SINTEF

FP5TRANS4M-R
Transforming Europe's Rail Freight

Planning Problems in a Combined Yard and Intermodal Rail Freight Terminal

The SmartRaCon 6th Scientific Seminar, October 2024
Marie Lindland, SINTEF

Europe's Rail

The project is supported by the Europe's Rail Joint Undertaking and its members.

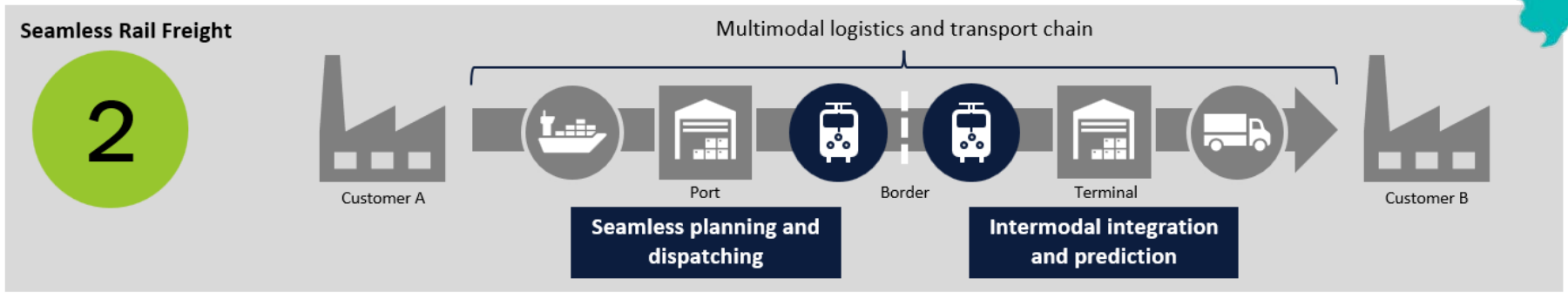
Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the Europe's Rail Joint Undertaking. Neither the European Union nor the granting authority can be held responsible for them.

The FP5 TRANS4M-R Project

Transforming European Rail Freigt

Establish rail freight as backbone of the lowest emission and most resilient logistics chain in Europe

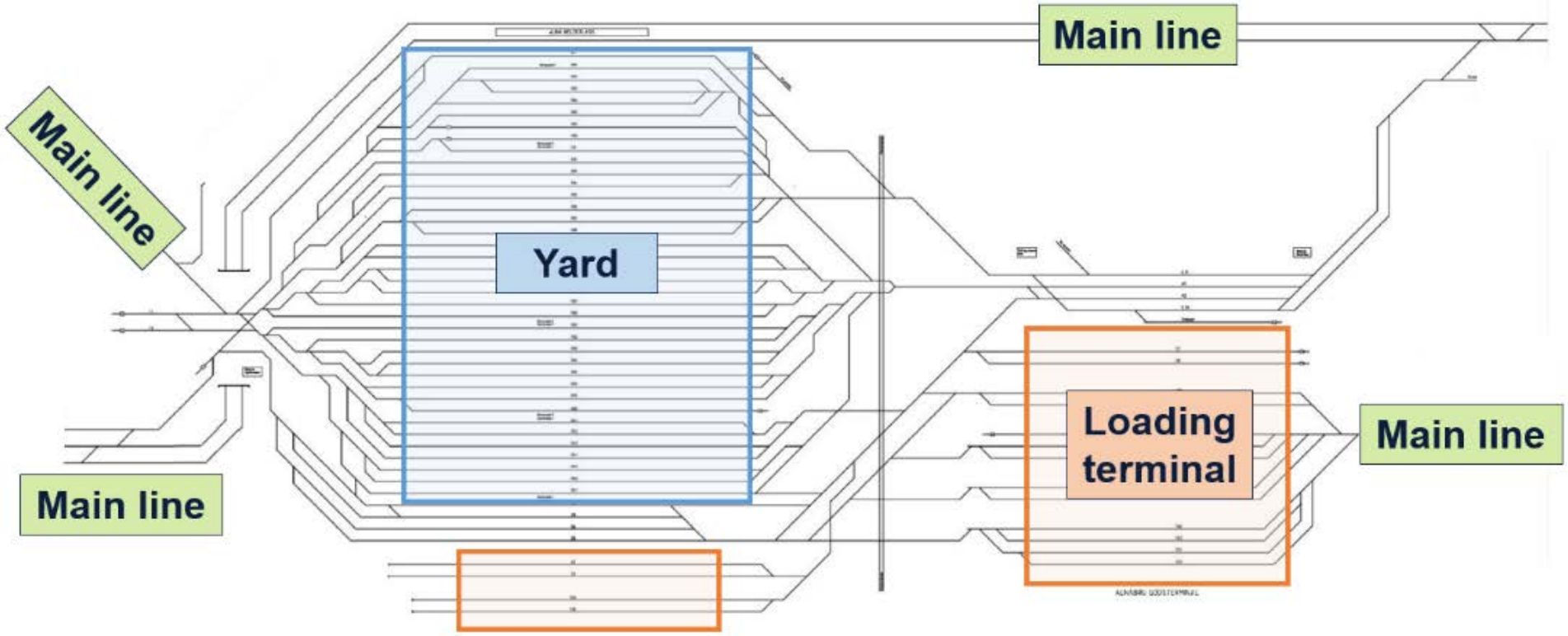
Seamless Rail Freight: Freight specific functions and capabilities for an integrated end-to-end train path and service planning



