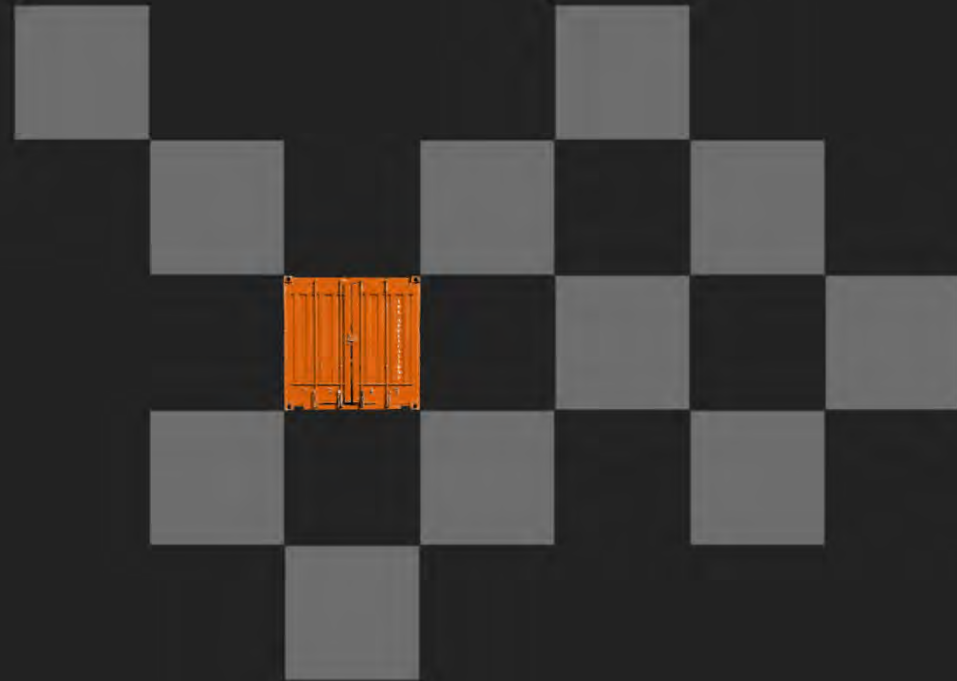


Modernise Port Processes using Virtual Terminals in the Day to Day Operation



Dr. Holger Schütt
ISL Applications GmbH

12th Intermodal Africa
Durban, October 23rd 2014



Agenda

ISL Applications

Virtual Terminal

Modernised Terminal Processes



ISL Applications

Virtual Terminal

Modernised Terminal Processes

RWI/ISL Container Throughput Index

2008 = 100



RWI/ISL computations based on data provided by 75 ports. September 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 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

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, 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, Columbia

