



GATE AUTOMATION & OCR

Intermodal Terminals

Mannheim – October 17, 2013

Anton Bernaerd
CAMCO Technologies



CAMCO Technologies

Premier vendor of Visual-Assisted
process automation
for Maritime & Rail container
terminals worldwide



CAMCO TECHNOLOGIES

CAMCO Technologies

- Founded in March, 1999
- Belgium-based
- Private-owned 100%
- Focused on terminal & gate process automation
- Engineering company
- Designs and develops all core technology
- Active world-wide
- Preferred partner for green field terminal projects



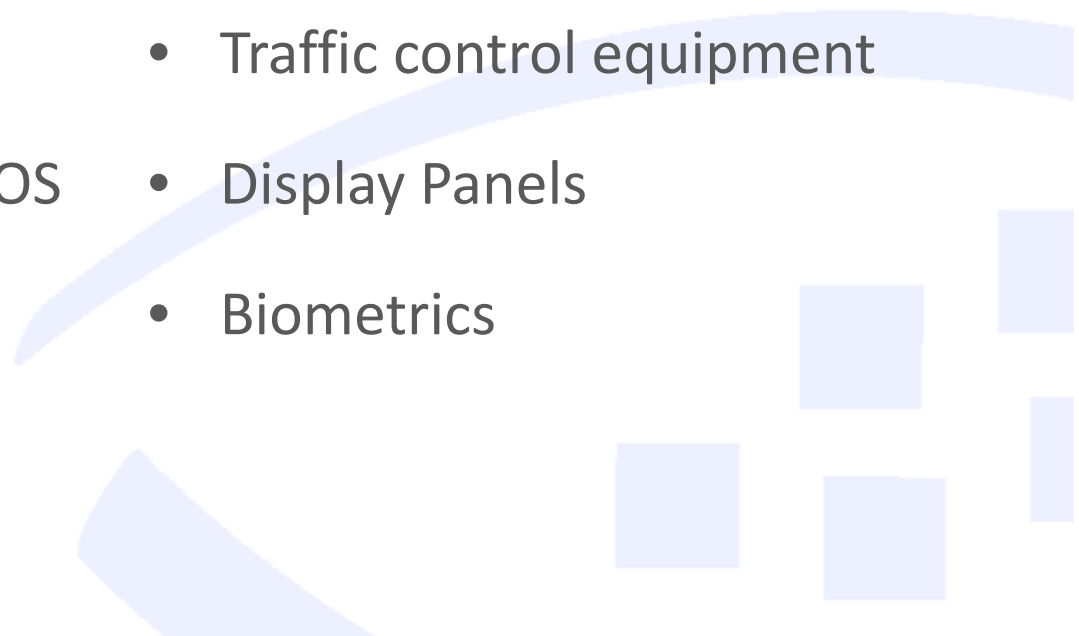
CAMCO Technologies

Core Solutions

- Intelligent Camera systems
- OCR & Image analysis
- Pedestal systems
- Gate Operating System GOS
- Truck - Crane - Rail

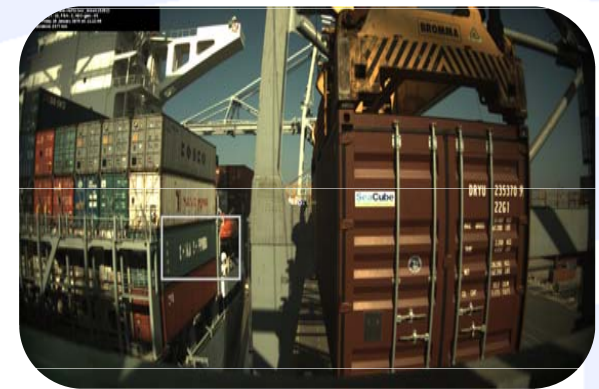
Integrator Solutions

- RFID (active & passive)
- PDS – RTLS
- Traffic control equipment
- Display Panels
- Biometrics



CAMCO Technologies

References



Container Terminals



- Rotterdam
- **Maasvlakte II**
- **Le Havre**
- Aarhus
- Zeebrugge
- ...



- Burchardkai
- Altenwerder
- Tollerort



- Jebel Ali T2 & T1
- Antwerp Gateway
- **Rotterdam World Gateway**
- **London Gateway**
- Germersheim
- **Le Havre**
- Caucedo
- **Brisbane**
- Port Botany
- Melbourne
- Fremantle



- Felixstowe
- **Tercat**
- **Brisbane**
- **Sydney**
- Dammam

TRANSNET



- Durban Pier 1
- Durban Pier 2
- **Ngqura**

Container Terminals



- Bremerhaven
- ***Wilhelmshaven***



- Seattle
- Oakland
- Long Beach Pier 1
- Long Beach PCT



- APM Terminal
- Norfolk International Terminals



- TPS Valparaíso



- ***BTP Santos***



- ***Malmö Terminal***



- ***FOS2XL***



- ***Fisherman Islands***
- Port Botany

Ro-Ro Terminals



- Gothenburg
- Europoort



- Purfleet
- Zeebrugge
- Rotterdam



Port of Felixstowe

- Dooley terminal



Harwich
International Port

- Ferry terminal



- Schwedenkai
- Ostuferhafen



- Seeland Terminal



Intermodal – Rail Terminals



- Chicago
- Alliance
- Memphis
- San Bernardino
- Willow Springs
- Cicero
- Stockton
- Hobbart



- Markham
- Calgary



- Dolton
- East-LA
- Rochelle
- Joliet
- Oakland
- Salt Lake City
- Denver
- Marion
- Chicago City
- Proviso
- Mesquite
- Dallas
- Von Ormy
- Santa Theresa



