RFID JOURNAL DIGITAL SUMMIT

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Using RFID to Manufacture/Track Composite Aerostructures

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Agenda

- How Aerospace Manufacturing is Changing – Supplier Dynamics, Composites
- Approach for RFID Deployment
- Lessons Learned, Recommendations

How Aerospace Manufacturing is Changing

- New Technologies from Defense Industry driving growth in Commercial Aviation
  - Composite Manufacturing
  - Engine Efficiency
  - Manufacturing Processes
- More Complex Manufacturing leading to Supplier Consolidation
  - From Metal Fabrication to Composite Aerostructures Expertise

Approach for

Deployment

Steps to Implement RFID

- Step 1 - Establish business case and secure executive sponsorship
  - Automation required to meet production levels for growth programs
- Step 2 - Design and execute a pilot project
  - Assemble a cross functional team and technology partners
    - Various points of view on usability, system & process integration
  - Prove out technology
  - Pilot conducted for freezer material out-time tracking
  - Pilot success was demonstrated in a real-world manufacturing situation
- Step 3 - Deploy for actual production use
  - Facility Rollout
  - Mapping to visual factory use cases, metrics
- Step 4 - Build out capabilities
  - Use the infrastructure and knowledge to gain more business benefit

Step 1 - RFID Project Business Case

- The business objectives of the facility-wide RFID project are all related to measurable operational efficiency:
- Automate composite material, tooling and work-in-process tracking, enabling greater manufacturing efficiency and throughput to meet aggressive delivery timelines for the end product
- Automate tool and part data capture in machine processes where possible to minimize manual data entry and improve documentation and traceability
- Improve asset utilization by increased accuracy of tool, part and material inventory tracking
- Improve manufacturing process tracking and product quality to ensure customer satisfaction

Step 2 Pilot - RFID for Composite Material Tracking

Initial Challenges to be Addressed with RFID:

Current method of tracking Tooling, Equipment, Materials and Parts through production is labor intensive and has a low fidelity of true item location. These inaccuracies result in additional work for production and support groups.

RFID Pilot Project Scope:

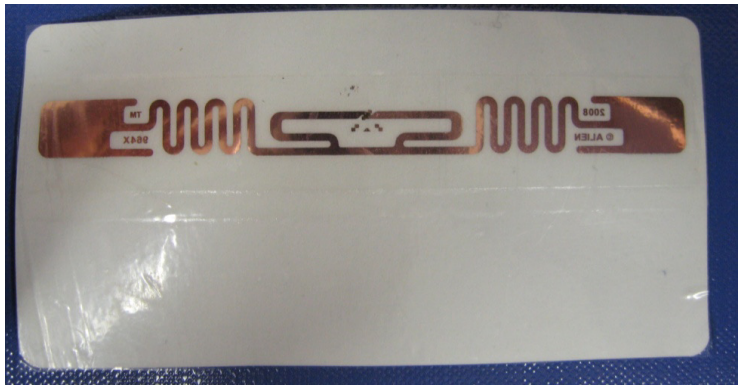
Freezer Out-Time Tracking for Composite Material

Project Components:

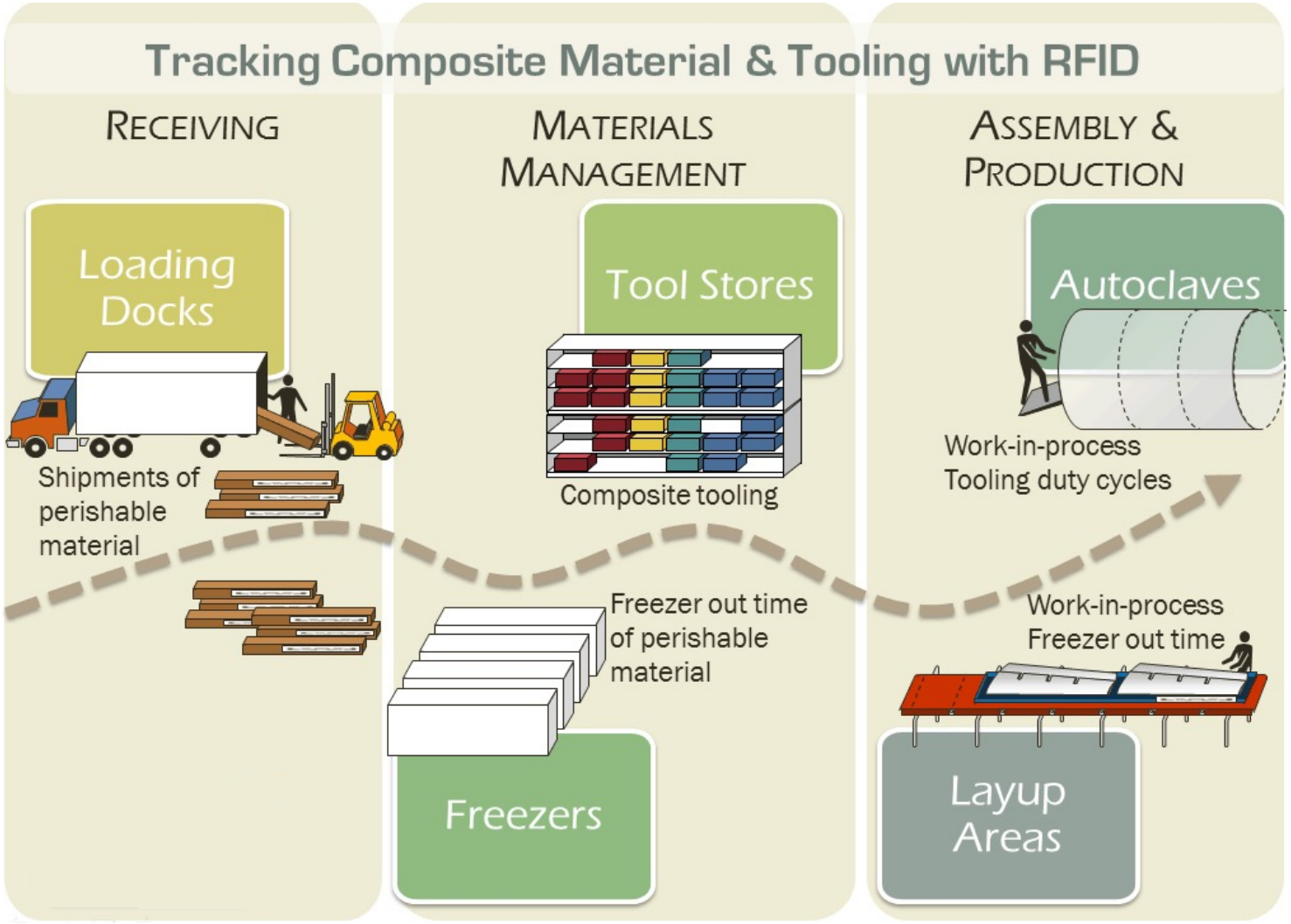
- Systems Integration: OATSystems.
- RFID Software: OAT Foundation Suite, OAT Asset
- Enterprise Systems: MES and Shop Floor Control
- Hardware: Impinj Readers with Additional Antennas
- Tags: Alien Squiggle Labels

Milestone / Deliverable	Date
PO for System scope finalization workshop	
Scope finalized and PO release	
Hardware testing complete (SRR)	
System operational	

