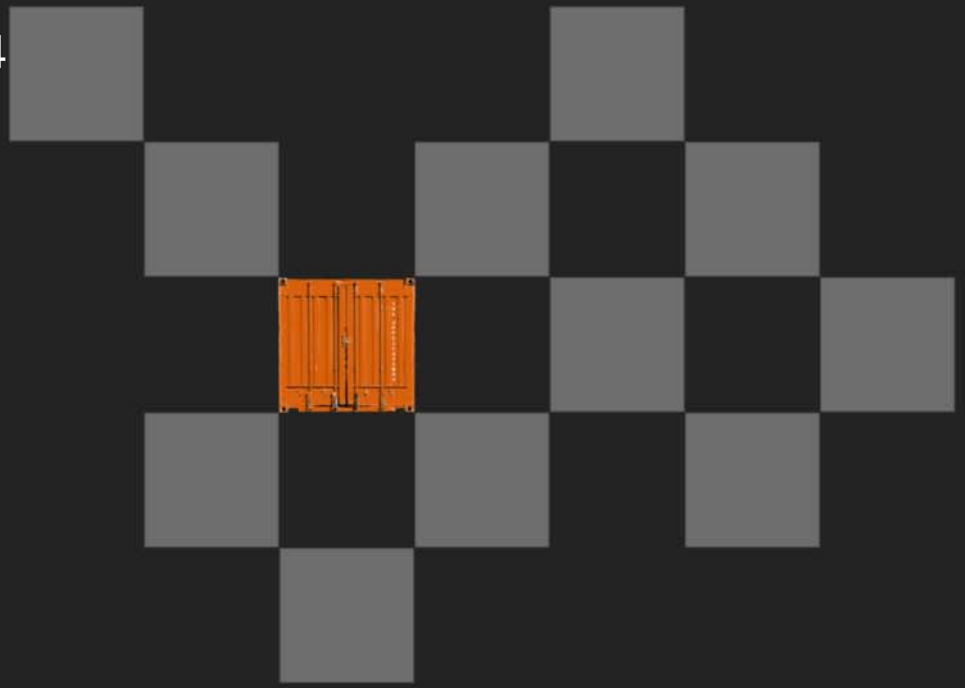
CHESSCON

ISL APPLICATIONS

# Improving Operational Intelligence by Use of Virtual Terminals

12th Asean Port and Shipping 2014
Jakarta



Holger Schuett
Prof. Dr.-Ing.
ISL Applications GmbH
schuett@isl-applications.com

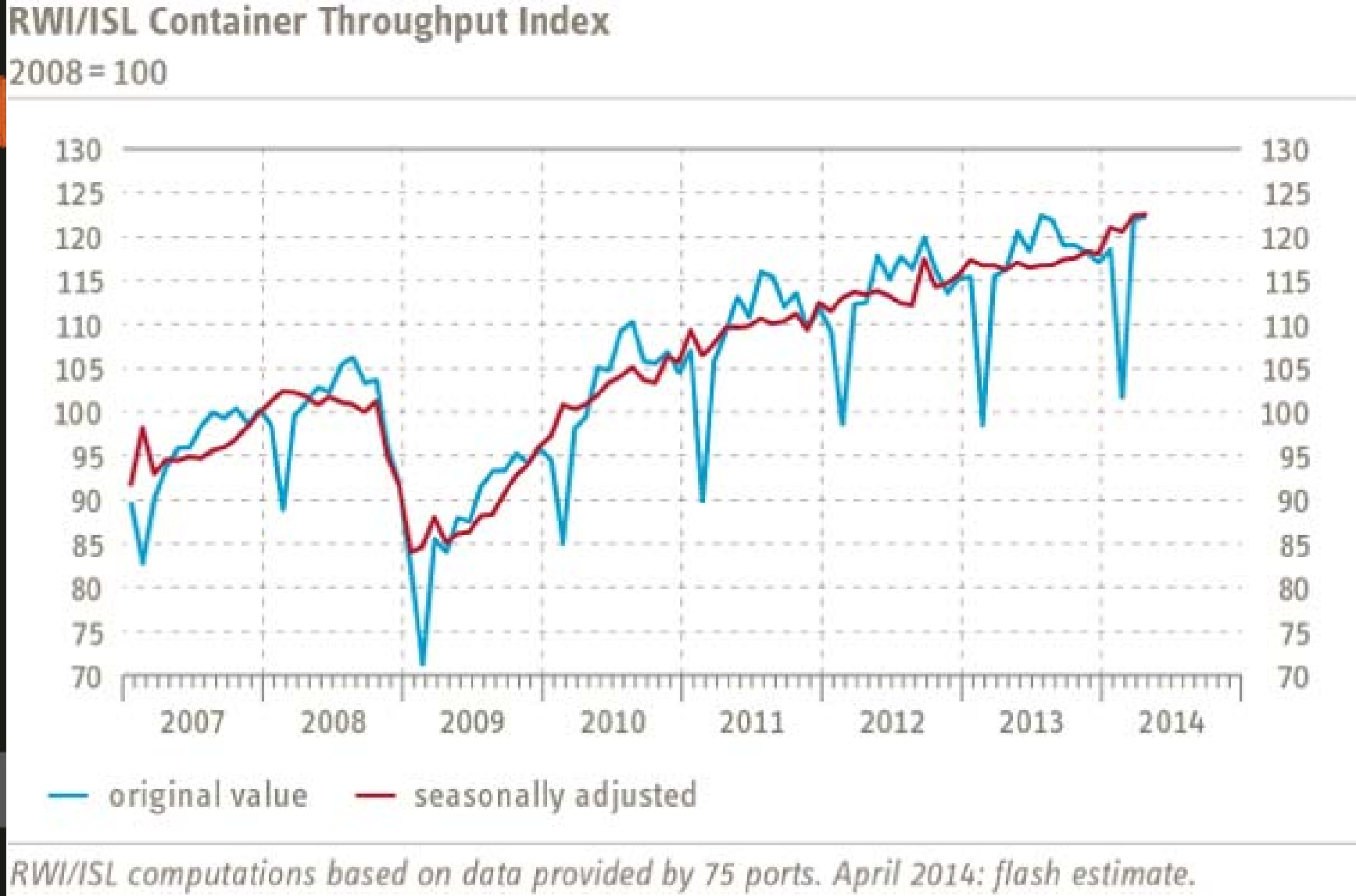
# Agenda

ISL Applications GmbH

Simulation in the planning phase

Operational Intelligence improved
By Virtual Terminals

Going operational




*RWI/ISL computations based on data provided by 75 ports. April 2014: flash estimate.*

***RWI/ISL Container Throughput index***

- ***75 ports worldwide***
- ***~ 60 % of worlds throughput***
- ***available 3 weeks in new month***
- ***www.isl.org → news***

# ISL Applications GmbH

**Founded 2010 as ISL‘s commercial subsidiary**

Holger Schütt
CEO, Prof. Dr.- Ing.

Horst-Dieter Kassl
CTO, Dipl.-Ing.

**– Institute of Shipping Economics and Logistics (R&D)**

- founded 1954
- private foundation
- suited in Bremen & Bremerhaven
- some 70 employees
- research based consultancy institute in maritime logistics

# 25 Years Simulation Experience

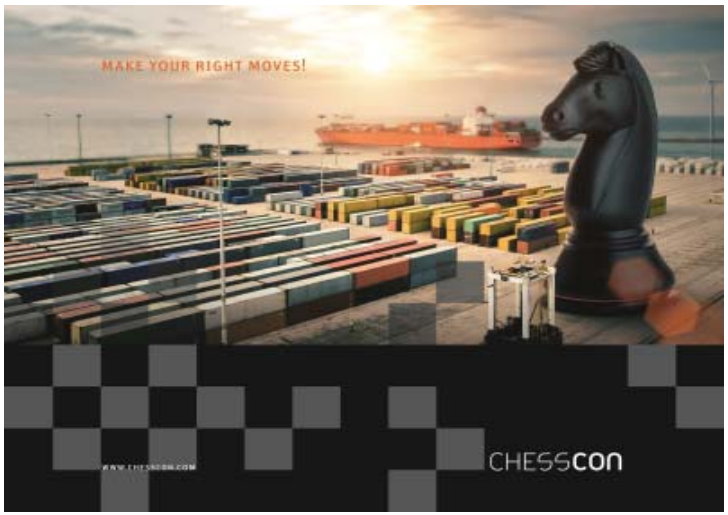
1989 1991 1993 1995 1998 2000 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014


Products rebranding:
CAPS
SCUSY
ViTO

# Optimisation and Simulation – References (selected)

APM Terminals
ASEAN Terminals, Philippines
Bejaia Mediterranean Terminal, Algeria
Centerm Terminal, Vancouver, Canada
Contship, La Spezia, Italy
CSX, Jacksonville, USA
DP World Terminal Antwerp, Europe
DP World, Australia
EUROGATE, Bremerhaven, Germany
EUROGATE, Hamburg, Germany
HHLA, Hamburg , Germany
HPA Hamburg Port Authority, Germany
HIT, Hong Kong
JadeWeserPort, Germany
Kalmar Industries, Finland
CMSA, Manzanillo, Mexico
MCT, Gioia Tauro, Italy
MTL, Hong Kong
Nhava Sheva Terminal, India
Noell Crane Systems, Germany
NTB, Bremerhaven, Germany
P&O Headquarter, London, Europe
Port of Odessa, Ukraine
Port of Tacoma, USA
PORTEK International Ltd., Singapore
Ports America, North America
Red Sea Gateway Terminal, Jeddah, KSA
Sandwell Eng. Inc., Vancouver, Canada
SCT, Southampton, U.K.
SPIA, Colombia
TecPlata ICTSI, Buenos Aires, Argentina
TotalSoftBank, Korea
TPT, Durban, South Africa
TRP, Buenos Aires, Argentina
VTE, Genoa, Italy
Warsteiner Brewery, Germany

