REVEAL YOUR BEST

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Honeywell Process Solutions
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• SMART TERMINAL DESIGN
• Americas HUG
01 Terminal Industry Challenges
02 Terminal Automation Paradigm
03 Improving Productivity & Operations
04 Enhancing Terminal Security & Safety
05 Summary
Terminal Industry Challenges
Terminal Industry Challenges

<table>
<thead>
<tr>
<th>Business Issues</th>
<th>Cases: Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Keep Business <strong>Continuity</strong></td>
<td>1-2 weeks unplanned Assets <strong>shutdowns</strong> due to Safety or Reliability: Revenue Loss and Penalties.</td>
</tr>
<tr>
<td>Improve <strong>Productivity &amp; Ops</strong></td>
<td>Loading Racks <strong>Inefficiency /Scheduling</strong>, Wrong Logistics &amp; Movements: Revenue Loss.</td>
</tr>
<tr>
<td>Secure Assets <strong>Utilization</strong></td>
<td><strong>Overfill, spills or Missing</strong>: Increase OPEX</td>
</tr>
<tr>
<td><strong>Optimal Logistics</strong></td>
<td><strong>Inefficient Movement</strong>/ Scheduling. Bottlenecks and Delivery Delays: Increase cost and Penalties.</td>
</tr>
<tr>
<td>Avoid <strong>Penalties</strong>, Fines or Lose <strong>Contracts</strong></td>
<td><strong>Demurrage</strong>, Volume &amp; Environmental claims, <strong>Supply shortage</strong>: Revenue Loss.</td>
</tr>
</tbody>
</table>

Honeywell understands biggest Terminal issues/needs
Terminal Automation Paradigm
Terminal Automation Challenge

- Pipeline control system
- Pipeline metering system
- Leak detection system
- Railcar loading system
- Railcar weighing system
- Gas detection system
- Building management system
- Truck loading system
- Terminal automation system
- Truck weighing system
- VRU control system
- Waste Water Treatment control system
- Tank gauging system
- Automatic overfill prevention system
- Floating roof monitoring system
- Fire alarm system
- Firefighting system
- Access control system
- Site security system
- Video surveillance system

Integration requires a common platform!
The same platform but different functionalities

Experion and EIS share the same platform. Integration via DSA.
Experion platform has standard built-in solutions for Terminal management and other applications.

- Experion PKS platform
  - Standard Trends, Analytics
  - HMI
  - Historian
  - Alarms/Alerts
  - Events
  - 35 std comms protocols

- Pluggable Modules
  - Tank Gauging
  - Cirrus - Continuous Emissions Monitoring
  - Fatigue Management

- Standard Applications
  - Standard Process Controller – PLC/DCS
  - Integrated Fire and Gas Solutions
  - Standard Industrial Security and Perimeter Protection

- Distributed Server Architecture (DSA) helps to replicate and communicate across multiple units.
Improving Productivity & Operations
- Truck & Rail Tank Car Workflow Automation
Necessity for Terminal Management System

TAS System is: A real time operations monitoring and control system (SCADA or DCS), coupled with a relational database application with workflow management, for handling transactions of product transfer.

Relational Database
The relational database element contains each and every asset required for a terminal to function, an example of these assets include:

- **Products & Storage:** finished products & recipes, tank groups & storage tanks
- **Vehicles:** Road tankers, tractors and trailers + related identification data
- **Personnel:** Drivers and operators + related identification data

Workflow
The term “workflow” in the context of a terminal automation system, can be broadly described in two steps.

*Business workflow:*
- Create a commercial contract between the source and destination
- Load products as per the contract
- Record and document the loaded products, dispatch and invoice

*Shipment or Loading workflow (road loading example):*
- Tanker entry into the terminal and queue
- Load authorization, preset, and loading at the bay
- Transport documents (e.g. BOL) and exit from terminal

Transaction
*The term “transaction” in the context of a TAS meaning to:*

- Authorize; validate against all applicable business and operational pre-requisites
- Wait for the actual transfer of product (the transfer itself is a real time ops. function)
- Record and document all final loaded / offloaded quantities, once loading is complete
WORK FLOW - TYPICAL

