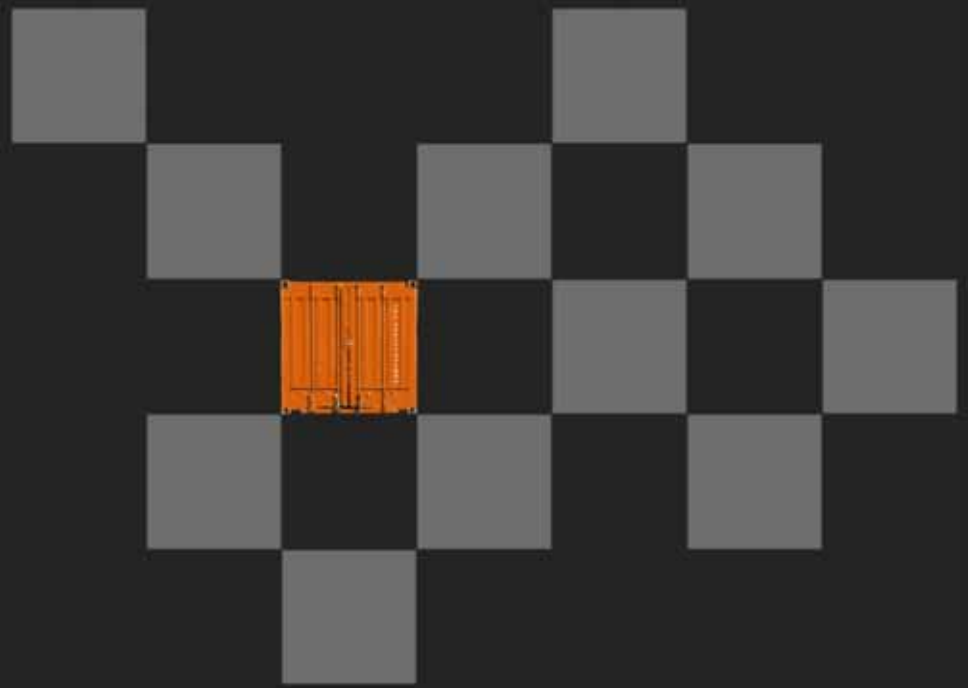
Avoiding bottlenecks by forecasting coming terminal operation - become pro-active

Dr. Holger Schütt
ISL Applications GmbH



8th Philippine Ports & Shipping 2015
Manila, February 11th-13th

Agenda

ISL Applications

Container Terminal Simulation

Become pro-active

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Container Terminal Simulation

Become pro-active

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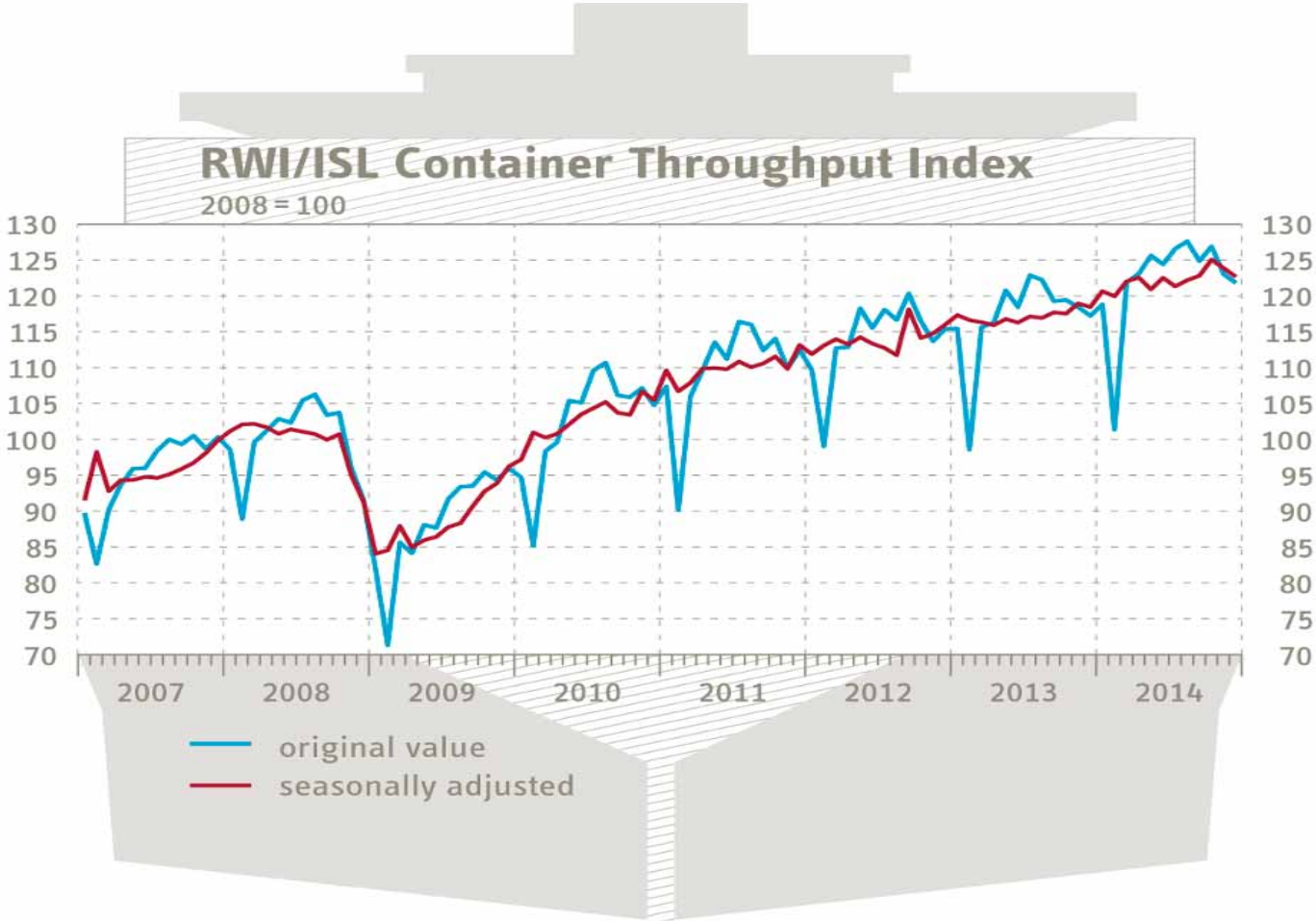

The Container Throughput Index experienced a significant decline of (revised) 123.9 to 122.7 points in December. All in all, the index is now just slightly above the level of mid-year 2014.