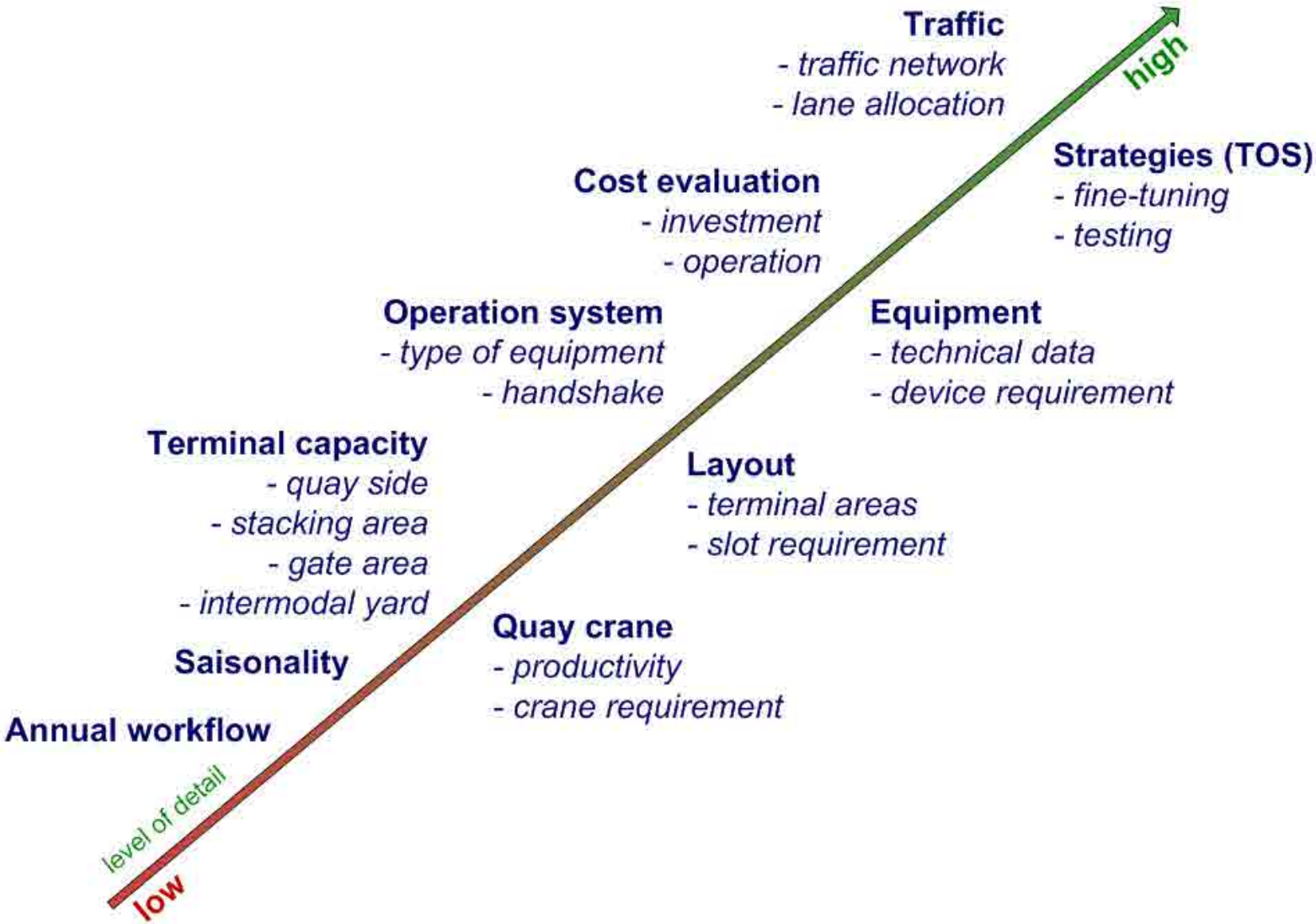
# ISL Applications‘ Product Strategy




**Clients shall use the software products**

- Training, customising first model → getting started
- Supporting the start-up of new projects
- Complete studies or black box models

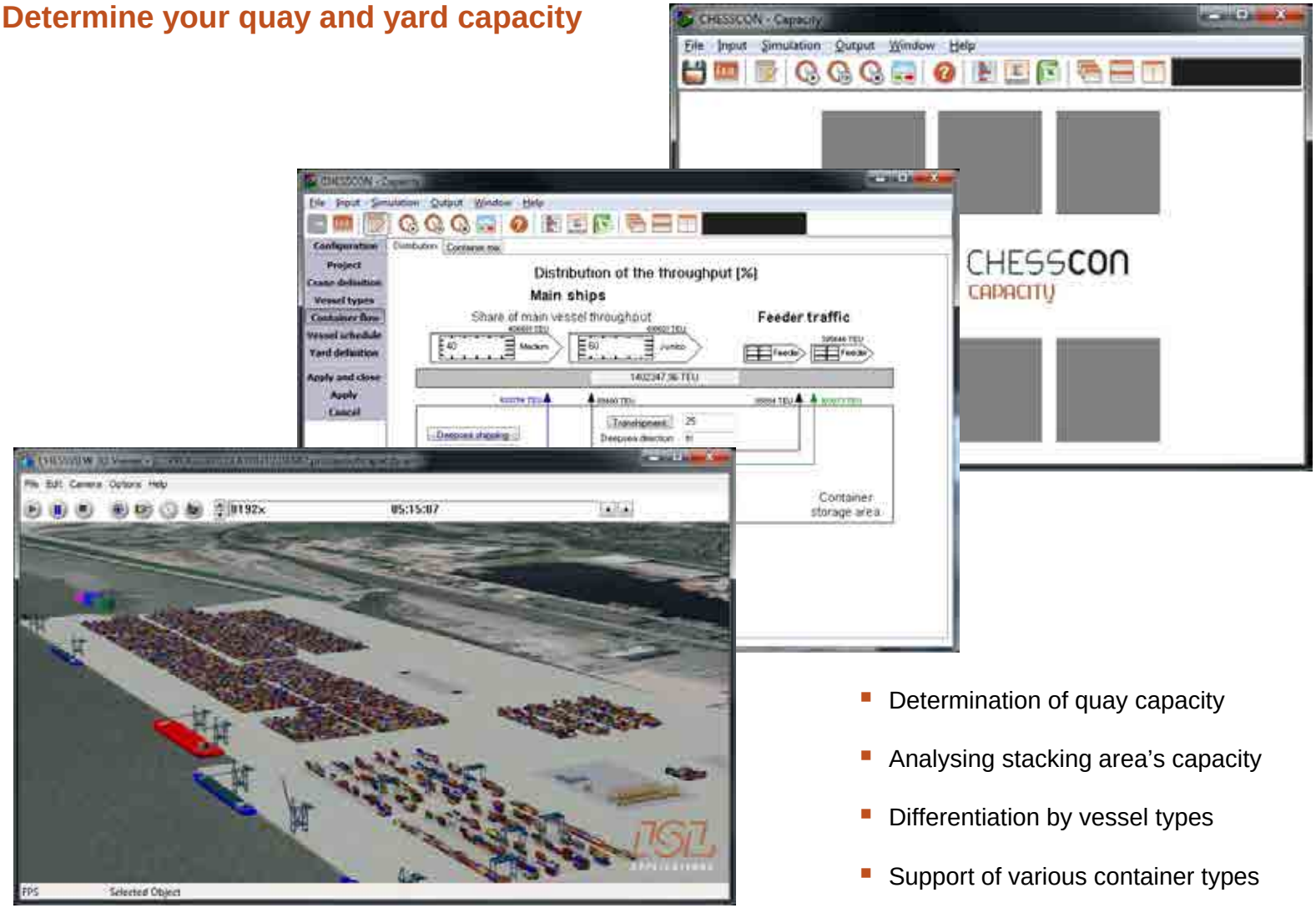
# Agenda


Traffic
- traffic network
- lane allocation
high
Strategies (TOS)
- fine-tuning
- testing
Cost evaluation
- investment
- operation
Operation system
- type of equipment
- handshake
Equipment
- technical data
- device requirement
Terminal capacity
- quay side
- stacking area
- gate area
- intermodal yard
Layout
- terminal areas
- slot requirement
Saisonality
Quay crane
- productivity
- crane requirement
Annual workflow
level of detail
low

