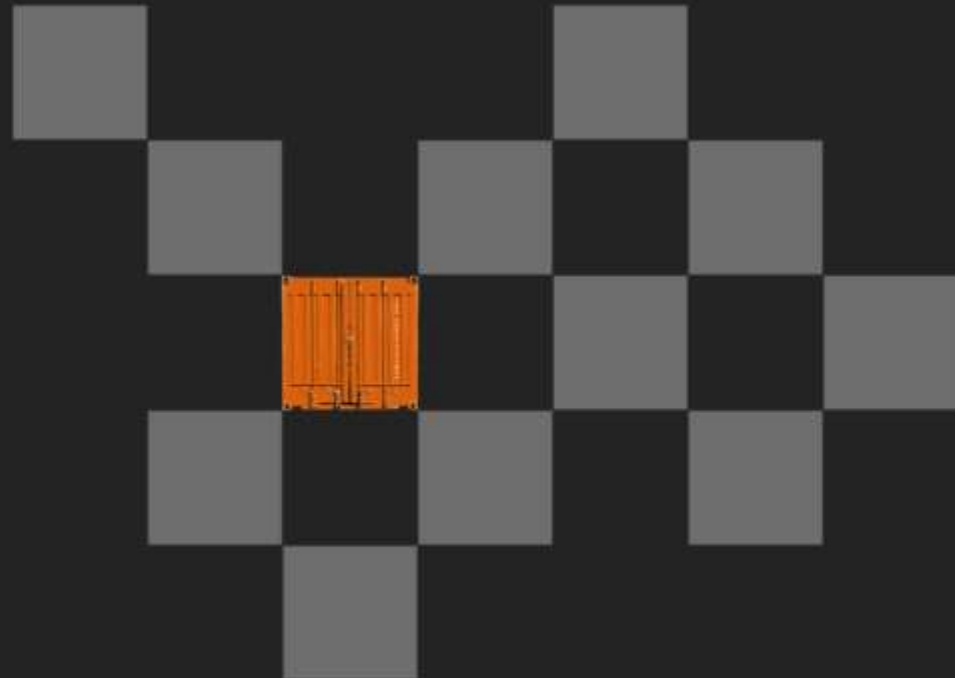


# Shift Preview - Improve Day-to-Day Operation with Simulation



Dr. Holger Schütt  
ISL Applications GmbH



Port & Terminal Technology 2015  
7th International Conference & Exhibition USA  
Miami, 21 & 22 April

## Agenda

**ISL Applications**

**Container Terminal Simulation**

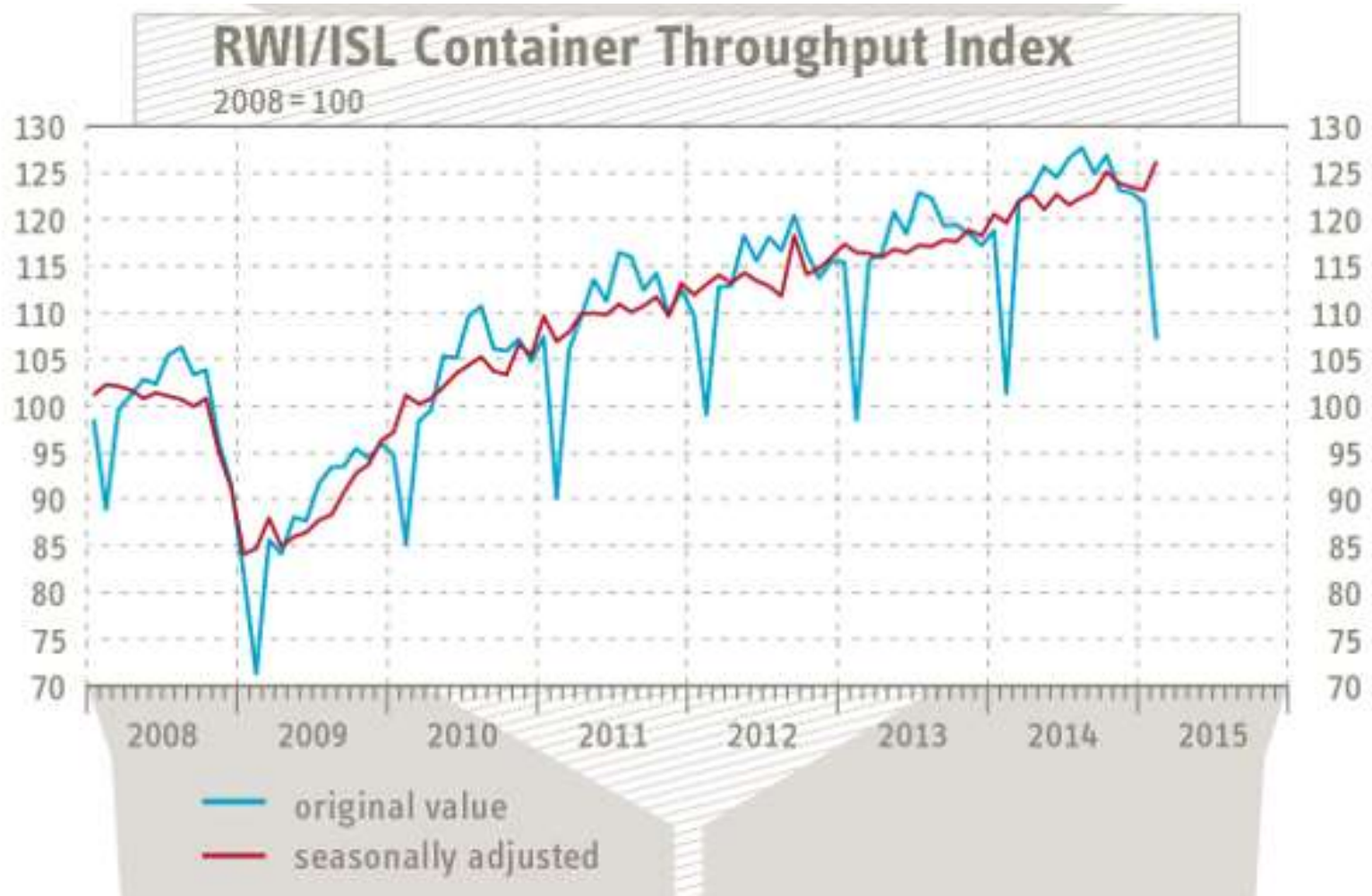
**Become pro-active**

## **ISL Applications**

Container Terminal Simulation

Become pro-active

ISL



During February, the RWI/ISL Container Throughput Index showed a robust increase from 123.1 points in January (unchanged) to 126.3 points.