- Austell
- Croxton
- Rickenbacker
- Landers
- Memphis
- McAlla



- Bedford Park





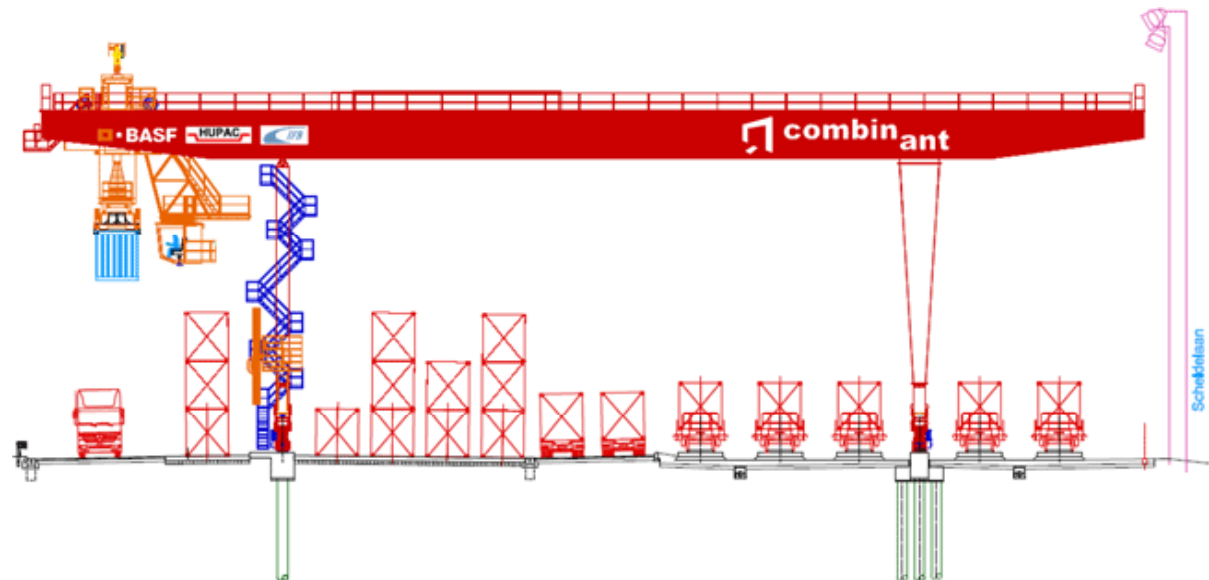
GATE AUTOMATION & OCR

Intermodal Terminals

Intermodal Terminals

Challenges

- Multimodus
 - Trucks
 - Trains
 - Trailers
 - Containers
 - Tank containers
- Quid Outbound trains?
- Rail Crane OCR...



Intermodal Terminals

Trucks

- Truck OCR camera portal
 - Images for condition check
 - OCR:
 - License plates
 - Container ID
 - ISO code
 - IMDG labels presence & classification
 - Seal presence (containers)
 - Trailer ID (ILU code)
- Operator console (exception handling)
- Truck driver self-service kiosk

Trains

- Train OCR camera portal
 - Images for condition check
 - OCR:
 - License plates
 - Container ID
 - ISO code
 - IMDG labels presence & classification
 - Seal presence (containers)
 - Trailer ID (ILU code)
- Rail Operator Console (OCR data validation)

GOS – TOS interfacing

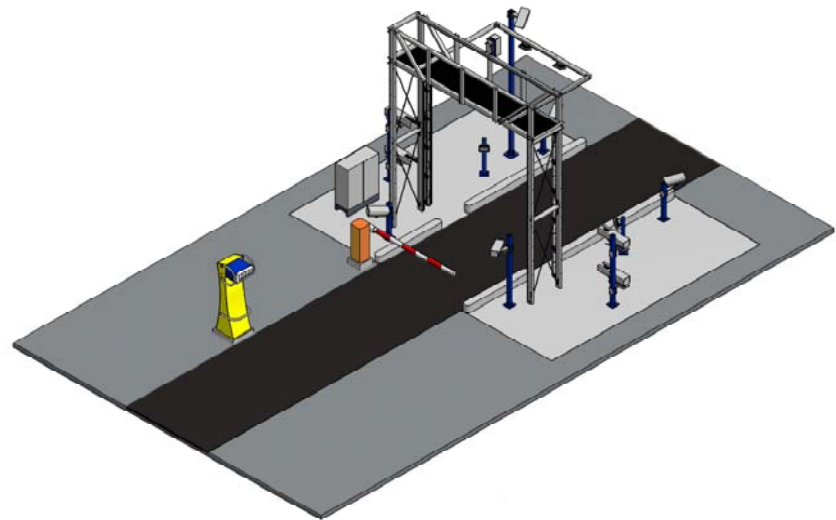
Truck OCR Camera Portal



Truck OCR camera portal



- Dynamic – Drive-through
- No speed limitations
- Fast processing <3 seconds
- 180 – 500 passages per hour
- Line-scan camera technology
- High resolution images
- Images of all sides
- Highest OCR rates >98%