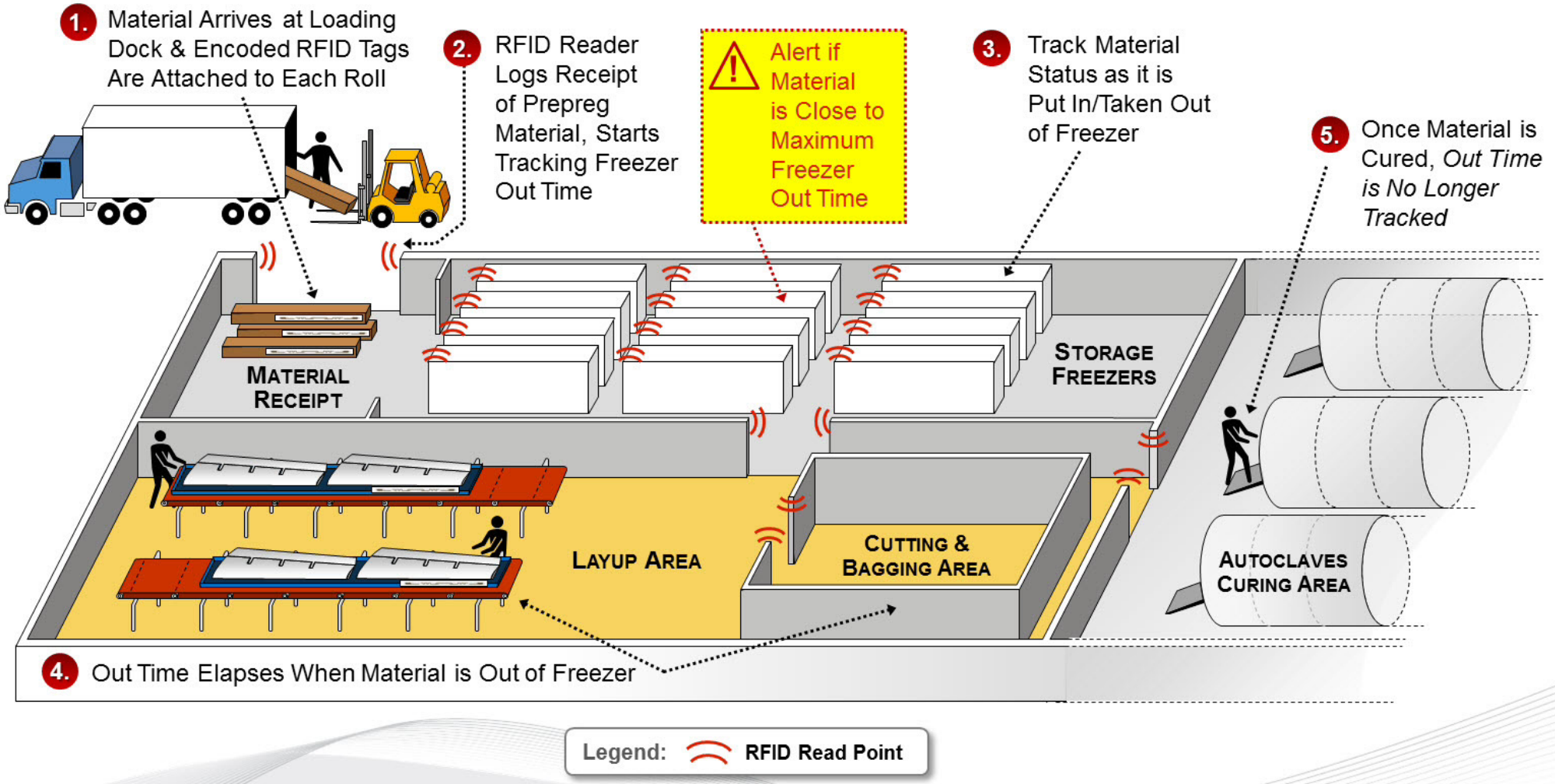
Step 2 Pilot - Tag and Reader Examples



Step 3 - RFID Deployed into Production



Step 3 - Tracking Composite Material with RFID



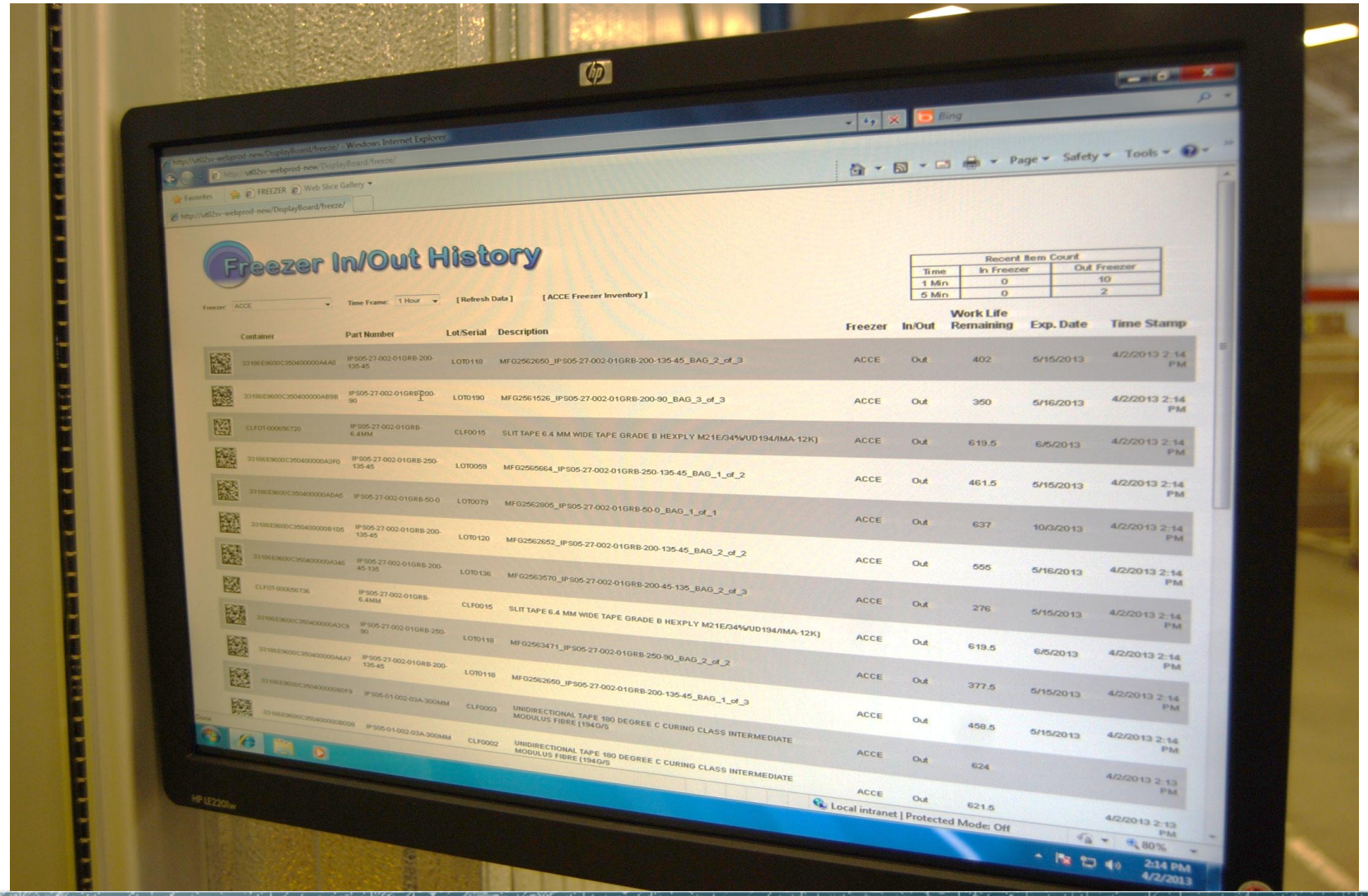
Step 3 – Components Deployed

OAT Foundation Suite

- OAT Foundation Suite Software
- OAT Asset Tracking Software
- Integration with (MES), (ERP), Reporting Systems, (Asset Management)
- 115 Impinj Speedway R420 FCC 4port Readers
- 460 Impinj Far Field Antennas
- 15 Zebra RZ400 - 200dpi printers
- 7 Motorola MC 9090Z Handhelds
- Alien 4x4 squiggle labels with AS3 freezer grade adhesive for freezer tracking
- Xerafy Micro II High-Temperature Tags for autoclave tracking

Step 3 - RFID : Process Areas (Freezer)

Step 3 – RFID: Monitor/Control



Step 3 - RFID : Results

- Automated tracking of composite material, tooling and work-in-process =
  - ✓ Improved manufacturing efficiency and throughput to meet aggressive delivery timelines
  - ✓ Enabling staff to focus on value-added activities vs. locating tools, materials and recipes
  - ✓ Improved traceability and documentation
  - ✓ Reduced waste
  - ✓ Customer satisfaction from improved process tracking and product quality
  - ✓ Increased asset utilization

Step 4 - Build Out Capabilities

- **Integrate even more with Visual Factory – Human Machine Interface (HMI)**
  - Manufacturing Work Order – Auto Open
  - Machine/Part – Forming instructions/recipes
  - Tool tracking
- **Provision RFID for new programs and facilities**
- **Vendor/Supplier integration**
  - Tagging parts/materials when shipped from vendor location
  - Outside services
    - Machining, Plating, Heat Treatment etc.

RFID Deployment Lessons Learned

- Tag selection takes time