RWI/ISL Container Throughput index

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

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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 60 employees
- research based consultancy institute in maritime logistics

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25 Years Simulation Experience

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

Products rebranding:
CAPS
SCUSY
ViTO

Development funded by European Union Land Bremen bis

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Optimisation and Simulation – References (selected)

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 ICTSI, 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, USA
PSA International, Singapore
Red Sea Gateway Terminal, Jeddah, UAE
Sandwell Eng. Inc., Vancouver, Canada
SCT, Southampton, U.K.
SPIA ICTSI, Columbia
TecPlata ICTSI, Buenos Aires, Argentina
TotalSoftBank, Korea
TPT, South Africa
TRP, Buenos Aires, Argentina
VTE, Genoa, Italy
Warsteiner Brewery, Germany

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Agenda

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Container Terminal Simulation

Become pro-active

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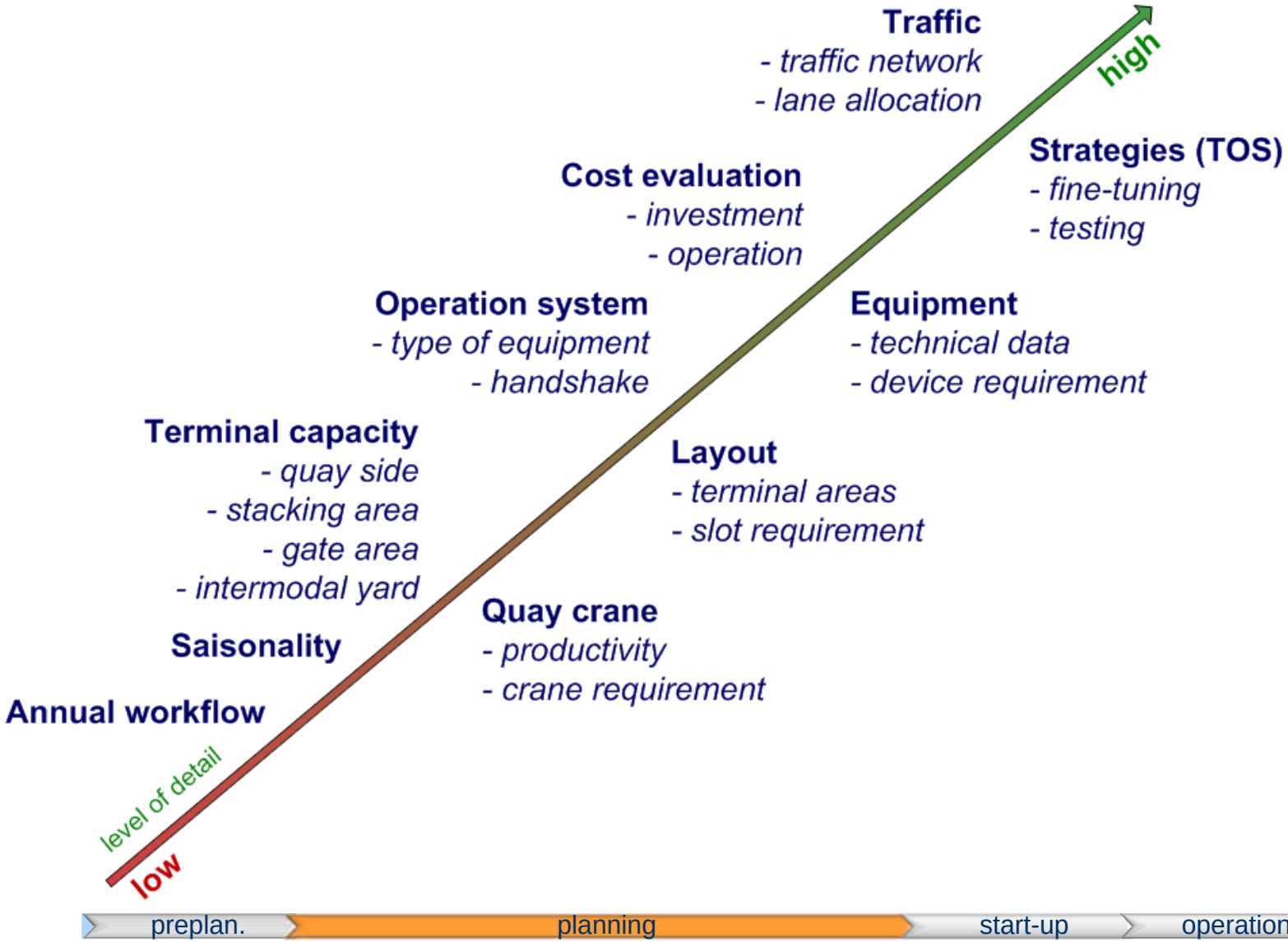
Tasks in terminal planing and optimisation



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Various layouts, which one is the best?

Tandem lift cranes, truck/chassis and RTG

© ISL 2015

Case study

Comparison of operation systems selected

		SC 1 over 3	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
evaluation production centres	aver. moves/hr per STSC	29.5	32.3	33.4
	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

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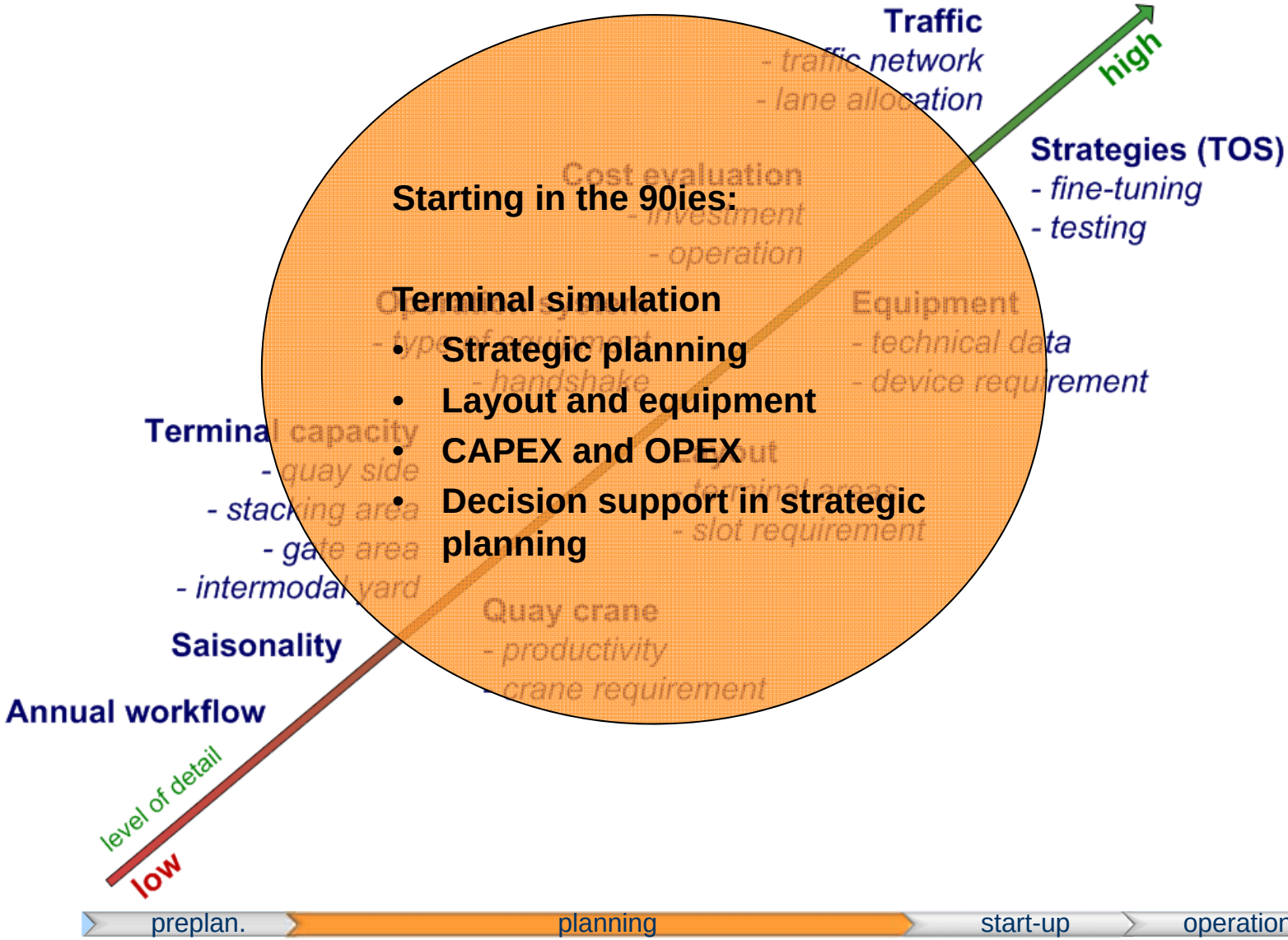
Tasks in terminal planing and optimisation



