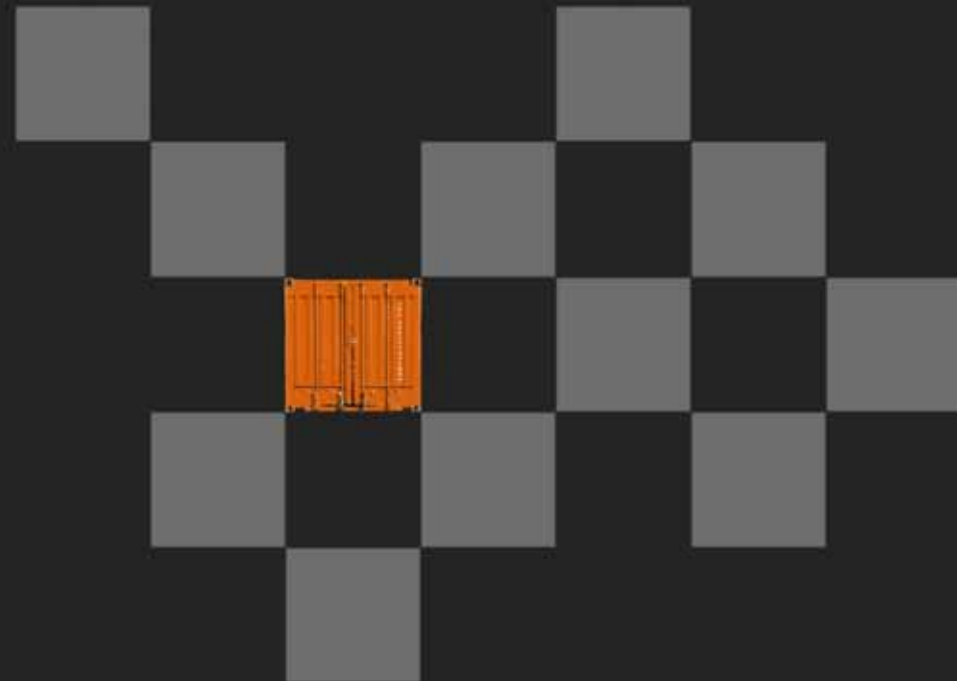


**Avoiding bottlenecks
by forecasting coming terminal operation
-
become pro-active**



**Dr. Holger Schütt
ISL Applications GmbH**

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



Agenda

ISL Applications

Container Terminal Simulation

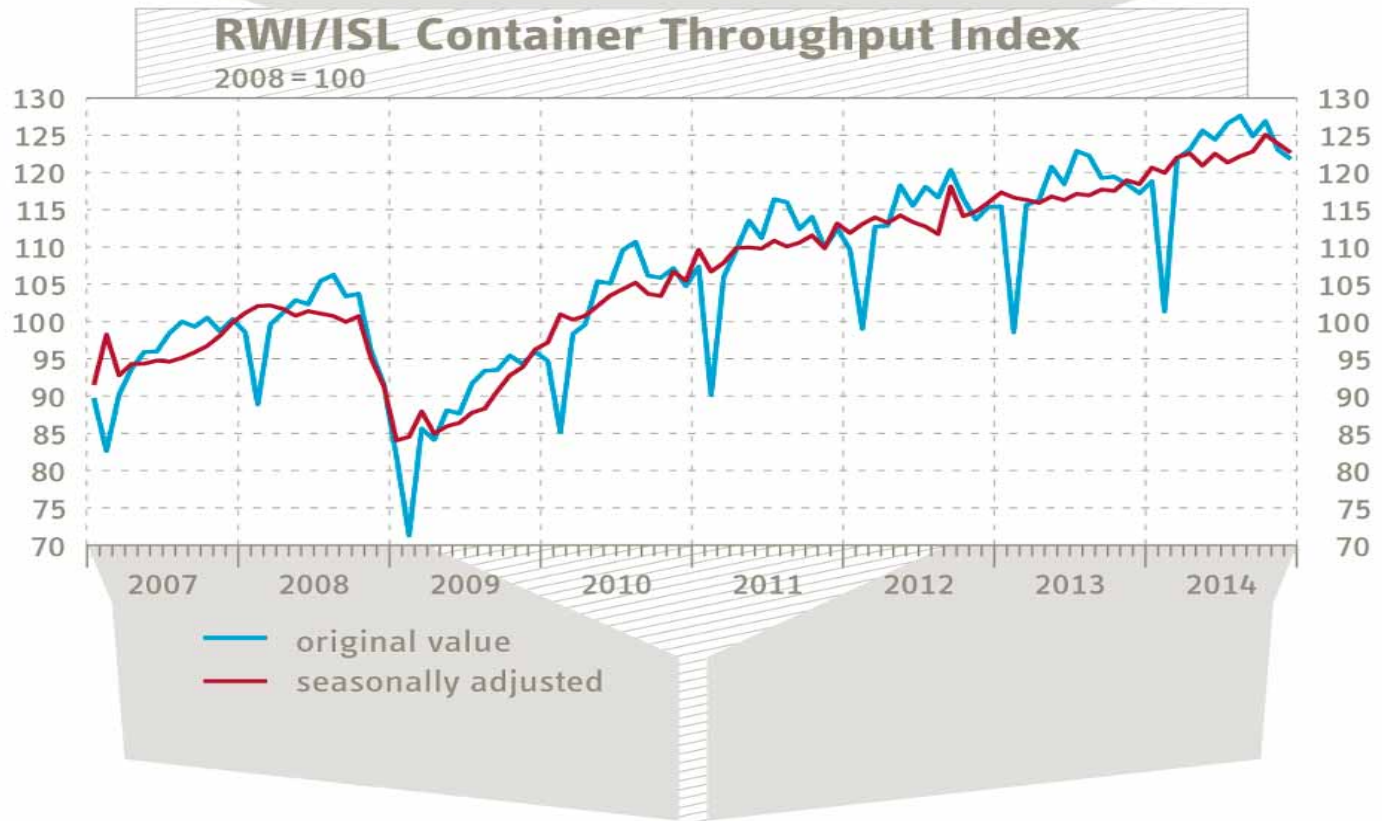
Become pro-active

ISL Applications

Container Terminal Simulation

Become pro-active

ISL



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***

ISL Applications GmbH



Founded 2010 as ISL's commercial subsidiary



Holger Schütt
CEO, Prof. Dr.- Ing.



Horst-Dieter Kassl
CTO, Dipl.-Ing.