TecPlata ICTSI, Buenos Aires, Argentina

TotalSoftBank, Korea

TPT, South Africa

TRP, Buenos Aires, Argentina

VTE, Genoa, Italy

Warsteiner Brewery, Germany

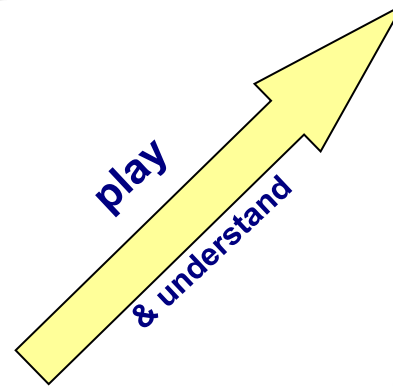
Agenda

ISL Applications

Virtual Terminal

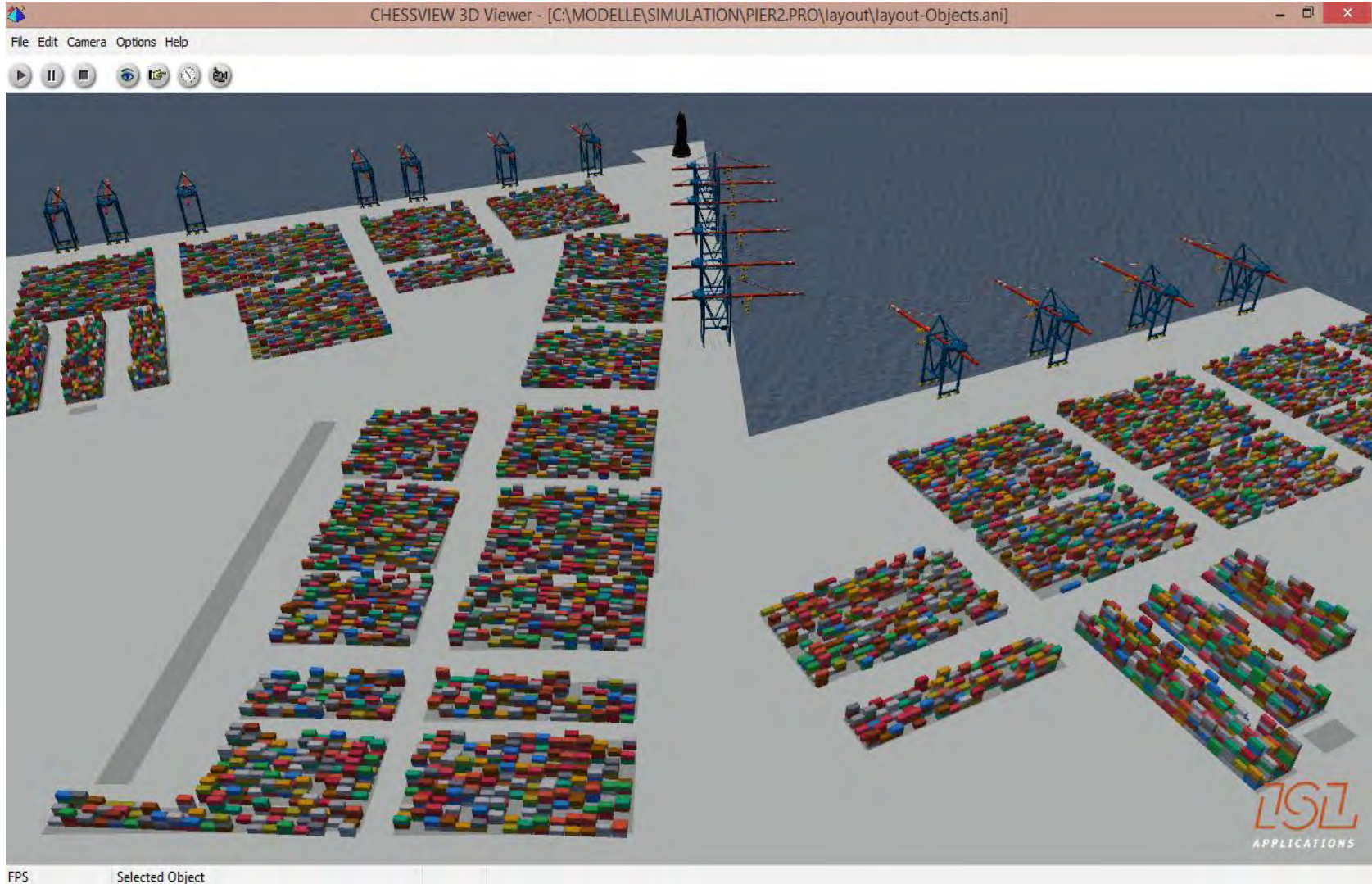
Modernised Terminal Processes

Simulation cycle





Durban





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
	total berth operation time	218.0	195.0	189.0
costs	costs per move [€]			

CHESSCON

- 1. Simulation in Terminal Planning**
 - **Offline tool**
 - **Very fast**
 - **Needs only few input**
 - **State of the art today**

Tune up your Terminal Operating System (TOS)

The screenshot displays the Chesscon TOS interface with three main windows:

- SPARCS N4 2.2.4.2 Rev 127234-1 (asl<CTW>):** The main console window with a menu bar (File, Edit, Vessel, Train, Yard, Container, Planning, Control, Windows, Help) and a toolbar. It features a control panel with 'Relative Priority' and 'Status' sliders, and a table of container jobs.
- CHESSVIEW 3D Viewer:** A 3D rendering of a port terminal with cranes, a ship, and a yard filled with containers.
- CT OEE:** A detailed performance monitoring window. It includes a table of OEE data and a Gantt chart for equipment utilization.

Container ID	Job End	Position	Door	Scale Unit	Job Progress	Screen
605191	B033138.1		UK			
1675112	B032938.1		UK			
163079	B032738.1		UK			
332049	B033338.1		UK			
1448398	B032538.1		UK			

Node	EU %	EC	CTs	Actual (CT/H)	Target (CT/H)	Lead time	Begin	End
Terminal	77.6	28	2946	152.2	342.0	19:21:14	00:02:12	19:23:27
Internal	1.1	14	31	2.3	192.0	13:17:57	04:53:44	18:11:42
Vessel	77.2	28	2915	150.6	150.0	19:21:14	00:02:12	19:23:27
	77.2	28	2915	150.6	150.0	19:21:14	00:02:12	19:23:27
QC-B07	85.7	4	369	21.2	30.0	16:55:56	00:02:12	16:58:09
QC-B10	83.4	6	619	33.8	30.0	18:17:54	00:02:14	18:20:09
QC-B11	81.0	6	634	34.3	30.0	18:27:42	00:02:14	18:29:56
QC-B09	82.4	6	686	35.4	30.0	19:21:14	00:02:13	19:23:27

Equipment	Timeline
QC-B07	[Gantt chart showing utilization bars for V100, V102, V106]