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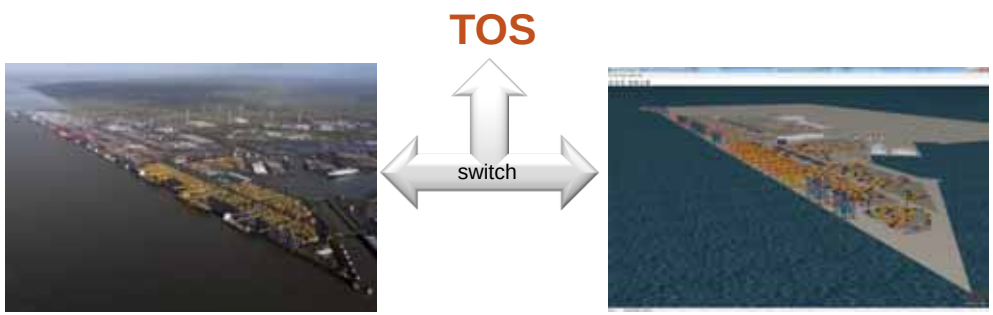
The main mission of CHESS**CON** VIRTUAL TERMINAL

what you can do with CHESS**CON**

Emulation:

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



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NTB (controlled by Sparcs 3.7)

© ISL 2015

NTB (controlled by Sparcs 3.7)

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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

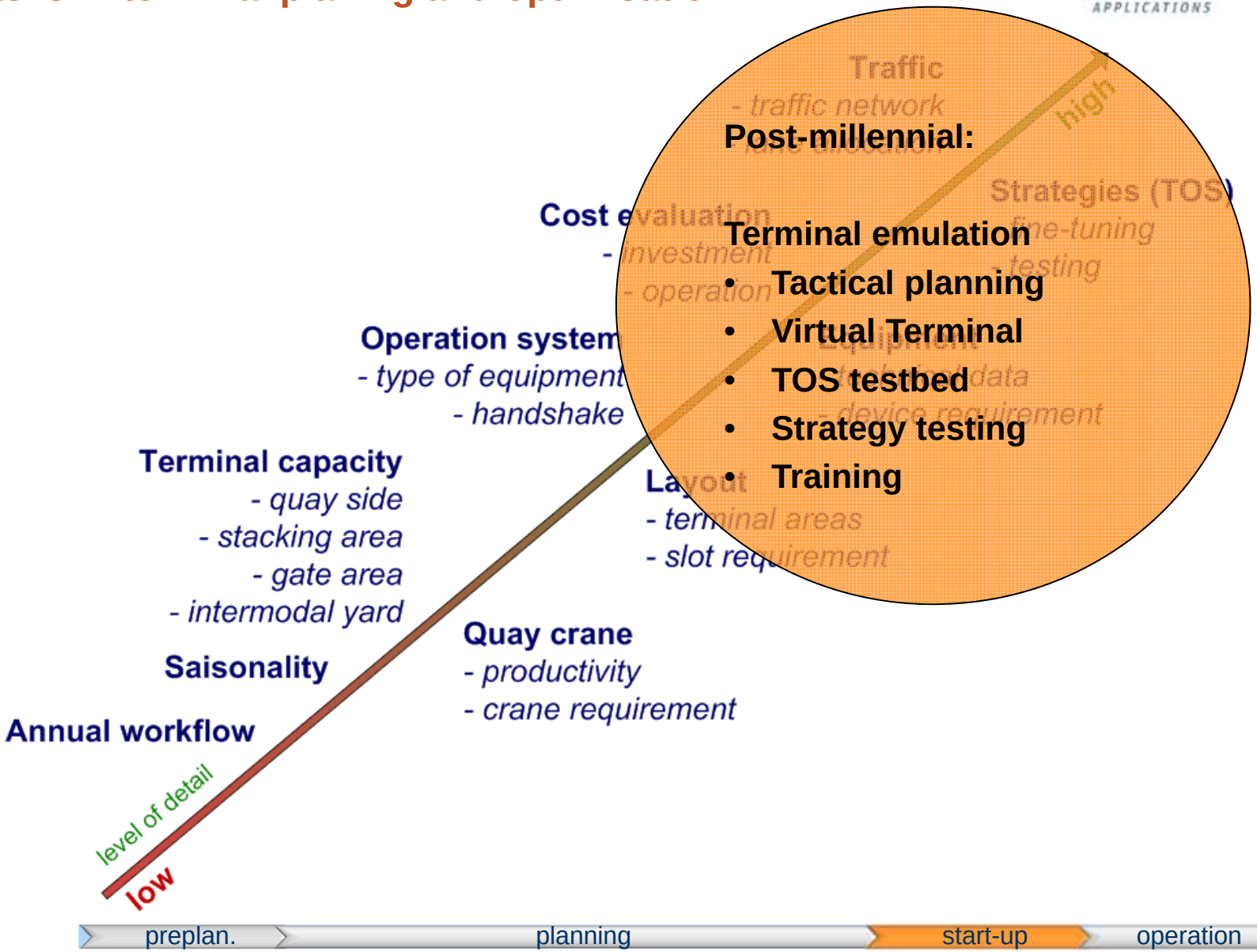
Container No.*	Kind*	From*	Len*	Tare (kg)*	Dispatch State*	
PONU7353480	DSCH	462020	40'	4000	Completed	B95905
MSKU0179252	DSCH	461820	40'	4000	Completed	C97715
MSKU1190240	DSCH	461818	40'	4000	Completed	C97713
MSKU0190626	DSCH	462018	40'	4000	Carrying	C97713
MSKU9289414	DSCH	461616	40'	4000	Dispatched	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

Tasks in terminal planing and optimisation



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Going operational…

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Agenda

ISL Applications

Container Terminal Simulation

Become pro-active

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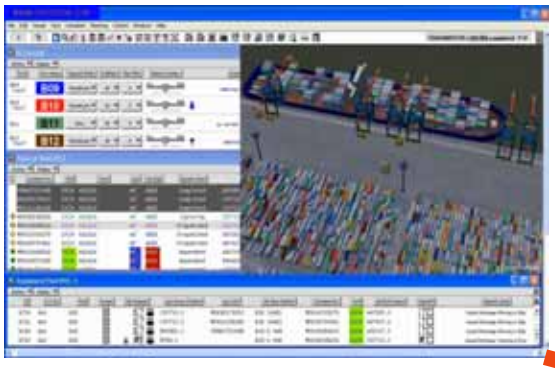
Terminal productivity



TOS

Process automation

Terminal productivity

Equipment

The first ALV of KMI

Terminal staff

© ISL 2015

- Stowage planning
- Berth planning
- Crane split planning
- Equipment planning
- Yard planning

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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“

