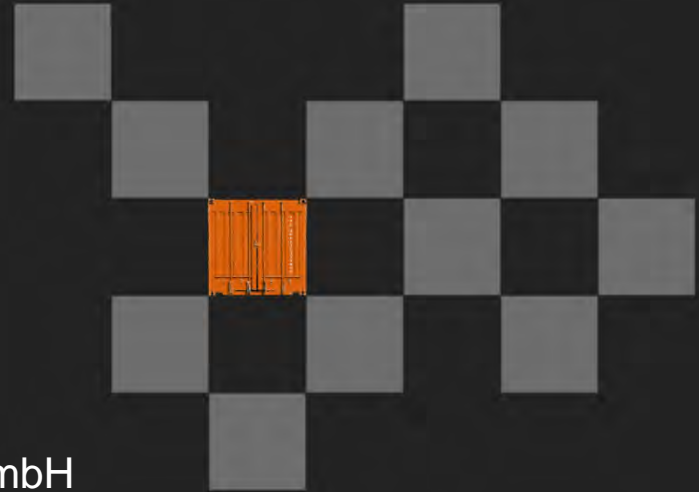


How to get more out of your existing resources

- Learn from the big ones



Anja Jablonski, Project Manager, ISL Applications GmbH

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WHO WE ARE

ISL APPLICATIONS GMBH

- founded 2010 as ISL's commercial subsidiary
- further development, rebranding and selling of simulation based solutions



Holger Schütt
CEO, Prof. Dr.- Ing.



Horst-Dieter Kassel
CTO, Dipl.- Ing.

ISL INSTITUTE OF SHIPPING ECONOMICS AND LOGISTICS

- research based consultancy institute in maritime logistics
- founded 1954
- private foundation
- suited in Bremen & Bremerhaven, Germany
- initial development of simulation software

WHAT WE DO

- marketing and selling of our simulation and emulation software solutions
- customising a first model, Training of our customers to use the software on their own
- complete studies or black box models
- consulting based on our software solutions with the knowledge of our experts





INTRODUCTION

- As a result of globalization **international trade has greatly increased**
- Caused by the aim to achieve **more efficient operation and higher productivity** nowadays automation of container terminals is progressing
- More and more terminals are searching for automated solutions to meet the challenge with **larger vessels, bigger package size per visit and taller cranes**

ADVANTAGES OF AUTOMATION

- Increase of container **throughput**
- Enhancement of terminal **performance**
- Decrease of **labor costs**
- Enhanced **utilization** of existing stacking areas
- Higher **productivity** and cost reduction per move
- STS, AGV, ASC and Shuttle Carriers are **working hand in hand**



HIGHTECH-TERMINALS

CONTAINER TERMINAL ALTENWERDER (CTA) IN HAMBURG, GERMANY

(FACTS)

worldwide state-of-the-art and still base for all current terminals



[Source: <https://www.hafen-hamburg.de>]

Dimensions

- Terminal Area 1.000.000 qm, Quaylength 1400m
- Capacity 2,4 Mio. TEU (up to 3 Mio TEU)

Ecological aspects

- „Low Emission“-terminal
- powered by electricity derived from regenerative sources

Equipment

- 15 STS, 26 automated yard blocks
- 78 AGV + 10 AGV purely electric battery-powered

