Condition Based Logistics Technology

IMPROVE PERFORMANCE, ELIMINATE WASTE, REDUCE RESOURCES
Navy Aircraft Engine Container Situation

Water / Moisture Intrusion

H-46 Gear Box
H-3 Tail Rotor Gearbox
Corrosion Inside TF-34 Engine (S-3)
H-46 Transmission

Misidentified / Mislabeled Inventory

Rotor Container

Lost Engine Visibility

Aircraft Engine Management System database – overdue status report

- 47 RFI Engines as of 7/29/03 (over 40 days)
- 15 Non-RFI Engines as of 7/29/03 (over 80 days)
Supply Chain Situation

Supplier → Materials → 3 PL’s

Third-Party Process

Materials → Distributor

Products

Systems Integrator

Materials Kits

MRO

Customer
Situation Summary

• High Value Asset Condition Monitoring

Problem: Loss of high value assets in transit / in-storage
Damage in-transit / in-storage

Implication: Excess inventory
Higher cost of rework / management

• Supply Chain – End-to-End Supply Chain Visibility

Problem: Inability to manage schedule

Implication: Excess inventory / hoarding / expedites

• Expeditionary Logistics – Pre-positioned Material / Condition Visibility

Problem: Inability to react to changes in priority

Implication: Excess pipeline material / unnecessary re-orders
Solution = Condition Based Logistics Technology
Integrated Sensor / Radio Frequency Identification Devices (ISRFID™)
in totes, pallets, containers, & equipment using patent-pending Low Power Sensor Network (LPSN™),
to provide
Integrity / Condition / Identity
at the lowest total cost to the user
The ISRFID
How It Works

Applications

LPSN™

Embedded Sensors provide condition
RFID provides identity
LPSN monitors integrity

isrfid™ & LPSN™ uniquely enable Condition based logistics
Turbocad Exercise 2005

**TurboCAD '05**
LogConGroup, Inc & CoBalT Technology, LLC

Orbcomm LEOS Satellite Network

Lat & Long at the Container Level

Six pallets of two barrels each placed in a TEU

aRFID Data Capture inside the Container

Temperature, Pressure, & Humidity at the Asset Level

Internet

Web-based PC
Container ID: TGHU 202581-2  
Date/Time (UTC): 21Apr05 18:30  
Ship to: N61755 Pri:12  
Ship from: W53XMD

**STATUS**  
4/18/05 Shipped via rail from Crane, IN

Container Temp: 75.0F  
Pressure: 14.7 PSI

1325014936405  
AIRFOIL, MXU-667A/B,W/COMPUTER CONTROL GROUP GUIDANCE  
EA68  
N61755 5066 TC06 XGX  
853  
2005102  
6 pallets, 2 canisters per pallet

**History**

09516 Temp: 77.2 Condition Code:A  
09470 Temp: 77.2 Condition Code:A  
09474 Temp: 76.0 Condition Code:A  
09514 Temp: 76.0 Condition Code:A  
09492 Temp: 79.9 Condition Code:A  
09475 Temp: 79.9 Condition Code:A  
09496 Temp: 77.1 Condition Code:A  
09502 Temp: 77.1 Condition Code:A  
09483 Temp: 77.1 Condition Code:A  
09506 Temp: 77.1 Condition Code:A  
09507 Temp: 77.3 Condition Code:A  
09489 Temp: 77.3 Condition Code:A
<table>
<thead>
<tr>
<th>Container ID: TGHU 202581-2</th>
<th>Date/Time (UTC): 05May05 19:36</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ship to: N61755 Pri:12</td>
<td>Ship from: W53XMD</td>
</tr>
<tr>
<td>STATUS</td>
<td></td>
</tr>
<tr>
<td>4/18/05 Shipped via rail from Crane, IN</td>
<td>4/24/05 Arrived at Concord. Awaiting xfer to ship</td>
</tr>
<tr>
<td>Container Temp: 75.0°F</td>
<td>Pressure: 14.7 PSI</td>
</tr>
</tbody>
</table>

| 1325014936405               |
| AIRFOIL, MXU-667A/B, W/COMPUTER CONTROL GROUP GUIDANCE |
| EA68                       |
| N61755 5066 TC06 XGX       |
| 853                        |
| 2005102                    |