ISL – 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

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



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

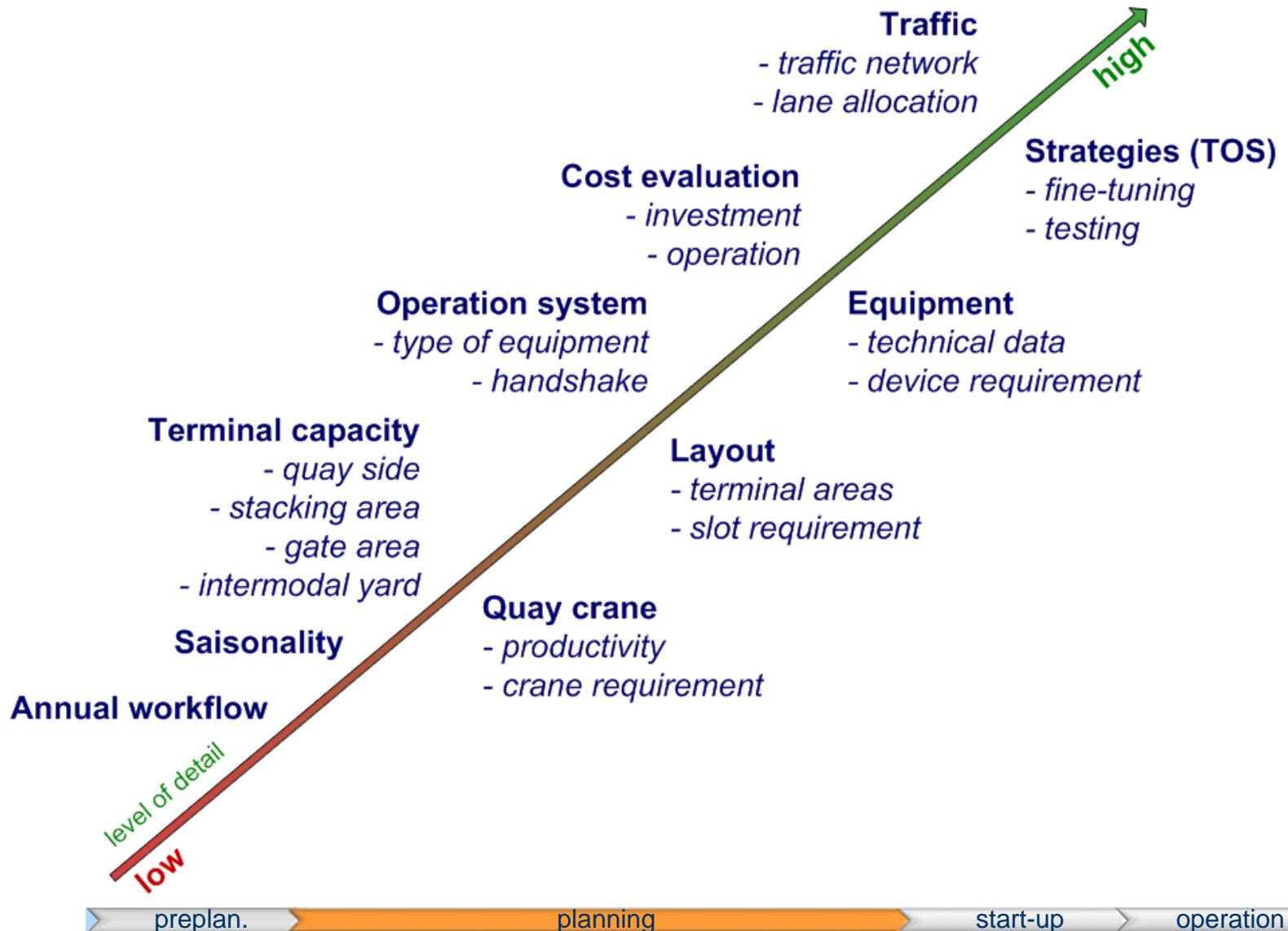
Agenda

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

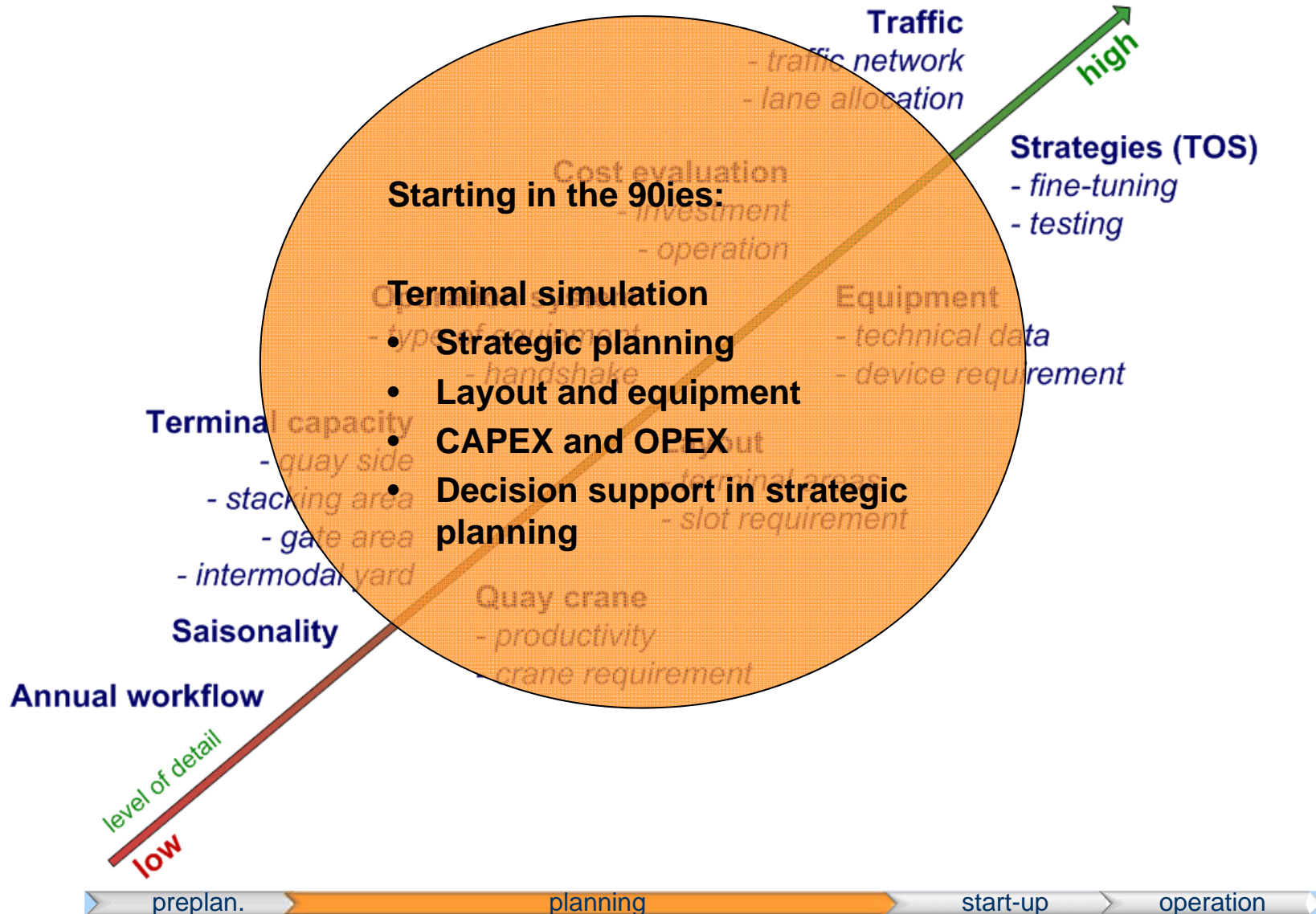
evaluation production centres

DS1000	aver. moves/hr (total)	147.0	107.0	117.0
	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
	total berth operation time	218.0	195.0	189.0

costs

costs per move [€]			
--------------------	--	--	--

Tasks in terminal planing and optimisation

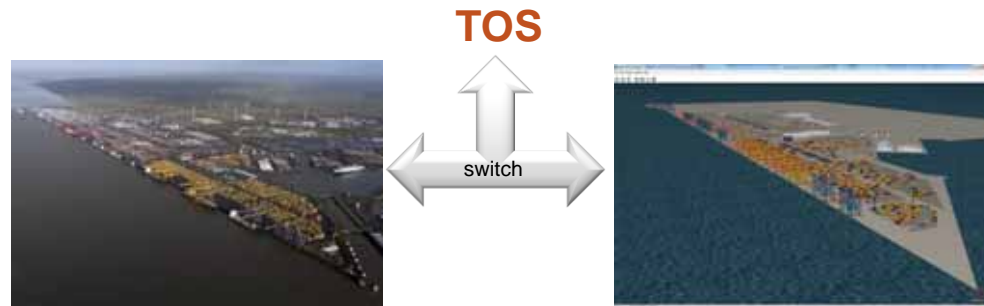


The main mission of CHESSCON VIRTUAL TERMINAL

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)

