GATE AUTOMATION & OCR
Intermodal Terminals

Mannheim – October 17, 2013

Anton Bernaerd
CAMCO Technologies
Premier vendor of Visual-Assisted process automation for Maritime & Rail container terminals worldwide
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

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

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

**HPH**
- 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 Valparaiso
- *BTP Santos*
- *Malmö Terminal*
- *FOS2XL*
- Fisherman Islands
- Port Botany
Ro-Ro Terminals

- Gothenburg
- Europoort
- Purfleet
- Zeebrugge
- Rotterdam
- Port of Felixstowe
- Dooley terminal
- Schwedenkai
- Ostuferhafen
- Harwich International Port
- Ferry terminal
- Seeland Terminal
Intermodal – Rail Terminals

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

- 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

- Markham
- Calgary

- Markham
- Calgary
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%
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.
Bitte Chassislänge eingeben.

20ft Chassis  40ft Chassis  60ft Chassis
ادخل رمز رحلة المعدة الداخلية.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
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 تصحيح

 إدخال
TrainGate
Train OCR portal

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

Current installed base:

<table>
<thead>
<tr>
<th>Terminal</th>
<th>Qty</th>
<th>Terminal</th>
<th>Qty</th>
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<tbody>
<tr>
<td>HHLA CTB</td>
<td>1</td>
<td>APMT Maasvlakte II</td>
<td>2</td>
</tr>
<tr>
<td>IFB Mainhub &amp; Zomerweg</td>
<td>4</td>
<td>Rotterdam World Gateway</td>
<td>2</td>
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<td>CMP</td>
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<td>DP World London Gateway</td>
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<td>Patrick Terminals</td>
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<td>BNSF Memphis</td>
<td>2</td>
</tr>
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<td>PSA CHZ Zeebrugge</td>
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<td>BNSF Kansas City</td>
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<tr>
<td>APMT TBD</td>
<td>1</td>
<td>ETGE Genk</td>
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</table>
Train OCR camera portal

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

Laser scanner
Segmenting system

Container Segmentation

Wagon Segmentation

HANJIN

MAERSK SEALAND

Hapag-Lloyd

NYK LOGISTICS & MEGACARRIER
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**

<table>
<thead>
<tr>
<th></th>
<th>Truck OCR Portal</th>
<th>Rail OCR Portal</th>
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<tbody>
<tr>
<td>Container number</td>
<td>&gt;98%</td>
<td>&gt;98%</td>
</tr>
<tr>
<td>ISO Code</td>
<td>&gt;98%</td>
<td>&gt;98%</td>
</tr>
<tr>
<td>IMO Placards - presence</td>
<td>&gt;92%</td>
<td>&gt;90%</td>
</tr>
<tr>
<td>IMO Placards – Class</td>
<td>&gt;90%</td>
<td>&gt;90%</td>
</tr>
<tr>
<td>License Plate number</td>
<td>93% - 98%</td>
<td></td>
</tr>
<tr>
<td>Rail Car number</td>
<td></td>
<td>70%</td>
</tr>
<tr>
<td>Container position</td>
<td>99%</td>
<td>99%</td>
</tr>
<tr>
<td>Container door direction</td>
<td>99%</td>
<td>99%</td>
</tr>
<tr>
<td>Seal presence</td>
<td>&gt;93%</td>
<td>93%</td>
</tr>
<tr>
<td>Empty Chassis</td>
<td>100%</td>
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</table>
Gate Operating System

OCR Portal

Traffic Guidance

Interchange

Remote Operators

OCR Server

VoIP Intercom Server

GOS

TOS

Self service Kiosk

Handhelds

Driver Information display
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
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
THANK YOU!

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