RFID & UID Compliancy: SAP and Lockheed Martin working together

Magnus Bjorendahl  SAP
Mark Roddy  SAP
Brian Quinn  Lockheed Martin
Companies Are Trying Hard and Have Made Progress

**What are we doing better?**

- Streamlined processes using Lean and Six Sigma
- Technology and data management has improved
- Centralized planning across Enterprise using ERP

**What can still be improved?**

- The data is too inaccurate and unreliable leading to incorrect decisions
- Information is distributed too late leading to incorrect decisions or even no decision
- Technology such as RFID and UID is “promising”

Despite turbulence around supply chain management, companies in the United States have been extremely successful in streamlining their supply chains.

**Inventory-to-sales ratio in the U.S.**

Source: U.S. Department of Commerce
UID & RFID: Where are they taking us?

UID Compliancy across your organization

Take RFID and AIT beyond compliancy

Lockheed Martin and SAP working together to pave the road of the future
UID – A globally unique identifier

Enterprise Identifier
Original Part Number
+ Serial Number

= Unique Item Identifier*

Data Carrier
(2D Data Matrix)

= IUID

Key attributes
- Global serialization
- Accurate data capture
- Interoperability

UID is the foundation for leveraging cross-functional, cross system, and cross partner synergies.
IUID Enables Traceability of an Item Throughout Its Lifecycle within the DoD Inventory System

Traceability will lead to smarter decisions and thereby cost savings.
# Removal of “Bad Actor” Reparable Parts

## U.S. DoD Business Case: Removal of “Bad Actor” Reparable Parts

<table>
<thead>
<tr>
<th>Estimated amount of “Bad Actors”</th>
<th>0.50%</th>
<th>Estimated by U.S. DoD IUID Program Office Staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumed Depot Labor Resources</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depot Workload: Communications-electronics (C-E) equipment</td>
<td>4,596,000 hours</td>
<td>Cited in Depot Maintenance Strategic Plan, Part II; February 23, 2007.</td>
</tr>
<tr>
<td>Depot Workload: Support Equipment</td>
<td>1,217,000 hours</td>
<td></td>
</tr>
<tr>
<td>Cost to repair &quot;Bad Actors&quot; Communications-electronics</td>
<td>$3,332,100</td>
<td></td>
</tr>
<tr>
<td>Cost to repair &quot;Bad Actors&quot; Support Equipment</td>
<td>$882,325</td>
<td></td>
</tr>
<tr>
<td><strong>Total Cost to repair &quot;Bad Actors&quot;</strong></td>
<td><strong>$4,214,425</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Logistics Costs associated with &quot;Bad Actors&quot;</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estimated Number of “Bad Actors”</td>
<td>7,266</td>
<td>Based on 4 hour bench check time per item</td>
</tr>
<tr>
<td>Estimated Logistics Costs per “Bad Actor”</td>
<td>$4,000</td>
<td>Estimate based on storage, handling, transportation, &amp; packaging costs</td>
</tr>
<tr>
<td><strong>Total Logistics Costs for &quot;Bad Actors&quot;</strong></td>
<td><strong>$29,064,000</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Total Business Case</strong></td>
<td><strong>$33,278,425</strong> per year</td>
<td></td>
</tr>
</tbody>
</table>

Having a holistic solution for tracking and managing UID items will save lots of money
Radio Frequency Identification Technology

Key attributes
- Accurate data
- Real-time data
- More data points

IT IS ALL ABOUT THE DATA!
According to current DoD Policy, RFID tags that carry data are required to be attached to packages at multiple levels, including item packages, cases, and pallets. Unique Identifiers are required to be attached or directly marked on items using a data matrix to carry the UID data elements.
Evolution of the Adaptive Enterprise

**PLAN**
- Plan and re-plan resource needs based on business objectives

**SENSE**
- Sense and alert in real time the deviations caused by internal and external events

**EXECUTE**
- Execute plan based on available supply chain network resource capability

**RESPOND**
- Collaborate and Respond to internal and external deviations across the extended network

**LEARN**
- Continually learn from exceptions and incorporate knowledge into business processes

**VISIBILITY**
UID & RFID: Where are they taking us?

UID Compliancy Now

Take RFID and AIT beyond compliancy

Lockheed Martin and SAP working together to pave the road of the future
Lockheed Martin I-GUIDES™ introduction

Lockheed Martin’s proven software for UID compliancy
- Lockheed Martin’s proven system integration with the best hardware, barcode, and verification teams in the industry
- Developed by a team that must deliver UID product, we do not just sell it we live it, guaranteed to be compliant.
- Lockheed Martin has more developers and produces more software in a given year than Microsoft.

