




Applied Port Integration

Terminal Optimisation Utilising Digitalisation, Automation and Interconnectivity for Sustainability Projects and Innovation

26.05.2022 | Dr. Nils Kemme, Managing Director

Recent Challenges for Maritime Supply Chains

Maritime Supply Chain Issues

 Logistics Management

Global Logistics 2022: Is this the new normal?

Global supply chain disruptions, port congestion, capacity shortages ... Because the impact of COVID-19 distorts ...

2 Feb 2022

 Foreign Policy

What the Ever Given Taught the World About Supply Chains

The Ever Given has delivered a lesson to everyone who depends on shipping: don't take your constant supply of goods...

10 Nov 2021

 Allianz Global Corporate & Specialty (AGCS)

Covid, crew and congestion | AGCS

The combination of the pandemic and current working conditions risks a future skill shortage for the shipping industry, according to...

19 Mar 2021



 The National

Global trade up 2.1% in April despite Russia- Ukraine crisis and China's Covid-19 curbs

The Covid-19 crisis highlighted significant challenges in the logistics ... The acute supply chain bottlenecks have led to ...


6 hours ago

 CNN

Shipping delays are back as China's lockdowns ripple around the world

That could exert even more pressure on global supply chains already ... Port amid the coronavirus disease (COVID-19) outbreak in ...

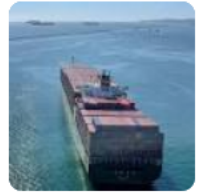
3 days ago

 Fortune

China's COVID-19 lockdown is inflaming the world's supply chain backlog, with 1 in 5 container ship...

According to shipping analytics firm Windward, 20% of the world's roughly 9,000 active container ships are currently sitting in...

2 weeks ago



What are the impacts on ports and shipping?

Many negative developments have emerged

Impact of Supply Chain Disruption on Ports and Shipping

Port Congestion

TradeWinds

Port congestion may lift booming container ship market even ...

Port congestion due to Asia's Covid-19 lockdowns may further hike container ship rates in a red-hot market that has already pu...
12 hours ago



Increasing Container Freight Rates

McKinsey

Overcoming global supply chain challenges

Overcoming global supply chain challenges ...
McKinsey's Tom Bartman discusses what's causing disruptions in global sup...
3 weeks ago

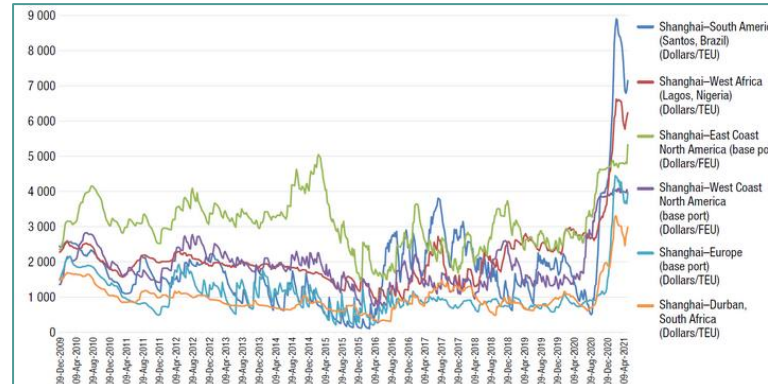
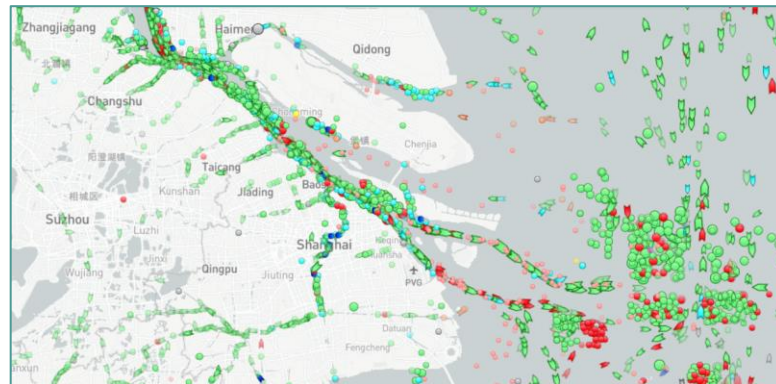


Full Container Stores and longer Dwell Times

FreightWaves

Shanghai port runs out of space for refrigerated containers

The slow pickup of cargo has resulted in long container dwell times, leaving less room to place arriving import boxes.
1 month ago



Stats Suggest That Port of Long Beach is Hitting its Limits

High pressure on ports to flexibly react and counterbalance supply chain disruptions

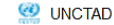
Consequences for the Port and Shipping Industry

Overcoming Supply Chain Disruptions

Need for action for Maritime Supply Chains became apparent

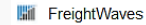
Long-term forecasts cannot be predicted, Resilience is becoming increasingly important

The pandemic has particularly created a drive for Digitalisation and Automation in global logistics



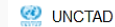
TrainForTrade Port Management Week

The COVID-19 pandemic was a stark reminder of the crucial role ports play in socioeconomic development and the urgent need to ...



Get ready for the next supply chain shockwave

Get ready for the next supply chain shockwave. Cargo backlogs in Shanghai a precursor to global port congestion as COVID...



Here's how we can resolve the global supply chain crisis

To resolve the supply chain crisis, developing countries have an opportunity ... more resilient against the COVID-19 global ...