Live stream: Saturday 21 March 2008 at 17:05:55
4:40:00

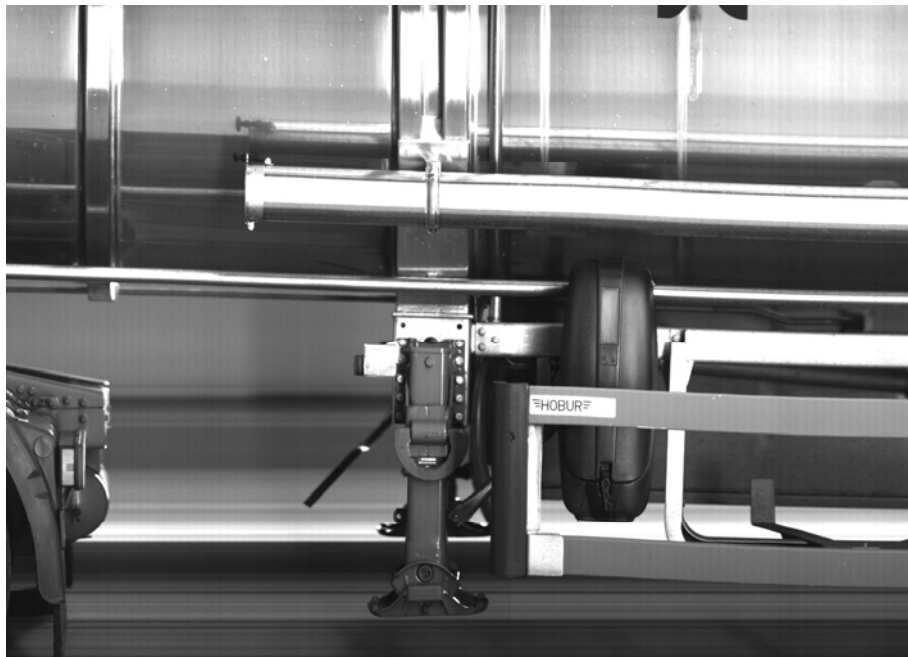


Live stream: Friday 20 March 2008 at 18:55:23
4:40:00



Live stream: Friday 20 March 2008 at 19:24:05
4:40:00





Truck OCR camera portal

Automatic Identification

- Container number
- ISO code
- License plate number
- Dangerous Goods Labels

Automatic Detection

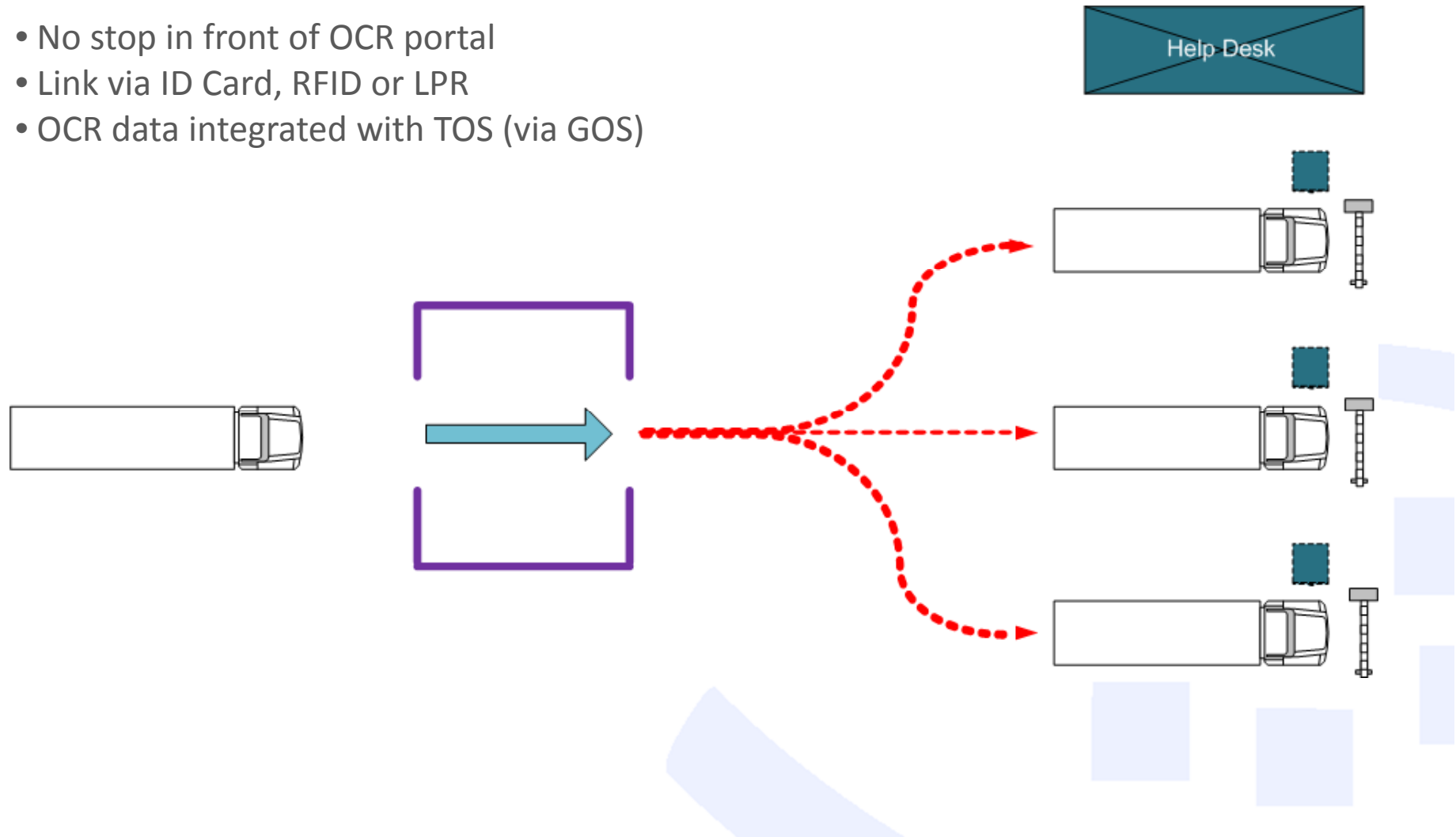
- Container location
- Door direction
- Seal Presence

Condition recording

- Condition Checking
- Storage for later retrieval
- Damage Claims management

Physical Implementation

- No stop in front of OCR portal
- Link via ID Card, RFID or LPR
- OCR data integrated with TOS (via GOS)



Operator Console



Self-Service Kiosks



Kiosk Systems

- LCD Touch Screen
- Soft keyboard
- Ticket printer
- Biometrics
- Card reader
- Barcode reader
- VoIP Intercom
- Face camera



GEN2 Kiosk Systems





Hou uw CargoCard
voor de kaartlezer.

Ik heb geen CargoCard.



NEDERLANDS



ENGLISH

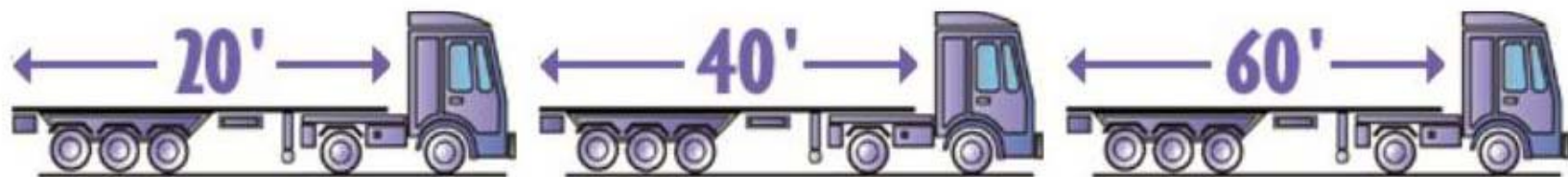


DEUTSCH



FRANÇAIS

Bitte Chassislänge eingeben.



20ft Chassis

40ft Chassis

60ft Chassis



DEUTSCH



POLSKI



DANSK



ENGLISH



رحلة معدة داخلية

ادخل رمز رحلة المعدة الداخلية.

1	2	3	تصحيح
4	5	6	
7	8	9	إدخال
	0		



TrainGate



Train OCR portal

CAMCO was pioneer with first Train OCR portal installation in Europe at HHLA Burchardkai.