Source: https://www.scanmedfreight.eu/scanmedrfc/whats_scanmedrfc/

Yards and intermodal terminals

Critical railway handover points



Enabling seamless planning

Which **challenges** arise when areas are combined?

How do they affect the planning processes?

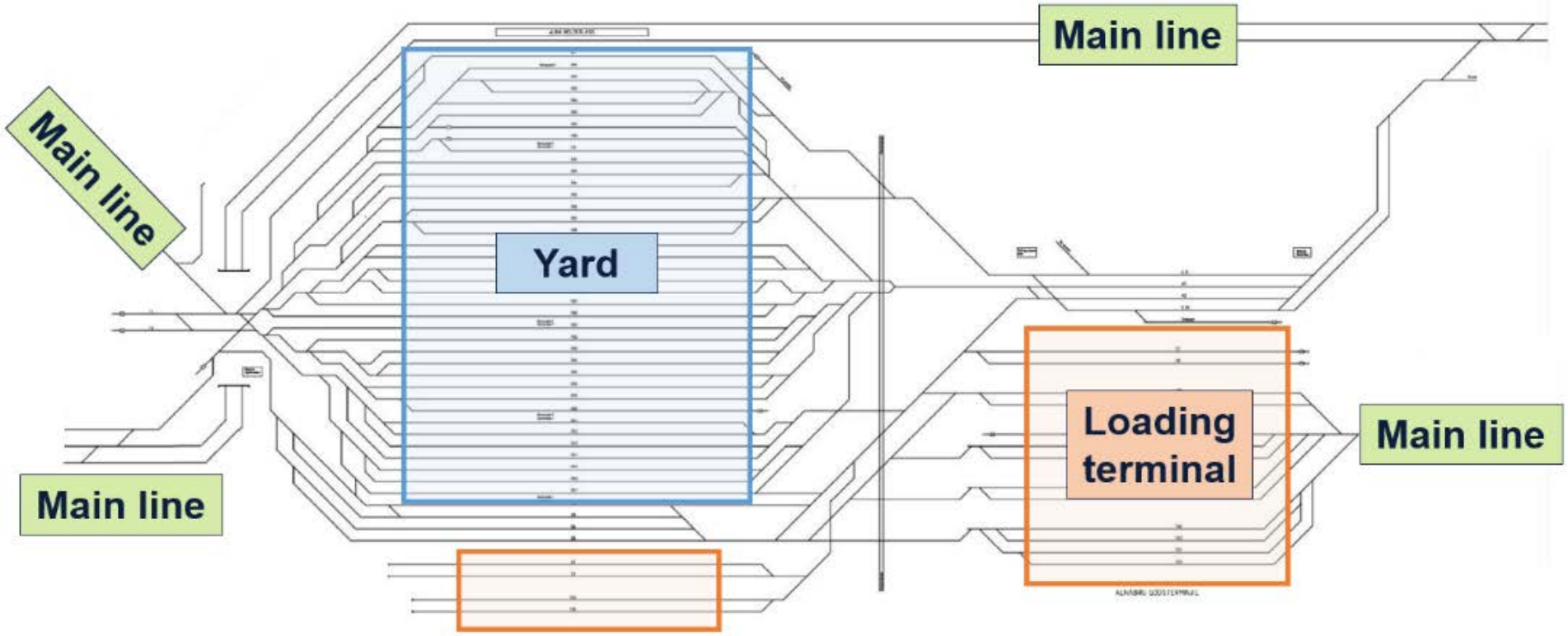
How can they be **solved**?