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

- ***75 ports worldwide***
- ***~ 60 % of worlds throughput***
- ***available 3 weeks in new month (typically on the 19th)***
- ***[www.isl.org](http://www.isl.org) → news***

**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 50 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 2013 2015



Products rebranding:  
CAPS  
SCUSY  
ViTO



CHESScon

Development funded by

European Union



Land Bremen



Bremerhavener Gesellschaft  
für Investitionsförderung  
und Stadtentwicklung mbH



## 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**

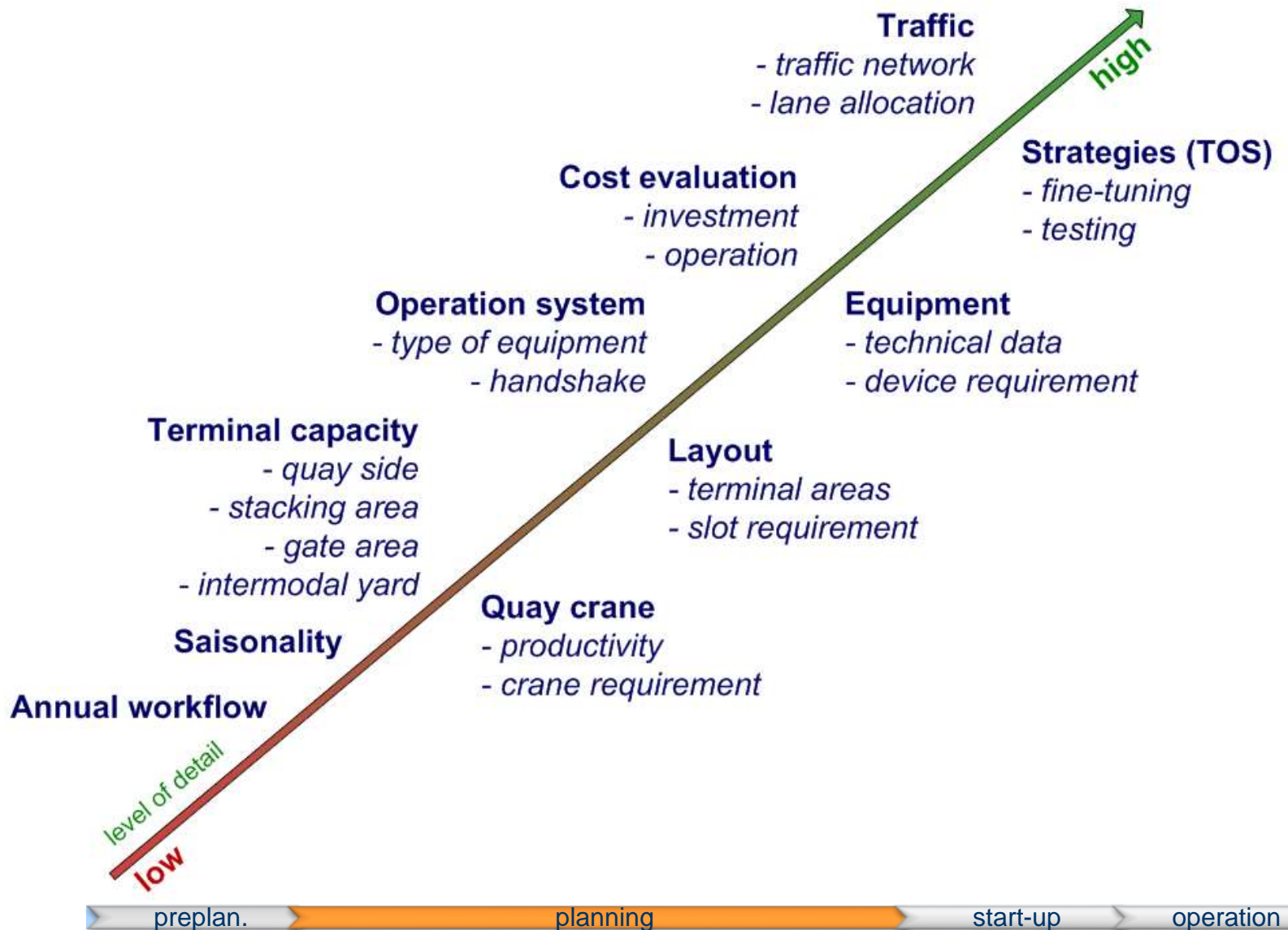
## Agenda

ISL Applications

**Container Terminal Simulation**

Become pro-active

## Tasks in terminal planing and optimisation



## Various layouts, which one is the best?



Tandem lift cranes, truck/chassis and RTG



## Case study

### Comparison of operation systems selected

equipment  
use

	SC 1 over 3	RTG/TC	RMG/AGV auto
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

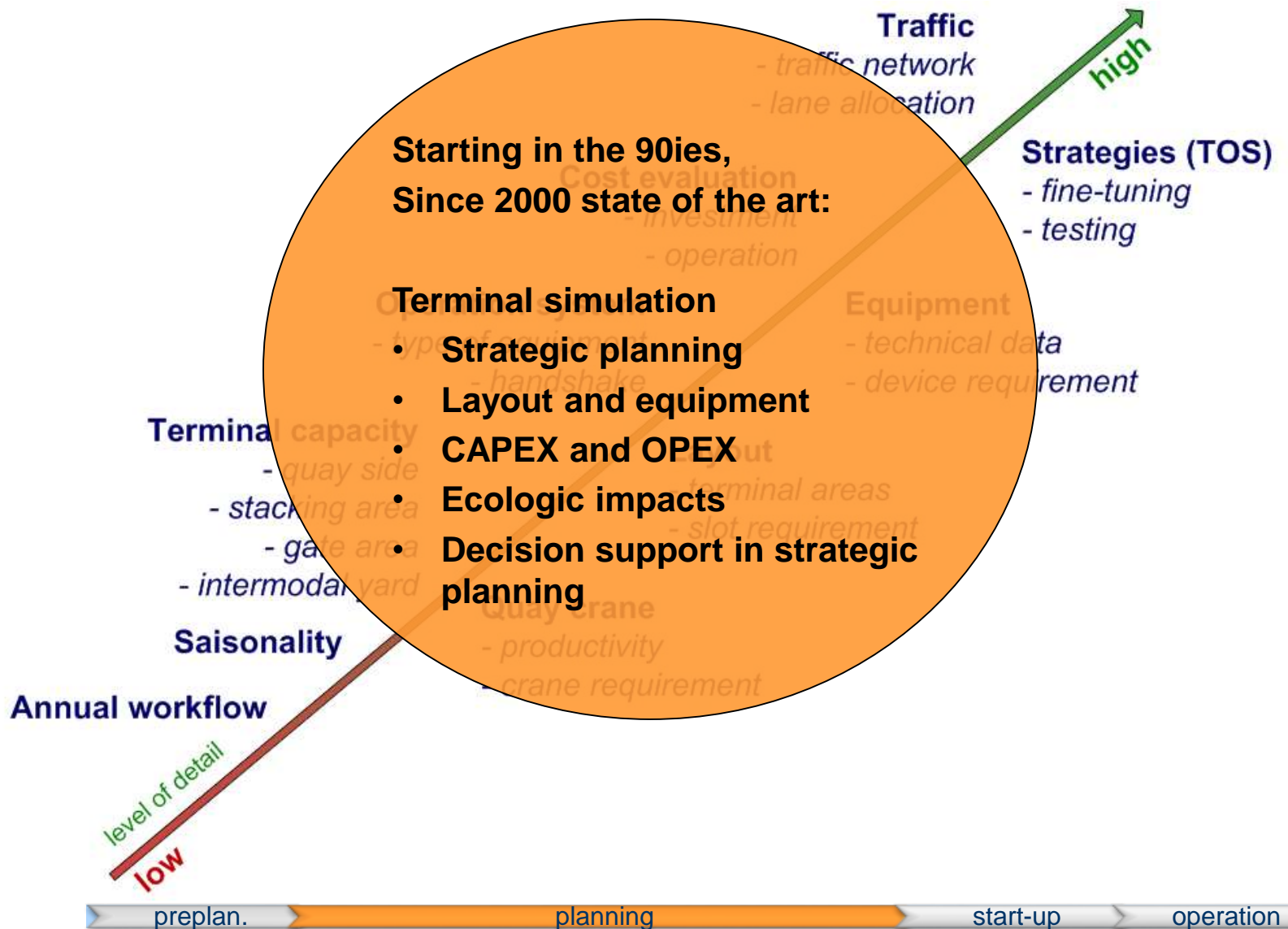
The decision from an economical view is supported  
based on operational costs and investment

