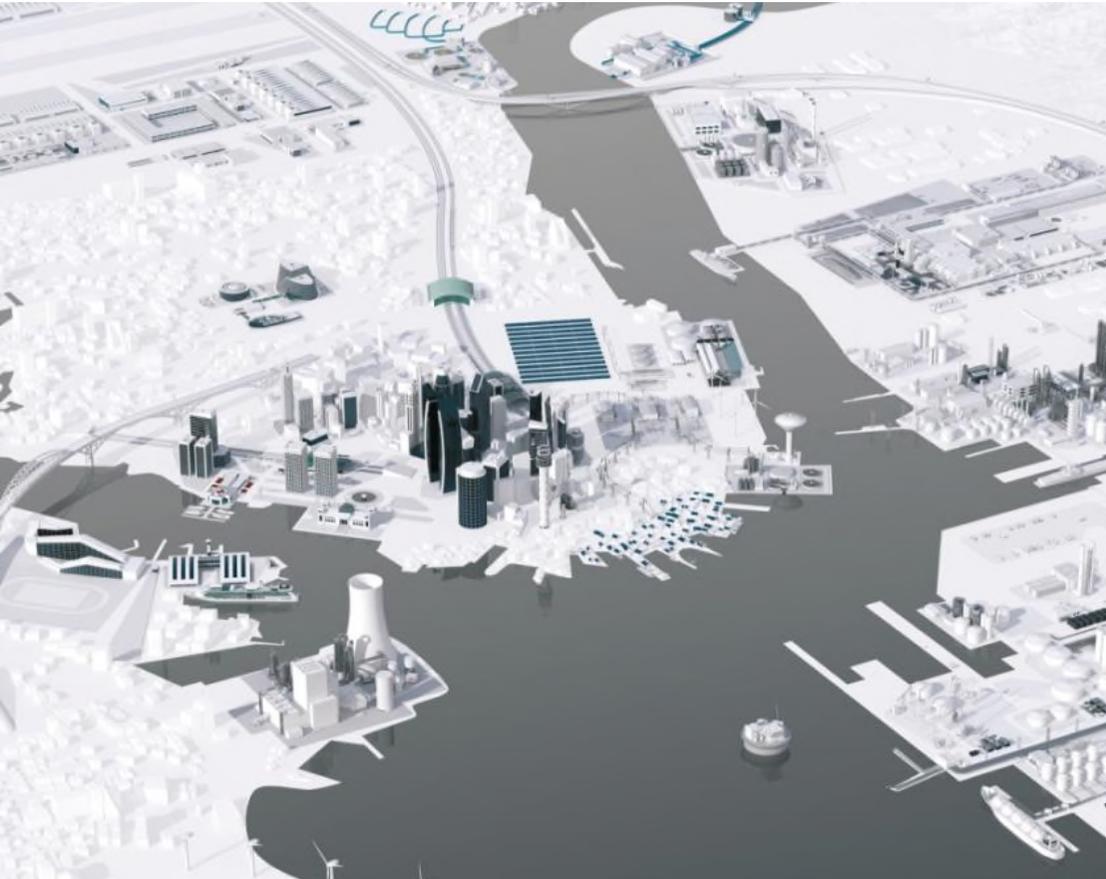




**Integrated Logistics
Solutions
Siemens ITS**

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Head of Consultancy Services

Introduction and Agenda



- 1 What is Logistics? – characteristics and challenges
- 2 UK Freight situation
- 3 Duisport – Scene Setting
- 4 Duisport – Solution
- 5 Summary

What are Logistics hubs?



Current challenges in logistics and industry hubs



Limited infrastructure capacity



No transparency about traffic situation around hub



Truck arrival time largely unknown



Long waiting times for trucks



Increasing truck traffic



Carbon Footprint



No buffer parking zones



No prioritisation of trucks



No route planning



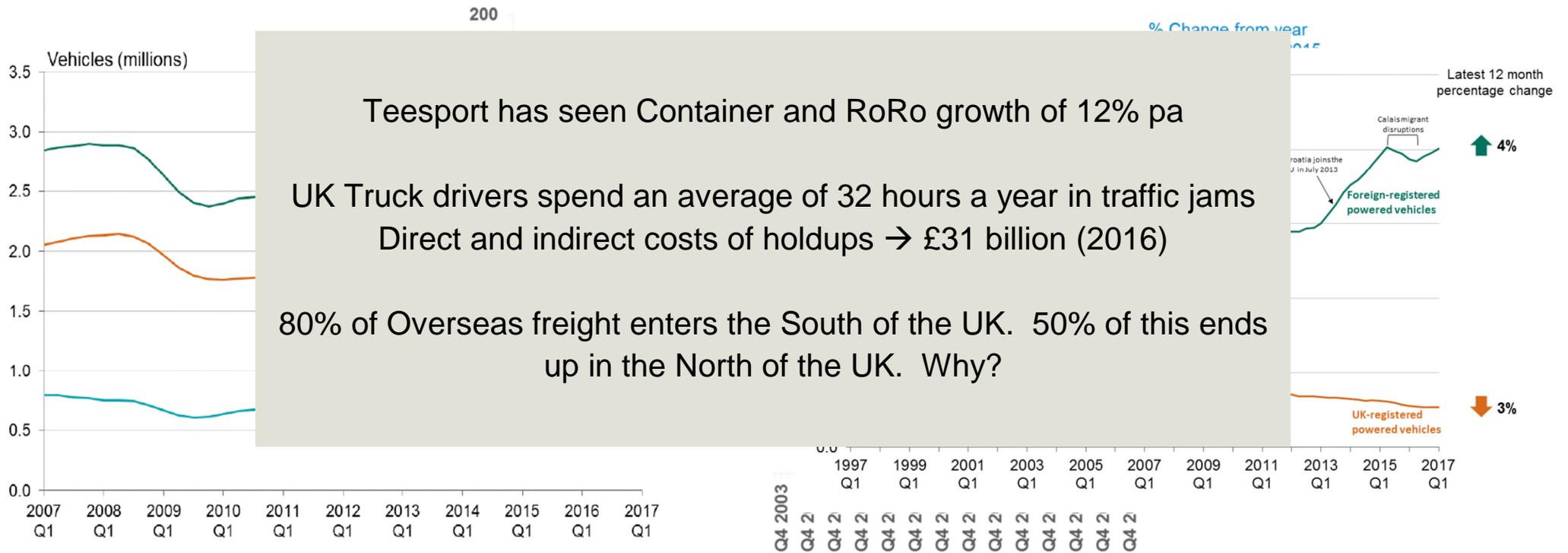
No truck guidance



Source: customsnow.com

Freight Traffic Growth UK UK→EU

Chart 3: Rolling annual index of road traffic in Great Britain, by vehicle type from 1993