Award Winning
- SSCI has selected I-GUIDES™ for its excellence award in 2005
- One of only 19 CMMI level 5 software companies in the world for quality process.

Customer Base
- I-GUIDES™ is currently owned by 6 of the top 10 defense contractors.
- DoD customers include USMC, SOCOM, US Navy, and US ARMY.
  - NMCI Compliant

Why the SAP and Lockheed Partnership?
- Lockheed Martin brings DoD capabilities and knowledge of intricate DoD processes
- SAP is the leader in Data Management and resource planning

The complimentary team enables compliancy for the customer in a world class solution set.
## Key Components of I-GUIDES™

- **Create UIDs** (Web user interface, batch files (.txt, xls, .xml), web services)
- **Drive marking devices** to mark parts (Hardware Agnostic)
- **Capture Validation/Verification results**
- **Data Management capabilities** – Interfaces to legacy and enterprise systems
- **Register UIDs** to the UID registry and sustains parent child updates as well supporting the UID throughout the product lifecycle

<table>
<thead>
<tr>
<th>Create the UID</th>
<th>Drives Marking of the UID</th>
<th>Capture Verification of the UID</th>
<th>Manage the Data of the UID</th>
<th>Register the UID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Builds Syntax</td>
<td>Dot Peen</td>
<td>Fix Mount</td>
<td>Parent Child</td>
<td>Valid Registration</td>
</tr>
<tr>
<td>Ensures Uniqueness</td>
<td>Lasers</td>
<td>Hand Held</td>
<td>Virtual/Legacy</td>
<td>File Transfer to Prime</td>
</tr>
<tr>
<td>Validates Requirements</td>
<td>Printers Ink Jet</td>
<td>In - Line</td>
<td>PIPC</td>
<td>Manages UID Updates</td>
</tr>
</tbody>
</table>
Environments within I-GUIDES™

- Environment is a user group, program, site, supplier, customer whatever you want to segregate, but all environments are under one instance of I-GUIDES™
- Any project or group can have a customized environment.
- Any number of environments with any number of users, all controlled by a single instance of I-GUIDES™ software.
- Used by sites, departments, projects, or any other grouping.

Program Sample using environments as processes
Working with other databases

Custom fields will relate UIDs to key fields in your legacy systems.

I-GUIDES™ database

<table>
<thead>
<tr>
<th>UID</th>
<th>DoD fields</th>
<th>Ship</th>
<th>Contr</th>
<th>Eng</th>
<th>Qual</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Protocols

- Text (.txt)
- Excel (.xls)
- Xml (.xml)

Communication methods

- FTP, SFTP
- Web Services

Implementation UID without modification of legacy systems
The I-GUIDES™ Application is one installation in a Web Environment. I-GUIDES™ can interface directly with current marking carts. I-GUIDES™ can also run installed on the marking cart or connect to the global install of I-GUIDES™.

Using **I-GUIDES™ templates on the handheld** can allow users to collect legacy marking data to create, validate and mark UID’s. The data can be transmitted to the cart via docking or wirelessly.
UID & RFID: Where are they taking us?

UID Compliancy across your organization

Take RFID and AIT beyond compliancy

Lockheed Martin and SAP working together to pave the road of the future
SAP is a Pioneer in RFID & Auto-ID Technologies

1998 Research Begins
SAP Corporate Research begins work with RFID

1999 Join MIT Auto-ID
Founding member of MIT Auto-ID center (now called EPC Global)
First DEMO at SAPPHIRE in Philadelphia

2001 All Dev. Begins
SAP Auto-ID Infrastructure development begins

2002 / 2003 Early Pilots & RFID Middleware
- P&G and Metro Pilots (Shelf / future store)
- Fraport RFID Asset Management Pilot enabled SAP Mobile Infrastructure
- Created SAP RFID Customer council and ASUG exec exchange
- Global Auto-ID customer survey (>400 respondents)
- Wall Street Journal Award for Metro Superstore Project