Global Supply Chains' Crisis Is Much Bigger Than The ...

Yet Covid-19, itself, has played a much smaller role in giving rise to ... intelligence (AI) and digitalization in logistics operations in...



Is Digitalisation and Automation a solution to make ports and terminals more resilient?

Digitalisation and Automation as a solution

How can ports implement this?



- Due to the development of ship sizes and the challenge of performance, the Digitalisation and Automation of seaports is becoming increasingly important
- There is efficiency potential in the provision and transfer of information along Maritime Supply Chains (for example, through improved coordination)
- Digitalisation holds great potential to make Maritime Transport Chains more efficient, agile and resilient
- Technologies and concepts such as partially automated crane systems, driverless transport vehicles and automated planning of container storage are becoming increasingly common

- **Digitalisation and Automation enables the economy to keep running**
- **European port operators are already investing in the use of new technologies in a variety of ways**

45 Years of Excellence – what we have achieved

Anchored in operations

1,700

Projects in

130 COUNTRIES



1976

Founded as subsidiary of HHLA

1st
FULLY
AUTOMATED

Terminal of scale.
Doubled capacity
on the same
footprint



100
ENTHUSIASTS



With background from port and terminal operations and software

Port Digitalisation
Projects



150+

OPTIMISATION

Improved operational excellence and reduced costs



180+
PORTS

And terminals planned and optimised

Hinterland connectivity

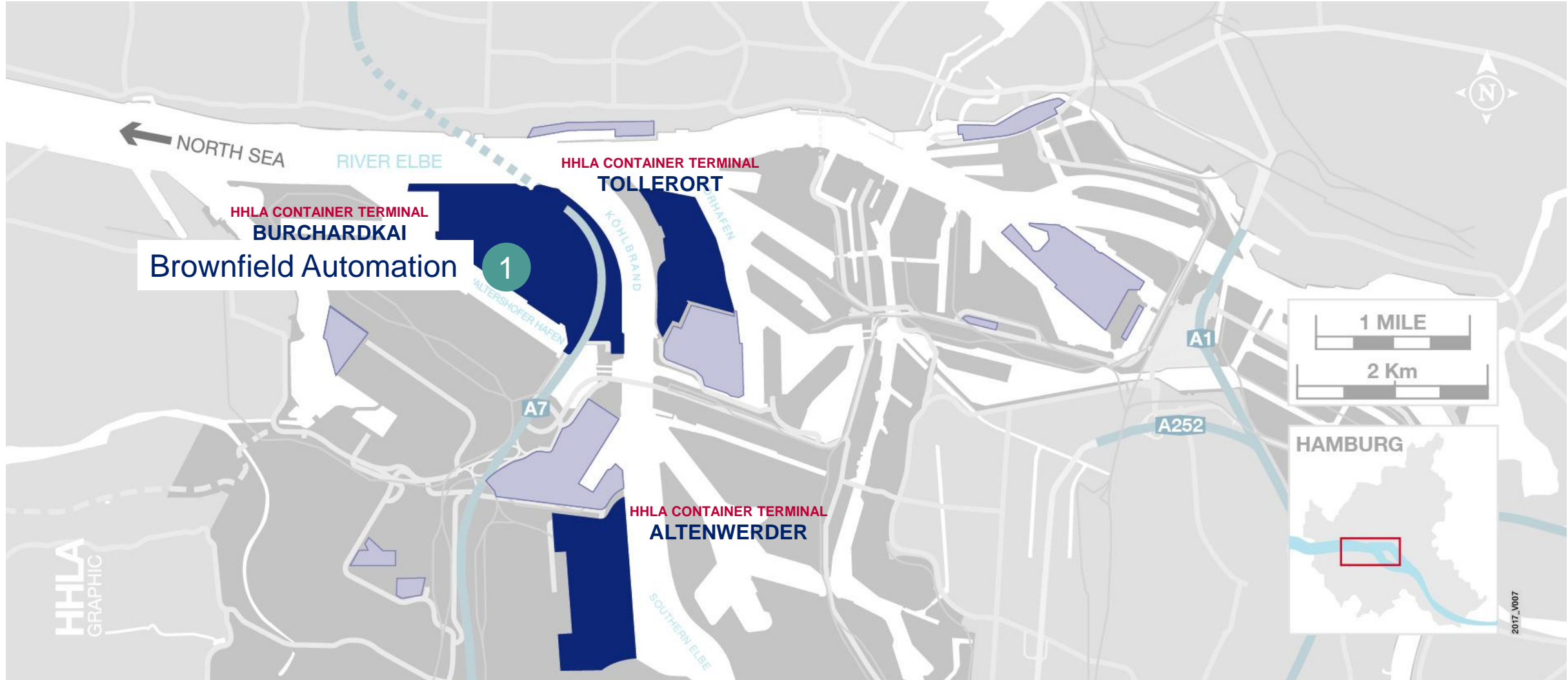
120 projects implemented for intermodal rail terminals, inland ports and warehouse logistics



