Radio Frequency Identification (RFID)
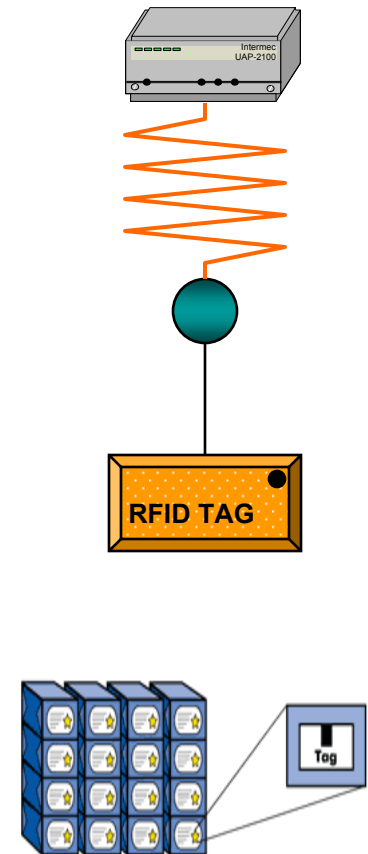

Radio Frequency Identification to Enable the Supply Chain
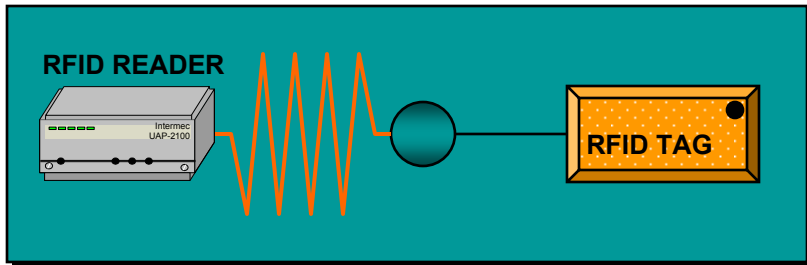
August 30-31, 2005

What is RFID?

- **RFID technology is a means of identifying a unique object or a person using a radio frequency transmission**

- **RFID tags can be programmed to receive, store and transmit information such as serial numbers, place of assembly or personal information such as healthcare records.**

RFID Technology and Tag Basics

RFID Systems have three main components:

- The RFID **tag** with its own data, functions and physical characteristics

- The **reader** (fixed or portable) and **antennae** with their own functions and physical characteristics

- The **host** with its own hardware, functions and pre-defined tasks

Tags have three components (see diagram) and come in three types:

- Active tags

- Passive tags

- Semi-passive tags

RFID tags are made up of three parts:

1) **Chip**: holds information about the physical object to which the tag is attached.

2) **Antenna**: transmits information to a reader (e.g., handheld, warehouse portal, store shelf) using radio waves.

3) **Packaging**: encases the chip and antenna so that tag can be attached to physical object.

Passive RFID: Reading Tags

RFID READER

Intermec
UAP-2100

RFID TAG

The reader/antenna calls out with a radio wave looking for a tag embedded on an object.