2005+ RFID Enabled Business Processes Delivered
- RFID Solution Package for Logistics and Enterprise Asset Management delivered
- First item level tagging effort in the world at Purdue Pharma
- 250+ Customers signed for SAP RFID solution worldwide
- RFID Scenarios in over 18 industries, in 17 countries
- Several pilot projects on sensors and sensor networks
- Analysts / Customers rank SAP RFID at the top

© SAP AG 2004, 17

THE BEST-RUN BUSINESSES RUN SAP
### SAP Solutions for RFID

<table>
<thead>
<tr>
<th>Delivery Processing</th>
<th>Inbound Processing and Goods Receipt</th>
<th>Outbound Processing and Goods Issue</th>
<th>Integrated Inbound and Outbound Processing</th>
<th>Slap &amp; Ship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lifecycle Tracking and Identification</td>
<td>Returnable Transport Items</td>
<td>KANBAN</td>
<td>Stock Count</td>
<td>Item Unique Identification</td>
</tr>
<tr>
<td>Product Tracking and Authentication</td>
<td>Tag Tracking</td>
<td>Product Track and Trace</td>
<td>Product Authentication</td>
<td></td>
</tr>
<tr>
<td>RFID Intelligence</td>
<td>Operational Reporting</td>
<td>Business Analytics</td>
<td>Object Event Repository</td>
<td></td>
</tr>
<tr>
<td>Device Integration</td>
<td>Device Management</td>
<td>Device Controller</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hardware</td>
<td>Tags</td>
<td>Readers</td>
<td>Printers</td>
<td>Sensors</td>
</tr>
</tbody>
</table>

Wide range of SAP’s processes and operations enabled by RFID
Pratt and Whitney using SAP for RFID DoD Compliance

By using SAP RFID technology, Pratt & Whitney has implemented DoD RFID compliance as an integrated solution with their SAP ERP implementation.

Go-Live: January 2007

Using SAP RFID to reach RFID DoD Compliance

- SAP RFID implementation with SAP ERP integration
- Item Pack / Carton / Pallet tagging and packing
- Go-Live day:
  - 136 RFID labels generated
  - 9 WAWF transmissions to the DOD with RFID data
  - 1 WAWF DOD acceptance transmission
Inbound Processing

A&D MANUFACTURER / SUPPLIER

Receive Goods

Scan EPCs
Check Authenticity
And Consistency

Feedback

Receive Multi level Handling Unit

Register EPC & UIDs

SAP ERP

Serial No (UID Items)

Delivery

Replenishment

Purchase Order (external) / Stock Transport Order (internal)

Advance Shipment Notice

Proof of Delivery

CUSTOMER
New RFID based Inbound Logistics solution

- LEAN principles drove design, e.g. re-engineering 3 separate receiving processes into 1
- Automating goods receipt based on ASN and RFID reads
- Separating exceptions for manual processing
- Integrating SAP ERP, SAP AII, GlobeRanger device management, Alien antennas, PLC controllers, Zebra RFID printers, and Intermec Handhelds

SAP RFID streamlines and automates logistics processes and integrates with U.S. Navy supply chain applications, legacy systems and WAWF system

Go-Live: March 2006
Significant cost savings and performance improvements have been measured.

<table>
<thead>
<tr>
<th>KPIs</th>
<th>Baseline</th>
<th>BRE Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Issue Customer Wait Time</td>
<td>7.91 Days</td>
<td>5.45 Days</td>
</tr>
<tr>
<td>Receipt to Stow Time</td>
<td>4.76 Days</td>
<td>1.56 Days</td>
</tr>
<tr>
<td>Inventory Effectiveness</td>
<td>Net: 88.16%</td>
<td>Net: 91.72%</td>
</tr>
<tr>
<td></td>
<td>Gross: 75.55%</td>
<td>Gross: 82.29%</td>
</tr>
</tbody>
</table>

*Data: September 2006 – January 2007*
SAP OER makes the data come alive

- SAP Object Event Repository (OER)
- AUTO-ID Repository
- Event Management Analytics
- Security Services

Processes:
- Manufacturing
- Distribution
- Depot
- Edge Server

Platform:
- Product Tracking & Authentication
- Supply Chain Visibility & Analytics
- UID Management
- PARTNERS