Developed *HPC Ukraina* (now HHLA CTO) as terminal operator in Odessa

Intelligent measures to establish Digitalisation and Automation

HPC Experience in the Port of Hamburg



HPC Experience 1: Biggest Brownfield Conversion Globally

Full-Automation at Hamburg's Container Terminal Burchardkai

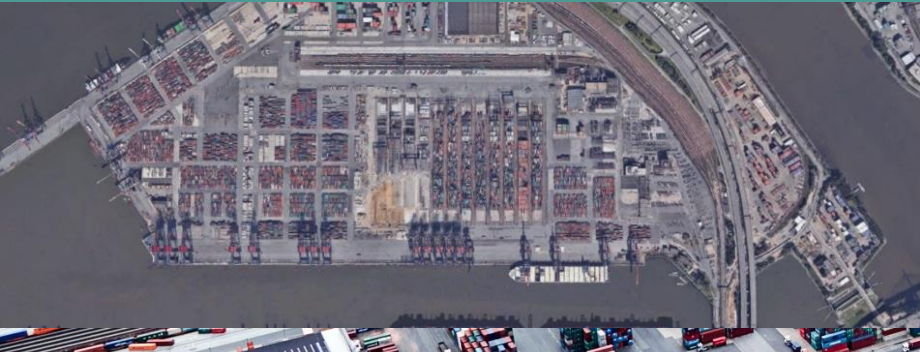
Started as fully manual SC terminal



Now going for full automation with AGVs



Step-wise conversion into ASC yard

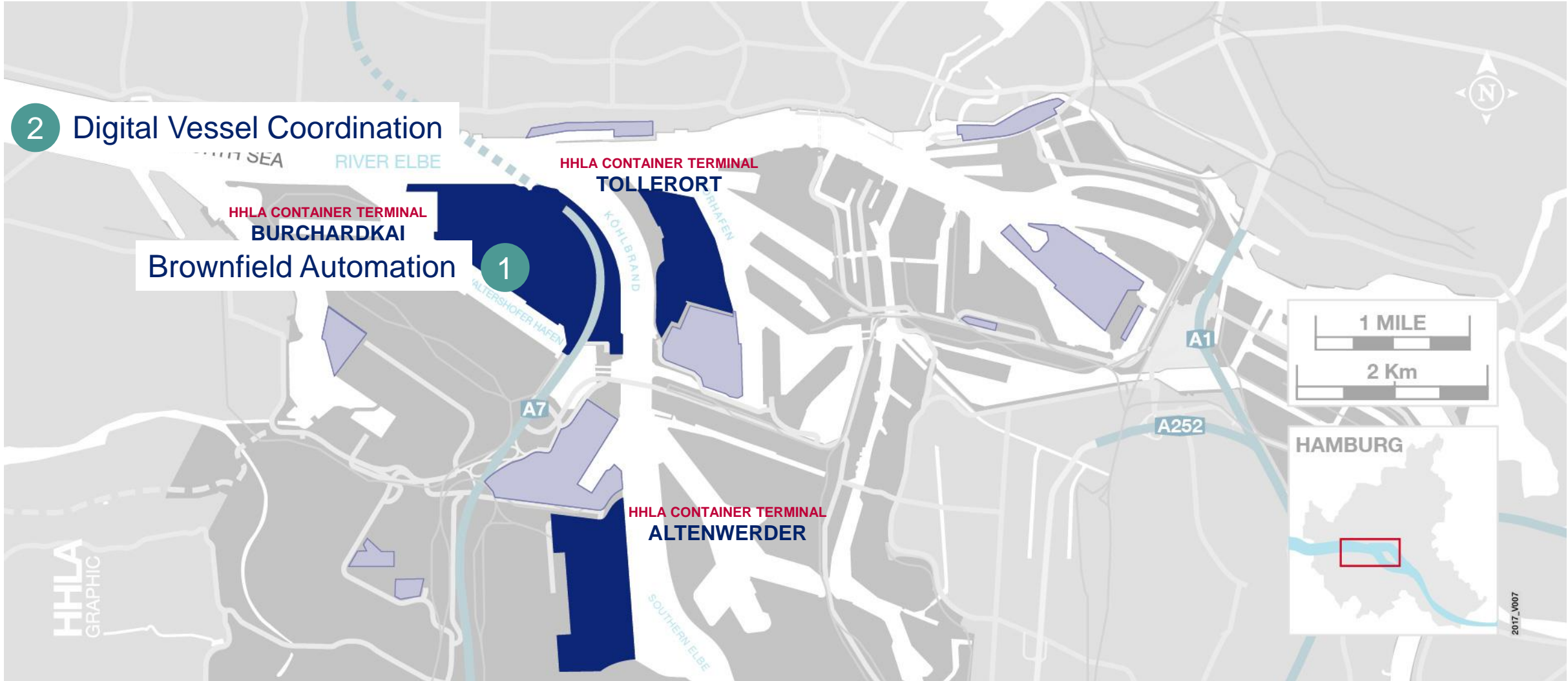


Requiring adaptable IT systems and proactive change management by HPC



Intelligent measures to establish Digitalisation and Automation

HPC Experience in the Port of Hamburg



