

## Trace Real-time Arrival of Cargo (TRAC)

### Redefining ETA Prediction in Rail Freight – A Data Driven AI Approach

#### **The challenge:** Need for better ETA solutions in rail freight

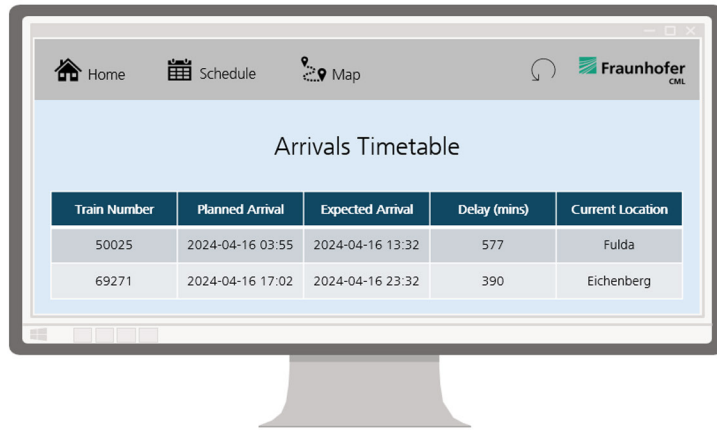
Freight trains are essential to supply chain logistics, providing a reliable, cost-efficient, and eco-friendly solution. Despite its ecological and economic advantages, rail freight transport in Germany lags far behind road freight in market share. A key reason: insufficient transparency and lack of estimated time of arrival (ETA) information in real-time.

German freight train operations involve multiple stakeholders depending on peer-to-peer contracts and information exchange to ensure timely train arrivals. The absence of a robust unified framework, combined with complex stakeholder interactions and their limited communication, hinders the flow of real-time ETA updates. Moreover, key actors involved in logistics face challenges in resource planning due to poor coordination leading to reduced customer service quality.

These complex stakeholder structures, fragmented communication, and incompatible IT systems hinder reliable planning. The consequences: idle times, inefficient resource use, and unsatisfied customers.

#### **Our Solution:** TRAC – Enhanced ETA predictions with AI

To address these challenges, we at Fraunhofer CML have developed an ETA prediction tool called TRAC. TRAC is an AI-powered application that accurately predicts arrival times for cargo trains. Unlike conventional methods that rely solely on the train's last reported location, TRAC includes the impact of multiple relevant factors for delay estimation and delivers reliable forecasts even when trains are far away from their destination. This allows for better planning, earlier reaction time, and increased operational efficiency.



Representation of train delay information offered by TRAC

## Advanced and real-time ETA updates for rail freight

TRAC is an advanced, data-driven solution for predicting cargo train arrival times, providing continuously updated ETAs from departure to destination. It analyzes historical train information including the latest stations crossed, route details, remaining distance to destination, and delays along the journey. In addition, TRAC goes beyond traditional methods by factoring in weather conditions and impact of time-based variables like peak and off-peak hours to enhance prediction accuracy.

The solution is offered as a web application that displays an arrival timetable for the customer's location and features an interactive map showing routes of active trains, including intermediate stops and delays at each stop. An API is also available, enabling easy integration of ETA data into dependent customer operations. The system is customizable to specific train types, routes, and output formats, ensuring seamless integration with existing workflows.

### How TRAC works

#### Real-time ETA updates

Offers continuous updates on train's progress, including the current ETA, present location and delays encountered at current position since train's departure from origin using AI.

#### Detailed route tracking

Monitors the entire journey of a train, capturing all intermediate stops and delays along the route, which are visually represented on an interactive map for easy tracking.

#### Enhanced prediction model

Delivers accurate and context-aware forecasts by incorporating multiple factors like historical delays, geographical impacts and weather conditions, which significantly enhance reliability of predictions.

#### Automated data integration

Automatically retrieves necessary data from external sources, updating predictions in real-time without the need for manual intervention.

#### Customizable output

Provides an API that allows users to customize the output according to their specific needs, ensuring smooth integration and full compatibility with existing systems.

### Your Benefits

- Optimize resource allocation across the supply chain
- Increase planning accuracy for terminal operations
- Reduce idle time and unnecessary standby of handling equipment
- Increase transparency and improve communication with customers through accurate forecasts

TRAC supports railway undertakings, operators and freight forwarders in accurately forecasting arrival times – enabling more efficient transshipment processes, reduced idle times and better downstream planning. Precise ETA predictions lead to improved resource allocation and optimized customer communication.

### Further Information

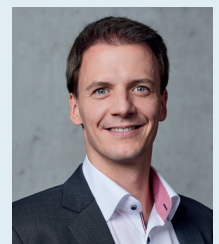
#### Have we caught your interest?

Feel free to contact us and we will show TRAC and its potential for your company in a demo.

### Contact

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