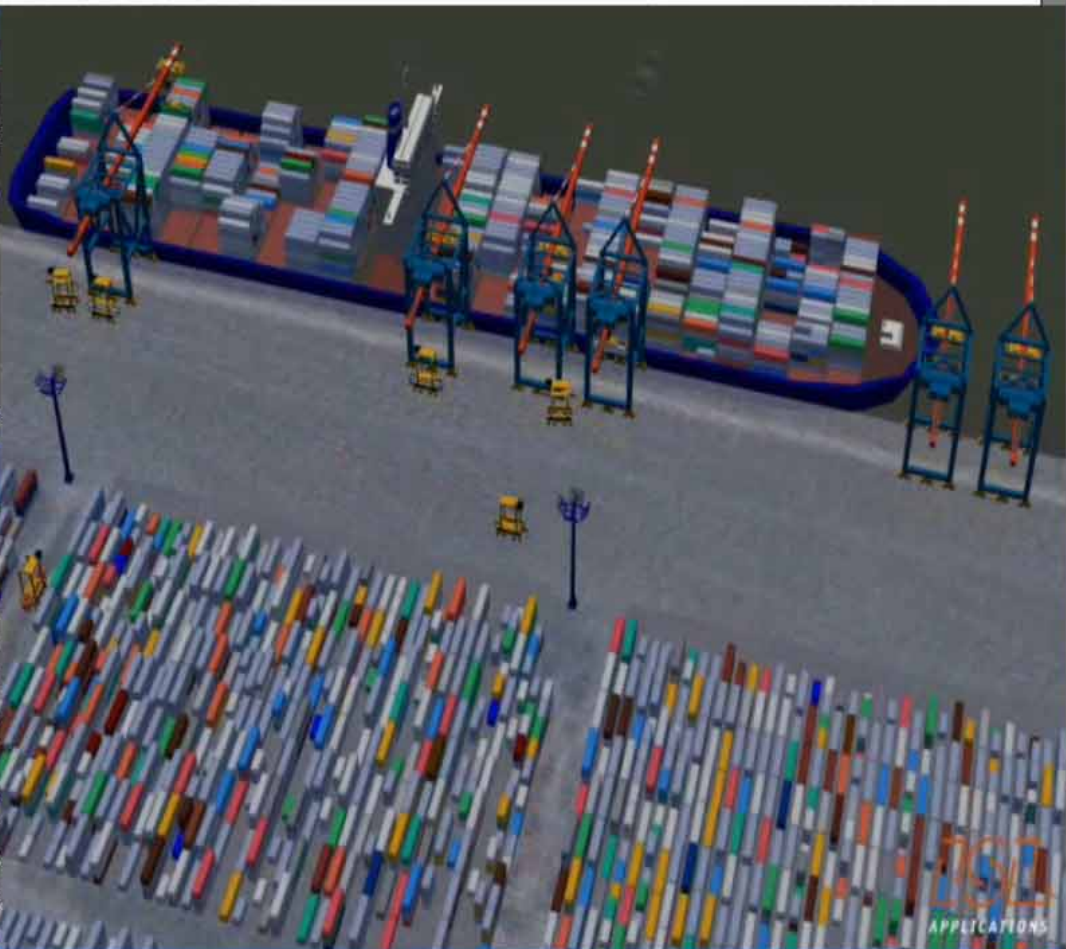


EC Console

Actions | Display

Pool | Pow Name | Dispatch Mode | PushRate | Max PMTs | Relative Priority | Status

N09 Kassl	B09	PrimeRoute	40	8	low <input type="range"/> high	Awaiting
N10 Kassl	B10	PrimeRoute	40	8	low <input type="range"/> high	
N11	B11	Auto	40	8	low <input type="range"/> high	no current
N12 Kassl	B12	PrimeRoute	40	8	low <input type="range"/> high	Awaiting



Point of Work B10

Actions | Display

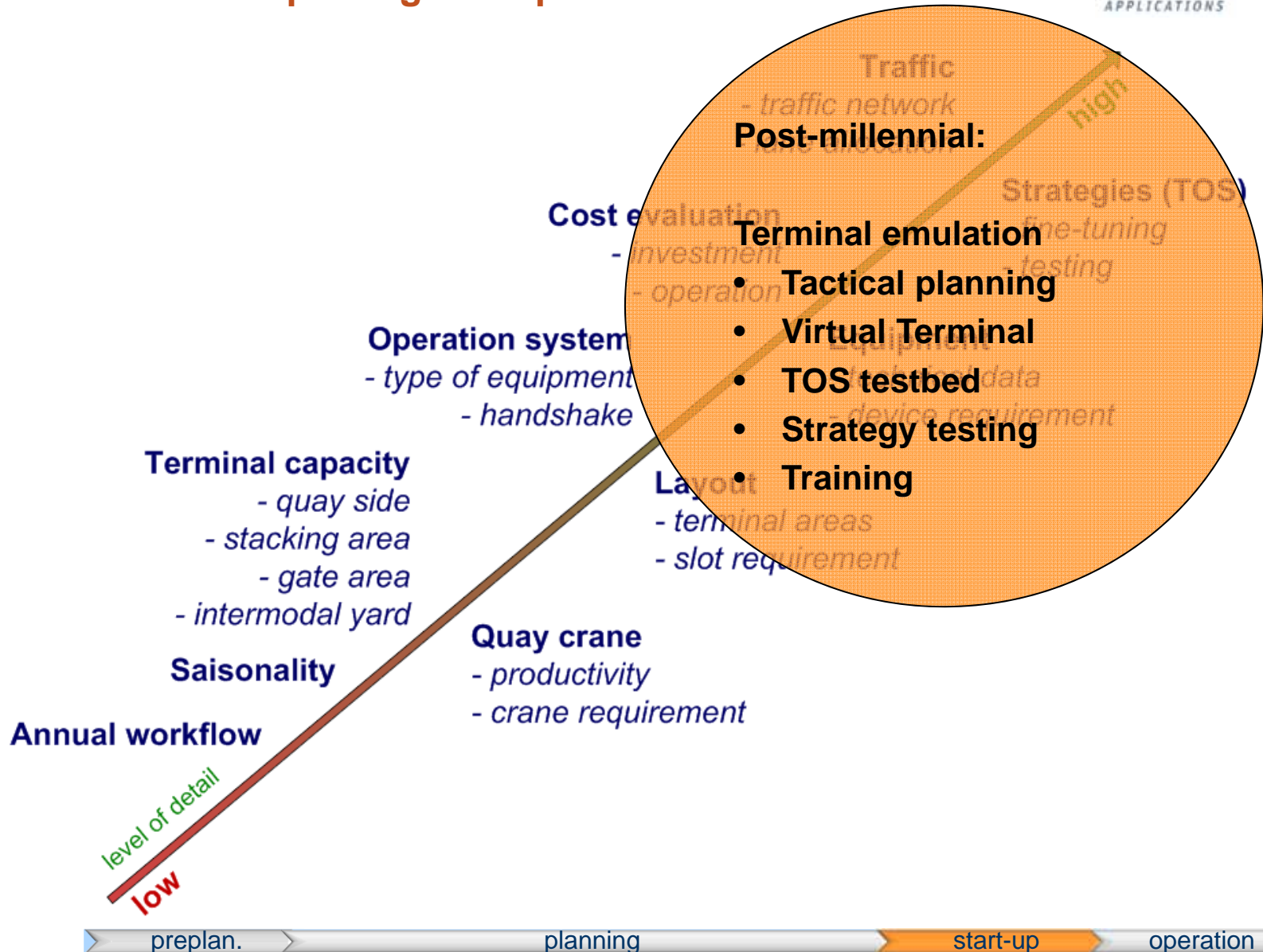
Container No.*	Kind*	From*	Len*	Tare (kg)*	Dispatch State*	
PONU7353480	DSCH	462020	40'	4000	Completed	B95905
MSKU0179252	DSCH	461820	40'	4000	Completed	C97715
MSKU1190240	DSCH	461818	40'	4000	Completed	C97713
MSKU0190626	DSCH	462018	40'	4000	Carrying	C97713
MSKU9289414	DSCH	461616	40'	4000	Dispatched	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
MSKU1433464	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...