HPC Experience 2: HVCC collaboration platform

One single truth across all partners



**Joint-venture
of two competing
terminal operators**

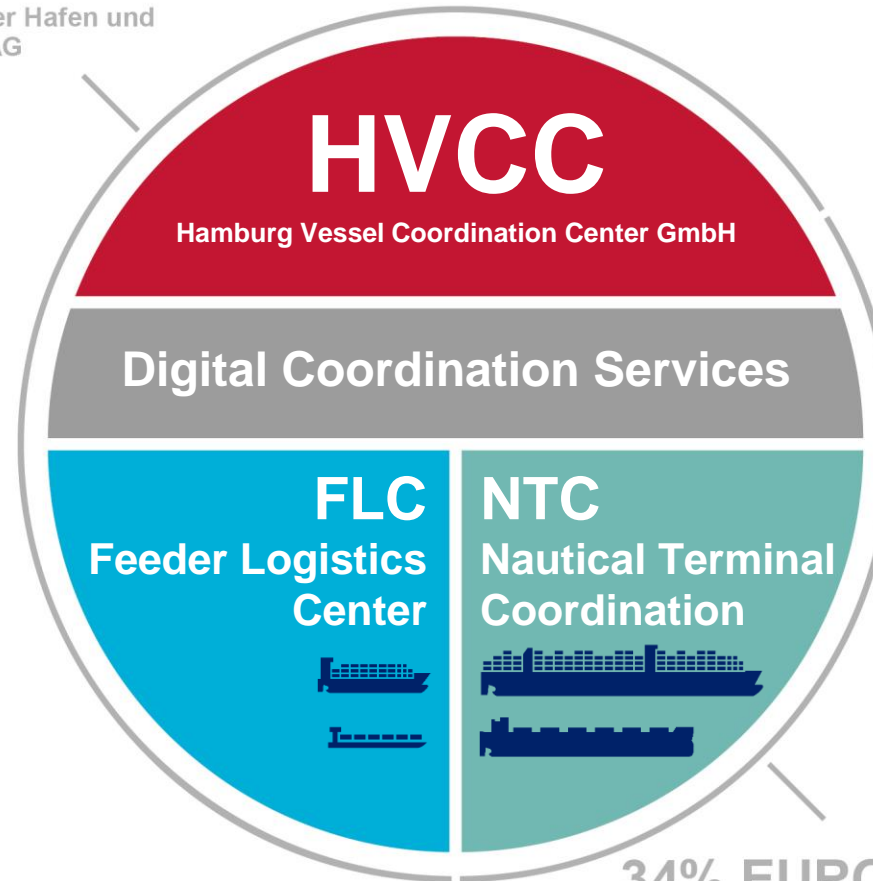


**24/7
operational**



**Port collaboration
platform with more
than 400 user**


66% HHLA
Hamburger Hafen und
Logistik AG



34% EUROGATE
Eurogate Container
Terminal Hamburg GmbH



**Port coordination
of barges and
feeder vessels**



**Coastal coordination
of large vessels**



**Member of the
International Taskforce
Port Call Optimization**

HPC Experience 2: HVCC services reducing emissions

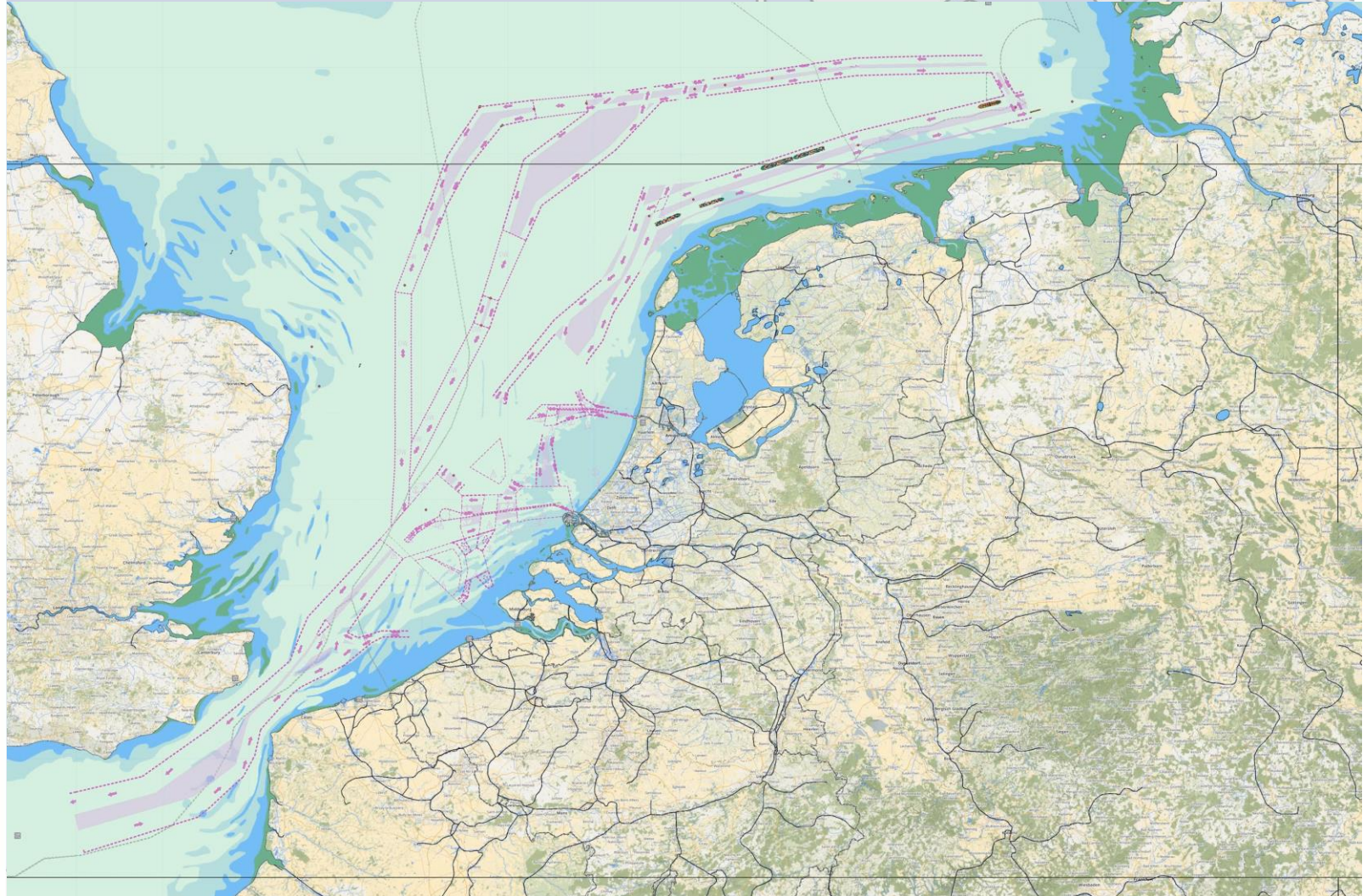
HVCC helps vessels to sail at optimal speed to arrive just-in-time