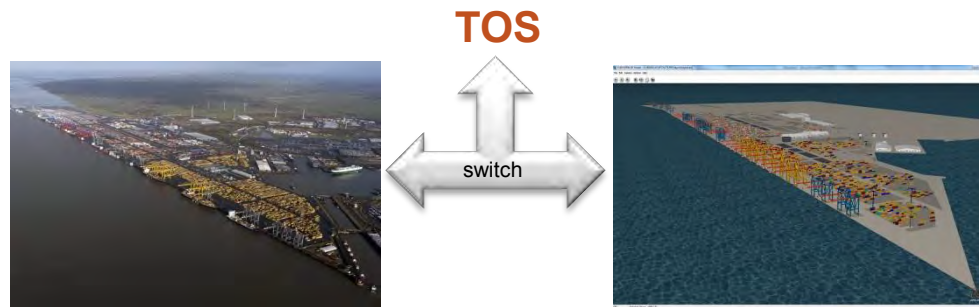
- Optimize utilization of devices
- Improve your terminal productivity
- Optimize handling strategies
- Reduce operational costs
- Increase the skill of your control staff

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	Pool Name	Dispatch Mode	PushRate	Max PMs	Relative Priority	Status
N09	B09	PrimeRoute	40	8	low <input type="range"/> high	Awaiting
N10	B10	PrimeRoute	40	8	low <input type="range"/> high	
N11	B11	Auto	40	8	low <input type="range"/> high	no current
N12	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	A02713

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

CICT (controlled by Sparcs 3.7)



SPARCS 3.7.24.1 - Kassl

File Edit Vessel Yard Container Planning Control Windows Help

navis

Equipment Pool QC06: 6

Handler id*	Icon Only*	Screen*	Dispatch State*	Move D
121			Carrying a container; Waiting at Row	1321+
122			Go to crane; Waiting at Ship	1321+
124			Go to crane; Waiting at Ship	1321+
125			Go to crane; Waiting at Ship	1321+
C06				
R33			Vessel Discharge	0+

Point of Work Q06

Sequence*	Container No.*	Type*	Current Position*	Handler id*	Dispatch State*
1	GATU8091789	45G1	*TR-121*	121/R33	In Progress
2	GATU8588121	45G0	CANX020*0361490	124	Go to Crane
3	FSCU6472343	45G1	CANX020*0361290	125	Go to Crane
4	HLXU6350672	45G1	CANX020*0361090	122	Go to Crane
5	HLXU6273703	45G1	CANX020*0361688		(not evaluated)
6	CPSU6439396	45G1	CANX020*0361488		(not evaluated)

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
- Tests the TOS
- Tests new ideas (strategy)
- Trains your staff

Going operational...