evaluation  
production  
centres

DS1000	aver. moves/hr (total)	147.0	107.0	171.0
	aver. moves/hr per STSC	29.5	32.3	33.4
	average service time	12.5	10.5	10.1
DS800	aver. moves/hr (total)	128.0	152.0	158.0
	aver. moves/hr per STSC	29.3	31.5	32.9
	average service time	4.5	4.3	4.1
F120	aver. moves/hr (total)	53.0	56.0	59.0
	aver. moves/hr per STSC	21.3	21.6	22.83
	average service time	8.8	8.0	7.8
F250	aver. moves/hr (total)	57.0	62.33	64.0
	aver. moves/hr per STSC	20.4	21.5	22.6
	average service time	20.4	21.5	22.6
total berth operation time		218.0	195.0	189.0
costs per move [€]				

costs

# Tasks in terminal planing and optimisation

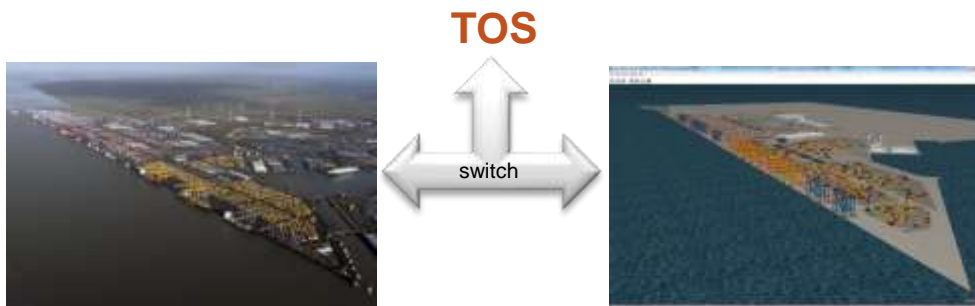


# The main mission of CHESSCON VIRTUAL TERMINAL

what you can do with CHESSCON

## Emulation:

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



## NTB (controlled by Sparcs 3.7)



## NTB (controlled by Sparcs 3.7)



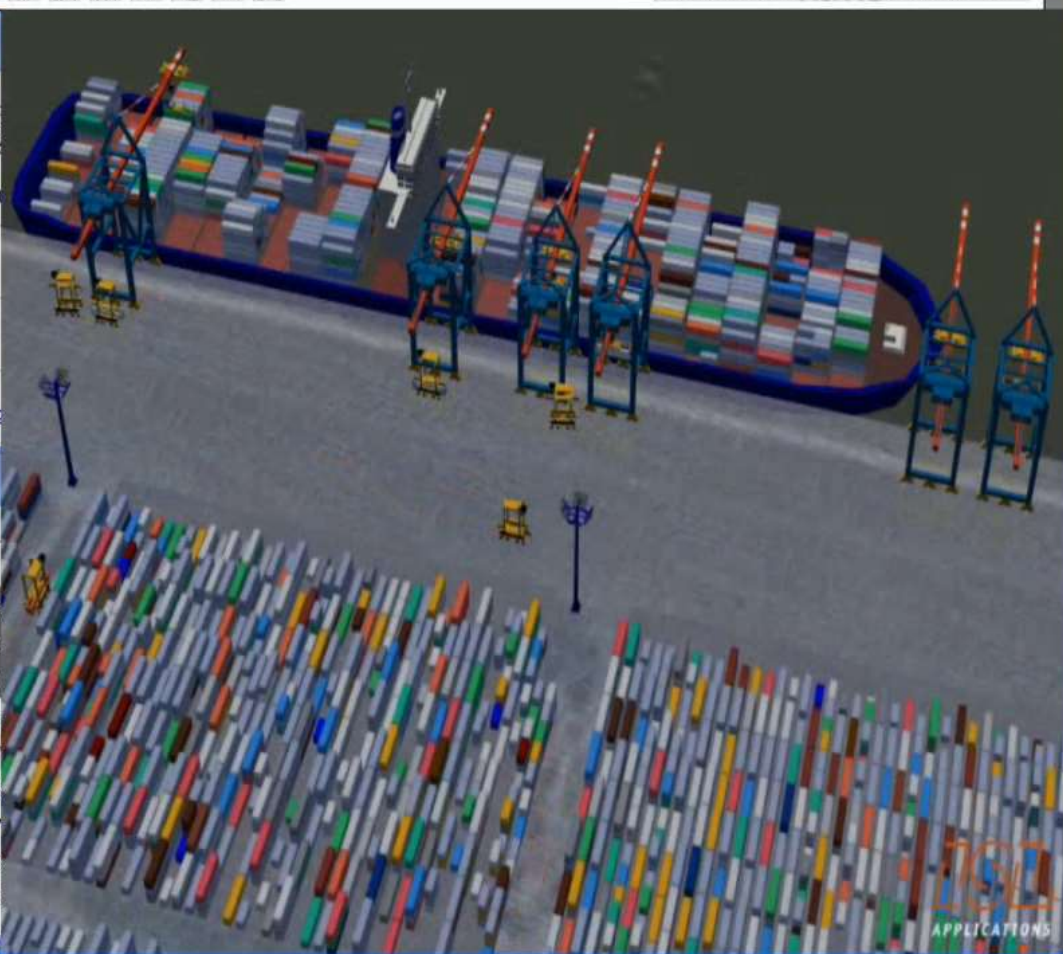


## EC Console

Actions ▾	Display ▾						
Pool	Pow Name	Dispatch Mode	PushRate	Max PMs	Relative Priority	Status	
N09 Kassl	<b>B09</b>	PrimeRoute ▾	40 ▾	8 ▾	<div><div>low</div><div><div></div></div><div>high</div></div>	Awaiting	
N10 Kassl	<b>B10</b>	PrimeRoute ▾	40 ▾	8 ▾	<div><div>low</div><div><div></div></div><div>high</div></div>		
N11	<b>B11</b>	Auto ▾	40 ▾	8 ▾	<div><div>low</div><div><div></div></div><div>high</div></div>	no current	
N12 Kassl	<b>B12</b>	PrimeRoute ▾	40 ▾	8 ▾	<div><div>low</div><div><div></div></div><div>high</div></div>	Awaiting	