In 2019, HVCC saved
84,000 t
of fuel for shipping lines

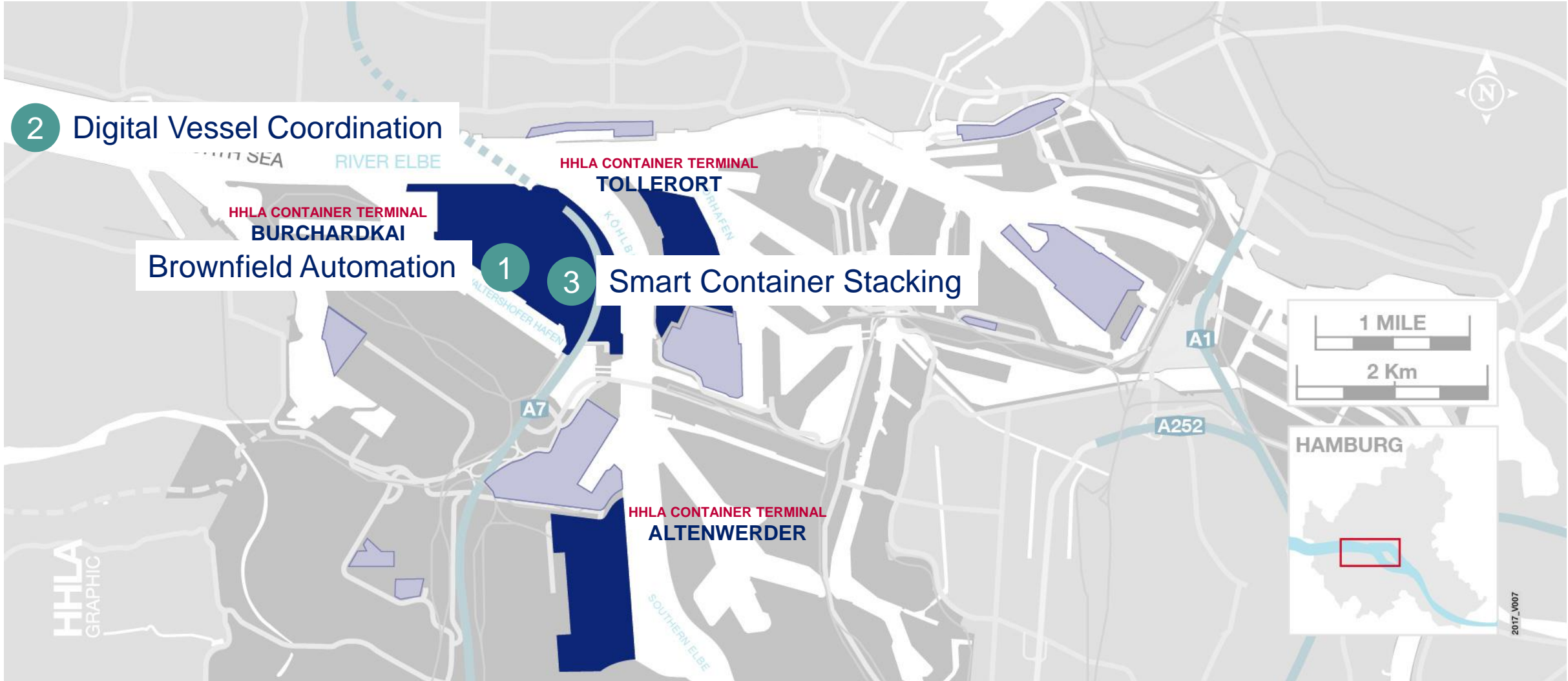
Reducing fuel costs by
30m USD

Cutting CO2 emissions
284,000 t



Intelligent measures to establish Digitalisation and Automation

HPC Experience in the Port of Hamburg



HPC Experience 3: AI Dwell Time Prediction

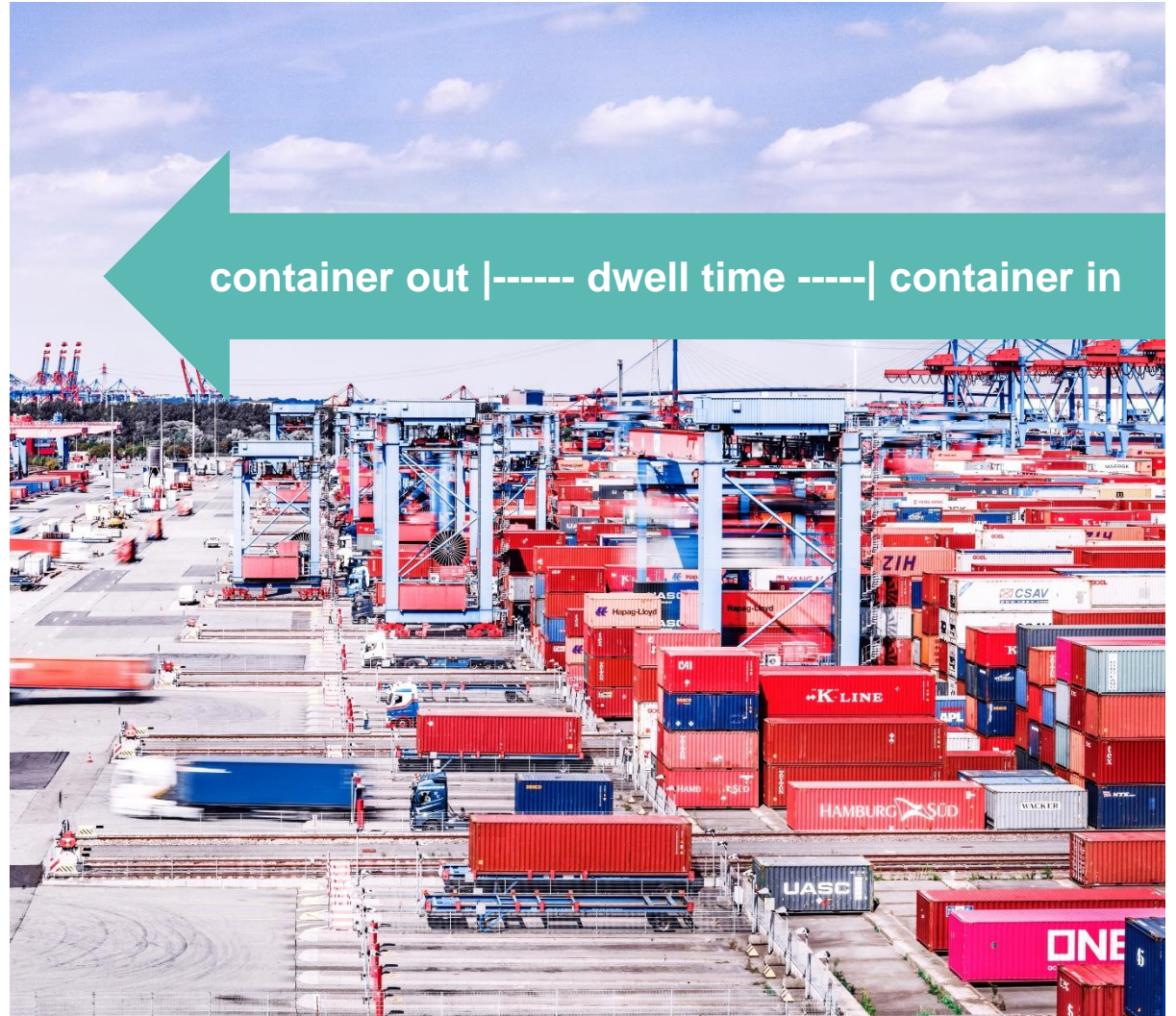
Using hidden Structures to predict Dwell Times of Import Containers and reduce unproductive Rehandling Moves

Motivation

- For import containers, no information on pick-up time by truck is available upon stack-in slot selection.
- Therefore, import containers cannot be stacked in a way that the needed container is always stacked on top of a pile.
- Hence, there is a high risk for additional shuffle moves, that require additional resources, maintenance, energy, etc.