STEP 1
- Receipt (ASN) and entry of dispatch nominations

STEP 2
- Order / Synchronization TM
- Shipping / Receipt / Planning TM
- Sending information to the transport company
- Transport company sends the tank trucks to the terminal

STEP 3
- Autotank authorization via RFID
- Authorization of drivers by biometric reading
- If the driver or self-tanker is not authorized, the barrier will not open

STEP 4
- The tank truck reaches the inspection area of 21 points
- HSE verification is done using a WiFi Tablet
- In case of rejection the tank car must leave the parking lot

STEP 5
- Notice and Indication of Load, Audio and Display

STEP 6
- FAN printing
- Bay Assignment

STEP 7
- Loading of tank trucks
- BCU receives load data from TM
- Operator confirms load data in BCU

STEP 8
- Sealed
- Send Loading Details to Billing system.
- Closing the shipment

STEP 9
- Invoicing by ERP
- Exit
Sealing of intakes - auto tanks
Rail Cars Workflow (Use Case)

RFID (AEI) Devices

Loco 1
Car 1
Car 2
Car 3

3 Cars

Read RFID Tags

Axel Counter (Each switch in an Area)
Railcar Inspection – initial inspection

1. Parked Railcars for initial Inspections.
2. Operator arrives for initial inspection.
3. Operator reads the RFID tag of the Car to be inspected with the hand held RFID Reader.
5. Terminal Manager lists the items to be inspected.
6. Operator visually inspect one by one and checks the check box in front.
7. Inspection Pass ?
   1. Car is listed in to be Washed.
8. Inspection fails
   1. Car is listed in the Repair / Bad Order list
9. Car need to be de-heeled ?
   1. Car is listed in de-heel list.
10. Switching or Shunting Operations will be able to see segregated lists.
### Inspection list – Bottom Pre inspection & during offloading

<table>
<thead>
<tr>
<th>Customer</th>
<th>Car #</th>
<th>Product</th>
<th>Date</th>
<th>Gauge Reading</th>
<th>Transloader #</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>N/A</td>
<td>Primary Initials</td>
</tr>
</tbody>
</table>

**Bottom Pre Inspection**

- Car is on inventory list to unload as notified by Supervisor
- Set hand brake, chocks and grounding cable.
- Inspect car for any sign of visible damage, leakage, or defect card.
- No damaged or missing items (handrails, ladders, platforms, & handbrakes)
- Properly placarded (4 sided), marked all stencils legible, tank car within inspection date.
- All caps, handles, plugs and chains in place and tool tightened.

**Bottom Outlet Valve**

**Bottom Outlet Valve Chain**

**During Unloading Of The Tank Car**

- Monitor car, hoses, and gaskets for any signs of leakage

List Configurability ✅
Sample Inspection list – Bottom Post inspection

<table>
<thead>
<tr>
<th>Bottom Post Inspection</th>
<th>Primary Initials</th>
</tr>
</thead>
<tbody>
<tr>
<td>All plugs and caps are chained and secured tool tight.</td>
<td></td>
</tr>
<tr>
<td>If any leakage is detected; car should be bad ordered</td>
<td></td>
</tr>
<tr>
<td>Re-check car and hoses for any signs of leakage.</td>
<td></td>
</tr>
<tr>
<td>Remove and stow grounding cable and remove wheel chocks.</td>
<td></td>
</tr>
<tr>
<td>Release handbrake with exception to brakes which were set by rail crew.</td>
<td></td>
</tr>
<tr>
<td>All hoses, cables and tools removed from car</td>
<td></td>
</tr>
<tr>
<td>Ensure car is clean and free of residue and debris</td>
<td></td>
</tr>
<tr>
<td>Outbound seals applied and inbound seals are properly disposed.</td>
<td></td>
</tr>
<tr>
<td>Outbound Seal Numbers:</td>
<td></td>
</tr>
<tr>
<td>Bottom Outlet Valve</td>
<td></td>
</tr>
<tr>
<td>Bottom Outlet Valve Chain</td>
<td></td>
</tr>
<tr>
<td>Primary Pre-Operation Print Name</td>
<td></td>
</tr>
<tr>
<td>Primary Pre-Operation Signature</td>
<td></td>
</tr>
<tr>
<td>Primary Post-Operation Print Name</td>
<td></td>
</tr>
<tr>
<td>Primary Post-Operation Signature</td>
<td></td>
</tr>
<tr>
<td>Bad Ordered</td>
<td>Y / N</td>
</tr>
<tr>
<td>REASON:</td>
<td></td>
</tr>
</tbody>
</table>
In Motion Weighbridge Tare & Gross Weight Capture

1. Selected Railcars moved through the In Motion weighbridge to the loading Spurs.
2. Railcars will be identified by RFID Tags on them.
3. Tare Weight will be Recorded against each Railcar.