Duisport Scene setting

Duisport

First mentioned in 883 as a Frankish Royal Court

Close to Dusseldorf Airport

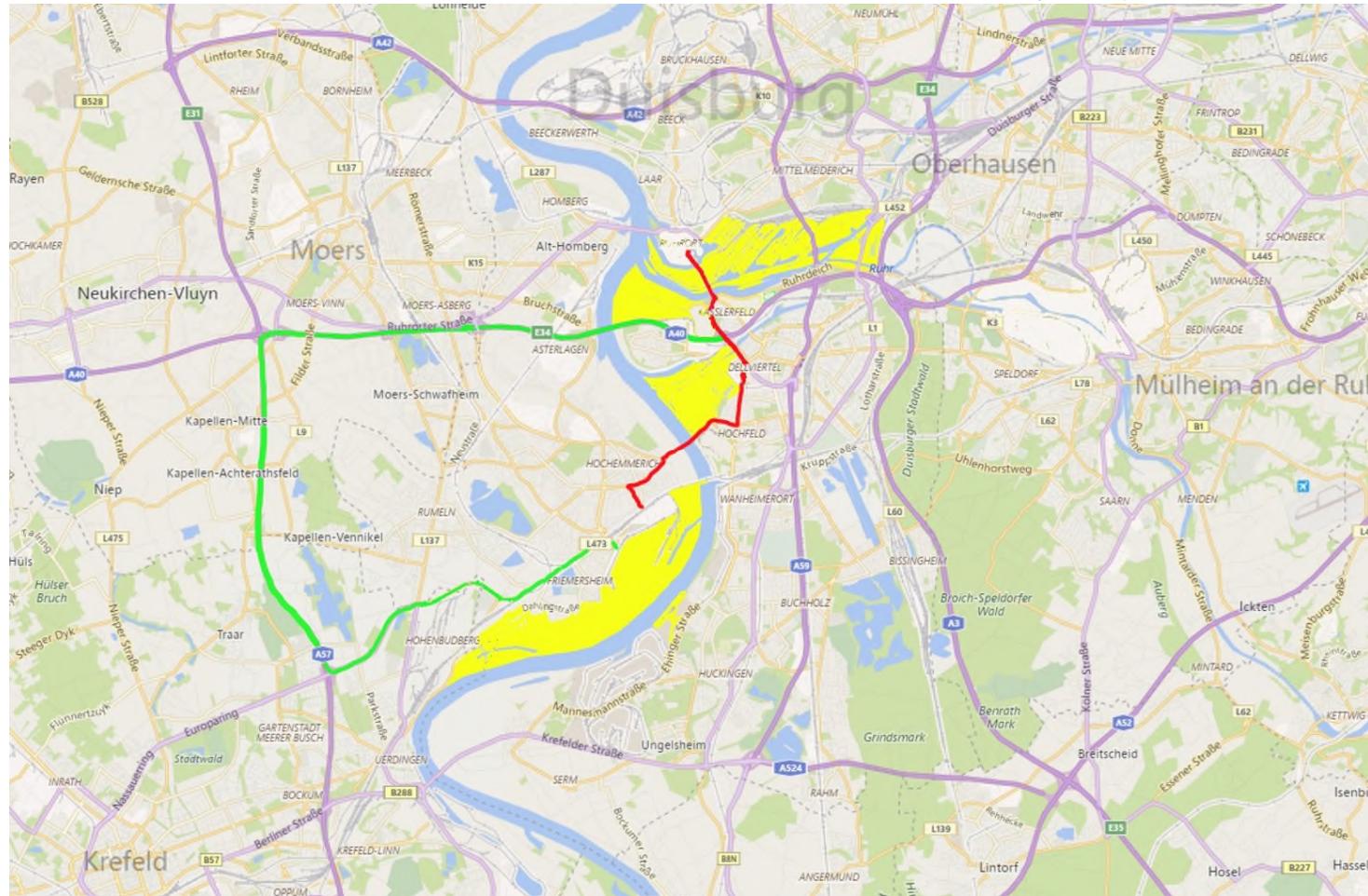
Population of ~500,000

Port of Duisport

Worlds biggest inland port

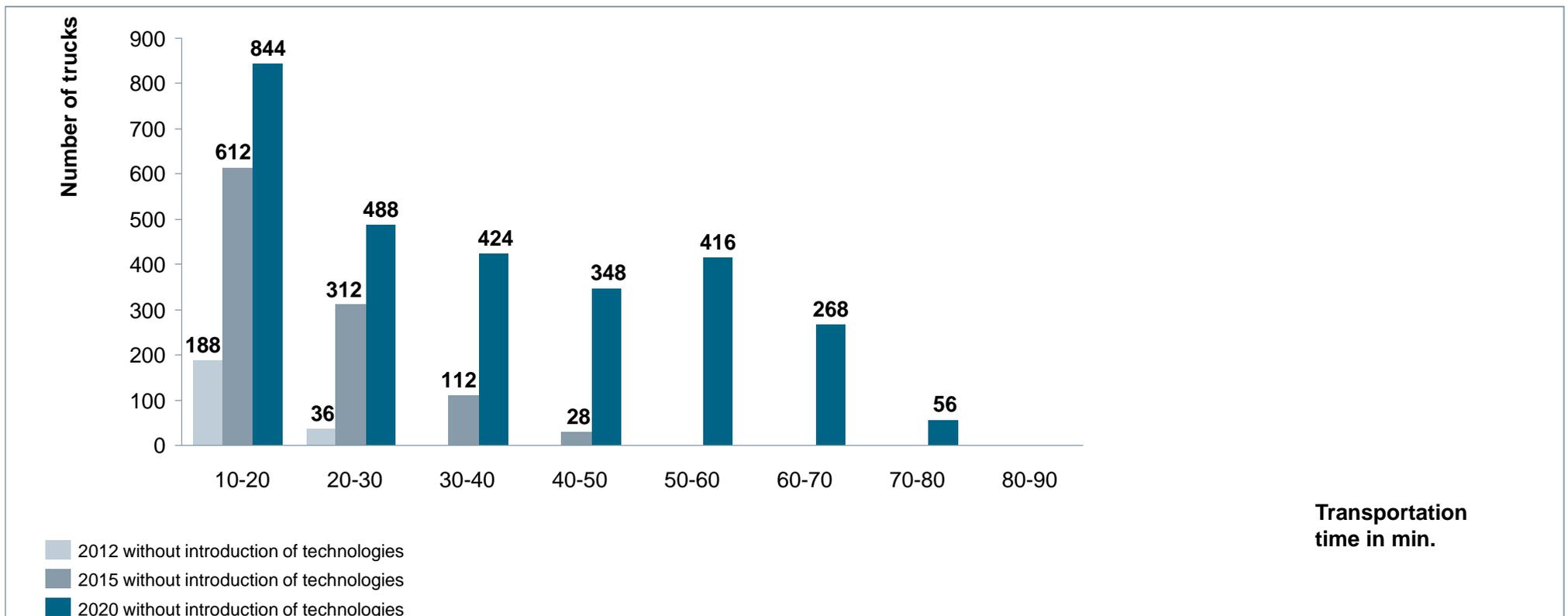
2.5 million TEU pa

20,000 ships pa



Simulation in Duisport shows an increase of transportation time over time

Simulation of transportation times – Current- and future transport time



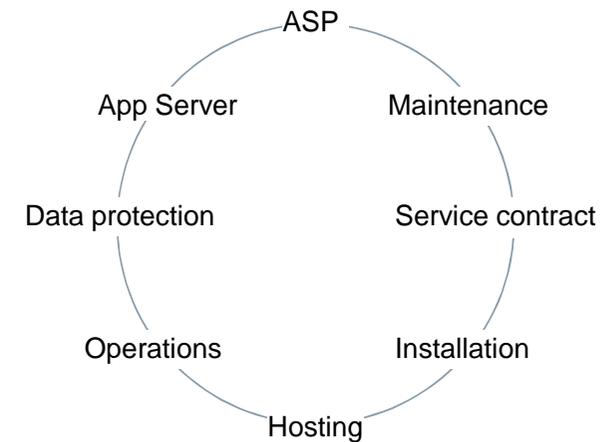
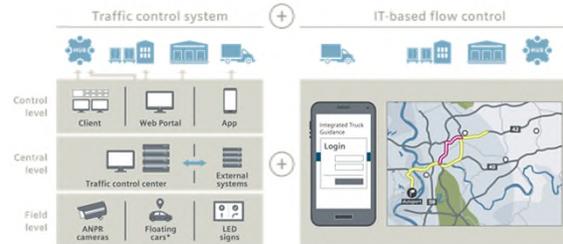
The approach: Integrated Truck Guidance was developed in cooperation with Duisport