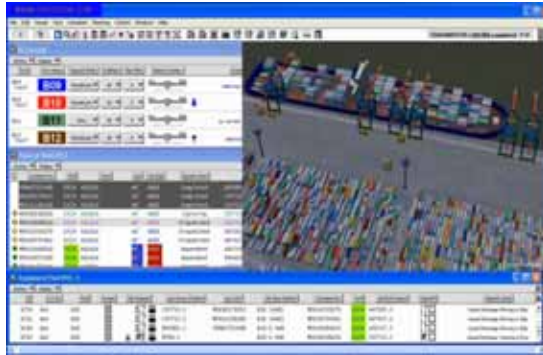
Agenda

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

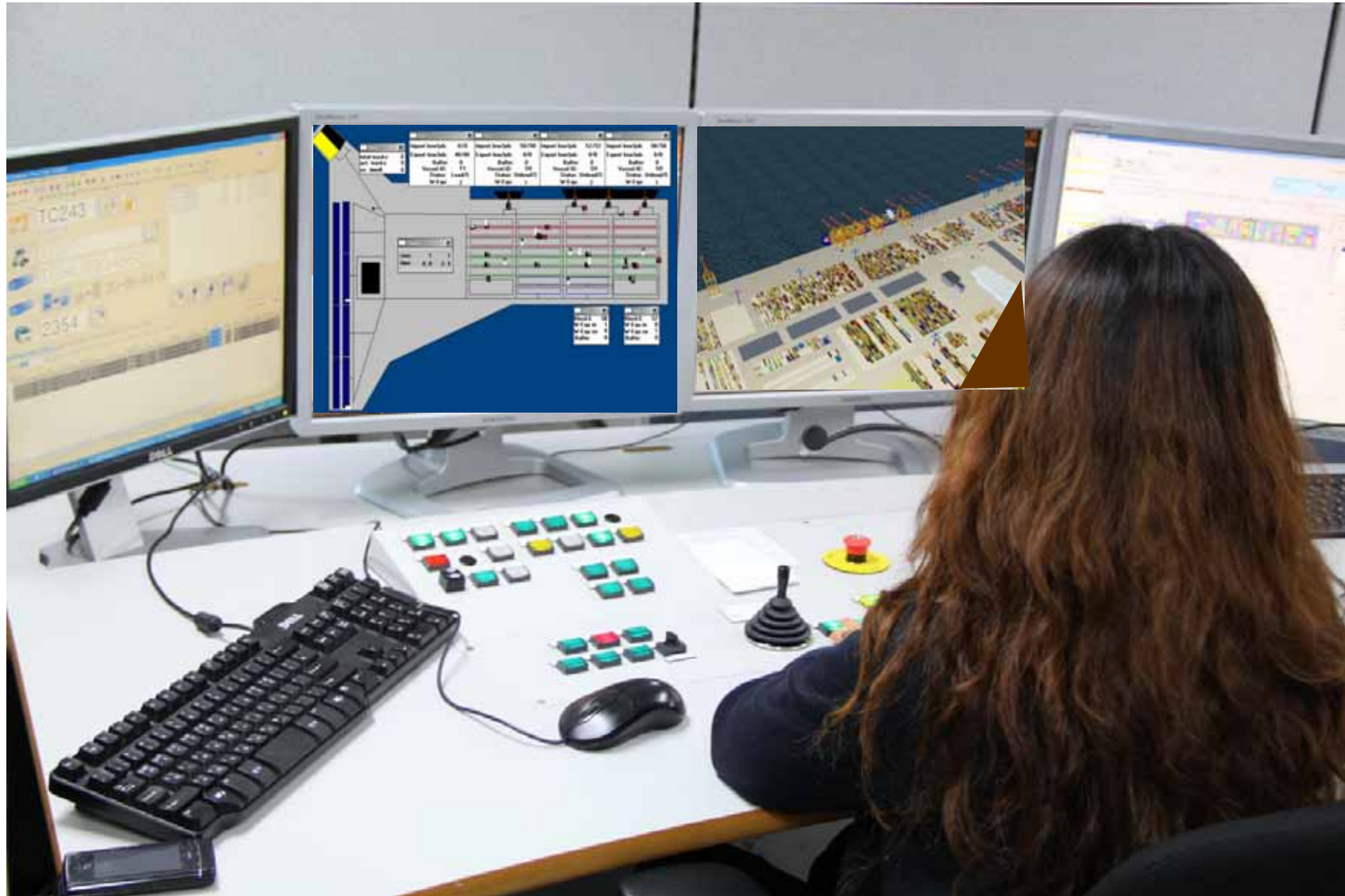
- The equipment
- The control system (TOS)
- The processes