CHESSCON
CAPACITY

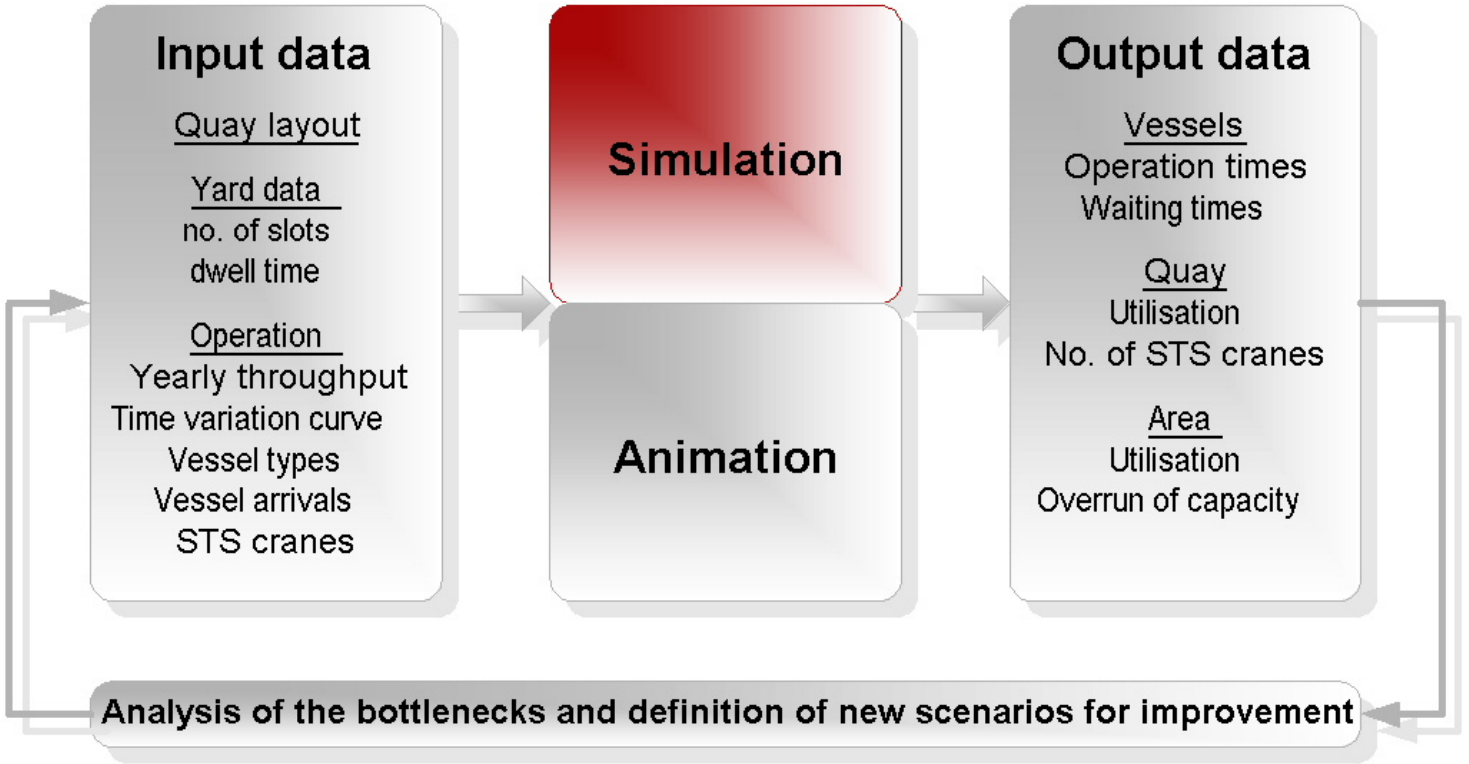
APPLICATIONS

## Determine your quay and yard capacity



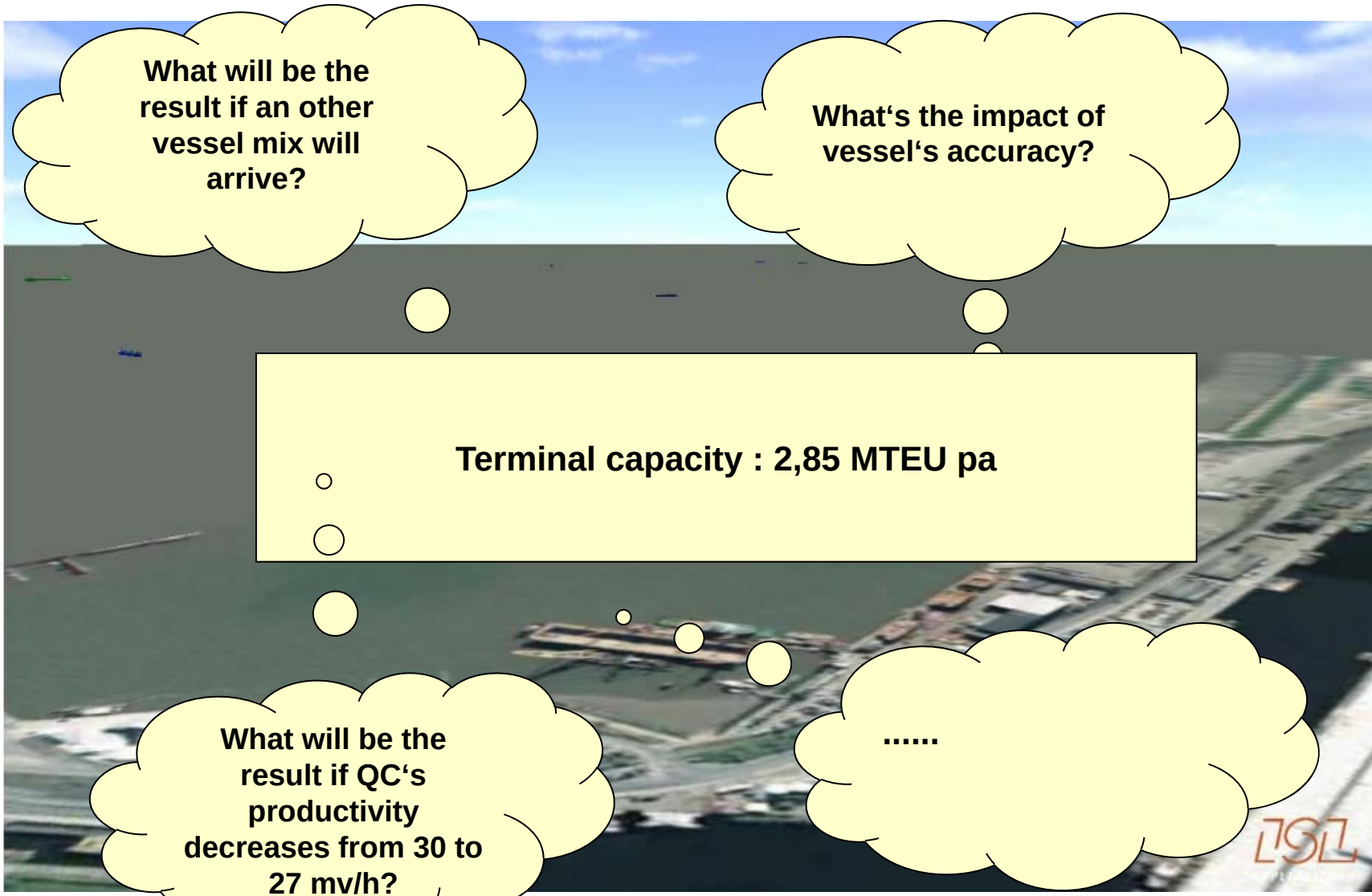

- Determination of quay capacity
- Analysing stacking area’s capacity
- Differentiation by vessel types
- Support of various container types

# Main modules



# Capacity planning

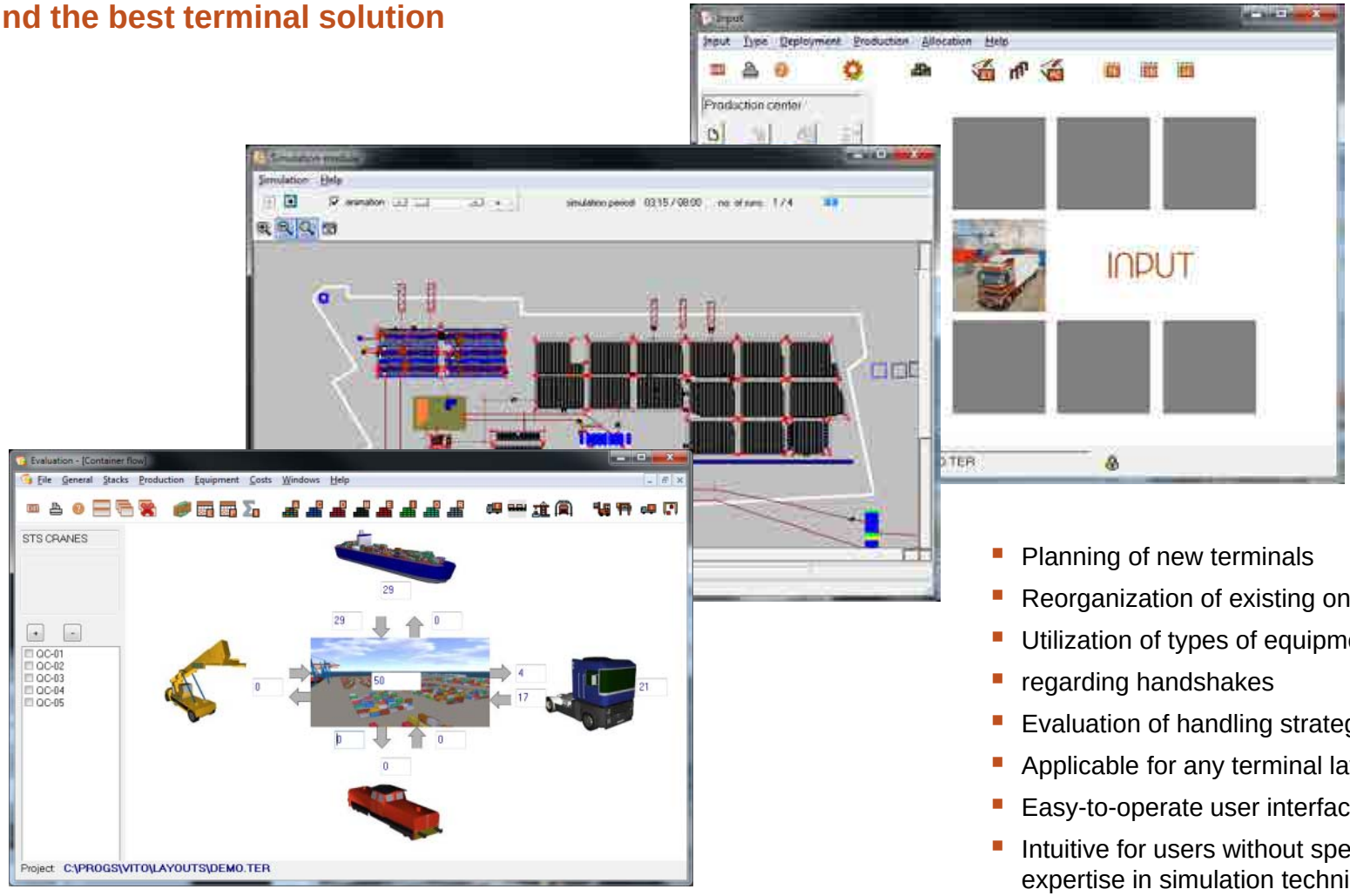
# Capacity planning



CHESSCON
SIMULATION

ISL
APPLICATIONS

## Find the best terminal solution




- Planning of new terminals
- Reorganization of existing ones
- Utilization of types of equipment
- regarding handshakes
- Evaluation of handling strategies
- Applicable for any terminal layout
- Easy-to-operate user interface
- Intuitive for users without specific expertise in simulation technique
- Online animation

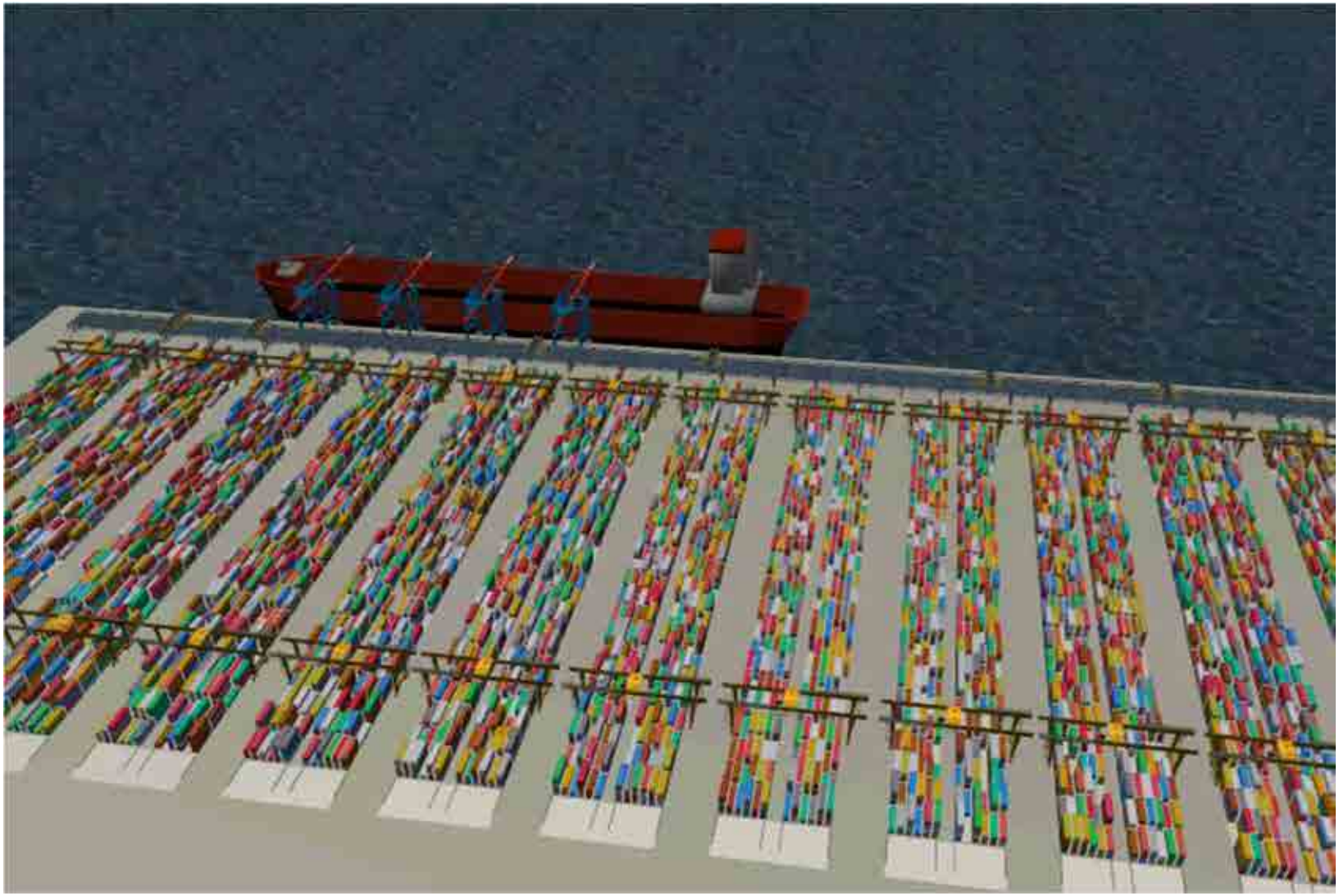
# Various layouts, which one is the best?