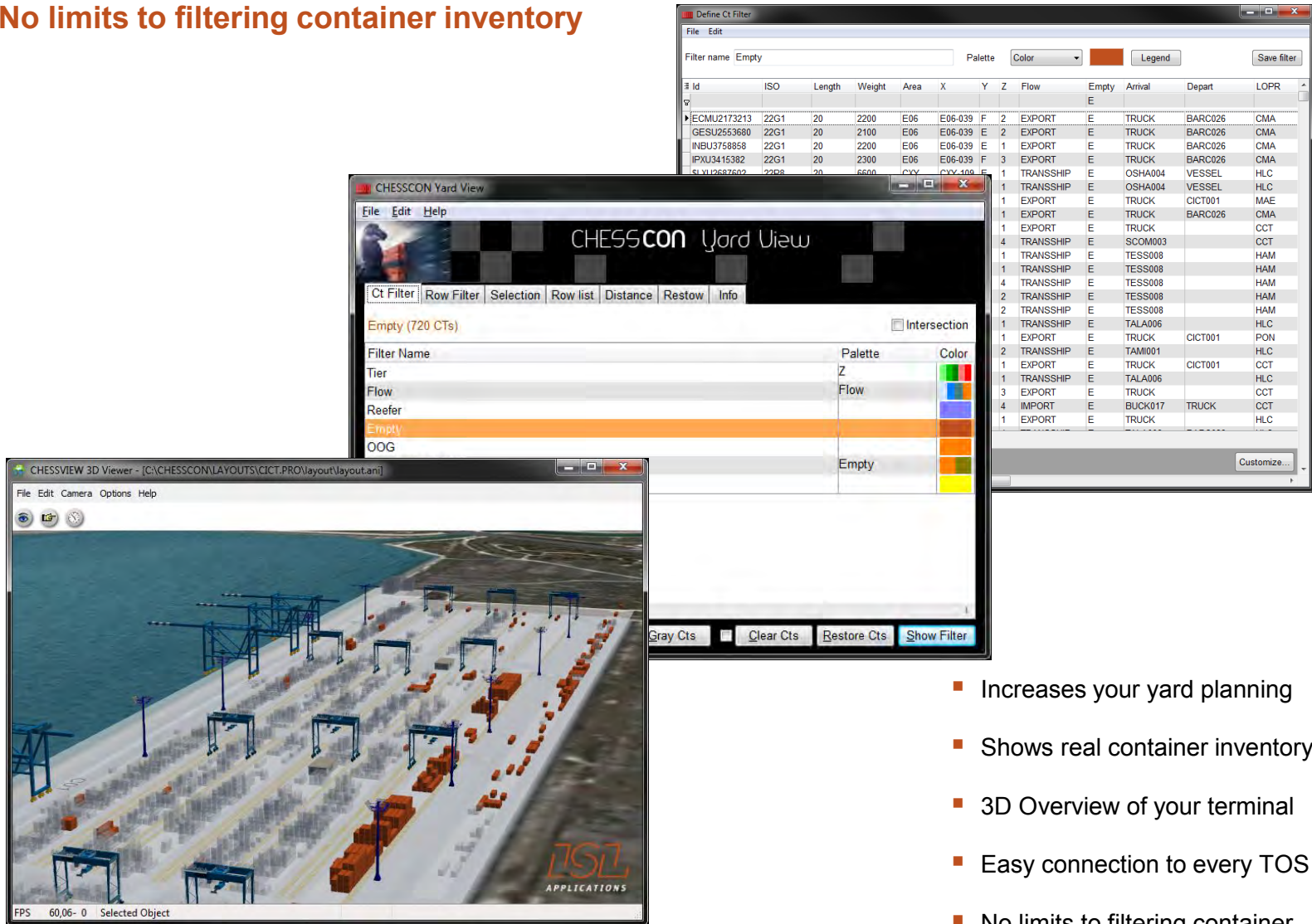
Agenda

ISL Applications

Virtual Terminal

Modernised Terminal Processes

No limits to filtering container inventory



The screenshot displays the CHESSCON software interface, which includes a 3D yard view, a data table, and a filter configuration window.

CHESSCON Yard View (Top Window):

- Menu: File, Edit, Help
- Navigation: Ct Filter, Row Filter, Selection, Row list, Distance, Restow, Info
- Filter Name: Empty (720 CTs)
- Intersection:
- Filter Name, Palette, Color, Tier, Flow, Reefer, Empty, OOG
- Buttons: Gray Cts, Clear Cts, Restore Cts, Show Filter

Define Ct Filter (Right Window):

- Filter name: Empty
- Palette: Color
- Legend
- Save filter

#	Id	ISO	Length	Weight	Area	X	Y	Z	Flow	Empty	Arrival	Depart	LOPR
1	ECMU2173213	22G1	20	2200	E06	E06-039	F	2	EXPORT	E	TRUCK	BARC026	CMA
2	GESU2553680	22G1	20	2100	E06	E06-039	E	2	EXPORT	E	TRUCK	BARC026	CMA
3	INBU3758858	22G1	20	2200	E06	E06-039	E	1	EXPORT	E	TRUCK	BARC026	CMA
4	IPXU3415382	22G1	20	2300	E06	E06-039	F	3	EXPORT	E	TRUCK	BARC026	CMA
1	SLV12687602	22D8	20	6600	CYV	CYV-109	F	1	TRANSHIP	E	OSHA004	VESSEL	HLC
1								1	TRANSHIP	E	OSHA004	VESSEL	HLC
1								1	EXPORT	E	TRUCK	CICT001	MAE
1								1	EXPORT	E	TRUCK	BARC026	CMA
1								1	EXPORT	E	TRUCK		CCT
4								4	TRANSHIP	E	SCOM003		CCT
1								1	TRANSHIP	E	TESS008		HAM
1								1	TRANSHIP	E	TESS008		HAM
4								4	TRANSHIP	E	TESS008		HAM
2								2	TRANSHIP	E	TESS008		HAM
1								1	TRANSHIP	E	TALA006		HLC
1								1	EXPORT	E	TRUCK	CICT001	PON
2								2	TRANSHIP	E	TAMI001		HLC
1								1	EXPORT	E	TRUCK	CICT001	CCT
1								1	TRANSHIP	E	TALA006		HLC
3								3	EXPORT	E	TRUCK		CCT
4								4	IMPORT	E	BUCK017	TRUCK	CCT
1								1	EXPORT	E	TRUCK		HLC


CHESSVIEW 3D Viewer (Bottom Window):

- File, Edit, Camera, Options, Help
- FPS: 60, 06- 0 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 – Tables View

