Fraunhofer CML

Fraunhofer Center for Maritime Logistics and Services CML

Efficiency and innovation through simulation

Designing and optimizing processes in ports and terminals

Optimized processes through simulation

What potential do simulation solutions offer to your company?

We conduct realistic simulation studies on various issues to identify your unique optimization potential, secure investment decisions, and coordinate the commissioning of new systems within your overall system.

In doing so, we specifically focus on your problems, objectives, and individual framework conditions at the site. It is important to us to consider not only the theoretical process sequences, but also real workflows from practice.

We at Fraunhofer CML specialize in:

- Logistics processes and IT at terminals
- Use of transportation and handling equipment at terminals
- Use of innovative technologies in ports and at terminals
- Traffic flows in ports and on factory premises
- Maritime logistics chains

You benefit from our extensive expertise gained from working with port infrastructure companies, terminal operators, and other stakeholders in the industry. Our knowledge in maritime logistics, terminal operations, and port processes allows us to conduct high-quality simulation studies.

We interpret the study results in the context of the specific operational challenges and develop actionable recommendations based on your questions.

Simulation software

Fraunhofer CML utilizes state-of-the-art programs to solve a wide range of problems. We are capable of conducting simulation studies on various scales, including complex and small-scale processes in confined spaces, traffic flow simulations, and simulations of global logistics chains. The simulation model is always customized to meet your specific needs, providing a sound foundation for your decision-making and tangible opportunities for optimization measures.

Simulation studies

Simulation studies are conducted in logistics to gain insights into the behavior and development of global supply chains. These studies focus on classic logistics and production processes such as transport, handling, storage, and production. By simulating these processes, we can draw conclusions and make informed decisions regarding global supply chain management.Fraunhofer CML provides simulation studies with a wide range of parameters that are defined in collaboration with you.

These parameters are used to analyze and evaluate the measures under investigation. This allows to assess individual logistics processes or infrastructure measures for different terminal types. You receive a solid foundation for making decisions on which optimization measures to implement.

We carry out these simulation scenarios for you:

- Traffic flow simulation
- Simulation of logistics processes (transportation, handling, storage)
- Terminal and layout planning
- Simulation of global supply chains

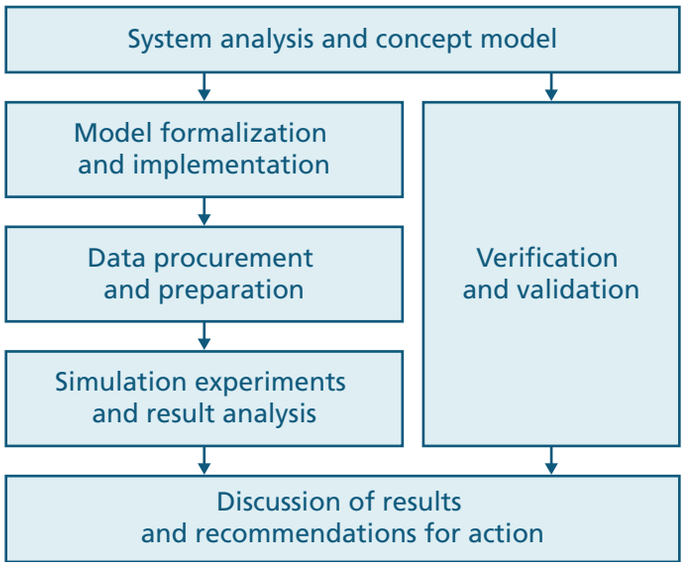
Example of a simulation project

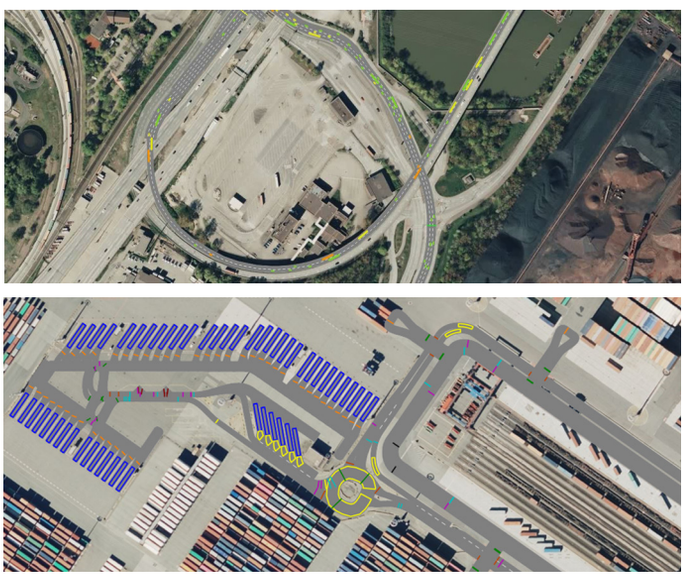
We structure simulation studies based on the VDI guideline 3633. The following example of a simulation study explores the thesis that autonomous trucks can contribute

At the beginning, we define the target horizon. This helps us focus on specific aspects and delimit the scope of the study.

We first record the terminal and its system boundaries. Then, the model is formalized and mapped in the simulation software. Input and system data from practice are procured and processed for a realistic analysis.

This is followed by the execution of the simulation experiments and the analysis of their results. We define individual key figures and output parameters in coordination. The simulation reveals that autonomous trucks can indeed contribute to a reduction in terminal throughput time in the reference terminal under consideration. However, organizational measures must be implemented in order to fully leverage this efficiency potential. We put the simulation results into the context of the real problem and formulate recommendations for action. Throughout the project, we continuously verify and validate the simulation model while defining individual key figures and output parameters in consultation with you.





Screenshots from the simulation
Above: Vehicles with varying degrees of automation at an intersection in public road traffic.
Below: Vehicles with varying degrees of automation within a container terminal.

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