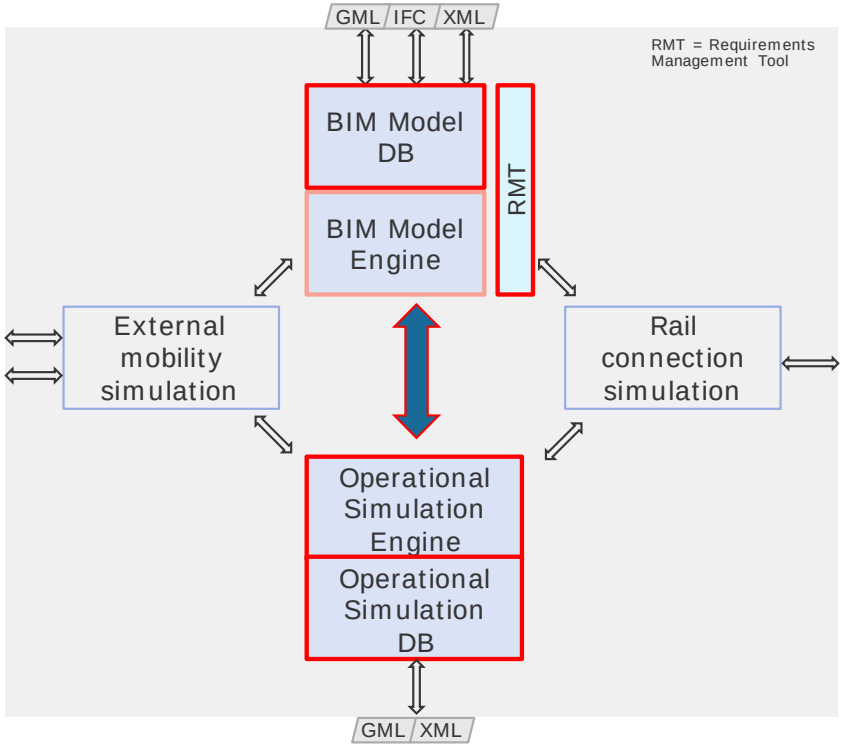
D2.2 - Integrated planning environment architecture

- **D2.2 published** (M12)
- The utilisation of platform in use cases
  - UC1 Strategic indicators
  - UC2 Design coordination
  - UC3 Integrated simulation coordination

  Each introduced step-by-step, and possible components and interfaces to be developed considered.



Sample from UC3

D9.13 – conference paper

- **D9.13 sent to TRA2018** (M12)
- Terminal Planning: The Selection of Relevant KPIs to Evaluate Operations
  - Sent to TRA2018 Vienna Austria 16-19.4.2018.

    Transport Research Arena conference (European Commission)

    2500 participants last time

    http://www.traconference.eu
  - Feedback received from PO

D2.2 Integrated Planning Environment architecture

4 The conference paper

4.1 Introduction

European Union is highly dependent on seaports for trade with the rest of the world and within its Internal Market. 74% of goods imported and exported and 37% of exchanges within the Union transit through seaports in 2013. To manage this amount of cargo in ports, smooth operations are required. The performance of individual port is currently evaluated by using different types of key performance indicators (KPIs). How the indicators are described is dependent on the stakeholders and their organizational interest.

Transport sector and ports are facing several changes and new requirements. For example, amounts of cargo are increasing and becoming concentrated, the vessels are enlarging, environmental issues are becoming more important and there are new requirements for the security. At the same time, the ports are usually in the middle of existing neighbourhood limiting possibilities to enlarge the area. Therefore, there is a need to invest in ports, but the planning of new infrastructure is difficult. The required investments are big and the planning horizon is long. So, if the designed structures turn out to be unsuitable due to changes in users' needs, it is expensive to make changes later.

The planning tools have developed remarkably during the past 10 years. Different types of planning tools are used in seaport and terminal design to model the completeness. The purpose of modelling is to generate digital representations of physical and functional characteristics of terminal area, buildings and other infrastructures. With the help of model-based approach and with suitable KPIs, it is easier to understand and evaluate the effects of certain design solutions for terminal operations in a larger context. By using modelling tools, there is also possibilities to compare different design alternatives to outline how certain choices in terminal design influences on the completeness.