Define Ct Filter

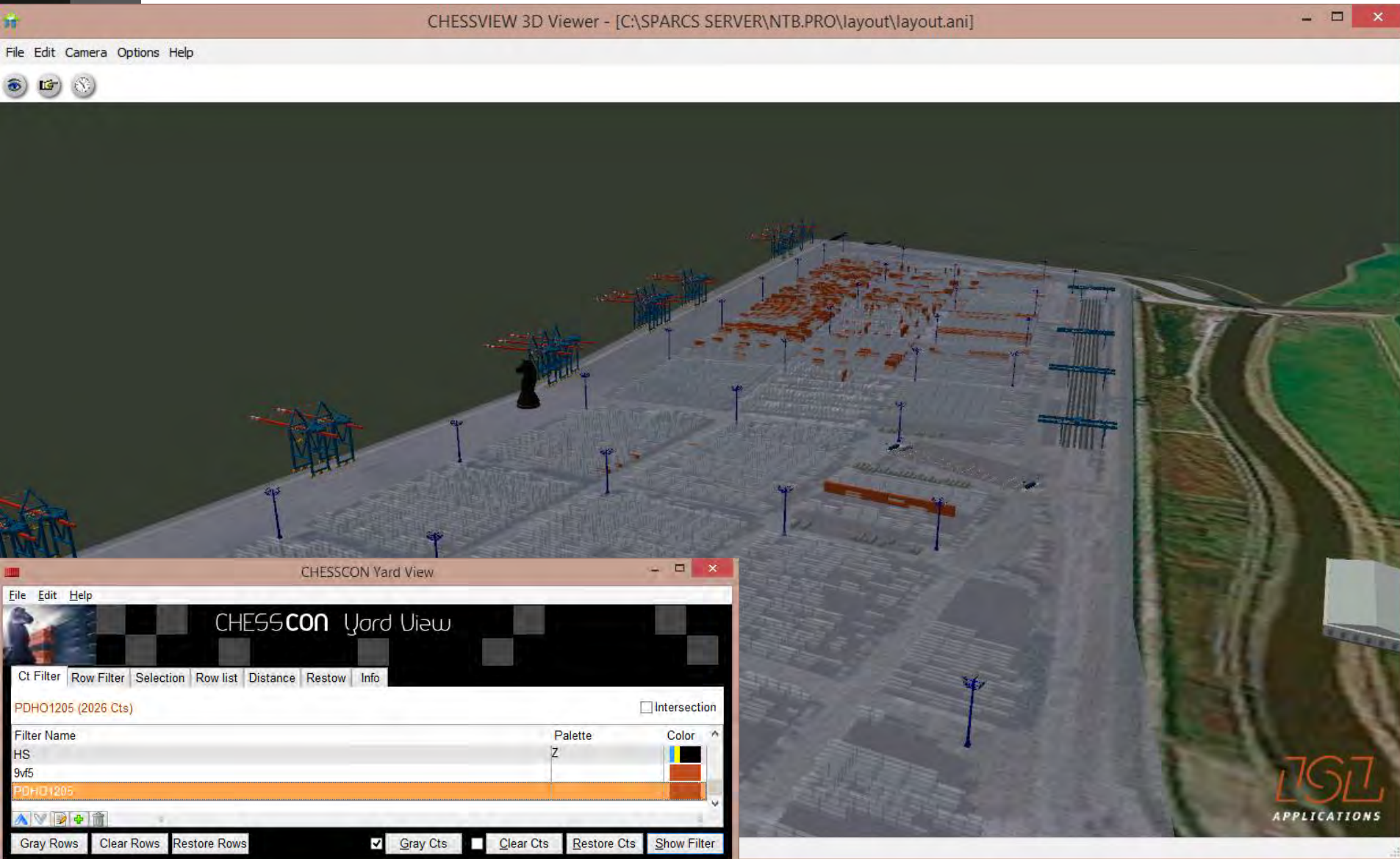
Filter name: Palette:  Legend

Id	ISO	Length	Weight	Area	X	Y	Z	Flow	Empty	Arrival	Depart	LOPR
									E			
▶ ECMU2173213	22G1	20	2200	E06	E06-039	F	2	EXPORT	E	TRUCK	BARC026	CMA
GESU2553680	22G1	20	2100	E06	E06-039	E	2	EXPORT	E	TRUCK	BARC026	CMA
INBU3758858	22G1	20	2200	E06	E06-039	E	1	EXPORT	E	TRUCK	BARC026	CMA
IPXU3415382	22G1	20	2300	E06	E06-039	F	3	EXPORT	E	TRUCK	BARC026	CMA
\$LXU2687602	22P8	20	6600	CXY	CXY-109	E	1	TRANSSHIP	E	OSHA004	VESSEL	HLC
\$LXU4686992	45P3	40	8600	CXY	CXY-112	E	1	TRANSSHIP	E	OSHA004	VESSEL	HLC
MSKU8012976	45G1	40	4000	CXZ	CXZ-004	B	1	EXPORT	E	TRUCK	CICT001	MAE
TRLU3841934	22G1	20	2200	E06	E06-039	F	1	EXPORT	E	TRUCK	BARC026	CMA
CLOU2824793	2251	20	2200	CXY	CXY-013	C	1	EXPORT	E	TRUCK		CCT
CMBU4067684	4310	40	3900	CXZ	CXZ-006	B	4	TRANSSHIP	E	SCOM003		CCT
CAIU2027424	22G1	20	2200	D06	D06-049	E	1	TRANSSHIP	E	TESS008		HAM
SUDU1974890	22G1	20	2300	D06	D06-049	F	1	TRANSSHIP	E	TESS008		HAM
SUDU7796959	22G1	20	2300	D06	D06-049	E	4	TRANSSHIP	E	TESS008		HAM
SUDU1472422	22G1	20	2300	F06	F06-017	F	2	TRANSSHIP	E	TESS008		HAM
SUDU7513494	22G1	20	2300	D06	D06-049	F	2	TRANSSHIP	E	TESS008		HAM
HLXU7700482	4232	40	4300	D06	D06-046	F	1	TRANSSHIP	E	TALA006		HLC
PONU7777174	45G1	40	3900	CXZ	CXZ-004	A	1	EXPORT	E	TRUCK	CICT001	PON
HLXU6697050	45P8	40	4300	CXY	CXY-048	D	2	TRANSSHIP	E	TAMI001		HLC
CSQU3104632	2210	20	2000	CXZ	CXZ-055	B	1	EXPORT	E	TRUCK	CICT001	CCT
TRLU1802775	45R1	40	4300	C06	C06-064	C	1	TRANSSHIP	E	TALA006		HLC
KNLU4260990	4300	40	4300	CXZ	CXZ-006	B	3	EXPORT	E	TRUCK		CCT
MAEU8282720	45G1	40	3700	CXY	CXY-014	E	4	IMPORT	E	BUCK017	TRUCK	CCT
HLXU2691623	22P8	20	2200	CXZ	CXZ-019	A	1	EXPORT	E	TRUCK		HLC