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

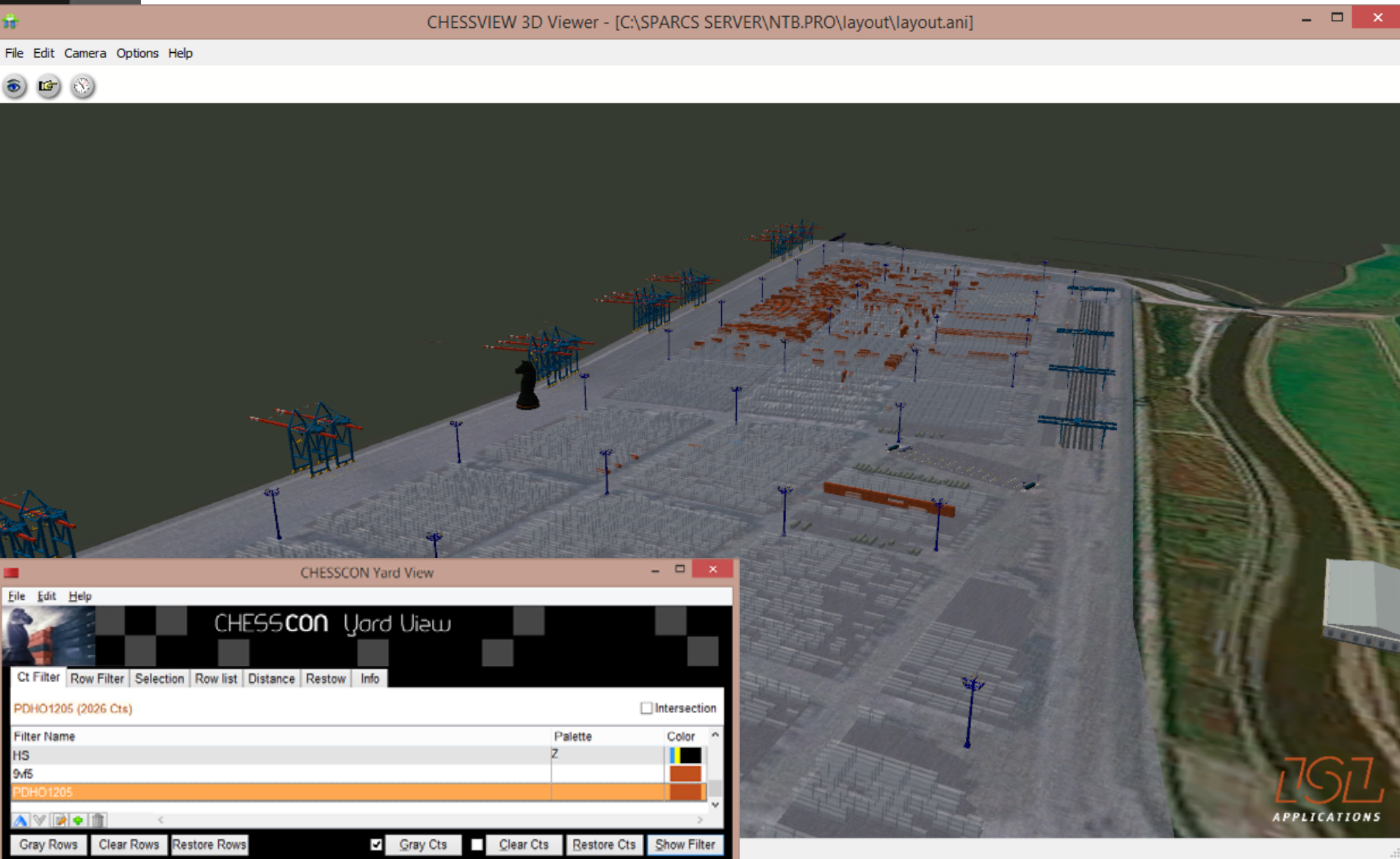


No limits to filtering container inventory

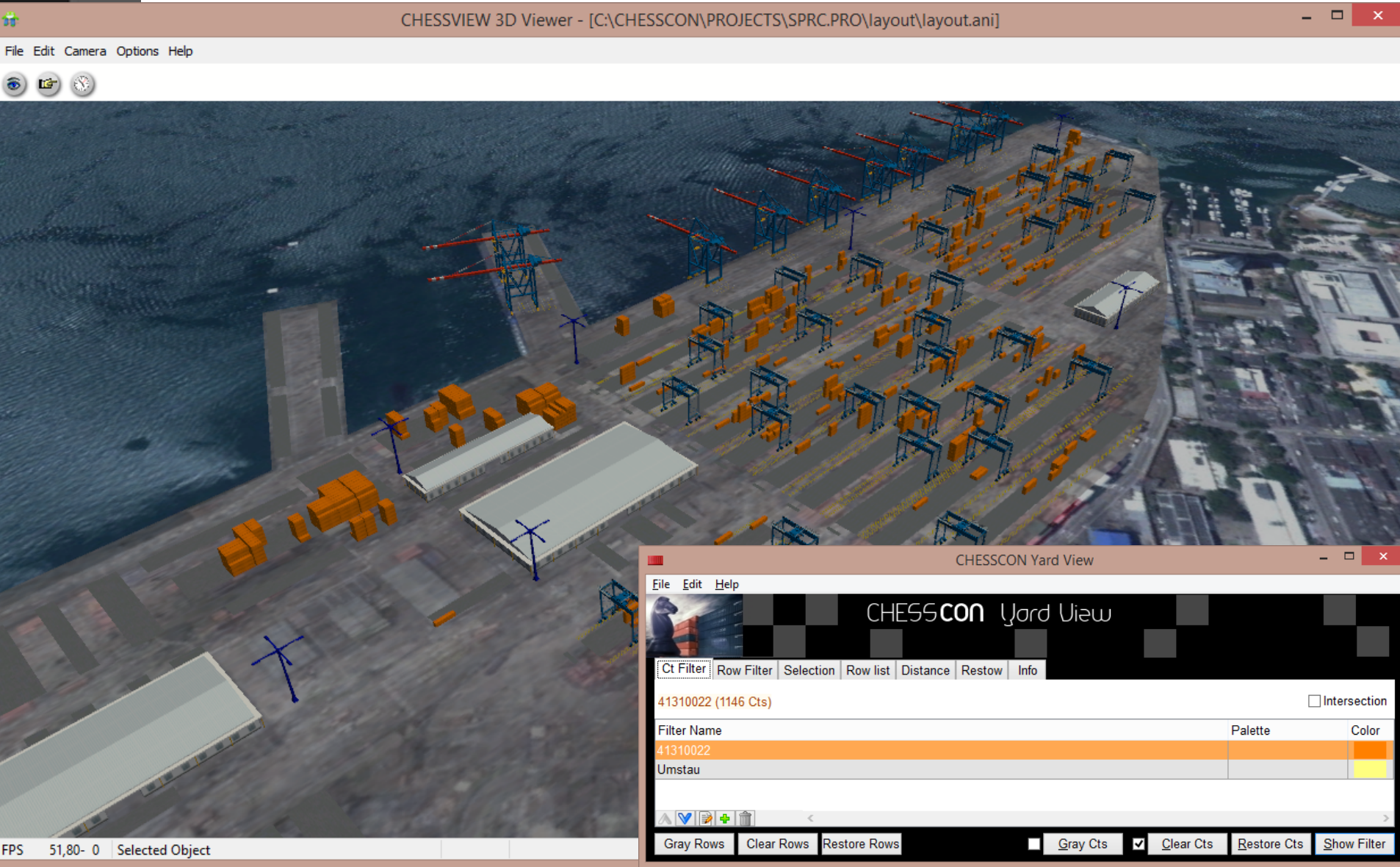
The image displays three overlapping windows from the Chesscon software. The top window is a data table titled 'Define CT Filter' showing a list of containers with columns for #, ISO, Length, Weight, Area, X, Y, Z, Flow, Empty, Actual, Depart, and LOPR. The middle window is the 'CHESSCON Yard View' interface, featuring a menu bar (File, Edit, Help) and a toolbar with options like 'CT Filter', 'Row Filter', 'Selection', 'Row list', 'Distance', 'Restow', and 'Info'. A filter configuration panel is open, showing a list of filter names: Empty (720 CTs), Tier, Flow, Reefer, Empty, and OOG. The 'Empty' filter is selected, and its configuration shows 'Paletta' as 'Z' and 'Color' as orange. The bottom window is the 'CHESSVIEW 3D Viewer' showing a 3D perspective of a container yard with multiple rows of containers and gantry cranes. The ISL APPLICATIONS logo is visible in the bottom right corner of the 3D viewer.