Consulting Project

Solution

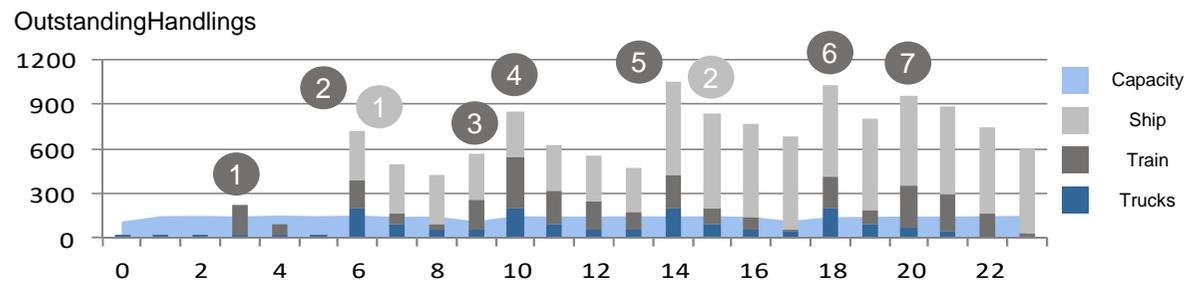
Service Focus



Terminal simulation (2020) shows bottlenecks and peaks



Terminal handlings outstanding per hour

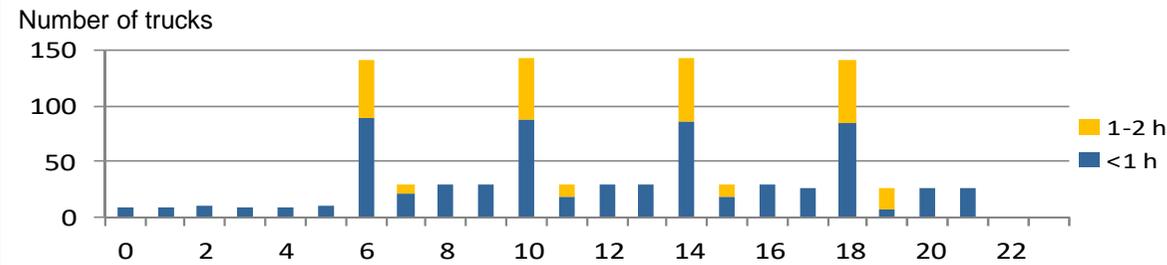


Total capacity during 24 h

$$\frac{\text{Handling Demand}}{\text{Handling Capacity}} = \frac{3812}{3052} = 112\%$$

- Worst-Case-Assumption (around 6 times per month)
- Handling Capacity = Hypothetical Capacity

Waiting time Trucks



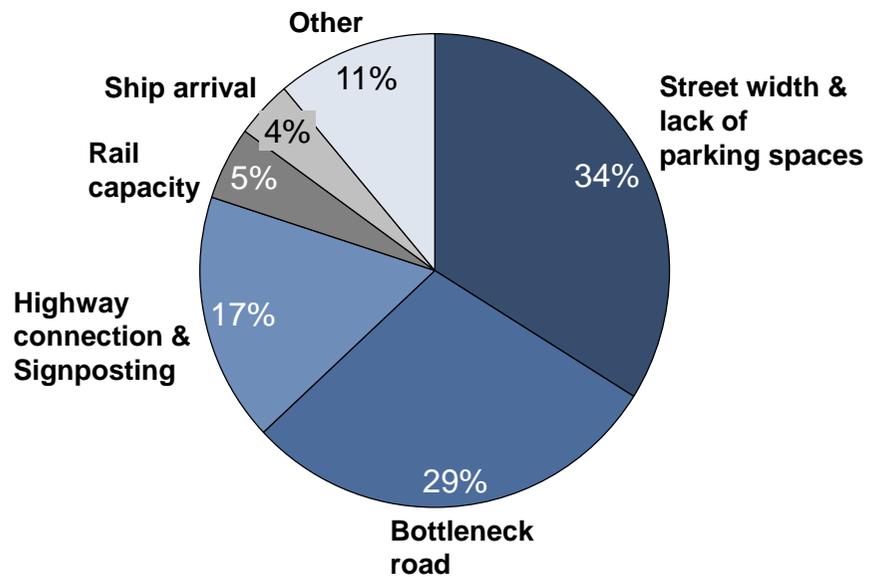
Train No.	1	2	3	4	5	6	7
Waiting-time (h)	2	3	3	5	4	4	4