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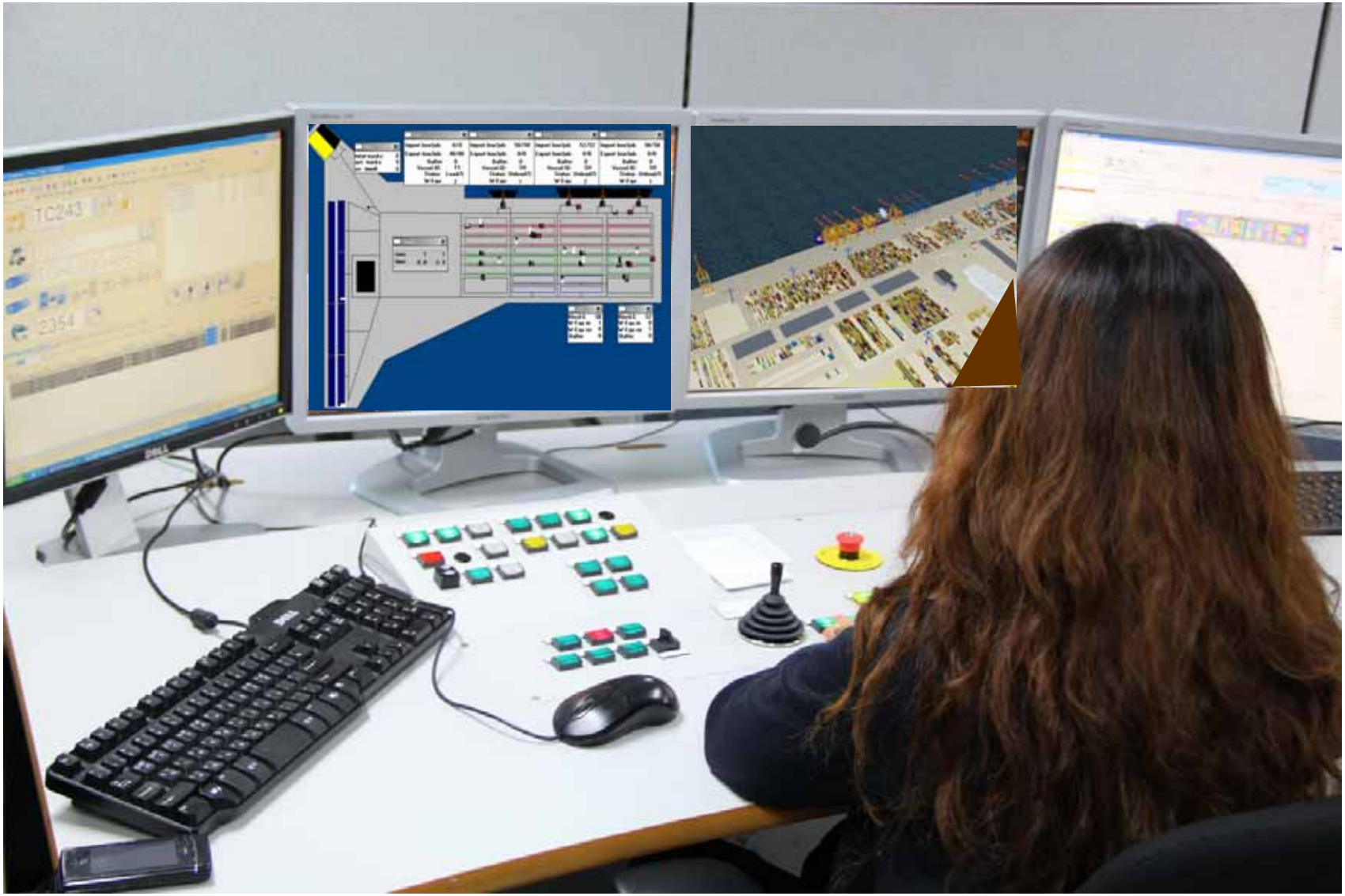
Become a grandmaster in terminal control



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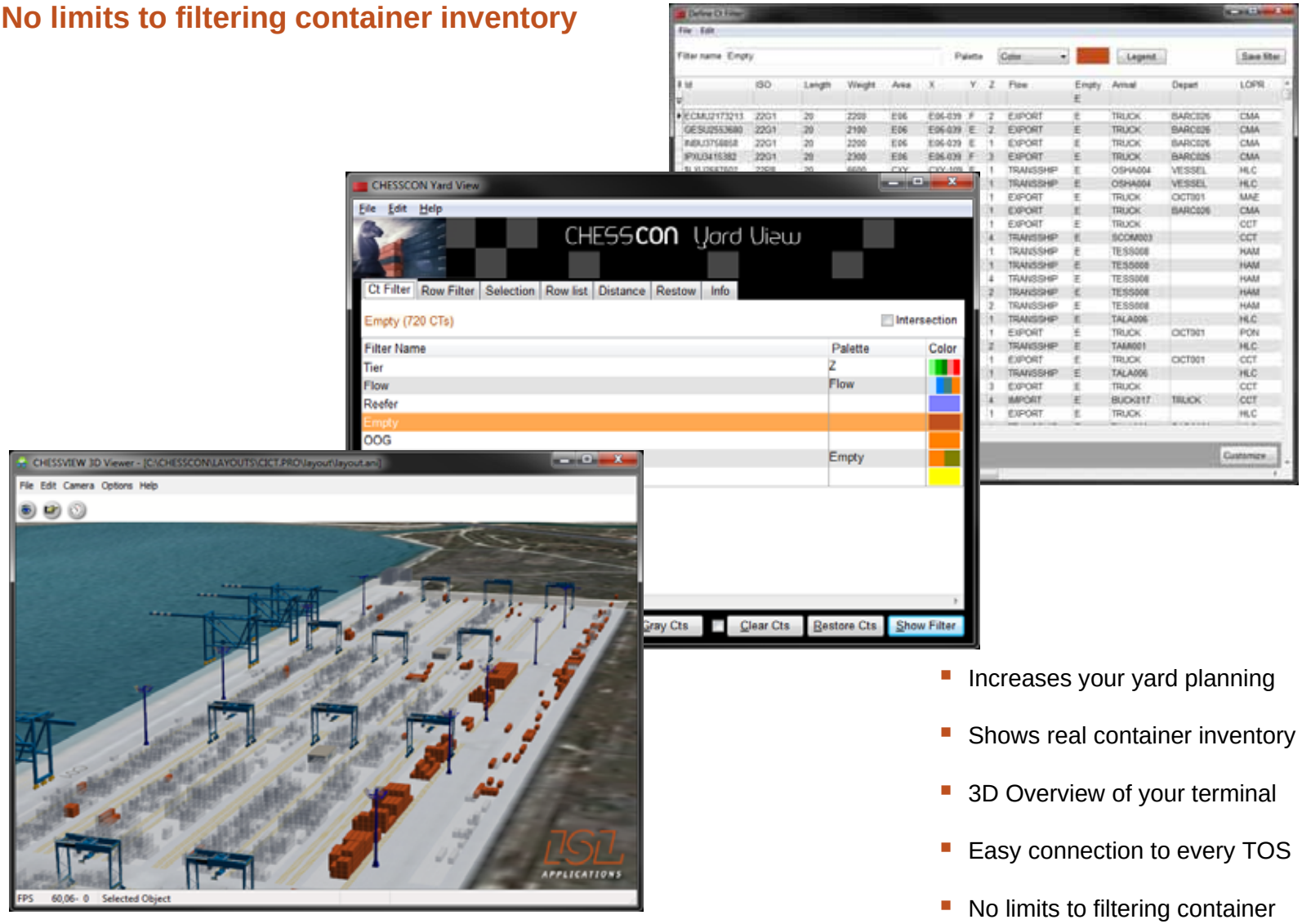
CHESSCON
YARD VIEW

