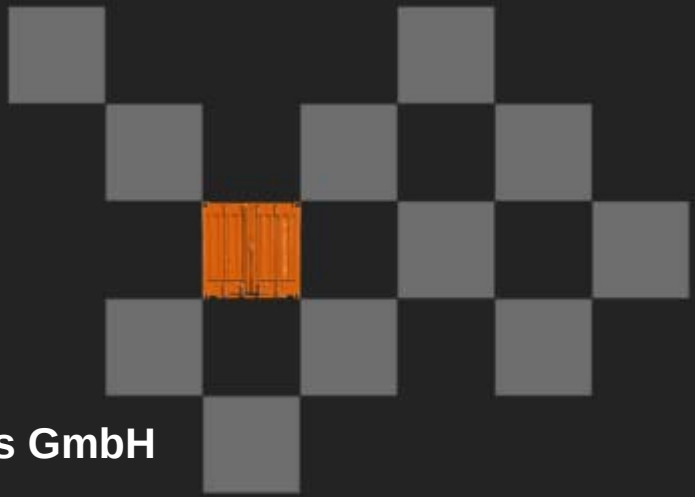
Being proactive in avoiding bottlenecks in terminal operations



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ISL GmbH
APPLICATIONS

ISL
APPLICATIONS

- Founded 2010 as ISL‘s commercial subsidiary
- Simulation and Emulation Tools
  for Container Terminals (CHESSCON)
- Complete studies and consulting on
  optimization of container terminal operation

CEO Prof. Dr.- Ing. Holger Schütt

CTO Dipl.-Ing. Horst-Dieter Kassl

- Research based consultancy institute
  in maritime logistics
- Suited in Bremerhaven and Bremen (Germany)

www.chesscon.com

ISL Institute of Shipping Economics and Logistics

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

Containerterminal 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)

Equipment

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

Ecological aspects

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

Start-up in 2002

Hightech-Terminals

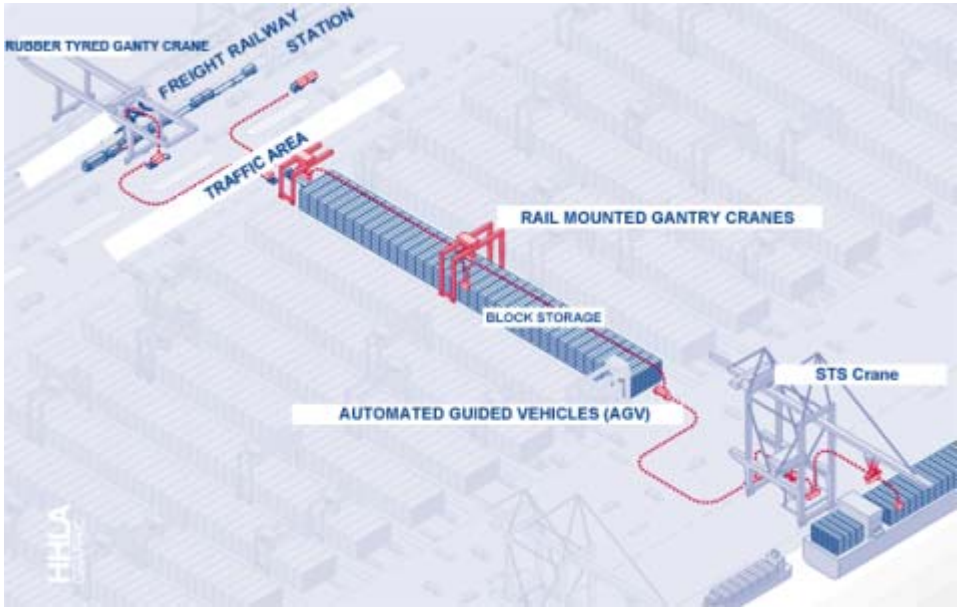
Containerterminal Altenwerder (CTA) in Hamburg, Germany

[Source: https://hhla.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://hhla.de/de/container/altenwerder-cta/so-funktioniert-cta.html]

Hightech-Terminals

Containerterminal Altenwerder (CTA) in Hamburg, Germany

Container Handling

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

[Source: https://hhla.de/de]

Container Yard

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

[Source: http://wirtschaftszeit.at]

Fully automated

AGV are navigated by 19.000 transponders set into the ground

- signals are transmitted to a specially developed software

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 happend wrong and inefficient operation is the order of the day?

