RFID & inflight equipment

- The Take-Off

TTS – Trolley Tracing System

Route map

• What? - Approach used by Airlines
• Why? - Benefits, Examples
• Status of pioneering systems
• Bigger Pictures
• Next Airline Approach
• Next Steps

outflight
Executive Summary

• RFID Trolley Tracking & Tracing Systems have been launched and operated for a period.

• The pioneering systems are inactive. After this ‘hype-curve’: take-off for RFID in airlines & equipment.

• Support by actors in the value chain:
  1. Lower RFID cost from RFID suppliers.
  2. Option: Data-by-the-dollar from “Service Managed RFID”.
  3. Users that can really integrate AIDC and IT with the business.

Examples

Reasons

Vision of future co-use of detection points

Coordination. Standardization.

Measure-to-manage. Strong, long-lasting KPI’s.
Example:

Gen I: ‘Semi-active’
- Commodity HF (3 m)
- Smashed!

Gen II: ‘RTLS’
- Proprietary 433 MHz (30 m)
- Cost?
Trolley, Contents & Smart Labels

Vitsab® Flight Label

Monitoring meals & cool chain on BA flights

Developed with British Airways

<table>
<thead>
<tr>
<th>Ex.</th>
<th>Smart labels found yellow on board</th>
</tr>
</thead>
<tbody>
<tr>
<td>LHR</td>
<td>0.43 %</td>
</tr>
<tr>
<td>LGW</td>
<td>1.19 %</td>
</tr>
</tbody>
</table>

Measure - to - Manage
Approach used by Airlines

50-90% = OK!

Data Collection:

100% Step-by-Step

50-90% = OK!

Measure - to - Manage

AC1

AC2

Stay - Out

eLSG (LH)

SAS

AF

KLM

Airline

‘Stand-Alone’

‘Service-Managed RFID’

Ownership:

‘Where & What’?

‘What’?

Track

Trace
Example: ‘ROI’

A conservative forecast:

<table>
<thead>
<tr>
<th>Improvement area</th>
<th>Est. saving / yr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inventory (~2%)</td>
<td>$280.000</td>
</tr>
<tr>
<td>Trucking (~20-50%)</td>
<td>$204.000</td>
</tr>
<tr>
<td>Shrinkage (~80%)</td>
<td>$213.000</td>
</tr>
<tr>
<td>Maintenance (2%)</td>
<td>$39.000</td>
</tr>
<tr>
<td>Inventory Count (100%)</td>
<td>$39.000</td>
</tr>
<tr>
<td>Total</td>
<td>$775.000</td>
</tr>
</tbody>
</table>

65 stns. x ~5 doors

<table>
<thead>
<tr>
<th>Costs</th>
<th>Qty.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tags</td>
<td>11,649 ea.</td>
</tr>
<tr>
<td>Readers</td>
<td>320 ea.</td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
<tr>
<td>Total Cost</td>
<td>$858,000</td>
</tr>
</tbody>
</table>

Payback 1.1 year

All members

Est. MUSD $470 / yr.

Track & Trace
+ Content, …

Incl. “Smart Labels”

But still: “Effort not justified by results”

“Effort not justified by results”

www.outflight.net
Example: ‘ROI’

The benefits from Trolley Tracing Systems has been in QUALITY PLUS initial and annual cost savings.

<table>
<thead>
<tr>
<th>Improvement area</th>
<th>Est. capital saving</th>
<th>Est. cost saving / yr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintenance (KLM, SAS)</td>
<td>€ 240.000</td>
<td>€ 330.000</td>
</tr>
<tr>
<td>Reduction US-time¹ (12 days)</td>
<td></td>
<td>€ 1.360.000</td>
</tr>
<tr>
<td>Reduction of trolleys (15%)</td>
<td></td>
<td>up to € 270.000</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>up to € 650.000</td>
</tr>
</tbody>
</table>

Ref. KLM: 80% reduction of crew complaints
Prevent & Preventive Maintenance

... after it’s fully implemented and tuned in (1-2 years) ...