Challenges related to planning

Time horizons	Competition	Related problems
Long-term	Unreliable input data	Planning in isolation
Short-term	Technical data-sharing	Decisions for one yield constraints for another
Real-time	Collaborative costs	Uncoordinated processes
	Self-selected KPIs	Few qualified people

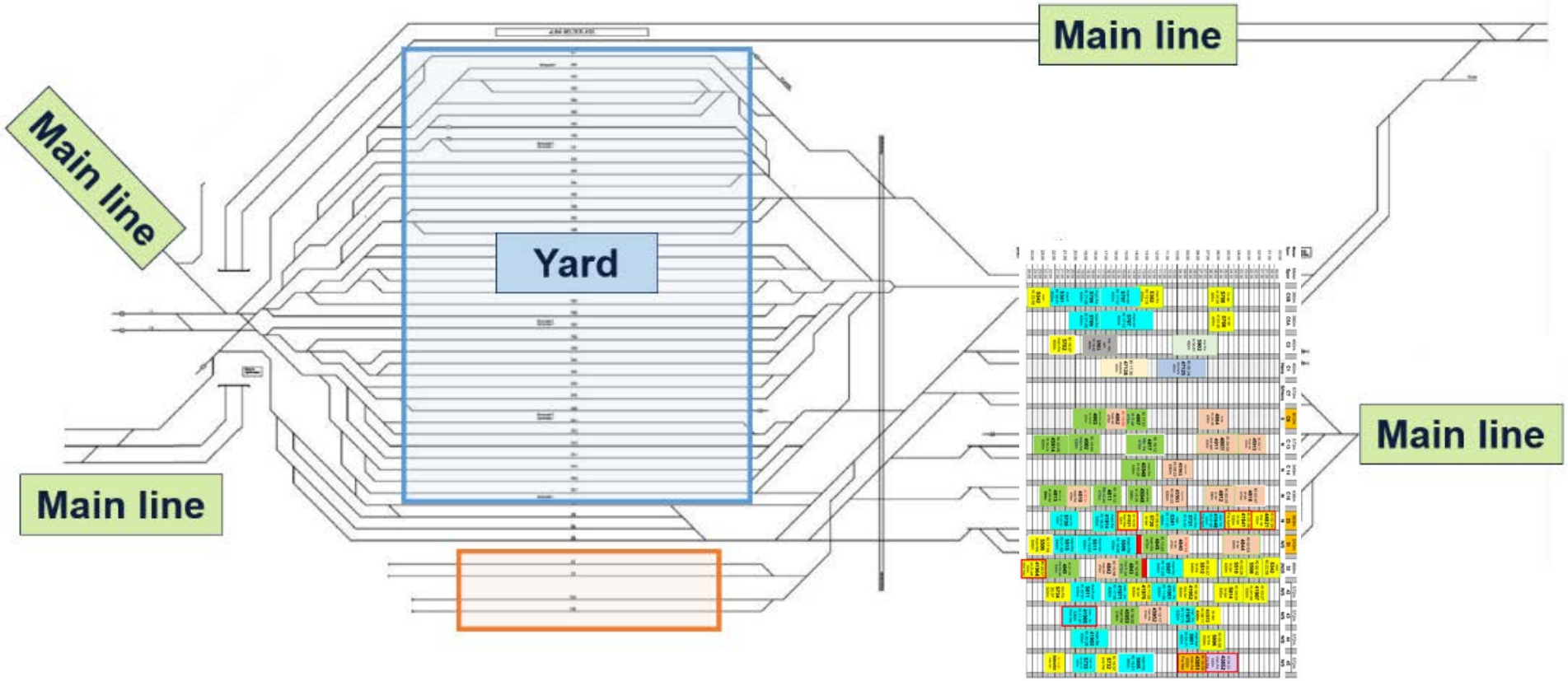
Loading track assignment

Use-case in WP26/WP27, The Alnabru Terminal (Oslo, Norway)



Loading track assignment

Use-case in WP26/WP27, The Alnabru Terminal (Oslo, Norway)



Decision Intelligence (DI)