Current installed base:

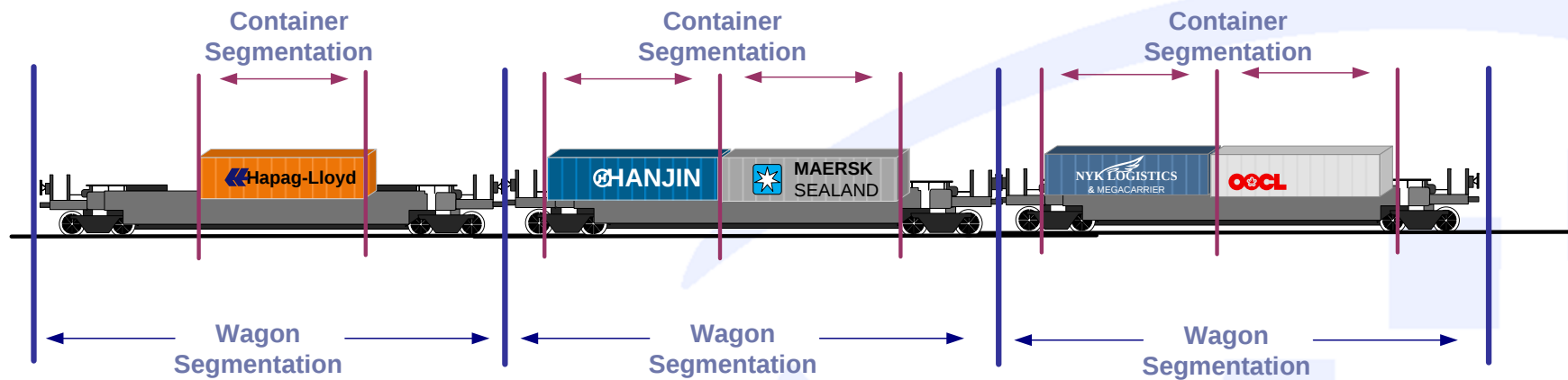
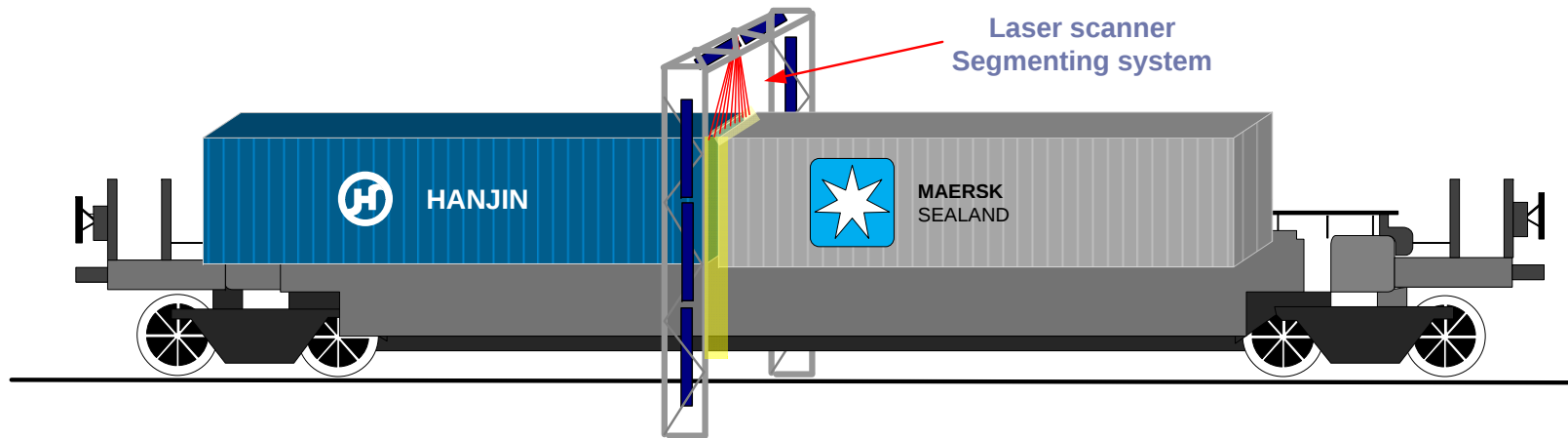
Terminal	Qty	Terminal	Qty
HHLA CTB	1	APMT Maasvlakte II	2
IFB Mainhub & Zomerweg	4	Rotterdam World Gateway	2
CMP	1	DP World London Gateway	1
Patrick Terminals	1	BNSF Memphis	2
PSA CHZ Zeebrugge	2	BNSF Kansas City	4
APMT TBD	1	ETGE Genk	1

Train OCR camera portal

- Same camera technology as Truck Gate
- No limitation in speed, length, double stack
- Shunting supported
- Identification of wagon numbers