ISL APPLICATIONS

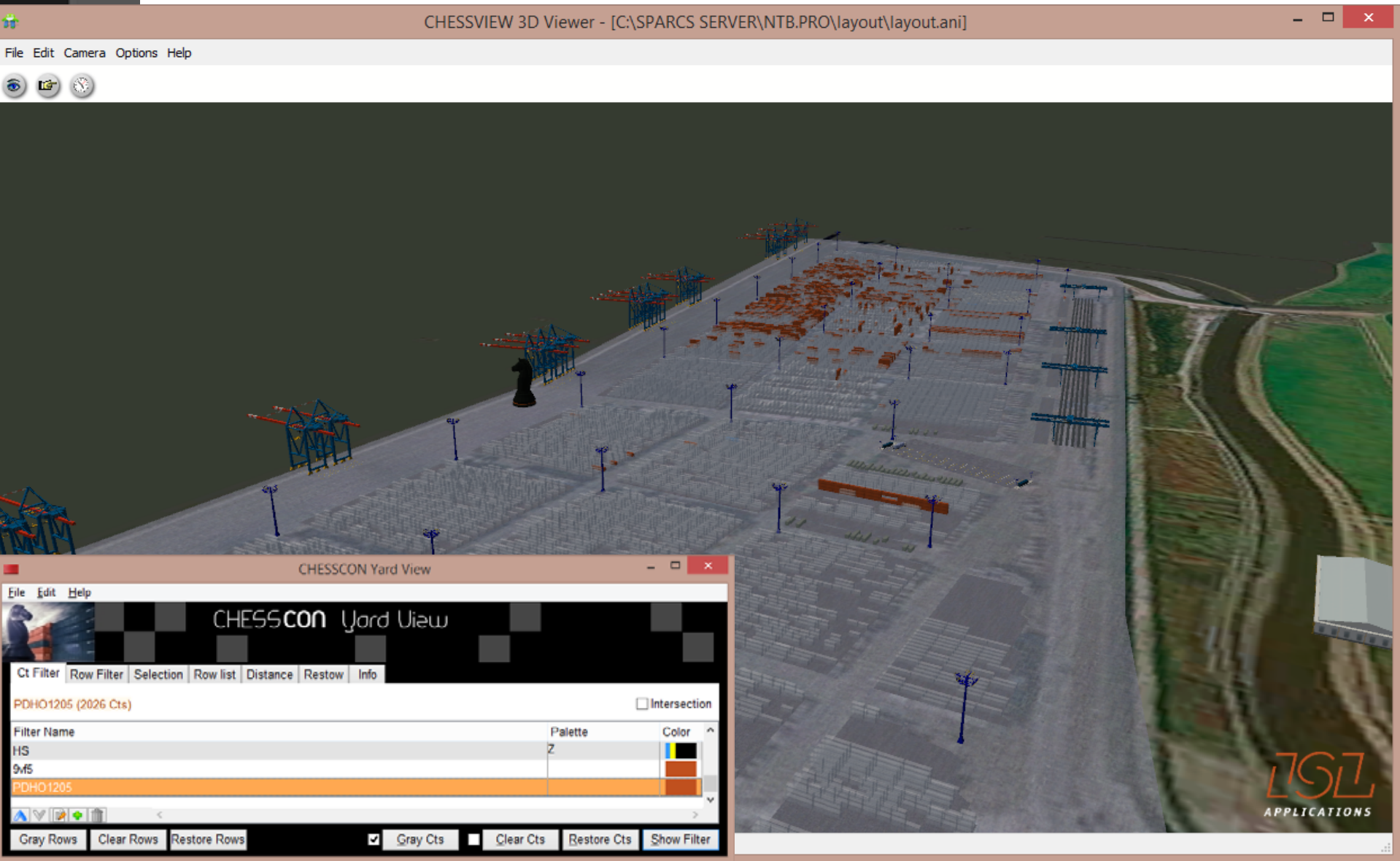
No limits to filtering container inventory



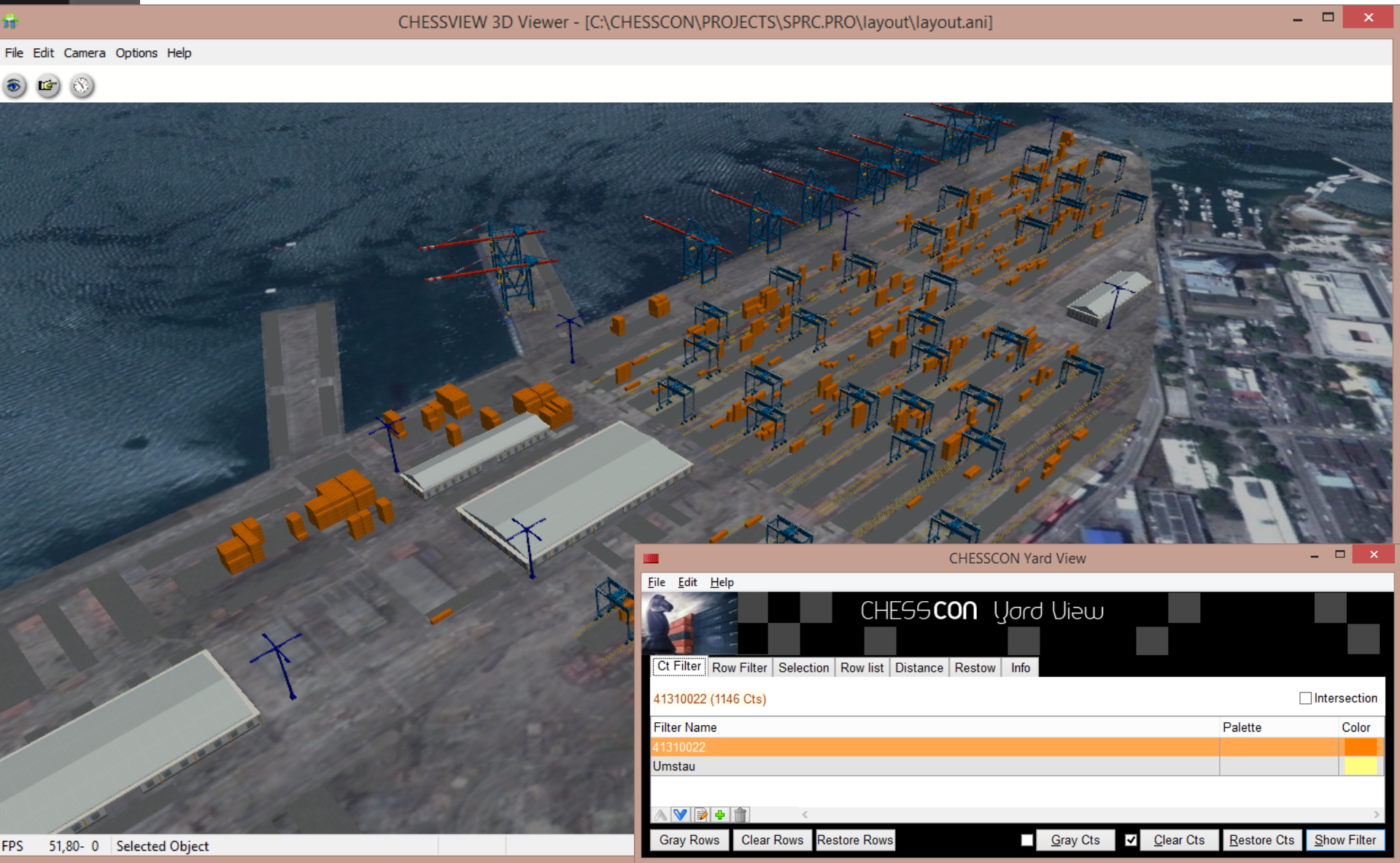
- Increases your yard planning
- Shows real container inventory
- 3D Overview of your terminal
- Easy connection to every TOS
- No limits to filtering container

© ISL 2015

NTB with Sparcs 3.7 – Yard View



SPRC with Sparcs 3.7 – Yard View



A picture tells more than 1,000 words!

