Group A

RFID & Information Architecture for Remote Logistics

Group Leader
Dr. Olivier deWeck, MIT

Group Facilitator
William A. (Andy) Evans, USA [SOLE]

Group Scribe
Mr. Xin (Mike) Li, MIT
ISS Inventory Management

- Barcode-based (manual) system
- Inventory Management System (IMS)

Communication occurs via Radio Frequency (RF) and is relayed through the RF Access Point located in the LAB.
What is RFID?

- Radio Frequency Identification
- System to read active/passive tags
- Automated asset tracking
Session Overview

- RFID & Information Architecture for Remote Logistics
  - A discussion of the development of interfaces to an open systems architecture to provide asset visibility, accountability and other utility in remote logistics operations.

- Breakout Session Goals
  - Identify and define the impact of topics related to RFID & Information Architecture on the three different types of exploration missions

- Breakout Session Organization
  - Brainstorm important topics
  - Pick the “top 3” issues/topics and discuss the Predicted Impact, Potential Mitigation, Testing Methods, Impact on Other Systems, and recommendation(s) relevant to each mission type
Discussion Points

- **Sensor technology**
  - RFID
  - UID
  - Combination

- **Modular Open Systems Architecture**
  - Middleware
  - Logistics Management System

- **Utility**
  - Asset Visibility
  - Accountability
  - Spatial Orientation
  - Maintenance
EPCglobal Architecture

Layer 4 – App/Solutions
- Real Time Enterprise/Point Apps
- Batch Oriented Enterprise Apps

Layer 3 – Services
- Open, standard based interfaces
- Product Info Resolution Look-up
- Business Process Mgmt
- Analytics, Reports and Notifications
- Enterprise Content Solutions

Layer 2 – Event Mgmt
- Events and Workflow Management
- Events, Messages, Business Rules

Layer 1 – Data Collection & Mgmt
- Data Collection and Management
- Collection, Storage, Smoothing, Filtering, Aggregation

Layer 0 – Devices
- Device Interfaces, Management
- RFID Readers
- Barcode Scanners
- 802.1X APs
- Pocket PC
- Handheld Terminals
- Others
Issues

Common to all Missions

1. Issue: **Criteria for Tagging/Tracking (what and when)**
   - Predicted Impact: Total Asset Visibility, High Costs
   - Potential Mitigation: Increased Inventory, more crew time, large logistics footprint
   - Testing Methods: Pilot projects, Flight Test, Simulation Models
   - Impact on Other Systems: Standardization, Interoperability, Compatibility
   - Potential Solution(s): RFID/UID/Smart Tags/Middleware/Integrated Database/Open Architecture

2. Issue: **Design of Middleware**
   - Predicted Impact: Balanced Information Flow, Data Filtering
   - Potential Mitigation: Decision Support Information, Alerts/Messages
   - Testing Methods: Real RFID Data Analysis
   - Impact on Other Systems: Interoperability, Standardization
   - Potential Solution(s): Solution Vendors

3. Issue: **Durability**
   - Predicted Impact: System Robustness, High Costs
   - Potential Mitigation: Increased Reliability, Lower Maintenance Cost
   - Testing Methods: Tag/Reader Lab Durability Test, Flight Test, Simulation Models
   - Impact on Other Systems:
   - Potential Solution(s): Designed package
4. **Issue: Package vs Cost vs Reliability**
   - Better designed package to increase tag readability
   - Potential Mitigation:
     - Testing Methods: Make recommendation about RFID friendly package design and work with Space supply vendors
   - Predicted Impact: Increased Robustness, Increased Costs
   - Potential Solution(s): Package Design Recommendations

5. **Issue: Reliability / Robustness**
   - Predicted Impact: Increased Costs, System Robustness
   - Potential Mitigation: Built-in Redundancy to increase robustness, supporting both Bar code and RFID Tags, Data Inconsistency
   - Testing Methods: Pilot Projects
   - Impact on Other Systems:
   - Potential Solution(s):
6. Issue: **Human Systems Integration**
   - Improve business process to reduce human factor errors
   - Look at 10-15 years horizon to incorporate active tags, Robotic solutions
   - Well-organized grouping/Procedure Design
   Predicted Impact: Improved operation efficiency, More/less crew time
   Potential Mitigation: Retraining crew for standard procedures
   Testing Methods: Simulations, Pilot Projects
   Impact on Other Systems: Integrated Database
   Potential Solution(s):

7. Issue: **Smart Tags**
   - what data to store/where to store/Limited data bandwith for downlink and uplink
   Predicted Impact: Increased information availability and accuracy, Costs
   Potential Mitigation: Balanced of number of smart tags and data storage
   Testing Methods: Pilot projects and Bandwidth analysis
   Impact on Other Systems: High requirement for Integrated Database/Service Oriented Architecture, Smart data integration capability, Data cache management
   Potential Solution(s): Multiview of data
8. Issue: **Integrated Database/Open Architecture**
   - Consolidate inventory databases, User friendly,
   - Predicted Impact: Increased operation efficiency, reduced costs
   - Potential Mitigation: Data belong to different organization, Standard data dictionary
   - Testing Methods: Develop Database and test for different use cases
   - Impact on Other Systems: Middleware, Open architecture
   - Potential Solution(s):

9. Issue: **Standards**
   - Predicted Impact: Information Exchangeable, Reduced implementation costs
   - Potential Mitigation: Many parties are involved, hard to come
   - Testing Methods:
   - Impact on Other Systems:
   - Potential Solution(s):

10. Issue: **Criticality Analysis**
    - Identify critical space supply for tracking
    - Predicted Impact: If we track everything, system may overloaded.
    - Potential Mitigation:
    - Testing Methods: Pilots and experiment and data analysis, Interviews
    - Impact on Other Systems:
    - Potential Solution(s):
# Issues vs Scenarios

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**High – Medium – Low**