SAS: Inventory 11.500 trolleys. 13.000 (!) RFID tags installed.

KLM: increased average trolley age to 13,4 years from ca 5-10

FAR / EASA Part 21: Company procedures for ‘release to install’.

But still: “Effort not justified by results”

www.outflight.net

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outflight.net
# Status Summary

<table>
<thead>
<tr>
<th>KLM</th>
<th>SAS</th>
<th>Air Canada</th>
<th>eLSGSkyChefs (Lufthansa)</th>
<th>(Air France), BA, …</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Status:</strong></td>
<td>Not operating</td>
<td>'Sleeping'</td>
<td>'Inactive - Detectors offline'</td>
<td>OPEN</td>
</tr>
</tbody>
</table>

All suffered from 9/11 and ‘inconsistent’ process management?

Pilots: Duty Free, Cool Chain

Data - by - the - Dollar

http://solutions.lsgskychefs.com
Bigger Pictures:

Status & Recommendations:

Hype Curve:

- Stay - Out
- Take - Off

Visibility

1995 2010

Plateau of Productivity

Sustainable Approach?

Issues:
1. Cost & Tech.
2. Ownership
3. Users

Lessons Learned

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Investments & Synergies

There will be investment in readers ...

Airlines and Airports:
Case studies: 79
Companies covered: 127
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... ‘Smart Airports’, Pax, Bags, Cargo, Spares, Equipment, Life Jackets
... Airbus - Boeing Global Aviation RFID Forum ... A/C turn-around ...

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+ Vision of Data Collection

In Aircraft Doors (open)

GateLink / DataLink:

‘All’ Airlines

Pax, Equipment, …
- visibility

‘All’ Airlines

Flight no. + Date = Track & Trace

All (open) A/C-doors are linked to provide a global view

Airport

Tags

Readers

Trolley inventory kitchen A

Trolley visibility

Trolley inventory Kitchen B

‘All’ catering stations linked to provide a global view

10 years? 20 years?

50-50 airlines / stn

100 stn’s / airline

100 stn’s / airline

‘All’ catering stations linked to provide a global view

100 stn’s / airline

100 stn’s / airline

TCT – Total Cycle Time

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Data Collection:

In Aircraft Doors (open)

Stay - Out

On Ground

Small, existing systems only

Airline ‘Stand-Alone’

Airlines do not care how we provide it – they just want to buy certain data – in order to manage and improve process and flow.

Examples:

‘Neutral’: SITA, IBM, Amadeus, CSC, Accenture, Sabre, ARINC, Kinetics, BT, etc.

Airbus, Boeing, …

‘Stake’: LSG, e-gatematrix, ...

‘Service-Managed RFID’

Track & Trace

Measure - to - Manage

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Support the take-off for RFID …

Sustainable approach:

Lower RFID cost from RFID suppliers.

Option: “Service Managed RFID”.

Users that can integrate IT with the business.

Standardize variations

Volume

… in the value chain …

Measure-to-manage. (Out-source). RFID to feed strong, contracted, long-lasting KPI’s.

<table>
<thead>
<tr>
<th>Standards</th>
<th>Chip design</th>
<th>Tags</th>
<th>Readers</th>
<th>Software</th>
<th>Distribution</th>
<th>System integration</th>
<th>Users</th>
</tr>
</thead>
</table>

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Next Steps (JAN07-)

Coordination

Inflight Initiative

Trolley
- Track
- Trace
- Content

Match Making
Implementation Plans
Standards
Type Trials
Feasibility Studies
Industry Business Case

Lessons Learned

Standardization

Aerospace & Defence

Summit 16-17JAN07 BRU, …

EPCglobal

Step by step
peter@outflight.net

… at your service.

Projects
Technology
Procurement

- Don’t get sucked in by the technology