Start-up in 2002

HIGHTECH-TERMINALS

CONTAINER TERMINAL ALTENWERDER (CTA) IN HAMBURG, GERMANY

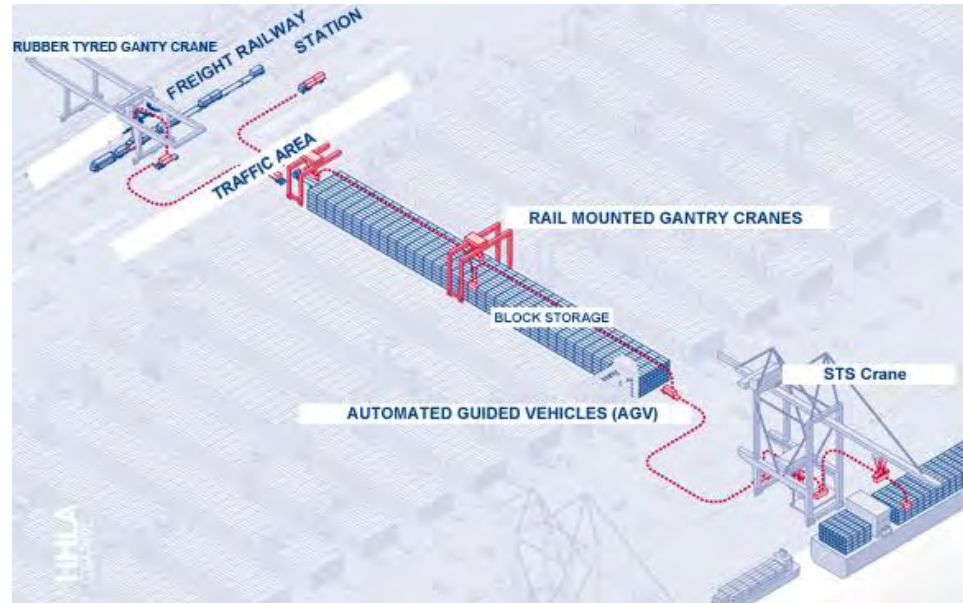


[Source: <https://hbla.de/de/container/altenwerder-cta.html>]

1. The basis of CTA's efficiency is the optimized interplay

- operation tested by simulation
- layout with a clear structure and short distances
- controlled by a continually upgraded IT system

2. The way of a container



[Source: <https://hbla.de/de/container/altenwerder-cta/so-funktioniert-cta.html>]

HIGHTECH-TERMINALS

CONTAINER TERMINAL ALTENWERDER (CTA) IN HAMBURG, GERMANY

Container Handling

- Semi-automatic STS cranes
- Automated Guided Vehicle (AGV)

Container Yard

- each stack is served by two different height rail-mounted gantry cranes (RMG)

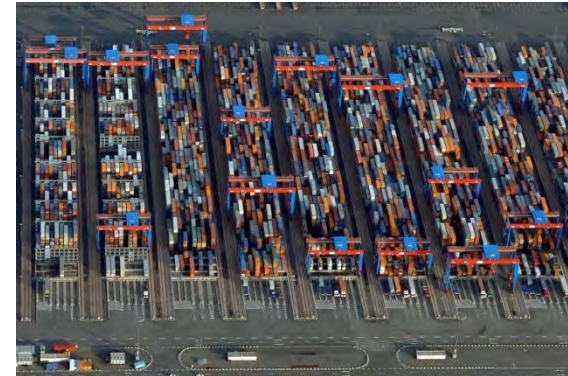
Fully automated

AGV are navigated by 19.000 transponders set into the ground

- signals are transmitted to a specially developed software



[SOURCE: [HTTPS://HHLA.DE/DE](https://hlla.de/de)]



[Source: <http://wirtschaftszeit.at>]

HOW TO DEAL WITH THAT KNOWLEDGE?

➔ not only a question of „either-or“

What is the solution if the terminal has to increase the performance but basically sufficient capital is lacking?

And how we can get into a **proactive position**, not only reacting after things happened wrong and inefficient operation is the order of the day?

PROCESS AUTOMATION & SIMULATION BASED VIRTUAL TERMINALS

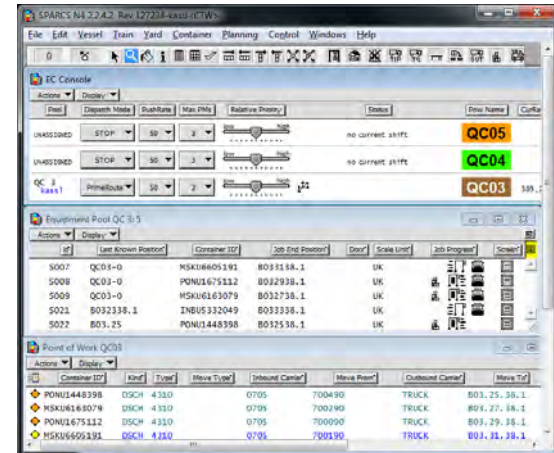
An intelligent optimization software can be implemented within a comparatively **short period of time** and at a **fraction of the cost**