Tandem lift cranes, truck/chassis and RTG

# Various layouts, which one is the best?

Straddle carrier operation

# Various layouts, which one is the best?



ZPMC horizontal transport and RMG

# Case study

**Comparison of operation systems sel**

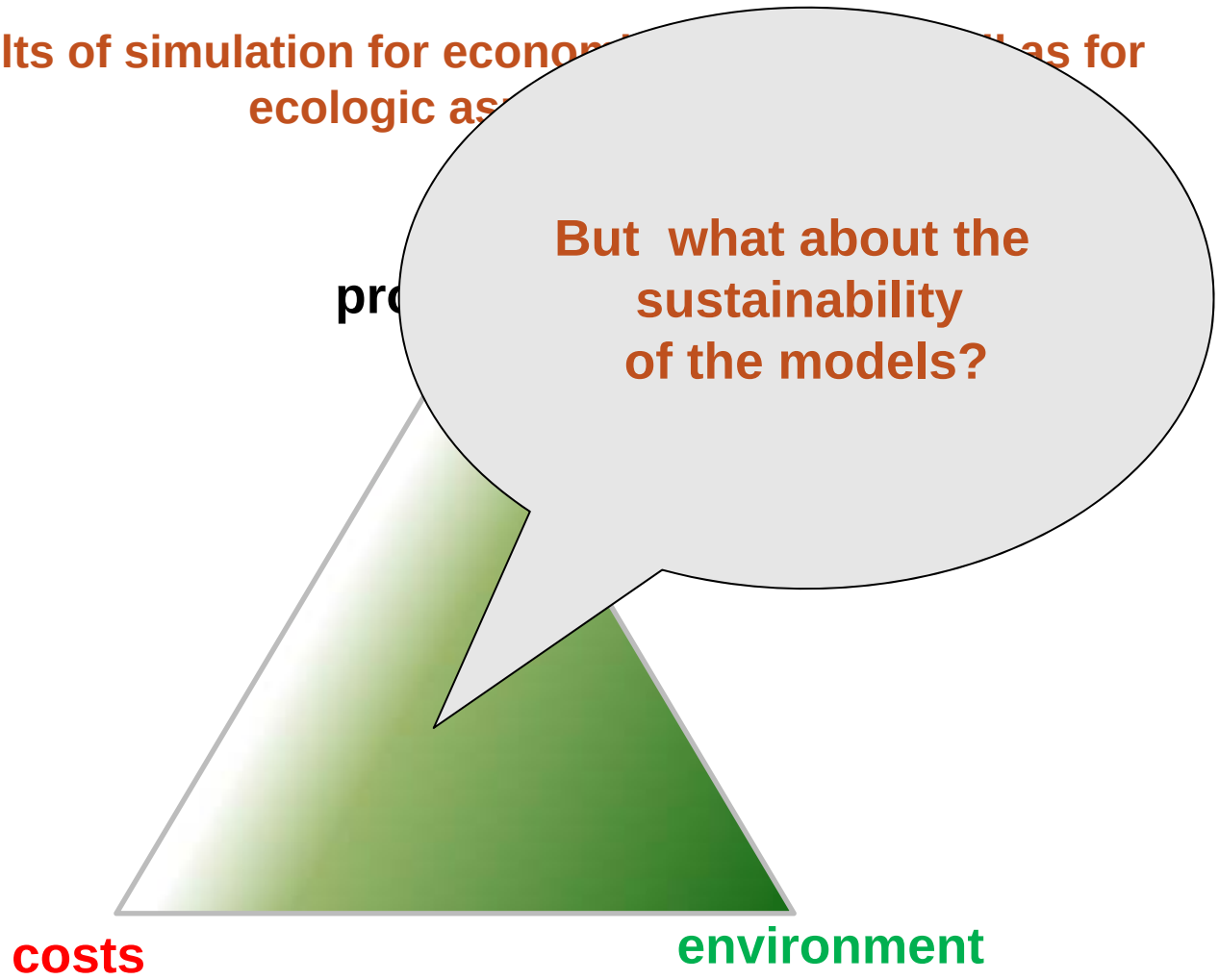
**... But what are the ecological impacts of the terminal?**

| | | | RTG/TC | RMG/AGV auto |
|---|---|---|---|---|
| equipment use | No. of STSCs | 12 | 12 | 12 |
| | No. of SCs | 45 | X | X |
| | No. of TCs/AGVs | X | 53 | 56 |
| | No.of RTGs/RMGs | X | 25 | 17 |
| | STSC operation hours | 1130 | 1074 | 1057 |
| | SC operation hours | 5016 | X | X |
| evaluation production centres | DS800 average service time | 12.5 | 10.5 | 10.1 |
| | DS800 aver. moves/hr (total) | 128.0 | 152.0 | 158.0 |
| | DS800 aver. moves/hr per STSC | 29.3 | 31.5 | 32.9 |
| | F120 average service time | 4.5 | 4.3 | 4.1 |
| | F120 aver. moves/hr (total) | 53.0 | 56.0 | 59.0 |
| | F120 aver. moves/hr per STSC | 21.3 | 21.6 | 22.83 |
| | F250 average service time | 8.8 | 8.0 | 7.8 |
| | F250 aver. moves/hr (total) | 57.0 | 62.33 | 64.0 |
| | F250 aver. moves/hr per STSC | 20.4 | 21.5 | 22.6 |
| | total berth operation time | 218.0 | 195.0 | 189.0 |
| costs | costs per move [€] | | | |

**The decision from an economical view is supported based on operational costs and investment**

Use the results of simulation for econon as for ecologic as

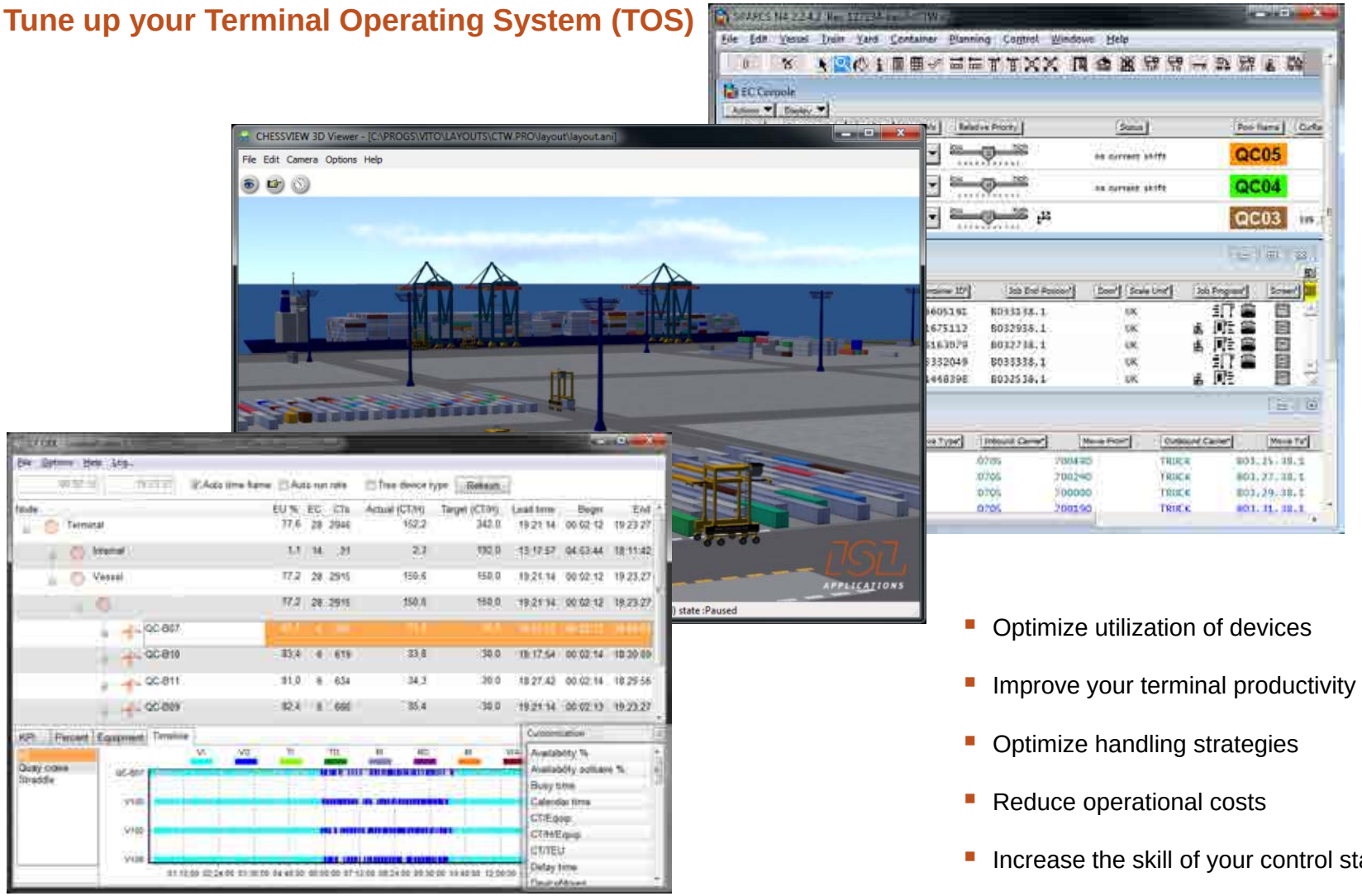
pr



CHESSCON
VIRTUAL TERMINAL

ISL APPLICATIONS

## Tune up your Terminal Operating System (TOS)




- Optimize utilization of devices
- Improve your terminal productivity
- Optimize handling strategies
- Reduce operational costs
- Increase the skill of your control staff

# TOS development challanges

- Central control instead of decentral intelligence
- Prevention of Collisions
- Direct handshake requires synchronisation
- Find the optimal sequence of working orders (OR methods)

→ Terminal Operating Systems are getting more and more complex

*Within the first step the development of the IT for the fully automated Terminal in Altenwerder had cost*

*26 M€*

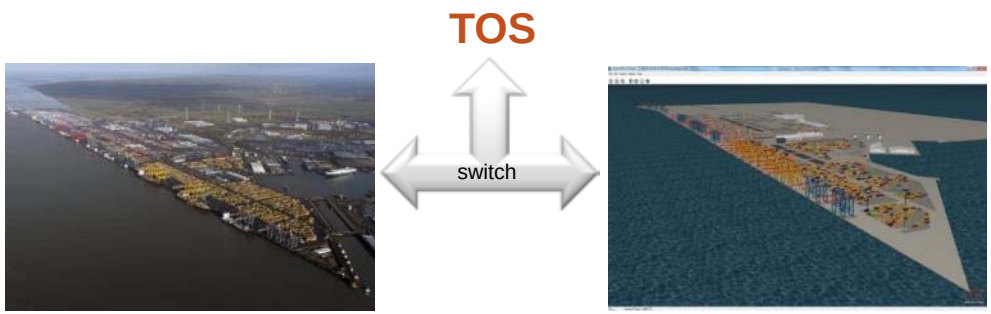
*(Interview with IT Director Michael Busch, Logistik Heute, 7-8/2004)*