There is a need to define the objectives of good terminal in order to plan the terminal and its operations. Good terminal would satisfy the stakeholders' expectations in best possible ways in the given preconditions. The achievement of objectives can be evaluated by using suitable indicators. However, the indicators used to plan and model terminal operations may differ from indicators used to evaluate the performance of current ports and terminals. The purpose of this paper is to analyse the indicators required for terminal planning and compare them with existing KPIs used for measuring the performance of ports and terminals.

This paper is organized as follows: After this Introduction section, the methodology is explained. Then the results of literature search of currently used KPIs used for terminal,

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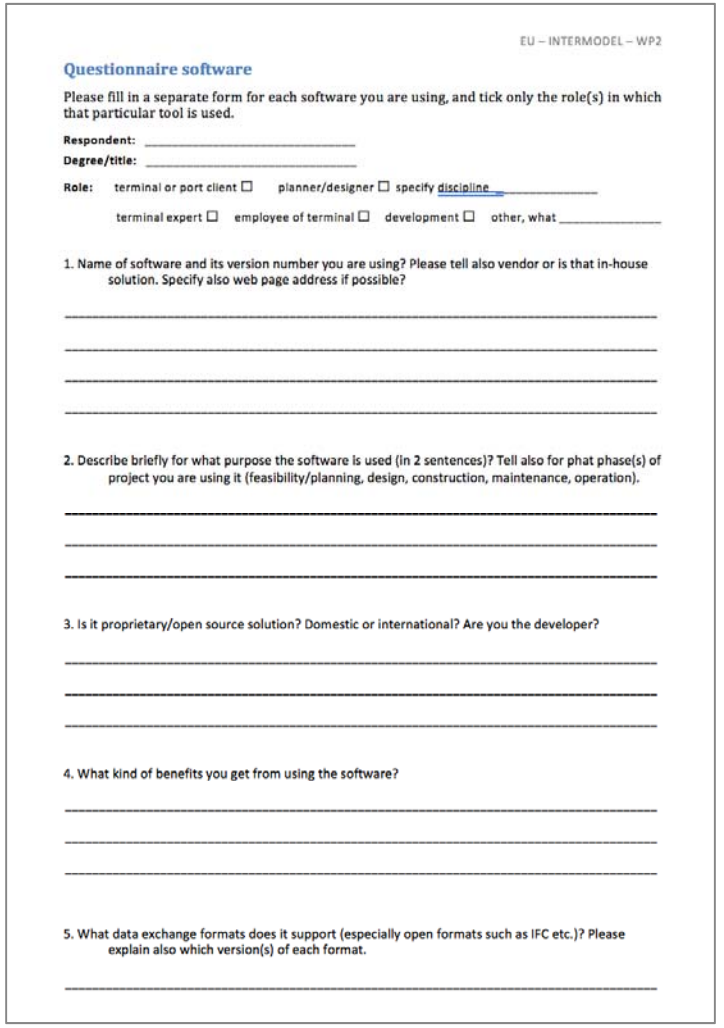
Software questionnaire: collected feedback

- **Questionnaire done** to **map relevant software tools** in terminal projects from participants
- Results will be taken into account in platform development



EU – INTERMODEL – WP2

Questionnaire software

Please fill in a separate form for each software you are using, and tick only the role(s) in which that particular tool is used.

Respondent: _____

Degree/title: _____

Role: terminal or port client ☐ planner/designer ☐ specify discipline _____

terminal expert ☐ employee of terminal ☐ development ☐ other, what _____

1. Name of software and its version number you are using? Please tell also vendor or is that in-house solution. Specify also web page address if possible?