Process automation & simulation based virtual terminals

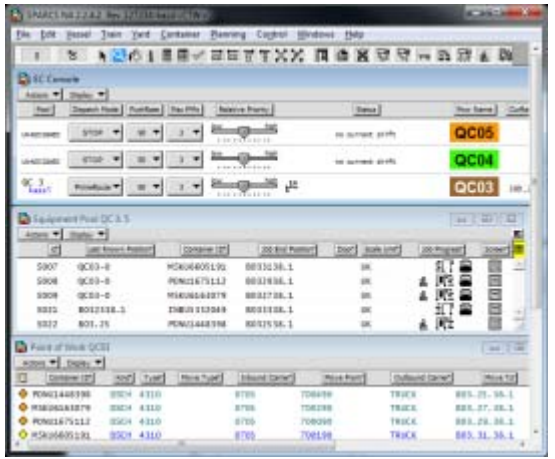
An intelligent optimization software can be implemented within a comparatively **short period of time** and at a **fraction of the cost**

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



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

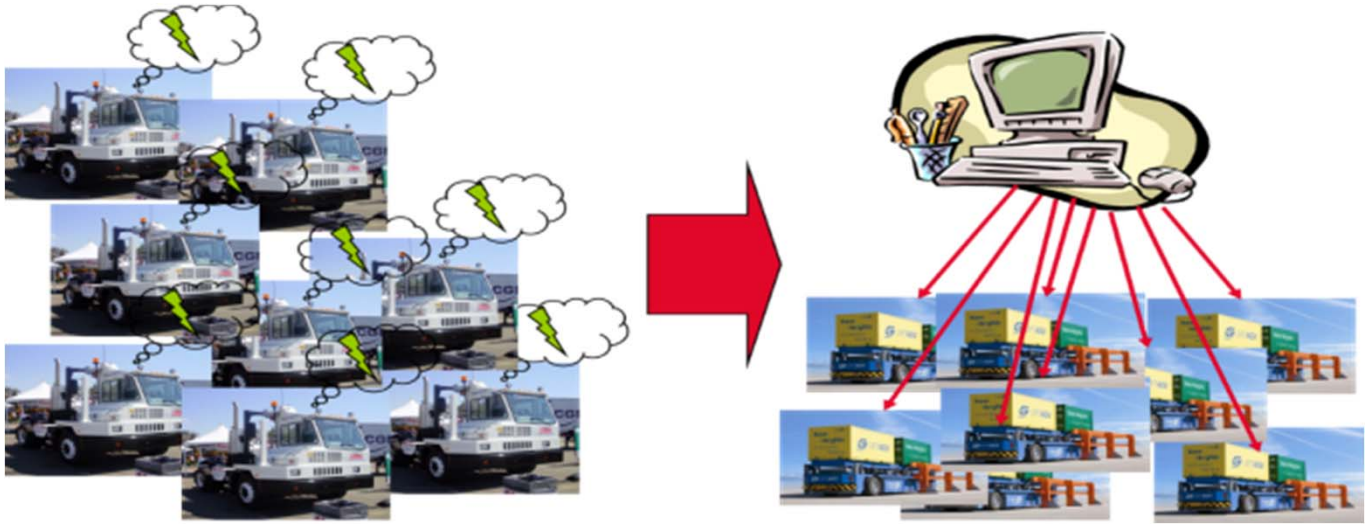
- **Avoid waiting times and synchronize processes** in a better way