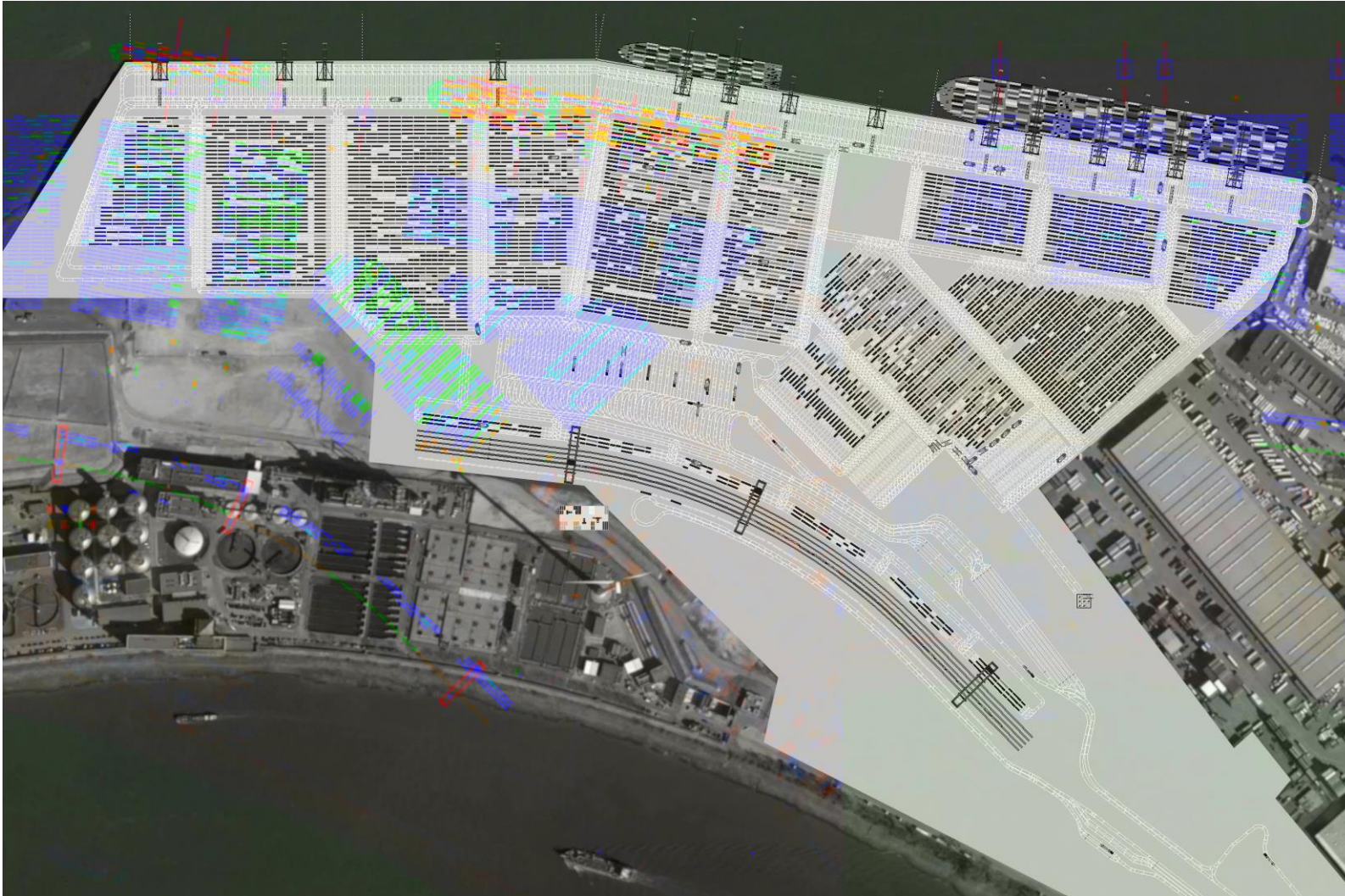
Idea

- Based on container attributes it might be possible to estimate the dwell time of individual containers.
- Use AI-Techniques to learn and identify hidden structures, which can be used to predict individual container dwell times.
- Dwell time estimate can be used to stack containers in a way that containers are only stacked on top of containers that are estimated to be picked up later.



HPC Experience 3: AI Dwell Time Prediction

Improving Cost and Performance of Container Terminals



Technical Setup:

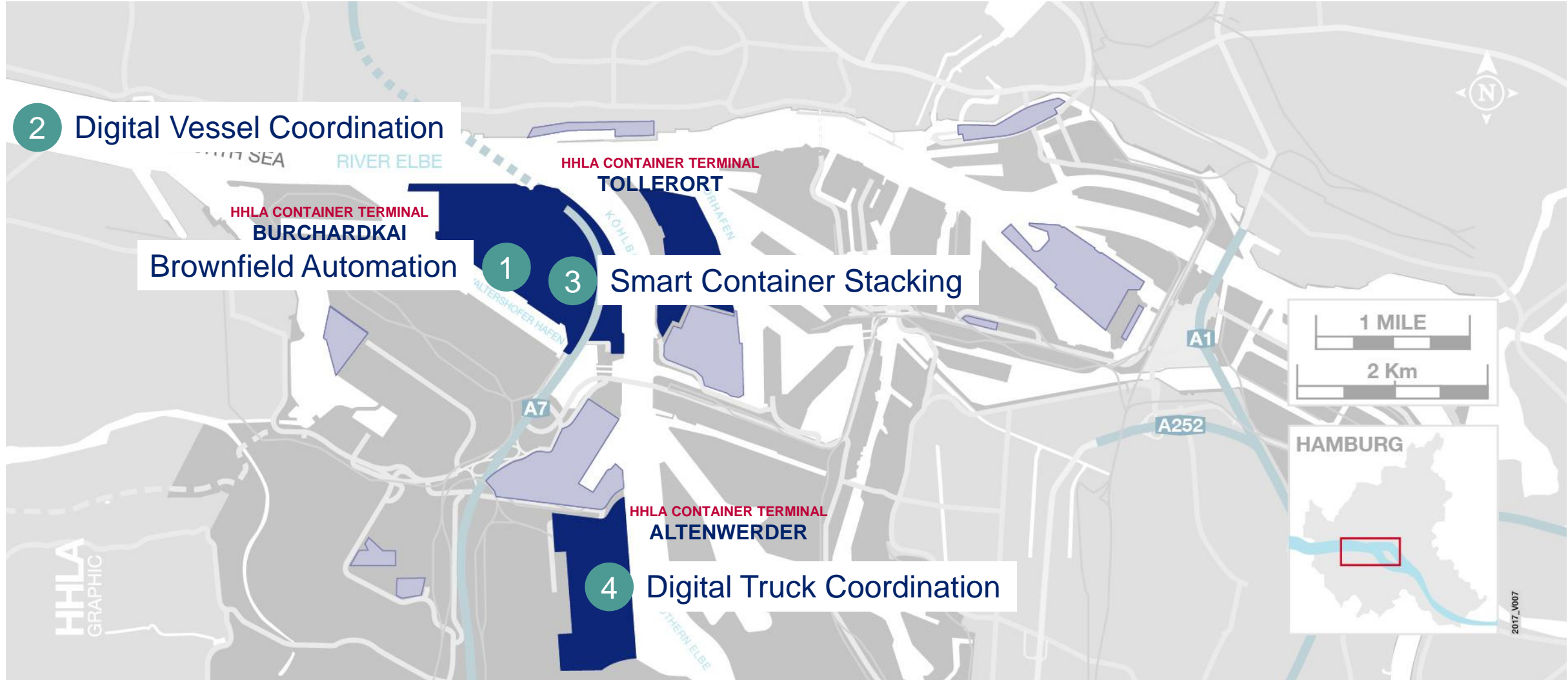
- AI Dwell Time Predictor as TOS add-on module
- Receiving data on container
- Returning optimal container slots
- Implemented at different Terminals in Hamburg