RFID READER

ePC

Intermec
UAP-2100
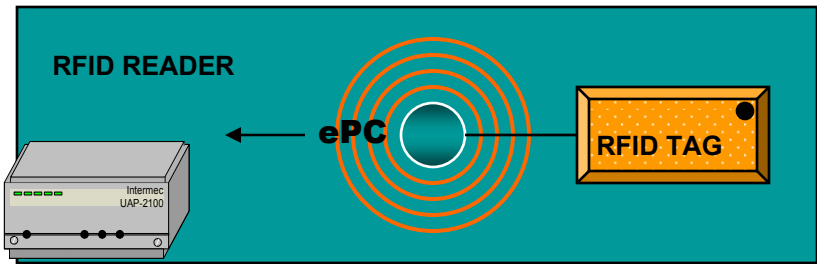
RFID TAG

The tag sends back its RFID tag ID.
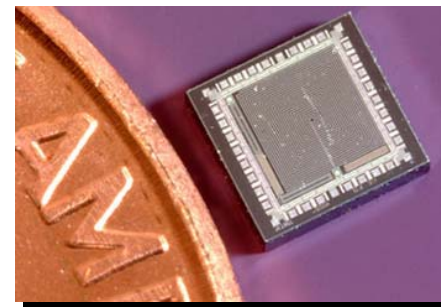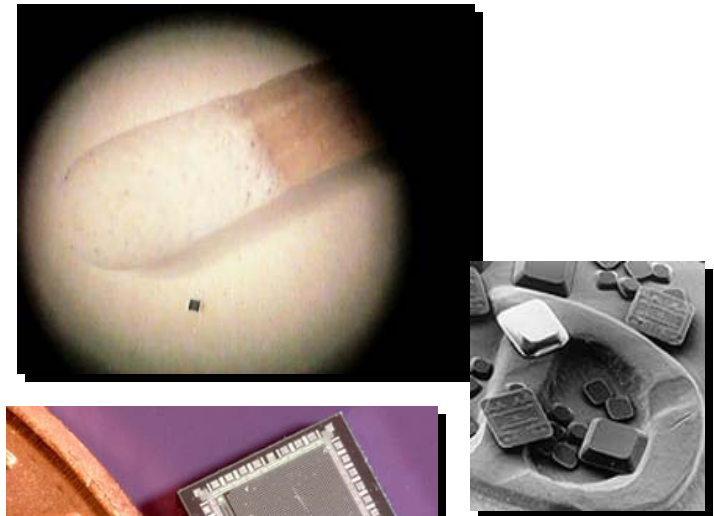
Putting RFID chips in perspective

Unlike barcode technology, no line of sight is required because readers and tags communicate via radio frequency.

The RFID Vision

Implement knowledge-enabled logistics through fully automated visibility and management of assets in support of the warfighter

The Benefits of RFID for DoD

RFID allows:

- No line-of-site/hands-free data capture
- Reduction in human intervention

Resulting in Improved:

- In-transit and asset visibility
- Timeliness and accuracy of shipping, receiving, and transportation
- Flexibility and confidence in the DoD Supply Chain

AND ultimately improved support to the warfighter

An Enabler to the Integrated DoD Supply Chain

Cases/Pallets are labeled with passive RFID tags. Cases are associated to pallet

Cases/Pallets are read as they are received and **new shipments are labeled**. Orders are verified for accuracy

Cases/Pallets are associated with **Active RFID** to provide TAV.

The **cases/pallets are automatically received** with few disputes and info is shared with the AISs. Reconfigured shipments receive a new RFID Tag.
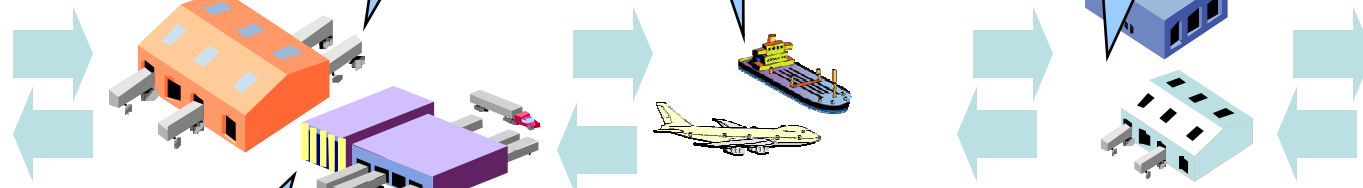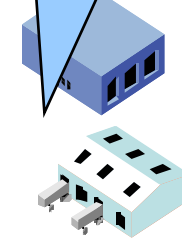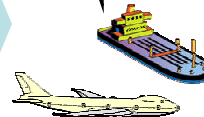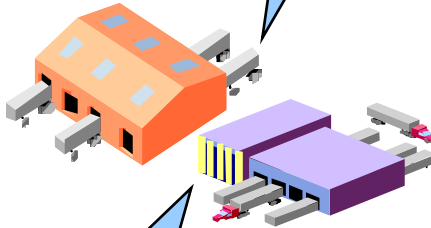
Manufacturers/ Suppliers

Distribution Centers/Depots/TDCs

Commercial /Military Carriers

TMO/Supply/ Theater Depots

Customer
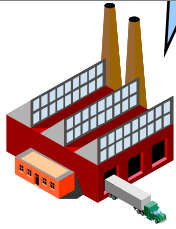
Timely and Accurate Data

When shipments are reconfigured a new RFID Tag is created for the pallet and associated with cases on that pallet

Data is timely and accurate via network of linked readers allowing asset visibility along the entire supply chain

Customers have visibility of requisitions and **are confident** in the status provided by the system