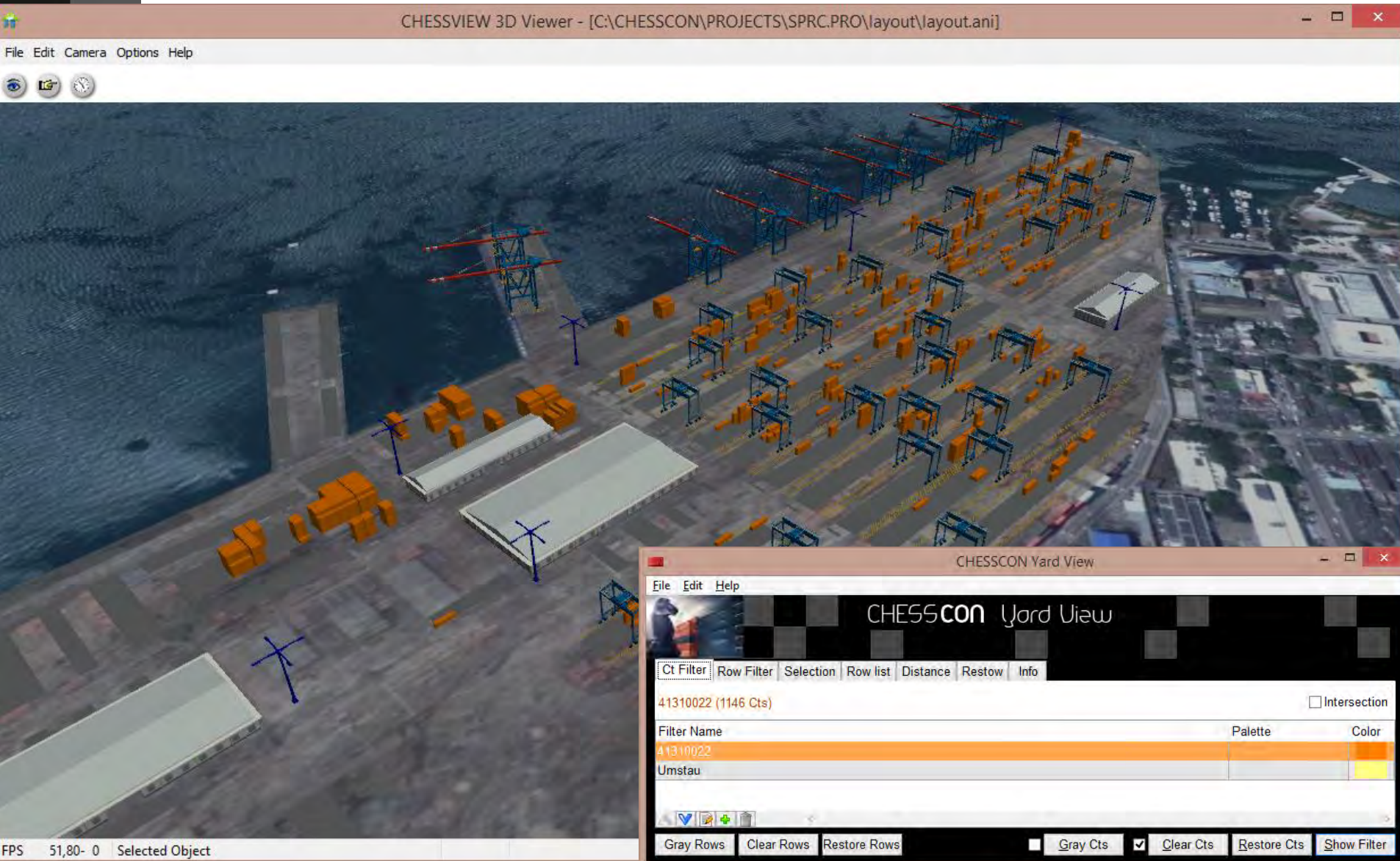
720

(Empty = E)

NTB with Sparcs 3.7 – Yard View



SPRC with Sparcs 3.7 – Yard View



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
- Tests the TOS
- Tests new ideas (strategy)
- Trains your staff