Ship No.	1	2					
Waiting-time (h)	30	29					

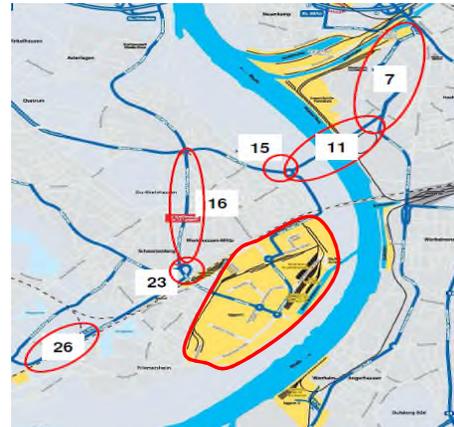
- Capacity limit reached
- At Peaks 272 Trucks / day with 2 hours waiting time
- Long waiting times for ships (30h) and trains (2-5h)
- Additional investments (+ 1 Stacker, +1 crane) taken into account

Issues in and around the port

Identified problems gained from interviews



Around 80% of identified problems concern the road



- Bottlenecks around logport I**
- High noise and CO₂ emissions**
- Investment in infrastructure needed**
- Hindrance by parking trucks**
- Bottleneck at D3T entrance**
- Trucks crossing residential areas**

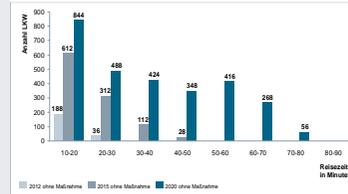
Duisport Solution



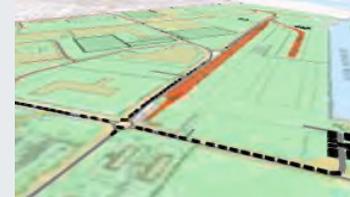
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Analysis of bottlenecks in the future

Simulation of travel times



Simulation of congestions



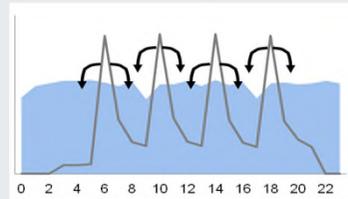
Simulation of bottlenecks



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Analysis of benefits and business case model

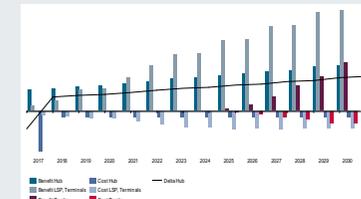
Reduction of peaks



Enhance greenhouse gas balance

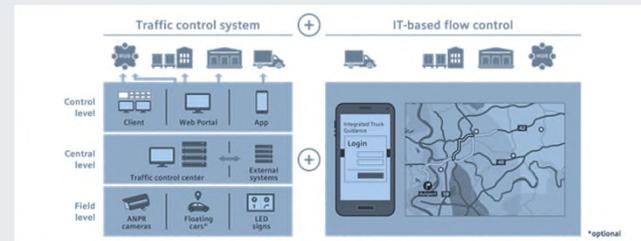


Business model calculation



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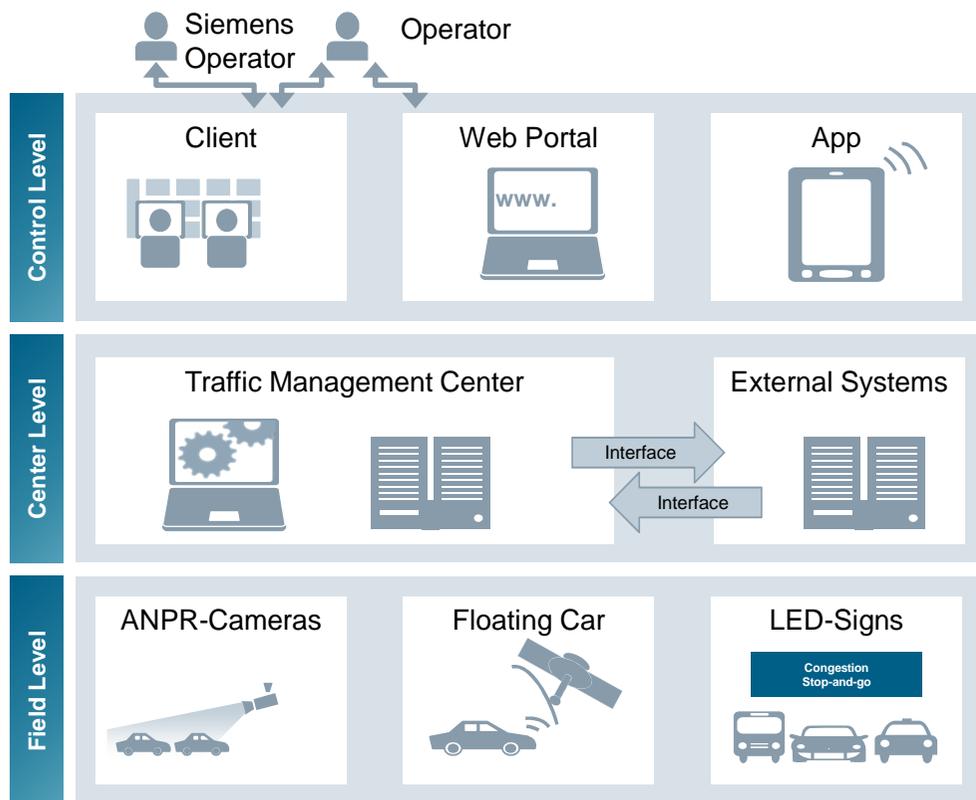
Implementation Traffic control system and truck guidance