RFID Scope/Standards

Active RFID – freight containers, air pallets, large engine containers

- *SAVI 433 Mhz readers*
- *SAVI tags*
- *DoD tag data formats*
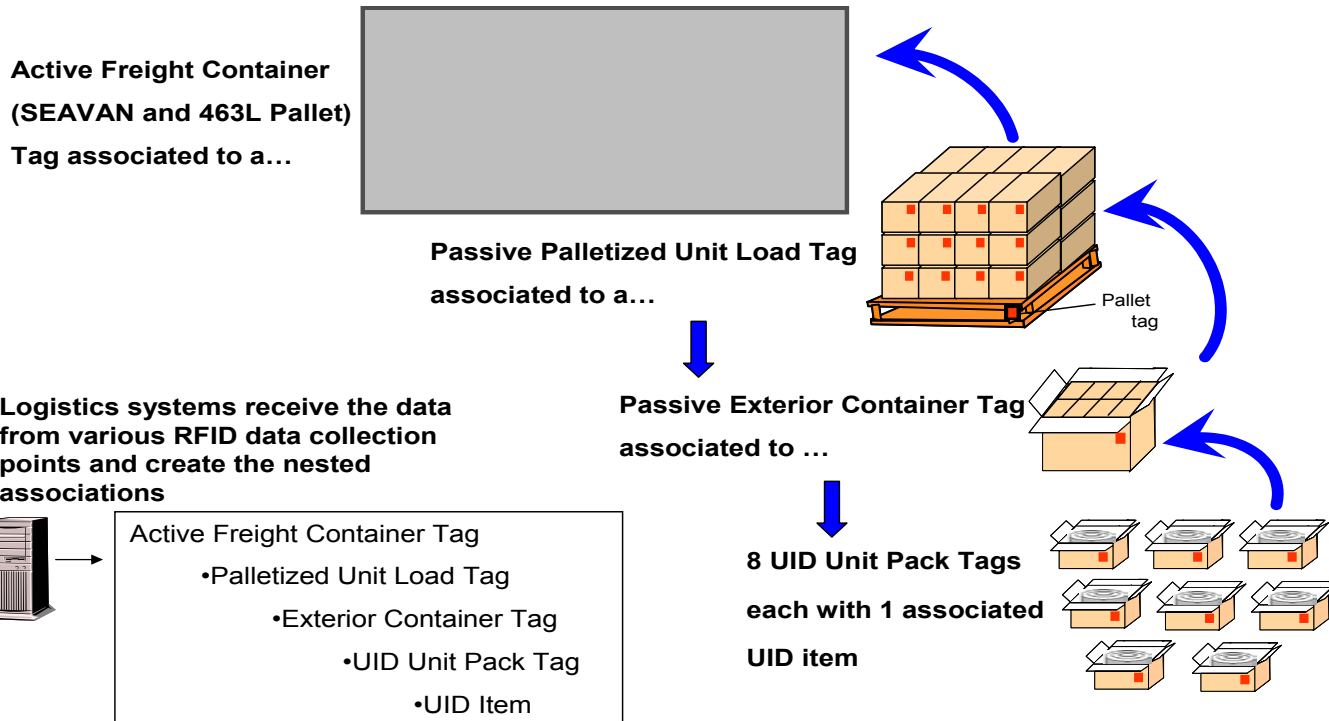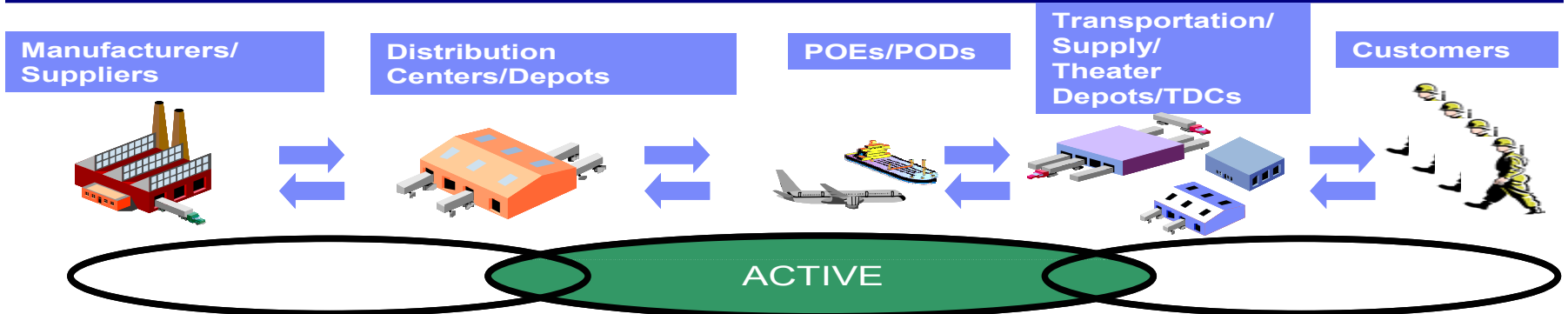- *Suppliers rarely obligated to apply tags*