3. Yard View

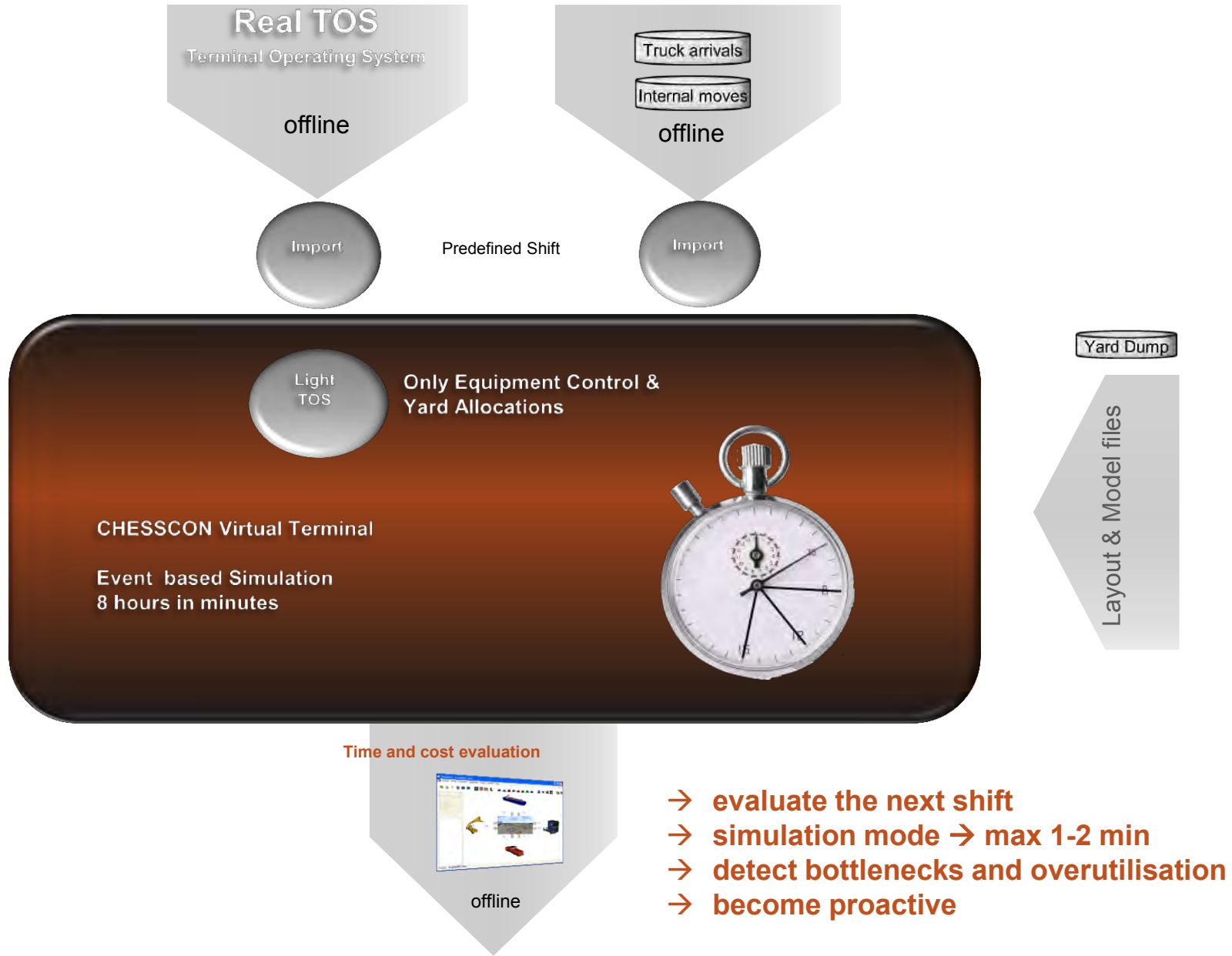
- Uses Navis data
- Visualises strategy
- Optimises yard planning
- Day to day operation