Benefits

- Fully utilization of all functionalities of your TOS
- Intelligent algorithms can help to achieve a faster Return of Investment (ROI)

➔ **optimize** investments/equipment

➔ **reduce** number of equipment



The screenshot displays the ISL Applications software interface, which is used for process automation and simulation. The interface is divided into several sections:

- FC Console:** This section shows a table of equipment with columns for 'Find', 'Dispatch Mode', 'Dispatch Rate', 'Max Pkts', 'Relative Priority', 'Status', 'Truck Name', and 'Color'. The table lists three equipment units: QC05 (orange), QC04 (green), and QC03 (red). Each unit has a 'STOP' button and a 'Dispatch Rate' of 50.
- Equipment Pool QC 0-5:** This section shows a table of equipment with columns for 'id', 'Last Known Position', 'Container ID', 'Job End Position', 'Door', 'Scale Level', 'Job Progress', and 'Screen'. The table lists five equipment units: S007, S008, S009, S021, and S022. Each unit has a 'Container ID', 'Job End Position', 'Door', 'Scale Level', 'Job Progress', and 'Screen'.
- Point of Work QC03:** This section shows a table of equipment with columns for 'Container ID', 'Kind', 'Type', 'Move Type', 'Inbound Carrier', 'Move Point', 'Outbound Carrier', and 'Move Tr'. The table lists three equipment units: PONI1448398, HSKU1618076, and PONI1675112. Each unit has a 'Container ID', 'Kind', 'Type', 'Move Type', 'Inbound Carrier', 'Move Point', 'Outbound Carrier', and 'Move Tr'.



PROCESS AUTOMATION

Possibilities: Find individual solutions for smaller or existing terminals

Known Data

- Provide **detailed information** about the current state of the equipment and the jobs
 - Position Detection Systems (in- and external equipment)
 - Sensors for Collision Avoiding

Replace Equipment

- Automated stacking cranes (ASC) **in combination** with manually working equipment

Renew you strategies

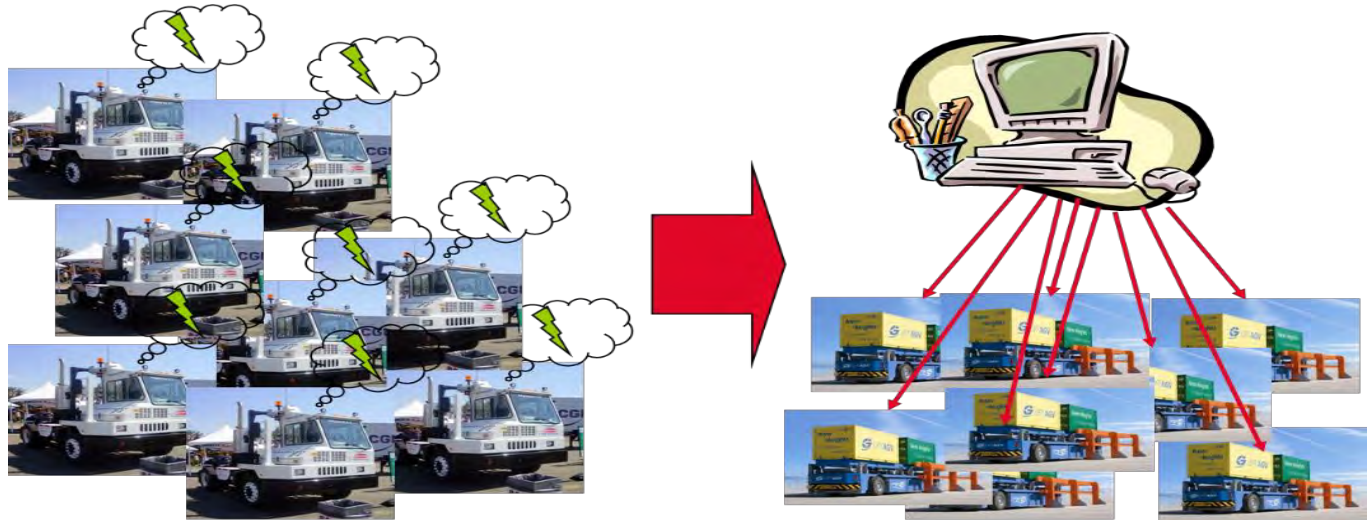
- **Avoid waiting times and synchronize processes** in a better way
(normally within settings of the TOS)