Passive RFID – case & pallet (all items), item packaging (UID items)

- *EPC std UHF readers*
- *EPC Class 0 & 1 std tags*
  - *Migration to EPC UHF Generation 2 std*
- *EPC and DoD tag data formats*
- *Suppliers will be contractually obligated to apply tags*
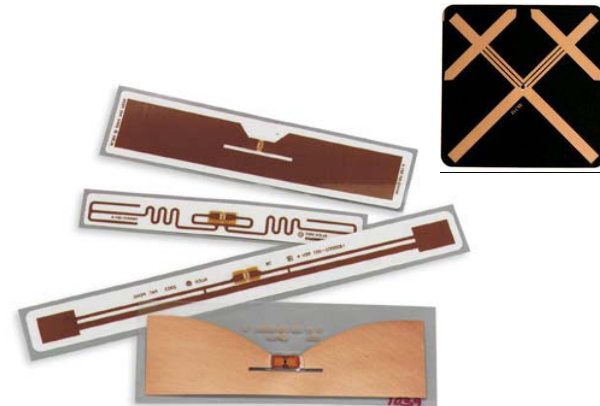
Active RFID, Passive EPC RFID, and UID Items in the DoD Supply Chain

Manufacturers/ Suppliers	Distribution Centers/Depots	POEs/PODs	Transportation/ Supply/ Theater Depots/TDCs	Customers

ACTIVE

Active Freight Container

(SEAVAN and 463L Pallet)

Tag associated to a…

Passive Palletized Unit Load Tag

associated to a…

Pallet tag

Logistics systems receive the data from various RFID data collection points and create the nested associations

Passive Exterior Container Tag

associated to …

Active Freight Container Tag
- Palletized Unit Load Tag
  - Exterior Container Tag
    - UID Unit Pack Tag
      - UID Item

8 UID Unit Pack Tags

each with 1 associated

UID item

Where we are…Active RFID

♦ **Institutionalizing Active RFID**

- – Doctrine – Update regulations, doctrine, on RFID use

- – Data – Ensuring that the accurate data is "burned" on tags

- – Training – Incorporate this in classroom training and development handbooks for field use

- – Return/Reuse – Improve return/reuse of active tags

♦ **System Integration**

- – Regional Server Web Sites Provide "Near Real Time" Visibility of Movements at/through Nodal Sites

- – Incorporate the capture and use within DoD systems

Where we are…
Passive EPC RFID

- ◆ **DoD issued policy July 30, 2004**

- ◆ **Current status (focus on supplier inbound compliance)**
  - – DFARS public comment period closed June 27, 2005
  - – Two key depots for implementation are operational
  - – RFID data requirements have been incorporated into Wide Area Workflow (WAWF)
  - – Volunteer RFID tagged shipments are being processed

- ◆ **Status internal to DoD**
  - – Remaining distribution centers by Jan 2006
  - – Key USTRANSCOM aerial ports in 2006
  - – Implement initial RFID related data architecture
  - – Incorporate passive RFID capabilities to the last tactical mile

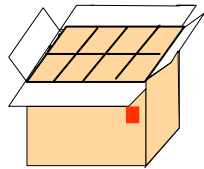# Implementation Plan: Level of Packaging
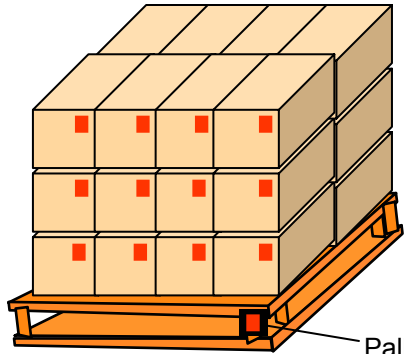
Palletized Unit Load Tag
YES – **January 1, 2005 - 2006**

Pallet tag

Exterior Container
YES – **January 1, 2005 - 2006**

Shipping Container
YES – **January 1, 2005 - 2006**
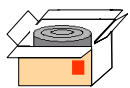
UID Item Unit Pack*
No – **January 1, 2005 - 2006**
YES – **January 1, 2007**

*If the UID Packaging is also an External Container or a Shipping Container, it will have an RFID tag.