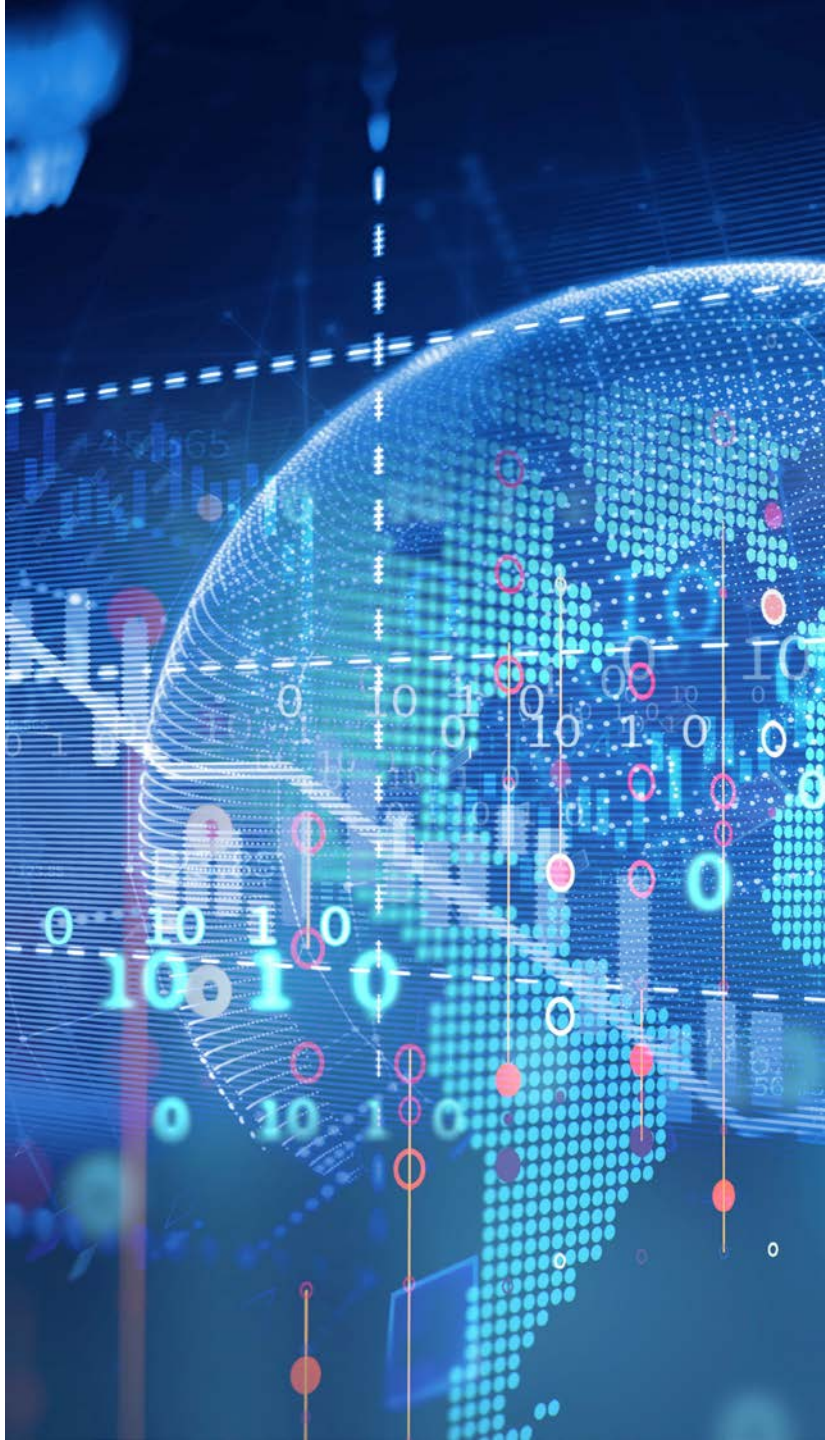
Decision: Exploring, evaluating, comparing and making decisions efficiently

Intelligence: Leveraging artificial intelligence-methods, e.g. machine reasoning and information processing

Aims of DI:

- Not replacing but empowering planners
- Model, align, monitor and execute informed decision-making processes
- Reduce heavy human dependence
- High quality of proposed solutions

For rail freight: Enable more coordinated planning



Track Assignment Planner

Technical Enabler demonstrated through FP5 TRANS4M-R

An interactive planning system using DI

Plans computed using mathematical optimization algorithms

Time horizons: Long-term plans from the applications, short-term/real-time automatic rescheduling

Competition: Fairness-oriented objective, illustrative and interactive system, ãwhat-ifõ analysis

Related problems: Recieve updated information, extend algorithms to include yard problems (next wave!)

Future work

Planning Problems in a Combined Yard and Intermodal Rail Freight Terminal

- Algorithmic improvement of the DI
- System development
- Testing with operators and IM at Alnabru
- Demonstration planning

Questions?

Source: https://www.scanmedfreight.eu/scanmedrfc/whats_scanmedrfc/

Contact
Marie Lindland, SINTEF, Norway
marie.lindland@sintef.no