# The main mission of CHESS**CON** VIRTUAL TERMINAL

what you can do with CHESS**CON**

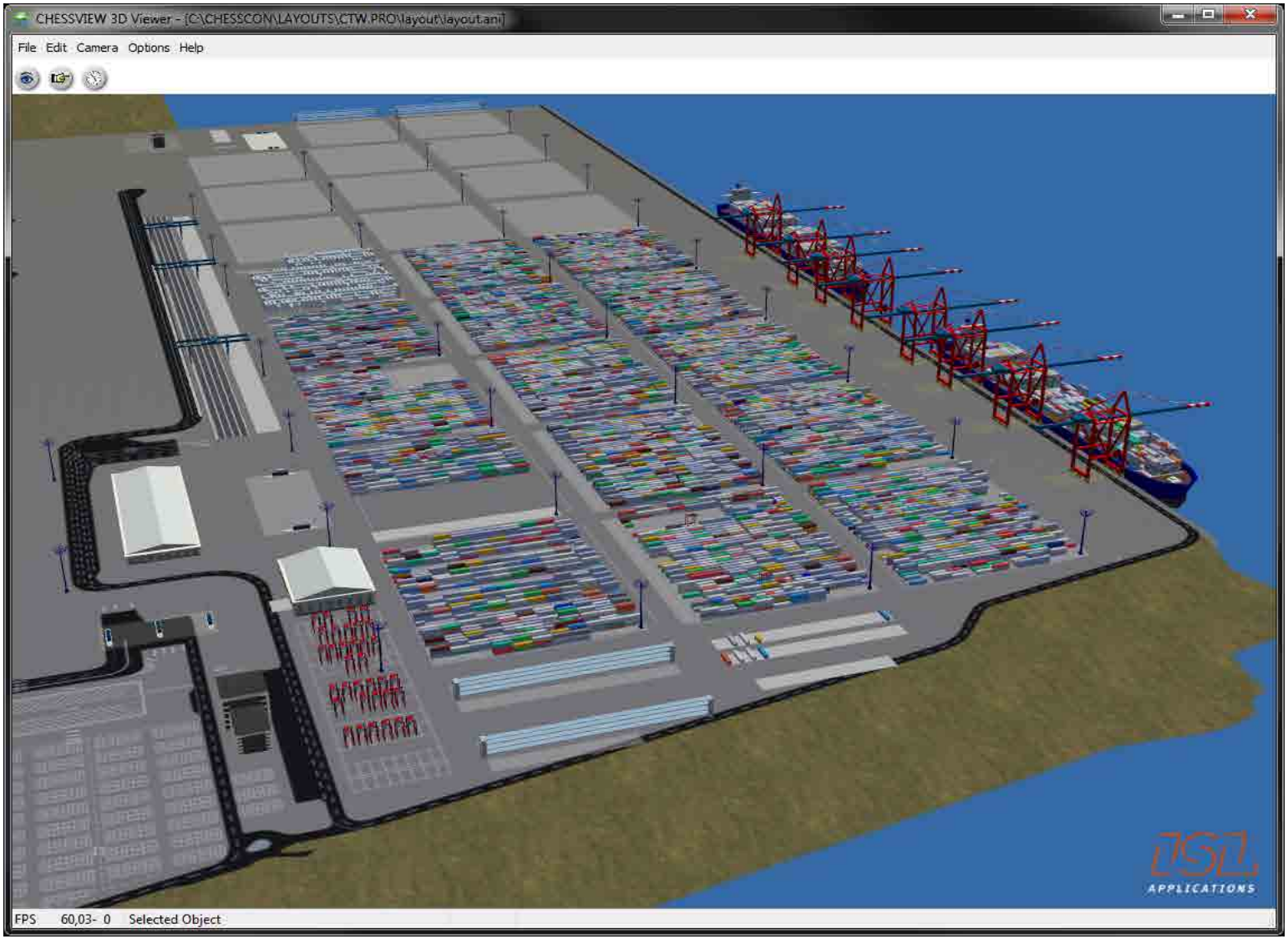
Emulation:

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




**JadeWeserPort, 28th November 2011**
**(no on-site-test available)**

## Jade Weser Port, 11/2011,
## first virtual on-site-test possible :-)



# Upgrading TOS

# NTB (controlled by Sparcs 3.7)

File Edit Vessel Yard Container Planning Control Windows Help

TGHU4001574>>261284 completed. Y>V

## EC Console

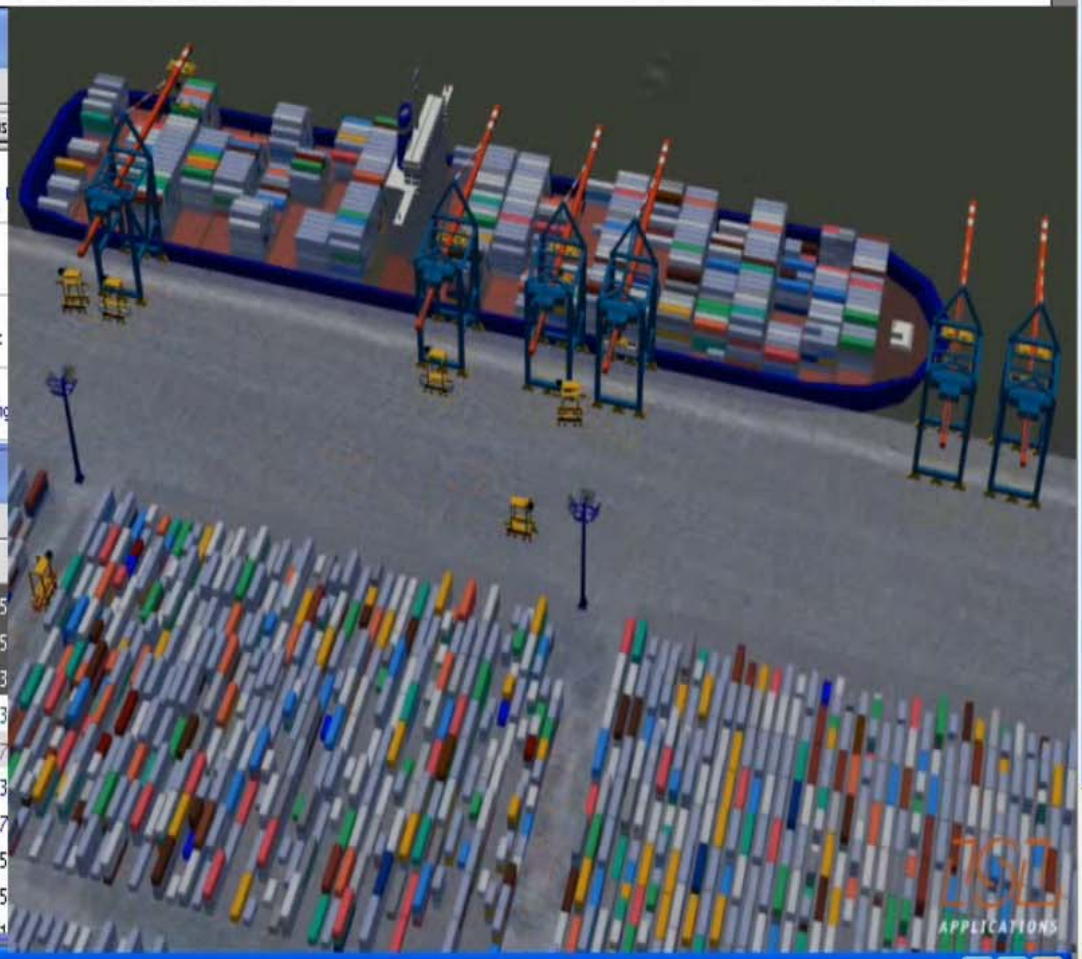
Actions Display

| Pool | Pow Name | Dispatch Mode | PushRate | Max PMs | Relative Priority | Status |
|---|---|---|---|---|---|---|
| N09 Kassl | B09 | PrimeRoute | 40 | 8 | low high | Awaiting |
| N10 Kassl | B10 | PrimeRoute | 40 | 8 | low high | |
| N11 | B11 | Auto | 40 | 8 | low high | no current |
| N12 Kassl | B12 | PrimeRoute | 40 | 8 | low high | Awaiting |

## Point of Work B10

Actions Display

| Container No.* | Kind* | From* | Len* | Tare (kg)* | Dispatch State* | |
|---|---|---|---|---|---|---|
| PONU7353480 | DSCH | 462020 | 40' | 4000 | Completed | B95905 |
| MSKU0179252 | DSCH | 461820 | 40' | 4000 | Completed | C97715 |
| MSKU1190240 | DSCH | 461818 | 40' | 4000 | Completed | C97713 |
| MSKU0190626 | DSCH | 462018 | 40' | 4000 | Carrying | C97713 |
| MSKU9289414 | DSCH | 461616 | 40' | 4000 | Dispatched | A92717 |
| MSKU1550270 | DSCH | 461816 | 40' | 4000 | Dispatched | A97203 |
| MSKU9735481 | DSCH | 462016 | 40' | 4000 | Dispatched | A97417 |
| MRKU2668918 | DSCH | 461614 | 40' | 4000 | dependent | A92715 |
| MSKU9972288 | DSCH | 461814 | 40' | 4000 | dependent | B94415 |



## Equipment Pool N10: 5

Actions Display

| id* | P.O.W.* | Pool* | Screen* | Job Progress* | Last Known Position* | Last Cntr* | Job Start Position* | Container No.* | Kind* | Job End Position* | Dispatch* | Dispatch State* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| VC59 | B10 | N10 | | | C97715.1 | MSKU0179252 | B10 (46B) | MSKU1550270 | DSCH | A97203.2 | | Vessel Discharge; Moving to Ship |
| VC61 | B10 | N10 | | | C97713.2 | MSKU1190240 | B10 (46B) | MSKU9735481 | DSCH | A97417.2 | | Vessel Discharge; Moving to Ship |
| VC84 | B10 | N10 | | | B95905.1 | PONU7353480 | B10-1 46B | MSKU9289414 | DSCH | A92717.3 | | Vessel Discharge; Moving to Ship |
| VC92 | B10 | N10 | | | BTH4-1 | | B10-1 46B | MSKU0190626 | DSCH | C97713.3 | | Vessel Discharge; Carrying to Row |

# Terminal productivity

**TOS**

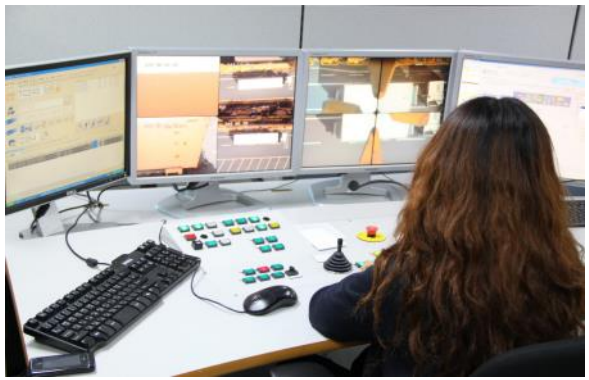
**Process automation**

**Terminal productivity**

**Equipment**

The first ALV of KMI

**Terminal staff**



Terminal‘s productivity is driven by

- The equipment
- The control system (TOS)
- The processes

Terminal Automation (processes as well as equipment) prepares for optimised operation, but more than ever very skilled control staff is required.