Implementation Plan: Commodities

Commencing January 1, 2005

- **Class I Subclass – Packaged Operational Rations & Packaged Food**
- **Class II – Clothing, Individual Equipment, Tools, & Administrative Supplies**
- **Class VI – Personal Demand Items**
- **Class IX – Repair Parts & Components**

Commencing January 1, 2006

- **Class I – Subsistence & Gratuitous Health & Comfort Items**
- **Class III – Packaged Petroleum, Lubricants, Oils, Preservatives, Chemicals & Additives**
- **Class IV – Construction & Barrier Equipment**
- **Class V – Ammunition of all types**
- **Class VII – Major End Items**
- **Class VIII – Medical Materials (Includes Pharmaceuticals)**

Passive RFID Implementation Plan for DoD Suppliers

January 1, 2005

Classes of Supply:

- II, VI, IX, I (PORs/MREs)

Level of Tagging:

- Shipping Containers
- Palletized Unit Loads
- Exterior Containers

Ship to locations:

- San Joaquin
- Susquehanna

January 1, 2006

Classes of Supply:

- Begin Additional Classes (decision pending)

Level of Tagging:

- Shipping Containers
- Palletized Unit Loads
- Exterior Containers

Ship to locations:

- CONUS DLA Depots
- TRANSCOM Facilities
- Service Maintenance Facilities (decision pending)

January 1, 2007

Classes of Supply:

- All Classes

Level of Tagging:

- Shipping Containers
- Palletized Unit Loads
- Exterior Containers
- UID Item Unit Pack

Ship to locations:

- All Locations

Gen 2 phased in

Key Operational Passive RFID Sites

- Distribution Centers at Susquehanna PA and San Joaquin CA

- Fleet and Industrial Supply Center Ocean Terminal in Norfolk VA

- 2nd Force Service Support Group at Camp Lejeune NC

- In progress….shipments between operating units in Iraq

Year in Review…..

DLA Distribution Centers & TRANSCOM Facilities

- Outfitted Defense Distribution Center San Joquain, CA (DDJC) and Defense Distribution Center Susquehanna, PA (DDSP) with passive RFID infrastructure (Jan 2005)

- Have begun process for instrumenting remaining CONUS DLA distribution centers (14) (Jan 2006)

- TRANSCOM has committed to instrumenting three major aerial ports (Jan 2006)

✓ Data read and filtered through RFID Middleware.