- 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!

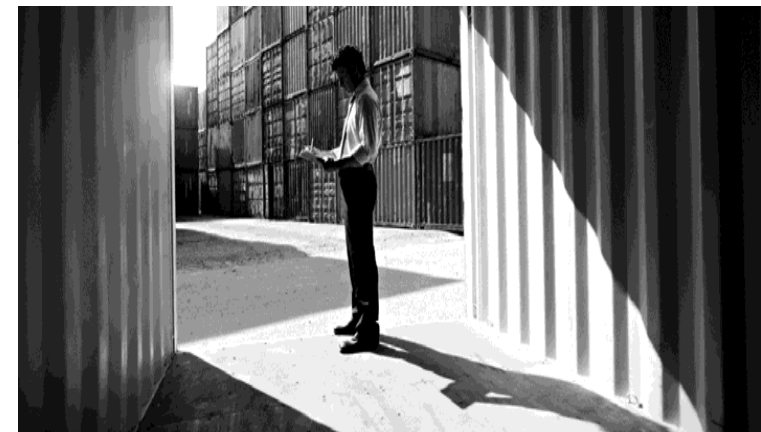


3D Yard View supports terminal planner
intuitively

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

The screenshot displays the SPARCS 3.7.2 software interface. The main window shows a list of equipment pools (MOB1 to B11) with various settings and status indicators. A purple callout box on the right contains the text: "0 step: day to day work use the TOS to plan the next shift" and "1 step: shift planning finished". Below the equipment list, there is a section for "Equipment Pool N09: 5" with a table of container details. On the right side, a list of containers is shown with columns for container ID, status, and location.

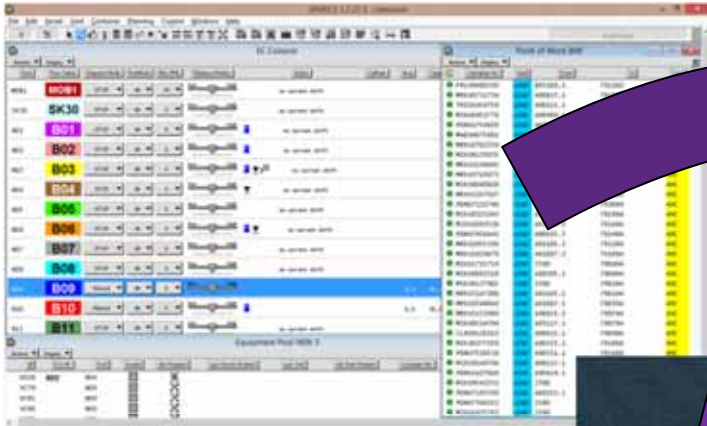
Pool	Pow Name	Dispatch Mode	PushRate	Max PMs	Relative Priority	Status
MOB1	MOB1	STOP	40	20	low	no current shift
SK30	SK30	STOP	40	8	low	no current shift
N01	B01	STOP	40	8	low	no current shift
N02	B02	STOP	40	8	low	no current shift
N03	B03	STOP	40	8	low	no current shift
N04	B04	STOP	40	8	low	no current 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

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

Container ID	Status	Location	Location
MRKU3257927	LOAD	A90717.1	780982
PONU7121740	LOAD	A93117.3	782284
MSKU8223243	LOAD	A92105.3	782084
MSKU1093528	LOAD	A91007.3	781884
PONU7956441	LOAD	A93117.2	781684
MRKU2855396	LOAD	A90615.3	781484
MRKU2639479	LOAD	A92105.2	781284
MSKU1715719	LOAD	A91007.2	781084
MSKU8083218	LOAD	J380	780684
MSKU8137905	LOAD	A90305.1	780484
MRKU3147200	LOAD	J380	780284
MRKU2568842	LOAD	A92105.1	780184
MRKU3133989	LOAD	A91007.1	780184
MSKU0514704	LOAD	A90615.2	780584
CLHU9125612	LOAD	A93117.1	780784
MSKU0277259	LOAD	A90615.1	780984
PONU7530538	LOAD	A90315.1	781886
MSKU9149794	LOAD	A90311.1	781686
PONU1627069	LOAD	A90117.1	781486
MSKU9542332	LOAD	A90419.1	781286
PONU7183399	LOAD	J380	781086
PONU7366152	LOAD	A88213.1	780886
MSKU1675703	LOAD	J380	780686
			780486

CHESSCON Shift Preview

ISL



Equipment ID	Equipment Name	Status	Location
SK30	SK30	Available	...
B01	B01	Available	...
B02	B02	Available	...
B03	B03	Available	...
B04	B04	Available	...
B05	B05	Available	...
B06	B06	Available	...
B07	B07	Available	...
B08	B08	Available	...
B09	B09	Available	...
B10	B10	Available	...
B11	B11	Available	...

2nd step:
Import planning state
automatically



Sample of based data

ISL



Equipment	Start	End	Activity
B01	08:00	10:00	...
B02	08:00	10:00	...
B03	08:00	10:00	...
B04	08:00	10:00	...
B05	08:00	10:00	...
B06	08:00	10:00	...
B07	08:00	10:00	...
B08	08:00	10:00	...
B09	08:00	10:00	...
B10	08:00	10:00	...
B11	08:00	10:00	...