→

3D Yard View supports terminal planner intuitively

© ISL 2015

The mission of CHESSCON SHIFT PREVIEW

- Check your current shift planning
- Based on your current planned data:
  Work-queues, Yard allocations, Yard inventory
  - Optimize deployment of equipment
  - Optimize yard allocations
  - Avoid yard clashes
- On short-term basis
- High-speed calculation: 8 hr shift within minutes

Development funded by: Bremerhavener Gesellschaft für Investitionsförderung und Stadtentwicklung mbH bis

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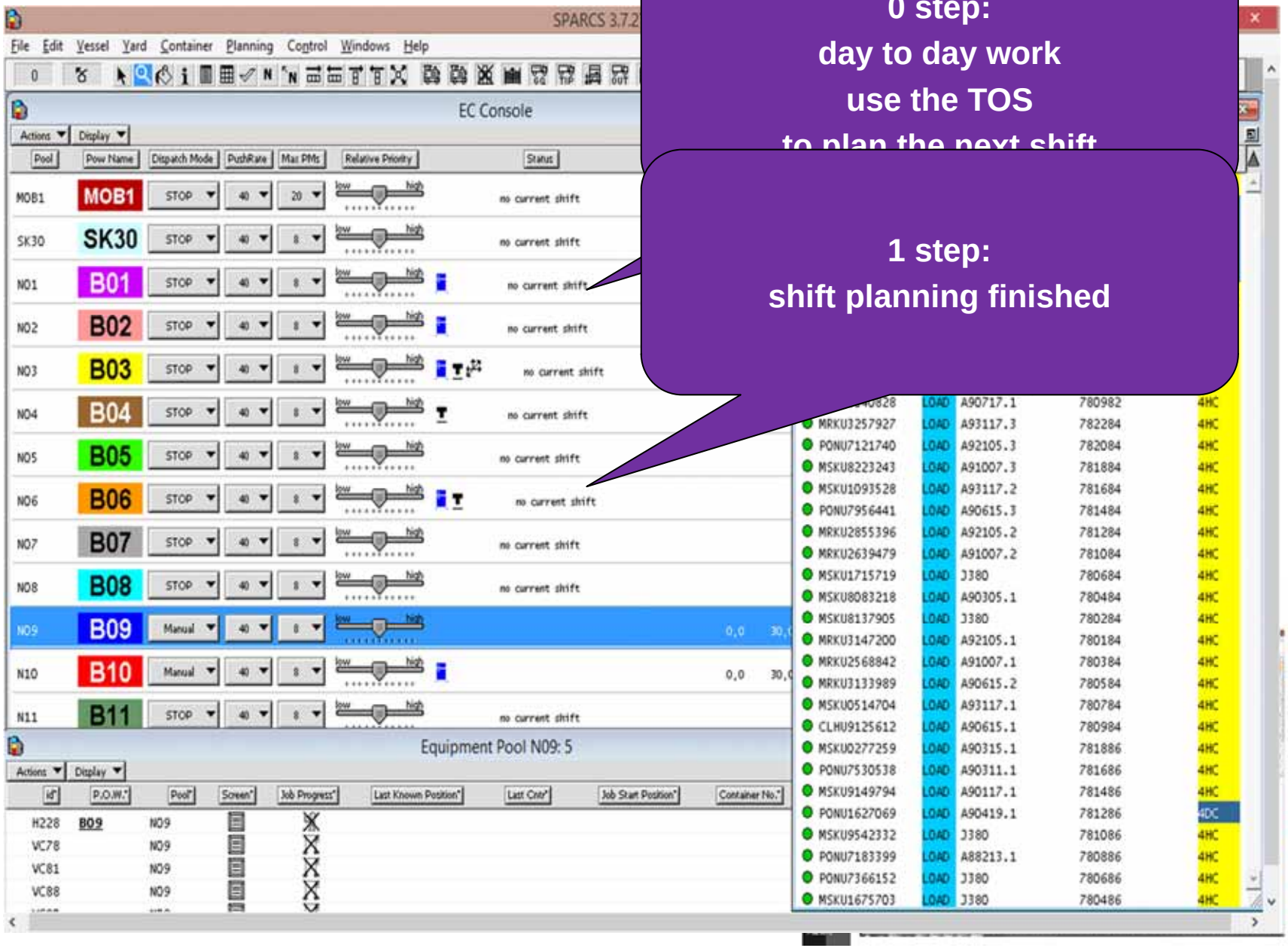
CHESS**CON** Shift Preview



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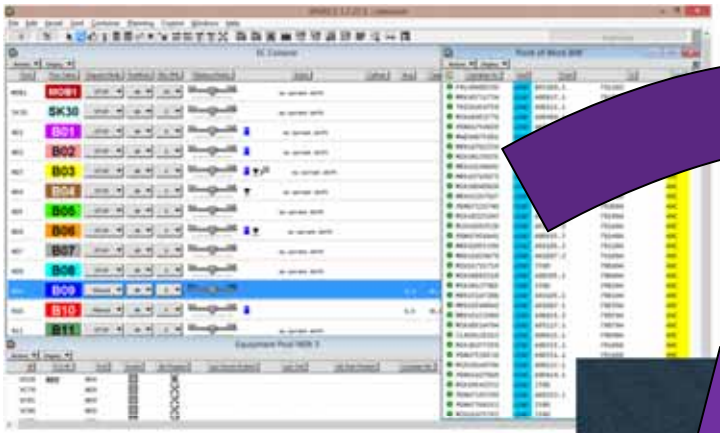
CHESS**CON** Shift Preview



2nd step:
Import planning state automatically

ample of based data

© ISL 2015

CHESS**CON** Shift Preview

3rd step:
fast simulation of the shift

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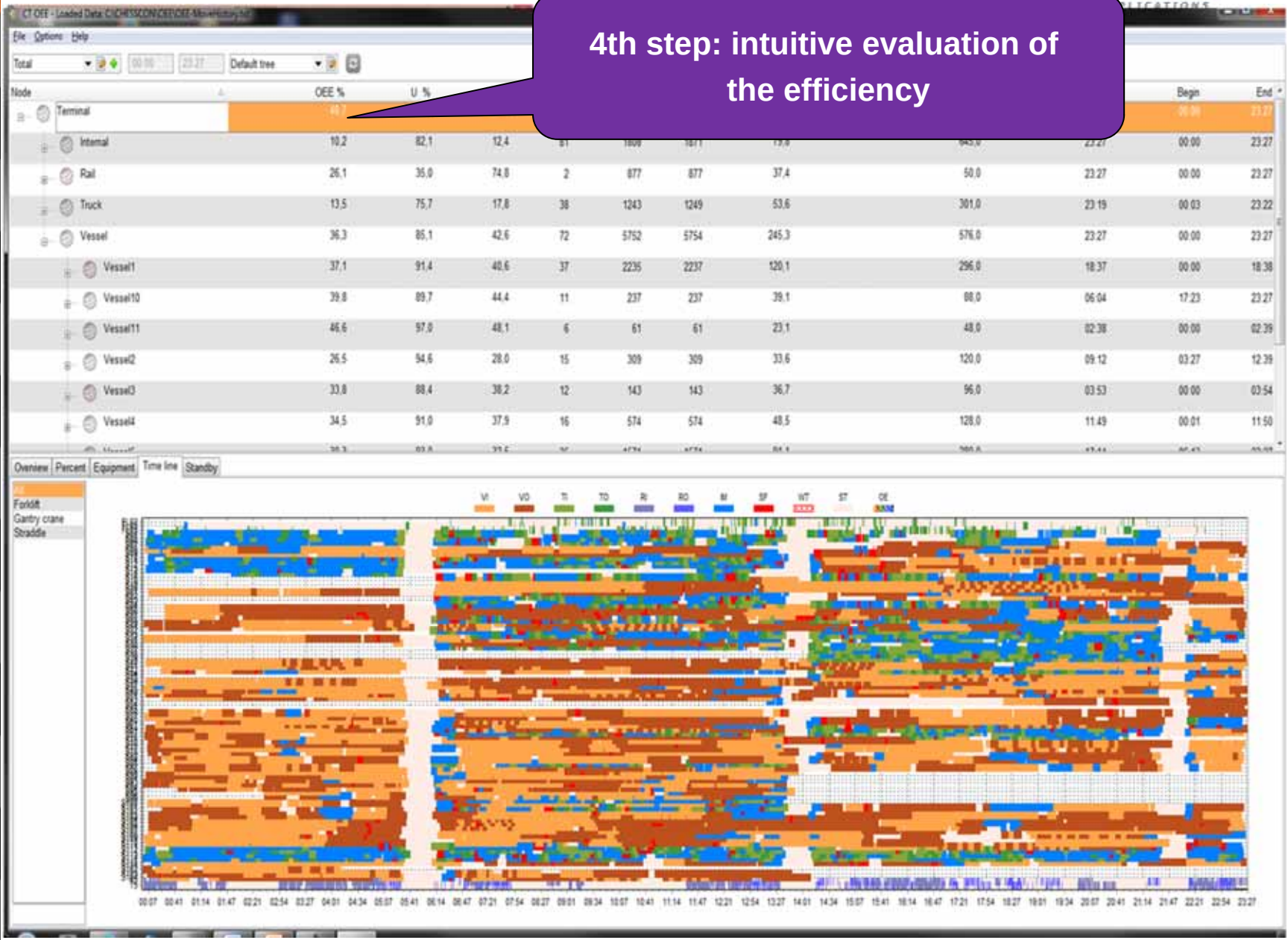
CHESS**CON** Shift Preview



