Monitoring Terminal Operations

Imagine a terminal where...

- Bottlenecks
- Exceptions
- User actions
- Low performance
- Controls with just 1 screen
It is all about…

…Monitoring & Exception Handling

Users

Actions

Screens

Information
Monitoring Terminal Operations

How did we get to this conclusion?

Evolution

Process Controller
Evolution of Container Terminals
Evolution of Container Terminals

**Timeline**

- **Cargo handling before TOS**
- **First Planning & Control Systems**
- **Development of Advanced Applications**
- **PR, ED, AS**
- **Semi Automation**
- **Full Automation**

Navis World 2015
Evolution of Container Terminals

Operations without Terminal Operating System

Port of Seattle – 1930s

Corpus Christi Port - 1926
Evolution of Container Terminals

Operations without Terminal Operating Systems

Hawaiian Container Terminals

Figure 3-1. Discharge capacity worksheet
Evolution of Container Terminals

Operations without Terminal Operating System

Summary

- Very manual operations
- Rudimentary equipment and techniques
- Limited volumes
Evolution of Container Terminals

Operations without Terminal Operating System

- **60’s**: 500 – 1530 TEU
- **70’s**: 2950 TEU
- **80’s**: 4500 TEU

Movements

Complexity
Evolution of Container Terminals

1st Planning & Control Systems

Graphical Tools
Evolution of Container Terminals

1st Planning & Control Systems

- Dispatcher
- Dispatcher
- Dispatcher
- Dispatcher
- Dispatcher

Shift Manager

- Yard Planner
- Yard Planner
- Yard Planner

Vessel Planners
Evolution of Container Terminals

Operations without Terminal Operating System

Summary

- Increase efficiency in vessel & yard planning
- Better & more standardized processes
- New equipment was better & faster
- Higher volumes & larger ships
Evolution of Container Terminals

1st Planning & Control Systems

- 60s - 1530 TEU
- 70s - 2950 TEU
- 80s - 4500 TEU
- 90s - 8680 TEU
- 2000s - 11000 TEU

What else?
Evolution of Container Terminals

OPTIMIZATION

Advanced Applications

- Expert Decking
- Prime Route
- AutoStow
Evolution of Container Terminals

Advanced Applications

Expert Decking
Evolution of Container Terminals

Advanced Applications

Autostow
Evolution of Container Terminals

Advanced Applications

Primeroute

Communication

No Radios
Evolution of Container Terminals

Before Advanced Applications

- Dispatcher
- Dispatcher
- Dispatcher
- Dispatcher
- Dispatcher
- Shift Manager
- Yard Planner
- Yard Planner
- Yard Planner
- Vessel Planners
Evolution of Container Terminals

After Advanced Applications

- Controller
- Controller
- Controller
- Controller
- Shift Manager
- Yard Strategist
- Vessel Planners
Evolution of Container Terminals

1st Planning & Control Systems

- 60s - 1530 TEU
- 90s - 8680 TEU
- 2000s - 11000TEU

What else?

Movements
Complexity
Cost Per Move
Evolution of Container Terminals

AUTOMATION

- Automated YC
- Automated HT
- Optimizers
- Schedulers
Evolution of Container Terminals

Automation

- Optimizers
  - Decision making...
    - Dispatching
    - Yard Decking
    - Vessel Stowage

- Automated Equipment
  - Reduce...
    - Labor cost
    - Equipment maintenance
  - Increase...
    - Efficiency
    - Performance

- Schedulers
  - When...
    - Not too late
    - Not too soon
  - Increase...
    - Efficiency
    - Performance
Evolution of Container Terminals

Before Automation

Controller

Controller

Controller

Controller

Shift Manager

Yard Strategist

Vessel Planners
Evolution of Container Terminals

After Automation

Are roles changing?

Shift Manager

Yard Strategist

Controller

Controller

Vessel Planners
Evolution of Container Terminals

“An 83,000-Processor Supercomputer Can Only Match 1% of Your Brain”

gizmodo.com, 2013
Evolution of Container Terminals

The brain is better at interpreting the outside world and finding solutions.
Future

FUTURE  →

←  PAST

NEXT?
Terminal Monitoring
Terminal Monitoring

What is Terminal Monitoring?

- Scheduling & Dispatching
- QC Control System
- PDS
- YC Control System
- Gate
# Terminal Monitoring

## Alerts

<table>
<thead>
<tr>
<th>Exception</th>
<th>Description</th>
<th>Affected Work Instruction</th>
<th>Work Queue</th>
<th>Work Assignment</th>
<th>Move Purpose</th>
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<tbody>
<tr>
<td>Abort by ASC11W</td>
<td>Error on spreader</td>
<td>BBCU2204074</td>
<td>yard-Admin</td>
<td>13615</td>
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### Priority promotions

- Dispatching
- Decking
- Validations
- Scheduling
- Gate

...and more +
# Terminal Monitoring

## Quick Actions

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- **User Ownership**
- Quick actions will help to resolve the exception
Terminal Monitoring

Real Time Analysis

Recommended Actions

[Diagram showing a terminal monitoring system with data points and recommended actions]
Terminal Monitoring

Real Time Monitoring
- Schedulers: Reports Scheduling information
- Dispatchers: Reports Dispatching information
- Deckers: Reports Decking information
- CHE Status: Reports Dispatching information
- BI Reports: Integration with BI to monitor OPS KPIs

Terminal Planning
- Vessel/Yard Planning: Planning issues, Utilization Distribution
- Berthing: Berthing, Vessel/Train Visits & Shifts

System Health
- N4 Status: Status of N4 Apps and Nodes
- 3rd party system: Status of 3rd party systems

API connections:
- Terminal Monitoring → API
- Vessel/Yard Planning → API
- 3rd party system → API

UI connections:
- UI → API
- Terminal Monitoring → Analyze data, Alarms Management
- Alarms view
Knowledge is power