## Point of Work B10

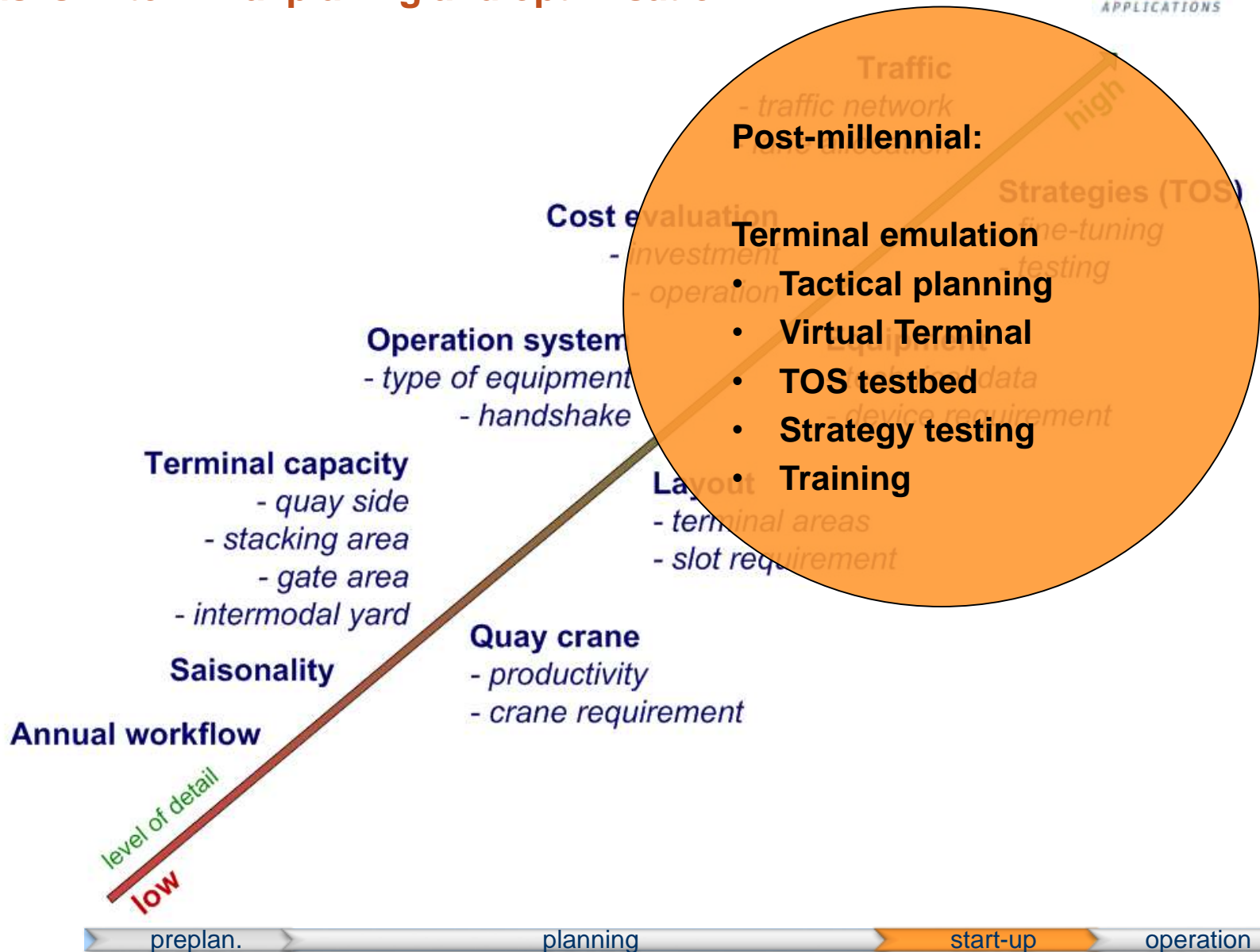
Actions	Display	Container No.*	Kind*	From*	Len*	Tare (kg)*	Dispatch State*
		PONU7353480	DSCH	462020	40'	4000	Completed B95905
		MSKU0179252	DSCH	461820	40'	4000	Completed C97715
		MSKU1190240	DSCH	461818	40'	4000	Completed C97713
		MSKU0190626	DSCH	462018	40'	4000	Carrying C97713
		MSKU9289414	DSCH	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
		MSKU1422464	DSCH	462014	40'	4000	dependent A92713



## 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



Going operational...

## Agenda

ISL Applications

Container Terminal Simulation

**Become pro-active**

## Terminal productivity



**TOS**



**Process automation**

**Equipment**



The first ALV of KMI

**Terminal  
productivity**

**Terminal staff**





**Stowage planning**

**Berth planning**

**Crane split planning**

**Equipment planning**

**Yard planning**



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.

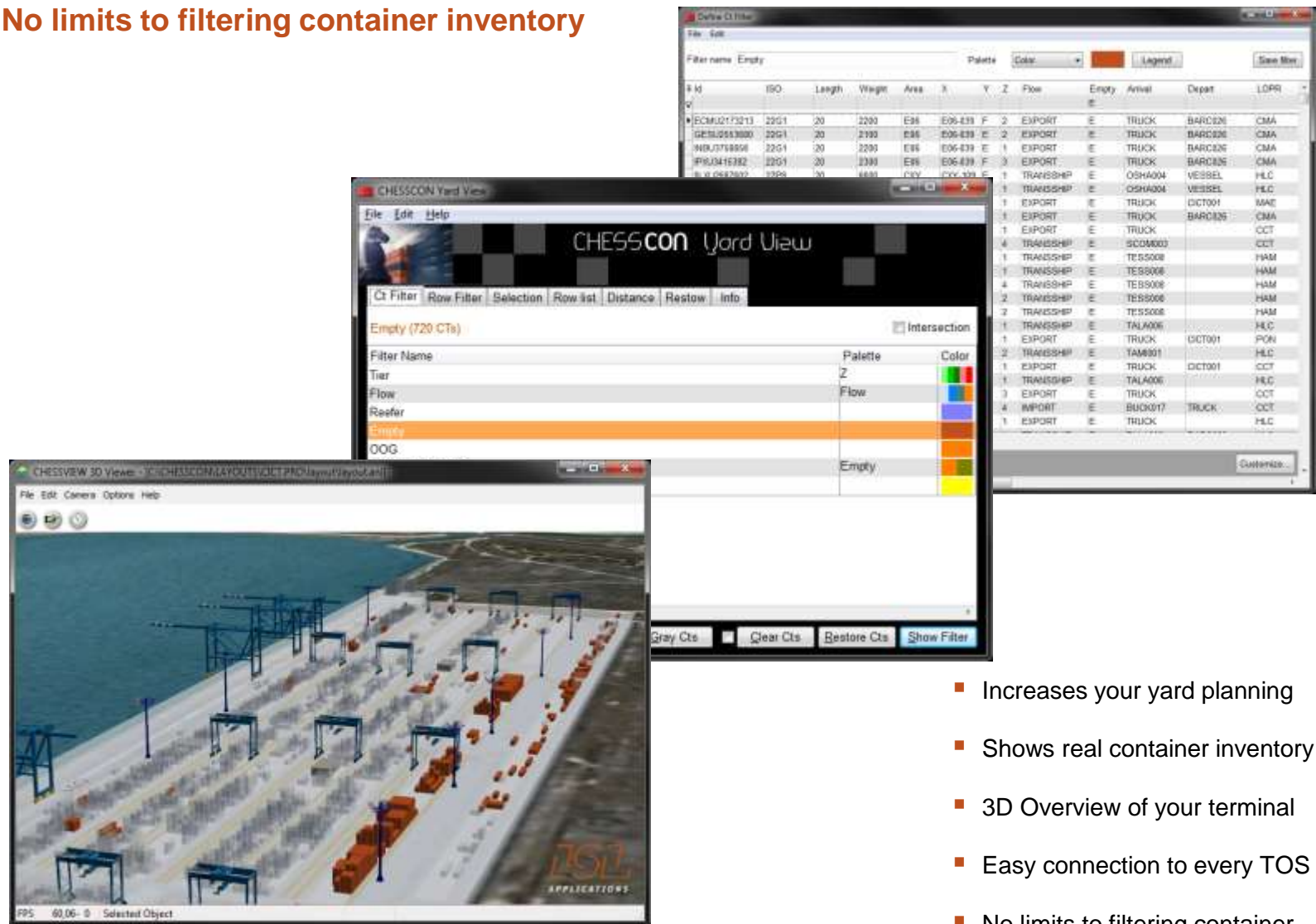
The last sentence within the Singapore Maritime Gallery (opened 09/2012):