AUTOMATION LEADS TO CENTRAL CONTROL

Remote operations

- from a control room
- means that the team comes together in one location
- easily interaction and sharing the same view



PROCESS AUTOMATION - GATE AUTOMATION



- Speeds up **standard processes**
- **Delivers information** about the current state
- Allows to build a **digital copy** of the status as base for process optimisation



[Source: <http://dis-me.com>, 2015]

TERMINAL PRODUCTIVITY IS DRIVEN BY...



TOS



Processes at the terminal

Equipment



Korean Prototype of a shuttle carrier



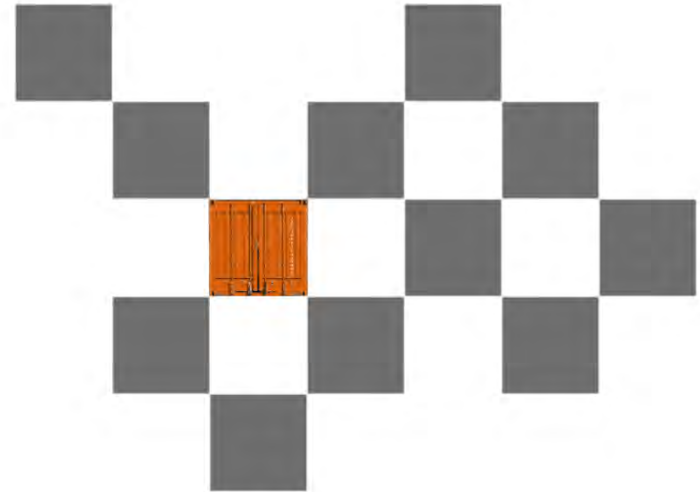
Terminal productivity

Terminal staff



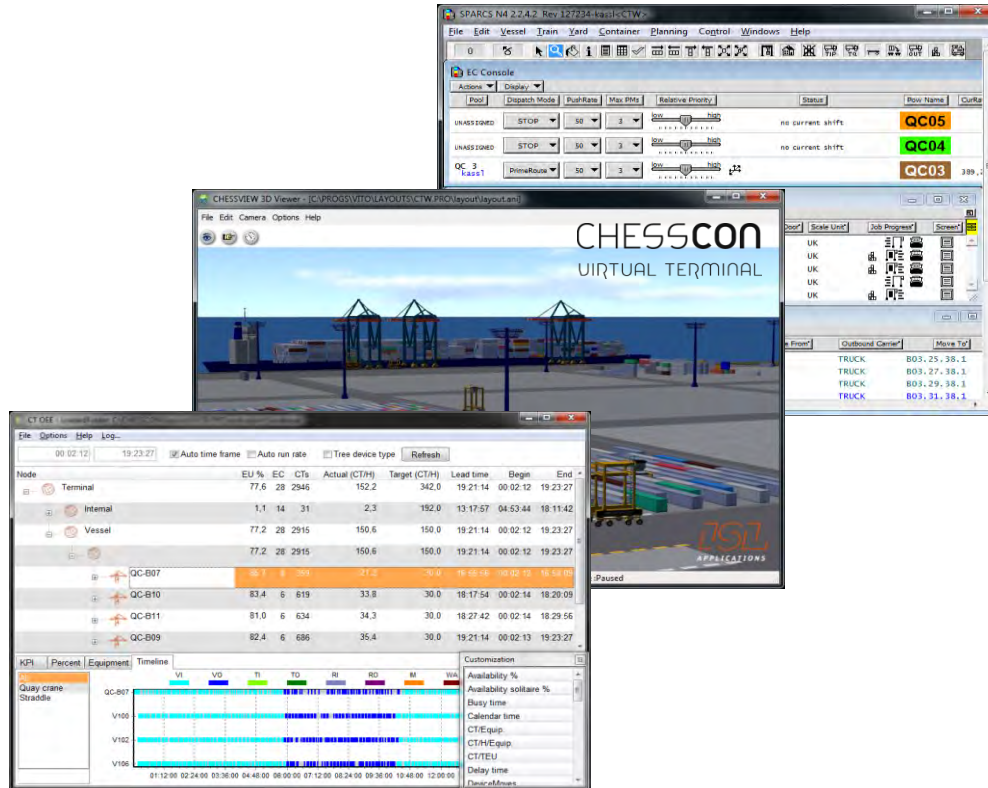
more than ever **very skilled control staff** is required

...but how to test and fine-tune this sophisticated systems?