Selected customer requirements affected the solution design

Requirement	Component/ Function in ITG	Impact/ Insights
Optimize traffic flow between different parts of the port (specific case)	<ul style="list-style-type: none"> • LED-Signs • ANPR-Camera 	<ul style="list-style-type: none"> • Calculate travel time of trucks with ANPR-Cameras on predefined routes • Display routing information for truck drivers on LED-signs • optimised traffic flow also for trucks without smartphone application
Increase capacity utilisation at terminals, gates and ramps	Provision of real-time ETA of trucks incl. rest periods and real-time traffic situation around the hub	<ul style="list-style-type: none"> • Real-time truck position via GPS (smartphone) • Better planning of resources based on truck arrival time • Prioritization of trucks
Provide transparency for all participants in the transport chain	Development of integrative Web Portal , accessible from PC, Tablet or Smartphone	<ul style="list-style-type: none"> • Visualization of incoming trucks on SmartTruckGuide • Tour info and ETA of every truck displayed with 1 mouse click • Provision of communication among all participants on Web Portal
Flatten peaks of incoming trucks	Integration of tour planning systems (truck, truck driver and loaded goods)	<ul style="list-style-type: none"> • Arrival of trucks can be planned ahead • Gain more flexibility on resource planning with the possibility to cancel and redistribute slots in case of unforeseen delays, decrease waiting times
Enable smooth communication with truck drivers	Development of Smartphone-App	<ul style="list-style-type: none"> • Ensure communication between dispatcher and truck driver • Provision of a mobile device for the truck driver to report incidents and resting times
Reduce Greenhouse Gas emissions through less waiting times	Routing trucks to buffer zones	<ul style="list-style-type: none"> • Guide truck drivers to nearby truck parking spaces in case of long waiting times or incidents that caused a major delay

Traffic Management Control System Overview



Objectives of the road solution concept

1

The guidance system optimizes the truck traffic in hubs through provision of information

2

The **travel time** between the hub areas will be forwarded to truckers, freight forwarders, terminals, cargo handlers, and LSPs

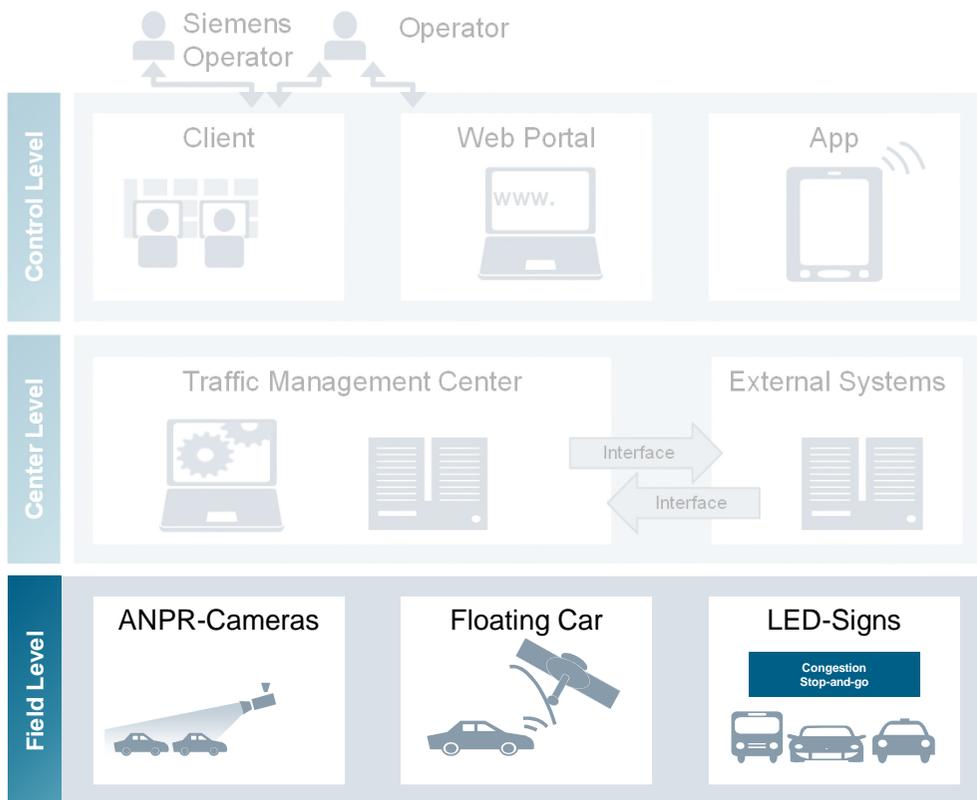
3

In case of road congestion the traffic will be redirected to optimised routes through **dynamic traffic signs**

4

The data of the traffic situation of surrounding areas should be captured via **open interfaces** and forwarded to other information systems

The field level provides detailed transportation time on operational platform



ANPR-cameras (Sittraffic Sicore):

- 24h operation
- focused IR-LEDs
- Rugged integrated solutions
- Significant detection distance up to 35 m
- Max. high speed about: 240 km/h
- Simple installation and implementation

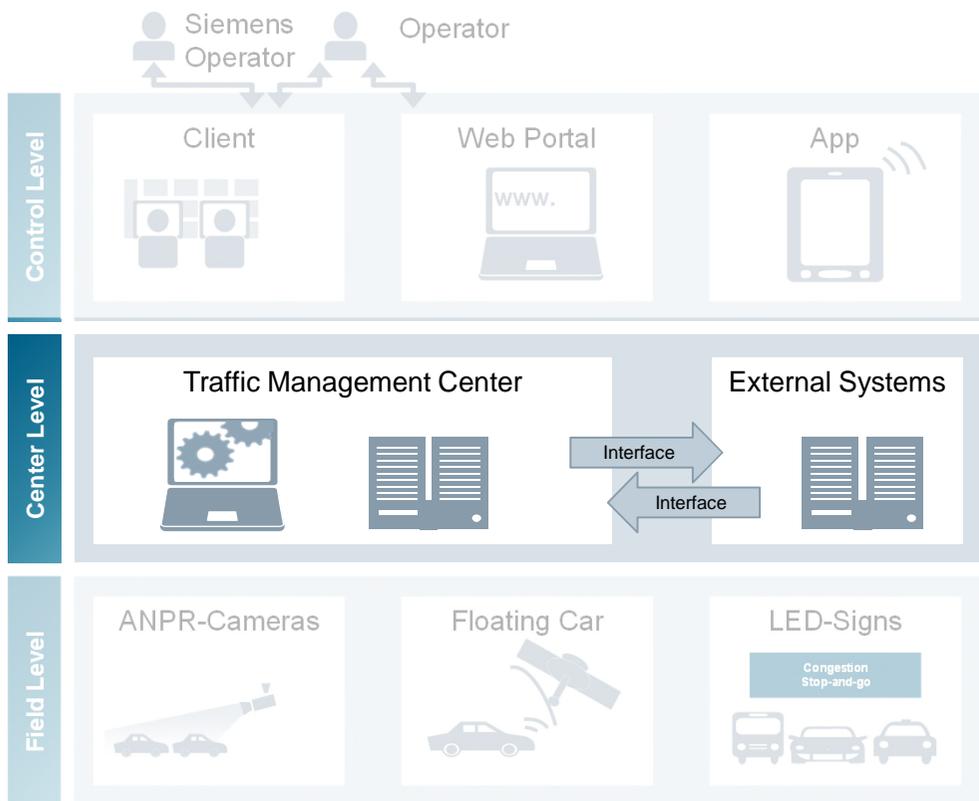


LED-signs:

- Dynamic texts for route and transport time information
- 2-lined LED-displays
- Combination with traffic light technology
- Communication through GPRS
- LCD-Technology



The control center evaluates all incoming data and forwards them to the users



Traffic Management Control Center:

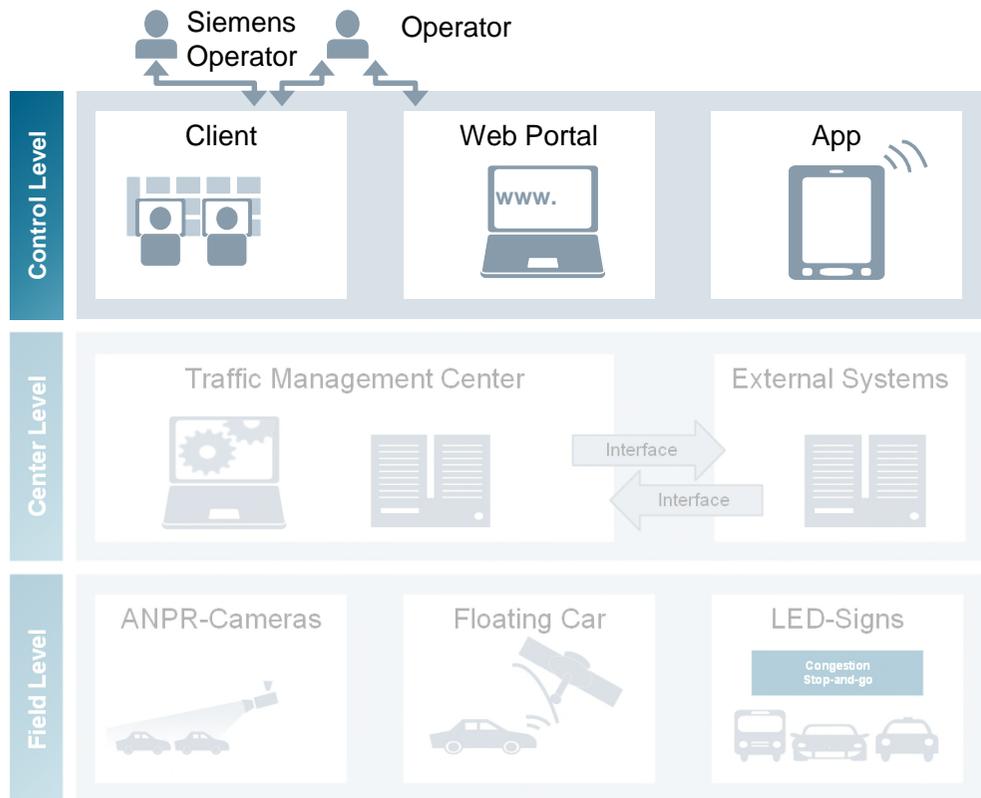
The control center evaluates detector data and transportation time, shows actual traffic situation as well as transportation time and adapts strategy management and controls the signs

- Network (Open Street Map)
- Operations monitoring (Operations-/Status signals)
- Data management (preparation/archiving)
- Shows traffic situation
- Statistics
- Strategy management
- Service messages
- External interfaces
- TravelTimeKit (Transportation time)
- Regulation of signs (Control/editing of text)

External Systems

- E.G. external traffic and roadworks data

The control level is the interface for users to receive all relevant information



Client:

All functions:

- Visualization of all items
- Traffic situation
- Analysis of operations- and congestion status
- Configuration/ Parameterisation of field gadgets
- Statistic analysis and illustration of traffic data
- Management of traffic strategies
- Service of signs operation

Web Portal:

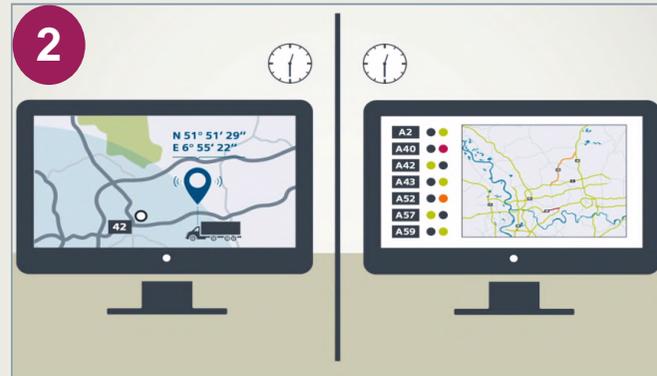
Limited functions:

- Visualization of all items
- Traffic situation
- Overview about current status'
- Visualisation of operation data
- Security relevant interferences via PIN

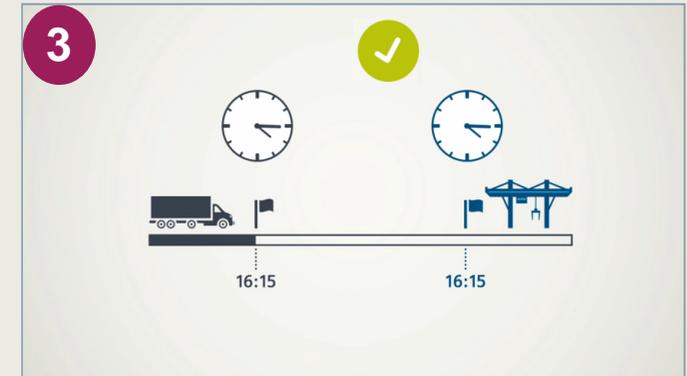
Integrated Truck Guidance – Efficient truck arrival at logistics hubs (1/2)



- Truck driver enters reference number in app
- The position on the road network is determined by GPS.