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

## Become a grandmaster in terminal control



## No limits to filtering container inventory



**Define Q Filter**

ID	ISO	Length	Weight	Area	X	Y	Z	Flow	Empty	Arrival	Depart	LOPR
ECMU0173213	22G1	20	2200	E86	E06-839	F	2	EXPORT	E	TRUCK	BARC026	CMA
GETU0530000	22G1	20	2190	E86	E06-839	E	2	EXPORT	E	TRUCK	BARC026	CMA
NDU0758856	22G1	20	2200	E86	E06-839	E	1	EXPORT	E	TRUCK	BARC026	CMA
PRU0416382	22G1	20	2200	E86	E06-839	F	3	EXPORT	E	TRUCK	BARC026	CMA
SHU0687007	22G1	20	2200	CVV	CVV-120	E	1	TRANSHIP	E	OSHA004	VESSEL	HLC
							1	TRANSHIP	E	OSHA004	VESSEL	HLC
							1	EXPORT	E	TRUCK	DICT001	MAE
							1	EXPORT	E	TRUCK	BARC026	CMA
							1	EXPORT	E	TRUCK	BARC026	CMA
							4	TRANSHIP	E	SCOM003		CCT
							1	TRANSHIP	E	TESS008		HAM
							1	TRANSHIP	E	TESS008		HAM
							4	TRANSHIP	E	TESS008		HAM
							2	TRANSHIP	E	TESS008		HAM
							1	TRANSHIP	E	TALAO06		HLC
							1	EXPORT	E	TRUCK	DICT001	POA
							2	TRANSHIP	E	TAM001		HLC
							1	EXPORT	E	TRUCK	DICT001	CCT
							1	TRANSHIP	E	TALAO06		HLC
							3	EXPORT	E	TRUCK		CCT
							4	IMPORT	E	BUCK017	TRUCK	CCT
							1	EXPORT	E	TRUCK		HLC

**CHESSCON Yard View**

File Edit Help

Ct Filter Row Filter Selection Row list Distance Restow Info

Empty (720 CTs) ☒ Intersection

Filter Name	Palette	Color
Tier	Z	Color
Flow	Flow	Color
Reefer		Color
Empty		Color
OOG		Color