✓ Tag data is received in a database within DSS

DSS

RFID Middle-ware

Tag Data

Tag Data

Tag Data

✓ Tag ID passed through integration software to DSS

✓ Read EPC Class 0 and 1 tags
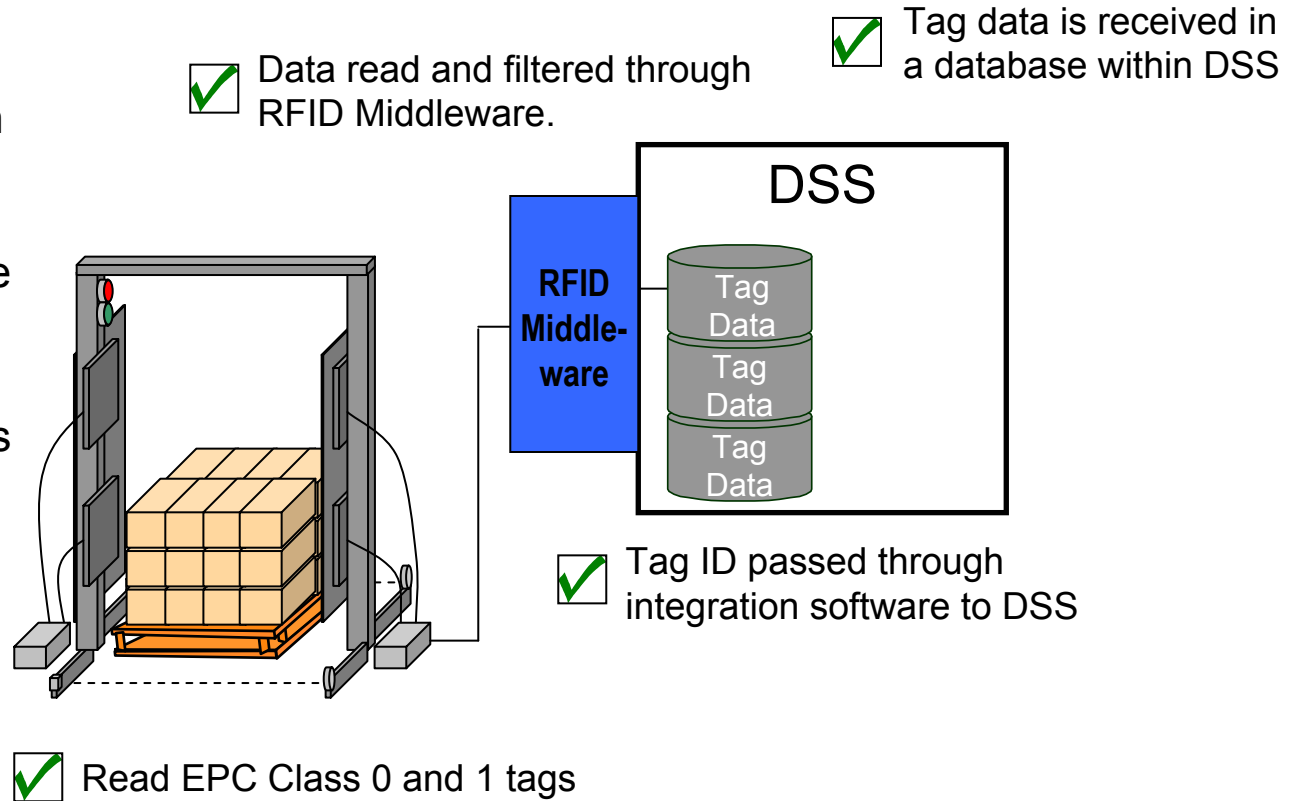
Defense Federal Acquisition Regulation
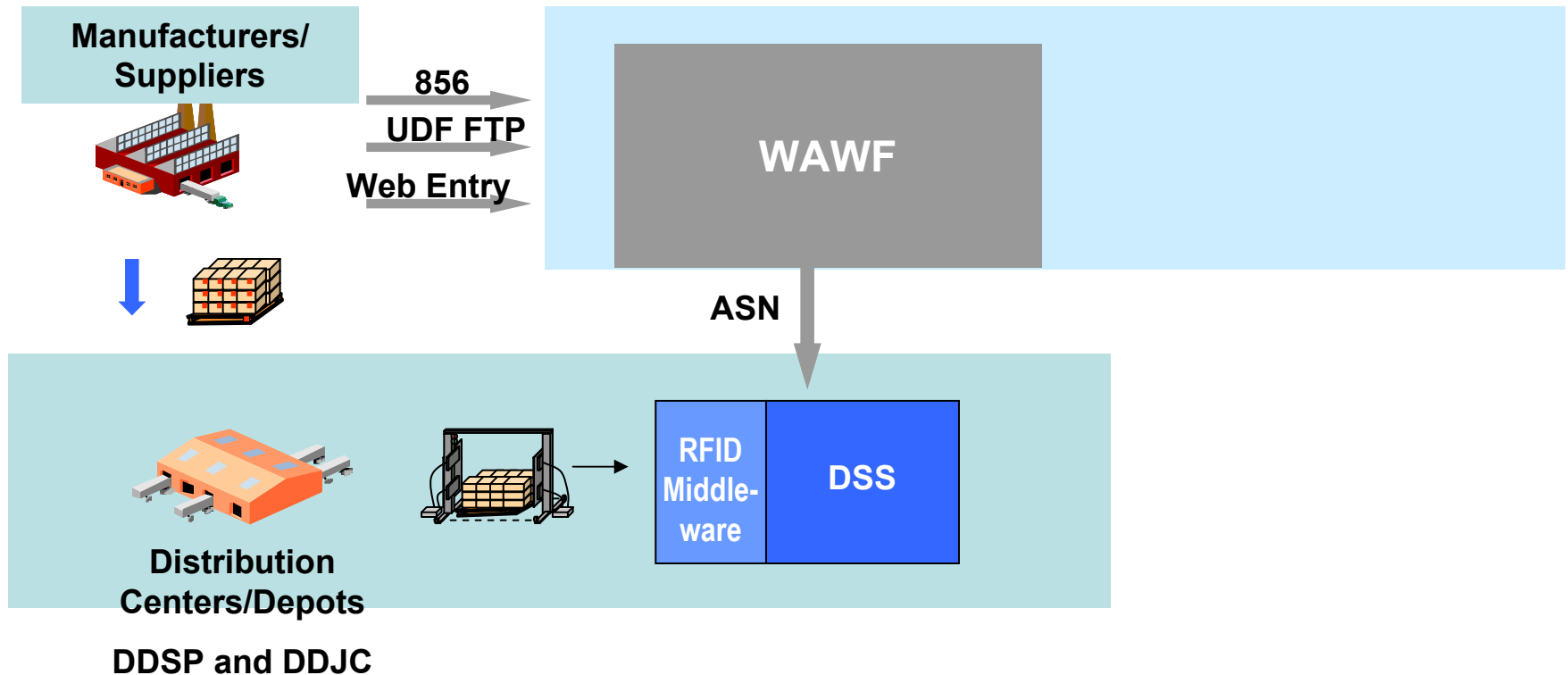
- Published proposed rule in Federal Register (Apr 2005)