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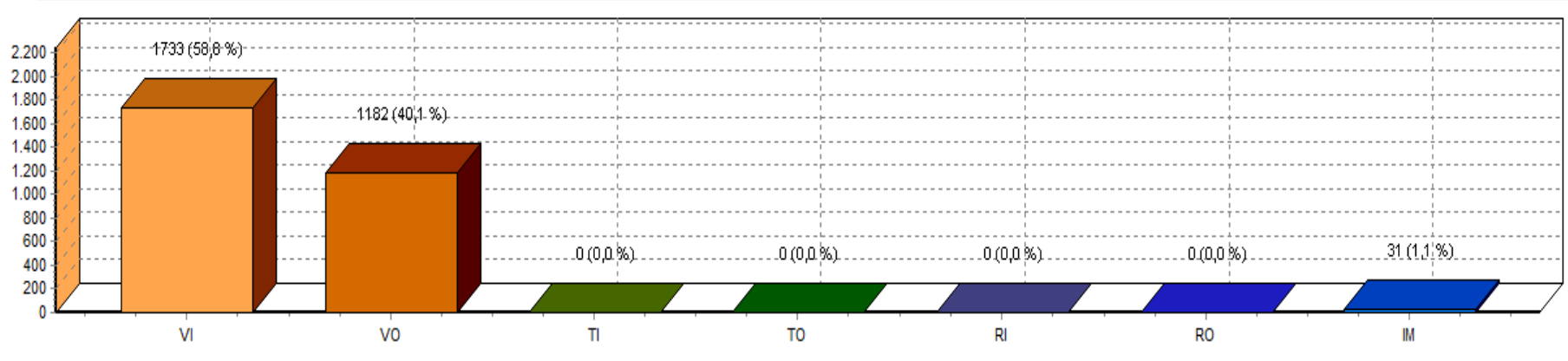
CT OEE - LoadedFolder: C:\CHESSCON\projects\NTB.PRO\evaluation\Surabaya\