The last sentence within the Singapore Maritime Gallery (opened 09/2012):

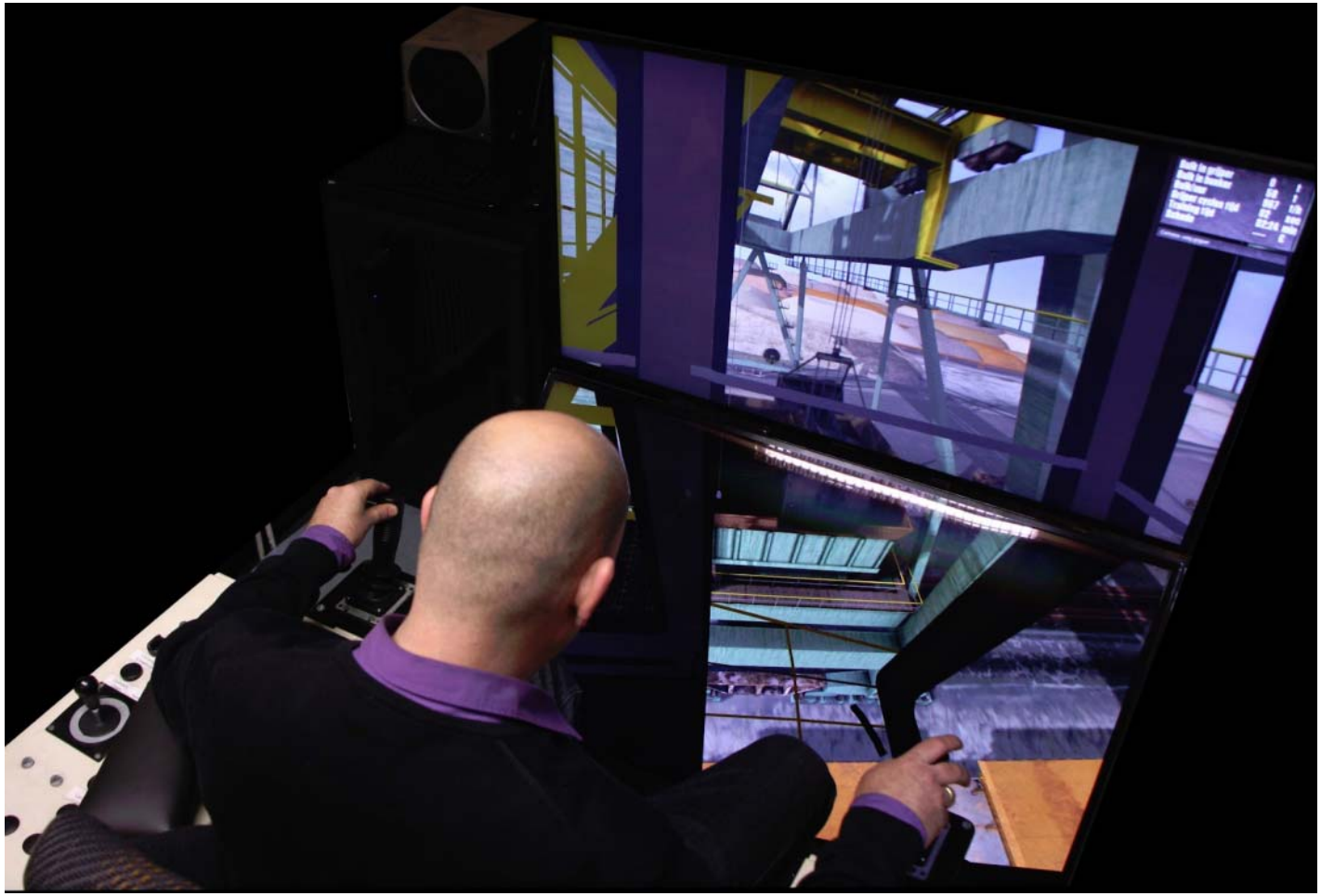
**„ It is man making the difference“**

# Vessel simulator

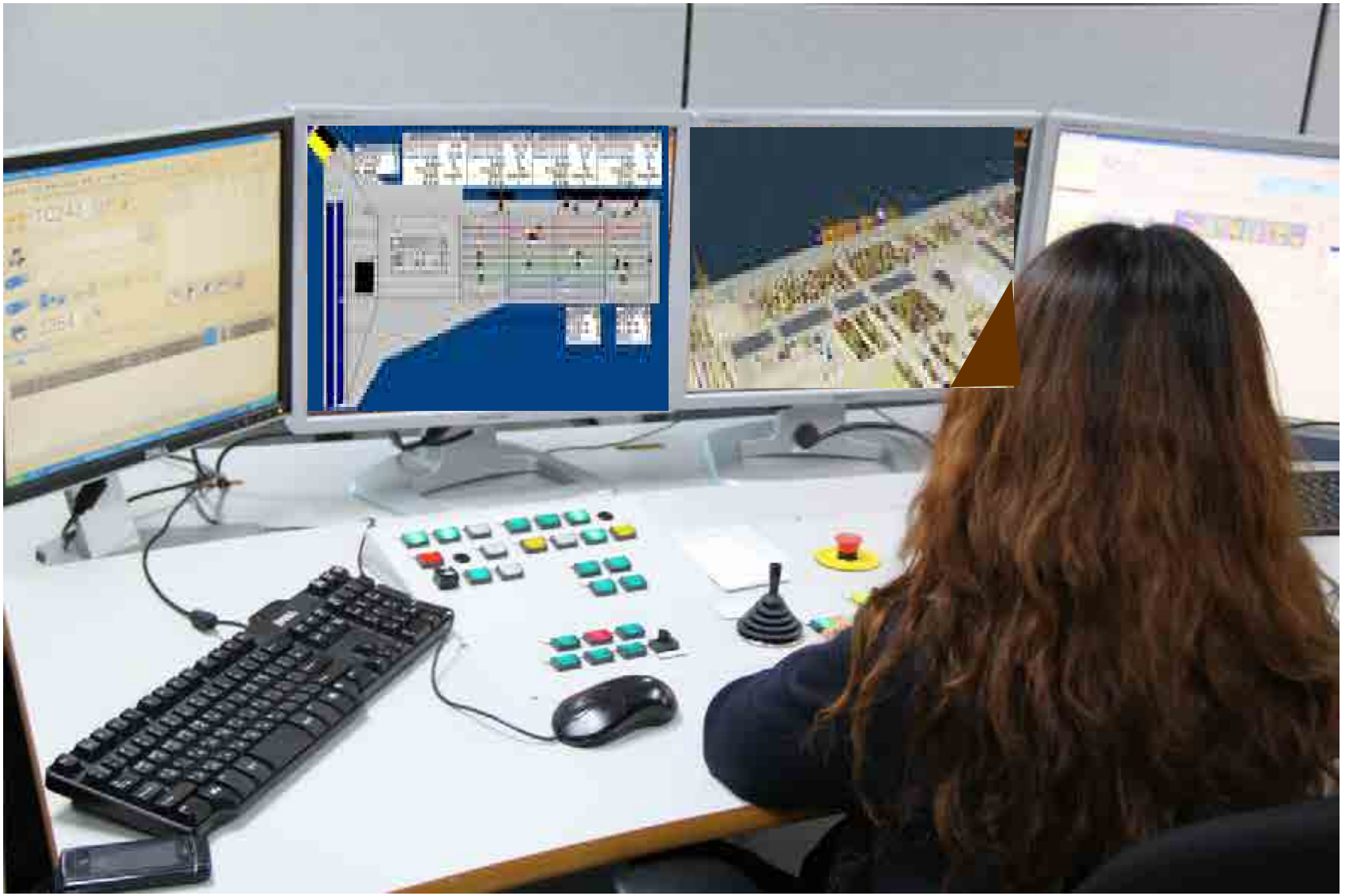
- train your control staff (as shipping lines do)

# Crane simulator

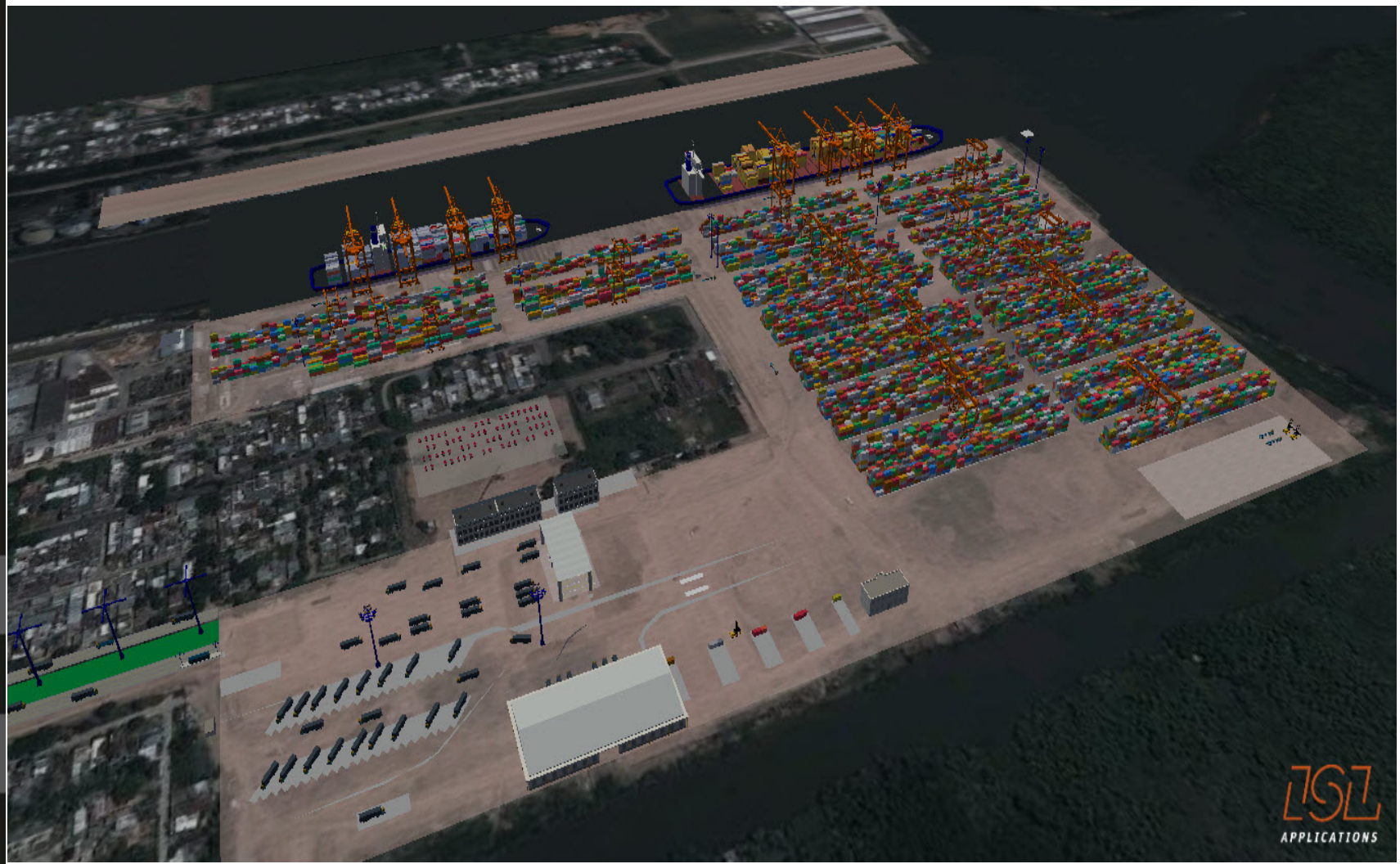
- train your control terminal staff (as you do with crane drivers)