- Public comment period ended (Jun 2005)

- Comments review/answered and appropriate documents updated (Aug 2005)

- Awaiting publication of Final Rule (August 2005)

RFID Data Flow Architecture

- A Joint Team (DAASC, DLMSO, DLA, TRANSCOM, ADUSD SCI) have developed an architecture for the transfer of RFID data throughout the existing enterprise systems.

- Variable length transaction records have been defined to allow for RFID information to be sent in standard ANSI X12 formats as part of the DLMS migration.

Manufacturers/ Suppliers

856
UDF FTP
Web Entry

WAWF

ASN

Distribution Centers/Depots

DDSP and DDJC

RFID Middle-ware

DSS

PTAC Training

- ◆ ADUSD SCI established a formal agreement with the Procurement Technical Assistance Centers (PTAC) to provide RFID training/outreach to the DoD supplier community.

- ◆ ADUSD SCI developed "Train-the-Trainer" material and presented this information in one day workshops with 14 regional workshops

- ◆ PTACs will now develop and deliver RFID assistance via a variety of mediums
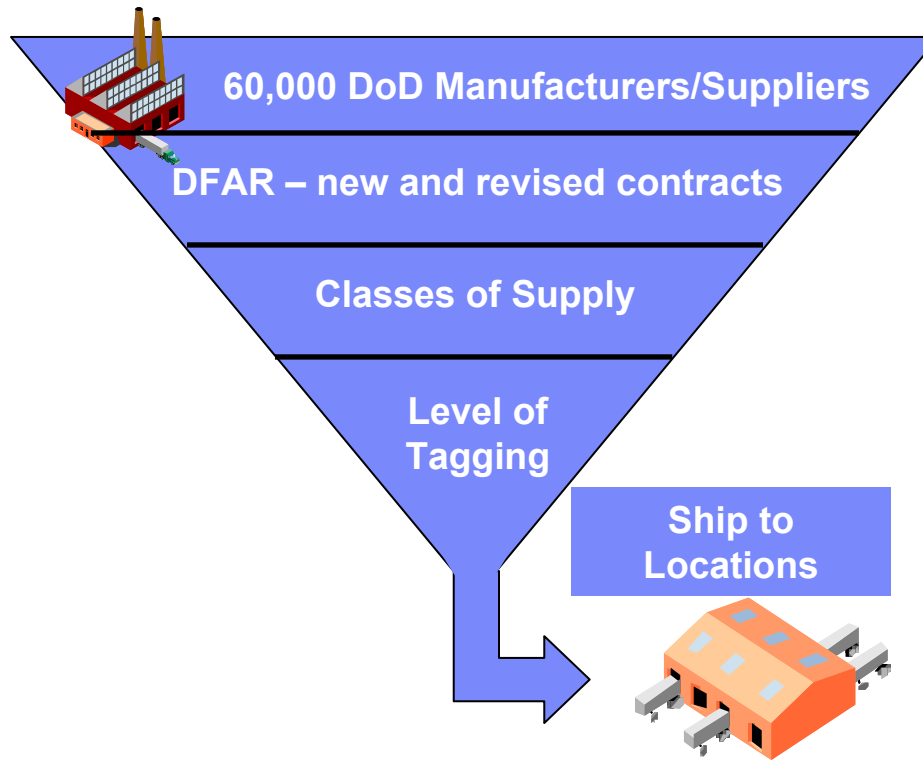
EPCglobal

- ♦ DoD has worked closely with EPCglobal over the past year
  - – DoD serves as a liason to the Board of Directors
  - – Representation on the Software Action Group