Results:

- Reduced number of unproductive container restacking moves by +120,000 per year
 - ➔ Saving Operating Cost
- Increasing equipment productivities
 - ➔ Improving terminal capacity
 - ➔ Improving terminal service level
- Cutting energy and emissions
 - ➔ Reducing diesel by 390,000 l
 - ➔ Cutting emissions by 1,050 t

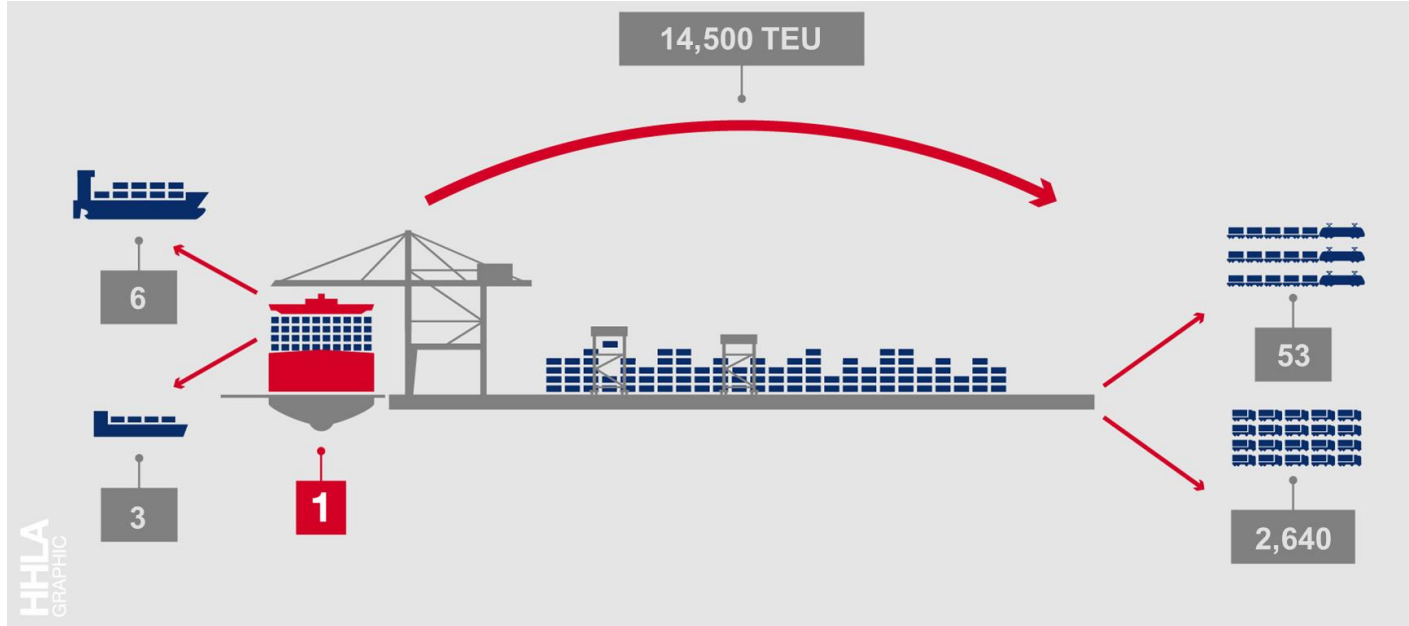
Intelligent measures to establish Digitalisation and Automation

HPC Experience in the Port of Hamburg



HPC Experience 4: Truck Appointment in the Port of Hamburg

Hinterland traffic management to reduce Traffic Jams and improve Plannability for Terminals



Overview of Partners

HHLA
EUROGATE

Project Owner

HPC

Project Management

DAKOSY
Datenkommunikationssystem AG

Software Development

Overview of Objectives

- Transparency and control of truck arrivals
- Better capacity utilisation by lowering peaks
- Reduction of congestion
- Improved resource planning
- Increased terminal performance
- Reduced emissions

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