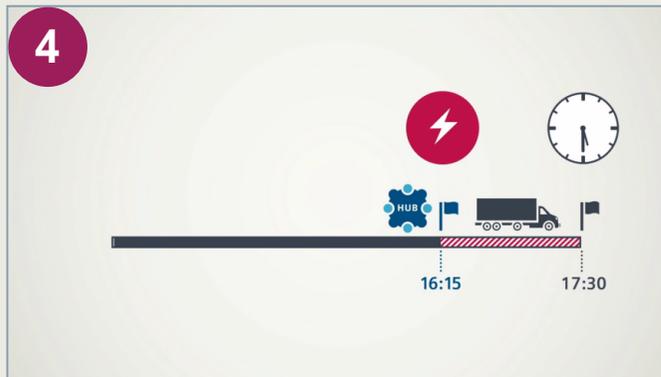


- GPS position of truck will be combined with regional real time traffic data
- The hub operator can check if the expected arrival time matches with the planned arrival time.



- Each party receives confirmation that expected and planned arrival time matches
- The optimal route is displayed by dynamic LED signs

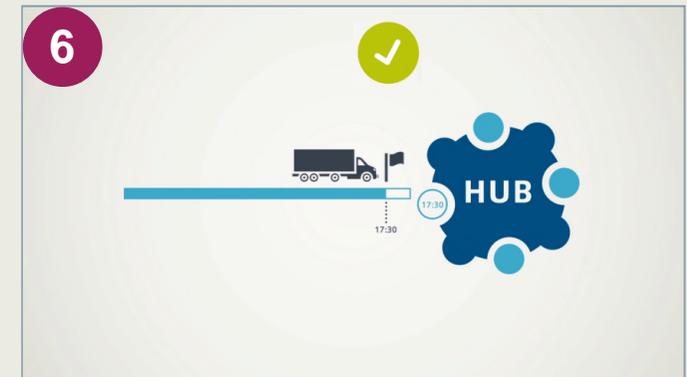
Integrated Truck Guidance – Efficient truck arrival at logistics hubs (2/2)



- If planned and estimated time does not match, the driver is informed
- Dispatcher can allocate new slot
- Truck driver is then informed through app



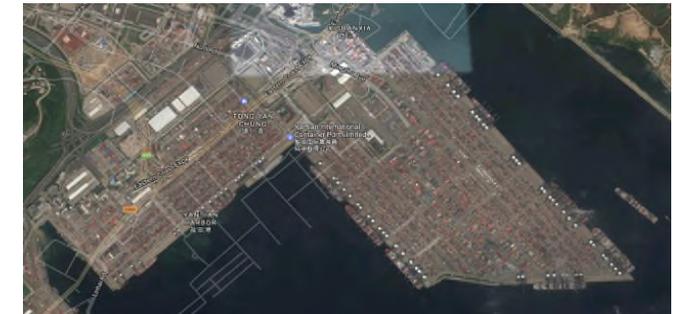
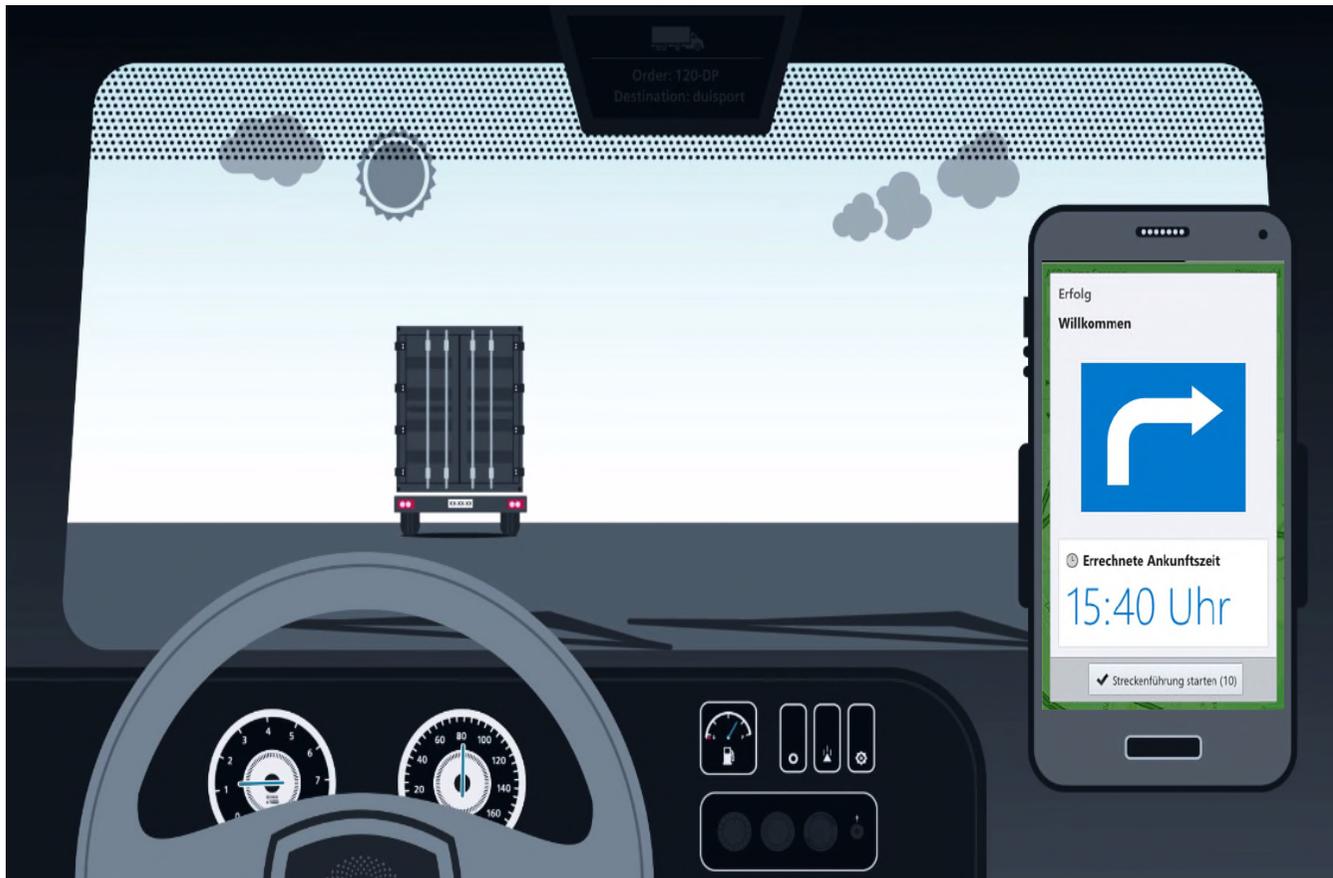
- If a new slot is not immediately available – resulting in a delay – the app automatically informs the driver about available parking spaces.