SIMULATION BASED VIRTUAL TERMINALS

Tune up your Terminal Operating System (TOS)



- Increase the skills of your control staff
- Provide new training methodologies
 - without burning fuel
 - without operational costs
 - without disturbing the real operation
- Find the best parameter setting within the TOS
- Find bottlenecks or overutilization
- Optimize utilization of devices
- Improve your terminal productivity
- Reduce operational costs



CHESSCON

VIRTUAL TERMINAL

A SOFTWARE TOOL TO BUILD A VIRTUAL COPY OF A
REAL CONTAINER TERMINAL

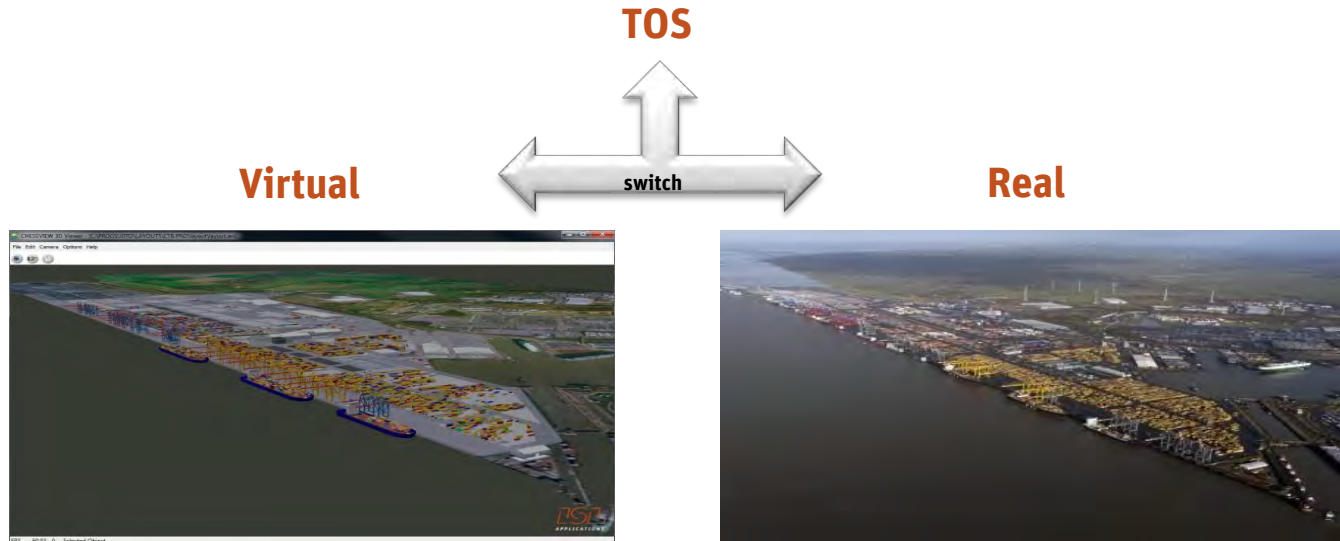




THE MAIN MISSION OF VIRTUAL TERMINAL

WHAT YOU CAN DO WITH EMULATION

- use your Terminal Operation System (TOS)
- use your software interfaces
- but use a **Virtual Container Terminal**



IN CONCLUSION: BEING PROACTIVE IN AVOIDING BOTTLENECKS

Challenges

- Increasing vessel size
- Increasing peak loads at the quay
- Increasing peaks in the stack

Solutions

- Adjust your equipment
- Process automation
- Equipment automation
- Sophisticated IT systems

→ **Terminal Operators have to rethink their way of operation to stay competitive within a more and more demanding market!**

THANK YOU FOR YOUR ATTENTION



APPLICATIONS

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