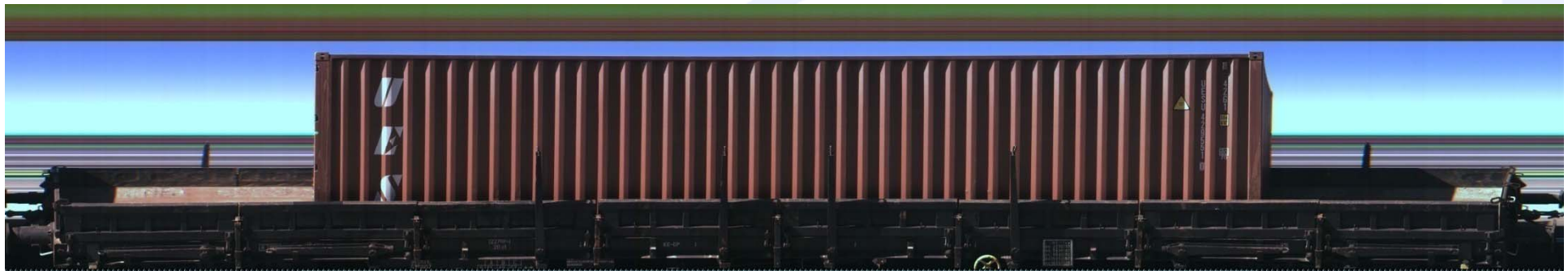


Segmentation











Train OCR camera portal

Automatic Identification

- Container number
- ISO code
- Dangerous Goods Labels

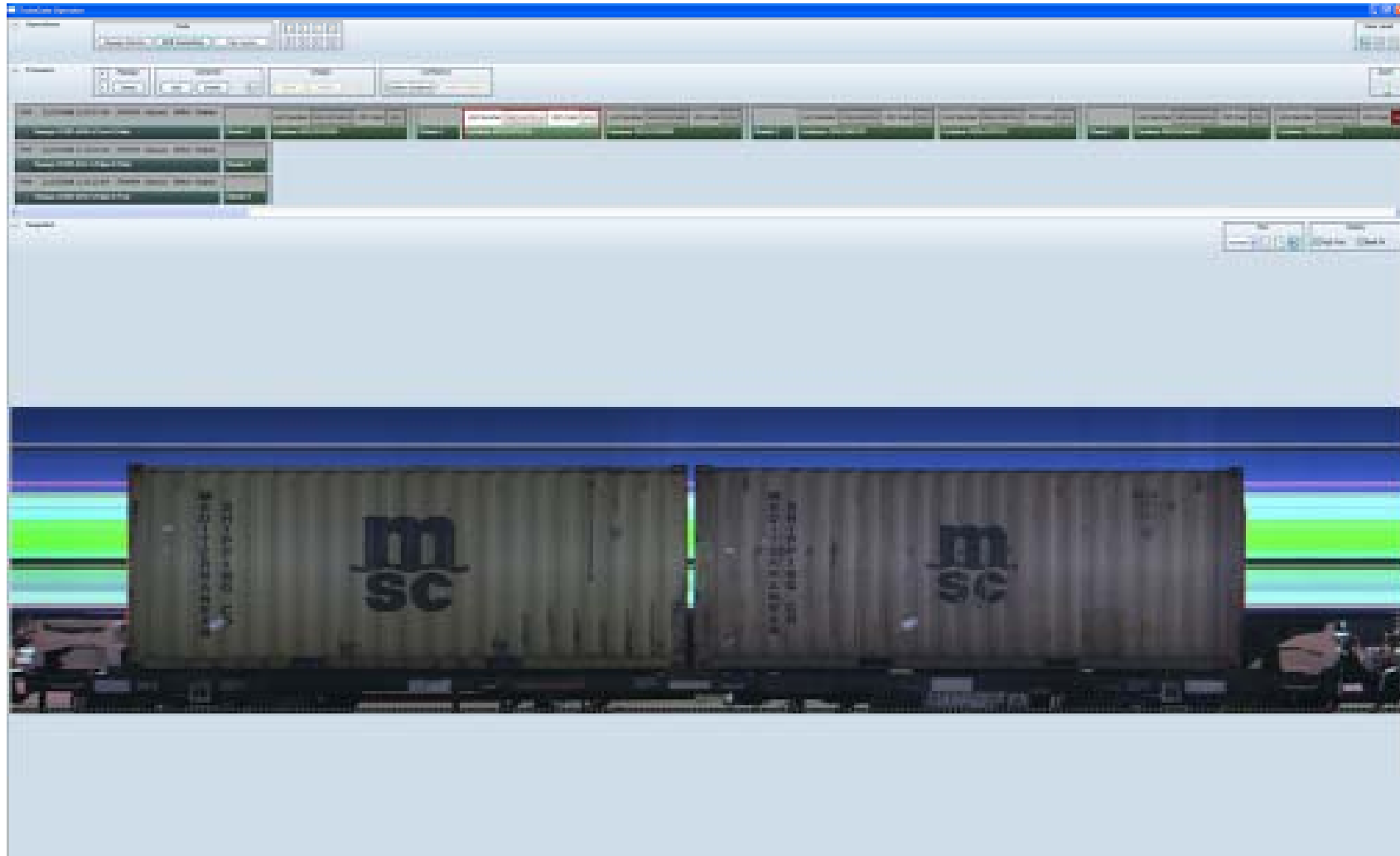
Automatic Detection

- Container location on train
- Door direction
- Seal Presence

Condition recording

- Condition Checking
- Storage for later retrieval
- Damage Claims management

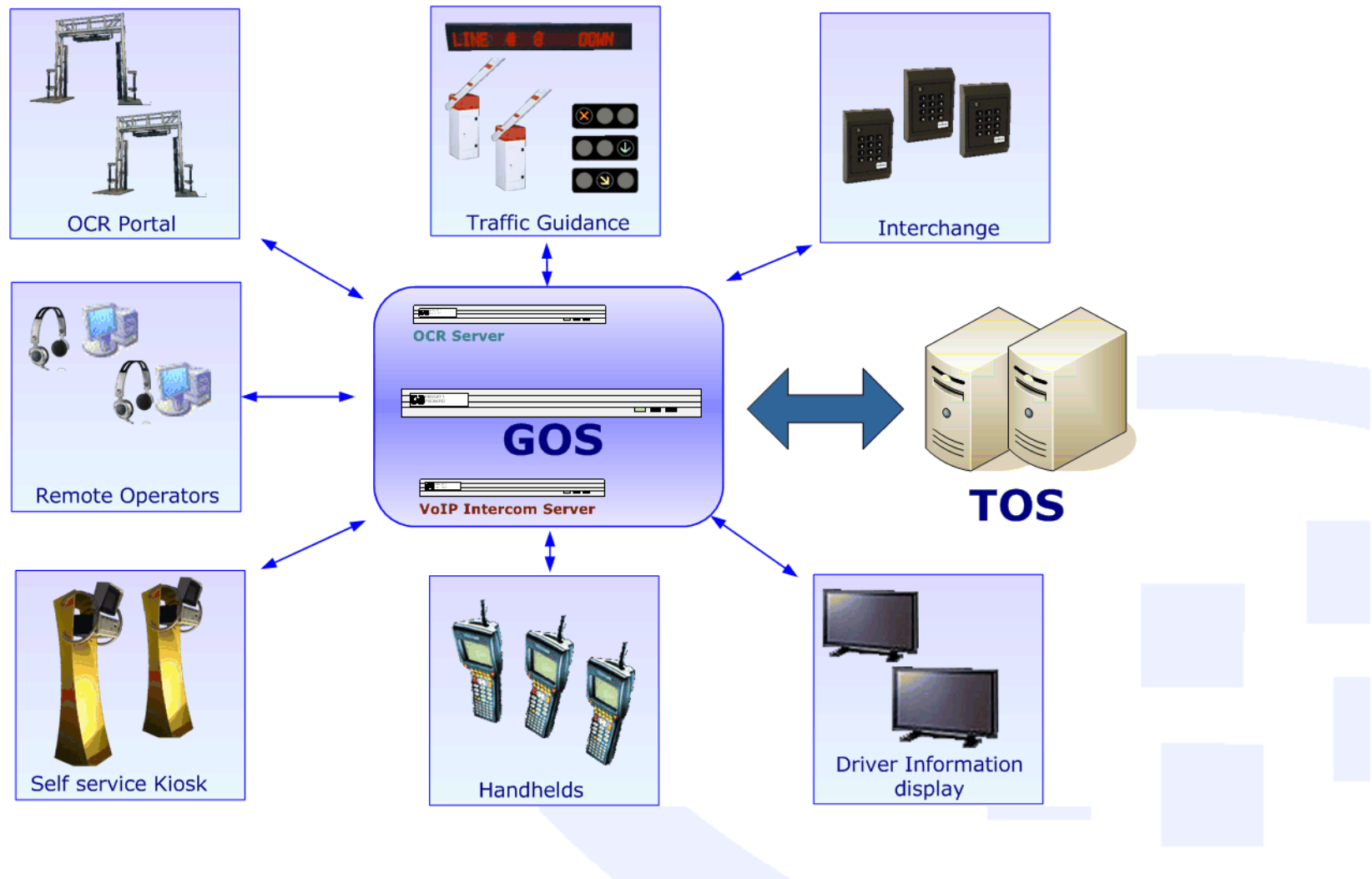
Rail Operator Console



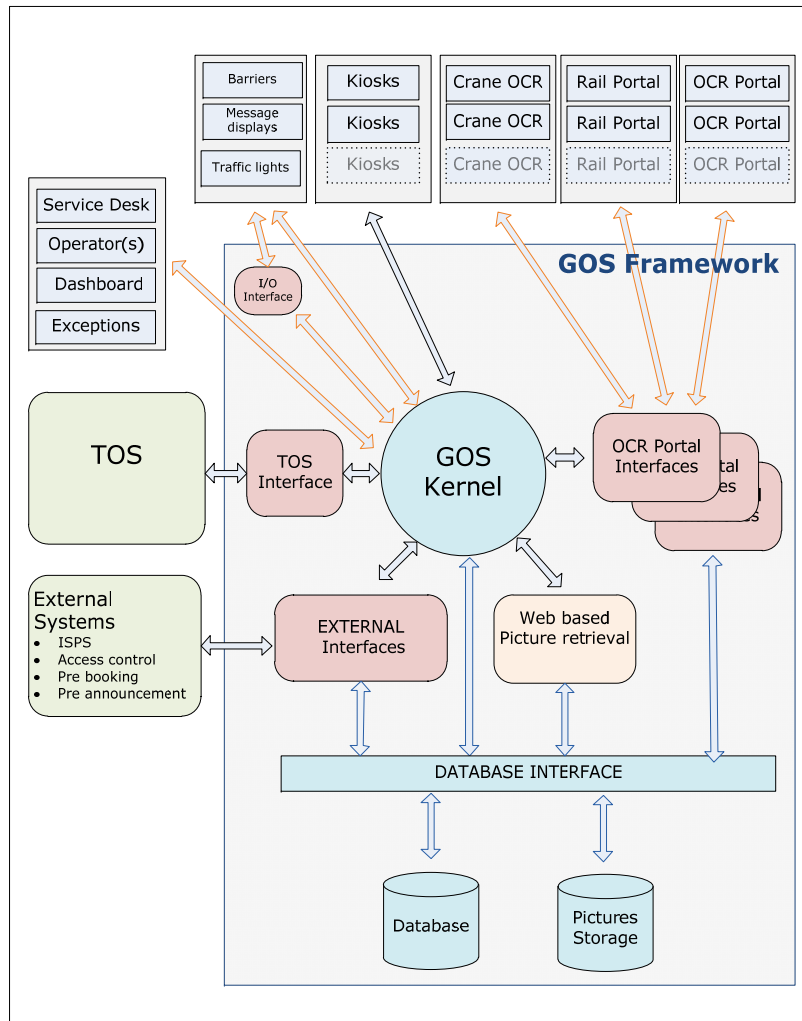
OCR Accuracy Rate

	Truck OCR Portal	Rail OCR Portal
Container number	>98%	>98%
ISO Code	>98%	>98%
IMO Placards - presence	>92%	>90%
IMO Placards – Class	>90%	>90%
License Plate number	93% - 98%	
Rail Car number		70%
Container position	99%	99%
Container door direction	99%	99%
Seal presence	>93%	93%
Empty Chassis	100%	

Gate Operating System



GOS Architecture



- GOS kernel
- Extremely modular
- Component driven
- Unlimited customization
- Open interfaces
- Database vendor independent
- Event driven

TOS Interface

- Most TOS supported
 - Commercial: Navis, Express, N4, Cosmos, CATOS, Tideworks, PIC, CMC, RBS Tops, Interman...
 - Proprietary: S88, Ngen, STINT...
- Technology
 - Xml based