# Become a grandmaster in terminal control



# ICTSI – TecPlata Fase 3

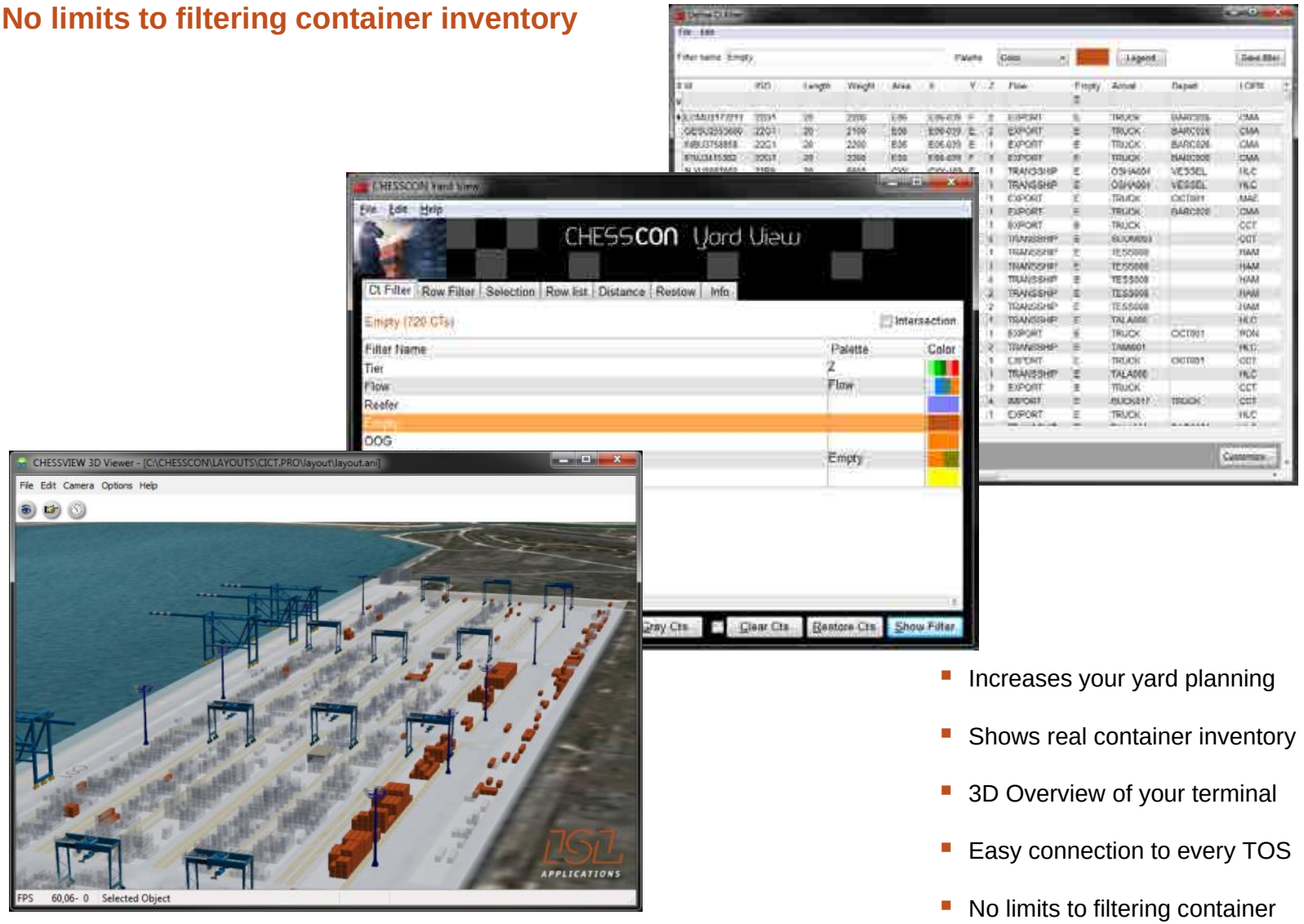


# Even more operational …

CHESSCON
YARD VIEW

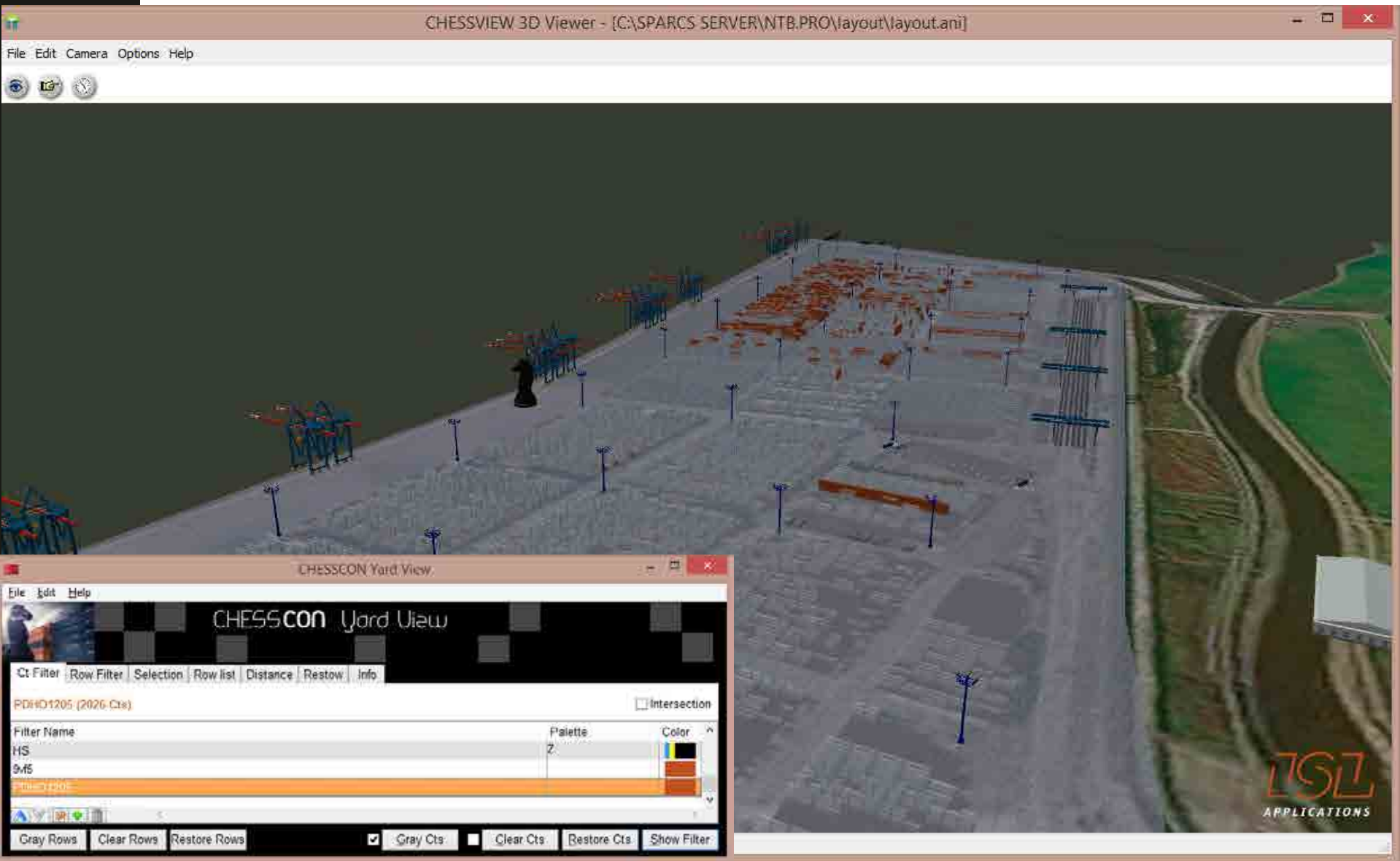
APPLICATIONS

## No limits to filtering container inventory




- Increases your yard planning
- Shows real container inventory
- 3D Overview of your terminal
- Easy connection to every TOS
- No limits to filtering container