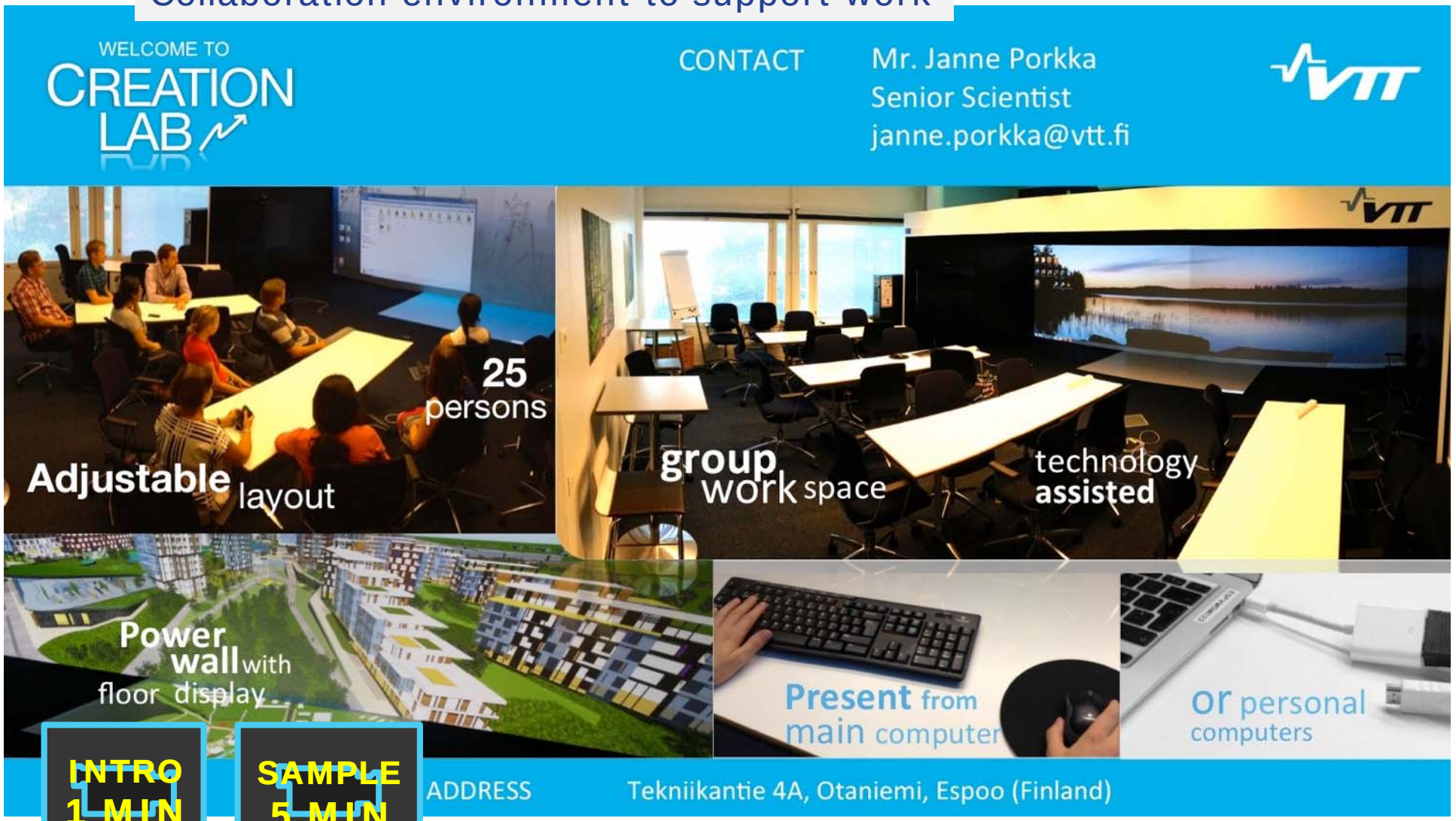
2. Describe briefly for what purpose the software is used (in 2 sentences)? Tell also for phat phase(s) of project you are using it (feasibility/planning, design, construction, maintenance, operation).

3. Is it proprietary/open source solution? Domestic or international? Are you the developer?

4. What kind of benefits you get from using the software?

5. What data exchange formats does it support (especially open formats such as IFC etc.)? Please explain also which version(s) of each format.

Collaboration environment to support work



INTRO 1 MIN

SAMPLE 5 MIN

http://cic.vtt.fi/creationlab

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Pictures (password “Intermodel”)
https://janneporkka.smugmug.com/Shared/2016-2019-Intermodel-EU