Gray Cts Clear Cts Restore Cts Show Filter

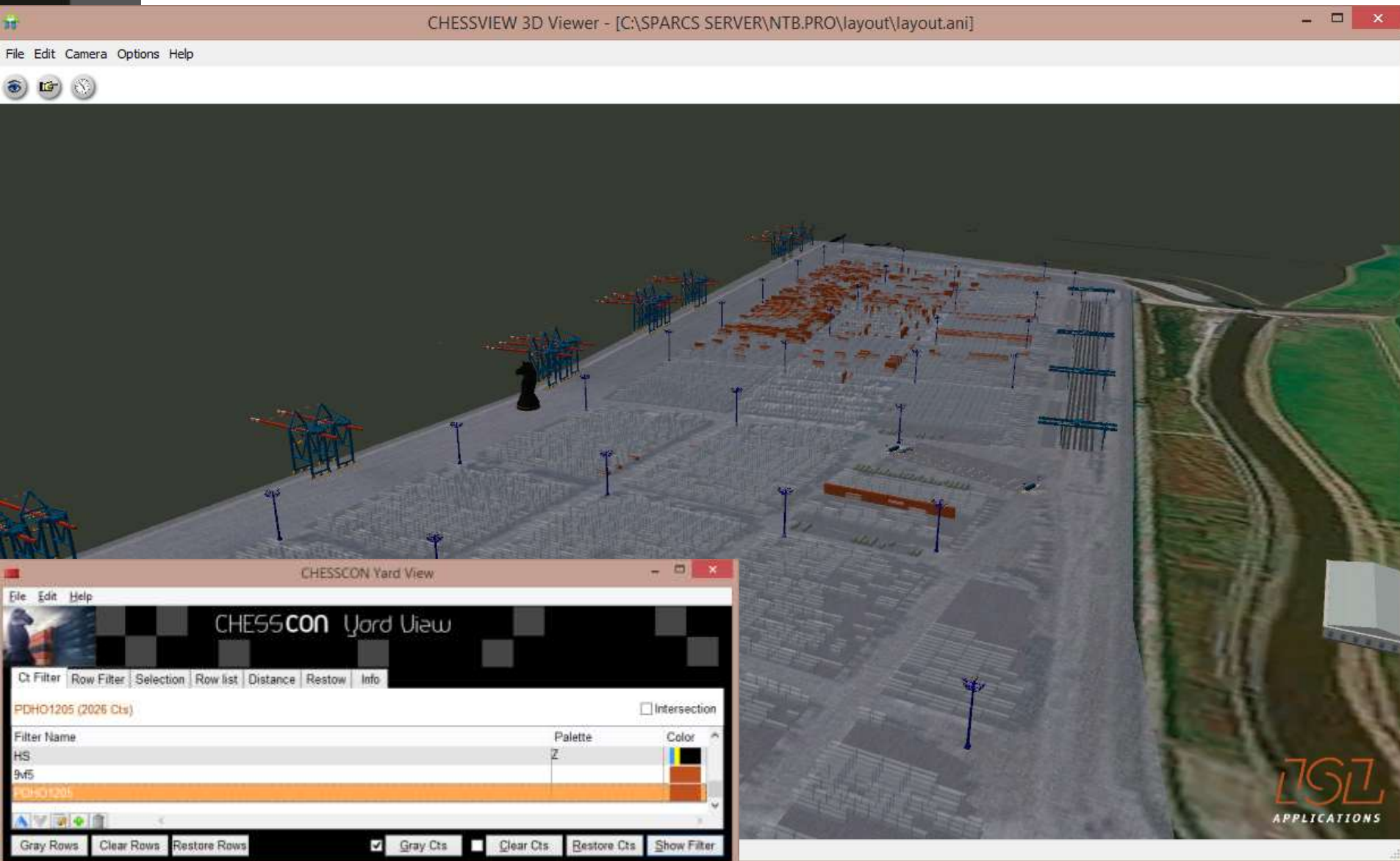
**CHESSVIEW 3D Viewer**

File Edit Camera Options Help

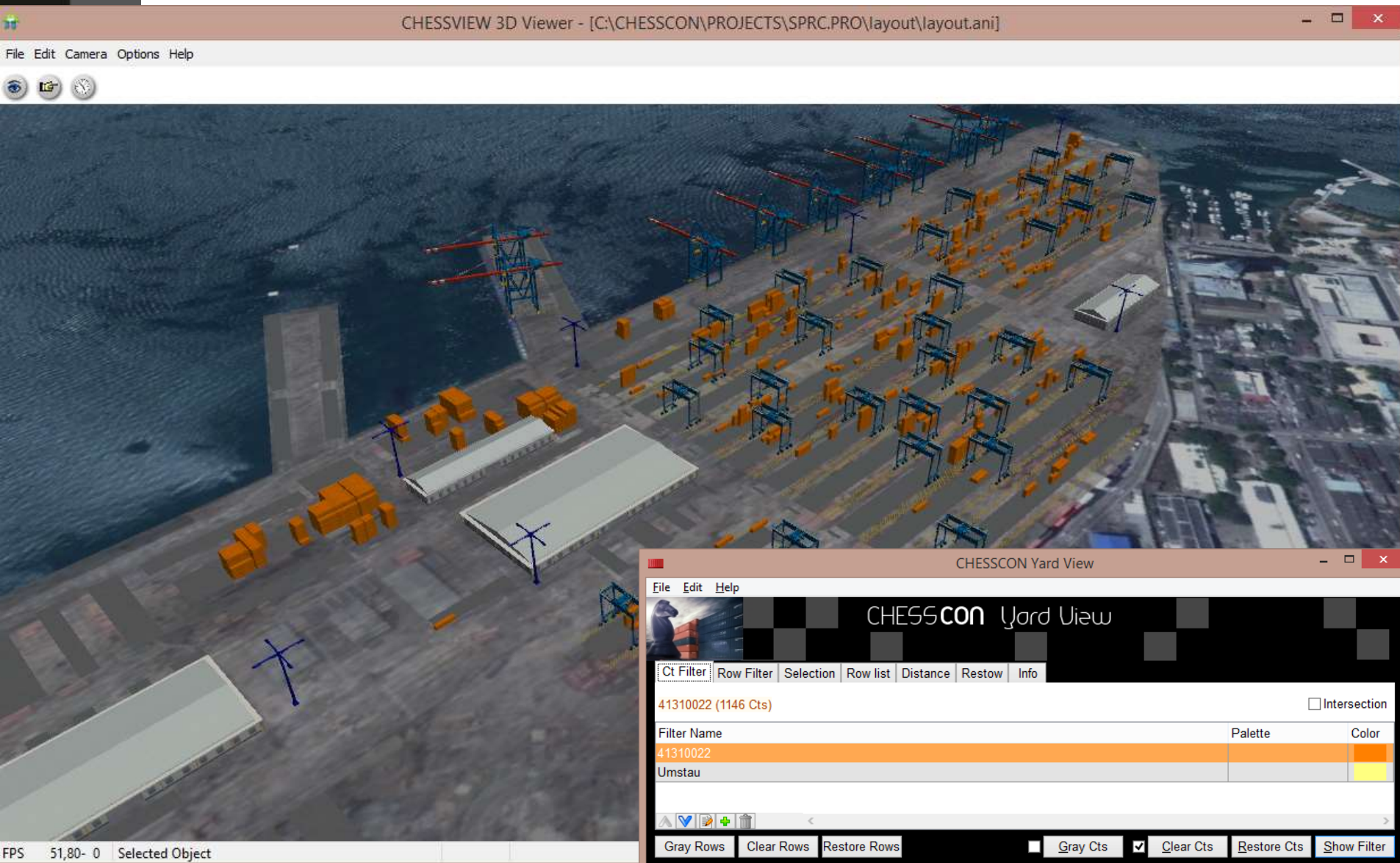
FPS: 60.06 Selected Object

- 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 – Yard View



# SPRC with Sparcs 3.7 – Yard View



A picture tells more than 1,000 words!



3D Yard View supports terminal planner  
intuitively

# 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



# CHESSCON Shift Preview

SPARCS 3.7.2

File Edit Vessel Yard Container Planning Control Windows Help

EC Console

Pool	Pos Name	Dispatch Mode	PushRate	Max PMs	Relative Priority	Status
MOB1	MOB1	STOP	40	20	low	no current shift
SK30	SK30	STOP	40	8	low	no current shift
N01	B01	STOP	40	8	low	no current shift
N02	B02	STOP	40	8	low	no current shift
N03	B03	STOP	40	8	low	no current shift
N04	B04	STOP	40	8	low	no current shift
N05	B05	STOP	40	8	low	no current shift
N06	B06	STOP	40	8	low	no current shift
N07	B07	STOP	40	8	low	no current shift
N08	B08	STOP	40	8	low	no current shift
N09	B09	Manual	40	8	low	0,0 30,0
N10	B10	Manual	40	8	low	0,0 30,0
N11	B11	STOP	40	8	low	no current shift

Equipment Pool N09: 5

ID	P.O.W.	Pool	Screen	Job Progress	Last Known Position	Last Crn	Job Start Position	Container No.
H228	B09	N09		X				
VC78		N09		X				
VC81		N09		X				
VC88		N09		X				

0 step:  
day to day work  
use the TOS  
to plan the next shift

1 step:  
shift planning finished

MRKU3257927	LOAD	A90717.1	780982	4HC
PONU7121740	LOAD	A93117.3	782284	4HC
MSKU8223243	LOAD	A92105.3	782084	4HC
MSKU1093528	LOAD	A91007.3	781884	4HC
PONU7956441	LOAD	A90615.3	781484	4HC
MRKU2855396	LOAD	A92105.2	781284	4HC
MRKU2639479	LOAD	A91007.2	781084	4HC
MSKU1715719	LOAD	J380	780684	4HC
MSKU8083218	LOAD	A90305.1	780484	4HC
MSKU8137905	LOAD	J380	780284	4HC
MRKU3147200	LOAD	A92105.1	780184	4HC
MRKU2568842	LOAD	A91007.1	780384	4HC
MRKU3133989	LOAD	A90615.2	780584	4HC
MSKU0514704	LOAD	A93117.1	780784	4HC
CLHU9125612	LOAD	A90615.1	780984	4HC
MSKU0277259	LOAD	A90315.1	781886	4HC
PONU7530538	LOAD	A90311.1	781686	4HC
MSKU9149794	LOAD	A90117.1	781486	4HC
PONU1627069	LOAD	A90419.1	781286	4HC
MSKU9542332	LOAD	J380	781086	4HC
PONU7183399	LOAD	A88213.1	780886	4HC
PONU7366152	LOAD	J380	780686	4HC
MSKU1675703	LOAD	J380	780486	4HC

# CHESSCON Shift Preview

The screenshot shows a software interface with a list of equipment. The list includes columns for equipment ID, name, status, and location. The equipment is color-coded: red for 'H001', yellow for 'H002', green for 'H003', blue for 'H004', and orange for 'H005'. The interface also shows a 'Point of View' dropdown menu and a 'Filter' button.

2nd step:  
Import planning state  
automatically



sample of based data

The screenshot shows a data table with columns for 'Name', 'Value', 'Unit', 'Color', and 'Type'. The table contains data for various equipment and their status. Below the table is a 3D visualization of the data, showing a grid of colored blocks representing different equipment and their status.