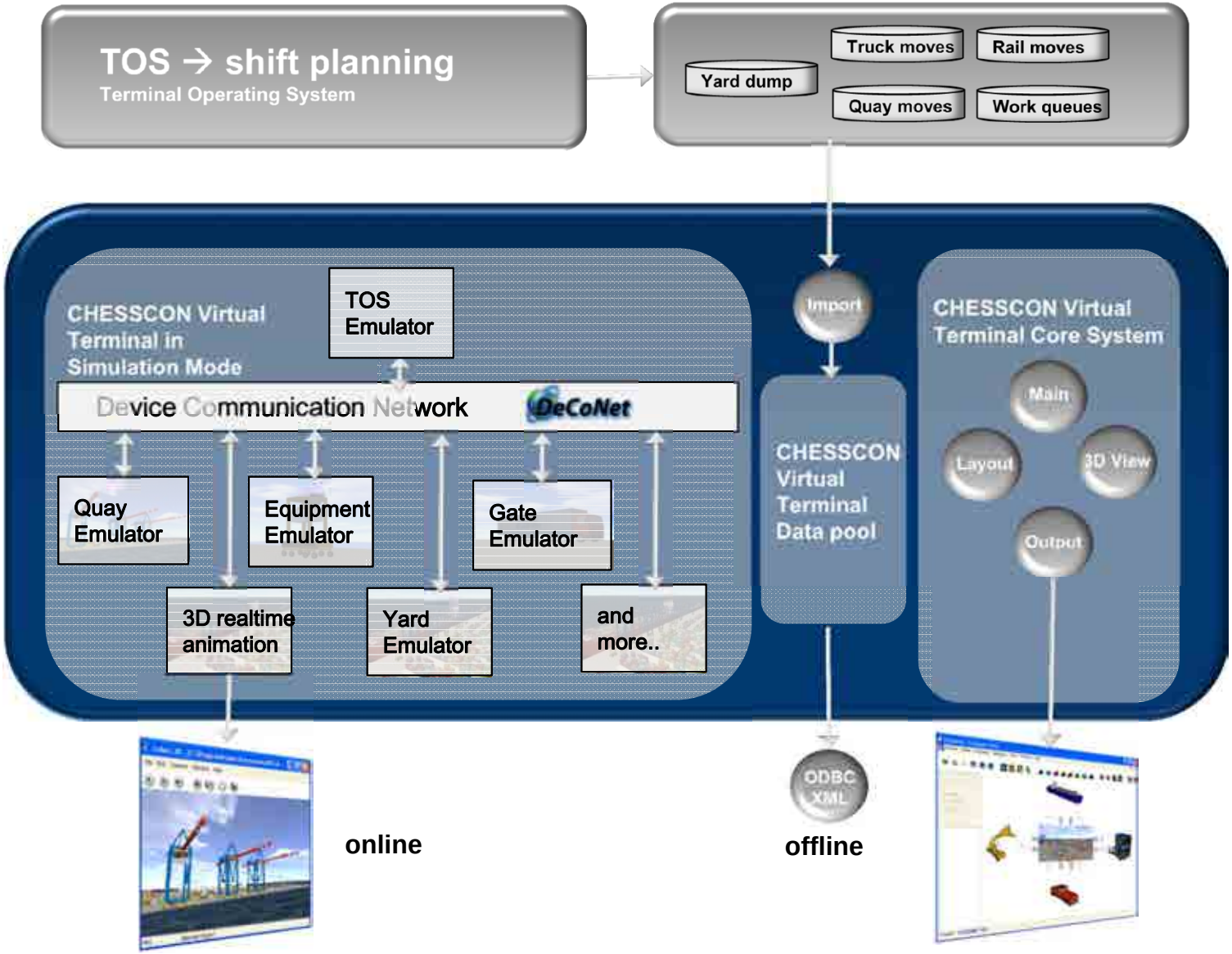
# NTB with Sparcs 3.7



# SPRC with Sparcs 3.7

# Shift Preview

→ evaluate the next shift
→ simulation mode → max 1-2 min
→ detect bottlenecks and overutilisation
→ become proactive



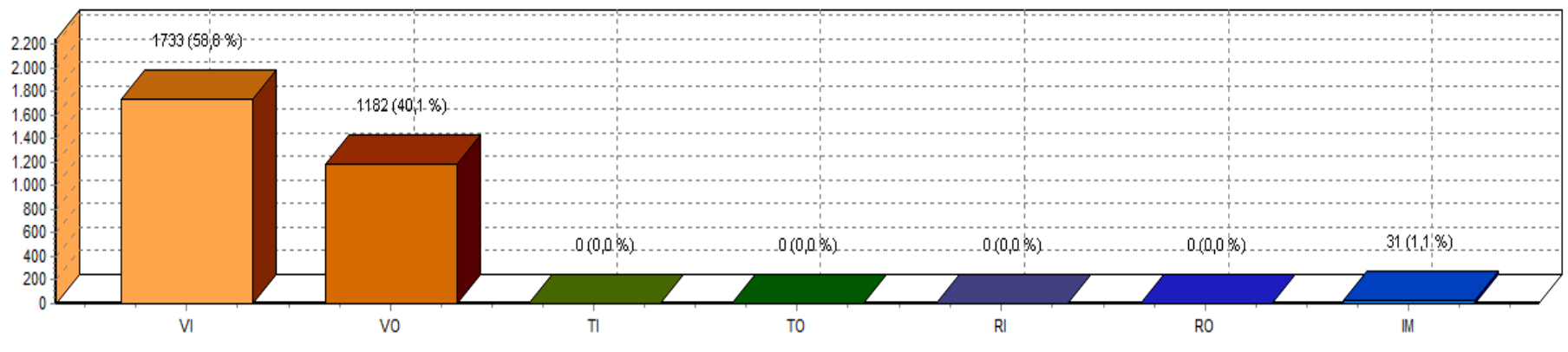
CT OEE - LoadedFolder: C:\CHESSCON\projects\NTB.PRO\evaluation\Surabaya\

File Options Help

00:02 19:23 Auto time frame Default tree Refresh

| Node | OEE % | U % | P % | EC | CTs | Ct/h | TM/h | Target (TM/h) | Lead time | Begin | End |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Terminal | 59,7 | 74,2 | 80,5 | 28 | 2946 | 152,2 | 268,9 | 334,0 | 19:21 | 00:02 | 19:23 |
| Vessel | 59,3 | 74,1 | 80,0 | 28 | 2915 | 150,6 | 267,3 | 334,0 | 19:21 | 00:02 | 19:23 |
| MAERSK_SURA | 59,3 | 74,1 | 80,0 | 28 | 2915 | 150,6 | 267,3 | 334,0 | 19:21 | 00:02 | 19:23 |
| QC-B07 | 56,1 | 75,2 | 74,6 | 4 | 359 | 21,2 | 40,3 | 54,0 | 16:55 | 00:02 | 16:58 |
| QC-B08 | 68,1 | 73,5 | 92,6 | 6 | 617 | 36,5 | 64,8 | 70,0 | 16:55 | 00:02 | 16:57 |
| QC-B09 | 63,2 | 74,5 | 84,9 | 6 | 686 | 35,4 | 59,4 | 70,0 | 19:21 | 00:02 | 19:23 |
| QC-B11 | 66,0 | 75,9 | 86,9 | 6 | 634 | 34,3 | 60,8 | 70,0 | 18:27 | 00:02 | 18:29 |
| QC-I | 61,6 | 69,8 | 88,3 | 1 | 634 | 34,3 | 26,5 | 30,0 | 18:27 | 00:02 | 18:29 |
| VC5 | 69,7 | 77,9 | 89,5 | 1 | 130 | 7,2 | 7,2 | 8,0 | 18:09 | 00:12 | 18:22 |
| VC5 | 67,1 | 77,1 | 87,0 | 1 | 127 | 7,0 | 7,0 | 8,0 | 18:15 | 00:12 | 18:28 |
| VC5 | 64,7 | 75,8 | 85,4 | 1 | 124 | 6,8 | 6,8 | 8,0 | 18:09 | 00:11 | 18:21 |
| VC5 | 68,1 | 78,7 | 86,6 | 1 | 126 | 6,9 | 6,9 | 8,0 | 18:11 | 00:11 | 18:22 |

Overview Percent Equipment Time line Standby



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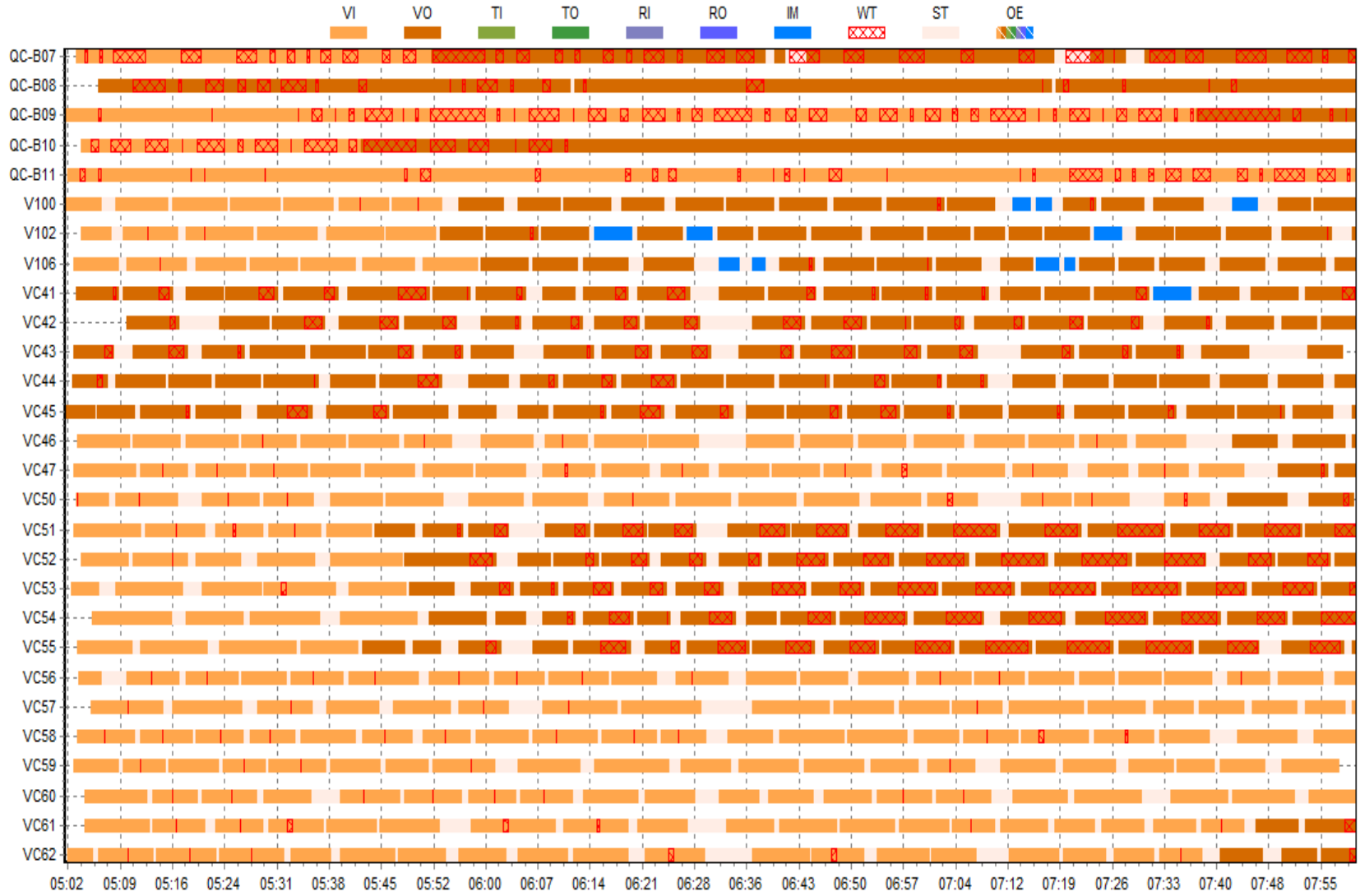
File Options Help

05:02 08:00 Auto time frame Default tree Refresh

| Node | OEE % | U % | P % | EC | CTs | Ct/h | TM/h | Target (TM/h) | Lead time | Begin | End |
|---|---|---|---|---|---|---|---|---|---|---|---|

Overview Percent Equipment Time line Standby

All
Quay crane
Straddle



## Summary

Improve Operation Intelligence

- by training of your controls staff using Virtual Terminals
- by fine-tuning your operational strategies (YardView)
- by becoming pro-active using Shift Preview options
- by new evaluation technologies (OEE)

APPLICATIONS

# THANK YOU FOR YOUR ATTENTION

ISL APPLICATIONS GMBH
Barkhausenstrasse 2
27568 Bremerhaven
Germany

WWW.ISL-APPLICATIONS.COM