6 pallets, 2 canisters per pallet

| 09511 Temp: 77.2 Condition Code:A |
| 09505 Temp: 77.2 Condition Code:A  |
| 09463 Temp: 76.0 Condition Code:A  |
| 09514 Temp: 76.0 Condition Code:A  |
| 09508 Temp: 79.9 Condition Code:A  |
| 09493 Temp: 79.9 Condition Code:A  |
| 09513 Temp: 77.1 Condition Code:A  |
| 09512 Temp: 77.1 Condition Code:A  |
| 09399 Temp: 77.1 Condition Code:A  |
| 09517 Temp: 77.1 Condition Code:A  |
| 09515 Temp: 77.3 Condition Code:A  |
| 09503 Temp: 77.3 Condition Code:A  |
Container ID: TGHU 202581-2
Date/Time (UTC): 17May05 16:00

Ship to: N61755 Pri:12
Ship from: W53XMD

STATUS
4/18/05 Shipped via rail from Crane, IN
4/24/05 Arrived at Concord. Awaiting xfer to ship
5/16/05 Container loaded on SS Cape Flattery for transport to Guam
5/17/05 Ship departed MOTCO

Container Temp: 75.0F
Pressure: 14.7 PSI

1325014936405
AIRFOIL, MXU-667A/B,W/COMPUTER CONTROL GROUP GUIDANCE
EA68
N61755 5066 TC06 XGX
853
2005102

6 pallets, 2 canisters per pallet

09511 Temp: 77.2 Condition Code: J
09505 Temp: 77.2 Condition Code: A
09463 Temp: 76.0 Condition Code: A
09514 Temp: 76.0 Condition Code: A
09508 Temp: 79.9 Condition Code: A
09493 Temp: 79.9 Condition Code: J
09513 Temp: 77.1 Condition Code: A
09512 Temp: 77.1 Condition Code: A
09399 Temp: 77.1 Condition Code: A
09517 Temp: 77.1 Condition Code: J
09515 Temp: 77.3 Condition Code: A
09503 Temp: 77.3 Condition Code: A
Direct Satellite Communications / GTN

Turbo Cads 2005
## Results

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Competitor 1</th>
<th>Competitor 2</th>
<th>CoBaLt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduce Infrastructure</td>
<td>Cannot Network</td>
<td>Cannot Network</td>
<td>Yes Networked</td>
</tr>
<tr>
<td>Record data sent &amp; received</td>
<td>No</td>
<td>Yes to container level</td>
<td>Yes to tag / pallet level</td>
</tr>
<tr>
<td>Store multiple ID’s at tag / pallet level</td>
<td>No – not a pallet level tag</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Integrate location with ITV systems (JTAV, GTN, IRRIS)</td>
<td>Partial visibility</td>
<td>Partial visibility</td>
<td>Yes</td>
</tr>
<tr>
<td>Response on demand</td>
<td>No</td>
<td>Only at container level</td>
<td>Yes</td>
</tr>
<tr>
<td>Re-tasking pallet level tag data</td>
<td>0%</td>
<td>0%</td>
<td>100%</td>
</tr>
</tbody>
</table>
Integrity Monitoring

USMC TRICON with prototype Integrated Sensor / RFID
Electronic Shelf Paper

IMI smartShelf™ Project

IMI smartController™

Battery

IMI smartShelf™

Bin Monitoring with Pick LEDs
Integrated Applications

- Integrated Totes/Pallets/Containers & RFID
- Embedded RFID Sensors in pallets / totes
- Networked devices
Unique Solutions
Shipping Containers

CoBaLt is the only solution!
Integrity / Condition / Identity
At an acceptable cost per trip
CoBaLt = $XX per trip
Competition = $XXX per trip*

* Source = CHCP Study
CoBaLt is the only solution!
Integrity / Condition / Identity
At the pallet level without infrastructure
Ability to dynamically retask
Unique Solutions
Unit Load Devices

CoBaLt is the best solution!
Integrity / Condition / Identity
At the material handling equipment level without infrastructure
Ability to manage dynamic warehouse inventory
Unique Solutions
Equipment Prognostics

CoBaLt is a unique solution!

Integrity / Condition / Identity

At the equipment level without infrastructure

Ability to manage dynamic inventory
Uniqueness

- With **Condition Based Logistics** Technology:
  
  Enterprises can **know**:  
  - Location of their entire supply chain – Total Asset Visibility  
  - Condition of their assets in-transit, in-storage, in-use  
  - Real time exceedance monitoring of critical parameters  
    - Temperature / Humidity / Pressure / Battery / Motion  
  
  Enterprises can **optimize**  
  - Transportation  
  - Distribution  
  
  Enterprises can **minimize**  
  - Labor  
  - Time  

- Result: Improved Performance: **Velocity & Cost**  
  - Shorter customer wait times  
  - Leaner supply chain  

**Technical Discriminators**

- Integrated Sensors  
- Addt’l Sensor Interface  
- Low Power  
- Controlled Network  
- Minimum Infrastructure  
- HERO Certified  
- Flexible Architecture