(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

Terminal productivity

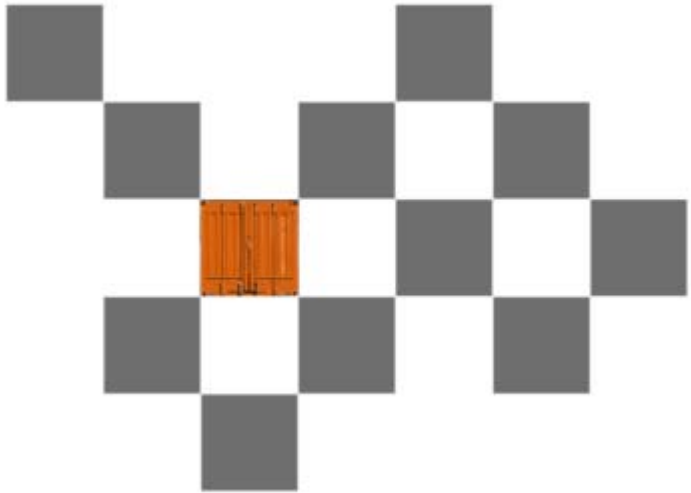
Equipment

Korean Prototype of a shuttle carrier

Terminal staff

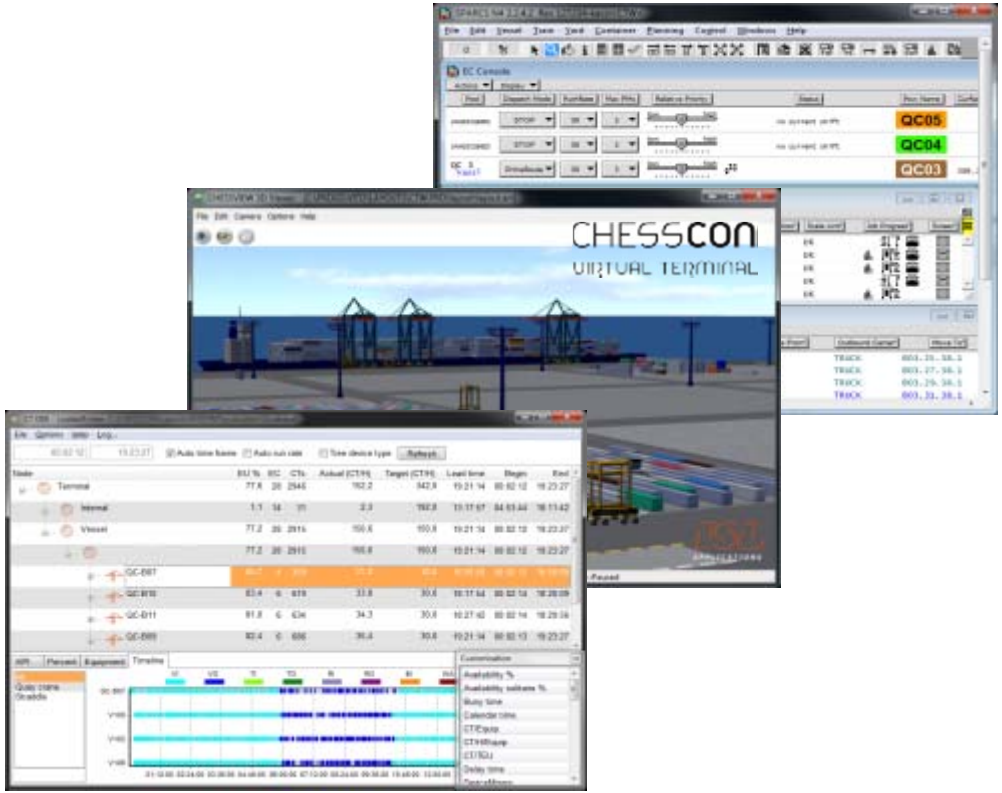
more than ever **very skilled control staff** is required

…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

ISL APPLICATIONS

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**

TOS

Virtual **Real**

switch

Finally: Being proactice in avoiding bottlenecks

Challanges

- 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!**

APPLICATIONS

THANK YOU FOR YOUR ATTENTION

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