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



Interfaces of CHESSCON Shift Preview



Real TOS

Terminal Operating System

offline

Import

Predefined Shift

Truck arrivals

Internal moves

offline

Import

Light TOS

Only Equipment Control & Yard Allocations

Yard Dump

Layout & Model files

CHESSCON Virtual Terminal

Event based Simulation
8 hours in minutes



Time and cost evaluation



offline

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

00:02 19:23

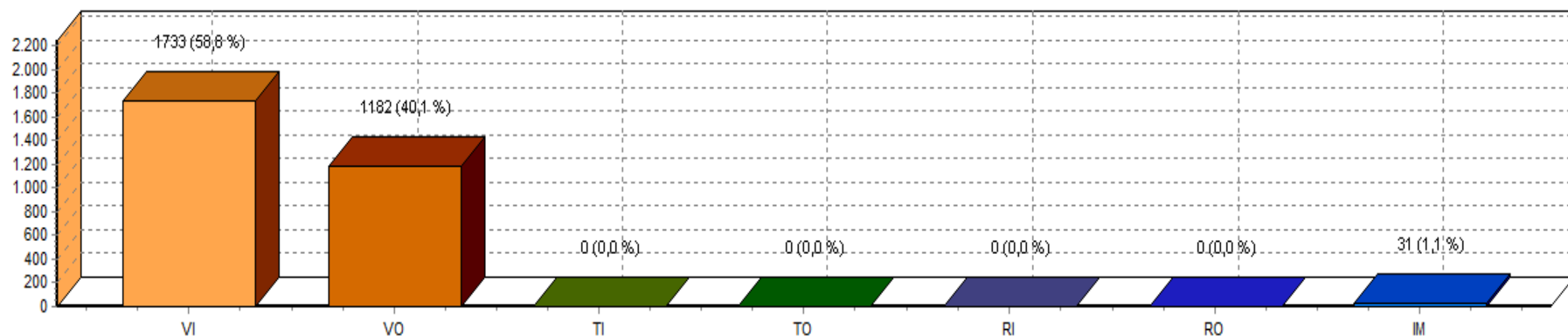
Auto time frame

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



05:02

08:00

Auto time frame

Default tree

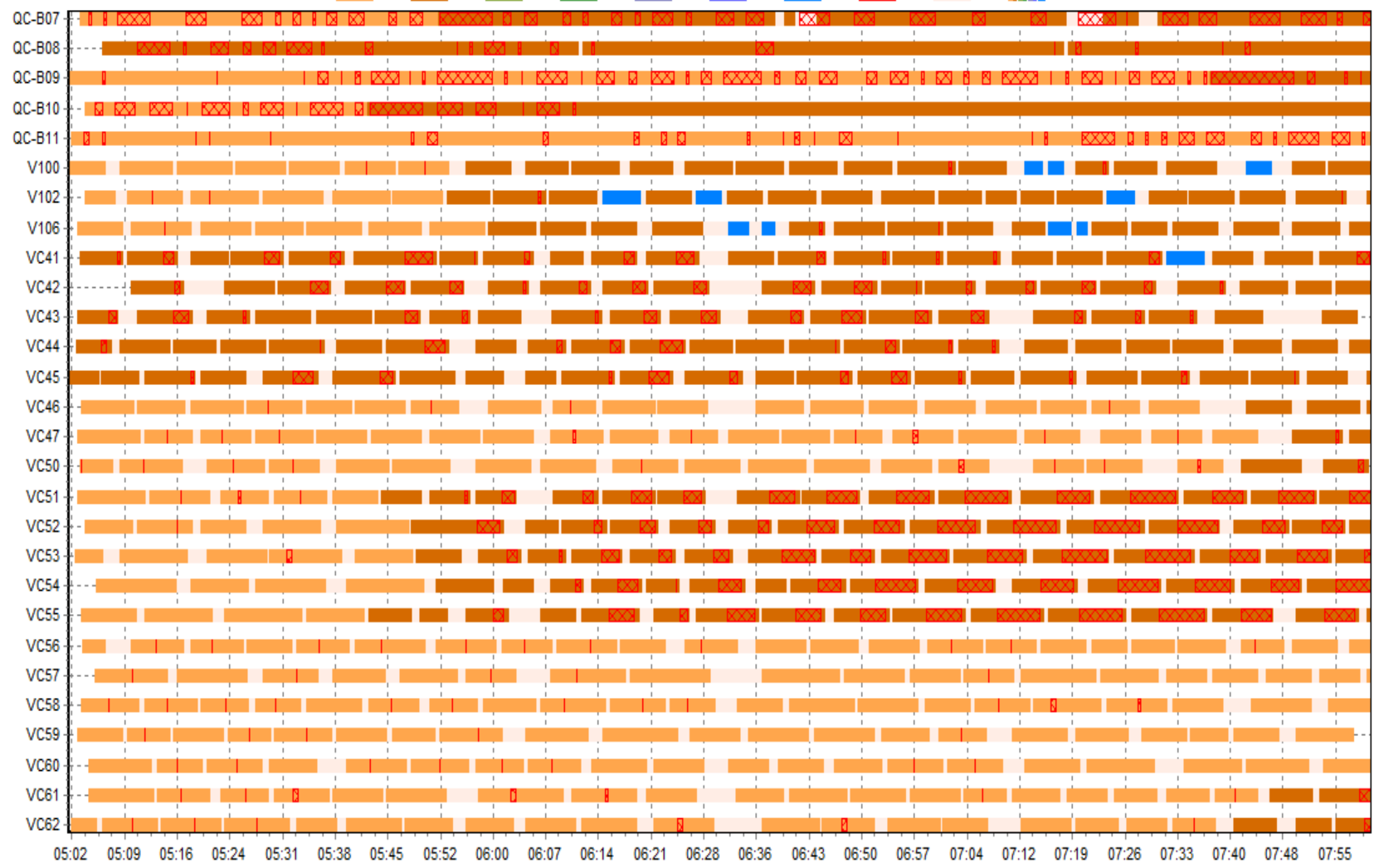
Refresh

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



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

4. Shift Preview

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

3. Yard View

- Uses Navis data
- Visualise strategy
- Optimise yard planning
- Day to day operation

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



MAKE YOUR RIGHT MOVES!



WWW.CHESSCON.COM

CHESSCON
VIRTUAL TERMINAL