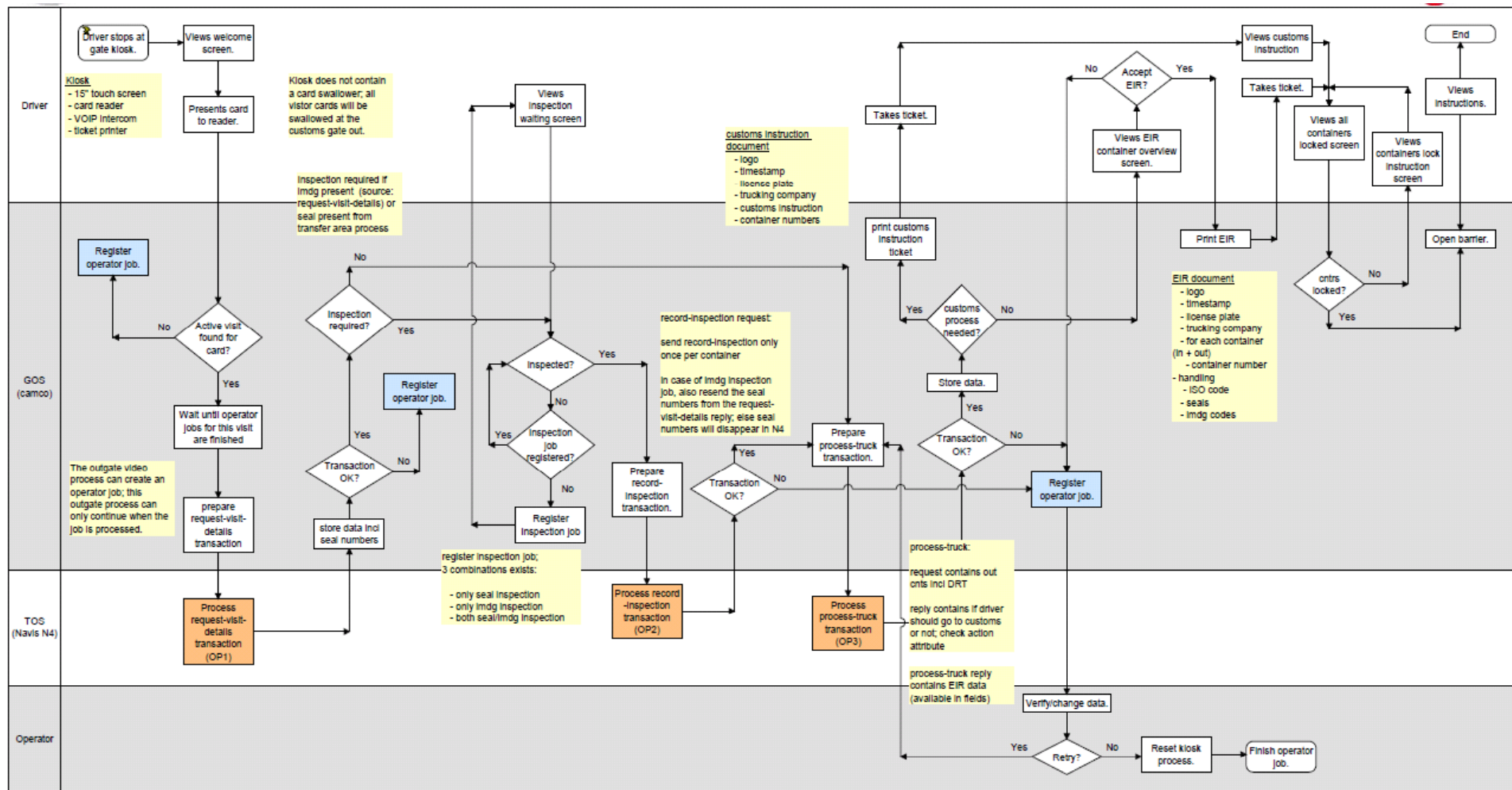
The screenshot displays the 'Grid area kiosk controller' application. The top menu bar includes 'File', 'Window', and 'Help'. Below it, a toolbar contains icons for 'Logging', 'Message broker', 'View/Control', 'Job Manager', 'GOSTOSInterfacing', 'Grid gate kiosk controller', 'Grid Area Controller Sim', and 'Services'. The main window is divided into several panes. The 'Transactions' pane shows a list of transactions with columns for Time, Name, Visit, Duration (ms), State, Abort Reason, ID, Connection, and Formatter. The 'Request' pane shows details for a selected transaction, including messageID, message type, timestamp, transaction type, visitID, lane, body, booking info, unit, terminal, unit number, handling, in, unit type, and unit size. The 'Reply' pane shows the corresponding reply details.

Time	Name	Visit	Duration (ms)	State	Abort Reason	ID	Connection	Formatter
2008-04-10 11:36:03	EIR-data	223210	15	reply sent (1)		8bc9ba3b74a727475c5c55da3b7d90	pic-top-outbound	pic-ent
2008-04-10 11:35:52	truck-grid-operations	223207	1421	done		4525ca220e594a29012c23d7504d527a6	pic-top-outbound	pic-ent
2008-04-10 11:35:36	EIR-accept	223204	1562	done		2329147ac2be4c038a2d98a5a6c7104d	pic-top-outbound	pic-ent
2008-04-10 11:35:02	EIR-data	223204	15	done		60bba6d0ba0d0b0c95c1b61bcb979242	pic-top-outbound	pic-ent
2008-04-10 11:34:59	activate-straddle-caster	223210	2046	done		c203493e9e664d0c0a5e11d446cece914	pic-top-outbound	pic-ent
2008-04-10 11:34:30	EIR-data	223202	156	done		0934509ed8a2c57437fbaz15333a9327	pic-top-outbound	pic-ent
2008-04-10 11:34:21	truck-grid-operations	223210	1438	done		a89572933a8445883d4e4c1ba30a0174	pic-top-outbound	pic-ent
2008-04-10 11:33:12	EIR-accept	223236	1812	done		18a0e1330084586b0b932216d3a566	pic-top-outbound	pic-ent
2008-04-10 11:33:12	EIR-accept	223203	1750	aborted	Transaction ERROR (22001) [BMJD]	4323c77542147083ad4d9020b69424	pic-top-outbound	pic-ent
2008-04-10 11:32:53	EIR-data	223236	31	done		2ab8210940702ae7550cd1ce7910663	pic-top-outbound	pic-ent
2008-04-10 11:32:49	EIR-accept	223243	1369	done		7b336128e6846a5a5d8f5524a5c0513	pic-top-outbound	pic-ent
2008-04-10 11:32:37	EIR-data	223203	15	done		3d109052070612b1a053c1a3ab1c3b	pic-top-outbound	pic-ent
2008-04-10 11:32:22	EIR-data	223242	21	done		5979750e430529a5d9528a5003c0b7e	pic-top-outbound	pic-ent
2008-04-10 11:30:05	activate-straddle-caster	223212	1546	done		348d02014884434a5c5c21280219e1	pic-top-outbound	pic-ent
2008-04-10 11:30:03	activate-straddle-caster	223264	1687	done		7ab24a1801294e6c96c161508a0a9a5	pic-top-outbound	pic-ent
2008-04-10 11:29:34	EIR-data	223214	15	done		ae02441c5075c0b7524b043c0b56341	pic-top-outbound	pic-ent
2008-04-10 11:29:31	truck-grid-operations	223212	562	done		408999a16c245a8d8f45a6e183a6d81	pic-top-outbound	pic-ent
2008-04-10 11:29:19	truck-grid-operations	223204	734	done		3bc002031e914b1232a540c0b0c17d4d2	pic-top-outbound	pic-ent
2008-04-10 11:28:39	activate-straddle-caster	223243	2156	done		3a1aafcd-eeb3-450c-99ad-7181d9ccf7b	pic-top-outbound	pic-ent
2008-04-10 11:27:59	truck-grid-operations	223243	999	done		60650299a774341a101e23a0d35a5	pic-top-outbound	pic-ent
2008-04-10 11:27:33	activate-straddle-caster	223262	1546	done		75b1522c136e4d0b0a337f0984330952	pic-top-outbound	pic-ent
2008-04-10 11:27:21	EIR-accept	223214	1390	done		082702994624663867a6da30d125c5	pic-top-outbound	pic-ent
2008-04-10 11:27:12	EIR-data	223214	15	done		1c12884b401e189010371ef36d5517	pic-top-outbound	pic-ent
2008-04-10 11:26:39	truck-grid-operations	223252	1890	done		115977941874e58b867421fca3a2a7	pic-top-outbound	pic-ent
2008-04-10 11:26:39	activate-straddle-caster	223236	2494	done		3c480a4a4a104c3b93e1c93a007da504	pic-top-outbound	pic-ent
2008-04-10 11:25:46	suspend-straddle-caster	223236	234	done		142b998447d4367b3e7e4a616134c72	pic-top-outbound	pic-ent
2008-04-10 11:24:24	activate-straddle-caster	777712	1765	done		1c1a112b112b112b112b112b112b112b	pic-top-outbound	pic-ent