SAP Object Event Repository (OER) Query Interface

© SAP AG 2004, 24
SAP OER makes the data come alive

**Product Authentication and Tracking**
- Tracking products across supply chain in multiple level hierarchy (pallet, case, item, UID)
- Traceability of all events related to any object
- Automated authentication to prevent counterfeit
- Alert for unexpected events
SAP OER makes the data come alive

Supply Chain Visibility & Analytics
- Measure cycle times and movements across Locations and within Location
- Measure and detect trends early
- Measure read rates to find technical challenges
- etc…

Processes
- Product Tracking & Authentication
- Supply Chain Visibility & Analytics
- UID Mgmt

Platform
- SAP Object Event Repository (OER)

AUTO-ID Repository
Event Management Analytics
Security Services

QUERY INTERFACE

PARTNERS
SAP OER makes the data come alive

Future Focus
An interactive UID Registry

Processes
Platform

SAP Object Event Repository (OER)

QUERY INTERFACE

AUTO-ID Repository
Event Management Analytics
Security Services

PARTNERS

© SAP AG 2004, 27
UID & RFID: Where are they taking us?

UID Compliancy across your organization

Take RFID and AIT beyond compliancy

Lockheed Martin and SAP working together to pave the road of the future
SAP and Lockheed Martin Join Forces

**Solution Capabilities**
- Side-by-side solution
  - I-GUIDES - UID Compliance certified with SAP
  - SAP AII - RFID Compliance and Logistics
- Integration services for implementation and deployment of solutions
- Serves both SAP and non-SAP customers

**Phase 2**
- Single, integrated application offered by Lockheed Martin and SAP on NetWeaver platform
  - Provides for full SAP ERP integration
  - Integration services
Phase 1: SAP and Lockheed Martin teamed to enable UID and RFID Compliancy

RFID and UID Compliance Suite

RFID Compliancy & Logistics
- Auto-ID Infrastructure*

UID Compliancy
- I-GUIDES

SAP Business Process Platform

SAP Applications
- ERP

Other Solutions
- WAWF and UID registry
- Legacy systems

Certified with NetWeaver in 2007

* SAP Auto-ID Infrastructure is compatible with non-SAP applications as well

UID and RFID Compliance TODAY!
Phase 2: The joint RFID/UID Solution
Product alignment and integration on NetWeaver platform

Single RFID/UID Solution
- UID generation
- Parts Marking and Validation
- WAWF and UID registry integration
- Logistics with RFID and UID

SAP Business Process Platform
SAP Applications
- UID enhancements (EhP 3)
- ERP
- All

Other Solutions
- I-GUIDES
- WAWF and UID registry
- Legacy Systems

The UID RFID Compliancy Solution Become Part of the NetWeaver Platform.
Candidate Solution ROI Targets

- Tracking and eliminating “bad actors”
- Warranty enforcement
- Supporting Performance-Based Logistics contracts
- Facilitating LEAN Business Process Reengineering
- Inventory management and forecasting
- Budget justification
- Contingency and deployment planning

All of the above are more effective when you know any and all items’ pedigree, location, current status, and event history
Key Take Aways

- UID and RFID technologies have matured to the point where, working together, these technologies CAN provide true total asset visibility

- SAP and Lockheed Martin have recognized that potential

- We have a plan and a roadmap and are jointly working to fully exploit these technologies and provide better support across the extended Defense supply chain

But more importantly, together we will all enhance logistics support to our warfighters
SAP & Lockheed Martin Partnership – Point of Contacts

**SAP POCs**

Program Management RFID in A&D/DoD  
Stephen Cloughley – 267-312-0326  
stephen.cloughley@sap.com

Business Development DoD  
Mark Roddy - 703 459-4919  
mark.roddy@sap.com

Business Development A&D  
Joel Hall - 703-966-4945  
joel.hall@sap.com

A&D Partner Manager  
Magnus Bjorendahl – 610-741-8663  
magnus.bjorendahl@sap.com

**Lockheed Martin POCs**

Program Management  
Richard Erickson – 651-456-2450  
richard.a.erickson@lmco.com

Business Development  
Brian Quinn – 727-415-9732  
brian.quinn@lmco.com

www.I-GUIDES.com
RFID & UID Compliancy: SAP and Lockheed Martin working together

Magnus Bjorendahl  
Mark Roddy  
Brian Quinn  

SAP  
SAP  
Lockheed Martin