RFID Composite Tracking & Tool Monitoring:
A&D Manufacturing Case Studies

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Agenda

- RFID A&D Deployments in 2012
- Why WIP Tracking is Different in A&D
- RFID in Composites Manufacturing
  - Sample Deployments
  - Process Walkthrough
- RFID for Tool/Tooling Tracking
  - Sample Deployments
  - Process Walkthrough
- Deployment Considerations
A&D RFID Deployments in 2012

• Tipping point for Complex Manufacturing
  – A&D inter facility assembly
  – Composite materials management – Tier 1 consolidation, defense cross-over
  – Indirect materials/tooling
  – Manufacturing budgets opening up – deferred projects back in play

• Multi-facility to enterprise projects
  – Multi-modal – Zebra agreement
  – Inter-facility transfers – high value assets
  – ATA Spec 2000 deadlines looming, adoption gaining traction (suppliers leveraging information)

• It’s all about Integration
  – RFID is the “common thread” betw disparate systems
  – Existing systems, existing processes – leveraging existing IT investment
WIP Tracking is Different in A&D

WIP Tracking with RFID Provides:
- Process automation
- Error-proofing
WIP Tracking is Different in A&D

- Multiple Geographies, MRO Facilities
- Materials Management Challenges
- Indirect Materials, High-Value Asset Tracking
- Inter-Facility/Out of Facility WIP
- Multiple Geographies, MRO Facilities
COMPOSITE MATERIALS
WIP Tracking – Composite Materials

- Inter-Facility/Out of Facility WIP
  - Multiple Geographies, MRO Facilities
- Tool Tracking
  - Indirect Materials, High-Value Asset Tracking
- Composites Manufacturing
  - Materials Management Challenges
Composite Materials in Commercial Aircraft

• Newer aircraft use 10x composite material

• 8000+ Airbus & Boeing aircraft to be built over next 5 years

Sources: PWC A&D Mfg Update, GKN Aerospace Briefing
RFID for Composite Materials Management

• High Investment in Equipment and Materials
• Perishable Material Tracking
• Quality Risk

GKN Aerospace set to become first UK user of AFP machine

16 March 2012 | By Stephen Harris

GKN Aerospace is to become the first UK-based user of a machine that can significantly speed up production of complex composite structures.

The National Composites Centre (NCC) in Bristol is hosting the UK’s first automatic fibre placement (AFP) machine with two robotic arms, which produces composites much faster than single machines or conventional hand-laying methods.

The £2.5m machine, supplied by French firm Composite Materials, was installed at the NCC research facility to enable companies to develop complex prototype structures and optimise manufacturing techniques before buying their own machines.

Rich Oldfield, GKN Aerospace’s technical director, told The Engineer that the machine allows multi-head deposition of material, which increases speed, flexibility and complexity for large composite parts where various integrated manufacturing techniques are required.
Composite Manufacturing Examples

**Material Tracking**

Tier 1 Supplier

- **Assets**: Composite prepreg through freezers and layup process
- **Auto-ID Integration**: RFID, Barcode with Solumina MMS
- **Metrics**: Reduction in scrap material, reduced schedule risk

**Indirect Material Tracking**

Multiple A&D Manufacturers

- **Assets**: Specialized tooling used for layup and curing processes- duty cycles
- **Auto-ID Integration**: RFID integrated with in-house systems, SAP ERP
- **Metrics**: Reduction in tooling costs, Reduced quality risk
Case Study: Composite Materials Management
Tier 1 Aircraft Supplier

**Tracking Prepreg Freezer Out Time w/RFID – Process Overview**

1. Material Arrives at Loading Dock & Encoded RFID Tags Are Attached to Each Roll
2. RFID Reader Logs Receipt of Prepreg Material, Starts Tracking Freezer Out Time
3. Track Material Status as it is Put In/Taken Out of Freezer
4. Out Time Elapses When Material is Out of Freezer
5. Once Material is Cured, Out Time is No Longer Tracked

Legend: RFID Read Point

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Tooling Tracking Examples

**Tool/Tooling Tracking**

Multiple Aerospace OEMs

- **Assets:** Specialized tools, right-to-use tooling across multiple facilities
- **Auto-ID Integration:** RFID, Barcode with Deltek Cost Point, SAP ERP
- **Metrics:** Improved utilization of specialized tools & equipment, Reduction in audit fines, Improved scheduling, Reduced tool inventory

**Indirect Material Tracking**

Multiple A&D Manufacturers

- **Assets:** Molds, jigs and conveyances associated with work orders
- **Auto-ID Integration:** RFID, RTLS integrated with in-house systems, SAP ERP
- **Metrics:** Reduction in tooling costs, Improved on-time delivery
Process Flow: Tooling Tracking

Check-in Check-out
Maintenance Mgt
Right to Use Tracking
EXAMPLE: AN RFID-ENABLED TOOL TRACKING PROCESS

ERP / Program Management System

- Get Work Order Details from ERP / MMS / MRO System
- Update with New Location Status
- Validate Against Maintenance Schedule
- Update Work Order Status

OAT Tool Tracking

- Get Specialized Tool Requirements & Location
- Check Out Tool at Store #3
- Read Tool Information
- Send Service Details

Alert!

Operator Feedback

Auto-ID Devices & Sensors

RTLS, Wi-Fi, Barcode, Active/Passive RFID, Stack Lights, Alarms…

Example Tool Tracking
DEPLOYMENT CONSIDERATIONS

1. Identify Process Areas
   • Work-in-Process
   • Inventory Control
   • Tooling
   • Logistics
   • Aftermarket Service

2. Quantify Value
   • As-Is Processes
   • Manual vs. Automated Process
   • Cost Reduction
   • Process Improvement
   • Quality/Safety

3. Define Solution
   • To-Be Process
   • Map Use Cases to Business Scenario
   • Solution
     o Software
     o Hardware
     o Integration

4. Deploy Solution
   • Define Project Timeline
   • By Process
   • By Facility
   • By Enterprise Solution

5. Measure Result
   • Gather Metrics
   • Evaluate Process Parameters
6 Keys to Successful Deployments

1. Tackling the Hard Problems First
   • High-Impact Use Cases
   • Measurable Outcomes

2. Aligning with Organizational Objectives
   • Operate within your limitations
   • Be prepared to be successful

3. Focusing on Process Automation & Cost Efficiencies
   • Real-time enabling error-prone process areas
   • Alignment with Six Sigma/Lean Initiatives

4. Leveraging Enterprise Systems
   • Enriching ERP, Project Management, WMS, Asset Management & MRO systems
   • Leverage Enterprise Systems Resources & Budget vs. Adding a new “RFID Line Item”

5. Leveraging Existing Software Platforms, Proven Use Cases
   • Don’t reinvent the wheel!
   • Much faster to test and deploy proven software than writing custom code

6. Building in Room for Growth
   • If you’re successful, you’ll be asked to do more
   • Think ahead and deploy a solution that can scale and evolve easily
   • Select a platform with broad device support
Deployment Guide, A&D WIP Poster
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Thank You