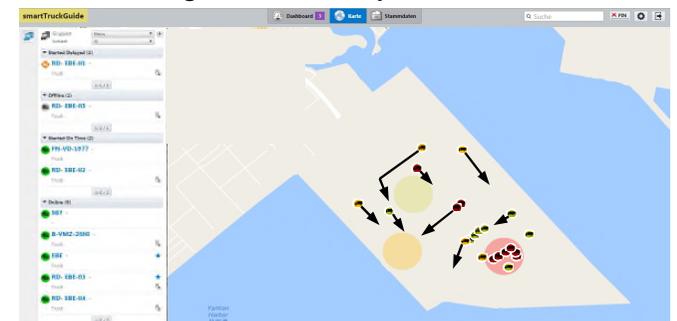
- After rescheduling, the driver is informed by the app that a new slot is available. The driver can continue his tour

Route guidance in the hub area increases the efficiency of infrastructure capacity

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Ingenuity for life



- Traffic disturbances are reduced
- Truck transit time is shortened
- Less resource expenditure for the coordination of transport
- Reducing unnecessary search traffic



Summary

Reduced emissions by using ITG

Contribution to sustainability

- external costs: ~ 6.2 €/h
- reduction of travel time in peaks: ~ 38,500 h/year

2020: ~ € 240,000

Savings from transparency

Calculation

- costs for delayed truck at the ramp: ~ 180 €/truck (preparation)
- number of truck delays: ~ 1600 changes/year

2020: ~ € 290,000

Waiting time reduction for trucking companies

Profit from waiting time reduction

- business costs: ~ 63 €/h
- reduction of waiting time of trucks at terminals: ~ 43,625 h/year

2020: ~ € 2.75 m

Travel time reduction for trucking companies

Profit from travel time reduction

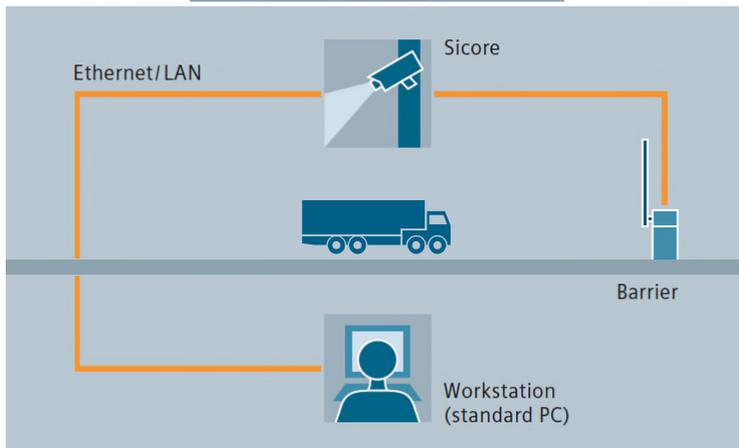
- business costs: ~ 63 €/h
- reduction of travel time in peaks: ~ 38,500 h/year

2020: ~ € 2.43 m

Identification of truck and driver through license plate recognition and biometry technology



1. Identification of truck license plate through ANPR-Camera
2. Identification of driver through biometry scanner or RFID card
3. Comparison with “white list” in central data base and specific criteria
4. If truck driver is allowed to enter, he receives instructions and documents via display and printer
5. Barrier opens and the truck is allowed to enter the site



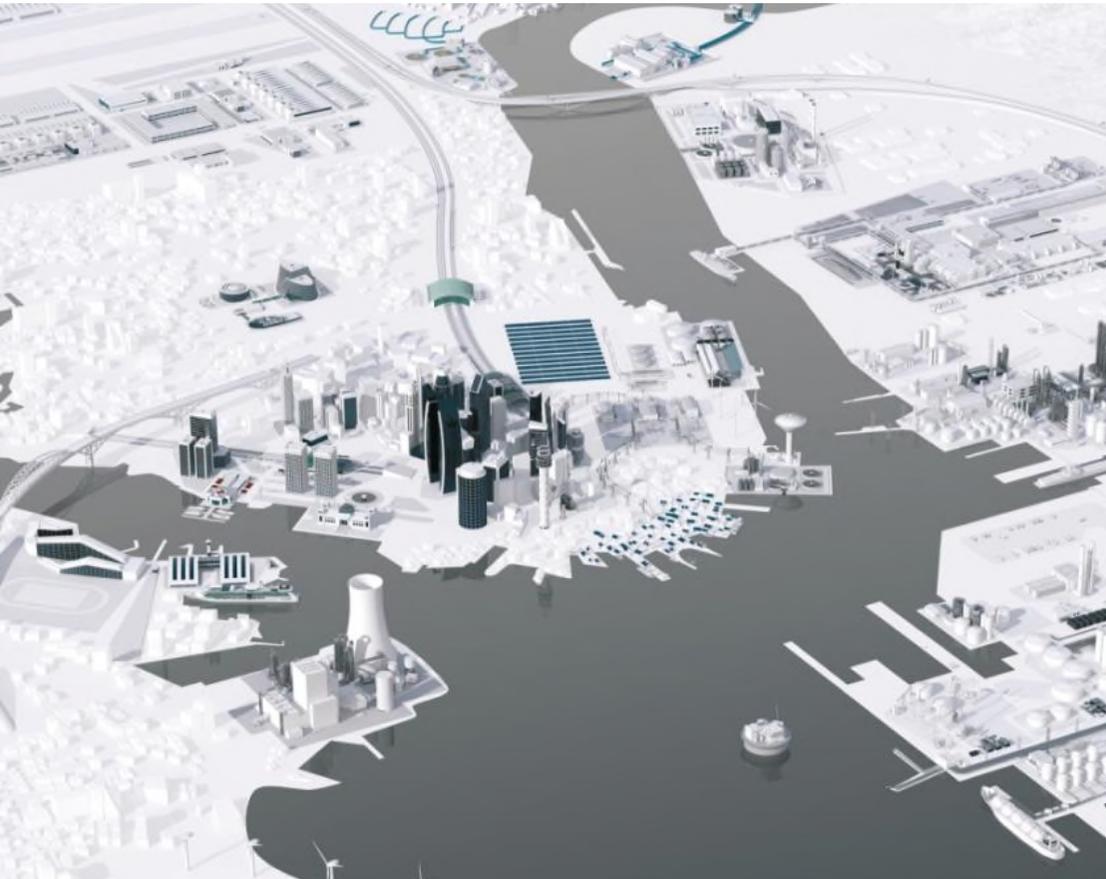
Benefits

- Faster gate handling time
- Less congestion at gates
- Monitoring and controlling of entrance and exit
- Seamless gate process without stepping out of the truck
- No face to face interactions between truck driver and gate officer required



Questions?

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