CHESSCON Shift Preview

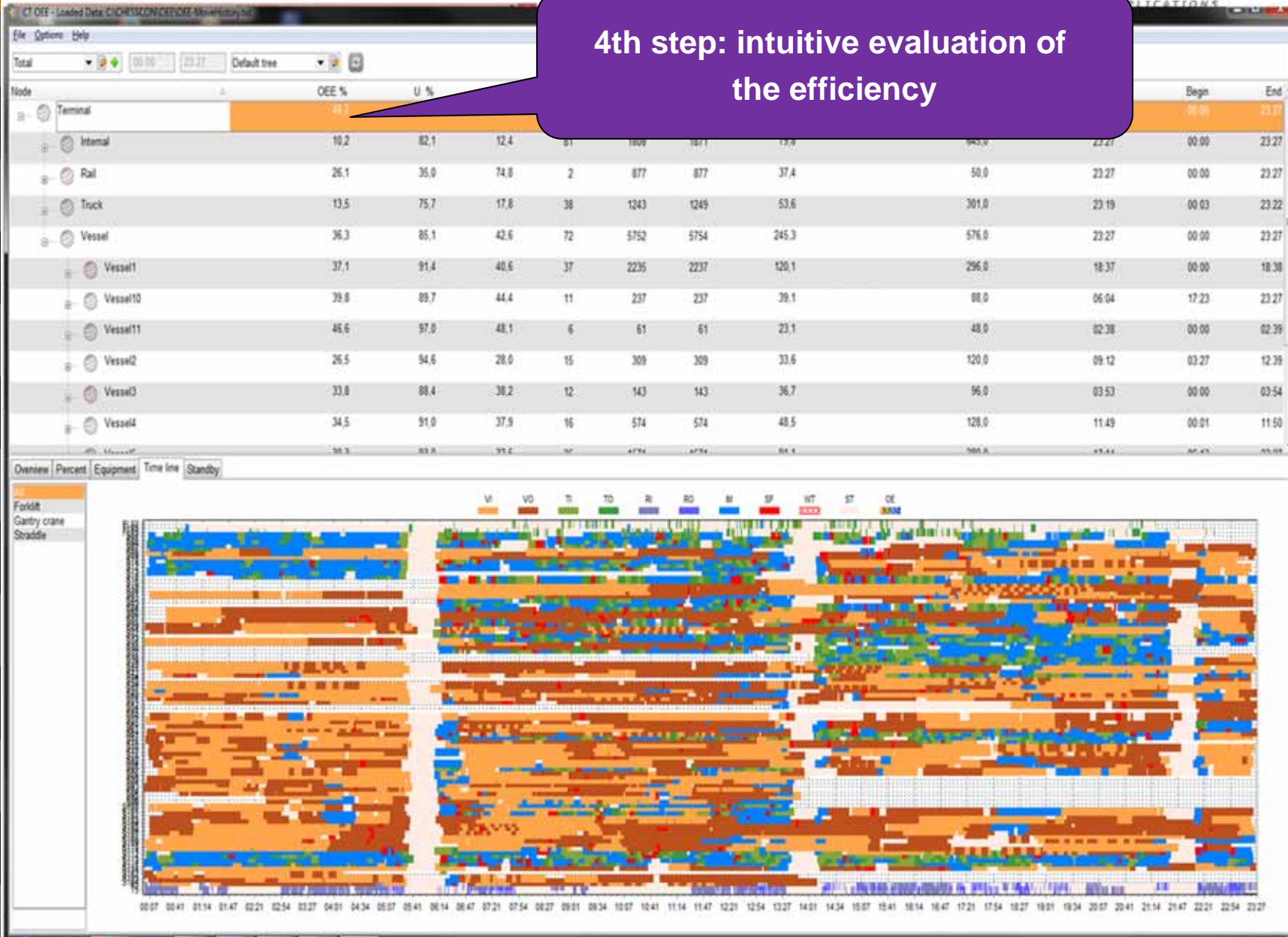
3rd step:
fast simulation of the shift



CHESSCON Shift Preview

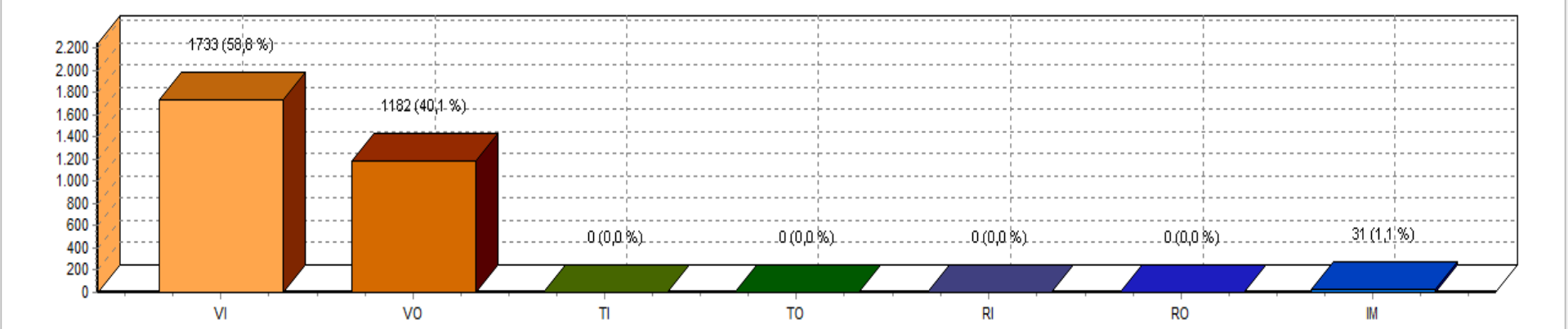


4th step: intuitive evaluation of the efficiency



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_SUR/	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