## CHESSCON Shift Preview

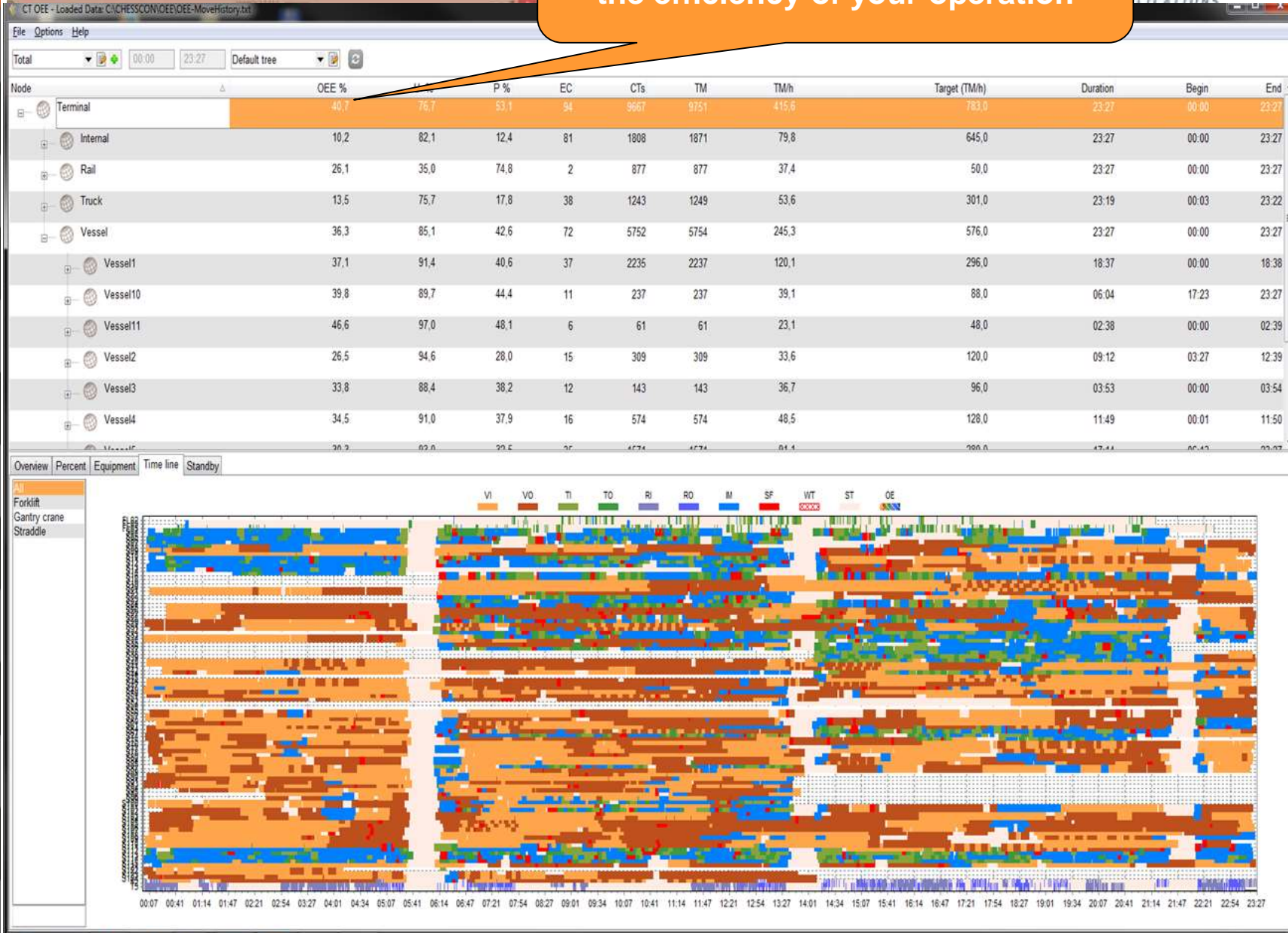
3rd step:  
fast simulation of the shift

SL



# CHESSCON Shift Preview

4th step: intuitive evaluation of the efficiency of your operation



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_SUR4	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

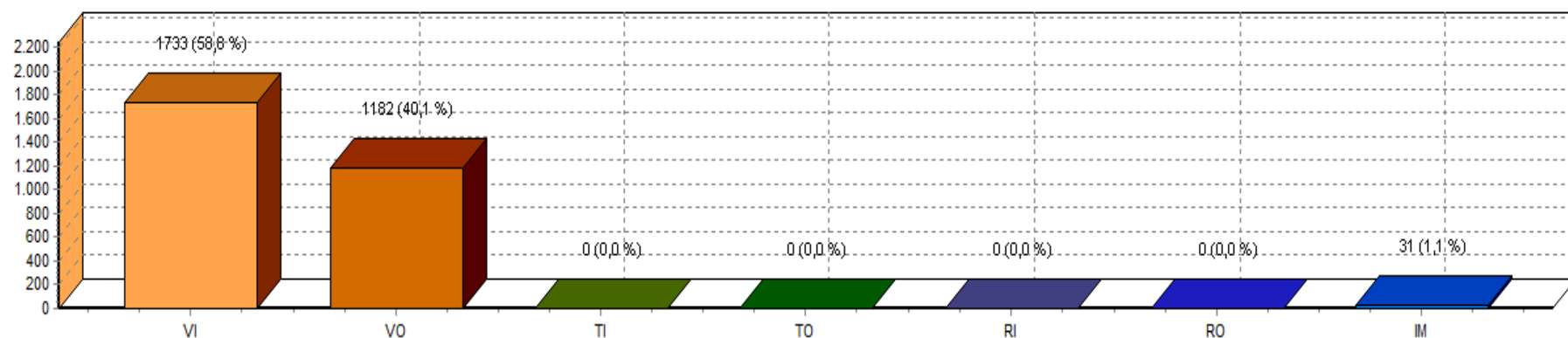
Overview

Percent

Equipment

Time line

Standby



05:02

08:00

☐ Auto time frame

Default tree

Refresh

Node

OEE %

U %

P %

EC

CTs

Ct/h

TM/h

Target (TM/h)