- Car-1: 17,502 Kg
- Car-2: 18,305 Kg
- Car-3: 19,324 Kg
- Car-4: 16,543 Kg
Enhancing Security & Personnel Safety
LOPA (DOW Onion Model) & EN 61511 - Separation of Layers of Safety

Safety Layer(s)

MITIGATION

PROTECTION

COMMUNITY EMERGENCY RESPONSE

PLANT EMERGENCY RESPONSE

PHYSICAL PROTECTION (DIKES)

PHYSICAL PROTECTION (RELIEF DEVICES)

AUTOMATIC ACTION SIS

CRITICAL ALARMS, OPERATOR SUPERVISION, AND MANUAL INTERVENTION

BASIC CONTROLS, PROCESS ALARMS, AND OPERATOR SUPERVISION

PROCESS DESIGN
Digital Video Manager
Integrated Solutions

- Video Playback
- Video Surveillance
- Video PTZ Control
- Video Intercom calls
- User/Alarm/Event initiated video
- Integrated Alarm Summary

- Video Capture
- Video Storage
- Video Archiving
- Intelligent Video Analysis
- Encoder I/O monitoring

Integration by Design = More Functionality & Less Risk
Integration – EBI/Experion Alarm Activation

Display Video of alarm related camera

Start Recording of alarm related camera

EBI or Experion Stations

EBI or Experion Server

DVM Clients

DVM Database and Camera Server

Local Area Network

Video Network

Access Control

Card Reader

PIR

Security Controller

HVAC & Lighting Controller

Analog Cameras

Camera Streamers

Digital Cameras

Fixed or Pan, Tilt, Zoom Cameras Supported

Alarm!

Alarm and Event Activation from field sensors

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Integration – Alarm Activation from DVM

Cams are not just dumb but become additional sensors in the field.

Display Video

Start Recording

Local Area Network

Access Control

Card Reader

Security Controller

PIR

Video Network

EBI or Experion Stations

EBI or Experion Server

DVM Clients

DVM Database and Camera Server

Analog Cameras

Camera Streamers

Fixed or Pan, Tilt, Zoom Cameras Supported

Digital Cameras

HVAC & Lighting Controller

Alarm!

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Personal Gas Safety

An integrated solution that combines Industry leading Honeywell’s Personal Gas detection Solution with Honeywell Experion PKS. Supports multiple communication protocols including radio, wireless and Bluetooth.

A man slips and falls & is motionless on the ground. The Honeywell Personal Gas detector he is wearing raises a Man down Alarm.

The Control Room Operator sees a Man Down Alarm. He calls the Experion Graphic page showing real time location of the device in alarm on the site map.

- Informs emergency Response teams
- Uses Video cameras in Area to monitor situation,
- Sees nearby workers on map and contact them for support

Integration is critical when Every Second Counts
WIRELESS VALVE POSITIONERS - VALVE MANIFOLDS; TANK INLET / OUTLET VALVES
5 Summary
Honeywell Driving an Integrated Solution

Non-Integrated Approach: Each supplier has a different view

- Multiple solution providers
- Only focus on subsystem
- Plant staff become the integrators
- More expensive to implement & manage

Honeywell’s holistic approach: Integrated solution, single view

- Single solution view
- Common design philosophy
- Integrated “out of the box”
- Less expensive to implement & manage

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Standard, Off-The-Shelf Solutions

- Movement Scheduling
- Movement Management
- Loading Management
- Performance Management
- Balancing & Reconciliation
- Data Management
Q & A
Honeywell is building a smarter, safer, and more sustainable world

THAT’S THE POWER OF CONNECTED
THAT’S THE POWER OF HONEYWELL

Connected Aircraft · Connected Automobile · Connected Home · Connected Building
Connected Plant · Connected Supply Chain · Connected Worker

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