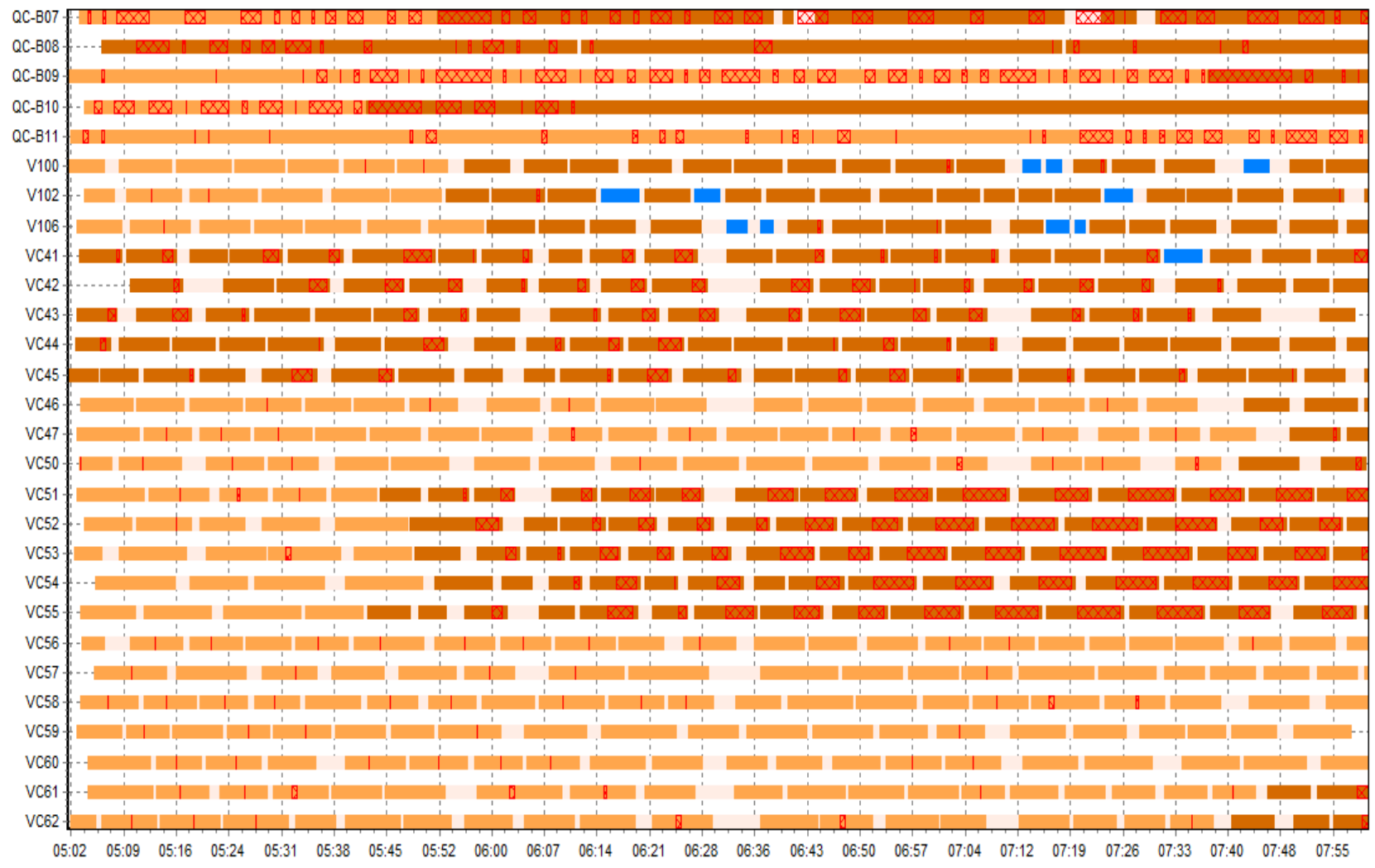
Refresh

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

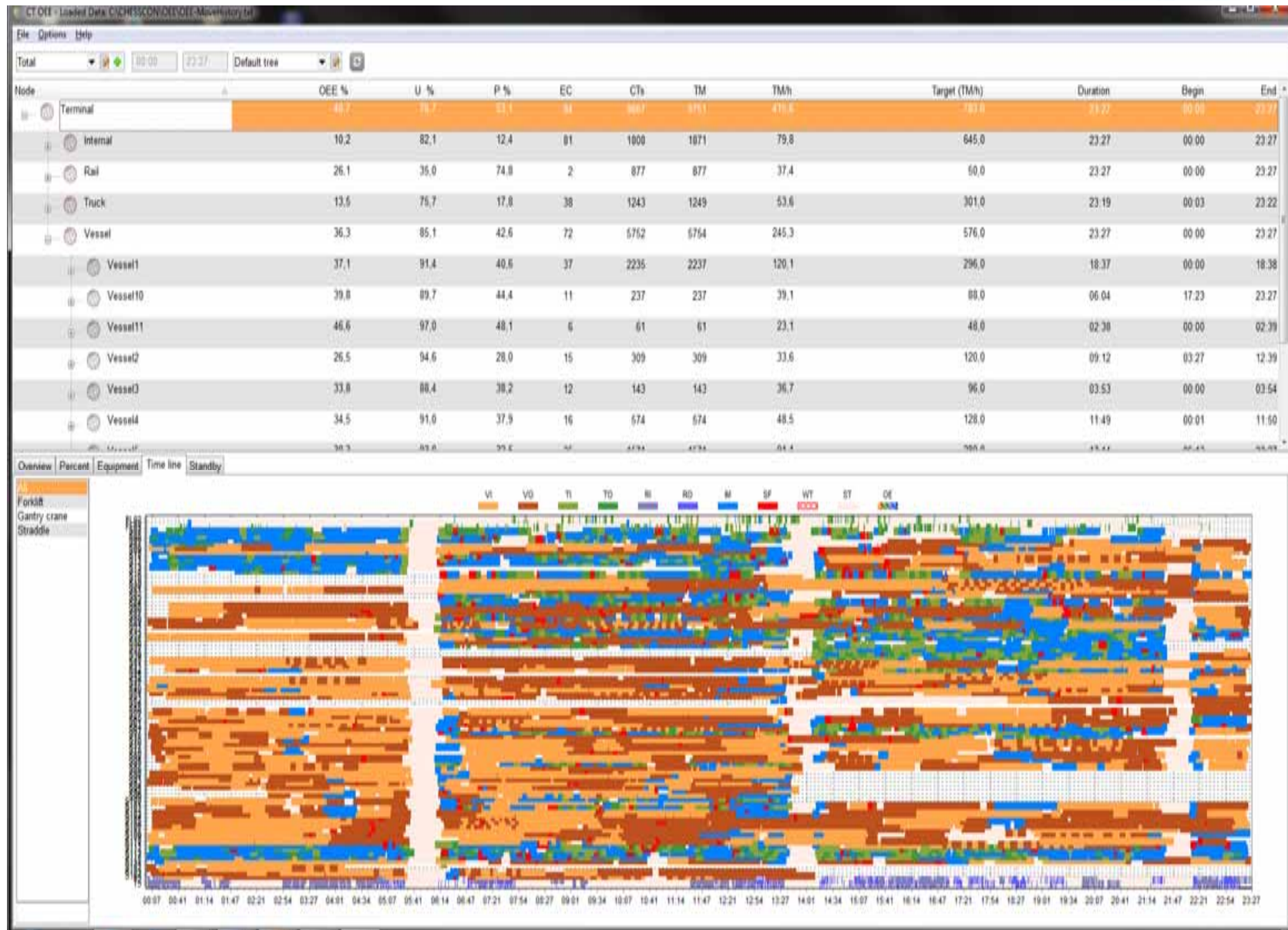
Overview Percent Equipment Time line Standby

- 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



CHESSCON
VIRTUAL TERMINAL

CHESSCON
SHIFT PREVIEW

CHESSCON
YARD VIEW

CHESSCON
SIMULATION

CHESSCON
CAPACITY

CHESSCON
TERMINAL VIEW



MAKE YOUR RIGHT MOVES!



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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

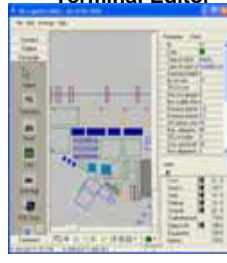


Evaluation Module

CHESSCON
VIRTUAL TERMINAL



Project Manager



Terminal Editor



Input Module



3D Terminal Viewer*



Emulation Manager



Evaluation Module

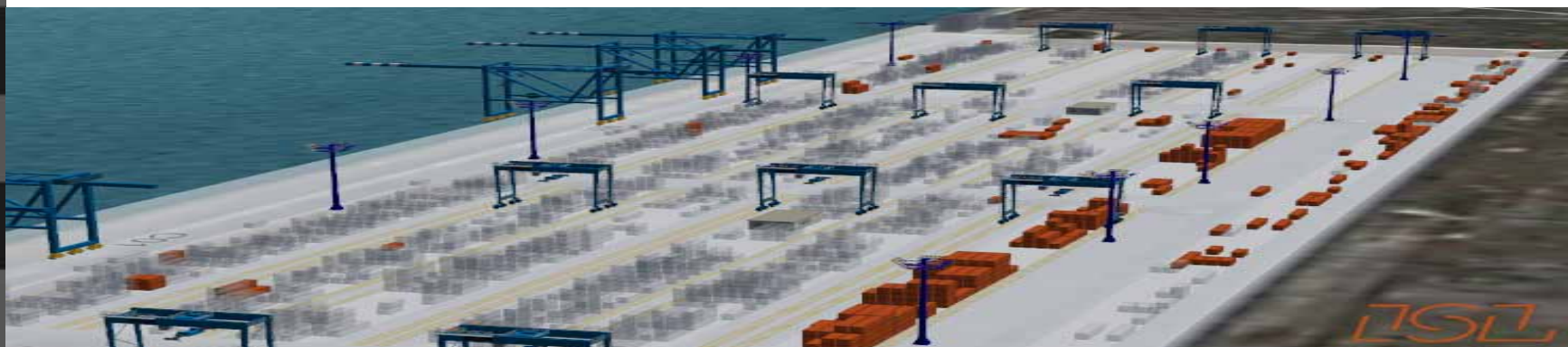
* Static 3D view

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 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



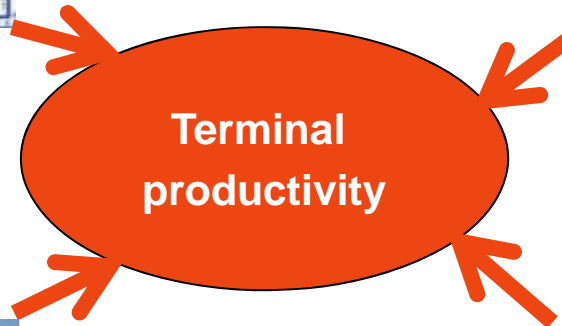
Terminal productivity



TOS



Process automation



Terminal
productivity

Equipment



The first ALV of KMI

Terminal staff