  - There are many different tag designs, shapes, chips and each has different strengths and weaknesses. Additionally, most tags are made to order and not stocked. When defining your business case, make sure you give sufficient time to test multiple tags and then place an order for the tags to be made.
- Tag location and placement on tracked assets matter
  - Conductive material are very effective at blocking/reflecting radio frequency energy. The placement of the tag on the asset that is being tracked will be very critical if 100% read rates are desired.
- Place Reader/Antenna so they do not interfere with operations
  - The size and placement of the antenna needs to be taken into consideration when the work cell is being designed. The baseline antenna used for the demo program are ~10” x 10” and extend from the wall 4-6”. Make sure there is room in the work cell for proper antenna placement without interfering with the process.
- Integrating into your enterprise system can be complex
  - Up front planning for new or changes in the technical approach as well as associated integration/interfaces with your enterprise system is a key component. The Auto-ID system will have to adapt to work with the existing enterprise system(s). This adds complexity and cost to the Auto-ID system.

RFID Recommendations

- Have a formalized partner selection process
  - Utilize internal project requirements/SOW
  - Vendor demonstrated compliance to requirements
  - Identify existing customers and solutions
  - Turnkey solution
  - Establish prioritized/weighted scoring/selection criteria
- Vendor Selection

Discussion/Questions

Reference/Contact Information

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THANK YOU

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