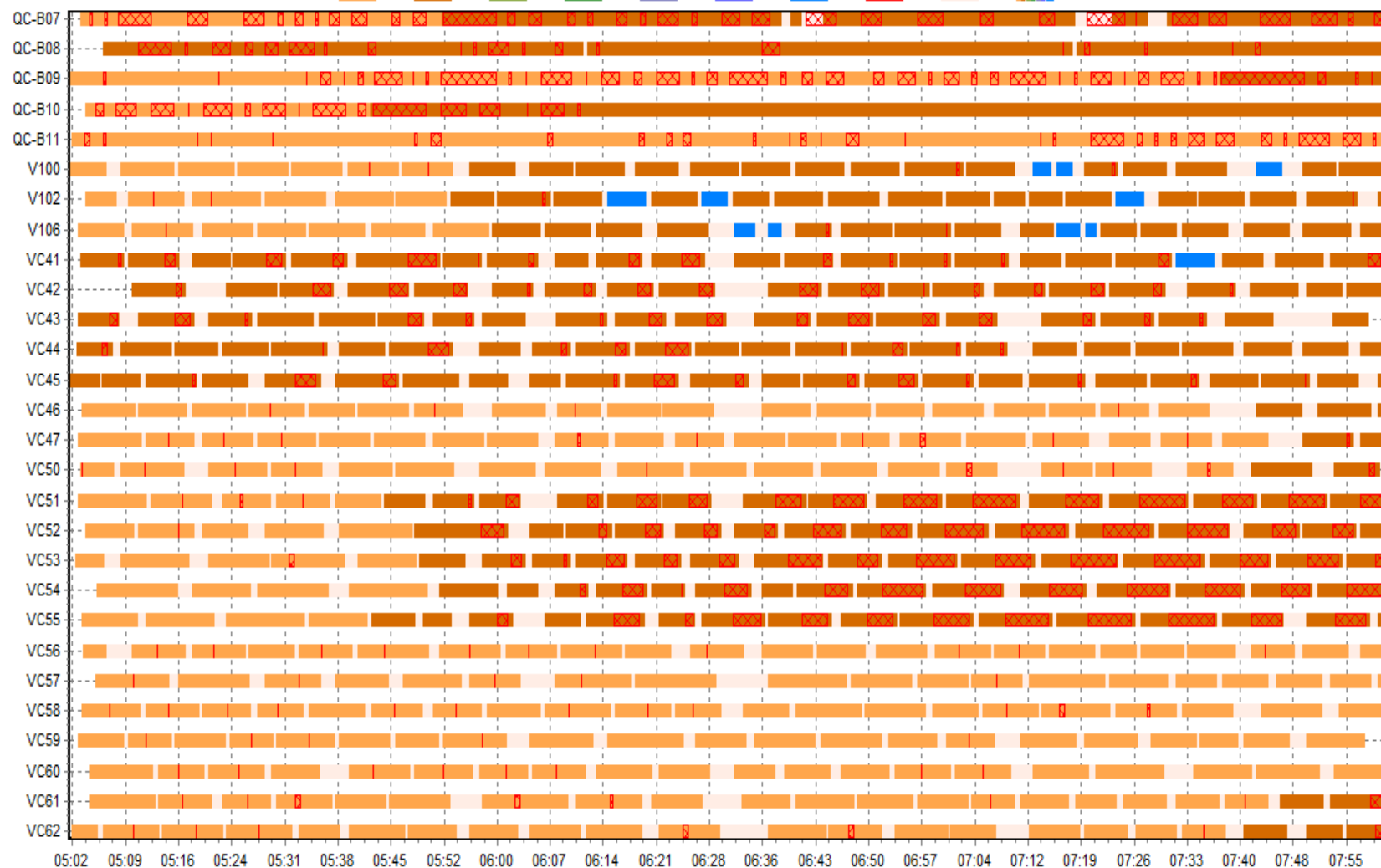
Lead time

Begin End

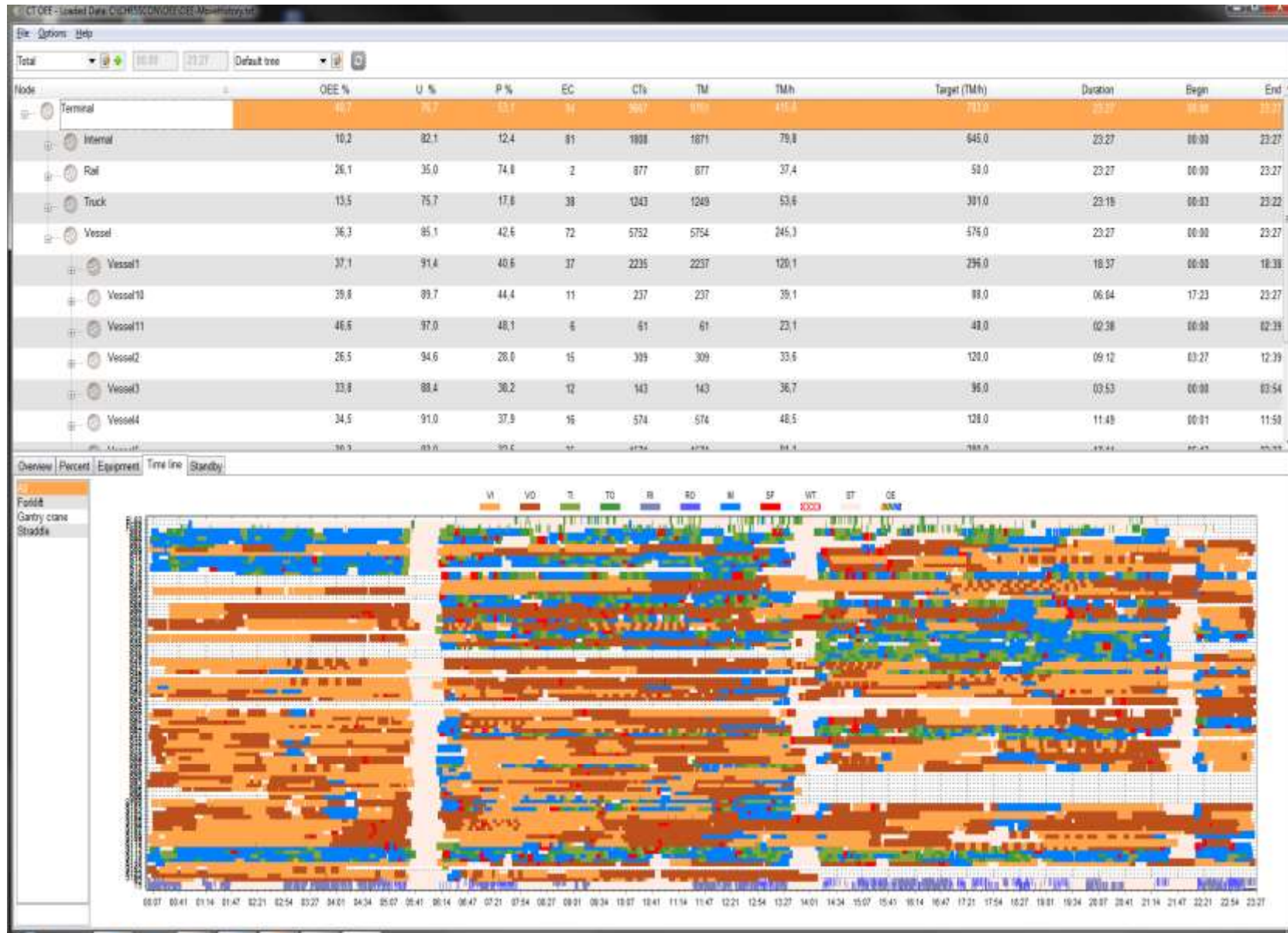
Overview Percent Equipment Time line Standby

All  
Quay crane  
Straddle

VI VO TI TO RI RO IM WT ST OE



# Example of based data



# CHESSCON

## 1. Simulation in Terminal Planning

- Offline tool
- Very fast
- Needs 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**

# 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

## Cites from NTB – North Sea Terminal Bremerhaven



*a joint venture of APM Terminals and the Eurogate group*

- **CHESSCON Shift Preview was developed out of our demands for a fast simulation of the current state of shift planning.**
- **Together we (NTB) and ISL Applications GmbH defined a module, which is based on operational as well as IT expertise.**
- **The result is easy to use and supports short term optimisation of the day-to-day shift planning.**

### **Why Shift Preview ?**

**→ Terminals,**

**which today are not in the position to analyse their operation predictively,  
are living yesterday**

***Marc Dieterich, Operations Manager at NTB***

MAKE YOUR RIGHT MOVES!



[WWW.CHESSCON.COM](http://WWW.CHESSCON.COM)

CHESScon  
VIRTUAL TERMINAL

# CHESSCON modules



CHESSCON  
TERMINAL VIEW



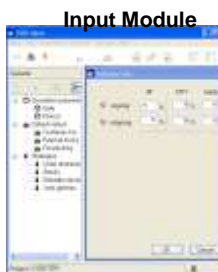
CHESSCON  
CAPACITY



CHESSCON  
SIMULATION



CHESSCON  
VIRTUAL TERMINAL



# 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 equipment's technical data
  - Buy new devices of your equipment
- Open and distributed architecture
  - Plug in your own equipment emulators
  - Run evaluation and 3D visualisation on various computers