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



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

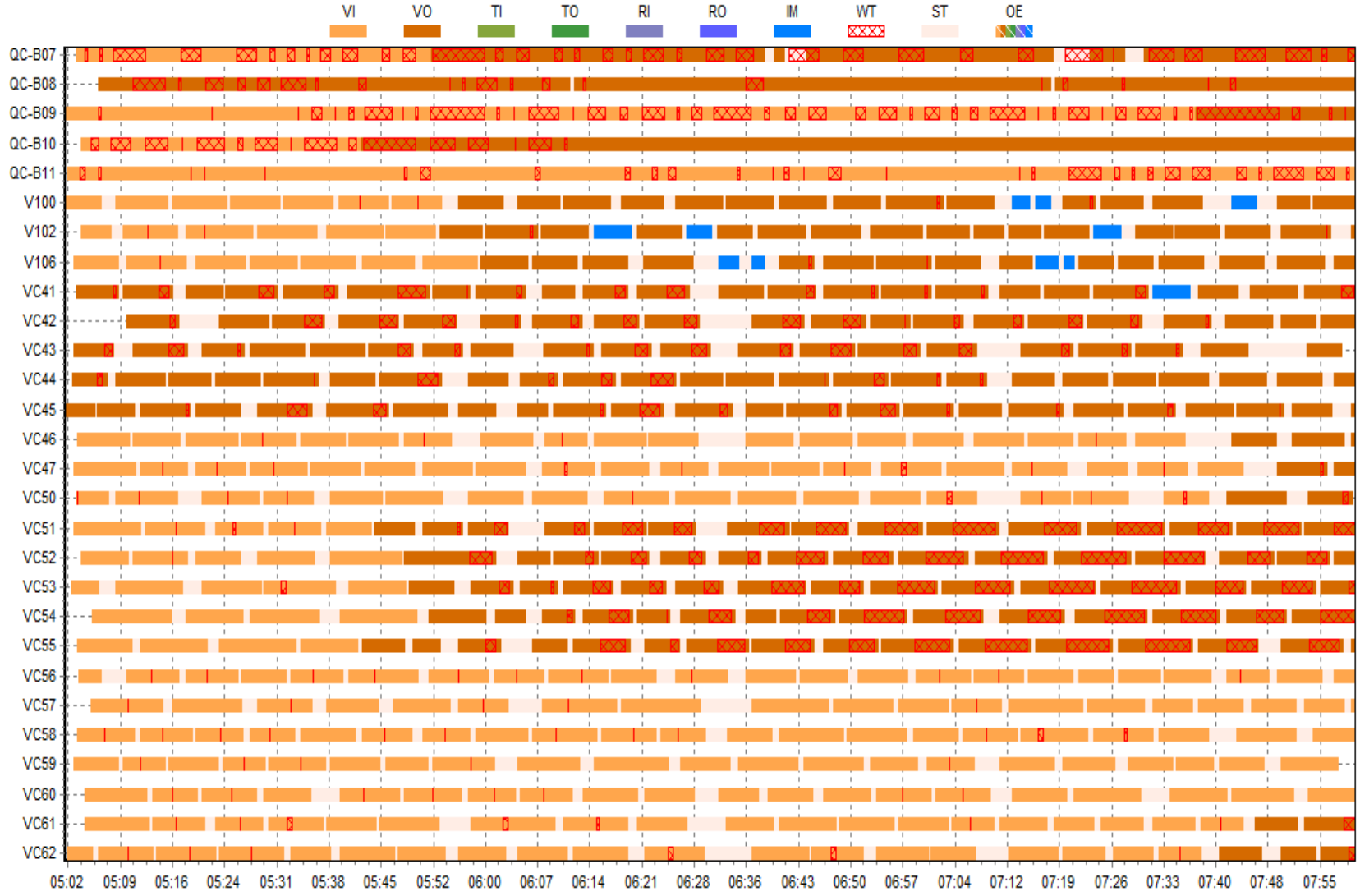
File Options Help

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

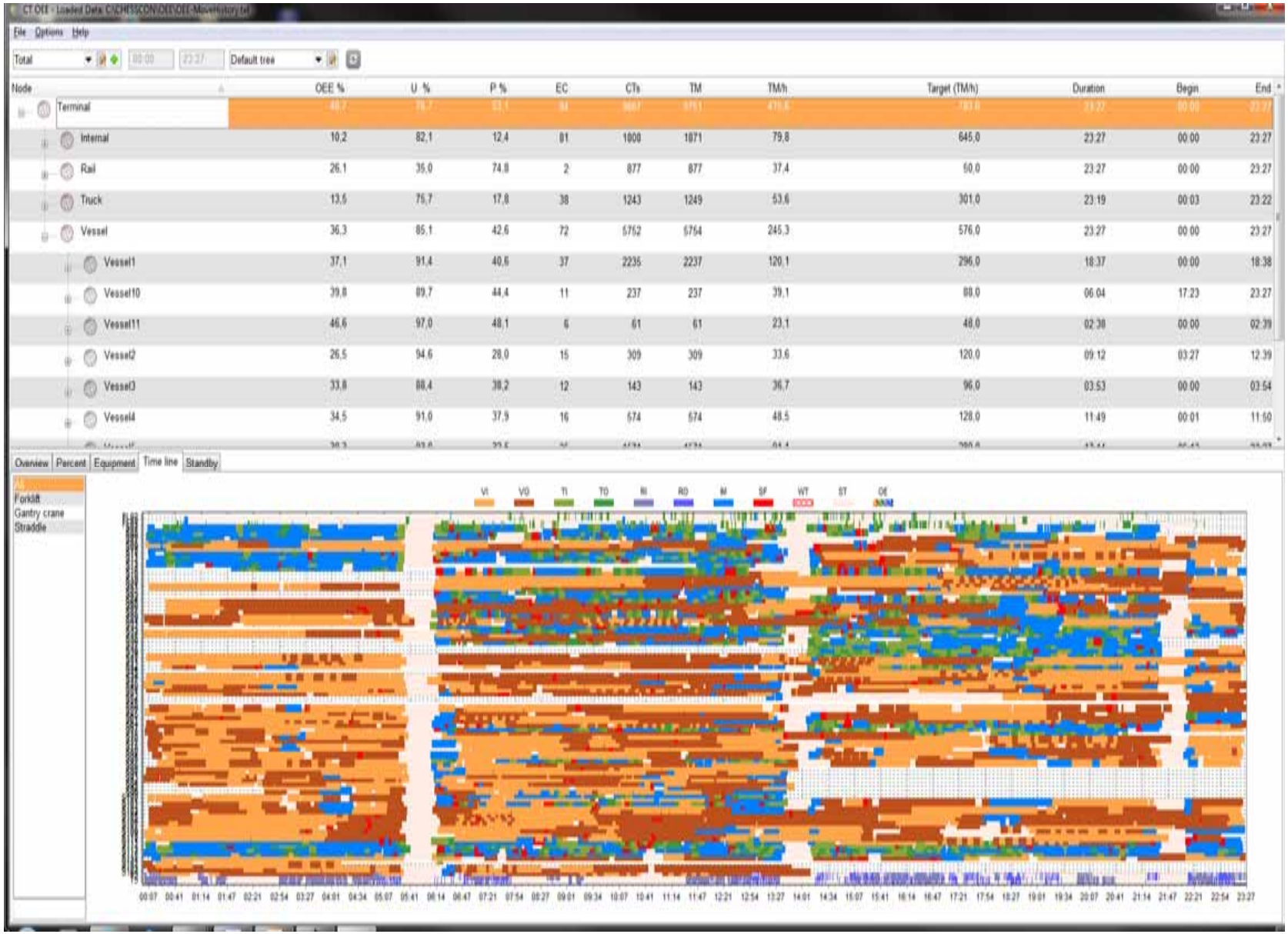
Node	OEE %	U %	P %	EC	CTs	Ct/h	TM/h	Target (TM/h)	Lead time	Begin	End

Overview Percent Equipment Time line Standby

All
Quay crane
Straddle



Example of based data



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CHESSCON

1. Simulation in Terminal Planning
→ Offline tool
→ Very fast
→ Needes only few input
→ State of the art today

2. Virtual Terminal
→ Uses Navis data and strategies
→ Test the TOS
→ Test new ideas (strategy)
→ Train your staff
→ But slow

combines the benefits

3. **Shift Preview**
→ **Imports Navis planning data**
→ **Imports Navis strategy parameters**
→ **Forecast next shift**
→ **Fast (1 shift in minutes)**
→ **Finding bottlenecks and underutilis.**
→ **Planner becomes pro-active**

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Optimisation Tools for Container Terminals

high

Level of detail

low

CHESSCON
VIRTUAL TERMINAL

CHESSCON
SHIFT PREVIEW

CHESSCON
YARD VIEW

CHESSCON
SIMULATION

CHESSCON
CAPACITY

CHESSCON
TERMINAL VIEW

preplan. > planning > start-up > operation

Development funded by European Union Land Bremen bis

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CHESSCON

VIRTUAL TERMINAL

CHESSCON modules

CHESSCON TERMINAL VIEW

Project Manager

Terminal Editor

3D Terminal Viewer*

CHESSCON CAPACITY

Project Manager

Terminal Editor

Capacity Input

3D Terminal Viewer

Capacity Simulation

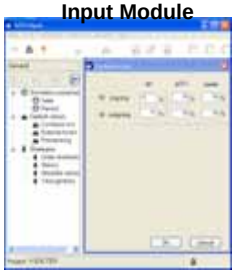
Capacity Evaluation

CHESSCON SIMULATION

Project Manager

Terminal Editor

Input Module



3D Terminal Viewer *

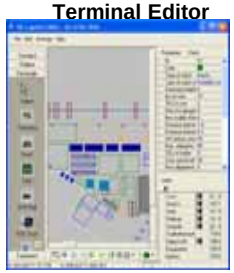
Simulation

Evaluation Module

CHESSCON VIRTUAL TERMINAL

Project Manager

Terminal Editor



Input Module

3D Terminal Viewer

Emulation Manager

Evaluation Module

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* Static 3D view

CHESSCON Modules

Main benefits

Why to choose CHESSCON Module Virtual Terminal?

- Easy to use as directly connected to the TOS
  - Import your layout
  - Backup current planning state as new scenario
- Fully configurable and scalable by the client
  - Layout definition incl. traffic network
  - Add new areas and extensions
  - Change equipement‘s technical data
  - Buy new devices of your equipement
- Open and distributed architecture
  - Plug in your own equipement emulators
  - Run evaluation and 3D visualisation on various computers

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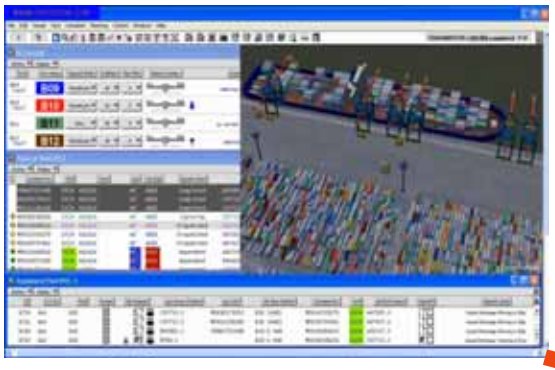
Terminal productivity



TOS

Process automation

Terminal productivity

Equipment

The first ALV of KMI

Terminal staff

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