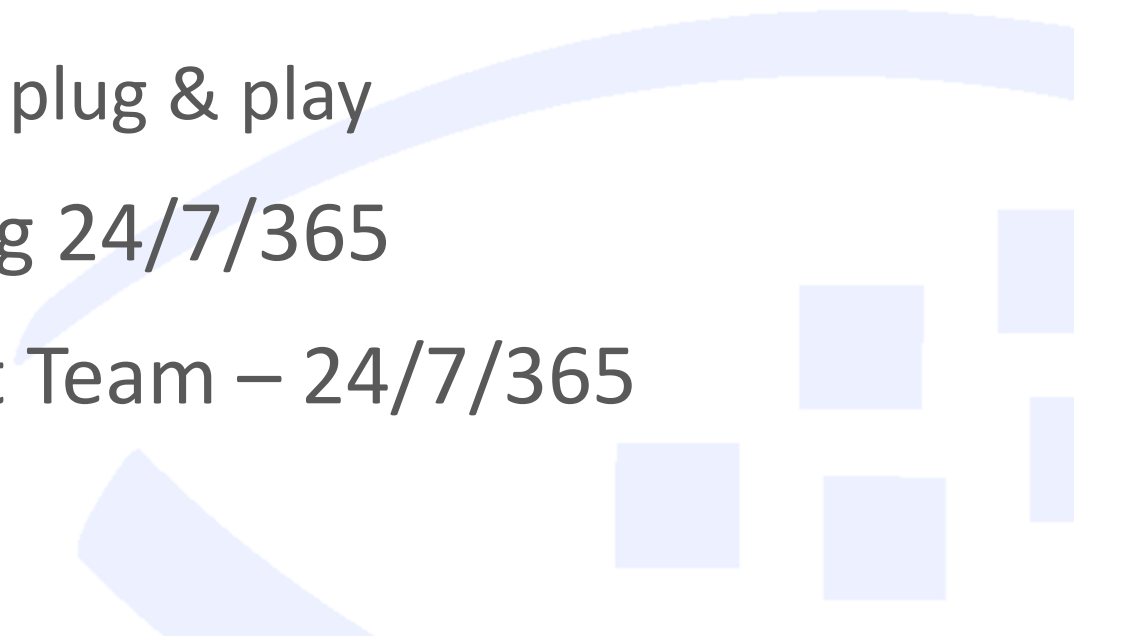
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message type = request
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transaction = EIR-data
visitID = 223214
lane =
body =
booking info =
unit =
terminal = CSC
unit number = CAUJ4809809
handling = in
unit type = CONT
unit size = 40960C

Reply details:
messageID = ae324a1c5075c0b7524b043c0b56341
message type = reply
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transaction = EIR-data
visitID = 223214
lane =
body =

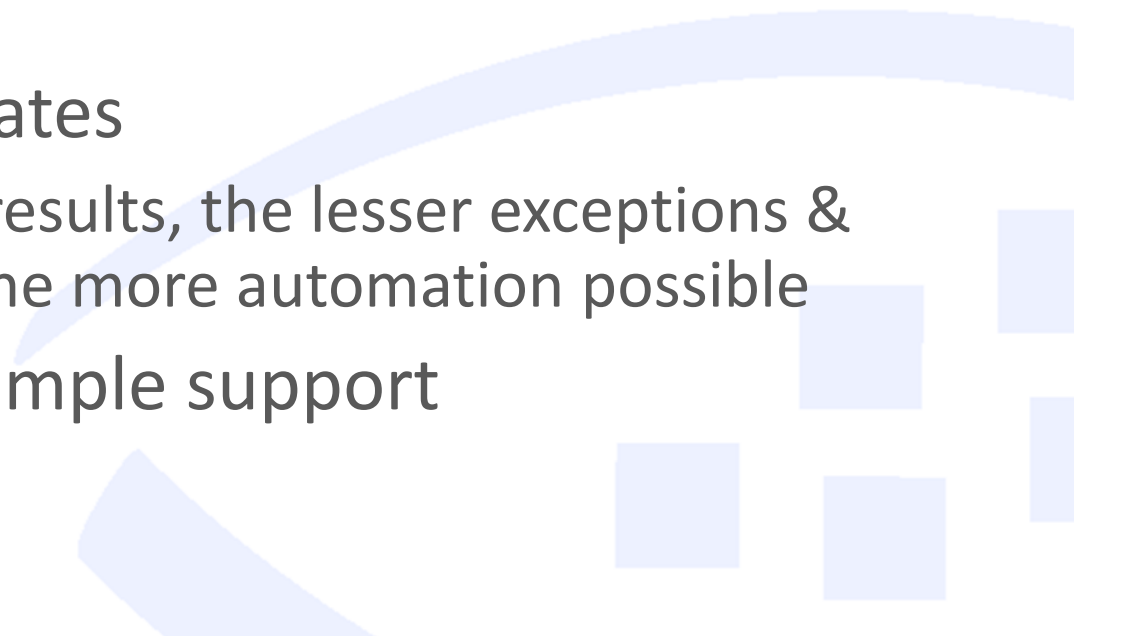
Business Process Modelling



Support & Maintenance

- Systems specifically designed for easy and seamless support & maintenance
 - Embedded diagnostic hardware
 - Field Swappable modules
 - Modular design – plug & play
 - Remote monitoring 24/7/365
 - Dedicated Support Team – 24/7/365
- 

Success factors

- Accurate and successful integration with TOS is the Key factor!
 - OCR data matched with booking in TOS
 - Train OCR data is validated via Rail Operator and matched/consolidated with load lists before integration with TOS
 - High OCR accuracy rates
 - The better the OCR results, the lesser exceptions & intervention need, the more automation possible
 - Seamless, fast and simple support
- 

**There is no
Substitute for
Experience**

The background features several light blue decorative elements: a large, thick, curved line that starts from the left and sweeps towards the right, and a cluster of smaller, semi-transparent squares and rectangles of various sizes and orientations in the lower right quadrant.



THANK YOU!

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