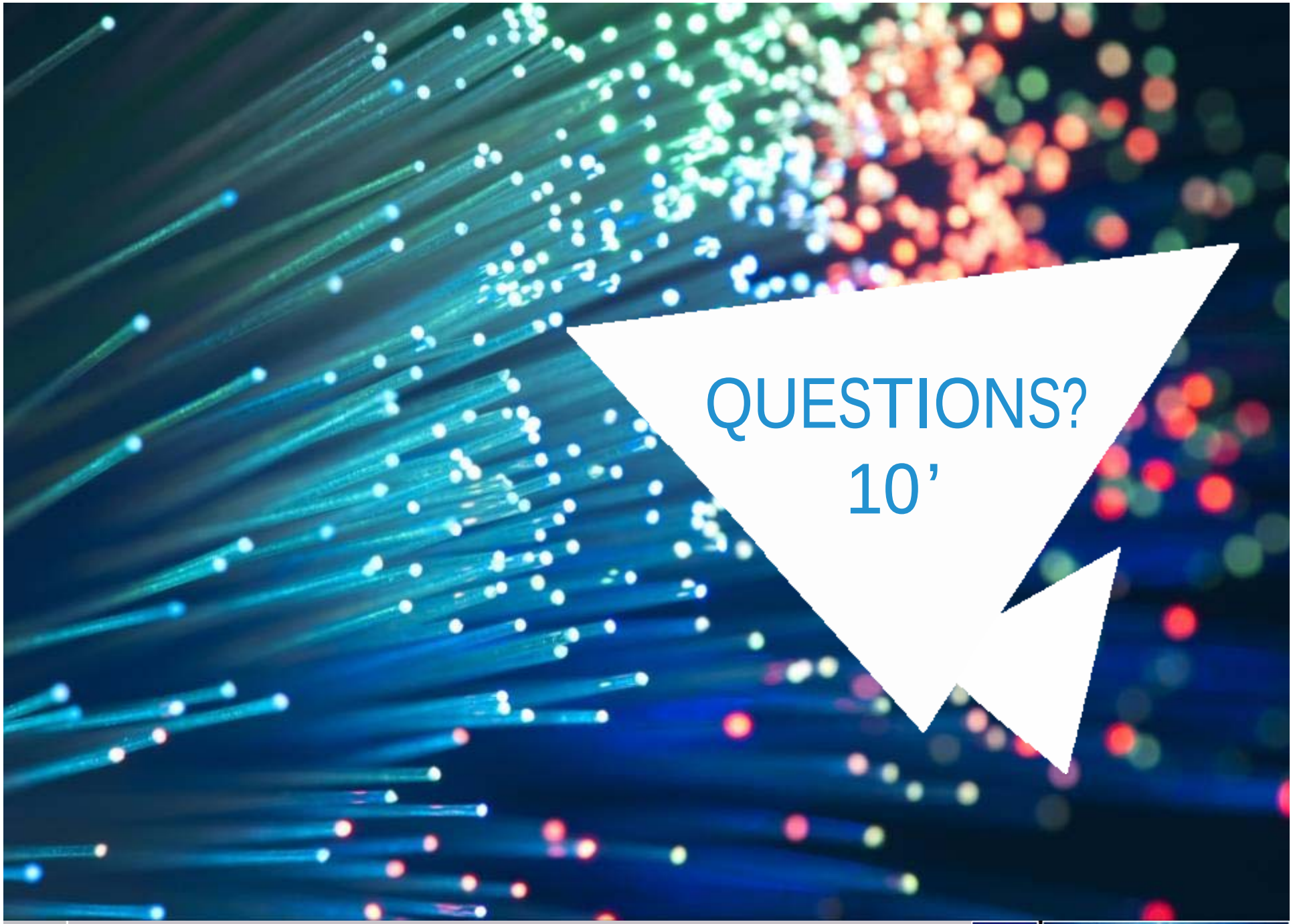
- 2017-04 Kiiruna 1st global meeting
- 2017-03 La Spezia port
- 2017-03 Melzo intermodal terminal
- 2016-09 Barcelona kickoff

- Contribute to D2.3 Interoperability and data exchange specification (M4-M18)
  - Open standards in terminal projects to improve interoperability
- Carry out integrated platform development
  - Together with VIAN, MAC, IDP and CENIT
- Provide support for *WP4: BIM model terminals*
  - Model coordination, interfaces

- Expectations to participants
  - VIAN: Model coordination (WP4), platform development and interfaces, technical expertise
  - IDP: Modelling in pilots (WP4), technical expertise.
  - MAC: Simulation expertise, interfaces/APIs to operational simulation (WP5) and rail connection simulation (WP7).
  - CENIT: Indicators (WP3), external mobility (WP6).

- D2.1: Schedule harmonised to task delivery → M0-M9 (earlier M0-M6)

- ~~Risk 1: Use case description~~
- ~~Risk 2: Indicators in assisting decision making~~
- Risk 3: Lacking partner information on used software tools and their data exchange (questionnaire results being considered)



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