- ♦ EPCglobal ratified the DoD Tag Construct as part of the Tag Data Standard v. 1.2.7

- ♦ DoD will continue to work with EPCglobal through the recently established Aerospace & Defense working group

Future DFAR Requirements

- ♦ Began developing DFAR clause for 2006 implementation plan
- ♦ Targeted commodities being considered are:
  - Class III – Packaged Petroleum
  - Class IV – Construction/Barrier Equipment
  - Class VIII – Medical/Surgical Equipment (not Pharmaceuticals)

60,000 DoD Manufacturers/Suppliers

DFAR – new and revised contracts

Classes of Supply

Level of Tagging

Ship to Locations

January 1, 2006

Classes of Supply:

- Class III, Class IV, Class VIII (partial)

Level of Tagging:

- Shipping Containers, Palletized Unit Loads, Exterior Containers

Ship to locations:

- Strategic CONUS DLA Depots, TRANSCOM Facilities & Service Maintenance Facilities

Coordinating RFID use across the Federal Government

♦ **Established the Intra-Governmental working group on passive RFID**

- Representatives from 30+ federal agencies
- Goal is for federal agencies to share their plans for use of RFID in order for there to be synergy across the various agencies
- Four subcommittees:
  - Policy
  - Applications
  - Security
  - Privacy

Additional Internal Accomplishments

- Completed an initial Business Case Analysis (BCA) which shows a positive ROI for the use of passive RFID within DoD

- Military Services and DoD Agencies provided initial drafts of their RFID implementation plans. Final plans will be complete in late September 2005.

- "Lessons Learned" report is being written that compiles key findings from initial implementations that were completed in 2004-2005.

- USMC is beginning to use passive RFID in CENTCOM for asset tracking in "last tactical mile."

Way Ahead

- ◆ Publish the final DFARS rule for passive RFID

- ◆ Continue to provide education and outreach to the acquisition community (external and internal)

- ◆ Continue working with the Services and Agencies on the DoD internal rollout for passive RFID

- ◆ Perform safety certification testing (HERO, HERF) for passive RFID

- ◆ Receive and ship tagged materiel

- ◆ Determine Gen 2 implementation timeline

For Your Information

♦ For further information that can assist you with compliance, visit: http://www.dodrfid.org

  – DoD RFID Policy

  – DoD RFID Supplier Implementation Plan

  – DoD Suppliers' Passive RFID Information Guide

  – MIL-STD 129P(3) (Updated with RFID changes)

  – Wide Area Workflow (WAWF) Implementation Guides

  – Frequently Asked Questions (FAQ)

  – Lessons Learned

  – Schedule of RFID Events where DoD RFID personnel will be speaking

♦ You can ask the team any RFID-related question through the following email address: info@dodrfid.org

DLA RFID Volunteer Suppliers

DLA Suppliers can volunteer to send RFID tagged material and associated transactions. Any agreement will be strictly voluntary with no contractual obligation or compliance enforcement requirements.

- Contact the DLA point of contact at ddc.rfid@ddc.dla.mil with the following information: name, title, organization, email, phone, anticipated date of shipment and shipment location (Susquehanna or San Joaquin). Contact info@dodrfid.org if you have DoD RFID questions.

- Comply with the latest version of the DoD Suppliers' Passive Information Guide found at www.dodrfid.org/supplierguide.htm . Specifically, ensure compliance with the approved tag classes, the tag placement and the tag data constructs.

- Construct an EDI Advance Ship Notice (ASN) that includes RFID data in accordance with the WAWF Implementation Guides found at www.dodrfid.org/wawfguides.htm . The DLA point of contact will provide specific instructions regarding the transmission of your RFID transaction.

- The DLA point of contact will respond to your email with additional instructions for sending the material and transferring data.

UID vs RFID

	UID	RFID
Marking	Item	Packaging
Technology	2D Data Matrix	EPC RFID tag
Purpose	Life cycle data visibility	Supply chain receipt/track
Threshold	>$5000, some exceptions	NONE
Implementation	January 1, 2004	January 1, 2005

Separate but integrated initiatives
Different technologies
Different business rules

Don't get stuck in the box

"I think the industry has sold itself on a program that offers so little return that it simply won't be worth the trouble and expense."

A Midwestern Grocery Chain Executive discussing the potential of the barcode in 1975*

*"Scanning Hits a Snag," Progressive Grocer, December 1975, p. 47

QUESTIONS???